

**GROUND WATER INVESTIGATION
REPORT**

**THE CEDAR BAY COGENERATION
PROJECT**



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1.0 INTRODUCTION

AES Cedar Bay, Inc. and Seminole Kraft Corporation are proposing to construct and operate the Cedar Bay Cogeneration Project as an integrated power complex to be built on an existing industrial site in Jacksonville, Florida (Figure 1-1). The cogeneration plant will produce 225 MW of electricity for sale to Florida Power and Light Company (FP&L) as well as process steam for sale to the adjacent Seminole Kraft Corporation paper mill. The project also includes installation of a new kraft recovery boiler system required to modernize the paper mill and reduce odor emissions.

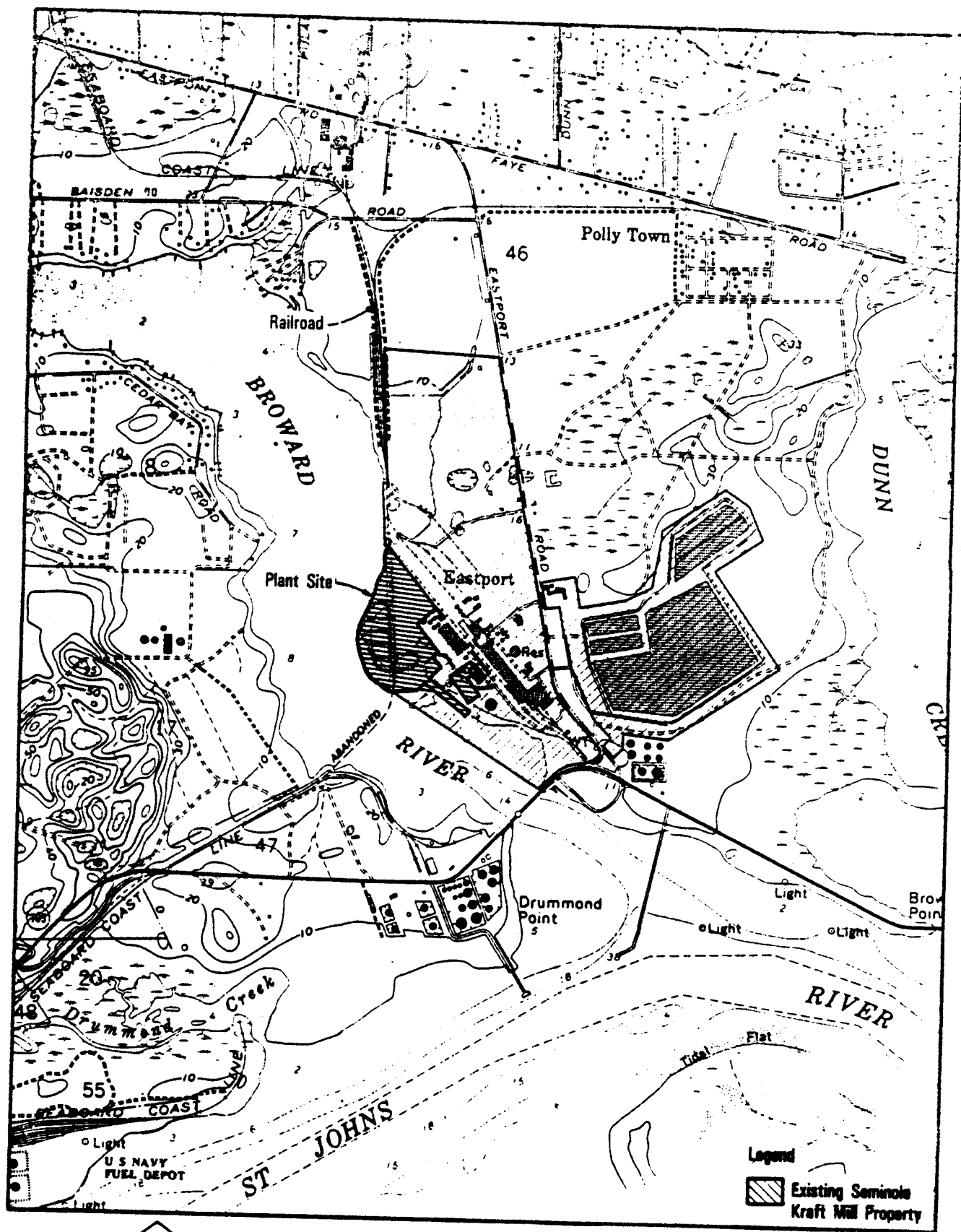
Ground water consumption at the site will be increased from the current average mill consumption of 19.5 million gallons per day (mgd) up to an average of 25 mgd. The current Seminole Kraft Corporation permit allows withdrawal of 25 mgd. The increase is required for the circulating water makeup, cycle makeup, and other miscellaneous plant uses. Ground water will be withdrawn from the existing Seminole Kraft wells in the upper and middle water-bearing units of the Floridan Aquifer. No new wells will be drilled.

This report presents the results of the hydrogeologic investigation of the Floridan Aquifer at the Cedar Bay Cogeneration Project site and surrounding area.

1.1 EXECUTIVE SUMMARY

The hydrogeologic investigation of the Floridan Aquifer at the Cedar Bay Cogeneration Project site included compiling and reviewing existing data, performing a field aquifer testing and sampling program, and using the field data to model the response of the Floridan Aquifer to 40 years of additional pumping at the site.

The data collected in the field investigation were used to generate existing piezometric surface and chloride concentration maps. In comparison of these maps to historical data, it is apparent that site conditions



SITE LOCATION
Figure 1-1

have not significantly changed in the past 27 years of pumping at the Seminole Kraft mill.

The USGS flow and transport models, MODFLOW and MOC, approved by the St. Johns River water, were used to simulate the effects of pumping on water level elevations and water quality for the upper water-bearing zone of the Floridan Aquifer. The flow and transport models were calibrated to the site and run for a background case and three pumping rates.

A background case was modeled to determine projected chloride concentrations within the study area. This case was run for 40 years assuming no ground water withdrawal from any of the Seminole Kraft mill wells. The regional reduction in the piezometric surface of the Floridan Aquifer permits increased flow from the high chloride content lower water-bearing zone of the Floridan Aquifer to the middle and upper water-bearing zones. The projected increase in chloride concentrations at the Seminole Kraft mill site attributable to 40 years of offsite ground water withdrawals is 5 mg/l.

The first case simulated the current average daily pumping rate, 19.5 mgd, at the Seminole Kraft mill. The results of the flow model showed that the drawdown at the wells and in the surrounding area is approximately the same as the existing conditions, signifying steady-state has been achieved at the site. The chloride concentration is projected to increase 1 mg/l (1 percent of the drinking water quality standards) over the background case, for a total increase of 6 mg/l over a 40-year pumping period.

The second case simulates the anticipated long-term pumping rate or the average combined daily pumping rate of the Seminole Kraft mill and the Cedar Bay Cogeneration Project for a total of 25 mgd. This is also equal to the peak pumping rate of the Seminole Kraft mill alone. The results of the flow and transport model, for the 40-year pumping period, for this case indicate that the drawdown at the well field will increase approximately 1.5 feet. The model conservatively estimates a drawdown of 0.6 foot 1 mile from the well field even though pump tests showed no drawdown at adjacent wells within the Seminole Kraft well field. Projected chloride concentrations will increase 1 mg/l (1 percent of the drinking water quality

standards) over the Seminole Kraft average pumping conditions, or 7 mg/l total. Therefore, the additional 5.5 mgd required by the Cedar Bay Cogeneration Project will have minimal effect on chloride concentration after 40 years of pumping.

The last case simulated the maximum combined daily pumping rate of the Seminole Kraft mill (25 mgd) and the Cedar Bay Cogeneration Project (7 mgd) for a total of 32 mgd for the 40-year pumping period. This case assumes a combination of maximum instantaneous withdrawals occurring continuously, and, therefore, is extremely conservative. The anticipated actual flows will average only 78 percent of these maximums. The results of the flow and transport models indicate that the drawdown at the well field will increase approximately 3.4 feet and the chloride concentration will increase 7 mg/l above current conditions. This contributes an additional 1 mg/l (1 percent of the drinking water standards) for this very conservative case, over the maximum Seminole Kraft mill pumping rates.

In conclusion, the results of the modeling effort indicate that continued pumping at the Seminole Kraft well field will not decrease water levels or increase chloride concentrations any significant amount in the upper water-bearing zone, and that the additional water supply required for the Cedar Bay Cogeneration Project will have minimal effect on the well field and surrounding area.

2.0 REGIONAL SETTING

2.1 PHYSIOGRAPHY

Jacksonville, Florida, is within the northern or Proximal physiographic zone, typified by continuous high ground between the Gulf Coastal lowlands and Eastern Valley (Figures 2-1 and 2-2). The site is marginally between the St. Mary's Meander Plain and Eastern Valley. The Broward River and the St. Johns River form western and southern site boundaries and are subject to tidal fluctuations.

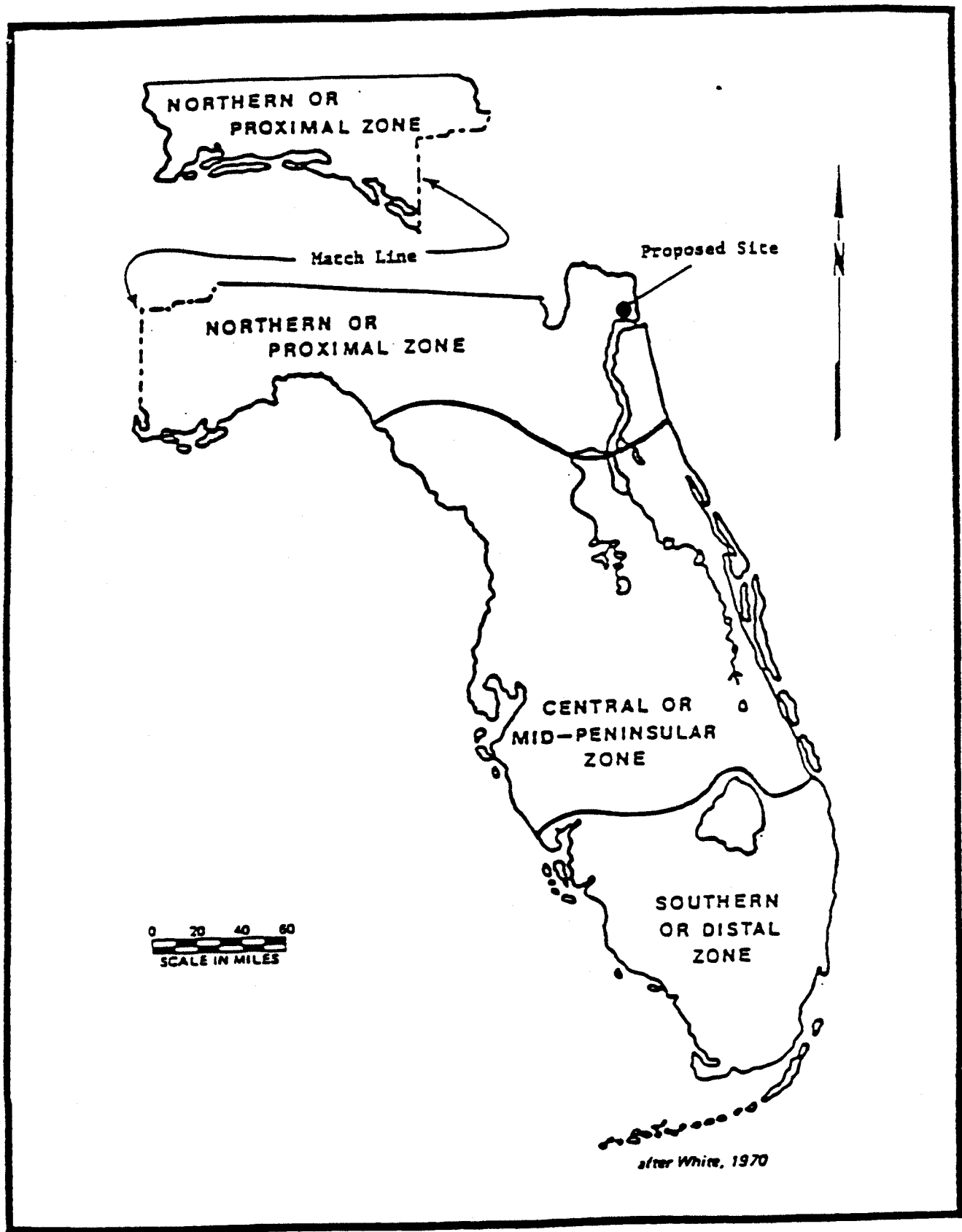
Geomorphology is composed of marine terraces formed when the ocean level dropped. Low scarps at relatively uniform elevations are remnants of ancient shorelines. The Pamlico and Silver Bluff Marine terraces are found on the site (Figure 2-3).

2.2 STRUCTURAL GEOLOGY

Northeastern Florida, including the site area, is located on the northeastern flank of the Peninsular Arch (Figure 2-4). The regional dip of the top of the limestone formations of Eocene age that comprises the Floridan Aquifer is toward the northeast; however, east of the St. Johns River the formations dip locally toward the north to northwest from a structural high, termed the Sanford High by Vernon (1951).

Two concealed inferred faults were mapped by Leve (1978) from interpretation of geologic and geophysical well logs. One fault trends N10°E along the St. Johns River and displaces the top of the limestone more than 45 meters in northeastern Clay County. Two freshwater springs, Green Cove Springs and Wadesboro Springs, are aligned along this fault in eastern Clay County. The other fault trends N5°W in eastern St. Johns and Duval counties and displaces the top of the limestone more than 30 meters in east-central Duval County. The faults bound a graben trending generally north-south through east-central Duval County (Figure 2-5).

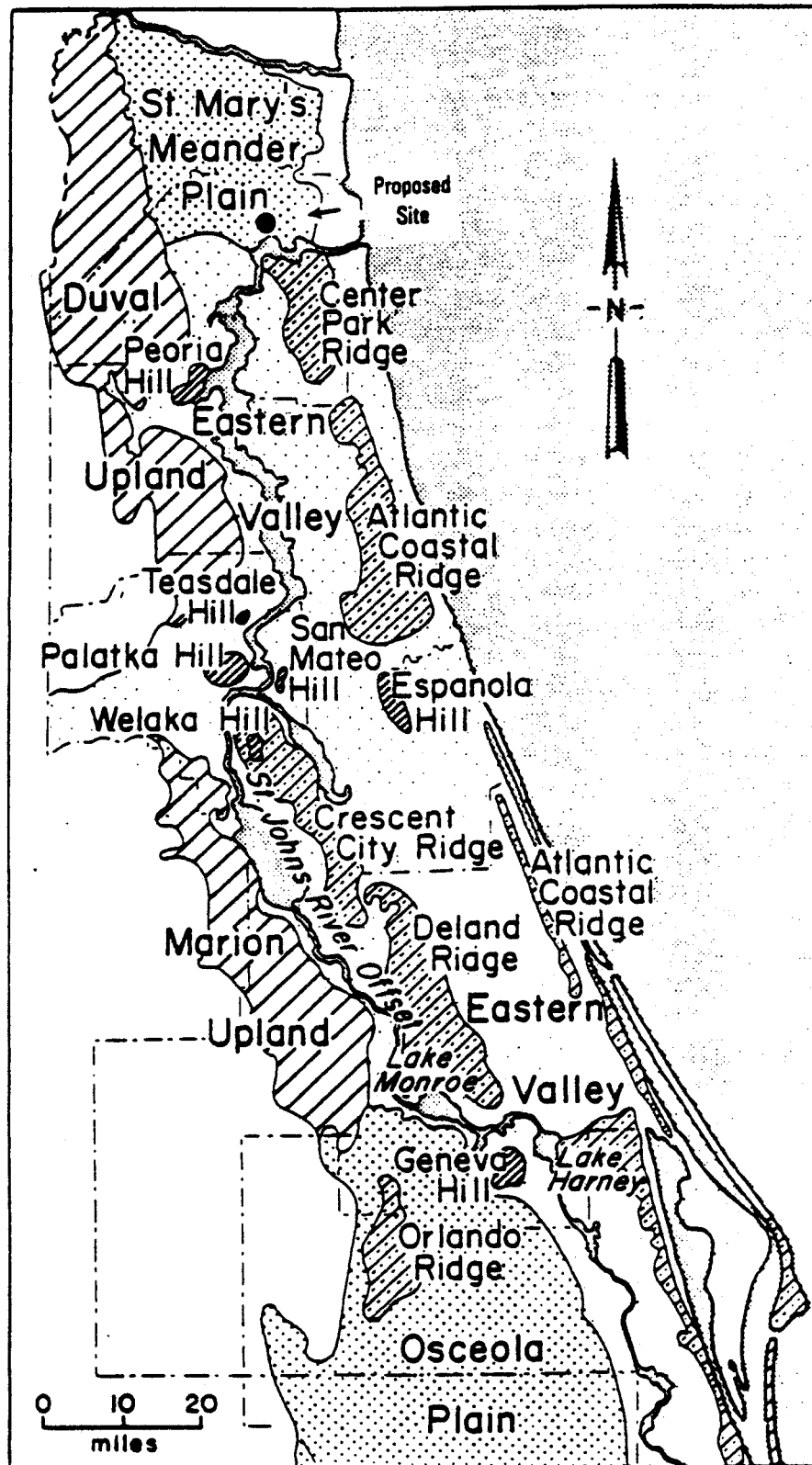




PHYSIOGRAPHIC DIVISIONS OF FLORIDA
Figure 2-1

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Source: Pirkle, 1971

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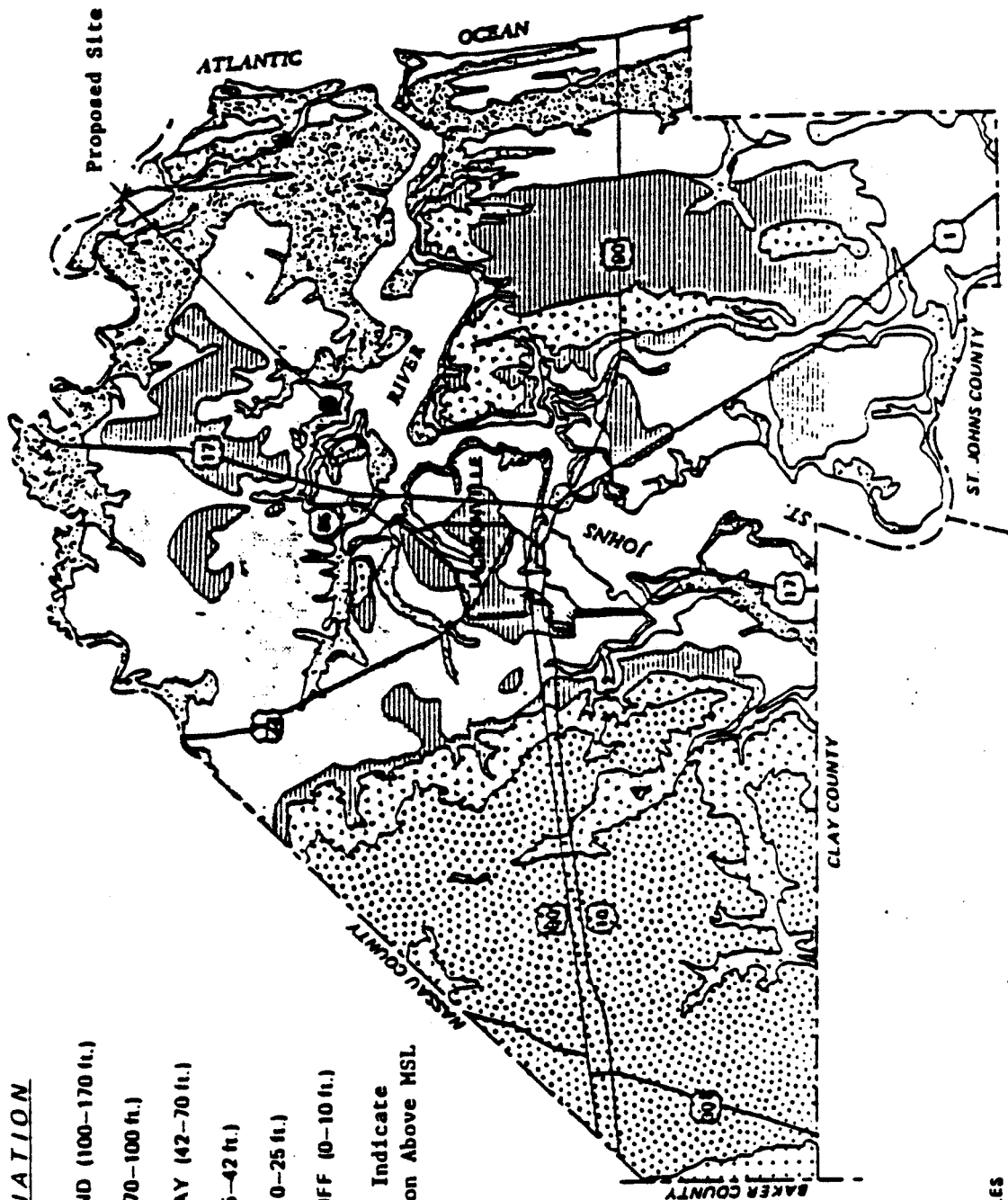
LANDFORMS IN THE REGION
OF THE ST. JOHNS RIVER
Figure 2-2



EXPLANATION

-  SUNDERLAND (100-170 ft.)
-  WICOMICO (70-100 ft.)
-  PENHOLOWAY (42-70 ft.)
-  TALBOT (25-42 ft.)
-  PAMLUCO (10-25 ft.)
-  SILVER BLUFF (0-10 ft.)

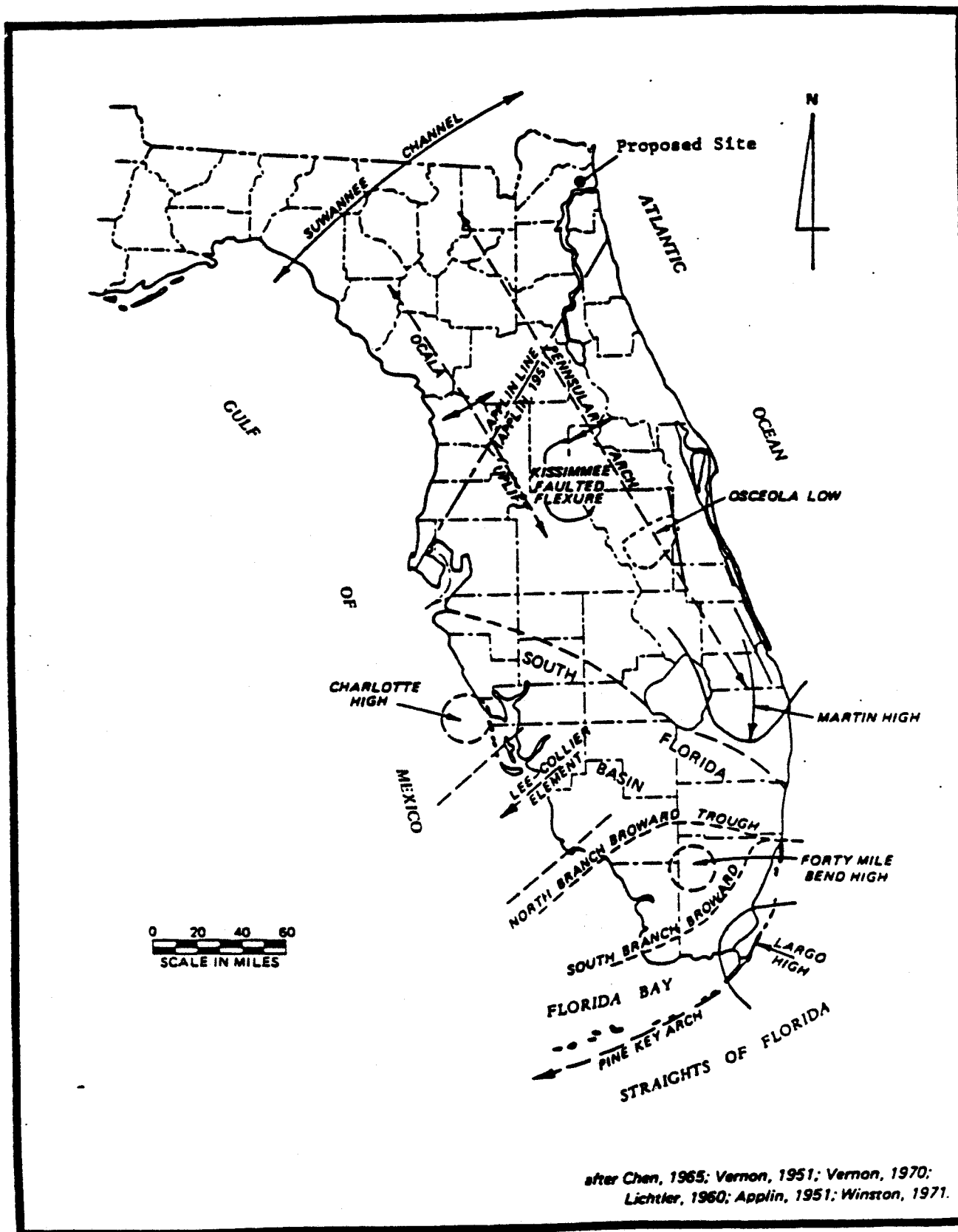
NOTE: Numbers Indicate
Elevation Above MSL



from Leve, 1966

PLEISTOCENE MARINE TERRACES
Figure 2-3





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REGIONAL STRUCTURAL ELEMENTS
Figure 2-4



EXPLANATION

• Well Control Point.

— Fault—Vertical or nearly so. U—Upthrown side. D—downthrown side.

—600—

Structure Contour—Shows altitude of top of the limestone aquifer system. Contour interval 100 feet. Datum is National Geodetic Vertical Datum of 1989.

Line Showing Approximate Updip Limit of the Limestone Aquifer System.

Line Showing Approximate Updip Limit of the Upper Permeable Zone of the Limestone Aquifer System.

UNIT COMPRISING TOP OF AQUIFER SYSTEM
Time-Stratigraphic Unit Formational.



Rocks of Early Miocene Age—
Tampa Limestone.

Rocks of Oligocene Age—
Suwannee Limestone or equivalent.

Rocks of Jackson Age—
Ocala Limestone or equivalent.

Rocks of Chalkstone Age—
Avon Park Limestone (Florida, South Georgia; Santa Rosa Limestone (part), (South Carolina); or equivalent.

Tertiary



0 10

MILES

PROPOSED
SITE

Source: USGS OFR 81-1178

GEOLOGY AND CONFIGURATION OF THE TOP OF
THE TERTIARY LIMESTONE AQUIFER SYSTEM,
SOUTHEASTERN UNITED STATES

Figure 2-5



According to Miller (1982), none of the faults shown in Florida appear to have any major effect on the flow system of the limestone aquifer, probably because there is no great contrast in the permeability among any of the units shown that make up the upper part of the aquifer system. Accordingly, small displacements juxtaposing different rock units would not change the flow system appreciably because the abutting permeabilities are similar.

2.3 STRATIGRAPHY

Florida's stratigraphy consists of unconsolidated sediments overlying a sedimentary rock sequence which overlies crystalline basement rocks. Table 2-1 describes these units. The sedimentary stratigraphic sequence of peninsular Florida is made up of about 8,000 feet of marine, littoral, and terrestrial deposits. Of this total, approximately 5,000 feet of these sediments are of Paleozoic and Mesozoic age. The Cenozoic strata extend to over 3,000 feet below the ground surface. These strata contain all of the geologic and hydrologic formations of primary importance to this project. Figures 2-6 and 2-7 show a generalized geologic section and geologic map of Duval County.

The Cedar Keys limestone is the oldest stratum in the Cenozoic series. The limestone was deposited in an open Paleocene sea. Generally, its composition is believed to be of evaporites and hard bioclastic limestones, some of which have likely been dolomitized. It serves as the regional aquiclude for the overlying Floridan Aquifer.

The Eocene Epoch deposits overlying the Cedar Keys limestone, in ascending order, include the Oldsmar limestone, Lake City limestone, Avon Park limestone, and Ocala group. The Oldsmar, Lake City, and Avon Park limestones are dolomitic, crystalline dolomitic, and granular calcitic limestones. The Ocala group consists of chalk, fossiliferous marine limestone, and marine limestone, and represents the last deposition of the Eocene Epoch.

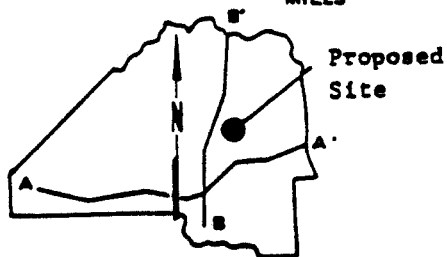
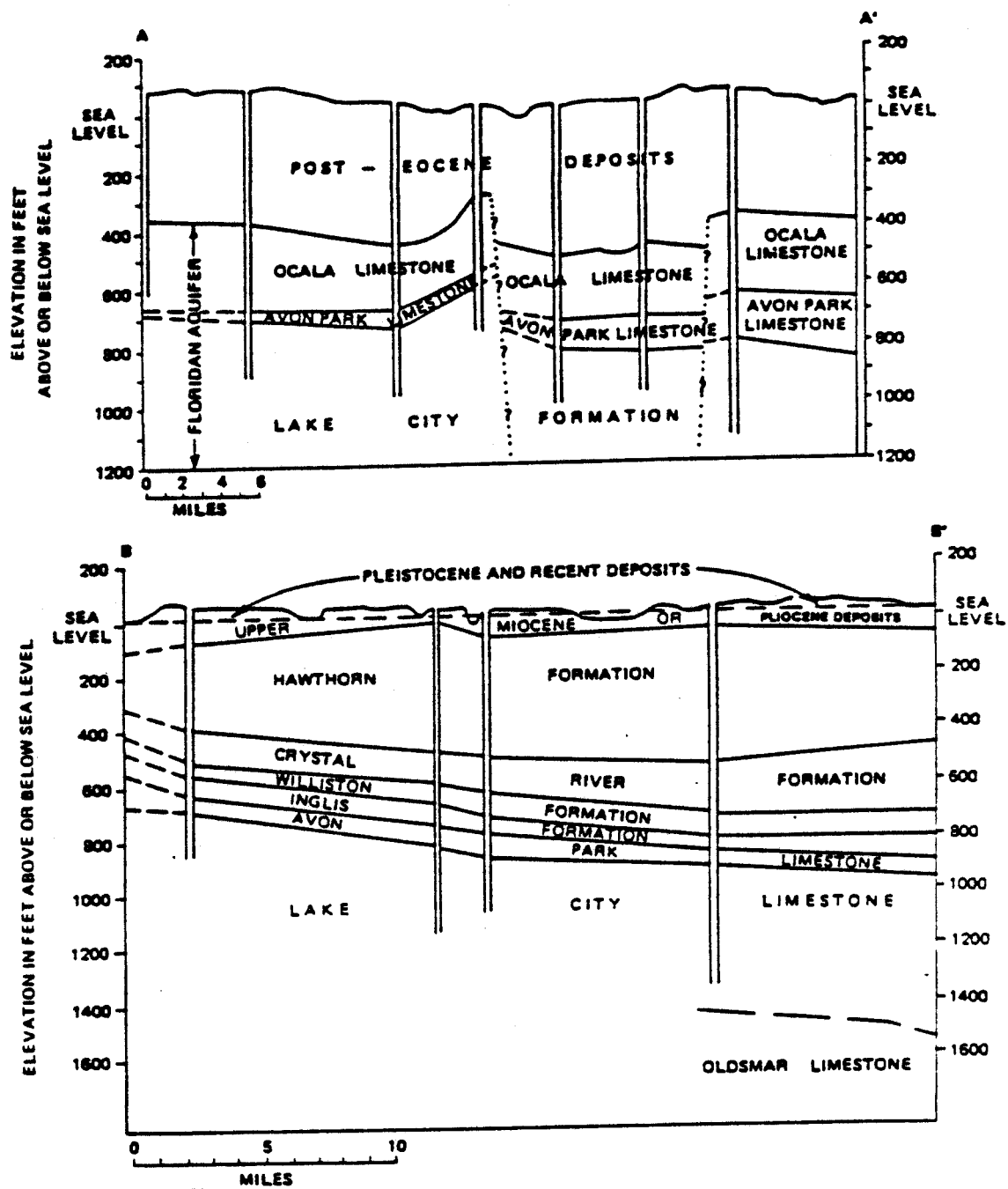
The Ocala group is the oldest deposit to outcrop in Florida. Exposures of the group are visible along the structure known as the Ocala Arch, located some 60 to 70 miles west-southwest of the Jacksonville area.



TABLE 2-1 STRATIGRAPHY OF THE CENOZOIC FORMATIONS OF DUVAL COUNTY

<u>Geologic Age</u>	<u>Stratigraphic Unit</u>	<u>Approximate Thickness</u> feet	<u>Lithologic Character</u>
Recent and Pleistocene	Recent and Pleistocene deposits	0 - 150	Soil, muck, coarse to fine sand, shell, and some clayey sand
Pliocene	Pliocene or Upper Miocene deposits	20 - 110	Gray-green calcareous, silty clay and clayey sand; contains shell beds and white soft, friable limestone beds
Miocene	Hawthorn Formation	260 - 490	Gray to blue-green calcareous phosphatic, sandy clays and clayey sands; contains fine to medium phosphatic sand lenses and limestone and dolomite beds, particularly near the base of the formation
Eocene	Ocala Group		
	Crystal River Formation	50 - 300	White to cream chalk, massive fossiliferous marine limestone
	Williston Formation	20 - 100	Tan to buff granular, marine limestone
	Inglis Formation	40 - 100	Tan to buff granular, calcitic, marine limestone; contains thin dolomite lenses and zones of Miliolidae foraminiferal coquina
	Avon Park Limestone	50 - 250	Alternating beds of brown to tan hard, massive dolomite, brown finely crystalline dolomite, and granular calcitic limestone
	Lake City Limestone	425 - 500+	White to brown, purple-tinted lignitic, granular limestone and gray hard, massive dolomite; contains lignite beds and zones of Valvulinidae foraminiferal coquina
	Oldsmar Limestone	846	Cream to brown massive to chalky granular limestone and tan to brown massive to finely crystalline dolomite





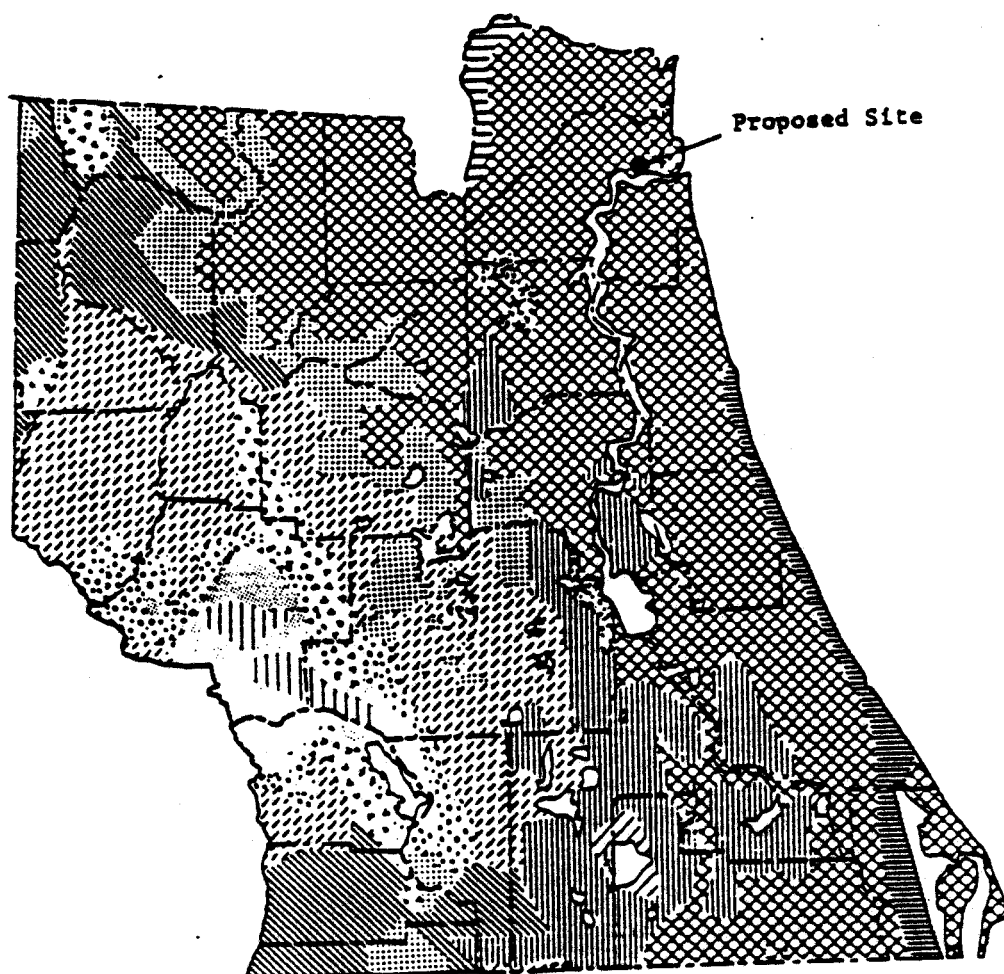
after Leve, 1966 and Leve, 1978

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GEOLOGIC CROSS SECTIONS,
DUVAL COUNTY

Figure 2-6





0 10 20 30 40 50 MILES

SERIES	STAGE	FORMATION & MEMBER
RECENT AND PLEISTOCENE		SEVERAL LOWER MARINE AND ESTUARINE TERRACE DEPOSITS LAKE FLIRT MARL
PLEISTOCENE		ANASTASIA FORMATION FORT THOMPSON FORMATION
MIOCENE	CHOCTA-WHATCHEE	"CHARLTON" FORMATION
		JACKSON BLUFF FORMATION
		ALACHUA FORMATION
		FORT PRESTON FORMATION
		HAWTHORN FORMATION
OLIGOCENE		SUWANNEE LIMESTONE
EOCENE	JACKSON	CRYSTAL RIVER FM.
		WILLISTON FM.
		INGLIS FM.
	CLAIBORNE	AVON PARK LIMESTONE

after Vernon & Puri, 1964

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GENERALIZED REGIONAL GEOLOGIC MAP
Figure 2-7



The Hawthorn formation deposited during the Miocene Epoch overlies the Ocala group. Thickness of the Hawthorn varies from 290 to 490 feet. It is identified by gray to blue-green phosphatic, sandy clays, and clayey sands with fine to medium phosphatic sand lenses and limestone beds more prevalent near the formation's base.

Resting conformably on top of the Hawthorn are deposits 20 to 110 feet thick of Upper Miocene to Pliocene age. These deposits are silty clays and clayey sands grading to soft, white, friable limestone beds.

Pleistocene and Holocene deposits make up the upper 150 feet of sediments in Northern Peninsular Florida. These unconsolidated sediment deposits are marine terraces, and materials are loose to dense sands, sandy clays, and silty clays. Marine terrace depositional environments produce deposits which are quite variable so stratigraphic uniformity is not expected.

2.4 HYDROGEOLOGY

Two aquifer systems of significance underlie the site. Table 2-2 provides a description of the stratigraphic and aquifer systems underlying Duval County. The Floridan Aquifer is encountered at depths ranging from 400 to 600 feet in the Duval County area. It is the principal source of fresh water for northeast Florida. The other aquifer is the surficial or shallow aquifer. It extends from the surface to an approximate depth of 100 feet.

2.4.1 Floridan Aquifer

The Floridan Aquifer is composed chiefly of limestone and dolomite and includes the following geologic formations: Lake City limestone, Avon Park limestone, and Ocala group, all of Eocene age; Suwannee limestone of Oligocene age; and Tampa limestone and lower part of the Hawthorn formation of Miocene age where it contains limestone beds that are hydrologically connected to the older limestones (Parker et al., 1955). The aquifer ranges in thickness from about 500 feet in west-central Florida to about 2,000 feet in central and northeast Florida (Lichtler, 1972; and Healy, 1975).



TABLE 2.2 STRATIGRAPHIC UNITS AND AQUIFER SYSTEMS IN DUVAL, NASSAU, AND BAKER COUNTIES

Geologic Age	Stratigraphic Unit	Approximate Thickness feet	Lithologic Character	Aquifer System	Water-Bearing Properties
Recent and Pleistocene	Recent and Pleistocene deposits	0 - 150	Soil, muck, coarse to fine sand, shell, and some clayey sand	Shallow Aquifer	Surficial sand yields small amounts of water. Sand and shell bed along coast yields moderate quantities.
			Gray-green calcareous, silty clay and clayey sand; contains shell beds and white soft, friable limestone beds		Limestone, sand, and shell bed near base of deposits yield moderate to (locally) large amounts.
Pliocene?	Pliocene or Upper Miocene deposits	20 - 110	Gray to blue-green calcareous phosphatic, sandy clays and clayey sands; contains fine to medium phosphatic sand lenses and limestone and dolomite beds, particularly near the base of the formation	Aquiclude	Relatively impermeable clays and marls in both the late Miocene or Pliocene deposits and the Hawthorn Formation confines the artesian water in the Eocene limestone and in the limestone and shell beds above the Eocene limestone. Yields small to moderate supplies.
					Marine limestone formations utilized as the primary source of water in the area.
Eocene	Ocala Group	50 - 300	White to cream chalk, massive fossiliferous marine limestone	Floridan Aquifer System	Massive dolomite beds restrict vertical movement of water.
		20 - 100	Tan to buff granular, marine limestone		
		40 - 120	Tan to buff granular, calcitic, marine limestone; contains thin dolomite lenses and zones of Milloidae foraminiferal coquina		
	Avon Park Limestone	50 - 250	Alternating beds of brown to tan hard, massive dolomite, brown finely crystalline dolomite, and granular calcitic limestone		
		425 - 500+	White to brown, purple-tinted lignitic, granular limestone and gray hard, massive dolomite; contains lignite beds and zones of Valvulinidae foraminiferal coquina		
		846	Cream to brown massive to chalky granular limestone and tan to brown massive to finely crystalline dolomite		
	Oldsmar Limestone				Limestone and porous dolomite beds yield large to very large quantities of water. Hard dolomite and limestone beds restrict vertical movement of water within certain zones. Potentially the greatest source of water in the area.



In the Jacksonville area, the Floridan Aquifer consists of all the Eocene Epoch deposits overlying the Cedar Keys limestone. The Cedar Keys limestone serves as the lower confining unit, and the Hawthorn formation serves as the aquiclude between the Floridan and the surface aquifer. The Floridan Aquifer is artesian. Figure 2-5 shows the elevation of the top of the Floridan.

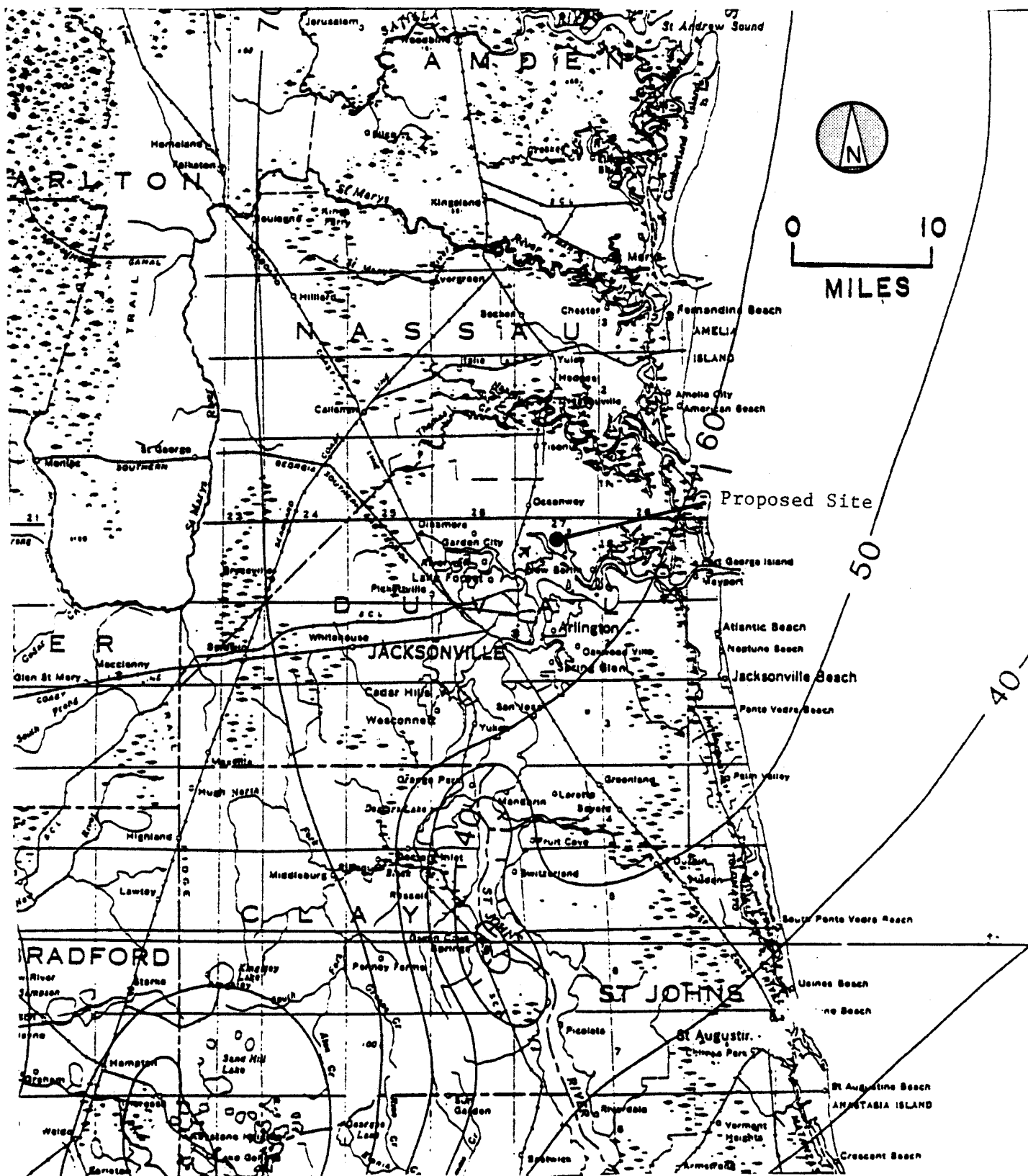
The top of the first water-bearing interval (the upper water-bearing zone [UWBZ]) generally occurs at depths 400 to 600 feet below mean sea level. Transmissivity of this permeable zone ranges from 1.5×10^5 to 1.5×10^6 gallons per day per foot, based on an analysis of 20 aquifer tests in Duval County (Franks and Phelps, 1979). An average transmissivity of 6.0×10^5 gallons per day per foot was estimated for the Duval County area. A specific storage of 10^{-6} ft⁻¹ was calculated from data for this zone and is considered to be fairly uniform for the Duval County area.

The top of the second water-bearing interval (the middle water-bearing zone [MWBZ]) generally occurs at depths 750 to 1,100 feet below mean sea level. Transmissivity of this zone ranges from 3.0×10^5 to 6.0×10^5 gallons per day per foot, and the storativity ranges between 10^{-3} to 10^{-4} (Environmental Science and Engineering, Inc., 1985).

Recharge occurs as direct infiltration of rainfall where the Floridan sequence is exposed at the surface. This occurs to the west and southwest of Duval County in the areas of Putnam, Clay, Alachua, and Bradford counties. Water percolates downward where confining beds are breached by sink holes and fractures. It also occurs through underlying and overlying confining beds where the Floridan Aquifer piezometric surface is lower than that of adjacent water-bearing strata. Discharge from the aquifer occurs naturally as spring discharge and as discharge to the Atlantic Ocean.

The hydraulic head in the vicinity of Jacksonville was approximately 65 feet msl prior to development in northeast Florida (Johnston et al., 1980) as shown on Figure 2-8. Major pumping centers at Fernandina Beach and in Jacksonville have lowered the piezometric pressure in the Floridan Aquifer and have caused major changes in the shape of the original, predevelopment piezometric surface. Today, water within the Floridan Aquifer generally moves laterally to the northeast.





Source: Johnston et al., 1980

PRE-DEVELOPMENT PIEZOMETRIC SURFACE
OF THE FLORIDAN AQUIFER

Figure 2-8



Figures 2-9 and 2-10 show the piezometric surface of Duval County in May 1962 and May 1979, respectively.

In the northeast and eastern part of Duval County, chloride concentrations have increased, as shown on Figures 2-11 and 2-12. Chloride concentrations generally increased in these areas from 10 to 20 ppm between 1940 and 1962.

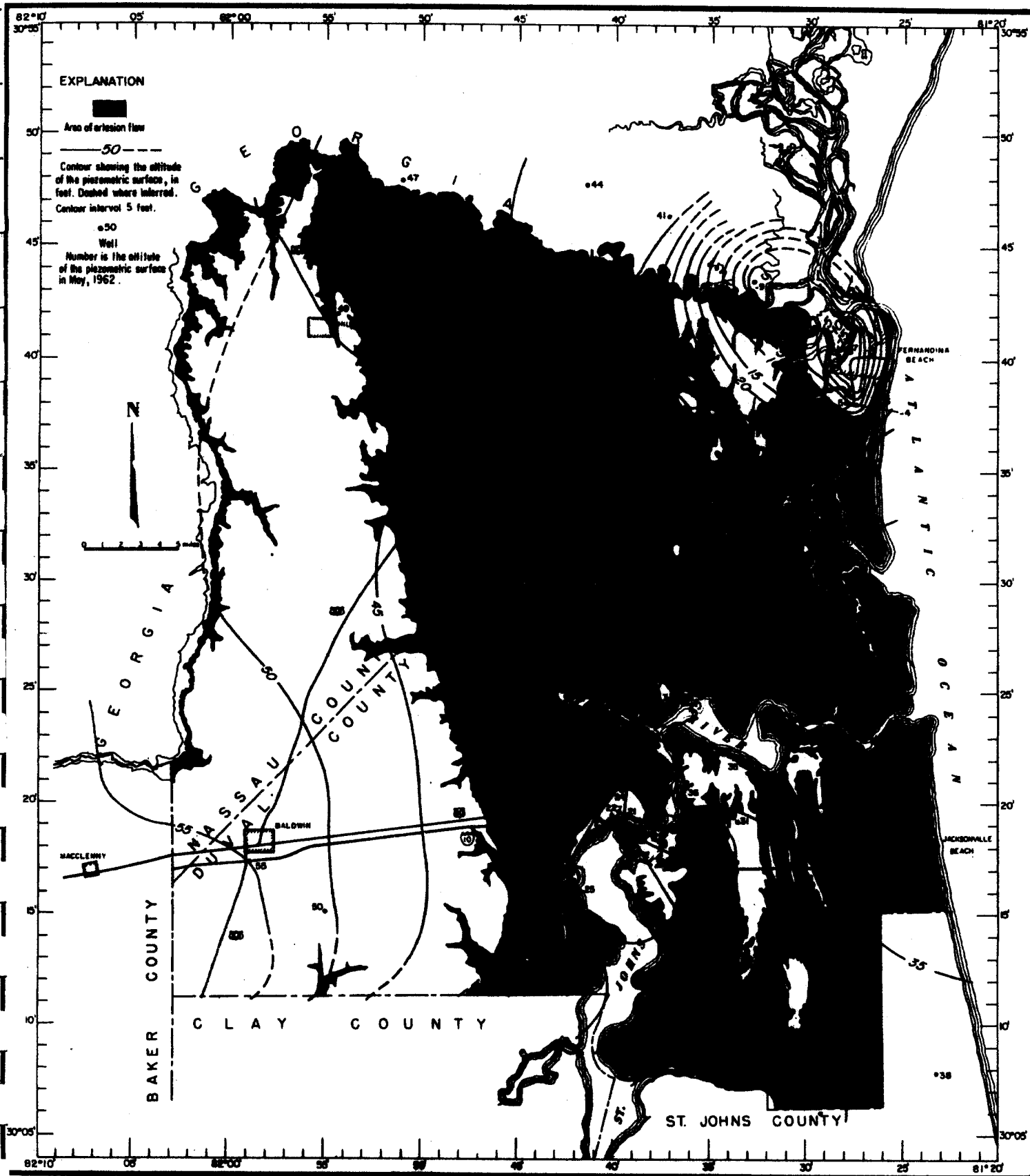
2.4.2 Surficial Aquifer

Overlying the artesian Floridan Aquifer is the Hawthorn formation. The Hawthorn formation, which has a low permeability, serves as a confining unit to severely limit movement of water between the surficial aquifer and the underlying Floridan Aquifer. The Hawthorn formation consists of silt, sand, shell, and limestone beds. Vertical hydraulic conductivity was estimated to be 1.0×10^{-3} ft/d. Specific storage was estimated to be 1.0×10^{-5} ft⁻¹ (Franks and Phelps, 1979).

The Hawthorn formation is overlain by the surficial aquifer system. This system underlies the Duval County area to depths of 100 to 200 feet. The USGS reports that the local surficial aquifer system is divided into three zones, shown on Figure 2-13. The water table zone occurs in the upper part of the aquifer where water is in an unconfined condition. Below the water table is a discontinuous semi-confining zone of sediments with lower permeability which partially confines water in the lowest limestone unit. Underlying the limestone unit is the Hawthorn formation which has low permeability and serves as the lower confining unit.

Recharge to the surficial aquifer system is principally by infiltration of rainfall and percolation from surface water bodies. The confining and semi-confining beds in the surficial aquifer system and boundary conditions around the site will tend to provide a predominantly horizontal direction of flow for water within the aquifer and minimize vertically downward flow. Any shallow ground water is expected to discharge into the contiguous surface water bodies, the Broward River, St. Johns River, and Dunn Creek.



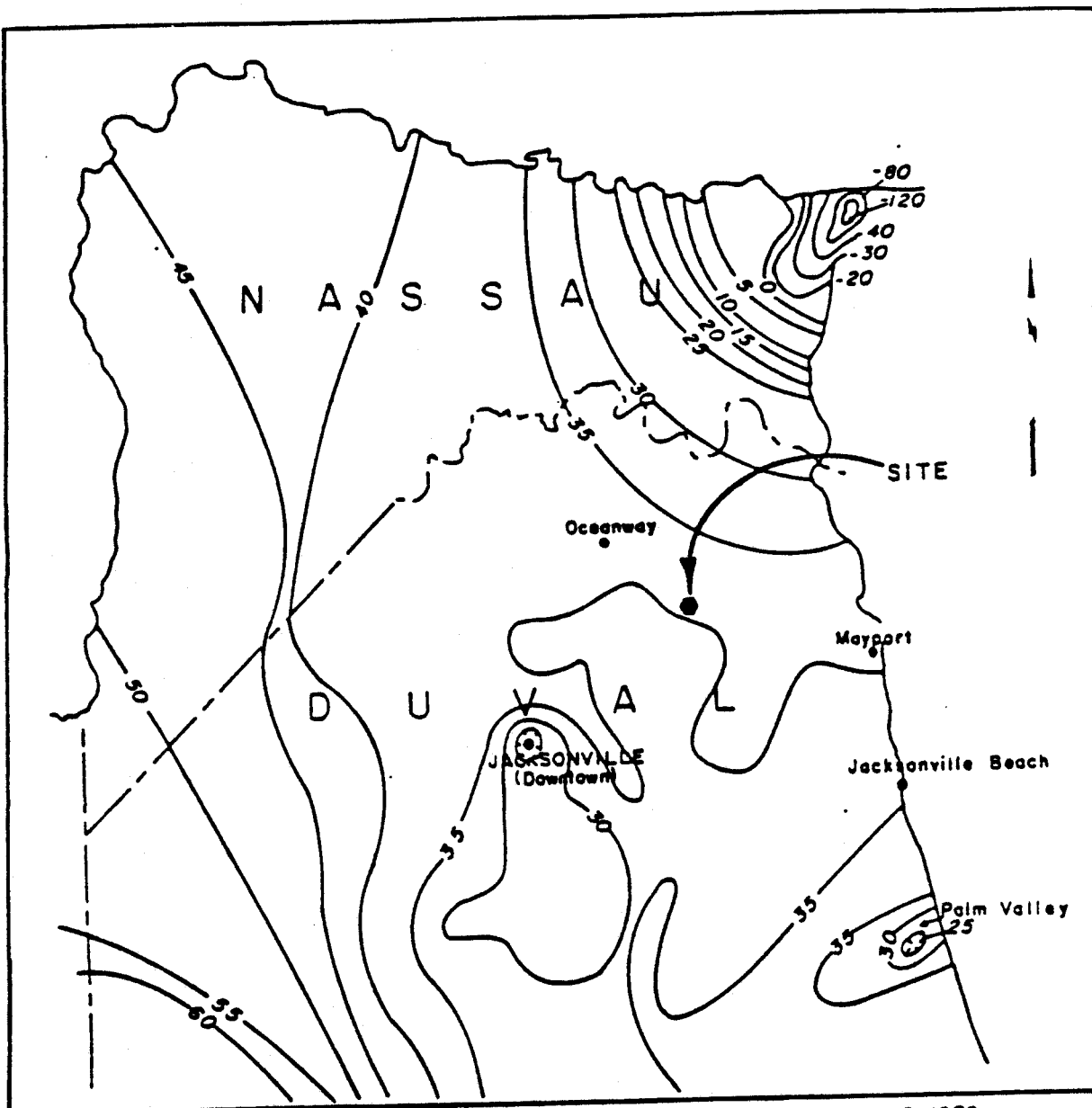


Source: Leve, 1966

MAP OF DUVAL AND NASSAU COUNTIES SHOWING THE PIEZOMETRIC SURFACE OF THE FLORIDA AQUIFER SYSTEM AND THE AREA OF ARTESIAN FLOW IN MAY 1962.

Figure 2-9



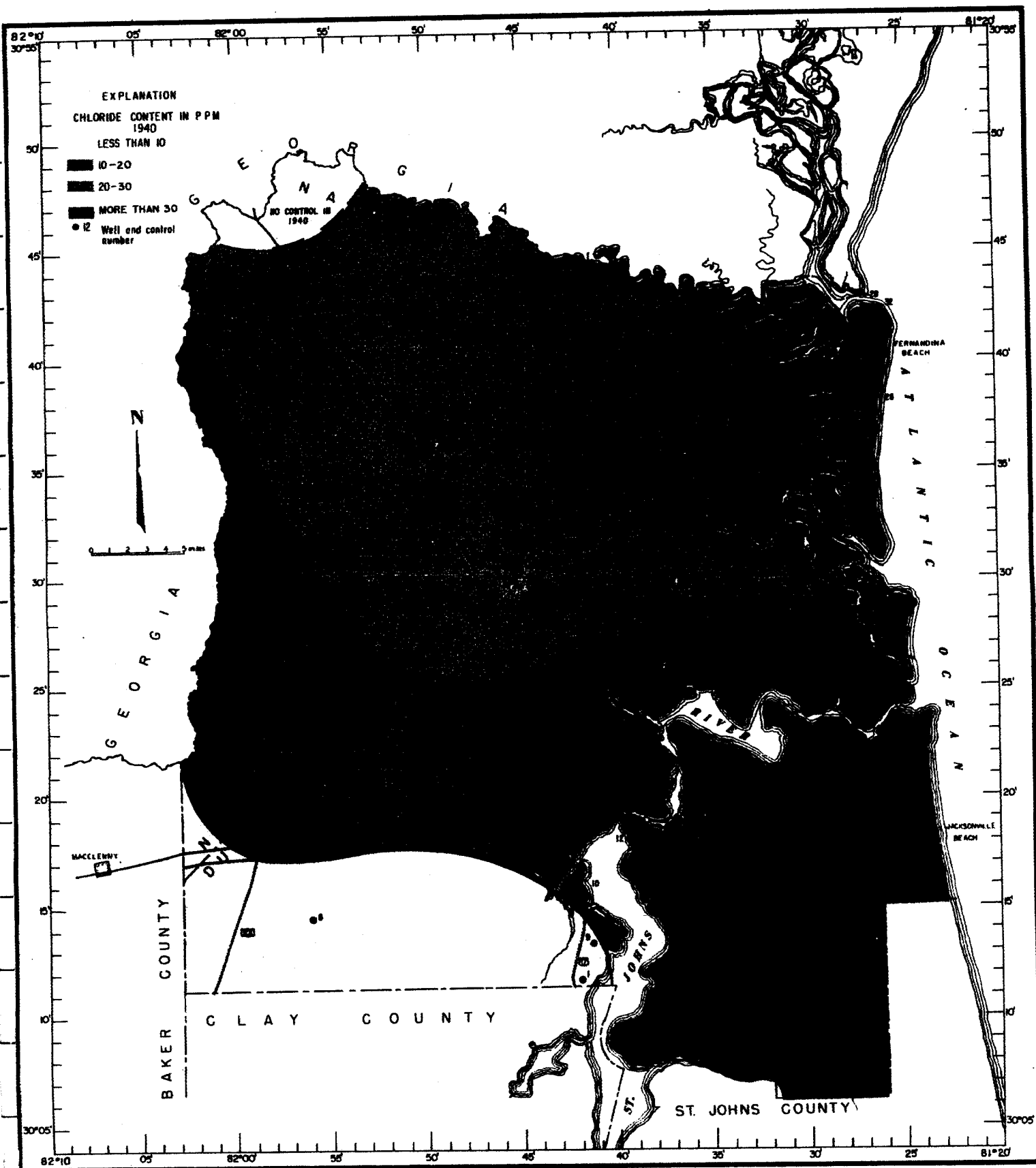


SOURCE: U.S. GEOLOGICAL SURVEY, OPEN-FILE REPORT 80-69, 1980.

—30— POTENTIOMETRIC CONTOUR - Shows altitude of which water level would have stood in tightly cased wells. Dashures indicate depressions. Contour intervals 5, 20, and 40 feet. Datum is National Geodetic Vertical Datum of 1929 (NGVD).

SCALE
10 MILES 0 10 MILES

PIEZOMETRIC SURFACE MAP OF THE
FLORIDAN AQUIFER: MAY 1979
Figure 2-10

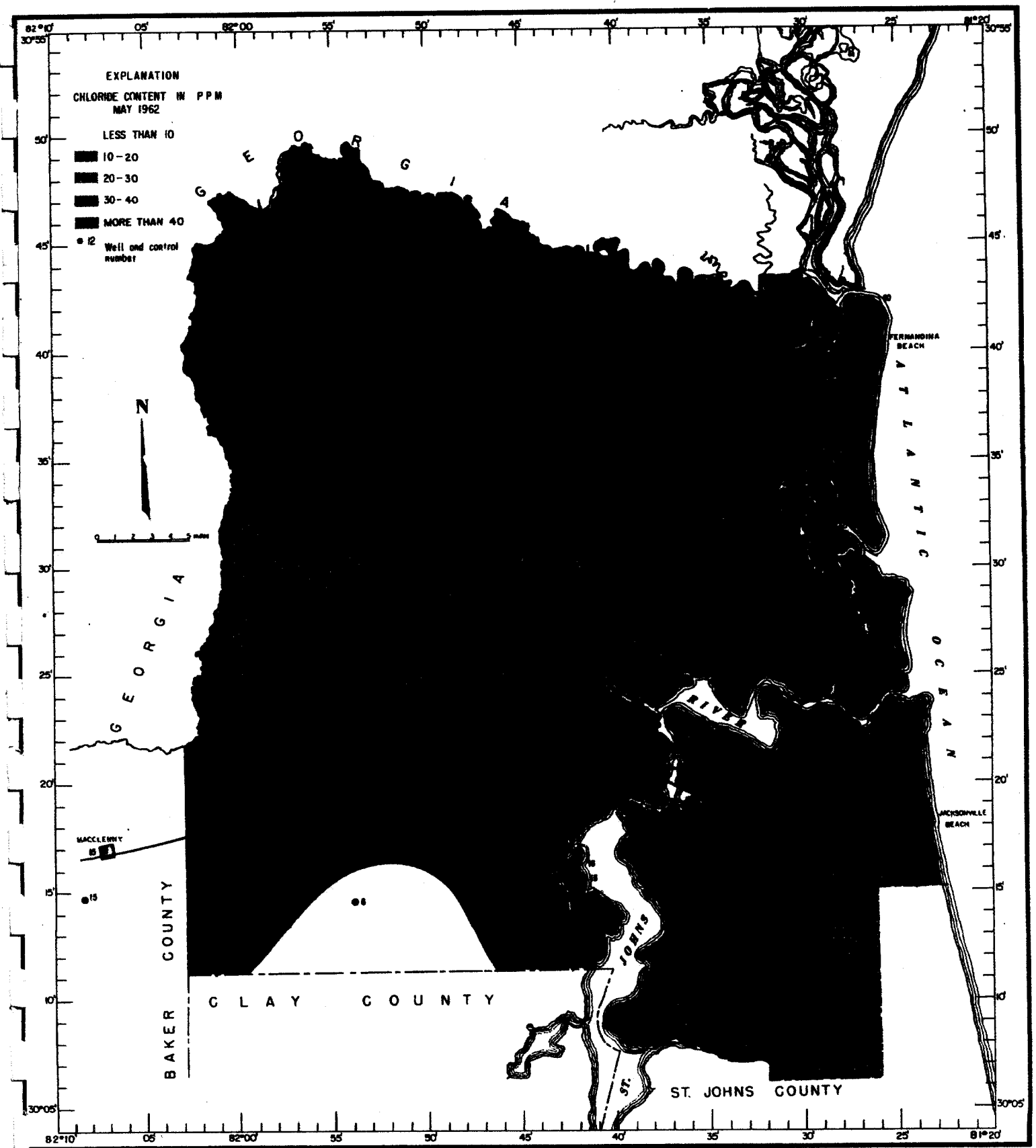


Source: Leve, 1966

MAP OF DUVAL AND NASSAU COUNTIES SHOWING THE APPROXIMATE CHLORIDE CONTENT OF WATER FROM ARTESIAN WELLS IN 1940.

Figure 2-11

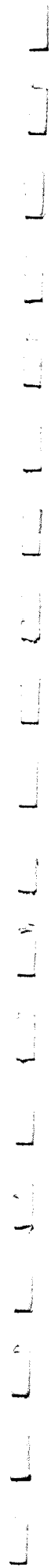


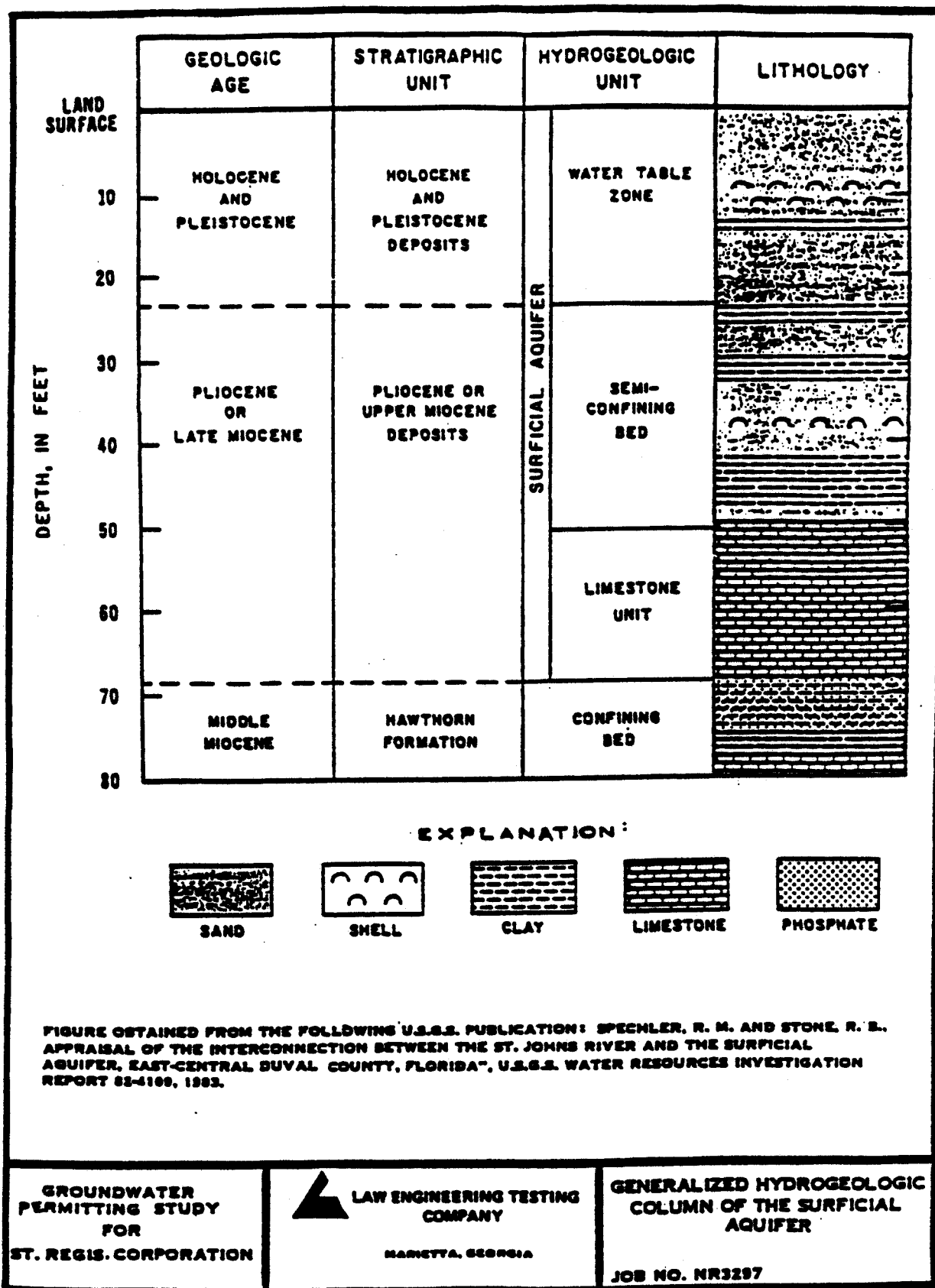


Source: Leve, 1966

MAP OF DUVAL AND NASSAU COUNTIES SHOWING THE
APPROXIMATE CHLORIDE CONTENT OF WATER FROM
ARTESIAN WELLS IN MAY 1962

Figure 2-12





GENERALIZED HYDROGEOLOGIC COLUMN
OF THE SURFICIAL AQUIFER

Most wells in the Jacksonville area producing water from the surficial aquifer system have been completed in the limestone unit or "shallow rock zone" lying at approximately 40 to 100 feet below land surface.

Transmissivity of the limestone unit of the surficial aquifer system ranges from 2,000 to 10,000 gallons per day per foot. The average thickness of the unit was approximately 17 feet in 13 test wells drilled in Duval County for the purpose of evaluating the unit's hydrologic properties (Causey and Phelps, 1978). The aquifer conditions within the limestone unit range from full artesian to unconfined. The storage coefficient is expected to range from 10^{-1} to about 10^{-5} .

2.5 WATER USE IN DUVAL COUNTY

Major ground water users within the study area are summarized in Table 2-3. In 1986, the Floridan Aquifer provided 153.49 mgd for Duval County. Of the total, 69 percent was for water supply, 15 percent for industrial/commercial use, 10 percent for agricultural use, 2 percent for power, and 4 percent for miscellaneous use. Since then, the Seminole Kraft mill resumed operation, consuming about 20 mgd. Revised percentages are 61 percent for water supply, 25 percent for industrial/commercial, 9 percent for agriculture, 1.5 percent for power, and 3.5 percent for miscellaneous.

TABLE 2-3. MAJOR GROUND WATER USERS IN STUDY AREA

City of Jacksonville		
Highlands	4 wells at 1.94 mgd each =	7.76 mgd
Norwood	4 wells at 0.63 mgd each =	2.52 mgd
Jacksonville Suburban Utilities		
Cavanaugh & Bradshaw		0.4 mgd
Columbine & Pine Summit		1.01 mgd
Greenfern		0.47 mgd
Jacksonville Electric Authority		
Well A		0.45 mgd
Well B		2.59 mgd
Northside Generating Station	4 wells at 0.4 mgd each =	1.6 mgd
Mayport Naval Air Station		2.9 mgd
SCM Glidco Organics	3 wells at 0.83 mgd each =	2.49 mgd
Wonderwood Mobile Home Park		0.1 mgd
Wonderwood Village Water Treatment Plant		0.1 mgd
Bennett Estates Water Treatment Plant		0.12 mgd
Free Flowing Well D-431		0.1 mgd
Beacon Hills Water Treatment Plant		0.29 mgd
Ft. George Island Club House		0.1 mgd
Seminole Kraft		19.5 mgd

3.0 HYDROGEOLOGIC INVESTIGATION OF THE CEDAR BAY COGENERATION PROJECT WELLS

3.1 SCOPE OF INVESTIGATION

This ground water investigation included compiling and reviewing existing data and consulting reports and published literature, performing a well inventory, obtaining water samples for quality analyses, measuring well head pressures, performing geophysical and flowmeter logs, and performing a 72-hour pump test to determine characteristics of the Floridan Aquifer at the Seminole Kraft/Cedar Bay Cogeneration Project wells.

3.1.1 Well Inventory

A well inventory was compiled using existing USGS and Jacksonville Bio-Environmental Services Division (BESD) records. The inventory covered a 10-1/2 by 18-mile study area, shown on Figure 3-1. The well number, ownership, location, depth of well, ground elevation, piezometric elevation, and chloride content were tabulated in a data base (Appendix A). Piezometric elevations and chloride contents available from existing records were included in the well inventory only if the well had been sampled and tested since 1980.

3.1.2 Geophysical and Flowmeter Logs

Geophysical surveys were performed by Layne-Atlantic Company on Seminole Kraft Wells 1, 5, 7, and 8 (Figure 3-2). Natural gamma, spontaneous potential, resistivity, caliper, temperature, and flowmeter logs were run for each well. Conductance logs were run in Wells 1, 7, and 8, and a video survey was performed in Well 1.

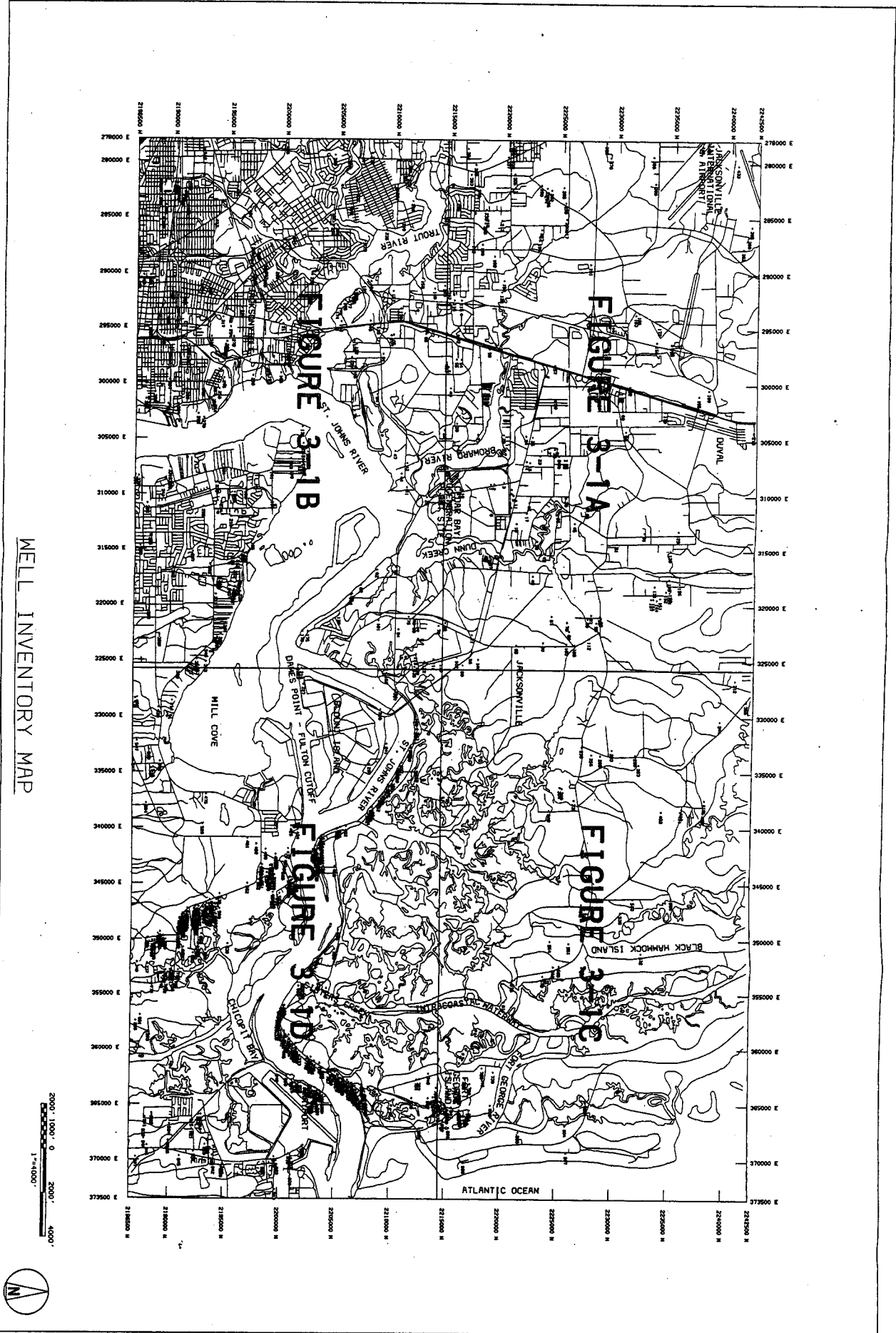
The geophysical logs were used to determine lithological units and to select locations for collecting water samples and setting packers. Table 3-1 lists the depths at which packers were set and the intervals sampled for each well. Table 3-2 gives geologic interpretations of the geophysical logs for the four wells surveyed.

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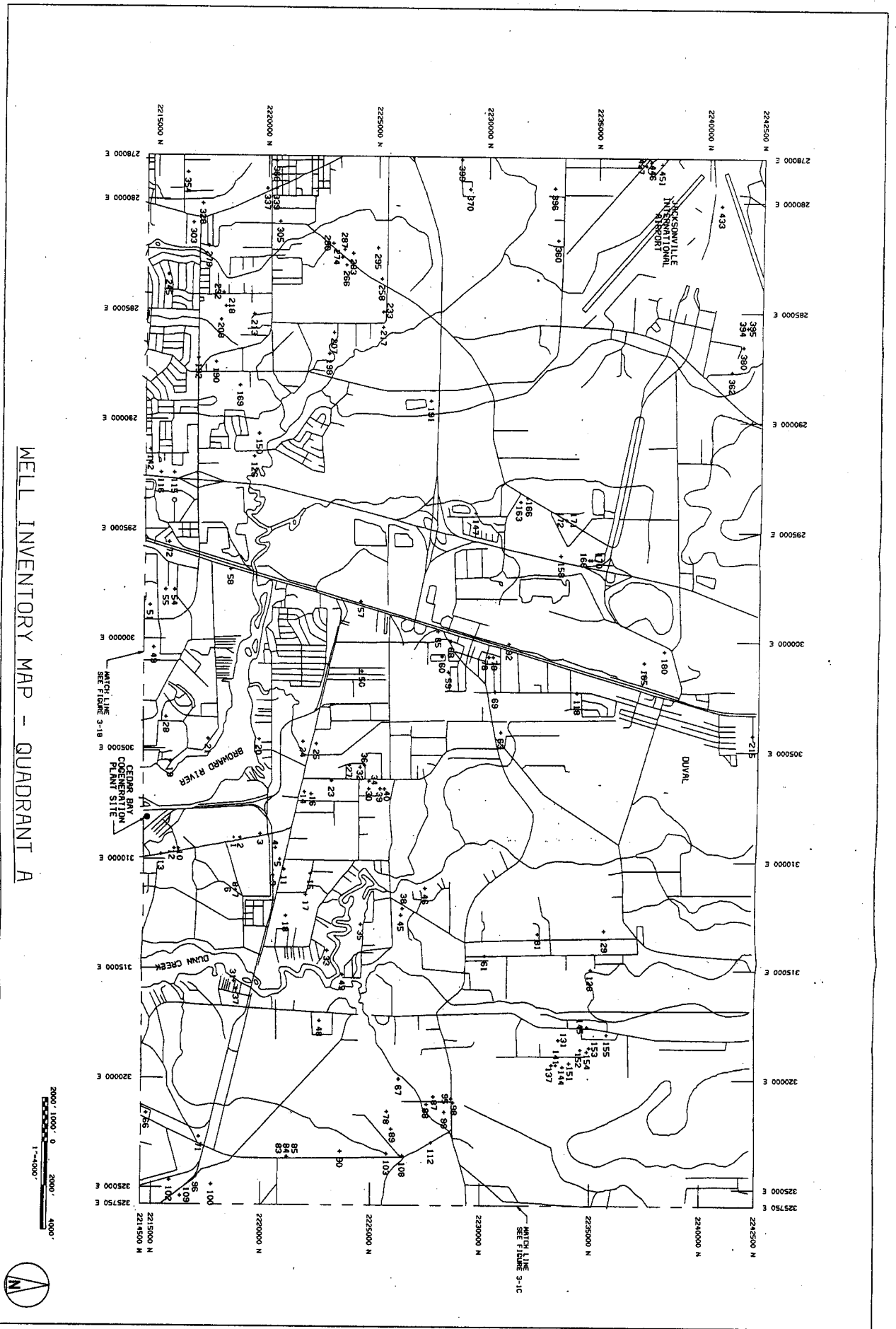
WELL INVENTORY MAP

3-2

FIGURE 3-1



PLOT SCALE: 1=2000'



WELL INVENTORY MAP - QUADRANT B

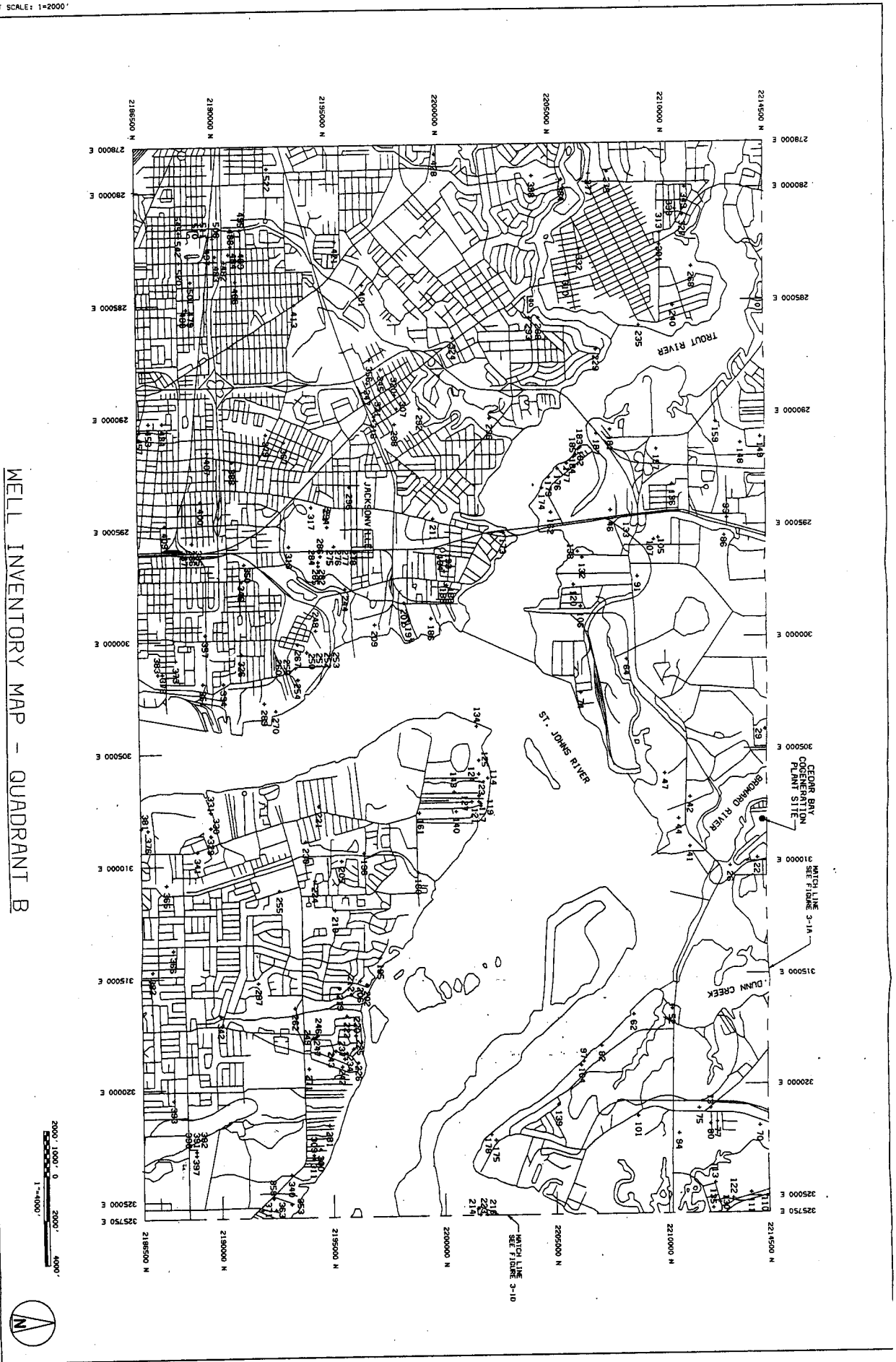


FIGURE 3-18

PLOT SCALE: 1=2000'

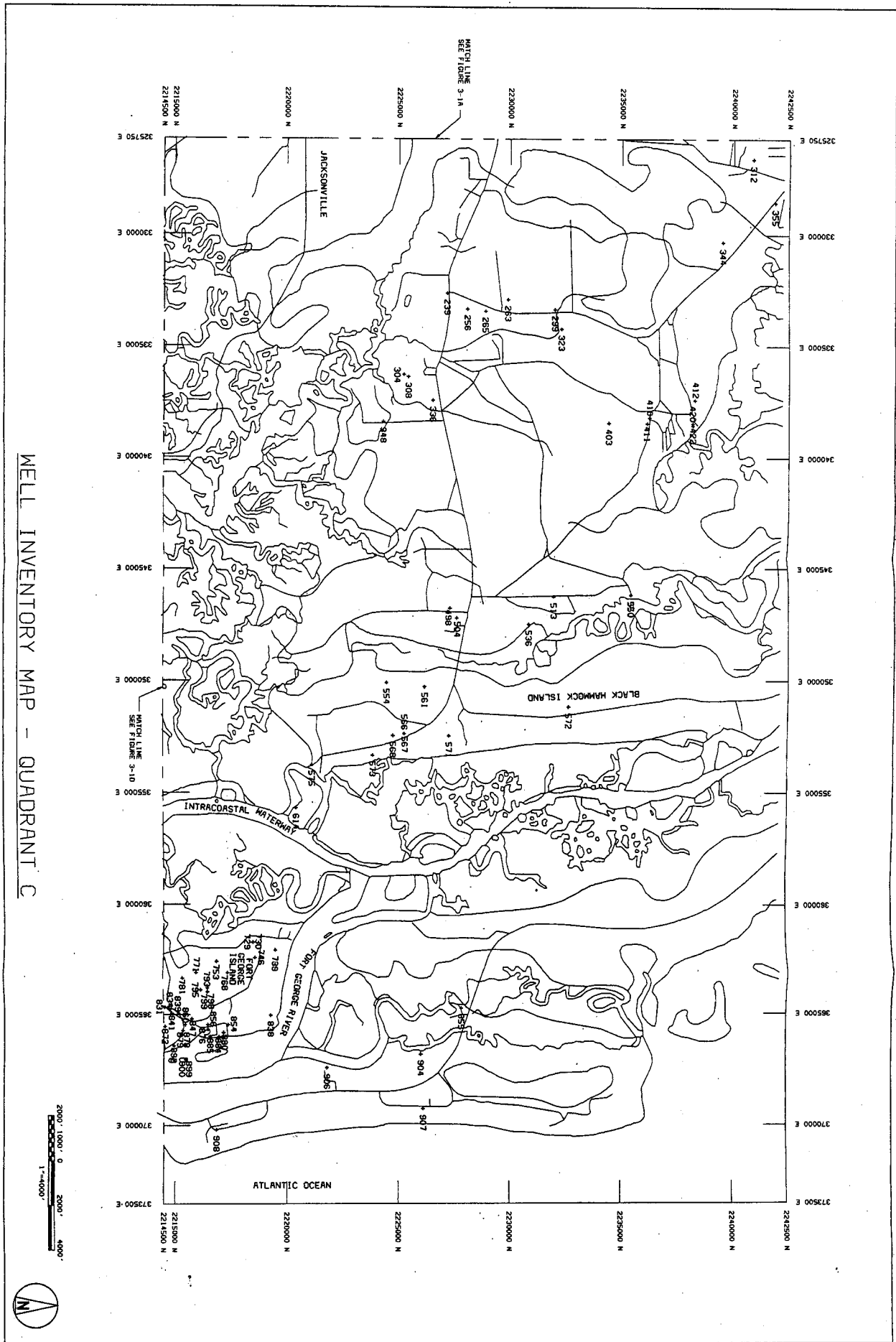
072089

3-5

WELL INVENTORY MAP - QUADRANT C



FIGURE 3-1C



072089

3-6

FIGURE 3-1D

PLOT SCALE: 1"=2000'

TABLE 1									
605	623	639	652	664					
606	624	642	653	665					
607	625	643	654	666					
608	626	644	655	667					
609	627	645	656	668					
610	628	646	657	669					
611	629	647	658	670					
612	630	648	659	671					
613	631	649	660						
614	632	650							
615	633	651							
616	634	652							
617	635	653							
618	636	654							
619	637	655							
620	638	656							

WELL INVENTORY MAP - QUADRANT D

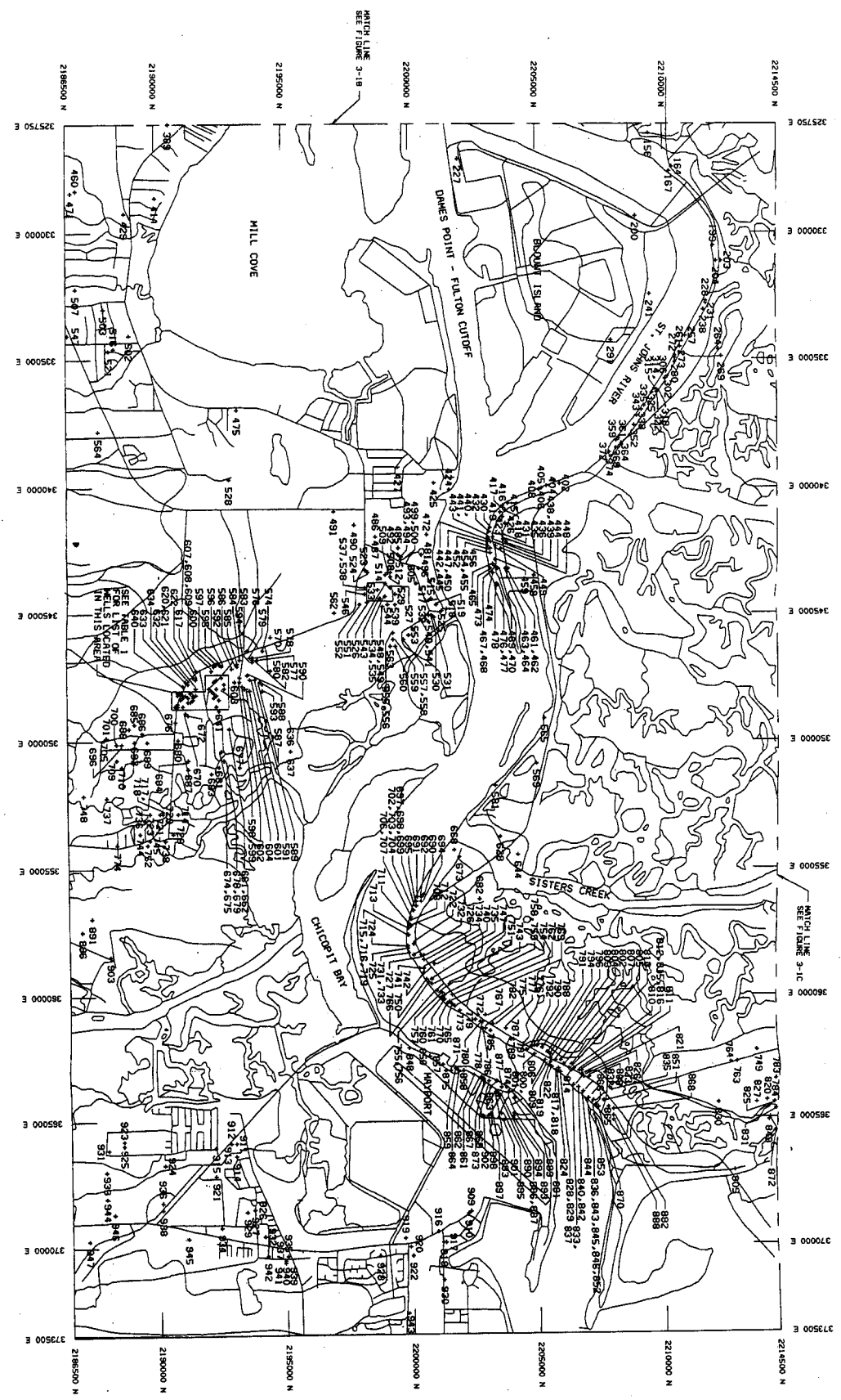


TABLE 3-1. SUMMARY OF WELL INTERVALS SAMPLED

	Well 1		Well 5		Well 8	
	UWBZ	MWBZ	UWBZ	MWBZ	UWBZ	MWBZ
Packer Location (depth in feet)	978 and 1,320	1,320	881 and 1,291	1,291	980 and 1,278	1,278
Sample Interval (depth in feet)	978 to 1,320	1,320 to 1,378	881 to 1,291	1,291 to 1,400	980 to 1,278	1,278 to 1,400

TABLE 3-2. GEOLOGICAL INTERPRETATIONS OF GEOPHYSICAL LOGS

Well 1 Geophysical Interpretations

<u>Depth</u>	<u>Stratigraphic Unit</u>	<u>Lithology</u>
To 568	Crystal River (Ocala)	Hard, brown fossiliferous marine limestone, slightly porous.
568 to 848	Williston (Ocala)	Hard, brown fossiliferous marine limestone. Medium porosity, some dolomite layers.
848 to 975	Inglis (Ocala)	Brown, medium argillaceous limestone. Intermittent dolomite.
975 to 1,080	Avon Park	Soft, brown and white fossiliferous limestone with alternating layers of dolomite. Limestone is medium to high porosity.
1,080 to 1,370	Lake City	Soft, brown and white highly fractured, highly porous, fossiliferous limestone with alternating layers of very dense dolomite in beds from 6 in. to 5 ft thick.

Well 5 Geophysical Interpretations

<u>Depth</u>	<u>Stratigraphic Unit</u>	<u>Lithology</u>
560 to 618	Crystal River (Ocala)	Hard, brown fossiliferous, marine limestone, slightly porous.
618 to 865	Williston (Ocala)	Hard, gray and brown fossiliferous marine limestone, medium porosity.
865 to 982	Inglis (Ocala)	Brown, hard argillaceous limestone with intermittent dolomite streaks. Medium porosity.
982 to 1,100	Avon Park	Soft, brown fossiliferous marine limestone with layers of dense blue-gray dolomite. Medium to high porosity.
1,100 to 1,340	Lake City	Soft, brown and white highly fractured fossiliferous marine limestone with alternating beds of very hard dolomite. Porosity of limestone is very high with some signs of intermingled fine quartz sand.

TABLE 3-2 (Continued). GEOLOGICAL INTERPRETATIONS OF GEOPHYSICAL LOGS

Well 7 Geophysical Interpretations

<u>Depth</u>	<u>Stratigraphic Unit</u>	<u>Lithology</u>
To 568	Crystal River (Ocala)	Hard, brown, fossiliferous, slightly porous marine limestone.
568 to 845	Williston (Ocala)	Hard, gray and brown fossiliferous marine limestone, medium porosity.
845 to 960	Inglis (Ocala)	Brown, hard medium porosity, slightly fractured argillaceous limestone with intermittent dolomite streaks.
960 to 1,075	Avon Park	Soft, brown fossiliferous marine limestone. Medium to high porosity with layers of dense blue-gray dolomite.
1,075 to 1,368	Lake City	Soft, brown tulite, highly porous, highly fractured fossiliferous marine limestone with alternating beds of very hard dolomite. Some fine sand intermingled in the soft poorly cemented limestone.

Well 8 Geophysical Interpretations

<u>Depth</u>	<u>Stratigraphic Unit</u>	<u>Lithology</u>
To 588	Crystal River (Ocala)	Hard, brown, slightly porous, fossiliferous marine limestone.
588 to 852	Williston (Ocala)	Hard, gray and brown, medium porosity, fossiliferous marine limestone.
852 to 960	Inglis (Ocala)	Brown, hard, medium porosity, slightly fractured argillaceous limestone with intermittent dolomite streaks.
960 to 1,068	Avon Park	Soft, brown, medium to high porosity, fossiliferous marine limestone with intermittent layers of dense blue-gray dolomite.
1,068 to 1,367	Lake City	Soft, brown and white, highly fractured fossiliferous limestone with alternating beds of very dense dolomite. Some fine quartz sand intermingled in the soft, poorly cemented limestone.

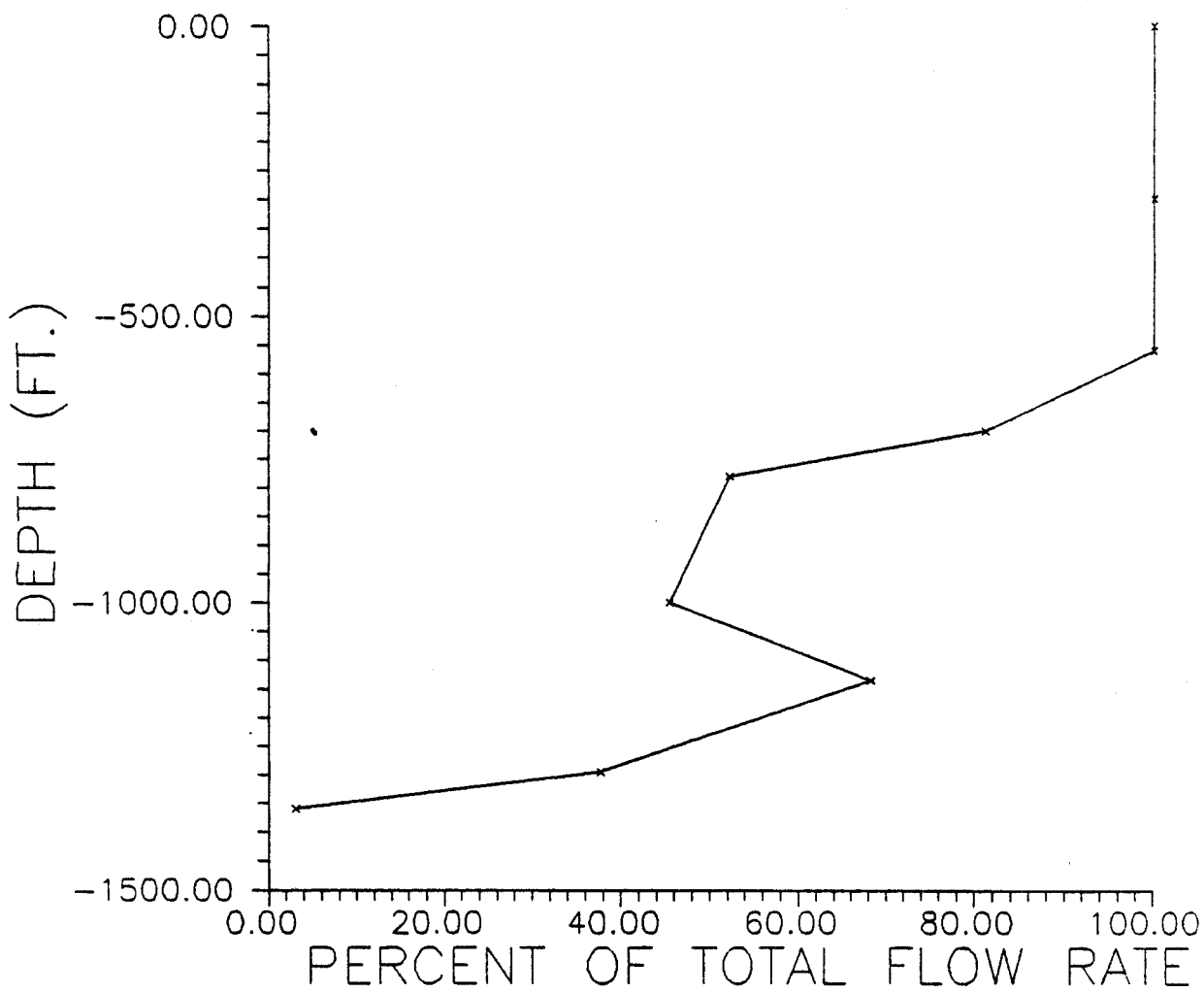
Velocities recorded with a propeller-type flowmeter were converted to capacities by dividing the velocity by the well cross-sectional area. The cross-sectional area of the well was determined from the caliper logs. Figures 3-3 through 3-6 show flow versus depth for each well. It should be noted that the constant total flow between depths 900 and 1,200 feet in Wells 5, 7, and 8 indicates a low flow zone, which correlates with the semi-confining unit between the upper and middle water-bearing zones of the Floridan. The reduction in flow in Well 1 between 800 and 1,000 feet can be attributed to a section of suction pipe that had fallen off the pump and lodged in the open hole before the pump was removed for this study. The video survey of Well 1 showed a 10-foot section of 14-inch diameter suction pipe lodged at a depth of 865 to 875 feet.

3.1.3 Water Quality Survey

Because only limited recent data are available from the USGS and BESD, a water sampling program was performed. Black & Veatch performed an off-site field sampling program on May 19-24, 1989, and Layne-Atlantic performed an onsite sampling program between May 12 and June 5, 1989. All available well logs within a 1-mile radius of the AES Cedar Bay site, and well logs for selected wells within a 6-mile radius of the site, were obtained from the BESD. Wells were then located on the well inventory map, and 39 wells in the Floridan Aquifer were selected for sampling. Table 3-3 summarizes the wells for which logs were obtained and from which samples were taken.

Sampling bottles and equipment were obtained from Enviropact Services, Incorporated. In addition to preparing bottles for field sampling, Enviropact prepared field and laboratory trip blank sets. The trip blank sets consisted of a 1,000-milliliter untreated bottle and a 500-milliliter HNO₃-treated bottle filled with deionized water. The laboratory set was filled and sealed in the lab to guard against contamination by the laboratory air. The field blank set was filled with deionized water at a representative field site.

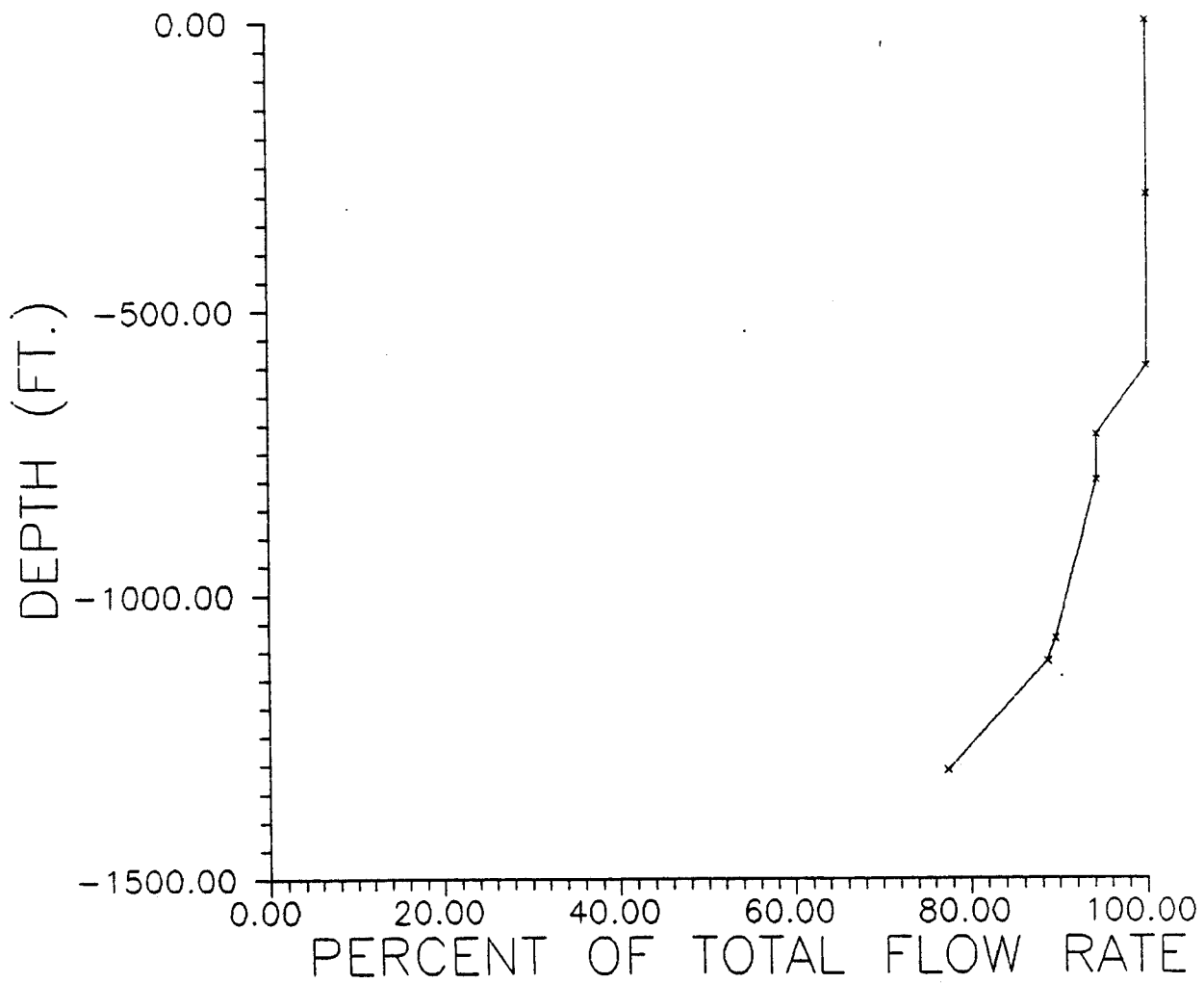
Results of the field and laboratory tests, including the analyses on the field and laboratory trip blanks, are summarized in Table 3-4. The locations of the wells correspond to the map numbers shown on Figure 3-1.



072189-AES

FLOW VERSUS DEPTH
SEMINOLE KRAFT
WELL #1

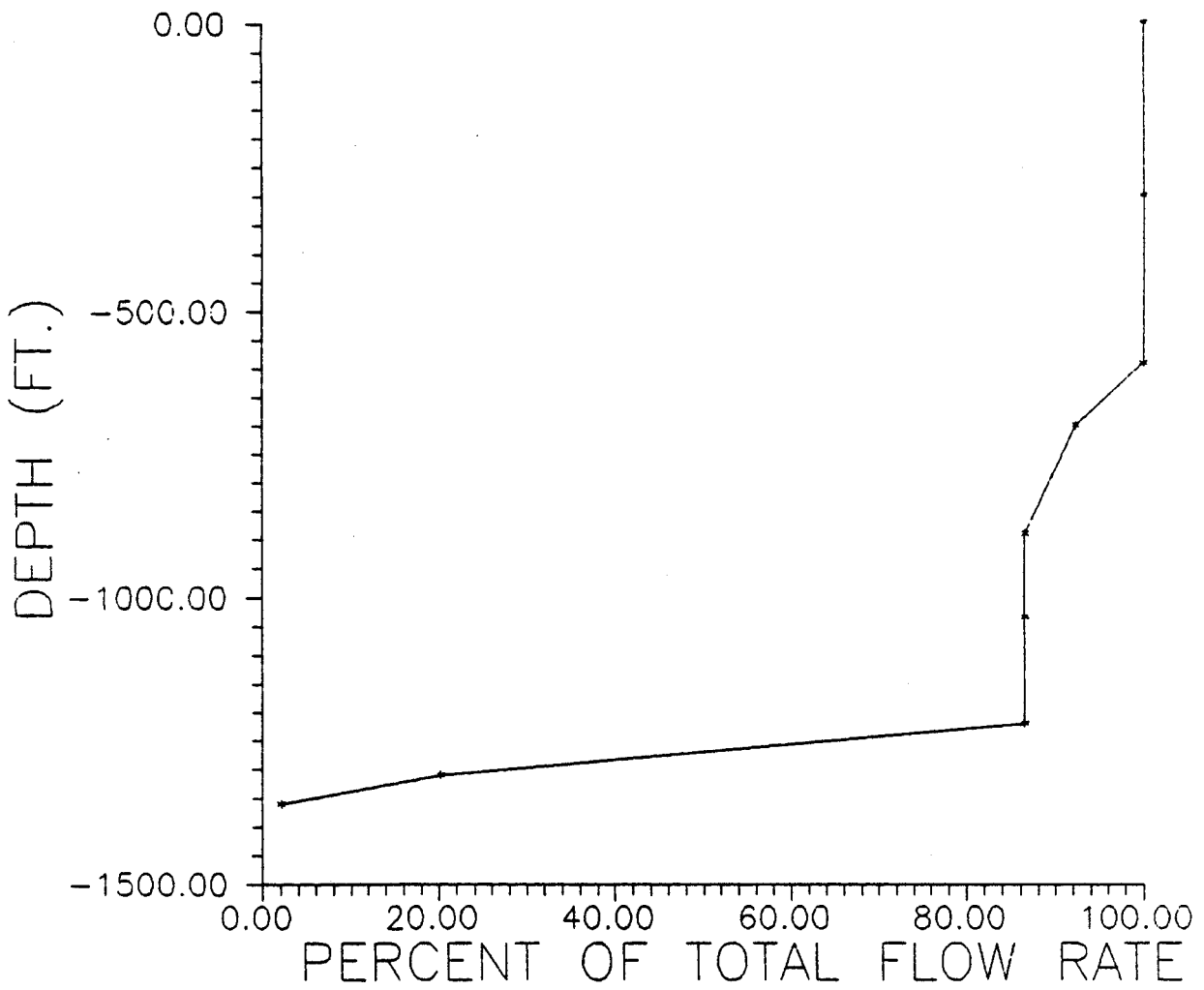
Figure 3-3



072189-AES

FLOW VERSUS DEPTH
SEMINOLE KRAFT
WELL #5

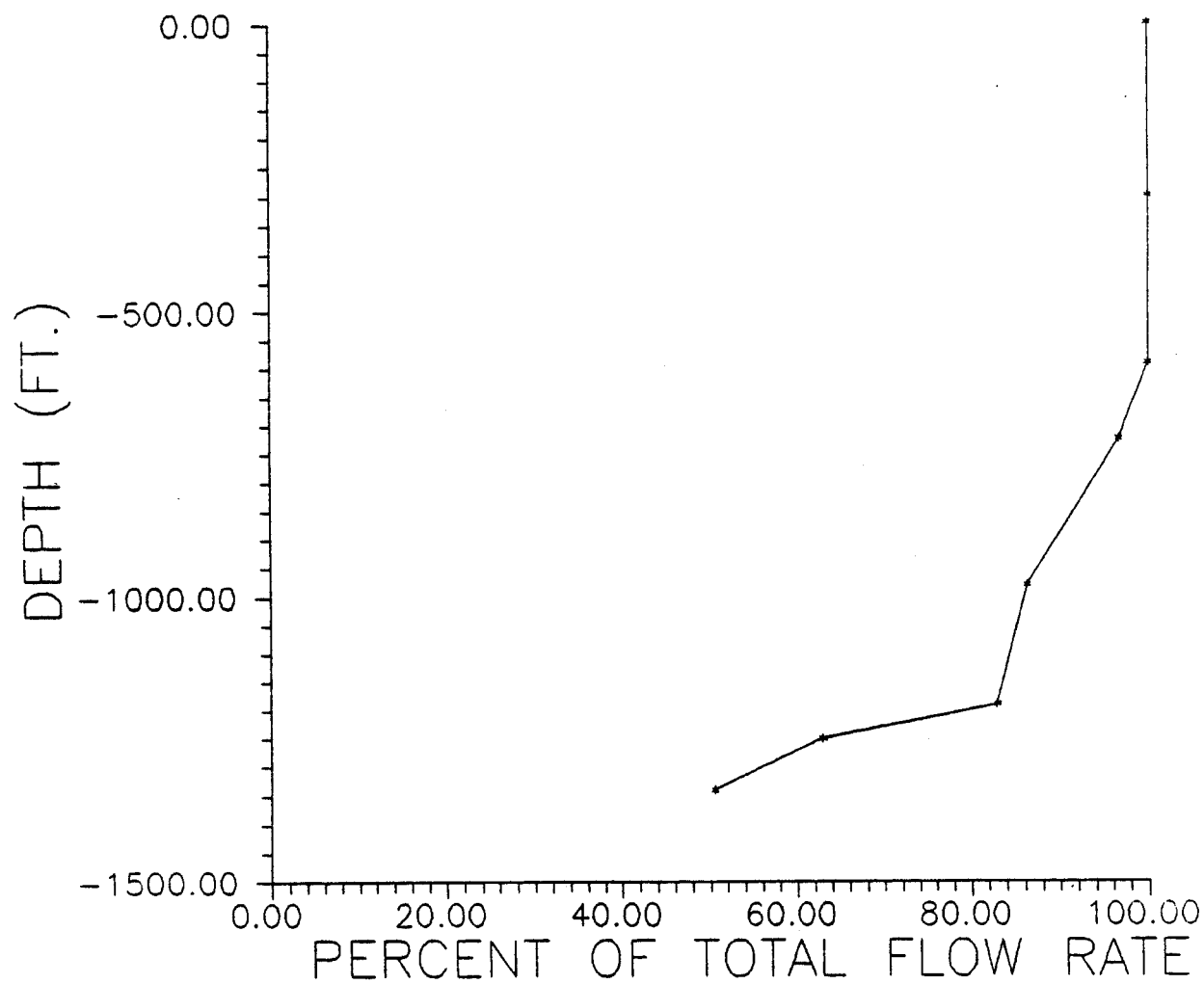
Figure 3-4



072189-AES

FLOW VERSUS DEPTH
SEMINOLE KRAFT
WELL #7

Figure 3-5



072189-AES

FLOW VERSUS DEPTH
SEMINOLE KRAFT
WELL #8

Figure 3-6

TABLE 3-3. WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
1	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	1,373	18.0	Industrial	Upper and Middle Floridan
2	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	1,400	32.8	Industrial	Upper and Middle Floridan
3	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	1,400	36.9	Industrial	Upper and Middle Floridan
4	George Burnsed 1509 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	700	32.5	Domestic	Upper Floridan
5	Blaine Conn 1682 Faye Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	600	32.2	Domestic	Upper Floridan
6	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	1,237	32.6	Test	Middle Floridan
7	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	654	31.6	Test	Upper Floridan
8	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	1,025	36.0	Test	Middle Floridan
9	James Smith 1826 Faye Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	600	32.0	Domestic	Upper Floridan
10	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	1,400	11.5	Industrial	Upper and Middle Floridan
11	D. Fussell 1733 Faye Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	680	NA	Domestic	Upper Floridan

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
12	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	556	30.6	Test	Upper Floridan
13	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	B	1,400		Industrial	Upper and Middle Floridan
15	C. Degrove 1900 Farm Lane Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	B	640		Domestic	Upper Floridan
16	City of Jacksonville 1321 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	B	NA		Domestic	NA
17	Walter Libucha 1887 Farm Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	609	32.1	Domestic	Upper Floridan
18	P. D. Burnsed 2003 Faye Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	640	29.0	Domestic	Upper Floridan
19	Rockaway Beach Cedar Bay Road Jacksonville, FL 32218	SE1/4, SW1/4, SE1/4, Sec 8, T1S, R27E	B	NA		NA	NA
20	F. I. Stalneck 1044 Baisden Road Jacksonville, FL 32218	Land Grant Sec 37, T1S, R27E	A	NA	29.5	Domestic	Upper Floridan
21	Clauson 1379 Cedar Bay Road Jacksonville, FL 32218	NE1/4, NE1/4, SW1/4, Sec 8, T1S, R27E	B	NA		Irrigation	NA
22	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	1,390	34.3	Industrial	Upper and Middle Floridan
23	Landon Griffis 11720 Pulaski Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	B	NA		Domestic	NA

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
24	Long Wheel and Rim 960 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	700	35.9	Domestic	Upper Floridan
26	Seminole Kraft Corporation 9469 Eastport Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	A	1,378	32.5	Industrial	Upper and Middle Floridan
27	Dept. of Transportation Miller Circle Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	B	Plugged 05/18/83			
29	City of Jacksonville Cedar Bay Road Jacksonville, FL 32218	Land Grant Sec 47, T1S, R27E	B	1,285		Industrial	Upper and Middle Floridan
30	Carey Hitchen 11939 Pulaski Road Jacksonville, FL 32218	Land Grant Sec 37, T1S, R27E	B	NA		Domestic	NA
31	Dept. of Transportation 11054 Pleasant Oak Jacksonville, FL 32218	SW1/4, NE1/4, Sec 10, T1S, R27E	B	Plugged 02/03/83			
32	James Oliver 11924 Pulaski Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	B	675		Domestic	Upper Floridan
33	Webster Williams End of Vickers Road Jacksonville, FL 32218	NW1/4, NE1/4, SE1/4, Sec 3, T1S, R27E	A	NA	34.1	Unused	NA
34	Dorothy Cothorn 11971 Pulaski Road Jacksonville, FL 32218	Land Grant S37, T1S, R27E	A	655	28.0	Irrigation	Upper Floridan
35	Carroll Rhoden 2390 Waterbluff Drive Jacksonville, FL 32218	SE1/4, NW1/4, NW1/4, Sec 3, T1S, R27E	A	595	33.5	Domestic	Upper Floridan
36	Nicholas Pantijsa Miller Circle North Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	B	655		Irrigation	Upper Floridan

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
37	Dept. of Transportation 11052 Pleasant Oak Jacksonville, FL 32218	SW1/4, NE1/4, Sec 10, T1S, R27E	B	Plugged 02/03/83			
38	Alvin Speicher 12087 Dunn Creek Road Jacksonville, FL 32218	NW1/4, SE1/4, SE1/4, Sec 34, T1N, R27E	A	660	29.8	Domestic	Upper Floridan
39	Mallery Purvis 12033 Pulaski Road Jacksonville, FL 32218	Land Grant Sec 37, T1S, R27E	A	650	29.5	Domestic	Upper Floridan
40	Jim Mercer 12041 Pulaski Road Jacksonville, FL 32218	Land Grant Sec 37, T1S, R27E	A	643	29.2	Domestic	Upper Floridan
41	BP Oil Inc. 2101 Heckscher Drive Jacksonville, FL 32226	Land Grant S47, T1S, R27E	A	NA	NA	Monitoring	NA
42	Southern Intermodel Logistics, Inc. 1921 Heckscher Drive Jacksonville, FL 32226	Land Grant S47, T1S, R27E	A	660	36.3	Domestic	Upper Floridan
43	Elmer Lewis 2680 Cauley Lane Jacksonville, FL 32226	SE1/4, SE1/4, NE1/4, Sec 3 T1S, R27E	B	620		Domestic	Upper Floridan
44	Amoco Oil Company 2054 Heckscher Drive Jacksonville, FL 32226	Land Grant S47, T1S, R27E	A	810	NA	Domestic	Upper Floridan
45	Alvin Speicher 12087 Dunn Creek Road Jacksonville, FL 32218	SW1/4, SE1/4, S33, T1N, R27E	B	NA		NA	NA
46	Raymond Spaulding 12208 Dunn Creek Road Jacksonville, FL 32218	SE1/4, SE1/4, NE1/4, Sec 33, T1N, R27E	A	668	35.2	Domestic	Upper Floridan
47	W. Bostwick 1632 Heckscher Drive Jacksonville, FL 32226	Land Grant Sec 47, T1S, R27E	B	800		Domestic	Upper Floridan

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
48	Donald Robinson Aldersgate Road Jacksonville, FL	SE1/4, SW1/4, Sec 2, T1S, R27E	B	580		Domestic	Upper Floridan
49	Elliot Support Services 10485 Busch Drive Jacksonville, FL 32226	NE1/4, NW1/4, NE1/4, Sec 18, T1S, R27E	A	700	28.5	Irrigation	Upper Floridan
50	Paul Smith Charlie Road Jacksonville, FL 32218	Land Grant Sec 46, T1S, R27E	B	NA		Irrigation	NA
51	Webb International Inc. Imenson Park Blvd. Jacksonville, FL 32218	SW1/4, SW1/4, SE1/4, Sec 7, T1S, R27E	B	NA		Fire	NA
54	Webb International Inc. Busch Drive Jacksonville, FL 32218	SW1/4, NE1/4, SW1/4, Sec 7, T1S, R27E	A	942	NA	Capped	Upper Floridan
55	Webb International Inc. Busch Drive Jacksonville, FL 32218	SW1/4, SE1/4, SW1/4, Sec 7, T1S, R27E	B	NA		Capped	NA
62	Sea Lift Inc. 9810 August Drive Jacksonville, FL 32226	NW1/4, NW1/4, SW1/4, Sec 14, T1S, R27E	A	700	32.5	Municipal	Upper Floridan
63	Larry Reinhardt 865 New Berlin Road Jacksonville, FL 32218	Land Grant Sec 37, T1N, R27E	A	651	33.8	Domestic	Upper Floridan
64	Sloan Construction Company 1050 Heckscher Drive Jacksonville, FL 32226	Land Grant Sec 48, T1S, R27E	A	660	34.3	Industrial	Upper Floridan
65	McDonald Restaurant 12311 North Main St. Jacksonville, FL 32218	Land Grant Sec 37, T1N, R27E	B	NA		Capped	NA
66	Duval Asphalt 10420 New Berlin Road Jacksonville, FL 32226	Land Grant Sec 38, T1S, R27E	A	659	32.2	Industrial	Upper Floridan

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
67	M&M Dairy, Inc. Newbern Road Jacksonville, FL 32218	SE1/4, SW1/4, SE1/4, Sec 35, T1N, R27E	A	NA	NA	Fish Pond Supply	NA
68	Wayne Soud 12477 Sago Avenue Jacksonville, FL 32218	Land Grant Sec 37, T1N, R27E	B	NA		Unused	NA
70	Jacksonville Electric Authority Northside Generating Sta. New Berlin Road Jacksonville, FL 32226	Land Grant Sec 38, T1S, R27E	E	1,104		Industrial	Upper and Middle Floridan
71	Capitol Concrete Faye & New Berlin Road Jacksonville, FL 32226	Land Grant Sec 39, T1S, R27E	B	753		Industrial	Upper Floridan
72	Lady Fair Bakery 10300 Main Street Jacksonville, FL 32218	Land Grant Sec 49, T1S, R27E	B	700		Fire	Upper Floridan
73	U.S. Navy Fuel Depot Sommers Road Jacksonville, FL 32226	Land Grant Sec 55, T1S, R27E	A	800	33.8	Industrial	Upper Floridan
76	Duval County Oceanway School 143 Oceanway Avenue Jacksonville, FL	Land Grant Sec 37, T1N, R27E	E	NA		Observation	NA
78	M&M Dairy, Inc. 12094 New Berlin Road Jacksonville, FL 32226	NE1/4, NE1/4, NE1/4, Sec 2, T1S, R27E	E	628		Irrigation	Upper Floridan
79	Duval County Oceanway School 143 Oceanway Avenue Jacksonville, FL	Land Grant Sec 37, T1N, R27E	B	NA		Unused	NA
81	James Hickox 13040 Dunn Creek Pond Jacksonville, FL 32218	Land Grant Sec 37, T1N, R27E	A	680	30.0	Domestic	Upper Floridan

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
82	Dunns Terminal Corporation August Drive Jacksonville, FL	SE1/4, SW1/4, SW1/4, Sec 14, T1S, R27E	B	Plugged 9/20/83			
86	Webb International Inc. 10000 Main Street Jacksonville, FL 32218	SE1/4, SE1/4, NE1/4, Sec 13, T1S, R26E	A	1,019	NA	Capped	Upper and Middle Floridan
87	Bill Graham New Berlin and Cedar Bay Roads Jacksonville, FL 32218	SE1/4, NW1/4, SW1/4, Sec 36, T1N, R27E	B	NA			NA
89	McM Dairy, Inc. 12094 New Berlin Road Jacksonville, FL 32226	NW1/4, NW1/4, NW1/4, Sec 3, T1S, R27E	B	NA		Irrigation	NA
90	McM Dairy, Inc. 12094 New Berlin Road Jacksonville, FL 32226	SE1/4, SW1/4, NW1/4, Sec 1, T1S, R27E	B	NA		Cattle Watering	NA
91	Southern Bell Telephone 9209 Hayden Road Jacksonville, FL 32218	NW1/4, NW1/4, Sec 19, T1S, R27E	B	600		Domestic	Upper Floridan
92	H. C. Baughn Woodland Drive Jacksonville, FL 32218	Land Grant Sec 37, T1N, R27E	B	700		Domestic	Upper Floridan
93	Capitol Concrete Franklin Road Jacksonville, FL 32218	NW1/4, SE1/4, NE1/4, Sec 13, T1S, R26E	B	650		Industrial	Upper Floridan
94	Jannie Brill 4261 Heckscher Drive Jacksonville, FL 32226	SE1/4, SE1/4, SE1/4, Sec 14, T1S, R27E	B	640		Domestic	Upper Floridan
95	L. S. Sheffield 3569 New Berlin Road Jacksonville, FL 32226	SE1/4, SE1/4, SW1/4, Sec 35, T1N, R27E	B	642		Domestic	Upper Floridan

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
96	Jacksonville Electric Authority St. Johns River Power Park New Berlin Road Jacksonville, FL 32226	SE1/4, NE1/4, SW1/4, Sec 12, T1S, R27E	B	NA		Industrial	NA
97	Jacksonville Electric Authority August Drive Jacksonville, FL 32226	SE1/4, SE1/4, SW1/4, Sec 14, T1S, R27E	B	NA		Unused	NA
98	Sheffield Dairy 3569 New Berlin Road Jacksonville, FL 32226	SE1/4, SW1/4, NE1/4, Sec 35, T1N, R27E	B	NA		Domestic	NA
99	Claude Braddock 3650 New Berlin Road Jacksonville, FL 32226	NW1/4, NE1/4, SE1/4, Sec 35, T1N, R27E	A	595	29.9	Domestic	Upper Floridan
100	Jacksonville Electric Authority St. Johns River Power Park Off New Berlin at Faye Road Jacksonville, FL 32226	NE1/4, NE1/4, SW1/2, Sec 12, T1S, R27E	B	752		Industrial	Upper Floridan
101	Alvin Jenkins 9877 New Berlin Road Jacksonville, FL 32226	NW1/4, NW1/4, SW1/4, Sec 14, T1S, R27E	B	NA		Domestic	NA
104	Jacksonville Electric Authority August Drive Jacksonville, FL 32226	Land Grant Sec 46, T1S, R27E	B	NA		Unused	NA
109	Jacksonville Electric Authority St. Johns River Power Park New Berlin Road Jacksonville, FL 32226	NW1/4, SE1/4, SE1/4, Sec 12, T1S, R27E	B	750		Industrial	Upper Floridan
110	Jacksonville Electric Authority St. Johns River Power Park New Berlin Road Jacksonville, FL 32226	SW1/4, SE1/4, SE1/4, Sec 12, T1S, R27E	B	750		Industrial	Upper Floridan

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
111	Jacksonville Electric Authority Northside Generating Station 4377 Heckscher Drive Jacksonville, FL 32226	NE1/4, SE1/4, NW1/4, Sec 13, T1S, R27E	A	1,104	30.5	Industrial	Upper and Middle Floridan
113	Jacksonville Electric Authority Northside Generating Station 4377 Heckscher Drive Jacksonville, FL 32226	NE1/4, NE1/4, SW1/4, Sec 13, T1S, R27E	A	1,104	33.4	Industrial	Upper and Middle Floridan
118	City of Jacksonville 234 Shamrock Avenue Jacksonville, FL 32218	Land Grant Sec 37, T1S, R27E	B	1,000		Municipal	Upper and Middle Floridan
122	Jacksonville Electric Authority Northside Generating Station 4377 Heckscher Drive Jacksonville, FL 32226	SW1/4, SW1/4, NE1/4, Sec 13, T1S, R27E	B	1,104		Industrial	Upper and Middle Floridan
130	Jacksonville Electric Authority Northside Generating Station 4377 Heckscher Drive Jacksonville, FL 32226	NW1/4, NW1/4, SE1/4, Sec 13, T1S, R27E	A	1,104	33.3	Industrial	Upper and Middle Floridan
135	Jacksonville Electric Authority Northside Generating Station 4377 Heckscher Drive Jacksonville, FL 32226	SE1/4, NW1/4, SE1/4, Sec 13, T1S, R27E	A	850	34.5	Capped	Upper Floridan
147	Dale Clancy 13030 Duval Lakes Road Jacksonville, FL	Land Grant Sec 38, T1N, R27E	B	680		Domestic	Upper Floridan

TABLE 3-3 (Continued). WELL INVENTORY OF SELECTED WELLS

Map Number	Owner Name/Property Address	Location	Information Level	Well Depth feet	Piezometric Elevation*	Use	Aquifer Penetrated
161	Southern States Utilities University Blvd. and Edenfield Road Jacksonville, FL	SE1/4, SW1/4, SW1/4, Sec 28, T1S, R27E	A	1,000	21.2	Municipal	Upper and Middle Floridan
214	Jacksonville Port Authority SW Corner of Blount Island Jacksonville, FL	SE1/4, SW1/4, NE1/4, Sec 25, T1S, R27E	A	1,328	26.6	Fire Protection	Upper and Middle Floridan
223	Jacksonville Port Authority SW Corner of Blount Island Jacksonville, FL	SW1/4, NE1/4, Sec 25, T1S, R27E	B	1,274		Fire Protection	Upper and Middle Floridan
316	City of Jacksonville Carlton and Burton Street Jacksonville, FL	Land Grant Sec 50, T1S, R26E	B	1,212		Municipal	Upper and Middle Floridan
345	City of Jacksonville Kenmore Street Jacksonville, FL	Land Grant Sec 37, T1S, R26E	E	1,303		Irrigation	Upper and Middle Floridan

*May 1989.

Notes:

A--Have access to well logs (Appendix B) and field sampled.

E--Have access to well logs (Appendix B).

NA--Not Available.

TABLE 3-4. RESULTS OF WATER QUALITY ANALYSES

Map Number	pH, Field		Conductivity, Field		Temperature, deg C	pH, Lab		Conductivity, umho/cm	Bicarbonate Alkalinity, mg/l CaCO ₃	Carbonate Alkalinity, mg/l CaCO ₃	Chloride, mg/l	Sulfate, mg/l	Total Dissolved Solids, mg/l	Total Hardness, mg/l CaCO ₃	Calcium, mg/l	Iron, mg/l	Magnesium, mg/l	Potassium, mg/l	Sodium, mg/l
	S.U.	Field	S.U.	Lab															
2 ^A	7.0	--	--	7.60	620	159	<1	159	620	33	88	395	308	67.3	0.12	29.7	<0.5	16.5	
2 ^B	7.0	--	--	7.60	633	158	<1	158	633	29	93	380	301	68.3	0.13	29.3	<0.5	16.0	
4	7.3	470	--	7.6	426	154	<1	154	426	20	88	313	296	52.8	<0.05	23.2	1.0	13.7	
5	7.1	470	--	7.6	432	156	<1	156	432	20	75	320	292	53.6	<0.05	23.2	1.0	12.7	
6	7.9	450	--	8.05	454	165	<1	165	454	19	73	325	270	52.6	0.45	25.2	0.5	13.6	
8	8.0	540	--	8.04	493	161	<1	161	493	36	84	412	311	62.0	1.98	29.7	0.6	18.2	
9	7.3	580	--	7.5	506	154	<1	154	506	32	96	370	313	57.1	<0.05	28.3	1.1	18.6	
10 ^A	7.0	--	--	7.55	510	158	<1	158	510	21	72	340	315	56.2	0.10	25.2	1.1	14.8	
10 ^B	--	--	--	7.50	520	159	<1	159	520	30	82	382	322	61.0	0.16	27.4	1.0	16.3	
11	7.5	480	--	7.6	458	155	<1	155	458	17	72	333	285	51.0	<0.05	25.0	1.0	14.8	
12	7.8	470	--	7.94	427	161	<1	161	427	18	64	342	279	54.7	0.29	26.0	0.5	13.8	
17	7.1	460	--	7.5	449	156	<1	156	449	17	78	313	287	52.8	<0.05	22.9	1.0	12.7	
18	7.4	500	--	7.92	445	156	<1	156	445	20	64	332	270	53.7	<0.05	25.3	<0.5	14.0	
20	7.4	520	--	7.62	463	153	<1	153	463	22	87	355	294	56.8	<0.05	26.1	0.5	15.0	
24	7.5	470	--	7.56	449	151	<1	151	449	20	78	345	278	55.7	0.08	26.8	0.6	15.5	
26 ^A	7.0	--	--	7.51	626	156	<1	156	626	37	89	372	308	72.5	0.19	30.3	<0.5	17.5	
26 ^B	--	--	--	7.41	563	156	<1	156	563	37	80	395	295	72.5	0.19	29.7	0.5	17.7	
33	7.5	480	--	7.70	430	156	<1	156	430	20	73	350	277	53.7	0.14	24.2	0.5	14.5	
34	7.7	430	--	7.7	473	155	<1	155	473	20	77	343	288	64.1	<0.05	29.7	0.5	15.5	
35	7.8	440	--	7.69	458	154	<1	154	458	19	70	332	282	62.0	<0.05	26.4	<0.5	14.8	
38	7.5	470	--	7.6	452	154	<1	154	452	18	67	345	278	48.4	<0.05	25.2	1.0	13.4	
39	7.4	450	--	7.6	446	155	<1	155	446	20	81	335	285	56.2	<0.05	25.8	1.1	14.4	

A Sample obtained from the upper water bearing zone of the Floridan Aquifer.

B Sample obtained from the middle water bearing zone of the Floridan Aquifer.

TABLE 3-4 (Continued). RESULTS OF WATER QUALITY ANALYSES

Map Number	pH, Field S.U.	Conductivity, Field $\mu\text{mho/cm}$	Temperature, Field deg C	pH, Lab S.U.	Conductivity Lab $\mu\text{mho/cm}$	Bicarbonate Alkalinity mg/l CaCO_3	Carbonate Alkalinity mg/l CaCO_3	Chloride mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Total Hardness mg/l CaCO_3	Calcium mg/l	Iron mg/l	Magnesium mg/l	Potassium mg/l	Sodium mg/l
40	7.4	470	24	7.6	455	156	<1	20	79	330	278	58.0	<0.05	26.6	1.1	15.6
41	7.5	450	23	7.9	441	161	<1	17	67	333	267	51.0	0.25	25.5	1.1	14.1
42	7.4	N/A	24	7.84	445	176	<1	15	58	340	270	51.6	0.49	22.3	<0.5	13.1
44	7.2	230	24	8.0	229	93	<1	7.1	15	138	120	28.4	<0.05	8.2	0.6	8.3
46	7.3	470	24	7.6	460	154	<1	21	75	348	275	46.2	<0.05	25.5	1.2	15.8
49	7.6	450	24	7.67	452	149	<1	19	101	326	284	53.7	<0.05	21.6	<0.05	10.6
54	7.5	400	24	8.06	416	148	<1	16	55	272	252	49.5	5.85	26.0	<0.5	10.9
62	7.4	430	24	7.5	450	152	<1	18	12	323	292	48.4	<0.05	24.9	1.0	13.9
63	7.6	490	24	7.73	473	158	<1	20	20	358	384	57.8	<0.05	26.4	0.5	14.8
64	7.2	N/A	26	7.74	441	155	<1	16	69	330	270	58.2	0.11	21.5	0.5	14.5
66	7.6	400	27	7.74	455	158	<1	18	77	336	289	64.1	0.67	27.7	<0.5	14.3
67	7.3	440	25	7.49	480	155	<1	19	79	312	274	58.9	<0.05	26.3	<0.5	13.9
74	7.6	500	26	7.75	484	143	<1	13	106	380	315	63.1	0.07	26.8	0.6	12.1
81	7.5	480	26	7.68	468	173	<1	20	78	348	268	57.8	<0.05	25.5	0.5	13.8
86	7.7	410	26	7.93	445	156	<1	17	63	332	273	53.7	3.20	26.1	<0.5	12.3
99	7.6	N/A	24	7.68	481	156	<1	19	80	354	298	63.1	<0.05	26.4	0.5	13.8
111	7.6	370	26	7.59	349	122	<1	20	33	238	183	34.8	0.05	21.0	<0.5	14.0
113	7.4	340	26	8.39	323	107	<1	17	37	205	169	28.5	0.12	22.3	0.5	13.1
130	7.3	520	26	7.49	477	151	<1	24	73	358	276	66.2	<0.05	26.4	0.5	14.8
135	7.4	450	24	7.97	452	150	<1	20	61	280	251	53.7	0.40	25.8	0.5	14.5
161	7.9	440	26	7.56	437	142	<1	13	101	340	291	61.0	<0.05	24.7	<0.5	12.1
214	7.8	510	25	7.68	479	151	<1	22	77	360	314	59.9	<0.05	24.8	0.5	13.3
Trip Blank 05/19/89	--	--	--	6.8	1.80	<1	<1	<1	<2	15	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Trip Blank 05/20/89	--	--	--	7.1	0.81	<1	<1	<1.0	<2	15	<1	<0.5	<0.05	<0.5	<0.5	<0.5

TABLE 3-4 (Continued). RESULTS OF WATER QUALITY ANALISES

Map Number	pH, Field S.U.	Conductivity, Field $\mu\text{mho/cm}$	Temperature, Field deg C	pH, Lab S.U.	Conductivity Lab $\mu\text{mho/cm}$	Bicarbonate Alkalinity mg/l CaCO_3	Carbonate Alkalinity mg/l CaCO_3	Chloride mg/l	Sulfate mg/l	Total Dissolved Solids mg/l	Total Hardness mg/l CaCO_3	Calcium mg/l	Iron mg/l	Magnesium mg/l	Potassium mg/l	Sodium mg/l
Field Blank 05/20/89	--	--	--	6.0	1.21	<1	<1	<1	<2	8	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Field Blank 05/15/89	--	--	--	7.1	0.85	<1	<1	<1	<2	13	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Field Blank B 05/22/89	--	--	--	6.12	4.82	<1	<1	<1	<2	10	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Trip Blank B 05/22/89	--	--	--	7.25	3.90	<1	<1	<1	<2	<1	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Field Blank A 05/22/89	--	--	--	6.39	1.81	<1	<1	<1	<2	<1	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Trip Blank A 05/22/89	--	--	--	7.56	0.86	<1	<1	<1	<2	<1	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Field Blank B 05/23/89	--	--	--	6.48	0.93	<2	<1	<1	<2	28	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Lab Blank B 05/23/89	--	--	--	7.13	0.82	<2	<1	<1	<2	<10	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Lab Blank A 05/23/89	--	--	--	7.39	0.82	<2	<1	<1	<2	<10	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Field Blank A 05/23/89	--	--	--	6.03	2.10	<2	<1	<1	<2	<10	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Trip Blank 05/24/89	--	--	--	8.44	1.57	<2	<1	<1	<2	<1	<1	<0.5	<0.05	<0.5	<0.5	<0.5
Field Blank 05/24/89	--	--	--	8.04	2.58	<2	<1	<1	<2	<1	<1	<0.5	<0.05	<0.5	<0.5	<0.5

3.1.3.1 Offsite Sampling Procedure. Upon arriving at a sampling site, the well was allowed to flow for a minimum of five minutes to flush the system. Wells used infrequently were allowed to flow for a longer period of time. At each well, three samples were collected. The first sample consisted of filling an untreated 1,000- milliliter bottle. This water sample was used to determine total hardness, carbonate, bicarbonate, specific conductivity, chloride content, sulfate content, pH, and total dissolved solids. The second sample was collected in a 500-milliliter bottle that was treated with HNO_3 . This sample was used to determine calcium, magnesium, potassium, iron, and sodium contents. The third sample was collected in a 100-milliliter glass jar and was used to determine field pH, conductivity, and temperature. Samples to be laboratory tested were placed in an ice-filled cooler to maintain a constant temperature. All samples were transported to the lab in accordance with standard laboratory procedures.

3.1.3.2 Onsite Sampling Procedure. Two water samples were collected from Seminole Kraft Wells 1, 5, and 8 (Figure 3-2). In each well, one sample was obtained from the UWBZ, and one sample was obtained from the MWBZ of the Floridan Aquifer.

The samples from the MWBZ were collected by isolating the lower portion of the well with a single inflatable packer. The natural flow was allowed to travel through the drill rod to the surface for approximately 20 minutes to ensure an unpolluted sample.

The UWBZ samples were collected by constructing a straddle packer to isolate the MWBZ from the UWBZ. The straddle packer consisted of a perforated drill rod connecting an upper and lower packer assembly. The wells were allowed to flow for approximately 20 minutes before samples were taken.

Each sample was collected and stored in an insulated container until delivered to the laboratory. Parameters tested in the lab include pH, bicarbonate alkalinity, carbonate alkalinity, chloride, conductivity, total dissolved solids, total hardness, calcium, iron, magnesium, potassium, and sodium.

3.1.4 Water Level Measurements

Well-head pressures relative to ground surface were measured at 39 wells between May 19 and June 5, 1989. Water level elevations (Table 3-3) were calculated from the pressure readings and the ground surface elevations. For offsite wells, ground surface elevations were estimated from USGS topographic maps, and pressure gauges were accurate to 0.1 psi. For onsite wells, 0 to 15 psi calibrated pressure gauges were installed on the 16-inch blowoff lines. The elevation of each gauge was referenced to surveyed elevations at the top of the concrete slab at each well.

3.1.5 Aquifer Tests

A 72-hour pump test was performed at the project site. During the pump test, Wells 4, 5, and 7 were each pumped at a rate of 4,500 to 5,000 gpm. Water levels were recorded in Wells 1, 2, 5, 7, 8, and 9 throughout pumping. The wells reached stabilization very quickly as shown in the pump test data in the Layne report (Appendix C). The influence of the pumping wells on the adjacent wells was negligible. Once the pumping wells stabilized, the water levels did not fluctuate during the entire test.

Data from Well 5 were used to calculate the aquifer parameters. Drawdown versus time was plotted on semi-log paper and the Jacob Method was used to calculate a range of transmissivities and storage coefficients. As shown in Appendix C, the slope of the drawdown versus time plot became horizontal after 90 minutes of pumping; therefore, the portion of the line between 0 and 90 minutes was used to calculate the aquifer parameters. From this portion of the data, transmissivity ranged from 344,348 to 416,842 gallons per day per foot, and storage coefficient ranged from 1.43×10^{-3} to 5.76×10^{-4} .

3.2 RESULTS OF INVESTIGATION

The data collected in the investigation were used to generate the existing piezometric surface and chloride concentration maps (Figures 3-7 and 3-8). In comparison of these maps to the 1962 maps of Duval and Nassau counties showing the piezometric surface and approximate chloride content

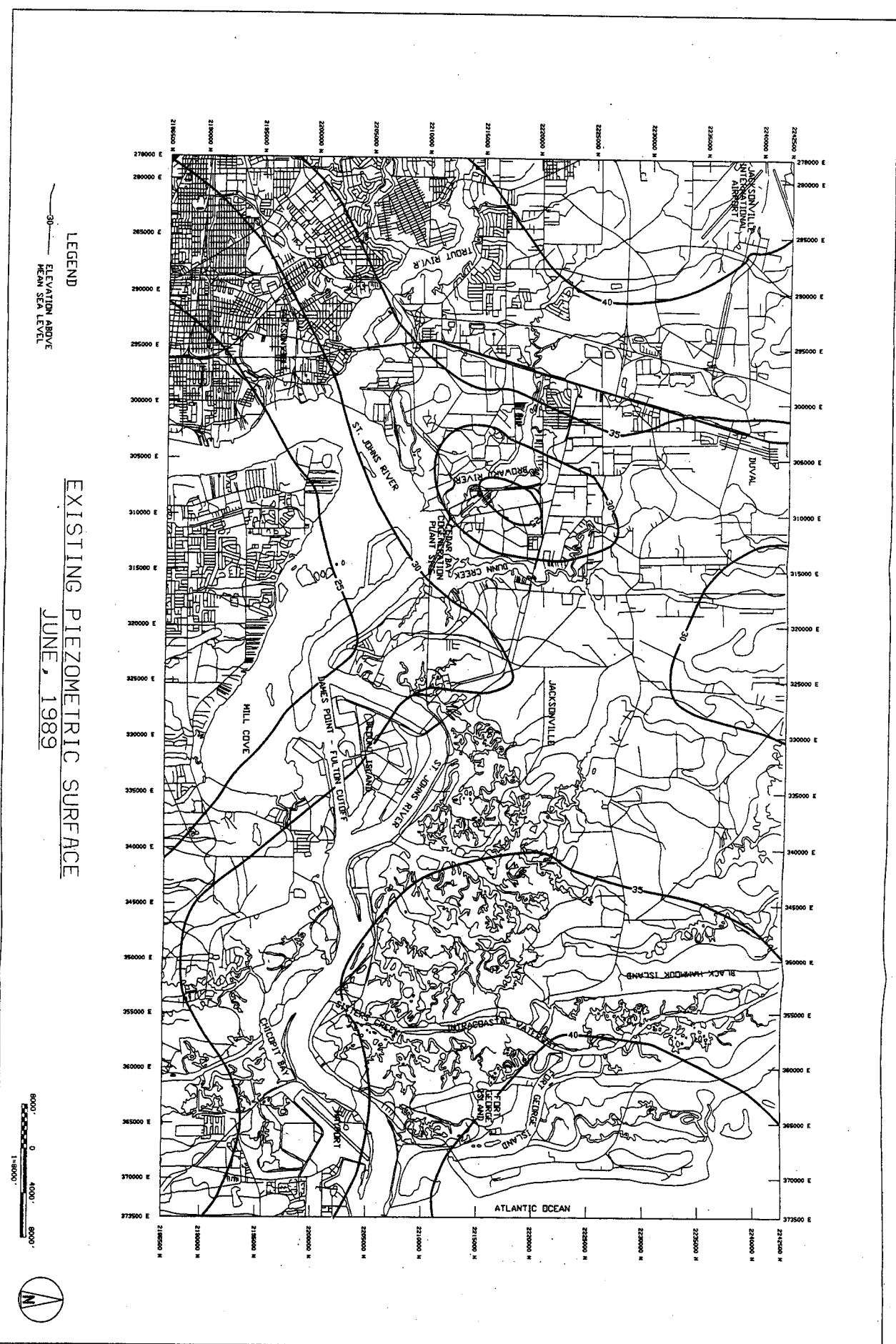
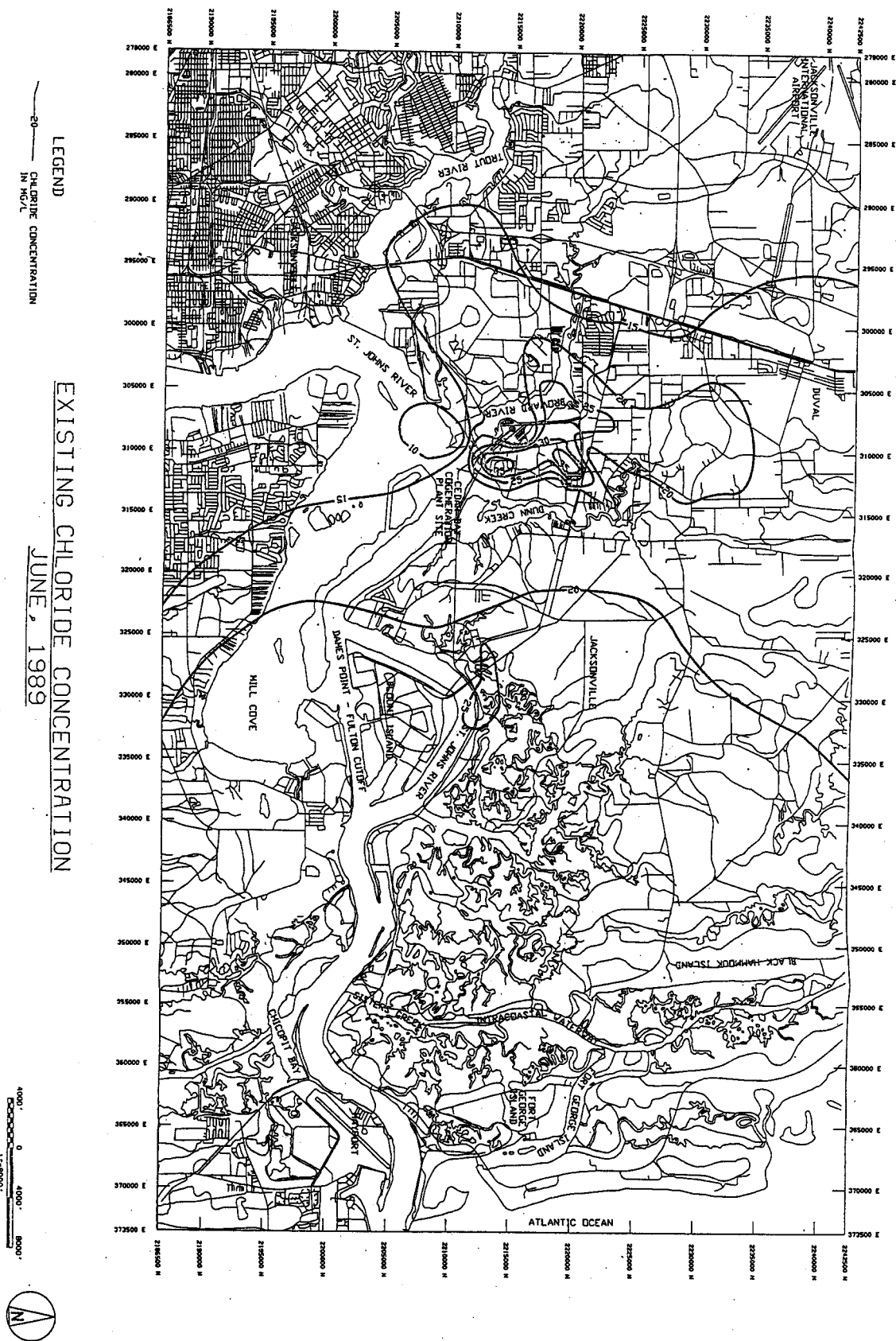


FIGURE 3-7



for the Floridan Aquifer (Figures 2-9 and 2-12), it is apparent that site conditions have not significantly changed in the past 27 years of pumping at the Seminole Kraft mill.

The Seminole Kraft mill began pumping from their well field in 1956. Table 3-5 shows the comparison of historical to current water quality data in Seminole Kraft Wells 5, 8, and 9. The degradation of water quality due to chloride intrusion is negligible to nonexistent during operation of the well field.

TABLE 3-5. COMPARISON OF HISTORICAL TO CURRENT WATER QUALITY DATA FOR SEMINOLE KRAFT WELL NUMBERS 5, 8, AND 9

<u>Seminole Kraft Well Number</u>	<u>Date Sampled</u>	<u>Depth Sample</u>	<u>Specific Conductance</u>	<u>Total Hardness</u>	<u>Chloride</u>	<u>Sulfate</u>
5	4/24/56			262	23.0	78
	5/20/89	881 to 1,290	510	315	21.0	72
	5/18/89	1,290 to 1,400	520	322	30.0	82
8	3/19/56	650		264	20.6	84.3
		700		264	20.6	86.2
		750		266	20.6	89.2
		800		658	21.2	95.4
		850		280	20.6	104.9
		900		272	20.6	82.3
		950		274	17.0	80.5
		1,000		268	19.4	82.3
		1,050		300	21.8	67.7
		1,100		296	19.4	73.7
		1,150		520	17.0	70.4
		1,250		276	21.9	57.8
		1,300		278	22.0	69.3
		1,350		272	28.0	81.5
	6/6/56	698		274	26.7	89.7
		788		292	26.7	86.4
		878		284	25.5	95.0
		968		274	26.7	82.3
		1,058		272	27.9	87.2
		1,148		290	26.7	86.9
		1,238		284	27.9	85.6
		1,348		280	27.9	85.6
	6/2/89	980 to 1,278	620	308	33.0	88.0
	6/1/89	1,278 to 1,400	633	301	29.0	93.0

TABLE 3-5 (Continued). COMPARISON OF HISTORICAL TO CURRENT WATER QUALITY DATA FOR SEMINOLE KRAFT WELL NUMBERS 5, 8, AND 9

<u>Seminole Kraft Well Number</u>	<u>Date Sampled</u>	<u>Depth Sample</u>	<u>Specific Conductance</u>	<u>Total Hardness</u>	<u>Chloride</u>	<u>Sulfate</u>
9	7/9/56	700		300	26.0	71.8
		750		260	25.4	75.9
		800		286	24.8	81.5
		850		580	24.8	73.4
		900		280	26.7	76.9
		950		292	25.4	78.2
		1,000		286	21.2	175.6
		1,050		280	22.4	165.2
		1,100		280	23.0	174.2
		1,150		276	23.0	165.4
		1,200		280	22.8	154.3
		1,400		276	32.2	158.6
	2/17/76	650	650	250	25.0	.
		1,300	553	260	25.0	

4.0 PUMPING EFFECTS

4.1 WATER SUPPLY REQUIREMENTS

The primary source of water for the Cedar Bay Cogeneration Project will be ground water from the Floridan Aquifer. Most of the water will be used as makeup to the cooling towers. The remainder will be used for portable water, general plant uses, fire water, and makeup to the steam cycle.

The well water will be obtained from the existing Seminole Kraft Corporation well field (Figure 3-2). Makeup to the cooling towers will be untreated. Water for all other plant uses will be treated.

The Cedar Bay Cogeneration Plant will require an average flow of 5.5 mgd (3,800 gpm) and a peak flow of 7 mgd (4,900 gpm) in addition to the ground water currently withdrawn for the Seminole Kraft plant operations. This would be equivalent, with the maximum Seminole Kraft plant usage, to three wells at a full design withdrawal rate of 7,500 gpm per well. This would require full capacity of Wells 7, 8, and 9.

Freshwater use in Duval County is 173.5 mgd, with 158.01 mgd from the Floridan Aquifer. Power generation in Duval County requires 3.09 mgd. The Cedar Bay Cogeneration Plant would increase the average daily requirement for power generation to 8.6 mgd. Total water withdrawn from the Floridan Aquifer for power generation within the St. Johns Water Management District was 133.72 mgd in 1986. This project would increase the total withdrawn for power generation to 139.2 mgd.

4.2 WATER LEVEL AND WATER QUALITY CHANGES

4.2.1 Flow and Transport Model

The USGS flow and transport models, MODFLOW (McDonald and Harbaugh) and MOC (Konikow and Bedehoeft) were used to simulate the effects of pumping on water level elevations and water quality for the upper water-bearing zone and the middle water-bearing zone of the Floridan Aquifer.

MODFLOW is a finite-difference model that simulates ground water flow in three dimensions. Ground water flow within the aquifer is simulated using a block-centered finite-difference approach. Layers can be simulated

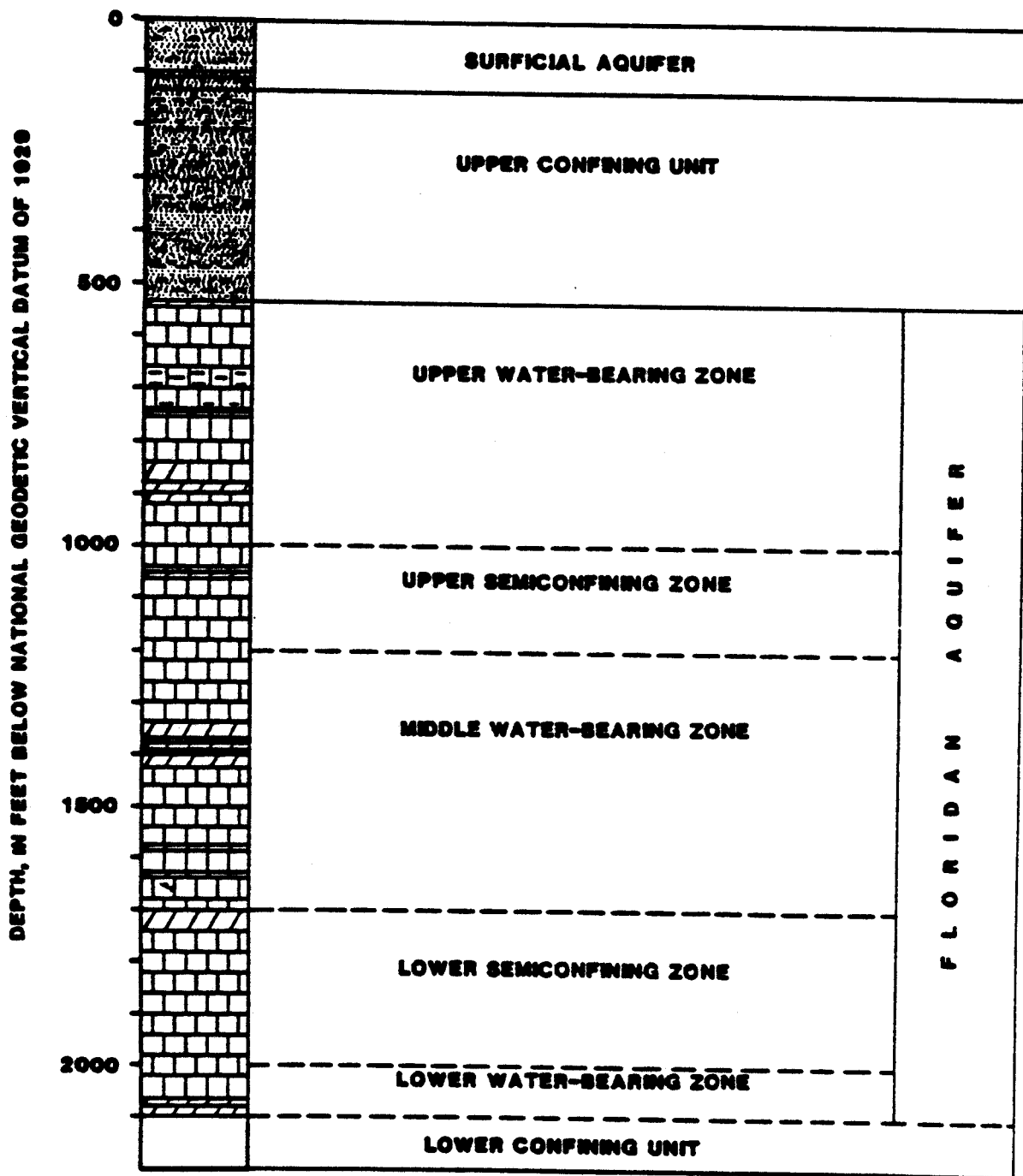
as confined, unconfined, or a combination of confined and unconfined. Flow from external stresses, such as flow to wells, areal recharge, evapotranspiration, flow to drains, and flow through river beds, can also be simulated. The finite-difference equations can be solved using either the Strongly Implicit Procedure or Slice-Successive Overrelaxation.

MOC is a model that simulates solute transport in flowing ground water. It is applicable to one-dimensional or two-dimensional problems involving steady-state or transient flow. The model computes changes in concentration over time caused by the processes of convective transport, hydrodynamic dispersion, and mixing (or dilution) from fluid sources. The model assumes that the solute is nonreactive and that gradients of fluid density, viscosity, and temperature do not affect the velocity distribution. The aquifer may be heterogeneous and (or) anisotropic. The model couples the ground water flow equation with the solute-transport equation.

4.2.1.1 Flow Model Calibration. The flow model was calibrated for the UWBZ by simulating observed hydraulic heads in the region and at the Seminole Kraft well field. The calibration model simulated the change in piezometric head from 1956, when Seminole Kraft began withdrawal of ground water, to the present. All major water users in the study area (Table 2-3) were included in the model.

The model consisted of seven layers (Figure 4-1) including the surficial aquifer, the upper confining unit (Hawthorn formation), the UWBZ of the Floridan (Ocala), the upper semi-confining unit (Avon Park limestone), the MWBZ of the Floridan (Lake City limestone), the lower semi-confining unit, and the LWBZ of the Floridan. Each unit was assumed to be uniform in thickness across the study area. The normal faults which occur within the study area were neglected in the model because they do not have any major effect on the flow system of the aquifer (Miller, 1982). Aquifer parameters used for each layer are summarized in Table 4-1.

Since no regional piezometric head information was available for 1956, the regional piezometric map for May 1962 (Figure 2-9) was assumed to be representative of the UWBZ conditions in 1956. Figure 2-9 indicates that



Source: Environmental Science and Engineering, Inc. 1985

GENERALIZED MODEL OF THE
SITE STRATIGRAPHY

TABLE 4-1. AQUIFER PARAMETERS USED IN FLOW MODEL

<u>Layer</u>	
1	Surficial Aquifer--Unconfined $S = 1 \times 10^{-3}$ $K = 8 \text{ ft/day}$ Thickness = 100 feet
2	Upper Confining Unit--Confined $S = 1 \times 10^{-5}$ $T = 0.4 \text{ ft}^2/\text{day}$ Thickness = 400 feet $K_H = 1 \times 10^{-3} \text{ ft/day}$ $K_V = 2 \times 10^{-7} \text{ ft/day}$
3	Upper Water-Bearing Zone--Confined $S = 5 \times 10^{-4}$ $T = 55,000 \text{ ft}^2/\text{day}$ Thickness = 450 feet $K_H = 122 \text{ ft/day}$ $K_V = 0.15 \text{ ft/day}$
4	Upper Semi-Confining Zone--Confined $S = 5 \times 10^{-4}$ $T = 0.2 \text{ ft}^2/\text{day}$ Thickness = 200 feet $K_H = 1 \times 10^{-3} \text{ ft/day}$ $K_V = 5 \times 10^{-5} \text{ ft/day}$

TABLE 4-1 (Continued). AQUIFER PARAMETERS USED IN FLOW MODEL

Layer

5	Middle Water-Bearing Zone--Confined $S = 5 \times 10^{-4}$ $T = 67,000 \text{ ft}^2/\text{day}$ Thickness = 500 feet $K_H = 134 \text{ ft/day}$ $K_V = 0.27 \text{ ft/day}$
6	Lower Semi-Confining Zone--Confined $S = 5 \times 10^{-4}$ $T = 0.3 \text{ ft}^2/\text{day}$ Thickness = 300 feet $K_H = 1 \times 10^{-3} \text{ ft/day}$ $K_V = 3.3 \times 10^{-6} \text{ ft/day}$
7	Lower Water-Bearing Zone--Confined $S = 1 \times 10^{-4}$ $T = 75,000 \text{ ft}^2/\text{day}$ Thickness = 100 feet $K_H = 750 \text{ ft/day}$

where S = Storage Coefficient or Storativity
K = Hydraulic Conductivity
T = Transmissivity
 K_H = Horizontal Hydraulic Conductivity
 K_V = Vertical Hydraulic Conductivity

the hydraulic head at the Seminole Kraft mill was approximately 35 feet msl in 1962; therefore, the starting head values for the UWBZ were set equal to elevation 35 feet msl. Beginning heads for the other layers were assumed.

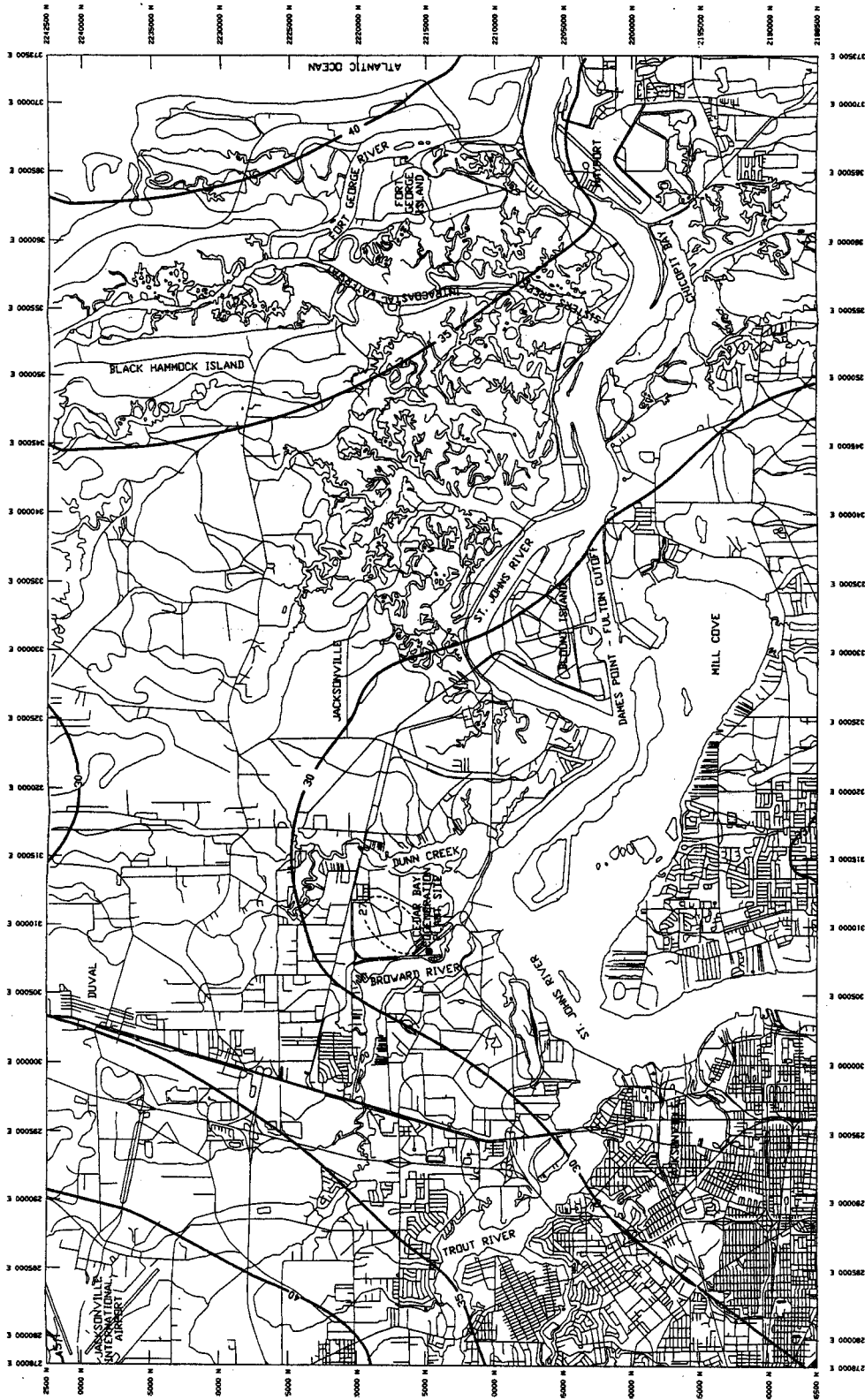
Constant head boundaries were selected to reflect the regional lowering of the piezometric pressure due to major pumping at Fernandina Beach and the City of Jacksonville. These pumping centers were both outside the boundaries of the model; however, they have significant effects on the boundary conditions of the study area. Constant head boundaries for the UWBZ were set at 45 feet at the northwest corner and west boundary, 40 feet at the northeast corner and east boundary, 30 feet at the north-central boundary, and 25 feet at the south boundary.

The calibration model for the piezometric surface assumed transient flow conditions with three time steps: 1956 to 1978 (22 years), 1978 to 1984 (6 years), and 1984 to 1989 (5 years). During this 33-year simulation, it was assumed that three Seminole Kraft wells and the City of Jacksonville Highlands and Norwood wells were continuously pumping at a constant rate of 19.5, 7.76, and 2.52 mgd, respectively. During the second time step, the Northside Generating Station wells were added to the model at a pumping rate of 1.6 mgd. During the third time step, two Jacksonville Electric Authority wells were added to the model at pumping rates of 0.45 and 2.59 mgd.

The above mentioned wells penetrate both the upper and middle water-bearing zones of the Floridan Aquifer. It was assumed that for each well, 20 percent of the flow was obtained from the UWBZ and 80 percent of the flow was obtained from the MWBZ. This assumption was based on the flow-meter log results obtained at the Seminole Kraft well field (Figures 3-3 through 3-6).

All other wells used in the model only penetrate the UWBZ and were assumed to be continuously pumping at the rates given in Table 2-3 for the entire 33-year simulation.

The calibration results were in good agreement with the observed conditions as indicated by comparing the current piezometric surface map (Figure 3-7) with the simulated piezometric surface map (Figure 4-2).



SIMULATED EXISTING PIEZOMETRIC
SURFACE, 1989

SIMULATION PERIOD:
22 YEARS (1956-1989)

2000' 1000' 0 2000' 4000'

4.2.1.2 Effects of Proposed Pumping on Water Levels. The long-term effects of the proposed pumping were simulated using the calibrated flow model for the study area. Three production rates were modeled assuming transient conditions for 40 years. Simulated piezometric surface maps for the three cases are shown on Figures 4-3 through 4-5.

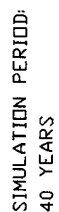
The first case simulated the current average daily pumping rate, 19.5 mgd, at the Seminole Kraft mill. The results of this model show that the drawdown at the wells and in the surrounding area is approximately the same as the existing conditions, signifying steady-state has been achieved at the site.

The second case simulated the average combined daily pumping rate of the Seminole Kraft mill and the Cedar Bay Cogeneration Project for a total of 25 mgd. The results of this model indicate that the drawdown at the well field will increase approximately 1.5 feet as a result of the additional 5.5 mgd withdrawn over the 40-year period.

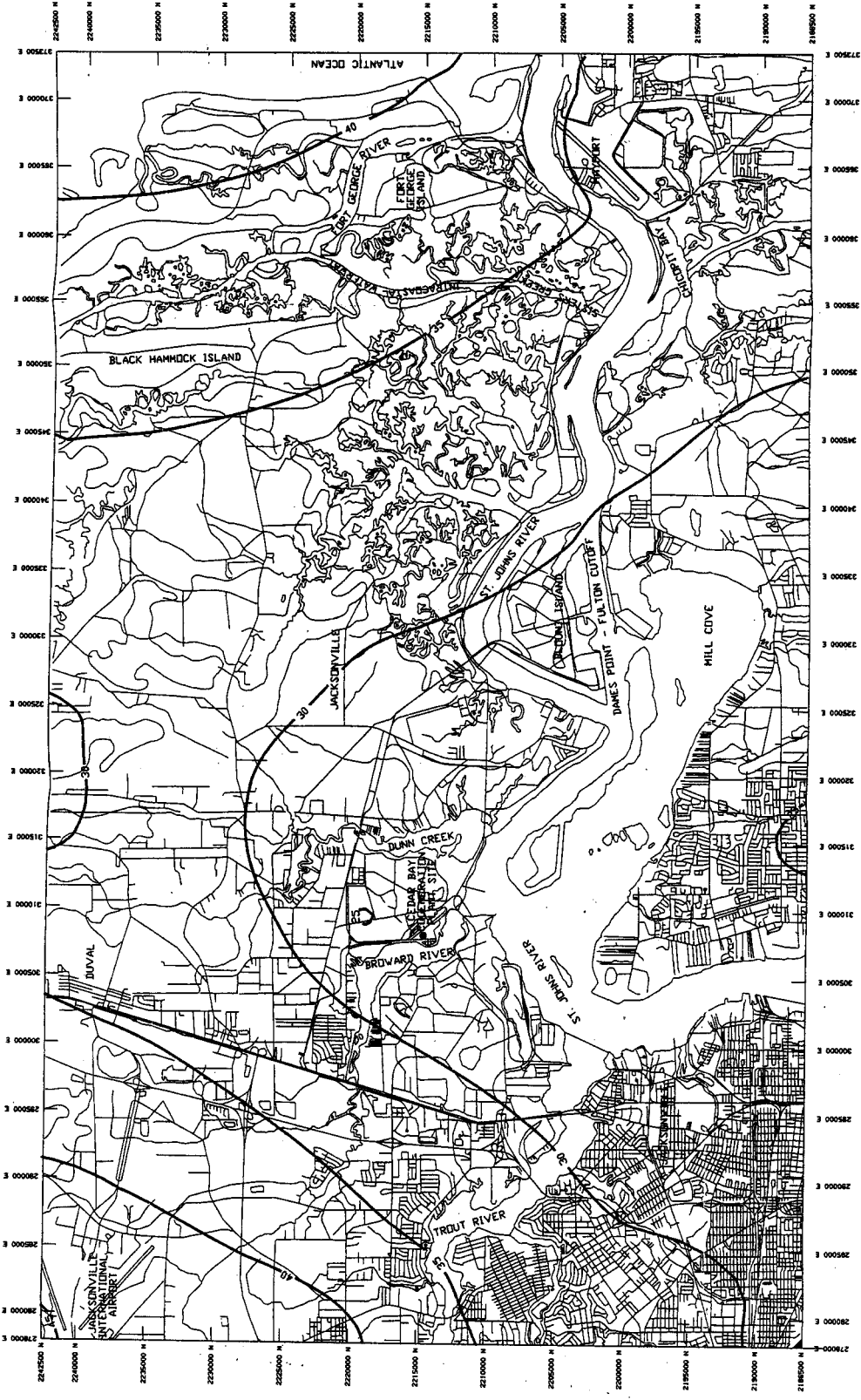
The third case simulated the maximum combined daily pumping rate of the Seminole Kraft mill and the Cedar Bay Cogeneration Project for a total of 32 mgd. This case assumes a combination of maximum instantaneous withdrawal occurring continuously and, therefore, is extremely conservative. The anticipated actual flows will average only 78 percent of these maximums. The results of this model indicate that the drawdown at the well field will increase approximately 3.4 feet as a result of an additional 7.0 mgd withdrawn over the 40-year period.

None of the cases indicated significant drawdowns offsite; therefore, wells in the surrounding area are not expected to be adversely affected by the additional withdrawal of water required by the Cedar Bay Cogeneration Project. This conclusion is also supported by the results of the pump test performed at the well field. During this test, the influence of the pumping wells on adjacent wells in the well field could not be measured (Subsection 3.1.5 and Appendix C).

4.2.1.3 Calibration of Transport Model. The transport model was calibrated for the UWBZ by simulating observed chloride concentrations in the region and at the Seminole Kraft well field. The calibration model simulated the change in chloride content from 1956, when Seminole Kraft began



4-9



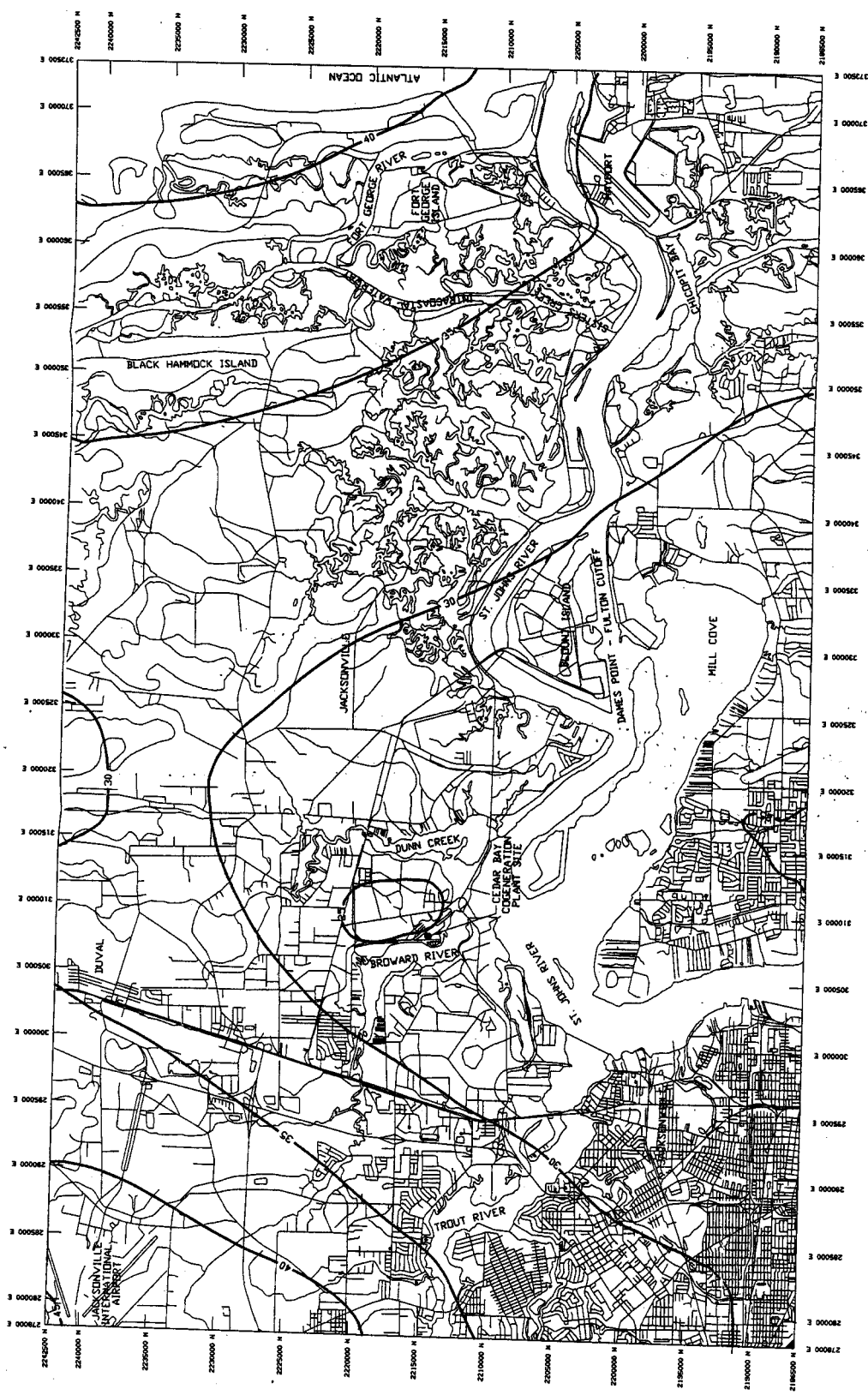
SIMULATION PERIOD:
40 YEARS

SIMULATED PIEZOMETRIC SURFACE
AVERAGE DAILY COMBINED
PUMPING RATE, 25 MGD

072089

4-10

FIGURE 4-4



SIMULATION PERIOD:
 40 YEARS
 SIMULATED PIEZOMETRIC SURFACE
 MAXIMUM COMBINED DAILY PUMPING
 RATE, 32 MGD

072089

withdrawal of ground water, to the present. The initial chloride concentrations used in the calibration were estimated from the maps of Duval and Nassau counties showing the approximate chloride content in 1940 and 1962 (Figures 2-11 and 2-12).

The source of chloride in the Floridan Aquifer comes from the Cedar Keys formation (LWBZ) at a depth of approximately 2,000 feet. The concentration of chloride in this zone is about 3,000 mg/l (Brown, et al., 1984). The potential for chloride contamination in the UWBZ was simulated by specifying the flux into each grid block of the MOC model. The flow into each grid block was determined by calculating the differential head between UWBZ and LWBZ of the Floridan Aquifer, as determined from the calibration flow model, and calculating a flow rate using Darcy's Law. Aquifer parameters used in the model are summarized in Table 4-2.

The results of the calibration indicate trends similar to those measured in the field investigation as shown by comparing the existing chloride concentration map (Figure 3-8) to the simulated existing chloride concentration map (Figure 4-6). The simulated chloride concentrations were slightly higher than those observed because the flow rates were assumed to be constant over the entire 33-year period of pumping from 1956 to 1989. This assumption is conservative considering some wells included in the model were not drilled until the late 1970s to early 1980s, therefore, increasing flow with time.

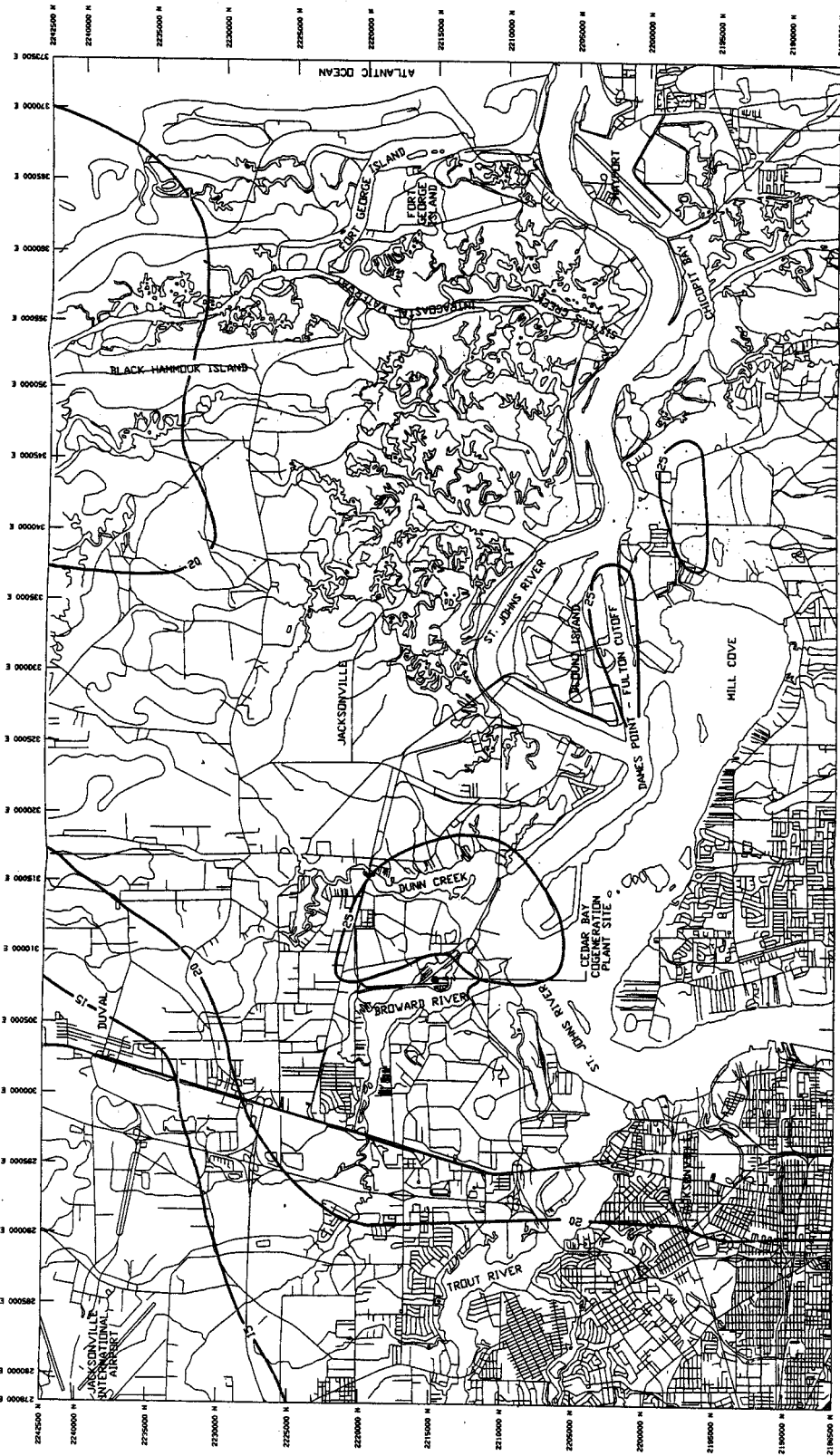
4.2.1.4 Effects of Proposed Pumping on Chloride Concentrations. The potential for ground water degradation due to chloride intrusion was modeled for each of the pumping rates used in the flow model (19.5, 25.0, and 32.0 mgd) over 40 years. Chloride concentration contours for these three cases are shown on Figures 4-7 through 4-9. In addition to these cases, a background case was modeled assuming no pumping at the Seminole Kraft well field to determine the effects of the other major water users on the water quality.

This background model which assumed no future pumping at the Seminole Kraft wells showed an increase of approximately 5 mg/l in 40 years in the area of the Seminole Kraft well field (Figure 4-10). This increase is consistent with the regional increase in chloride content shown from 1940 to

TABLE 4-2. AQUIFER PARAMETERS USED IN TRANSPORT MODEL

$T = 60,000 \text{ ft}^2/\text{day}$	19 rows by 20 columns
$b = 1,100 \text{ ft}$	$\Delta X = 5,000 \text{ ft}$
$K' = 2.2 \times 10^{-3} \text{ ft/day}$	$\Delta Y = 2,500 \text{ ft}$
$S = 0.0$	$C' = 3,000 \text{ mg/l}$
$E = 0.35$	$C_o = \text{varied across study area}$
$\alpha_L = 250 \text{ ft}$	$\text{CELDIS} = 0.50$
$\alpha_T/\alpha_L = 0.30$	$\text{NPTPND} = 9$

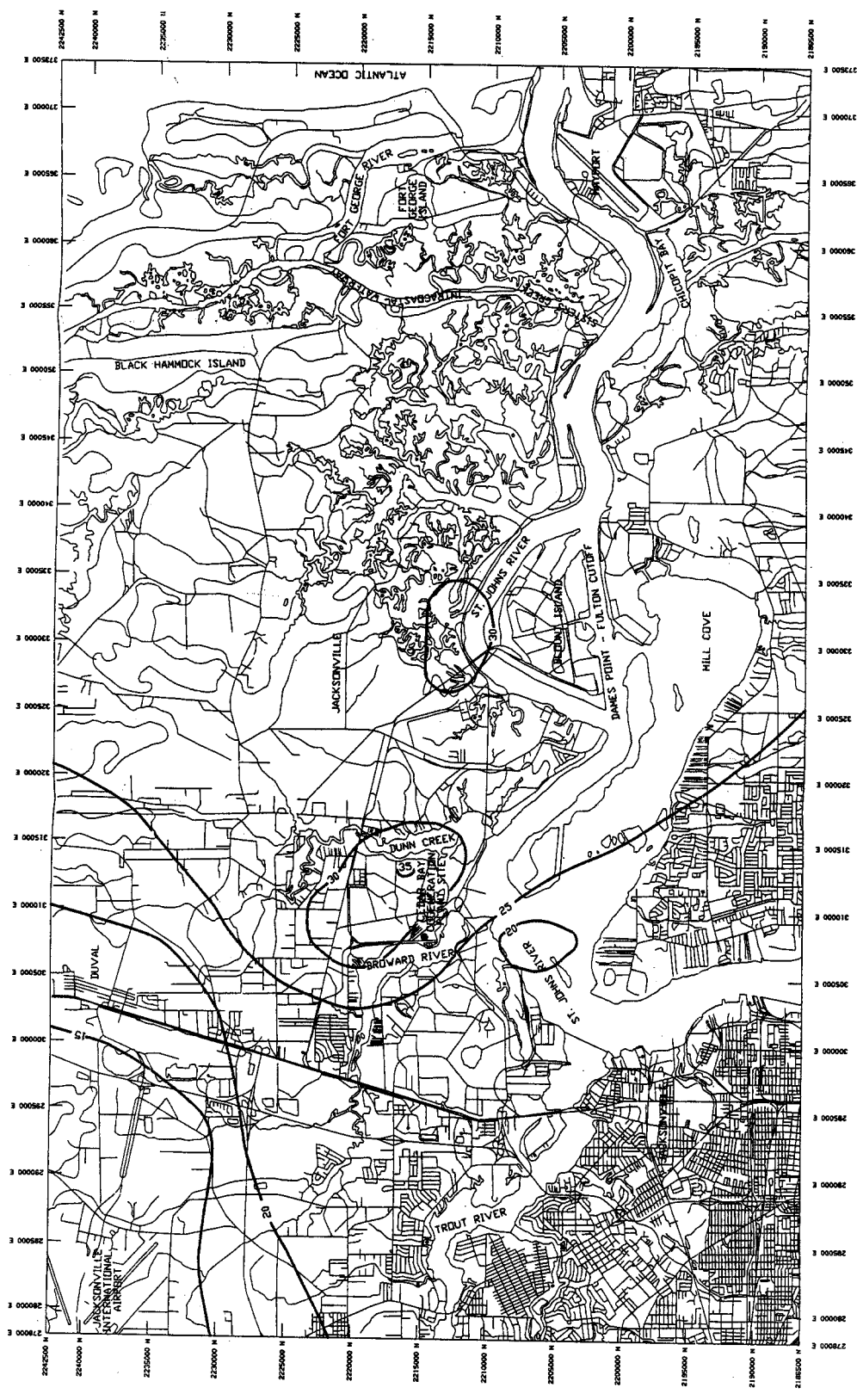
where	T	= Transmissivity
	b	= Total Thickness
	K'	= Hydraulic Conductivity for Layered System
	S	= Storage Coefficient
	E	= Porosity
	α_L	= Longitudinal Dispersivity
	α_T	= Transverse Dispersivity
	C'	= Chloride Concentration of LWRZ
	C_o	= Initial Chloride Concentration
	CELDIS	= Grid Dimensions that particles are allowed to move
	NPTPND	= Initial Number of Particles per Node



**SIMULATED EXISTING CHLORIDE
CONCENTRATION CONTOURS, 1989**

**SIMULATION PERIOD:
33 YEARS (1956-1989)**

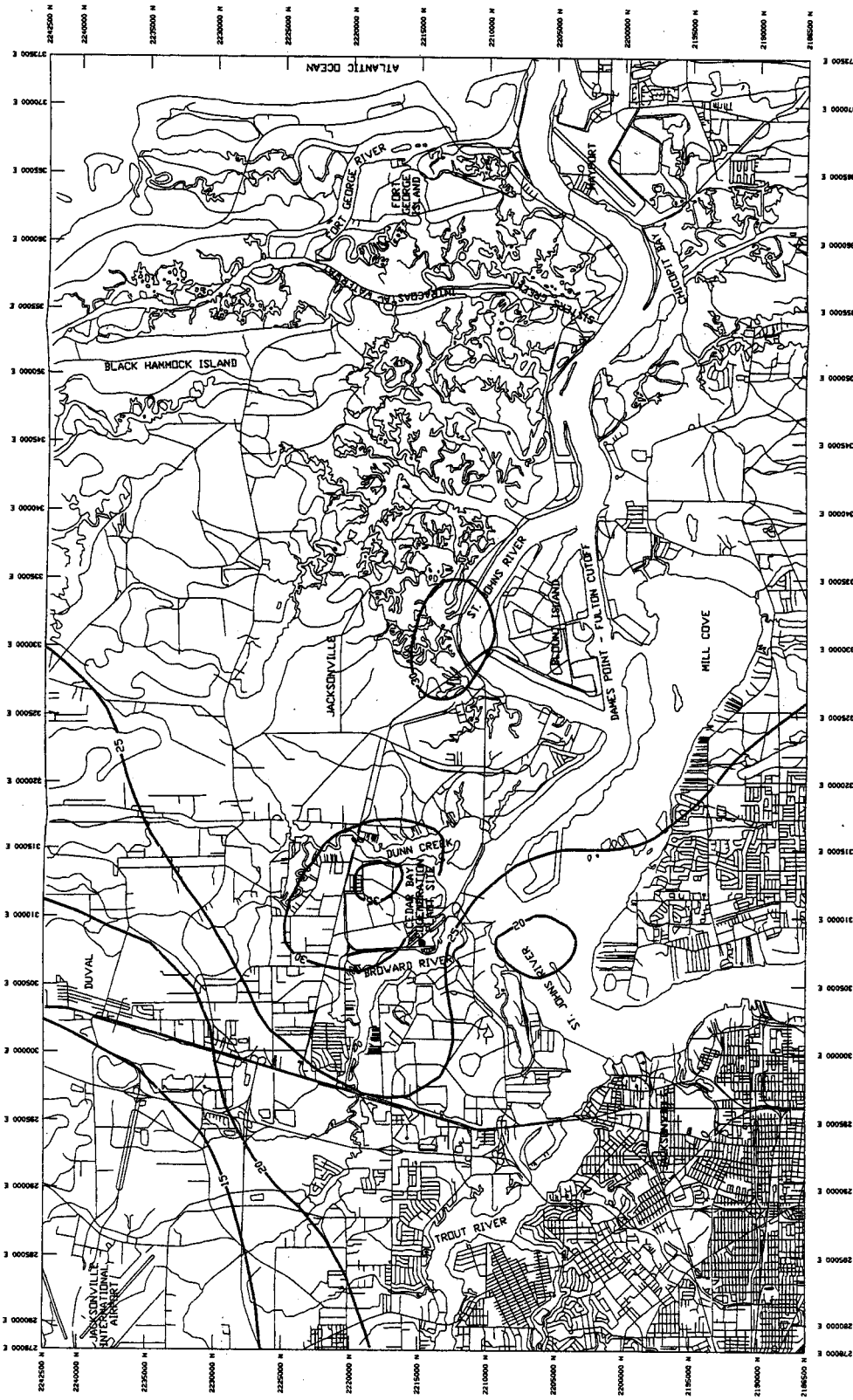
FIGURE 4-6



SIMULATED CHLORIDE CONCENTRATION
SEMINOLE KRAFT AVERAGE
DAILY PUMPING RATE, 19.5 MGD

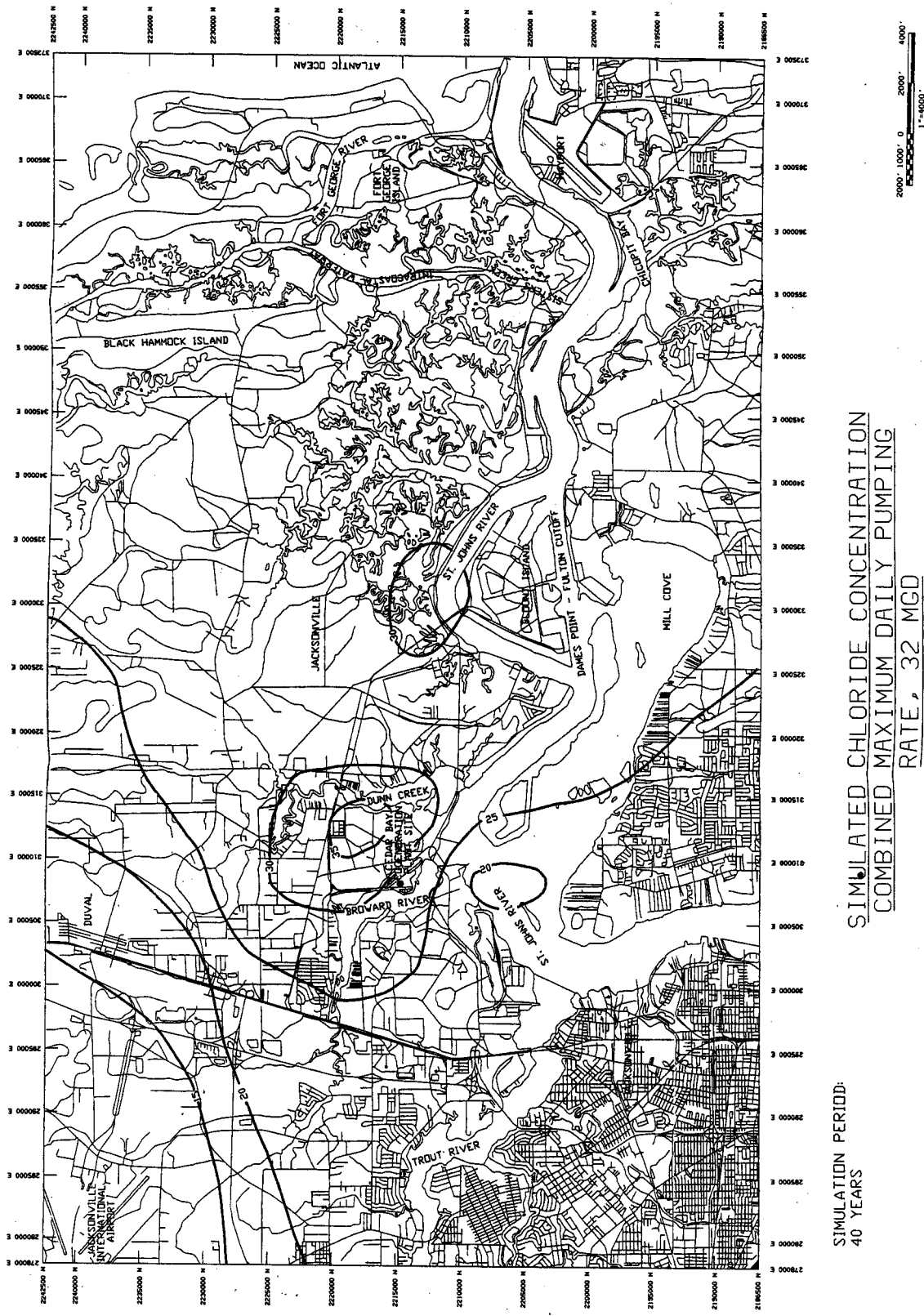
SIMULATION PERIOD:
40 YEARS





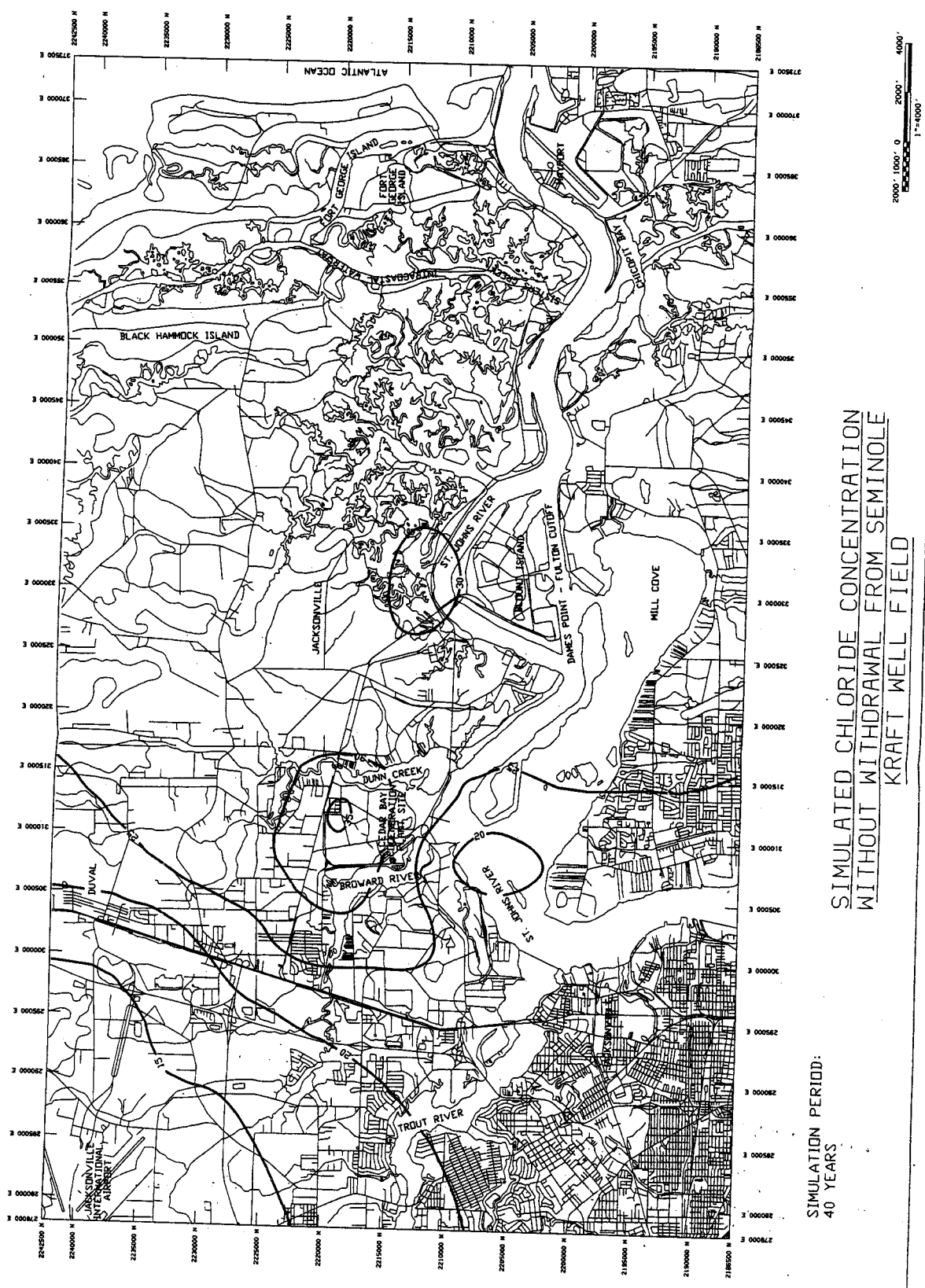
SIMULATED CHLORIDE CONCENTRATION
COMBINED AVERAGE DAILY PUMPING
RATE, 25 MGD

SIMULATION PERIOD:
40 YEARS



SIMULATION PERIOD:
40 YEARS

SIMULATED CHLORIDE CONCENTRATION
COMBINED MAXIMUM DAILY PUMPING
RATE, 32 MGD



SIMULATED CHLORIDE CONCENTRATION
WITHOUT WITHDRAWAL FROM SEMINOLE
KRAFT WELL FIELD

SIMULATION PERIOD:
 40 YEARS

FIGURE 4-10

1962 in Figures 2-11 and 2-12. The regional increase in chloride content is primarily due to the regional decline of piezometric head (compare Figures 2-9 and 3-7).

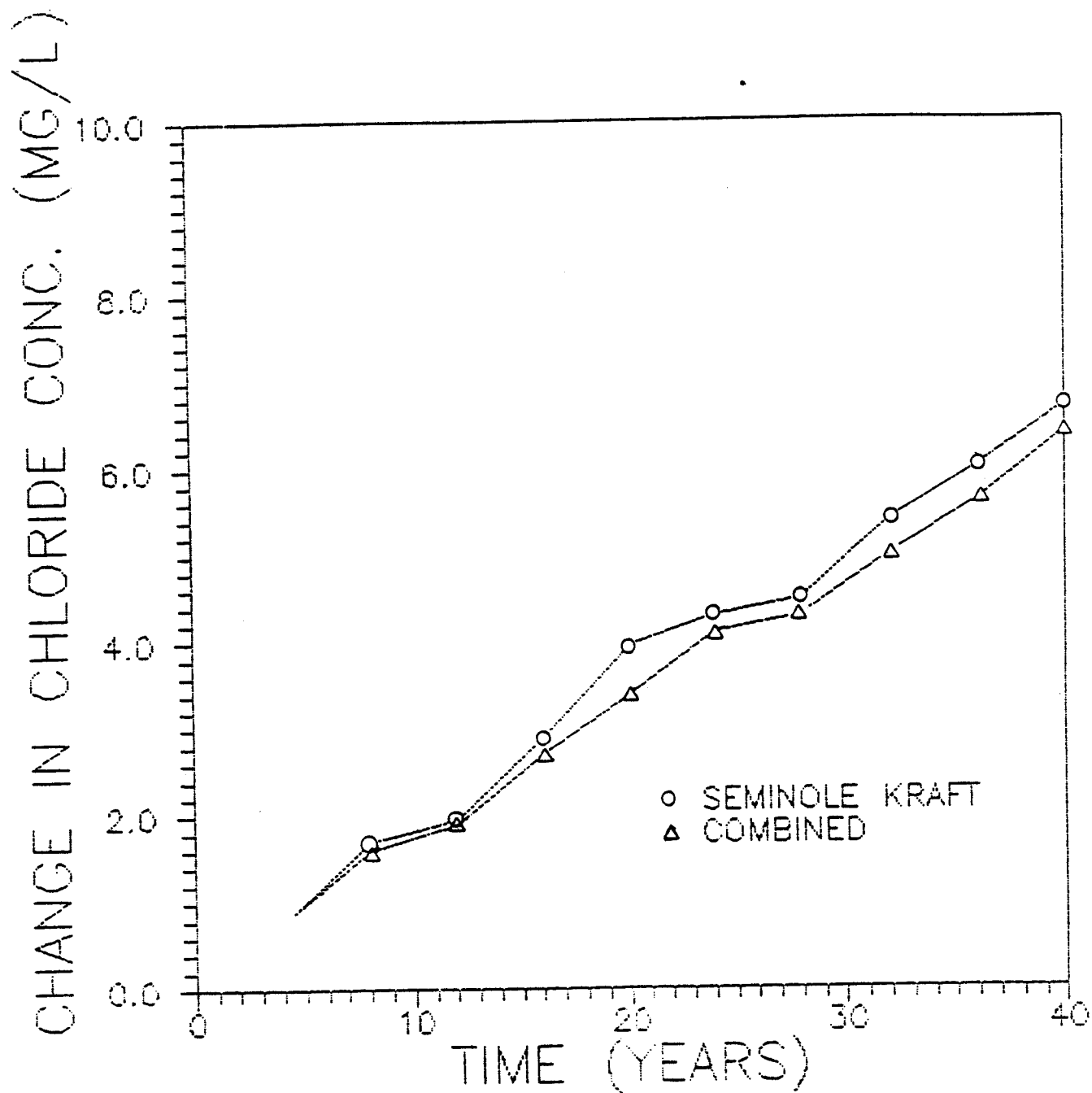
The maximum increase in chloride content at the Seminole Kraft well field after 40 years of pumping at 19.5, 25.0, and 32.0 mgd is projected to be 6, 7, and 8 mg/l, respectively. Therefore, an increase of only 1 mg/l above the projected regional increase can be attributed to the Seminole Kraft average daily withdrawal rate (19.5 mgd), 2 mg/l can be attributed to the average combined Seminole Kraft/Cedar Bay Cogeneration Project withdrawal rate (25.0 mgd), and 3 mg/l can be attributed to the maximum combined Seminole Kraft/Cedar Bay Cogeneration Project withdrawal rate (32.0 mgd). The 32.0 mgd pumping rate, as previously described, is an extremely conservative case.

The maximum increase in chloride content for the study area was predicted to be 12 mg/l at the Amoco Oil Company well (Map No. 44) south of the Seminole Kraft well field. This well, however, had a very low initial chloride content (7 mg/l) compared to the surrounding wells (15 mg/l).

In conclusion, the additional withdrawal required for the Cedar Bay Cogeneration Project is projected to result in a maximum increase in chloride content of 1 mg/l, over the average and maximum Seminole Kraft pumping conditions, as shown on Figures 4-11 and 4-12.

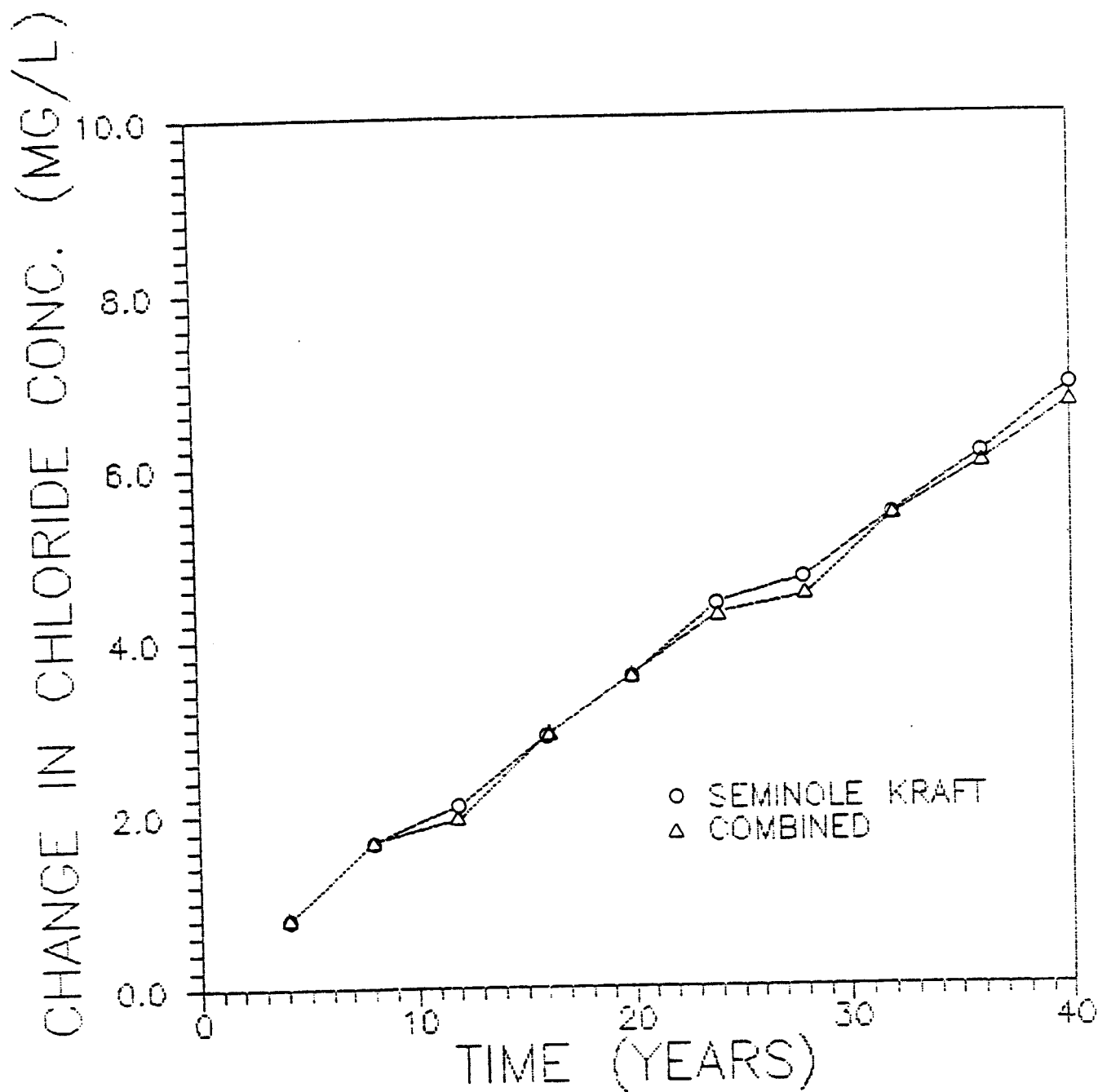
4.3 WATER LEVEL AND WATER QUALITY CHANGES IN THE MWBZ

The MWBZ was not modeled independently from the UWBZ because data from this zone were unavailable. All wells which terminate in the MWBZ within the study area are also open to the UWBZ and, therefore, are hydraulically interconnected in these areas. The MWBZ is geologically and hydrogeologically similar to the UWBZ and is expected to respond to pumping in a similar manner. In addition, most wells in the study area terminate in the UWBZ where the effects of pumping from the MWBZ are expected to be minimal because of the thick semi-confining unit which separates them.



COMPARISON OF SEMINOLE KRAFT
AVERAGE DAILY PUMPING RATE
19.5 MGD AND COMBINED AVERAGE
DAILY PUMPING RATE, 25 MGD

Figure 4-11



COMPARISON OF SEMINOLE KRAFT
MAXIMUM DAILY PUMPING RATE,
25 MGD AND COMBINED MAXIMUM
DAILY PUMPING RATE, 32 MGD

Figure 4-12

4.4 SUMMARY OF PUMPING EFFECTS

The results of this modeling effort indicate that continued pumping at the Seminole Kraft well field will not decrease water levels or increase chloride concentrations any significant amount in the UWBZ, and that the additional water supply required for the Cedar Bay Cogeneration Project will have minimal effect at the well field and the surrounding area.

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APPENDIX A
WELL INVENTORY

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS C1 mg/l
1	D-0069 J-0133	SEMINOLE KRAFT	309509.6 2218544.	0.00	1370	6-7-89	11.0	18.0	33
2	D-0532 J-0599	SEMINOLE KRAFT	309511.3 2218947.	0.06	1400	6-7-89	12.0	32.8	
3	D-0533 J-0600	SEMINOLE KRAFT	309341.6 2219858.	0.23	1400	6-7-89	12.0	36.9	20
4	D-2594 J-3094	MR. G. BURNSED	309958.6 2220561.	0.37	700	-17.5 5-22-89	15.0	32.2	20
5	D-2594 J-3145	MR. B. CONN	310485.2 2220760.	0.44	--	-17.2 5-22-89	15.0	32.6	19
6	D-0264 J-0030	SEMINOLE KRAFT	311874.3 2218731.	0.45	1237	-16.7 5-22-89	15.9	32.6	20
7	D-0263 J-0329	SEMINOLE KRAFT	311874.3 2218731.	0.45	1025	-20.0 1-26-89	16.0	36.0	36
8	D-0262 J-0031	SEMINOLE KRAFT	311874.3 2218731.	0.45	1393	-15.3 5-22-89	16.3	31.6	32
9	D-2400 J-2140	MR. J. SMITH	311183.9 2220453.	0.47	600	-17.0 5-18-89	15.0	32.0	30
10	D-564 J-0631	SEMINOLE KRAFT	310020.1 2216116.	0.49	1400	6-7-89	15.0	11.5	17
11	D-2401 J-2514	MR. J. D. FUSSELL	310924.2 2220960.	0.51	556	-21.8 5-22-89	8.8	30.6	18
12	D-0265 J-0330	SEMINOLE KRAFT	310018.9 2215913.	0.53	4000				
13	D-563 J-0630	SEMINOLE KRAFT	310278.1 2215306.	0.65	100				
14	DS-0289 JS-1604		307427.1 2221889.	0.73	640				
15	D-1030 J-768		311106.4 2222171.	0.73					
16	D-4823 J-4823	CITY OF JACKSONVILLE	307516.4 2222192.	0.77					
17	D-1259 J-1187	MR. W. LIBUCHA	312068.4 2221963.	0.79	609	-20.1 5-19-89	20.0	32.1	17
18	D-2579 J-3147	MR. P. D. BURNSED	313026.3 2221048.	0.81	640	-14.0 5-22-89	15.0	29.0	20
19	D-2350 J-1189		306077.5 2215735.	0.85	--				
20	D-3322 J-3182	MRS. F. STALNECKER	305050.4 2219782.	0.87	--	-14.5 5-22-89	15.0	29.5	22
21	D-3701 J-3701	CLAUSON	305036.8 2217458.	0.88			10.0	34.3	
22	D-0274 J-0339	SEMINOLE KRAFT	310358.5 2214093.	0.88	1390	6-7-89	14.0		
23	D-3177 J-3400		306908.8 2223105.	0.98	--				
24	D-1737 J-2038	LONG WHEEL AND RIM	305149.9 2221802.	1.02	86.8	-25.9 5-22-89	10.0	35.9	20
25	DS-0176 J-0553	SEMINOLE KRAFT	305241.0 2222407.	1.08	1378	6-7-89	20.0	32.5	37
26	D-0486 J-3428		306213.0 2223917.	1.18					
27	D-3181 JS-1747		304062.3 2215544.	1.19	100				
28	DS-0290 J-1017	CITY OF JACKSONVILLE	304668.8 2214430.	1.22	1285		20.0		
29	J-3090	MR. C. MINCHEW	307269.1 2224820.	1.24			20.0		
30	D-3471 J-3340		316077.3 2218707.	1.24	558				
31	D-2129 J-1842		306303.6 2224422.	1.25	675				
32	D-2631 J-1659	MR. W. N. WILLIAMS	314613.7 2222958.	1.27	--	-24.1 5-22-89	10.0	34.1	20
33	D-2559 J-2586	MR. J. W. COTHERN	306918.9 2224822.	1.27	--	-13.0 5-23-89	15.0	28.0	20
34	D-1031 J-930	MS. C. RHODEN	312172.6 2224791.	1.27	585	-23.5 5-23-89	10.0	33.5	19
35	D-3170 J-1881	MR. N. PANTIJA	306217.2 2224624.	1.29	655		15.0		
36	D-3170 J-3339		316428.2 2218806.	1.31	558				
37	D-1732 J-1924	MR. A. L. SPEICHER	310688.2 2225507.	1.32	660	-17.8 5-19-89	12.0	29.8	18
38	D-2185 J-2371	MR. M. PURVIS	307272.1 2225325.	1.33	650	-14.5 5-19-89	15.0	29.5	20
39	D-2566 J-2587	MR. J. MERCER	307273.3 2225527.	1.37	--	-14.2 5-19-89	15.0	29.2	20
40	D-0520 J-0587	FOLEY LUMBER CO.	309815.3 2211065.	1.44	--	-12.4 5-19-89	15.0	27.4	17
41	D-1110 J-1129	SOUTHERN INTL LOGISTICS	307626.3 2211078.	1.48	660	-19.3 5-22-89	17.0	36.3	15
42	D-3393 J-3765		315756.1 2223659.	1.52	620	-20.0 7-16-84			
43	D-0068 J-0132	AMOCO OIL CO.	308586.5 2210567.	1.54	810				7.1
44	D-2184 J-2432		312969.6 2226302.	1.59	--				
45	D-2580 J-2820	MR. R. L. SPAULDING	311750.2 2227421.	1.71	--	-20.2 5-19-89	15.0	35.2	21
46	D-0149 J-213	MRS. W. BOSTWICK	306569.0 2209973.	1.74	800		29.0		
47	D-0732 J-0060		317851.7 2222636.	1.75	580		15.0		
48	D-2612 J-2770	SUPPORT SERVICES	300906.6 2214957.	1.77	700	-8.5 5-23-89	20.0	28.5	19
49	D-0778 J-0864		301925.5 2224448.	1.81	--				

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51	D- 2192 J-2417		298979.0 2214766.	2.13	--				
52	DS- 0292 JS-1992		317078.2 2210214.	2.15	--				
53	D- 2624 J-2994		298715.1 2214566.	2.19	--				
54	D- 0272 J-0337	CITY OF JACKSONVILLE	298285.0 2215882.	2.19	942	-17.8 5-23-89	21.0	38.8	16
55	D- 0808 J-0869	MR. W. WEBB	298282.7 2215477.	2.21	--				
56	D- 2615 J-2993		298540.0 2214567.	2.22	--				
57	DS- 81		298772.7 2224365.	2.30	120		27.0		
58	DS- 0038		297336.7 2218413.	2.31	76		15.0		
59	DS- 0043		301948.6 2228388.	2.33	105				
60	DS- 181		301246.3 2228089.	2.37	129		30.0		
61	DS- 0187		314830.9 2230130.	2.40	110		25.0		
62	D- 3395 J-3836	SEA LIFT INC.	317330.8 2208495.	2.43	--				
63	D- 3468 J-3848	MR. REINHARDT	304677.3 2230796.	2.47	651	-27.5 5-18-89	5.0	32.5	18
64	D- 1207 J-924	SLOAN CONST. CO	301480.3 2208286.	2.48	660	-11.8 5-23-89	22.0	33.8	20
65	D- 3530 J-3566		300106.8 2227893.	2.50	--		10.0	33.3	16
66	D- 0737 J-0012	DUVAL ASPHALT	322096.0 2214731.	2.50	--		28.0	29.0	
67	D- 1001 J-1061		321451.8 2224333.	2.51	659	-1.0 12-16-83	10.0	32.2	18
68	D- 804 J-905		300548.2 2228497.	2.52	--				19
69	DS- 0198		302836.7 2230504.	2.58	190				
70	D- 0402 J-0469		322355.1 2214123.	2.58	1100				
71	D- 1255 J1398		323160.9 2217149.	2.60	753				
72	D- 3293 J-2132		296094.2 2215591.	2.61	700				
73	DS- 0186		321554.0 2211905.	2.62	65				
74	D- 1205 J-925	U.S. NAVAL FUEL DEPOT	302957.0 2206256.	2.66	800	-25.8 5-22-89	8.0	33.8	13
75	DS- 0039		321551.0 2211400.	2.66	57	0.1 1-26-89	35.0	34.9	31
76	D- 0145 J-0209		301258.8 2230210.	2.69	--				
77	D- 414 JS-4103		322168.7 2212205.	2.69	50				
78	D- 1000 J-1060		321985.5 2225744.	2.72	628				
79	D- 570 J-0636		301260.0 2230412.	2.72	--				
80	DS- 413 JS-4102		322254.5 2211901.	2.73	58				
81	D- 2562 J-2181	MR. J. C. HICKOX	313794.4 2232561.	2.76	680	-7 5-22-89	23.0	30.0	20
82	D- 2582 J-2976		318548.4 2207074.	2.78	--				
83	DS- 0265 J-0330		324060.3 2221185.	2.80	12				
84	DS- 0237		324060.3 2221185.	2.80	76				
85	DS- 0236		324060.3 2221185.	2.80	88	8.96 9-15-82	25.0	16.04	17
86	D- 0273 J-0338	MR. W. WEBB	295989.4 2212662.	2.80	1020				
87	D- 2270 J-2231		321297.4 2227869.	2.83	--				
88	DS- 61		321645.9 2227564.	2.85	132				
89	D- 999 J-1059		322774.7 2225941.	2.87	--				
90	D- 2577 J-2791		323811.8 2223611.	2.87	--				
91	D- 0718 J-0059		297805.7 2208812.	2.90	600	-10.7 5-8-81	21.0	31.7	
92	D- 0410 J-0477		300651.2 2231123.	2.90	700				
93	D- 1254 J-1397		295202.0 2212768.	2.93	650				
94	D- 3168 J-3318		322684.0 2210484.	2.94	640		21.0		
95	D- 0152 J-0216		321389.7 2228677.	2.94	642				
96	D- 3063 J-3620		324999.1 2217038.	2.95	--				
97	D- 2128 J-2374		319156.6 2206262.	2.97	--				
98	D- 998 J-1058		321565.5 2228777.	2.98	--		20.0		
99	D- 997 J-982	MR. C. BRADDOCK	322000.9 2228370.	3.00	595	-9.9 5-22-89	20.0	29.9	19
100	D- 2399 J-2496		325353.5 2217743.	3.01	--	-19.5 8-20-80			

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101	D- 2210 J-2355		321885.3 2208671.	3.01	--	22.9 2-29-80			
102	DS- 0180		325167.2 2215824.	3.01	60				
103	DS- 2583 JS-2996		323911.8 2225732.	3.04	120				
104	D- 3590 J-4153		319593.8 2206158.	3.04	--				
105	D- 1208 J-923		296059.8 2209732.	3.06	--				
106	D- 1206 J-922		299104.3 2206279.	3.06	750				
107	D- 2241 J-2135		296146.2 2209529.	3.06	--				
108	D- 2425 J-2792		324003.6 2226439.	3.12	--	-5.8 5-8-81	24.0	29.8	
109	D- 3065 J-3619	JACKSONVILLE ELECTRIC	325870.6 2216325.	3.13	--				
110	D- 3066 J-3618		325509.1 2214408.	3.14	--				
111	J-1141	JACKSONVILLE ELECTRIC	325329.8 2213702.	3.14	1104	-18.5 5-24-89	12.0	30.5	20
112	DS- 0040		323398.3 2227756.	3.15	80				
113	J-1138	JACKSONVILLE ELECTRIC	324882.5 2212088.	3.17	1104	-19.5 5-24-89	14.0	33.4	17
114	D- 560 J-0627		306697.9 2202092.	3.18	--				
115	D- 0329 J-0394	CITY OF JACKSONVILLE	292943.2 2215812.	3.18	1210				
116	D- 0330 J-0395	CITY OF JACKSONVILLE	292939.6 2215206.	3.20	1210				
117	D- 2572 J-2698		307922.0 2201782.	3.21	--				
118	D- 0603 J-0669		302858.6 2234242.	3.21	1000				
119	D- 3165 J-3085		307834.4 2201782.	3.21	--				
120	D- 1204 J-0921		298139.4 2205982.	3.22	910	-28.1 9-23-82	4.0	32.1	
121	D- 0816 J-0908		307746.3 2201682.	3.23	666				
122	J-1140	JACKSONVILLE ELECTRIC	325587.8 2212892.	3.24	1104				
123	D- 561 J-0628		307483.6 2201683.	3.24	--				
124	D- 0107 J-0171		306520.4 2201689.	3.26	--				
125	D- 3172 J-3362		305907.5 2201693.	3.28	--				
126	D- 805 J-0882		292176.4 2219454.	3.29	693				
127	D- 0817 J-0857		307744.5 2201379.	3.29	714				
128	D- 2427 J-2254		315472.3 2234976.	3.29	620				
129	D- 2565 J-2570		313637.0 2235593.	3.30	--				
130	J-1139	JACKSONVILLE ELECTRIC	325759.3 2212285.	3.31	1104	-22.3 5-24-89	11.0	33.3	24
131	D- 3166 J-3243		318703.8 2233542.	3.31	--				
132	D- 0776 J-0849		296915.9 2206393.	3.33	--				
133	D- 1186 J1230		295088.3 2208323.	3.36	--				
134	D- 996 J-763		304418.3 2201600.	3.37	720				
135	D- 0228 J-0295		326020.2 2211980.	3.37	850	-19.5 5-24-89	15.0	34.5	20
136	D- 2170 J-2198		293699.2 2210352.	3.38	--				
137	D- 2578 J-2796		319840.3 2232333.	3.38	--				
138	D- 0777 J-0850		296652.0 2206192.	3.39	1100				
139	D- 1736 J-1789		321339.1 2205138.	3.40	--				
140	DS- 0144		308178.1 2200669.	3.42	--				
141	D- 3394 J-3556		319841.5 2233435.	3.42	--	-3.9 6-7-84	31.0	34.9	
142	D- 0226 J-0293	CITY OF JACKSONVILLE	291885.9 2214707.	3.42	1260				
143	D- 2561 J-2103		307301.9 2200573.	3.45	--				
144	D- 3179 J-3420		319930.8 2233737.	3.47	--				
145	D- 2426 J-2258		318098.6 2234859.	3.47	580				
146	D- 898 J-1033		294821.5 2207618.	3.48	450				
147	D- 3425 J-3675		294687.5 2229542.	3.48	680				
148	D- 0227 J-0294	CITY OF JACKSONVILLE	291878.2 2213394.	3.48	1300				
149	DS- 0271		291620.8 2214304.	3.49	84				
150	D- 2616 J-2746		291126.9 2219662.	3.49	720				

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151	D- 2428 J-2646		319757.5 2234041.	3.50	--				
152	D- 3392 J-3784		319147.5 2234550.	3.52	--	5.76 1-1-80	27.0	32.8	
153	D- 2186 J-2270		319062.3 2234955.	3.58	--				
154	D- 2563 J-2336		319236.9 2234853.	3.66	--				
155	D- 3182 J-3436		318454.1 2235766.	3.68	--	-13.4 4-13-82			
156	D- 2588 J-3051		326618.4 2209451.	3.71	--				
157	D- 2343 J-2310		292118.9 2209654.	3.72	--				
158	D- 2245 J-2456		296637.0 2233470.	3.72	640				
159	D- 2620 J-2931		290908.5 2212288.	3.74	1020				
160	D- 356 J-0421		310882.5 2198936.	3.76	1000	-10.23 5-22-89	11.0	21.2	13
161	D- 0654 J-0717		308255.0 2198850.	3.79	700				
162	D- 0151 J-0215		294893.6 2204991.	3.80	98				
163	DS- 0054		294174.0 2231565.	3.83	580	-33.2 4-8-80	4.0	37.2	
164	D- 2298 J-2466		327937.1 2210352.	3.84	--				
165	D- 0507 J-0574		301475.4 2237281.	3.86	88				
166	D- 3037 J-3234		294000.6 2231869.	3.87	560				
167	D- 942 J1004		328111.6 2210250.	3.89	--				
168	D- 3294 J-3252		296819.8 2234783.	3.90	--				
169	D- 2608 J-2688		288932.5 2218766.	3.90	--				
170	D- 0648 J-0713		296820.4 2234884.	3.96	105				
171	DS- 0234		294974.5 2233682.	3.96	95				
172	DS- 0235		294974.5 2233682.	3.97	100				
173	D- 2621 J-2934		295756.8 2202864.	4.00	--	-31.8 6-22-84	3.0	34.8	
174	D- 3424 J-3754		293753.0 2204593.	4.00	--				
175	D- 3396 J-3868		322898.6 2202300.	4.02	--				
176	D- 0781 J-0880		292969.0 2205305.	4.03	--				
177	D- 0782 J-0879		292621.2 2205711.	4.03	720	-30.4 3-31-82	3.0	33.4	
178	D- 2585 J-3004		322369.7 2201697.	4.04	--				
179	D- 801 J-881		293229.4 2204899.	4.04	--				
180	D- 0427 J-0494		300955.4 2238193.	4.04	815				
181	D- 798 J-851		291231.4 2207639.	4.04	--				
182	D- 800 J-904		292098.8 2206219.	4.05	--				
183	D- 0799 J-0853		292011.8 2206321.	4.05	620				
184	D- 0779 J-0866		292185.1 2206017.	4.06	700				
185	D- 0780 J-0867		292098.2 2206118.	4.06	--				
186	D- 0716 J-0008		299590.5 2199608.	4.07	950				
187	D- 0674 J-0848		291403.0 2207032.	4.07	--				
188	D- 0042A J-0106		298106.1 2200324.	4.09	--				
189	D- 0042 J-0106		298106.1 2200324.	4.09	--				
190	D- 876 J900		287875.2 2217660.	4.10	735				
191	DS- 426 JS-4405		289596.4 2227450.	4.12	85				
192	D- 2599 J-2068		287695.4 2216853.	4.14	700				
193	D- 0122 C-0021		297492.6 2200227.	4.17	905				
194	D- 0122A C-0021		297492.6 2200227.	4.17	905				
195	D- 0485 J-0552		314637.6 2197196.	4.18	--				
196	D- 2172 J-2349		309992.6 2196516.	4.19	--				
197	D- 0721 J-0009		299672.2 2198598.	4.23	750				
198	D- 946 J-1050		287467.7 2222815.	4.25	--				
199	D- 0270 J-0335		331011.3 2211951.	4.27	--	-22.0 3-8-82	10.0	32.0	
200	D- 2567 J-2606		329855.2 2208927.	4.27	780				

SOUTHERN STATES UTIL

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251	D- 0178 J-0242		301046.5 2194043.	4.93	1270				
252	D- 0177A J-0241		301046.5 2194043.	4.93	1100				
253	D- 0179 J-0243		301046.5 2194043.	4.93	1070				
254	D- 1147 J-1238		302270.0 2193632.	4.93	--				
255	DS- 0035		311633.8 2192667.	4.94	91				
256	D- 2271 J-2107		333820.6 2228099.	4.94	--				
257	D- 2209 J-2351		334595.4 2210919.	4.97	560				
258	D- 2595 J-2459		284066.4 2225159.	4.97	--				
259	D- 3191 J-2965-A		301744.0 2193534.	4.98	590				
260	D- 3192 J-2965-B		301744.0 2193534.	4.98	1060				
261	D- 968 J-1087		334594.2 2210717.	4.98	580				
262	D- 0415 J-0482		316891.7 2193344.	4.99	1100				
263	D- 3323 J-3512		333393.4 2229920.	5.00	635				
264	DJ- 3186 J-3489		335128.5 2212230.	5.00	--				
265	DS- 0135		333912.9 2228906.	5.01	84				
266	D- 0675 J-0846		283444.0 2223546.	5.02	700				
267	D- 1085 J-1158		300693.9 2193641.	5.02	--				
268	D- 797 J-917		283985.1 2211319.	5.03	--				
269	D- 3187 J-3496		335391.7 2212329.	5.05	--				
270	D- 0197		303665.0 2192613.	5.05	--				
271	D- 1083 J-1147		319609.6 2193934.	5.06	740				
272	D- 3183 J-3437		334943.3 2210513.	5.06	--				
273	D- 3184 J-3442		335030.8 2210513.	5.07	--				
274	D- 0676 J-0845		283092.5 2223346.	5.08	700				
275	D- 0036		296325.3 2195283.	5.08	777				
276	D- 0040		296325.3 2195283.	5.08	--				
277	D- 0038		296325.3 2195283.	5.08	--				
278	D- 0037		296325.3 2195283.	5.08	--				
279	D- 0807 J-0873		282619.1 2217287.	5.10	650				
280	D- 3180 J-3427		335206.0 2210512.	5.11	600				
281	D- 3091 J-3377		322154.3 2194828.	5.11	700				
282	D- 1263 J1426		297196.7 2194571.	5.12	1120				
283	D- 0719 J-0056		282920.4 2223852.	5.13	650				
284	D- 0035A CO-0066		297021.6 2194572.	5.14	1060				
285	D- 0035		297021.6 2194572.	5.14	1060				
286	D- 0039		296759.5 2194675.	5.14	1300				
287	D- 0677 J-0844		282742.9 2223449.	5.15	750				
288	D- 2618 J-2895		286222.0 2204536.	5.16	--				
289	D- 1489 J-1745		303311.8 2192110.	5.16	--				
290	D- 0678 J-0843		282477.2 2222946.	5.18	700				
291	D- 2088 J-1308		334753.3 2207989.	5.19	--				
292	D- 0374	GLIDCO ORGANICS	290218.4 2199158.	5.19	550				
293	D- 0667 J-0730		286219.7 2204132.	5.20	1100				
294	D- 0300		295447.9 2194985.	5.21	1300				
295	D- 2626 J-3006		282664.2 2224965.	5.22	--				
296	D- 2383 J-2584		293702.5 2196006.	5.23	--				
297	D- 2774 J-2982		315743.9 2191734.	5.23	--				
298	D- 0375	GLIDCO ORGANICS	290912.4 2198043.	5.26	750				
299	D- 3185 J-3481		333843.7 2232039.	5.26	--				
300	D- 2444 J-2762		323202.6 2194418.	5.27	--				

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS Cl mg/l
301	D-0717 J-0799		283013.7 2209910.	5.28	--				
302	D-2570 J-2680		336167.4 2210203.	5.30	546				
303	D-0131		281564.2 2216586.	5.31	725				
304	D-1125 J-1208		336781.1 2225252.	5.31	--				
305	D-2610 J-2728		281499.8 2220527.	5.32	700				
306	DS-120		336254.3 2210101.	5.32	235				
307	D-0373		290212.5 2198148.	5.33	600				
308	D-1126 J-1207		336869.8 2225454.	5.34	--				
309	D-875 J-998		323463.5 2194113.	5.35	650				
310	D-2412 J-2642		284302.8 2205760.	5.36	--				
311	D-559		323638.7 2194112.	5.36	645				
312	D-2568 J-2619		327153.0 2240868.	5.37	--				
313	D-0353		282488.3 2209913.	5.38	--				
314	D-2397 J-2718		336602.2 2209695.	5.41	--				
315	D-2587 J-3034		336602.2 2209695.	5.41	600	-30.8 -2-1-82	3.0	33.8	
316	D-863 J-919	CITY OF JACKSONVILLE	290732.0 2197135.	5.41	1200				
317	D-0041 J-0105		294568.1 2194283.	5.41	700				
318	D-1050 J-1110		336690.4 2209796.	5.41	580				
319	D-1262 J-1427		296313.4 2193263.	5.42	--				
320	D-0490 J-0557		289599.0 2198051.	5.43	--				
321	D-0863 J-0919	CITY OF JACKSONVILLE	290556.8 2197136.	5.43	1200				
322	D-2398 J-2717		336777.9 2209795.	5.43	--				
323	D-2560 J-1928		334721.1 2232337.	5.43	609				
324	D-0806 J-0878		287075.1 2200692.	5.44	720				
325	D-1087 J-1177		336776.7 2209593.	5.44	580				
326	D-0211		301116.9 2191113.	5.45	1000				
327	DS-0288 JS-1425		281706.2 2210928.	5.46	120				
328	D-2168 J-2292		280691.0 2216996.	5.47	--				
329	D-0308		309164.3 2189651.	5.49	1100				
330	D-0310		308814.0 2189653.	5.49	--				
331	D-0309		308113.5 2189657.	5.50	1300				
332	D-0346		283168.0 2206373.	5.50	800				
333	DS-0169		281441.7 2210626.	5.53	90				
334	D-0212		302425.5 2190297.	5.54	750				
335	D-3591 J-4041		337212.8 2209287.	5.54	600				
336	D-1127 J-1179		337927.1 2226559.	5.59	609	-25.6 6-28-85	4.0	29.6	
337	DS-0012		280007.7 2219929.	5.59	70				
338	D-3173 J-3363		337474.9 2209185.	5.59	580				
339	D-0524 J-0591		280010.1 2220334.	5.60	117				
340	D-1088 J-941		324333.2 2193098.	5.60	--				
341	D-2788 J-3153		309861.2 2189041.	5.61	--				
342	D-0430 J-0497		317222.3 2190008.	5.62	--				
343	D-3391 J-3703		337561.2 2208982.	5.62	540	-30.4 7-23-84	3.0	33.4	
344	DS-0158		330822.9 2239533.	5.65	110				
345	D-0336 C-0059	CITY OF JACKSONVILLE	288457.1 2197451.	5.66	1300				
346	D-606 J-672		297877.1 2191132.	5.66	804				
347	D-0261		289066.5 2196842.	5.66	1340				
348	DS-0175	CITY OF JACKSONVILLE	338877.2 2224331.	5.67	90				
349	DS-0058		280480.9 2211036.	5.68	90				
350	D-0514 J-0581		297089.6 2191238.	5.70	660				

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351	D-0201		302420.2 2189388.	5.70	700				
352	D-3033 J-3180		338086.0 2208878.	5.72	--				
353	DS-0210		325646.7 2193090.	5.73	39				
354	D-3292 J-1635		279285.9 2216297.	5.74	--				
355	DS-0041		329085.3 2241866.	5.75	75				
356	D-0271		288016.4 2196949.	5.78	1230				
357	D-0377		300231.7 2189502.	5.79	600				
358	D-0015		325379.2 2192283.	5.83	61				
359	D-3592 J-4130		338519.7 2208168.	5.84	600				
360	DS-0063		282274.4 2233151.	5.84	150				
361	D-3175 J-3375		338607.8 2208269.	5.85	580				
362	DS-0031		288187.9 2241097.	5.86	90				
363	DS-0209		325905.2 2192381.	5.87	38				
364	D-2573 J-2734		338783.5 2208369.	5.88	580	-29.8 4-26-82	3.0	32.8	
365	D-2115 J-1983		311341.4 2187618.	5.89	700				
366	D-0453 J-0520		314232.8 2187904.	5.89	707				
367	D-0045 J-0109		291671.4 2193088.	5.90	706				
368	DS-0395 JS-3594		278346.4 2220343.	5.91	34	6.38 11-29-83	22.0	15.6	
369	D-995 J-738		338957.5 2208166.	5.92	560				
370	D-796 J-918		279974.1 2229123.	5.93	--				
371	D-0277		325901.6 2191775.	5.96	610				
372	D-1052 J-1114		339130.8 2207862.	5.97	--				
373	D-2145 J-2244		301362.3 2188182.	5.97	--				
374	D-1051 J-1113		339306.5 2207962.	6.00	--				
375	DS-71		279760.2 2207605.	6.01	73				
376	D-3087 J-3333		308885.0 2186824.	6.03	728				
377	D-2604 J-2591		279843.0 2206797.	6.05	--				
378	D-1589 J-1762		301971.7 2187572.	6.06	--				
379	D-0043 J-0107		291316.4 2192282.	6.07	730				
380	D-3532 J-2477		287052.6 2241609.	6.08	--				
381	D-0827		308795.6 2186521.	6.09	850				
382	D-0429 J-0496	COLUMBINE/JACK. SUB. UTIL.	315190.6 2186989.	6.09	--				
383	D-0128		301970.5 2187370.	6.09	--				
384	D-2167 J-2314		280098.6 2205583.	6.09	--				
385	D-0210		296112.8 2188920.	6.18	750				
386	D-0831		296112.8 2188920.	6.18	747				
387	D-0210A		296112.8 2188920.	6.18	--				
388	D-2352 J-2513		292533.4 2190759.	6.18	--				
389	D-3370 J-3855		326244.8 2190561.	6.19	600				
390	DS-0248		323257.6 2188861.	6.21	80				
391	DS-0260		323257.6 2188861.	6.21	15				
392	DS-0249		323257.6 2188861.	6.21	75				
393	D-0431 J-0498		320975.0 2187864.	6.22	1300				
394	D-0363A		286178.2 2241816.	6.23	998				
395	D-0363		286178.2 2241816.	6.23	1100				
396	D-0302		279909.1 2232963.	6.23	--				
397	D-0338		323432.7 2188860.	6.23	640				
398	D-2104 J-2324		279915.8 2204271.	6.23	1200				
399	D-1244 J1378		278045.4 2228730.	6.26	--				
400	D-0034		294276.3 2189335.	6.26	--				

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401	D-0417	J-0484	284687.2 2196665.	6.28	703				
402	D-2187	J-2391	340345.4 2205935.	6.32	--				
403	D-2584	J-3001	338936.5 2234433.	6.32	--	-10.6 3-16-82	20.0	30.6	
404	D-2574	J-2782	340430.0 2205429.	6.37	--				
405	D-2208	J-1561	340516.4 2205227.	6.40	--				
406	D-1124	J-1152	340516.4 2205227.	6.40	580				
407	D-0785	J-0883	292089.1 2189651.	6.41	--				
408	D-3178	J-3414	340515.8 2205126.	6.41	--				
409	D-0217		295317.6 2187712.	6.45	1400				
410	D-3171	J-3356	338684.5 2236253.	6.45	600				
411	D-3324	J-3519	338946.6 2236151.	6.49	--				
412	DS-0033		337908.3 2238278.	6.54	87				
413	D-0133		285545.0 2193629.	6.56	755				
414	D-0158		329131.4 2190039.	6.57	540				
415	D-1368	J-1569	341121.6 2203910.	6.61	--				
416	D-2272	J-2097	341208.0 2203707.	6.64	--				
417	D-3593	J-4173	341295.6 2203707.	6.65	560	-19.6 8-6-85	5.0	24.6	
418	D-1058	J-1067	341383.7 2203807.	6.66	560				
419	D-2581	J-2839	341470.1 2203605.	6.69	530	-26.5 1-21-82	5.0	31.5	
420	DS-0046		338958.5 2238171.	6.69	26				
421	D-2092	J-2302	282753.7 2195464.	6.71	--				
422	D-2402	J-2479	339046.0 2238171.	6.71	600				
423	D-2127	J-2333	341645.8 2203705.	6.71	--				
424	D-0733	J-0058	340582.6 2201589.	6.71	--				
425	D-2751	J-3155	340316.4 2200985.	6.73	600				
426	D-3321	J-3507	341909.1 2203804.	6.75	--				
427	D-0278		339695.1 2199574.	6.76	1000				
428	D-3301	J-3416	278927.1 2199932.	6.79	--				
429	D-0655	J-0718	329737.2 2188823.	6.83	750				
430	D-0731	J-0828	342080.7 2203197.	6.83	700				
431	D-2545	J-2590	342360.5 2203737.	6.83	--				
432	D-2089	J-2080	342080.1 2203096.	6.84	--				
433	D-0301		280654.0 2240535.	6.86	1100				
434	D-0383		290763.8 2187638.	6.86	--				
435	D-1296	J-1287	342535.6 2203737.	6.86	504				
436	D-1297	J-1231	342623.6 2203837.	6.87	546				
437	DS-0125		278269.7 2237115.	6.87	133				
438	DS-319		342446.4 2203333.	6.88	6				
439	DS-320		342446.4 2203333.	6.88	55				
440	DS-391		342445.6 2203131.	6.90	--				
441	D-1421	J-1579	342445.2 2203030.	6.90	560				
442	D-2546	J-2721	342533.1 2203131.	6.91	54				
443	DS-321		342444.8 2202929.	6.91	520				
444	D-948	J-1010	342621.1 2203231.	6.92	--				
445	D-1422	J-1574	342532.7 2203030.	6.92	1100				
446	D-0362		278095.8 2237318.	6.92	--				
447	D-1419	J-1580	342620.7 2203130.	6.93	520				
448	D-2156	J-2264	342885.4 2203634.	6.93	525				
449	D-2541	J-2029	342797.1 2203433.	6.93	520				
450	D-948	J-1010	342619.9 2202928.	6.94	--				

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451	DS-0004		278186.3 2237822.	6.95	142				
452	D-1420 J-1582		342795.8 2203129.	6.96	--				
453	D-0822		290760.2 2187032.	6.96					
454	D-2332 J-1643		342883.8 2203230.	6.96	540				
455	D-712 J-791		342883.8 2203230.	6.96	540				
456	D-1417 J-1581		343058.9 2203229.	6.99					
457	D-3478 J-909		291108.1 2186626.	7.00	525				
458	D-2232 J-1360		343941.5 2204943.	7.02	540				
459	D-1478 J-1583		343322.4 2203430.	7.02	--				
460	D-3083 J-3281		328850.3 2186908.	7.04					
461	D-3345 J-3325		343674.7 2203934.	7.05	560				
462	D-3346 J-3447		343674.7 2203934.	7.05	560				
463	D-3258 J-1264		343674.3 2203833.	7.05					
464	D-3256 J-3493		343674.3 2203833.	7.06					
465	D-1617 J-1584		343497.1 2203329.	7.06	1340				
466	D-99 C-52		284478.9 2191009.	7.07					
467	D-3254 J-3401		343585.1 2203429.	7.07					
468	D-3253 J-3331		343585.1 2203429.	7.07	580				
469	D-3408 J-3602		343673.1 2203530.	7.08	580				
470	D-3409 J-2732		343673.1 2203530.	7.08	--				
471	D-3060	ARLINGTON F TW	328936.7 2186706.	7.08	50				
472	DS-314		342348.2 2200707.	7.09					
473	D-1418 J-1585		343671.8 2203227.	7.10					
474	D-1414 J-1586		343847.4 2203327.	7.12	--				
475	D-2763 J-2900		337468.7 2193222.	7.16					
476	D-1479 J-1588		344285.2 2203326.	7.20					
477	D-1415 J-1587		344285.2 2203326.	7.20					
478	D-1416 J-1589		344372.7 2203325.	7.21					
479	D-0027		285691.7 2188779.	7.24	750				
480	D-0026		285691.7 2188779.	7.24	900				
481	DS-153		343135.4 2200502.	7.24	200				
482	D-0052 J-0116		283600.3 2190509.	7.24	1050				
483	D-0052A J-0116		283600.3 2190509.	7.24	1360				
484	D-0165		283251.2 2190713.	7.26	1040				
485	DS-349		342869.1 2199593.	7.28	25		10.0		
486	D-3343 J-3532		342427.6 2198686.	7.29	600				
487	D-3342 J-3533		342427.6 2198686.	7.29	600				
488	D-0046A C-0033		282901.6 2190816.	7.29	1280				
489	D-0046 C-0033		282901.6 2190816.	7.29	646				
490	D-0360		341961.7 2197843.	7.30	665				
491	D-0656 J-0719		341431.5 2197038.	7.30	1020				
492	D-396 J-463	AT FORT CA	343131.8 2199592.	7.32	700			34.4	17
493	D-3538	FT CAROLINE STATE	343219.7 2199693.	7.33	204				
494	D-3537	FT CAROLINE STATE	343219.7 2199693.	7.33	34				
495	D-943 J856		282203.5 2191224.	7.33	600				
496	D-1324 J-1603		343660.4 2200398.	7.33	546				
497	D-0260		283335.2 2190106.	7.33	1360				
498	D-394 J-461		347272.0 2227357.	7.34					
499	D-1681 J-1870		343307.3 2199693.	7.34					
500	D-1680 J-1869		343307.3 2199693.	7.34					

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501	D-0168		284467.0 2188988.	7.35	1320				
502	D-2195 J-2401		334554.3 2188996.	7.35	--				
503	D-2447 J-2661		333497.6 2187992.	7.37	--				
504	D-1078 J-1106 7124 CEDAR		347711.0 2227658.	7.43					
505	D-424 J-491		344272.9 2200295.	7.45	700	-21 4-3-88	15.0	36.0	18
506	D-0240		282546.6 2190010.	7.45	1360				
507	D-3097 J-3501		332703.0 2186886.	7.45	--				
508	D-2011 J-1977		343831.0 2199286.	7.46	540				
509	D-2409 J-2595		343830.6 2199185.	7.47	525				
510	D-0051 J-0115		282457.8 2189808.	7.49	1050				
511	D-0051A J-0115		282457.8 2189808.	7.49	1290				
512	D-1266 J-1337		344006.1 2199286.	7.49	546				
513	D-2557 J-3144		346765.4 2232006.	7.50					
514	D-1264 J-1336		343917.7 2199084.	7.50	546				
515	D-2550 J-2841		344888.3 2200899.	7.50					
516	D-2197 J-2193		335076.1 2188387.	7.50	520				
517	D-2549 J-2840		344975.4 2200797.	7.52					
518	D-2377 J-2218		345328.5 2201503.	7.52					
519	D-3493 J-3564		345151.8 2201100.	7.53	600				
520	D-0100 C-0049		283588.4 2188488.	7.53	1360				
521	D-1183 J807		335162.5 2188185.	7.54	540				
522	D-0011		279496.2 2192453.	7.55	44				
523	D-2331 J-2288		343739.4 2198277.	7.55	609				
524	D-1679 J-1988		343827.3 2198377.	7.55					
525	D-2554 J-2956		345415.3 2201300.	7.55					
526	D-1675 J-1932		344268.0 2199083.	7.56	546				
527	D-2009 J-1846		344443.9 2199284.	7.57	546				
528	D-0671 J-0734		340181.4 2192903.	7.59	750				
529	D-1269 J-1323		344707.4 2199485.	7.59	546				
530	D-2225 J-2467		345588.7 2200896.	7.62	600				
531	D-2227 J-2468		345676.7 2200996.	7.62	600				
532	D-1673 J-1776		345588.3 2200795.	7.63					
533	D-1341 J-1607		344529.4 2198779.	7.63					
534	D-1674 J-1716		344793.3 2199081.	7.64	546				
535	D-1123 J-1165		344793.3 2199081.	7.64			10.0		
536	D-2548 J-2828		347986.8 2230889.	7.65					
537	D-3252 J-3323		344439.8 2198274.	7.66					
538	D-3253 J-3331		344439.8 2198274.	7.66					
539	D-1275 J-1274		345145.2 2199483.	7.66	546				
540	D-2378 J-2448		345851.0 2200794.	7.67	588				
541	D-2378 J-2448		345851.0 2200794.	7.67	588				
542	D-0162		282450.1 2188495.	7.67	1310				
543	D-1168 J-1229		344880.1 2198878.	7.68	609				
544	D-1878 J-1606		345144.0 2199180.	7.69					
545	D-92 C-51		282275.0 2188496.	7.70	1300				
546	D-1931 J-1409		344702.5 2198273.	7.70	567				
547	D-0983 J-1021		334540.0 2186572.	7.71	--				
548	D-1169 J-1228		345230.7 2198978.	7.72	546				
549	D-1283 J-1389		345230.7 2198978.	7.72	546				
550	DS-51		346691.8 2235441.	7.73	58				

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS Cl mg/l
551	D-1659 J-1717		345053.2 2198372.	7.75	609				
552	D-1340 J-1636		345139.5 2198069.	7.79	546				
553	D-2543 J-2504		346373.1 2199983.	7.83					
554	WT-27		350587.8 2224514.	7.86	10				
555	D-3256 J-3493		346283.1 2199378.	7.86					
556	D-3255 J-3455		346283.1 2199378.	7.86					
557	DS-383		346547.4 2199781.	7.87	100				
558	DS-382		346547.4 2199781.	7.87	120				
559	DS-347		346547.4 2199781.	7.87	65				
560	DS-348		346808.9 2199476.	7.94	567				
561	D-2540 J-2008		345485.6 2197057.	7.95					
562	D-2010 J-2079		346808.0 2199274.	7.96	100				
563	DS-345		338312.3 2187762.	8.00	565				
564	D-1182 J1306		349634.5 2205324.	8.01					
565	D-1411 J-1591		352867.6 2225313.	8.31					
566	D-3248 J-1601		352867.6 2225313.	8.31					
567	D-3249 J-3237		352953.2 2224808.	8.31					
568	DS-191		351384.5 2205014.	8.34	78				
569	D-2008 J-2096		346438.6 2194528.	8.35					
570	D-757		352963.4 2227333.	8.39					
571	D-2537 J-1405		351671.7 2232693.	8.42					
572	D-3490 J-3775		353825.1 2223895.	8.45					
573	DS-177		346962.7 2194223.	8.47	88				
574	D-2713 J-2627		354251.8 2221166.	8.49	520				
575	D-1276 J-1458		346960.3 2193617.	8.53					
576	D-3484 J-3555		347312.1 2194019.	8.55					
577	D-3485 J-3561		347223.8 2193818.	8.55					
578	D-2714 J-2640		347223.3 2193717.	8.56					
579	D-1819 J-1696		347752.0 2194523.	8.56	520				
580	D-758 J-798		352078.4 2203395.	8.57					
581	D-1413 J-1592		347311.3 2193817.	8.57					
582	D-1820 J-1695		347398.9 2193817.	8.58	620				
583	D-1534 J-1694		347309.3 2193312.	8.62					
584	D-1692 J-1890		347484.0 2193210.	8.66	525				
585	D-1344 J-1632		347571.5 2193210.	8.67	500				
586	D-1832 J-1958		348188.1 2194117.	8.68	546				
587	D-2328 J-2326		348276.1 2194217.	8.68	560				
588	D-2329 J-2278		348099.8 2193915.	8.68	432				
589	D-2330 J-2230		347923.4 2193613.	8.69					
590	D-1693 J-1863		348098.9 2193713.	8.70	520				
591	D-1694 J-2010		347658.3 2193008.	8.71	560				
592	D-1831 J-1957		348538.8 2194216.	8.72					
593	D-2726 J-2767		348009.8 2193309.	8.73					
594	D-2712 J-2579		347481.1 2192503.	8.73					
595	D-1818 J-1673		347569.1 2192604.	8.74	560				
596	D-1625 J-1857		347480.7 2192402.	8.74	575				
597	D-1407 J-1638		348184.9 2193309.	8.76	540				
598	D-3229 J-3459		348184.9 2193309.	8.76					
599	D-3230 J-3469		347567.9 2192301.	8.77					
600	D-1817 J-1672								

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS Cl mg/l
601	D-3483	J-3494	348536.7	2193711.	8.77				
602	D-2744	J-3123	348360.4	2193409.	8.78				
603	D-3486	J-3750	348184.1	2193107.	8.78				
604	D-2720	J-2735	348448.4	2193510.	8.80				
605	D-3229	J-3459	348006.9	2192602.	8.80				
606	D-3228	J-3458	348006.9	2192602.	8.80				
607	D-1683	J-1883	347742.6	2192199.	8.81				
608	D-3402	J-3694	347742.6	2192199.	8.81				
609	D-2216	J-2387	347830.1	2192199.	8.82				
610	D-2708	J-2536	348182.4	2192702.	8.82				
611	D-2706	J-2500	348270.0	2192702.	8.84				
612	D-2722	J-2738	348093.6	2192400.	8.84				
613	D-3213	J-2738	348093.6	2192400.	8.84				
614	D-3624	J-4099	356175.3	2220451.	8.85				
615	D-2222	J-2259	348445.1	2192701.	8.86				
616	D-2730	J-2903	348180.8	2192298.	8.86				
617	D-1573	J-1767	347740.1	2191593.	8.87				
618	D-1682	J-1961	348268.3	2192298.	8.88				
619	D-2721	J-2737	348443.9	2192398.	8.89				
620	D-1546	J-1702	348002.4	2191491.	8.92				
621	D-3609	J-2034	348002.4	2191491.	8.92				
622	D-1545	J-1703	348090.4	2191592.	8.93				
623	D-2724	J-2747	348442.6	2192095.	8.93				
624	D-2717	J-2705	348530.6	2192196.	8.93				
625	D-2718	J-2706	348618.6	2192297.	8.93				
626	D-3227	J-3430	348706.6	2192397.	8.94				
627	D-3228	J-3458	348706.6	2192397.	8.94				
628	D-1412	J-1593	354268.2	2203588.	8.94				
629	D-3225	J-3419	348882.1	2192498.	8.95				
630	D-3226	J-3423	348882.1	2192498.	8.95				
631	D-2719	J-2707	348793.7	2192296.	8.96				
632	D-1384	J-1644	348440.6	2191590.	8.98				
633	D-2217	J-1908	348176.3	2191187.	8.98				
634	D-1827	J-1960	348264.3	2191288.	8.99				
635	D-2731	J-2904	349056.8	2192396.	8.99				
636	D-3404	J-3588	350907.4	2195318.	9.00				
637	D-3405	J-3431	350907.4	2195318.	9.00				
638	D-2728	J-2815	349144.4	2192395.	9.01				
639	D-1566	J-1766	348703.3	2191589.	9.02				
640	D-1826	J-1982	348351.0	2191085.	9.02				
641	D-2735	J-2978	349319.9	2192496.	9.02				
642	D-1690	J-1968	348526.9	2191287.	9.03				
643	D-1828	J-1939	348614.9	2191387.	9.03				
644	D-1477	J-1235	354971.6	2204292.	9.03				
645	D-2221	J-2069	348702.9	2191488.	9.03				
646	D-2221	J-2069	348702.9	2191488.	9.03				
647	D-1830	J-1981	348702.9	2191488.	9.03				
648	D-1829	J-1980	348790.4	2191488.	9.05				
649	D-1691	J-1979	348878.0	2191487.	9.06				
650	D-1689	J-2018	348701.6	2191185.	9.06				

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS CL mg/l
651	D-1626	J-1860	348789.6 2191286.	9.07	560				
652	D-1567	J-1768	348613.3 2190983.	9.07	540				
653	D-1825	J-1937	348701.2 2191084.	9.08	520				
654	D-1961	J-1909	348965.1 2191386.	9.08	520				
655	D-1663	J-1859	348965.1 2191386.	9.08	560				
656	D-1815	J-1906	348612.9 2190882.	9.08	540				
657	D-2279	J-1938	348612.9 2190882.	9.08	500				
658	D-2363	J-2380	348612.9 2190882.	9.08	1220				
659	D-2436	J-1841	348788.8 2191084.	9.09	540				
660	D-2437	J-1611	348788.8 2191084.	9.09	540				
661	D-3338	J-3521	350022.0 2192897.	9.09	540				
662	D-3337	J-3545	350022.0 2192897.	9.09	540				
663	D-1898	J-1879	348964.7 2191285.	9.09	540				
664	D-1823	J-1907	348700.4 2190882.	9.10	500				
665	D-1688	J-2017	348875.9 2190982.	9.11	500				
666	D-1824	J-1940	349139.0 2191082.	9.14	520				
667	D-1822	J-1936	349050.7 2190881.	9.15	500				
668	D-255	J-322	354786.2 2201768.	9.17	540				
669	D-1687	J-2019	349138.2 2190880.	9.17					
670	D-2705	J-2178	349402.1 2191182.	9.18	560				
671	D-2364	J-2460	349137.8 2190779.	9.18					
672	D-2704	J-2177	349490.1 2191283.	9.19	700				
673	D-3625	J-4330	355049.7 2201969.	9.26					
674	D-3225	J-3419	350896.4 2192590.	9.26					
675	D-3224	J-3384	350896.4 2192590.	9.27					
676	D-1664	J-1734	349750.7 2190777.	9.27	525				
677	D-3605	J-3838	351512.2 2193295.	9.29	550				
678	D-3336	J-3544	351247.0 2192690.	9.31	540				
679	D-3337	J-3545	351247.0 2192690.	9.31	540				
680	D-606	J-672	350451.6 2190875.	9.37	804				
681	D-1201	J-1273	351508.9 2192487.	9.37	585		24.0		
682	D-1409	J-1379	356716.6 2202770.	9.43					
683	D-708	J-14	351770.3 2192183.	9.44	449				
684	D-1064	J-1119	351241.3 2191276.	9.45	525				
685	D-3338	J-3521	349831.7 2189160.	9.46	480				
686	D-3230	J-3469	350183.2 2189462.	9.48					
687	D-1043	J-752	351591.5 2191274.	9.51	585				
688	D-2727	J-2769	350006.0 218957.	9.51					
689	D-3403	J-3587	350534.3 2189662.	9.51					
690	D-1265	J-1441	356532.5 2200548.	9.54					
691	D-2539	J-1904	356531.3 2200245.	9.56					
692	D-1222	J-1442	356619.7 2200447.	9.57					
693	D-1684	J-1995	350532.2 2189157.	9.57	525				
694	D-1221	J-1448	356794.8 2200446.	9.60					
695	D-1220	J-1443	356794.0 2200244.	9.61					
696	D-3226	J-3423	350617.7 2188652.	9.64	520				
697	D-1218	J-1444	356880.7 2200042.	9.64					
698	D-2594	J-3145	356969.1 2200243.	9.64					
699	D-2536	J-950	356969.1 2200243.	9.64	580				
700	D-3335	J-2429	350616.9 2188450.	9.66	499				

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS Cl mg/l
701	D-3334 J-3491		350352.6 2188047.	9.67					
702	D-1219 J-1445		357143.8 2200142.	9.68					
703	D-3344 J-3289		357143.4 2200041.	9.69	540				
704	D-3343 J-3532		357143.4 2200041.	9.69	540				
705	D-3231 J-3472		350439.8 2187945.	9.69	84				
706	D-1216 J-1449		357318.1 2199939.	9.72					
707	D-1217 J-1450		357406.1 2200040.	9.73					
708	D-3494 J-1451		357493.6 2200039.	9.75					
709	D-3217 J-3213		351229.8 2188447.	9.76	500				
710	D-1816 J-1163		351493.3 2188648.	9.77					
711	D-1480 J-1473		357668.3 2199938.	9.79					
712	D-1481 J-1474		357756.3 2200038.	9.79					
713	D-1482 J-1475		357843.5 2199937.	9.82					
714	D-2745 J-3132		353341.1 2190863.	9.83					
715	D-1604 J-1476		358018.2 2199835.	9.85	900				
716	D-1606 J-1478		358106.1 2199936.	9.86					
717	D-3214 J-2939		353251.1 2190257.	9.88					
718	D-3212 J-2731		353251.1 2190257.	9.88					
719	D-1608 J-1477		358193.3 2199834.	9.89					
720	D-2733 J-2972		353338.6 2190257.	9.89	500				
721	D-1572 J-1839		353338.2 2190156.	9.90	500				
722	D-2558 J-3148		358457.2 2200136.	9.91	560				
723	D-1120 J-1134		353336.6 2189752.	9.94	485				
724	D-1930 J-1710		358543.5 2199833.	9.95	575				
725	D-1610 J-1481		358631.1 2199833.	9.96					
726	D-1614 J-1483		358896.6 2200539.	9.96					
727	D-1612 J-1482		358896.2 2200438.	9.97					
728	D-1245 J-1294		354128.3 2190658.	9.98	380				
729	D-551 J-2906	M. KOONEE	362209.2 2218507.	9.98	566	9-13-84	9.7	39.5	
730	D-2551 J-2906		362209.2 2218507.	9.98					
731	D-1929 J-1851		358806.6 2199933.	9.99	580				
732	D-1611 J-1480		358895.0 2200135.	9.99					
733	D-1609 J-1479		358806.2 2199832.	9.99					
734	D-2553 J-2946		359071.8 2200538.	9.99					
735	D-2231 J-1486		359248.5 2200941.	10.00					
736	D-2734 J-2974		353598.5 2189549.	10.01	500				
737	D-3220 J-3306		352716.7 2188037.	10.03					
738	D-1962 J-1897		354389.8 2190354.	10.05	462				
739	D-163 J-227	KINGSLEY PLANTATION	362563.5 2219516.	10.05	455	9-13-84	11.8	40.2	
740	D-1656 J-1485		359422.0 2200537.	10.06					
741	D-1658 J-1484		359421.2 2200335.	10.07					
742	D-1657 J-1487		359597.1 2200536.	10.09					
743	D-1548 J-951		360039.0 2201544.	10.10	520				
744	D-1084 J-1149		354123.0 2189345.	10.11	500				
745	DS-184		354387.3 2189748.	10.11	100				
746	D-912 J-1028	D. P. EDSON	362910.1 2218605.	10.11	484	9-13-84	11.2	39.8	
747	D-1653 J-1489		359861.0 2200838.	10.12					
748	D-1145 J-1198		352625.5 2187128.	10.12	500				
749	D-897 J-1025	C. STRICKLAND	362714.9 2213656.	10.12	475	9-13-84	9.6	39.2	
750	D-1655 J-1488		359860.2 2200636.	10.13					

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS Cl mg/l
751	D-1654 J-1491	1669 GIRVIN ROAD	360036.1 2200837.	10.15					
752	D-400 J-467		354562.0 2189646.	10.15	490	9-15-87	10.0	31.1	17
753	D-3491 J-3727		363078.2 2216887.	10.15	600				
754	D-2154 J-2243		360477.2 2201644.	10.18					
755	D-1652 J-1492		360299.6 2201038.	10.18					
756	D-1678 J-1490		360299.6 2201038.	10.18					
757	D-1295 J-1332		360388.0 2201240.	10.19	575				
758	D-2155 J-2309		360476.0 2201340.	10.20	540				
759	D-2157 J-2299		360476.0 2201340.	10.20					
760	D-1632 J-1493		360563.1 2201239.	10.22					
761	D-1928 J-1494	FAIRFIELD P-1 FAIRFIELD TP-2	360651.1 2201340.	10.23					
762	D-1677 J-1496		360739.5 2201541.	10.23		9-13-84	14.4 13.2	39.4	
763	J-3257		363215.0 2212800.	10.24	800				
764	J-4003		363220.0 2212550.	10.24	1311				
765	D-1676 J-1497		360472.7 2200532.	10.24					
766	D-2154 J-2243		361270.6 2202954.	10.24					
767	D-2544 J-2576		363605.6 2217390.	10.25	504	9-13-84	13.7	41.1	
768	D-509 J-576		360915.4 2201743.	10.25					
769	D-1634 J-1498		360826.6 2201440.	10.26					
770	D-1633 J-1495		363599.9 2215976.	10.26	560		8.3		
771	D-1256 J-1170	LEACH/OLIVER	361269.3 2202651.	10.26	540				
772	D-3623 J-3957		361091.4 2201944.	10.27	605				
773	D-1635 J-1500		354557.1 2188434.	10.27					
774	D-1547 J-1780		361622.0 2203255.	10.29					
775	D-1647 J-1505		361799.2 2203760.	10.30	520				
776	D-3344 J-3289		361799.2 2203760.	10.30	520				
777	D-3345 J-3325		361532.8 2202851.	10.30					
778	D-1639 J-1502		361444.1 2202549.	10.30					
779	D-1636 J-1503		361532.4 2202750.	10.30					
780	D-1638 J-1501		363860.1 2215369.	10.31	544	9-13-84	11.2	37.1	
781	D-2555 J-3055	R. SAGE	361795.9 2202951.	10.34					
782	D-1640 J-1507		363943.6 2214358.	10.34					
783	D-3251 J-3330		363943.6 2214358.	10.34					
784	D-3251 J-3262		361884.3 2203153.	10.35					
785	D-1641 J-1508		361795.5 2202850.	10.35					
786	D-1637 J-1506		362238.2 2204061.	10.36					
787	D-470 J-537		362504.6 2204969.	10.37					
788	D-1642 J-1517		362237.8 2203960.	10.37					
789	D-1646 J-1510		362504.2 2204868.	10.37					
790	D-2228 J-2452		362593.0 2205171.	10.37	520	-26.6 9-14-87	7.0	33.6	18
791	D-713 J-50	MAYPORT FE	362503.8 2204767.	10.38					
792	D-1644 J-1512		364302.4 2216478.	10.39	560		6.6		
793	D-1071 J-739		362768.9 2205372.	10.40					
794	D-1649 J-1518		364388.8 2216175.	10.41					
795	D-1672 J-1733		362856.9 2205473.	10.41	510	6-5-84	7.0	30.1	
796	D-1662 J-1351		362678.1 2204564.	10.42					
797	D-1645 J-1511		364477.5 2216477.	10.42					
798	D-3249 J-3237		364477.5 2216477.	10.42					
799	D-3250 J-3263		362854.4 2204867.	10.44					
800	D-3248 J-1601								

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS Cl mg/l
801	D-3247 J-1513	J.W. McCORKLE	362854.4 2204867.	10.44					
802	D-1651 J-1520		363121.2 2205876.	10.44					
803	D-1650 J-1519		363032.0 2205472.	10.44					
804	D-3492 J-3665		363120.4 2205674.	10.45					
805	D-1922 J-1525		363298.0 2206279.	10.45					
806	D-1648 J-1515		363118.7 2205270.	10.47					
807	D-1924 J-1522		363296.7 2205976.	10.47					
808	D-927 J-1030		363653.5 2207591.	10.47	495	9-13-84	6.3	36.8	
809	D-1926 J-1521		363207.1 2205471.	10.47					
810	D-2556 J-3091		363473.5 2206379.	10.48	520				
811	D-714 J-48	DR. O. BEAHR	363562.3 2206682.	10.49	528				
812	D-3247 J-1513		363561.9 2206581.	10.49					
813	D-1923 J-1526		363472.7 2206177.	10.49					
814	D-1975 J-1527		363560.6 2206278.	10.50					
815	D-3245 J-782		363649.4 2206581.	10.51	525				
816	D-3246 J-1211		363649.4 2206581.	10.51	525				
817	D-3410 J-3785		363471.0 2205773.	10.51	685				
818	D-3409 J-2732		363471.0 2205773.	10.51	685				
819	D-2160 J-2229		363381.8 2205370.	10.51	540				
820	D-920 J-1038		364818.0 2214052.	10.51	598	9-13-84	15.2	39.2	
821	D-926 J-1039	I.H. OWENS	363737.4 2206681.	10.52					
822	D-1927 J-1523		363469.8 2205470.	10.52					
823	D-1916 J-1529		363826.2 2206984.	10.52					
824	D-1925 J-1524		363558.6 2205773.	10.52					
825	D-925 J-1047		364906.8 2214354.	10.52					
826	D-786 J-806		363825.4 2206782.	10.53	540				
827	D-916 J-1029		364903.9 2213647.	10.53	632	9-13-84	15.0	39.9	
828	D-711 J-824		363734.1 2205873.	10.55	504				
829	D-710 J-800		363734.1 2205873.	10.55	504				
830	D-914 J-1027		364897.8 2212132.	10.56	478	9-13-84	12.4	39.0	
831	D-917 J-1037	ROLLINS BIRD SANCTUARY DR. A.C. WILLIAMS	365170.3 2214555.	10.57	623	9-13-84	15.2	39.5	
832	D-1911 J-1539		364267.2 2207790.	10.57					
833	D-1921 J-1528		363998.8 2206377.	10.58					
834	D-625 J-691		365258.6 2214757.	10.58	600	6-5-84	15.2	39.4	
835	D-1912 J-1540		364355.2 2207891.	10.59					
836	D-1917 J-1535		364176.4 2206983.	10.59					
837	D-919 J-1043		364174.0 2206377.	10.61					
838	D-941 J-1053		365539.7 2219302.	10.61	608	9-13-84	19.8	41.0	
839	D-2379 J-2473		365435.4 2215160.	10.61	510	9-13-84	14.3	39.7	
840	D-1920 J-1509		364262.7 2206679.	10.62					
841	D-915 J-1026	J.W. LUCAS	365434.2 2214857.	10.62	555	9-13-84	16.2	40.4	
842	D-918 J-1044		364262.3 2206578.	10.62					
843	D-921 J-1045		364439.1 2206982.	10.64					
844	D-2538 J-1878		364438.3 2206780.	10.64					
845	D-1976 J-1536		364527.1 2207082.	10.65					
846	D-1919 J-1516		364526.2 2206880.	10.66					
847	D-715 J-16		365700.5 2215765.	10.66	742	9-13-84	6.6	40.6	
848	D-2159 J-2329		362571.7 2199918.	10.66	525				
849	D-922 J-1046		365606.4 2214149.	10.66					
850	D-472 J-539		362925.2 2200724.	10.67					
		FAIRFIELD NE-1							

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS Cl mg/l
851	D-1910 J-1542	G. BETZ	364791.8 2207586.	10.68					
852	D-1918 J-1537		364701.8 2206981.	10.68					
853	D-142 J-206		364790.2 2207182.	10.69	625				
854	D-913 J-1048		365969.7 2217381.	10.70	556	6-5-84	19.6	40.2	
855	D-1914 J-1914		365224.2 2227890.	10.70	560				
856	D-2368 J-1402		365966.1 2216471.	10.70					
857	D-1170 J-1262		363277.5 2201228.	10.71					
858	D-3035 J-3203		363543.5 2202035.	10.71					
859	D-471 J-538		363454.7 2201732.	10.71					
860	D-164 J-228		365962.0 2215461.	10.71	840	5-4-88	15.7	39.2	250
861	D-2408 J-2669	FT. GEO. GOLF CLUB	363809.0 2202741.	10.72	500				
862	D-2542 J-2400		363720.2 2202439.	10.72	500				
863	D-475 J-542		363986.6 2203347.	10.72	700				
864	D-468 J-535		363542.6 2201833.	10.72					
865	D-150 J-214		365055.3 2207787.	10.72	500				
866	D-1915 J-1538		364965.7 2207283.	10.72					
867	D-477 J-544		363897.0 2202842.	10.73					
868	D-144 J-208		365143.7 2207989.	10.73	500				
869	D-2161 J-2351		363985.3 2203044.	10.73	800				
870	D-1977 J-1541		365053.7 2207383.	10.73					
871	D-1171 J-1261	J. E. GAY	363541.4 2201530.	10.74					
872	D-2552 J-2928		366045.9 2214552.	10.74					
873	D-1172 J-1284		363984.5 2202842.	10.74					
874	D-109 J-173		364250.9 2203750.	10.75					
875	D-1175 J-1258		363540.6 2201328.	10.75	600	9-13-84	17.5	43.4	
876	D-924 J-1040		366228.7 2216470.	10.75	900				
877	D-467 J-534		364250.1 2203548.	10.76					
878	D-3250 J-3253		366224.2 2215359.	10.76					
879	D-3250 J-3262		366224.2 2215359.	10.76					
880	D-1070 J-1175	G. REGISTER	366319.2 2217177.	10.76	520	9-13-84	6.4	40.3	
881	D-474 J-541		364426.4 2203850.	10.77					
882	D-2410 J-2449		365406.3 2207988.	10.78					
883	D-465 J-532		364424.4 2203345.	10.80	700				
884	D-923 J-1041		366493.5 2216974.	10.80	577	6-5-84	5.0	40.6	
885	D-2158 J-2347		366491.8 2216570.	10.80	560	6-5-84	5.5	41.3	
886	D-464A J-531		364512.3 2203446.	10.81	1000	6-5-84	7.0	33.5	
887	D-464 J-531		364512.3 2203446.	10.81	1220	9-17-88			
888	D-2094 J-2164		365581.5 2207987.	10.81	600				
889	D-1880 J-2021	DR. KNAUER W. ARNOLD	364689.9 2204051.	10.81					
890	D-2547 J-2725		364599.9 2203445.	10.82					
891	D-13		357442.5 2187412.	10.84	22				
892	D-299 J-364		366923.1 2214952.	10.90					
893	D-1185 J-1309		365302.8 2204048.	10.92	525				
894	D-97 J-161		365300.4 2204048.	10.94	510				
895	D-1883 J-2023		365390.8 2203543.	10.95	510				
896	D-3333 J-3500		357966.2 2187006.	10.96					
897	D-473 J-540		365299.2 2203139.	10.97	560				
898	D-1882 J-2022		365386.3 2203038.	10.99					
899	D-3255 J-3255		367451.3 2215657.	10.99					
900	D-3254 J-3401		367451.3 2215657.	10.99	660				

MAP NO.	WELL NO.	OWNER	STATE PLANE COORDINATES NORTH EAST	DISTANCE FROM WELLFIELD (MILES)	DEPTH OF WELL (FEET)	PIEZOMETRIC SURFACE MEASUREMENT (FEET) DATE	GROUND ELEVATION NGVD (FEET)	PIEZOMETRIC ELEVATION NGVD (FEET)	CHLORIDES AS Cl mg/l
901	D-466 J-533	LITTLE TAL	365563.9 2203643.	10.99					
902	D-1881 J-2024		365385.5 2202836.	11.00			10.0		
903	D-491 J-558		358933.9 2188113.	11.00					
904	D-1913 J-1548		367318.3 2226063.	11.04					
905	D-143 J-207		367615.0 2212828.	11.06					
906	D-1660 J-1546		367914.1 2221818.	11.08					
907	D-395 J-462		369770.4 2226154.	11.50					
908	D-1661 J-1549		370695.9 2216856.	11.59					
909	D-233 J-300		369148.5 2202316.	11.73	814		10.0		
910	D-232 J-299		369235.7 2202214.	11.73					
911	D-2738 J-3033		366396.5 2193033.	11.82					
912	D-3220 J-3306		366395.7 2192831.	11.83					
913	D-3219 J-3278		366395.7 2192831.	11.83					
914	D-268 J-333		366921.9 2193031.	11.91	705		7.0		
915	D-1160 J-1259		366568.4 2192224.	11.91					
916	D-234 J-301		369931.2 2200999.	11.92					
917	D-47 J-111		370370.3 2201300.	11.99	764				
918	D-303 J-368		370369.9 2201199.	11.99	1000				
919	D-2230 J-2228		370188.6 2199685.	12.04	1000				
920	D-47 J-111		370539.7 2199885.	12.09	764				
921	D-1243 J-1372		367706.7 2192219.	12.11					
922	D-303		370890.3 2199985.	12.15	1000				
923	D-933 J-993		366291.0 2188588.	12.17	650		8.0		
924	D-295 J-360		367260.7 2190201.	12.19	703		10.0		
925	D-932 J-992		366466.1 2188587.	12.20	650				
926	DS-119		369026.2 2193729.	12.22	98				
927	DS-119A		369026.2 2193729.	12.22	162				
928	D-235 J-302		370885.0 2198672.	12.23					
929	DS-145		369112.5 2193426.	12.26	110		10.0		
930	D-2229 J-2227		371858.4 2201193.	12.26	1000				
931	D-1686 J-1793		366638.8 2187981.	12.28					
932	D-609 J-675		370078.6 2194129.	12.38	700		8.0		
933	D-3487 J-4006		367514.0 2187876.	12.44	546				
934	D-1061 J-1116		369721.4 2192413.	12.44	504		10.0		
935	D-231 J-298		370870.3 2195035.	12.45					
936	D-454 J-521		368748.8 2190094.	12.46	500		15.0		
937	D-230 J-297		371045.0 2194933.	12.49			9.0		
938	WT-13		369011.5 2190092.	12.50	14				
939	DS-257		371132.5 2194933.	12.51	63		9.0		
940	DS-263		371132.5 2194933.	12.51	14		9.0		
941	DS-256		371132.5 2194933.	12.51	61		9.0		
942	D-872 J-988		370867.0 2194227.	12.51	545		10.0		
943	D-236 J-303		373166.1 2199774.	12.58					
944	D-3221 J-3308		368564.7 2187872.	12.61	710				
945	D-613 J-679		370153.8 2191098.	12.62	618		11.0		
946	D-1267 J-1347		369178.8 2188172.	12.69					
947	D-1107 J-1075		370225.5 2187158.	12.95	1010		10.0		

**GROUND WATER INVESTIGATION
REPORT**

**THE CEDAR BAY COGENERATION
PROJECT**

**APPENDIX B
WELL LOGS**



WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR

WATER RESOURCES DIVISION

WALTER CARD

Recorded by J. Longo Source ST. REGIS Date 3/4/74 No. Eastport 75-714

Field 12 County Douglas 16

Latitude: 302610N Longitude: 0913616 7

Altitude: 1027 1046 11

Local name: D-533 7-599 10532

Local use: 0152746 ST. REGIS

Owner or agent: ST. REGIS Address: JAN 31A

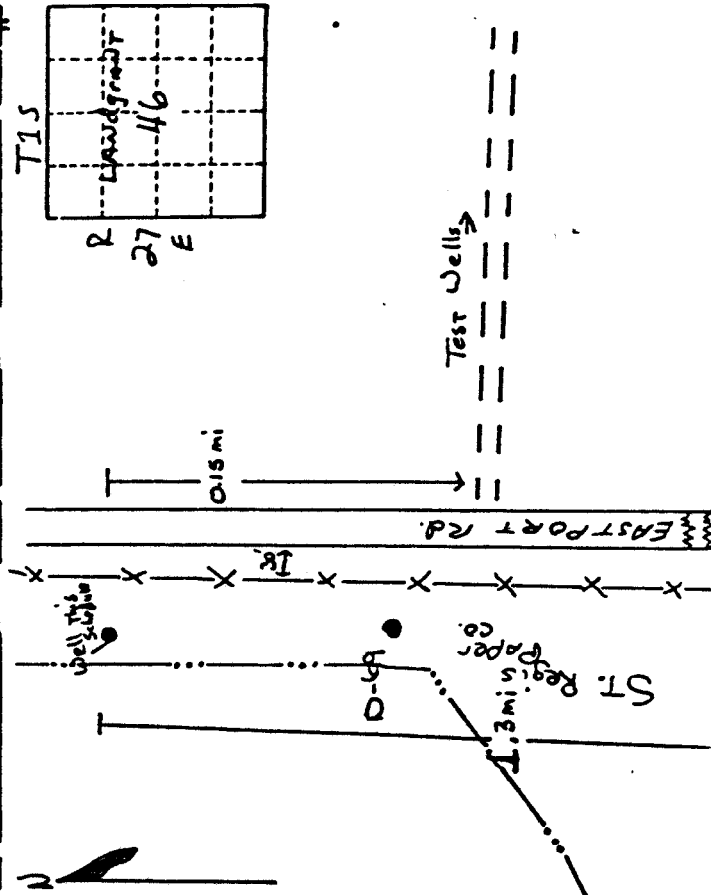
[illegible][illegible]**WELL-DESCRIPTION CARD**[illegible]

Prisoner	Name		Address					Deep	Shallow
	(1)	(2)	(3)	(4)	(5)	(6)	(7)		
Mills (Arms)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	☐	☐
	dir.	bacter.	cont.	for.	(cont.)	more,	picton,	res.	other
Young (Arms)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	☐	☐
	dir.	bacter.	cont.	for.	(cont.)	more,	picton,	res.	other

[illegible]

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HYDROLOGIC CARD

[illegible]

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Recorded by GLENN

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 5-20-82Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302626081361101 RG Number R-0 Transaction T-0 D M V
 Site-Type 2-C D M I M P T Date 3-0 U L M Reliability field checked, uncheckered, location not, minimal
 Project No. 5- District 6-121 State 7-12 County (or town) Sum Reporting Agency 4-FL039
 Latitude 9-302626 Longitude 10-0813611 Let-Long Accuracy 11-S T M
 Local Number 12-T-3094 Land Net Loc. 13-LARGE 46 T 1 S R 20 E
 Location Map 14-EASTPORT Scale 15-24000
 Altitude 16-30 Method of Measurement 17-A L Accuracy 18-5
 Topo Setting 19-D C E H K L B P S T U V W Hydrologic Unit (OWDC) 20-03080103
 Date of First Construction/Completion 21-05/03/1982 Use of Site 23-A D E G H M P R S T U X Z
 Use of Water 24-A B C D E F I M N P R S T U V Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27-700 Depth of Well 28-700 Source of Depth Data 29-D
 Water Level 30-718.02 Date Measured 31-05/20/1982 Source 33-5
 Method of Measurement 34-A C E H L M R S T V Z
 Site Status 37-D F G H P R S T V X Z
 Source of Geohydrologic Data 38- Pump Used 39- Measuring Point 268-0 Measuring Point Date 267-05/20/1982

OWNER IDENTIFICATION (1)

R-100 T-0 D M Date of Ownership 100-05/03/1982
 Name: Last 101-BURSE First 102-GEORGE Middle Initial 103-A

OTHER SITE IDENTIFICATION NUMBERS (1)

R-100 T-0 D M Name 100-SJ Assign 101-FLAND
 New Card Same R & T Name 100-EASTPORT Assign 101-FL039

SITE VISIT DATA (1)

R-100 T-0 D M Date of Visit 107-05/20/1982 Name of Person 108-GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R-102 T-A D M Date 103- / / Geohydrologic Unit 105-
 New Card Same R thru 195 Temperature 100-0.0.0.1.0 Degrees C 107-
 Conductance 100-0.0.0.0.5 pH 107-
 Other (STORET) Parameter 100- Value 107-
 Other (STORET) Parameter 100- Value 107-

FOOT NOTES:

① Source of Data Codes:

S D B A R L Q Z
 reporting, driller, owner, other gov't, other logs, geologist, other



WELL CONSTRUCTION DATA (1)

R = 58 * T = 0 D M * Entry No 100.1 * Date of Construction Completion 60-05-1982 * Source of Construction Data 04 D *

Name of Contractor/Driller OE SMITH *

Method of Construction 65 * A B C D 11 J P R T V W Z *

Finish 66 * C F G H B P S T W 10 Z * Type of Seal G7 * R C G Z *

Bottom of Seal 68 * * Method of Development 69 * A B C J N P S Z * Number of Hours in Development 70 * *

Special Treatment During Development 71 * C D E F H M Z *

chemicals, dry ice, explosives, deflocculant, hydraulic fracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = 0 D M * Construction Entry No 50-100.1 *

New Card for Each Hole Segment
Same R, T & Field 59

Top of Hole Segment Below LSD

73 #	<u>0.0</u>	*
73 #	<u>1.05</u>	*
73 #		*
73 #		*
73 #		*

Bottom of Hole Segment below LSD

74 #	<u>1.05</u>	*
74 #	<u>1.05</u>	*
74 #		*
74 #		*
74 #		*

Diameter of Hole Segment

75 #	<u>3</u>	*
75 #	<u>3</u>	*
75 #		*
75 #		*
75 #		*

CASING SCHEDULE (2)

R = 78 * T = 0 D M * Construction Entry No 50-100.1 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 #	<u>0.0</u>	*
77 #	<u>0.0</u>	*
77 #	<u>1.05</u>	*
77 #		*
77 #		*

Bottom of Casing Segment Below LSD

78 #		*
78 #	<u>1.05</u>	*
78 #	<u>4.03</u>	*
78 #		*
78 #		*

Diameter of Casing Segment

79 #		*
79 #	<u>3</u>	*
79 #	<u>2</u>	*
79 #		*
79 #		*

Casing Material 80 * 6 * 6 * 6 * 6 * 6 *

Thickness of Casing

81 #		*
81 #		*
81 #		*
81 #		*
81 #		*

OPENINGS SCHEDULE (2)

R = 82 * T = 0 D M * Construction Entry No 50-100.1 *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD 83 # * * (Openings Data)

Bottom of Section Below LSD 84 # * * (Openings Data)

Type of Opening 85 # * * (Openings Data)

Type of Material 86 # * * (Openings Data)

Diameter of Open Section 87 # * * (Openings Data)

Width of Opening 88 # * * (Openings Data)

Length of Opening 89 # * * (Openings Data)

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z

reporting, driller, owner, other gov't, other logs, geologist, other agency, reported,

⑤ Casing Material Codes

B C G I M P R S T U W Z

brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, metal, wood, other iron iron metal plastic stone metal

② Type of Openings Codes

F L M P R S T W X Z

fracture, lowered, mesh, perforated, wire screen, sand, welded, open, other slotted or slotted around technique point hole

③ Type of Material Codes for Open Sections

B C G I M P R S T Z

brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other bronze iron iron metal plastic metal

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GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- D M *

Er A

96 # 001 *

Depth

to Top

91 -

Depth to

Bottom

92 -

Unit Identifier

93- 120FLRD *

Lithology

96- LMSM *

Lithologic Modifier

97- MARINE *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No

286 #

Date

95 # / / *

month

day

year

Water Level

126 - *

% Water

Contributed

132 - *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No

286 #

Depth to Top

91 - *

Depth to Bottom

92 - *

Unit Identifier

93- *

Lithology

96- *

Lithologic Modifier

97- *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No

286 #

Date

95 # / / *

month

day

year

Water Level

126 - *

% Water

Contributed

132 - *

PERTINENT REMARKS

R-183 *

T- A *

add

185 - *

New Card Same R&T

185 - *

185 - *

NOTES:

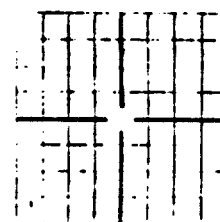
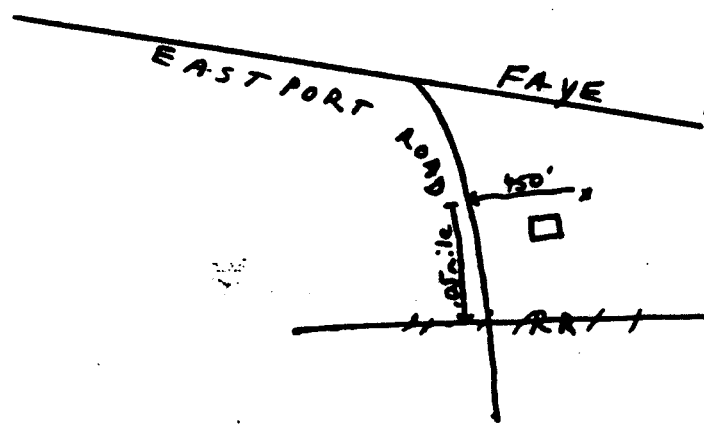
R-212 *

T- A *

1509 EASTPORT ROAD *

N

J. 3094



U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Recorded by GLENNDate 6-28-82Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302628081360501 RG Number R-0 Transaction T-0 D M V
 Site-Type 2-C D H I M P T Reliability 3-0 U L M Reporting Agency 4-FL039
 Project No. 5- District 6-121 State 7-12 County (or town) Dulal 8-031
 Latitude 9-302628 Longitude 10-0813605 Lat-Long Accuracy 11-S 0 T M
 Local Number 12-J-3145 Land Net Loc. 13-LANDGAIN 46 T 15 R 27 E
 Location Map 14-EASTPORT Scale 15-24000
 Altitude 16-20 Method of Measurement 17-A L 0 Accuracy 18-5
 Topo Setting 19-D C E 0 H K L 0 P S T U V W Hydrologic Unit (OWOC) 20-0308010
 Date of First Construction/Completion 21-06/28/1982 Use of Site 23-A D E G H 0 M P R S T U 0 X Z
 Use of Water 24-A B C D E F 0 I M N P R S T U Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- Depth of Well 28- Source of Depth Data 29-
 Water Level 30- Date Measured 31- Source 33-
 Method of Measurement 34-A C E G H L M R S T V Z
 Site Status 37-D F G H 0 P R S T V X Z
 Source of Geohydrologic Data 36- Pump Used 35- Measuring Point 266- Measuring Point Date 267-

OWNER IDENTIFICATION (1)

R-158 T-0 D M Date of Ownership 159-06/28/1982
 Name: Last 161-COAN First 162-BLAINE Middle Initial 163-0

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-0 D M Ident 190-ST Assigner 191-FLAWHD
 New Card Same R & T Ident 190-EAYE Assigner 191-FL039

SITE VISIT DATA (1)

R-188 T-0 D M Date of Visit 187-06/28/1982 Name of Person 188-GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-A D M Date 193- Geohydrologic Unit 195-
 New Card Same R thru 195 Temperature 196-0,0,0,1,0 Degrees C 197-
 Conductance 198-0,0,0,9,5 μ Mhos 197-
 Other (STORET) Parameter 199- Value 197-
 Other (STORET) Parameter 199- Value 197-

FOOT NOTES

① Source of Data Codes:

S O 0 A R L G Z

WELL CONSTRUCTION DATA (1)

R = 68 * T = Q D M * Entry 001 * Date of Construction Completion 60-06-12 1982 * Source of Data 64 D *

Name of Contractor/Driller 63 GRIFFIS *

Method of Construction 65 A B C D 11 J P R T V W Z *

Finish 66 C F G H I P S T W 10 Z * Type of Seal 67 B C G Z *

Bottom of Seal 68 * Method of Development 69 A B C J N P S Z * Number of Hours in Development 70 *

Special Treatment During Development 71 C D E F H M Z *

chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 58 *

Top of Hole Segment Below LSD 73 # 73 # 73 # 73 # 73 #

Bottom of Hole Segment below LSD 74 # 74 # 74 # 74 # 74 #

Diameter of Hole Segment 75 # 75 # 75 # 75 # 75 #

New Card for Each Hole Segment Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 *

Top of Casing Segment Below LSD 77 # 77 # 77 # 77 # 77 #

Bottom of Casing Segment Below LSD 78 # 78 # 78 # 78 # 78 #

Diameter of Casing Segment 79 # 79 # 79 # 79 # 79 #

Casing Material 80 # 80 # 80 # 80 # 80 #

Thickness of Casing 81 # 81 # 81 # 81 # 81 #

New Card for Each Casing With Same R, T & Field 59

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 *

Top of Section Below LSD 83 # 83 # 83 #

Bottom of Section Below LSD 84 # 84 # 84 #

Type of Openings 85 # 85 # 85 #

Type of Material 86 # 86 # 86 #

Diameter of Open Section 87 # 87 # 87 #

Width of Opening 88 # 88 # 88 #

Length of Opening 89 # 89 # 89 #

New Card for Each Open Section With Same R, T and Field 59

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z

reporting, driller, owner, other gov't, other logs, geologist, other agency, reported,

② Type of Openings Codes

F L M P R S T W X Z

fracture, lateral, mesh, perforated, wire screen, sand, welded, open, other, slotted, or slotted, wood (unknown), point, hole

③ Casing Material Codes

B C G I M P R S T U W Z

brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other, iron, metal plastic, stone, steel

④ Type of Material Codes for Open Sections

B C G I M P R S T Z

brass or, concrete, galv, wrought, other, PVC or, titanium, steel, tile, other, bronze, iron, iron, metal plastic, steel

2-3145

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T-0 D M *
add, delete, modify

256 # 001 *

Depth to Top

91 *

Depth to Bottom

92 *

Unit Identifier

93- 120. FLD *

Lithology

96 LHSU *

Lithologic Modifier

97 MARINE

AQUIFER DATA (2)

R-94 * T- A D M *
add, delete, modify

Geohydrologic Unit Entry No

256 # *

Date

95 # / / *
month day year

Water Level

126 = *

% Water Contributed

132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M *
add, delete, modify

Entry No

256 # *

Depth to Top

91 *

Depth to Bottom

92 *

Unit Identifier

93- *

Lithology

96 *

Lithologic Modifier

97 *

AQUIFER DATA (2)

R-94 * T- A D M *
add, delete, modify

Geohydrologic Unit Entry No

256 # *

Date

95 # / / *
month day year

Water Level

126 = *

% Water Contributed

132 = *

PERTINENT REMARKS

R-183 * T- A *
add

New Card Same R&T

185 *

185 *

185 *

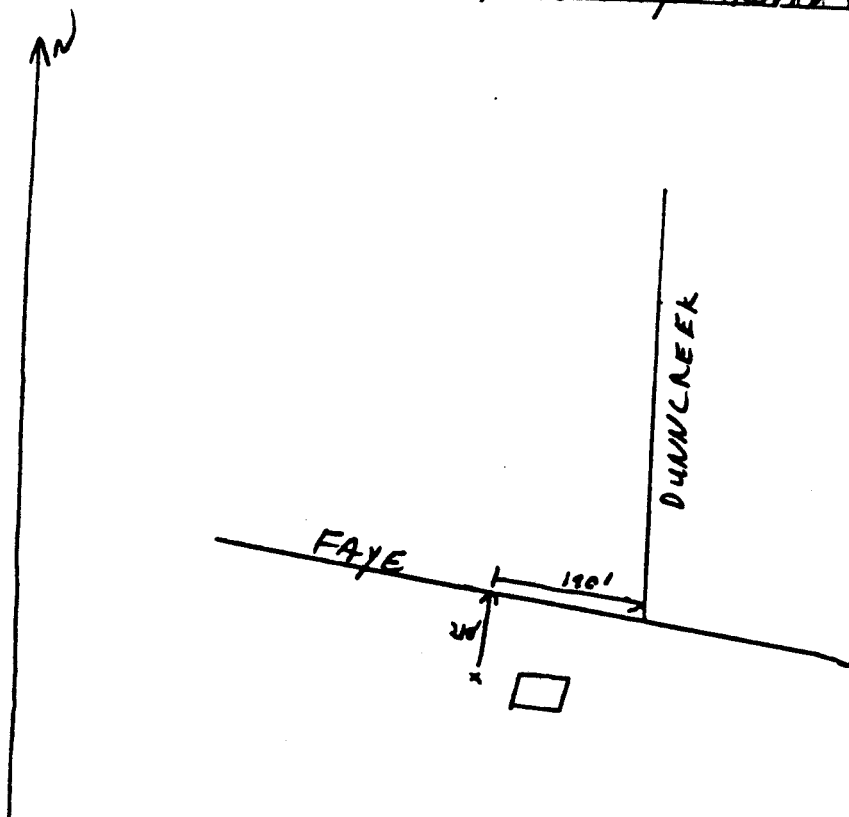
NOTES.

R-212 * T- A *

218 =

1682 FAYE ROAD

J-3145



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
WELL COMPLETION REPORT

OWNER: WILSON, FREDERICK W
Last Name First Name Initial
1509 EAST POINTE RD.
Number Street
NAX FLA
City State
708 757 9352 32718
Area Code Phone Number Zip Code

WELL LOCATION:
X of Section: 1
Township: 1 (N-S) Range: 1 (E-W)
Latitude: 26 Deg. 15 Min. 00 Sec. N
Longitude: 82 Deg. 15 Min. 00 Sec. W
Locate in Section:
1509 EAST POINTE RD.
Number Street/Road
NAX FLA
City State County

OWNER WELL NUMBER OR NAME:

DRILL METHOD: ☒ Rotary ☐ Cable Tool ☐ Jet ☐ Auger
☐ Other:

Steel Dia. (In.)	Steel Wt. (lb./ft.)	Dia. (In.)	From (Ft.)	To (Ft.)	Schedule No.	Joints
Black Galv. S. Steel		PVC Other				
<u>3</u>			<u>0</u>	<u>103</u>		<u>10</u>
<u>2</u>			<u>15</u>	<u>243</u>		

Describe Material:
TC = Threaded and Coupled, TCW = Threaded, Coupled, and Welded.
W = Welded, S = Bonded (PVC), O = Other:

GROUT: ☐ None ☒ Neat Cement ☐ Other:
Type and Percent of Additives and Grout Volume or Number of 94 lb. Bags
25 Bags From (Ft.) To (Ft.)

FINISH: ☒ Open Hole ☐ Perforated or Slotted Casing ☐ Gravel Pack
☐ Sandpoint or Screen Attached to Well Casing ☐ Sandpoint or Screen
Telescoped with Packer Inside Casing (Packer Material:)

Sandpoint/Screen Material	Dia. (In.)	Slot Size (In.)	From (Ft.)	To (Ft.)

☐ Other Finish:

QUALITY TEST: ☒ None ☐ Bacteria ☐ Chemical
By: Date:

Conductance (Micromhos): Chloride: ppm

Hardness: open to calcium carbonate (Data)

Well Disinfected: ☒ No ☐ Yes (Data)

WELL TEST: ☒ None ☐

Discharge Measured By: ☐ Bell ☐

Measured Static Water Level:

Measured Pumping Water Level:

After: Hours At: G.P.M.

Specific Capacity: G.P.M./Ft. of Drawdown

Measuring Pt. (Describe):

Which is Ft. ☐ Above ☐ Below Land Surface

Elevation of Measuring Pt. = Ft. ☐ Above ☐ Below MSL

WELL EQUIPMENT: ☐ Open ☒ Capped ☐ Valved

☐ Permanent Pump ☐ Temporary Pump

Type Pump: ☐ Centrifugal ☐ Cylinder ☐ Jet ☐ Submersible

☐ Turbine ☐ Other:

Power: ☐ Diesel ☐ Electric ☐ Gasoline ☐ Other:

TYPE OF WORK: ☒ New Construction ☐ Rep.
☐ Deepening ☐ Plugging
☐ Other:

PERMIT NUMBER: # 82-81
J-3094

WELL NUMBER:

TYPE OF WELL: ☒ Water Well ☐ Test Well ☐ Recharge ☐ Drainage
☐ Waste Disposal ☐ Observation ☐ Other:

USE: ☐ Domestic ☒ Irrigation ☐ Industrial ☐ Livestock ☐ Public Supply
☐ Other:

SKETCH LOCATION OF WELL in relation to local landmarks, giving distance and direction from nearest town, road, or other reference point:

GEOPHYSICAL LOGS: Type: By:

WELL LOG			Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary.
Bore Hole (In.)	Casing Size (In.)	Depth (Ft.)	
		From To	
		<u>0</u> <u>15</u>	<u>Sand</u>
		<u>15</u> <u>35</u>	<u>B. Mud w L. Sand</u>
		<u>35</u> <u>55</u>	<u>" " Sand</u>
		<u>55</u> <u>60</u>	<u>B. Mud</u>
		<u>60</u> <u>75</u>	<u>Rock</u>
		<u>75</u> <u>93</u>	<u>" "</u>
		<u>93</u> <u>95</u>	<u>Rock w mud</u>
		<u>95</u> <u>105</u>	<u>w mud</u>
		<u>105</u> <u>140</u>	<u>B. mud</u>
		<u>140</u> <u>200</u>	<u>" " w L. Sand</u>
		<u>200</u> <u>390</u>	<u>B. mud w Sand</u>
		<u>390</u> <u>400</u>	<u>Rock</u>
		<u>400</u> <u>440</u>	<u>B. mud</u>
		<u>440</u> <u>465</u>	<u>Rock</u>
		<u>465</u> <u>480</u>	<u>B. Mud w Sand</u>
		<u>480</u> <u>500</u>	<u>B. Mud w L. Sand</u>
		<u>500</u> <u>570</u>	<u>B. mud</u>
		<u>570</u> <u>575</u>	<u>Rock</u>
		<u>575</u> <u>590</u>	<u>" " w B. mud</u>
		<u>590</u> <u>595</u>	<u>mud</u>
		<u>595</u> <u>670</u>	<u>Rock w mud</u>
		<u>670</u> <u>690</u>	<u>" " mud</u>
		<u>690</u> <u>700</u>	<u>Rock</u>
		<u>700</u> <u>700</u>	<u>" "</u>

Total Depth: 700 Ft. Producing Zone Material: ☐ Sand ☐ Gravel ☐ Other:

Top of Producing Zone: Ft. Bottom of Producing Zone: Ft.

☐ Drift Cuttings Sent to Bureau of Geology

License No. Water Well Contractor's Signature: Position:

Completion Date: Driller Signature:

Complaint No. _____

TWP No. _____

Construction/Plugging
Permit No. _____Well Inventory No. 1-3010-24Is Well Free Flowing? Yes NoOwner ST Regis / USGS Test Well - West Phone _____

Owner's Address _____

Well Location Address _____

Well Drilling Contractor _____ License/Bond No. _____

Well Identification: 30 2610 081 3549 01 Lat./Long (if different) 30 _____ 081 _____ 014 1/4 1/4 Section TWP _____ Range _____ Quad Map Name _____

Depth of Hole Drilled _____ Depth of Well _____ How measured _____

Diameter/Cross Section _____ Depth of Casing _____

Depth and Diameter of Well Segments: _____ " from LSD to _____

_____ " Dia. from _____ ' to _____ ' _____ " Dia. from _____ ' to _____ ' _____

Depth and Diameter of Casing Segments: _____ " Dia. from _____ ' _____ Above LSD
Below LSD

To _____ ' _____ " Dia. from _____ ' to _____ ' _____

Type and Quantity of Grouting Used _____ Well centered in Grout? _____

Use of Well _____ Number of People Served _____

Water Level 6.4 psi 15.42' Above LSD Measuring Pt. 166 Above LSD
Below BelowHow Measured Pressure Gauge Measured by Essex Date 5-22-81

Method of Construction _____ Date of Construction _____

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.) _____

Casing Material Used _____

Altitude _____ Interval _____

Topo Setting _____

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer
than 300' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM

WATER CONSERVATION PROGRAM
WATER WELL FIELD INSPECTION GUIDE

Reason for Inspection:

Complaint W.U. Permit Construction, etc. Permit Well Inventory

Free flowing well

DER LOGGING ✓

Regulatory Status: Received Application to Construct, Modify ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

Received Application for Temporary Water Use Permit ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

DNR/BW-2 Received ☐ Yes N/A ☐ Date _____

Data Submitted to USGS ☐ Yes Date _____

Owner SV. Regis Paper Co.

Address Well site #3 - (SV. Regis assigned #)

Well Drilling Contractor _____

License/Bond No. _____

Location of water well Latitude 30°26'10" N Longitude 081°35'49" Sequential 7

Ident # of Quad Sheet SW 1/4 Land Grant 46 1S 27E

Depth of Water Well 1237' How measured? DER LOG

Diameter/Cross Section 4

Depth of Casing 1163 Diameter of Casing from LSD 4" to 1163 feet and diameter from _____ to _____ feet.

Type of grouting used Neat Cement Hole centered in grout? Yes

Use of well Test Well For U.S.G.S.

Water level 20.8' Above LSD How measured Gauge

Method of well construction Rotary

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.)

Good

Casing material used Steel

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' 25' + 50' Two Wells

Distance to nearest contaminant - septic tank, etc. if less than 100' NA

Maximum well yield 366 GPM Artesian GPM Average well yield _____ GPM

Frequency of well use Not Used Hrs./Day _____ Days/Year _____

Pump Data - Type & Make _____ HP _____ Pump Rating _____

Capacity _____ No. of Bowls or Stages _____

Type of Power _____ Static water level _____

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness _____, and Chloride 55 PPM. Temp 81°F

General Rating: poor _____ average _____ good _____ excellent _____

Additional Info/Action Required _____

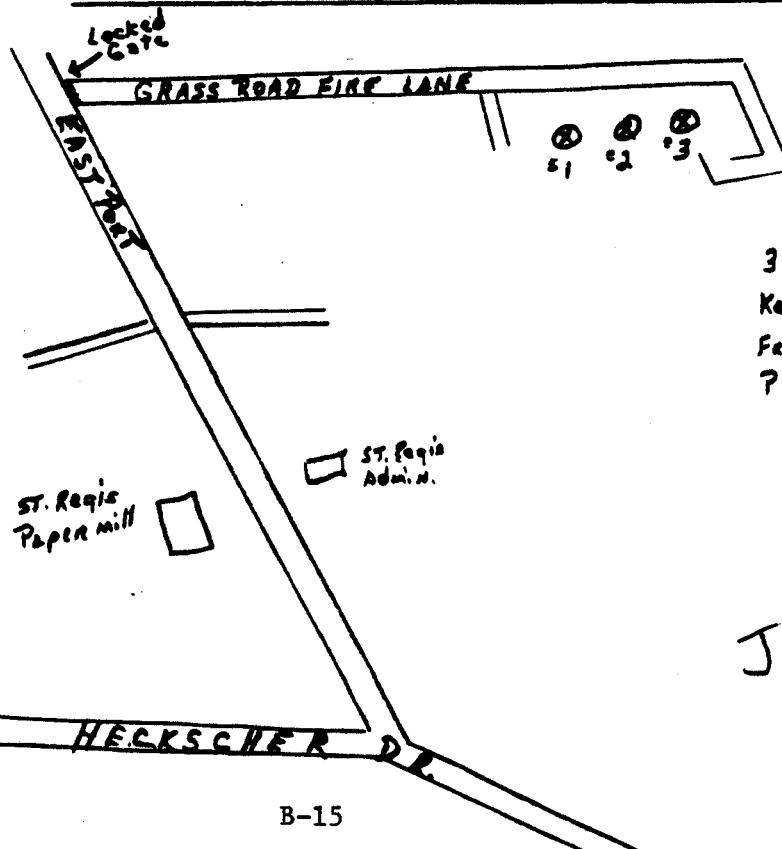
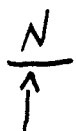
Action taken/Comments Well Geophysically Logged This Date with Information Received

Entered Here ON

Date _____

Inspector's Name D. J. Beck Field Inspection Date 9 July 1975

Inventory Complete Date _____



3 Wells In Line 25' Apart.
Key For Locked Gate maybe Too
From Mr. Beat Rhyme AT Main
Plant. ST. Regis Paper Mill.

J30

Water Resources Division Well Schedule Form

1951 ¹ ₂ ³ ⁴ ⁵ ⁶ ⁷ ⁸ ⁹ ¹⁰ ¹¹ ¹² ¹³ ¹⁴ ¹⁵ ¹⁶ ¹⁷ ¹⁸ ¹⁹ ²⁰ ²¹ ²² ²³ ²⁴ ²⁵ ²⁶ ²⁷ ²⁸ ²⁹ ³⁰ ³¹ ³² ³³ ³⁴ ³⁵ ³⁶ ³⁷ ³⁸ ³⁹ ⁴⁰ ⁴¹ ⁴² ⁴³ ⁴⁴ ⁴⁵ ⁴⁶ ⁴⁷ ⁴⁸ ⁴⁹ ⁵⁰ ⁵¹ ⁵² ⁵³ ⁵⁴ ⁵⁵ ⁵⁶ ⁵⁷ ⁵⁸ ⁵⁹ ⁶⁰ ⁶¹ ⁶² ⁶³ ⁶⁴ ⁶⁵ ⁶⁶ ⁶⁷ ⁶⁸ ⁶⁹ ⁷⁰ ⁷¹ ⁷² ⁷³ ⁷⁴ ⁷⁵ ⁷⁶ ⁷⁷ ⁷⁸ ⁷⁹ ⁸⁰ ⁸¹ ⁸² ⁸³ ⁸⁴ ⁸⁵ ⁸⁶ ⁸⁷ ⁸⁸ ⁸⁹ ⁹⁰ ⁹¹ ⁹² ⁹³ ⁹⁴ ⁹⁵ ⁹⁶ ⁹⁷ ⁹⁸ ⁹⁹ ¹⁰⁰ ¹⁰¹ ¹⁰² ¹⁰³ ¹⁰⁴ ¹⁰⁵ ¹⁰⁶ ¹⁰⁷ ¹⁰⁸ ¹⁰⁹ ¹¹⁰ ¹¹¹ ¹¹² ¹¹³ ¹¹⁴ ¹¹⁵ ¹¹⁶ ¹¹⁷ ¹¹⁸ ¹¹⁹ ¹²⁰ ¹²¹ ¹²² ¹²³ ¹²⁴ ¹²⁵ ¹²⁶ ¹²⁷ ¹²⁸ ¹²⁹ ¹³⁰ ¹³¹ ¹³² ¹³³ ¹³⁴ ¹³⁵ ¹³⁶ ¹³⁷ ¹³⁸ ¹³⁹ ¹⁴⁰ ¹⁴¹ ¹⁴² ¹⁴³ ¹⁴⁴ ¹⁴⁵ ¹⁴⁶ ¹⁴⁷ ¹⁴⁸ ¹⁴⁹ ¹⁵⁰ ¹⁵¹ ¹⁵² ¹⁵³ ¹⁵⁴ ¹⁵⁵ ¹⁵⁶ ¹⁵⁷ ¹⁵⁸ ¹⁵⁹ ¹⁶⁰ ¹⁶¹ ¹⁶² ¹⁶³ ¹⁶⁴ ¹⁶⁵ ¹⁶⁶ ¹⁶⁷ ¹⁶⁸ ¹⁶⁹ ¹⁷⁰ ¹⁷¹ ¹⁷² ¹⁷³ ¹⁷⁴ ¹⁷⁵ ¹⁷⁶ ¹⁷⁷ ¹⁷⁸ ¹⁷⁹ ¹⁸⁰ ¹⁸¹ ¹⁸² ¹⁸³ ¹⁸⁴ ¹⁸⁵ ¹⁸⁶ ¹⁸⁷ ¹⁸⁸ ¹⁸⁹ ¹⁹⁰ ¹⁹¹ ¹⁹² ¹⁹³ ¹⁹⁴ ¹⁹⁵ ¹⁹⁶ ¹⁹⁷ ¹⁹⁸ ¹⁹⁹ ²⁰⁰ ²⁰¹ ²⁰² ²⁰³ ²⁰⁴ ²⁰⁵ ²⁰⁶ ²⁰⁷ ²⁰⁸ ²⁰⁹ ²¹⁰ ²¹¹ ²¹² ²¹³ ²¹⁴ ²¹⁵ ²¹⁶ ²¹⁷ ²¹⁸ ²¹⁹ ²²⁰ ²²¹ ²²² ²²³ ²²⁴ ²²⁵ ²²⁶ ²²⁷ ²²⁸ ²²⁹ ²³⁰ ²³¹ ²³² ²³³ ²³⁴ ²³⁵ ²³⁶ ²³⁷ ²³⁸ ²³⁹ ²⁴⁰ ²⁴¹ ²⁴² ²⁴³ ²⁴⁴ ²⁴⁵ ²⁴⁶ ²⁴⁷ ²⁴⁸ ²⁴⁹ ²⁵⁰ ²⁵¹ ²⁵² ²⁵³ ²⁵⁴ ²⁵⁵ ²⁵⁶ ²⁵⁷ ²⁵⁸ ²⁵⁹ ²⁶⁰ ²⁶¹ ²⁶² ²⁶³ ²⁶⁴ ²⁶⁵ ²⁶⁶ ²⁶⁷ ²⁶⁸ ²⁶⁹ ²⁷⁰ ²⁷¹ ²⁷² ²⁷³ ²⁷⁴ ²⁷⁵ ²⁷⁶ ²⁷⁷ ²⁷⁸ ²⁷⁹ ²⁸⁰ ²⁸¹ ²⁸² ²⁸³ ²⁸⁴ ²⁸⁵ ²⁸⁶ ²⁸⁷ ²⁸⁸ ²⁸⁹ ²⁹⁰ ²⁹¹ ²⁹² ²⁹³ ²⁹⁴ ²⁹⁵ ²⁹⁶ ²⁹⁷ ²⁹⁸ ²⁹⁹ ³⁰⁰ ³⁰¹ ³⁰² ³⁰³ ³⁰⁴ ³⁰⁵ ³⁰⁶ ³⁰⁷ ³⁰⁸ ³⁰⁹ ³¹⁰ ³¹¹ ³¹² ³¹³ ³¹⁴ ³¹⁵ ³¹⁶ ³¹⁷ ³¹⁸ ³¹⁹ ³²⁰ ³²¹ ³²² ³²³ ³²⁴ ³²⁵ ³²⁶ ³²⁷ ³²⁸ ³²⁹ ³³⁰ ³³¹ ³³² ³³³ ³³⁴ ³³⁵ ³³⁶ ³³⁷ ³³⁸ ³³⁹ ³⁴⁰ ³⁴¹ ³⁴² ³⁴³ ³⁴⁴ ³⁴⁵ ³⁴⁶ ³⁴⁷ ³⁴⁸ ³⁴⁹ ³⁵⁰ ³⁵¹ ³⁵² ³⁵³ ³⁵⁴ ³⁵⁵ ³⁵⁶ ³⁵⁷ ³⁵⁸ ³⁵⁹ ³⁶⁰ ³⁶¹ ³⁶² ³⁶³ ³⁶⁴ ³⁶⁵ ³⁶⁶ ³⁶⁷ ³⁶⁸ ³⁶⁹ ³⁷⁰ ³⁷¹ ³⁷² ³⁷³ ³⁷⁴ ³⁷⁵ ³⁷⁶ ³⁷⁷ ³⁷⁸ ³⁷⁹ ³⁸⁰ ³⁸¹ ³⁸² ³⁸³ ³⁸⁴ ³⁸⁵ ³⁸⁶ ³⁸⁷ ³⁸⁸ ³⁸⁹ ³⁹⁰ ³⁹¹ ³⁹² ³⁹³ ³⁹⁴ ³⁹⁵ ³⁹⁶ ³⁹⁷ ³⁹⁸ ³⁹⁹ ⁴⁰⁰ ⁴⁰¹ ⁴⁰² ⁴⁰³ ⁴⁰⁴ ⁴⁰⁵ ⁴⁰⁶ ⁴⁰⁷ ⁴⁰⁸ ⁴⁰⁹ ⁴¹⁰ ⁴¹¹ ⁴¹² ⁴¹³ ⁴¹⁴ ⁴¹⁵ ⁴¹⁶ ⁴¹⁷ ⁴¹⁸ ⁴¹⁹ ⁴²⁰ ⁴²¹ ⁴²² ⁴²³ ⁴²⁴ ⁴²⁵ ⁴²⁶ ⁴²⁷ ⁴²⁸ ⁴²⁹ ⁴³⁰ ⁴³¹ ⁴³² ⁴³³ ⁴³⁴ ⁴³⁵ ⁴³⁶ ⁴³⁷ ⁴³⁸ ⁴³⁹ ⁴⁴⁰ ⁴⁴¹ ⁴⁴² ⁴⁴³ ⁴⁴⁴ ⁴⁴⁵ ⁴⁴⁶ ⁴⁴⁷ ⁴⁴⁸ ⁴⁴⁹ ⁴⁵⁰ ⁴⁵¹ ⁴⁵² ⁴⁵³ ⁴⁵⁴ ⁴⁵⁵ ⁴⁵⁶ ⁴⁵⁷ ⁴⁵⁸ ⁴⁵⁹ ⁴⁶⁰ ⁴⁶¹ ⁴⁶² ⁴⁶³ ⁴⁶⁴ ⁴⁶⁵

WELL-DESCRIPTION CARD

[illegible]

B-16

Well Number 302608 @ 0813549.2

ENTHUSIASTIC CARD

[illegible]

P 27 F

POLLYTOWN

715

Radio Towers

FASTPORT

Hecksher Drive Florida 105

.....

Complaint No. _____

THUP No. _____

Construction/Plugging
Permit No. _____J-329/
Well Inventory _____

Is Well Free Flowing? _____

Yes _____

No ☒ _____Owner St. Regis Paper Co / USGS Center Festival (Phone _____)

Owner's Address _____

Location Address _____

Eastport Rd

Well Drilling Contractor _____

License/Bond No. _____

Identification: 30 2608 081 3549 02 Lat./Long (if different) 30 _____ 081 _____ 01

Section TWP Range Quad Map Name

4

1/4

1/4

Section

TWP

Range

Quad Map Name

Depth of Hole Drilled _____ Depth of Well _____ How measured _____

Diameter/Cross Section _____ Depth of Casing _____

Depth and Diameter of Well Segments: _____ " from LSD to _____

" Dia. from _____ 'to _____ " Dia. from _____ 'to _____

Depth and Diameter of Casing Segments: _____ " Dia. from _____ Above LSD
Below LSD

" Dia. from _____ 'to _____

Type and Quantity of Grouting Used _____ Well centered in Grout? _____

Use of Well Observation Number of People Served _____Water Level 6.6 psi 16.5 Above LSD Measuring Pt. 83 Above LSD
Below LSDHow Measured Pressure Gauge Measured by Essex Date 5-22-81

Method of Construction _____ Date of Construction _____

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.) _____

Casing Material Used _____

Altitude _____

Interval _____

Topo Setting _____

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer
than 300' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Minimum Well Yield _____ GPM Average Well Yield _____ GPM

J 329

19 S

WELL DESCRIPTIONS AND WATER LEVEL MEASUREMENTS

DUVAL COUNTY

WELL NUMBER.---302608081354902. Local Number Duval-263, St. Regis Paper Company.

LOCATION.---Lat 30°26'08", long 81°35'49", in sec.46 land grant, T.1 S., R.27 E., Hydrologic Unit 03080103, 75 ft (23 m) south from pasture road and .4 mi (.6 km) east of Eastport Road in Jacksonville, Florida.

DESCRIPTION.---Drilled, unused, artesian well in Floridan aquifer (Geologic Unit 120FLRD), diam 4 in (10 cm), depth 1025 ft (312 m), cased to 950 ft (290 m).

PERIOD OF RECORD.---October 1951 to current year (semiannually).

INSTRUMENTATION.---Pressure gage. Measuring point; top of "T" flange, 1.0 ft (.3 m) above lsd. Land surface datum is 15.96 ft (4.865 m) above mean sea level.

EXTREMES.---Current year: Highest water level, 38.06 ft (11.601 m) above msl January 23; lowest, 36.16 ft (11.022 m) above msl May 9, 1974.
Period of record: Highest water level, 52.16 ft (15.898 m) above msl February 4, 1954; lowest, 35.90 ft (10.942 m) above msl May 6, 1974.

ELEVATION, IN FEET, ABOVE MSL, JANUARY 1974 TO SEPTEMBER 1975

January 23, 1974.....	38.56	January 23, 1975.....	38.06
May 6, 1974.....	35.96	May 9, 1975.....	36.16

WELL NUMBER: 502608081551901. Local Number Duval-267, St. Regis Paper Company.

LOCATION: Lat 30°26'10", long 81°35'48", in sec. 46 land grant, T.1 S., R.27 E., Hydrologic Unit 03080103, 75 ft (23 m) south from pasture road and .5 mi (.8 km) east of Eastport Road in Jacksonville, Florida.

DESCRIPTION: Drilled, industrial, artesian well in Floridan aquifer (Geologic Unit 120FLRD), diam 4 in (10 cm), depth 1237 ft (377 m), cased to 1165 ft (355 m).

PERIOD OF RECORD: June 1951 to current year (bimonthly).

INSTALLATION: Pressure gage. Measuring point; top of well flange, 1.0 ft (.3 m) above 1st. Land surface datum is 16.32 ft (4.971 m) above mean sea level.

EXPLANATIONS: Current year: Highest water level, 39.32 ft (11.985 m) above msl March 26; lowest, 36.32 ft (11.070 m) above msl May 9. Period of record: Highest water level, 53.32 ft (16.252 m) above msl June 12, 1951; lowest, 35.82 ft (10.918 m) above msl May 6, 1974.

ELEVATION, IN FEET, ABOVE NSL, JANUARY 1974 TO SEPTEMBER 1975

January 23, 1974	38.32	January 23, 1975	38.02
March 20, 1974	36.82	March 26, 1975	39.32
May 6, 1974	35.82	May 9, 1975	36.32
July 24, 1974	36.92	July 23, 1975	37.32
September 24, 1974	37.92	September 22, 1975	38.02
November 21, 1974	37.22		

J-31/D-262

WATER WELL FIELD INSPECTION REPORT

Contaminant No. _____ TWP No. _____ Construction/Plugging Permit No. _____ Well Inventory No. _____

Is Well Free Flowing? Yes ☒ No ☐

Owner St Regis Paper Co/USGS Test well - East Phone _____

Owner's Address _____

Well Location Address Eastport Rd

Well Drilling Contractor _____ License/Bond No. _____

Site Identification: 30 2608 081 3549 03 Lat./Long (if different) 30 _____ 081 _____ 01

1/4 _____ 1/4 _____ 1/4 _____ Section _____ TWP _____ Range _____ Quad Map Name _____

Depth of Hole Drilled _____ Depth of Well _____ How measured _____

Diameter/Cross Section _____ Depth of Casing _____

Depth and Diameter of Well Segments: _____ " from LSD to _____ ' _____ " Dia. from _____ ' to _____ ' _____ " Dia. from _____ ' to _____ ' _____

Depth and Diameter of Casing Segments: _____ " Dia. from _____ ' to _____ ' _____ Above LSD _____ Below _____

To: _____ " Dia. from _____ ' to _____ ' _____

Type and Quantity of Grouting Used _____ Well centered in Grout? _____

Use of Well Observation Number of People Served _____

Water Level 6.5 PSI 15.99' Above LSD Measuring Pt. 12" 1' Above LSD

How Measured Pressure Gage Measured by Essex Date 5-22-81

Method of Construction _____ Date of Construction _____

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.) _____

Casing Material Used _____

Altitude _____ Interval _____

Tool Setting _____

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer than 300' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM

Free Flow Well Yield _____ GPM How Yield Determined _____
Frequency of Well Use _____ Hrs/Day _____ Days/Year
Pump Data - Type and Make _____ HP _____
Pump Capacity _____ GPM No. Bowls or Stages _____
Type of Power _____ Static Water Level _____
Production Water Level _____ Pump Intake Setting _____ = Depth of Section Line
Water Sampled for: Dissolved Solids _____ Conductivity 410 μ mho
Hardness _____ Chlorides _____ PH= _____ Temperature 20°C
General Rating: Poor _____ Average _____ Good _____ Excellent _____
Action Taken/Comments _____
Follow Up Needed _____
Inspector's Name WTP Sney Field Inspection Date 5-22-81

WATER CONSERVATION PROGRAM
WATER WELL FIELD INSPECTION GUIDE

Reason for Inspection:

Complaint W.U. Permit Construction, etc. Permit Well Inventory

Free flowing well

DER LOGGING ✓

Regulatory Status:

Received Application
to Construct, Modify

☐

Yes

N/A

☐

Date

Permit Issued for
Above

☐

Yes

N/A

☐

Date

Received Application
for Temporary Water
Use Permit

☐

Yes

N/A

☐

Date

Permit Issued for
Above

☐

Yes

N/A

☐

Date

DNR/BW-2 Received

☐

Yes

N/A

☐

Date

Data Submitted to
USGS

☐

Yes

Date

Owner

SV Regis Paper Co.

Address

Well Site #2

Well Drilling Contractor

To coincide with USGS information we
302608 N0813549.3 License/Bond No.

Location of water well

Latitude 22° 16' N Longitude 81° 42' W Sequential 3

Ident # of Quad Sheet

LAND GRANT 46 1S 2E

Depth of Water Well

654

How measured?

DER LOGGING

Diameter/Cross Section

4"

Depth of Casing
meter from

574

Diameter of Casing from LSD

4"

to

574

feet and dia-

meter from to feet.

Type of grouting used

Neat Cement

Hole centered in grout?

Yes

Use of well

Test For USGS

Water level

21.4 Above LSD

How measured

Gage

Method of well construction

Rotary

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.)

Good

Casing material used

Steel

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' 25' + 50' Two other wells

Distance to nearest contaminant - septic tank, etc. if less than 100' N.A.

Maximum well yield 236 ARIESIAN GPM Average well yield _____ GPM

Frequency of well use NOT Used Hrs./Day _____ Days/Year

Pump Data - Type & Make _____ HP _____ Pump Rating _____

Capacity _____ No. of Bowls or Stages _____

Type of Power _____ Static water level _____

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness _____, and Chloride 55 PPM. Temp 28°F

General Rating: poor _____ average _____ good _____ excellent _____

Additional Info/Action Required _____

Action taken/Comments Well Geophysically Logged this Date with Information Received
Entered Here ON.

_____ Date _____

Inspector's Name Donny B. Smith Field Inspection Date 9 July 1975

Inventory Complete Date _____

J31

J30

South 301 1 1/2 mi

D-90X

WELL NUMBER.--302608081354903. Local Number Duval-264, St. Regis Paper Company.
LOCATION.--Lat 30°25'10", long 81°35'48"; in sec.46 land grant, T.1 S., R.27 E., Hydrologic Unit 03080103, 75 ft (23 m) south from pasture road and .3 mi (.5 km) east of Eastport Road in Jacksonville, Florida.
DESCRIPTION.--Drilled, industrial, artesian well in Floridan aquifer (Geologic Unit 120FLRD), diam 4 in (10 cm), depth 654 ft (199 m), cased to 574 ft (175 m).
PERIOD OF RECORD.--October 1951 to current year (semiannually).
INSTRUMENTATION.--Pressure gage. Measuring point; top of well flange, 1.0 ft (.3 m) above lsd. Land surface datum is 15.87 ft (4.837 m) above mean sea level.
EXTREMES.--Current year: Highest water level, 37.77 ft (11.512 m) above msl January 23; lowest, 35.97 ft (10.964 m) above msl May 9. Period of record: Highest water level, 51.87 ft (15.809 m) above msl January 9, 1952; lowest, 35.67 ft (10.872 m) above msl May 6, 1974.

ELEVATION, IN FEET, ABOVE MSL, JANUARY 1974 TO SEPTEMBER 1975

January 23, 1974.....	38.07	January 23, 1975.....	37.77
May 6, 1974.....	35.67	May 9, 1975.....	35.97

Essex

302625-813557-1

21

12-30-80

SITE SCHEDULE

Site Ident No 302625-813557 RG Number H-0 Transaction T-A-C-M-V
 Site Type 2-D-H-I-M-P-T-W Data 3-C-U-L-M Reliability field checked uncheck location not minims
 collector drain, siphon, connector, multiple, pond, tunnel or well, shaft, accurate data
 District 6-121 State 7-12 County (or town) DUKE H-031
 Latitude 4-302625 Longitude 10-0813557
 deg min sec deg min sec

J-2140

LUDGRT 46 15

27E

EASTPORT

24000

14.

C

03080803

0300 1979

Secondary Well No 25 Tertiary Well No 36 Depth of Well 37 600 Depth of Well 28 600 Water Level 30 Date Measured 31 month day year
 Method of Measurement 34 A C E G H L N R S T V Z
 airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other
 gauge, pressure gauge, logs, tape, tape, electric, tape
 Site Status 37 D F G H Ø P R S T V X Z
 dry, flowing, nearby, nearby, obstruction, pumping, recently, nearby, nearby, turning, surface water, other
 flowing, recently, flowing, pumped, pumping, recently, substance, effects, pumped
 Source of Geohydrologic Data 3 3E Pump Used 35 Measuring Point 266 Measuring Point Date 267
 no month day year

OWNER IDENTIFICATION (1)

R-158 T-A-D-M Date of Ownership 159 03/00/1979
 add, delete, modify month day year
 Name: Last 161 SMITH First 162 JAMES Middle Initial 163 D

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-A-D-M Ident 190 SJ Assigner 191 FLA WAD
 add, delete, modify
 New Card Same R & T Ident 190 FAYE Assigner 191 FLO39

SITE VISIT DATA (1)

R-186 T-A-D-M Date of Visit 187 07/31/1980 Name of Person 188 YOST
 add, delete, modify month day year

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-A-D-M Date 193 month day year Geohydrologic Unit 195
 add, delete, modify
 New Card Same R thru 195
 Temperature 196 0,0,0,1,0 Degrees C 197
 Conductance 196 0,0,0,9,5 u Mhos 197
 Other (STORET) Parameter 196 Value 197
 Other (STORET) Parameter 196 Value 197

FOOT NOTES

Source of Data Codes

S D O A R L G Z
 reporting, driller, owner, other, gov't, other, logs, geologist, other, reported, agency

B-27

Plotted _____
 Header _____
 Local # _____
 Keypunched _____

4-58 * T A D M *
add, delete, modify

001 *

Date of Construction Completion: 03 00 1970 *
month day year

GRIFFIS

IR-72 * T A D M *
add, delete, modify

Construction Entry No. 59 *

Top of Hole Segment Below LSD

73	*
73	*
73	*
73	*
73	*

IR-76 * T A D M *
add, delete, modify

Construction Entry No. 59 *

Top of Casing Segment Below LSD

77	*
77	*
77	*
77	*
77	*

OPENING SCHEDULE 2

IR-82 * T A D M *
add, delete, modify

Construction Entry No. 59 *

New Card for Each Open Section With Same F, T and Field 5.9

Top of Section Below LSD

83 #

Bottom of Section Below LSD

84 #

Type of Opening

85 #

Type of Material

86 #

Diameter of Open Section

87 #

Width of Opening

88 #

Length of Opening

89 #

(Openings Data)

83 #

84 #

85 #

86 #

87 #

88 #

89 #

(Openings Data)

83 #

84 #

85 #

86 #

87 #

88 #

89 #

FOOT NOTES

1 Source of Data Codes:

S	D	O	A	R	L	G	Z
mining	driller	owner	other	govt	agency	other	logs
						geologist	other
						reported	

5 Casing Material Codes

B	C	G	I	M	P	R	S	T	U	W	Z
brick	concrete	galv	wrought	other	PVC	or	rock	or	steel	tile	coated
		iron	iron	metal	plastic		stone			mud	other
										steel	

6 Type of Openings Codes

F	L	M	P	R	S	T	W	X	Z
fracture	covered	mesh	perforated	wire	screen	sand	walled	open	other
	shutters		or slotted	would	unknown	point			hole

7 Type of Material Codes for Open Sections

B	C	G	I	M	P	R	S	T	Z
brass	or	concrete	galv	wrought	other	PVC	or	stainless	steel
		bronze	iron	iron	metal	plastic			other

J-2140

R = 90 • T = A • D • M • 256 = 001 •

93 • 1700 E L R D •

LSM

MARI NE

ANNUAL DATA

R = 90 • T = A • D • M •

Geohydrologic Unit Entry No 256 •

Date 95 •
month day year

Water Level

Comments

GEOPHYLOGICAL UNIT DESCRIPTION

R = 90 • T = A • D • M •

Entry No 256 •

Unit Identifier 93 •

R = 90 • T = A • D • M •

Geohydrologic Unit Entry No 256 •

Date 95 •
month day year

PERMANENT REMARKS

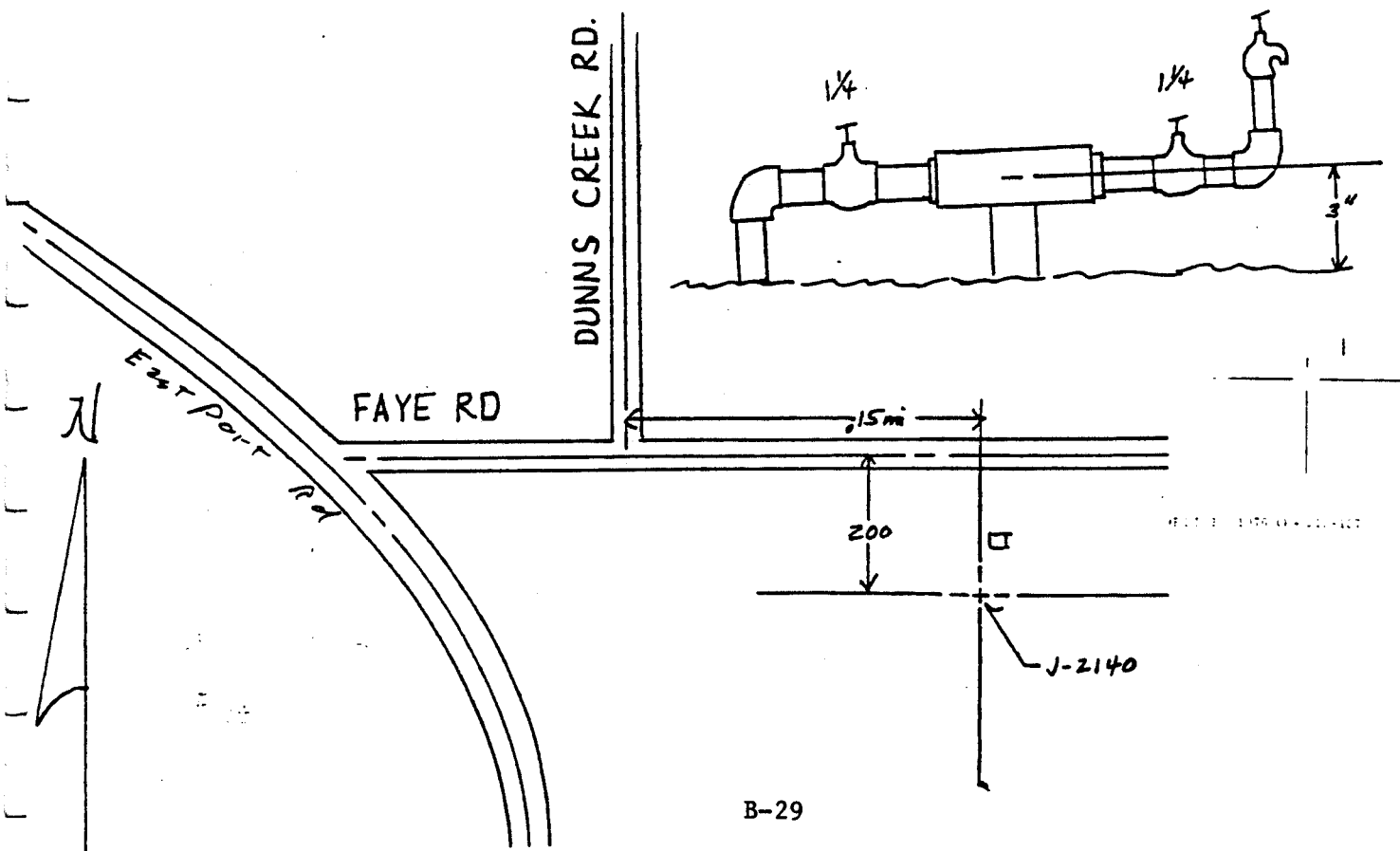
R = 183 • T = A •

Remarks

NOTES

R = 218 • T = A • 218 • 1832 FAYE RD

J-2140



302630081360001

Essex

STATE OF MASSACHUSETTS
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

12-31-80

GENERAL SITE DATA (1)

Site Ident No 302630081360001 RG Number R=01 Transaction T=0 D M V
 Site Type 2=C D M I M P T Data 3=C U L M Reporting Agency 4=FL039
 District 5=121 State 7=12 County (or town) DUN21 8=1031
 Latitude 9=30.2630 Longitude 10=0813600
 Author J. 2514 LAD GRT 46 15 27E
14 EASTPORT 24000
14 5
03080103
00 00 1980
24 A B C D E F
 Secondary 25 Tertiary Use 26 Depth of Hole 27 Depth of Well 28 Source of 29
 Water Level 30 Date Measured 31 Source 32
 Method of Measurement 34=A C E G H L M R S T V Z
 Site Status 37=D F G H P R S T V X Z
 Source of Geohydrologic Data 36 Pump Used 35 Measuring Point 266 Measuring Point Date 267

OWNER IDENTIFICATION (1)

R=158 T=0 D M Date of Ownership 159 00/00/1980
 Name: Last 161=FUSSELL First 162=J Middle Initial 163

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 T=0 D M Ident 190 SL Assigner 191 FLA WND
 New Card Same R & T Ident 190 FAYE Assigner 191 FL039

SITE VISIT DATA (1)

R=186 T=0 D M Date of Visit 187 07/31/1980 Name of Person 188 YOST

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 T=A D M Date 193 00/00/1980 Geohydrologic Unit 195
 New Card Same R thru 195 Temperature 196 00010 Degrees C 197
 Conductance 196 00095 μ Mhos 197
 Other (STORET) Parameter 196 Value 197
 Other (STORET) Parameter 196 Value 197

Plotted _____
 Header _____
 Local # _____
 Key punched _____

FOOT NOTES:

① Source of Data Codes:

S D G A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency reported.

R-58 *

T- A D M *

001 *

Date of Construction
Completion

60 00 00

980 *

Control for Design 13 OF SMITH

Method of Construction	60	A	D	M	*
Method of Development	60	A	D	M	*
Number of Hours in Development					

Notes: Drilling, explosives, detritus, hydrofracturing, mechanical, etc.

Construction Entry No 59 *

Top of Hole Segment Below LSD	73	*
73	*	
73	*	
73	*	
73	*	

Construction Entry No 59 *

Top of Casing Segment Below LSD	77	*
77	*	
77	*	
77	*	
77	*	

OPENINGS SCHEDULE (2)

Construction Entry No 59 *

Top of Section Below LSD	83	*
Bottom of Section Below LSD	84	*
Type of Openings	85	*
Type of Material	86	*
Diameter of Open Section	87	*
Width of Opening	88	*
Length of Opening	89	*

New Card for Each Open Section With Same R, T and Field 59

(Openings Data)	(Openings Data)
83	83
84	84
85	85
86	86
87	87
88	88
89	89

FOOT NOTES:

1 Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other, geologist, other, agency, reported.

5 Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other, iron, iron, metal, plastic, stone, steel

6 Type of Openings Codes

F L M P R S T W X Z
fracture, lowered, mesh, perforated, wire, screen, sand, walled, open, other, shutters, or slotted, wound (unknown), point, hole

7 Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other, bronze, iron, iron, metal, plastic, steel

1-2514

UNIT DESCRIPTION

R=90 T=6 D M

256 # 921

Unit Identifier 93 1.20 ELP RD

Lithology 96 Lithologic Name

AQUIFER DATA

R=94 T=1 A D M

Geohydrologic Unit Entry No 256 # 1

Date 95 month day year

Water Level 120 Water Contributed

HYDROLOGIC UNIT DESCRIPTION

R=90 T= A D M

Entry No 256 #

Depth to Top 91

Depth to Bottom 91

Unit Identifier 93

Lithology 96 Lithologic Name

R=94 T= A D M

Geohydrologic Unit Entry No 256 # 1

Date 95 month day year

Water Level 120 Water Contributed

PERMANENT RECORD

R=183 T= A

185

New Card Same R&T

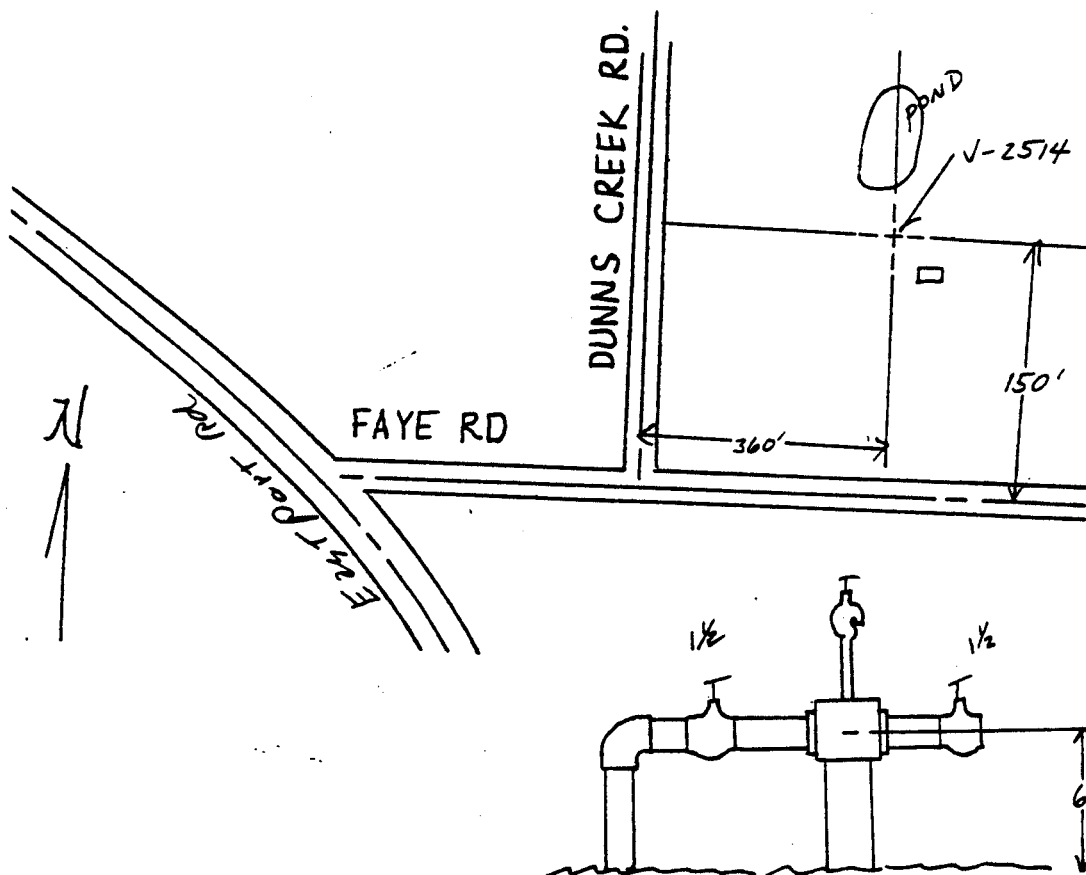
185

185

NOTES

R=212 T= A

218 1.733 FAYE RD



ICE - 1976 O - 213-137

7330

WELL DESCRIPTIONS AND WATER LEVEL MEASUREMENTS

DNAAC COUNTY

WELL NUMBER: 302510.081361001. Local Number Inval-265, St. Regis Paper Company.

LOCATION: Lat 30°25'40", long 81°36'10", T.1 S., R.27 E., Hydrologic Unit 03080103, 100 ft (31 m) west of Eastport Road and .8 mi (1.3 km) north of SR-105 in Jacksonville, Florida.

DESCRIPTION: Drilled unused, artesian well in Floridan aquifer (Geologic Unit 120FLRD), diam 8 in (20 cm), depth 556 ft (170 m).

PERIOD OF RECORD: March 1951 to current year (semiannually).

INSTRUMENTATION: Pressure gage. Measuring point; top of 8 in (20 cm) cross, 4.0 ft (1.2 m) above lsl. Land surface datum is 8.78 ft (2.676 m) above mean sea level.

EXTREMES: Current year: Highest water level, 36.78 ft (11.211 m) above msl January 23; lowest, 31.88 ft (9.717 m) above msl May 9. Period of record: Highest water level, 52.28 ft (15.935 m) above msl March 22, 1951; lowest, 26.98 ft (8.224 m) above msl April 23, 1963.

ELEVATION, IN FEET, ABOVE MSL, JANUARY 1974 TO SEPTEMBER 1975

January 23, 1974.....	35.78	January 23, 1975.....	36.78
May 6, 1974.....	31.88	May 9, 1975.....	31.88

Recorded by B. H. H. M. W. D.U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 5/17/76 15Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (80)

Site Name No. 302642081355801 RG Number R-00 Transcription T-A-D-M-V
 Site Type 2-C-D-H-I-M-P-T Data 3-E U L M Reporting Agency 4-F-L-D-39
 Project No. 5- District 6-121 State 7-112 County (or town) Duval 8-059
 Latitude 9-302642 Longitude 10-081355 Lat-Long Authority 11-0 F T M
 Land Number 12- Land Not Loc. 13-LND 6 RT 8 46 T 15 R 38 E
 Location Map 14-EAST PORT Scale 15-1:4000
 Altitude 16- Method of Measurement 17-A L Accuracy 18-MOS
 Type Setting 19-D C E F H K L S P S T U V W Hydrologic Unit (FOWC) 20-03040103
 Date of First Construction/Completion 21-05/10/1970 Use of Site 23-A D E G H I M P R S T U V W X Z
 Use of Water 24-A B C D E F H I M N P R S T U V W X Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27-640.00 Depth of Well 28-649.00 Source of 29-1
 Water Level 30- Date Measured 31- / / Source 32-
 Method of Measurement 33-A C E G H I M N P R S T U V W X Z
 Site Status 34-D 35-G H I M N P R S T U V W X Z
 Source of Geohydrologic Data 36- Pump Used 37- Measuring Point 38- Measuring Point Date 39- / /

OWNER IDENTIFICATION (11)

Name 101-DEERIVE Date of Ownership 102-05/10/1970 Middle Initial 103-

OTHER SITE IDENTIFICATION NUMBERS (10)

R-100 T-A-D-M 1008 101-
 New Card State R-0-T 1008 101-

SITE VISIT DATA (1)

R-100 T-A-D-M Date of Visit 107-05/11/1976 Name of Person 108-D. H. H. M. W. D.

FIELD WATER QUALITY MEASUREMENTS (10)

R-102 T-A-D-M Date 103- 105-
 New Card Same R-102 1000 0.0 0.1 0.1 107-
 Conductance 1002 0.0 0.0 0.5 107-
 Other (STOREY) Parameter 1003 107-
 Other (STOREY) Parameter 1004 107-

FOOT NOTES:

① Source of Data Codes:

S O S A R L G Z
 reporting driller, owner, other gov't, other legit. geologist, other agency reported.

J-768

WELL CONSTRUCTION DATA (1)

R-58 = T-A-O-M =
ad, cased, mostly

Entry No 598 00.11

Date of Construction
Completion50-5/10/1976
month day year

Source of

Chart, Date

54-2

Name of
Contractor/Driller

63-S.M.I.H.

Method of
Construction65-A-B-C-D-H-J-P-R-T-V-W-Z
air rotary, bored, cable tool, dual, hydraulic, rotary, jetted, air-lift, reverse, vibratory, trenching, driven, driven, otherType of
Seal67-B-C-Z
bituminous, clay, cement, other

Finish

66-C-F-G-H-I-P-S-T-W-Z
porous, concrete, gravel w. surf, gravel, various, horizontal, galvanized, open, perforated, or slotted, screen, sand point, welded, open, hole, otherNumber of Piers
in Development

20

Bottom of
Seal

68

Method of
Development69-A-B-C-J-N-P-S-Z
air-lift, bailed, compressed, jetted, rock, other, surges, other pumpSpecial Treatment
During Development71-C-D-E-F-H-N-Z
chemicals, dry ice, explosives, deflocculants, hydrofracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72 = T-A-O-M =
ad, cased, mostlyConstruction
Entry No 598 00.11

Top of Hole Segment Below LSD

73-73.00
73-73.00
73-73.00
73-73.00
73-73.00
73-73.00

Bottom of Hole Segment Below LSD

74-73.00
74-73.00
74-73.00
74-73.00
74-73.00
74-73.00

Diameter of Hole Segment

75-73.00
75-73.00
75-73.00
75-73.00
75-73.00
75-73.00New Card for Each Hole Segment
Same R, T & Field SS

CASING SCHEDULE (2)

R-74 = T-A-O-M =
ad, cased, mostlyConstruction
Entry No 598 00.11

Top of Casing Segment Below LSD

77-73.00
77-73.00
77-73.00
77-73.00
77-73.00
77-73.00

Bottom of Casing Segment Below LSD

78-73.00
78-524.00
78-
78-
78-
78-

New Card for Each Casing With Same R, T & Field SS

Diameter of Casing Segment

79-73.00
79-2.00
79-
79-
79-
79-

Casing Material

80-
80-
80-
80-
80-
80-

Thickness of Casing

81-
81-
81-
81-
81-
81-

OPENINGS SCHEDULE (2)

R-82 = T-A-O-M =
ad, cased, mostlyConstruction
Entry No 598 00.11

Top of Section Below LSD

83-73.00

Bottom of Section Below LSD

84-524.00

Type of Opening

85-A

Type of Material

86-G

Diameter of Open Section

87-
87-
87-
87-

Width of Opening

88-
88-
88-
88-

Length of Opening

89-
89-
89-
89-

New Card for Each Open Section With Same R, T and Field SS

(Opening Date)

83-
84-
85-
86-
87-
88-
89-

Opening Date

83-
84-
85-
86-
87-
88-
89-

FOOT NOTES:

① Source of Data Codes:

S-D-B-A-R-L-E-Z
reporting, direct, carrier, other post, other logs, geological, other

② Type of Opening Codes:

P-L-M-P-R-S-U-X-Z
pressure, internal, mesh, perforated, wire screen, sand, welded, open, other

③ Type of Material Codes for Open Sections:

S-G-I-M-P-R-S-U-X-Z
steel, galvanized, galv, wrought, other, PVC, etc., mesh, sand, wire, other

598 00.11

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 00 • T = A D M • Entry No. 256 ± 801 • Depth to Top 91 • Depth to Bottom 92 •

Unit Identifier 93 • 122 PLR2 • Lithology 96 • Lithologic Modifier 97 •

AQUIFER DATA (2)

R = 04 Y = A O M Geohydrologic Unit Entry No 254 *
 salt, sulfate, mostly
 Date 08 / / Water Level 128 * * % Water Conductivity 132 * *
 sec sec day year

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

S-98 • T- A D M • Survey No. 288 • Depth to Top 91 • Depth to Bottom 92 •
 alt. depths, modify
 Mast Identifier 98 • Lithology 98 • Lithology Modifier 97 •

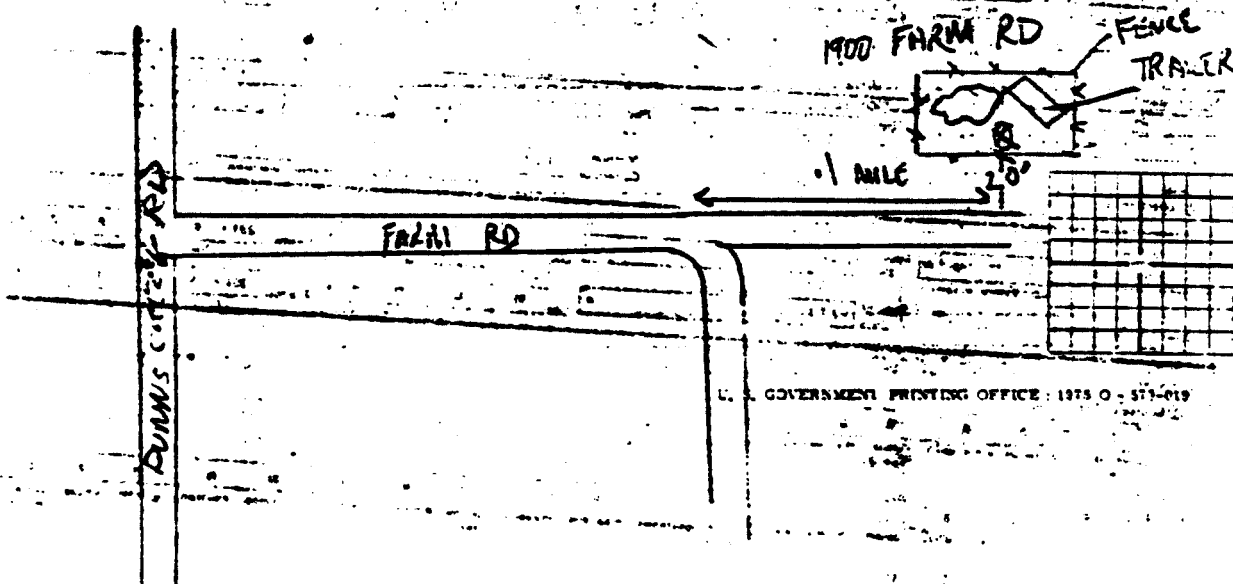
AQUIFER DATA (2)

S = 64 T = A O M Geohydrology 256 # % Water 132 #
 Unit Entry No. 256 # Contained

PERTINENT REMARKS

A-103	T-A	103
add -		
New Card Says R&T	103	
	103	

NOTES:



WELL CONSTRUCTION DATA (1)

Entry No. 1	001	Date of Construction Completion	60 = 08 00 1987	Source of Data	64 = D
Name of Contractor/Driller	63 = PARTRIDGE Partridge Well Co.				
Method of Construction	65 = A B C D <u>H</u> I J P R T V W Z				
Finish	66 = C F G H Ø P S T W X Z				
Bottom of Seal	68 = Method of Development 69 = A B C J N P S				
Special Treatment During Development	71 = C D E F H M Z				

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

Entry No. 2	59	Top of Hole Segment Below LSD	Bottom of Hole Segment below LSD	Diameter of Hole Segment
72 =	73 =	74 =	75 =	
72 =	74 =	75 =		
72 =	74 =	75 =		
72 =	74 =	75 =		
72 =	74 =	75 =		

CASING SCHEDULE (2)

Entry No. 2	59	Top of Casing Segment Below LSD	Bottom of Casing Segment Below LSD	Diameter of Casing Segment	Casing Material	Thickness of Casing
76 =	78 =	79 =	80 =	81 =		
76 =	78 =	79 =	80 =	81 =		
76 =	78 =	79 =	80 =	81 =		
76 =	78 =	79 =	80 =	81 =		
76 =	78 =	79 =	80 =	81 =		

OPENINGS SCHEDULE (2)

Entry No. 2	59	Top of Open Section Below LSD	Bottom of Open Section Below LSD	Diameter of Open Section	Length of Opening
82 =	84 =	86 =	87 =	88 =	89 =
82 =	84 =	86 =	87 =	88 =	89 =
82 =	84 =	86 =	87 =	88 =	89 =
82 =	84 =	86 =	87 =	88 =	89 =
82 =	84 =	86 =	87 =	88 =	89 =

FOOT NOTES

1 Source of Data Codes

A	D	J	M	O	R	S	Z
driller	owner	operator	other	agency	other	other	other

5 Casing Material Codes

B	C	D	G	I	M	P	R	S	T	U	V	Z
brick	concrete	concrete	galv	wrought	other	PVC or	rock or	steel	tile	coated	wood	other
iron	iron	metal	plastic	stone	steel							

6 Type of Openings Codes

F	L	M	P	R	S	T	W	X	Z
fracture	drilled	mesh	perforated	wire	screen	sand	walled	open	other
fracture	drilled	mesh	perforated	wire	screen	sand	walled	open	other

7 Type of Material Codes for Open Sections

B	C	G	I	M	P	R	S	T	Z
brass or	concrete	galv	wrought	other	PVC or	stainless	steel	tile	other
bronze		iron	iron	metal	plastic	steel			

J-4823

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 = T = A D M = No 256 = 001 = Depth to Top 91 = Depth to Bottom 92 =
 33 = 120FLRD = 304 = 96 = LMSM = 97 = MARINE =
 Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)

R = 94 = T = A D M = Geohydrologic Unit Entry No 256 =
 Date Water Level 126 = Water Contributed 132 =
 month day year

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 = T = A D M = Entry No 256 = Depth to Top 91 = Depth to Bottom 92 =
 33 = 304 = 96 = 97 =
 Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)

R = 94 = T = A D M = Geohydrologic Unit Entry No 256 =
 Date Water Level 126 = Water Contributed 132 =
 month day year

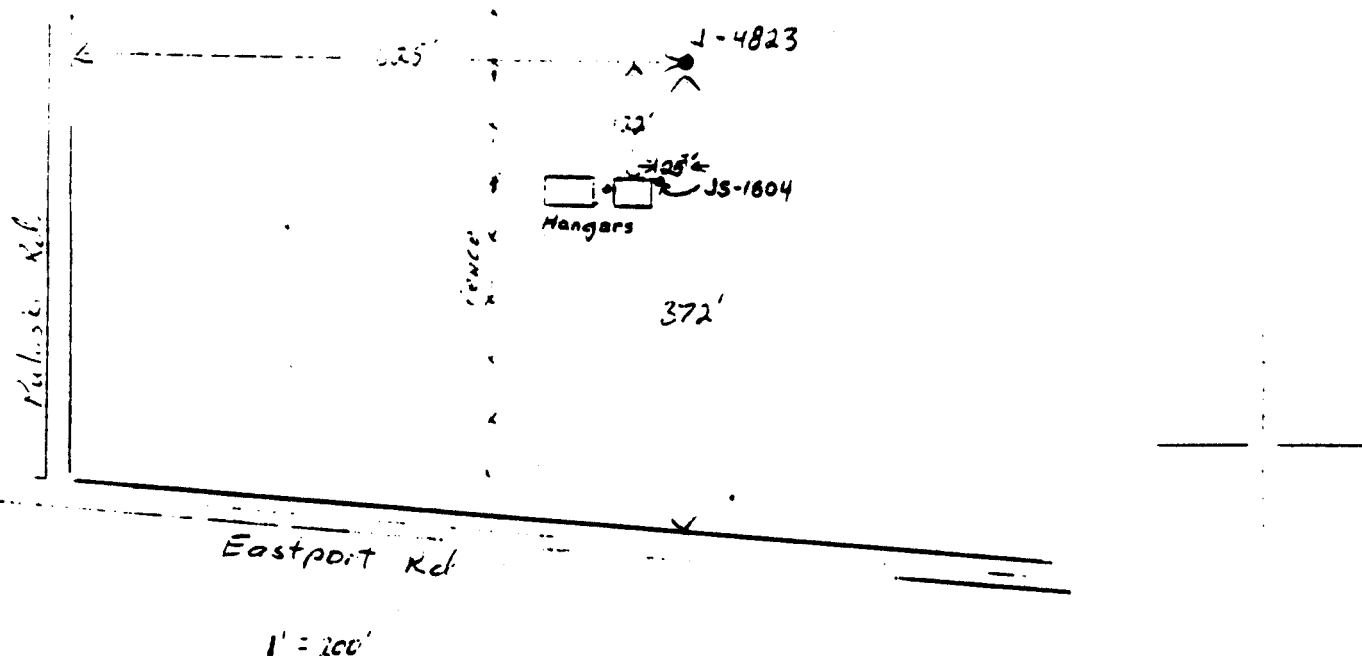
PERTINENT REMARKS

R = 93 = T = A D M = New Card Same R&T
 185 =
 185 =

Contributing Unit Codes

P	S	N	U
primary contributing	secondary contributing	non contributing	unknown

1321 EASTPORT RD



Recorded by E. BANDUCCI

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 4/29/77Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (0)

Site Ident No 302640081354701 RG Number R=0* Transaction T= (A) D M V *
 Site-Type 2= C D H I M P T (W) * Data 3= (C) U L M * Reporting Agency 4= FLO.3.9 *
 Project No. 5= District 6= 121 * State 7= 1.2 * County (or town) DUVAL 8= 0.3.1 *
 Latitude 9= 30.2640 * Longitude 10= 081.3547 * Lat-Long Accuracy 11= S (F) T M *
 Local Number 12= Land Net Loc. 13= LNDGRTS 46, T 1.3, R 2.7E
 Location Map 14= EASTPORT Scale 15= 24000 *
 Altitude 16= 10.0 * Method of Measurement 17= A L (M) * Accuracy 18= 2.5 *
 Topo Setting 19= D C E (F) H K L O P S T U V W * Hydrologic Unit (OWDC) 20= 03080103 *
 Date of First Construction/Completion 21= 12/03/1976 * Use of Site 23= A D E G H (M) P R S T U (W) X Z *
 Use of Water 24= A B C D E F (H) I M N P R S T U Y Z *
 Secondary Water Use 25= * Tertiary Use of Water 26= * Depth of Hole 27= 609.0 * Depth of Well 28= 609.0 * Source of Depth Data 29= D *
 Water Level 30= Date Measured 31= Source 33= *
 Method of Measurement 34= A C E G H L M R S T V Z *
 Site Status 37= D F G H (M) P R S T V X Z *
 Source of Geohydrologic Data 36= D * Pump Used 35= * Measuring Point 266= -0.92 * Measuring Point Date 267= 12/06/1976 *

OWNER IDENTIFICATION (1)

R=158 * T= (A) D M * Date of Ownership 159= 12/03/1976 *
 Name: Last 161= L. B. UCHAS First 162= WALTER Middle Initial 163= C *

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 * T= (A) D M * Ident 190= S. J. * Assigner 191= F. L. A. W. M. D.
 New Card Same R & T Ident 190= F. A. R. M. R. D. Assigner 191= F. L. O. 3. 9.

SITE VISIT DATA (1)

R=186 * T= (A) D M * Date of Visit 187= 12/06/1976 * Name of Person 188= B. A. L. D. U. C. C. I.

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 * T= (A) D M * Date 193= 12/06/1976 * Geohydro-logic Unit 195= 03080103 *
 New Card Same R thru 195 Temperature 196= 00.010 * Degrees C 197=
 Conductance 198= 00.095 * μ Mhos 197=
 Other (STORET) Parameter 196= 0.0940 * Value 197= 20.0 *
 Other (STORET) Parameter 196= 0.0900 * Value 197= 25.2 *

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other geol., other logs, geologist, other agency reported.

WELL CONSTRUCTION DATA (1)

R = 58 * T = Q D M * Entry No 59 = 001 *

Date of Construction Completion 60 = 12/03/1976 *
month day year

Source of ① Const. Data 64 = 11 *

Name of Contractor/Driller 63 = PARTTRIDGE *

Method of Construction 65 = A B C D (H) J P R T V W Z *
air, rotary, bored, or augered, cable, tool, dug, hydraulic, rotary, jetted, air perc., cushion, reverse, rotary, trenching, driven, drive, wash, otherFinish 66 = C F G H (X) P S T W (X) Z *
porous, concrete, gravel w. perl, gravel, screen, horizontal, gallery, open, end, perforated, or slotted, screen, sand point, walled, open, other holeType of Seal 67 = B C G Z *
bentonite, clay, cement, other grout

Bottom of Seal 68 = * *

Method of Development 69 = A B C J N P S Z *
air-lift, bailed, compressed, jetted, none, other, surged, other pump, air pump

Number of Hours in Development 70 = * *

Special Treatment During Development 71 = C D E F H M Z *
chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = Q D M * Construction Entry No 59 = 001 *

Top of Hole Segment Below LSD

73 = 0. *
73 = 94. *
73 = 515. *
73 = * *
73 = * *

Bottom of Hole Segment below LSD

74 = 94. *
74 = 515. *
74 = 609. *
74 = * *
74 = * *

Diameter of Hole Segment

75 = 5. *
75 = 3. *
75 = 2. *
75 = * *
75 = * *New Card for Each Hole Segment
Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 * T = Q D M * Construction Entry No 59 = 001 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 = 0. *
77 = 88. *
77 = * *
77 = * *
77 = * *

Bottom of Casing Segment Below LSD

78 = 94. *
78 = 515. *
78 = * *
78 = * *
78 = * *

Diameter of Casing Segment

79 = 3. *
79 = 2. *
79 = * *
79 = * *
79 = * *

Casing Material ⑤

80 = 4 *
80 = *
80 = *
80 = *
80 = *

Thickness of Casing

81 = * *
81 = * *
81 = * *
81 = * *
81 = * *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 = * *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 = * *

Bottom of Section Below LSD

84 = * *

Type of Openings ⑥

85 = * *

Type of Material ⑦

86 = * *

Diameter of Open Section

87 = * *

Width of Opening

88 = * *

Length of Opening

89 = * *

(Openings Data)

83 = * *
84 = * *
85 = * *
86 = * *
87 = * *
88 = * *
89 = * *

(Openings Data)

83 = * *
84 = * *
85 = * *
86 = * *
87 = * *
88 = * *
89 = * *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency reported

⑤ Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other iron iron metal plastic stone steel

⑥ Type of Openings Codes

F L M P R S T W X Z
fracture, lowered, man, perforated, wra, screen, sand, walled, open, other shuttered or slotted wound (unknown) point hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other bronze iron iron metal plastic steel

PRODUCTION DATA (1)

R = 137 1481 * T = 3 D M * Entry No 147 = 0.01 * Date 148 = / / *
flowing, pumped add, delete, modify

Discharge: 150 = 4.4 * Source of Data 151 = 3 * J1187

Method of Measurement 152 = B C E F M O P R T U V W Z *
bailey, current, estimated, flow, totaling, orifice, pilot-tube, reported, trajectory, venturi, volumetric, wow, other

Production Level 153 = * Static Level 154 = * Source of Data 155 = * Specific Capacity 272 = *
airline

Method of Measurement 156 = A C E G H L M R S T V Z * Pumping Period 157 = *
spring, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other

LIFT DATA (1)

R = 42 * T = A D M * Type of Lift 43 = A B C J P R S T U Z * Entry No 254 #1 *
add, delete, modify air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other

Pump Intake Setting 44 = * Type of Power 45 = D E G H L N W Z *
diesel, electric, gasoline, hand, LP gas, natural, windmill, other gas

Date 38 = / / * Horsepower 46 = *
month day year

MAJOR PUMP DATA (2)

R = 47 * T = A D M * Type of Lift 43 = * Lift Entry No 254 #1 * Manufacturer of Pump 48 = *
add, delete, modify

Serial No of Pump 49 = * Name of Power Company 50 = *
Power Company Account No 51 = * Power Meter No 52 = * Pump Rating 53 = *

Person or Company Who Maintains the Pump 54 = * Additional Lift 255 = * Rated Pump Capacity 268 = *

STANDBY POWER DATA (2)

(See LIFT DATA for codes of fields 43 and 56 below)

R = 55 * T = A D M * Type of Lift 43 = * Type of Power 56 = * Horsepower 57 = * Lift Entry No 254 #1 *
add, delete, modify

AVAILABLE LOG DATA (1)

R = 198 * T = A D M * New Card for Each Log Type Same R & T

Type of Log	Begin Depth	End Depth	Source of Data
199 #	200 =	201 =	202 =
199 #	200 =	201 =	202 =
199 #	200 =	201 =	202 =
199 #	200 =	201 =	202 =

WATER QUALITY DATA COLLECTION (1)

R = 114 * T = A D M * Begin Year 115 = * End Year 116 = * Source Agency 117 = *
add, delete, modify

Frequency of Collection 118 = * Network Site 257 = * Type of Analyses 120 = *

WATER LEVEL DATA COLLECTION (1)

R = 121 * T = A D M * Begin Year 122 = * End Year 123 = * Source Agency 124 = *
add, delete, modify

Frequency of Collection 125 = * Network Site 258 = *

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R = 127 * T = A D M * Begin Year 128 = * End Year 129 = * Source Agency 130 = *
add, delete, modify

Frequency of Collection 131 = * Network Site 259 = * Method of Collection 133 = C E M U Z *
calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)

R = 180 * T = A D M * Type of Data 181 = * Loc 182 = C D Z * Format 261 = F M P Z *
add, delete, modify

New Card Same R & T Type of Data 181 = * Loc 182 = C D Z * Format 261 = F M P Z *

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
reporting, driller, owner, other govt agency other logs, geologist, other reported

② Frequency of Collection Codes

A B C D F I M Q S W Z
annual, bi-monthly, continuous, daily, semi-monthly, intermittent, monthly, one time, quarter, semi-weekly, other only annual annual

③ Type of Log Codes

A B C D E F G H I J K L M N P Q
lime, collar, caliper, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, laterolog, microlat, neutron, μ later, photo, radio, active

S T U V Z
solid, temp, gamma, fluid, other gamma velocity

④ Type of Quality Analyses Codes

A B C D E F G H J K L M Z
physical, common, chemical, trace, pesticides, nutrients, sanitary, codes, codes, codes, codes, codes, other, other

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = ① D M * Entry No 258 = 001 * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = 120.F.L.R.D. * Lithology 96 = L.M.S.N. * Lithologic Modifier 97 = M.A.R.I.N.E. *

AQUIFER DATA (2)

R = 94 * T = A D M * Geohydrologic Unit Entry No 258 = *

add, delete, modify

Date 95 = / / * Water Level 126 = * % Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 258 # * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = * Lithology 96 = * Lithologic Modifier 97 = *

AQUIFER DATA (2)

R = 94 * T = A D M * Geohydrologic Unit Entry No 258 # *

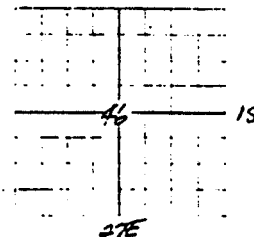
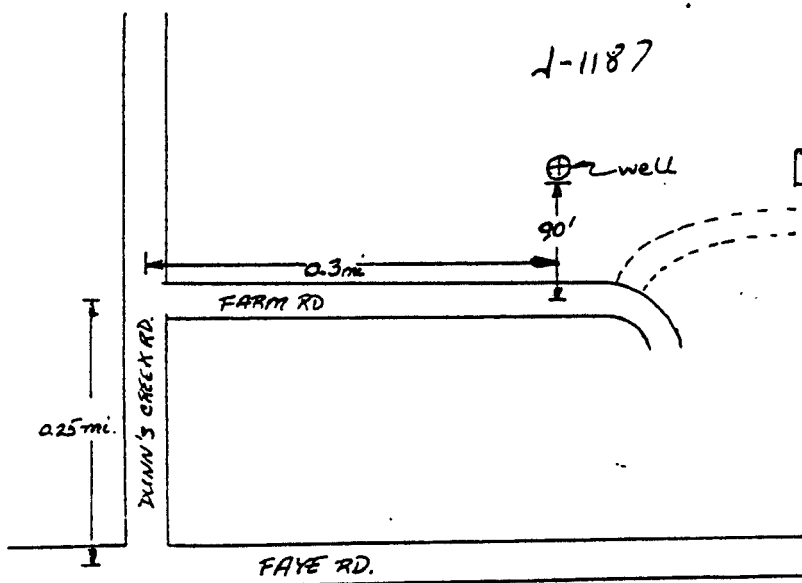
add, delete, modify

Date 95 = / / * Water Level 126 = * % Water Contributed 132 = *

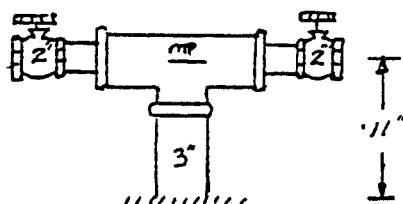
PERSISTENT REMARKS

R = 183 * T = A = 185 = *
add 185 = *
New Card Same R&T 185 = *

NOTES:



U. S. GOVERNMENT PRINTING OFFICE : 1976 O - 213-137



Recorded by E. BALDUCCIU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY -
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATADate 4/29/77Check One ☒ English ☐ Metric UnitsSite Ident No 302640081354701

COOPERATOR DATA (1)

R = 212 * T = A D M *Cooperator
Site Identifier213 = J-1187 *

Registration No. 214 = _____ *

Inspection Status 215 = _____ *

Reason Unapproved 216 = _____ *

Inspection Date 217 = _____ / _____ / _____
month day yearRemarks 218 = LOT 14 FARM RD *

DATA ON MINOR SITE REPAIRS (1)

R = 164 * T = A D M *

add, delete, modify

New Card for each Repair
Same R&T

(Minor Repair)

Entry No. 165 # _____ *

Nature of Repair ① 166 = _____ *

Date Completed 167 = _____ / _____ / _____ *

Contractor 168 = _____ *

% Performance Chg. 170 = _____ *

(Minor Repair)

Entry No. 165 # _____ *

Nature of Repair ① 166 = _____ *

Date Completed 167 = _____ / _____ / _____ *

Contractor 168 = _____ *

% Performance Chg. 170 = _____ *

(Minor Repair)

Entry No. 165 # _____ *

Nature of Repair ① 166 = _____ *

Date Completed 167 = _____ / _____ / _____ *

Contractor 168 = _____ *

% Performance Chg. 170 = _____ *

(Minor Repair)

Entry No. 165 # _____ *

Nature of Repair ① 166 = _____ *

Date Completed 167 = _____ / _____ / _____ *

Contractor 168 = _____ *

% Performance Chg. 170 = _____ *

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 * T = A D M *

add, delete, modify

No. Wells in Group 204 = _____ *

Deepest Depth 205 = _____ *

Shallowest
Depth 206 = _____ *Construction
Method 207 = D J V W Z *
drilled, jetted, driven, drive, other
washSize of
Well Field 208 = _____ *

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208 * T = A D M *

add, delete, modify

Longest
Dimension 209 = _____ *Other (Width)
Dimension 210 = _____ *

Depth 211 = _____ *

Orientation 263 = _____ *

Dip 264 = _____ *

DATA FOR COLLECTOR WELLS (1)

R = 219 * T = A D M *

add, delete, modify

New Card for each Lateral
Same R&T

Entry No.

Depth to the Lateral

Length of Lateral

Diameter of Lateral

Screen Mesh

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

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224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

FOOT NOTES:

① Nature of repair

B C D L P S Z

bored, cleaned, deepened, liner, drilled or, plugged, screen, other
off perforated back replaced

STATE OF FLORIDA
WATER WELL CONTRACTOR'S
WELL COMPLETION REPORT
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES
203 Pennington Building, Tallahassee, Florida 32304
Telephone: (904) 488-8476

No. 68170

Permit No.

Owner's Well Identification J-1187

State Well Number
For Department Use
ONLY

1. OWNER:

Name _____
Address _____ City _____ State _____

2. LOCATION OF WELL:

Street Address/Road _____
City _____ County _____
Subdivision _____ Lot No. _____
Section _____ Township _____ Range _____

3. PURPOSE OF WELL:

☐ Domestic ☐ Irrigation ☐ Public Supply
☐ Industrial ☐ Stock ☐ Other _____

4. TYPE OF WORK:

☐ New Well ☐ Plugging ☐ Other _____
☐ Deepening ☐ Reconditioning

5. QUALITY:

☐ Clear ☐ Colored ☐ Sulfur ☐ Salty ☐ Other _____

CHECK TEST MADE

☐ None ☐ Bacteria ☐ Chemical
Chloride _____ PPM
(Check ☐ if test was for sodium chloride)
Temperature _____
Well Disinfected ☐ Yes ☐ No
Test By: ☐ County Health Dept. ☐ State Health Dept. ☐ U.S.G.S. ☐ Other _____
Name _____
Address _____

6. EQUIPMENT:

☐ Rotary ☐ Cable Tool ☐ Other _____
☐ Jet ☐ Reverse Rotary

7. GROUT:

☐ None ☐ Cement ☐ Other _____
Describe and give number of bags (94)lb. From (ft) To (ft)
+ _____

8. CASING AND LINER PIPE:

Diameter (Inches) Kind From (ft) To (ft)
_____ 4 94'
_____ 4 515'
(Check One) ☐ Threaded & Coupled ☐ Welded Only
☐ T & C & Welded ☐ Other _____

9. WATER LEVEL:

Water level after well completed _____ feet
☐ Above ☐ Below land surface
Well Flowing: ☐ Yes ☐ No Flow _____ gal/min

10. SCREENS:

Make Materials Diameter (In) Slot Size From (ft) To (ft)
_____ _____ _____ _____ _____
_____ _____ _____ _____ _____
_____ _____ _____ _____ _____

11. UPPER END OF WELL:

☐ Pump Installed ☐ Valve ☐ Cap ☐ Other _____

12. PUMPING TEST:

Date _____ ☐ Test Pump ☐ Permanent Pump
Measure point is _____

which is _____ feet ☐ above ☐ below land surface

Static water level _____ feet ☐ above ☐ below measure point

Maximum Drawdown _____ feet below measure point

Discharge at maximum drawdown _____ gal/min

After _____ hours

13. PUMP INSTALLED:

Type _____ Make _____ Model No. _____

Motor Power _____ Make _____ H.P. _____

Capacity _____ Gal/min at _____ ft. of total dynamic head

No. of bowls or stages _____

Pump setting _____ feet

14. WELL LOG:

Well bore (in)	Depth (feet)		Note each type of material, producing zones, & cavities if any. Give description at not less than 20 foot intervals and at changes.
	From	To	
	0	44	SAND & GRAVEL
	44	50	SHALE
	50	51	SOFT SAND
	51	54	HARD GREY ROCK
	54	55	CLAY
	55	70	HARD GRAY ROCK
	70	73	SAND
	73	75	HARD GRAY ROCK
	75	84	WHITE ROCK
	84	94	WHITE MARL w/BLK SPOTS
	94	101	SEATED 3" CASING
	101	250	SOFT CLAY & SAND
	250	342	SAND & SOFT CLAY
	342	354	SAME
	354	446	BRN ROCK w/BLK SPOTS
	446	454	SAND
	454	476	HARD BROWN ROCK
	476	485	SAND & CLAY
	485	506	COARSE BROWN ROCK
	506	515	SAME w/GRAY ROCK
	515	515	Ocala LIME
	515	609	SEATED 2" PIPE
	609	609	Ocala LIME

12 LBS
PRESS

15. CONTRACTOR'S CERTIFICATION:

This work was done under my jurisdiction and this report is true to the best of my knowledge and belief. The work commenced on _____ and was completed on _____

Contractor _____ License Number _____
Signature of Representative _____ P.O. Box or Street _____
City _____ County _____ State _____
Phone Number _____ Driller _____

Recorded by GLENN

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

(Check One) ☒ English ☐ Metric (Units)

GENERAL SITE DATA (10)

Site Ident No. **302631081353601** RG Number **R=01*** Transaction **T= A D M V ***
 Site Type **2= C D H I M P T (P)*** Data **3= (C) U L M *** Reporting Agency **4= FLO39***
 Project No. **5=** District **6= 121*** State **7= 12*** Country (or town) **DUAL** **8= 031***
 Latitude **9= 30.2631*** Longitude **10= 081.3536*** Lat Long Accuracy **11= S (C) T M ***
 Local Number **12= J-3147*** Land Net Loc **13= LANDGRANT 46 T 15 R 27 E ***
 Location Map **14= EASTPORT** Scale **15= 24000***
 Altitude **16= 10*** Method of Measurement **17= A L (M)*** Accuracy **18= 5***
 Type Setting **19= D C (C) H K L O P S T U V W *** Hydrologic Unit (LOWDC) **20= 03080103***
 Date of First Construction Completion **21= 06 20 1982*** Use of Site **23= A D E G H (H) M P R S T U (U) X Z ***
 Use of Water **24= A B C D E F (F) I M N P R S T U Y Z ***
 Secondary Water Use **25=** Tertiary Use of Water **26=** Depth of Hole **27= 640*** Depth of Well **28= 640*** Source of Depth Data **29= D***
 Water Level **30= -15.7*** Date Measured **31= 06 24 1982*** Source **33= S***
 Method of Measurement **34= A C E (E) H L M R S T V Z ***
 Site Status **37= D F G H (H) P R S T V X Z ***
 Source of Geohydrologic Data **36=** Pump Used **35=** Measuring Point **266= 0.0*** Measuring Point Date **267= 06 24 1982***

OWNER IDENTIFICATION (11)

R=158* **T= A D M *** Date of Ownership **159= 06 20 1982***
 Name: Last **161= BURRISTER** First **162= P** Middle Initial **163= P ***

OTHER SITE IDENTIFICATION NUMBERS (11)

R=189* **T= A D M *** Ident **190= ST** Assigner **191= FLAMM**
 New Card Same R & T Ident **190= FAYE** Assigner **191= FLO39**

SITE VISIT DATA (11)

R=186* **T= A D M *** Date of Visit **187= 06 24 1982*** Name of Person **188= GLENN**

FIELD WATER QUALITY MEASUREMENTS (11)

R=192* **T= A D M *** Date **193=** Geohydrologic Unit **195=**
 Temperature **196= 0.0 0.1 0 *** Degrees C **197=**
 Conductance **198= 0.0 0.9 5 *** μ Mhos **197=**
 Other (STORET) Parameter **198=** Value **197=**
 Other (STORET) Parameter **198=** Value **197=**

FOOT NOTES

(1) Source of Data Codes

S D O A R L G Z
 reporting driller owner other govt other logs geologist other agency

R = 58 * T = A D M * Construction Entry No. = 001 * Date of Construction Completion 50 = 06 1952
 add, delete, modify month year

Name of Contractor: DE SMITH

Method of Construction: 0

Material: 0

Bottom of Hole: 68

Method of Development: 69

Number of Hours in Development: 70

Special Treatment During Development: 71

Chemicals: 72

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No. 59 # 001 *
 add, delete, modify

New Card for Each Hole Segment Same R, T & Field 59

Top of Hole Segment Below LSD	
73 #	0.0
73 #	1.05
73 #	
73 #	
73 #	

Bottom of Hole Segment below LSD

74	1.05
74	640
74	
74	
74	

75	3
75	2
75	
75	
75	

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No. 59 # 001 *
 add, delete, modify

New Card for Each Casing with Same R, T & Field 59

Top of Casing Segment Below LSD	
77 #	0.0
77 #	1.05
77 #	
77 #	
77 #	

Bottom of Casing Segment Below LSD	
78	1.05
78	441
78	
78	
78	

Diameter of Casing Segment	
79	3
79	2
79	
79	
79	

Casing Material		Thickness of Casing	
80	G	81	
80	G	81	
80		81	
80		81	
80		81	

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No. 59 # 001 *
 add, delete, modify

New Card for Each Open Section With Same R, T & Field 59

Top of Section Below LSD	
83 #	
84	
Type of Openings	85
Type of Material	86
Diameter of Open Section	87
Width of Opening	88
Length of Opening	89

83 #	
84	
85	
86	
87	
88	
89	

83 #	
84	
85	
86	
87	
88	
89	

FOOT NOTES

1 Source of Data Codes

S	D	B	A	R	L	G	Z
sanitary	driller	owner	other	govt	other	logs	geologist
agency					reported		other

5 Casing Material Codes

B	C	G	I	M	P	R	S	T	U	V	Z
brick	concrete	galv	wrought	other	PVC or	rock or	steel	tile	clay	wood	other
iron		iron	metal	plastic	stone						

6 Type of Openings Codes

F	L	M	P	R	S	T	W	X	Z
fracture	inverted	mesh	perforated	wire	screen	sand	walled	open	other
shutters			or slotted	wound	fundamental	point			hole

7 Type of Material Codes for Open Sections

B	C	G	I	M	P	R	S	T	Z
brass or	concrete	galv	wrought	other	PVC or	stainless	steel	tile	other
bronze		iron	iron	metal	plastic	traps			

J - 3147

PRODUCTION DATA (1)

R-136 146 T-A D Entry No 147 001 Date 148 06 1982

Discharge 150 33.3 Source of Data 151 D

Method of Measurement 152 4 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Method of Measurement 153 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Method of Measurement 154 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Pumping Period 157

LOGISTICS

R-42 T-A D M Type of Lift 43 A B C J P R S T U Z Entry No 254

Accumulator Setting 158 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Date 159 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Horsepower 160 46

MANUFACTURE DATA

R-47 T-A D M Type of Lift 43 Entry No 254 Manufacturer of Pump 161

Name of Pump 162 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Name of Power Company 163 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Power Meter No 164 52

Pump Rating 165 53

Additional Lift 166 355

Rating Pump Capacity 167 258

LOGISTICS

R-55 T-A D M Type of Lift 43 Type of Power 56 Horsepower 57 Entry No 254

LOGISTICS

R-198 T-A D M Type of Log 199 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Begin Year 200 200 200 200 200

End Year 201 201 201 201 201

Source of Data 202 202 202 202 202

WATER ACTIVITY DATA (COLLECTION 1)

R-114 T-A D M Begin Year 115 End Year 116 Source Agency 117

Frequency 118 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Network Site 119 257

Type of Analysis 120 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

WATER ACTIVITY DATA (COLLECTION 2)

R-121 T-A D M Begin Year 122 End Year 123 Source Agency 124

Frequency 125 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Network Site 126 258

WATER ACTIVITY DATA (COLLECTION 3)

R-127 T-A D M Begin Year 128 End Year 129 Source Agency 130

Frequency 131 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Network Site 132 259

Method of Collection 133 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

OTHER DATA AVAILABLE (1)

R-180 T-A D M Type of Data 181 Loc 182 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

Type of Data 181 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

FOOTNOTES

1. Source of Data Codes

S D J A R L G Z

Sampling 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

2. Type of Log Codes

A B C D E F G H I J K L M N O P Q

Time water level other 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

3. Frequency and Collection Codes

A H C D F I M B O S W Z

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

4. Type of Sample Analysis Codes

A B C D E F G H I J K L M Z

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

HYDROLOGIC UNIT DESCRIPTIONS (1)
R=90 T= A D M E 7.6 # 001 Depth to Top 9.1 Depth to Bottom 9.2

Unit Identifier 93 120FLR0 Lithology 96 LHSN Lithologic Modifier 97 HARTHE

AQUIFER DATA (2)

R=94 T= A D M Geohydrologic Unit Entry No 256 #

Date 95 # month day year

Water Level 126 #

Water Contributed 132 #

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 T= A D M Entry No 256 # Depth to Top 9.1 Depth to Bottom 9.2

Unit Identifier 93 #

Lithology 96 Lithologic Modifier 97

AQUIFER DATA (2)

R=94 T= A D M Geohydrologic Unit Entry No 256 #

Date 95 # month day year

Water Level 126 #

Water Contributed 132 #

PERTINENT REMARKS

R=183 T= A

185

New Card Same R&T

185

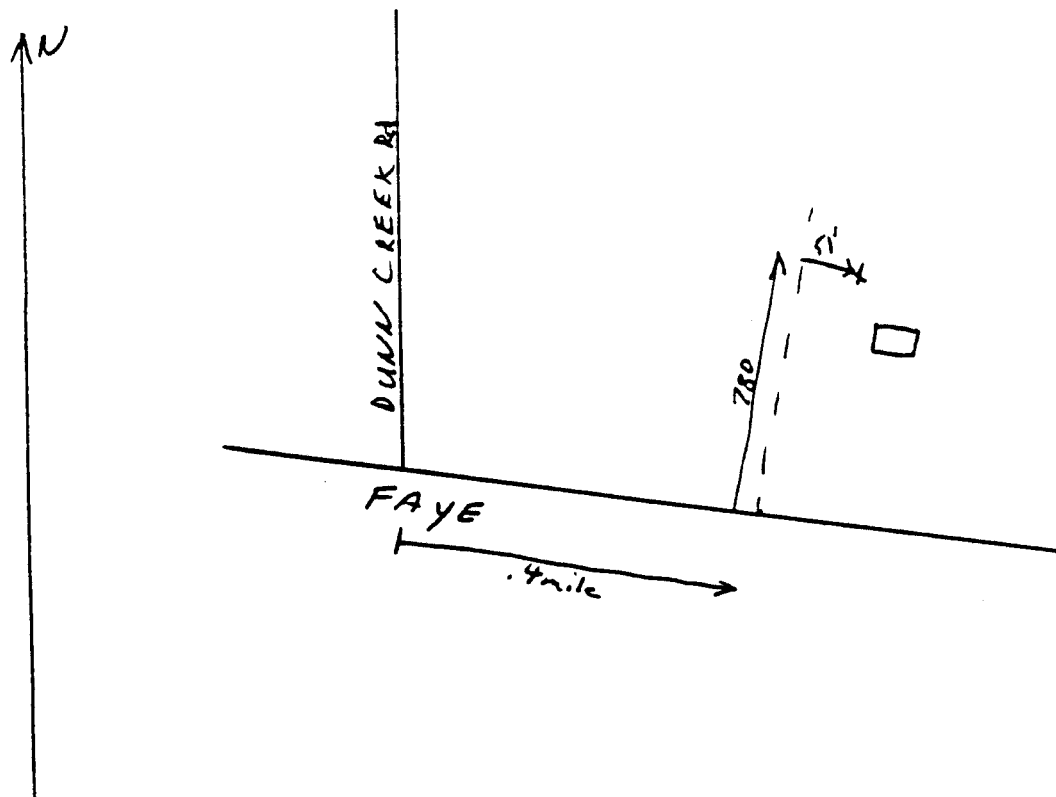
185

NOTES

R=212 T= A

2003 FAYE ROAD

J-3147



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
WELL COMPLETION REPORT

OWNER: QUANER POWER CO.
Last Name First Name Initial
QUANER POWER CO.
Number Street
2003 FAVIE RD.
City State
DAKOTA SD 57000
Area Code Phone Number Zip Code

WELL LOCATION:
Locate in Section Township Range
Latitude Longitude
Deg. Min. Sec. N
Deg. Min. Sec. W
Number Street/Road
Lot No. Subdivision
City County

OWNER WELL NUMBER OR NAME: 2003 FAVIE RD.

DRILL METHOD: ☒ Rotary ☐ Cable Tool ☐ Jet ☐ Auger
☐ Other:

SURFACE CASING, CASING, AND LINER MATERIAL

Steel Dia. (In.)	Steel Wt. (Lb./Ft.)	Steel Dia. (In.)	Steel Wt. (Lb./Ft.)	From (Ft.)	To (Ft.)	Schedule No.	Joins
Black	5	S. Steel	PVC	0	105	10	
2							

Describe Material:
TC = Threaded and Coupled, TCW = Threaded, Coupled, and Welded,
W = Welded, S = Bonded (PVC), O = Other:

GROUT: ☐ None ☒ Neat Cement ☐ Other:
Type and Percent of Additives and Grout Volume or Number of 94 lb. Sacks
28 Bags From (Ft.) To (Ft.)

FINISH: ☒ Open Hole ☐ Perforated or Slotted Casing ☐ Gravel Pack
☐ Sandpoint or Screen Attached to Well Casing ☐ Sandpoint or Screen Telescoped with Packter Inside Casing (Packter Material)

Sandpoint/Screen Material

From (Ft.)	To (Ft.)	Material

QUALITY TEST: ☐ None ☐ Bacteria ☐ Chemical
By: ☐ Health Dept. ☐ USGS ☐ Other:

Well Completion Report No. 2-1-1
Date: 10/1/80
By: DAKOTA
Signature: DAKOTA
Title: DAKOTA

WELL TEST: ☐ None ☐ Flow Test ☐ Pressure Test
By: DAKOTA
Signature: DAKOTA
Title: DAKOTA

Flow Test: ☐ None ☐ Constant Rate ☐ Step Rate
By: DAKOTA
Signature: DAKOTA
Title: DAKOTA

Pressure Test: ☐ None ☐ Constant Pressure ☐ Variable Pressure
By: DAKOTA
Signature: DAKOTA
Title: DAKOTA

Flow Test: ☐ None ☐ Constant Rate ☐ Step Rate
By: DAKOTA
Signature: DAKOTA
Title: DAKOTA

Pressure Test: ☐ None ☐ Constant Pressure ☐ Variable Pressure
By: DAKOTA
Signature: DAKOTA
Title: DAKOTA

Flow Test: ☐ None ☐ Constant Rate ☐ Step Rate
By: DAKOTA
Signature: DAKOTA
Title: DAKOTA

Pressure Test: ☐ None ☐ Constant Pressure ☐ Variable Pressure
By: DAKOTA
Signature: DAKOTA
Title: DAKOTA

TYPE OF WORK: ☒ New Construction ☐ Repair
☐ Deepening ☐ Plugging
☐ Other:
PERMIT NUMBER:
82-117
2-3147
WELL NUMBER:

TYPE OF WELL: ☒ Water Well ☐ Test Well ☐ Recharge ☐ Drainage
☐ Waste Disposal ☐ Observation ☐ Other:

USE: ☐ Domestic ☒ Irrigation ☐ Industrial ☐ Livestock ☐ Public Supply
☐ Other:

SKETCH LOCATION OF WELL in relation to local landmarks, giving distance and direction from nearest town, road, or other reference point.

North

GEOPHYSICAL LOGS: Type: WELL LOG

Bore Hole (In.)	Casing Size (In.)	Depth (Ft.)		Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type-of material. Note any cavities, indicate producing zones. Attach additional sheets if necessary.
		From	To	
		0	20	Sand
		20	53	Sand w/ B mud
		53	58	B mud
		58	75	Rock
		75	95	Rock w/ mud
		95	120	Rock w/ mud
		120	200	B mud
		200	260	B mud w/ sand
		260	280	B. mud w/ sand
		280	320	B. mud w/ sand
		320	360	B. mud w/ sand
		360	380	Rock w/ mud
		380	420	B. mud w/ sand
		420	460	B. mud w/ sand
		460	480	Rock w/ mud
		480	500	Rock w/ mud
		500	520	Rock w/ mud
		520	540	Rock w/ mud
		540	560	Rock w/ mud
		560	580	Rock w/ mud
		580	600	Rock w/ mud
		600	620	Rock w/ mud
		620	640	Rock w/ mud
		640	660	Rock w/ mud
		660	680	Rock w/ mud
		680	700	Rock w/ mud
		700	720	Rock w/ mud
		720	740	Rock w/ mud
		740	760	Rock w/ mud
		760	780	Rock w/ mud
		780	800	Rock w/ mud
		800	820	Rock w/ mud
		820	840	Rock w/ mud
		840	860	Rock w/ mud
		860	880	Rock w/ mud
		880	900	Rock w/ mud
		900	920	Rock w/ mud
		920	940	Rock w/ mud
		940	960	Rock w/ mud
		960	980	Rock w/ mud
		980	1000	Rock w/ mud

Total Depth: 1000 Ft.
Producing Zone: None
Broken Shell: ☒ Limestone ☐ Other:
Top of Producing Zone: None Ft. Bottom of Producing Zone: None Ft.
Drill Cuttings Sent to Bureau of Geology: ☐
License No. 06-000000
Water Well Contractor's Signature: DAKOTA
Driller's Signature: DAKOTA
Completion Date: 10/1/80

Recorded by ESSEX

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 6-23-80 (3)

GENERAL SITE DATA (0)

Check One ☒ English ☐ Metric Units

Site Ident No 302538081365501 RG Number R=01* Transaction T= (A) D M V *
 Site-Type 2= C D H I M P T (W) * Data 3= (C) U L M * Reliability 4= FLO.39 *
 Project No. 5= District 6= 121 * State 7= 12 * County 8= 031 *
 Latitude 9= 30.2538 * Longitude 10= 081.3655 * Lat-Long Accuracy 11= S (F) T M *
 Local Number 12= J= 1189 * Land Net Loc. 13= S E S W S E S 8 T 1 S R 27 E *
 Location Map 14= EAST PORT * Scale 15= 24000 *
 Altitude 16= 10. * Method of Measurement 17= A L (M) * Accuracy 18= 5 *
 Topo Setting 19= D C E F H K L O P (S) T U V W * Hydrologic Unit (OWDC) 20= 03080103 *
 Date of First Construction/Completion 21= 00/00/1970 * Use of Site 23= A D E G H O M P R S T U (W) X Z *
 Use of Water 24= A B C D E F H I M N P R S T (U) Y Z *
 Secondary Water Use 25= * Tertiary Use of Water 26= * Depth of Hole 27= * Depth of Well 28= * Source of Depth Data 29= *
 Water Level 30= * Date Measured 31= / / * Source 33= *
 Method of Measurement 34= A C E G H L M R S T V Z *
 Site Status 37= D F G H O P R S T V X Z *
 Source of Geohydrologic Data 36= * Pump Used 35= * Measuring Point 266= * Measuring Point Date 267= / / *

OWNER IDENTIFICATION (1)

R=158* T= (A) D M * Date of Ownership 159# 00/00/1970 *
 Name: Last 161= ROCKAWAY * First 162= BEACH * Middle Initial 163= *

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189* T= (A) D M * Ident 190# SJ * Assigner 191= FLA. MAP *
 New Card Same R & T Ident 190# CEDAR BAY * Assigner 191= FLO.39 *

SITE VISIT DATA (1)

R=186* T= (A) D M * Date of Visit 187# 05/19/1975 * Name of Person 188= ESSEX *

FIELD WATER QUALITY MEASUREMENTS (1)

R=192* T= A D M * Date 193# / / * Geohydrologic Unit 195# *
 New Card Same R thru 195 Temperature 196# 00.010 * Degrees C 197= *
 Conductance 196# 00.095 * uMhos 197= *
 Other (STORET) Parameter 196# * Value 197= *
 Other (STORET) Parameter 196# * Value 197= *

FOOT NOTES:

① Source of Data Codes:

S O O A R L G Z
 reporting, driller, owner, other geol. logs, geologist, other agency reported.

Plotted _____
 Header _____
 Local # _____
 Key punched _____

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= ① O M * Entry No 256 # 001 * Depth to Top 91 = _____ * Depth to Bottom 92 = _____ *

add, delete, modify

Unit Identifier 93 = 120 FLRD * Lithology 96 = LMSW * Lithologic Modifier 97 = MARINE *

AQUIFER DATA (2)

R=94 * T= A O M * Geohydrologic Unit Entry No 256 # _____ *

add, delete, modify

Date 95 # _____ / _____ / _____ * Water Level 126 = _____ * % Water Contributed 132 = _____ *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= A O M * Entry No 256 # _____ * Depth to Top 91 = _____ * Depth to Bottom 92 = _____ *

add, delete, modify

Unit Identifier 93 = _____ * Lithology 96 = _____ * Lithologic Modifier 97 = _____ *

AQUIFER DATA (2)

R=94 * T= A O M * Geohydrologic Unit Entry No 256 # _____ *

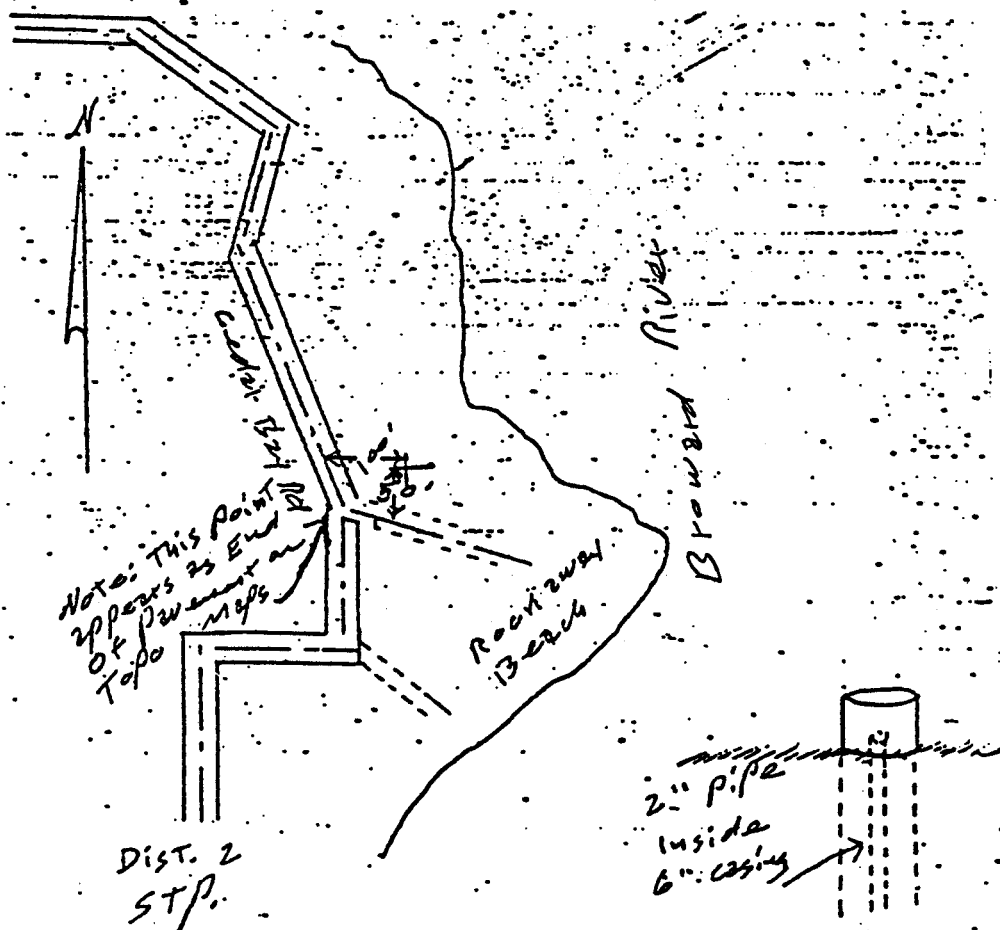
add, delete, modify

Date 95 # _____ / _____ / _____ * Water Level 126 = _____ * % Water Contributed 132 = _____ *

PERTINENT REMARKS

R=183 * T= A * 185 = _____ *
add
New Card Same R&T 185 = _____ *
185 = _____ *

NOTES: R= 256 * T= A * 256 LAST CURVE CEDAR BAY AD. *



PRINTING OFFICE: 1976 O-213-137

Recorded by Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

Date 9-13-83

SITE SCHEDULE

GENERAL SITE DATA (I)

Check One ☒ English ☐ Metric Units

Site Ident No 02618081370701 RG Number R-01 Transaction T-A D M V
Site Type 2-C D E H I M O P S T W X Data 3-0 U Reliability 3-0 U Reporting Agency 4-FL039
Project No 5- District 6-121 State 7-12 County (or town) Dubuque 8-031
Latitude 9-302618 Longitude 10-0813707 Lat-Long Accuracy 11-S 0 T M
Local Number 12-1-3182 Land Net Loc 13-LMDC-RTS 37 T 15 R 22E
Location Map 14-EAST PORT Scale 15-24000
Altitude 16-10 Method of Measurement 17-A L Accuracy 18-5
Topo Setting 19-A B C D E F G H K L M O P S T U V W Hydrologic Unit (OWDC) 20-03080103
Use of Site 23-A C D E G H M O P R S T U X Z Secondary Site Use 301 Tertiary Site Use 302
Use of Water 24-A B C D E F H I J K M N P Q R S T U Y Z
Secondary Water Use 25-P Tertiary Use of Water 26- Depth of Hole 27- Depth of Well 28- Source of Depth Date 29-
Water Level 30- Date Measured 31- Source 33-
Method of Measurement 34-A B C E G H L M N R S T V Z
Site Status 37-D E F G H I J N O P R S T V W X Z
Source of Geohydrologic Data 36- Pump Used 35- Date of First Construction/Completion 21-00 00 1955

OWNER IDENTIFICATION (I)

R-158 T-A D M Date of Ownership 159-00 00 1976
Name Last 161-STANLEY First 162-F Middle Initial 163-I

OTHER SITE IDENTIFICATION NUMBERS (I)

R-189 T-A D M Ident 190-SJ Assigner 191-FLA WMD
New Card Same R & T Ident 190-BATISDEN Assigner 191-FL039

SITE VISIT DATA (I)

R-186 T-A D M Date of Visit 187-04 12 1983 Name of Person 188-ESSEX

FIELD WATER QUALITY MEASUREMENTS (I)

R-192 T-A D M Date 193- Geohydrologic Unit 195-
Temperature 196-00.010 Degrees C 197-
Conductance 196-00.095 μ Mhos 197-
Other (STORE) Parameter 196- Value 197-
Other (STORE) Parameter 196- Value 197-

Revised September 1980

SITE NO. 22555081370701

Recorded by EssexU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULEDate 3-20-84

GENERAL SITE DATA (0)

Check One ☒ English ☐ Metric Units

Site Ident No 30255081370701 RG Number R-0 Transaction T-ADMV

Site Type 2- C D E H I M O P S T V Data 3- C U Reliability 3- C U Reporting Agency 4- FLO39

Project No. 5- District 6- 1218 State 7- 12 County (or town) DUGAL 8- 031

Latitude 9- 302555 Longitude 10- 0813707 Lat-Long Accuracy 11- S C T M

Local Number 12- J-3701 Land Net 13- NENESW 8 T 15 R 27E

Location Map 14- EASTPORT Scale 15 24000

Altitude 16- 10.1 Method of Measurement 17- A L M Accuracy 18- 5

Topo Setting 19- A B C D E G H K L M O P S T U V W a Hydrologic Unit (OWDC) 20- 03080103

Use of Site 21- A C D E G H M O P R S T U V W X Z Secondary Site Use 301 Tertiary Site Use 302

Use of Water 24- A B C D E F H J K M N P Q R S T U Y Z

Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- Depth of Well 28- Source of Depth Data 29-

Water Level 30- -6.9 Date Measured 31- 03/16/1984 Source 33- S

Method of Measurement 34- A B C E G H L M N R S T V Z

Site Status 37- D E F G H I J N O P R S T V W X Z

Source of Geohydrologic Data 38- Pump Used 35- Date of First Construction/Completion 21- 00 00/1940

OWNER IDENTIFICATION (1)

R-158 T-ADM Date of Ownership 159- 00 00/1948

Name: Last 161- CLAUSON First 162- Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-ADM Ident 190- SL Assigner 191- FLP HMD

New Card Same R & T Ident 190- CEDAR BAY Assigner 191- FLO39

SITE VISIT DATA (1)

R-186 T-ADM Date of Visit 187- 03/16/1984 Name of Person 188- Essex

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-ADM Date 193- Geohydrologic Unit 195-

New Card Same R thru 195 Temperature 196- 0.0 0.1 0.0 Degree C 197-

Conductance 196- 0.0 0.9 5.0 μ Mhos 197-

Other (STORE) Parameter 196- Value 197-

Other (STORE) Parameter 196- Value 197-

FOOT NOTES

OTHER DATA UNITS
A D G L M O R S Z
OTHER: driller geologist logs memory owner other reporting other
page 1

1. CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No 59 # 1 1 *

Date of Construction Completion 60 = 00 / 00 / 1 40 *

Source of Data b = 0 *

Name of Contractor/Driller 63 = UNKNOWN *

Method of Construction 65 = A B C D H J P R T V W Z *
 air rotary, bored, cable, dug, hydraulic, jetted, air per, reverse, trenching, driven, drive, other
 or augered, tool

Finish 66 = C F G H P S T W X Z * Type of Seal 67 = B C G N Z *
 porous, gravel, gravel, horizontal, open, perforated, screen, sand point, welled, open, other
 concrete, vent, screen, end, or slotted, pump, air, other, surged, other pump

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *
 air lift, bailed, compressed, jetted, none, other, surged, other pump

Special Treatment During Development 71 = C D E F H M Z *
 chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

2. DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # 1 1 *

Top of Hole Segment Below LSD

73 # *
 73 # *
 73 # *
 73 # *
 73 # *

Bottom of Hole Segment below LSD

74 # *
 74 # *
 74 # *
 74 # *
 74 # *

Diameter of Hole Segment

75 # *
 75 # *
 75 # *
 75 # *
 75 # *

New Card for Each Hole Segment Same R, T & Field 59

3. CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 # 1 1 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 # *
 77 # *
 77 # *
 77 # *
 77 # *

Bottom of Casing Segment Below LSD

78 # *
 78 # *
 78 # *
 78 # *
 78 # *

Diameter of Casing Segment

79 # *
 79 # *
 79 # *
 79 # *
 79 # *

Casing Material 80 = *

80 = *
 80 = *
 80 = *
 80 = *
 80 = *

Thickness of Casing

81 # *
 81 # *
 81 # *
 81 # *
 81 # *

4. OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # 1 1 *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # *

Bottom of Section Below LSD

84 # *

Type of Openings 85 = *

85 = *

Type of Material 86 = *

86 = *

Diameter of Open Section

87 # *

Width of Opening

88 # *

Length of Opening

89 # *

(Openings Data)

83 # *
 84 # *
 85 = *
 86 = *
 87 # *
 88 # *
 89 # *

(Openings Data)

83 # *
 84 # *
 85 = *
 86 = *
 87 # *
 88 # *
 89 # *

5. FOOT NOTES

1 Source of Data Codes:

A D G L M O R S Z
 other, driller, geologist, logs, memory, owner, other, reporting, other, govt, reported, agency

2 Casing Material Codes

B C D G I M P R S T U W Z
 brick, concrete, copper, galv, wrought, other, PVC or, rock or, steel, tile, coated wood, other, iron, iron, metal, plastic, stone, steel

3 Type of Openings Codes

F L M P R S T W X Z
 fracture, layered, mesh, perforated, wire, screen, sand, welled, open, other, shattered, or slotted, wound (unknown), point, hole

4 Type of Material Codes for Open Sections

B C G I M P R S T Z
 brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other, bronze, iron, iron, metal, plastic, steel

ENTRY 174 1

R-134 448 T- A O M Entry No 147 001 Date 14R 031 1784

Discharge: 180 46 Source of Data 1 151 5 Draw down 309

Method of Measurement 152 B C 0 F M O P R T U V W Z

Production Level 153 Static Level 154 Source of Data 155 Specific Gravity 272

Method of Measurement 156 A B C E G H L M N R S T V Z Pumping Period 157

LIFT DATA 1

R-42 T- A O M Type of Lift 43 A B C J P R S T U Z Entry 44

Pump Intake Setting 44 Type of Power 45 D E G H L N W Z

Date 48 Horsepower 46

MAJOR PUMP DATA (2)

R-47 T- A O M Type of Lift 43 Entry No 254 Manufacturer of Pump 48

Serial No. of Pump 49 Name of Power Company 50

Power Company Account No. 51 Power Meter No. 52 Pump Rating 53

Manufacturer of Company Who Maintains the Pump 54 Additional Lift 255 Rated Pump Capacity 266

STANDBY PUMP DATA 2

R-55 T- A O M Type of Lift 43 Type of Power 56 Horsepower 57 Entry 254

AVAILABLE LOG DATA (1)

R-198 T- A O M

New Card for Each Log Type Same R & T

Type of Log	Begin Depth	End Depth	Source of Data
199	200	201	202
199	200	201	202
199	200	201	202
199	200	201	202

WATER QUALITY DATA COLLECTION (1)

R-114 T- A O M Begin Year 115 End Year 116 Source Agency 117

Frequency of Collection 3 118 Network Site 5 257 Type of Analyses 120 Analyzing Agency 307

WATER LEVEL DATA COLLECTION (1)

R-121 T- A O M Begin Year 122 End Year 123 Source Agency 124

Frequency of Collection 3 125 Network Site 5 258

WATER TEMPERATURE DATA COLLECTION (1)

R-127 T- A O M Begin Year 128 End Year 129 Source Agency 130

Frequency of Collection 3 131 Network Site 5 259 Method of Collection 133 C E M U Z

OTHER DATA AVAILABLE (1)

R-180 T- A O M Entry Number 312 Type of Data 181 Loc 182 C D R Z = 261 F M P Z

New Card Same R & T 312 181 182 C D R Z = 261 F M P Z

FOOT NOTES

1 Source of Data Codes

A	D	G	L	M	O	R	S	Z
other	driller	geologist	logs	memory	owner	other	reporting	other
son						reporting	agency	

2 Frequency of Collection Codes

A	B	C	D	F	I	M	Q	S	W	Z	3	4	5	X
an	bi	cu	da	da	da	da	da	da	da	da	monthly	one	quarter	yearly
the	monthly	biweekly	quarterly	semi-annual	annual	monthly	one	quarter	yearly	other	parts	yearly	yearly	yearly
							one	quarter	yearly		yearly	yearly	yearly	yearly

3 Type of Quality Analyses Codes

A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Z
physical, common	trace	pesticides	nutrients	sanitary	codes	codes	codes	codes	codes	codes	codes	codes	codes	codes	codes
an	biomass					B&D	BAE	BAC	B&F	D&E	CODE	CODE	CODE	CODE	CODE

4 Network Codes

S	T	U	V	X	Z
surv	temp	summa	fluid	core	other

WA- WELL FIELD INSPECTION REPORT

Complaint No. _____ TWUP No. _____ Construction/Plugging Permit No. _____ Well Inventory No. _____

Is Well Free Flowing? Yes ☒ No ☐

Owner Clausen Phone _____

Owner's Address _____

Well Location Address 1379 Cedar Bay Rd

Well Drilling Contractor _____ License/Bond No. _____

Site Identification: 30 2555 081 3707 01 Lat./Long (if different) 30 _____ 081 _____ 01

NE NE SW SE Section 15 TWP 27E Range Eastport Quad Map Name

Depth of Hole Drilled _____ Depth of Well _____ How measured _____

Diameter/Cross Section 3" inside 4" pit Depth of Casing _____

Depth and Diameter of Well Segments: _____ " from LSD to _____

_____ " Dia. from _____ ' to _____ ' " Dia. from _____ ' to _____ ' Above Below LSD

Depth and Diameter of Casing Segments: _____ " Dia. from _____ ' to _____ ' Above Below LSD

To: _____ " Dia. from _____ ' to _____ ' Above Below LSD

Type and Quantity of Grouting Used _____ Well centered in Grout? _____

Use of Well Irrigation Number of People Served _____

Water Level 3 PSI 6.9 ft Above LSD Measuring Pt. 20' Above LSD

How Measured Pressure Gauge Measured by Clausen Date 3-16-84

Method of Construction _____ Date of Construction _____

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.) _____

Casing Material Used Galv

Altitude 10 Interval 10

Topo Setting F12T

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer than 300' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM

$$C = 1.9 \quad H = 1' \\ D = 3"$$

$$Q = 5.68 \times C \times D^2 \times \sqrt{H}$$

Free Flow Well Yield 46 GPM How Yield Determined Vert EST

Frequency of Well Use _____ Hrs/Day _____ Days/Year

Pump Data - Type and Make _____ HP _____

Pump Capacity _____ GPM No. Bowls or Stages _____

Type of Power _____ Static Water Level _____

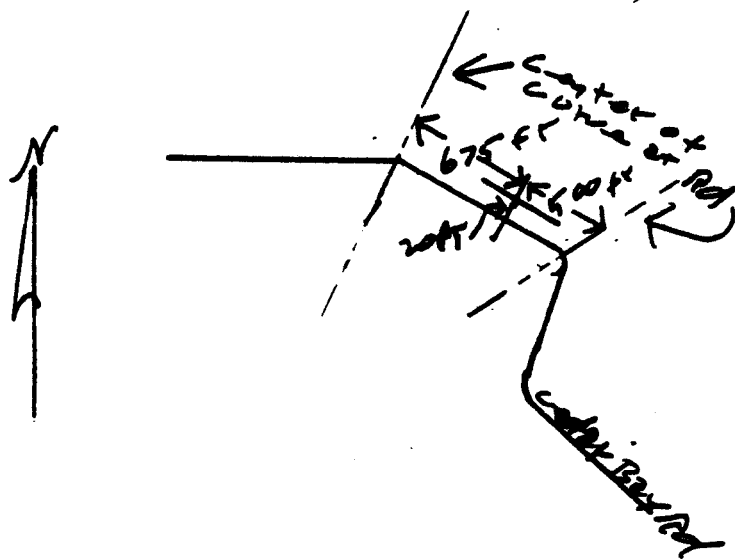
Production Water Level _____ Pump Intake Setting _____
= Depth of Section Line

Water Sampled for: Dissolved Solids _____ Conductivity _____

Hardness _____ Chlorides _____ PH= _____ Temperature _____ °C

General Rating: Poor ☒ Average _____ Good _____ Excellent _____Action Taken/Comments Log attempted by SLPWD well obstructed
at 31 ft

Follow Up Needed _____

Inspector's Name W.R. Essex Field Inspection Date 3-16-84

Glenn

DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULE

30

5-23-83

GENERAL SITE DATA (I)

Site Ident No. 302451091314601 RG Number R-0 Transaction T- R D M V

Site Type 2- C D E H I M S P S T X Data 3- R U Reliability 1- 100

Project No. 5 District 6- 127 State 7- 12 County 8- 031

Latitude 9- 30 26 51 Longitude 10- 08 13 46 Land Net 13- LAND GRANT 46

Location Map 14- EASTPORT Scale 15- 1:40,000

Altitude 16- 10 Method of Measurement 17- A L Accuracy 18- 5

Topo Setting 19- A B C D E F G H K L M O P S T U V W Hydrologic Unit 20- 03080100

Use of 23- A C D E G H M O P R S T U X Z Secondary Site Use 301 Tertiary Site Use 302

Use of Water 24- A B C D E F G H I J K L M N P Q R S T U V W X Y Z

Secondary Water Use 25 Tertiary Use of Water 26 Depth of Hole 27 Depth of Well 28 Source of Depth Data 29

Water Level 30 Data Measured 31- 1 Source 32- 1

Method of Measurement 34- A B C E G H L M N R S T V Z

Site Status 37- D E F G H I J N G P R S T V W X Z

Source of Geohydrologic Data 36- 1 Pump Used 35- 1 Date of First Construction/Completion 21- 05 00 1983

OWNER IDENTIFICATION (I)

R-158 T-1 A D M Date of Ownership 159- 05 00 1983

Name Last 161- GLENN First 162- LONDON Middle Initial 163- E

OTHER SITE IDENTIFICATION NUMBERS (I)

R-189 T- A D M Ident 190- ST Assigner 191- FLAND

New Card Same R & T Ident 190- PULASKI Assigner 191- FLO39

SITE VISIT DATA (I)

R-186 T- A D M Date of Visit 187- 05 23 1983 Name of Person 188- GLENN

FIELD WATER QUALITY MEASUREMENTS (I)

R-192 T- A D M Date 193- 8 / / Geohydrologic Unit 195- 2

New Card Same R thru 195 Temperature 196- 0 0 0 1 0 Degrees C 197- 0

Conductance 198- 0 0 0 0 5 u Mhos 199- 0

Other (STORET) Parameter 199- 0 Value 197- 0

Other (STORET) Parameter 199- 0 Value 197- 0

FOOTNOTES

1 Source of Data Codes
A D G M N S Z
199- 0 199- 0 199- 0 199- 0 199- 0 199- 0

ADD, DELETE, MODIFY

Entry No 59

1500

GRIFI

Method of Construction	65	A	B	C	D	<u>H</u>	J	P	R
		air entry	open in augering	cable tool	dig.	hydraulic rotary	jetted	other	reverse rotary
Finish	66	C	F	G	H	O	P	S	T
		smooth	rough	gravel	horizontal	open	perforated	screen	sand point
Bottom of Seal	68								
Method of Development	69	A	B	C	J	N	P	S	T
		air lift	bailed	compressed air	jetted	mine	other	surged	other
Special Treatment During Development	71	C	D	E	F	H	M	Z	
		chemicals	drill	ice	explosives	deflocculant	hydraulic fracturing	mechanical	other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 #

Top of Hole Segment Below LSD

73 #		*
73 #		*
73 #		*
73 #		*
73 #		*

Bottom of Hole Segment below LSD

74 #		*
74 #		*
74 #		*
74 #		*
74 #		*

Diameter of Hole Segment

75 #		*
75 #		*
75 #		*
75 #		*
75 #		*

New Card for Each Hole Segment Same R, T & Field 59

CASING SCHEDULE (2)

R = 78 * T = A D M * Construction Entry No 59 #

Top of Casing Segment Below LSD

77 #		*
77 #		*
77 #		*
77 #		*
77 #		*

Bottom of Casing Segment Below LSD

78 #		*
78 #		*
78 #		*
78 #		*
78 #		*

New Card for Each Casing With Same R, T & Field 59

Diameter of Casing Segment

79 #		*
79 #		*
79 #		*
79 #		*
79 #		*

Casing Material 5

80 #		*
80 #		*
80 #		*
80 #		*
80 #		*

Thickness of Casing

81 #		*
81 #		*
81 #		*
81 #		*
81 #		*

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 #

Top of Section Below LSD

83 #

Bottom of Section Below LSD

84 #

Type of Openings 6

85 #

Type of Material 7

86 #

Diameter of Open Section

87 #

Width of Opening

88 #

Length of Opening

89 #

New Card for Each Open Section With Same R, T and Field 59

(Openings Data)

83 #		*
84 #		*
85 #		*
86 #		*
87 #		*
88 #		*
89 #		*

(Openings Data)

83 #		*
84 #		*
85 #		*
86 #		*
87 #		*
88 #		*
89 #		*

FOOT NOTES

1 Source of Data Codes

A D G L M O R S Z
other, driller, geologist, logs, memory, owner, other, reporting, other
gov't reported agency

5 Casing Material Codes

B C D G I M P R S T U W Z
brick, concrete, copper, galv, wrought, other, PVC or, rock or, steel, tile, coated wood, other
iron iron metal plastic stone steel

6 Type of Openings Codes

F L M P R S T W X Z
fracture, burred, mesh, perforated, wire, screen, sand, welded, open, other
shuffled or slotted wound tungsten point hole

7 Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other
bronze iron iron metal plastic steel

1-3400

UNIT IDENTIFIER
 R = 90 * T = A D M * add, delete, modify
 93 * 126FLRD *
 Unit Identifier
 Lithology LHSN *
 Lithologic Modifier HXIVE

AQUIFER DATA (2)
 R = 94 * T = A D M * add, delete, modify
 Date 95 = / / month day year
 Geohydrologic Unit Entry No 256 #
 Water Level 126 =
 Water Contributed 132 =

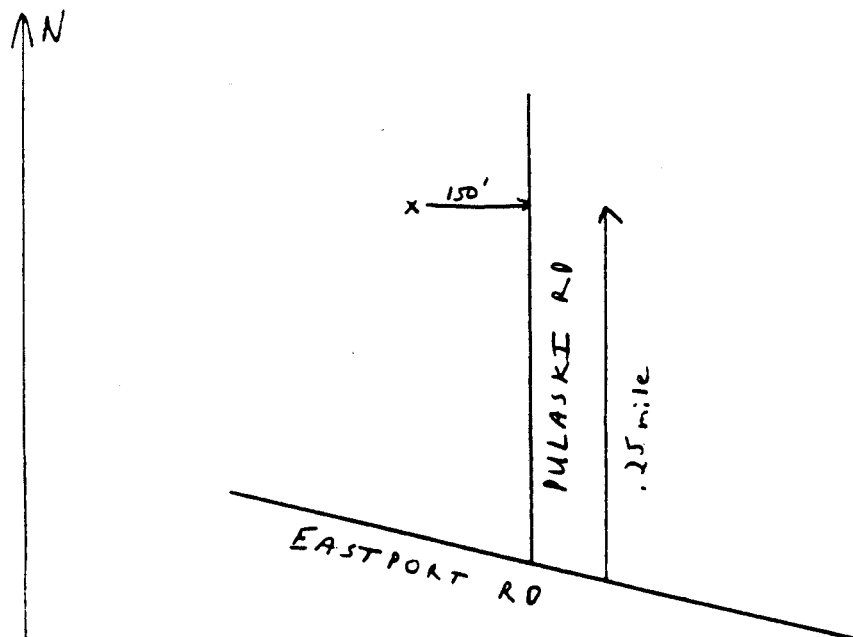
GEOHYDROLOGIC UNIT DESCRIPTIONS (1)
 R = 90 * T = A D M * add, delete, modify
 Entry No 256 #
 Depth to Top 91 =
 Depth to Bottom 92 =
 93 = 304 = 96 = 97 =
 Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)
 R = 94 * T = A D M * add, delete, modify
 Date 95 = / / month day year
 Geohydrologic Unit Entry No 256 #
 Water Level 126 =
 Water Contributed 132 =

PERTINENT REMARKS
 R = 183 * T = A D M * add, delete, modify
 New Card Same R&T
 Remarks No. 311 = 185 =
 311 = 185 =

Contributing Unit Codes
 P S N U
 primary secondary non-contributing unknown
 R = 2.2 * T = A *
 1.172.0 PULASKI RD

J-3400



Recorded by Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 11-7-78Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (0)

Site Ident No 302638081370601 RG Number R-0 Transaction T- (A) O M V
 Site-Type 2- C D H I M P T W Data 3- (C) U L M Reporting Agency 4- FL039
 Project No. 5- District 8- 121 State 7- 12 County (or town) DUV21 8- 031
 Latitude 9- 302638 Longitude 10- 0813706 Lat-Long Accuracy 11- S O T M
 Local Number 12- J- 2038 Land Net Loc 13- LNDERTS 4.6 T 1.5 R 27E
 Location Map 14- EASTPORT Scale 15- 24000
 Altitude 16- 10 Method of Measurement 17- A L Accuracy 18- 5
 Topo Setting 19- D C E F H K L O P S T U V W Hydrologic Unit (OWDC) 20- 03080103
 Date of First Construction/Completion 21- 11/01/1978 Use of Site 23- A D E G H O M P R S T U W X Z
 Use of Water 24- A B C D E F H I M N P R S T U Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- Depth of Well 28- Source of Depth Data 29-
 Water Level 30- Date Measured 31- Source 33-
 Method of Measurement 34- A C E G H L M R S T V Z
 Site Status 37- D F G H I P R S T V X Z
 Source of Geohydrologic Data 36- D Pump Used 35- 4 Measuring Point 206- Measuring Point Date 207-

OWNER IDENTIFICATION (1)

R- 150 T- (A) D M Date of Ownership 159- 11/01/1978
 Name: Last 181- LAMG First 182- Middle Initial 183-

OTHER SITE IDENTIFICATION NUMBERS (1)

R- 189 T- (A) D M Ident 190- ST Assigner 191- FLA WAD
 New Card Same R & T Ident 190- EASTPORT Assigner 191- FL039

SITE VISIT DATA (1)

R- 186 T- (A) D M Date of Visit 187- 11/02/1978 Name of Person 188- Essex

FIELD WATER QUALITY MEASUREMENTS (1)

R- 192 T- A D M Date 193- Geohydrologic Unit 195-
 New Card Same R thru 195
 Temperature 196- 00010 Degrees C 197-
 Conductance 196- 00095 μ Mhos 197-
 Other (STORET) Parameter 196- Value 197-
 Other (STORET) Parameter 196- Value 197-

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency reported,

PRODUCTION DATA (1)

R-134 46

T-A D M

Entry No 147# 021

Date 148# 1/10.2/1978

Discharge:

150# 52.42

Source of Data 151# 5

Method of Measurement

152# B C E F M O P R T U V W Z

Production Level

153#

Static Level

154#

Source of Data

155#

Specific Capacity

272#

Method of Measurement

156# A C E G H L M R S T V Z

Pumping Period

157#

LIFT DATA (1)

R-42

T-A D M

Type of Lift

43# A B C J P R S T U Z

Entry No

254#

Pump Intake Setting

44#

Type of Power

45# D E G H L N W Z

Date

38#

Horsepower

46#

MAJOR PUMP DATA (2)

R-47

T-A D M

Type of Lift

43#

Lift Entry No

254#

Manufacturer of Pump

48#

Serial No of Pump

49#

Name of Power Company

50#

Power Company Account No

51#

Power Meter No

52#

Pump Rating

53#

Person or Company Who Maintains the Pump

54#

Additional Lift

255#

Rated Pump Capacity

256#

STANDBY POWER DATA (2)

(See LIFT DATA for codes of fields 43 and 50 below)

R-55

T-A D M

Type of Lift

43#

Type of Power

56#

Horsepower

57#

Lift Entry No

254#

AVAILABLE LOG DATA (1)

R-198

T-A D M

add, delete, modify

New Card for Each Log Type Same R & T

Type of Log

199#

Begin Depth

200#

End Depth

201#

Source of Data

202#

WATER QUALITY DATA COLLECTION (1)

R-114

T-A D M

add, delete, modify

Frequency of Collection

115#

Begin Year

115#

End Year

116#

Source Agency

117#

Frequency of Collection

115#

Network Site

257#

Type of Analysis

120#

WATER LEVEL DATA COLLECTION (1)

R-121

T-A D M

add, delete, modify

Frequency of Collection

125#

Begin Year

122#

End Year

123#

Source Agency

124#

Frequency of Collection

125#

Network Site

258#

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R-127

T-A D M

add, delete, modify

Frequency of Collection

131#

Begin Year

128#

End Year

129#

Source Agency

130#

Frequency of Collection

131#

Network Site

259#

Method of Collection

133# C E M U Z

OTHER DATA AVAILABLE (1)

R-180

T-A D M

add, delete, modify

Type of Data

181#

Loc

182# C D Z

Format

261# F M P Z

New Card Same R & T

Type of Data

181#

Loc

182# C D Z

Format

261# F M P Z

FOOT NOTES:

① Source of Data Codes:

S D G A R L G Z

reporting, driller, owner, other gov't, other logs, geologist, other agency, reported.

③ Frequency of Collection Codes

A B C D F I M S Q S W Z

annual, bi-monthly, continuous, daily, semi-annual, intermittent, monthly, one time, quarter, semi-monthly, weekly, other only annual annual

② Type of Log Codes

A B C D E F G H I J K L M N S P Q

tube, collar, casing, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, logging, microlog, neutron, p. later, photo, radio, active

S T U V Z

sonic, temp, gamma, fluid, other gamma velocity

④ Type of Quality Analysis Codes

A B C D E F G H J K L M Z

physical, chemical, trace, petroleum, nutrients, sanitary, radio, radio, radio, radio, radio, all or, other

B&O B&E B&F O&E C.D&E most

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATA

Recorded by EssexDate 11-7-78

Check One

☒ English☐ Metric UnitsSite Ident No 302638281370601

COOPERATOR DATA (1)

R = 212 * T = D M *

add, delete, modify

Cooperator
Site identifier213 = J-2038 *

Registration No.

214 = _____ *

Inspection Status 215 = _____ *

Reason Unapproved

216 = _____ *

Inspection Date

217 = 11/02/1978 *

month day year

Remarks 218 = 960 EAST RPT RD *

DATA ON MINOR SITE REPAIRS (1)

R = 164 * T = A D M *

add, delete, modify

New Card for each Repair
Same R&T

(Minor Repair)

Entry No.

165 # _____ *

Nature of Repair ①

166 = _____ *

Date Completed

167 = _____ *

Contractor

168 = _____ *

% Performance Chg

170 = _____ *

(Minor Repair)

Entry No.

165 # _____ *

Nature of Repair ①

166 = _____ *

Date Completed

167 = _____ *

Contractor

168 = _____ *

% Performance Chg

170 = _____ *

(Minor Repair)

165 # _____ *

166 = _____ *

167 = _____ *

168 = _____ *

170 = _____ *

(Minor Repair)

165 # _____ *

166 = _____ *

167 = _____ *

168 = _____ *

170 = _____ *

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 * T = A D M *

add, delete, modify

No. Wells in Group

204 = _____ *

Deepest Depth

205 = _____ *

Shallowest
Depth

206 = _____ *

Construction
Method207 = D J V W Z *drilled, jammed, driven, drive, other
washSize of
Well Field

262 = _____ *

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208 * T = A D M *

add, delete, modify

Longest
Dimension

209 = _____ *

Other (Width)
Dimension

210 = _____ *

Depth

211 = _____ *

Orientation

263 = _____ *

Dip

264 = _____ *

DATA FOR COLLECTOR WELLS (1)

R = 219 * T = A D M *

add, delete, modify

New Card for each Lateral
Same R&T

Entry No.

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

220 # _____ *

Depth to the Lateral

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

221 = _____ *

Length of Lateral

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

222 = _____ *

Diameter of Lateral

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

223 = _____ *

Screen Mesh

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

224 = _____ *

FOOT NOTES:

① Nature of repair

B	C	D	L	P	S	Z
blocked, off	cleaned	damaged	leak	drilled or perforated	plugged, back	screen, replaced

WELL COMPLETION REPORT
DEPARTMENT OF ENVIRONMENTAL REGULATION
2562 EXECUTIVE CENTER CIRCLE E. MONTGOMERY BLDG.
TALLAHASSEE, FLORIDA 32301

OWNER: Edgar MR
 Last Name First Name Initial
3771 Wells KE
 Number Street
AK EL
 City State
72708
 Area Code Phone Number Zip Code

WELL LOCATION:
 Township (N-S) Range (E-W)
 Latitude Deg. Min. Sec. N
 Longitude Deg. Min. Sec. W
 Locate in Section
21.0 24.0 25.0 26.0 27.0 28.0 29.0 30.0
 Number Street/Road
 Lot No. Subdivision
127-118-RE 127-118-RE
 City State Country

OWNER WELL NUMBER OR NAME: 2445

DRILL METHOD: ☒ Rotary ☐ Cable Tool ☐ Jet ☐ Auger
☐ Other

SURFACE CASING, CASING, AND LINER MATERIAL:

Steel Dia. (in.)	Steel Wt. (lb./ft.)	Dis. (in.)	From (ft.)	To (ft.)	Schedule No.	Joint
Black Galv. S. Steel	4.5	PVC	0	105	40	74
TC - Threaded and Coupled						
W - Welded						
B - Banded (PVC)						
O - Other						

Describe Material:
 * TC - Threaded and Coupled; TCW - Threaded, Coupled, and Welded.
 W - Welded, B - Banded (PVC), O - Other.

GROUT: ☐ None ☒ Neat Cement ☐ Other
 Type and Percent of Additives and Grout Volume or Number of 94 lb. Bags
9 Bags
 From (ft.) To (ft.)
0 105

FINISH: ☒ Open Hole ☐ Perforated or Slotted Casing ☐ Gravel Pack
☐ Sandpoint or Screen Attached to Well Casing ☐ Sandpoint or Screen
 Threaded with Packer Inside Casing (Packer Material)

Sandpoint/Screen Material:

Dis. (in.)	Slot Size (in.)	From (ft.)	To (ft.)

☐ Other Finish:

QUALITY TEST: ☒ None ☐ Bacteria ☐ Chemical
 By: ☐ Health Dept. ☐ USGS ☐ Other
☒ Clear ☐ Colored ☐ Sulphur ☐ Salty ☐ Iron ☐ Other
 Conductance (Micromhos) Chloride ppm
 Hardness pH Temp °F
 ppm as calcium carbonate
 Well Disinfected: ☐ No ☐ Yes (Date)

WELL TEST, by: ☒ Natural Flow ☐ 10 G.P.M. ☐ Airlift
☐ Sailer ☐ Permanent Pump ☐ Test Pump ☐ None
 Discharge Measured By: ☐ Sailer ☐ Estimated ☐ Current Meter
☐ Orifice ☐ Trajectory ☐ Venturi ☐ Volumetric ☐ Other

Measured Static Water Level Ft.
 Measured Pumping Water Level Ft.
 After Hours At G.P.M.
 Specific Capacity G.P.M./Ft. of Drawdown
 Measuring Pt. (Describe):
 Which is Ft. ☐ Above ☐ Below Land Surface
 Elevation of Measuring Pt. = Ft. ☐ Above ☐ Below MSL

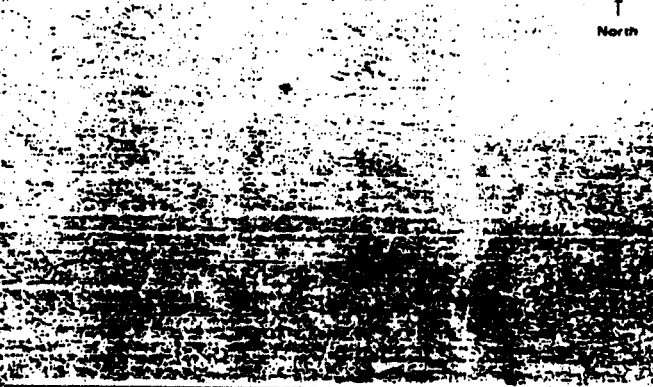
WELL EQUIPMENT: ☒ Open ☐ Capped ☐ Valved
☐ Permanent Pump ☐ Temporary Pump
 Type Pump: ☐ Centrifugal ☐ Cylinder ☐ Jet ☐ Submersible
☐ Turbine ☐ Other
 Power: ☐ Diesel ☐ Electric ☐ Gasoline ☐ Other
 Horsepower Capacity G.P.M.
 Intake/Injection Depth Ft.

☐ New Construction ☐ Repair
☐ Deepening ☐ Plugging
☐ Other
75310
7-2030
 WELL NUMBER

TYPE OF WELL: ☒ Water Well ☐ Test Well ☐ Recharge ☐ Drainage
☐ Waste Disposal ☐ Observation ☐ Other

USE: ☒ Domestic ☐ Irrigation ☐ Industrial ☐ Livestock ☐ Public Supply
☐ Other

SKETCH LOCATION OF WELL in relation to local landmarks, giving distance and direction from nearest town, road, or other reference point.



GEOPHYSICAL LOGS: Type By

WELL LOG

Casing Dia. (in.)	Casing Wt. (lb./ft.)	Depth (ft.)		Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary.
		From	To	
3.5	4.5	0	15	SAND
3.5	4.5	15	20	Gravel with 3 and
3.5	4.5	20	40	Gravel
3.5	4.5	40	60	B-mud
3.5	4.5	60	70	SAND + B-mud
3.5	4.5	70	78	115
3.5	4.5	78	80	ROCK
3.5	4.5	80	95	11
3.5	4.5	95	100	B-mud
3.5	4.5	100	140	115
3.5	4.5	140	160	SAND with B-mud
3.5	4.5	160	200	11
3.5	4.5	200	220	B-mud
3.5	4.5	220	280	11
3.5	4.5	280	290	SAND with water
3.5	4.5	290	300	B-mud
3.5	4.5	300	320	SAND w B/mud
3.5	4.5	320	380	11
3.5	4.5	380	390	ROCK
3.5	4.5	390	400	SAND with B-mud
3.5	4.5	400	420	11
3.5	4.5	420	480	Blue mud
3.5	4.5	480	550	11
3.5	4.5	550	560	ROCK
3.5	4.5	560	600	Line Rock +
3.5	4.5	600	620	center

Total Depth 620 Ft. Producing Zone Material: ☐ Sand ☐ Shell
☐ Broken Shell ☒ Limestone ☐ Other

Top of Producing Zone 560 Ft., Bottom of Producing Zone 620 Ft.
☐ Drill Cuttings Sent to Bureau of Geology

 License No.
 Contractor Signature Position
 Completion Date Driller Signature

Well No. 502510 No 813602.1

U. S. DEPT. OF THE INTERIOR
BUREAU OF GEOLOGICAL SURVEY
WELL SCHEDULE

MASTER CARD	A. J. Longo	Office	12/23/73	Eastport	7.54
NAME	7/A	12	00001	16	
DATE	30251040	08	13602	Sequential	1
TIME	23 10 270	46	Landsgorner	Time	11/2
LOCAL	20-486			OTHER	0-446, Producer
STATION	01527E46			DATE	12/23/73
STATION	ST 20515	PAPER		Address	St. Regis Paper Co.
STATION					3/A

[illegible]

* Partial (01-4 Hardness) yes
 Original 6-21-51 ☒ no
 Date water desc.: _____
 Temp. analyzed: _____
 Approximate date: _____
 Log No.: _____

WELL-DESCRIPTION CARD

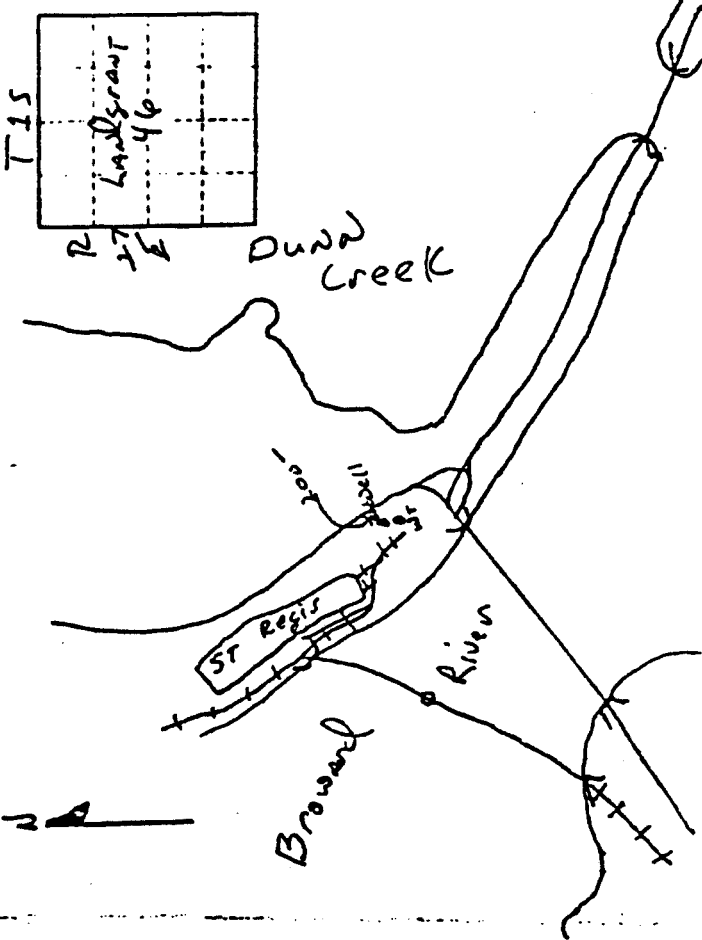
SAVED AS ON MASTER CARD) Depth well: 1378 ft. 1 3 7 8 Accuracy 16

Depth corrd: 606 ft. 6 0 6 Accuracy 20

Drilling: (C) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) (101) (102) (103) (104) (105) (106) (107) (108) (109) (110) (111) (112) (113) (114) (115) (116) (117) (118) (119) (120) (121) (122) (123) (124) (125) (126) (127) (128) (129) (130) (131) (132) (133) (134) (135) (136) (137) (138) (139) (140) (141) (142) (143) (144) (145) (146) (147) (148) (149) (150) (151) (152) (153) (154) (155) (156) (157) (158) (159) (160) (161) (162) (163) (164) (165) (166) (167) (168) (169) (170) (171) (172) (173) (174) (175) (176) (177) (178) (179) (180) (181) (182) (183) (184) (185) (186) (187) (188) (189) (190) (191) (192) (193) (194) (195) (196) (197) (198) (199) (200) (201) (202) (203) (204) (205) (206) (207) (208) (209) (210) (211) (212) (213) (214) (215) (216) (217) (218) (219) (220) (221) (222) (223) (224) (225) (226) (227) (228) (229) (230) (231) (232) (233) (234) (235) (236) (237) (238) (239) (240) (241) (242) (243) (244) (245) (246) (247) (248) (249) (250) (251) (252) (253) (254) (255) (256) (257) (258) (259) (260) (261) (262) (263) (264) (265) (266) (267) (268) (269) (270) (271) (272) (273) (274) (275) (276) (277) (278) (279) (280) (281) (282) (283) (284) (285) (286) (287) (288) (289) (290) (291) (292) (293) (294) (295) (296) (297) (298) (299) (300) (301) (302) (303) (304) (305) (306) (307) (308) (309) (310) (311) (312) (313) (314) (315) (316) (317) (318) (319) (320) (321) (322) (323) (324) (325) (326) (327) (328) (329) (330) (331) (332) (333) (334) (335) (336) (337) (338) (339) (340) (341) (342) (343) (344) (345) (346) (347) (348) (349) (350) (351) (352) (353) (354) (355) (356) (357) (358) (359) (360) (361) (362) (363) (364) (365) (366) (367) (368) (369) (370) (371) (372) (373) (374) (375) (376) (377) (378) (379) (380) (381) (382) (383) (384) (385) (386) (387) (388) (389) (390) (391) (392) (393) (394) (395) (396) (397) (398) (399) (400) (401) (402) (403) (404) (405) (406) (407) (408) (409) (410) (411) (412) (413) (414) (415) (416) (417) (418) (419) (420) (421) (422) (423) (424) (425) (426) (427) (428) (429) (430) (431) (432) (433) (434) (435) (436) (437) (438) (439) (440) (441) (442) (443) (444) (445) (446) (447) (448) (449) (450) (451) (452) (453) (454) (455) (456) (457) (458) (459) (460) (461) (462) (463) (464) (465) (466) (467) (468) (469) (470) (471) (472) (473) (474) (475) (476) (477) (478) (479) (480) (481) (482) (483) (484) (485) (486) (487) (488) (489) (490) (491) (492) (493) (494) (495) (496) (497) (498) (499) (500) (501) (502) (503) (504) (505) (506) (507) (508) (509) (510) (511) (512) (513) (514) (515) (516) (517) (518) (519) (520) (521) (522) (523) (524) (525) (526) (527) (528) (529) (530) (531) (532) (533) (534) (535) (536) (537) (538) (539) (540) (541) (542) (543) (544) (545) (546) (547) (548) (549) (550) (551) (552) (553) (554) (555) (556) (557) (558) (559) (560) (561) (562) (563) (564) (565) (566) (567) (568) (569) (570) (571) (572) (573) (574) (575) (576) (577) (578) (579) (580) (581) (582) (583) (584) (585) (586) (587) (588) (589) (590) (591) (592) (593) (594) (595) (596) (597) (598) (599) (600) (601) (602) (603) (604) (605) (606) (607) (608) (609) (610) (611) (612) (613) (614) (615) (616) (617) (618) (619) (620) (621) (622) (623) (624) (625) (626) (627) (628) (629) (630) (631) (632) (633) (634) (635) (636) (637) (638) (639) (640) (641) (642) (643) (644) (645) (646) (647) (648) (649) (650) (651) (652) (653) (654) (655) (656) (657) (658) (659) (660) (661) (662) (663) (664) (665) (666) (667) (668) (669) (670) (671) (672) (673) (674) (675) (676) (677) (678) (679) (680) (681) (682) (683) (684) (685) (686) (687) (688) (689) (690) (691) (692) (693) (694) (695) (696) (697) (698) (699) (700) (701) (702) (703) (704) (705) (706) (707) (708) (709) (710) (711) (712) (713) (714) (715) (716) (717) (718) (719) (720) (721) (722) (723) (724) (725) (726) (727) (728) (729) (730) (731) (732) (733) (734) (735) (736) (737) (738) (739) (740) (741) (742) (743) (744) (745) (746) (747) (748) (749) (750) (751) (752) (753) (754) (755) (756) (757) (758) (759) (760) (761) (762) (763) (764) (765) (766) (767) (768) (769) (770) (771) (772) (773) (774) (775) (776) (777) (778) (779) (780) (781) (782) (783) (784) (785) (786) (787) (788) (789) (790) (791) (792) (793) (794) (795) (796) (797) (798) (799) (800) (801) (802) (803) (804) (805) (806) (807) (808) (809) (810) (811) (812) (813) (814) (815) (816) (817) (818) (819) (820) (821) (822) (823) (824) (825) (826) (827) (8

HYDRO-TECTOLIC CARD

Section	C	ST John R.	0.9 E	Below Okmaha	0.3	Florida
Top of depression, stream channel, dunes	(1)	(2)	(3)	(4)	(5)	(6)
Well sites	(7)	(8)	(9)	(10)	(11)	(12)
offshore, pediment, alluvium, terrace, sediments, valley floor						FIAT
Terrestrial						Florida
Limestone						Marine
Length of well open	772					
Depth to top of						
System						
Length of well open						
Depth to top of						
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System						



Proposed for for use by Water Conservation Program Field
Inspector during Well Plugging Operation

J-3428

WATER CONSERVATION ACTIVITY
DUVAL COUNTY

Reason for inspection: Proper procedures for plugging of
abandoned water well.

Regulatory status: Received application to plug
abandoned well

(date)

Permit issued for above

(number)

Well scheduled

5-18-83
(date)

New abandoned well schedule
completed

(date)

Submitted to U.S.G.S.

(date)

Owner DOT
(name of owner or his agent)

Address _____
(street) (city) (state) (zip)

Well Drilling Contractor O. E. SMITH
(name)

(address)

(license or bond number)

Identification of Quad. Sheet EASTPORT

LANDGRANT 46 15 27E
(Section) (Township) (Range)

Latitude 30° 26' 59" N Longitude 081° 36' 54" N

Sequential 01

Was well logged?

☐
YES

☒
NO

Date _____

By whom? _____

Total well depth _____ feet

Depth cased _____ feet

Diameter of well 3x2 inches.

Volume of material calculated to properly plug well 15.54 FT³

12.95415 ~~cu ft~~. Materials to be used: portland cement

Density: 15.5 lbs./gal. Pumping pressure _____ p.s.i. Pumping temperature _____ OF

Was plug used? ☐ YES ☒ NO What type/style? _____

Placement depth land surface feet.

Was operation continuous? ☒ YES ☐ NO

Date and time started: 5/18/83 at 10:00 a.m./p.m.

Date and time completed: 5/18/83 at 10:15 a.m./p.m.

Volume of material used 18 sacks of portland cement
15.5 lbs./gal. ~~_____~~ = 21.6 ft³

Name of company providing materials: _____

Were all specifications followed as set forth in City of Jacksonville Ordinance Chapter 625, Florida Statutes Chapter 373, and Florida Administrative Code 16C - 8?

☒ YES ☐ NO

Inspector's evaluation of operation: 18 sacks of portland

cement with a density of 15.5 lbs./gal. was
pumped into the well. The following day the level of
the cement was found to be 13.8 ft. below the top of
the casing. Cement will be brought up to land surface

Any additional future action required by inspector?

☐ YES ☒ NO

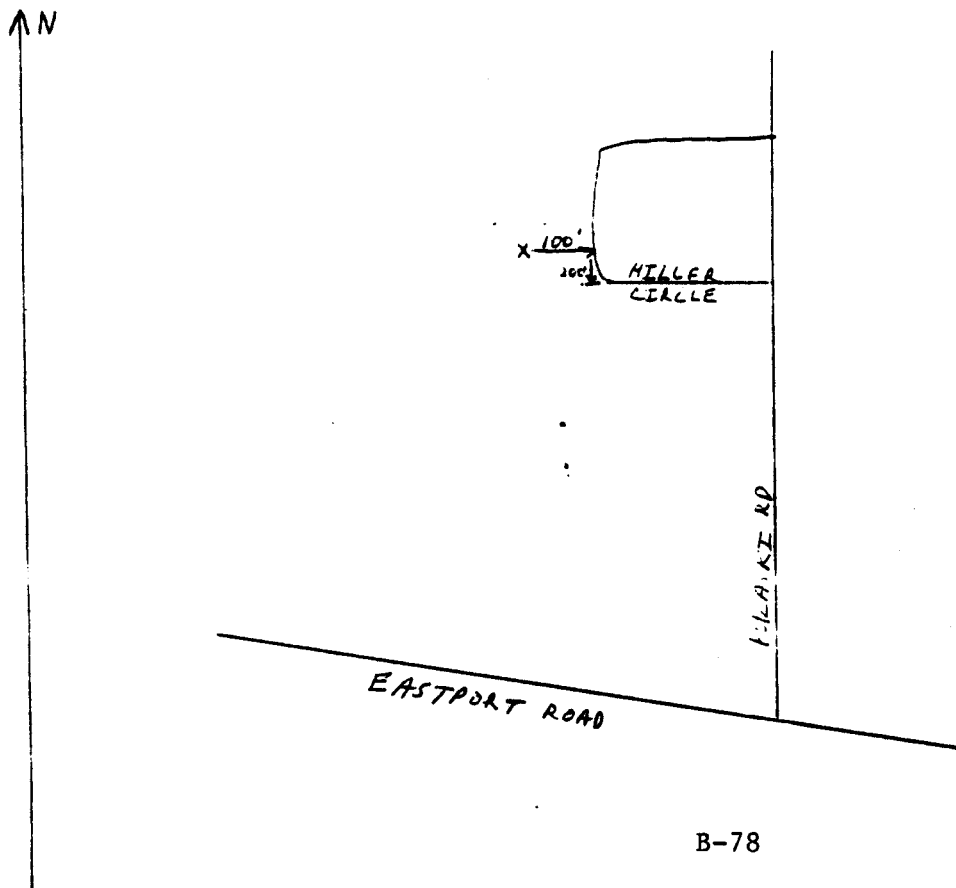
If yes, please explain: _____

J. T. Glenn
(Signature of Inspector)

5-18-83
(date)

Complaint No. _____ TRUP No. _____ Construction Tugging J-3428
Permit No. _____
Will Free Flowing? Yes ☒ No ☐ Phone _____
DOT _____
Owner's Address PULASKI RD - MILLER CIRCLE
Location Address _____
Drilling Contractor D.E. SMITH License/Bond No. _____
Identification: 30 2659 081 3654 01 Lat./Long (if different) 30 _____ 081 _____
TANDGRANT 1/4 46 Section TWP 15 Range 27E Quad Map Name EASTPORT
Depth of Hole Drilled _____ Depth of Well _____ How measured _____
Diameter/Cross Section 3X2 Depth of Casing _____
Depth and Diameter of Well Segments: _____ " from LSD to _____
" Dia. from _____ 'to _____ " Dia. from _____ 'to _____
Depth and Diameter of Casing Segments: _____ " Dia. from _____ Above LSD
Below LSD
" Dia. from _____ 'to _____
Depth and Quantity of Grouting Used _____ Well centered in Grout? _____
Type of Well Destroyed Number of People Served _____
Water Level _____ Above LSD Measuring Pt. _____ Above LSD
Below LSD
How Measured _____ Measured by _____ Date _____
Method of Construction _____ Date of Construction _____
Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.)
Good
Lining Material Used GALV
Elevation 10 Interval 10
Ground Setting FLAT
Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer
than 300' _____
Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Free Flow Well Yield _____ GPM How Yield Determined _____
Frequency of Well Use _____ Hrs/Day _____ Days/Year
Pump Data - Type and Make _____ HP _____
Pump Capacity _____ GPM No. Bowls or Stages _____
Type of Power _____ Static Water Level _____
Production Water Level _____ Pump Intake Setting _____
= Depth of Section Line
Water Sampled for: Dissolved Solids _____ Conductivity _____
Hardness _____ Chlorides _____ PH= _____ Temperature _____ °C
General Rating: Poor _____ Average ☒ Good _____ Excellent _____
Action Taken/Comments well was destroyed. 18 sacks of portland
cement with a density of 15.5 lbs/gal was pumped into
the well. The level of the cement in the well was 13.8 ft
Follow Up Needed below top of the 3" casing.
Inspector's Name Glinne Field Inspection Date 5-18-83



Revised September 1980

SITE NO 302659081365401

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULERecorded by GLENNDate 5-18-83

GENERAL SITE DATA (01)

Check One ☒ English ☐ Metric Units

Site Ident No 302659081365401 RG Number R-0 Transaction T- (A) D M V
 Site-Type 2- C D E H I M P S T (X) X Data 3- (C) U Reporting Agency 4- FLO39
 Project No 5- District 6- 121 State 7- 12 County (or town) Dunn 8- 031
 Latitude 9- 302659 Longitude 10- 0813654 Lat-Long Accuracy 11- S O T M
 Local Number 12- J-3428 Land Net Loc. 13- LAND GRANT 46 T 15 R 27 E
 Location Map 14- EASTPORT Scale 15- 24000
 Altitude 16- 10 Method of Measurement 17- A L Accuracy 18- 5
 Topo Setting 19- A B C D E (E) G H K L M O P S T U V W Hydrologic Unit (OWDC) 20- 07080107
 Use of Site 23- A C D E G H M P R S T U (X) X Secondary Site Use 301- Tertiary Site Use 302-
 Use of Water 24- A B C D E F H I J K M N P Q R S T (U) Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- Depth of Well 28- Source of Depth Data 29- 1
 Water Level 30- Data Measured 31- Source 33-
 Method of Measurement 34- A B C E G H L M N R S T V Z
 Site Status 37- D E F G H I J N P R S T V W X Z
 Source of Geohydrologic Data 36- Pump Used 35- Date of First Construction/Completion 21- 00-00-1975

OWNER IDENTIFICATION (1)

R-158 T- (A) D M Date of Ownership 159- 05-00-1983
 Name: Last 161- D.O.T. First 162- Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T- (A) D M Ident 190- ST Assigner 191- FLA WND
 New Card Same R & T Ident 190- HILLER Assigner 191- FLO39

SITE VISIT DATA (1)

R-186 T- (A) D M Date of Visit 187- 05/18/1983 Name of Person 188- GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T- A D M Date 193- Geohydrologic Unit 195-
 New Card Same R thru 195
 Temperature 196- 00010 Degrees C 197-
 Conductance 198- 00005 μ Mhos 197-
 Other (STORET) Parameter 198- Value 197-
 Other (STORET) Parameter 198- Value 197-

FOOT NOTES

1. Source of Data Codes

A D G L M O R S Z
 other direct geologist log memory owner other reporting other
 unit agency

LL CONSTRUCTION DATA (1)

R = 58 * T = 6 D M * Entry No 59 # 20 *

Date of Construction Completion 60: 00 00 16 * month day year

Source of Const Data 64: 5 *

Name of Contractor/Driller 63: O.E. SMITH *

Method of Construction 65: A B C D H J P R T V W Z *

Finish 66: C F G H O P S T W X Z * Type of Seal 67: B C G N Z *

Bottom of Seal 68: * Method of Development 69: A B C J N P S Z * Number of Hours in Development 70: *

Special Treatment During Development 71: C D E F H M Z *

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # * *

Top of Hole Segment Below LSD
73 # *
73 # *
73 # *
73 # *
73 # *

Bottom of Hole Segment below LSD
74 = *
74 = *
74 = *
74 = *
74 = *

Diameter of Hole Segment
75 = *
75 = *
75 = *
75 = *
75 = *

New Card for Each Hole Segment Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 # * *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD
77 # *
77 # *
77 # *
77 # *
77 # *

Bottom of Casing Segment Below LSD
78 = *
78 = *
78 = *
78 = *
78 = *

Diameter of Casing Segment
79 # *
79 # *
79 # *
79 # *
79 # *

Casing Material 80 = *
80 = *
80 = *
80 = *
80 = *

Thickness of Casing
81 = *
81 = *
81 = *
81 = *
81 = *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # * *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD 83 # *
Bottom of Section Below LSD: 84 = *
Type of Openings 85 = *
Type of Material 86 = *
Diameter of Open Section 87 = *
Width of Opening 88 = *
Length of Opening 89 = *

(Openings Data)
83 # *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

(Openings Data)
83 # *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

DOT NOTES

1 Source of Data Codes

A D G L M O R S Z
other driller, geologist logs, memory, owner, other, reporting, other reported agency

5 Casing Material Codes

B C D G I M P R S T U W Z
brick, concrete, copper, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other iron iron metal plastic stone steel

6 Type of Openings Codes

F L M P R S T W X Z
fracture, lowered, mesh, perforated, wire, screen, sand, walled, open, other shuttered or slotted wound (unknown) point hole

7 Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other bronze iron iron metal plastic steel

3428

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * add, delete, modify

Entry No 256 # 001 * Depth to Top 91 = * Bottom 92 = *

93 = L. J. O'FLYNN * 304 = * 96 = LHSN * 97 = MARINE *

Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)

R-94 * T- A D M * add, delete, modify

Geohydrologic Unit Entry No 256 # * % Water Contributed 132 = *

Date 95 # / / * Water Level 126 = *

month day year

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * add, delete, modify

Entry No 256 # * Depth to Top 91 = * Bottom 92 = *

93 = * 304 = * 96 = * 97 = *

Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)

R-94 * T- A D M * add, delete, modify

Geohydrologic Unit Entry No 256 # * % Water Contributed 132 = *

Date 95 # / / * Water Level 126 = *

month day year

PERTINENT REMARKS

R-183 * T- A D M * add, delete, modify

New Card Same R&T

Remark No. 311 # * 185 = *

311 # * 185 = *

Contributing Unit Codes

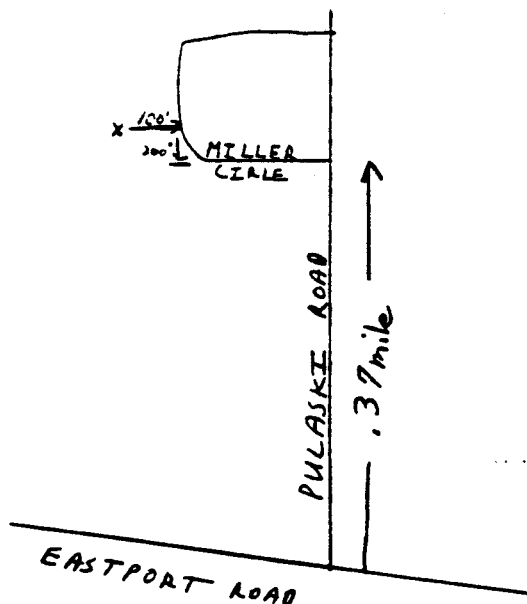
P S N U

primary secondary non-contributing unknown

R-212 * T- A * 218 = MILLER CIRCLE *

2-3428

N



Recorded by

Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date _____

20 Dec 76



Check Out

English

— **Starting Unit**

GENERAL SITE DATA (04)

Site Ident No	302525081371101										RQ Number	R-0-0		Transit	T-0		M-V		
Site-Type	2-C D H I M P T W										Date	3-0		U L M		Reporting Agency		4-FLA39	
Project No.	8-										District	8-121		State	7-12		Country (or town)	DUVAL 8-031	
Latitude	9-302525										Longitude	10-0813711		Lat-Long Accuracy	11-50 T M				
Lead Number	12-1										Land Net Loc.	13-1		UDERTS	47 T 1 S		R 27 E		
Location Map	14-EASTPORT										Scale		15-24000						
Altitude	16-20										Method of Measurement	17-A L		Accuracy		18-5			
Type Setting	19-B-C										Hydrologic Unit (OWOCI)		20-03080103						
Date of First Construction/Completion	21-12-00 1976										Use of Site	23-A D E G H S M P R S T U		X Z					
Use of Water	24-A B C D E F H I M										P R S T U Y Z								
Secondary Water Use	25-										Tertiary Use of Water	26-		Depth of Hole	27-1285		Depth of Well	28-1285	
Water Level	30-19.6										Date Measured	31-12/17/1976		Source		33-5			
Method of Measurement	34-A C E H L M R S T V Z																		
Site Status	37-D F G H S P R S T V X Z																		
Source of Geohydrologic Data	38-										Pump Used	35-		Measuring Point	200-		Measuring Point Date	207-12/17/1976	

OWNER IDENTIFICATION (1)

R-150 • T-2 • D • N •
 Date of Ownership 199 # 12 of 1976 •
 month day year
 Name Last 181 JACKSON, L •
 First 182 GUY, JR •
 Middle Initial 183 •

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 * T= A D N * 190 # ST * 191 # FLA MAR *
 add, delete, modify
 New Card Same-R & T 190 # CEDAR BAY * 191 # FLA39 *

SITE VISIT DATA (1)

R-106 • T • A O M • Date of Visit 1278 12/17/1976 • Name of Person 100 • ESSEX •

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-ADM Date 193 12 17 1976 Geohydro- 195 8
 add, color, modify month day year logs Unit
 New Card Same R show 198
 Temperature 100 0 0 0 1 0 Degree C 107
 Conductance 100 0 0 0 9 5 μ Mhos 107 520 (626)
 Other (STORET) Parameter 100 009.40 Value 107 20
 Other (STORET) Parameter 100 9.00 Value 107 266
 Plotted

FOOT NOTES:

① **Source of Data Center:**

REPORTING, DESIGN, OWNER, OTHER GOV'T. OTHER LEADS, POSTAL, OTHER
ADDRESS RECORDED.

Plotted _____
Header _____
Local # _____
Keypunched _____

WELL CONSTRUCTION DATA 44

R = SC * T = Q D M * Entry No 598 001 * Date of Construction Completion 80-12-00-1976 * Source of 1 Count Date 84-12-00 *
 Name of Contractor/Owner 83-SOUTHERN * Southern Drillers
 Method of Construction 85- A B C D H J P R T V W Z *
air, rotary; bar, or magnet; cable, tool; dug; hydraulic, rotary; jacked; air-gun, suction; reverse, rotary; trenching; driven; driven, wash; other
 Finish 86- C F G H B P S T W Z * Type of Seal 87- S C G Z *
perforated, screen; gravel w. part; gravel, screen; horizontal, gallery; open, end; perforated, or slotted; screen; sand point; welded; open, hole; bitumen, clay, cement, other; grease
 Bottom of Seal 88- A * Method of Development 89- A S C J N P S Z * Number of Hours in Development 70- 0 *
air-lift, bailed, compressed, jetted, pump, other, surged, other; pump
 Special Treatment During Development 71- C D E F H M Z *
chemicals, dry ice, explosives, deflocculant, hydraulic fracturing, mudmat, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = Q D M * Construction Entry No 598 001 *
add, delete, modify
 Top of Hole Segment Below LSD

72#	<u>0</u>
73#	<u>1.22</u>
73#	<u>5.63</u>
73#	
73#	

 Bottom of Hole Segment Below LSD

74#	<u>1.22</u>
74#	<u>5.63</u>
74#	<u>12.85</u>
74#	
74#	

 Diameter of Hole Segment

75#	<u>1.2</u>
75#	<u>8</u>
75#	<u>8</u>
75#	
75#	

New Card for Each Hole Segment Same R, T & Field 59

CASING SCHEDULE (2)

R = 70 * T = Q D M * Construction Entry No 598 001 *
add, delete, modify
 Top of Casing Segment Below LSD

77#	<u>0</u>
77#	<u>10.8</u>
77#	
77#	
77#	

 Bottom of Casing Segment Below LSD

78#	<u>1.22</u>
78#	<u>5.63</u>
78#	
78#	
78#	

 Diameter of Casing Segment

79#	<u>1.2</u>
79#	<u>8</u>
79#	
79#	
79#	

 Casing Material ^⑤

80#	<u>S</u>
80#	<u>S</u>
80#	
80#	
80#	

 Thickness of Casing

81#	
81#	
81#	
81#	
81#	

New Card for Each Casing With Same R, T & Field 59

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 598 *
add, delete, modify
 Top of Section Below LSD 83# *
 Bottom of Section Below LSD 84# *
 Type of Opening ^① 85# *
 Type of Material ^② 86# *
 Diameter of Open Section 87# *
 Width of Opening 88# *
 Length of Opening 89# *

New Card for Each Open Section With Same R, T and Field 59

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
 reporting, driller, owner, other geol., other logs, geologist, other reported

② Type of Opening Codes

F L M P R S T W X Z
 fracture, fractured, wash, perforated, open, screen, sand, welded, open, other slotted, or slotted, sound (technical) point, hole

⑤ Casing Material Codes

B C G I M P R S T U W Z
 brick, concrete, galv., wrought, other, PVC or, rock or, steel, tile, cement, wood, other iron iron metal plastic stone

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
 bronze, concrete, galv., wrought, other, PVC or, stainless, steel, tile, other bronze iron iron wood plastic steel

PRODUCTION DATA (19)

R=134 148 T=ADM Entry No 147# 001 Date 148=12/17/1976

Discharge 150=1442.36 Source of Data 151=S

Method of Measurement 152=B-C-F-M-O-P-R-T-U-V-W-Z

Production Level 153= Static Level 154= Source of Data 155= Specific Capacity 272=

Method of Measurement 156=A-C-E-G-H-L-M-R-S-T-V-Z

Pumping Period 157=

LIFT DATA (1)

R=42 T=ADM Type of Lift 43# A-B-C-J-P-R-S-T-U-Z

Pump Intake Setting 44= Type of Power 45=D-E-G-H-L-N-W-Z

Date 38=12/17/1976 Horsepower 46=

MAJOR PUMP DATA (2)

R=47 T=ADM Type of Lift 43# Lift Entry No 254# Manufacturer of Pump 48=

Serial No of Pump 49= Name of Power Company 50=

Power Company Account No 51= Power Meter No 52= Pump Rating 53=

Person or Company Who Maintains the Pump 54= Additional Lift 256= Rated Pump Capacity 258=

STANDBY POWER DATA (2)

R=55 T=ADM Type of Lift 43# Type of Power 55= Horsepower 57= Lift Entry No 254#

AVAILABLE LOG DATA (1)

R=198 T=ADM

Now Card for Each Log Type Same R & T

Type of Log 199#

Begin Depth 200=

End Depth 201=

Source of Data 202=

WATER QUALITY DATA COLLECTION (1)

R=114 T=ADM

Begin Year 115#

End Year 116=

Source Agency 117=

Frequency of Collection 118=

Network Site 257=

Type of Analysis 120=

WATER LEVEL DATA COLLECTION (1)

R=121 T=ADM

Begin Year 122#

End Year 123=

Source Agency 124=

Frequency of Collection 125=

Network Site 258=

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R=127 T=ADM

Begin Year 128#

End Year 129=

Source Agency 130=

Frequency of Collection 131=

Network Site 259=

Method of Collection 133= C-E-M-U-Z

OTHER DATA AVAILABLE (1)

R=180 T=ADM

Type of Data 181#

182= C-D-Z

201= F-M-P-Z

Now Card Same R & T

Type of Data 181#

182= C-D-Z

201= F-M-P-Z

FOOT NOTES:

① Source of Data Codes:

S-D-S-A-R-L-G-Z

reporting, drilling, owner, other gov't, other log, geological, other agency, reported

② Type of Log Codes

A-B-C-D-E-F-G-H-I-J-K-L-M-N-O-P-Q

core, collar, casing, driller's, electric, fluid, geological, magnetic, induction, gamma, depth, leveling, microlite, neutron, p. level, photo, radio, ray

S-T-U-V-Z

seals, temp, granular, fluid, other gamma velocity

③ Frequency of Collection Codes

A-B-C-D-F-I-M-S-G-S-W-Z

annual, bi-monthly, continuous, daily, semi, intermittent, monthly, one time, quarterly, semi, weekly, other monthly only annual annual

④ Type of Quality Analysis Codes

A-B-C-D-E-F-G-H-I-J-K-L-M-Z

physical, chemical, trace, pollution, nutrients, sensory, color, taste, odor, solids, pH, etc, all or, other chemical elements

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 T=ADM Entry No 256 Depth to Top 91 Depth to Bottom 92

Unit Identifier 93=120FLRD Lithology 96=L45N Lithologic Modifier 97=MARINE

AQUIFER DATA (2)

R=96 T=ADM Geohydrologic Unit Entry No 256 Date 98/ / Water Level 128 % Water Contributed 132

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 T=ADM Entry No 256 Depth to Top 91 Depth to Bottom 92

Unit Identifier 93= Lithology 96= Lithologic Modifier 97=

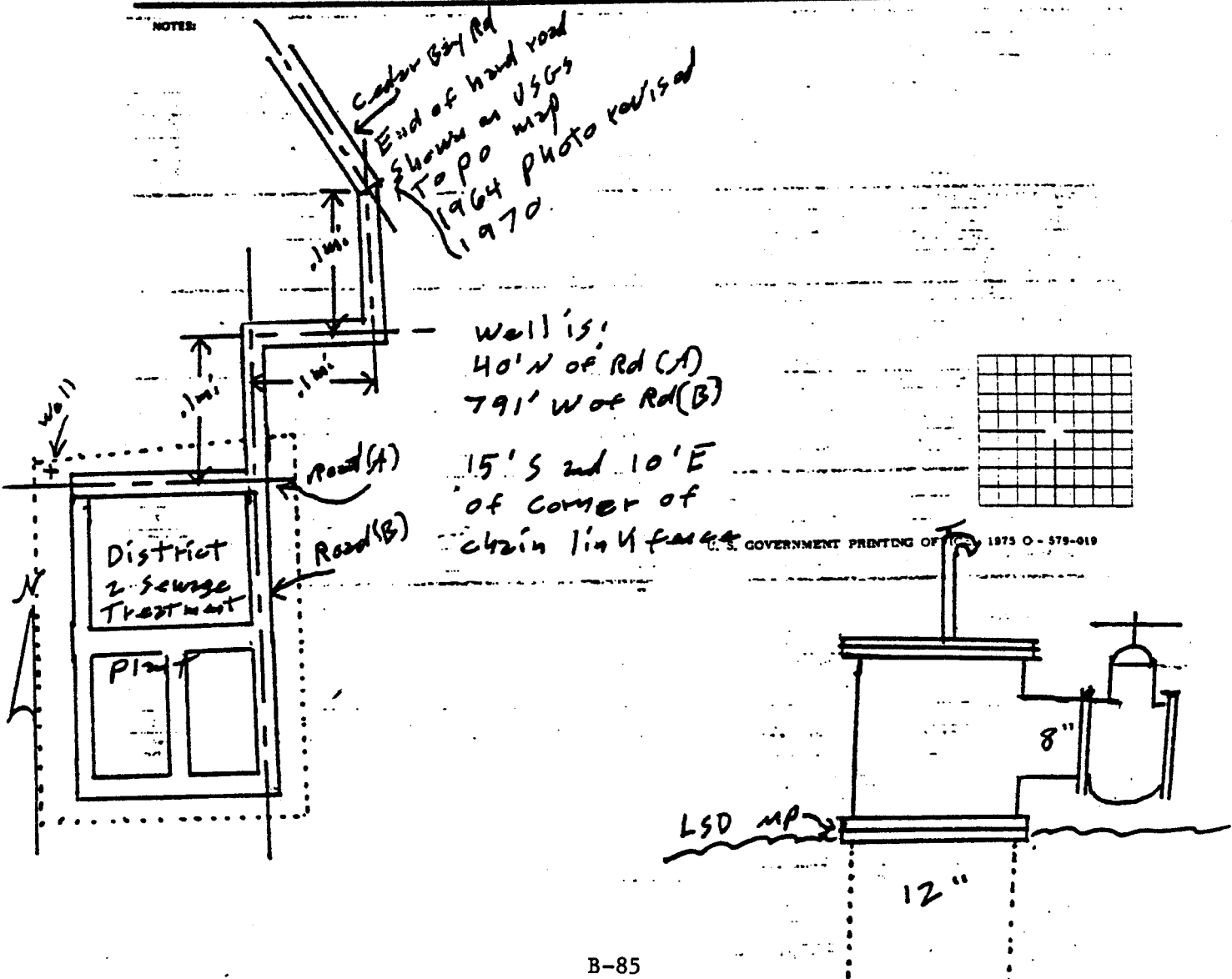
AQUIFER DATA (2)

R=96 T=ADM Geohydrologic Unit Entry No 256 Date 98/ / Water Level 128 % Water Contributed 132

PERTINENT REMARKS

R=162 T=A 105
New Card Same R&T 105

NOTES:



U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Recorded by GLENNDate 5-14-82

GENERAL SITE DATA (I)

Check One ☒ English ☐ Metric Units

Site Ident No 30270808/364201 RG Number R-0 Transaction T-0 D M V
 Site-Type 2-C D H I M P T Data 3-U L M Reliability 1 Reporting Agency 4-FLG39
 Project No. 5 District 8-121 State 7-12 County (or town) DUAL 8-031
 Latitude 9-30.2708 Longitude 10-08.1364 Lat-Long Accuracy 11-S 0 T M
 Local Number 12-52092 Land Loc. 13-LANCAST 37 15R 27E
 Location Map 14-EASTPORT Scale 15-24000
 Altitude 16-20 Method of Measurement 17-A L Accuracy 18-5
 Type Setting 19-D C E H K L P S T U V W Hydrologic Unit (OWDC) 20-03080103
 Date of First Construction/Completion 21-00 00 1982 Use of Site 23-A D E G H M P R S T U X Z
 Use of Water 24-A B C D E F I M N P R S T U Y Z
 Secondary Water Use 25 Tertiary Use of Water 26 Depth of Hole 27 Depth of Well 28 Source of Depth Data 29
 Water Level 30-17.3 Date Measured 31-05/14/1982 Source 33-D
 Method of Measurement 34-A C E H L M R S T V Z
 Site Status 37-D F G H P R S T V X Z
 Source of Geohydrologic Data 36 Pump Used 35 Measuring Point 266-0 Measuring Point Date 267-05/14/1982

OWNER IDENTIFICATION (1)

R-158 T-0 D M Date of Ownership 158-00/00/1932
 Name: Last 161-HINKLEY First 162-CAREY Middle Initial 163

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-0 D M Ident 100-5T Assigner 191-FLANND
 New Card Same R & T Ident 100-DILLASET Assigner 191-FLG39

SITE VISIT DATA (1)

R-186 T-0 D M Date of Visit 186-05/14/1982 Name of Person 188-GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-A D M Date 192 Geohydrologic Unit 195
 New Card Same R thru 195 Temperature 190-0.0.0.1.0 Degree C 197
 Conductance 190-0.0.0.0.0 μ Mhos 197
 Other (STORET) Parameter 190 Value 197
 Other (STORET) Parameter 190 Value 197

FOOT NOTES.

① Source of Data Codes.

S D O A R L G Z
 reporting, driller, owner, other geol. other logs, geologist, other agency reported.

R = 581	T = 1 D M 1	Entry No. 592 001	Date of Construction Completion 60-00-00 1982	Source of Estimate 0-14	Chart 0-14
Name of Contractor/Owner 63 DAYMON					
Method of Construction 65 A B C D E J F H T V W X					
air rotary hot, or sugared cable tool aug hydraulic rotary jetted air jet cushion reverse rotary trenching align drive wash other air rotary hot, or sugared cable tool aug hydraulic rotary jetted air jet cushion reverse rotary trenching align drive wash other					
Finish 66-1 C F G H B P S T W X Z					
porous concrete gravel w. soil gravel screen horizontal gallery open end perforated or slotted screen sand point well open hole other porous concrete gravel w. soil gravel screen horizontal gallery open end perforated or slotted screen sand point well open hole other					
Bottom of Seal 68-1					
Method of Development 69-1 A B C J N P S Z					
air lift boiled compressed jetted none other surged other pump air lift boiled compressed jetted none other surged other pump					
Number of Hours in Development 70-1					
Special Treatment During Development 71-1 C D E F H M Z					
chemicals dry ice explosives defollicent hydrate structuring mechanical other chemicals dry ice explosives defollicent hydrate structuring mechanical other					

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72 * T- A D M * Construction Entry No 59 # *
 add, delete, modify

New Card for Each Hole Segment
Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 # * *

Top of Casing Segment Below LSD	Bottom of Casing Segment Below LSD	Diameter of Casing Segment	Casing Material ⁵	Thickness of Casing
77#	78-	79#	80-	81-
77#	78-	79#	80-	81-
77#	78-	79#	80-	81-
77#	78-	79#	80-	81-
77#	78-	79#	80-	81-

OPENINGS SCHEDULE (2)

R = * T = * Construction *
 Entry No *

New Card for Each Open Section With Same R, T and Field 59

	Example Data	Example Data	Example Data
Top of Section Below LSD	83 #	83 #	83 #
Bottom of Section Below LSD	84 =	84 =	84 =
Type of Openings ①	85 = *	85 = *	85 = *
Type of Material ②	86 = *	86 = *	86 = *
Diameter of Open Section	87 = *	87 = *	87 = *
Width of Opening	88 = *	88 = *	88 = *
Length of Opening	89 = *	89 = *	89 = *

FOOT NOTES:

① **Source of Data Codes:**

S O B A R L G Z

reporting, driver, owner, other gov't, other	logs, geologist, other
agency	reporting.

5 Casing Material Codes

B C G I M P R S T U W Z

brick, concrete, galv. wrought, other, PVC or, rock or, steel, tile, enamel, wood, other
iron iron metal plastic stone steel steel

6) Type of Openings Codes

F	L	M	P	R	S	T	W	X	Z
---	---	---	---	---	---	---	---	---	---

fracture, injured, crush, perforated, wire screen, sand, welded, open, other
stuffed or stuffed around (unknown) point hole

⑦ Type of Material Codes for Open Sections

B	C	G	I	M	P	R	S	T	Z
---	---	---	---	---	---	---	---	---	---

brass or. concrete, galv. wrought, other, PVC or. stainless steel, tile, other
brass iron iron metal plastic wood

GEOMORPHOLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- (A) D M * Entry No 256 # 001 * Depth to Top 91 * Depth to Bottom 92 *

Unit Identifier 93- 1206120 *

Lithology 96- LMSN *

Lithologic Modifier 97- MARINE

AQUIFER DATA (2)

R-94 * T- A D M *

Geohydrologic Unit Entry No 256 #

Date 95 # / /

Water Level 126 =

% Water Contributed 132 =

GEOMORPHOLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * Entry No 256 # Depth to Top 91 * Depth to Bottom 92 *

Unit Identifier 93- *

Lithology 96- *

Lithologic Modifier 97- *

AQUIFER DATA (2)

R-94 * T- A D M *

Geohydrologic Unit Entry No 256 #

Date 95 # / /

Water Level 126 =

% Water Contributed 132 =

PERTINENT REMARKS

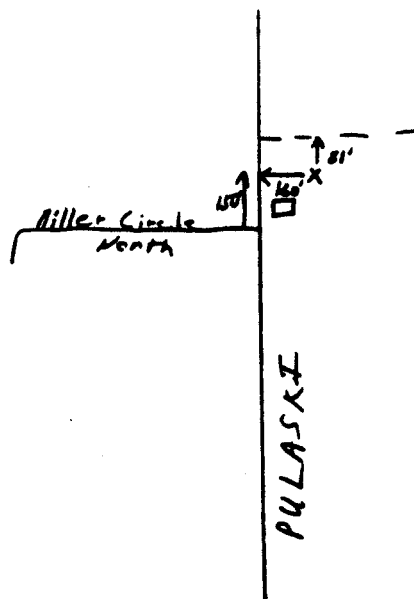
R-183 * T- A * 185 =
New Card Same R&T 185 =
185 =

NOTES:

11-212- 1- A * 1/19/39 PULASKI ROAD

AN

1-3090



DRAFT COPY

Proposed for use by Water Conservation Program Field
Inspector during Well Plugging Operation

1-340

WATER CONSERVATION ACTIVITY
DUVAL COUNTY

Reason for inspection: Proper procedures for plugging of
abandoned water well.

Regulatory status: Received application to plug
abandoned well

2-2-83
(date)

Permit issued for above

(number)

Well scheduled

2-3-83
(date)

New abandoned well schedule
completed

(date)

Submitted to U.S.G.S.

(date)

Owner DEPT OF TRANSPORTATION
(name of owner or his agent)

Address 11054 PLEASANTDALE JAX FLA
(street) (city) (state) (zip)

Well Drilling Contractor D.E. SMITH
(name)

11749 US T. NORTH 32219
(address)

1068
(license or bond number)

Identification of Quad. Sheet EAST 10RT

10 15 27E
1/4 1/4 1/4 (Section) (Township) (Range)

Latitude 30° 26' 08" N Longitude 081° 35' 01" N

Sequential _____

Was well logged?

YES	NO
-----	----

Date _____

By whom? _____

Total well depth 460⁵⁶⁰ feet

Depth cased 450 feet

Diameter of well 3x2 inches.

Volume of material calculated to properly plug well _____

14.89 cu. feet. Materials to be used: Cement slurry
10.7 sacks

Density: 14.5 lbs/gal Pumping
pressure _____ p.s.i. Pumping temperature _____ °F

Was plug used? ☐ YES ☒ NO What type/style? _____

Placement depth land surface feet.

Was operation continuous? ☒ YES ☐ NO

Date and time started: 2/3/83 at 1:00 a.m./(p.m.)

Date and time completed: 2/3/83 at 1:15 a.m./(p.m.)

Volume of material used _____ cu. ft.

Name of company providing materials: _____

Were all specifications followed as set forth in City of Jacksonville Ordinance Chapter 625, Florida Statutes Chapter 373, and Florida Administrative Code 16C - 8?

☒ YES ☐ NO

Inspector's evaluation of operation: 20 sacks of portland cement slurry was created by the addition of 100 gallons of water. The density of the mixture was 14.5 lbs per gallon. The mixture was pumped at land surface.

Any additional future action required by inspector?

☐ YES ☒ NO

If yes, please explain: _____

J.T. Gannon
(Signature of Inspector)

2-3-83
(date)

Complaint No. _____ TRUP No. _____ Construction/Drilling Well Inventor _____
Permit No. _____ J-3340

1 Free Flowing? Yes ☒ No ☒ Phone _____

Owner's Address 11054 PLEASANT OAK

Location Address _____

Drilling Contractor O. E. SMITH ^{Smith 2160 or 12 Driller} License/Bond No. _____

Identification: 30 2608 081 3501 01 Lat./Long (if different) 30 _____ 081 _____

1/4 1/4 1/4 Section 10 TWP 15 Range 27E Quad Map Name EASTPORT

Depth of Hole Drilled 558 Depth of Well 558 How measured D

Depth of Casing 458

Thickness and Diameter of Well Segments: 3 " from LSD to 458

" Dia. from _____ 'to _____ " Dia. from _____ 'to _____

Thickness and Diameter of Casing Segments: _____ " Dia. from _____ Above LSD
Below LSD

" Dia. from _____ 'to _____

Volume and Quantity of Grouting Used _____ Well centered in Grout? _____

Use of Well PLUGGED ^{20 sacks 100 gallons 14.5 lbs/gal} Number of People Served _____

Water Level _____ Above LSD Measuring Pt. _____ Above LSD
Below LSD

Measured _____ Measured by _____ Date _____

Method of Construction _____ Date of Construction 1968

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.)
GOOD

Material Used GALV

Interval 10

Top Setting FLAT

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer
than 300' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM

Free Flowing Well Yield _____ GPM How Yield Determined _____

Frequency of Well Use _____ Hrs/Day _____ Days/Year

Pump Data - Type and Make _____ HP _____

Pump Capacity _____ GPM No. Bowls or Stages _____

Type of Power _____ Static Water Level _____

Production Water Level _____ Pump Intake Setting _____
= Depth of Section Line

Water Sampled for: Dissolved Solids _____ Conductivity _____

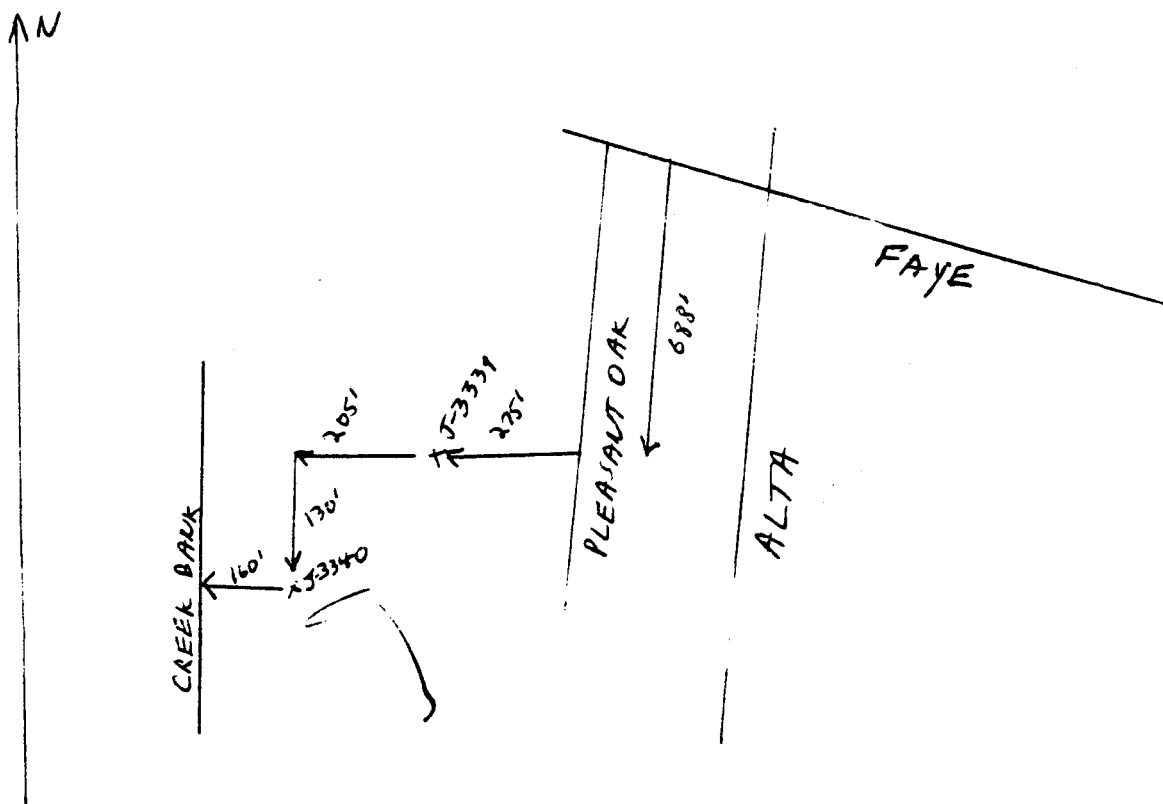
Hardness _____ Chlorides _____ PH= _____ Temperature _____

General Rating: Poor _____ Average ☒ Good _____ Excellent _____

Action Taken/Comments _____

Follow Up Needed _____

Inspector's Name Glen Field Inspection Date 2-3-83



Revised September 1980

SITE NO. 302608081350101

Recorded by GLENNU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULEDate 2-3-83

GENERAL SITE DATA (1)

Check One ☒ English ☐ Metric Units

Site Ident No 302608081350101 RG Number R-01 Transaction T-0 D M V

Site Type 2-C D E H I M O P S T X Data 3-C U Reliability 1 Reporting Agency FL039

Project No 5 District 8-121 State 7-12 County (or town) Duval 8-031

Latitude 9-302608 Longitude 10-0813501 Lat Long Accuracy 11-S O T M

Local Number 12 J-3340 Land Type 13 10 T 15 R 22 E

Location Map 14-EASTPORT State 15-24000

Altitude 16-10 Method of Measurement 17-A L O Accuracy 18-5

Topo Setting 19-0 Hydrologic 20-03080103

Site 21-A C D E G H I M O P S T U V Secondary Water Use 25-1 Tertiary Use of Water 26-1 Depth of Hole 27-558 Depth of Well 28-558 Source of Depth Data 29-D

Water Level 30-1 Data Measured 31-1 Source 32-1

Method of Measurement 33-A B C E G H L M N R S T V Z

Site Status 37-D E F G H I J N O P R S T V W X Z

Source of Geohydrologic Data 38-1 Pump Used 39-1 Date of First Construction/Completion 21-00 00 1982

OWNER IDENTIFICATION (1)

R-158 T-0 D M Date of Ownership 159-00 00 1982

Name: Last 161-DEPT. OF First 162-TRANSPORT Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-188 T-0 D M Ident 189-5T Assigner 191-FLAHHI

Ident 190-PLEASANT Assigner 191-FL039

SITE VISIT DATA (1)

R-186 T-0 D M Date of Visit 187-02 03 1983 Name of Person 188-GLENN

FIELD WATER QUALITY MEASUREMENTS

R-192 T-A O M Date 193- / - / - Geohydrologic Unit 195-

New Card Samp. R. thru 195

Temperature 196-0 0 0 1 0 Degrees C 197-

Conductance 198-0 0 0 9 5 u Mhos 199-

Other (STORET) Parameter 196- Value 197-

Other (STORET) Parameter 198- Value 199-

Source of Data Cont.

A O G L F

Other: driller geologist logs memory owner other recording unit

FILE CONSTRUCTION DATA (1)

R = 58 * T = AD M * Entry No 59 # 00.1 *

Date of Construction Completion 60 / 00 1960 * 7980 *

Source of Const. Data 64 J *

Name of Contractor DE SMITH

Method of Development 68 * AD M * 0 * 0 *

Bottom of Hole 68 * 69 * AD M * 0 * 0 *

Method of Development 69 * AD M * 0 * 0 *

Special Treatment During Development 71 * AD M * 0 * 0 *

DATA OF THE HOLE CONSTRUCTED (2)

R = 72 * T = AD M * Construction Entry No 59 # *

Top of Hole Segment Below LSD

73 * AD M * 0 * 0 *

Bottom of Hole Segment Below LSD

74 * AD M * 0 * 0 *

Diameter of Hole Segment

75 * AD M * 0 * 0 *

R = 76 * T = AD M *

Construction Entry No 59 # *

Top of Casing Segment Below LSD

77 * AD M * 0 * 0 *

Bottom of Casing Segment Below LSD

78 * AD M * 0 * 0 *

Diameter of Casing Segment

79 * AD M * 0 * 0 *

Casing Material

80 * AD M * 0 * 0 *

Thickness of Casing

81 * AD M * 0 * 0 *

OPENINGS SCHEDULE (2)

R = 82 * T = AD M * Construction Entry No 59 # *

Top of Section Below LSD

83 * AD M * 0 * 0 *

(Openings Data)

84 * AD M * 0 * 0 *

Openings Data

85 * AD M * 0 * 0 *

Source of Data Codes

5 - Casing Material Codes

AD M * 0 * 0 *

AD M * 0 * 0 *

7 - Type of Material Codes for Open Section

AD M * 0 * 0 *

AD M * 0 * 0 *

Recorded by EssexU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 20 July 79Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (I)

Site Ident No 302704081365301 RG Number R-0 Transaction T-0 D M V
 Site-Type 2- C D H I M P T Date 3- 6 U L M Reporting Agency 4- ELA39
 Project No. 5- District 6- 1.21 State 7- 1.22 County (or town) Duke 8- 031
 Latitude 9- 302704 Longitude 10- 0813653 Loc-Long Accuracy 11- 8 0 T M
 Local Number 12- Land Map Loc. 13- 4.6 T 1.5 R 28.5
 Location Map 14- EASTPORT Scale 15- 24000
 Altitude 16- 190 Method of Measurement 17- A L M Accuracy 18- 5
 Topo Setting 19- D C E F H K L B P S T U V W Hydrologic Unit (GWDC) 20- 03080103
 Date of First Construction/Completion 21- 05 05 1978 Use of Site 23- A D E G H I M P R S T U X Z
 Use of Water 24- A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
 Secondary Water Use 25- 1 Tertiary Use of Water 26- Depth of Hole 27- 67.5 Depth of Well 28- 67.5 Source of 29- D
 Water Level 30- 8 Date Measured 31- 05 05 1978 Source 33- D
 Method of Measurement 34- A C E G H L M S T U V W X Y Z
 Site Status 37- D F G H I J K L M N O P Q R S T U V W X Y Z
 Source of Geohydrologic Data 38- D Pump Used 39- Measuring Point 40- 0 Measuring Point Date 41- 05 05 1978

OWNER IDENTIFICATION (I)

R-188 T-0 D M V Date of Ownership 188 05 05 1978
 Name: Last 181- ALLEN Middle Initial 182- J First 183- J

OTHER SITE IDENTIFICATION NUMBERS (I)

R-189 T-0 D M V 189 05 05 1978 191- ELA 4000 05 05 1978
 New Card Same R & T 190 05 05 1978 192- ELA 39

SITE VISIT DATA (I)

R-186 T-0 D M V Date of Visit 186 08 04 1978 Name of Person 188- Essex

FIELD WATER QUALITY MEASUREMENTS (I)

R-192 T-0 D M V Date 192 8 / / Geohydrologic Unit 195 8
 New Card Same R & T 193 8 Temperature 196 8 0.0 0.1 0.0 Degrees C 197-
 Conductance 198 8 0.0 0.0 0.5 pH 199-
 Other (STORET) Parameter 200 8 Value 201-
 Other (STORET) Parameter 202 8 Value 203-

FOOT NOTES:

① Source of Data Codes:

S D G A R L G Z
 reporting, driller, owner, other geol. other log. geologist, other agency reported.

B-97

GEOMORPHOLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- D M * Entry No 256 # 001 * Depth to Top 91 = * Depth to Bottom 92 = *

Unit Identifier 93 = 122614RD * Lithology 96 = basal * Lithologic Modifier 97 = marine *

AQUIFER DATA (2)

R-94 * T- A D M * Geomorphologic Unit Entry No 256 # * add, delete, modify

Date 95 # / / * Water Level 126 = * % Water Contributed 132 = *

GEOMORPHOLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * Entry No 256 # * Depth to Top 91 = * Depth to Bottom 92 = *

Unit Identifier 93 = * Lithology 96 = * Lithologic Modifier 97 = *

AQUIFER DATA (2)

R-94 * T- A D M * Geomorphologic Unit Entry No 256 # * add, delete, modify

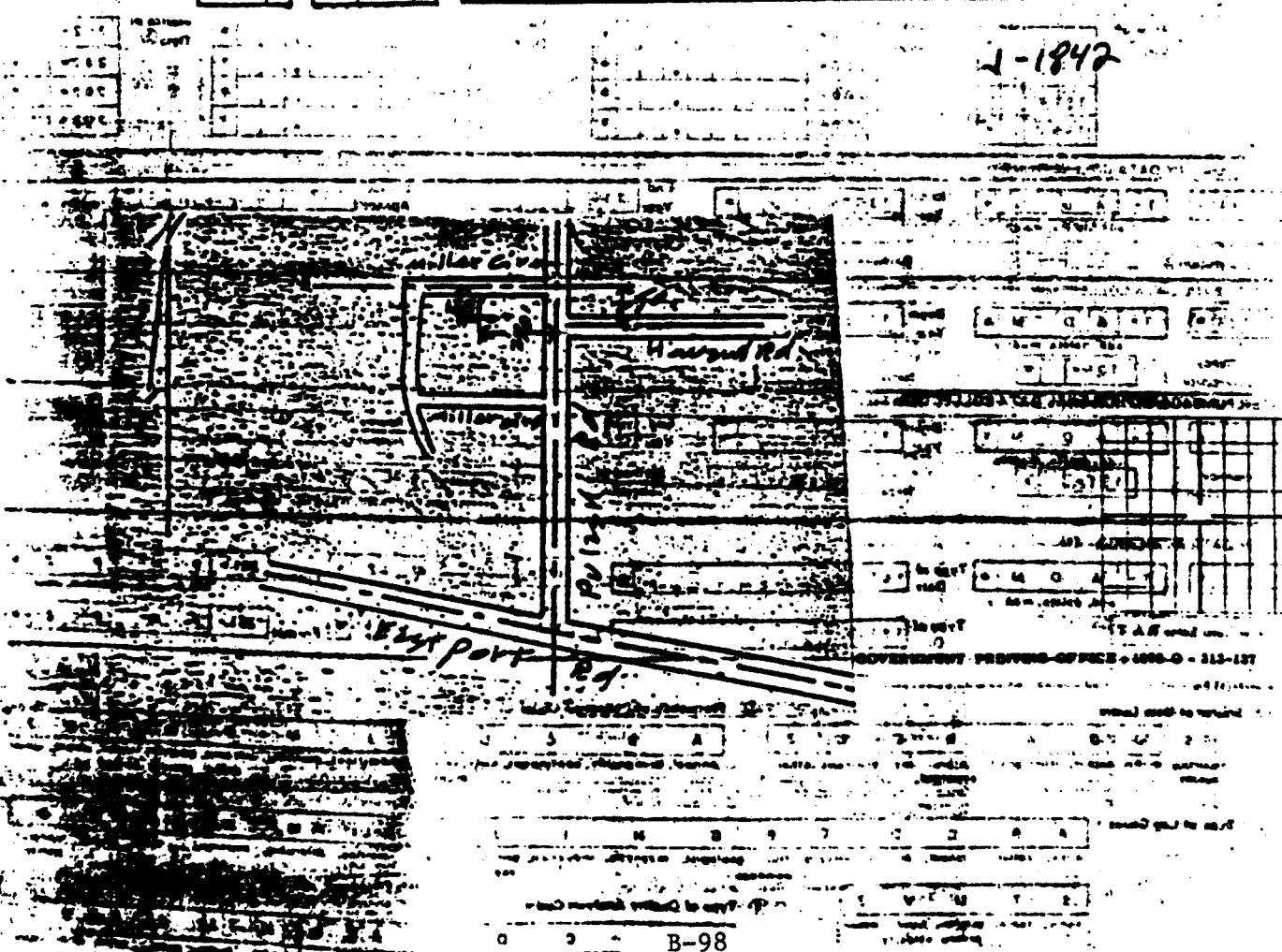
Date 95 # / / * Water Level 126 = * % Water Contributed 132 = *

PERTINENT REMARKS

R-183 * T- A * 185 = *
add
186 = *
New Card Same R&T
188 = *

NOTES:

R-212 * T- A * 218 = *



Discharge: 150- 30. Source of Data 151- D

Method of Measurement 152- B C E F M O P N T U V W Z

Production Level 153- Static Level 154- Source of Data 155- Specific Capacity 272-

Method of Measurement 156- A C E G H L M R S T V Z

Pumping Period 157-

LIFT DATA (1)

R-42 T- A D M Type of Lift 43- A B C J P R S T U Z Entry No 254

Pump Intake Setting 44- Type of Power 45- D E G H L N W Z

Date 38- / / Horsepower 46-

MAJOR PUMP DATA (2)

R-47 T- A D M Type of Lift 43- Lift Entry No 254 Manufacturer of Pump 48-

Serial No of Pump 49- Name of Power Company 50-

Power Company Account No 51- Power Motor No 52- Pump Rating 53-

Person or Company Who Maintains the Pump 54- Additional Lift 255- Rated Pump Capacity 256-

STANDBY POWER DATA (2)

(See LIFT DATA for codes of fields 43 and 56 below)

R-55 T- A D M Type of Lift 43- Type of Power 56- Horsepower 57- Lift Entry No 254

AVAILABLE LOG DATA (1)

R-198 T- A D M

Flow Card for Each Log Type Same R & T

Type of Log	Begin Depth	End Depth	Source of Data
199	200	201	202
199	200	201	202
199	200	201	202
199	200	201	202

WATER QUALITY DATA COLLECTION (1)

R-114 T- A D M

Frequency of Collection 115- Network No 116- Type of Analysis 117- Source Agency 118-

WATER LEVEL DATA COLLECTION (1)

R-121 T- A D M

Frequency of Collection 122- Network No 123- Type of Analysis 124-

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R-127 T- A D M

Frequency of Collection 128- Network No 129- Type of Analysis 130-

OTHER DATA AVAILABLE (1)

R-180 T- A D M

New Card Same R & T

Type of Data 181- 182- 183- 184- 185- 186- 187- 188- 189- 190-

FOOT NOTES:

① Source of Data Codes: S D S A R L S Z

② Type of Log Codes: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

③ Type of Quality Analysis Codes: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

B-100

Recorded by - GLENN

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 7-25-82

GENERAL SITE DATA (1)

Check One

English

Metric Units

Site Ident No 302650081351801 RG Number R=0* Transaction T= A D M V *
add, delete, modify, verified

Site-Type 2= C D H I M P T (W) * Data 3= C U L M * Reporting Agency 4= FLO391 *
collector, drain, sinkhole, connector, multiple, pond, tunnel or, well field checked, unchecked, location not, minimal accurate data

Project No. 5= District 6= 121 * State 7= 12 * County (or town) Dunn 8= 031 *
shaft

Latitude 9= 302650 * Longitude 10= 0813518 * Lat-Long Accuracy 11= S T M *
deg min sec deg min sec sec. 5 sec 10 sec Min

Local Number 12= J-1659 Land Net 13= NNN/ESE 3 15 R 27 E *
Loc 1/4 1/4 1/4 section township range main

Location Map 14= EAST POINT Scale 15= 24000 *
Map

Altitude 16= 10 * Method of Measurement 17= A L (W) * Accuracy 18= 5 *
altimeter level map

Top Setting 19= D C E F H K O P S T U V W * Hydrologic Unit (OWDC) 20= 03030102 *
depression stream dunes flat hilltop sink swamp offshore sediment hillside terrace undulating valley upland draw

Date of First Construction Completion 21= 00 00 1980 * Use of Site 23= A D E G H O M P R S T U (X) X Z *
month day year anode, drain, gas, seismic, heat, observ, mine, oil or recharge, repress, test, unused, with waste destroyed, thermal, reservoir, gas, drawal

Use of Water 24= A B C D E F (M) I M N P R S T U Y Z *
air cond, bottling, commercial, de-water, power, fire, domestic, irrigation, medicinal, industrial, public recreation, stock, institution, unused, desal, other

Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hnle 27= Depth of Well 28= Source of Depth Date 29=

Water Level 30= -28.15 * Date Measured 31= 07 28 1982 * Source 33= S *
month day year

Method of Measurement 34= A C E (G) H L M R S T V Z *
airline calibrated estimated pressure calibrated geophysical manometer reported steel electric calibrated other
airline page pressure tape tape tape electric tape

Site Status 37= D F G H O P R S T V X Z *
dry flowing, nearby flowing, recently flowing, obstruction, pumping, recently pumped, nearby pumped, nearby foreign substance, surface water effects, other

Source of Geohydrologic Data 36= Pump Used 35= Measuring Point 266= 0.0 * Measuring Point Date 267= 07 28 1982 *
no month day year

OWNER IDENTIFICATION (1)

R=158 * T= A D M * Date of Ownership 159= 00 00 1950 *
add, delete, modify month day year

Name: Last 161= WIT/LTANUS * First 162= WEBSTER * Middle Initial 163= V *

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 * T= A D M * Ident 190= SJ * Assigner 191= FLA WMD *
add, delete, modify

New Card Same R & T Ident 190= WICKERS * Assigner 191= FLO391 *

SITE VISIT DATA (1)

R=186 * T= A D M * Date of Visit 187= 07 28 1982 * Name of Person 188= GLENN *
add, delete, modify month day year

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 * T= A D M * Date 193= / / * Geohydro-logic Unit 195= *
add, delete, modify month day year

New Card Same R thru 195 Temperature 196= 00.010 * Degrees C 197= *
R thru 195

Conductance 196= 00.095 * u Mhos 197= *

Other (STORET) Parameter 198= * Value 197= *

Other (STORET) Parameter 198= * Value 197= *

FOOT NOTES

① Source of Data Codes

S D O A R L G Z
reporting, driller, owner, other gov't, other, logs, geologist, other, agency, reported.

WELL CONSTRUCTION DATA (1)

R = 58 * T = Q D M * Entry No. 59 # 001 *

Date of Construction Completion 60 = 00/00/1980 *

Source of Data 64 = D *

J 1659

Name of Contractor/Owner 63 FREEHAN *

Method of Construction 65 A B C D (11) J P R T V W Z *

Finish 66 = C F G H Ø P S T W (12) Z * Type of Seal 67 = B C G Z *

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *

Special Treatment During Development 71 = C D E F H M Z *

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No. 59 # *

New Card for Each Hole Segment
Same R, T & Field 59

Top of Hole Segment Below LSD

73 # *
73 # *
73 # *
73 # *
73 # *

Bottom of Hole Segment below LSD

74 = *
74 = *
74 = *
74 = *
74 = *

Diameter of Hole Segment

75 = *
75 = *
75 = *
75 = *
75 = *

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No. 59 # *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 # *
77 # *
77 # *
77 # *
77 # *

Bottom of Casing Segment Below LSD

78 = *
78 = *
78 = *
78 = *
78 = *

Diameter of Casing Segment

79 = *
79 = *
79 = *
79 = *
79 = *

Casing Material ⁵

80 = *
80 = *
80 = *
80 = *
80 = *

Thickness of Casing

81 = *
81 = *
81 = *
81 = *
81 = *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No. 59 # *

New Card for Each Open Section With Same R, T & Field 59

Top of Section Below LSD

83 # *

Bottom of Section Below LSD 84 = *

Type of Openings ⁶

85 = *

Type of Material ⁷

86 = *

Diameter of Open Section

87 = *

Width of Opening

88 = *

Length of Opening

89 = *

83 # *

84 = *

Type of Openings ⁶

85 = *

Type of Material ⁷

86 = *

Diameter of Open Section

87 = *

Width of Opening

88 = *

Length of Opening

89 = *

83 # *

84 = *

Type of Openings ⁶

85 = *

Type of Material ⁷

86 = *

Diameter of Open Section

87 = *

Width of Opening

88 = *

Length of Opening

89 = *

FOOT NOTES:

① Source of Data Codes:

S D Ø A R L G Z
reporting agency, driller/owner, other govt., other reported, logs, geologist, other

⑤ Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv. iron, wrought iron, other metal, PVC or plastic, rock or stone, steel, tile, coated steel, wood, other

⑥ Type of Openings Codes

F L M P R S T W X Z
fracture, fractured, mesh, perforated, wire, screen, sand, welded, open, other, shuttled, or slotted, wound (unknown), point, hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or bronze, concrete, galv. iron, wrought iron, other metal, PVC or plastic, stainless steel, tile, other

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry

No 256 # 001 *

Depth

to Top 91 = * *

Depth to

Bottom 92 = * *

Unit

Identifier

93 = 130.5 LAD *

Lithology

96 = L.H. S.W. *

Lithologic

Modifier

97 = MARINE *

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic

Unit Entry No

256 # * *

Date

95 # / / *

month day year

Water Level

126 = * *

% Water

Contributed

132 = * *

J 1659

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry

No 256 # * *

Depth

to Top 91 = * *

Depth to

Bottom 92 = * *

Unit

Identifier

93 = * *

Lithology

96 = * *

Lithologic

Modifier

97 = * *

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic

Unit Entry No

256 # * *

Date

95 # / / *

month day year

Water Level

126 = * *

% Water

Contributed

132 = * *

PERTINENT REMARKS

R = 183 *

T = A *

add

185 = *

New Card Same R&T

185 = *

185 = *

NOTES:

R = 212 *

T = A *

212 =

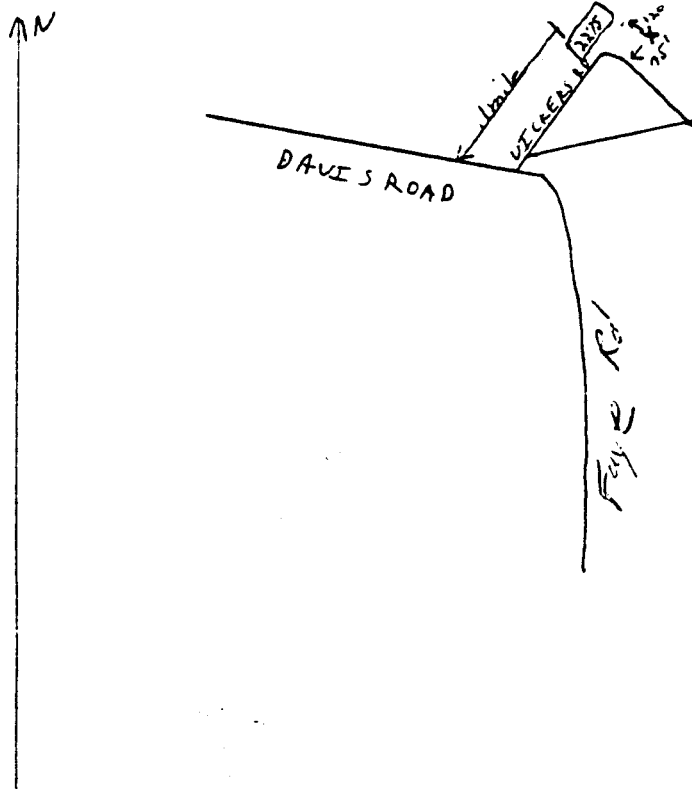
END OF VICKERS ROAD *

R = 212 *

T = A *

212 =

END OF VICKERS ROAD *



1941 Silver St.

Recorded by GLENN

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

24

Date 2/24/82

GENERAL SITE DATA (1)

Check One English Metric Units

Site Ident No 302708081364601 RG Number R-0 Transaction T-0 D M V
 Site-Type 2-C D H I M P T Data 3-0 U L M Reliability 3-0 U L M Reporting Agency 4-FL029
 Project No 5- District 6-121 State 7-12 County (or town) Dual 8-031
 Latitude 9-30 27 08 Longitude 10-08 13 64 Lat-Long Accuracy 11-S 0 T M
 Local Number 12-J-2586 Land Not Loc. 13-LANAGANT 37 T 1 S R 22 E
 Location Map 14-EASTPORT Scale 15-24000
 Altitude 16-20 Method of Measurement 17-A L Accuracy 18-5
 Topo Setting 19-D C E 0 H K L O P S T U V W Hydrologic Unit (OWOC) 20-03080183
 Date of First Construction/Completion 21-00 00 1988 Use of Site 23-A D E G H 0 M P R S T U 0 X Z
 Use of Water 24-A B C D E F H 0 M N P R S T U Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- Depth of Well 28- Source of Depth Data 29-
 Water Level 30- Date Measured 31- Source 33-
 Method of Measurement 34-A C E G H L M R S T V Z
 Site Status 37-D F G H 0 P R S T V X Z
 Source of Geohydrologic Data 38- Pump Used 35- Measuring Point 266- Measuring Point Date 267-

OWNER IDENTIFICATION (1)

R-158 T-0 D M Date of Ownership 158-00 00 1980
 Name: Last 161-COTHERN First 162-J Middle Initial 163-L

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-0 D M Ident 189-ST Assigner 191-FLANN
 New Card Same R & T Ident 190-HELLEA LERUE Assigner 191-FL029

SITE VISIT DATA (1)

R-186 T-0 D M Date of Visit 186-02 24 1982 Name of Person 188-GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-A D M Date 192- Geohydrologic Unit 195-
 New Card Same R thru 199 Temperature 196-0 0 0 1 0 Degree C 197-
 Conductance 198-0 0 0 0 5 199-
 Other (STORE) Parameter 199- Value 197-
 Other (STORE) Parameter 199- Value 197-

FOOT NOTES.

① Source of Data Codes

S D G A R L G Z
 reporting, driller, owner, other geol., other logs, geologist, other agency reported.

WELL CONSTRUCTION DATA

R = 58 • T = **D M** • Entry # **001** Date of Construction Completion **80-00/0** **1980** Source of Data **1-3-D**

Name of Contractor/Driller **DAYMON**

Method of Construction **65** A B C D **0** J P R T V W Z

Finish **66** C F G H B P S T W **0** Z • Type of Seal **67** B C G Z •

Bottom of Seal **68** • Method of Development **69** A B C J N P S Z • Number of Hours in Development **70** •

Special Treatment During Development **71** C D E F H M Z •

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 • T = **A D M** • Construction Entry No **59** •

New Card for Each Hole Segment Same R, T & Field 59

Top of Hole Segment Below LSD

73 # **74** # **75** # **76** # **77** #

Bottom of Hole Segment - below, LSD-

74 # **75** # **76** # **77** # **78** #

Diameter of Hole Segment

75 # **76** # **77** # **78** # **79** #

CASING SCHEDULE (2)

R = 78 • T = **A D M** • Construction Entry No **59** •

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 # **78** # **79** # **80** # **81** #

Bottom of Casing Segment Below LSD

78 # **79** # **80** # **81** # **82** #

Diameter of Casing Segment

79 # **80** # **81** # **82** # **83** #

Casing Material

80 # **81** # **82** # **83** # **84** #

Thickness of Casing

81 # **82** # **83** # **84** # **85** #

OPENINGS SCHEDULE (2)

R = 82 • T = **A D M** • Construction Entry No **59** •

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # **84** # **85** # **86** # **87** #

Bottom of Section Below LSD

84 # **85** # **86** # **87** # **88** #

Type of Opening

85 # **86** # **87** # **88** # **89** #

Type of Material

86 # **87** # **88** # **89** # **90** #

Diameter of Open Section

87 # **88** # **89** # **90** # **91** #

Width of Opening

88 # **89** # **90** # **91** # **92** #

Length of Opening

89 # **90** # **91** # **92** # **93** #

(Openings Data)

83 # **84** # **85** # **86** # **87** # **88** # **89** #

(Openings Data)

83 # **84** # **85** # **86** # **87** # **88** # **89** #

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other geol's, other logs, geologist, other agency

② Casing Material Codes:

B C G I M P R S T U W Z
brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, cast, wood, other iron iron metal plastic stone steel

③ Type of Openings Codes

F L M P R A T W X Z
fracture, laminar, mesh, perforated, tarp, taroon, sand, welded, open, other shuttered or slotted round (unknown) point hole

④ Type of Material Codes for Open Sections

B C G I M P R S T Z
bronze, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other iron iron metal plastic steel

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T-0 D M * Entry N 001 * Depth to Top 91 * Depth to Bottom 92 *

Unit Identifier 93 * 20 FLR * Lithology 96 * LMSN * Lithologic Modifier 97 * MARINE

AQUIFER DATA (2)

R-94 * T-A D M * Geohydrologic Unit Entry No 258 #

Date 95 # / / * Water Level 126 * % Water Contributed 132 *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T-A D M * Entry No 258 # Depth to Top 91 * Depth to Bottom 92 *

Unit Identifier 93 * Lithology 96 * Lithologic Modifier 97 *

AQUIFER DATA (2)

R-94 * T-A D M * Geohydrologic Unit Entry No 258 #

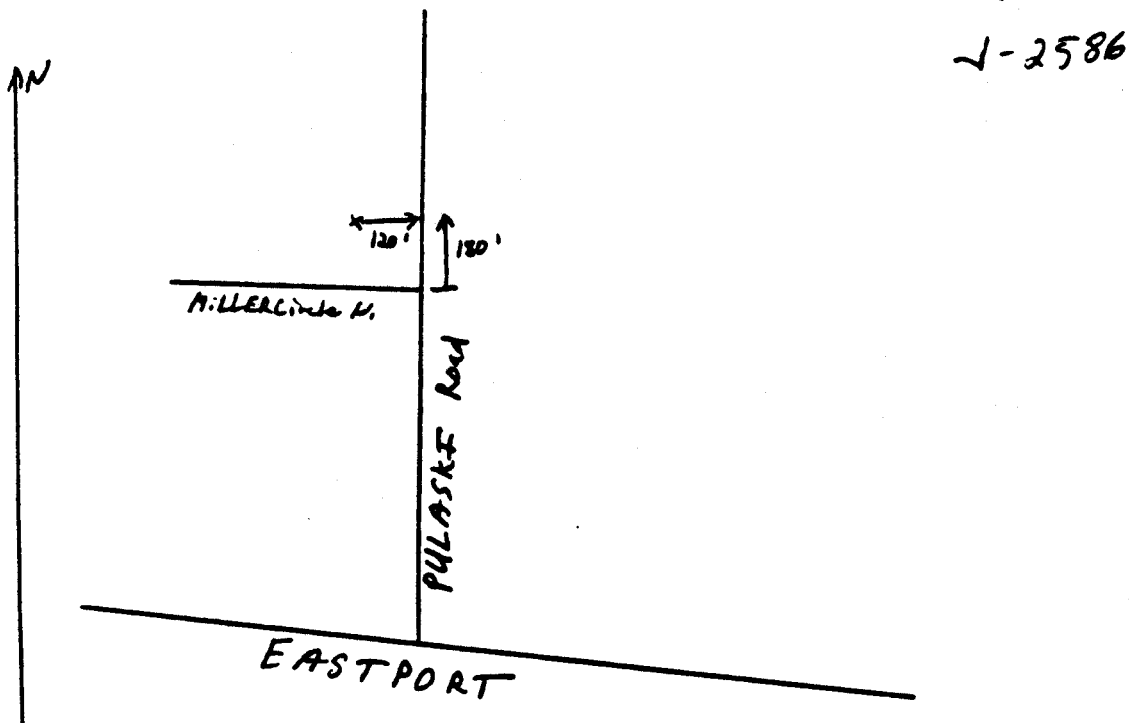
Date 95 # / / * Water Level 126 * % Water Contributed 132 *

PERTINENT REMARKS

R-183 * T-A * 185 *
 add
 New Card Same R&T
 185 *
 185 *

NOTES:

R-212 * T-A * 212 * 1115 MILLER CIRCLE NORTH *



WELL CONSTRUCTION DATA (1)

A-00 T-00 M-00 Entry No 000 10.1 Date of Construction Completion 00-11/14/1979 Source of Core Data 00-00
 Name of Contractor 00-00 F. R. E. M. W. 00-00
 Method of Construction 00-00 A B C D H J P R T V W Z 00-00
 Finish 00-00 C F G H I P S T W X Z 00-00 Type of Soil 00-00 00-00 00-00 00-00
 Bottom of Soil 00-00 Method of Development 00-00 A B C J N P S Z 00-00 Number of Hours in Development 00-00
 Special Treatment During Development 00-00 00-00 00-00 00-00 00-00 00-00 00-00
 chemicals, dry ice, explosives, defluorination, hydrofluorination, methanol, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72 T-00 M-00 Construction Entry No 000 10.1
 Top of Hole Segment Below LSS 720 00-00 00-00 00-00
 Bottom of Hole Segment Below LSS 740 00-00 00-00 00-00
 Diameter of Hole Segment 760 00-00 00-00 00-00
 New Card for Each Hole Segment Same R, T & Field 00

CASING SCHEDULE (2)

A-70 T-00 M-00 Construction Entry No 000 10.1
 Top of Casing Segment Below LSS 770 00-00 00-00 00-00
 Bottom of Casing Segment Below LSS 780 00-00 00-00 00-00
 Diameter of Casing Segment 790 00-00 00-00 00-00
 Casing Material 00-00 00-00 00-00
 Thickness of Casing 810 00-00 00-00 00-00
 New Card for Each Casing With Same R, T & Field 00

OPENING SCHEDULE (2)

A-00 T-00 M-00 Construction Entry No 000 10.1
 Top of Opening Below LSS 000 00-00 00-00 00-00
 Bottom of Opening Below LSS 040 00-00 00-00 00-00
 Type of Opening 00-00 00-00 00-00
 Type of Material 00-00 00-00 00-00
 Diameter of Open Section 070 00-00 00-00 00-00
 Width of Opening 080 00-00 00-00 00-00
 Length of Opening 090 00-00 00-00 00-00
 New Card for Each Open Section With Same R, T and Field 00

FOOTNOTES

① Source of Core Section
 ② Casing Material Code
 ③ Type of Opening Code
 ④ Type of Material Code for Open Section

R-90 • T-000 • Entry No. 256 # 001 • Depth to Top 91 • • • • • Depth to Bottom 92 • • • • •
 200. distance, steady
 Line Identifier 93- 1208LRL • Lithology 96 • • • • • Lithology Modifier 97 • • • • •

R-24 • T- A D M •

Contributions:

2000	8		•
------	---	--	---

Date 05/11/2000

Water Level 128 -

1. Name _____
2. Address _____
3. City _____
4. State _____
5. Zip _____
6. Phone _____
7. E-mail _____
8. Date _____
9. Signature _____
10. Title _____
11. Organization _____
12. Country _____
13. Continent _____
14. Region _____
15. Sub-region _____
16. District _____
17. Sub-district _____
18. Village _____
19. Hamlet _____
20. Settlement _____
21. Township _____
22. Sub-township _____
23. Ward _____
24. Sub-ward _____
25. Block _____
26. Sub-block _____
27. Street _____
28. Sub-street _____
29. Lane _____
30. Sub-lane _____
31. Alley _____
32. Sub-alley _____
33. Road _____
34. Sub-road _____
35. Highway _____
36. Sub-highway _____
37. Expressway _____
38. Sub-expressway _____
39. Interchange _____
40. Sub-interchange _____
41. Bridge _____
42. Sub-bridge _____
43. Tunnel _____
44. Sub-tunnel _____
45. Overpass _____
46. Sub-overpass _____
47. Underpass _____
48. Sub-underpass _____
49. Viaduct _____
50. Sub-viaduct _____
51. Flyover _____
52. Sub-flyover _____
53. At-grade _____
54. Sub-at-grade _____
55. Grade-separated _____
56. Sub-grade-separated _____
57. Grade-level _____
58. Sub-grade-level _____
59. Grade-down _____
60. Sub-grade-down _____
61. Grade-up _____
62. Sub-grade-up _____
63. Grade-flat _____
64. Sub-grade-flat _____
65. Grade-slope _____
66. Sub-grade-slope _____
67. Grade-level _____
68. Sub-grade-level _____
69. Grade-down _____
70. Sub-grade-down _____
71. Grade-up _____
72. Sub-grade-up _____
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76. Sub-grade-slope _____
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89. Grade-down _____
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92. Sub-grade-up _____
93. Grade-flat _____
94. Sub-grade-flat _____
95. Grade-slope _____
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107. Grade-level _____
108. Sub-grade-level _____
109. Grade-down _____
110. Sub-grade-down _____
111. Grade-up _____
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113. Grade-flat _____
114. Sub-grade-flat _____
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116. Sub-grade-slope _____
117. Grade-level _____
118. Sub-grade-level _____
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120. Sub-grade-down _____
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122. Sub-grade-up _____
123. Grade-flat _____
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131. Grade-up _____
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133. Grade-flat _____
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135. Grade-slope _____
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386. Sub-grade-slope _____
387. Grade-level _____
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389. Grade-down _____
390. Sub-grade-down _____
391. Grade-up _____
392. Sub-grade-up _____
393. Grade-flat _____
394. Sub-grade-flat _____
395. Grade-slope _____
396. Sub-grade-slope _____
397. Grade-level _____

A-000 T-0000
 and 4 other models

Sherry 2008

[illegible]

Depth to Bottom 92.

Unit	03		
------	----	--	--

- 1 -

[illegible]

R-000 Y-A-D-M-0
and other marks

Geohydrology 238 0

Date 98.8

128 •

3 Water	132		
Compressed			

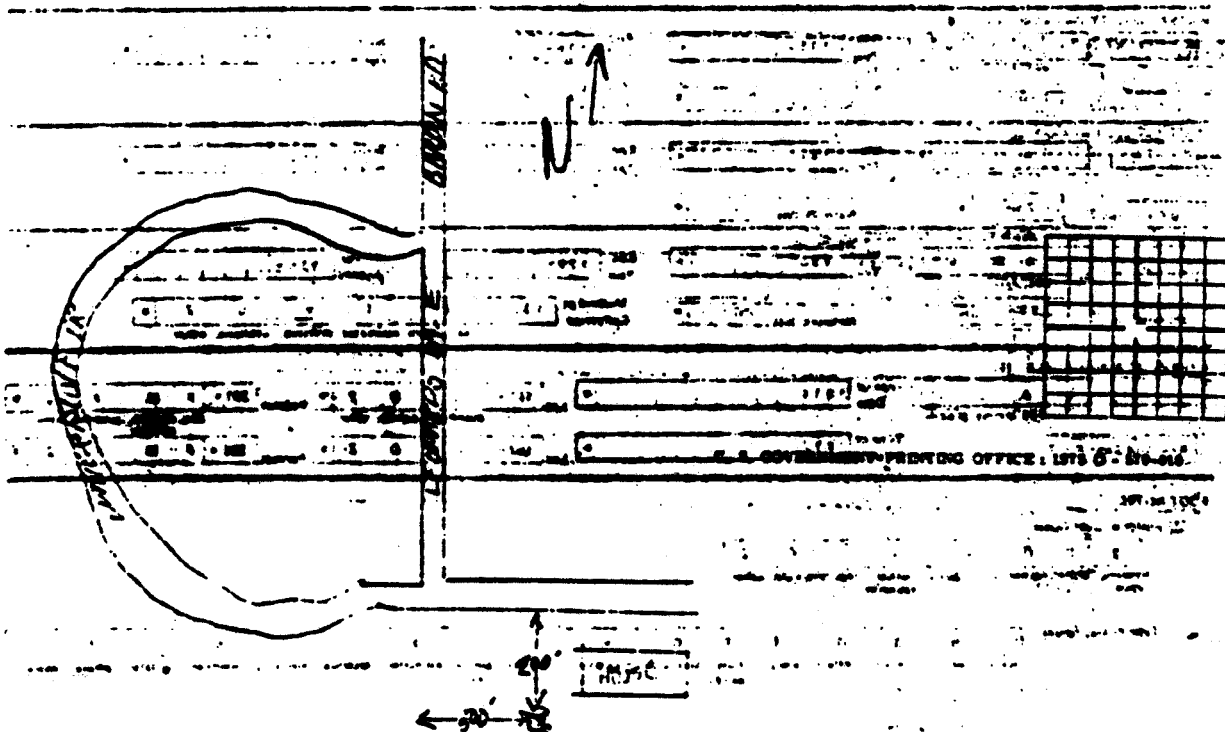
R-183 • T-A • 185 •

100-

New City Series 50Y

188-

NOTE:



FLORIDA DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES
BUREAU OF GEOLOGY
TALLAHASSEE

WELL DATA

5980 75-108

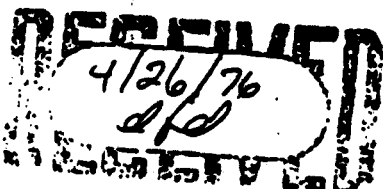
Please fill this blank out in so far as is possible and consistent with your policy, and either mail it direct to the Bureau of Geology or send it with the samples. On completion of the well the samples should be promptly sent collect by United Parcel Service, if available. If not, ship by least expensive method possible.

When additional sample bags are needed notify us.

- Owner: Carroll Rhoden Address: New Berlin Road
- Location of well (If possible, please get from owner's tax receipt description):
Water Bluff Drive - Jacksonville
- County: Duval Nearest post office: _____
Direction from post office: _____ Distance from post office: _____
Section: 3 Township: 1-5 Range: 27E
- Driller: Bob S. Freeman Address: Terminia Bch. Fla
- Exact Surface Elevation: _____ feet above sea level
(If the exact elevation is unknown please DO NOT give an estimate)
- Date well started: 11/18/75 Date completed: 11/23/75
- Depth of well: 585 Total depth cased: _____
Sizes and lengths of casings: 105 feet of 3 inch
400 feet of 2 inch
_____ feet of _____ inch
_____ feet of _____ inch
- Does water flow at surface without pumping? Yes
If so, how high above surface will it rise? 2 feet
If not flowing, how far below surface does it stand? 240
- Natural yield, if flowing: 30 Yield by pumping: _____ Drawdown: _____
gals. per min. gals. per min.
- For what purpose is water used? Domestic Quality: Clear - sulfur
(Domestic, irrigation, manufacturing, etc.) (Fresh, salty, soft, etc.)
- On back of this sheet give driller's log, record of activities, analysis of water and other facts not provided for above.

DATE: 3/20/76

B.T. Freeman by M.W.F
(Name of Person filling out data blank)
606 S. 6 Street, Term. Bch
(Address)



DRILLER'S LOG

Character of Material	From	To
White Sand	0	12
Red Clay + sand	12	25
White Sand + mud	25	55
Hard Rock	55	56
White Rock	56	75
Sand and Mud	75	105
Grey Mud	105	220
Coarse sand	220	235
Grey Mud	235	400
Greenish sand	400	410
" Mud	410	495
Open Hole	495	585

Recorded by BakerU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 12/13/78

GENERAL SITE DATA (0)

Check One ☒ English ☐ Metric Units

Site Ident No 302706081365401 RG Number R-0 Transmission T-A D M V
 Site Type 2-C D M I M P T W Date 3-C U L M 4-ELO39
 Project No. 5- District 6-121 State 7-13 County (or town) 0 8-031
 Latitude 9-302706 Longitude 10-0813654 Lat-Long Accuracy 11-S 0 T M
 Local Number 12- Land Not Loc. 13-LNOGRTS 4.6 T 15 R 27 E
 Location Map 14-EASTPORT Scale 15-24000
 Altitude 16-15 Method of Measurement 17-A L W Accuracy 18-5
 Top Setting 19-D C E 0 H K L S P S T U V Hydrologic Unit (GWDC) 20-03080103
 Date of First Construction/Completion 21-06/10/1978 Use of Site 23-A D E G H S M P R S T U X Z
 Use of Water 24-A B C D E F H 0 M N P R S T U V Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27-65.5 Depth of Well 28-65.5 Source of Depth Data 29-0
 Water Level 30-1.0 Date Measured 31-06/10/1978 Source 33-0
 Method of Measurement 34-A C E G H L M 0 S T V Z
 Site Status 37-D F G H S P R S T V X Z
 Source of Geohydrologic Data 38-0 Pump Used 39-0 Measuring Point 40-0 Measuring Point Date 41-06/10/1978

OWNER IDENTIFICATION (1)

R-150 T-A D M Date of Ownership 159-06/10/1978
 Name: Last 161-PANTTJA First 162-WICHOLAS Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-A D M 188-SJ 189-FLA WMO
 New Card Same R & T 188-MILLER CTR 189-ELO39

SITE VISIT DATA (1)

R-186 T-A D M Date of Visit 187-08/03/1978 Name of Person 188-ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-A B S Date 193- 194-
 New Card Same R thru 199
 Temperature 195-000100 Degrees C 197-
 Conductance 196-000000 μ Mhos 197-
 Other (STORE?) Parameter 198- Value 197-
 Other (STORE?) Parameter 199- Value 197-

FOOT NOTES:

① Source of Data Codes:

S O S A R L G Z
 reporting, driller, owner, other geol., other logs, geologist, other agency reported

PROJ. NO. 1478 0011 Date 100- / /

R-148- T-A D M- Entry No 1478 0011

Discharge: 150- 60- Source of Data 151- 7-

Method of Measurement 152- B C E F M O P (A) T U V W Z

Production Level 153- 154- Source of Data 155- Specific Capacity 272-

Method of Measurement 156- A C E G H L M R S T V Z Pumping Period 157-

LIFT DATA (1)

R-42- T-A D M- Type of Lift 43- A B C J P R S T U Z

Pump Inlets Setting 44- Type of Power 45- D E G H L N W Z

Date 46- / / Horsepower 48-

J 1881

MAJOR PUMP DATA (2)

R-47- T-A D M- Type of Lift 43- Lift Entry No 254- Manufacturer of Pump 48-

Serial No of Pump 49- Name of Power Company 50-

Power Company Account No 51- Power Meter No 52- Pump Rating 53-

Person or Company Who Maintains the Pump 54- Additional Lift 255- Rated Pump Capacity 256-

STANDBY POWER DATA (2) (See LIFT DATA for codes of fields 43 and 50 below)

R-55- T-A D M- Type of Lift 43- Type of Power 56- Horsepower 57- Lift Entry No 254-

AVAILABLE LOG DATA (1)

R-100- T-A D M- New Card for Each Log Type Same R & T

Type of Log 100- 100- 100- 100- 100-

Begin Depth 200- 200- 200- 200- 200-

End Depth 201- 201- 201- 201- 201-

Source of Data 202- 202- 202- 202- 202-

WATER QUALITY DATA COLLECTION (1)

R-114- T-A D M- Begin Year 115- End Year 116- Source Agency 117-

Frequency of Collection 118- Network Site 257- Type of Analysis 120-

WATER LEVEL DATA COLLECTION (1)

R-121- T-A D M- Begin Year 122- End Year 123- Source Agency 124-

Frequency of Collection 125- Network Site 258-

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R-127- T-A D M- Begin Year 128- End Year 129- Source Agency 130-

Frequency of Collection 129- Method of Collection 133- C E M U Z

OTHER DATA AVAILABLE (1)

R-180- T-A D M- Type of Data 181- 182- C D Z- 201- F M P Z-

New Card Same R & T Type of Data 181- 182- C D Z- 201- F M P Z-

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z

reporting, driller, owner, other gov't, other logs, geologist, other agency

② Frequency of Collection Codes:

A B C D F I M S O S W Z

annual, bi-monthly, continuous, daily, once a month, intermittent, monthly, one time, quarterly, semi-annually, other

③ Type of Log Codes:

A B C D E F G H I J K L M N P Q

tube, collar, casing, order's, electric, fluid, geologist, magnetic, induction, pitfall, dipmeter, testings, monitoring, sources, p, test, photo, radio-

S T U V Z

sound, temp, gravity, field, other gauge velocity

④ Type of Quality Analysis Codes:

A B C D E F G H J K L M Z

physical, chemical, toxic, petroleum, electrical, optical, color, odor, taste, pH, etc, other

Date 12/13/1978

Check One ☒ English ☐ Mexican/Urdu

Site Ident No 30.270608.1365901

N-212 **T-ADM**

Compartments
Site Identifier

213-	J-1881
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Registration No.	214 -					*
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Inspection Status: 215 = ☐ ☐ * Reason Unapproved: 216 = ☐ ☐ * Inspection Date: 217 = 08/03/1978 *
month day year

Remarks	218 -	1111 MILLER CIRCLE NORTH	
---------	-------	--------------------------	--

R = 124 | * T = A D M | *

**Now Card for each Repair
Save 84¢**

1-1881

Bilinear Repair	
Entry No	185 #
Nature of Repair	186 =
Date Completed	187 =
Contractor	188 =
% Performance Chg	179 =

(Minor Repairs)	
185 \$	*
186 =	*
187 =	/ / / / / *
188 =	/ / / / / / / / / / / / / / / *
179 =	/ / / / / *

	Dinner Repair									
Entry No.	165	2								*
Nature of Repair ①	166	=		*						
Date Completed	167	=								*
Contractor	168	=								*
% Performance Chg.	170	=			*					

Driver Report	
105 #	*
106 #	*
167 #	*
168 #	*
170 #	*

R = 203 • T = A D M •

No. Wells in Group	204 =		*	Percent Depth	205 =		*
--------------------	-------	--	---	---------------	-------	--	---

Shallowest Depth 206 1 0

Construction Method	207 =	D	J	V	W	Z	•
		drill	joint	drill	drill	other	

Size of Well Field 282 =

R = 208 * T = A D M *

Longest Dimension	200 =		*	Other (Width) Dimension	210 =		*	Date	211 =		*
-------------------	-------	--	---	-------------------------	-------	--	---	------	-------	--	---

R-219 * T-ADM *

**New Card for each Lateral
Some R&T**

[illegible][illegible][illegible][illegible][illegible]

① Nature of exercise

B	C	D	L	D	P	S	Z
bleached, off	discolored	discolored	flap	detrital or, redwood	slipped, back	green, redwood	other

STATE OF FLORIDA
WELL COMPLETION REPORT
DEPARTMENT OF ENVIRONMENTAL REGULATION
2562 EXECUTIVE CENTER CIRCLE S. MONTELEONE BLDG
TALLAHASSEE, FLORIDA 32301

OWNER: Aditya Michael
Last Name First Name Initial
11111111111111111111
Number Street
11111111111111111111
City State
32301
Area Code Phone Number Zip Code

WELL LOCATION:
% % % of Section
11 11 11 (N-S) (E-W)
Township Range
Latitude 00 00 00 N
Longitude 00 00 00 W
Locate in Section
11111111111111111111
Number Street/Road
11111111111111111111
Lot No. Subdivision
11111111111111111111
City County

OWNER WELL NUMBER OR NAME: 11111111111111111111

DRILL METHOD: ☒ Rotary ☐ Cable Tool ☐ Jet ☐ Auger
☐ Other: _____

SURFACE CASING, CASING, AND LINER MATERIAL:

Steel Dia. (in.)	Steel Wt. (lb./ft.)	Steel Dia. (in.)	From (Ft.)	To (Ft.)	Schedule No.	Joins*
<u>3 1/2</u>		<u>PVC</u>	<u>0</u>	<u>105</u>	<u>40</u>	
<u>2</u>		<u>PVC</u>	<u>105</u>	<u>105</u>	<u>40</u>	

* Describe Material:
TC = Threaded and Coupled, TCW = Threaded, Coupled, and Welded.
W = Welded, B = Bonded (PVC), O = Other: _____

GROUT: ☐ None ☒ Mortar Cement ☐ Other: _____

Type and Percent of Additives and Grout Volume or Number of 94 lb. Bags
16 Sacks Portland Cement From (Ft.) To (Ft.)
0 105

FINISH: ☐ Open Hole ☐ Perforated or Slotted Casing ☐ Gravel Pack
☐ Sandpoint or Screen Attached to Well Casing ☐ Sandpoint or Screen
Telescoped with Packer Inside Casing (Packer Material: _____)

Sandpoint/Screen Material	Dia. (in.)	Slot Size (in.)	From (Ft.)	To (Ft.)
<u>None</u>				

☐ Other Finish: _____

QUALITY TEST: ☒ None ☐ Bacteria ☐ Chemical ☐ Date

By: ☐ Health Dept. ☐ USGS ☐ Other _____

☐ Clear ☐ Colored ☐ Sulphur ☐ Salty ☐ Iron ☐ Other _____

Conductance (Micromhos) 11111111111111111111 Chloride 11111111111111111111

Hardness 11111111111111111111 ppm as calcium carbonate

Well Disinfected: ☒ No ☐ Yes (Date) _____

WELL TEST, by: ☒ Natural Flow 11111111111111111111 G.P.M. ☐ Airlift
☐ Sailer ☐ Permanent Pump ☐ Test Pump ☐ None
Discharge Measured By: ☐ Sailer ☐ Estimated ☐ Current Meter
☐ Orifice ☐ Trajectory ☐ Venturi ☐ Venturimeter ☐ Other _____

Measured Static Water Level 11111111111111111111 Ft.

Measured Pumping Water Level 11111111111111111111 Ft.

After 11111111111111111111 Hours At 11111111111111111111 G.P.M.

Specific Capacity 11111111111111111111 G.P.M./Ft. of Drawdown

Which is 11111111111111111111 Ft. ☐ Above ☐ Below Land Surface

Elevation of Measuring Pt. 11111111111111111111 Ft.

WELL EQUIPMENT: ☐ Casing ☐ Casing Head ☐ Casing Head

☐ Permanent Pump ☐ Temporary Pump

Type Pump: ☐ Centrifugal ☐ Cylinder ☐ Jet ☐ Submersible

☐ Turbine ☐ Other: _____

Power: ☐ Diesel ☐ Electric ☐ Gasoline ☐ Other _____

Motorpower 11111111111111111111 Capacity 11111111111111111111 G.P.M.

Stroke/Injection Depth 11111111111111111111

TYPE OF WORK:
☒ New Construction ☐ Repair
☐ Deepening ☐ Plugging
☐ Other: _____

PERMIT NUMBER:

75-161

T-1021

1881

WELL NUMBER

TYPE OF WELL: ☒ Water Well ☐ Test Well ☐ Recharge ☐ Drainage
☐ Waste Disposal ☐ Observation ☐ Other _____

USE: ☒ Domestic ☐ Irrigation ☐ Industrial ☐ Livestock ☐ Public Supply
☐ Other: _____

SKETCH LOCATION OF WELL in relation to local landmarks, giving distance and direction from nearest town, road, or other reference point.

North

house

Miller Cir. N.

GEOPHYSICAL LOGS: Type: _____ By: _____

WELL LOG			Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary.
Bore Hole (in.)	Casing Size (in.)	Depth (Ft.)	
		From To	
		0' 20'	Sand + Clay
		20' 40'	green clay
		40' 60'	" "
		60' 80'	green clay 15' rock
		80' 100'	Rock + clay layer
		100' 120'	little rock
		120' 140'	" "
		140' 160'	" "
		160' 180'	green clay
		180' 200'	" "
		200' 220'	" "
		220' 240'	" "
		240' 260'	coarse sand, black;
		260' 280'	soft rock + green cl.
		280' 300'	sand + green clay
		300' 320'	green clay
		320' 340'	" "
		340' 360'	thin layers hard rock
		360' 380'	green clay
		380' 400'	soft rock green cl.
		400' 420'	clay + rock layers
		420' 440'	Clay
		440' 460'	green clay rock layer
		460' 480'	" "
		480' 500'	tan clay + rock
		500' 520'	rock to line
		520' 540'	same time

Producing Zone Material: ☐ Sand ☐ Gravel
☐ Broken Shell ☐ Limestone ☐ Other: _____

Top of Producing Zone 11111111111111111111 Ft. Bottom of Producing Zone 11111111111111111111 Ft.

☐ Drill Cuttings Sample in Bottom of Casing

11111111111111111111 License No. 11111111111111111111 Signature 11111111111111111111

11111111111111111111 Date 11111111111111111111

Diameter of well 3x2 inches.

Volume of material calculated to properly plug well _____

14.7 cu. feet. Materials to be used: 10.7 sacks cement slurry

Density: 14.5 lbs/gal Pumping pressure _____ p.s.i. Pumping temperature _____ °F

Was plug used?

YES

☒
NO

 What type/style? _____

Placement depth land surface feet.

Was operation continuous?

☒
YES

NO

Date and time started: 2/3/83 at 11:00 (a.m.) p.m.

Date and time completed: 2/3/83 at 11:10 a.m./p.m.

Volume of material used _____ cu. ft.

Name of company providing materials: D.F. SMITH

Were all specifications followed as set forth in City of Jacksonville Ordinance Chapter 625, Florida Statutes Chapter 373, and Florida Administrative Code 16C - 8?

☒	☐
YES	NO

Inspector's evaluation of operation: 20 sacks of portland cement slurry were created by the addition of 100 gallons of water. The density of the mixture was 14.5 lbs per gal. The mixture was pumped at land surface.

Any additional future action required by inspector?

☐	☒
YES	NO

If yes, please explain: _____

J.T. Glenn
(Signature of Inspector)

2-3-83
(date)

DRAFT COPY

Proposed for use by Water Conservation Program Field
Inspector during Well Plugging Operation

WATER CONSERVATION ACTIVITY
DUVAL COUNTY

Reason for inspection: Proper procedures for plugging of
abandoned water well.

Regulatory status: Received application to plug
abandoned well

2-2-83
(date)

Permit issued for above

(number)

Well scheduled

2-3-83
(date)

New abandoned well schedule
completed

(date)

Submitted to U.S.G.S.

(date)

Owner DEPT OF TRANSPORTATION
(name of owner or his agent)

Address 1052 PLEASANT OAK JAX FLA
(street) (city) (state) (zip)

Well Drilling Contractor O.E. SMITH
(name)

11749 U.S. 1 NORTH 32219
(address)

1068
(license or bond number)

Identification of Quad. Sheet EASTPORT

10 15 27E
1/4 1/4 1/4 (Section) (Township) (Range)

Latitude 30° 26' 09" N Longitude 081° 34' 57" N

Sequential _____

Was well logged?

YES	NO
-----	----

Date _____

By whom? _____

Total well depth 558 feet

Depth cased 458 feet

Revised September 1980

SITE NO. 302609081345701

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULERecorded by GLENNDate 2-3-83

GENERAL SITE DATA (1)

Site Ident No 302609081345701 RG Number R-01 Transaction T-0 D M V
 Site Type 2- C D E H I M O P S T X Date 3-0 U Reporting Agency FL039
 Project No 5- District 8-121 State 7-12 County (or town) Daval 8-031
 Latitude 9-302609 Longitude 10-0813457 Lat Long Accuracy 11-S O T M
 Local Number 12- J-333.9 Land 10 15 R 27E
 Location Map 14- EAST 10 LT Scale 15- 240.00
 Altitude 16- 10 Method of Measurement 17- A L O Accuracy 18- 5
 Tinting 19- 0 Hydrologic 20- 03080.103
 Use of 23- A C D E F G H I J K L M N O P Q R S T U V W X Y Z Site Use 24- 0
 Use of 25- A C D E F G H I J K L M N O P Q R S T U V W X Y Z Site Use 26- 0
 Secondary Water Use 27- 558 Depth of Well 28- 558 Source of Depth Data 29- D
 Water Level 30- 30 Data Measured 31- 33 Source 32- 33
 Method of Measurement 34- A C D E F G H I J K L M N O P Q R S T U V W X Y Z
 Site Status 37- D E F G H I J K L M N O P Q R S T U V W X Y Z
 Source of Geohydrologic Data 38- 36 Pump Used 39- 35 Date of First Construction/Completion 21- 00 00 1982
 Date of Ownership 159- 00 00 1982

OWNER IDENTIFICATION (1)

R-158 T-0 D M V Date of Ownership 159- 00 00 1982
 Name: Last 161- DEPT. OF First 162- TRANS. P. & T. Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-0 D M V Ident 190- ST Assigner 191- FLA WND
 New Card Same R & T Ident 190- PLEASANT Assigner 191- FL039

SITE VISIT DATA (1)

R-186 T-0 D M V Date of Visit 187- 02 03 1983 Name of Person 188- GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-0 D M V Date 193- / / Geohydrologic Unit 195-
 New Card Same R & T thru 195
 Temperature 196- 0.0 0.1 0.1 Degrees C 197- / /
 Conductance 196- 0.0 0.9 5 u Mhos 197- / /
 Other (STORET) Parameter 196- / / Value 197- / /
 Other (STORET) Parameter 196- / / Value 197- / /

FOOT NOTES

1. Source of Data Code:

A D G L M O P R S T
 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100. 101. 102. 103. 104. 105. 106. 107. 108. 109. 110. 111. 112. 113. 114. 115. 116. 117. 118. 119. 120. 121. 122. 123. 124. 125. 126. 127. 128. 129. 130. 131. 132. 133. 134. 135. 136. 137. 138. 139. 140. 141. 142. 143. 144. 145. 146. 147. 148. 149. 150. 151. 152. 153. 154. 155. 156. 157. 158. 159. 160. 161. 162. 163. 164. 165. 166. 167. 168. 169. 170. 171. 172. 173. 174. 175. 176. 177. 178. 179. 180. 181. 182. 183. 184. 185. 186. 187. 188. 189. 190. 191. 192. 193. 194. 195. 196. 197. 198. 199. 200. 201. 202. 203. 204. 205. 206. 207. 208. 209. 210. 211. 212. 213. 214. 215. 216. 217. 218. 219. 220. 221. 222. 223. 224. 225. 226. 227. 228. 229. 230. 231. 232. 233. 234. 235. 236. 237. 238. 239. 240. 241. 242. 243. 244. 245. 246. 247. 248. 249. 250. 251. 252. 253. 254. 255. 256. 257. 258. 259. 260. 261. 262. 263. 264. 265. 266. 267. 268. 269. 270. 271. 272. 273. 274. 275. 276. 277. 278. 279. 280. 281. 282. 283. 284. 285. 286. 287. 288. 289. 290. 291. 292. 293. 294. 295. 296. 297. 298. 299. 300. 301. 302. 303. 304. 305. 306. 307. 308. 309. 310. 311. 312. 313. 314. 315. 316. 317. 318. 319. 320. 321. 322. 323. 324. 325. 326. 327. 328. 329. 330. 331. 332. 333. 334. 335. 336. 337. 338. 339. 340. 341. 342. 343. 344. 345. 346. 347. 348. 349. 350. 351. 352. 353. 354. 355. 356. 357. 358. 359. 360. 361. 362. 363. 364. 365. 366. 367. 368. 369. 370. 371. 372. 373. 374. 375. 376. 377. 378. 379. 380. 381. 382. 383. 384. 385. 386. 387. 388. 389. 390. 391. 392. 393. 394. 395. 396. 397. 398. 399. 400. 401. 402. 403. 404. 405. 406. 407. 408. 409. 410. 411. 412. 413. 414. 415. 416. 417. 418. 419. 420. 421. 422. 423. 424. 425. 426. 427. 428. 429. 430. 431. 432. 433. 434. 435. 436. 437. 438. 439. 440. 441. 442. 443. 444. 445. 446. 447. 448. 449. 450. 451. 452. 453. 454. 455. 456. 457. 458. 459. 460. 461. 462. 463. 464. 465. 466. 467. 468. 469. 470. 471. 472. 473. 474. 475. 476. 477. 478. 479. 480. 481. 482. 483. 484. 485. 486. 487. 488. 489. 490. 491. 492. 493. 494. 495. 496. 497. 498. 499. 500. 501. 502. 503. 504. 505. 506. 507. 508. 509. 510. 511. 512. 513. 514. 515. 516. 517. 518. 519. 520. 521. 522. 523. 524. 525. 526. 527. 528. 529. 530. 531. 532. 533. 534. 535. 536. 537. 538. 539. 540. 541. 542. 543. 544. 545. 546. 547. 548. 549. 550. 551. 552. 553. 554. 555. 556. 557. 558. 559. 560. 561. 562. 563. 564. 565. 566. 567. 568. 569. 570. 571. 572. 573. 574. 575. 576. 577. 578. 579. 580. 581. 582. 583. 584. 585. 586. 587. 588. 589. 590. 591. 592. 593. 594. 595. 596. 597. 598. 599. 600. 601. 602. 603. 604. 605. 606. 607. 608. 609. 610. 611. 612. 613. 614. 615. 616. 617. 618. 619. 620. 621. 622. 623. 624. 625. 626. 627. 628. 629. 630. 631. 632. 633. 634. 635. 636. 637. 638. 639. 640. 641. 642. 643. 644. 645. 646. 647. 648. 649. 650. 651. 652. 653. 654. 655. 656. 657. 658. 659. 660. 661. 662. 663. 664. 665. 666. 667. 668. 669. 670. 671. 672. 673. 674. 675. 676. 677. 678. 679. 680. 681. 682. 683. 684. 685. 686. 687. 688. 689. 690. 691. 692. 693. 694. 695. 696. 697. 698. 699. 700. 701. 702. 703. 704. 705. 706. 707. 708. 709. 710. 711. 712. 713. 714. 715. 716. 717. 718. 719. 720. 721. 722. 723. 724. 725. 726. 727. 728. 729. 730. 731. 732. 733. 734. 735. 736. 737. 738. 739. 740. 741. 742. 743. 744. 745. 746. 747. 748. 749. 750. 751. 752. 753. 754. 755. 756. 757. 758. 759. 760. 761. 762. 763. 764. 765. 766. 767. 768. 769. 770. 771. 772. 773. 774. 775. 776. 777. 778. 779. 780. 781. 782. 783. 784. 785. 786. 787. 788. 789. 790. 791. 792. 793. 794. 795. 796. 797. 798. 799. 800. 801. 802. 803. 804. 805. 806. 807. 808. 809. 810. 811. 812. 813. 814. 815. 816. 817. 818. 819. 820. 821. 822. 823. 824. 825. 826. 827. 828. 829. 830. 831. 832. 833. 834. 835. 836. 837. 838. 839. 840. 841. 842. 843. 844. 845. 846. 847. 848. 849. 850. 851. 852. 853. 854. 855. 856. 857. 858. 859. 860. 861. 862. 863. 864. 865. 866. 867. 868. 869. 870. 871. 872. 873. 874. 875. 876. 877. 878. 879. 880. 881. 882. 883. 884. 885. 886. 887. 888. 889. 890. 891. 892. 893. 894. 895. 896. 897. 898. 899. 900. 901. 902. 903. 904. 905. 906. 907. 908. 909. 910. 911. 912. 913. 914. 915. 916. 917. 918. 919. 920. 921. 922. 923. 924. 925. 926. 927. 928. 929. 930. 931. 932. 933. 934. 935. 936. 937. 938. 939. 940. 941. 942. 943. 944. 945. 946. 947. 948. 949. 950. 951. 952. 953. 954. 955. 956. 957. 958. 959. 960. 961. 962. 963. 964. 965. 966. 967. 968. 969. 970. 971. 972. 973. 974. 975. 976. 977. 978. 979. 980. 981. 982. 983. 984. 985. 986. 987. 988. 989. 990. 991. 992. 993. 994. 995. 996. 997. 998. 999. 1000.

1. CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No 59 # 001 *

Date of Construction Completion 60 00 / 00 / 17 68 *

Source of Const. Data D *

6.3 OE SMITH *

6.4 A B C D H J K L M N O P Q R S T U V W X Y Z *

6.5 F G H I J K L M N O P Q R S T U V W X Y Z *

6.6 69 A B C J N P S T *

6.7 71 C D E F H M Z *

2. SECTIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # *

Top of Hole Segment Below LSD

73 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

73 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

73 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

73 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

73 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Bottom of Hole Segment Below LSD

74 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

75 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

76 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

77 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

78 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

79 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Diameter of Hole

74 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

75 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

76 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

77 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

78 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

79 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

R = 76 * T = A D M * Construction Entry No 59 # *

Top of Casing Segment Below LSD

77 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

77 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

77 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

77 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

77 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Bottom of Casing Segment Below LSD

78 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

79 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

80 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

81 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

82 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Diameter of Casing Segment

78 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

79 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

80 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

81 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

82 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Thickness of Casing

78 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

79 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

80 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

81 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

82 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

3. OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # *

Top of Section Below LSD 83 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Bottom of Section Below LSD 84 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Type of Openings 85 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Type of Material 86 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Diameter of Open Section 87 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Width of Opening 88 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Length of Opening 89 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Openings Data

83 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

84 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

85 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

86 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

87 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

88 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

89 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

Openings Data

83 # 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

84 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

85 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

86 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

87 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

88 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

89 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 *

4. Source of Data Codes

D G I M O S Z

Direct, indirect, gas, memory, owner, other, reported, other

5. Casing Material Codes

C E I P R S T W X Y Z

Concrete, copper, other, wrought, other, PVC or other, other, other, other, other

6. Type of Material Codes for Open Section

F L N P R S T W X Y Z

fracture, poured, mesh, perforated, wire, screen, sand, welded, open, other, shuttered, or slotted, wound, unknown, point, none

7. Type of Material Codes for Open Section

C E I P R S T W X Y Z

brass or bronze, concrete, other, wrought, other, PVC or other, other, other, other, other

Plaint No. _____ TWP No. _____ Construction / Plugging Permit No. _____ J-3339
Well Inventor _____

Well Free Flowing? Yes ☒ No ☐ Phone _____
Owner _____ DOT _____

Owner's Address _____ 11052 PLEASANT OAK _____

Location Address _____

Drilling Contractor _____ O.E. SMITH - ^{Oris Driller} ~~Plugging Fee~~ License/Bond No. _____

Identification: 30 2609 081 3457 01 Lat./Long (if different) 30 _____ 081 _____

Section _____ 10 _____ TWP _____ 1S _____ Range _____ 27E _____ Quad Map Name _____ EAST PORT

Depth of Hole Drilled _____ 558 _____ Depth of Well _____ 558 _____ How measured _____ 1

Outer/Cross Section _____ 3x2 _____ Depth of Casing _____ 458 _____

Length and Diameter of Well Segments: _____ " from LSD to _____

_____ " Dia. from _____ 'to _____ ' " Dia. from _____ 'to _____

Length and Diameter of Casing Segments: _____ " Dia. from _____ 'to _____ ' Above LSD
Below LSD

_____ " Dia. from _____ 'to _____ ' _____

Amount and Quantity of Grouting Used _____ Well centered in Grout? _____

Condition of Well _____ PLUGGED ^{20 sacks 145 lbs/gal} _{100 gal} Number of People Served _____

Water Level _____ Above LSD _____ Below LSD _____ Measuring Pt. _____ Above LSD _____ Below LSD _____

Measured _____ Measured by _____ Date _____

Year of Construction _____ Date of Construction _____ 1968

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.)

_____ Good _____

Grouting Material Used _____ GALV _____

Interval _____ 10 _____

Setting _____ FLAT _____

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer

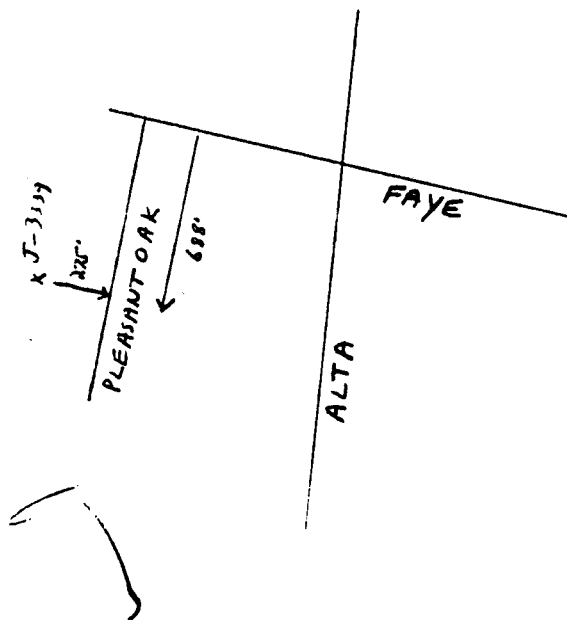
_____ 30' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM
Free Flowing Well Yield _____ GPM How Yield Determined _____
Frequency of Well Use _____ Hrs/Day _____ Days/Year
Pump Data - Type and Make _____ HP _____
Pump Capacity _____ GPM No. Bowls or Stages _____
Type of Power _____ Static Water Level _____
Production Water Level _____ Pump Intake Setting _____
= Depth of Section Line
Water Sampled for: Dissolved Solids _____ Conductivity _____
Hardness _____ Chlorides _____ PH= _____ Temperature _____
General Rating: Poor _____ Average ☒ Good _____ Excellent _____
Action Taken/Comments _____

Follow Up Needed _____
Inspector's Name Colman Field Inspection Date 2-3-83

↑ N



Recorded by Albertie

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 12/15/78

GENERAL SITE DATA (1)

Check One ☒ English ☐ Metric Units

Site Ident No 302715081360301 RG Number R-0 Transaction T- (A) D M V

Site Type 2- C O H I M P T (W) Data 3- (C) U L M Reporting Agency 4- FL039

Project No. 5- District 8- 121 State 7- 12 County (or town) DUVAL 8- 031

Latitude 9- 30 27 15 Longitude 10- 08 13 60 3 Lat-Long Accuracy 11- 5 (P) T M

Local Number 12- J-1924 Land Net 13- NWNWNWS 3T 15R 27E

Location Map 14- EASTPORT Scale 15- 24000

Altitude 16- 10 Method of Measurement 17- A L (M) Accuracy 18- 5

Top Setting 19- D C E (F) H K L O P S T U V W Hydrologic Unit (OWDC) 20- 03080103

Date of First Construction/Completion 21- 08/01/1978 Use of Site 23- A D E G H (W) X Z

Use of Water 24- A B C D E F (H) I M N P R S T U V Y Z

Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- 6.60 Depth of Well 28- 6.60 Source of 29- D

Water Level 30- Date Measured 31- / / Source 33-

Method of Measurement 34- A C E G H L M R S T V Z

Site Status 37- D F G H (P) R S T V X Z

Source of Geohydrologic Data 38- D Pump Used 35- Measuring Point 285- Measuring Point Date 267-

OWNER IDENTIFICATION (1)

R-158 T- (A) D M Date of Ownership 159- 08/01/1978

Name: Last 161- BENNETT First 162- HUBERT Middle Initial 163- C

OTHER SITE IDENTIFICATION NUMBERS (1)

R-129 T- (A) D M Ident 190- SJ Assigner 191- FLA WMD

New Card Same R & T Ident 190- DUNNS CRK Assigner 191- FL039

SITE VISIT DATA (1)

R-186 T- (A) D M Date of Visit 187- 08/03/1978 Name of Person 188- ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T- A D M Date 193- / / Geohydrologic Unit 195-

New Card Same R & T Ring 195 Temperature 196- 0 0 0 1 0 Degrees C 197-

Conductance 198- 0 0 0 9 5 μ Mhos 199-

Other (STORET) Parameter 200- Value 201-

Other (STORET) Parameter 202- Value 203-

FOOT NOTES.

① Sources of Data Codes:

S O O A R L G Z

requiring 2" or larger diameter, other gov't, other logs, geologist, other agency reported.

R-134 146 T- A O M Entry No 147 # 148 month d year
 Discharge: 150 Source of Data 151
 Method of Measurement 152 B C E F M O P R T U V W Z
 Production Level 153 State Level 154 Source of Data 155 Specific Capacity 272
 Method of Measurement 156 A C E G H L M R S T V Z Pumping Period 157

LIFT DATA (1)
 R-42 T- A O M Type of Lift 43 A B C J P R S T U Z Entry No 254 #
 Pump Intake Setting 44 Type of Power 45 D E G H L N W Z
 Date 38 month day year Horsepower 46

MAJOR PUMP DATA (2)
 R-47 T- A O M Type of Lift 43 # Lift Entry No 254 # Manufacturer of Pump 48
 Serial No of Pump 49 Name of Power Company 50
 Power Company Account No 51 Power Meter No 52 Pump Rating 53
 Person or Company Who Maintains the Pump 54 Additional Lift 255 Rated Pump Capacity 256

STANDBY POWER DATA (2) (See LIFT DATA for codes of fields 43 and 56 below)
 R-55 T- A O M Type of Lift 43 # Type of Power 56 Horsepower 57 Lift Entry No 254 #

AVAILABLE LOG DATA (1)
 R-100 T- A O M
 New Card for Each Log Type Same R & T
 Type of Log 100 # Begin Depth 200 End Depth 201 Source of Data 202
 100 # 200 201 202
 100 # 200 201 202
 100 # 200 201 202

WATER QUALITY DATA COLLECTION (1)
 R-114 T- A O M Begin Year 115 End Year 116 Source Agency 117
 Frequency of Collection 118 Network Site 257 Type of Analysis 120

WATER LEVEL DATA COLLECTION (1)
 R-121 T- A O M Begin Year 122 End Year 123 Source Agency 124
 Frequency of Collection 125 Network Site 258

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)
 R-127 T- A O M Begin Year 128 End Year 129 Source Agency 130
 Frequency of Collection 131 Network Site 259 Method of Collection 133 C E M U Z
 calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)
 R-180 T- A O M Type of Data 181 # Lat 182 C D Z Form 261 F M P Z
 New Card Same R & T Type of Data 181 # Lat 182 C D Z Form 261 F M P Z
 measured, direct, other 183, machine, published, other available

FOOT NOTES:

① Source of Data Codes:

S O G A R L G Z
 reporting, driller, owner, other gov't, other logs, geological, other reported, agency

② Frequency of Collection Codes

A B C D F I M S Q S W Z
 annual, bi-monthly, continuous, daily, semi-monthly, intermittent, monthly, one time, quarter, semi-weekly, other only annual annual

③ Type of Log Codes

A B C D E F G H I J K L M N P Q
 tube, collar, slip, driller's, electric, fluid, geological, magnetic, induction, gamma, dipmeter, logging, monitoring, neutron, p log, photo, radio-active
 S T U V Z
 sonic, temp, gamma, fluid, other gamma velocity

④ Type of Quality Analysis Codes

A B C D E F G H I J K L M Z
 physical, chemical, toxic, petroleum, microbiological, sensory, radio, color, odor, taste, other, C.O.D. must

GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATADate 12/15/78Check One - ☒ English☐ Metric UnitsSite Name No. 3027150811310301
19

COOPERATOR DATA (1)

R = 212

T = A D N *
add, delete, modifyCooperator
Site identifier213 = 0-1924

Registration No.

214 =

Inspection Status 215 =

Reason Unapproved

216 =

Inspection Date

217 = / / *
month day yearRemarks 218 = 12087 DUNN'S CREEK Rd

DATA ON MINOR SITE REPAIRS (1)

R = 186

T = A D M *
add, delete, modifyNew Card for each Repair
Same R&T

Entry No.

Nature of Repair ①

Date Completed

Contractor

% Performance Chg.

(Minor Repair)

| | | | | |
|-------|--|--|--|---|
| 186 # | | | | * |
| 186 = | | | | * |
| 187 = | | | | * |
| 188 = | | | | * |
| 189 = | | | | * |
| 190 = | | | | * |

(Minor Repair)

| | | | | |
|-------|--|--|--|---|
| 186 # | | | | * |
| 186 = | | | | * |
| 187 = | | | | * |
| 188 = | | | | * |
| 189 = | | | | * |
| 190 = | | | | * |

(Minor Repair)

Entry No.

Nature of Repair ①

Date Completed

Contractor

% Performance Chg.

| | | | | |
|-------|--|--|--|---|
| 186 # | | | | * |
| 186 = | | | | * |
| 187 = | | | | * |
| 188 = | | | | * |
| 189 = | | | | * |
| 190 = | | | | * |

(Minor Repair)

| | | | | |
|-------|--|--|--|---|
| 186 # | | | | * |
| 186 = | | | | * |
| 187 = | | | | * |
| 188 = | | | | * |
| 189 = | | | | * |
| 190 = | | | | * |

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203

T = A D M *
add, delete, modify

No. Wells in Group

204 =

Deepest Depth

205 =

Shallowest
Depth

206 =

Construction
Method207 = D J V W Z *
drilled, jetted, driven, driven, otherSize of
Well Field

208 =

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208

T = A D M *
add, delete, modifyLongest
Dimension

209 =

Other (Width)
Dimension

210 =

Depth

211 =

Orientation

203 =

Dip

204 =

DATA FOR COLLECTOR WELLS (1)

R = 219

T = A D M *
add, delete, modifyNew Card for each Lateral
Same R&T

Entry No.

Depth to the Lateral

Length of Lateral

Diameter of Lateral

Screen Mesh

| | | | | |
|-------|--|--|--|---|
| 220 # | | | | * |
| 220 # | | | | * |
| 220 # | | | | * |
| 220 # | | | | * |
| 220 # | | | | * |
| 220 # | | | | * |
| 220 # | | | | * |
| 220 # | | | | * |
| 220 # | | | | * |
| 220 # | | | | * |

| | | | | |
|-------|--|--|--|---|
| 221 = | | | | * |
| 221 = | | | | * |
| 221 = | | | | * |
| 221 = | | | | * |
| 221 = | | | | * |
| 221 = | | | | * |
| 221 = | | | | * |
| 221 = | | | | * |
| 221 = | | | | * |
| 221 = | | | | * |

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|-------|--|--|--|---|
| 222 = | | | | * |
| 222 = | | | | * |
| 222 = | | | | * |
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| 222 = | | | | * |
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| 222 = | | | | * |

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|-------|--|--|--|---|
| 223 = | | | | * |
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|-------|--|--|--|---|
| 224 = | | | | * |
| 224 = | | | | * |
| 224 = | | | | * |
| 224 = | | | | * |
| 224 = | | | | * |
| 224 = | | | | * |
| 224 = | | | | * |
| 224 = | | | | * |
| 224 = | | | | * |
| 224 = | | | | * |

FOOT NOTES:

① Nature of repair

| | | | | | | |
|---------|---------|---------|------------|------------|----------|-------|
| B | C | D | L | P | S | Z |
| blasted | cleaned | drilled | lower | plugged or | screen | other |
| off | | | perforated | back | repaired | |

Recorded by YOST

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 1-28-80

GENERAL SITE DATA (0)

Check One

☒ English☐ Metric Units

Site Ident No 302713081364201 RG Number R=0 Transaction T=(A) D M V
 Site-Type 2=C D H I M P T (W) Data 3=(G) U L M Reporting Agency 4=FL039
 Project No. 5= District S=121 State 7=12 County (or town) DUAL 8=031
 Latitude 9=302713 Longitude 10=0813642 Lat-Long Accuracy 11=S (F) T M
 Local Number 12= Land Net 13=NWSESW 37 T 1 N R 27E
 Location Map 14=EASTPORT Scale 15=24000
 Altitude 16=1000 Method of Measurement 17=A L (M) Accuracy 18=15
 Topo Setting 19=D C E F H K (L) O P S T U V W Hydrologic Unit (OWDC) 20=03080103
 Date of First Construction/Completion 21=00/00/1980 Use of Site 23=A D E G H O M P R S T U (W) X Z
 Use of Water 24=A B C D E F H I M N (P) R S T U Y Z
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27= Depth of Well 28= Source of Depth Data 29=
 Water Level 30= Date Measured 31= Source 33=
 Method of Measurement 34=A C E G H L M R S T V Z
 Site Status 37=D F G H O P R S T V X Z
 Source of Geohydrologic Data 36= Pump Used 35= Measuring Point 266=1.0 Measuring Point Date 267=01/25/1980

OWNER IDENTIFICATION (1)

R=158 T=(A) D M Date of Ownership 159#00/00/1980
 Name: Last 161=PURVIS First 162=MALLERY Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 T=(A) D M Ident 190#SJ Assigner 191=FLA WMD
 New Card Same R & T Ident 190#PULASKI Assigner 191=FL039

SITE VISIT DATA (1)

R=186 T=(A) D M Date of Visit 187#01/25/1980 Name of Person 188=ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 T=(A) D M Date 193# Geohydrologic Unit 195#
 New Card Same R thru 195 Temperature 196#00010 Degrees C 197=
 Conductance 196#00095 μ Mhos 197=
 Other (STORET) Parameter 196# Value 197=
 Other (STORET) Parameter 196# Value 197=

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency reported

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

256 # 0.0.1 *

Depth
to Top 91 =Depth to
Bottom 92 =Unit
Identifier

93 = 120 FLRD *

Lithology

96 = LMSN *

Lithologic
Modifier

97 = MARINE *

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic
Unit Entry No

256 #

Date

95 # / / *

month day year

Water Level

126 = *

% Water
Contributed

132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry
No

256 #

Depth
to Top

91 = *

Depth to
Bottom

92 = *

Unit

Identifier

93 = *

Lithology

96 = *

Lithologic
Modifier

97 = *

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic
Unit Entry No

256 #

Date

95 # / / *

month day year

Water Level

126 = *

% Water
Contributed

132 = *

PERTINENT REMARKS

R = 183 *

T = A *

add

185 = *

New Card Same R&T

185 = *

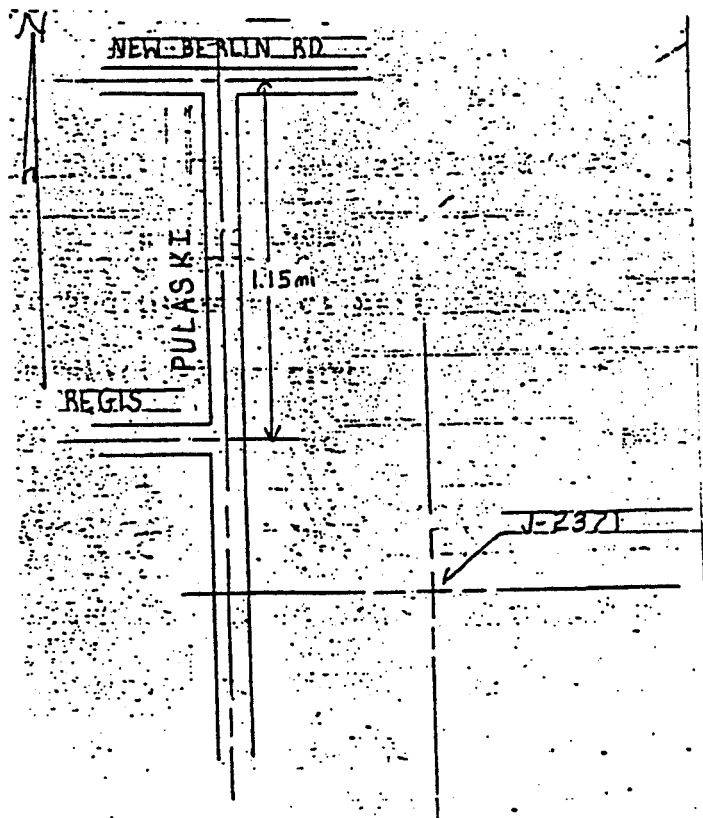
185 = *

NOTES:

R = 212 *

T = A *

213 = 1,2,3,3, PULASKI



MENT PRINTING OFFICE : 1976 O - 213-137

Recorded by GLENN

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 2-24-82Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (10)

Site Ident No 302715081364201 RG Number R=0 Transaction T= D M V *
 Site-Type 2 C D H I M P T * Data Reliability 3 0 U L M * Reporting Agency 4 FLOJ9 *
 Project No. 5 District 6 121 State 7 12 County (or town) 1441 8 031 *
 Latitude 9 30 27 15 * Longitude 10 68 13 64 * Lat-Long Accuracy 11 S 0 T M *
 Local Number 12 J-2587 Land Net Loc 13 LAND GRANT 32 15 R 27 E *
 Location Map 14 EASTPORT Scale 15 240.00 *
 Altitude 16 20 * Method of Measurement 17 A L 0 * Accuracy 18 5 *
 Topo Setting 19 D C E 0 H K L 0 S T U V W * Hydrologic Unit (OWDC) 20 0308.01.02 *
 Date of First Construction/Completion 21 00 00 1980 * Use of Site 23 A D E G H 0 M P R S T U 0 X Z *
 Use of Water 24 A B C D E F 0 I M N P R S T U Y Z *
 Secondary Water Use 25 * Tertiary Use of Water 26 * Depth of Hole 27 * Depth of Well 28 * Source of Depth Data 29 *
 Water Level 30 718.2 * Date Measured 31 02 24 1982 * Source 33 D *
 Method of Measurement 34 A C E 0 H L M R S T V Z *
 Site Status 37 D F G H 0 P R S T V X Z *
 Source of Geohydrologic Data 36 * Pump Used 35 * Measuring Point 266 0.0 * Measuring Point Date 267 02 24 1982 *

OWNER IDENTIFICATION (1)

R=158 * T= 0 D M * Date of Ownership 159 00 00 1980 *
 Name: Last 161 MERCER * First 162 JEAN * Middle Initial 163 *

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 * T= 0 D M * Ident 190 ST * Assigner 191 FLANNO *
 New Card Same R & T Ident 190 WILASKI * Assigner 191 FLOJ9 *

SITE VISIT DATA (1)

R=186 * T= 0 D M * Date of Visit 187 02 24 1982 * Name of Person 188 GLENN *

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 * T= A D M * Date 193 / / * Geohydrologic Unit 195 # *
 New Card Same R thru 195 Temperature 196 0 0 0 1 0 * Degrees C 197 *
 Conductance 198 0 0 0 9 5 * μ Mhos 197 *
 Other (STORET) Parameter 199 # * Value 197 *
 Other (STORET) Parameter 199 # * Value 197 *

FOOT NOTES.

① Source of Data Codes

S D 0 A R L G Z *
 reporting, driller, owner, other gov't, other logs, geologist, other

No PHONE

WELL CONSTRUCTION DATA (1)

R = 58 * T = Q D M * Entry No 59 # 001 *

Date of Construction Completion 60 = 0 0 / 00 / 1990 *

Source of Const. Data 64 0 *

Name of Contractor/Driller 63 = G R E F F E S *

Method of Construction 65 = A B C D J P H T V W Z *

Finish 66 = C F G H P S T W Z * Type of Seal 67 = B C G Z *

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *

Special Treatment During Development 71 = C D E F H M Z *

J 2587

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # *

Top of Hole Segment Below LSD

73 # *
73 # *
73 # *
73 # *
73 # *

Bottom of Hole Segment below LSD

74 = *
74 = *
74 = *
74 = *
74 = *

Diameter of Hole Segment

75 = *
75 = *
75 = *
75 = *
75 = *

New Card for Each Hole Segment
Same R, T & Field 59

CASING SCHEDULE (2)

R = 78 * T = A D M * Construction Entry No 59 # *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 # *
77 # *
77 # *
77 # *
77 # *

Bottom of Casing Segment Below LSD

78 = *
78 = *
78 = *
78 = *
78 = *

Diameter of Casing Segment

79 # *
79 # *
79 # *
79 # *
79 # *

Casing Material

80 = *
80 = *
80 = *
80 = *
80 = *

Thickness of Casing

81 = *
81 = *
81 = *
81 = *
81 = *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # *
84 = *

Bottom of Section Below LSD

84 = *

Type of Openings

85 = *

Type of Material

86 = *

Diameter of Open Section

87 = *

Width of Opening

88 = *

Length of Opening

89 = *

(Openings Data)

83 # *
84 = *

84 = *

85 = *

86 = *

87 = *

88 = *

89 = *

(Openings Data)

83 # *
84 = *

84 = *

85 = *

86 = *

87 = *

88 = *

89 = *

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency reported.

② Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other iron iron metal plastic stone steel

③ Type of Openings Codes

F L M P R S T W X Z
fracture, lowered, man, perforated, well screen, sand, walled, open, other shutters or slotted wound (unknown) point hole

④ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, bronze, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other iron iron metal plastic steel

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No 256 # 001 *

Depth to Top 91 =

Depth to Bottom 92 =

Unit Identifier

93 = 120 FLRD *

Lithology

96 = LMSN *

Lithologic Modifier

97 = HARENE *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No

256 #

Date

95 # / / *

month day year

Water Level

126 = *

% Water

Contributed

132 = *

J 2587

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No

256 #

Depth to Top

91 = *

Depth to Bottom

92 = *

Unit

Identifier

93 = *

Lithology

96 = *

Lithologic Modifier

97 = *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No

256 #

Date

95 # / / *

month day year

Water Level

126 = *

% Water

Contributed

132 = *

PERTINENT REMARKS

R-183 *

T- A *

add

185 = *

New Card Same R&T

185 = *

185 = *

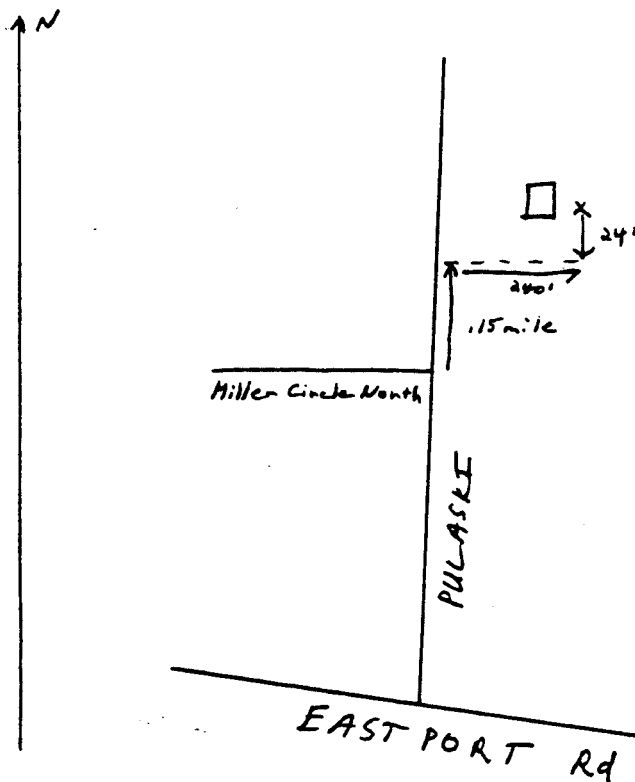
NOTES.

B-22 =

T- A *

256 #

12041 PULASKI ROAD



WELL SCHEDULE

MASTER CARD (H. H. C. 9/12/40)
 State Florida
 County Duval
 City Tallahassee
 Locality 1013 2nd St. E. 4th
 Well No. 1013 2nd St. E. 4th
 Owner or name Foley Lumber Co.
 Use of well Water
 Date of last test 9/14/40
 Name of tester John R. C. 1013 2nd St. E. 4th
 Address Tallahassee, Fla.

2nd establishment County, Fed Gov't, City, Corp of Co., Private, State Agency, Water Dist
 Use of well Water
 Date of last test 9/14/40
 Name of tester John R. C. 1013 2nd St. E. 4th
 Address Tallahassee, Fla.

WELL-DESCRIPTION CARD
 Well No. 1013 2nd St. E. 4th
 Depth well: 1013 2nd St. E. 4th
 Depth casing: 1013 2nd St. E. 4th
 Depth screen: 1013 2nd St. E. 4th
 Method Drilled
 Drilled: Drilled
 Data Drilled
 Drilled: Drilled

WATER-LEVEL RECORD
 Date 9/14/40
 Time 13.70
 Reading 13.70
 Accuracy 1.74
 Instrument Level
 Pressure Pressure
 Date 9/14/40
 Time 13.70
 Reading 13.70
 Accuracy 1.74
 Instrument Level
 Pressure Pressure

WELL SCHEDULE

MASTER CARD (H. H. C. 9/12/40)
 State Florida
 County Duval
 City Tallahassee
 Locality 1013 2nd St. E. 4th
 Well No. 1013 2nd St. E. 4th
 Owner or name Foley Lumber Co.
 Use of well Water
 Date of last test 9/14/40
 Name of tester John R. C. 1013 2nd St. E. 4th
 Address Tallahassee, Fla.

2nd establishment County, Fed Gov't, City, Corp of Co., Private, State Agency, Water Dist
 Use of well Water
 Date of last test 9/14/40
 Name of tester John R. C. 1013 2nd St. E. 4th
 Address Tallahassee, Fla.

WELL-DESCRIPTION CARD
 Well No. 1013 2nd St. E. 4th
 Depth well: 1013 2nd St. E. 4th
 Depth casing: 1013 2nd St. E. 4th
 Depth screen: 1013 2nd St. E. 4th
 Method Drilled
 Drilled: Drilled
 Data Drilled
 Drilled: Drilled

WATER-LEVEL RECORD
 Date 9/14/40
 Time 13.70
 Reading 13.70
 Accuracy 1.74
 Instrument Level
 Pressure Pressure
 Date 9/14/40
 Time 13.70
 Reading 13.70
 Accuracy 1.74
 Instrument Level
 Pressure Pressure

Recorded by E. BALDUCCI

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 11/12/1976Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (I)

Site Ident No 30 24 51 .08/ 36 34 01 RG Number R=0 Transaction T= A D M V
 add, delete, modify, revised
 Site Type 2= C D H I M P T W Data 3= 0 U L M Reliability 3= 0 U L M
 add, delete, modify, revised
 Project No. 5= District 6= 1 2 1 State 7= 1 2 County (or town) DUVAL 8= 0 3 3
 Latitude 9= 30 24 51 Longitude 10= 08 1 36 34 Lat-Long Accuracy 11= S D T M
 sec, 6 sec, 10 sec, Min
 Local Number 12= Land Net Loc. 13= LND G RTS 47 T 1 S R 27 E
 1/4 1/4 1/4 section, township, range, meridian
 Location Map 14= EASTPORT Scale 15= 24000
 Altitude 16= 15 Method of Measurement 17= A L M
 altimeter, level, map
 Accuracy 18= 5
 Topo Setting 19= D C E F H K L O P S T U V W Hydrologic Unit (OHWC) 20= 0 3 0 9 0 1 0 3
 depression, stream, dunes, flat, hilltop, sink, swamp, offshore, sediment, hillside, terrace, undulating, valley, upland, flat, cone
 Date of First Construction/Completion 21= 0 9 2 5 1 9 7 6 Use of Site 23= A D E G H O M P R S T U W X Z
 month day year
 and/or, drain, gas, seismic, heat, observ, mine, oil, gas, recharge, recharge, test, untested, with, waste, destroyed, drawal, etc.
 Use of Water 24= A B C D E F H I M N O P R S T U V W X Y Z
 air cond., bottling, commercial, domestic, power, fire, domestic, irrigation, medicinal, industrial, public, recreation, stock, institution, untested, diesel, other supply
 Secondary Water Use 25= Tertiary Use 26= Depth of Hole 27= 660 Depth of Well 28= 660 Source of 29= D
 of Water
 Water Level 30= Date Measured 31=
 month day year
 Method of Measurement 34= A C E G H L M R S T V Z
 spring, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other tape, pressure tape, log
 Site Status 37= D F G H O P R S T V X Z
 dry, flowing, nearby, nearby, obstruction, pumping, recently, nearby, nearby, foreign, surface water, other
 flowing, recently, recently, pumping, recently, recently, substance, effects
 Source of Geohydrologic Data 38= Pump Used 39= Measuring Point 266= - 2.12 Measuring Point Date 267= 0 9 3 0 1 1 9 7 6
 no month day year

OWNER IDENTIFICATION (I)

R=158 T= A D M V Date of Ownership 159= 0 9 2 5 1 9 7 6
 add, delete, modify
 Name: Last 161= DICKERSON First 162= I. N. C. Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (I)

R=183 T= A D M V Ident 190= 53 Assigner 191= F. L. A. W. M. D.
 add, delete, modify
 New Card Same R & T Ident 190= HECKSCHER Assigner 191= F. L. O. 3 9

SITE VISIT DATA (I)

N=186 T= A D M V Date of Visit 187= 0 9 3 0 1 1 9 7 6 Name of Person 188= BALDUCCI
 add, delete, modify month day year

FIELD WATER QUALITY MEASUREMENTS (I)

R=192 T= A D M V Date 193= Geohydrologic Unit 195=
 add, delete, modify month day year
 New Card Same R thru 195
 Temperature 196= 0 0 0 1 0 Degree C 197=
 Conductance 198= 0 0 0 9 5 u Mhos 199=
 Other (STORET) Parameter 199= Value 197=
 Other (STORET) Parameter 199= Value 197=

FOOT NOTES:

① Source of Data Codes:

S O G A R L G Z
 reporting, driller, owner, other gov't, other inst., geologist, other agency reported.

R-58: * T- (A) D M * Entry No 59 00.1 * Date of Construction Completion 50 09/25/1976 * Source of Const. Data 54 10 *
 Name of Contractor/Driller 53 FLOYD, W. E. FLOYD & SON
 Method of Construction 65 A B C D (H) J F R T V W Z *
 Finish 68 C F G H B P S T W (X) Z * Type of Seal 67 B C (X) Z *
 Bottom of Seal 68 * Method of Development 69 A B C J N P S Z * Number of Hours in Development 70 *
 Special Treatment During Development 71 C D E F H M Z *
 (air-lift, bored, compressed, jetted, none, other, surged, other pump)
 (chemicals, dry ice, explosives, deflocculants, hydrating, mixing, mechanical, other)

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72: * T- (A) D M * Construction Entry No 59 00.1 *
 add, delete, modify

New Card for Each Hole Segment Same R, T & Field 59

Top of Hole Segment Below LSD
 73 # 0.0 *
 73 # *
 73 # *
 73 # *
 73 # *

Bottom of Hole Segment below LSD
 74 # 6.60 *
 74 # *
 74 # *
 74 # *
 74 # *

Diameter of Hole Segment
 75 # 3.0 *
 75 # *
 75 # *
 75 # *
 75 # *

CASING SCHEDULE (2)

A-75 * T- (A) D M *
 add, delete, modify

Construction Entry No 59 00.1 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD
 77 # 0.0 *
 77 # *
 77 # *
 77 # *

Bottom of Casing Segment Below LSD
 78 # 5.50 *
 78 # *
 78 # *
 78 # *

Diameter of Casing Segment
 79 # 3.0 *
 79 # *
 79 # *
 79 # *

Casing Material
 80 # S *
 80 # *
 80 # *
 80 # *

Thickness of Casing
 81 # *
 81 # *
 81 # *
 81 # *

OPENINGS SCHEDULE (2)

R-82: * T- (A) D M *
 add, delete, modify

Construction Entry No 59 00.1 *

New Card for Each Open Section With Same R, T & Field 59

Top of Section Below LSD 83 # 5.50 *
 Bottom of Section Below LSD 84 # 6.60 *
 Type of Opening 85 X *
 Type of Material 86 *
 Diameter of Open Section 87 3.0 *
 Width of Opening 88 *
 Length of Opening 89 *
 (Opening Data)

(Opening Data)
 83 # *
 84 # *
 85 # *
 86 # *
 87 # *
 88 # *
 89 # *

(Opening Data)
 83 # *
 84 # *
 85 # *
 86 # *
 87 # *
 88 # *
 89 # *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency

② Casing Material Codes

B C G I M P R S T U W Z
 brick, concrete, tile, wrought, other, PVC or, steel, tile, metal, wood, other iron iron metal plastic stone steel

③ Type of Openings Codes

F L M P R S T W X Z
 fracture, fractured, man, perforated, wood, screen, sand, welded, open, other shuttled or slotted round (unknown) point hole

④ Type of Material Codes for Open Sections

B C G I M P R S T Z
 brass or, concrete, tile, wrought, other, PVC or, stainless, steel, tile, other bronze iron iron metal plastic wood

PRODUCTION DATA (1)

R = 134 146 = * T = A D M = * Entry No 147 = * Date 148 = / / month day year

Discharge: 150 = * Source of Data 151 = *

Method of Measurement 152 = B C E F M O P R T U V W Z = *
boiler, current, estimated, flame, totalizing, orifice, pitot-tube, reported, trajectory, venturi, volumetric, weir, other

Production Level 153 = * Static Level 154 = * Source of Data 155 = * Specific Capacity 272 = *

Method of Measurement 156 = A C E G H L M R S T V Z = *
active, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, stand, electric, calibrated, other

Pumping Period 157 = *

LIFT DATA (1)

R = 42 = * T = A D M = * Type of Lift 43 = A B C J P R S T U Z = * Entry No 254 = *

Pump Intake Setting 44 = * Type of Power 45 = D E G H L N W Z = *
diesel, electric, gasoline, hand, LP gas, natural, windmill, other

Date 46 = / / month day year Horsepower 47 = *

MAJOR PUMP DATA (2)

R = 47 = * T = A D M = * Type of Lift 43 = * Lift Entry No 254 = * Manufacturer of Pump 48 = *

Serial No. of Pump 49 = * Name of Power Company 50 = *

Power Company Account No 51 = * Power Meter No 52 = * Pump Rating 53 = *

Person or Company Who Maintains the Pump 54 = * Additional Lift 255 = * Rated Pump Capacity 256 = *

STANDBY POWER DATA (2)

R = 55 = * T = A D M = * Type of L.H. 43 = * Type of Power 56 = * Horsepower 57 = * Lift Entry No 254 = *

AVAILABLE LOG DATA (1)

R = 198 = * T = A D M = * New Card for Each Log Type Same R & T

Type of Log 199 = * Begin Depth 200 = * End Depth 201 = * Source of Data 202 = *

WATER QUALITY DATA COLLECTION (1)

R = 114 = * T = A D M = * Begin Year 115 = * End Year 116 = * Source Agency 117 = *

Frequency of Collection 118 = * Network Site 257 = * Type of Analysis 120 = *

WATER LEVEL DATA COLLECTION (1)

R = 121 = * T = A D M = * Begin Year 122 = * End Year 123 = * Source Agency 124 = *

Frequency of Collection 125 = * Network Site 258 = *

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R = 127 = * T = A D M = * Begin Year 128 = * End Year 129 = * Source Agency 130 = *

Frequency of Collection 131 = * Network Site 259 = * Method of Collection 133 = C E M U Z = *
calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)

R = 180 = * T = A D M = * Type of Data 181 = * Loc 182 = C D Z = * Format 251 = F M P Z = *
cooperator, electric, other

New Card Same R & T Type of Data 181 = * Loc 182 = C D Z = * Format 251 = F M P Z = *

FOOT NOTES:

① Source of Data Codes

S D O A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency

② Type of Log Codes

A B C D E F G H I J K L M N O P Q
time, collar, caliper, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, laterolog, microlog, neutron, μ later, photo, radio-, sonic, temp, gamma, fluid, other

S T U V Z
sonic, temp, gamma, fluid, other

③ Frequency of Collection Codes

A B C D F I M O Q S W Z
annual, bi-monthly, continuous, daily, semi-, intermittent, monthly, one time, quarter, semi-, weekly, other

④ Type of Quality Analyses Codes

A B C D E F G H J K L M Z
physical, common, trace, pesticides, nutrients, sanitary, codes, codes, codes, codes, codes, other, other

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = 0 0 M * Entry No 254 E 001 * Depth to Top 31 * Depth to Bottom 92 *

Unit Identifier 93 = 120FLRD * Lithology 96 = LMSN * Lithologic Modifier 97 = MARINE *

AQUIFER DATA (2)

R = 94 * T = A D M * Geohydrologic Unit Entry No 256 *

Date 95 4 / / * Water Level 125 * % Water Contributed 132 *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 256 * Depth to Top 91 * Depth to Bottom 92 *

Unit Identifier 93 * Lithology 98 * Lithologic Modifier 97 *

AQUIFER DATA (2)

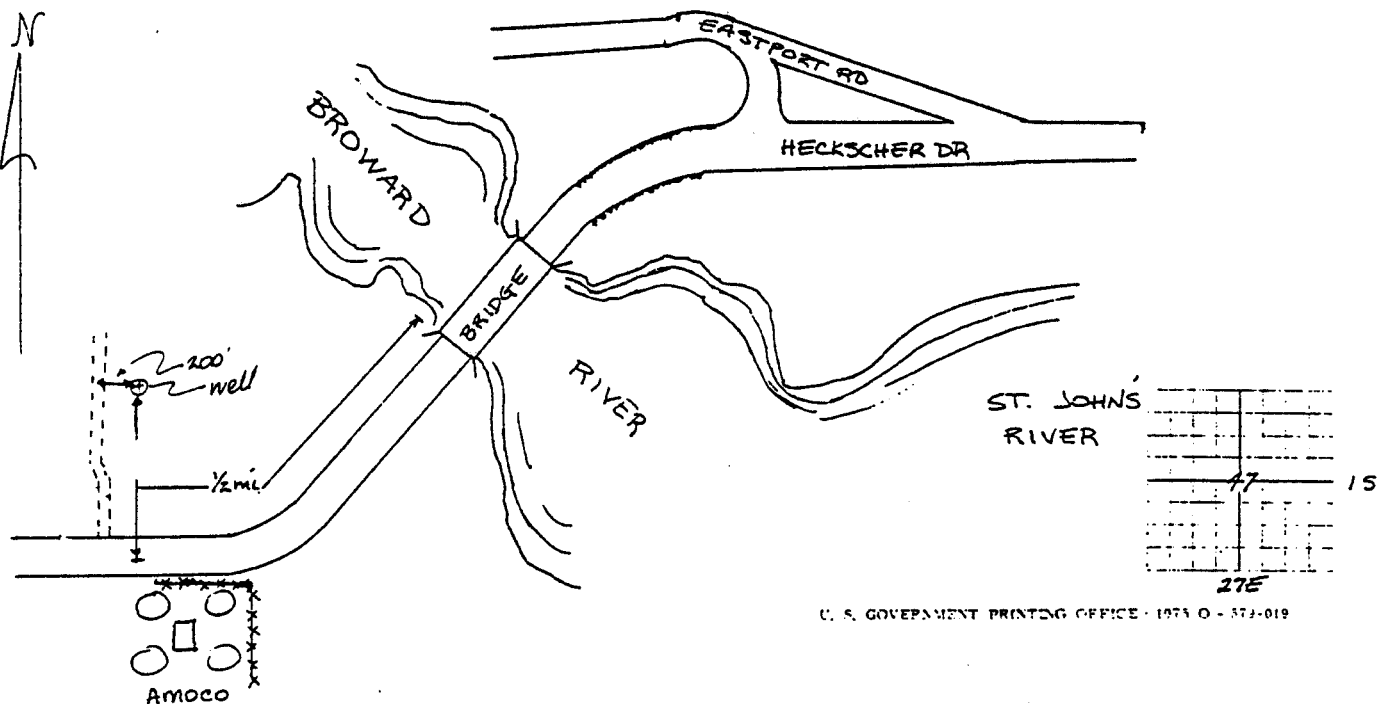
R = 94 * T = A D M * Geohydrologic Unit Entry No 256 *

Date 95 * / / * Water Level 125 * % Water Contributed 132 *

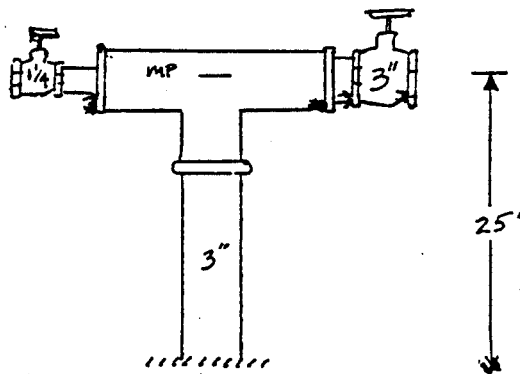
PERTINENT REMARKS

R = 183 * T = A * 185 *
New Card Same R&T
185 *
185 *

NOTES:



U. S. GOVERNMENT PRINTING OFFICE : 1975 O - 373-019



302657081350501

GRANT

7-18-84

Site Ident No **302657081350501** RG Number **R=01** Transaction **T=③ D M V**
 add, delete, modify, verified

Site-Type **2=C D E H I M O P S T (W) X** Data **3=③ U** Reliability **3=③ U** Reporting Agency **4=FLO39**
 collector, drain, excise, sink, connector, multiple, outcrop, pond, spring, tunnel, well, test, or shaft, hole, well, hole field checked, unchecked

District **6=121** State **7=12** County **DUVAL** **8=031**

Latitude **9=302657** Longitude **10=0813505**
 deg min sec deg min sec

J-3765 **SESENGS 3 T 15 27E**

14= EASTPORT Scale **15=24000**

10= **5**

19= A B C D E ③ G H K L M O P R T U V W **03080103**
 add, delete, modify, verified

23= A B C D E G H M O P R T U V W **③ X 2** **301**
 add, delete, modify, verified

24= A B C D E F ③ G H I J K L M N P Q R S T U V W X Y Z
 add, delete, modify, verified

25= **26=** **27=620** **28=620** **D**
 Tertiary Use of Water Depth of Well

30= -20.3 **07161984** **33=5**
 Water Level Date Measured Source

34= A B C D E ③ F G H I J K L M N O P Q R S T U V W X Y Z
 add, delete, modify, verified

37= D E F G H I J N C P R S T V W X Y Z
 add, delete, modify, verified

38= **39=** **21-06141984**
 Source of Construction Date

R=158 **T=③ D M** **06141984**
 add, delete, modify

Name Last **161= LEWIS** **ELMER**

R=189 **T=③ D M** **190# SJ** **FLAWMD**
 add, delete, modify

R=190 **T=③ D M** **190# CAULEY LN** **FLO39**
 add, delete, modify

R=186 **T=③ D M** **187=07/16/1984** **GRANT**
 add, delete, modify Date of Visit

R=192 **T=③ D M** **193# 07/16/1984** **195**
 add, delete, modify Date

196# 0.0010 **197# 28**
 Temperature Degrees C

196# 0.0095 **197# 420**
 Conductance u Mhos

198# **197#**
 Other (STORET) Parameter Value

198# **197#**
 Other (STORET) Parameter Value

R = 58 * T = A D M * Entry No 59 # 0.0.1 *

Date of Construction 06 14 1984 *

Source of Data 0

03765

Name of Contractor 06 SMITH *

Construction 65 = A B C D (H) E F G R T V W X Y Z

air rotary buried or augered cable tool dug hydraulic rotary jetted auger or other reverse rotary trenching driven drive wash other

Material of Hole Segment 66 = C F G H O P S T W (S) Z * Type of Soil 67 = B C G N Z *

Concrete port screen horizontal gallery open end perforated or slotted screen jetted or other

Method of Development 69 = A B C D E F S * Number of Hours in Development 70 = *

air lift, bailed, compressed air, pump, air pump, other

Chemical Treatment 71 = C D E F H M Z *

Chemical Development chemicals, drilling explosives, defoliant, hyperinfecting, herbicide, etc.

SECTIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # 0.0.1 *

Top of Hole Segment Below LSD

| | | |
|------|-------|---|
| 73 # | 0. | * |
| 73 # | 1.05. | * |
| 73 # | | * |
| 73 # | | * |
| 73 # | | * |

Bottom of Hole Segment Below LSD

| | | |
|------|------|---|
| 74 = | 105. | * |
| 74 = | 620. | * |
| 74 = | | * |
| 74 = | | * |
| 74 = | | * |

Diameter of Hole Segment

| | | |
|------|----|---|
| 75 = | 3. | * |
| 75 = | 2. | * |
| 75 = | | * |
| 75 = | | * |
| 75 = | | * |

New Card for Each Hole Segment Copy to T & Field 59

OPENINGS - RULE 12

R = 76 * T = A D M * Construction Entry No 59 # 0.0.1 *

Top of Casing Segment Below LSD

| | | |
|------|-------|---|
| 77 # | 0. | * |
| 77 # | 1.05. | * |
| 77 # | | * |
| 77 # | | * |
| 77 # | | * |

Bottom of Casing Segment Below LSD

| | | |
|------|------|---|
| 78 = | 105. | * |
| 78 = | 525. | * |
| 78 = | | * |
| 78 = | | * |
| 78 = | | * |

Diameter of Casing Segment

| | | |
|------|----|---|
| 79 = | 3. | * |
| 79 = | 2. | * |
| 79 = | | * |
| 79 = | | * |
| 79 = | | * |

Casing Material 80 = 9 * 80 = 5 * 80 = * 80 = *

Thickness of Casing

| | | |
|------|--|---|
| 81 = | | * |
| 81 = | | * |
| 81 = | | * |
| 81 = | | * |
| 81 = | | * |

New Card for Each Open Section With Same R, T and Field 59

OPENINGS - SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 #

Top of Section Below LSD 83 # * *

Bottom of Section Below LSD 84 = *

Type of Openings 85 = *

Type of Material 86 = *

Width of Opening 87 = *

Length of Opening 88 = *

89 = *

(Openings Data)

| | | |
|------|--|---|
| 83 # | | * |
| 84 = | | * |
| 85 = | | * |
| 86 = | | * |
| 87 = | | * |
| 88 = | | * |
| 89 = | | * |

(Openings Data)

| | | |
|------|--|---|
| 83 # | | * |
| 84 = | | * |
| 85 = | | * |
| 86 = | | * |
| 87 = | | * |
| 88 = | | * |
| 89 = | | * |

FOOTNOTES

1. Source of Data Codes

| | | | | | | | | |
|-----|-------|-------|------|--------|------------|------|-----|-------|
| A | D | G | L | M | O | R | S | Z |
| air | drill | auger | port | screen | horizontal | open | end | other |

2. Casing Material Codes

| | | | | | | | | | | | | |
|-------|----------|------|-------|---------|-------|-----|----|--------|----|-------|-----|-------|
| B | C | D | G | I | M | P | R | S | T | U | V | Z |
| brick | concrete | clay | galv. | wrought | other | PVC | or | rubber | or | steel | tin | other |

3. Type of Openings Codes

| | | | | | | | | | |
|-------|---------|------|------------|------|--------|-----|--------|------|-------|
| F | L | M | P | R | S | T | W | X | Z |
| flush | drilled | port | perforated | wire | screen | end | walled | open | other |

4. Type of Material Codes for Open Sections

| | | | | | | | | | |
|-------|----|--------|-------|---------|-------|-----|----|-----------|-------|
| F | C | G | I | M | P | R | S | T | Z |
| brass | or | bronze | galv. | wrought | other | PVC | or | stainless | steel |

J 3765

[illegible]

R=90 * T= A D M *
add, delete, modify

Entry No 256 # 001 *

93= 120FLRD *

Contributing Unit

LMSN *

97= MARINE

Unit Identifier

Lithologic Modifier

REF DATA (2)

R=94 * T= A D M *
add, delete, modify

Geohydrologic Unit Entry No 256 #

J 3765

Date 95 # / / *
month day year

Water Level 126 =

PHYSIOLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= A D M *
add, delete, modify

Entry No 256 #

Depth to Top 91 =

Depth to Bottom 92 =

93= *

94= *

95= *

97= *

Unit Identifier

Contributing Unit

Lithology

Lithologic Modifier

REF DATA (2)

R=94 * T= A D M *
add, delete, modify

Geohydrologic Unit Entry No 256 #

Date 95 # / / *
month day year

Water Level 126 =

Water Contained 122 =

REMARKS

R=183 * T= A D M *
add, delete, modify

New Core Same R&T

Remark No. 311 # *

185 =

311 # *

185 =

R=212 *

T= A *

210= 216, 310, CAULEY, LANE *

P S N U
very boundary non unknown
slight contributing contributing



CAULEY LN.

WATER BLUFF D.R.E

65'

B-141

181'

WATER CONSERVATION PROGRAM WATER WELL FIELD INSPECTION REPORT

0259 Complaint No. 84-39 TWUP No. 5-3765 Construction/Plugging Permit No. Well Inventory No

Is Well Free Flowing? Yes ☒ No ☐

Owner ELMER LEWIS Phone 757-0873

Owner's Address 2680 CAULEY LANE

Well Location Address SAME

Well Drilling Contractor O.E. SMITH License/Bond No. 1068

Site Identification: 30 26570813505 01 Lat./Long (if different) 30 081 01

SE SE NE 3 15 27E EASTPORT
1/4 1/4 1/4 Section TWP Range Quad Map Name

Depth of Hole Drilled 620' Depth of Well 620' How measured DRILLERS RPT

Diameter/Cross Section 3" X 2" Depth of Casing 525'

Depth and Diameter of Well Segments: 3 " from LSD to 105 '
2 " Dia. from 105 ' to 620 ' " Dia. from ' to '

Depth and Diameter of Casing Segments: 3 " Dia. from 0 ' Above LSD
105 ' 2 " Dia. from 105 ' to 525 ' Below

Type and Quantity of Grouting Used 11 Bgs NEAT CF Well centered in Grout?

Use of Well DOMESTIC Number of People Served

Water Level 8.8 PSI / 20.3 ft Above LSD Measuring Pt. 0 ' Above LSD
 Below Below

How Measured PRESSURE GAUGE Measured by GRANT Date 7-16-84

Method of Construction ROTARY Date of Construction 6-14-84

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.)
NEW

Casing Material Used GALVANIZED

Altitude 10' Interval 10'

Topo Setting FLAT

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer than 300'

Distance to nearest Contaminant - Septic Tank; etc., if less than 100'

Maximum Well Yield GPM Average Well Yield GPM

Free Flow Well Yield 30 GPM How Yield Determined DRILLERS RPT.

Frequency of Well Use 24 Hrs/Day 365 Days/Year

Pump Data - Type and Make _____ HP _____

Pump Capacity _____ GPM No. Bowls or Stages _____

Type of Power _____ Static Water Level _____

Production Water Level _____ Pump Intake Setting _____
= Depth of Section Line

Water Sampled for: Dissolved Solids _____ Conductivity 420 μMhos

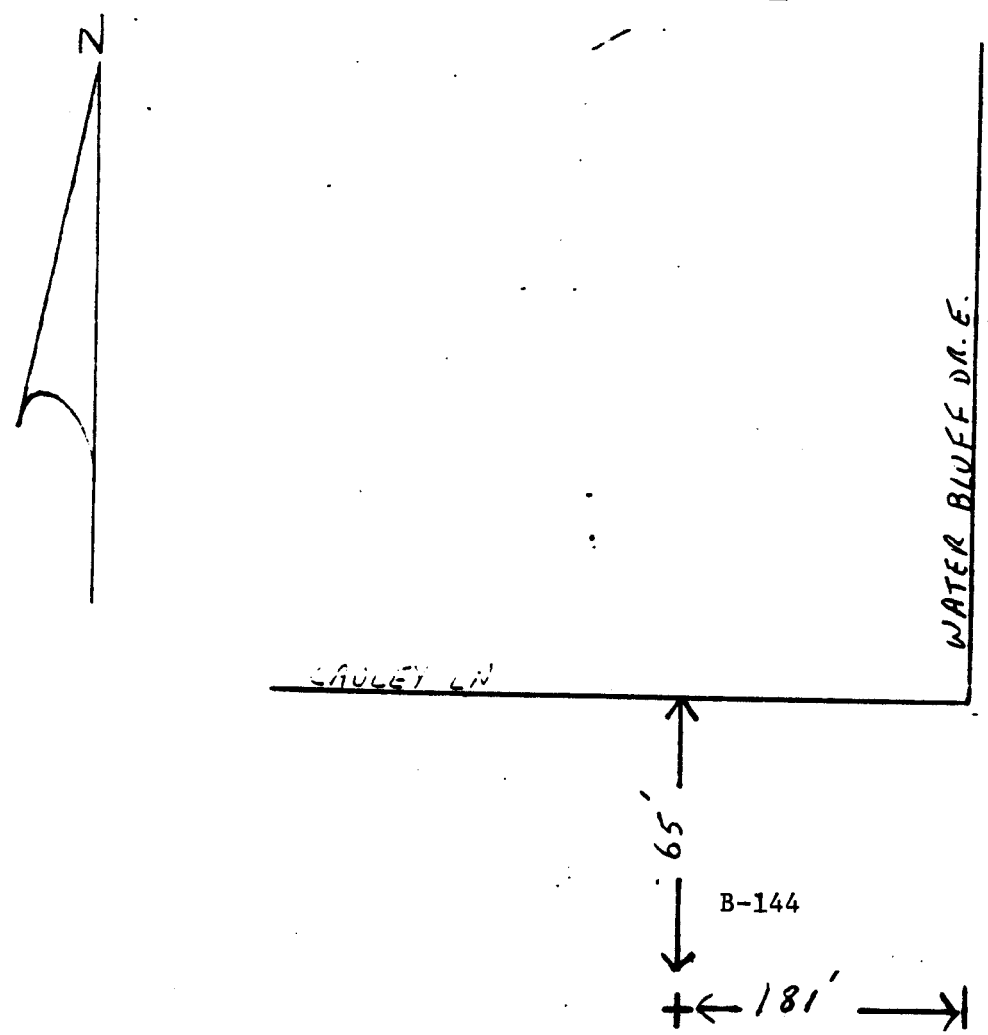
Hardness _____ Chlorides _____ PH= _____ Temperature 28 °

General Rating: Poor _____ Average ☒ Good _____ Excellent _____

Action Taken/Comments _____

Follow Up Needed _____

Inspector's Name LOU GRANT Field Inspection Date 7-16-84



Recorded by

YOST

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 1-28-80

Check One

English

Metric Units

GENERAL SITE DATA (I)

Site Ident No 302723081353701 RG Number R=0* Transaction T=(A) D M V*
 Site-Type 2=C D H I M P T W* Data 3=(C) U L M* Reporting Agency 4=FL039*
 Project No. 5= District 6=121* State 7=12* County Duval 8=031*
 Latitude 9=302723* Longitude 10=0813537* Lat-Long Accuracy 11=S (F) T M*
 Local Number 12= N-2432* Land Net Loc. 13=SENE-SW33 T1N R27E*
 Location Map 14=EASTPORT* Scale 15=24000*
 Altitude 16=1010* Method of Measurement 17=A L (M)* Accuracy 18=5*
 Topo Setting 19=D C E (F) H K L O P S T U V W* Hydrologic Unit (OWDC) 20=03080103*
 Date of First Construction/Completion 21=00/00/1980* Use of Site 23=A D E G H O M P R S T U (W) X Z*
 Use of Water 24=A B C D E F H I M N P R (S) T U Y Z*
 Secondary Water Use 25=* Tertiary Use of Water 26=* Depth of Hole 27=* Depth of Well 28=* Source of Depth Data 29=*
 Water Level 30=* Date Measured 31= month day year Source 33=*
 Method of Measurement 34=A C E G H L M R S T V Z*
 Site Status 37=D F G H O P R S T V X Z*
 Source of Geohydrologic Data 36=* Pump Used 35=no Measuring Point 266=* Measuring Point Date 267= month day year

OWNER IDENTIFICATION (1)

R=158* T=(A) D M* Date of Ownership 159# 00/00/1980*
 Name: Last 161=BENNETT* First 162=HUBERT* Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189* T=(A) D M* Ident 190=SJ* Assigner 191=FLA WMD*
 New Card Same R & T Ident 190=DUNN CREEK* Assigner 191=FL039*

SITE VISIT DATA (1)

R=186* T=(A) D M* Date of Visit 187# 01/25/1980* Name of Person 188=YOST*

FIELD WATER QUALITY MEASUREMENTS (1)

R=192* T=A D M* Date 193# month day year Geohydrologic Unit 195#*
 New Card Same R thru 195 Temperature 196# 00010* Degrees C 197=*
 Conductance 198# 00095* μ Mhos 197=*
 Other (STORET) Parameter 199#* Value 197=*
 Other (STORET) Parameter 199#* Value 197=

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency reported.

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)
 R = 90 * T = A D M *
 add, delete, modify
 Entry No. 256 # 001 * Depth to Top 91 = * Depth to Bottom 92 = *

Unit Identifier 93-120 FLRD *

Lithology

| | |
|------|-----------|
| 96 - | L.A.S.N * |
|------|-----------|

Lithologie Modifier 97 = MARINE *

AQUIFER DATA (2)

| | | | | | | |
|--------|---|-----|---|---|---|---|
| R = 94 | * | T = | A | D | M | * |
|--------|---|-----|---|---|---|---|

add, delete, modify

| | | | | | |
|-----------------------------|-----|---|--|--|---|
| Geohydrologic Unit Entry No | 256 | 7 | | | * |
|-----------------------------|-----|---|--|--|---|

Date 95 # / / *
month day year

Water Level 126 = 

| | | | | |
|---------------------|-----|--|--|---|
| % Water Contributed | 132 | | | * |
|---------------------|-----|--|--|---|

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 i * T = 4 0 M *

Entry No. 256 #

Depth to Top 91 -

| | | | | |
|-----------------|------|--|--|---|
| Depth to Bottom | 92 = | | | * |
|-----------------|------|--|--|---|

Unit Identifier: 93 -

| | | | |
|-----------|------|--|---|
| Lithology | 96 = | | * |
|-----------|------|--|---|

| | | | | | | | | | | |
|------------------------|------|--|--|--|--|--|--|--|--|---|
| Lithologic
Modifier | 97 = | | | | | | | | | * |
|------------------------|------|--|--|--|--|--|--|--|--|---|

AQUIFER DATA (2)

| | | | | | | |
|--------|---|-----|---|---|---|---|
| R = 94 | * | T = | A | O | M | * |
|--------|---|-----|---|---|---|---|

add, delete, modify

Geohydrologic Unit Entry No.

| | | | |
|-------|--|--|---|
| 256 # | | | * |
|-------|--|--|---|

Date 95 # / / *
month day year

Water Level

| | | | | | | |
|-------|--|--|--|---|--|---|
| 126 = | | | | . | | * |
|-------|--|--|--|---|--|---|

| | | | | |
|---------------------|-------|--|--|---|
| % Water Contributed | 132 = | | | * |
|---------------------|-------|--|--|---|

PERTINENT REMARKS

R = 183 | * T = A *
add

| | |
|-------|--|
| 185 = | |
|-------|--|

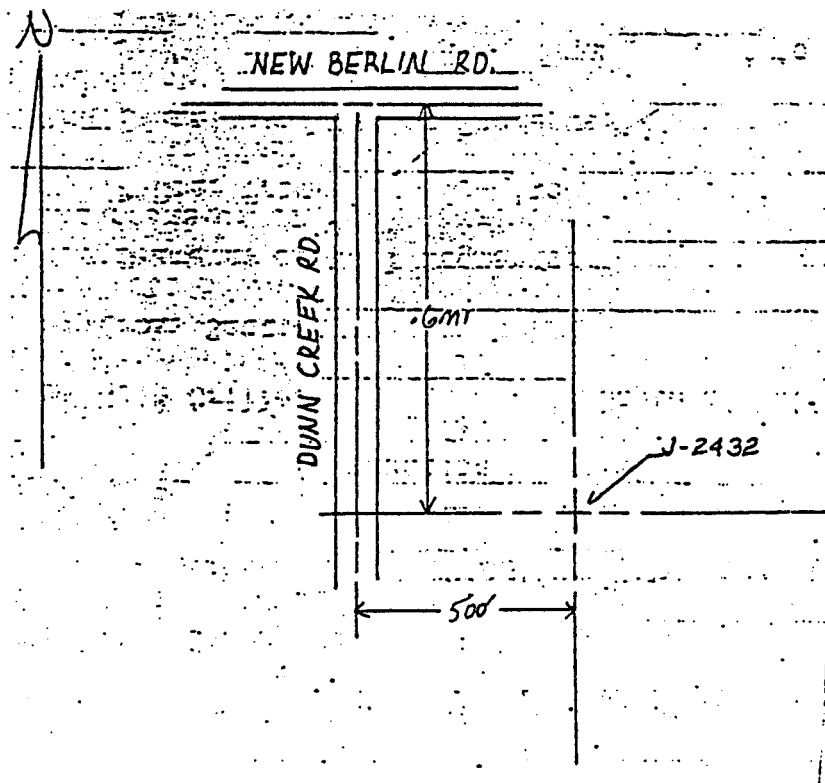
| | |
|------|--|
| 185- | |
|------|--|

New Card Same R&T

185-

NOTES:

R-212 * T- (A) * 212- 1,208.7, DUNN CREEK RD. *



PRINTING OFFICE : 1976 O - 213-137

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Recorded by GLENNDate 3/16/82Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (0)

Site Ident No 30273408/355101 RG Number R-0* Transaction T- (A) D M V *
 Site-Type 2- C D H I M P T (A) * Data Reliability 3- (C) U L M * Reporting Agency 4- FLO39 *
 Project No. 5- * District 6- 121 * State 7- 12 * County (or town) Pinal * 8- 031 *
 Latitude 9- 302734 * Longitude 10- 0813551 * Lat-Long Accuracy 11- S 0 T M *
 Local Number 12- J-2 820 * Land Net Loc. 13- SESENE S 33T 1N 27E *
 Location Map 14- EASTPORT * Scale 15- 24000 *
 Altitude 16- 10. * Method of Measurement 17- A L (A) * Accuracy 18- 5 *
 Topo Setting 19- D C E (A) H K L O P S T U V W * Hydrologic Unit (OWDC) 20- 03080101 *
 Date of First Construction/Completion 21- 00 00 1981 * Use of Site 23- A D E G H O M P R S T U (A) X Z *
 Use of Water 24- A B C D E F (A) I M N P R S T U Y Z *
 Secondary Water Use 25- * Tertiary Use of Water 26- * Depth of Hole 27- * Depth of Well 28- * Source of Depth Data 29- *
 Water Level 30- * Date Measured 31- / / * Source 33- *
 Method of Measurement 34- A C E G H L M R S T V Z *
 Site Status 37- D F G H I P R S T V X Z *
 Source of Geohydrologic Data 38- * Pump Used 35- * Measuring Point 266- * Measuring Point Date 267- / / *

OWNER IDENTIFICATION (1)

R-158 * T- (A) D M * Date of Ownership 159- 00/00/1981 *
 Name: Last 161- SAMPSON * First 162- RAYMOND * Middle Initial 163- L *

OTHER SITE IDENTIFICATION NUMBERS (1)

R-188 * T- (A) D M * Ident 190- ST * Assigner 191- FLAND *
 New Card Same R & T Ident 190- PULM CREEK * Assigner 191- FLO39 *

SITE VISIT DATA (1)

R-186 * T- (A) D M * Date of Visit 187- 03/16/1982 * Name of Person 188- GLENN *

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 * T- A D M * Date 193- / / * Geohydrologic Unit 195- *
 New Card Same R thru 195
 Temperature 196- 00010 * Degrees C 197- *
 Conductance 196- 00085 * μ Mhos 197- *
 Other (STORE) Parameter 196- * Value 197- *
 Other (STORE) Parameter 196- * Value 197- *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
 reporting, driller, owner, other govt, other logs, geologist, other

| | | | | |
|--|--|------------------------------|--|---|
| R = 50 * | T = D M *
<small>add, delete, modify</small> | Entry No. 59 # 00.1 * | Date of Construction Completion
60 = 00/00/1981 *
<small>month day year</small> | Source of ①
Const. Data 64 = 1 * |
| Name of Contractor/Driller: 63 GRIFFIS * | | | | |
| Method of Construction
65 = A B C D <u>PH</u> J P R T V W Z *
<small>air, rotary bored, or augered cable tool dug, hydraulic, rotary jetted, air percussive reverse, rotary trenching, driven, driven, wash other</small> | | | | |
| Finish
66 = C F G H <u>Ø</u> P S T W <u>Ø</u> Z *
<small>porous, concrete gravel, pool gravel, screen horizontal, gallery open, and perforated, or slotted screen, sand point, welded, open, hole other</small> | | | | |
| Type of Seal 67 = B C G Z *
<small>bitumens clay, cement, other grout</small> | | | | |
| Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z *
<small>air-lift, bailed, compressed, jetted, none, other, surged, other pump air</small> | | | | |
| Number of Hours in Development 70 = * | | | | |
| Special Treatment During Development 71 = C D E F H M Z *
<small>chemicals, dry ice, explosives, deflocculant, hydraulic fracturing, mechanical, other</small> | | | | |

| | | | |
|-------------------------------|-------------|-----------------------|------|
| R = 72 * | T = A D M * | Construction Entry No | 59 # |
| add, delete, modify | | | |
| Top of Hole Segment Below LSD | | | |
| | | 73 # | • * |
| | | 73 # | • * |
| | | 73 # | • * |
| | | 73 # | • * |
| | | 73 # | • * |

New Card for Each Hole Segment
Same R, T & Field 59

| | | | | | |
|---------------------------------|------------------------------------|----------------------------|--------------------------------|--|--|
| R = 76 * | T = A D M * | Construction Entry No | 59 # | New Card for Each Casing With Same R, T & Field 59 | |
| add, delete, modify | | | | | |
| Top of Casing Segment Below LSD | Bottom of Casing Segment Below LSD | Diameter of Casing Segment | Casing Material ⁽⁵⁾ | Thickness of Casing | |
| 77 # | 78 = | 79 # | 80 = | 81 = | |
| 77 # | 78 = | 79 # | 80 = | 81 = | |
| 77 # | 78 = | 79 # | 80 = | 81 = | |
| 77 # | 78 = | 79 # | 80 = | 81 = | |
| 77 # | 78 = | 79 # | 80 = | 81 = | |

| | | | | |
|-----------------------------|---------------------|-----------------------|------|--|
| R = 82 * | T = A D M * | Construction Entry No | 59 # | New Card for Each Open Section With Same R, T and Field 59 |
| | add, delete, modify | (Openings Data) | | |
| Top of Section Below LSD | 83 # | | | |
| Bottom of Section Below LSD | 84 = | | | |
| Type of Openings ① | 85 = | | | |
| Type of Material ② | 86 = | | | |
| Diameter of Open Section | 87 = | | | |
| Width of Opening | 88 = | | | |
| Length of Opening | 89 = | | | |

| S | D | S | A | R | L | G | Z |
|---|---|---|---|-----------|------------------------|---|---|
| reporting, driller, owner, other gov't. | | | | other | logs, geologist, other | | |
| country | | | | reported. | | | |

| B | C | G | I | M | P | R | S | T | U | W | Z |
|------------------|-------|----------|--------|---------|--------|--------|-------|---------|-------|-------|---|
| brick, concrete, | galv. | wrought, | other, | PVC or, | rebar, | steel, | tile, | coated, | wood, | other | |
| | iron | iron | metal | plastic | stone | | | steel | | | |

| F | L | M | P | R | S | T | W | X | Z |
|-----------------|--------|-------------|-----------------|---------|-------|---------|-------|-------|---|
| ature, lowered, | marsh, | perforated, | wire- | screen, | sand, | walled, | open, | other | |
| shuttered | | or slotted | wound (unknown) | point | | | | hole | |

| B | C | G | I | M | P | R | S | T | Z |
|--------------------|----------|---------------|------------------|-----------------|--------------------|---------------------|--------------------|---|---|
| brass or
bronze | concrete | galv.
iron | wrought,
iron | other,
metal | PVC or,
plastic | stainless,
steel | steel, tile, other | | |

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- B D M *

add, delete, modify

Entry No 258 # 001 *

Depth to Top 91 -

Depth to Bottom 92 -

Unit Identifier

93 - 120.5 L&A *

Lithology

96 - L&SN *

Lithologic Modifier

97 - HARINE *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No 258 #

Date

95 # / / *

month day year

Water Level

126 - *

% Water

Contributed 132 - *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No 258 #

Depth to Top 91 -

Depth to Bottom 92 -

Unit

Identifier

93 - *

Lithology

96 - *

Lithologic

Modifier

97 - *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No 258 #

Date

95 # / / *

month day year

Water Level

126 - *

% Water

Contributed 132 - *

PERTINENT REMARKS

R-183 *

T- A *

add

185 - *

New Card Same R&T

185 - *

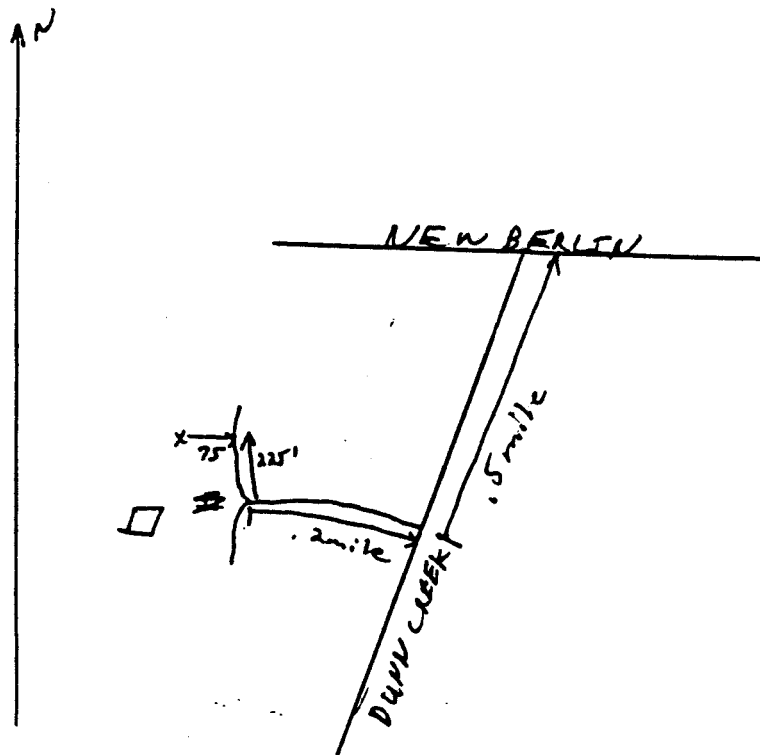
185 - *

NOTES:

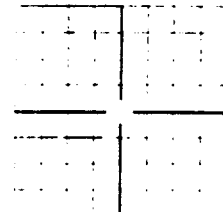
R-212 *

T- A *

120.5 DUNN CREEK ROAD *



5 2870



JPM 8-1042C
(rec. 88)

Well No. 30 26 47 081 34 41

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR GEOLOGICAL SURVEY WATER RESOURCES DIVISION

MASTER CARD

Record by FLYNN Source of data State Date 7/11/64 Map CR 8R 4

State FLORIDA County (or town) DUNN Section 1-1-1

Latitude: 30 26 47 N Longitude: 81 34 41 W Sequential number: 7

Well name: 15 S. 27. sec 2, T15N, R15W, S.W. 1/4, T15N, R15W

Local well number: 7160 Other number: 2

Local use: WATER Owner or name: JOHN L. ROBERTSON Address: 415 WOODBINE ST.

Comments: County, Fed Gov't, City, Corp of Co., Private, State Agency, Water Dist

Use of (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Use of (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Use of (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

DATA AVAILABLE: Well data ☐ Ereq. w/l meas. ☐ Field aquifer char. ☐

Hyd. lab. data: ☐

Qual. water data: ☐

Test. sampling: ☐

Aperture cards: ☐

Log data: ☐

WELL-DESCRIPTION CARD

Same as on Master Card

Depth well: 560 ft. Casing size: 6 in 4 in Dia. 3 X 2 in

Material: concrete (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Method: drilled (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drilled: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Drill: rot (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)

Well No. 30 26 47 081 34 41

Latitude: longitude 30 26 47 081 34 41

HYDROGEOLOGIC CARD

Same as on Master Card

Physiographic features: depression, stream channel, dunes, flat, hilltop, sink, swamp, off-shore, pediment, hillside, terrace, undulating, valley flat

Major aquifers: system section aquifer, formation, group aquifer thickness ft

Lithology: length of well open to ft origin ft depth to top of ft

Minor aquifers: system section aquifer, formation, group aquifer thickness ft

Lithology: length of well open to ft origin ft depth to top of ft

Material: depth to consolidated rock ft source of data ft

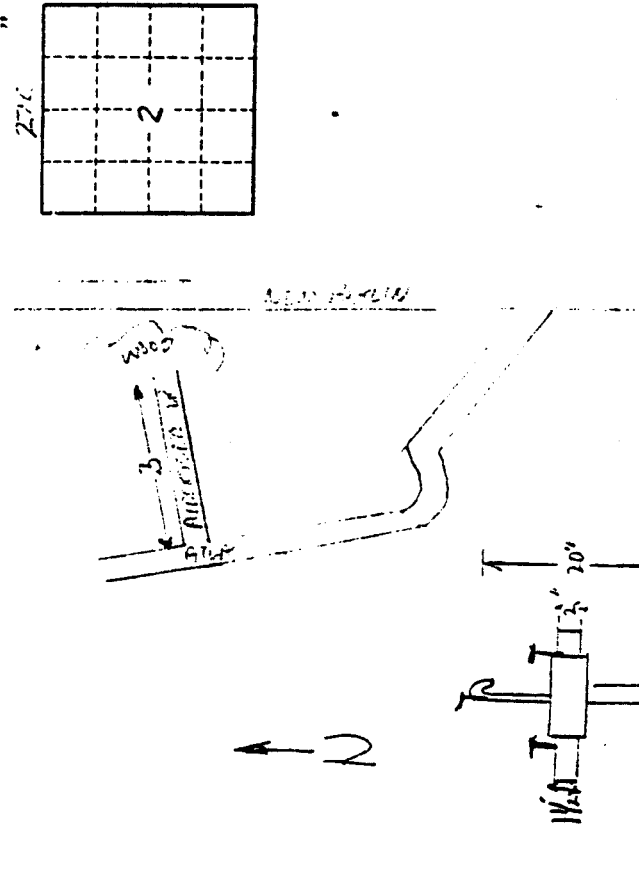
Depth to basement: ft source of data ft

Surface material: infiltration characteristics ft

Coefficient of permeability: ft source of data ft

Coefficient of storage: ft source of data ft

Rate: ft source of data ft



STATE OF FLORIDA
WATER WELL CONTRACTOR'S
WELL COMPLETION REPORT
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES

203 Pennington Building, Tallahassee, Florida 32304
Telephone (904) 498-8478

No. 71112

Permit No. 75-6A

Owner's Well Identification 160

State Well Number
For Department Use
ONLY

1. OWNER: Donard Palacios
Name 1115 Woodbine St. Tall
Address Tall City Duval State FL

2. LOCATION OF WELL: 1115 Woodbine St. Tall
Street Address/Rail
City Tall County Duval
Subdivision 12 Lot No.
Section 12 Township 12 Range 12

3. PURPOSE OF WELL:
☒ Domestic ☐ Irrigation ☐ Public Supply
☐ Industrial ☐ Stock ☐ Other

4. TYPE OF WORK:
☒ New Well ☐ Plugging ☐ Other
☐ Deepening ☐ Reconditioning

5. QUALITY:
☒ Clear ☐ Colored ☐ Sulfur ☐ Salty ☐ Other
CHECK TEST MADE
☒ None ☐ Bacteria ☐ Chemical
Chloride PPM ☐ County Health Dept.
(Check ☐ if test was for ☐ State Health Dept.
sodium chloride) ☐ U.S.G.S.
Temperature 58 Name Donard Palacios
Well Disinfected ☐ Yes ☒ No Address 1115 Woodbine St. Tall

6. EQUIPMENT:
☒ Rotary ☐ Cable Tool ☐ Other
☐ Jet ☐ Reverse Rotary

7. GROUT:
☐ None ☐ Cement ☐ Other
Describe and give number of bags (94 lb.) From (ft) To (ft)

8. CASING AND LINER PIPE:
Diameter (inches) 3" Kind Steel From (ft) To (ft)
3" Steel 0 103
(Check One) ☒ Threaded & Coupled ☐ Welded Only 530
☐ T & C & Welded ☐ Other

9. WATER LEVEL:
Water level after well completed 30 feet
☒ Above ☐ Below land surface
Well Flowing: ☐ Yes ☒ No Flow 30 gal/min

10. SCREENS:
Location (ft) Below Surface
Make Materials Diameter (in) Slot Size From (ft) To (ft)

11. UPPER END OF WELL:
☐ Pump Installed ☒ Valve ☐ Plug ☐ Other

12. PUMPING TEST:
Date 10/15/75 ☐ Test Pump ☒ Permanent Pump
Measure point is 30 feet
which is 30 feet ☐ above ☒ below land surface
Static water level 30 feet ☐ above ☒ below measure point
Maximum Drawdown 30 feet
Discharge at maximum drawdown 30 gal/min
After 30 hours

13. PUMP INSTALLED:
Type Submersible Make Grundfos Model No. 103
Motor Power 1/2 Make Grundfos H.P.
Capacity 30 Gal/min at 30 ft. of total dynamic head
No. of bowls or stages 1
Pump setting 30 feet

| 14. WELL LOG: | | | Note each type of material passing through, & cavities if any. Give description not less than 20 foot intervals and at changes. |
|----------------------|------|-----|---|
| Well
Bore
(in) | From | To | |
| 0 | 0 | 20 | Sand |
| 20 | 20 | 40 | Sand |
| 40 | 40 | 60 | Sand |
| 60 | 60 | 80 | Rock |
| 80 | 80 | 100 | Rock |
| 100 | 100 | 120 | Rock |
| 120 | 120 | 140 | Rock |
| 140 | 140 | 160 | Rock |
| 160 | 160 | 180 | Rock |
| 180 | 180 | 200 | Rock |
| 200 | 200 | 220 | Rock |
| 220 | 220 | 240 | Rock |
| 240 | 240 | 260 | Rock |
| 260 | 260 | 280 | Rock |
| 280 | 280 | 300 | Rock |
| 300 | 300 | 320 | Rock |
| 320 | 320 | 340 | Rock |
| 340 | 340 | 360 | Rock |
| 360 | 360 | 380 | Rock |
| 380 | 380 | 400 | Rock |
| 400 | 400 | 420 | Rock |
| 420 | 420 | 440 | Rock |
| 440 | 440 | 460 | Rock |
| 460 | 460 | 480 | Rock |
| 480 | 480 | 500 | Rock |

CONTRACTOR'S CERTIFICATION:
This work was done under my supervision and this report is true to the best of my knowledge and belief. The work commenced on 10/15/75 and was completed on 10/15/75
Contractor Donard Palacios License Number 103
City Tall County Duval State FL

POTABLE WATER MONTHLY REPORT
NORTHSIDE GENERATING STATION
PRODUCTION PERFORMANCE DIVISION

DATE SAMPLED: 1-19-89

PERIOD COVERED: 1/1/89 thru 1/31/89
M D Y M D Y

REPORT DATE: 2-14-89

1. A sample of potable water from MAINTANANCE BREAKroom SINK was analyzed for:

CATIONS: sample number 890117

ANIONS: sample number 890118

| | | | LIMIT |
|-----------|-----------------|------|-------|
| Boron | <u><1.0</u> | mg/L | * |
| Calcium | <u>44.10</u> | mg/L | * |
| Chromium | <u><0.01</u> | mg/L | 0.05 |
| Iron | <u><0.05</u> | mg/L | 0.3 |
| Magnesium | <u>22.4</u> | mg/L | * |
| Sodium | <u>15.1</u> | mg/L | 160 |
| Vanadium | <u><0.1</u> | mg/L | * |

| | | | LIMIT |
|-------------|-----------------|------|-------|
| Alkanlinity | <u>140</u> | mg/L | * |
| Chlorides | <u>35</u> | mg/L | 250 |
| Hardness | <u>23.6</u> | mg/L | * |
| Nitrate | <u>0.02</u> | mg/L | 10 |
| Nitrite | <u><0.02</u> | mg/L | * |
| Phosphate | <u>0.05</u> | mg/L | * |
| Silicates | <u>29.3</u> | mg/L | * |
| Sulfate | <u>30</u> | mg/L | 250 |

* NO PRIMARY OR SECONDARY DRINKING WATER LIMIT

2. Number of daily samples during the month the chlorine was below the 0.2 mg/L limit 1
3. Date samples last sent to the Health Department (required quarterly) JAN 19, 1989
4. COMMENTS: Jan 21, 1989 chlorine level dropped below 0.2 mg/L. Injection rate was raised and level of chlorine was above minimum at next check.

SIGNED: Robert Lucas

cc: R.N. Jones
G.A. Finklea
W.R. Jenkins
Northside Safety Committee Chairman

File: potable

Recorded by Glean

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 12-30-81Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302530081375401 RG Number R=0* Transaction T=0 D M V*
 Site-Type 2=C D H I M P T 0* Data 3=0 U L M* Reporting Agency 4=FL039*
 Project No. 5= District 6=121* State 7=12* County (or town) Dur 8=031*
 Latitude 9=302530* Longitude 10=0913754* Lat-Long Accuracy 11=S O T M*
 Local Number 12=J-2770 Land Net Loc 13=VERMENS 19 T 15 R 27 E
 Location Map 14=TROUT RIVER Scale 15=2400.0*
 Altitude 16=30.* Method of Measurement 17=A L 0* Accuracy 18=5*
 Topo Setting 19=D C E F H K L O P 0 T U V W* Hydrologic Unit (OWDC) 20=0308010*
 Date of First Construction/Completion 21=7/10/1981* Use of Site 23=A D E G H 0 M P R S T U 0 X Z*
 Use of Water 24=A B C D E 0 H I M N P R S T U Y Z*
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27=100.* Depth of Well 28=100.* Source of Depth Data 29=J*
 Water Level 30= Date Measured 31= Source 33=
 Method of Measurement 34=A C E G H L M R S T V Z*
 Site Status 37=D F G H 0 P R S T V X Z*
 Source of Geohydrologic Data 36= Pump Used 35= Measuring Point 266= Measuring Point Date 267=

OWNER IDENTIFICATION (1)

R=158* T=0 D M* Date of Ownership 159=7/10/1981*
 Name: Last 161=POWERS First 162=SERVILLO Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189* T=0 D M* Ident 190=ST Assigner 191=FLAWND
 New Card Same R & T Ident 190=BUSCH Assigner 191=FL039

SITE VISIT DATA (1)

R=186* T=0 D M* Date of Visit 187=12/29/1981* Name of Person 188=GLEAN

FIELD WATER QUALITY MEASUREMENTS (1)

R=192* T=A D M* Date 193= Geohydrologic Unit 195=
 New Card Same R thru 195 Temperature 196=00010* Degrees C 197=
 Conductance 196=00095* μ Mhos 197=
 Other (STORET) Parameter 196= Value 197=
 Other (STORET) Parameter 196= Value 197=

FOOT NOTES:

① Source of Data Codes:

S D 0 A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency reported.

WELL CONSTRUCTION DATA (1)

R = 58 * T = D O M * Entry No. 59 # 201 *

Date of Construction Completion 60 = 7 / 10 / 1991 *

Source of Const. Data 64 D *

Name of Contractor/Driller 63 DE SMITH *

Method of Construction 65 = A B C D J P R T V W Z *

Finish 66 = C F G H P S T W Z *

Type of Seal 67 = B C G Z *

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z *

Number of Hours in Development 70 = *

Special Treatment During Development 71 = C D E F H M Z *

J 2770

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = D O M * Construction Entry No. 59 # 000 *

Top of Hole Segment Below LSD

73 # 0 *
73 # 126 *
73 # *
73 # *
73 # *

Bottom of Hole Segment below LSD

74 = 126 *
74 = 200 *
74 = *
74 = *
74 = *

Diameter of Hole Segment

75 = 2 *
75 = 2 *
75 = *
75 = *
75 = *

New Card for Each Hole Segment
Same R, T & Field 59

CASING SCHEDULE (2)

R = 78 * T = D O M * Construction Entry No. 59 # 001 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 # 0 *
77 # 126 *
77 # *
77 # *
77 # *

Bottom of Casing Segment Below LSD

78 = 126 *
78 = 462 *
78 = *
78 = *
78 = *

Diameter of Casing Segment

79 = 2 *
79 = 2 *
79 = *
79 = *
79 = *

Casing Material 5

80 = 6 *
80 = 6 *
80 = *
80 = *
80 = *

Thickness of Casing

81 = *
81 = *
81 = *
81 = *
81 = *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No. 59 # * *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # * *

Bottom of Section Below LSD 84 = * *

Type of Openings ①

Type of Material ②

Diameter of Open Section

Width of Opening

Length of Opening

85 = * *

86 = *

87 = *

88 = *

89 = *

(Openings Data)

83 # * *

84 = * *

85 = * *

86 = *

87 = *

88 = *

89 = *

(Openings Data)

83 # * *

84 = * *

85 = * *

86 = *

87 = *

88 = *

89 = *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency reported

⑤ Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv. wrought, other, PVC or, rock or, steel, tile, coated, wood, other iron iron metal plastic stone steel

⑥ Type of Openings Codes

F L M P R S T W X Z
fracture, slurred, mesh, perforated, wire-screen, sand, walled, open, other, shuttled, or slotted, wound (unknown), point, hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv. wrought, other, PVC or, stainless, steel, tile, other, bronze, iron iron metal plastic steel

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- *Q* D M *Entry No 256 # *08* *

Depth to Top 91 =

Depth to Bottom 92 =

add, delete, modify

Unit Identifier

93- *12 FCLD* *

Lithology

96- *LH5N*

Lithologic Modifier

97- *MAINE*

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic Unit Entry No

256 #

Date

95 # / / *

month day year

Water Level

126 = *

% Water

Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No 256 # *

Depth to Top 91 = *

Depth to Bottom 92 = *

Unit Identifier

93 = *

Lithology

96 = *

Lithologic Modifier

97 = *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic Unit Entry No

256 # *

Date

95 # / / *

month day year

Water Level

126 = *

% Water

Contributed 132 = *

PERTINENT REMARKS

R-183 *

T- A *

add

185 = *

New Card Same R&T

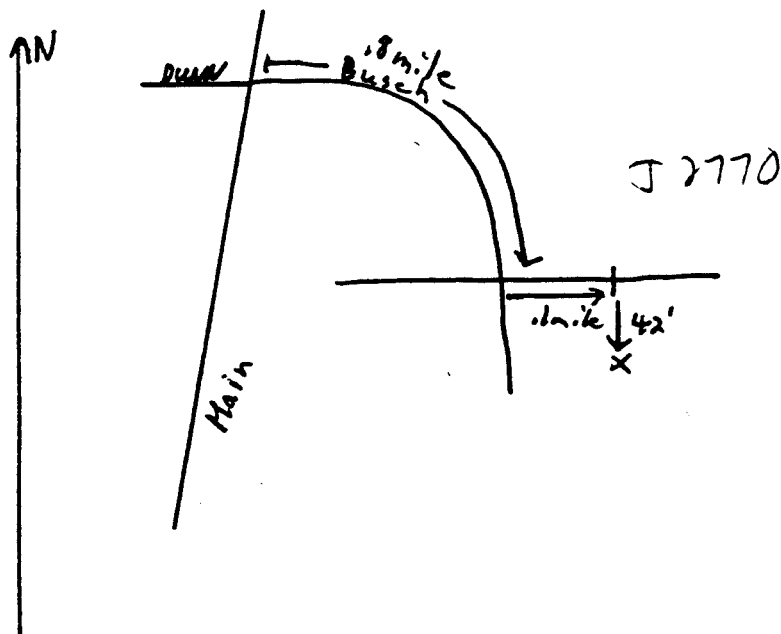
185 = *

185 = *

NOTES:

R-201 *

T- A *

200- *10485 BUSCH DRIVE* *

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Recorded by EssexDate 1-7-80Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302528081381601 RG Number R=0 Transaction T=A D M V
 Site-Type 2=C D H I M P T Data 3=C U L M Reporting Agency 4=FL039
 Project No. 5= District 6=121 State 7=12 County (or town) DUNEL 8=031
 Latitude 9=302528 Longitude 10=0813816 Lat-Long Accuracy 11=S C T M
 Local Number 12= Land Net Loc. 13=SW SW SE E 7 T 1 S R 27 E
 Location Map 14=TRAUT RIVER Scale 15=24000
 Altitude 16=20 Method of Measurement 17=A L M Accuracy 18=5
 Topo Setting 19=D C E F H K L O P S T U V W Hydrologic Unit (OWOC) 20=03080103
 Date of First Construction/Completion 21=00/00/1979 Use of Site 23=A D E G H O M P R S T U W X Z
 Use of Water 24=A B C D E F H I M N P R S T U Y Z
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27= Depth of Well 28= Source of Depth Data 29=
 Water Level 30= Date Measured 31= Source 33=
 Method of Measurement 34=A C E G H L M R S T V Z
 Site Status 37=D F G H O P R S T V X Z
 Source of Geohydrologic Data 36= Pump Used 35= Measuring Point 266= Measuring Point Date 287=

OWNER IDENTIFICATION (1)

R=158 T=A D M Date of Ownership 159=00/00/1979
 Name: Last 161=WEBB First 162=INTERNATIO Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=183 T=A D M Ident 190=SU Assigner 191=FLA WMD
 New Card Same R & T Ident 190=MAIN Assigner 191=FL039

SITE VISIT DATA (1)

R=186 T=A D M Date of Visit 187=12/27/1979 Name of Person 188=ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 T=A D M Date 193= Geohydrologic Unit 195=
 New Card Same R thru 195 Temperature 196=0.0.0.1.0 Degrees C 197=
 Conductance 198=0.0.0.9.5 μ Mhos 197=
 Other (STORET) Parameter 198= Value 197=
 Other (STORET) Parameter 198= Value 197=

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency reported.

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= Q D M * add, delete, modify Entry No 256 # 001 * Depth to Top 91 = * Depth to Bottom 92 = *

Unit Identifier 93 = 120EVRD * Lithology 96 = LMSH * Lithologic Modifier 97 = MARINE *

AQUIFER DATA (2)

R=94 * T= A D M * add, delete, modify Geohydrologic Unit Entry No 256 # * *

Date 95 # / / * Water Level 126 = * % Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= A D M * add, delete, modify Entry No 256 # * * Depth to Top 91 = * Depth to Bottom 92 = *

Unit Identifier 93 = * Lithology 96 = * Lithologic Modifier 97 = *

AQUIFER DATA (2)

R=94 * T= A D M * add, delete, modify Geohydrologic Unit Entry No 256 # * *

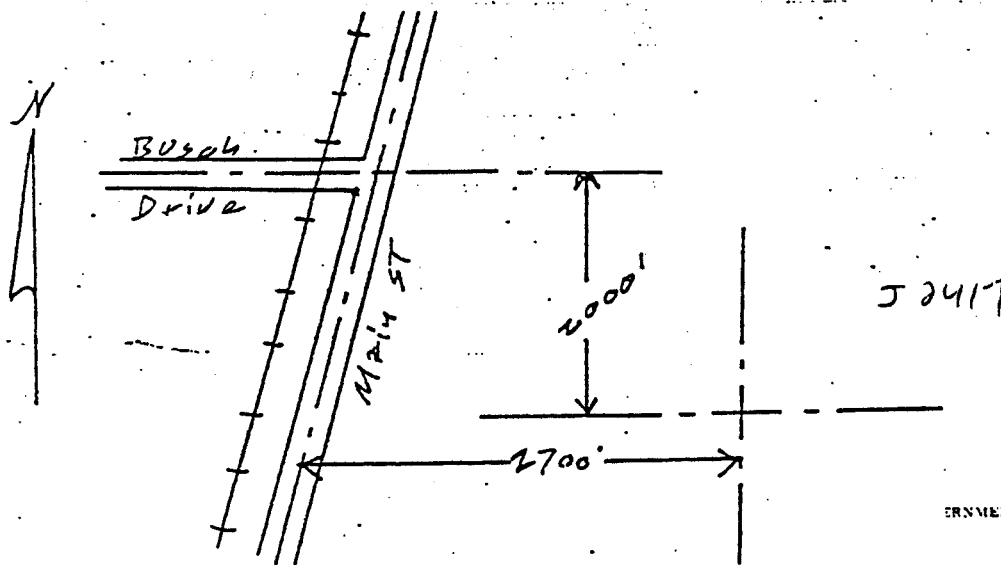
Date 95 # / / * Water Level 126 = * % Water Contributed 132 = *

PERTINENT REMARKS

R=183 * T= A * 185 = *
add
New Card Same R&T 185 = *
185 = *

NOTES:

R= 256 * T= A * 256 = WEBB INTERNATIONAL PARK



ENVIRONMENTAL PROTECTING OFFICE: 1976 O-213-137

Well No. 3C-2.5.390103132241

U. S. DEPT. OF THE INTERIOR
WELL SCHEDULE
GEOLOGICAL SURVEY

MASTER CARD

Record by 661606 Source C.F. Apples Date 1/20/60 No. 75 Tax 2.50 Min. Good

| | | | | |
|----------|-------------------|---------------------|-----------|-------------------------|
| State | Frieda | County
(or town) | Daniel | Counties
1-6 |
| Latitude | 3° 0' N | Longitude | 83° 13' W | Geographical
number: |
| Lat-long | 3° 0' N 83° 13' W | Altitude | 11 m | asc no |

[] 1 [] 2 [] 3 sec. 1 NE SE SW Tolls
 local
 rel number: 12-273-342 other numbers 342
 3 4 2

Local agent: _____
Office or place: JACKSONVILLE
Date of issue: 01-27-07
City of Tax: City of Jacksonville

| | (C) | (F) | (H) | (N) | (P) | (S) |
|--|-----|-----|-----|-----|-----|-----|
| Ownership: County, Fed Gov., City, Corp or Co, Private, State Agency, Water Dist | | | | | | |
| (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) | | | | | | |
| Line of Air cond, Bottling, Cook, Dumpster, Food, Ice, Junk, Lumber, Metal, Paper, Rubber, Tires, Toys, Wash, etc. | | | | | | |
| City | | | | | | |

[illegible]

DATA AVAILABLE: Well date ☐ 70 Freq. w/h. meas.: Original / ☒ Field aquifer char.

[illegible][illegible]**WELL-OFSCRIPTION CARD**

SANK AS ON MASTER CARD Birth mtl: 9/4/22 Mean. 7 4 2 Accuracy 8 10 6
Length card: 6.60 Card type: 6.6 C Plan. 8 10 6

[illegible][illegible]

| name | | address | | | | | other | | |
|------|--|---------|-----|-----|-----|-----|-------|-----|--|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | |
| 11 | (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z) (AA) (AB) (AC) (AD) (AE) (AF) (AG) (AH) (AI) (AJ) (AK) (AL) (AM) (AN) (AO) (AP) (AQ) (AR) (AS) (AT) (AU) (AV) (AW) (AX) (AY) (AZ) (BA) (BB) (BC) (BD) (BE) (BF) (BG) (BH) (BI) (BJ) (BK) (BL) (BM) (BN) (BO) (BP) (BQ) (BR) (BS) (BT) (BU) (BV) (BW) (BX) (BY) (BZ) (CA) (CB) (CC) (CD) (CE) (CF) (CG) (CH) (CI) (CJ) (CK) (CL) (CM) (CN) (CO) (CP) (CQ) (CR) (CS) (CT) (CU) (CV) (CW) (CX) (CY) (CZ) (DA) (DB) (DC) (DD) (DE) (DF) (DG) (DH) (DI) (DJ) (DK) (DL) (DM) (DN) (DO) (DP) (DQ) (DR) (DS) (DT) (DU) (DV) (DW) (DX) (DY) (DZ) (EA) (EB) (EC) (ED) (EE) (EF) (EG) (EH) (EI) (EJ) (EK) (EL) (EM) (EN) (EO) (EP) (EQ) (ER) (ES) (ET) (EU) (EV) (EW) (EX) (EY) (EZ) (FA) (FB) (FC) (FD) (FE) (FF) (FG) (FH) (FI) (FJ) (FK) (FL) (FM) (FN) (FO) (FP) (FQ) (FR) (FS) (FT) (FU) (FV) (FW) (FX) (FY) (FZ) (GA) (GB) (GC) (GD) (GE) (GF) (GG) (GH) (GI) (GJ) (GK) (GL) (GM) (GN) (GO) (GP) (GQ) (GR) (GS) (GT) (GU) (GV) (GW) (GX) (GY) (GZ) (HA) (HB) (HC) (HD) (HE) (HF) (HG) (HH) (HI) (HJ) (HK) (HL) (HM) (HN) (HO) (HP) (HQ) (HR) (HS) (HT) (HU) (HV) (HW) (HX) (HY) (HZ) (IA) (IB) (IC) (ID) (IE) (IF) (IG) (IH) (II) (IJ) (IK) (IL) (IM) (IN) (IO) (IP) (IQ) (IR) (IS) (IT) (IU) (IV) (IW) (IX) (IY) (IZ) (JA) (JB) (JC) (JD) (JE) (JF) (JG) (JH) (JI) (JJ) (JK) (JL) (JM) (JN) (JO) (JP) (JQ) (JR) (JS) (JT) (JU) (JV) (JW) (JX) (JY) (JZ) (KA) (KB) (KC) (KD) (KE) (KF) (KG) (KH) (KI) (KJ) (KK) (KL) (KM) (KN) (KO) (KP) (KQ) (KR) (KS) (KT) (KU) (KV) (KW) (KX) (KY) (KZ) (LA) (LB) (LC) (LD) (LE) (LF) (LG) (LH) (LI) (LJ) (LK) (LL) (LM) (LN) (LO) (LP) (LQ) (LR) (LS) (LT) (LU) (LV) (LW) (LX) (LY) (LZ) (MA) (MB) (MC) (MD) (ME) (MF) (MG) (MH) (MI) (MJ) (MK) (ML) (MM) (MN) (MO) (MP) (MQ) (MR) (MS) (MT) (MU) (MV) (MW) (MX) (MY) (MZ) (NA) (NB) (NC) (ND) (NE) (NF) (NG) (NH) (NI) (NJ) (NK) (NL) (NM) (NN) (NO) (NP) (NQ) (NR) (NS) (NT) (NU) (NV) (NW) (NX) (NY) (NZ) (OA) (OB) (OC) (OD) (OE) (OF) (OG) (OH) (OI) (OJ) (OK) (OL) (OM) (ON) (OO) (OP) (OQ) (OR) (OS) (OT) (OU) (OV) (OW) (OX) (OY) (OZ) (PA) (PB) (PC) (PD) (PE) (PF) (PG) (PH) (PI) (PJ) (PK) (PL) (PM) (PN) (PO) (PP) (PQ) (PR) (PS) (PT) (PU) (PV) (PW) (PX) (PY) (PZ) (QA) (QB) (QC) (QD) (QE) (QF) (QG) (QH) (QI) (QJ) (QK) (QL) (QM) (QN) (QO) (QP) (QQ) (QR) (QS) (QT) (QU) (QV) (QW) (QX) (QY) (QZ) (RA) (RB) (RC) (RD) (RE) (RF) (RG) (RH) (RI) (RJ) (RK) (RL) (RM) (RN) (RO) (RP) (RQ) (RR) (RS) (RT) (RU) (RV) (RW) (RX) (RY) (RZ) (SA) (SB) (SC) (SD) (SE) (SF) (SG) (SH) (SI) (SJ) (SK) (SL) (SM) (SN) (SO) (SP) (SQ) (SR) (SS) (ST) (SU) (SV) (SW) (SX) (SY) (SZ) (TA) (TB) (TC) (TD) (TE) (TF) (TG) (TH) (TI) (TJ) (TK) (TL) (TM) (TN) (TO) (TP) (TQ) (TR) (TS) (TT) (TU) (TV) (TW) (TX) (TY) (TZ) (UA) (UB) (UC) (UD) (UE) (UF) (UG) (UH) (UI) (UJ) (UK) (UL) (UM) (UN) (UO) (UP) (UQ) (UR) (US) (UT) (UU) (UV) (UW) (UX) (UY) (UZ) (VA) (VB) (VC) (VD) (VE) (VF) (VG) (VH) (VI) (VJ) (VK) (VL) (VM) (VN) (VO) (VP) (VQ) (VR) (VS) (VT) (VU) (VV) (VW) (VX) (VY) (VZ) (WA) (WB) (WC) (WD) (WE) (WF) (WG) (WH) (WI) (WJ) (WK) (WL) (WM) (WN) (WO) (WP) (WQ) (WR) (WS) (WT) (WU) (WV) (WW) (WX) (WY) (WZ) (XA) (XB) (XC) (XD) (XE) (XF) (XG) (XH) (XI) (XJ) (XK) (XL) (XM) (XN) (XO) (XP) (XQ) (XR) (XS) (XT) (XU) (XV) (XW) (XX) (XY) (XZ) (YA) (YB) (YC) (YD) (YE) (YF) (YG) (YH) (YI) (YJ) (YK) (YL) (YM) (YN) (YO) (YP) (YQ) (YR) (YS) (YT) (YU) (YV) (YW) (YX) (YZ) (ZA) (ZB) (ZC) (ZD) (ZE) (ZF) (ZG) (ZH) (ZI) (ZJ) (ZK) (ZL) (ZM) (ZN) (ZO) (ZP) (ZQ) (ZR) (ZS) (ZT) (ZU) (ZV) (ZW) (ZX) (ZY) (ZZ) | | | | | | | | |

[illegible][illegible][illegible][illegible]

No. 1 No. 30 25 35 081 38 24

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR

WATER RESOURCES DIVISION

MASTER CARD

| | | | |
|----------------|--------------|--------------|--------------|
| Source of data | Date | County | Map |
| Record by | Time | Locality | Map |
| Altitude | Longitude | Latitude | Scale |
| Other number | Other number | Other number | Other number |

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100
 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039

(C) (P) (N) (P) (S)
 Membership County, Fed Gov't, City, Corp or So, Private, State Agency, Water Dist

(A) (C) (B) (N) (I) (H) (P) (A)
 of Air cond, bottling, Comm, Brewster, Yeast, Pils, Dom, Irr, Ind, Ind, P S, Sec,

[illegible]

DATA AVAILABLE: ☐ Well data ☐ Free. w/L meas.: ☒ Field aquifer char.

[illegible]

76
 picture cards: _____ you ☐
 a date: _____ ☐

ELL-DESCRIPTION CARD[illegible][illegible]

acq. MP _____ above _____ ft below L50, Alt. MP _____
 i. L50: _____ Accuracy: _____
 _____ (source)

[illegible][illegible]

| Conduct | $\kappa \times 10^6$ | Temp. | *F | Temp. | °C |
|---------|----------------------|-------|----|-------|------|
| | | 77 | | 77 | -55 |
| | | | | 78 | -56 |
| | | | | 79 | -57 |
| | | | | 80 | -58 |
| | | | | 81 | -59 |
| | | | | 82 | -60 |
| | | | | 83 | -61 |
| | | | | 84 | -62 |
| | | | | 85 | -63 |
| | | | | 86 | -64 |
| | | | | 87 | -65 |
| | | | | 88 | -66 |
| | | | | 89 | -67 |
| | | | | 90 | -68 |
| | | | | 91 | -69 |
| | | | | 92 | -70 |
| | | | | 93 | -71 |
| | | | | 94 | -72 |
| | | | | 95 | -73 |
| | | | | 96 | -74 |
| | | | | 97 | -75 |
| | | | | 98 | -76 |
| | | | | 99 | -77 |
| | | | | 100 | -78 |
| | | | | 101 | -79 |
| | | | | 102 | -80 |
| | | | | 103 | -81 |
| | | | | 104 | -82 |
| | | | | 105 | -83 |
| | | | | 106 | -84 |
| | | | | 107 | -85 |
| | | | | 108 | -86 |
| | | | | 109 | -87 |
| | | | | 110 | -88 |
| | | | | 111 | -89 |
| | | | | 112 | -90 |
| | | | | 113 | -91 |
| | | | | 114 | -92 |
| | | | | 115 | -93 |
| | | | | 116 | -94 |
| | | | | 117 | -95 |
| | | | | 118 | -96 |
| | | | | 119 | -97 |
| | | | | 120 | -98 |
| | | | | 121 | -99 |
| | | | | 122 | -100 |

HYDROGEOLOGIC CARD

SAME AS ON MASTER CARD _____
Preflightable _____
Province: _____
Dallas _____
Section: _____
Substation: _____

| | 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) |
| Types of depression, stream channel, dunes, flat, hilltop, sink, swamp, salt flat | | | | | | | | | |
| (b) | (c) | (d) | (e) | (f) | (g) | (h) | (i) | (j) | (k) |
| offshore, sediment, hillslope, terrace, undulating, valley flat | | | | | | | | | |

[illegible]

| Number | Length of well open to | Depth to top of | Stratigraphic | Thickness |
|--------|------------------------|-----------------|---------------|-----------|
| 1 | 10 | 10 | 10 | 10 |
| 2 | 10 | 10 | 10 | 10 |
| 3 | 10 | 10 | 10 | 10 |
| 4 | 10 | 10 | 10 | 10 |
| 5 | 10 | 10 | 10 | 10 |
| 6 | 10 | 10 | 10 | 10 |
| 7 | 10 | 10 | 10 | 10 |
| 8 | 10 | 10 | 10 | 10 |
| 9 | 10 | 10 | 10 | 10 |
| 10 | 10 | 10 | 10 | 10 |
| 11 | 10 | 10 | 10 | 10 |
| 12 | 10 | 10 | 10 | 10 |
| 13 | 10 | 10 | 10 | 10 |
| 14 | 10 | 10 | 10 | 10 |
| 15 | 10 | 10 | 10 | 10 |
| 16 | 10 | 10 | 10 | 10 |
| 17 | 10 | 10 | 10 | 10 |
| 18 | 10 | 10 | 10 | 10 |
| 19 | 10 | 10 | 10 | 10 |
| 20 | 10 | 10 | 10 | 10 |
| 21 | 10 | 10 | 10 | 10 |
| 22 | 10 | 10 | 10 | 10 |
| 23 | 10 | 10 | 10 | 10 |
| 24 | 10 | 10 | 10 | 10 |
| 25 | 10 | 10 | 10 | 10 |
| 26 | 10 | 10 | 10 | 10 |
| 27 | 10 | 10 | 10 | 10 |
| 28 | 10 | 10 | 10 | 10 |
| 29 | 10 | 10 | 10 | 10 |
| 30 | 10 | 10 | 10 | 10 |
| 31 | 10 | 10 | 10 | 10 |
| 32 | 10 | 10 | 10 | 10 |
| 33 | 10 | 10 | 10 | 10 |
| 34 | 10 | 10 | 10 | 10 |
| 35 | 10 | 10 | 10 | 10 |
| 36 | 10 | 10 | 10 | 10 |
| 37 | 10 | 10 | 10 | 10 |
| 38 | 10 | 10 | 10 | 10 |
| 39 | 10 | 10 | 10 | 10 |
| 40 | 10 | 10 | 10 | 10 |
| 41 | 10 | 10 | 10 | 10 |
| 42 | 10 | 10 | 10 | 10 |
| 43 | 10 | 10 | 10 | 10 |
| 44 | 10 | 10 | 10 | 10 |
| 45 | 10 | 10 | 10 | 10 |
| 46 | 10 | 10 | 10 | 10 |
| 47 | 10 | 10 | 10 | 10 |
| 48 | 10 | 10 | 10 | 10 |
| 49 | 10 | 10 | 10 | 10 |
| 50 | 10 | 10 | 10 | 10 |
| 51 | 10 | 10 | 10 | 10 |
| 52 | 10 | 10 | 10 | 10 |
| 53 | 10 | 10 | 10 | 10 |
| 54 | 10 | 10 | 10 | 10 |
| 55 | 10 | 10 | 10 | 10 |
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| 57 | 10 | 10 | 10 | 10 |
| 58 | 10 | 10 | 10 | 10 |
| 59 | 10 | 10 | 10 | 10 |
| 60 | 10 | 10 | 10 | 10 |
| 61 | 10 | 10 | 10 | 10 |
| 62 | 10 | 10 | 10 | 10 |
| 63 | 10 | 10 | 10 | 10 |
| 64 | 10 | 10 | 10 | 10 |
| 65 | 10 | 10 | 10 | 10 |
| 66 | 10 | 10 | 10 | 10 |
| 67 | 10 | 10 | 10 | 10 |
| 68 | 10 | 10 | 10 | 10 |
| 69 | 10 | 10 | 10 | 10 |
| 70 | 10 | 10 | 10 | 10 |
| 71 | 10 | 10 | 10 | 10 |
| 72 | 10 | 10 | 10 | 10 |
| 73 | 10 | 10 | 10 | 10 |
| 74 | 10 | 10 | 10 | 10 |
| 75 | 10 | 10 | 10 | 10 |
| 76 | 10 | 10 | 10 | 10 |
| 77 | 10 | 10 | 10 | 10 |
| 78 | 10 | 10 | 10 | 10 |
| 79 | 10 | 10 | 10 | 10 |
| 80 | 10 | 10 | 10 | 10 |
| 81 | 10 | 10 | 10 | 10 |
| 82 | 10 | 10 | 10 | 10 |
| 83 | 10 | 10 | 10 | 10 |
| 84 | 10 | 10 | 10 | 10 |
| 85 | 10 | 10 | 10 | 10 |
| 86 | 10 | 10 | 10 | 10 |

system _____ series _____ aquifer, formation, group _____
 aquifer _____
 lithology _____ origin: _____ thickness: _____
 length of _____ depth to _____

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044

[illegible]

Coefficient Coefficient Coefficient

(ions) (ions) (ions)

Term: Term: Term:

gas/lit. gas/lit. gas/lit.

Spec cap: Spec cap: Spec cap:

Number of zeolitic cards:

765

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2

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|-----|

ALL
1944

YONGE

Notified
and

Wall No. 3020 11 081 30.4

Well No. 30 25 35 071 38 24

Latitude - Longitude 30 25 35 N 071 38 24 W

342

2

busch

Well No. 3025 35 081 3624

YONGE
Hydrograph

10055-1
35mm
NRC A

WATER CONSERVATION PROGRAM
WATER WELL FIELD INSPECTION GUIDE

Reason for Inspection:

Complaint

W.U. Permit

Construction, etc. Permit

✓ 4669
Well Inventory

Free flowing well

Regulatory Status: Received Application to Construct, Modify ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

Received Application for Temporary Water Use Permit ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

DNR/BW-2 Received ☐ Yes N/A ☐ Date _____

Data Submitted to USGS ☐ Yes Date _____

Owner ~~Robert Byrd~~ WILLIAM C WEBB IMESON INTERNATIONAL INDUST. PAR

Address ~~556 Broward Rd~~ 9601 N. MAIN ST.

Well Drilling Contractor _____ License/Bond No. _____

Location of water well Latitude 30 15 35 N Long 88 36 24 Sequential 1

Ident # of Quad Sheet 7 1/4 SE 1/4 7 15 26E
Section Township Range Subdivision

Depth of Water Well _____ How measured? _____

Diameter/Cross Section 18"

Depth of Casing _____ Diameter of Casing from LSD _____ to _____ feet and diameter _____ from _____ to _____ feet.

Type of grouting used _____ Hole centered in grout? _____

Use of well UNUSED

Water level _____ How measured _____

Method of well construction _____

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.) _____

Casing material used _____

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' NONE

Distance to nearest contaminant - septic tank, etc. if less than 100' NONE

Maximum well yield _____ GPM Average well yield _____ GPM

Frequency of well use _____ Hrs./Day _____ Days/Year

Pump Data - Type & Make _____ HP _____ Pump Rating _____

Capacity _____ No. of Bowls or Stages _____

Type of Power _____ Static water level _____

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness _____, and Chloride _____.

General Rating: poor _____ average _____ good _____ excellent _____

Additional Info/Action Required _____

Action taken/Comments _____

Date 9/25/75

Inspector's Name Brett Hammond Field Inspection Date _____

Inventory Complete Date _____

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULE

Prepared by GRANT

Date 7-27-84

47

Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (10)

Site Ident No 302427081344601 RG Number R-0 Transaction T-A D M V
Site-Type 2-C D E H I M G P S T W X Data 3-C U Reporting Agency 4-FLO39
Project No. 5 District 6-121 State 7-12 County (or town) DUVALL 8-031
Latitude 9-302427 Longitude 10-0813446 Lat-Long Accuracy 11-S 0 T M
Local Number 12-53836 Land Net Loc. 13-NWNWSWS 14-T 1 S R 27E
Location Map 14-EASTPORT Scale 15-24000
Altitude 16-10 Method of Measurement 17-A L Accuracy 18-S
Type Setting 19-A B C D E G H K L M O P S T U V W Hydrologic Unit (OWDC) 20-03080103
Use of Site 23-A C D E G H M G P R S T U X Z Secondary Site Use 301 Tertiary Site Use 302
Use of Water 24-A B C D E F H I J K M N Q R S T U Y Z
Secondary Water Use 25 Tertiary Use of Water 26 Depth of Hole 27 Depth of Well 28 Source of Depth Data 29
Water Level 30-32.07 Data Measured 31-07/23/1984 Source 32-5
Method of Measurement 34-A B C E H L M N R S T V Z
Site Status 37-D E F G H I J N G P R S T V W X Z
Source of Geohydrologic Data 38- Pump Used 35- Date of First Construction/Completion 21-00/00/1984

OWNER IDENTIFICATION (1)

R-158 T-A D M V Date of Ownership 159-00 00 1984
Name: Last 161-SEA LIFT First 162-INC Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-A D M V Ident 190-55 Assigner 191-FLAWAD
New Card Same R & T Ident 190-AVAST Assigner 191-FLO39

SITE VISIT DATA (1)

R-186 T-A D M V Date of Visit 187-07/23/1984 Name of Person 188-GRANT

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-A D M V Date 193-07/23/1984 Geohydrologic Unit 195-
New Card Same R thru 195
Temperature 196-00010 Degrees C 197-25
Conductance 196-00095 μ Mhos 197-470
Other (STORET) Parameter 196- Value 197-
Other (STORET) Parameter 196- Value 197-

FOOTNOTES

Source of Data Codes

A E G L M O S Z

| | | | | | | | | |
|--------------------------------------|------|---|---|---|---|---|---|-----|
| Special Treatment During Development | 71 = | C | D | E | F | H | M | Z = |
| | | chemicals, dry ice, explosives, defloculent, hydrofracturing, mechanical, other | | | | | | |

| B | C | G | I | M | P | R | S | T | Z |
|--------------------|----------|--------------|------------------|-----------------|--------------------|--------------------|-------|------|-------|
| brass or
bronze | concrete | galv
iron | wrought,
iron | other,
metal | PVC or,
plastic | stainless
steel | steel | tile | other |

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= A D M *
add, delete, modify

Entry No #001 *

Depth to Top 91 *

Depth to Bottom 92 *

93= 120 FLRD *

304= *

96= LMSN *

97= MARINE
Lithologic Modifier

Unit Identifier

Contributing Unit

Lithology

Lithologic Modifier

AQUIFER DATA (2)

R=94 * T= A D M *
add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *
month day year

Water Level 126 = *
Contributed 132 = *

Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= A D M *
add, delete, modify

Entry No 256 # *

Depth to Top 91 *

Depth to Bottom 92 *

93= *

304= *

96= *

97= *
Lithologic Modifier

Unit Identifier

Contributing Unit

Lithology

Lithologic Modifier

AQUIFER DATA (2)

R=94 * T= A D M *
add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *
month day year

Water Level 126 = *
Contributed 132 = *

Water Contributed 132 = *

PERTINENT REMARKS

R=183 * T= A D M *
add, delete, modify

New Card Same R&T

Remark No. 311# * 185= *
311# * 185= *

Contributing Unit Codes

P S N U
primary secondary non- unknown
contributing contributing contributing

R=212 * T= A * *

218= DUNNS, TERRY, AUGUST, ROAD

N

HECKSCHER

DRIVE

AUGUST DRIVE (ROAD)



39'

1037'

J 3836

Revised September 1980

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULE

Recorded by GRANTSITE 302807081371201 W2Date 11-27-84Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302807081371201 RG Number R=0* Transaction T=(A) D M V*
 Site-Type 2=C D E H I M O P S T (W) X* Data 3=(C) U* Reporting Agency 4=FL039*
 Project No. 5= District 6=121* State 7=12* County (or town) DUVAL 8=031*
 Latitude 9=302807* Longitude 10=0813712* Lat-Long Accuracy 11=S (C) T M*
 Local Number 12=33848* Land Net Loc. 13=LNDGRTS37 T IN R 276*
 Location Map 14=EASTPORT Scale 15=24000*
 Altitude 16=20.0* Method of Measurement 17=A L (C) * Accuracy 18=5*
 Topo Setting 19=A B C D E (F) G H K L M O P S T U V W* Hydrologic Unit (OWDC) 20=03080103*
 Use of Site 23=A C D E G H M O P R S T U (V) X Z* Secondary Site Use 301= Tertiary Site Use 302=
 Use of Water 24=A B C D E F H (I) J K M N P Q R S T U Y Z* Source of Depth Data 29=D*
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27=651.0* Depth of Well 28=651.0*
 Water Level 30=-15.24* Data Measured 31=10/03/1984* Source 33=S*
 Method of Measurement 34=A B C E (G) H L M N R S T V Z*
 Site Status 37=D E F G H I J N O P R S T V W X Z*
 Source of Geohydrologic Data 36= Pump Used 35= Date of First Construction/Completion 21=08/03/1984*

OWNER IDENTIFICATION (1)

R=158* T=(A) D M* Date of Ownership 159=10/03/1984*
 Name: Last 161=BASS First 162=JAMES Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189* T=(A) D M* Ident 190# SJ Assigner 191=FLAUMD
 New Card Same R & T Ident 190# NEW BERLIN Assigner 191=FL039

SITE VISIT DATA (1)

R=186* T=(A) D M* Date of Visit 187#10/03/1984* Name of Person 188=GRANT

FIELD WATER QUALITY MEASUREMENTS (1)

R=192* T=(A) D M* Date 193#10/03/1984* Geohydrologic Unit 195#
 Temperature 196#00010* Degrees C 197=22.0*
 Conductance 198#00095* μ Mhos 197=440.0*
 Other (STORET) Parameter 198# Value 197=
 Other (STORET) Parameter 198# Value 197=

FOOT NOTES:

① Source of Data Codes:

A D G L M O R S Z
 other driller geologist logs, memory owner, other, reporting, other

WELL CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No 59 001 * Date of Construction Completion 60 = 08/03/84 * Source of ① Const. Data 64 = D *

Name of Contractor/Driller 63 = P.A.R.I.D.G.E. *

Method of Construction 65 = A B C D D J P R T V W Z *

Finish 66 = C F G H D P S T W X Z * Type of Seal 67 = B C G N Z *

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *

Special Treatment During Development 71 = C D E F H M Z *

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 001 *

New Card for Each Hole Segment Same R, T & Field 59

Top of Hole Segment Below LSD

73# 0. *
73# 1.50. *
73# 5.53. *
73# *
73# *

Bottom of Hole Segment below LSD

74# 1.50. *
74# 5.53. *
74# 6.51. *
74# *
74# *

Diameter of Hole Segment

75# 8. *
75# 2.94 *
75# 1.88 *
75# *
75# *

CASING SCHEDULE (2)

R = 78 * T = A D M * Construction Entry No 59 * *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77# 1. *
77# 1.50. *
77# *
77# *
77# *

Bottom of Casing Segment Below LSD

78# 1.50. *
78# 5.53. *
78# *
78# *
78# *

Diameter of Casing Segment

79# 4. *
79# 2. *
79# *
79# *
79# *

Casing Material ⑤

80# P *
80# 9 *
80# *
80# *
80# *

Thickness of Casing

81# *
81# *
81# *
81# *
81# *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 * *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83# * *

Bottom of Section Below LSD

84# * *

Type of Openings ⑥

85# * *

Type of Material ⑦

86# * *

Diameter of Open Section

87# * *

Width of Opening

88# * *

Length of Opening

89# * *

(Openings Data)

83# * *
84# * *
85# * *
86# * *
87# * *
88# * *
89# * *

(Openings Data)

83# * *
84# * *
85# * *
86# * *
87# * *
88# * *
89# * *

FOOT NOTES:

① Source of Data Codes:

A D G L M O R S Z
other, driller, geologist, logs, memory, owner, other, reporting, other
gov't reported agency

⑤ Casing Material Codes

B C D G I M P R S T U W Z
brick, concrete, copper, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other
iron iron metal plastic stone steel

⑥ Type of Openings Codes

F L M P R S T W X Z
fracture, lowered, mesh, perforated, wire, screen, sand, walled, open, other
shuttered or slotted wound (unknown) point hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other
bronze iron iron metal plastic steel

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry No. 0, 0, 1 *

Depth to Top 91 =

Depth to Bottom 92 =

93 = 1, 2, 0, F, L, R, D *

Unit Identifier

304 = *

Contributing Unit

96 = L, M, S, N *

Lithology

97 = M, A, R, I, N, E *

Lithologic Modifier

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic Unit Entry No. 256 # *

Date 95 # / / *
month day year

Water Level 126 = *

% Water Contributed 132 = *

J 3848

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry No. 256 # *

Depth to Top 91 = *

Depth to Bottom 92 = *

93 = *

Unit Identifier

304 = *

Contributing Unit

96 = *

Lithology

97 = *

Lithologic Modifier

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic Unit Entry No. 256 # *

Date 95 # / / *
month day year

Water Level 126 = *

% Water Contributed 132 = *

PERTINENT REMARKS

R = 183 *

T = A D M *

add, delete, modify

New Card Same R&T

Remark No. 311 # * 185 = *

311 # * 185 = *

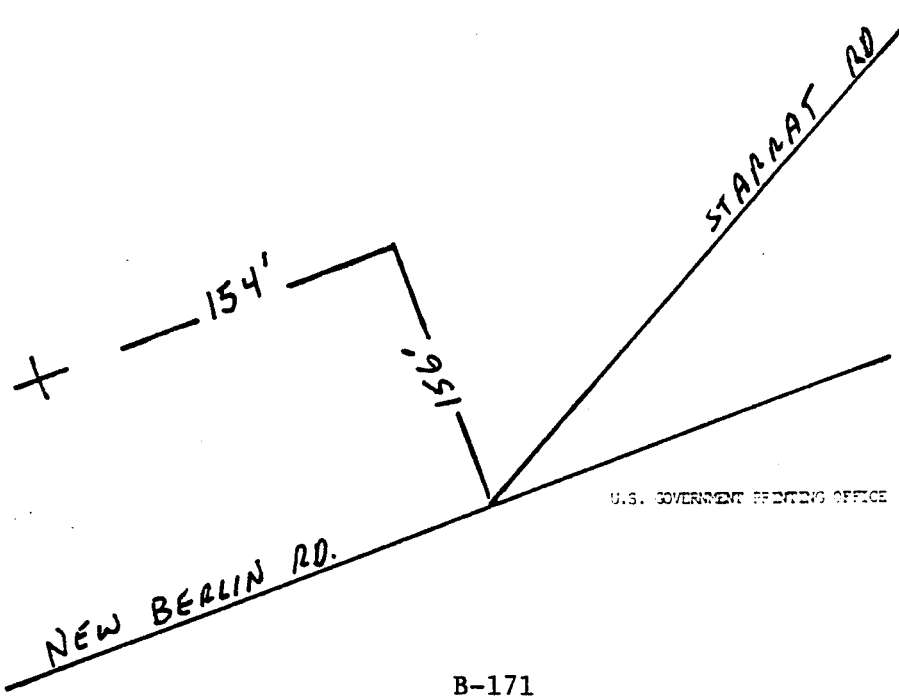
① Contributing Unit Codes

R = 212 *

T = A *

213 = 86, 5, NEW BERLIN ROAD *

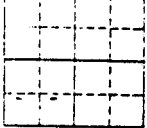
| | | | |
|----------------------|------------------------|------------------|---------|
| P | S | N | U |
| primary contributing | secondary contributing | non-contributing | unknown |



| | | | | | |
|--|--|--|--|--|--|
| | | | | | |
| | | | | | |
| | | | | | |
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| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
WELL COMPLETION REPORT

OWNER: Alais James
Last Name First Name Initial
865 New Berlin Rd
Number Street
FL
City State
Area Code Phone Number Zip Code 32218

WELL LOCATION:
Locate in Section: 
Township 1 Range 1 Section 1
Latitude 28 N Longitude 81 W
Des. Min. Sec. Des. Min. Sec.

865 New Berlin Rd
Number Street/Road
Lot No. Subdivision
City County

OWNER WELL NUMBER OR NAME: _____

DRILL METHOD: ☒ Rotary ☐ Cable Tool ☐ Jet ☐ Auger
☐ Other: _____

SURFACE CASING, CASING, AND LINER MATERIAL:

| Steel Dia. (In.) | Steel Dia. (In.) | PVC Other | From (Ft.) | To (Ft.) | Schedule No. | Joints* |
|------------------|------------------|-----------|------------|----------|--------------|---------|
| Black Iron 5 | 4" | | 150 | 40 | | |
| 7" | 4" | | 150 | 53 | 40 | T&C |

* Describe Material:
* TC = Threaded and Coupling, TCW = Threaded, Coupled, and Welded,
W = Welded, B = Bonded (PVC), O = Other: _____

GROUT: ☐ None ☒ Neat Cement ☐ Other: _____

Type and Percent of Additives and Grout Volume or Number of 94 lb. Sacks

| Neat Cement from Top To Bottom | From (Ft.) | To (Ft.) |
|--------------------------------|------------|----------|
| | 0 | 150 |

FINISH: ☒ Open Hole ☐ Perforated or Slotted Casing ☐ Gravel Pack
☐ Sandpoint or Screen Attached to Well Casing ☐ Sandpoint or Screen
Teleconed with Packer Inside Casing (Packer Material: _____)

| Sandpoint/Screen Material | Dia. (In.) | Slot Size (In.) | From (Ft.) | To (Ft.) |
|---------------------------|------------|-----------------|------------|----------|
| | | | | |

☐ Other Finish: _____

QUALITY TEST: ☐ None ☐ Bacteria ☐ Chemical
By: ☐ Health Dept. ☐ USGS ☐ Other: _____ Date: _____

☐ Clear ☐ Colored ☐ Sulphur ☐ Salty ☐ Iron ☐ Other: _____

Conductance (Micromhos) _____ Chloride _____ ppm

Hardness _____ pH _____ Temp _____ °F

Well Disinfected: ☐ No ☐ Yes _____ (Date)

WELL TEST, by: ☒ Natural Flow ☐ G.P.M. ☐ Other: _____

☐ Bailor ☐ Permanent Pump ☐ Test Pump ☐ Other: _____

Discharge Measured By: ☐ Bailor ☐ Estimated ☐ Other: _____

☐ Office ☐ Trajectory ☐ Venturi ☐ Volumetric

Measured Static Water Level ☐ - ☐ - ☐ Ft.

Measured Pumping Water Level ☐ - ☐ - ☐ Ft.

After ☐ Hours At ☐ G.P.M.

Specific Capacity ☐ G.P.M./Ft. of Drawdown

Measuring Pt. (Describe): _____

Which is ☐ Ft. ☐ Above ☐ Below Land Surface

Elevation of Measuring Pt. = ☐ Ft. ☐ Above ☐ Below

WELL EQUIPMENT: ☐ Open ☐ Capped ☒ Valved

☐ Permanent Pump ☐ Temporary Pump

Type Pump: ☐ Centrifugal ☐ Cylinder ☐ Jet ☐ Submersible

☐ Turbine ☐ Other: _____

Power: ☐ Diesel ☐ Electric ☐ Gasoline ☐ Other: _____

Horsepower ☐ Capacity ☐ G.P.M.

Intake/Injection Depth ☐ Ft.

Form 17-1 213(2) Effective November 30, 1982

TYPE OF WORK: ☒ New Construction ☐ Repair
☐ Deepening ☐ Plugging
☐ Other: _____

PERMIT NUMBER: 84-197
23848

WELL NUMBER: _____

TYPE OF WELL: ☒ Water Well ☐ Test Well ☐ Recharge ☐ Drainage
☐ Waste Disposal ☐ Observation ☐ Other: _____

USE: ☒ Domestic ☐ Irrigation ☐ Industrial ☐ Livestock ☐ Public Supply
☐ Other: _____

SKETCH LOCATION OF WELL in relation to local landmarks, giving distance and direction from nearest town, road, or other reference point.

STARRATT Rd New Berlin Rd
house
well

GEOPHYSICAL LOGS: Type: _____ By: _____

| WELL LOG | | | | Examine cuttings at 20 ft. or smaller intervals and changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary. | |
|-----------------|-------------------|-------------|------|---|---------------------|
| Bore Hole (In.) | Casing Size (In.) | Depth (Ft.) | From | To | |
| 6" | 4" | 0 | 19 | | sand |
| | | 19 | 43 | | gray clay |
| | | 43 | 58 | | Orange clay |
| | | 58 | 81 | | Sand |
| | | 81 | 103 | | shell |
| | | 103 | 110 | | rock |
| | | 110 | 137 | | green clay |
| | | 137 | 145 | | Soft Tan Rock |
| 2 1/2" | 2" | 145 | 293 | | Marl |
| | | 293 | 302 | | Soft Sandy green cl |
| | | 302 | 327 | | Sand |
| | | 327 | 351 | | green clay |
| | | 351 | 385 | | gray clay & sand |
| | | 385 | 403 | | Sand |
| | | 403 | 427 | | Rock |
| | | 427 | 453 | | green clay |
| | | 453 | 471 | | Blue clay & Rock |
| | | 471 | 494 | | Sand |
| | | 494 | 518 | | Rock |
| | | 518 | 531 | | green clay |
| | | 531 | 548 | | Hard Rock |
| | | 548 | | | Lime stone |
| | | | | | 651: Bottom |

Total Depth 651 Ft. Producing Zone Material: ☐ Sand ☐ Shell

☐ Broken Shell ☒ Limestone ☐ Other: _____

Top of Producing Zone 548 Ft., Bottom of Producing Zone 651 Ft.

☐ Drill Cuttings Sent to Bureau of Geology

1005 Don W. Watkins

License No. 8 2 313 Water Well Contractor's Signature Position

Completion Date Nov 1 1984 Driller Signature

Driller Signature

Driller Signature

Driller Signature

Driller Signature

Recorded by

Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date

19 APR 77

Check One

✓ English

Metric Units

GENERAL SITE DATA (0)

Site Ident No 302424081374701
RG Number R=0
Transaction T= C D M V
add, delete, modify, verified

Site-Type 2= C D H I M P T V
collector, drain, sinkhole, connector, multiple, pond, tunnel or, well
Reliability 3= C U L M
field checked, unchecked, location not, minimal
Reporting Agency 4= FL039

Project No. 5= District 6= 121 State 7= 12 County 8= 031
(or town)

Latitude 9= 30.2424 Longitude 10= 081.3747 Lat-Long Accuracy 11= S F T M
deg min sec deg min sec sec, 5 sec, 10 sec, Min

Local Number 12= J-924 Land 13= LUGERT 48 T. 1 S. R. 27 E
Loc. 1/4 1/4 1/4 section township range meridian

Location Map 14= TROUT RIVER Scale 15= 24000

Altitude 16= 10 Method of Measurement 17= A L M
altimeter, level, map Accuracy 18= 5

Topo Setting 19= D C E F H K L O P S T U V W
depression, stream, dunes, flat, hilltop, sink, swamp, offshore, piedmont, hillside, terrace, undulating, relief, upland, channel, flat, draw

Date of First Construction/Completion 21= 00 00 1970
month day year Use of Site 23= A D E G H O M P R S T U V X Z
anode, drain, geo-seismic, heat, observ. mmo, oil or, recharge, reprod, test, unused, with waste, destroyed, thermal, reservoir, gas, drawal

Use of Water 24= A B C D E F H I M P R S T U Y Z
air cond., bottling, commercial, dewater, power, fire, domestic, irrigation, medicinal, industrial, public, recreation, stock, institution, unused, diesel, other supply

Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hnle 27= 660 Depth of Well 28= 660 Source of Depth Data 29= 0

Water Level 30= Date Measured 31= Source 33=

Method of Measurement 34= A C E G H L M R S T V Z
airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other
airline page pressure page logs tape tape electric tape

Site Status 37= D F G H O P R S T V X Z
dry, flowing, nearby, nearby, obstruction, pumping, recently, nearby, nearby, foreign surface water other
flowing recently flowing pumped pumping recently substance effects
flowing

Source of Geohydrologic Data 38= 0 Pump Used 35= Measuring Point 256= Measuring Point Date 267=

OWNER IDENTIFICATION (1)

R=158 T= C D M V
add, delete, modify Date of Ownership 159= 00 00 1970
month day year

Name: Last 161= DICHERSON First 162= CONST CO Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=139 T= C D M V
add, delete, modify Ident 190= SJ Assigner 191= FLA WWD
New Card Same R & T Ident 190= HECKSCHER Assigner 191= FL039

SITE VISIT DATA (1)

R=186 T= A D M V
add, delete, modify Date of Visit 187= Name of Person 188=

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 T= A D M V
add, delete, modify Date 193= Geohydrologic Unit 195=

New Card Same R thru 195
Temperature 196= 0 0 0 1 0 Degrees C 197=

Conductance 198= 0 0 0 9 5 uMhos 199=

Other (STORET) Parameter 196= Value 197=

Other (STORET) Parameter 196= Value 197=

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z

reporting, driller, owner, other gov't, other logs, geologist, other agency reported

WELL CONSTRUCTION DATA (1)

R = 581 *

T = G D M *
add, delete, modifyEntry No 59 = 001 *Date of Construction
Completion60 = 00 / 00 / 1970 *
month day yearSource of Data
Cust. Data64 = 0 *

Name of

Contractor/Driller 63 = PARTIDGE *Method of
Construction65 = A B C D H J P R T V W Z *
air- rotary bored, cable- dug, hydraulic, jetted, air-per., reverse, trenching, driven, drive, other
or augered tool rotary rotary cushion rotary wash

Finish

66 = C F G H O P S T W Z *
porous, gravel w. gravel, horizontal, open, perforated, screen, sand point, welded, open, other
concrete perl screen gallery, and or slotted

Type of

Seal 67 = B C G Z *
bentonite, clay, cement, other
groutBottom of
Seal68 = 1 *

Method of

Development 69 = A B C J N P S Z *
air-lift, bored, compressed, jetted, none, other, surged, other
pump air pumpNumber of Hours
in Development70 = 1 *Special Treatment
During Development71 = C D E F H M Z *
chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

J 924

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 *

T = G D M *
add, delete, modifyConstruction
Entry No59 = 001 *

Top of Hole Segment Below LSD

73 = 2 *
73 = *
73 = *
73 = *
73 = *

Bottom of Hole Segment below LSD

74 = 66.0 *
74 = *
74 = *
74 = *
74 = *

Diameter of Hole Segment

75 = 6 *
75 = *
75 = *
75 = *
75 = *New Card for Each Hole Segment
Same R, T & Field 59

CASING SCHEDULE (2)

R = 75 *

T = A D M *
add, delete, modifyConstruction
Entry No59 = 1 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 = *
77 = *
77 = *
77 = *
77 = *

Bottom of Casing Segment Below LSD

78 = *
78 = *
78 = *
78 = *
78 = *

Diameter of Casing Segment

79 = *
79 = *
79 = *
79 = *
79 = *

Casing Material 5

80 = *
80 = *
80 = *
80 = *
80 = *

Thickness of Casing

81 = *
81 = *
81 = *
81 = *
81 = *

OPENINGS SCHEDULE (2)

R = 82 *

T = A D M *
add, delete, modifyConstruction
Entry No59 = 1 *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 = *
Bottom of Section Below LSD, 84 = *

Type of Openings 6

Type of Material 7

Diameter of Open Section

Width of Opening

Length of Opening

85 = *
86 = *
87 = *
88 = *
89 = *83 = *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *83 = *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

FOOT NOTES:

① Source of Data Codes:

S O D A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other
agency reported

5: Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv., wrought, other, PVC or, rock or, steel, tile, coated, wood, other
iron iron metal plastic stone grout

6 Type of Openings Codes

F L M P R S T W X Z
fracture, lowered, mesh, perforated, wire- screen, sand, welded, open, other
shut-in or slotted wound (unknown) point hole

7 Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv., wrought, other, PVC or, stainless, steel, tile, other
bronze iron iron metal plastic steel

| | | | |
|-----------------------------|--|------------------------|---------------------------------|
| R = 134 146 * | T = A D M * | Entry No 147 # | Date 148 = month / day / year * |
| Flowing, pumps | add, delete, modify | | |
| Discharge: 150 = * | Source of Data 151 = * | | |
| Method of Measurement 152 = | B C E F M O P R T U V W Z * | | |
| | bailer, current, estimated, flume, totalling, orifice, pitot-tube, reported, trajectory, venturi, volumetric, weir, other | | |
| Production Level 153 = * | Static Level 154 = * | Source of Data 155 = * | Specific Capacity 272 = * |
| Method of Measurement 156 = | A C E G H L M R S T V Z * | | |
| | airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other | | |
| | airline, gauge, pressure, gauge, logs, tape, tape, electric, tape | | |
| | Pumping Period 157 = * | | |

| | | | | |
|---------------------|------------------------------------|------------------------|---|-------------------|
| R = 42 * | T = A D M *
add, delete, modify | Type of Lift | 43 # A B C J P R S T U Z * | Entry No. 254 # * |
| Pump Intake Setting | 44 = *
Type of Power | 45 = D E G H L N W Z * | air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other
diesel, electric, gasoline, hand, LP gas, natural, windmill, other gas | |
| Date 38 = / / * | month day year | Horsepower 46 = * * | 924 | |

| | | | | |
|---------------------------------|---|-------------------------|-----------------------------|-----------------------------|
| R = 47 * | T = A D M *
add, delete, modify | Type of Lift 43 * | Lift Entry No 254 = * | Manufacturer of Pump 48 = * |
| Serial No of Pump 49 = * | Name of Power Company 50 = * | Power Meter No 52 = * | Pump Rating 53 = * | |
| Power Company Account No 51 = * | Person or Company Who Maintains the Pump 54 = * | Additional Lift 255 = * | Rated Pump Capacity 258 = * | |

R = 55 * T = A D M * Type of Lift 43# * Type of Power 56 * * Horsepower 57 * * Lift Entry No 254 * *

[illegible]

R = 114 * T = A D M * Begin Year 115 # End Year 115 # Source Agency 117 #
 add, delete, modify
 Frequency of Collection 113 # Network Site 257 # Type of Analysis 120 #

R = 121 * T = A O M * Begin Year 122 * End Year 123 * Source Agency 124 *
 add, delete, modify
 Frequency of Collection 3 125 * Network Site 258 *

| | | | | | | | |
|-------------------------|--------------------------|--------------|-----------|----------------------|---|---------------|-----------|
| R = 127 * | T = A D M * | Begin Year | 128 = * * | End Year | 129 = * * | Source Agency | 130 = * * |
| Frequency of Collection | <i>add delete modify</i> | | | | | | |
| | 131 = * | Network Site | 259 = * | Method of Collection | 133 = C E M U Z * | | |
| | | | | | <i>calculated, estimated, metered, unknown, other</i> | | |

R = 180 # T = A D M # Type of Data 181 # Loc 182 = C D Z # Format 261 = F M P Z #
add, delete, modify. cooperator, district, other files, machine, published, other readable
New Card Same R & T Type of Data 181 # Loc 182 = C O Z # Format 261 = F M P Z #

① Source of Data Codes

| S | D | O | A. | R | L | G | Z |
|-----------|---------|-------|--------------|----------|------|-----------|-------|
| reporting | driller | owner | other gov't. | other | logs | geologist | other |
| agency | | | | reported | | | |

3) Frequency of Collection Codes

| A | B | C | D | F | I | M | Q | S | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|
| annual, bi-monthly, continuous, daily, semi-monthly, intermittent, monthly, one-time, quarter, semi-weekly, other
monthly only annual annual | | | | | | | | | | |

② **Type of Log Codes**

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
|-------|---------|----------|------------|-----------|---------|------------|-----------|------------|--------|-----------|------------|-----------|----------|----------|--------|--------|
| time, | collar, | caliper, | driller's, | electric, | fluid, | geologist, | magnetic, | induction, | gamma, | digmeter, | laterolog, | microlog, | neutron, | μ later, | photo, | radio- |
| | | | | | conduct | | | | ray | | | | | | | carbon |

| S | T | U | V | Z |
|----------------------------------|---|---|---|---|
| sonic, temp, gamma, fluid, other | | | | |
| gamma velocity | | | | |

4) Type of Quality Analyses Codes

| A | B | C | D | E | F | G | H | J | K | L | M | Z |
|----------|----------------------|------------------|-----------------------|--------------------|----------------|--------------|--------------|--------------|--------------|--------------|---------------|---|
| Physical | on motion, character | trace, character | particular, nutrients | nutrients, sensory | sensory, codes | codes, codes | codes, codes | codes, codes | codes, codes | codes, codes | all or, other | |

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A O M *
add, delete, modify

Entry No 256 # 001 *

Depth to Top 91 =

Depth to Bottom 92 =

Unit Identifier 93 = 120 FLRD *

Lithology 96 = LMSM *

Lithologic Modifier 97 = UNPLINE *

AQUIFER DATA (2)

R = 94 * T = A D M *
add, delete, modify

Geohydrologic Unit Entry No 256 #

Date 95 = / /
month day year

Water Level 126 =

% Water Contributed 132 =

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M *
add, delete, modify

Entry No 256 #

Depth to Top 91 =

Depth to Bottom 92 =

Unit Identifier 93 =

Lithology 96 =

Lithologic Modifier 97 =

AQUIFER DATA (2)

R = 94 * T = A D M *
add, delete, modify

Geohydrologic Unit Entry No 256 #

Date 95 = / /
month day year

Water Level 126 =

% Water Contributed 132 =

PERTINENT REMARKS

R = 183 * T = A *

add

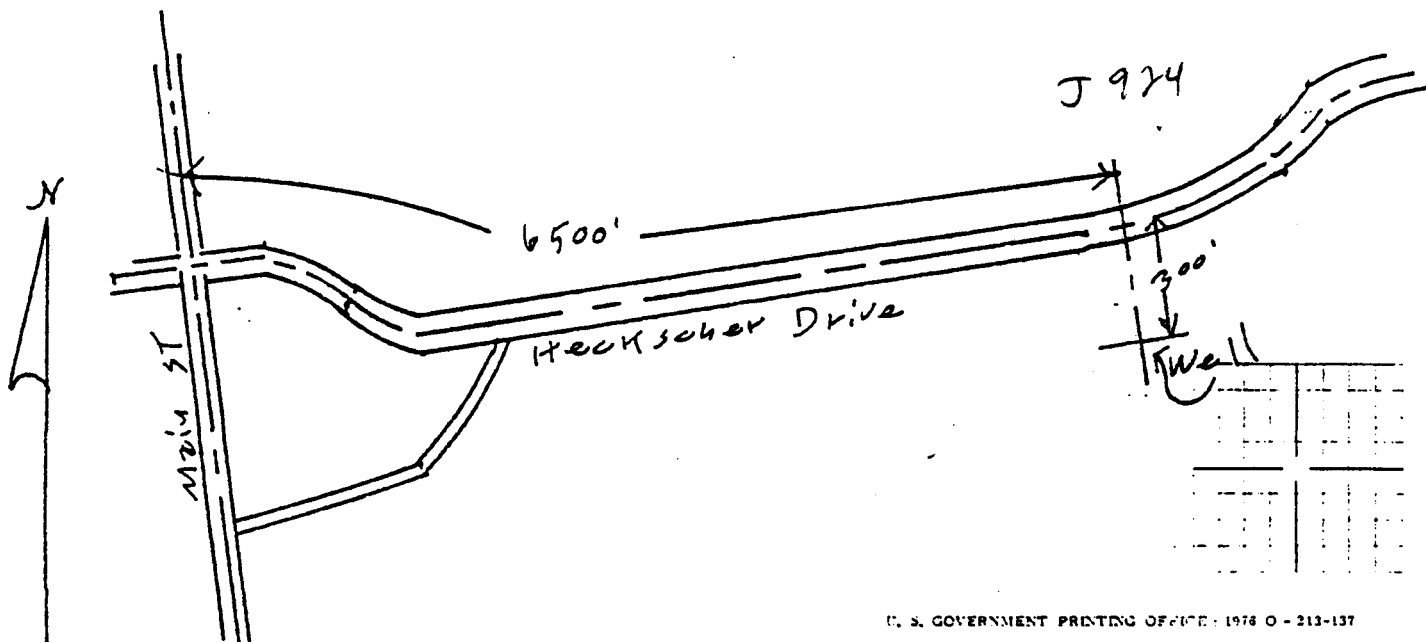
185 =

New Card Same R&T

185 =

185 =

NOTES:



U. S. GOVERNMENT PRINTING OFFICE: 1978 O - 213-137

Recorded by

Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATA

Date

19 APR 77

Check One

☒ English☐ Metric Units

Site Ident No

302424081374701

19

COOPERATOR DATA (1)

R = 212 *

T = ☒ D ☐ M *

add, delete, modify

Cooperators
Site Identifier

213 = J-924 *

Registration No.

214 =

Inspection Status

215 = *

Reason Unapproved

218 = *

Inspection Date

217 =

month day year

Remarks

219 = 1050 HECKSCHER DRIVE *

DATA ON MINOR SITE REPAIRS (1)

R = 164 *

T = ☒ A ☐ D ☐ M *

add, delete, modify

New Card for each Repair
Same R&T

(Minor Repair)

Entry No

165 = *

Nature of Repair

166 = *

Date Completed

167 = *

Contractor

169 = *

% Performance Chg

170 = *

(Minor Repair)

Entry No

165 = *

Nature of Repair

166 = *

Date Completed

167 = *

Contractor

169 = *

% Performance Chg

170 = *

(Minor Repair)

165 = *

166 = *

167 = *

169 = *

170 = *

(Minor Repair)

165 = *

166 = *

167 = *

169 = *

170 = *

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 *

T = ☒ A ☐ D ☐ M *

add, delete, modify

No. Wells in Group

204 = *

Deepest Depth

205 = *

Shallowest
Depth

206 = *

Construction
Method

207 = D J V W Z *

drilled, jetted, driven, drive, other
washSize of
Well Field

262 = *

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208 *

T = ☒ A ☐ D ☐ M *

add, delete, modify

Longest
Dimension

209 = *

Other (Width)
Dimension

210 = *

Depth

211 = *

Orientation

263 = *

Dip

264 = *

DATA FOR COLLECTOR WELLS (1)

R = 219 *

T = ☒ A ☐ D ☐ M *

add, delete, modify

New Card for each Lateral
Same R&T

Entry No.

220 = *

220 = *

220 = *

220 = *

220 = *

220 = *

220 = *

220 = *

220 = *

220 = *

220 = *

220 = *

Depth to the Lateral

221 = *

221 = *

221 = *

221 = *

221 = *

221 = *

221 = *

221 = *

221 = *

221 = *

221 = *

221 = *

Length of Lateral

222 = *

222 = *

222 = *

222 = *

222 = *

222 = *

222 = *

222 = *

222 = *

222 = *

222 = *

222 = *

Diameter of Lateral

223 = *

223 = *

223 = *

223 = *

223 = *

223 = *

223 = *

223 = *

223 = *

223 = *

223 = *

223 = *

Screen Mesh

224 = *

224 = *

224 = *

224 = *

224 = *

224 = *

224 = *

224 = *

224 = *

224 = *

224 = *

224 = *

FOOT NOTES:

1 Nature of repair

| B | C | D | L | P | S | Z |
|-----------------|---------|----------|----------------------|------------------|---------------------|-------|
| blocked,
off | cleaned | deepened | liner,
perforated | plugged,
back | screen,
replaced | other |

U. S. DEPT. OF THE INTERIOR
WELL SCHEDULE
GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

[illegible]

WELL-DESCRIPTION CARD

[illegible]

Revised September 1980

SITE NO 030223808/380406

Recorded by GLENNU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULEDate 12-16-83Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (10)

Site Ident No 030223808/380406 RG Number R=0 Transaction T=(A) D M V
 Site Type 2=C D E H I M O P S T W X Data 3=C U Reliability 4=FLC39
 Project No. 5= District 6=101 State 7=12 County (or town) Duval 8=031
 Latitude 9=302238 Longitude 10=0813804 Lat-Long Accuracy 11=S D T V
 Local Number 12=J-3566 Land Net Loc. 13=LANDGRANT 37T 18R 27E
 Location Map 14=TROUT RIVER Scale 15=24000
 Altitude 16=30 Method of Measurement 17=A L M Accuracy 18=5
 Type 19=A B C D E F G H K L M O P S T U V W Hydrologic Unit (CADC) 20=03080103
 Site 23=A C D E G H M O P R S T U W X Z Secondary Site Use 301= Tertiary Site Use 302=
 Use of Water 24=A B C D E F H I J K M N O P Q R S T U Y Z
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27= Depth of Well 28= Source of Depth Data 29=
 Water Level 30=1.0 Data Measured 31=12/16/1983 Source 33=
 Method of Measurement 34=A B C E G H L N R T V Z
 Site Status 37=D E F G H I J N O P R S T V W X Z
 Source of Geohydrologic Data 36= Pump Used 35= Date of First Construction/Completion 21=12/00/1983

OWNER IDENTIFICATION (1)

R=158 T=(A) D M Date of Ownership 159=12/00/1983
 Name Last 161=M. C. REMAID First 162=RESTAURANT Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 T=(A) D M Ident 190#ST Assigner 191=FLANND
 Ident 190#US 12 Assigner 191=FLC39

SITE VISIT DATA (1)

R=186 T=(A) D M Date of Visit 187#12/16/1983 Name of Person 188=GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 T=A D M Date 193# Geohydrologic Unit 195=
 Temperature 196#0.0010 Degrees C 197=
 Conductance 196#0.0095 μ Mhos 197=
 Other (STORET) Parameter 196# Value 197=
 Other (STORET) Parameter 196# Value 197=

NOTES

Source of Data Codes

53566

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 *

T= A D M *

add, delete, modify

Entry No 256 # *

Depth to Top 91 = *

Depth to Bottom 92 = *

93 = *

304 = *

96 = *

97 = *

Unit Identifier

Contributing Unit

Lithology

Lithologic Modifier

AQUIFER DATA (2)

R=94 *

T= A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *

month day year

Water Level 126 = *

% Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 *

T= A D M *

add, delete, modify

Entry No 256 # *

Depth to Top 91 = *

Depth to Bottom 92 = *

93 = *

304 = *

96 = *

97 = *

Unit Identifier

Contributing Unit

Lithology

Lithologic Modifier

AQUIFER DATA (2)

R=94 *

T= A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *

month day year

Water Level 126 = *

% Water Contributed 132 = *

PERTINENT REMARKS

R=183 *

T= A D M *

add, delete, modify

New Card Same R&T

Remark No. 311 # *

185 = *

311 # *

185 = *

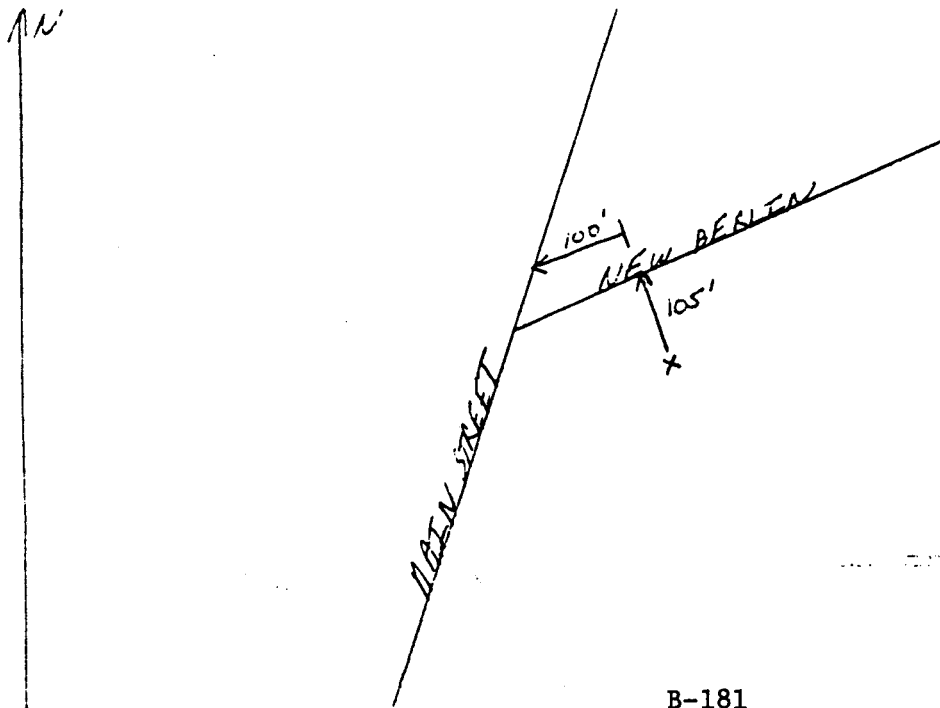
① Contributing Unit Codes

| P | S | N | U |
|----------------------|------------------------|------------------|---------|
| primary contributing | secondary contributing | non-contributing | unknown |

R=212 *

T= A *

218 = US 17 AND NEW BERLIN RD *



WELL SCHEDULE

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION
7.5' Quad

MASTER CARD

Source of data: DNR LOG Date: 6-15-22 Map: EAST PORT

County: DUVAL

Latitude: 30° 35' 39" N Longitude: 081° 33' 52" W

Section: 1 Township: 16 N Range: 13 E

Local land number: 1 Section number: 1 Township number: 16 Range number: 13

Other number: SPRING CREEK

Special use: [] [] [] [] [] [] [] [] [] [] [] [] [] [] []
 Order or name: SEABOARD COAST LINE
 Address: 500 WATER ST.
 JAX.

| | (C) | (D) | (E) | (F) | (G) | (H) |
|--|------|------|------|------|------|------|
| <u>Chicago County, Fed Gov't, City of Chicago</u> | | | | | | |
| <u>Private, State Agency, Water Dist</u> | | | | | | |
| <u>Corp at Co</u> | | | | | | |
| (A) Air cond., Heating, Comm. | (1) | (2) | (3) | (4) | (5) | (6) |
| (B) Deventer, Power, Pipe, Dam, Irr. Mod., Ind., P & S, Rec. | (7) | (8) | (9) | (10) | (11) | (12) |
| (C) Stock, Insult. | (13) | (14) | (15) | (16) | (17) | (18) |
| (D) Repressure, Recharge, Diesel-P 2, Diesel-Other, Other | (19) | (20) | (21) | (22) | (23) | (24) |
| (E) Anoda, Dredge, Solenoid, Heat Res. Obs., Oil-gas, Recharge, Test | (25) | (26) | (27) | (28) | (29) | (30) |
| (F) Unkown, Unknown, Water, Destroyed | (31) | (32) | (33) | (34) | (35) | (36) |

DATA AVAILABLE: Well date 6/6 Freez. W/L meas.: _____
 v.d. lab. date: _____
 1. water date: type: CL
 est. sampling: _____ yes
 capture cards: _____ Pumpage inventory: no period: _____
 Date: DNB 706

ELL-DESCRIPTION CARD

[illegible]

3025 294 0213352.1

HYDROGEOLOGIC CARD

[illegible]

Hand-drawn map of the study area. The map shows the intersection of New Berlin Rd and Heckscher Dr. A 4x4 grid is drawn in the upper left, labeled 'R 27E' and 'T1S' with a '30' measurement. A 'Cleared Area' and 'Well B' are marked near the intersection. A '1 mile' distance is indicated along New Berlin Rd. The map also shows 'Dunn Creek' and '25th R.R. Tracks'.

WATER CONSERVATION PROGRAM
WATER WELL FIELD INSPECTION GUIDE

J12

Reason for Inspection:

Complaint W.U. Permit Construction, etc. Permit Well Inventory

X

Free flowing well

Regulatory Status:

Received Application
to Construct, Modify

☐ Yes N/A ☐ Date _____

Permit Issued for
Above

☐ Yes N/A ☐ Date _____

Received Application
for Temporary Water
Use Permit

☐ Yes N/A ☐ Date _____

Permit Issued for
Above

☐ Yes N/A ☐ Date _____

DNR/BW-2 Received

☐ Yes N/A ☐ Date _____

Data Submitted to
USGS

☐ Yes Date _____

Owner Seaboard Coast Line

Address ~~2600 West Broad Street~~ 500 Water Street, Jax. Well location-Heckscher Dr. & New Berlin Road

Well Drilling Contractor _____ License/Bond No. _____

Location of water well Latitude 30° 25' 29" N Long 81° 33' 52" W Sequential 1

Ident # of Quad Sheet SE SW NE 38 1s 27E
1/4 1/4 1/4 Section Township Range Subdivision

Depth of Water Well 659 How measured? DNR Logbook

Diameter/Cross Section 4"

Depth of Casing 569 Diameter of Casing from LSD 4" to 85 feet and diameter 3 1/2 from 85 to 569 feet.

Type of grouting used _____ Hole centered in grout? _____

Use of well Apparently abandoned

Water level 11" to 12" drop Hort. & 25.8 Above LSD How measured Rule Gauge
1" above 4" cas. vert.

Method of well construction _____

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.) _____

Casing material used ~~Black Iron~~ Steel

J 12

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' NA

Distance to nearest contaminant - septic tank, etc. if less than 100' NA

Maximum well yield _____ GPM Average well yield 73 GPM

Frequency of well use _____ Hrs./Day _____ Days/Year

Pump Data - Type & Make NA HP 1/4 Pump Rating NA

Capacity NA No. of Bowls or Stages NA

Type of Power NA Static water level 24.8 Above M.P.

Pump Intake Setting NA = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness _____, and Chloride 61 PPM. Temp 76°F

General Rating: poor _____ average _____ good _____ excellent _____

Additional Info/Action Required _____

Action taken/Comments Follow up for results after 30 days.

Letter sent to SCL by certified mail this date. Copy of correspondence on file.

Date May 6, 1975

Inspector's Name Doug Blackall Field Inspection Date _____

Inventory Complete Date _____

25 June 75 This well was Logged This Date with All Information Obtained, Supplied to this Form. Awaiting Determination of DFR. Well is Now Controlled with Pipe Plugs and Not Flowing. Doug Blackall

Recorded by

D. HAMMOND

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date

5/18/76 5/24/76

Check One

English

Metric Units

GENERAL SITE DATA (10)

Site Ident No. 50 17 20 08 1 24 12 01
RG Number R-01
Transaction T-1 (A) O M V
25. delete, modify, recheck

Site-Type 2- C D H I M P T W
Data 3- C U L M
Reliability 1- 1 2 3 4 5 6 7 8 9 10
26. delete, modify, recheck

Project No. 5-
District 5- 124
State 7- 12
County (or town) DWA
8- 1244

Latitude 9- 30 27 20
Longitude 10- 04 1 34 0
Let-Long Accuracy 11- 3 P T M
12. 5 min, 10 sec, 15 min

Local Number 12-
Land 13- N E N W S 2 T 1 S R 27 E
Location Map 14- C A S P P R T
Scale 15- 24 000
Altitude 18- 20.00
Method of Measurement 17- A L M
Assessment 18- 1005

Topo Setting 19- D C E F H K L O P S T U V W
Hydrology Unit (OWDC) 20- 000 50 1 0 3
21. depression, stream, dunes, flat, hilltop, wet, swamp, offshore, sediment, hillside, terrace, undulating, valley, upland, channel, flat

Date of First Construction/Completion 21- 05 15 19 76
Use of Site 23- A O E G H I M P R S T U V X Z
22. abandoned, drain, gas, sewage, heat, observation, mine, oil or, road, charge, reagent, lost, covered, with, waste, destroyed, thermal, resource, other, gas

Use of Water 24- A B C D E F H I M N P R S T U V Y Z
25. air cond., bottling, commercial, domestic, power, fire, domestic, irrigation, medicinal, industrial, public, recreation, stock, institution, unusual, dental, other supply

Secondary Water Use 25-
Tertiary Use of Water 26-
Depth of Hole 27-
Depth of Well 28-
Source of Duplication 29-
Water Level 30-
Date Measured 31-
Source 32-
Method of Measurement 34- A C E H L M R S T V Z
33. surface, subsurface, estimated, pressure, saturated, geophysical, manometer, reported, data, electric, controlled, other, surface, pressure, gas, loss, time, loss, other, time

Site Status 37- D G H I P R S T V X Z
38. dry, flowing, nearby, nearby, observation, pumping, recently, nearby, nearby, foreign, surface water, other, flowing, recently, pumped, pumping, recently, pumped, pumped

Source of Geohydrologic Data 35-
Pump Used 35-
Measuring Point 256-
Measuring Point Date 257-
month day year

OWNER IDENTIFICATION (1)

R-158
T-1 (A) D M V
Date of Ownership 159- 05 14 19 76
25. delete, modify

Name: Last 161- D H O R E First 162- D H O R E Middle Initial 163-
26. delete, modify

OTHER SITE IDENTIFICATION NUMBERS (1)

R-159
T-1 (A) D M V
Ident 190-
Assigner 191-
25. delete, modify

New Card Same R & T
Ident 190-
Assigner 191-

SITE VISIT DATA (1)

R-156
T-1 (A) D M V
Date of Visit 172- 05 15 19 76
Name of Person 188- D H O R E
25. delete, modify

FIELD WATER QUALITY MEASUREMENTS (1)

R-152
T-1 (A) D M V
Date 192-
Geohydro-logic Unit 195-
25. delete, modify

New Card Same R & T
Temperature 193- 0 0 0 1 0
Degrees C 197-
Conductance 194- 0 0 0 9 5
u Mhos 197-
Other STORET meter 195-
Value 197-
Other STORET meter 195-
Value 197-

FOOTNOTES

1. See Notes on Data Codes.

S O O A R L G Z
2. See Notes on Data Codes.
3. See Notes on Data Codes.
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93. See Notes on Data Codes.
94. See Notes on Data Codes.
95. See Notes on Data Codes.
96. See Notes on Data Codes.
97. See Notes on Data Codes.
98. See Notes on Data Codes.
99. See Notes on Data Codes.
100. See Notes on Data Codes.

WELL CONSTRUCTION DATA (1)

R = 66 = T = A D M = Entry No 55 10 C 1 = Date of Construction Completion 66 05 14 1976 = Source of Const. Data 64 = 1 =

Name of Contractor/Driller 63 =

Method of Construction 65 = A B C D H J P R T V W Z =

65 = 1 = 2 = 3 = 4 = 5 = 6 = 7 = 8 = 9 = 10 = 11 = 12 = 13 = 14 = 15 = 16 = 17 = 18 = 19 = 20 = 21 = 22 = 23 = 24 = 25 = 26 = 27 = 28 = 29 = 30 = 31 = 32 = 33 = 34 = 35 = 36 = 37 = 38 = 39 = 40 = 41 = 42 = 43 = 44 = 45 = 46 = 47 = 48 = 49 = 50 = 51 = 52 = 53 = 54 = 55 = 56 = 57 = 58 = 59 = 60 = 61 = 62 = 63 = 64 = 65 = 66 = 67 = 68 = 69 = 70 = 71 = 72 = 73 = 74 = 75 = 76 = 77 = 78 = 79 = 80 = 81 = 82 = 83 = 84 = 85 = 86 = 87 = 88 = 89 = 90 = 91 = 92 = 93 = 94 = 95 = 96 = 97 = 98 = 99 = 100 =

Finish 66 = C F G H B P S T W X Z =

66 = 1 = 2 = 3 = 4 = 5 = 6 = 7 = 8 = 9 = 10 = 11 = 12 = 13 = 14 = 15 = 16 = 17 = 18 = 19 = 20 = 21 = 22 = 23 = 24 = 25 = 26 = 27 = 28 = 29 = 30 = 31 = 32 = 33 = 34 = 35 = 36 = 37 = 38 = 39 = 40 = 41 = 42 = 43 = 44 = 45 = 46 = 47 = 48 = 49 = 50 = 51 = 52 = 53 = 54 = 55 = 56 = 57 = 58 = 59 = 60 = 61 = 62 = 63 = 64 = 65 = 66 = 67 = 68 = 69 = 70 = 71 = 72 = 73 = 74 = 75 = 76 = 77 = 78 = 79 = 80 = 81 = 82 = 83 = 84 = 85 = 86 = 87 = 88 = 89 = 90 = 91 = 92 = 93 = 94 = 95 = 96 = 97 = 98 = 99 = 100 =

Bottom of Seal 68 =

Method of Development 69 = A B C J N P S Z =

69 = 1 = 2 = 3 = 4 = 5 = 6 = 7 = 8 = 9 = 10 = 11 = 12 = 13 = 14 = 15 = 16 = 17 = 18 = 19 = 20 = 21 = 22 = 23 = 24 = 25 = 26 = 27 = 28 = 29 = 30 = 31 = 32 = 33 = 34 = 35 = 36 = 37 = 38 = 39 = 40 = 41 = 42 = 43 = 44 = 45 = 46 = 47 = 48 = 49 = 50 = 51 = 52 = 53 = 54 = 55 = 56 = 57 = 58 = 59 = 60 = 61 = 62 = 63 = 64 = 65 = 66 = 67 = 68 = 69 = 70 = 71 = 72 = 73 = 74 = 75 = 76 = 77 = 78 = 79 = 80 = 81 = 82 = 83 = 84 = 85 = 86 = 87 = 88 = 89 = 90 = 91 = 92 = 93 = 94 = 95 = 96 = 97 = 98 = 99 = 100 =

Special Treatment During Development 71 = C D E F H M Z =

71 = 1 = 2 = 3 = 4 = 5 = 6 = 7 = 8 = 9 = 10 = 11 = 12 = 13 = 14 = 15 = 16 = 17 = 18 = 19 = 20 = 21 = 22 = 23 = 24 = 25 = 26 = 27 = 28 = 29 = 30 = 31 = 32 = 33 = 34 = 35 = 36 = 37 = 38 = 39 = 40 = 41 = 42 = 43 = 44 = 45 = 46 = 47 = 48 = 49 = 50 = 51 = 52 = 53 = 54 = 55 = 56 = 57 = 58 = 59 = 60 = 61 = 62 = 63 = 64 = 65 = 66 = 67 = 68 = 69 = 70 = 71 = 72 = 73 = 74 = 75 = 76 = 77 = 78 = 79 = 80 = 81 = 82 = 83 = 84 = 85 = 86 = 87 = 88 = 89 = 90 = 91 = 92 = 93 = 94 = 95 = 96 = 97 = 98 = 99 = 100 =

J 1061

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 = T = A D M = Construction Entry No 58 =

New Card for Each Hole Segment Same R, T & Field 59

Top of Hole Segment Below LSD 73 1 = 73 2 = 73 3 = 73 4 = 73 5 = 73 6 =

Bottom of Hole Segment Below LSD 74 1 = 74 2 = 74 3 = 74 4 = 74 5 = 74 6 =

Diameter of Hole Segment 75 1 = 75 2 = 75 3 = 75 4 = 75 5 = 75 6 =

CASING SCHEDULE (2)

R = 76 = T = A D M = Construction Entry No 59 2 =

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD 77 1 = 77 2 = 77 3 = 77 4 = 77 5 = 77 6 =

Bottom of Casing Segment Below LSD 78 1 = 78 2 = 78 3 = 78 4 = 78 5 = 78 6 =

Diameter of Casing Segment 79 1 = 79 2 = 79 3 = 79 4 = 79 5 = 79 6 =

Casing Material 80 1 = 80 2 = 80 3 = 80 4 = 80 5 = 80 6 =

Thickness of Casing 81 1 = 81 2 = 81 3 = 81 4 = 81 5 = 81 6 =

OPENINGS SCHEDULE (2)

R = 62 = T = A D M = Construction Entry No 59 2 =

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD 83 1 = 83 2 = 83 3 =

Bottom of Section Below LSD 84 1 = 84 2 = 84 3 =

Type of Opening 85 1 = 85 2 = 85 3 =

Type of Material 86 1 = 86 2 = 86 3 =

Diameter of Open Section 87 1 = 87 2 = 87 3 =

Width of Opening 88 1 = 88 2 = 88 3 =

Length of Opening 89 1 = 89 2 = 89 3 =

FOOTNOTES:

1 Source of Data Codes.

| | | | | | | | |
|--|-------|-----------------------|-----------|---|---|---|---|
| S | D | B | A | R | L | G | Z |
| reporting, driller, owner, other gov't, agency | other | log, geologist, other | reported, | | | | |

2 Type of Opening Codes

| | | | | | | | | | |
|---|----------|------------|-------|---------|-------|------|---|---|---|
| F | L | M | P | R | S | T | W | X | Z |
| fracture, horizontal, mesh, perforated, sand, screen, sand, welded, open, other | shuffled | or slotted | wound | tumbler | point | hole | | | |

3 Casing Material Codes

| | | | | | | | | | | | |
|--|------|------|-------|---------|------|---|---|---|---|---|---|
| B | C | G | I | M | P | R | S | T | U | W | Z |
| brass, aluminum, galv, wrought, other, PVC or, steel or, steel, tin, coated, wood, other | iron | iron | metal | plastic | none | | | | | | |

4 Type of Material Codes for Open Sections

| | | | | | | | | | |
|--|-------|---|---|---|---|---|---|---|---|
| B | C | G | I | M | P | R | S | T | Z |
| brass or, aluminum, galv, wrought, other, PVC or, stainless, steel, tin, other | brass | | | | | | | | |

PRODUCTION DATA (1)

R=134 146= T= A D M Entry No 147= Date 148= / /

Discharge 150= Source of Data 151=

Method of Measurement 152= B C E F M O P R T U V W Z

Production Level 153= State Level 154= Source of Data 155= Specific Capacity 272=

Method of Measurement 156= A C E G H L M R S T V Z

Pumping Period 157=

LIFT DATA (1)

R=42= T= A D M Type of Lift 43= A B C J P R S T U Z Entry No 254=

Pump Intake Setting 44= Type of Power 45= D E G H L N W Z

Date 46= / / Horsepower 47=

MAJOR PUMP DATA (2)

R=47= T= A D M Type of Lift 48= Lift Entry No 254= Manufacturer of Pump 49=

Serial No of Pump 49= Name of Power Company 50=

Power Company Account No 51= Power Meter No 52= Pump Rating 53=

Person or Company Who Maintains the Pump 54= Additional Lift 255= Rated Pump Capacity 256=

STANDBY POWER DATA (2)

R=55= T= A D M Type of Lift 43= Type of Power 56= Horsepower 57= Lift Entry No 254=

AVAILABLE LOG DATA (1)

R=199= T= A D M

New Card for Each Log Type Same R & T

Type of Log 199=

Begin Depth 200=

End Depth 201=

Source of Data 202=

WATER QUALITY DATA COLLECTION (1)

R=114= T= A D M Begin Year 115= End Year 116= Source Agency 117=

Frequency of Collection 118= Network Site 257= Type of Analyses 120=

WATER LEVEL DATA COLLECTION (1)

R=121= T= A D M Begin Year 122= End Year 123= Source Agency 124=

Frequency of Collection 125= Network Site 258=

WATER PUMPAGE WITHDRAWAL DATA COLLECTION (1)

R=127= T= A D M Begin Year 128= End Year 129= Source Agency 130=

Frequency of Collection 131= Network Site 259= Method of Collection 133= C E M U Z

OTHER DATA AVAILABLE (1)

R=170= T= A D M Type of Data 171= 172= C D Z Format 201= F M P Z

New Card Same R & T Type of Data 191= 192= C D Z Format 261= F M P Z

FOOT NOTES:

1 Source of Data Codes:

| | | | | | | | |
|----------|---------|-------|-------|------|-------|----------|-----------|
| S | D | O | A | R | L | G | Z |
| starting | driller | owner | other | govt | other | hydro | geologist |
| agency | | | | | | reported | |

2 Source of Log Codes

| | | | | | | | | | | | | | | | | |
|------|--------|-------|-------|----------|-------|-----------|-------|-------|-------|----------|-----------|----------|---------|---------|-------|--------|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| time | collar | drill | drill | electric | fluid | geologist | hydro | hydro | gamma | diameter | laterolog | microlog | neutron | u later | photo | radio |
| | | | | | | conduct | | | ray | | | | | | | active |

3 Frequency of Collection Codes

| | | | | | | | | | |
|--------|------------|------------|-------|------|--------------|---------|---------|---------|--------|
| A | R | C | D | F | M | Q | S | W | Z |
| annual | bi monthly | continuous | daily | semi | intermittent | monthly | on time | quarter | semi |
| | | | | | | monthly | | | weekly |

4 Type of Quality Analyses Codes

| | | | | | | | | | | | |
|----------|----------|-------|----------|-----------|---------|---------|----------|------------|--------|-------|-------|
| A | B | C | D | E | F | G | H | J | K | M | Z |
| physical | chemical | trace | chemical | nutrients | nitrate | nitrite | nitrogen | phosphorus | silica | total | other |
| | | | | | BSO | BAE | BSH | CSL | CSL | CSL | other |

GEOMORPHOLOGIC UNIT DESCRIPTIONS (1)

R=00 T= A O M Entry No 256 # 0 1 1 Depth to Top 91 Depth to Bottom 92
 Unit Identifier 93- 1122 70140 Lithology 96 Lithology Modifier 97

AQUIFER DATA (2)

R=94 T= A O M Geomorphologic Unit Entry No 256 # Date 95 2 Water Level 126 % Water Contributed 132

GEOMORPHOLOGIC UNIT DESCRIPTIONS (1)

R=00 T= A O M Entry No 256 # Depth to Top 91 Depth to Bottom 92
 Unit Identifier 93 Lithology 96 Lithology Modifier 97

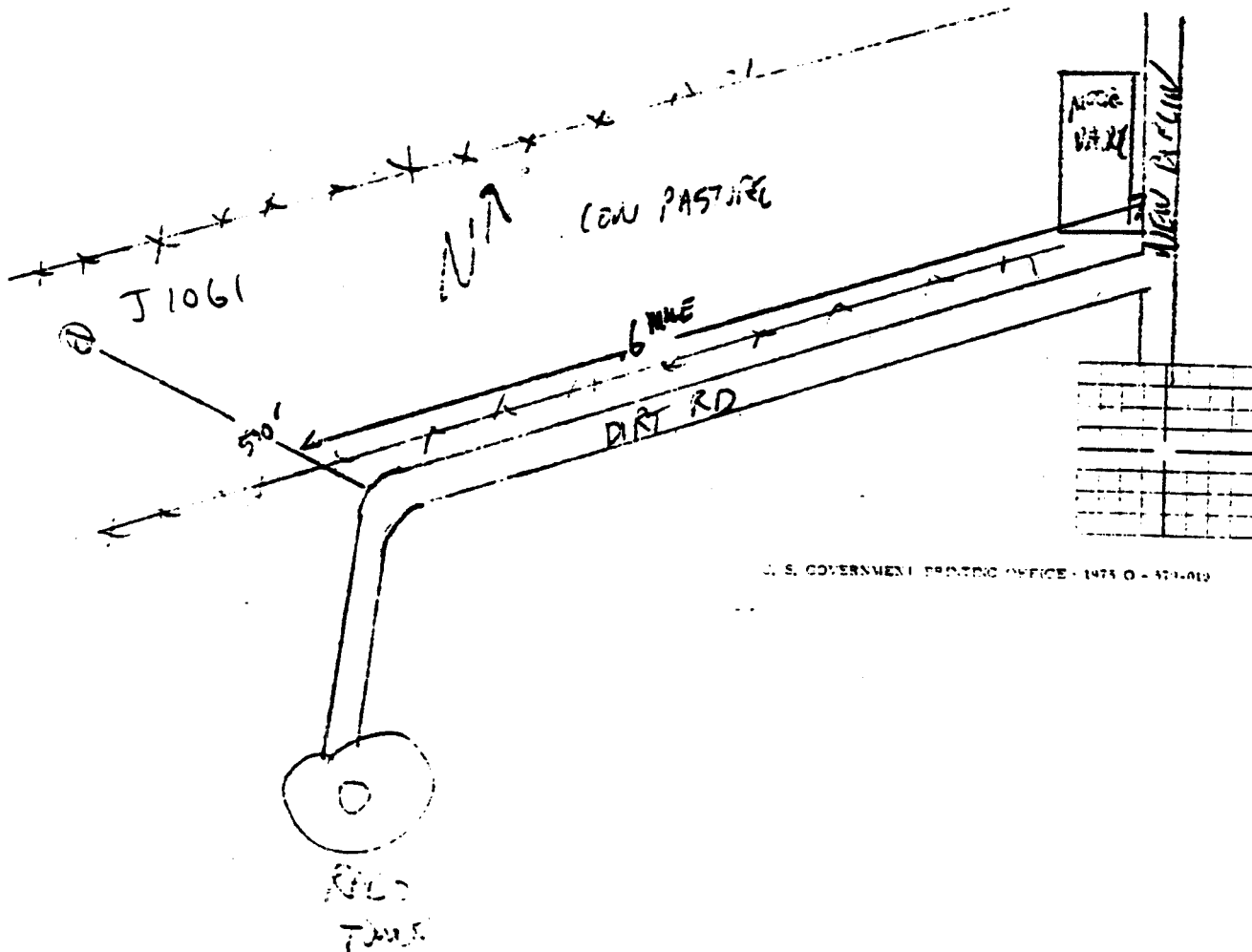
AQUIFER DATA (2)

R=94 T= A O M Geomorphologic Unit Entry No 256 # Date 95 2 Water Level 126 % Water Contributed 132

PERTINENT REMARKS

R=163 T= A 185
 New Card Same R&T 185
 185

NOTES:



U. S. GOVERNMENT PRINTING OFFICE : 1975 O - 471-012

Complaint No. _____ TWUP No. _____ Construction/Plugging Permit No. _____ Well Inventory No. 2-1261

Is it Free Flowing? Yes No

Owner M+M Drilling Phone _____

Owner's Address 12094 New Berlin Rd

Well Location Address _____

Well Drilling Contractor _____ License/Bond No. _____

Well Identification: 30 2704 081 34000 01 Lat./Long (if different) 30 2727 081 3403 01

SE SW SE 35 1N 27E East Point
1/4 1/4 Section TWP Range Quad Map Name

Depth of Hole Drilled _____ Depth of Well _____ How measured _____

Casing Diameter/Cross Section _____ Depth of Casing _____

Length and Diameter of Well Segments: _____ " from LSD to _____
" Dia. from _____ ' to _____ ' " Dia. from _____ ' to _____ '

Length and Diameter of Casing Segments: _____ " Dia. from _____ ' Above LSD
Below LSD

Grout: _____ " Dia. from _____ ' to _____ ' Well centered in Grout? _____

Type and Quantity of Grouting Used _____

Use of Well _____ Number of People Served _____

Water Level 5.5psi 14 ft Above LSD Measuring Pt. 16" 1.33' Above LSD
Below LSD Below LSD

How Measured Pressure Gauge Measured by Essex Date 5-8-81

Method of Construction _____ Date of Construction _____

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.) _____

Casing Material Used _____

Elevation _____ Interval 10'

Well Setting _____

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer than 300' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM

Free Flow Well Yield _____ GPM How Yield Determined _____

Frequency of Well Use _____ Hrs/Day _____ Days/Year _____

Pump Data - Type and Make _____ HP _____

Pump Capacity _____ GPM No. Bowls or Stages _____

Type of Power _____ Static Water Level _____

Production Water Level _____ Pump Intake Setting _____
= Depth or Section Line

Water Sampled for: Dissolved Solids _____ Conductivity 470 u/mk

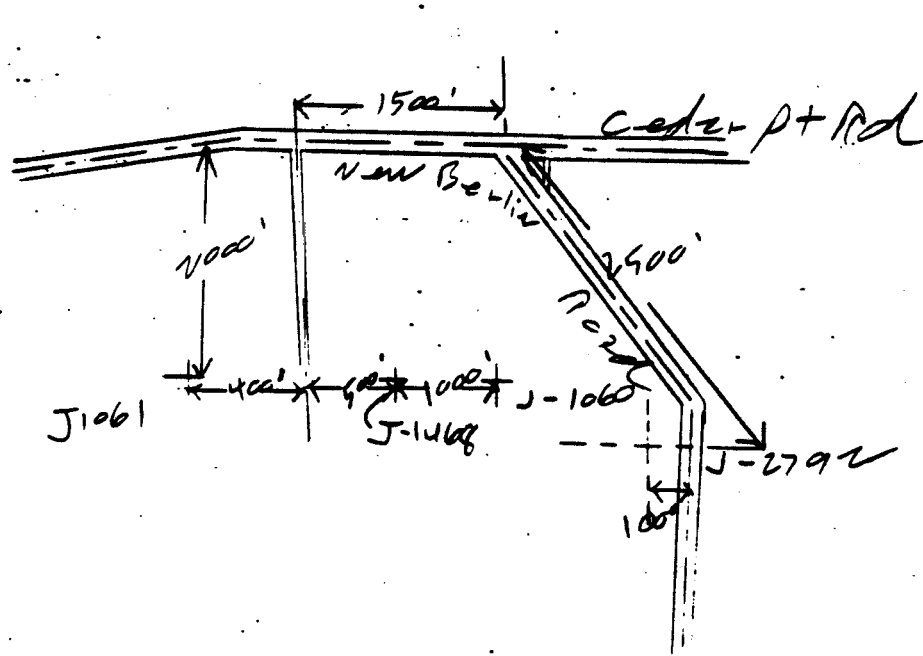
Hardness _____ Chlorides _____ PH= _____ Temperature 23°

General Rating: Poor _____ Average _____ Good ✓ Excellent _____

Action Taken/Comments _____

Follow Up Needed _____

Inspector's Name WTP GARY Field Inspection Date 5-8-81



WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

MASTER CARD

| | | | | |
|---------------|------------|-----------|------------|-----------|
| Recorded by | Source | Date | Map | Scale |
| 1301010 | 100000 | 10/10/70 | 100000 | 100000 |
| State | County | Country | City | Postal |
| 100000 | 100000 | 100000 | 100000 | 100000 |
| Latitude | Longitude | Altitude | Area | Area |
| 100000 | 100000 | 100000 | 100000 | 100000 |
| East-long | North-long | East-long | North-long | East-long |
| 100000 | 100000 | 100000 | 100000 | 100000 |
| Local | Other | Local | Other | Local |
| 100000 | 100000 | 100000 | 100000 | 100000 |
| Local use | Other use | Local use | Other use | Local use |
| 100000 | 100000 | 100000 | 100000 | 100000 |
| Owner or name | Address | Address | Address | Address |
| 100000 | 100000 | 100000 | 100000 | 100000 |

| | (C) | (T) | (N) | (U) | (S) | (D) |
|---|-----|-----|-----|-----|-----|-----|
| Donorship: County, Fed Gov't, City, Corp of Co, <u>Foreign</u> , State Agency, United Dist | | | | | | |
| (A) (A) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) | | | | | | |
| Use of
<u>Air Cond, Bottling, Comm, Dumpster, Power, Fire, Gas, Irr, Heat, P, S, Sec,</u> | | | | | | |
| <u>WATER</u> | | | | | | |
| (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) | | | | | | |
| Stock, Inslit, <u>Unexpd</u> , Repressure, Recharge, Diesel-P, S, Diesel-other, Other | | | | | | |
| Use of
<u>Amoed, Drain, Seismic, Heat Ray, One, Oil-gas, Recharge, Test, Unused, Withdrg, Waste, Destroyed</u> | | | | | | |
| <u>WILL</u> | | | | | | |

DATA AVAILABLE: Well data ☐ Freq. W/L meas.: _____ Field aquifer char. ☒ ☐

Hed. lab. data: _____

Qual. water data: Type: _____

Freq. sampling: _____ Pumpage inventory: no. period: ☐ yes ☐

Abscure cards: _____ Yes ☐

Log date: _____ Log date: ☐ - ☐ - ☐

WELL-DESCRIPTION CARD[illegible]

Prefiller: _____

Name _____ **(L)** _____ **(N)** _____ **address**

(A) **(H)** **(C)** **(J)** multiple, (M) (P) (R) (S) (T)
air, bukat, cent, lot, (cont.) nose, piston, rot, submers, turb, other

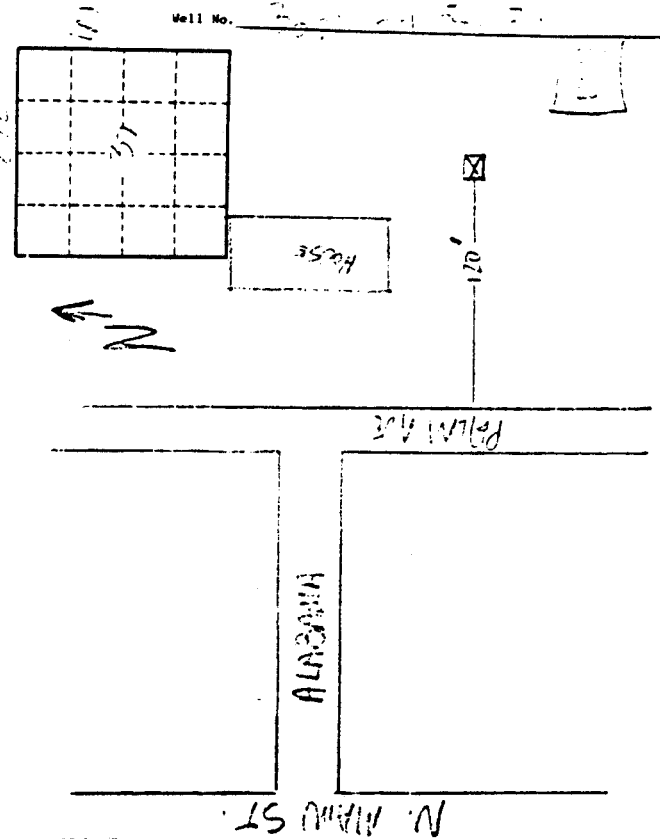
LP ☐ ☐ ☐ ☐ Deep Shallow

Power net diesel, elec, gas, gasoline, hand, gas, wind; H.P.

(Type) _____ **Index of** _____
serial no. _____

| | | | | |
|--------------|-----------------------|--------|-----------------------|-----|
| Descript. NF | above 1 | | ft below LED, Alt. NF | |
| Alt. LSD: | 23 | 24 | Accuracy: | 25 |
| Water | above LED | 26 | Accuracy: | 27 |
| 12901 | ft below NF, Ft below | 28 | Method | 29 |
| Date | 30 | Yield: | determined | 31 |
| meag: | 32 | 33 | 34 | 35 |
| Drumdown: | ft | 36 | 37 | 38 |
| QUALITY OF | 39 | 40 | 41 | 42 |
| WATER DATA: | Sulfate | 43 | Chloride | 44 |
| Iron | ppm | 45 | Hard. | 46 |
| Temp. | 47 | 48 | Date | 49 |
| Conduct | 50 | 51 | sampled | 52 |
| 53 | 54 | 55 | 56 | 57 |
| 58 | 59 | 60 | 61 | 62 |
| 63 | 64 | 65 | 66 | 67 |
| 68 | 69 | 70 | 71 | 72 |
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| 393 | 394 | 395 | 396 | |

HYDROGEOLOGIC CARD

[illegible]

WELL SCHEDULE
GEOLOGICAL SURVEY

MASTER CARD
E.W.

Record by: QW Leve Date: 5/20/66 No: Eastport

10:00 County (for term)
 10:00 County (for term)
 10:00 County (for term)

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|-----|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | 74 | 75 | 76 | 77 | 78 | 79 | 80 | 81 | 82 | 83 | 84 | 85 | 86 | 87 | 88 | 89 | 90 | 91 | 92 | 93 | 94 | 95 | 96 | 97 | 98 | 99 | 100 |
|---|---|---|---|---|---|---|---|---|-----|

Latitude: 20° 11' 30" N
Longitude: 156° 51' 30" W

| | |
|-----------|--|
| Accuracy: | |
| Local | |
| Other | |
| Total | |

| | total | serial number: | number: |
|-----|-------|----------------|---------|
| b7D | 602 | | D-902 |

Local no: 01527 E38
 Date of issue: Jacksonvile

NAME: SOKKSONVILLE ADDRESS: Hickshire & Bener Str.

| Case | Year | Age | Sex | Occupation | Education | Religion | Marital Status | Family Size | Income | Health Status | Life Expectancy |
|------|------|-----|-----|-------------|-------------|------------|----------------|-------------|----------|---------------|-----------------|
| 1 | 1950 | 25 | M | Farmer | High School | Protestant | Married | 4 | \$12,000 | Good | 75 |
| 2 | 1955 | 30 | F | Teacher | College | Catholic | Married | 3 | \$15,000 | Good | 80 |
| 3 | 1960 | 35 | M | Engineer | College | Jewish | Married | 2 | \$20,000 | Good | 85 |
| 4 | 1965 | 40 | F | Nurse | College | Protestant | Married | 3 | \$18,000 | Good | 82 |
| 5 | 1970 | 45 | M | Doctor | College | Catholic | Married | 2 | \$25,000 | Good | 88 |
| 6 | 1975 | 50 | F | Lawyer | College | Jewish | Married | 2 | \$30,000 | Good | 90 |
| 7 | 1980 | 55 | M | Businessman | College | Protestant | Married | 3 | \$35,000 | Good | 92 |
| 8 | 1985 | 60 | F | Retired | College | Catholic | Married | 2 | \$28,000 | Good | 88 |
| 9 | 1990 | 65 | M | Engineer | College | Jewish | Married | 2 | \$40,000 | Good | 95 |
| 10 | 1995 | 70 | F | Teacher | College | Protestant | Married | 3 | \$32,000 | Good | 90 |

Demographic: County, Fed Gov't, City, Corp or Co, Private, State Agency, Water Dist

Use of Air cond., Bottling, Comm., Bunker, Power, Fire, Bus. Int. Med. Ind., 3 Flac.

| Water: | (S) | (T) | (U) | (V) | (W) | (X) | (Y) | (Z) |
|--|-----|-----|-----|-----|-----|-----|-----|-----|
| Stock, Inalt, Unused, Repressure, Recherche, Resol-P 5, Resol-other, Other | | | | | | | | |

☐ (A) ☐ (B) ☐ (C) ☐ (D) ☐ (E)

| | |
|--|--|
| <u>well.</u> | |
| Anode, Bzta, Brionic, Heat Res, Chg Oil-gas, Recharge. Test, Unused, Wabber, Waste, Destroyed. | |

DATA AVAILABLE: ☐ 8
Well data ☐ 8
Area, w/h meas.: Delta 5/10/66
Fluid aquifer char. ☐ 8

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Aperture cards:

[illegible]

WILLIAMS-SONNET CARD

SAVE AS ON MASTER CARD

Depth will: 1104' "

2107

SEP. 1964

copy

MEAS.

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Depth canal:
(light part.)

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[illegible][illegible]

Reel: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z) (AA) (AB) (AC) (AD) (AE) (AF) (AG) (AH) (AI) (AJ) (AK) (AL) (AM) (AN) (AO) (AP) (AQ) (AR) (AS) (AT) (AU) (AV) (AW) (AX) (AY) (AZ) (BA) (BB) (BC) (BD) (BE) (BF) (BG) (BH) (BI) (BJ) (BK) (BL) (BM) (BN) (BO) (BP) (BQ) (BR) (BS) (BT) (BU) (BV) (BW) (BX) (BY) (BZ) (CA) (CB) (CC) (CD) (CE) (CF) (CG) (CH) (CI) (CJ) (CK) (CL) (CM) (CN) (CO) (CP) (CQ) (CR) (CS) (CT) (CU) (CV) (CW) (CX) (CY) (CZ) (DA) (DB) (DC) (DD) (DE) (DF) (DG) (DH) (DI) (DJ) (DK) (DL) (DM) (DN) (DO) (DP) (DQ) (DR) (DS) (DT) (DU) (DV) (DW) (DX) (DY) (DZ) (EA) (EB) (EC) (ED) (EE) (EF) (EG) (EH) (EI) (EJ) (EK) (EL) (EM) (EN) (EO) (EP) (EQ) (ER) (ES) (ET) (EU) (EV) (EW) (EX) (EY) (EZ) (FA) (FB) (FC) (FD) (FE) (FF) (FG) (FH) (FI) (FJ) (FK) (FL) (FM) (FN) (FO) (FP) (FQ) (FR) (FS) (FT) (FU) (FV) (FW) (FX) (FY) (FZ) (GA) (GB) (GC) (GD) (GE) (GF) (GG) (GH) (GI) (GJ) (GK) (GL) (GM) (GN) (GO) (GP) (GQ) (GR) (GS) (GT) (GU) (GV) (GW) (GX) (GY) (GZ) (HA) (HB) (HC) (HD) (HE) (HF) (HG) (HH) (HI) (HJ) (HK) (HL) (HM) (HN) (HO) (HP) (HQ) (HR) (HS) (HT) (HU) (HV) (HW) (HX) (HY) (HZ) (IA) (IB) (IC) (ID) (IE) (IF) (IG) (IH) (II) (IJ) (IK) (IL) (IM) (IN) (IO) (IP) (IQ) (IR) (IS) (IT) (IU) (IV) (IW) (IX) (IY) (IZ) (JA) (JB) (JC) (JD) (JE) (JF) (JG) (JH) (JI) (JJ) (JK) (JL) (JM) (JN) (JO) (JP) (JQ) (JR) (JS) (JT) (JU) (JV) (JW) (JX) (JY) (JZ) (KA) (KB) (KC) (KD) (KE) (KF) (KG) (KH) (KI) (KJ) (KK) (KL) (KM) (KN) (KO) (KP) (KQ) (KR) (KS) (KT) (KU) (KV) (KW) (KX) (KY) (KZ) (LA) (LB) (LC) (LD) (LE) (LF) (LG) (LH) (LI) (LJ) (LK) (LL) (LM) (LN) (LO) (LP) (LQ) (LR) (LS) (LT) (LU) (LV) (LW) (LX) (LY) (LZ) (MA) (MB) (MC) (MD) (ME) (MF) (MG) (MH) (MI) (MJ) (MK) (ML) (MM) (MN) (MO) (MP) (MQ) (MR) (MS) (MT) (MU) (MV) (MW) (MX) (MY) (MZ) (NA) (NB) (NC) (ND) (NE) (NF) (NG) (NH) (NI) (NJ) (NK) (NL) (NM) (NN) (NO) (NP) (NQ) (NR) (NS) (NT) (NU) (NV) (NW) (NX) (NY) (NZ) (OA) (OB) (OC) (OD) (OE) (OF) (OG) (OH) (OI) (OJ) (OK) (OL) (OM) (ON) (OO) (OP) (OQ) (OR) (OS) (OT) (OU) (OV) (OW) (OX) (OY) (OZ) (PA) (PB) (PC) (PD) (PE) (PF) (PG) (PH) (PI) (PJ) (PK) (PL) (PM) (PN) (PO) (PP) (PQ) (PR) (PS) (PT) (PU) (PV) (PW) (PX) (PY) (PZ) (QA) (QB) (QC) (QD) (QE) (QF) (QG) (QH) (QI) (QJ) (QK) (QL) (QM) (QN) (QO) (QP) (QQ) (QR) (QS) (QT) (QU) (QV) (QW) (QX) (QY) (QZ) (RA) (RB) (RC) (RD) (RE) (RF) (RG) (RH) (RI) (RJ) (RK) (RL) (RM) (RN) (RO) (RP) (RQ) (RR) (RS) (RT) (RU) (RV) (RW) (RX) (RY) (RZ) (SA) (SB) (SC) (SD) (SE) (SF) (SG) (SH) (SI) (SJ) (SK) (SL) (SM) (SN) (SO) (SP) (SQ) (SR) (SS) (ST) (SU) (SV) (SW) (SX) (SY) (SZ) (TA) (TB) (TC) (TD) (TE) (TF) (TG) (TH) (TI) (TJ) (TK) (TL) (TM) (TN) (TO) (TP) (TQ) (TR) (TS) (TT) (TU) (TV) (TW) (TX) (TY) (TZ) (UA) (UB) (UC) (UD) (UE) (UF) (UG) (UH) (UI) (UJ) (UK) (UL) (UM) (UN) (UO) (UP) (UQ) (UR) (US) (UT) (UU) (UV) (UW) (UX) (UY) (UZ) (VA) (VB) (VC) (VD) (VE) (VF) (VG) (VH) (VI) (VJ) (VK) (VL) (VM) (VN) (VO) (VP) (VQ) (VR) (VS) (VT) (VU) (VV) (VW) (VX) (VY) (VZ) (WA) (WB) (WC) (WD) (WE) (WF) (WG) (WH) (WI) (WJ) (WK) (WL) (WM) (WN) (WO) (WP) (WQ) (WR) (WS) (WT) (WU) (WV) (WW) (WX) (WY) (WZ) (XA) (XB) (XC) (XD) (XE) (XF) (XG) (XH) (XI) (XJ) (XK) (XL) (XM) (XN) (XO) (XP) (XQ) (XR) (XS) (XT) (XU) (XV) (XW) (XX) (XY) (XZ) (YA) (YB) (YC) (YD) (YE) (YF) (YG) (YH) (YI) (YJ) (YK) (YL) (YM) (YN) (YO) (YP) (YQ) (YR) (YS) (YT) (YU) (YV) (YW) (YX) (YZ) (ZA) (ZB) (ZC) (ZD) (ZE) (ZF) (ZG) (ZH) (ZI) (ZJ) (ZK) (ZL) (ZM) (ZN) (ZO) (ZP) (ZQ) (ZR) (ZS) (ZT) (ZU) (ZV) (ZW) (ZX) (ZY) (ZZ)

Date _____ Pump (or) cable setting: _____

[illegible][illegible]

| (type): | air, surface, cont., jet. | multiple, (cont.) | cont., piston, .01, subcont. turb. other | Shallow |
|---------|---------------------------|-------------------|--|---------|
| | | | | 20 |
| | | | | 40 |

Power _____
 (type): diesel, elec, gas, gasoline, band, gas, wind; H.P. _____
 net _____
 1 P
 U.S.A. No. _____
 Serial No. _____

16" flange 1.75 " below L30, Alt. MP 10.75

Actuaries:

[illegible][illegible]

| | | | |
|---------|-------|-----|-------------|
| 5/10/66 | Yield | gms | determining |
|---------|-------|-----|-------------|

[illegible]

| | | | | | | | |
|------------|--------------------------|---------|--------------------------|----------|--------------------------|-------|--------------------------|
| ALLIANCE | ☐ | Sulfate | ☐ | Chloride | ☐ | Hard. | ☐ |
| WATER DATA | | | | | | | |

[illegible]

492

21

Recorded by Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 24 June 77

GENERAL SITE DATA (I)

Check One ☒ English ☐ Metric Units

Site Ident No 302553081334001 RG Number R=0* Transaction T= A D M V *
 Site-Type 2= C D H I M P T * Data 3= C U L M * Reporting Agency 4= FL039*
 Project No. 5= 1 2 1 * District 6= 1 2 1 * State 7= 1 2 * County (or town) 8= 031*
 Latitude 9= 30 25 53 * Longitude 10= 08 13 40 * Lat-Long Accuracy 11= S E T M *
 Local Number 12= J 1398 * Land Net Loc. 13= LAND GAT'S 39 T 1 S R 27E *
 Location Map 14= EASTPORT * Scale 15= 24000 *
 Altitude 16= 16 * Method of Measurement 17= A L M * Accuracy 18= 5 *
 Topo Setting 19= D C E F H K L O P S T U V W * Hydrologic Unit (OWDC) 20= 03080103*
 Date of First Construction/Completion 21= 00 00 1973 * Use of Site 23= A D E G H O M P R S T U W X Z *
 Use of Water 24= A B C D E F H I M N P R S T U Y Z *
 Secondary Water Use 25= * Tertiary Use of Water 26= * Depth of Hole 27= 753 * Depth of Well 28= 753 * Source of Depth Data 29= 4 *
 Water Level 30= -17.3 * Date Measured 31= 06 23 1977 * Source 33= S *
 Method of Measurement 34= A C E G H L M R S T V Z *
 Site Status 37= D F G H O P R S T V X Z *
 Source of Geohydrologic Data 35= 0 * Pump Used 35= * Measuring Point 266= -1.5 * Measuring Point Date 267= 06 23 1977 *

OWNER IDENTIFICATION (I)

R=158* T= A D M V * Date of Ownership 159= 00 00 1973 *
 Name: Last 161= CAPITOL * First 162= CONCRETE * Middle Initial 163= *

OTHER SITE IDENTIFICATION NUMBERS (I)

R=189* T= A D M V * Ident 190= ST * Assigner 191= FLA WMD *
 New Card Same R & T Ident 190= NEW BERLIN * Assigner 191= FL039 *

SITE VISIT DATA (I)

R=186* T= A D M V * Date of Visit 187= 06 23 1977 * Name of Person 188= ESSEX *

FIELD WATER QUALITY MEASUREMENTS (I)

R=192* T= A D M V * Date 193= 1977 06 23 1977 * Geohydrologic Unit 195= *
 New Card Same R thru 195 Temperature 196= 0 0 0 1 0 * Degrees C 197= *
 Conductance 196= 0 0 0 9 5 * μ Mhos 197= *
 Other (STORET) Parameter 198= * Value 197= *
 Other (STORET) Parameter 199= * Value 197= *

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency reported.

WELL CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No 59 # 001 *

Date of Construction Completion

60 = 00/00/1973 *

Source of ①

Const. Data 84 = 0 *

Name of Contractor/Driller 63 = *

Method of Construction

65 = A B C D H J P R T V W Z *
air, rotary, bored, cable, dug, hydraulic, jetted, air-per, reverse, trenching, driven, drive, other
or augered, tool, or slotted, rotary, cushion, rotary, wash, groutFinish 66 = C F G H P S T W X Z *
porous, gravel w. gravel, horizontal, open, perforated, screen, sand point, welded, open, other
concrete, port, screen, gallery, and or slotted, air pumpType of Seal 67 = B C G Z *
bentonite, clay, cement, other

Bottom of Seal 68 = *

Method of Development

69 = A B C J N P S Z *
air-lift, bailed, compressed, jetted, none, other, surged, other
pump air pump

Number of Hours in Development 70 = *

Special Treatment During Development

71 = C D E F H M Z *
chemicals, dry ice, explosives, deflocculant, hydraulic fracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M *
add, delete, modify

Construction Entry No 59 # 001 *

Top of Hole Segment Below LSD

73 # 0.0 *
73 # 8.5 *
73 # *
73 # *
73 # *

Bottom of Hole Segment below LSD

74 # 8.5 *
74 # 763 *
74 # *
74 # *
74 # *

Diameter of Hole Segment

75 # 6 *
75 # 4 *
75 # *
75 # *
75 # *New Card for Each Hole Segment
Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 * T = A D M *
add, delete, modify

Construction Entry No 59 # 001 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 # 1.5 *
77 # 8.5 *
77 # *
77 # *
77 # *

Bottom of Casing Segment Below LSD

78 # 8.5 *
78 # 568 *
78 # *
78 # *
78 # *

Diameter of Casing Segment

79 # 6 *
79 # 4 *
79 # *
79 # *
79 # *

Casing Material ⑤

80 # 6 *
80 # 6 *
80 # *
80 # *
80 # *

Thickness of Casing

81 # *
81 # *
81 # *
81 # *
81 # *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M *
add, delete, modifyConstruction Entry No 59 # *
(Openings Data)

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # *
(Openings Data)

Bottom of Section Below LSD

84 # *
(Openings Data)

Type of Openings ⑥

85 # *
(Openings Data)

Type of Material ⑦

86 # *
(Openings Data)

Diameter of Open Section

87 # *
(Openings Data)

Width of Opening

88 # *
(Openings Data)

Length of Opening

89 # *
(Openings Data)

(Openings Data)

83 # *
(Openings Data)84 # *
(Openings Data)85 # *
(Openings Data)86 # *
(Openings Data)87 # *
(Openings Data)88 # *
(Openings Data)89 # *
(Openings Data)

(Openings Data)

83 # *
(Openings Data)84 # *
(Openings Data)85 # *
(Openings Data)86 # *
(Openings Data)87 # *
(Openings Data)88 # *
(Openings Data)89 # *
(Openings Data)

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other
agency reported

⑤ Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other
iron iron metal plastic stone steel

⑥ Type of Openings Codes

F L M P R S T W X Z
fracture, lowered, mesh, perforated, wire screen, sand, welded, open, other
shuttered or slotted wound (unknown) point hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other
bronze iron iron metal plastic steel

PRODUCTION DATA (1)

R = 134 146 = T = 6 D M * Entry No 147 = 001 * Date 148 = 06/23/1977 *
flowing, pumped add, delete, modify
 Discharge: 150 = 21.0 * Source of Data 151 = S *
 Method of Measurement 152 = B C E F M O P R U V W Z *
bailer, current, estimated, flume, totaling, orifice, pitot-tube, reported, trajectory, venturi, volumetric, weir, other
 Production Level 153 = * Static Level 154 = * Source of Data 155 = * Specific Capacity 272 = *
 Method of Measurement 156 = A C E G H L M R S T V Z *
spring, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other
 Pumping Period 157 = *

LIFT DATA (1)

R = 42 * T = A D M * Type of Lift 43 # A B C J P R S T U Z * Entry No 254 # *
add, delete, modify air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other
 Pump Intake Setting 44 = * Type of Power 45 = D E G H L N W Z *
diesel, electric, gasoline, hand, LP gas, natural, windmill, other
 Date 38 = / / * Horsepower 46 = *

MAJOR PUMP DATA (2)

R = 47 * T = A D M * Type of Lift 43 # * Lift Entry No 254 # * Manufacturer of Pump 48 = *
add, delete, modify
 Serial No of Pump 49 = * Name of Power Company 50 = *
 Power Company Account No 51 = * Power Meter No 52 = * Pump Rating 53 = *
 Person or Company Who Maintains the Pump 54 = * Additional Lift 255 = * Rated Pump Capacity 268 = *

STANDBY POWER DATA (2)

(See LIFT DATA for codes of fields 43 and 56 below)

R = 55 * T = A D M * Type of Lift 43 # * Type of Power 56 = * Horsepower 57 = * Lift Entry No 254 # *
add, delete, modify

AVAILABLE LOG DATA (1)

R = 198 * T = A D M * New Card for Each Log Type Same R & T
add, delete, modify
 Type of Log 199 # * Begin Depth 200 = * End Depth 201 = * Source of Data 202 = *
 199 # * 200 = * 201 = * 202 = *
 199 # * 200 = * 201 = * 202 = *
 199 # * 200 = * 201 = * 202 = *

WATER QUALITY DATA COLLECTION (1)

R = 114 * T = A D M * Begin Year 115 # * End Year 116 = * Source Agency 117 = *
add, delete, modify
 Frequency of Collection 118 = * Network Site 257 = * Type of Analyses 120 = *

WATER LEVEL DATA COLLECTION (1)

R = 121 * T = A D M * Begin Year 122 # * End Year 123 = * Source Agency 124 = *
add, delete, modify
 Frequency of Collection 125 = * Network Site 258 = *

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R = 127 * T = A D M * Begin Year 128 # * End Year 129 = * Source Agency 130 = *
add, delete, modify
 Frequency of Collection 131 = * Network Site 259 = * Method of Collection 133 = C E M U Z *
calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)

R = 180 * T = A D M * Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *
add, delete, modify
 New Card Same R & T Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *
cooperator, district, other files, machine, published, other readable

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
reporting, driller, owner, other govt, other logs, geologist, other agency reported

② Frequency of Collection Codes

A B C D F I M O Q S W Z
annual, bi-monthly, continuous, daily, semi-annual, intermittent, monthly, one time, quarter, semi-annual, weekly, other only annual annual

③ Type of Log Codes

A B C D E F G H I J K L M N O P Q
time, collar, colour, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, laterolog, microlog, neutron, mu later, photo, radio, conduct ray active

④ Type of Quality Analyses Codes

A B C D E F G H J K L M Z
physical, common, trace, pesticides, nutrients, sanitary, codes, codes, codes, codes, codes, other, other

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 99 *

T = Q D M *

add, delete, modify

Entry

No 256 = 001 *

Depth

to Top 91 = *

Depth to

Bottom 92 = *

Unit

Identifier

93 = L20.F.L.P.D. *

Lithology

96 = L.M.S.M. *

Lithologic

Modifier

97 = MARI KE *

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic

Unit Entry No

256 = *

Depth

to Top

91 = *

Depth to

Bottom

92 = *

Date

95 = / / *

month day year

Water Level

126 = *

% Water

Contributed

132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry

No 256 = *

Depth

to Top

91 = *

Depth to

Bottom

92 = *

Unit

Identifier

93 = *

Lithology

96 = *

Lithologic

Modifier

97 = *

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic

Unit Entry No

256 = *

Depth

to Top

91 = *

Depth to

Bottom

92 = *

Date

95 = / / *

month day year

Water Level

126 = *

% Water

Contributed

132 = *

PERTINENT REMARKS

R = 183 *

T = A *

add

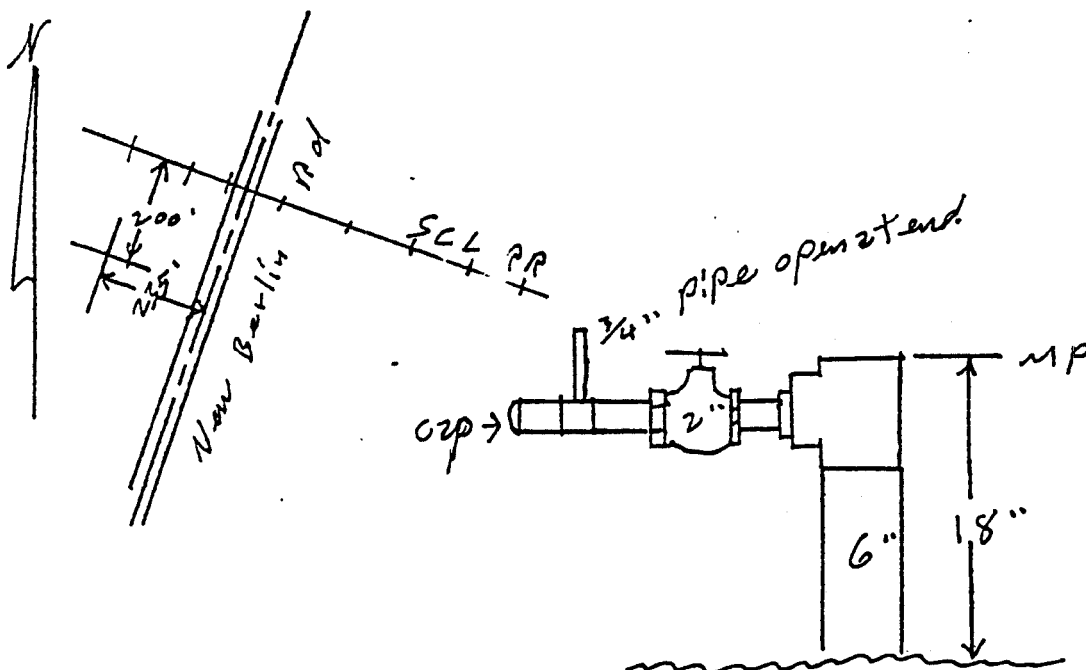
185 = *

New Card Same R&T

185 = *

185 = *

NOTES:



1978 O-213-137

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATA

Recorded by

Essex

Date 24 June 77

Check One

English

Metric Units

Site Ident No 302553081334001

COOPERATOR DATA (1)

R = 212 *

T = A D M *

Cooperators
Site Identifier

213 = J-1398 *

Registration No.

214 = *

Inspection Status

215 = *

Reason Unapproved

216 = *

Inspection Date

217 = *

month day year

Remarks

219 = 1002 NEW BERLIN RD *

DATA ON MINOR SITE REPAIRS (1)

R = 154 *

T = A D M *

add, delete, modify

New Card for each Repair
Same R&T

(Minor Repair)

(Minor Repair)

Entry No

165 = *

Nature of Repair

166 = *

Date Completed

167 = *

Contractor

169 = *

Performance Chg

170 = *

155 = *

156 = *

157 = *

159 = *

170 = *

(Minor Repair)

(Minor Repair)

Entry No

155 = *

Nature of Repair

156 = *

Date Completed

157 = *

Contractor

159 = *

Performance Chg

170 = *

155 = *

156 = *

157 = *

159 = *

170 = *

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 *

T = A D M *

add, delete, modify

No. Wells in Group

204 = *

Deepest Depth

205 = *

Shallowest
Depth

206 = *

Construction
Method

207 = D J V W Z *

drilled, jetted, driven, jaws, other
washSize of
Well Field

262 = *

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 203 *

T = A D M *

add, delete, modify

Longest
Dimension

209 = *

Other (Width)
Dimension

210 = *

Depth

211 = *

Orientation

263 = *

Dip

264 = *

DATA FOR COLLECTOR WELLS (1)

R = 219 *

T = A D M *

add, delete, modify

New Card for each Lateral
Same R&T

Entry No.

220 = *

Depth to the Lateral

221 = *

Length of Lateral

222 = *

Diameter of Lateral

223 = *

Screen Mesh

224 = *

220 = *

221 = *

222 = *

223 = *

224 = *

220 = *

221 = *

222 = *

223 = *

224 = *

220 = *

221 = *

222 = *

223 = *

224 = *

220 = *

221 = *

222 = *

223 = *

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224 = *

220 = *

221 = *

222 = *

223 = *

224 = *

220 = *

221 = *

222 = *

223 = *

224 = *

220 = *

221 = *

222 = *

223 = *

224 = *

FOOTNOTES:

1. Nature of repair

| B | C | D | L | O | P | S | Z |
|----------------|---------|----------|-------|--------------------------|------------------|---------------------|-------|
| blocked,
sh | cleaned | deepened | liner | slotted or
perforated | plugged,
back | screen,
replaced | other |

Date 24 June 77

Check One English Metric Units

Site Ident No 302553081334001

R = 212 * T = ☒ A ☐ D ☐ M *
add, delete, modify

Cooperators
Site Identifier 213 = J-1398 *

Registration No. 211 -

Inspection Status: 215 * Reason Unimproved: 218 * Inspection Date: 217 *
Month Day Year

Remarks 219 - 1002 NEW BERLIN RD *

R = 134 | *

New Card for each Repair
Same R&T

| | | |
|-------------------|-------|---|
| Entry No | 165 = | * |
| Nature of Repair | 166 = | * |
| Date Completed | 167 = | * |
| Contractor | 169 = | * |
| % Performance Chg | 170 = | * |

| (Minor Repair) | | | |
|----------------|---|--|---|
| 135 # | | | * |
| 136 = | * | | |
| 157 = | | | * |
| 169 = | | | * |
| 170 = | * | | |

| (Minor Repair) | |
|--------------------|---------|
| Entry No. | 155 = * |
| Nature of Repair | 156 = * |
| Date Completed | 157 = * |
| Contractor | 169 = * |
| % Performance Chg. | 170 = * |

| (Minor Repair) | |
|----------------|---|
| 155 = | * |
| 156 = | * |
| 167 = | * |
| 169 = | * |
| 170 = | * |

R = 203 * T = A D M *

| | | | | | | | |
|--------------------|-------|--|---|---------------|-------|--|---|
| No. Wells in Group | 204 = | | * | Deepest Depth | 205 = | | * |
|--------------------|-------|--|---|---------------|-------|--|---|

| | | |
|------------------|-------|---|
| Shallowest Depth | 206 = | * |
|------------------|-------|---|

| | | | | | | | |
|---------------------|-------|---------|--------|--------|-------|-------|---|
| Construction Method | 207 = | D | J | V | W | Z | * |
| | | drilled | jacked | driven | drive | other | |
| | | | | | wash | | |

| | | | |
|--------------------|-------|--|---|
| Size of Well Field | 262 = | | * |
|--------------------|-------|--|---|

R = 203 * T = A D M *

Longest Dimension 209 = * Other (Width) Dimension 210 = * Depth 211 = *

Orientation 263 * * * Dip 264 * *

R = 219 * T = A D M *

New Card for each Latent
Same H&T

[illegible]

| Nature of repair | | | | | | | |
|------------------|----------|-----------|--------|--------------------------|-----------------|---------|-------|
| B | C | D | L | O | P | S | Z |
| blocked,
off | cleaned, | deepened, | liner, | distorted,
perforated | plugged
back | screen, | other |

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

SITE NO 302553081334001

Recorded by Essex

Date 31 Oct 77

GENERAL SITE DATA (1)

J 1398

Check One English _____ Metric Units _____

Site Ident No 302553081334001 RG Number R-0 Transmittal T-A-D-M-V

Site-Type 2=C D H I M P T W * Data Reliability 3=C U L M * add, delete, modify, verified

Project No. 5= District 6= State 7= County 8=

Latitude 9= Longitude 10= Lat-Long Accuracy 11=S F T M *

Local Number 12= Land Net Loc. 13= 1/4 1/4 1/4 Section Township Range

Location Map 14= Scale 15=

Altitude 16= Method of Measurement 17=A L M * altimeter, level, map Accuracy 18=

Topo Setting 19=D C E F H K L O P S T U V * Hydrologic Unit (OWOC) 20=

Date of First Construction/Completion 21= Use of Site 23=A D E G H M P R S T U V Z *

Use of Water 24=A B C D E F H I M N P R S T U V Z *

Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27= Depth of Well 28= Source of Depth Data 29=

Water Level 30= Date Measured 31= Source 32=

Method of Measurement 34=A C E G H L M R S T V Z *

Site Status 37=D F G H P R S T V X Z *

Source of Geohydrologic Data 38= Pump Used 35= Measuring Point 268= Measuring Point Date 267=

OWNER IDENTIFICATION (1)

R-158 T-A-D-M Date of Ownership 159=

Name: Last 161= First 162= Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-A-D-M Ident 190# Assigner 191=

New Card Same R & T Ident 190# Assigner 191=

SITE VISIT DATA (1)

R-186 T-A-D-M Date of Visit 187# Name of Person 188=

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-O-D-M Date 193# Geohydrologic Unit 195#

New Card Same R thru 195 Temperature 196# Degrees C 197=

Conductance 196# μ Mhos 197=

Other (STORET) Parameter 196# Value 197=

Other (STORET) Parameter 196# Value 197=

FOOT NOTES:

① Source of Data Codes:

S O G A R L G Z

reporting, driller, owner, other geo't. other logs, geologist, other agency reported.

MODIFICATION

STATE OF FLORIDA
WATER WELL CONTRACTOR'S NOTIFICATION
OF CONSTRUCTION OR REPAIR OF A WATER WELL
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES
 505 Larson Building, Tallahassee, Florida 32304
 Telephone: (904) 488-8476

 Permit No. J-1398

Owner's Well Identification _____

No. 36106

 For Department Use
 ONLY

| <p>1. OWNER: <u>John G. Gossard, Sr.</u>
 Name _____
 Address _____ City _____ State _____</p> <p>2. LOCATION OF WELL: <u>1011 Old Kings Rd.</u>
 Street Address/Road _____
 City _____ County _____
 Subdivision _____ Lot No. _____
 Section _____ Township _____ Range _____</p> <p>3. PURPOSE OF WELL:
 ☐ Domestic ☐ Irrigation ☐ Public Supply
 ☐ Industrial ☐ Stock ☐ Other _____</p> <p>4. TYPE OF WORK:
 ☐ New Well ☐ Plugging ☐ Other _____
 ☐ Deepening ☐ Reconditioning</p> <p>5. QUALITY:
 ☐ Clear ☐ Colored ☐ Sulfur ☐ Salty ☐ Other _____</p> <p align="center">CHECK TEST MADE</p> <p>☐ None ☐ Bacteria ☐ Chemical
 Chloride _____ PPM
 (Check ☐ if test was for sodium chloride)
 Temperature _____
 Well Disinfected ☐ Yes ☐ No</p> <p>6. EQUIPMENT:
 ☐ Rotary ☐ Cable Tool ☐ Other _____
 ☐ Jet ☐ Reverse Rotary</p> <p>7. GROUT: ☐ None ☐ Cement ☐ Other _____
 Describe and give number of bags (94 lb.) From (ft) To (ft)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </table> <p>8. CASING AND LINER PIPE:
 Diameter (inches) Kind From (ft) To (ft)
 <u>6" galvanized steel</u> <u>0</u> <u>107</u>
 <u>4" galvanized steel</u> <u>107</u> <u>475</u>
 (Check One) ☐ Threaded & Coupled ☐ Welded Only
 ☐ T & C Welded ☐ Other _____</p> <p>9. WATER LEVEL:
 Water level after well completed <u>flow</u> feet
 ☐ Above ☐ below land surface
 Well Flowing: ☐ Yes ☐ No Flow _____ gal/min</p> <p>10. SCREENS:
 Location (ft) Below Surface
 Make Materials Diameter (in) Slot Size From (ft) To (ft)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </table> <p>11. UPPER END OF WELL:
 ☐ Pump Installed ☐ Valve ☐ Cap ☐ Other _____</p> <p>12. PUMPING TEST:
 Date _____ ☐ Test Pump ☐ Permanent Pump
 Measure point is _____
 which is _____ feet ☐ above ☐ below land surface
 Static water level _____ feet ☐ above ☐ below measure point
 Maximum Drawdown _____ feet below measure point
 Discharge at maximum drawdown _____ gal/min
 After _____ hours</p> <p>13. PUMP INSTALLED:
 Type _____ Make _____ Model No. _____
 Motor Power _____ Make _____ H.P. _____
 Capacity _____ Gal/min at _____ ft. of total dynamic head
 No. of bowls or stages _____
 Pump setting _____ feet</p> | | | | <p>14. WELL LOG:</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Well bore (in)</th> <th colspan="2">Depth (feet)</th> <th rowspan="2">Note each type of material, producing zones, & cavities if any. Give description at not less than 20 foot intervals and at changes.</th> </tr> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr><td>0</td><td>0</td><td>20</td><td>Sand</td></tr> <tr><td>20</td><td>20</td><td>40</td><td>Sand</td></tr> <tr><td>40</td><td>40</td><td>50</td><td>Same as above</td></tr> <tr><td>50</td><td>50</td><td>55</td><td>Rock</td></tr> <tr><td>55</td><td>55</td><td>75</td><td>Same as above</td></tr> <tr><td>75</td><td>75</td><td>85</td><td>Same as above</td></tr> <tr><td>85</td><td>85</td><td>100</td><td>Mud</td></tr> <tr><td>100</td><td>100</td><td>107</td><td>Same as above</td></tr> <tr><td>107</td><td>107</td><td>120</td><td>Sandy mud</td></tr> <tr><td>120</td><td>120</td><td>140</td><td>Same as above</td></tr> <tr><td>140</td><td>140</td><td>150</td><td>Same as above</td></tr> <tr><td>150</td><td>150</td><td>160</td><td>Mud</td></tr> <tr><td>160</td><td>160</td><td>175</td><td>Same as above</td></tr> <tr><td>175</td><td>175</td><td>190</td><td>Same as above</td></tr> <tr><td>190</td><td>190</td><td>200</td><td>Rock</td></tr> <tr><td>200</td><td>200</td><td>203</td><td>Rock</td></tr> <tr><td>203</td><td>203</td><td>220</td><td>Hardy sand</td></tr> <tr><td>220</td><td>220</td><td>240</td><td>Same as above</td></tr> <tr><td>240</td><td>240</td><td>245</td><td>Mud</td></tr> <tr><td>245</td><td>245</td><td>255</td><td>Sand</td></tr> <tr><td>255</td><td>255</td><td>265</td><td>Same as above</td></tr> <tr><td>265</td><td>265</td><td>275</td><td>Same as above</td></tr> <tr><td>275</td><td>275</td><td>300</td><td>Mud</td></tr> <tr><td>300</td><td>300</td><td>310</td><td>Rock</td></tr> <tr><td>310</td><td>310</td><td>330</td><td>Mud & sand</td></tr> <tr><td>330</td><td>330</td><td>350</td><td>Same as above</td></tr> <tr><td>350</td><td>350</td><td>360</td><td>Same as above</td></tr> <tr><td>360</td><td>360</td><td>375</td><td>Rock</td></tr> <tr><td>375</td><td>375</td><td>385</td><td>Muddy sand</td></tr> <tr><td>385</td><td>385</td><td>400</td><td>Same as above</td></tr> <tr><td>400</td><td>400</td><td>408</td><td>Mud</td></tr> <tr><td>408</td><td>408</td><td>415</td><td>Rock</td></tr> <tr><td>415</td><td>415</td><td>430</td><td>Mud</td></tr> <tr><td>430</td><td>430</td><td>450</td><td>Broken rock</td></tr> <tr><td>450</td><td>450</td><td>455</td><td>Same as above</td></tr> <tr><td>455</td><td>455</td><td>475</td><td>lime rock</td></tr> <tr><td>475</td><td>475</td><td>495</td><td>Same as above</td></tr> <tr><td>495</td><td>495</td><td>515</td><td>Same as above</td></tr> <tr><td>515</td><td>515</td><td>535</td><td>Same as above</td></tr> <tr><td>535</td><td>535</td><td>555</td><td>Same as above</td></tr> <tr><td>555</td><td>555</td><td>575</td><td>Same as above</td></tr> <tr><td>575</td><td>575</td><td>595</td><td>Same as above</td></tr> <tr><td>595</td><td>595</td><td>615</td><td>Same as above</td></tr> <tr><td>615</td><td>615</td><td>635</td><td>Same as above</td></tr> <tr><td>635</td><td>635</td><td>650</td><td>Same as above</td></tr> <tr><td>650</td><td>650</td><td>660</td><td>Same as above</td></tr> </tbody> </table> <p>Bottom of hole at 660 ft.</p> | Well bore (in) | Depth (feet) | | Note each type of material, producing zones, & cavities if any. Give description at not less than 20 foot intervals and at changes. | From | To | 0 | 0 | 20 | Sand | 20 | 20 | 40 | Sand | 40 | 40 | 50 | Same as above | 50 | 50 | 55 | Rock | 55 | 55 | 75 | Same as above | 75 | 75 | 85 | Same as above | 85 | 85 | 100 | Mud | 100 | 100 | 107 | Same as above | 107 | 107 | 120 | Sandy mud | 120 | 120 | 140 | Same as above | 140 | 140 | 150 | Same as above | 150 | 150 | 160 | Mud | 160 | 160 | 175 | Same as above | 175 | 175 | 190 | Same as above | 190 | 190 | 200 | Rock | 200 | 200 | 203 | Rock | 203 | 203 | 220 | Hardy sand | 220 | 220 | 240 | Same as above | 240 | 240 | 245 | Mud | 245 | 245 | 255 | Sand | 255 | 255 | 265 | Same as above | 265 | 265 | 275 | Same as above | 275 | 275 | 300 | Mud | 300 | 300 | 310 | Rock | 310 | 310 | 330 | Mud & sand | 330 | 330 | 350 | Same as above | 350 | 350 | 360 | Same as above | 360 | 360 | 375 | Rock | 375 | 375 | 385 | Muddy sand | 385 | 385 | 400 | Same as above | 400 | 400 | 408 | Mud | 408 | 408 | 415 | Rock | 415 | 415 | 430 | Mud | 430 | 430 | 450 | Broken rock | 450 | 450 | 455 | Same as above | 455 | 455 | 475 | lime rock | 475 | 475 | 495 | Same as above | 495 | 495 | 515 | Same as above | 515 | 515 | 535 | Same as above | 535 | 535 | 555 | Same as above | 555 | 555 | 575 | Same as above | 575 | 575 | 595 | Same as above | 595 | 595 | 615 | Same as above | 615 | 615 | 635 | Same as above | 635 | 635 | 650 | Same as above | 650 | 650 | 660 | Same as above |
|--|--------------|-----|---|----|----------------|--------------|--|---|------|----|---|---|----|------|----|----|----|------|----|----|----|---------------|----|----|----|------|----|----|----|---------------|----|----|----|---------------|----|----|-----|-----|-----|-----|-----|---------------|-----|-----|-----|-----------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|------|-----|-----|-----|------|-----|-----|-----|------------|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|------------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|------|-----|-----|-----|------------|-----|-----|-----|---------------|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|-----|-----|-----|-----|-------------|-----|-----|-----|---------------|-----|-----|-----|-----------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|---------------|-----|-----|-----|---------------|
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| Well bore (in) | Depth (feet) | | Note each type of material, producing zones, & cavities if any. Give description at not less than 20 foot intervals and at changes. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | From | To | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 20 | Sand | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 20 | 40 | Sand | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 40 | 50 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 50 | 55 | Rock | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 55 | 55 | 75 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 75 | 75 | 85 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| 475 | 475 | 495 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 495 | 495 | 515 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 515 | 515 | 535 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 535 | 535 | 555 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 555 | 555 | 575 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 575 | 575 | 595 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 595 | 595 | 615 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 615 | 615 | 635 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 635 | 635 | 650 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 650 | 650 | 660 | Same as above | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>15. CONTRACTOR'S CERTIFICATION:</p> <p>This work was done under my jurisdiction and this report is true to the best of my knowledge and belief. The work commenced on <u>6-27-71</u> and was completed on <u>6-27-71</u></p> <p>_____
 Contractor License Number _____</p> <p><u>John G. Gossard, Sr.</u> <u>1011 Old Kings Rd.</u>
 Signature of Representative P.O. Box or Street
 <u>Jacksonville, Duval Florida</u>
 City County State
 <u>754-5555</u> <u>754-5515</u> <u>John Gossard</u>
 Phone Number Dealer</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

FORM: DNR/BW-2

September 1980

SITE NO 302536081384901

Essex

WATER RESOURCES DIVISION
SITE SCHEDULE

2-1-83

FIELD SITE DATA

Site Ident No 302536081384901 RG Number R-01 Transaction T- (A) O M V

Site Type 2- C D E H I M O P S T X Data 3- C U Reporting Agency 4- FL039

Project No 1 District 6- 121 State 7- 12 County DUV21 8- 231

Latitude 9- 302536 Longitude 10- 0813849 Lat-Long Accuracy 11- S O T M

Land Net 13- LNDGRTS 49 T 1 S 14- 26E

Scale 15- 24000

Source of Data 16- 29- R

Date Measured 17- 02/00/1975

Source of Data 18- 33

Depth of Well 28- 700

Depth of Well 29- 700

Source of Data 30- R

Source of Data 31- 36

Pump Used 32- 35

Date of First Construction/Completion 21- 02/00/1975

OWNER IDENTIFICATION (1)

R-158 T- (A) O M V Date of Ownership 159- 02/00/1975

Name: Last 161- LADY, EALP First 162- BAKERY Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T- (A) O M V Ident 190- S Assigner 191- FLA WMD

New Card Same R & T Ident 190- MALA Assigner 191- FL039

SITE VISIT DATA (1)

R-188 T- (A) O M V Date of Visit 187- 02/00/1975 Name of Person 188- ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T- (A) O M V Date 193- 02/00/1975 Geohydrologic Unit 195-

Temperature 196- 00.010 Degrees C 197-

Conductance 198- 00.095 μ Mhos 199-

Other (STORET) Parameter 200- Value 201-

Other (STORET) Parameter 202- Value 203-

FOOT NOTES

1. Source of Data Codes

A D G L M O R S Z
Other: driller equipment logs memory owner other reporting other
see 1.

A = 5B! *

| | | | | |
|----|---|---|---|---|
| T. | A | D | M | * |
|----|---|---|---|---|

Entry No 59 # *201* *

Date of Construction Completion: _____

100 10000 1975

Source of Const Data

 ϕ

53132

UNKNOWN

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | AB | AC | AD | AE | AF | AG | AH | AI | AJ | AK | AL | AM | AN | AO | AP | AQ | AR | AS | AT | AU | AV | AW | AX | AY | AZ | BA | BB | BC | BD | BE | BF | BG | BH | BI | BJ | BK | BL | BM | BN | BO | BP | BQ | BR | BS | BT | BU | BV | BW | BX | BY | BZ | CA | CB | CC | CD | CE | CF | CG | CH | CI | CJ | CK | CL | CM | CN | CO | CP | CQ | CR | CS | CT | CU | CV | CW | CX | CY | CZ | DA | DB | DC | DD | DE | DF | DG | DH | DI | DJ | DK | DL | DM | DN | DO | DP | DQ | DR | DS | DT | DU | DV | DW | DX | DY | DZ | EA | EB | EC | ED | EE | EF | EG | EH | EI | EJ | EK | EL | EM | EN | EO | EP | EQ | ER | ES | ET | EU | EV | EW | EX | EY | EZ | FA | FB | FC | FD | FE | FF | FG | FH | FI | FJ | FK | FL | FM | FN | FO | FP | FQ | FR | FS | FT | FU | FV | FW | FX | FY | FZ | GA | GB | GC | GD | GE | GF | GG | GH | GI | GJ | GK | GL | GM | GN | GO | GP | GQ | GR | GS | GT | GU | GV | GW | GX | GY | GZ | HA | HB | HC | HD | HE | HF | HG | HH | HI | HJ | HK | HL | HM | HN | HO | HP | HQ | HR | HS | HT | HU | HV | HW | HX | HY | HZ | IA | IB | IC | ID | IE | IF | IG | IH | II | IJ | IK | IL | IM | IN | IO | IP | IQ | IR | IS | IT | IU | IV | IW | IX | IY | IZ | JA | JB | JC | JD | JE | JF | JG | JH | JI | JJ | JK | JL | JM | JN | JO | JP | JQ | JR | JS | JT | JU | JV | JW | JX | JY | JZ | KA | KB | KC | KD | KE | KF | KG | KH | KI | KJ | KK | KL | KM | KN | KO | KP | KQ | KR | KS | KT | KU | KV | KW | KX | KY | KZ | LA | LB | LC | LD | LE | LF | LG | LH | LI | LJ | LK | LL | LM | LN | LO | LP | LQ | LR | LS | LT | LU | LV | LW | LX | LY | LZ | MA | MB | MC | MD | ME | MF | MG | MH | MI | MJ | MK | ML | MM | MN | MO | MP | MQ | MR | MS | MT | MU | MV | MW | MX | MY | MZ | NA | NB | NC | ND | NE | NF | NG | NH | NI | NJ | NK | NL | NM | NN | NO | NP | NQ | NR | NS | NT | NU | NV | NW | NX | NY | NZ | OA | OB | OC | OD | OE | OF | OG | OH | OI | OJ | OK | OL | OM | ON | OO | OP | OQ | OR | OS | OT | OU | OV | OW | OX | OY | OZ | PA | PB | PC | PD | PE | PF | PG | PH | PI | PJ | PK | PL | PM | PN | PO | PP | PQ | PR | PS | PT | PU | PV | PW | PX | PY | PZ | QA | QB | QC | QD | QE | QF | QG | QH | QI | QJ | QK | QL | QM | QN | QO | QP | QQ | QR | QS | QT | QU | QV | QW | QX | QY | QZ | RA | RB | RC | RD | RE | RF | RG | RH | RI | RJ | RK | RL | RM | RN | RO | RP | RQ | RR | RS | RT | RU | RV | RW | RX | RY | RZ | SA | SB | SC | SD | SE | SF | SG | SH | SI | SJ | SK | SL | SM | SN | SO | SP | SQ | SR | SS | ST | SU | SV | SW | SX | SY | SZ | TA | TB | TC | TD | TE | TF | TG | TH | TI | TJ | TK | TL | TM | TN | TO | TP | TQ | TR | TS | TT | TU | TV | TW | TX | TY | TZ | UA | UB | UC | UD | UE | UF | UG | UH | UI | UJ | UK | UL | UM | UN | UO | UP | UQ | UR | US | UT | UU | UV | UW | UX | UY | UZ | VA | VB | VC | VD | VE | VF | VG | VH | VI | VJ | VK | VL | VM | VN | VO | VP | VQ | VR | VS | VT | VU | VV | VW | VX | VY | VZ | WA | WB | WC | WD | WE | WF | WG | WH | WI | WJ | WK | WL | WM | WN | WO | WP | WQ | WR | WS | WT | WU | WV | WW | WX | WY | WZ | XA | XB | XC | XD | XE | XF | XG | XH | XI | XJ | XK | XL | XM | XN | XO | XP | XQ | XR | XS | XT | XU | XV | XW | XX | XY | XZ | YA | YB | YC | YD | YE | YF | YG | YH | YI | YJ | YK | YL | YM | YN | YO | YP | YQ | YR | YS | YT | YU | YV | YW | YX | YZ | ZA | ZB | ZC | Z |
|--|----|---|
|--|----|---|

| | | | | | | | | | | | | | | | |
|-----------|-----|---|-----------------------|---|---|---|---|---|---|---|---|---|---|--------------------------------|----|
| Bottom of | 6.8 | * | Method of Development | 69 | A | B | C | J | N | P | S | 7 | * | Number of Hours in Development | 70 |
| | | | | air-lift, bailed, compressed, jetted, none
pump air pump other suction other | | | | | | | | | | | |

| Treatment | | Chemical | | | | | | |
|--------------------|--|--|---|---|---|---|---|---|
| During Development | | C | D | E | F | H | M | Z |
| | | chemicals, dry ice, explosives, defoliant, hydrofracturing mechanical, other | | | | | | |

DEPTH OF THE HOLE CONSTRUCTED (2)

R = 72 | *
T = A D M | *
Construction Entry No 58 # | *

Top of Hole Segment Below LSD

73 #

73 #

73 #

73 #

73 #

• From 1st June 2017 to 31st May 2018

• • • • •

R = 761 * T = A D M * Construction Entry No 59 # *

Top of Casing Segment Below LSD

| | | | |
|-----|--|---|---|
| 77# | | ● | ● |
| 77# | | ● | ● |
| 77# | | ● | ● |
| 77# | | ● | ● |
| 77# | | ● | ● |

Bottom of Casino Segment Expires 1/97

| | | |
|------|---|---|
| 76 | . | * |
| 77 | . | * |
| 78 | . | * |
| 79 | . | * |
| 78 = | . | * |

7

| County Water Users | Total Income |
|--------------------|--------------|
| 1. _____ | _____ |
| 2. _____ | _____ |
| 3. _____ | _____ |
| 4. _____ | _____ |
| 5. _____ | _____ |
| 6. _____ | _____ |
| 7. _____ | _____ |
| 8. _____ | _____ |
| 9. _____ | _____ |
| 10. _____ | _____ |
| 11. _____ | _____ |
| 12. _____ | _____ |
| 13. _____ | _____ |
| 14. _____ | _____ |
| 15. _____ | _____ |
| 16. _____ | _____ |
| 17. _____ | _____ |
| 18. _____ | _____ |
| 19. _____ | _____ |
| 20. _____ | _____ |
| 21. _____ | _____ |
| 22. _____ | _____ |
| 23. _____ | _____ |
| 24. _____ | _____ |
| 25. _____ | _____ |
| 26. _____ | _____ |
| 27. _____ | _____ |
| 28. _____ | _____ |
| 29. _____ | _____ |
| 30. _____ | _____ |

OFFICINGS SCHEDULE (2)

| | | | | | | | | | | |
|--------|---|-----|---|---|---|---|-----------------------|----|---|---|
| R = 82 | * | T = | A | D | M | * | Construction Entry No | 59 | # | * |
|--------|---|-----|---|---|---|---|-----------------------|----|---|---|

(Openings Data)

| | | | |
|-----------------------------|------|---|---|
| Top of Section Below LSD | 83 = | . | * |
| Bottom of Section Below LSD | 84 = | . | * |
| Type of Openings (5) | 85 = | . | * |
| Type of Material 7 | 86 = | . | * |
| Diameter of Open Section | 87 = | . | * |
| Width of Opening | 88 = | . | * |
| Length of Opening | 89 = | . | * |

New Card for Each Open Section With Same R, T and Field 5 C

Quinn, G. (1997)

83 =

84 =

85 =

86 =

87 =

88 =

89 =

Quercus Sect.

83 #

84

85 = *

86 = *

87 = *

88 = *

89 = *

1999

* Source of Data Codes

| NAME | GRADE | POSITION | REPORTING OFFICE | OTHER | REPORTING OFFICE | OTHER |
|------|-------|----------|------------------|-------|------------------|-------|
| NAME | GRADE | POSITION | REPORTING OFFICE | OTHER | REPORTING OFFICE | OTHER |

... of Ob-ninos Code...

| | L | M | F | F | S | I | W | S | |
|----------|-----------|------|------------|-------|---------|-------|--------|------|-------|
| fracture | unwelded | mesh | perforated | wire | screen | sand | walled | open | other |
| | shuttered | | or slotted | wound | unknown | point | | none | |

5 Casino night. 600

[illegible][illegible]

| | | | | | | | | |
|-------------------|------|------|-------|----------------|-----------------|-------|-------|-------|
| BRASS OR CONCRETE | IRON | WOOD | OTHER | PVC OR PLASTIC | STAINLESS STEEL | STEEL | STEEL | OTHER |
| BRASS | IRON | WOOD | OTHER | PVC OR PLASTIC | STAINLESS STEEL | STEEL | STEEL | OTHER |

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry No 256 # 001 *

Depth to Top 91 =

Depth to Bottom 92 =

93 = 120 FLRD *

Unit Identifier

304 =

Contributing Unit

96 = LMSN *

Lithology

97 = MARLUE *

Lithologic Modifier

ADDITIONAL DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 #

J 2132

Date 95 #

month day year

Water Level 126 =

Water Contributed 132 =

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry No 256 #

Depth to Top 91 =

Depth to Bottom 92 =

93 =

Unit Identifier

304 =

Contributing Unit

96 =

Lithology

97 =

Lithologic Modifier

ADDITIONAL DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 #

Date 95 #

month day year

Water Level 126 =

Water Contributed 132 =

PERTINENT REMARKS

R = 183 *

T = A D M *

add, delete, modify

New Cord Sample R&T

Remarks

No.

311 #

125

311 #

185

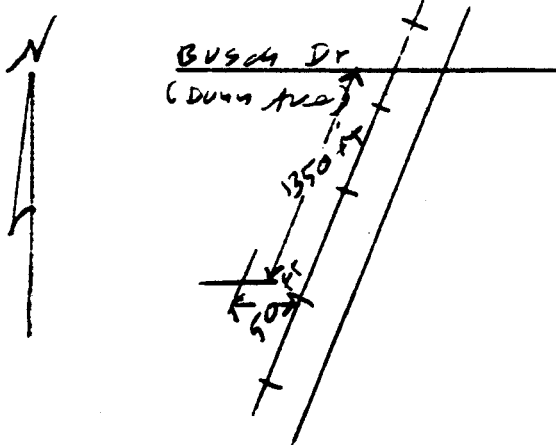
Contributing Unit Codes

R = 212 *

T = A *

412 = 10,300 ft. MAIN ST *

| P | S | N | U |
|----------------------|------------------------|------------------|---------|
| primary contributing | secondary contributing | non-contributing | unknown |



Recorded by EssexU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 20 Apr 77

GENERAL SITE DATA (I)

Check One ☒ English ☐ Metric Units

Site Ident No 302404081373001 RG Number R=0* Transaction T=ADMV*
 Site-Type 2=C D H I M P T* Data 3=C U L M* Reporting Agency 4=FLA39*
 Project No. 5= District 6=121* State 7=12* County (or town) 8=031*
 Latitude 9=302404* Longitude 10=0813730* Lat-Long Accuracy 11=S E T M*
 Local Number 12= Land Net 13=WDGATS 55 T 1 S R 27 E*
 Location Map 14=TROUT RIVER Scale 15=24000*
 Altitude 16=100* Method of Measurement 17=A L M* Accuracy 18=5*
 Topo Setting 19=D C E H K L O P S T U V W* Hydrologic Unit (OWDC) 20=03080103*
 Date of First Construction/Completion 21=00/00/1942* Use of Site 23=A D E G H O M P R S T U W X Z*
 Use of Water 24=A B C D E F H I M N P R S T U Y Z*
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27=800* Depth of Well 28=800* Source of Depth Data 29=4*
 Water Level 30= Date Measured 31= Source 33=
 Method of Measurement 34=A C E G H L M R S T V Z*
 Site Status 37=D F G H O P R S T V X Z*
 Source of Geohydrologic Data 38=4* Pump Used 35= Measuring Point 266= Measuring Point Date 267=

OWNER IDENTIFICATION (I)

R=158* T=ADM* Date of Ownership 159=00/00/1942*
 Name: Last 161=NAVAL FUEL First 162=DEPOT Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (I)

R=189* T=ADM* Ident 190= Assigner 191=FLA WND
 New Card Same R & T Ident 190=SUMMER S. RD Assigner 191=FLA39

SITE VISIT DATA (I)

R=186* T=ADM* Date of Visit 187=11/06/1975* Name of Person 188=HAMMOND

FIELD WATER QUALITY MEASUREMENTS (I)

R=192* T=ADM* Date 193= Geohydrologic Unit 195=
 New Card Same R thru 195
 Temperature 196=0.0.0.1.0* Degrees C 197=
 Conductance 196=0.0.0.9.5* μ Mho 197=
 Other (STORET) Parameter 196= Value 197=
 Other (STORET) Parameter 196= Value 197=

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other geol's, other logs, geologist, other agency reported.

WELL CONSTRUCTION DATA (1)

R = 58 * T = 9 D M * Entry No 59 # 001 *

Date of Construction Completion 80 = 00/00/1942 *

Source of ① Const. Data 84 = 0 *

Name of Contractor/Driller 63 = UNKNOWN *

Method of Construction 65 = A B C D H J P R T V W Z *
air rotary, bored, cable, dug, hydraulic, jetted, air-percussion, reverse, trenching, driven, drive, wash, other
rotary or augered tool end or slottedFinish 66 = C F G H 0 P S T W X Z * Type of Seal 67 = B C G Z *
porous, gravel w. concrete, gravel, screen, horizontal, open, perforated, screen, sand point, welded, open, other
concrete, port, screen, gallery, end or slotted holeBottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *
air-lift, bailed, compressed, jetted, none, other, surged, other
pump air pumpSpecial Treatment During Development 71 = C D E F H M Z *
chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

J 925

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = 6 D M * Construction Entry No 59 # 001 *

Top of Hole Segment Below LSD

73 # 0 *
73 # *
73 # *
73 # *
73 # *

Bottom of Hole Segment below LSD

74 = 8.00 *
74 = *
74 = *
74 = *
74 = *

Diameter of Hole Segment

75 = 8 *
75 = *
75 = *
75 = *
75 = *New Card for Each Hole Segment
Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 # *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 # *
77 # *
77 # *
77 # *
77 # *

Bottom of Casing Segment Below LSD

78 = *
78 = *
78 = *
78 = *
78 = *

Diameter of Casing Segment

79 # *
79 # *
79 # *
79 # *
79 # *

Casing Material 5

80 = *
80 = *
80 = *
80 = *
80 = *

Thickness of Casing

81 = *
81 = *
81 = *
81 = *
81 = *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # *
84 = *

Bottom of Section Below LSD

Type of Openings 6

Type of Material 7

Diameter of Open Section

Width of Opening

Length of Opening

85 = *
86 = *
87 = *
88 = *
89 = *

(Openings Data)

83 # *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

(Openings Data)

83 # *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other govt. other logs, geologist, other reported

⑤ Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv. wrought, other, PVC or, rock or, steel, tile, coated, wood, other
iron iron metal plastic stone steel

⑥ Type of Openings Codes

F L M P R S T W X Z
fracture, leeward, mesh, perforated, wire screen, sand, welded, open, other
shortened or slotted wound (unknown) point hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv. wrought, other, PVC or, stainless, steel, tile, other
bronze iron iron metal plastic steel

| | | | |
|-----------------------------|---|------------------------|------------------------------------|
| R = 134 146 = | T = A O M * | Entry No 147# | Date 148 = / / *
month day year |
| Flowing, pumping | add, delete, modify | | |
| Discharge: 150 = * | Source of Data 151 = * | | |
| Method of Measurement 152 = | B C E F M O P R T U V W Z * | | |
| | baker, current, estimated, flame, totaling, orifice, pitot-tube, reported, trajectory, venturi, volumetric, weir, other | | |
| Production Level 153 = * | State Level 154 = * | Source of Data 155 = * | Specific Capacity 272 = * |
| Method of Measurement 156 = | A C E G H L M R S T V Z * | | |
| | surface, calibrated, estimated, pressure, calibrated, gas/pressure, manometer, reported, weir, weir, calibrated, other | | |
| | surface, gas, pressure, gas, logs, time, time, electric, time | | |
| | | Pumping Period 157 = * | |

| | | | | |
|---------------------|---------------------|---------------|---|-----------------|
| R = 42 * | T = A D M * | Type of Lift | 43 # A B C J P R S T U Z * | Entry No. 254 # |
| | add, delete, modify | | air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other | |
| Pump Intake Setting | 44 = | Type of Power | 45 = D E G H L N W Z * | |
| | | | diesel, electric, gasoline, hand, LP gas, natural, windmill, other gas | |
| Date | 38 = | | Horsepower | 46 = |
| | month / day / year | | | |

| | | | | | | | |
|--------------------------|------------------------------------|--|-------|-----------------|---------|----------------------|-------|
| R = 47 * | T = A O M *
add, delete, modify | Type of Lift | 438 * | Lift Entry No | 254 # * | Manufacturer of Pump | 48 = |
| Serial No of Pump | 49 = | Name of Power Company | 50 = | Power Meter No | 52 = | Pump Rating | 53 = |
| Power Company Account No | 51 = | Person or Company Who Maintains the Pump | 54 = | Additional Lift | 255 = | Rated Pump Capacity | 258 = |

R=55 * T= A O M * Type of Lift 43# * Type of Power 50# * Horsepower 57# * Lift Entry No 254# *
add, delete, modify

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|---|--|---|-------|---|-------|---|-------|---|-------------|---|-------|---|---|---|-------|--|---|---|-------|--|---|---|-------|--|---|---|-----------|---|-------|--|---|---|-------|--|---|---|-------|--|---|---|-------|--|---|---|
| R = 198 * | T = A D M * | New Card for Each Log Type
Same R & T | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | add, delete, modify | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type of Log ② | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>199 #</td><td>*</td></tr> <tr><td>199 #</td><td>*</td></tr> <tr><td>199 #</td><td>*</td></tr> <tr><td>199 #</td><td>*</td></tr> </table> | 199 # | * | 199 # | * | 199 # | * | 199 # | * | Begin Depth | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>200 =</td><td></td><td>.</td><td>*</td></tr> <tr><td>200 =</td><td></td><td>.</td><td>*</td></tr> <tr><td>200 =</td><td></td><td>.</td><td>*</td></tr> <tr><td>200 =</td><td></td><td>.</td><td>*</td></tr> </table> | 200 = | | . | * | 200 = | | . | * | 200 = | | . | * | 200 = | | . | * | End Depth | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>201 =</td><td></td><td>.</td><td>*</td></tr> <tr><td>201 =</td><td></td><td>.</td><td>*</td></tr> <tr><td>201 =</td><td></td><td>.</td><td>*</td></tr> <tr><td>201 =</td><td></td><td>.</td><td>*</td></tr> </table> | 201 = | | . | * | 201 = | | . | * | 201 = | | . | * | 201 = | | . | * |
| 199 # | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 199 # | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 199 # | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 199 # | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 = | | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 = | | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 = | | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 = | | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201 = | | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201 = | | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201 = | | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201 = | | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | Source of Data ① | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | | | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>202 =</td><td>*</td></tr> <tr><td>202 =</td><td>*</td></tr> <tr><td>202 =</td><td>*</td></tr> <tr><td>202 =</td><td>*</td></tr> </table> | 202 = | * | 202 = | * | 202 = | * | 202 = | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202 = | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202 = | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202 = | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202 = | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

R = 114 * T = A D M * Begin Year 115 * End Year 116 * Source Agency 117 *
 add, delete, modify
 Frequency of Collection ① 118 * Network Site 257 * Type of Analysis 120 *

R = 121 * Y = A D M * Begin Year 122 = End Year 123 = Source Agency 124 =
 add, delete, modify
 Frequency of Collection 3) 125 = Network Site 258 =

| | | | | |
|---------------------------|---------------------------|--------------------|----------------------------|--|
| R = 127 * | T = A D M * | Begin Year 128 # | End Year 129 = | Source Agency 130 = |
| Frequency of Collection ③ | add, delete, modify 131 = | Network Site 259 = | Method of Collection 133 = | |
| | | | C E M U Z * | calculated, estimated, metered, unknown, other |

R = 180 * **T = A D M *** Type of Data **181 #** _____ * Loc **182 = C O Z *** Format **261 = F M P Z ***

add, delete, modify coprocessor, extract, other files, machines, published, other readable

New Card Same R & T Type of Data **181 #** _____ * Loc **182 = C O Z *** Format **261 = F M P Z ***

| S | D | G | A | R | L | G | Z |
|---|------------------------|--------|----------|---|---|---|---|
| reporting, driller, owner, other gov't, other | logs, geologist, other | agency | reported | | | | |

| | | | | | | | | | | | |
|--|---|---|---------|---|---|---|------|----------------|-------|----------------|---|
| A | B | C | D | F | I | M | O | Q | S | W | Z |
| annual, bi-monthly, continuous, daily, semi- | | | | | intermittent, monthly, one time, quarter, | | | | semi- | monthly, other | |
| | | | monthly | | | | only | annual, annual | | | |

| | | | | | | | | | | | | | | | | |
|-------|---------|--------|------------|-----------|---------|------------|----------|------------|--------|-----------|------------|-----------|----------|----------|--------|--------|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| time. | collar. | chain. | driller's. | electric. | fluid. | geologist. | magnets. | induction. | gamma. | dipmeter. | laterolog. | microlog. | neutron. | μ later. | photo. | radar. |
| | | | | | conduct | | | | ray | | | | | | | ASME |

| A | B | C | D | E | F | G | H | J | K | L | M | Z |
|-----------|-----------|--------|------------|----------|------------|---------|-----------|--------------|------------|------------|-----------|--------|
| physical, | chemical, | toxic, | poisonous, | noxious, | corrosive, | acidic, | alkaline, | radioactive, | explosive, | flammable, | volatile, | other. |

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = 0 D M * Entry No 256 # 001 * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = 120FLRD *

Lithology 96 = LASH *

Lithologic Modifier 97 = MARLNE *

AQUIFER DATA (2)

R = 94 * T = A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *

month day year

Water Level 126 = *

% Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 256 # * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = *

Lithology 96 = *

Lithologic Modifier 97 = *

AQUIFER DATA (2)

R = 94 * T = A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 = / / *

month day year

Water Level 126 = *

% Water Contributed 132 = *

PERTINENT REMARKS

R = 183 * T = A * 185 = *

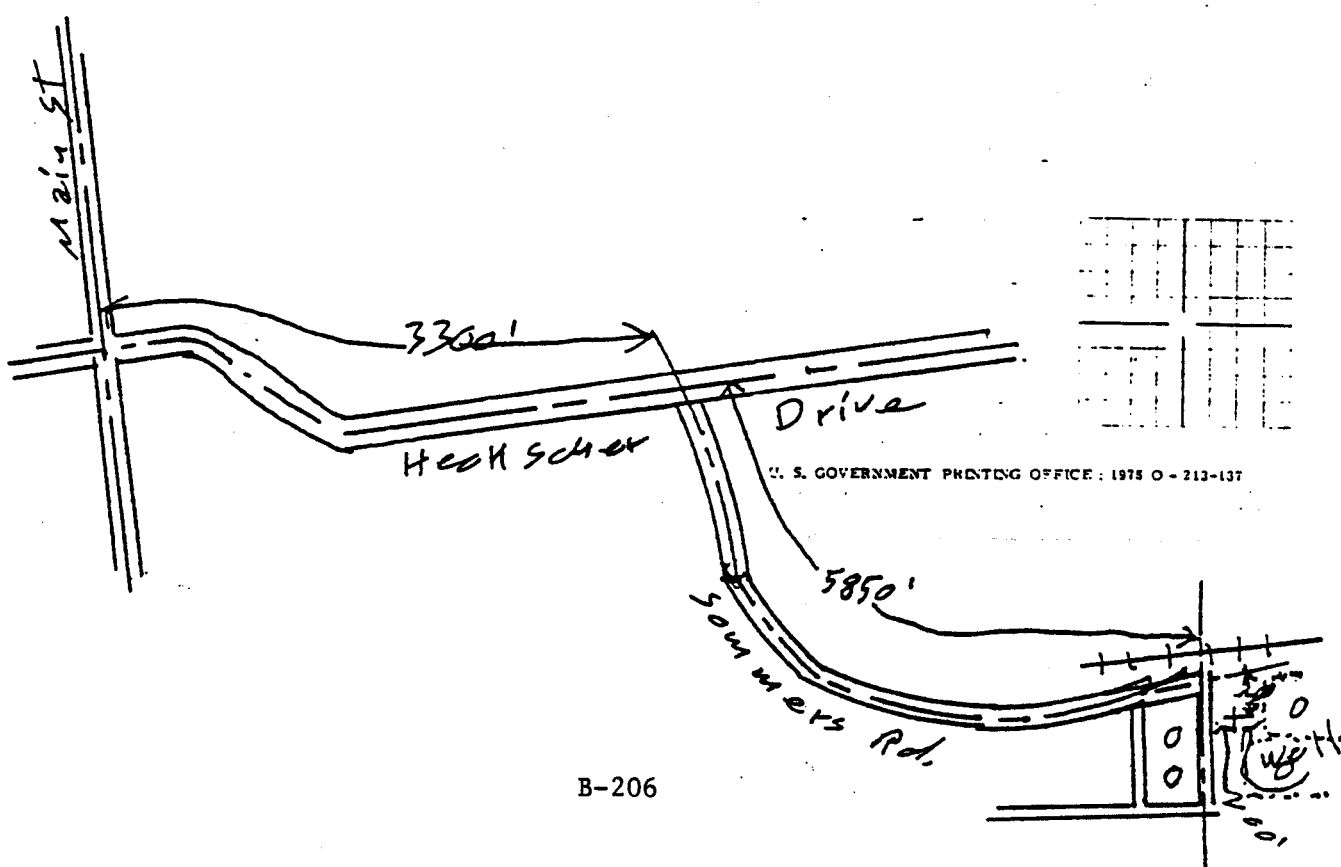
add

New Card Same R&T

185 = *

185 = *

NOTES:



Recorded by EssexU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATADate 20 Apr 77Check One ☒ English ☐ Metric UnitsSite Ident No 302404081373021

COOPERATOR DATA (1)

R = 212 * T = A O M *
add, delete, modifyCooperators
Site identifier 213 = J-925 *

Registration No. 214 = _____ *

Inspection Status 215 = _____ *

Reason Unapproved 216 = _____ *

Inspection Date 217 = _____ / _____ / _____
month day yearRemarks 218 = SOMMERS RD SO OF HECKSCKE *

DATA ON MINOR SITE REPAIRS (1)

R = 164 * T = A O M *
add, delete, modifyNew Card for each Repair
Same R&T(Minor Repair)
Entry No. 165 # _____ *
Nature of Repair ① 166 = _____ *
Date Completed 167 = _____ *
Contractor 169 = _____ *
% Performance Chg. 170 = _____ *(Minor Repair)
165 # _____ *
166 = _____ *
167 = _____ *
169 = _____ *
170 = _____ *(Minor Repair)
Entry No. 165 # _____ *
Nature of Repair ① 166 = _____ *
Date Completed 167 = _____ *
Contractor 169 = _____ *
% Performance Chg. 170 = _____ *(Minor Repair)
165 # _____ *
166 = _____ *
167 = _____ *
169 = _____ *
170 = _____ *

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 * T = A O M *
add, delete, modify

No. Wells in Group 204 = _____ *

Deepest Depth 205 = _____ *

Shallowest
Depth 206 = _____ *Construction
Method 207 = D J V W Z *
drilled, jetted, driven, drive, other
washSize of
Well Field 262 = _____ *

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208 * T = A O M *
add, delete, modifyLongest
Dimension 209 = _____ *Other (Width)
Dimension 210 = _____ *

Depth 211 = _____ *

Orientation 263 = _____ *

Dip 264 = _____ *

DATA FOR COLLECTOR WELLS (1)

R = 219 * T = A O M *
add, delete, modifyNew Card for each Lateral
Same R&T

Entry No.

Depth to the Lateral

Length of Lateral

Diameter of Lateral

Screen Mesh

220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *222 = _____ *
222 = _____ *
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222 = _____ *223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *

FOOT NOTES:

① Nature of repair

| B | C | D | L | O | P | S | Z |
|-----------------|---------|---------------------|---------------------------|------------------|---------------------|-------|---|
| blocked,
off | cleaned | desparged,
lower | slotted or,
perforated | plugged,
back | screen,
replaced | other | |

Well No. 30 24 04 081 37 30

U. S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION

MASTER CARD

Record by W. H. H. V. D. Source of data W. H. H. V. D. Date 11/6/70 Map 100-111111
 State IL County CH Latitude 38° 14' 10" N Longitude 88° 14' 10" W Sequential number 1
 Locality 100-111111 Section 100-111111 Township 100-111111 Range 100-111111
 Well number 100-111111 Other number 100-111111
 Local name 100-111111 Owner 100-111111 Address 100-111111
 Name of owner 100-111111 Address 100-111111

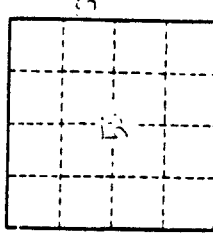
Remarks: County, City, Corp. of Co., Private, State Agency, Water Dist.
 (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Use of Air Cond., Boiling, Com., Duster, Filter, Hum., Irr., Ind., P. S., Rec.,
 Stock, Insult., Unused, Repressure, Recharge, Desal-P. S., Desal-other, Other
 Use of (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Well, Sand, Bed, Sealant, Heat Res., Oil, Gas, Recharge, Test, Unused, (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 DATA AVAILABLE: Well data ☐ Test. W/L meas. ☐ Field aquifer data ☐
 Hyd. lab. data: ☐
 Qual. water data: Type: ☐ Pumping inventory: no. period: ☐
 Freq. sampling: ☐ yes ☐ no
 Aperture cards: ☐ yes ☐ no
 Log data: ☐ yes ☐ no

WELL-DESCRIPTION CARD

Same as on Master Card
 Depth casing (if not part): 600 ft. Casing 7.625 in. Dia. 7.625 in. accuracy
 Finish: concrete, gravel, w. (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Method (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Drilled: air bored, cable, aug., jetted, air percussion, rotary, other
 Date Drilled: 1942 Pump intake setting: 9442 ft. accuracy
 Driller: 1942
 Life (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Type: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Power: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Type: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Description: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Alt. LSD: 900 ft. accuracy
 Water level: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Date: 1942 Accuracy: 10 ft. Method determined: 10 ft.
 Dr. down: 10 ft. Accuracy: 10 ft. Method determined: 10 ft.
 QUALITY OF WATER DATA: Iron ppm 10 Sulfate ppm 10 Chloride ppm 10 Hardness ppm 10
 Sp. Conduct. 10 x 10⁶ Temp. 10 °F
 Tests, color, etc.

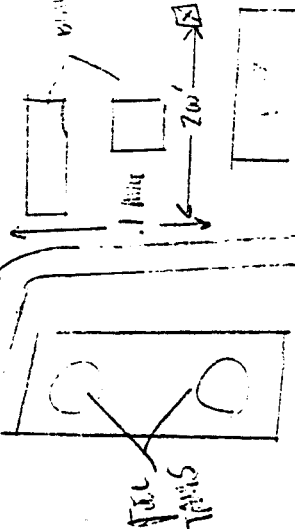
HYDROGEOLOGIC CARD

Same as on Master Card
 Physiographic Province: 100-111111 Subbasin: 100-111111 Section: 100-111111
 Top of depression, stream channel, dunes, flat, hilltop, sink, swamp, (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 Well site: (A) (B) (C) (D) (E) (F) (G) (H) (I) (J) (K) (L) (M) (N) (O) (P) (Q) (R) (S) (T) (U) (V) (W) (X) (Y) (Z)
 offshore, pediment, alluvial, terrace, undulating, valley flat
 MAJOR AQUIFER: system 100-111111 section 100-111111 aquifer, formation, group 100-111111
 Lithology: 100-111111 Length of well open to: 100-111111 Depth to top of: 100-111111 ft.
 MINOR AQUIFER: system 100-111111 section 100-111111 aquifer, formation, group 100-111111
 Lithology: 100-111111 Length of well open to: 100-111111 Depth to top of: 100-111111 ft.
 Intervals screened: 100-111111 Depth to top of: 100-111111 ft.
 Rock is consolidated rock: 100-111111 Source of data: 100-111111
 Depth to basement: 100-111111 Source of data: 100-111111
 Surficial material: 100-111111 Infiltration characteristics: 100-111111
 Trans: 100-111111 Coefficient of storage: 100-111111
 Coefficient of permeability: 100-111111 Sp. cap: 100-111111 Number of geologic cards: 100-111111



Well No.

1 mile to Mechanics DR



J209

WELL NUMBER---302801081375101. Local Number Dival-145, Duval County School Board.
 LOCATION---Lat 30°28'01", Long 81°37'51", T.1 N., R.27 E., Hydrologic Unit 03080103, 90 ft (27 m) north (in rear) of Oceanway School and 17 mi (27 km) east of Starrett Road in Oceanway, Jacksonville, Florida.
 DESCRIPTION---Drilled, unused, artesian well in Floridan aquifer (Geologic Unit 120FLRD), diam 2 in (5 cm), depth unknown.
 PERIOD OF RECORD---July 1940 to current year (semiannually). Published since 1940.
 INSTRUMENTATION---Pressure gage. Measuring point; top of 2 in (5 cm) tee, 1.5 ft (.5 m) above 1sd. Land surface datum is 34.79 ft (10.604 m) above mean sea level.
 EXTREMES---Current year: Highest water level, 38.19 ft (11.640 m) above msl January 23, lowest, 36.94 ft (11.259 m) above msl May 9, 1974.
 Period of record: Highest water level, 58.99 ft (17.980 m) above msl June 3, 1947; lowest, 36.11 ft (11.006 m) above msl May 6, 1974.

| ELEVATION, IN FEET, ABOVE NSL, JANUARY 1974 TO SEPTEMBER 1975 | | |
|---|-------|----------------------------|
| January 22, 1974..... | 38.49 | January 23, 1975.....38.19 |
| May 6, 1974..... | 36.11 | May 9, 1975.....36.94 |

Recorded by B. HAMMOND

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 5/4/76

Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (I)

Site Ident No 302718 081 3354.01 RG Number R-0 Transmission T-0 D M V
 Site Type 2- C O H I M P T Data 3- 2 U L M Reliability 1- 0 Add, delete, modify, verified
 Project No. 5- District 8- 1121 State 1- 12 County or town DUM 8- 039
 Latitude 9- 30 27 18 Longitude 10- 129 33 54 Lat-Long Accuracy 11- 0 1 M
 Local Number 12- 11000 Land Use 13- 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 00
 Location Map 14- EASTPORT Scale 15- 2400
 Altitude 16- Method of Measurement 17- A L 0 Accuracy 18- 0.05
 Topo Setting 19- D C E 0 H K L S P S T U V W Hydrologic Unit (OWOC) 20- 02080103
 Date of First Construction/Completion 21- 05 13 14 76 Use of Site 23- A D E G H M P R S T U V W X Z
 Use of Water 24- A B C D E F H 0 M N P R S T U V W X Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- 628.0 Depth of Well 28- 628.0 Source of Depth Data 29- 0
 Water Level 30- 14.7 Date Measured 31- 05 13 14 76 Source 32- 0
 Method of Measurement 34- A C E 0 H L M R S T V Z
 Site Status 37- D 0 G H S P R S T V X Z
 Source of Geohydrologic Data 35- Pump Used 36- Measuring Point 38- Measuring Point Date 39-

OWNER IDENTIFICATION (I)

R-158 T-1 A D M L Date of Ownership 159- 07 13 14 76
 Name: Last 161- 11000 First 162- 081 3354 Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (I)

R-181 T-1 A D M L Ident 190- Assigner 191-
 New Card Same R & T Ident 190- Assigner 191-

SITE VISIT DATA (I)

R-126 T-1 A D M L Date of Visit 187- 05 13 14 76 Name of Person 188- 11000

FIELD WATER QUALITY MEASUREMENTS (I)

R-122 T-1 A D M L Date 123- Geohydrologic Unit 135-
 New Card Same R thru 195 Temperature 196- 0 3 0 1 0 Degree C 197-
 Conductance 198- 0 3 0 9 5 u/Mho 199-
 pH 200- Value 201-
 Dissolved Oxygen 202- Value 203-
 Total Dissolved Solids 204- Value 205-

FOOT NOTES

Source of Data Code
 S O D O A R L G Z
 Reporting: district, owner, other gov't, other logs, biologist, other reported

WELL CONSTRUCTION DATA (1)

a = 58 T = D M Entry No 59 001 Date of Construction Completion 06/16/07 Source of 1 64
 add, delete, modify month day year Const. Date

Name of Construction/Owner 63

Method of Construction 66 A B C D H J P R T V W Z
 aug., rotary bored, cable, dug, hydro., lifted, air-lift, reverse, trenching, driven, drive, other
 or auger tool test rotary reason rotary

Finish 68 C F G H S P S T W X Z Type of Seal 67 B C G Z
 porous, gravel w. port, gravel, horizontal, open, perforated, screen, sand point, welded, open, other
 concrete, or screen screen gallery, end or slotted pump hole bottom, clay, cement, other
 or other

Bottom of Seal 68 Method of Development 69 A B C J N P S Z Number of Hours in Development 70
 admit, bleed, compressed, lifted, none, other, charged, other
 air pump

Special Treatment During Development 71 C D E F H M Z
 alkaline, dry ice, explosives, deflocculation, hydrate, maraging, other

J 1060

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

a = 72 T = A D M Construction Entry No 59 2
 add, delete, modify

Top of Hole Segment Below LSD 73 Bottom of Hole Segment below LSD 74 Diameter of Hole Segment 75
73 74 75
73 74 75
73 74 75
73 74 75
73 74 75

New Card for Each Hole Segment State R, T & Field S 9

CASING SCHEDULE (2)

a = 76 T = A D M Construction Entry No 59 2 New Card for Each Casing With Same R, T & Field S 9
 add, delete, modify

Top of Casing Segment Below LSD 77 Bottom of Casing Segment Below LSD 78 Diameter of Casing Segment 79 Casing Material 80 Thickness of Casing 81
77 78 79 80 81
77 78 79 80 81
77 78 79 80 81
77 78 79 80 81

OPENINGS SCHEDULE (2)

a = 82 T = A D M Construction Entry No 59 2 New Card for Each Open Section With Same R, T and Field S 9
 add, delete, modify

Top of Section Below LSD 83 Bottom of Section Below LSD 84 (Opening Date) 85 (Opening Date) 86 (Opening Date) 87
83 84 85 86 87
83 84 85 86 87
83 84 85 86 87
83 84 85 86 87

Type of Opening 88 Type of Material 89 Diameter of Open Section 90 Width of Opening 91 Length of Opening 92

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
 quarry, drift, owner, other part, other, exp. geologist, other
 quarry reported

③ Casing Material Codes

B C G I M P R S T U W Z
 brick, concrete, galv. wrought, other, PVC or, rock or, steel, tile, metal, wood, other
 iron iron metal plastic stone

② Type of Opening Codes

F L M P R S T W X Z
 feature, lowered, mesh, perforated, wire, screen, sand, welded, open, other
 fractured or stored round (cylindrical) point hole

④ Type of Material Codes for Open Sections

B C G I M P R S T Z
 brass or, concrete, galv. wrought, other, PVC or, plastic, steel, tile, other
 bronze iron iron metal plastic steel

PRODUCTION DATA (1)

R = 134 146 = T = A O M = Entry No 147 = Date 148 = / /

Flowing, pumped add, delete, modify

Discharge: 150 = Source of Data 151 =

Method of Measurement 152 = B C E F M O P R T U V W Z =
barrel, current, estimated, flow, rotating, orifice, pitot tube, reported, tripottery, venturi, volumetric, weir, other

Production Level 153 = State Level 154 = Source of Date 155 = Specific Capacity 272 =

Method of Measurement 156 = A C E G H L M R S T V Z =
active, estimated, pressure, calculated, geophysical, manometer, reported, steel, outside, uncalibrated, other

Pumping Period 157 =

LIFT DATA (1)

R = 42 = T = A O M = Type of Lift 43 = A B C J P R S T U Z = Entry No 254 =

add, delete, modify

Pump Intake Setting 44 = Type of Power 45 = D E G H L N W Z =
air, bucket, centrifugal, jet, piston rotary, submersible turbine, unknown, other

Date 38 = / / Horsepower 46 =

MAJOR PUMP DATA (2)

R = 47 = T = A O M = Type of Lift 43 = Lift Entry No 254 = Manufacturer of Pump 48 =

add, delete, modify

Serial No. of Pump 49 = Name of Power Company 50 =

Power Company Account No 51 = Power Meter No 52 = Pump Rating 53 =

Person or Company Who Maintains the Pump 54 = Additional Lift 255 = Rated Pump Capacity 268 =

STANDBY POWER DATA (2)

R = 55 = T = A O M = Type of Lift 43 = Type of Power 56 = Horsepower 57 = Lift Entry No 254.2 =

add, delete, modify

See LIFT DATA for codes of fields 43 and 56 below

AVAILABLE LOG DATA (1)

R = 198 = T = A O M = New Card for Each Log Type Same R & T

add, delete, modify

Type of Log 199 = 199 = 199 = 199 =

Begin Depth 200 = 200 = 200 = 200 =

End Depth 201 = 201 = 201 = 201 =

Source of Data 202 = 202 = 202 = 202 =

WATER QUALITY DATA COLLECTION (1)

R = 114 = T = A O M = Begin Year 115 = End Year 116 = Source Agency 117 =

add, delete, modify

Frequency of Collection 118 = Network Site 257 = Type of Analysis 123 =

WATER LEVEL DATA COLLECTION (1)

R = 121 = T = A O M = Begin Year 122 = End Year 123 = Source Agency 124 =

add, delete, modify

Frequency of Collection 125 = Network Site 258 =

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R = 127 = T = A O M = Begin Year 128 = End Year 129 = Source Agency 130 =

add, delete, modify

Frequency of Collection 131 = Network Site 259 = Method of Collection 133 = C E M U Z =
calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)

R = 180 = T = A O M = Type of Data 181 = Log 182 = C D Z = Format 261 = F M P Z =

add, delete, modify

New Card Same R & T Type of Data 181 = Log 182 = C D Z = Format 261 = F M P Z =
1 inch, machine readable, other

FOOT NOTES

① Source of Data Codes:

S D O A R L G Z

spring, drilled owner, other gov't, other inst, spring, other reported

② Type of Log Codes

A B C D E F G H I J K L M N O P Q

time, collar, casing, driller, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, isotopic, mineralog, neutron, u later, photo, radio, active

S T U V Z

sonic, temp, gamma, fluid, other gamma radio tv

③ Frequency of Collection Codes

A U C O F I M D Q S N Z

annual, bi-monthly, continuous daily, semi, intermittent, monthly, one-time, quarter, semi, weekly, other monthly only annual annual

④ Type of Quality Analyses Codes

A B C D E F G H I J K L M Z

optical, chemical, trace, dissolved, nutrients, biological, metals, gases, solids, organic, inorganic, other

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 T- O M Entry No 256 00 Depth to Top 91 Depth to Bottom 92

Unit Identifier 93 1. L. O. F. C. R. D. Lithology 96 Lithologic Modifier 97

AQUIFER DATA (2)

R-94 T- A D M Geohydrologic Unit Entry No 256 3

Date 95 2 / / Water Level 128 5 Water Contributed 132

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 T- A D M Entry No 256 0 Depth to Top 91 Depth to Bottom 92

Unit Identifier 91 Lithology 96 Lithologic Modifier 97

AQUIFER DATA (2)

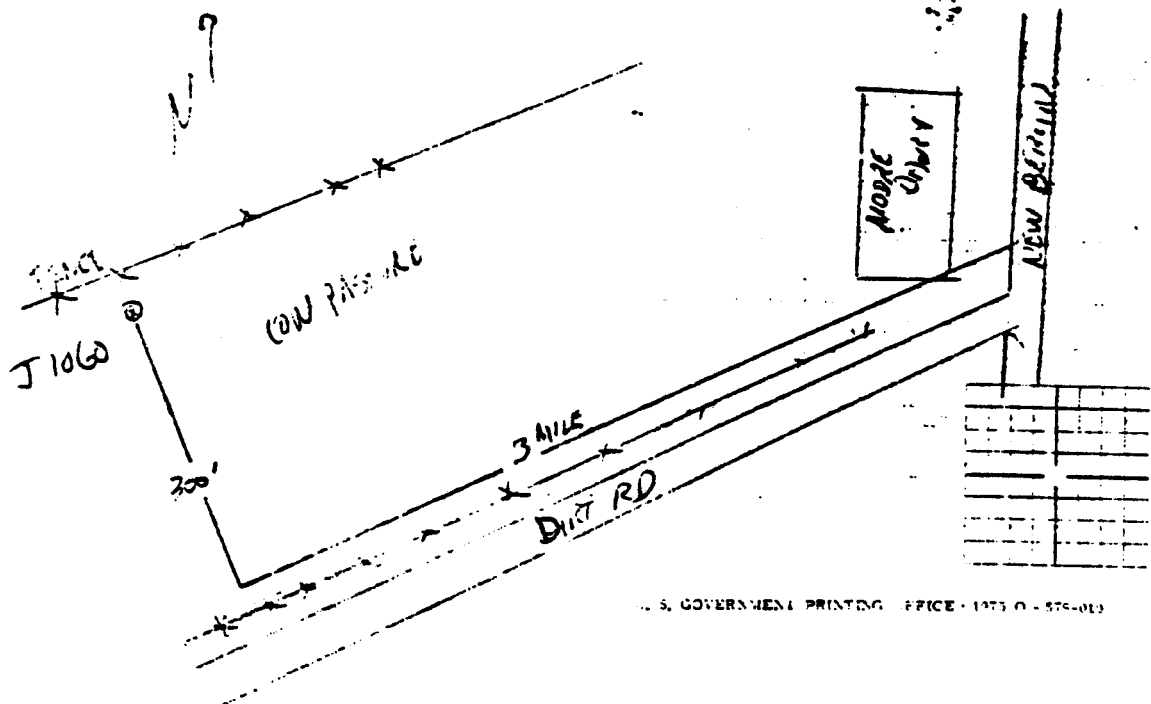
R-94 T- A D M Geohydrologic Unit Entry No 256 3

Date 95 2 / / Water Level 128 5 Water Contributed 132

PERTINENT REMARKS

R-183 T- A 185
New Card Same R&T
185
185

NOTES:



U. S. GOVERNMENT PRINTING OFFICE: 1975 O - 575-013

Complaint No.

TWUP No.

Construction/Plugging
Permit No.2-1060
Well Inventory No.

Is Well Free Flowing?

Yes

No

Owner M + M Drivies Phone _____Owner's Address 12094 New Berlin Rd

Well Location Address _____

Well Drilling Contractor _____ License/Bond No. _____

Well Identification: 30 2718 081 3354 01 Lat./Long (if different) 30 2726 081 3345 01SE SE SE 35
4 1/4 1/4 Section TWP 1 N Range 1 E Quad Map Name E 25 + Post

Depth of Hole Drilled _____ Depth of Well _____ How measured _____

Diameter/Cross Section 3 X 2 Depth of Casing _____

Depth and Diameter of Well Segments: _____ " from LSD to _____

_____ " Dia. from _____ ' to _____ ' _____ " Dia. from _____ ' to _____ ' _____

Depth and Diameter of Casing Segments: _____ " Dia. from _____ ' Above LSD
Below LSD

To: _____ " Dia. from _____ ' to _____ ' _____

Type and Quantity of Grouting Used _____ Well centered in Grout? _____

Use of Well Stock Number of People Served _____Water Level 2.3 PSI 8 ft Above LSD Measuring Pt. 33" 2.75 Above LSD
Below LSD Below LSDHow Measured Pressure Measured by Essex Date 5.8.81

Method of Construction _____ Date of Construction _____

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.) _____

Casing Material Used _____

Altitude 25 Interval 10Tie to Setting in comp

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer than 300' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM

7636

Well No. 302803N0813751.1

WELL SCHEDULE
GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

MASTER CARD

Record by H.H. Cooper 406 Date 3/28/74 Obs. Trowl River 75'

State 71A County (for town) Ocala

Latitude: 30 28 03 N Longitude: 81 37 51 W

Section: 37 Township: 27S Range: 1E

Local name: Talla

Well name: 015227517

Owner or name: DUBUQUE CO. 015227517

County: DUBUQUE CO. 015227517

City: DAY, 71A

County: DUBUQUE CO. 015227517

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City: DAY, 71A

County: DUBUQUE CO. 015227517

City: DAY, 71A

County: DUBUQUE CO. 015227517

WELL-DESCRIPTION CARD

Depth well: 100 ft

Depth casing: 100 ft

Depth screen: 100 ft

Depth filter: 100 ft

Depth pump: 100 ft

Depth motor: 100 ft

Depth control: 100 ft

Depth valve: 100 ft

Depth wellhead: 100 ft

Depth casinghead: 100 ft

Depth screenhead: 100 ft

Depth filterhead: 100 ft

Depth pumphead: 100 ft

Depth motorhead: 100 ft

Depth controlhead: 100 ft

Depth valvehead: 100 ft

Depth wellhead: 100 ft

Depth casinghead: 100 ft

Depth screenhead: 100 ft

Depth filterhead: 100 ft

Depth pumphead: 100 ft

HYDROGEOLOGIC CARD

State 71A County (for town) Ocala

Latitude: 30 28 03 N Longitude: 81 37 51 W

Section: 37 Township: 27S Range: 1E

Local name: Talla

Well name: 015227517

Owner or name: DUBUQUE CO. 015227517

County: DUBUQUE CO. 015227517

City: DAY, 71A

County: DUBUQUE CO. 015227517

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City: DAY, 71A

County: DUBUQUE CO. 015227517

City: DAY, 71A

County: DUBUQUE CO. 015227517

City: DAY, 71A

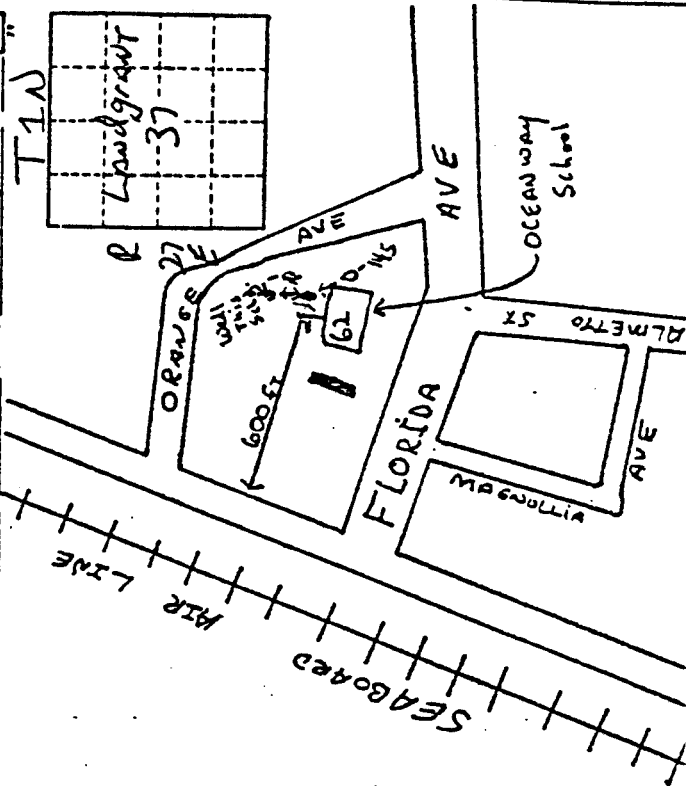
County: DUBUQUE CO. 015227517

City: DAY, 71A

County: DUBUQUE CO. 015227517

City: DAY, 71A

Well No. 302803N0813751.1



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J 636

Well Inventory

Free flowing well

Regulatory Status: Received Application
to Construct, Modify ☐ Yes N/A ☐ Date

Permit Issued for
Above ☐ Yes ☒ N/A ☐ Date

Received Application
for Temporary Water
Use Permit ☐ Yes ☒ N/A ☐ Date

Permit Issued for
Above ☐ Yes N/A ☐ Date

DNR/BW-2 Received ☐ Yes N/A ☐ Date

Data Submitted to USGS ☐ Yes Date

Owner (17) of EAX

Address 145 ~~Florida~~ ^{Ocean way Blvd (name change)}

Well Drilling Contractor _____ License/Bond No. _____

Location of water well Latitude 30 25 03 N Long 091 57 51 Sequential /

Ident # of Quad Sheet 20 102-104
1/4 1/4 1/4 37 1N 27E
 Section Township Range Subdivision

| Depth of Water Well | How measured? |
|---------------------|---------------|
| | |

Diameter/Cross Section

Depth of Casing _____ Diameter of Casing from LSD _____ to _____ feet and dia-
meter from _____ to _____ feet.

Type of grouting used _____ Hole centered in grout? _____

Use of well *for supply*

Water level 23' from L&D How measured Gage

Method of well construction

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.)

Casing material used

7636

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' None

Distance to nearest contaminant - septic tank, etc. if less than 100' None

Maximum well yield _____ GPM Average well yield _____ GPM

Frequency of well use _____ Hrs./Day _____ Days/Year

Pump Data - Type & Make _____ HP _____ Pump Rating _____

Capacity _____ No. of Bowls or Stages _____

Type of Power _____ Static water level _____

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness _____, and Chloride _____.

General Rating: poor _____ average _____ good _____ excellent _____

Additional Info/Action Required _____

Action taken/Comments _____

_____ Date 9/10/75

Inspector's Name BUT Hammond Field Inspection Date _____

Inventory Complete Date _____

39

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Recorded by GLENNDate 6-1-82Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302825081352801 RG Number R=0* Transaction T=(A) D M V*
 Site-Type 2=C D H I M P T (W)* Data 3=(C) U L M* Reporting Agency 4=FL039*
 Project No. 5= District 6=121* State 7=12* County (or town) 8=031*
 Latitude 9=302825* Longitude 10=0813528* Lat-Long Accuracy 11=S (C) T M*
 Local Number 12= Land Net 13=LANDGRANT 37T 1N R 27E
 Location Map 14=EASTPORT Scale 15=24000*
 Altitude 16=20* Method of Measurement 17=A L (M)* Accuracy 18=5*
 Topo Setting 19=D C E F H K L O P (S) T U V W* Hydrologic Unit (OWDC) 20=03080103*
 Date of First Construction/Completion 21=05/11/1982 Use of Site 23=A D E G H (M) P R S T U (W) X Z*
 Use of Water 24=A B C D E F (H) I M N P R S T U Y Z*
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27=68.0* Depth of Well 28=68.0* Source of Depth Data 29=D*
 Water Level 30= Date Measured 31= Source 33=
 Method of Measurement 34=A C E G H L M R S T V Z*
 Site Status 37=D F G H (P) R S T V X Z*
 Source of Geohydrologic Data 36= Pump Used 35= Measuring Point 266= Measuring Point Date 267=

OWNER IDENTIFICATION (1)

R=158* T=(A) D M* Date of Ownership 159=05/11/1982
 Name: Last 161=HICKORY First 162=JAMES Middle Initial 163=C*

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189* T=(A) D M* Identifier 190#ST Assigner 191=FLANND
 New Card Same R & T Identifier 190#D. HALL CREEK Assigner 191=FL039

SITE VISIT DATA (1)

R=186* T=(A) D M* Date of Visit 187#06/01/1982 Name of Person 188=GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R=192* T=A D M* Date 193# Geohydrologic Unit 195#
 New Card Same R thru 195
 Temperature 196#00010* Degrees C 197=
 Conductance 196#00095* μ Mhos 197=
 Other (STORET) Parameter 196# Value 197=
 Other (STORET) Parameter 196# Value 197=

FOOT NOTES.

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other

WELL CONSTRUCTION DATA (1)

R = 58 *

T = A D M *Entry No. 001 *Date of Construction
Completion05/01/1982

Source of Const. Data

64 D *

Name of

Contractor/Driller

63 = O.E. SMITH *Method of
Construction

65 =

A

B

C

D

H

J

P

R

T

V

W

Z

*

air
rotarybored
or augeredcable
tool

dug

hydraulic
rotary

jetted

air per
cussionreverse
rotary

trenching

driven

drive
wash

other

*

Finish

66 =

C

F

G

H

O

P

S

T

W

Z

*

porous
concretegravel
partgravel
screenhorizontal
galleryopen
endperforated
or slotted

screen

sand point

walled

open
hole

other

Type of
Seal

67 =

B

C

G

Z

*

bentonite clay, cement
other groutBottom of
Seal

68 =

*

Method of
Development

69 =

A

B

C

J

N

P

S

Z

*

air-lift, bailed, compressed, jetted, none, other, surged, other
pump air pumpNumber of Hours
in Development

70 =

*

*

Special Treatment
During Development

71 =

C

D

E

F

H

M

Z

*

chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 *

T = A D M *

Construction

Entry No. 59 # 001 *New Card for Each Hole Segment
Same R, T & Field 59

Top of Hole Segment Below LSD

73 #

0.

*

73 #

1.47.

*

73 #

*

*

73 #

*

*

73 #

*

*

Bottom of Hole Segment below LSD

74 =

1.47.

*

74 =

1.80.

*

74 =

*

*

74 =

*

*

74 =

*

*

Diameter of Hole Segment

75 =

2.

*

75 =

2.

*

75 =

*

*

75 =

*

*

75 =

*

*

CASING SCHEDULE (2)

R = 78 *

T = A D M *

Construction

Entry No. 59 # 001 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 #

0.

*

77 #

1.47.

*

77 #

*

*

77 #

*

*

77 #

*

*

Bottom of Casing Segment Below LSD

78 =

1.47.

*

78 =

4.41.

*

78 =

*

*

78 =

*

*

78 =

*

*

Diameter of Casing Segment

79 =

3.

*

79 =

2.

*

79 =

*

*

79 =

*

*

79 =

*

*

Casing Material ⁵

80 =

C

*

80 =

C

*

80 =

*

*

80 =

*

*

80 =

*

*

Thickness of Casing

81 =

*

81 =

*

81 =

*

81 =

*

81 =

*

OPENINGS SCHEDULE (2)

R = 82 *

T = A D M *

Construction

Entry No. 59 # 001 *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 #

*

Bottom of Section Below LSD: 84 =

*

Type of Openings ^①

85 =

*

Type of Material ^②

86 =

*

Diameter of Open Section

87 =

*

Width of Opening

88 =

*

Length of Opening

89 =

*

(Openings Data)

83 #

*

84 =

*

85 =

*

86 =

*

87 =

*

88 =

*

89 =

*

(Openings Data)

83 #

*

84 =

*

85 =

*

86 =

*

87 =

*

88 =

*

89 =

*

FOOT NOTES:

① Source of Data Codes:

S

D

O

A

R

L

G

Z

reporting, driller, owner, other gov't, other
agency logs, geologist, other reported

⑤ Casing Material Codes

B

C

G

I

M

P

R

S

T

U

W

Z

brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other
iron iron metal plastic stone steel

⑥ Type of Openings Codes

F

L

M

P

R

S

T

W

X

Z

fracture, lowered, mesh, perforated, wire, screen, sand, walled, open, other
shuttered or slotted wound (unknown) point hole

⑦ Type of Material Codes for Open Sections

B

C

G

I

M

P

R

S

T

Z

brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other
bronze iron iron metal plastic steel

| | | | |
|---|--|----------------------|-------------------------|
| R-134-148 | T-ADDM | Entry No 147# 001 | Date 148-05-21 9.82 |
| turning, pumped | add, delete, modify | | month day year |
| Discharge: 150 = 3000 | Source of Data 151 = D | | |
| Method of Measurement 152 = B C E F M O P R T U V W Z | barrel current meter estimated flow testing meter orifice meter tube reported trajectory venturi volumetric weir other | | |
| Production Level 153 = | Static Level 154 = | Source of Data 155 = | Specific Capacity 272 = |
| Method of Measurement 156 = A C E G H L M R S T V Z | active, automated, computed, pressure, colorimeter, gravimetric, manometer, reported, visual, chemical, colorimeter, other | | |
| | output pump pressure gauge logs tube logs electric logs | | |
| | | Pumping Period 157 = | |

| | | | | | |
|---------------------|-----------------------|---------------|---|----------|---------|
| R-42 * | T- A D M * | Type of Lift | 43 # A B C J P R S T U Z * | Entry No | 254 # * |
| | add delete modify | | air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other | | |
| Pump Intake Setting | 44 = * | Type of Power | 45 = D E G H L N W Z * | | |
| | | | diesel, electric, gasoline, hand, LP gas, natural, windmill, other gas | | |
| Date | 38 = month day year * | Horsepower | 46 = * | | |

| | | | | | |
|--|--|------------------------------------|--|-----------------------------------|--|
| R = 47 * T = A D M * Type of Lift 43# * | | Lift Entry No 254# * | | Manufacturer of Pump 48# * | |
| Serial No of Pump 49# * | | Name of Power Company 50# * | | | |
| Power Company Account No 51# * | | Power Meter No 52# * | | Pump Rating 53# * | |
| Person or Company Who Maintains the Pump 54# * | | Additional Lift 255# * | | Rated Pump Capacity 268# * | |

R=55 * T= A D M * Type of Lift 43# * * Type of Power 58# * * Horsepower 57# * * Lift Entry No 254# * *

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------|---|---------------------|---|------|---|--|---|------|---|-------------|---|------|---|---|------|---|---|------|---|---|------|---|---|-----------|---|------|---|---|------|---|---|------|---|---|------|---|---|------------------|---|------|---|------|---|------|---|------|---|
| R=198* | T= A D M * | add, delete, modify | | | | New Card for Each Log Type
Same R & T | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Type of Log ② | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>198#</td><td>*</td></tr> <tr><td>199#</td><td>*</td></tr> <tr><td>199#</td><td>*</td></tr> <tr><td>199#</td><td>*</td></tr> </table> | 198# | * | 199# | * | 199# | * | 199# | * | Begin Depth | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>200=</td><td>.</td><td>*</td></tr> <tr><td>200=</td><td>.</td><td>*</td></tr> <tr><td>200=</td><td>.</td><td>*</td></tr> <tr><td>200=</td><td>.</td><td>*</td></tr> </table> | 200= | . | * | 200= | . | * | 200= | . | * | 200= | . | * | End Depth | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>201=</td><td>.</td><td>*</td></tr> <tr><td>201=</td><td>.</td><td>*</td></tr> <tr><td>201=</td><td>.</td><td>*</td></tr> <tr><td>201=</td><td>.</td><td>*</td></tr> </table> | 201= | . | * | 201= | . | * | 201= | . | * | 201= | . | * | Source of Data ① | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>202=</td><td>*</td></tr> <tr><td>202=</td><td>*</td></tr> <tr><td>202=</td><td>*</td></tr> <tr><td>202=</td><td>*</td></tr> </table> | 202= | * | 202= | * | 202= | * | 202= | * |
| 198# | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 199# | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 199# | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 199# | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200= | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200= | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200= | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200= | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201= | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201= | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201= | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 201= | . | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202= | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202= | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202= | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202= | * | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | |
|---------------------------|------------------------------------|----------------------|--------------------------|---------------------|
| R = 114 * | T = A D M *
add, delete, modify | Begin Year 115 # | End Year 116 = | Source Agency 117 = |
| Frequency of Collection 3 | 118 = * | Network Site 257 = * | Type of Analysis 120 = * | |

R = 121 * T = A D M * Begin Year 122# * End Year 123 * Source Agency 124 *
add, delete, modify
Frequency of Collection: 3 125 * * Network Site 258 * *

| | | | | |
|---------------------------|-------------|--------------------|----------------------------|---------------------|
| R = 127 = | T = A D M = | Begin Year 128 = | End Year 129 = | Source Agency 130 = |
| add, delete, modify | | | | |
| Frequency of Collection 3 | 131 = | Network Site 259 = | Method of Collection 133 = | C E M U Z = |

| | | | | | | | |
|---------------------|---------------------|--------------|-------|-----|----------------------------|--------|----------------------------------|
| R=180 * | T= A D M * | Type of Date | 181 # | Loc | 182 = C D Z * | Format | 261 = F M P Z * |
| | add, delete, modify | | | | separator, district, other | | files, machine, published, other |
| New Card Same R & T | | Type of Date | 181 # | Loc | 182 = C D Z * | Format | 261 = F M P Z * |

① Source of Data Codes:

| S | D | G | A | R | L | G | Z |
|-------------------|-------|-------|--------|-------|----------|------------|-------|
| reporting, driver | owner | other | gov't. | other | logs. | geologist. | other |
| agency | | | | | reported | | |

[illegible]

| A | B | C | D | F | I | M | P | Q | S | W | Z |
|--------|------------|------------|-------|--------------|--------------|---------|----------|---------|-------------|--------|-------|
| annual | bi-monthly | continuous | daily | semi-monthly | intermittent | monthly | one time | quarter | semi-annual | weekly | other |
| | | | | monthly | | | only | annual | annual | | |

| A | B | C | D | E | F | G | H | J | K | L | M | Z |
|----------|--------|------|---------|---------|------|------|------|------|------|------|----|------|
| physiol. | common | free | parties | parties | very | com. | com. | com. | com. | com. | pl | very |
| | | | | | | can | can | 1st | 000 | 0.00 | | |

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

Entry
No

26 # 001 *

Depth
to Top

91 =

Depth to
Bottom

92 =

Unit
Identifier

93 = 120 FLRD *

Lithology

96 =

LMSN *

Lithologic
Modifier

97 =

MARINE

AQUIFER DATA (2)

R-94 *

T- A D M *

Geohydrologic
Unit Entry No

256 #

Date

95 #

month day year

Water Level

126 =

% Water

Contributed

132 =

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

Entry
No

256 #

Depth
to Top

91 =

Depth to
Bottom

92 =

Unit
Identifier

93 =

Lithology

96 =

Lithologic
Modifier

97 =

AQUIFER DATA (2)

R-94 *

T- A D M *

Geohydrologic
Unit Entry No

256 #

Date

95 #

month day year

Water Level

126 =

% Water

Contributed

132 =

PERTINENT REMARKS

R-183 *

T- A *

185 =

add

New Card Same R&T

185 =

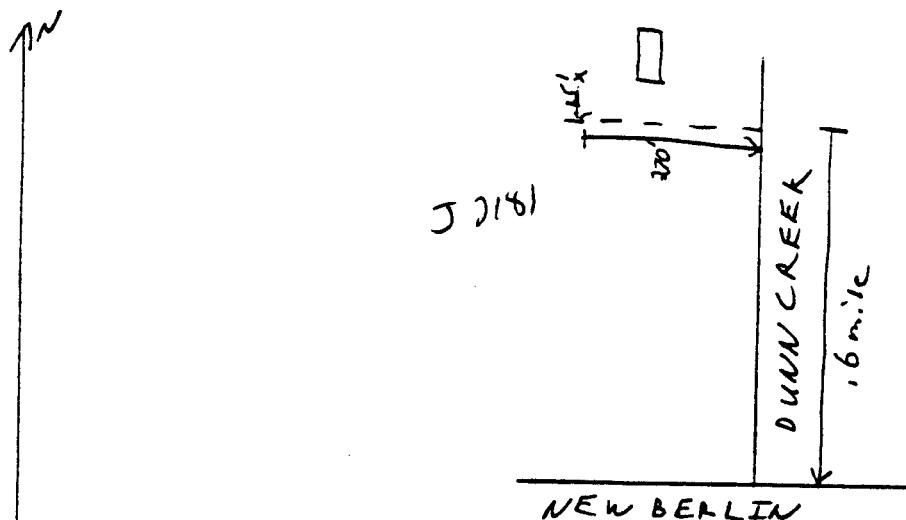
185 =

NOTES

R-212 *

T- A *

13.040 DUNN CREEK ROAD



STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
WELL COMPLETION REPORT

OWNER: HICKS, JAMES
Last Name First Name Initial
13070 WIMM STREET FLA.
Number Street State
SAF FLA. DUVAL
City State
904 252 3215 32110
Area Code Phone Number Zip Code

WELL LOCATION:
Locate in Section
Township Range (N-S) (E-W)
Latitude Longitude
Deg. Min. Sec. Deg. Min. Sec.

13070 WIMM STREET FLA.
Number Street/Road State
Lot No. Subdivision
514 724 32110
City County Duval

OWNER WELL NUMBER OR NAME:

DRILL METHOD: ☒ Rotary ☐ Cable Tool ☐ Jet ☐ Auger
☐ Other:

SURFACE CASING, CASING, AND LINER MATERIAL:

| Steel Dia. (In.) | Steel | Dia. (In.) | From (Ft.) | To (Ft.) | Schedule No. | Joints* |
|----------------------|---------------|------------|------------|------------|--------------|------------|
| Black Galv. S. Steel | Wt. (lb./ft.) | PVC Other† | | | | |
| <u>2</u> | | | <u>0</u> | <u>41</u> | | <u>1 C</u> |
| | | | <u>41</u> | <u>141</u> | | |

† Describe Material:

* TC = Threaded and Coupled, TCW = Threaded, Coupled, and Welded.
W = Welded, B = Bonded (PVC), O = Other:

GROUT: ☐ None ☒ Neat Cement ☐ Other:

Type and Percent of Additives and Grout Volume or Number of 94 lb. Sacks
31 Bags From (Ft.) To (Ft.)

FINISH: ☒ Open Hole ☐ Perforated or Slotted Casing ☐ Gravel Pack
☐ Sandpoint or Screen Attached to Well Casing ☐ Sandpoint or Screen
Telescoped with Packer Inside Casing (Packer Material:)

| Sandpoint/Screen Material | Dia. (In.) | Slot Size (In.) | From (Ft.) | To (Ft.) |
|---------------------------|------------|-----------------|------------|----------|
| | | | | |

☐ Other Finish:

QUALITY TEST: ☒ None ☐ Bacteria ☐ Chemical
By: ☐ Health Dept. ☐ USGS ☐ Other: Date

☐ Clear ☐ Colored ☐ Sulphur ☐ Salty ☐ Iron ☐ Other:

Conductance (Micromhos) Chloride ppm

Hardness pH Temp °F

Well Disinfected: ☐ No ☐ Yes (Date)

WELL TEST, by: ☒ Natural Flow ☐ Pumped ☐ Air Lift

☐ Bailor ☐ Permanent Pump ☐ Test Pump ☐ None

Discharge Measured By: ☐ Bailor ☐ Estimated ☐ Current Meter

☐ Orifice ☐ Trajectory ☐ Venturi ☐ Volumetric ☐ Other:

Measured Static Water Level + - Ft.

Measured Pumping Water Level + - Ft.

After Hours At G.P.M.

Specific Capacity G.P.M./Ft. of Drawdown

Measuring Pt. (Describe):

Which is Ft. ☐ Above ☐ Below Land Surface

Elevation of Measuring Pt. Ft. ☐ Above ☐ Below MSL

WELL EQUIPMENT: ☐ Open ☒ Capped ☐ Valved

☐ Permanent Pump ☐ Temporary Pump

Type Pump: ☐ Centrifugal ☐ Cylinder ☐ Jet ☐ Submersible

☐ Turbine ☐ Other:

Power: ☐ Diesel ☐ Electric ☐ Gasoline ☐ Other:

Horsepower Capacity G.P.M.

Intake/Injection Depth Ft.

TYPE OF WORK:
☒ New Construction ☐ Repair
☐ Deepening ☐ Plugging
☐ Other:

PERMIT NUMBER:

#8282

J-2181

WELL NUMBER

TYPE OF WELL: ☒ Water Well ☐ Test Well ☐ Recharge ☐ Drainage
☐ Waste Disposal ☐ Observation ☐ Other:

USE: ☒ Domestic ☐ Irrigation ☐ Industrial ☐ Livestock ☐ Public Supply
☐ Other:

SKETCH LOCATION OF WELL in relation to local landmarks, giving distance and direction from nearest town, road, or other reference point.

North

GEOPHYSICAL LOGS: Type: By:

| WELL LOG | | | Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities, inclines producing zones. Attach additional sheets if necessary. |
|-----------------|-------------------|-------------|--|
| Bore Hole (In.) | Casing Size (In.) | Depth (Ft.) | |
| | | From To | |
| | | 0 10 | Sand w/ L. P. |
| | | 10 35 | " " L. Mud |
| | | 35 55 | Sand w/ L. B. Mud |
| | | 55 75 | " " Shell B. Mud |
| | | 75 140 | Sand w/ L. Mud |
| | | 140 147 | L. Mud w/ L. Rock |
| | | 147 160 | L. B. Mud |
| | | 160 165 | Rock H. B. Mud |
| | | 165 200 | L. Mud & Sand |
| | | 200 240 | L. Mud w/ L. Sand & L. Rock |
| | | 240 260 | " " " " Sand & Rock |
| | | 260 265 | Rock |
| | | 265 300 | L. Mud w/ L. Sand |
| | | 300 320 | B. Mud w/ L. Rock |
| | | 320 340 | S. Mud w/ L. Sand |
| | | 340 360 | B. Mud w/ L. Sand |
| | | 360 380 | B. Mud w/ L. Sand & Rock |
| | | 380 395 | L. Mud |
| | | 395 420 | Rock |
| | | 420 460 | B. Mud w/ L. Sand |
| | | 460 477 | Rock |
| | | 477 480 | Rock |
| | | 480 500 | " " " " Rock |
| | | 500 560 | Rock |
| | | 560 575 | Rock |
| | | 575 580 | Rock |

Total Depth 580 Ft. Producing Zone Material: ☐ Sand ☐ Shell
☐ Broken Shell ☐ Limestone ☐ Other:

Top of Producing Zone Ft., Bottom of Producing Zone Ft.

☐ Drill Cuttings Sent to Bureau of Geology

10161 Joseph Smith
License No. Water Well Contractor's Signature

015 217 072 Completion Date Driller's Signature

Proposed for use by Water Conservation Program Field
Inspector during Well Plugging Operation

WATER CONSERVATION ACTIVITY
DUVAL COUNTY

J-2976

Reason for inspection: Proper procedures for plugging of
abandoned water well.

Regulatory status: Received application to plug
abandoned well

(date)

Permit issued for above

(number)

Well scheduled

(date)

New abandoned well schedule
completed

(date)

Submitted to U.S.G.S.

(date)

Owner Dunn's Terminal Company
(name of owner or his agent)

Address August Dr. J2X Fl 32226
(street) (city) (state) (zip)

Well Drilling Contractor partidge
(name)

(address)

(license or bond number)

Identification of Quad. Sheet

SE 1/4 14 19 27 E
SE 1/4 14 19 27 E
(Section) (Township) (Range)

Latitude 30° 24' 13" N Longitude 081° 34' 32" N

Sequential 1

Was well logged?

☐ YES

☒ NO

Date

By whom?

Total well depth 650 feet Average for area

Depth cased 550 feet

60' 3" 490 2"

Diameter of well 3x2 inches.

Volume of material calculated to properly plug well ~~14.5~~ 19.46 cu. feet. Materials to be used: Best Cement

slurry mixed 14.5 lbs/gal Density: _____ Pumping pressure _____ p.s.i. Pumping temperature _____ °F

Was plug used? ☐ YES ☒ NO What type/style? _____

Placement depth _____ feet.

Was operation continuous? ☒ YES ☐ NO

Cement used:
9-20-83 18.06 ft³ @ 14.5 lbs
9-22-83 .74 ft³ @ 0.575 lbs
Total 15.315

Date and time started: 9/20/83 at 10:41 a.m./p.m.

Date and time completed: 9/20/83 at 10:44 a.m./p.m.

Volume of material used 18.06 cu. ft. 14.5 lbs @ 15 lbs/gal

Name of company providing materials: Partridge - Hand mixed

Were all specifications followed as set forth in City of Jacksonville Ordinance Chapter 625, Florida Statutes Chapter 373, and Florida Administrative Code 16C - 8?

☒ YES ☐ NO

Inspector's evaluation of operation: well plugged pump down
method. Took 211 14.5 lbs cement. Top to be
removed, and cement level to be measured
Cement calculated at 14.5 lbs/gal, but driller mixed cement
2 little heavier at 15 lbs/gal. Used 1.085 ft³, or 1.4 ft³ less
that should be here put in well, or up to 28 ft below well head
Any additional future action required by inspector?

☒ YES ☐ NO

If yes, please explain: level check.

note pvt partridge notified on 9-22-83 that level was 15 ft below
low tide level, at 25 ft below well head. partridge added
cement to bring the level up to low tide level. 15 ft

WPP [Signature]
(Signature of Inspector)

9-20-83
(date)

Sited by Essex + Clark 9-28-83 - OH. Casing
Cut off one foot above low tide level and plug

Recorded by Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 10.21.81

GENERAL SITE DATA (1)

Check One ☒ English ☐ Metric Units

Site Ident No 302413081343201 RG Number R=0* Transaction T=0 D M V*
 Site-Type 2=C D H I M P T* Data 3=0 U L M* Reliability 3=0 U L M* Reporting Agency 4=FL039*
 Project No. 5= District 6=121* State 7=12* County (or town) DUN21 8=031*
 Latitude 9=302413* Longitude 10=0813432* Lat-Long Accuracy 11=S 0 T M*
 Local Number 12= Land Net Loc. 13=SESWSW 14 T 1 S R 27E
 Location Map 14=EAST POINT Scale 15=24000*
 Altitude 16=100* Method of Measurement 17=A L 0* Accuracy 18=5*
 Topo Setting 19=D 0 E F H K L 0 P S T U V W* Hydrologic Unit (OWDC) 20=03080103*
 Date of First Construction/Completion 21=02/01/1981* Use of Site 23=A D E G H 0 M P R S T U W X Z*
 Use of Water 24=A B C D E F H I M N P R S T U Y Z*
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27= Depth of Well 28= Source of Depth Data 29=
 Water Level 30= Date Measured 31= Source 33=
 Method of Measurement 34=A C E G H L M R S T V Z*
 Site Status 37=D F G H 0 P R S T V X Z*
 Source of Geohydrologic Data 38= Pump Used 35= Measuring Point 266= Measuring Point Date 267=

OWNER IDENTIFICATION (1)

R=158* T=0 D M* Date of Ownership 159#02/01/1981*
 Name: Last 161=DUNN First 162=T. E. R. M. A. L. Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189* T=0 D M* Ident 190#SL Assigner 191=FLA WMD
 New Card Same R & T Ident 190#AUGUST Assigner 191=FL039

SITE VISIT DATA (1)

R=186* T=0 D M* Date of Visit 187#10/20/1981* Name of Person 188=ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R=192* T=A D M* Date 193# Geohydrologic Unit 195#
 New Card Same R thru 195
 Temperature 196#00010* Degrees C 197=
 Conductance 198#00095* μ Mhos 197=
 Other (STORET) Parameter 196# Value 197=
 Other (STORET) Parameter 196# Value 197=

FOOT NOTES:

① Source of Data Codes:

S D 0 A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * Entry No 58 # 001 * Depth to Top 91 = Depth to Bottom 92 =

Unit Identifier 93 = 1200 FLWR Lithology 96 = LMS Lithologic Modifier 97 = MP1 ME

AQUIFER DATA (2)

R-94 * T- A D M * Geohydrologic Unit Entry No 258 #

Date 95 # / / * Water Level 126 = % Water Contributed 132 =

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * Entry No 258 # Depth to Top 91 = Depth to Bottom 92 =

Unit Identifier 93 = Lithology 96 = Lithologic Modifier 97 =

AQUIFER DATA (2)

R-94 * T- A D M * Geohydrologic Unit Entry No 258 #

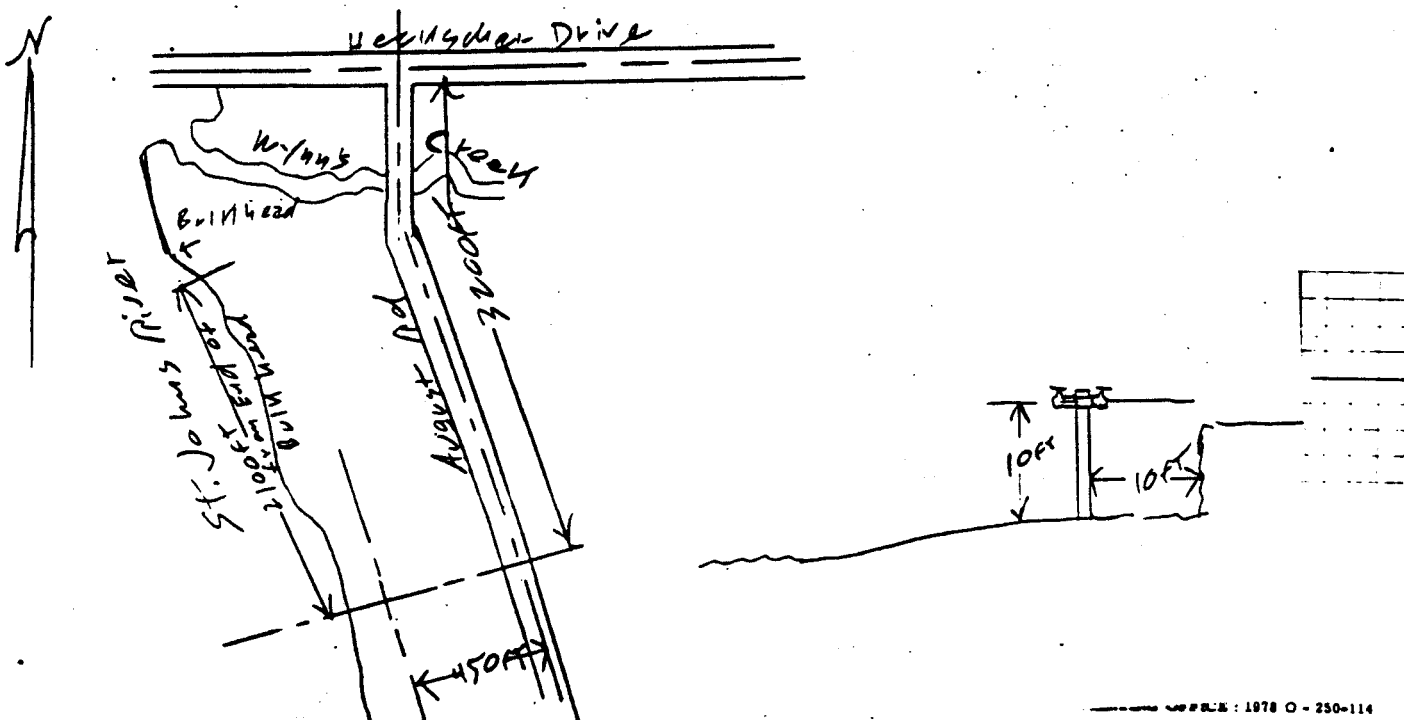
Date 95 # / / * Water Level 126 = % Water Contributed 132 =

PERTINENT REMARKS

R-183 * T- A * 185 =
add
New Card Same R&T
185 =
185 =

NOTES:

R-212 * T- A * 218 = 6000 BLN AUGUST AD



WATER CONSERVATION PROGRAM
WATER WELL FIELD INSPECTION REPORT

Complaint No. _____ TWUP No. _____ Construction/Plugging Permit No. _____ 1-2976 Well Inventory No.

Is Well Free Flowing? Yes No

Owner Dunn's Terminal Company Inc Phone _____

Owner's Address Suite 655 Florida National Bank Building

Well Location Address Property on St. Johns River with SE # 108836-000, 01

Well Drilling Contractor 108838-000 - 3200 ft SE of Hartsfield Dr on August Rd. License/Bond No. _____

Site Identification: 30 2413 081 3432 01 Lat./Long (if different) 30 _____ 081 _____ 01

2E SW SW 14 Section 13 TWP 27E East Point Quad Map Name

Depth of Hole Drilled _____ Depth of Well _____ How measured _____

Diameter/Cross Section 3 Depth of Casing _____

Depth and Diameter of Well Segments: _____ " from LSD to _____
_____ " Dia. from _____ ' to _____ ' _____ " Dia. from _____ ' to _____ ' _____

Depth and Diameter of Casing Segments: _____ " Dia. from _____ ' Above LSD
_____ " Dia. from _____ ' Below LSD

Type and Quantity of Grouting Used _____ Well centered in Grout? _____

Use of Well _____ Number of People Served _____

Water Level _____ Above LSD _____ Measuring Pt. _____ Above LSD
Below LSD Below LSD

How Measured _____ Measured by _____ Date _____

Method of Construction _____ Date of Construction _____

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.) _____

Casing Material Used _____

Altitude 10 Interval 10

Topo Setting _____

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer than 300' _____

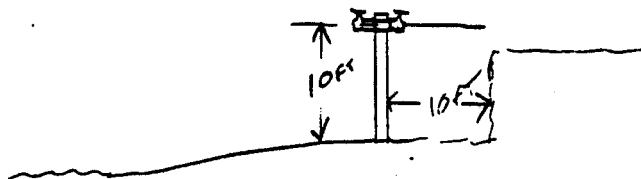
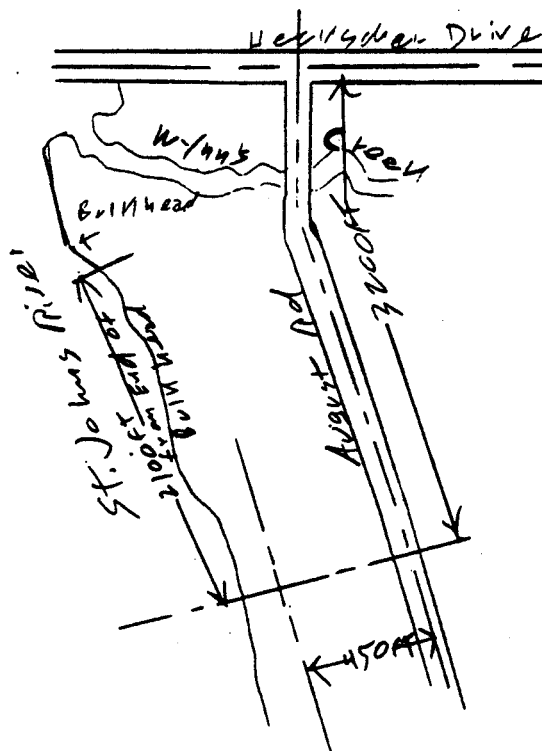
Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM

Free Flow Well Yield 33 GPM. How Yield Determined EST
 Frequency of Well Use _____ Hrs/Day _____ Days/Year
 Pump Data - Type and Make _____ HP _____
 Pump Capacity _____ GPM No. Bowls or Stages _____
 Type of Power _____ Static Water Level _____
 Production Water Level _____ Pump Intake Setting _____
 = Depth of Section Line
 Water Sampled for: Dissolved Solids _____ Conductivity _____
 Hardness _____ Chlorides _____ PH= _____ Temperature _____ °C
 General Rating: Poor ☒ Average _____ Good _____ Excellent _____
 Action Taken/Comments _____

Follow Up Needed Free Flowing

Inspector's Name W.P. Enge Field Inspection Date 10-20-81



SITE NO. 3027 3908134 0201
27 3402Recorded by MALLORYU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 3-3-80Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302739081340201 RG Number R=0* Transaction T= (A) D M V *
 Site-Type 2= C D H I M P T (W) * Data 3= (C) U L M * Reliability 4= FL039 *
 Project No. 5= District 6= 121 * State 7= 12 * County 8= 031 *
 Latitude 9= 30.2739 * Longitude 10= 081.3402 * Lat-Long Accuracy 11= S (F) T M *
 Local Number 12= J-2231 * Land Net Loc. 13= LUGGATS 36 T 14 R 27E *
 Location Map 14= EASTPORT * Scale 15= 2400.0 *
 Altitude 16= 10.0 * Method of Measurement 17= A L (M) * Accuracy 18= S *
 Topo Setting 19= D C E (F) H K L O P S T U V W * Hydrologic Unit (OWDC) 20= 03080103 *
 Date of First Construction/Completion 21= 00/00/1980 * Use of Site 23= A D E G H O M P R S T U (V) X Z *
 Use of Water 24= A B C D E F (G) I M N P R S T U Y Z *
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27= Depth of Well 28= Source of Depth Data 29=
 Water Level 30= Date Measured 31= Source 33=
 Method of Measurement 34= A C E G H L M R S T V Z *
 Site Status 37= D F G H O P R S T V X Z *
 Source of Geohydrologic Data 36= Pump Used 35= Measuring Point 266= Measuring Point Date 267=

OWNER IDENTIFICATION (1)

R=158 * T= (A) D M * Date of Ownership 159= 04/30/1979 *
 Name: Last 161= GRABHAM * First 162= B. J. * Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 * T= (A) D M * Ident 190= SJ * Assigner 191= FLA. UMD *
 New Card Same R & T Ident 190= NEW BERN * Assigner 191= FL039 *

SITE VISIT DATA (1)

R=186 * T= (A) D M * Date of Visit 187= 02/29/1980 * Name of Person 188= MALLORY *

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 * T= A D M * Date 193= Geohydro-logic Unit 195=
 Temperature 196= 0.0.0.1.0 * Degrees C 197=
 Conductance 196= 0.0.0.9.5 * u Mhos 197=
 Other (STORET) Parameter 196= Value 197=
 Other (STORET) Parameter 196= Value 197=

FOOT NOTES:

① Source of Data Codes:

| | | | | | | | |
|------------------|---------|-------|--------------|--------------|------|-----------|----------------|
| S | D | O | A | R | L | G | Z |
| reporting agency | driller | owner | other gov't. | other agency | logs | geologist | other reported |

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry

No 256 # 001 *

Depth

to Top 91 =

Depth to

Bottom 92 =

Unit

Identifier 93 = 120 FLRD *

Lithology

96 = LMSM *

Lithologic

Modifier 97 = MARINE *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No 256 #

Date

95 # / / *

month

day

year

Water Level

126 = *

% Water

Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry

No 256 #

Depth

to Top 91 =

Depth to

Bottom 92 =

Unit

Identifier 93 = *

Lithology

96 = *

Lithologic

Modifier 97 = *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No 256 #

Date

95 # / / *

month

day

year

Water Level

126 = *

% Water

Contributed 132 = *

PERTINENT REMARKS

R-183 *

T- A *

add

185 =

New Card Same R&T

185 =

185 =

NOTES:

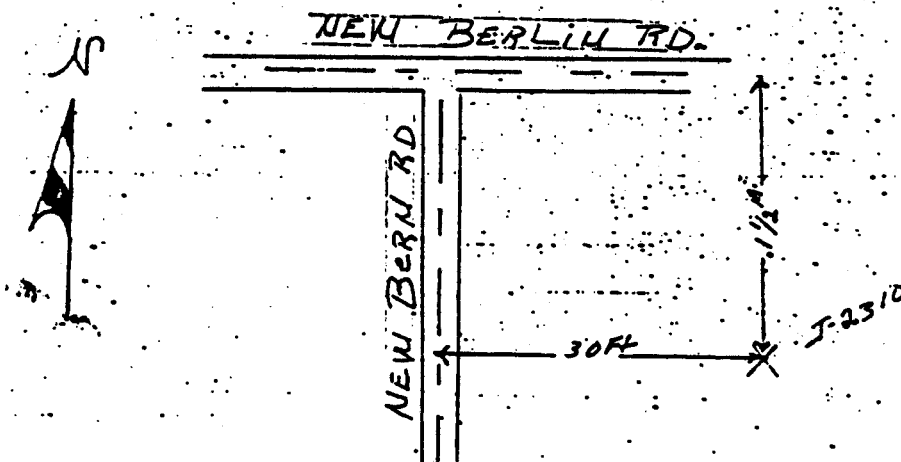
R-212 *

T- A *

212 =

12324 NEW BERN RD

J 2231



U. S. GOVERNMENT PRINTING OFFICE : 1978 O - 212-137

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No 256 # 001 *

Depth to Top 91 =

Depth to Bottom 92 =

Unit Identifier

93 = 120 FLRD *

Lithology

96 = LMSH *

Lithologic Modifier

97 = MARINE *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No 256 #

Date

95 # / / *

month day year

Water Level

126 = *

% Water

Contributed

132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No 256 #

Depth to Top 91 =

Depth to Bottom 92 =

Unit Identifier

93 = *

Lithology

96 = *

Lithologic Modifier

97 = *

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic

Unit Entry No 256 #

Date

95 # / / *

month day year

Water Level

126 = *

% Water

Contributed

132 = *

PERTINENT REMARKS

R-183 *

T- A *

add

185 =

New Card Same R&T

185 =

185 =

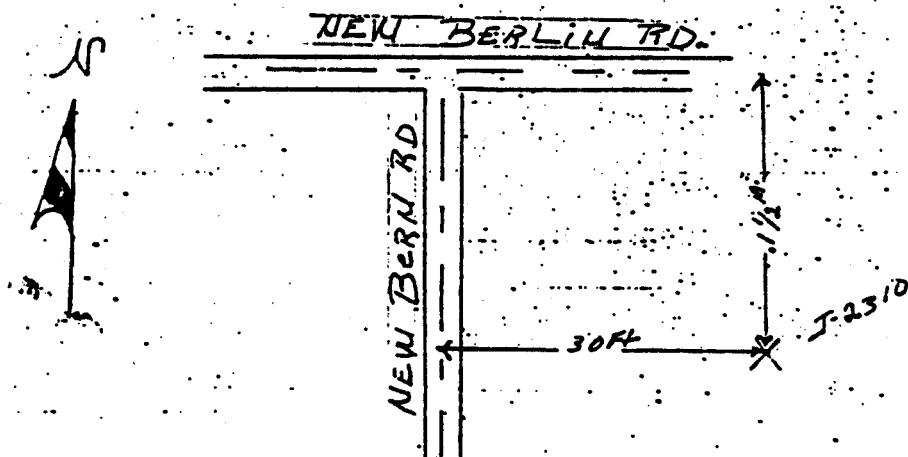
NOTES:

R-212 *

T- A *

212 = 12324 NEW BERN RD

J 2231



U. S. GOVERNMENT PRINTING OFFICE : 1978 O - 212-137

Recorded by

D. Hammond

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date

5/24/76

Check One

☒ English☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No. 30 27 20 0813345.1 RG Number 0-0-0 Transmission T-12 O M V
 Site Type 2- C O H I M P T W Date 3- (E) U L M Reporting Agency A- FCO-39
 Project No. 5- District 6- 21 State 1- 2 Country (or town) DUAL B- 039
 Latitude 9- 30 27 20 Longitude 10- 081 3345 Loc-Long Accuracy 11- (E) F T M
 Local Number 12- 59 Land Use 13- A A N W N U T 15- 276
 Location Map 14- EAST P.O.R.T. Scale 15- 24 000
 Altitude 16- 20.00 Method of Measurement 17- A L Accuracy 18- 10.5
 Type Setting 19- D C E (F) H K L G P S T U V W Hydrologic Unit (GWDC) 20- 03089103
 Date of First Construction Completion 21- 5/3/1976 Use of Site 22- A D E G H M P R S T U (W) X Z
 Use of Water 23- A B C D E F H M N P R S T U Y Z
 Secondary Water Use 24- Tertiary Use of Water 25- Depth of Hole 26- Depth of Well 27- Source of Depth Data 28-
 Water Level 29- Date Measured 30- Source 31-
 Method of Measurement 32- A C E G H L M R S T V Z
 Site Status 33- D (F) G H M P R S T V X Z
 Source of Geohydrologic Data 34- Pump Used 35- Measuring Point 36- Measuring Point Date 37-
 month day year

OWNER IDENTIFICATION (1)

R-158 T- (A) D M Date of Ownership 159- 05-08-1976
 Name: Last 161- M.D.B.R.E. First 162- P.H.N.Y. Middle Initial 163-
 month day year

OTHER SITE IDENTIFICATION NUMBERS (1)

R-123 T- A O M Ident 190- Assigner 191-
 New Card Same R & T Ident 192- Assigner 193-
 month day year

SITE VISIT DATA (1)

R-136 T- (A) D M Date of Visit 137- 05-04-1976 Name of Person 138- D.H.A.M.O.P.
 month day year

FIELD WATER QUALITY MEASUREMENTS (1)

R-132 T- A O M Date 193- month day year Geohydrologic Unit 195-
 New Card Same R thru 199 Temperature 196- 0 0 0 0 0 Degrees C 197-
 Conductance 198- 0 0 0 9 5 uMhos 199-
 Dissolved Oxygen Parameter 200- Value 201-
 Dissolved Oxygen Parameter 202- Value 203-
 month day year

FOOTNOTES

S D O A R L G Z

Reporting Station Number Other Data Other Notes
 Station Number Other Data Other Notes

WELL CONSTRUCTION DATA (1)

R-58 = T-A-D-M = Entry No 58-001 = Date of Construction Completion 80-05/19/1976 Source of ① 64-02 =
 add, delete, modify
 Name of Contractor/Driller 83 =
 Method of Construction 88 = A B C D H J P R T V W Z =
 aug., rotary, bored, or augered, cable tool, dug, hydraulic, rotary, jetted, air-lift, reverse, trenching, driven, driven, wash, other
 Finish 86 = C F G H S P S T W X Z = Type of Seal 87 = B C G Z =
 surface, gravel w. port, gravel, surface, horizontal, open, perforated, screen, land point, washed, open, other, bituminous, clay, cement, other, probe
 Bottom of Seal 88 = Method of Development 89 = A B C J N P S Z = Number of Hours in Development 70 =
 abrasion, soaked, compressed, jacked, none, other, tapered, other, pump
 Special Treatment During Development 71 = C D E F M =
 chemicals, dry ice, explosives, coffee, hydrate, mechanical, etc.

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72 = T-A-D-M = Construction Entry No 59 =
 add, delete, modify
 New Card for Each Hole Segment Same R, T & Field 59
 Top of Hole Segment Below LSD 72 = 73 = 74 = 75 =
 Bottom of Hole Segment below LSD 74 = 75 = 76 = 77 =
 Diameter of Hole Segment 75 = 76 = 77 = 78 =

CASING SCHEDULE (2)

R-75 = T-A-D-M = Construction Entry No 59 =
 add, delete, modify
 New Card for Each Casing With Same R, T & Field 59
 Top of Casing Segment Below LSD 77 = 78 = 79 = 80 =
 Bottom of Casing Segment Below LSD 78 = 79 = 80 = 81 =
 Diameter of Casing Segment 79 = 80 = 81 = 82 =
 Casing Material ① 80 = 81 = 82 =
 Thickness of Casing 81 = 82 =

OPENINGS SCHEDULE (2)

R-82 = T-A-D-M = Construction Entry No 59 =
 add, delete, modify
 New Card for Each Open Section With Same R, T and Field 59
 Top of Section Below LSD 83 = 84 = 85 =
 Bottom of Section Below LSD 84 = 85 = 86 =
 Type of Opening ① 85 = 86 = 87 =
 Type of Material ② 86 = 87 = 88 =
 Diameter of Open Section 87 = 88 = 89 =
 Width of Opening 88 = 89 =
 Length of Opening 89 =

FOOT NOTES.

① Source of Data Codes:

S O B A R L G Z
 reporting, driller, owner, other gov't, other local, geologist, other agency, resource

② Casing Material Codes

B C G I M P R S T U W Z
 brick, concrete, galv. wrought, other, PVC or, rod or, steel, tile, stone, wood, other, iron, iron, metal, plastic, stone, steel

③ Type of Opening Codes

F L M P R S T W X Z
 fracture, natural, mesh, perforated, open screen, sand, washed, open, other, slotted, or slotted, natural, terminal point, hole

④ Type of Material Codes for Open Sections

B C G I M P R S T Z
 brass or, concrete, galv. wrought, other, PVC or, stainless, steel, tile, other, bronze, iron, iron, metal, plastic, steel

R = 134 116 = **T** = A D M * Entry No 1478 = Date 148 = / / month day year

Flowing, pumped add, delete, modify

Discharge: 150 = Source of Data 151 = *

Method of Measurement 152 = B C E F M O P R T U V W Z *
bailer, current, estimated, flume, leveling, orifice, pitot tube, reported, trajectory, venturi, volumetric, weir, other meter

Production Level 153 = State Level 154 = Source of Data 155 = Seepage Capacity 272 = *

Method of Measurement 156 = A C E G H L M R S T V Z *
spring, springed, estimated, pressure, constant, groundwater, manometer, reported, steel, venturi, venturimeter, other tape, pressure tap, weir, tape, tape - metric tape

Pumping Period 157 = *

R=42 = T = A = D = M = R = Type of Lift 43 = A B C J P R S T U Z = Entry No. 254 =
 add, delete, modify air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, vaneless, other
 Pump Intake Setting 44 = Type of Power 45 = D E G H L N W Z =
 diesel, electric, gasoline, hand, LP gas, natural, windmill, other gas
 Date 38 = / / * Horsepower 46 = *

| MAJOR PUMP DATA (2) | | | | | | | | | |
|--|-------------|--------------|------|-----------------------|-------|----------------------|------|---------------------|--|
| R = 47 = | T = A D M = | Type of Lift | 43 = | Lift Entry No | 254 = | Manufacturer of Pump | 48 = | | |
| Serial No of Pump | | 49 = | | Name of Power Company | | 50 = | | | |
| Power Company Account No | | 51 = | | Power Meter No | | 52 = | | Pump Rating | |
| Person or Company Who Maintains the Pump | | 54 = | | Additional Lift | | 255 = | | Rated Pump Capacity | |
| | | | | | | | | 258 = | |

STANDBY POWER DATA (2) (See LIFT DATA for codes of fields 43 and 56 below)

| | | | | | |
|---------------------|-----------|-----------------|------------------|---------------|-------------------|
| R=53 | T=1 A D M | Type of Lift 43 | Type of Power 56 | Horsepower 57 | Lift Entry No 254 |
| add. colors, modify | | | | | |

| R=198 | T = A D M | | New Card for Each Log Type
Same R & T | | | |
|----------------------------|-------------|-----------|--|--|--|--|
| add delete modify | | | | | | |
| Type of Log ^(*) | Began Depth | End Depth | Source of Data ^(†) | | | |
| 199# | 200- | 201- | 202- | | | |
| 199# | 200- | 201- | 202- | | | |
| 199# | 200- | 201- | 202- | | | |
| 199# | 200- | 201- | 202- | | | |

R = 113 = T = A D M = Begin Year 115 = End Year 116 = Source Agency 117 =
 add, delete, modify
 Frequency of Collection 118 = Network Site 257 = Type of Analyses 120 =

R=121 * T= A D M * Begin Year 122 * End Year 123 * Source Agency 124 *
 add. source, modify
 Frequency 125 * Network Site 258 *

R = 127 * T = A D M * Begin Year 128 * End Year 129 * Source Agency 130 *
sed, derate, mobility
Frequency of Collection 131 * Network Site 259 * Method of Collection 133 * C E M U Z *

| | | |
|--|--|--|
| 1301 =
T = A D M =
000, 00000, 00000 | Data 1301 =
Loc 32 = C D Z =
000, 00000, 00000 | Format 25 = F M P Z
000, 00000, 00000 |
| New Card Same R & T | Data 181 =
Loc 32 = C D Z = | Format 261 = F M P Z |

① Source of Data Codes:

S O O A R L G Z

[illegible]

1. Ex. 100.000.000 Collection, 6.4m

A S C O F I M J J A S N
 annual, bi-monthly, continuous, daily, semi-, intermittent, monthly, unknown, quarter, semi-, none or other
 monthly only annual annual

4. Type of Quality Analysis System

[illegible]

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 • T = A D M • Entry No. 256 z 001 • Depth to Top 91 • Depth to Bottom 92 •

Unit Identifier 93 = 920.5 LRD • Lithology 96 • Lithology Modifier 97 •

AQUIFER DATA (2)

R = 94 • T = A D M • Geohydrologic Unit Entry No. 256 z • Date 95 z • Water Level 128 • % Water Contributed 132 •

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 • T = A D M • Entry No. 256 z • Depth to Top 91 • Depth to Bottom 92 •

Unit Identifier 93 • Lithology 96 • Lithology Modifier 97 •

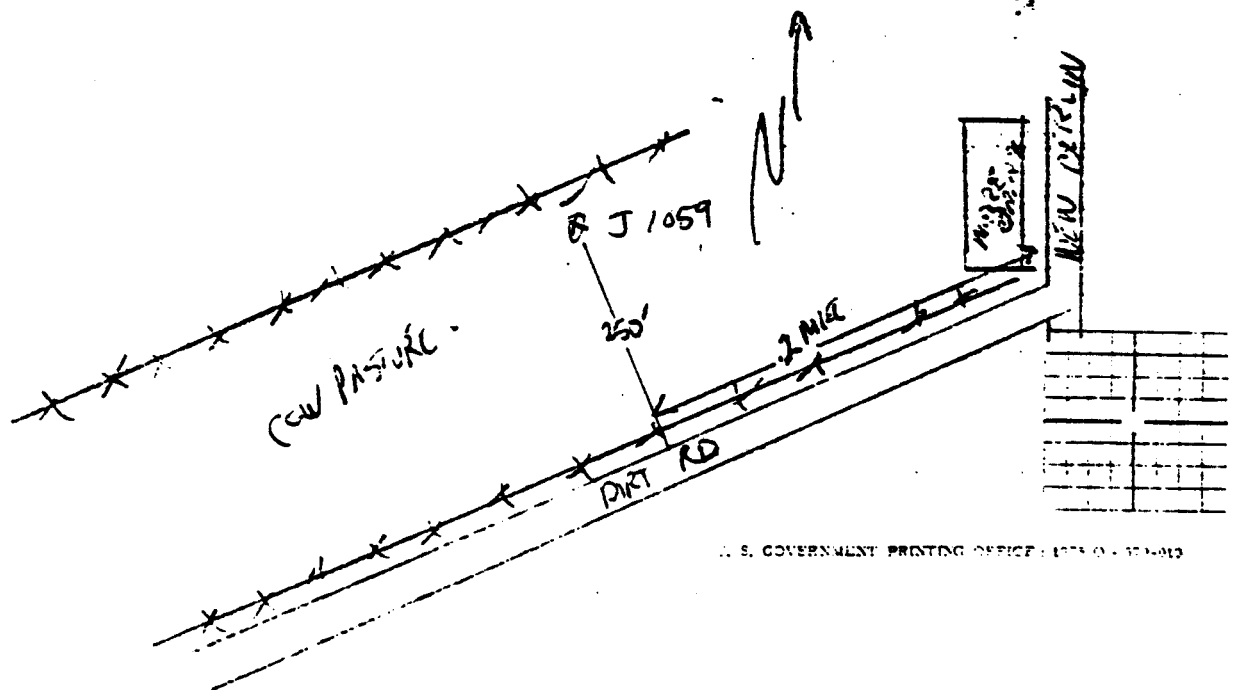
AQUIFER DATA (2)

R = 94 • T = A D M • Geohydrologic Unit Entry No. 256 z • Date 95 z • Water Level 128 • % Water Contributed 132 •

PERTINENT REMARKS

R = 183 • T = A • 185 •
New Card Same R&T • 185 •
185 •

NOTES:



U. S. GOVERNMENT PRINTING OFFICE: 1974 O - 374-013

Essex

SITE SCHEDULE

302657081333301 34

5-26-81

GENERAL SITE DATA (10)

Site Ident No 302657081333301 RG Number P=0 Transaction T=A D M V
Site-Type 2=C D H I M P T W Date 3=10 U L M Reporting Agency 4=FL039
Project No 5= District 6=112 State 7=12 County (or town) DUV21 8=03
Latitude 9=302657 Longitude 10=0813333 11=0 T M
Local Number 12=J-2791 Land Loc 13=SESWNW 1 13 27E
Location Map 14=EAST PORT Scale 15=24000
Altitude 16=27 Method of Measurement 17=A L O Accuracy 18=5
Trip Sitting 19=D C E O H K L O P S T U V Hydraulic Unit (OWDC) 20=03080103
Date of First Construction Completion 21=00 00 1981 Use of Site 22=A D E G H O M P R S T U X Z
Use of Water 23=A B C D E F H I M N P R O T U Y Z
Secondary Water Use 24=A Tertiary Use of Water 25= Depth of Hole 26= Depth of Well 27= Source of Depth Data 28=
Water Level 30=1-10.73 Date Measured 31=05 08 1981 Source 32=33 S
Method of Measurement 33=A C E G H L M R S T V Z
Site Status 34=D F G H O P R S T V X Z
Source of Geohydrologic Data 35=36 Pump Used 36= Measuring Point 266=-1 Measuring Point Date 267=05 08 1981

OWNER IDENTIFICATION (11)

R=158 T=A D M V Date of Ownership 159=00 00 1981
Name: Last 161=MAN DARBY First 162= Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (11)

R=189 T=A D M V Assigner 190=SI 191=FLA WMD
New Card Same R & T: Assigner 190=NEW BERLIN 191=FLA WMD

SITE VISIT DATA (11)

R=186 T=A D M V Date of Visit 187=05 08 1981 Name of Person 188=ESSEX

FIELD WATER QUALITY MEASUREMENTS (11)

R=192 T=A D M V Date 193= Geohydrologic Unit 195=
New Card Same R thru 195
Temperature 196=00010 Degrees C 197=
Conductance 198=00095 uMhos 199=
Other (STORET) Parameter 196= Value 197=
Other (STORET) Parameter 196= Value 197=

FOOT NOTES.

① Source of Data Codes:

S D O A R L G Z
reporting, driller, owner, other govt., other logs, geologist, other agency reported.

R-90 T- A D M Entry No 256 = 661

93 = 1206KRD

Lithology 96 LASH MARINE

AQUIFER DATA (2)

R-94 T- A D M

Geohydrologic Unit Entry No 256 #

Date 95 # / /

Water Level 126 =

Water Contributed 132 =

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 T- A D M

Entry No 256 #

Depth to Top 91 =

Depth to Bottom 92 =

Unit Identifier 93 =

Lithology 96 =

Lithologic Modifier 97 =

AQUIFER DATA (2)

R-94 T- A D M

Geohydrologic Unit Entry No 256 #

Date 95 # / /

Water Level 126 =

% Water Contributed 132 =

PERTINENT REMARKS

R-183 T- A

185 =

add

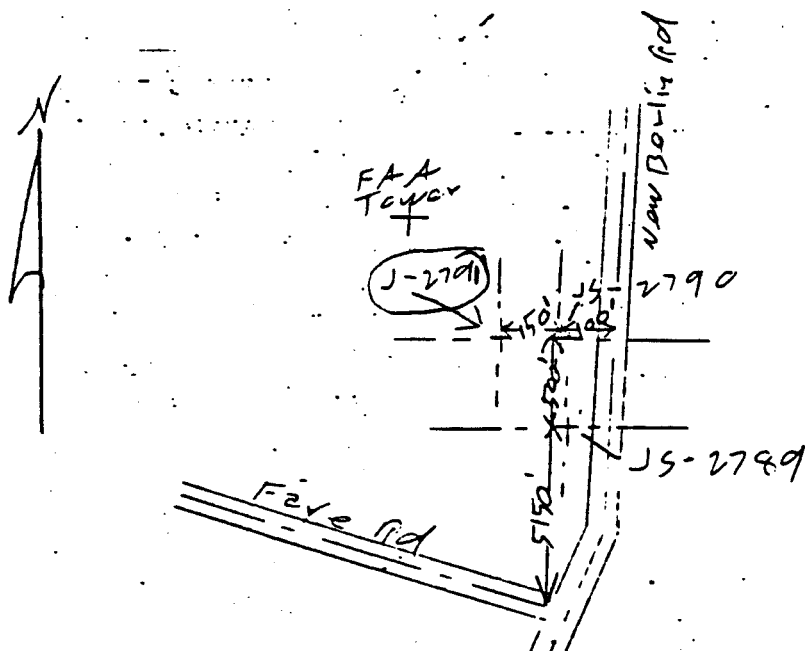
185 =

New Card Same R&T

185 =

NOTES.

R-212 T- A 213 = 1209.4 NEW BERLIN RD



U. S. GOVERNMENT PRINTING OFFICE : 1959 O - 210-127

WELL SCHEDULE

U. S. DEPT. OF THE INTERIOR

GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

MASTER CARD

| | | | | |
|--------------|-----------------|------------|----------------|--------------------|
| Record by | Source | Date | Trout River | |
| ESSOX | Fla | 1/1/48 | Date 22.4.1948 | |
| State | Fla | County | Twp | |
| Latitude: | 30° 24' 29.4" N | Longitude: | 81° 13' 29" W | Sequential number: |
| Lat-long | 30 24 29.4 | Long | 81 13 29 | 1 |
| SECURITY: | 1 15.5 221E | Sec | 19 | 12/12/48 ES |
| Local | 159 | Other | 11 | |
| Cell number: | 11 | Other | 11 | |

Local age: [] [] [] [] [] []
[] [] [] [] [] [] [] [] [] [] [] []
District or name: SCOTTHERN CELL
Address: 9209 Hazelton
Cover **Date of release:** Southern Bell Syst.

| | 30 | 31 | 32 |
|---|-----|-----|-----|
| Donorable: County, Fed Gov't, City, Cong go Co, Private, State Agency, Water Dist | (C) | (F) | (N) |
| (A) | (B) | (C) | (D) |
| Use of Air cond, Bottling, Comm, Donator, Power, Fire, Gas, Irr, Med, Ind, P, S, Sec, | (F) | (F) | (F) |
| | (F) | (F) | (F) |

[illegible]

DATA AVAILABLE:

| | | | | | |
|-----------------------|--------------------------|------------------------|---|---|---|
| Hell date | ☐ | Freq. w/L meas.: _____ | ☒ Field squiffer chg. | P ₁ ☐ | P ₂ ☐ |
| Hyd. lab. data: _____ | | | | | |

Qual. water desc: _____

Freq. sampling: _____

Pumpage inventory: _____
yes
no

Period: _____

Aperture card: _____
 Yes ☐ No ☐
 For date: _____
 Description: _____

WELL-DESCRIPTION CARD

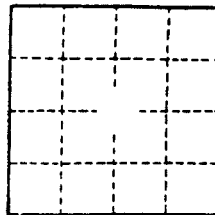
[illegible]

| | | | | | |
|----|-------|----|----------|-----|---------|
| 41 | above | 42 | ft below | 43 | LSD, MP |
| 44 | above | 45 | ft below | 46 | LSD, MP |
| 47 | above | 48 | ft below | 49 | LSD, MP |
| 50 | above | 51 | ft below | 52 | LSD, MP |
| 53 | above | 54 | ft below | 55 | LSD, MP |
| 56 | above | 57 | ft below | 58 | LSD, MP |
| 59 | above | 60 | ft below | 61 | LSD, MP |
| 62 | above | 63 | ft below | 64 | LSD, MP |
| 65 | above | 66 | ft below | 67 | LSD, MP |
| 68 | above | 69 | ft below | 70 | LSD, MP |
| 71 | above | 72 | ft below | 73 | LSD, MP |
| 74 | above | 75 | ft below | 76 | LSD, MP |
| 77 | above | 78 | ft below | 79 | LSD, MP |
| 80 | above | 81 | ft below | 82 | LSD, MP |
| 83 | above | 84 | ft below | 85 | LSD, MP |
| 86 | above | 87 | ft below | 88 | LSD, MP |
| 89 | above | 90 | ft below | 91 | LSD, MP |
| 92 | above | 93 | ft below | 94 | LSD, MP |
| 95 | above | 96 | ft below | 97 | LSD, MP |
| 98 | above | 99 | ft below | 100 | LSD, MP |

HYDROGEOLOGIC CARD

[illegible]

Well No.



10

Hand-drawn diagram of a transmission line. The line is 200 feet long. The receiving end is labeled "R21 1500V" and "Shorted". The sending end is labeled "220V" and "237V". The diagram shows a horizontal line with a vertical line at the right end labeled "Shorted" and "R21 1500V". The horizontal line is labeled "200'". The vertical line is labeled "220V" and "237V". The diagram is labeled "Carroll Electric" and "No. 11 system".

Small Electric Bell system

270' 237' *

28 April

STATE OF FLORIDA
WATER WELL CONTRACTOR'S
WELL COMPLETION REPORT
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES
203 Pennington Building, Tallahassee, Florida 32304
Telephone: (904) 488-8476

No. 80081

Permit No. 75-10

Owner's Well Identification J59

State Well Number
For Department Use
ONLY

| 1. OWNER:
Name: <u>JOHN A. HARRIS</u>
Address: <u>1000 N. W. 10th St.</u> City: <u>MIAMI</u> State: <u>FL</u> | | 14. WELL LOG: | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|-----------------|--|--|----------------------|-----------------|--|--|------|----|---|---|---|---------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|----|---|----|----|-----|---|-----|-----|-----|---|
| 2. LOCATION OF WELL:
Street Address/Road: <u>1000 N. W. 10th St.</u>
City: <u>MIAMI</u> County: <u>DADE</u>
Subdivision: <u>MIAMI</u> Lot No.: <u>100</u>
Section: <u>1</u> Township: <u>17N</u> Range: <u>18W</u> | | <table border="1"><thead><tr><th rowspan="2">Well
bore
(in)</th><th colspan="2">Depth
(feet)</th><th rowspan="2">Notes each type of material, producing zones, & cavities if any. Give description at not less than 20 foot intervals and at 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Give description at not less than 20 foot intervals and at changes. | From | To | 0 | 0 | 2 | 400-470 | 2 | 2 | 4 | " | 4 | 4 | 6 | " | 6 | 6 | 8 | " | 8 | 8 | 10 | " | 10 | 10 | 12 | " | 12 | 12 | 14 | " | 14 | 14 | 16 | " | 16 | 16 | 18 | " | 18 | 18 | 20 | " | 20 | 20 | 22 | " | 22 | 22 | 24 | " | 24 | 24 | 26 | " | 26 | 26 | 28 | " | 28 | 28 | 30 | " | 30 | 30 | 32 | " | 32 | 32 | 34 | " | 34 | 34 | 36 | " | 36 | 36 | 38 | " | 38 | 38 | 40 | " | 40 | 40 | 42 | " | 42 | 42 | 44 | " | 44 | 44 | 46 | " | 46 | 46 | 48 | " | 48 | 48 | 50 | " | 50 | 50 | 52 | " | 52 | 52 | 54 | " | 54 | 54 | 56 | " | 56 | 56 | 58 | " | 58 | 58 | 60 | " | 60 | 60 | 62 | " | 62 | 62 | 64 | " | 64 | 64 | 66 | " | 66 | 66 | 68 | " | 68 | 68 | 70 | " | 70 | 70 | 72 | " | 72 | 72 | 74 | " | 74 | 74 | 76 | " | 76 | 76 | 78 | " | 78 | 78 | 80 | " | 80 | 80 | 82 | " | 82 | 82 | 84 | " | 84 | 84 | 86 | " | 86 | 86 | 88 | " | 88 | 88 | 90 | " | 90 | 90 | 92 | " | 92 | 92 | 94 | " | 94 | 94 | 96 | " | 96 | 96 | 98 | " | 98 | 98 | 100 | " | 100 | 100 | 102 | " | 102 | 102 | 104 | " | 104 | 104 | 106 | " | 106 | 106 | 108 | " | 108 | 108 | 110 | " | 110 | 110 | 112 | " | 112 | 112 | 114 | " | 114 | 114 | 116 | " | 116 | 116 | 118 | " | 118 | 118 | 120 | " | 120 | 120 | 122 | " | 122 | 122 | 124 | " | 124 | 124 | 126 | " | 126 | 126 | 128 | " | 128 | 128 | 130 | " | 130 | 130 | 132 | " | 132 | 132 | 134 | " | 134 | 134 | 136 | " | 136 | 136 | 138 | " | 138 | 138 | 140 | " | 140 | 140 | 142 | " | 142 | 142 | 144 | " | 144 | 144 | 146 | " | 146 | 146 | 148 | " | 148 | 148 | 150 | " | 150 | 150 | 152 | " | 152 | 152 | 154 | " | 154 | 154 | 156 | " | 156 | 156 | 158 | " | 158 | 158 | 160 | " | 160 | 160 | 162 | " | 162 | 162 | 164 | " | 164 | 164 | 166 | " | 166 | 166 | 168 | " | 168 | 168 | 170 | " | 170 | 170 | 172 | " | 172 | 172 | 174 | " | 174 | 174 | 176 | " | 176 | 176 | 178 | " | 178 | 178 | 180 | " | 180 | 180 | 182 | " | 182 | 182 | 184 | " | 184 | 184 | 186 | " | 186 | 186 | 188 | " | 188 | 188 | 190 | " | 190 | 190 | 192 | " | 192 | 192 | 194 | " | 194 | 194 | 196 | " | 196 | 196 | 198 | " | 198 | 198 | 200 | " | 200 | 200 | 202 | " | 202 | 202 | 204 | " | 204 | 204 | 206 | " | 206 | 206 | 208 | " | 208 | 208 | 210 | " | 210 | 210 | 212 | " | 212 | 212 | 214 | " | 214 | 214 | 216 | " | 216 | 216 | 218 | " | 218 | 218 | 220 | " | 220 | 220 | 222 | " | 222 | 222 | 224 | " | 224 | 224 | 226 | " | 226 | 226 | 228 | " | 228 | 228 | 230 | " | 230 | 230 | 232 | " | 232 | 232 | 234 | " | 234 | 234 | 236 | " | 236 | 236 | 238 | " | 238 | 238 | 240 | " | 240 | 240 | 242 | " | 242 | 242 | 244 | " | 244 | 244 | 246 | " | 246 | 246 | 248 | " | 248 | 248 | 250 | " | 250 | 250 | 252 | " | 252 | 252 | 254 | " | 254 | 254 | 256 | " | 256 | 256 | 258 | " | 258 | 258 | 260 | " | 260 | 260 | 262 | " | 262 | 262 | 264 | " | 264 | 264 | 266 | " | 266 | 266 | 268 | " | 268 | 268 | 270 | " | 270 | 270 | 272 | " | 272 | 272 | 274 | " | 274 | 274 | 276 | " | 276 | 276 | 278 | " | 278 | 278 | 280 | " | 280 | 280 | 282 | " | 282 | 282 | 284 | " | 284 | 284 | 286 | " | 286 | 286 | 288 | " | 288 | 288 | 290 | " | 290 | 290 | 292 | " | 292 | 292 | 294 | " | 294 | 294 | 296 | " | 296 | 296 | 298 | " | 298 | 298 | 300 | " | 300 | 300 | 302 | " | 302 | 302 | 304 | " | 304 | 304 | 306 | " | 306 | 306 | 308 | " | 308 | 308 | 310 | " | 310 | 310 | 312 | " | 312 | 312 | 314 | " | 314 | 314 | 316 | " | 316 | 316 | 318 | " | 318 | 318 | 320 | " | 320 | 320 | 322 | " | 322 | 322 | 324 | " | 324 | 324 | 326 | " | 326 | 326 | 328 | " | 328 | 328 | 330 | " | 330 | 330 | 332 | " | 332 | 332 | 334 | " | 334 | 334 | 336 | " | 336 | 336 | 338 | " | 338 | 338 | 340 | " | 340 | 340 | 342 | " | 342 | 342 | 344 | " | 344 | 344 | 346 | " | 346 | 346 | 348 | " | 348 | 348 | 350 | " | 350 | 350 | 352 | " | 352 | 352 | 354 | " | 354 | 354 | 356 | " | 356 | 356 | 358 | " | 358 | 358 | 360 | " | 360 | 360 | 362 | " | 362 | 362 | 364 | " | 364 | 364 | 366 | " | 366 | 366 | 368 | " | 368 | 368 | 370 | " | 370 | 370 | 372 | " | 372 | 372 | 374 | " | 374 | 374 | 376 | " | 376 | 376 | 378 | " | 378 | 378 | 380 | " | 380 | 380 | 382 | " | 382 | 382 | 384 | " | 384 | 384 | 386 | " | 386 | 386 | 388 | " | 388 | 388 | 390 | " | 390 | 390 | 392 | " | 392 | 392 | 394 | " | 394 | 394 | 396 | " | 396 | 396 | 398 | " | 398 | 398 | 400 | " | 400 | 400 | 402 | " | 402 | 402 | 404 | " | 404 | 404 | 406 | " | 406 | 406 | 408 | " | 408 | 408 | 410 | " | 410 | 410 | 412 | " | 412 | 412 | 414 | " | 414 | 414 | 416 | " | 416 | 416 | 418 | " | 418 | 418 | 420 | " | 420 | 420 | 422 | " | 422 | 422 | 424 | " | 424 | 424 | 426 | " | 426 | 426 | 428 | " | 428 | 428 | 430 | " | 430 | 430 | 432 | " | 432 | 432 | 434 | " | 434 | 434 | 436 | " | 436 | 436 | 438 | " | 438 | 438 | 440 | " | 440 | 440 | 442 | " | 442 | 442 | 444 | " | 444 | 444 | 446 | " | 446 | 446 | 448 | " | 448 | 448 | 450 | " | 450 | 450 | 452 | " | 452 | 452 | 454 | " | 454 | 454 | 456 | " | 456 | 456 | 458 | " | 458 | 458 | 460 | " | 460 | 460 | 462 | " | 462 | 462 | 464 | " | 464 | 464 | 466 | " | 466 | 466 | 468 | " | 468 | 468 | 470 | " | 470 | 470 | 472 | " | 472 | 472 | 474 | " | 474 | 474 | 476 | " | 476 | 476 | 478 | " | 478 | 478 | 480 | " | 480 | 480 | 482 | " | 482 | 482 | 484 | " | 484 | 484 | 486 | " | 486 | 486 | 488 | " | 488 | 488 | 490 | " | 490 | 490 | 492 | " | 492 | 492 | 494 | " | 494 | 494 | 496 | " | 496 | 496 | 498 | " | 498 | 498 | 500 | " |
| Well
bore
(in) | Depth
(feet) | | Notes each type of material, producing zones, & cavities if any. Give description at not less than 20 foot intervals and at changes. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | From | To | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | 0 | 2 | 400-470 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | 2 | 4 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | 4 | 6 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | 6 | 8 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | 8 | 10 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | 10 | 12 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | 12 | 14 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | 14 | 16 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 16 | 16 | 18 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 18 | 18 | 20 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | 20 | 22 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 22 | 22 | 24 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 24 | 24 | 26 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 26 | 26 | 28 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 28 | 28 | 30 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | 30 | 32 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 32 | 32 | 34 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 34 | 34 | 36 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 36 | 36 | 38 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 38 | 38 | 40 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | 40 | 42 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 42 | 42 | 44 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 44 | 44 | 46 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 46 | 46 | 48 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 48 | 48 | 50 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 50 | 50 | 52 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 52 | 52 | 54 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 54 | 54 | 56 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 56 | 56 | 58 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 58 | 58 | 60 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 60 | 60 | 62 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 62 | 62 | 64 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 64 | 64 | 66 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66 | 66 | 68 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 68 | 68 | 70 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 70 | 70 | 72 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 72 | 72 | 74 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 74 | 74 | 76 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 76 | 76 | 78 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 78 | 78 | 80 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | 80 | 82 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 82 | 82 | 84 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 84 | 84 | 86 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 86 | 86 | 88 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88 | 88 | 90 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 90 | 90 | 92 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 92 | 92 | 94 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 94 | 94 | 96 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 96 | 96 | 98 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 98 | 98 | 100 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 100 | 102 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 102 | 102 | 104 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 104 | 104 | 106 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 106 | 106 | 108 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 108 | 108 | 110 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 110 | 110 | 112 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 112 | 112 | 114 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 114 | 114 | 116 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 116 | 116 | 118 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 118 | 118 | 120 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 120 | 120 | 122 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 122 | 122 | 124 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 124 | 124 | 126 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 126 | 126 | 128 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 128 | 128 | 130 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 130 | 130 | 132 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 132 | 132 | 134 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 134 | 134 | 136 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 136 | 136 | 138 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 138 | 138 | 140 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 140 | 140 | 142 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 142 | 142 | 144 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 144 | 144 | 146 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 146 | 146 | 148 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 148 | 148 | 150 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150 | 150 | 152 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 152 | 152 | 154 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 154 | 154 | 156 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 156 | 156 | 158 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 158 | 158 | 160 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 160 | 162 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 162 | 162 | 164 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 164 | 164 | 166 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 166 | 166 | 168 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 168 | 168 | 170 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 170 | 170 | 172 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 172 | 172 | 174 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 174 | 174 | 176 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 176 | 176 | 178 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 178 | 178 | 180 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 180 | 180 | 182 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 182 | 182 | 184 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 184 | 184 | 186 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 186 | 186 | 188 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 188 | 188 | 190 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 190 | 190 | 192 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 192 | 192 | 194 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 194 | 194 | 196 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 196 | 196 | 198 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 198 | 198 | 200 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 200 | 202 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 202 | 202 | 204 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 204 | 204 | 206 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 206 | 206 | 208 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 208 | 208 | 210 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 210 | 210 | 212 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 212 | 212 | 214 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 214 | 214 | 216 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 216 | 216 | 218 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 218 | 218 | 220 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220 | 220 | 222 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 222 | 222 | 224 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 224 | 224 | 226 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 226 | 226 | 228 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 228 | 228 | 230 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 230 | 230 | 232 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 232 | 232 | 234 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 234 | 234 | 236 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 236 | 236 | 238 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 238 | 238 | 240 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 240 | 240 | 242 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 242 | 242 | 244 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 244 | 244 | 246 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 246 | 246 | 248 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 248 | 248 | 250 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 250 | 252 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 252 | 252 | 254 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 254 | 254 | 256 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 256 | 256 | 258 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 258 | 258 | 260 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 260 | 260 | 262 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 262 | 262 | 264 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 264 | 264 | 266 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 266 | 266 | 268 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 268 | 268 | 270 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 270 | 270 | 272 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 272 | 272 | 274 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 274 | 274 | 276 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 276 | 276 | 278 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 278 | 278 | 280 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 280 | 280 | 282 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 282 | 282 | 284 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 284 | 284 | 286 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 286 | 286 | 288 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 288 | 288 | 290 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 290 | 290 | 292 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 292 | 292 | 294 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 294 | 294 | 296 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 296 | 296 | 298 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 298 | 298 | 300 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 300 | 300 | 302 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 302 | 302 | 304 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 304 | 304 | 306 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 306 | 306 | 308 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 308 | 308 | 310 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 310 | 310 | 312 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 312 | 312 | 314 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 314 | 314 | 316 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 316 | 316 | 318 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 318 | 318 | 320 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 320 | 320 | 322 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 322 | 322 | 324 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 324 | 324 | 326 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 326 | 326 | 328 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 328 | 328 | 330 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 330 | 330 | 332 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 332 | 332 | 334 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 334 | 334 | 336 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 336 | 336 | 338 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 338 | 338 | 340 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 340 | 340 | 342 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 342 | 342 | 344 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 344 | 344 | 346 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 346 | 346 | 348 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 348 | 348 | 350 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 350 | 350 | 352 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 352 | 352 | 354 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 354 | 354 | 356 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 356 | 356 | 358 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 358 | 358 | 360 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 360 | 360 | 362 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 362 | 362 | 364 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 364 | 364 | 366 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 366 | 366 | 368 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 368 | 368 | 370 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 370 | 370 | 372 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 372 | 372 | 374 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 374 | 374 | 376 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 376 | 376 | 378 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 378 | 378 | 380 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 380 | 380 | 382 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 382 | 382 | 384 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 384 | 384 | 386 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 386 | 386 | 388 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 388 | 388 | 390 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 390 | 390 | 392 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 392 | 392 | 394 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 394 | 394 | 396 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 396 | 396 | 398 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 398 | 398 | 400 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 400 | 402 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 402 | 402 | 404 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 404 | 404 | 406 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 406 | 406 | 408 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 408 | 408 | 410 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 410 | 410 | 412 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 412 | 412 | 414 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 414 | 414 | 416 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 416 | 416 | 418 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 418 | 418 | 420 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 420 | 420 | 422 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 422 | 422 | 424 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 424 | 424 | 426 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 426 | 426 | 428 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 428 | 428 | 430 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 430 | 430 | 432 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 432 | 432 | 434 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 434 | 434 | 436 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 436 | 436 | 438 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 438 | 438 | 440 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 440 | 440 | 442 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 442 | 442 | 444 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 444 | 444 | 446 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 446 | 446 | 448 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 448 | 448 | 450 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 450 | 450 | 452 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 452 | 452 | 454 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 454 | 454 | 456 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 456 | 456 | 458 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 458 | 458 | 460 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 460 | 460 | 462 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 462 | 462 | 464 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 464 | 464 | 466 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 466 | 466 | 468 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 468 | 468 | 470 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 470 | 470 | 472 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 472 | 472 | 474 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 474 | 474 | 476 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 476 | 476 | 478 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 478 | 478 | 480 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 480 | 480 | 482 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 482 | 482 | 484 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 484 | 484 | 486 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 486 | 486 | 488 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 488 | 488 | 490 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 490 | 490 | 492 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 492 | 492 | 494 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 494 | 494 | 496 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 496 | 496 | 498 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 498 | 498 | 500 | " | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3. PURPOSE OF WELL:
☐ Domestic ☐ Industrial ☐ Irrigation ☐ Stock ☐ Public Supply ☐ Other | | 15. CONTRACTOR'S CERTIFICATION:
This work was done under my jurisdiction and this report is true to the best of my knowledge and belief. The work commenced on <u>7/1/75</u> and was completed on <u>7/1/75</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4. TYPE OF WORK:
☐ New Well ☐ Deepening ☐ Plugging ☐ Reconditioning ☐ Other | | CONTRACTOR: <u>JOHN A. HARRIS</u> License Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5. QUALITY:
☐ Clear ☐ Colored ☐ Sulfur ☐ Salty ☐ Other | | Signature of Representative: <u>JOHN A. HARRIS</u> P.O. Box or Street: <u>1000 N. W. 10th St.</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| CHECK TEST MADE:
☐ None ☐ Bacteria ☐ Chemical ☐ Chloride _____ PPM ☐ Temperature _____
(Check ☐ if test was for sodium chloride) ☐ Test By: ☐ County Health Dept. ☐ State Health Dept. ☐ U.S.G.S. ☐ Other _____ Name: _____ Address: _____ | | City: <u>MIAMI</u> County: <u>DADE</u> State: <u>FL</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6. EQUIPMENT:
☐ Rotary ☐ Jet ☐ Cable Tool ☐ Reverse Rotary ☐ Other | | Driller: <u>JOHN A. HARRIS</u> Phone Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7. GROUT:
☐ None ☐ Cement ☐ Other
Describe and give number of bags (54)lb. From (ft) To (ft) | | Driller: <u>JOHN A. HARRIS</u> Phone Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8. CASING AND LINER PIPE:
Diameter (inches) Kind From (ft) To (ft)
<u>10</u> <u>105</u>
(Check One) ☐ Threaded & Coupled ☐ Welded Only ☐ T & C & Welded ☐ Other | | Driller: <u>JOHN A. HARRIS</u> Phone Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9. WATER LEVEL:
Water level after well completed _____ feet
☐ Above ☐ Below land surface
Well Flowing: ☐ Yes ☐ No Flow _____ gal/min | | Driller: <u>JOHN A. HARRIS</u> Phone Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10. SCREENS:
Make Materials Diameter (in) Slot Size From (ft) To (ft)
Location (ft) Below Surface | | Driller: <u>JOHN A. HARRIS</u> Phone Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11. UPPER END OF WELL:
☐ Pump Installed ☒ Valve ☐ Cap ☐ Other | | Driller: <u>JOHN A. HARRIS</u> Phone Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12. PUMPING TEST:
Date _____ ☐ Test Pump ☐ Permanent Pump
Measure point is _____
which is _____ feet ☐ above ☐ below land surface
Static water level _____ feet ☐ above ☐ below measure point
Maximum Drawdown _____ feet below measure point
Discharge at maximum drawdown _____ gal/min
After _____ hours | | Driller: <u>JOHN A. HARRIS</u> Phone Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13. PUMP INSTALLED:
Type _____ Make _____ Model No. _____
Motor Power _____ Make _____ H.P. _____
Capacity _____ Gal/min at _____ ft. of total dynamic head
No. of bowls or stages _____
Pump setting _____ feet | | Driller: <u>JOHN A. HARRIS</u> Phone Number: <u>1000</u> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

WATER RESOURCES DIVISION

11-7-66 W. J. C. 11-7-66 W. J. C.

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Recorded by Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 24 June 77

GENERAL SITE DATA (0)

Check One

☒ English☐ Metric Units

Site Ident No 302508081385901 RG Number R-0 Transaction T-0 D M V
 Site-Type 2- C D N I M P T (W) Data Reliability 3- C U L M Reporting Agency 4- FL039
 Project No. 5- District 6- 121 State 7- 12 County (or town) DUVAL 8- 031
 Latitude 9- 302.508 Longitude 10- 08.13859 Lat-Long Accuracy 11- S 0 T M
 Local Number 12- J-1397 Land Net Loc. 13- NWSENE S 13 T 1 S R 26 E
 Location Map 14- TRINITY RIVER Scale 15- 24000
 Altitude 16- 15 Method of Measurement 17- A L (M) Accuracy 18- 5
 Topo Setting 19- D C E (F) H K L O P S T U V W Hydrologic Unit (OWDC) 20- 03080103
 Date of First Construction/Completion 21- 00/00/1973 Use of Site 23- A D E G H (W) M P R S T U X Z
 Use of Water 24- A B C D E F H I M (N) P R S T U Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- 650 Depth of Well 28- 650 Source of Depth Data 29- 0
 Water Level 30- Date Measured 31- Source 33-
 Method of Measurement 34- A C E G H L M R S T V Z
 Site Status 37- D F G H (W) P R S T V X Z
 Source of Geohydrologic Data 36- 0 Pump Used 35- Measuring Point 266- Measuring Point Date 267-

OWNER IDENTIFICATION (1)

R-158 T-0 D M Date of Ownership 159- 00/00/1973
 Name: Last 161- CAPITOL First 162- CONCRETE Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-0 D M Ident 190- SJ Assigner 191- FLA WMD
 New Card Same R & T Ident 190- MAIN ST Assigner 191- FL039

SITE VISIT DATA (1)

R-186 T-0 D M Date of Visit 187- 06/23/1977 Name of Person 188- ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T- A D M Date 193- Geohydrologic Unit 195-
 New Card Same R thru 195 Temperature 196- 0.0.0.1.0 Degrees C 197-
 Conductance 196- 0.0.0.9.5 μ Mhos 197-
 Other (STORET) Parameter 196- Value 197-
 Other (STORET) Parameter 196- Value 197-

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other gov't, other agency
 logs, geologist, other reported

WELL CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No 59 # 001 *

Date of Construction Completion 60 = 00/00/1973 *

Source of Const. Data 64 = 0 *

Name of Contractor/Driller 63 = *

Method of Construction 65 = A B C D H J P R T V W Z *
air rotary, bored, cable, dug, hydraulic, jetted, air-per, reverse, trenching, driven, drive, other
rotary or augered, tool, rotary, cushion, rotary, wash, wash, groutFinish 66 = C F G H B P S T W X Z * Type of Seal 67 = B C G Z *
porous, gravel w., gravel, horizontal, open, perforated, screen, sand point, welded, open, other
concrete, peat, screen, gallery, end, or slotted, hole, hole, otherBottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *
air-lift, bailed, compressed, jetted, none, other, surged, other
pump, air, pumpSpecial Treatment During Development 71 = C D E F H M Z *
chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # 001 *

New Card for Each Hole Segment
Same R, T & Field 59

| Top of Hole Segment Below LSD | | Bottom of Hole Segment below LSD | | Diameter of Hole Segment | |
|-------------------------------|-------|----------------------------------|--------|--------------------------|-------|
| 72 # | 0.0 * | 74 # | 8.5 * | 75 # | 6.0 * |
| 73 # | 8.5 * | 74 # | 6.50 * | 75 # | 4.0 * |
| 73 # | 0.0 * | 74 # | 0.0 * | 75 # | 0.0 * |
| 73 # | 0.0 * | 74 # | 0.0 * | 75 # | 0.0 * |
| 73 # | 0.0 * | 74 # | 0.0 * | 75 # | 0.0 * |

CASING SCHEDULE (2)

R = 78 * T = A D M * Construction Entry No 59 # 001 * New Card for Each Casing With Same R, T & Field 59

| Top of Casing Segment Below LSD | | Bottom of Casing Segment Below LSD | | Diameter of Casing Segment | | Casing Material | | Thickness of Casing | |
|---------------------------------|--------|------------------------------------|--------|----------------------------|-------|-----------------|-------|---------------------|-------|
| 77 # | 1.92 * | 78 # | 8.5 * | 79 # | 6.0 * | 80 # | 6.0 * | 81 # | 0.0 * |
| 77 # | 8.5 * | 78 # | 5.68 * | 79 # | 4.0 * | 80 # | 6.0 * | 81 # | 0.0 * |
| 77 # | 0.0 * | 78 # | 0.0 * | 79 # | 0.0 * | 80 # | 0.0 * | 81 # | 0.0 * |
| 77 # | 0.0 * | 78 # | 0.0 * | 79 # | 0.0 * | 80 # | 0.0 * | 81 # | 0.0 * |
| 77 # | 0.0 * | 78 # | 0.0 * | 79 # | 0.0 * | 80 # | 0.0 * | 81 # | 0.0 * |

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # 001 * New Card for Each Open Section With Same R, T and Field 59

| Top of Section Below LSD | | Bottom of Section Below LSD | | Diameter of Open Section | | Width of Opening | | Length of Opening | |
|--------------------------|-------|-----------------------------|-------|--------------------------|-------|------------------|-------|-------------------|-------|
| 83 # | 0.0 * | 84 # | 0.0 * | 85 # | 0.0 * | 86 # | 0.0 * | 87 # | 0.0 * |
| 83 # | 0.0 * | 84 # | 0.0 * | 85 # | 0.0 * | 86 # | 0.0 * | 87 # | 0.0 * |
| 83 # | 0.0 * | 84 # | 0.0 * | 85 # | 0.0 * | 86 # | 0.0 * | 87 # | 0.0 * |
| 83 # | 0.0 * | 84 # | 0.0 * | 85 # | 0.0 * | 86 # | 0.0 * | 87 # | 0.0 * |
| 83 # | 0.0 * | 84 # | 0.0 * | 85 # | 0.0 * | 86 # | 0.0 * | 87 # | 0.0 * |

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency, reported

③ Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other
iron, iron, metal plastic, stone, steel

② Type of Openings Codes

F L M P R S T W X Z
fracture, leaved, mesh, perforated, wire screen, sand, welded, open, other
shuttered or slotted wound (unknown) point hole

④ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other
bronze, iron, iron, metal plastic, steel

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------|-------|-----------------|-------------|------------|---------------------|-------------|--------------|----------------|-----------|--------------|------------|-------------|-----------|----------------|-------|------|---|----------------|---|-------|---|---|-------------------|-------|--|---|---|---|---|---|
| R = | 134 | (146) = | T = | (A) | D | M | * | Entry No | 147# | 221 | * | Date | 148 = | | / | | / | | * | | | | | | | | | | | |
| | | flowing, pumped | | | add, delete, modify | | | | | | | | | month | day | year | | | | | | | | | | | | | | |
| Discharge: | 150 = | | 1.00 | . | | | * | Source of Data | ① | 151 = | 0 | * | | | | | | | | | | | | | | | | | | |
| Method of Measurement | 152 = | B | C | E | F | M | O | P | (R) | T | U | V | W | Z | * | | | | | | | | | | | | | | | |
| | | boiler, | current, | estimated, | flume, | totaing, | orifice, | pilot-tube, | reported, | trajectory, | venturi, | volumetric, | wow, | other | | | | | | | | | | | | | | | | |
| | | meter | | | | meter | | meter | | | | | | | | | | | | | | | | | | | | | | |
| Production Level | 153 = | | . | . | . | . | . | . | * | Static Level | 154 = | | . | . | . | . | * | Source of Date | ① | 155 = | | * | Specific Capacity | 272 = | | . | . | . | . | * |
| Method of Measurement | 156 = | A | C | E | G | H | L | M | R | S | T | V | Z | * | | | | | | | | | | | | | | | | |
| | | urine, | calibrated, | estimated, | pressure, | calibrated, | geophysical, | manometer, | reported, | steel, | electrode, | calibrated, | other | | | | | | | | | | | | | | | | | |
| | | urine | | | gauge | pressure | gauge | logs | | logs | logs | logs | electrode | logs | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | Pumping Period | 157 = | | . | . | . | . | * | | | | | | | | | |

| | | | | | |
|---------------------|-----------------------------------|---------------|----------------------------|----------|-------|
| R-42 * | T- A D M *
add, delete, modify | Type of Lift | 43 # A B C J P R S T U Z * | Entry No | 254 # |
| Pump Intake Setting | 44 = | Type of Power | 45 = D E G H L N W Z * | J 1397 | |
| Date | 38 = / /
month day year | Horsepower | 46 = | | |

| | | | | |
|--|---|--|--------------------------------|--------------------------------------|
| R = 47 * | T = A D M *
<small>add, delete, modify</small> | Type of Lift
43# * | Lift Entry No
254 # * | Manufacturer of Pump
48 = _____ * |
| Serial No of Pump
49 = _____ * | Name of Power Company
50 = _____ * | Power Company Account No
51 = _____ * | Power Meter No
52 = _____ * | Pump Rating
53 = _____ * |
| Person or Company Who Maintains the Pump
54 = _____ * | Additional Lift
255 = _____ * | Rated Pump Capacity
268 = _____ * | | |

R=55 * T= A D M * Type of Lift 43# * Type of Power 56# * Horsepower 57# * Lift Entry No 254# *

| | |
|-----|-------|
| R = | 198 * |
|-----|-------|

| | |
|-----|---------|
| T = | A D M * |
|-----|---------|

add, delete, modify

New Card for Each Log Type Same R & T

Type of Log②

| | |
|-------|---|
| 199 # | * |
| 199 # | * |
| 199 # | * |
| 199 # | * |

Begin Depth

| | | |
|-------|---|---|
| 200 = | . | * |
| 200 = | . | * |
| 200 = | . | * |
| 200 = | . | * |

End Depth

| | | |
|-------|---|---|
| 201 = | . | * |
| 201 = | . | * |
| 201 = | . | * |
| 201 = | . | * |

Source of Data①

| | |
|-------|---|
| 202 = | * |
| 202 = | * |
| 202 = | * |
| 202 = | * |

R=114 * T= A O M * Begin Year 115# End Year 116= Source Agency 117=

Frequency of Collection 118= add, delete, modify Network Site 257= Type of Analyses 120=

| | | | | |
|---------------------------|------------------------------------|--------------------|----------------|---------------------|
| R = 121 = | T = A D M =
add, delete, modify | Begin Year 122# | End Year 123 = | Source Agency 124 = |
| Frequency of Collection 3 | 125 = | Network Site 258 = | | |

| | | | | |
|---------------------------|---------------------------|--------------------|--|---|
| R = 127 * | T = A D M * | Begin Year 128 # | End Year 129 = | Source Agency 130 = |
| Frequency of Collection 3 | add, delete, modify 131 = | Network Site 259 = | Method of Collection 133 = C E M U Z * | |
| | | | | calculated, estimated, measured, unknown, other |

| | | | | | | | |
|---------------------|---------------------|--------------|-------|-----|---------------------------|--------|---|
| R = 180 * | T = A D M * | Type of Data | 181 # | Loc | 182 = C D Z * | Format | 261 = F M P Z * |
| | add, delete, modify | | | | operator, district, other | | files, machine, published, other readable |
| New Card Same R & T | | Type of Data | 181 # | Loc | 182 = C D Z * | Format | 261 = F M P Z * |

| S | D | G | A | R | L | G | Z |
|--|---|---|---|-------|------------------------|---|----------|
| reporting, driller, owner, other gov't. agency | | | | other | logs, geologist, other | | reported |

| A | B | C | D | F | I | M | S | Q | S | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|
| annual, bi-monthly, continuous, daily, semi- , intermittent, monthly, one time, quarter, semi-, weekly, other
monthly only annual annual | | | | | | | | | | | |

| | | | | | | | | | | | | | | | | |
|---------------|---------|------------|-----------|--------|------------|-----------|------------|--------|------------|-----------|-----------|----------|----------|--------|---------|---------|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| time, cellar, | carper, | driller's, | electric, | fluid, | geologist, | magnetic, | induction, | gamma, | diagnoser, | laserlog, | microlag, | neutron, | μ later, | photo, | radior, | PSITEP, |

| A | B | C | D | E | F | G | H | J | K | L | M | Z |
|------------------|---------------------|--------------------|-------------|------------|------------|---------------|---------------|---------------|---------------|-----------------|-----------------|-------|
| physical,
2/5 | common,
chemical | trace,
elements | pesticides, | nutrients, | secondary, | codes,
S&D | codes,
S&E | codes,
S&F | codes,
D&E | codes,
C,D&E | all or,
most | other |

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = Q D M *

add, delete, modify

Entry No 256 # 001 *

Depth to Top 91 =

Depth to Bottom 92 =

Unit Identifier

93 = 130 FLAD *

Lithology

96 = LMSM *

Lithologic Modifier

97 = MARLE *

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic

Unit Entry No 256 #

Date

95 = / / *

month day year

Water Level

126 = *

% Water

Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 *

T = A D M *

add, delete, modify

Entry No 256 #

Depth to Top 91 =

Depth to Bottom 92 =

Unit Identifier

93 = *

Lithology

96 = *

Lithologic Modifier

97 = *

AQUIFER DATA (2)

R = 94 *

T = A D M *

add, delete, modify

Geohydrologic

Unit Entry No 256 #

Date

95 = / / *

month day year

Water Level

126 = *

% Water

Contributed 132 = *

PERTINENT REMARKS

R = 83 *

T = A *

add

185 = *

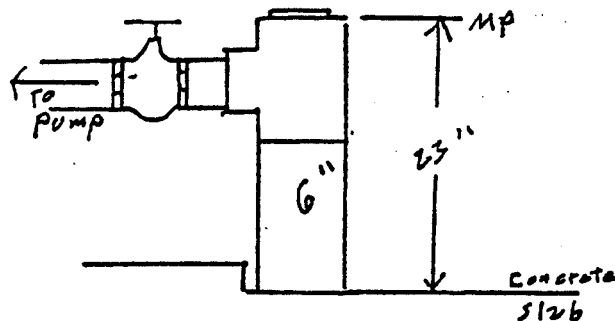
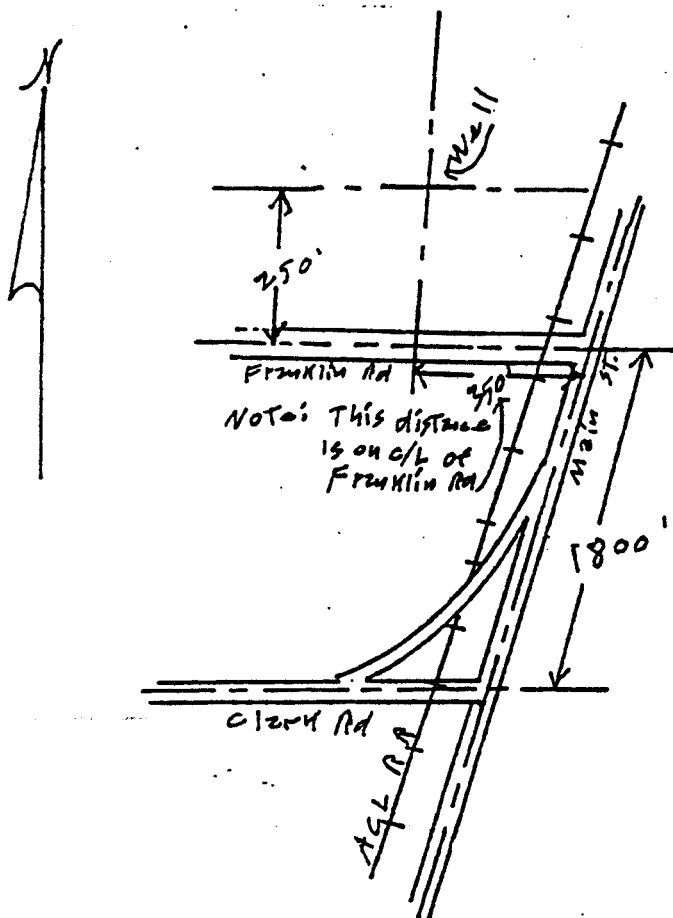
New Card Same R&T

185 = *

185 = *

NOTES:

J 1397



Recorded by EssexU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATADate 24 June 77Check One ☒ English ☐ Metric UnitsSite Ident No 302508081385901

COOPERATOR DATA (1)

R = 212 * T = 2 D M *
add, delete, modifyCooperator Site identifier 213 = J-13.97 *

Registration No. 214 = _____ *

Inspection Status 215 = _____ * Reason Unapproved 216 = _____ * Inspection Date 217 = _____ *
month day yearRemarks 218 = 1.0010 m MAIN ST *

DATA ON MINOR SITE REPAIRS (1)

R = 164 * T = A D M *
add, delete, modifyNew Card for each Repair
Same R&T

(Minor Repair)

Entry No. 155 # _____ *
Nature of Repair 156 = _____ *
Date Completed 157 = _____ *
Contractor 159 = _____ *
% Performance Chg. 170 = _____ *

(Minor Repair)

Entry No. 165 # _____ *
Nature of Repair 166 = _____ *
Date Completed 167 = _____ *
Contractor 169 = _____ *
% Performance Chg. 170 = _____ *

(Minor Repair)

Entry No. 165 # _____ *
Nature of Repair 166 = _____ *
Date Completed 167 = _____ *
Contractor 169 = _____ *
% Performance Chg. 170 = _____ *

(Minor Repair)

Entry No. 165 # _____ *
Nature of Repair 166 = _____ *
Date Completed 167 = _____ *
Contractor 169 = _____ *
% Performance Chg. 170 = _____ *

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 * T = A D M *
add, delete, modify

No. Wells in Group 204 = _____ *

Deepest Depth 205 = _____ *

Shallowest Depth 206 = _____ *

Construction Method 207 = D J V W Z *
drilled, jetted, driven, drive, other wash

Size of Well Field 262 = _____ *

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208 * T = A D M *
add, delete, modify

Longest Dimension 209 = _____ *

Other (Width) Dimension 210 = _____ *

Depth 211 = _____ *

Orientation 253 = _____ *

Dip 264 = _____ *

DATA FOR COLLECTOR WELLS (1)

R = 213 * T = A D M *
add, delete, modifyNew Card for each Lateral
Same R&T

Entry No.

Depth to the Lateral

Length of Lateral

Diameter of Lateral

Screen Mesh

220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *
220 # _____ *221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *
221 = _____ *222 = _____ *
222 = _____ *
222 = _____ *
222 = _____ *
222 = _____ *
222 = _____ *
222 = _____ *
222 = _____ *
222 = _____ *
222 = _____ *223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *
223 = _____ *224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *
224 = _____ *

FOOTNOTES:

Nature of repair

B C D L P S Z
blocked, cleaned, deepened, liner, sorted or, plugged, screen, other
off, or, perforated, back, replaced

U.S. DEPT. OF THE INTERIOR

SITE SCHEDULE

SITE DATA (1)

Site Ident No 302447081334501 RG Number R=0 Transaction T= A D M V
 add, delete, modify, verified
 Site-Type 2= C D H I M P T Data Reliability 3= U L M Reporting Agency 4= FLO39
 collector, drain, sinkhole, connector, multiple, pond, tunnel or, well
 field checked, unchecked, location not, minimal
 Project No 5= District 6= 121 State 7= 12 County (or town) Duval 8= 031
 accurate data
 Latitude 9= 30 24 47 Longitude 10= 08 12 34 Lat Long 11= S T M
 deg min sec deg min sec A curve sec. 5 sec 10 sec Min
 Local Number 12= J-33.18 Land Loc 13= 14 15 27E
EASTPORT 24000
10. C Accuracy 5
0 03080103
 depression stream, dikes, flat hilltop, sink, swamp, offshore pond, terrace, undulating, water, wind channel
 Hydrologic Unit, GWDQ
 Date 21 01 13 1983 03080103
 month day year
 shade, drain, dry, static, heat, observe, mine, oil or, recharge, repress, test, unused, with waste, desert, (thermal), activity, gas, drawal
 Water 24= A B C D E F 25= Tertiary Use of Water 26= Depth of Hole 27= 640 Depth of Well 28= 640 Source of Depth Data 29= D
 air cond, bottling, commercial, de-water, power, fire, domestic, irrigation, food, other, industrial, public, recreation, stock, institution, unused, data, other supply
 Water Level 30= Date Measured 31= Source 33=
 month day year
 Method of Measurement 34= A C E G H L M R S T V Z
 online, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other
 online, gage, pressure gage, logs, tape, tape, electric, tape
 Site Status 37= D F G H P R S T V X Z
 dry, flowing, nearly, nearly, obstruction, pumping, recently, nearly, nearly, foreign, surface water, other
 flowing, recently, pumped, pumping, recently, substance, effects
 flowing, pumped
 Source of Geohydrologic Data 36= Pump Used 35= Measuring Point 266= Measuring Point Date 267=
 no month day year

OWNER IDENTIFICATION (1)

R=158 T= A D M Date of Ownership 159= 01 13 1983
 add, delete, modify month day year
 Name: Last 161= BRITILL First 162= JANICE Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 T= A D M Ident 190= ST Assigner 191= FLAMMD
 add, delete, modify
 New Card Same R & T Ident 190= HELKSHER Assigner 191= FLO39

SITE VISIT DATA

R=186 T= A D M Date of Visit 187= 01 13 1983 Name of Person 188= GLENN
 add, delete, modify month day year

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 T= A D M Date 193= Geohydro-logic Unit 195=
 add, delete, modify month day year
 New Card Same R thru 195
 Temperature 196= 00010 Degrees C 197=
 Conductance 196= 00095 uMhos 197=
 Other (STORET) Parameter 198= Value 197=
 Other (STORET) Parameter 198= Value 197=

FOOT NOTES.

① Source of Data Codes:

S D G A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other agency reported

四〇五

Entry No 59-# 001 *

Date of Construction Completion 60 - 01 / 17 / 1983 *

Source of Data: 64-10000

Contracting Driller **03 DE SMITH**

| Method of Construction | B5 | A | B | C | D |  | F | G | H | I | V | W | Z | |
|------------------------|----|--------|---------------|-------|-----|---|-------|---------|-----------|-----------|--------|------|-------|--|
| | | air | forced | cable | dug | hydraulic | piled | air jet | explosive | longshore | divers | draw | other | |
| | | relays | or compressed | tool | | relays | | relays | | | | wash | | |

| Finish | C | F | G | H | B | P | S | T | A | C | Other | Remarks | B | C | G | Z | Other |
|--------|----------------|-------------|-------------|-----------------|-----------|-----------------|--------|------------|------|---------|-------|---------|--------|------|----------|-------|-------|
| 66 | rough concrete | gravel, w/c | gravel, w/c | horizontal, w/c | open, w/c | perforated, w/c | screen | land point | wall | up, w/c | other | | bricks | clay | concrete | other | |

| | | | | | | | | | | | | | |
|----------------|------|-----------------------|------|-----------|-------|------------|--------|------|-------|--------|-------|--------------------------------|------|
| Bottom of Seal | 68 = | Method of Development | 69 = | A | B | C | J | N | P | S | Z | Number of Hours in Development | 70 = |
| | | | | air-dried | baked | compressed | jetted | none | other | surged | other | | |
| | | | | gum | | oil | | | gum | | | | |

| Special Treatment
During Development | 71 | C | D | E | F | H | M | Z | * |
|---|----|--|---|---|---|---|---|---|---|
| | | chemicals, dry ice, explosives, defoliant, hydrofracturing, mechanical other | | | | | | | |

J 3318

R-72: *

Construction Entry No.

| | | | |
|----|---|------|---|
| 59 | # | 0.01 | * |
|----|---|------|---|

Bottom of Hole Segment below LSD

Time 10. T.H. Field 5.9

| | | |
|------|-----|---|
| 73 # | 0. | * |
| 73 # | 54. | * |
| 73 # | . | * |
| 73 # | . | * |
| 73 # | . | * |

74 84.
74 640.
74 .
74 .
74 .
74 .

| | | | |
|----|---|---|---|
| 76 | 3 | . | * |
| 77 | 2 | . | * |
| 78 | . | . | * |
| 79 | . | . | * |
| 80 | . | . | * |

月 = 76 年

Construction Entry No. **59 # 90.1 ***

New Card for Each Column With Same H, T & F Rating

| Top of Casing Segment Below LSD | | |
|---------------------------------|---------------|---|
| 77# | 0. | * |
| 77# | 3. | * |
| 77# | 84. | * |
| 77# | . | * |
| 77# | . | * |

Bottom of Casing Segment Below LSD

| | | |
|------|------|---|
| 78 - | 84. | * |
| 72 | 52. | * |
| 78 - | 546. | * |
| 78 - | . | * |
| 78 - | . | * |

Diameter of Casino Segment

| | | |
|------|----|---|
| 79 = | 3. | * |
| 79 = | 2. | * |
| 79 = | 2. | * |
| 79 = | . | * |
| 79 = | . | * |

| Casing Material | |
|----------------------------|--|
| 80 * <i>E</i> * | |
| 80 * <i>E</i> * | |
| 80 * <i>G</i> * | |
| 80 * * | |
| 80 * * | |

Thickness of Casings

8 - 82 *

Construction Entry No 59 #

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

 (Openings Data)

New Card for Each Open Section With Same R, T and Field 5 9

| | | | |
|-----------------------------|------|---|---|
| Top of Section Below LSD | 83 # | | * |
| Bottom of Section Below LSD | 84 = | | * |
| Type of Openings ① | 85 = | * | |
| Type of Material 7 | 86 = | * | |
| Diameter of Open Section | 87 = | | * |
| Width of Opening | 88 = | | * |
| Length of Opening | 89 = | | * |

(Openings Data)

| | | |
|------|---|---|
| 83 # | | * |
| 84 = | | * |
| 85 = | * | |
| 86 = | * | |
| 87 = | | * |
| 88 = | | * |
| 89 = | | * |

| (Openings Data) | | | | | |
|-----------------|---|---|---|---|--|
| 83 # | | | . | * | |
| 84 - | | | . | | |
| 85 = | * | | | | |
| 86 - | * | | | | |
| 87 - | | | . | * | |
| 88 - | | . | | * | |
| 89 - | | . | | * | |

① Source of Data Codes:

| S | D | O | A | R | L | G | Z |
|--------------------------|---|---|-------------|----------|---|------------------------|---|
| reporting, driller owner | | | other govt. | other | | logs, geologist, other | |
| agency | | | | reported | | | |

5) Casing Material Codes

| B | C | G | I | M | P | R | S | T | U | W | Z |
|------------------|-------|---------|-------|---------|---------|--------|-------|---------|-------|-------|---|
| brick, concrete, | galv. | wrought | other | PVC or | rock or | steel, | tile, | coated, | wood, | other | |
| | iron | iron | metal | plastic | stone | | | steel | | | |

6 Type of Openings Codes

| | F | L | M | P | R | S | T | W | X | Z |
|----------|-----------|-----|------------|-----------------|--------|------|--------|------|-------|---|
| fracture | lowered | man | perforated | wire | screen | sand | walled | open | other | |
| | shuttered | | or drilled | wound (unknown) | point | | | hole | | |

7 Type of Material Codes for Open Sections

| B | C | G | I | M | P | R | S | T | Z |
|--------------------|----------|--------------|-----------------|----------------|-------------------|--------------------|-------------|-------|---|
| brass or
bronze | concrete | galv
iron | wrought
iron | other
metal | PVC or
plastic | stainless
steel | steel, tile | other | |

PRODUCTION DATA (1)

R=134 348 * T= A D M * Entry No 147 # 201 * Date 148 = 01 / 17 / 1983 *
flowing, pumped add, delete, modify

Discharge 150 = 50.0 * Source of Data 1 151 = D
hailer, constant, estimated, flow, totaling, orifice, piston tube, reported, trajectory, venturi, volumetric, weir, other

Method of Measurement 152 = F F M O P R T U V W Z *
hailer, constant, estimated, flow, totaling, orifice, piston tube, reported, trajectory, venturi, volumetric, weir, other

Production Level 153 = * Static Level 154 = * Source of Data 155 = * Specific Capacity 270
of Date

Method of Measurement 156 = A C E G H L M R S T V Z *
calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other, well, other

Pumping Period 157 = *

LIFT DATA (1)

R=42 * T= A D M * Type of Lift 43 # A B C J P R S T U Z * Entry No 254 = *
add, delete, modify
air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other

Pump Intake Setting 44 = * Type of Power 45 = D E G H L N W Z *
diesel, electric, gasoline, hand, LP gas, natural, windmill, other, gas

Date 38 = * Horsepower 46 = *

J 33/8

MAJOR PUMP DATA (2)

R=47 * T= A D M * Type of Lift 43 # * Lift Entry No 254 = * Manufacturer of Pump 48 = *
add, delete, modify

Serial No of Pump 49 = * Name of Power Company 50 = *

Power Company Account No 51 = * Power Meter No 52 = * Pump Rating 53 = *

Person or Company Who Maintains the Pump 54 = * Additional Lift 255 = * Rated Pump Capacity 268 = *

STANDBY POWER DATA (2)

(See LIFT DATA for codes of fields 43 and 56 below)

R=55 * T= A D M * Type of Lift 43 # * Type of Power 56 = * Horsepower 57 = * Lift Entry No 254 = *

AVAILABLE LOG DATA (1)

R=198 * T= A D M * New Card for Each Log Type Same R & T

| Type of Log | Begin Depth | End Depth | Source of Data |
|-------------|-------------|-----------|----------------|
| 199 # | 200 = | 201 = | 202 = |
| 199 # | 200 = | 201 = | 202 = |
| 199 # | 200 = | 201 = | 202 = |
| 199 # | 200 = | 201 = | 202 = |

WATER QUALITY DATA COLLECTION (1)

R=114 * T= A D M * Begin Year 115 # * End Year 116 = * Source Agency 117 = *
add, delete, modify

Frequency of Collection 3 118 = * Network Site 257 = * Type of Analysis 120 = *

WATER LEVEL DATA COLLECTION (1)

R=121 * T= A D M * Begin Year 122 # * End Year 123 = * Source Agency 124 = *
add, delete, modify

Frequency of Collection 3 125 = * Network Site 258 = *

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R=127 * T= A D M * Begin Year 128 # * End Year 129 = * Source Agency 130 = *
add, delete, modify

Frequency of Collection 3 131 = * Network Site 259 = * Method of Collection 133 = C E M U Z *
calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)

R=180 * T= A D M * Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *
add, delete, modify
cooperator, district, other
file, machine, published, other, readable

New Card Same R & T Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *

FOOT NOTES:

① Source of Data Codes:

S D 3 A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency, reported

③ Frequency of Collection Codes

A B C D F I M # Q S W Z
annual, bi-monthly, continuous, daily, semi, intermittent, monthly, one time, quarter, semi, weekly, other, monthly, only annual annual

② Type of Log Codes

A B C D E F G H I J K L M N # P Q
time, collar, caliper, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, laterolog, moving, neutron, μ later, photo, radio, conduct, ray, active

S T U V Z
sonic, temp, gamma, fluid, other, gamma velocity

④ Type of Quality Analyses Codes

A B C D E F G H J K L M Z
physical, common, trace, pesticides, nutrients, sanitary, codes, codes, codes, codes, codes, all or, other

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * Entry No 256 # 001 * Depth to Top 91 * Depth to Bottom 92 *

93 * 120 FL R D *

Lithology 96 * LHSN * Lithologic Modifier 97 * MARINE

AQUIFER DATA (2)

R-94 * T- A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *
month day year

Water Level 126 * *

Water Contributed 132 * *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M *

add, delete, modify

Entry No 256 # * Depth to Top 91 * *

Depth to Bottom 92 * *

Unit Identifier 93 * *

Lithology 96 * *

Lithologic Modifier 97 *

AQUIFER DATA (2)

R-94 * T- A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *
month day year

Water Level 126 * *

Water Contributed *

PERTINENT REMARKS

R-183 * T- A *

add

185 *

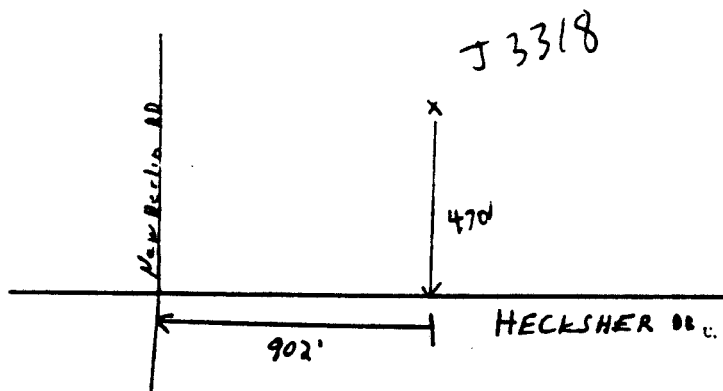
New Card Same R&T

185 *

185 *

NOTES

R-212 * T- A * 256 # 42.6.1 HECKSHER DRTME *



U. S. GOVERNMENT PRINTING OFFICE : 1976 O - 213-137

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
WELL COMPLETION REPORT

OWNER: BRENNER, JAMES
Last Name First Name Initial
7261 HECKSLEY DR
Number Street
904 751 0616 32246
City State
Area Code Phone Number Zip Code

WELL LOCATION: None
% % % of Section
11 3 (N-S) 20 E (E-W)
Township Range
Latitude 29 00 00 N
Longitude 81 00 00 W
Locate in Section
7261 HECKSLEY DR
Number Street/Road
Lot No. Subdivision
City County

OWNER WELL NUMBER OR NAME:

DRILL METHOD: ☒ Rotary ☐ Cable Tool ☐ Jet ☐ Auger
☐ Other:

SURFACE CASING, CASING, AND LINER MATERIAL:

| Steel Dia. (in.) | Steel Wt. (lb./ft.) | Steel Dia. (in.) | From (Ft.) | To (Ft.) | Schedule No. | Joints* |
|------------------|---------------------|------------------|------------|----------|--------------|---------|
| 3" | | | 0 | 84 | | 76 |
| 3" | | | 84 | 100 | | 76 |

* Describe Material:
TC = Threaded and Coupled, TCW = Threaded, Coupled, and Welded,
W = Welded, B = Bonded (PVC), O = Other:

GROUT: ☐ None ☒ Neat Cement ☐ Other:

Type and Percent of Additives and Grout Volume or Number of 94 lb. Sacks
29 Bags From (Ft.) To (Ft.)

FINISH: ☒ Open Hole ☐ Perforated or Slotted Casing ☐ Gravel Pack
☐ Sandpoint or Screen Attached to Well Casing ☐ Sandpoint or Screen
Telescoped with Packer Inside Casing (Packer Material:)

| Sandpoint/Screen Material | Dia. (in.) | Slot Size (in.) | From (Ft.) | To (Ft.) |
|---------------------------|------------|-----------------|------------|----------|
| | | | | |

☐ Other Finish:

QUALITY TEST: ☐ None ☐ Bacteria Date ☐ Chemical Date

By: ☐ Health Dept. ☐ USGS ☐ Other:

☐ Clear ☐ Colored ☐ Sulphur ☐ Salty ☐ Iron ☐ Other:

Conductance (Micromhos) Chloride ppm

Hardness pH Temp °F

ppm as calcium carbonate

Well Disinfected: ☐ No ☐ Yes (Date)

WELL TEST, by: ☒ Natural Flow 350 G.P.M. ☐ Airlift

☐ Boiler ☐ Permanent Pump ☐ Test Pump ☐ None

Discharge Measured By: ☐ Bailer ☐ Estimated ☐ Current Meter

☐ Orifice ☐ Trajectory ☐ Venturi ☐ Volumetric ☐ Other:

Measured Static Water Level + - Ft.

Measured Pumping Water Level + - Ft.

After Hours At G.P.M.

Specific Capacity G.P.M./Ft. of Drawdown

Measuring Pt. (Describe):

Which is Ft. ☐ Above ☐ Below Land Surface

Elevation of Measuring Pt. = Ft. ☐ Above ☐ Below MSL

WELL EQUIPMENT: ☐ Open ☒ Capped ☐ Valved

☐ Permanent Pump ☐ Temporary Pump

Type Pump: ☐ Centrifugal ☐ Cylinder ☐ Jet ☐ Submersible

☐ Turbine ☐ Other:

Power: ☐ Diesel ☐ Electric ☐ Gasoline ☐ Other:

Horsepower Capacity G.P.M.

Intake/Injection Depth Ft.

TYPE OF WORK:
☒ New Construction ☐ Repair
☐ Deepening ☐ Plugging
☐ Other:

PERMIT NUMBER:

82-247

J-3218

WELL NUMBER:

TYPE OF WELL: ☒ Water Well ☐ Test Well ☐ Recharge ☐ Drainage
☐ Waste Disposal ☐ Observation ☐ Other:

USE: ☒ Domestic ☐ Irrigation ☐ Industrial ☐ Livestock: ☐ Public Supply
☐ Other:

SKETCH LOCATION OF WELL in relation to local landmarks, giving distance and direction from nearest town, road, or other reference point.

North

GEOPHYSICAL LOGS: Type: By:

WELL LOG

| Bore Hole (in.) | Casing Size (in.) | Depth (Ft.) | | Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities, indicate producing zones. Attach additional sheets if necessary. |
|-----------------|-------------------|-------------|-----|--|
| | | From | To | |
| | | 0 | 20 | Sand |
| | | 20 | 35 | Sand w/ mud |
| | | 35 | 50 | Sand w/ gas gravel |
| | | 50 | 70 | Rock |
| | | 70 | 84 | Rock w/ w mud |
| | | 84 | 100 | Rocky w mud |
| | | 100 | 140 | Rock w/ B mud, sand |
| | | 140 | 180 | Blue mud w/ sand |
| | | 180 | 220 | " " " " |
| | | 220 | 300 | B/ mud l sand |
| | | 300 | 365 | O/ mud w/ sand & rock |
| | | 365 | 370 | Rock |
| | | 370 | 380 | B/ mud |
| | | 380 | 468 | B/ mud w/ Rocked sand |
| | | 468 | 480 | White & B mud w/ sand |
| | | 480 | 490 | White mud |
| | | 490 | 500 | Rock |
| | | 500 | 520 | Rock w/ white & B mud |
| | | 520 | 530 | Rock w/ white mud |
| | | 530 | 535 | Rock |
| | | 535 | 540 | Gravel |
| | | 540 | 640 | Gravel rock |

Total Depth 640 Ft. Producing Zone Material: ☐ Sand ☐ Shell

☐ Broken Shell ☐ Limestone ☐ Other:

Top of Producing Zone Ft. Bottom of Producing Zone Ft.

☐ Drill Cuttings sent to Bureau of Geology

George O. Smith Pres.

License No. Water Well Contractor's Signature Position

 Driller Signature

5216

302747N08134011

U. S. DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Director, Resources Division Well Schedule Form

7-26-40 POWER @ W/NER MASTER CARD
10-10-40 Trinfield (Owner) 11-17-66
of Trinfield 11-17-66
1-20-66
Eastport, Fla.
For 2 years 8 and

| | | | | | |
|-------|---------|-----|-------------------------------|-------|-----|
| State | Florida | Q.9 | (Serial)
Flow
(or 1000) | Dural | 1.6 |
|-------|---------|-----|-------------------------------|-------|-----|

Longitude: 302742ND Longitude: 081340E
 Latitude: 302742ND Latitude: 081340E

2. 1 0. 27 ① in 35 SE 1 SW 1 NE 1 T412.

Serial Number: D-152
Sheet Number: 227-134-1

Level no: 01 W 27 E 35

Don't get ahead
without a
"S. H. E. F. I. F. L. D."

Address: Talkeville, Fla.

(C) (T) (M) (S) (A) (N)
 Ownership: County, Fed Gov't, City, Corp of Co. Private State Agency, Water Dist.

(A) File of
 (B) Donating, Fire, Acc. (U) (1) (2) (3) (4)
 (C) used (U) (1) (2) (3) (4)
 (D) Donating, Fire, Acc. (U) (1) (2) (3) (4)
 (E) Donating, Fire, Acc. (U) (1) (2) (3) (4)
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 (Z) Donating, Fire, Acc. (U) (1) (2) (3) (4)

[illegible]

DATA AVAILABLE -

Mail Acc. ☒ 8

Spec. M/I acc. ☒ 5

Spec! Avail. ☒ 5

DATA AVAILABLE -

[illegible]

bed, water date, type

700
 Pumpage inventory: 700
 period:

Destination cards:

100-4118: _____

WILL-DESCRIPTION CARD

9000 AM ON MASTER CARD
 642
 6:43
 1000
 1000

| | | | |
|------------|--|--------|---|
| Print word | | Easton | 3 |
| Print word | | Easton | 3 |

(c) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100)

| NAME | DATE | TIME | LOCATION | REMARKS |
|------|------|------|----------|---------|
| ... | ... | ... | ... | ... |

[illegible]

11 11 11
 9 13 16
 11 11 11
 Pump Intake settings:

Prisoner: Urbah Freeman Unknown

(17) air, bucket, cat, job, (cont.)
 (18) multiple, (cont.)
 (19) piston, ref., release, verb, other
 (20) shallow

1122: steel, elec. gun, 600. gamellon, hand, gun, vial, R.L.

Mass.: 2 Top of 3-inch class 1.2 11 22.04 ft

| FILE NO. | DATE | DESCRIPTION | INITIALS | REMARKS |
|-------------------|-----------|-----------------|-----------|-----------|
| 100-100000-100000 | 10/1/1964 | Instrument Loan | 10/1/1964 | 10/1/1964 |

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WELL DESCRIPTIONS AND WATER LEVEL MEASUREMENTS

DUVAL COUNTY

WELL NUMBER.--302747081340101. Local Number Duval-152, L. S. Sheffield.

LOCATION.--Lat 30°27'47", long 81°34'01", in SE¼, NW¼, NE¼ sec.35, T.1 N., R.27 E., Hydrologic Unit 03080103, .3 mi (.5 km) east of Cedar Point Road on New Berlin Road and 3.8 mi (6.1 km) east of Oceanway, Florida.

DESCRIPTION.--Drilled, commercial, artesian well in Floridan aquifer (Geologic Unit 120FLRD), diam 3 in (8 cm), depth 642 ft (196 m).
PERIOD OF RECORD.--July 1940, February 1951 to current year (semiannually).

INSTRUMENTATION.--Pressure gage. Measuring point; top of 3 in (8 cm) cross, 1.2 ft (.4 m) above isd. Land surface datum is 20.84 ft (6.352 m) above mean sea level.

EXTREMES.--Current year: Highest water level, 38.44 ft (11.717 m) above msl January 23; lowest, 36.44 ft (11.107 m) above msl May 9. 1975.
Period of record: Highest water level, 55.24 ft (16.837 m) above msl July 26, 1940; lowest, 36.44 ft (11.107 m) above msl May 9, 1975.

ELEVATION, IN FEET, ABOVE MSL, JANUARY 1974 TO SEPTEMBER 1975

| | | | |
|-----------------------|-------|-----------------------|-------|
| January 22, 1974..... | 39.04 | January 23, 1975..... | 38.44 |
| May 6, 1974..... | 36.94 | May 9, 1975..... | 36.44 |

Recorded by GLENN

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULE

Date 1-5-84

GENERAL SITE DATA (1)

Check One ☒ English ☐ Metric Units

Site Ident No 302552091331901 RG Number R=0 Transaction T=C D M V
Site-Type 2=C D E H I M O P S T X Data 3=C U Reporting Agency 4=FLC39
Project No 5= District 6=121 State 7=12 County (or town) Dual 8=031
Latitude 9=30255 Longitude 10=0813319 Lat Long Accuracy 11=S O T M
Local Number 12=1-3063 Land Net Loc 13=SENECA 12T 15R 27E
Section 14=EASTPORT 15=24000
Altitude 16=10 Method of Measurement 17=A L Accuracy 18=5
Topo Siting 19=A B C D E G H K L M O P S T U V W Hydrologic Unit (OWDC) 20=03080102
Use of Site 23=A C D E G H M O P R S T U X Z Secondary Site Use 301 Tertiary Site Use 302
Use of Water 24=A B C D E F H I J K M O P Q R S T U Y Z
Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27= Depth of Well 28= Source of 29=
Water Level 30= Date Measured 31= Source 33=
Method of Measurement 34=A B C E G H L M N R S T V Z
Site Status 37=D E F G H I J N O P R S T V W X Z
Source of Hydrologic Data 36= Pump Used 35= Date of First Construction/Completion 21=12/00/1983

OWNER IDENTIFICATION (1)

R=158 T=C D M Date of Ownership 159=12/00/1983
Name: Last 161=JEA First 162= Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 T=C D M Ident 190#ST Assigner 191=FLAND
New Card Same R & T Ident 190#NEW BERTIN Assigner 191=FLC39

SITE VISIT DATA (1)

R=186 T=C D M Date of Visit 187#01/05/1983 Name of Person 188=GLENN

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 T=A D M Date 193# Geohydrologic Unit 195=
Temperature 196#00010 Degrees C 197=
Conductance 196#00095 μ Mhos 197=
Other (STORET) Parameter 196# Value 197=
Other (STORET) Parameter 196# Value 197=

FOOTNOTES

1. HOLE CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No 59 # 00 / * Date of Construction Construction 60 = 12 00 / 1983 * Source of Const. Data 64 = 0 *

Name of Contractor/Driller 63 - LAYNE *

Method of Construction 65 = A B C D H J P R T V W Z *
air-lift, rotary, cable tool, dug, hydraulic, rotary, jetted, air-percussion, reverse, rotary, trenching, driven, drive, wash, other

Figure 66 = C F G H Ø P S T W X Z * Type of Seal 67 = B C G N Z *
concrete, gravel, bent, gravel, screen, horizontal, gallery, open, end, perforated, or slotted, screen, sand point, welded, open hole, other, bentonite, clay, cement, none, other, grout

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S ? * Number of Hours in Development 70 = *
air-lift, bailed, compressed, jetted, none, other, surged, other pump

Special Treatment During Development 71 = C D E F H M Z *
chemicals, dry ice, explosives, deflocculent, hydrofracturing, mechanical, other

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2. DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # *
add, delete, modify

Top of Hole Segment Below LSD
 73 # *
 73 # *
 73 # *
 73 # *
 73 # *

Bottom of Hole Segment below LSD
 74 # *
 74 # *
 74 # *
 74 # *
 74 # *

Diameter of Hole Segment
 75 # *
 75 # *
 75 # *
 75 # *
 75 # *

New Card for Each Hole Segment Same R, T & Field 59

3. CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 # *
add, delete, modify

Top of Casing Segment Below LSD
 77 # *
 77 # *
 77 # *
 77 # *
 77 # *

Bottom of Casing Segment Below LSD
 78 # *
 78 # *
 78 # *
 78 # *
 78 # *

Diameter of Casing Segment
 79 # *
 79 # *
 79 # *
 79 # *
 79 # *

Casing Material 80 # *
 80 # *
 80 # *
 80 # *
 80 # *

Thickness of Casing
 81 # *
 81 # *
 81 # *
 81 # *
 81 # *

New Card for Each Casing With Same R, T & Field 59

4. OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # *
add, delete, modify

Top of Section Below LSD 83 # *
 Bottom of Section Below LSD 84 # *
 Type of Openings 85 # *
 Type of Material 86 # *
 Diameter of Opening 87 # *
 Width of Opening 88 # *
 Length of Opening 89 # *

(Openings Data)
 83 # *
 84 # *
 85 # *
 86 # *
 87 # *
 88 # *
 89 # *

(Openings Data)
 83 # *
 84 # *
 85 # *
 86 # *
 87 # *
 88 # *
 89 # *

(Openings Data)
 83 # *
 84 # *
 85 # *
 86 # *
 87 # *
 88 # *
 89 # *

New Card for Each Open Section With Same R, T and Field 59

5. REFERENCES

1 Source of Data Codes
 A D G L M O R S Z
Agency, District, Local, Ministry, Owner, Other, Reporting, Other reported, Agency

2 Type of Openings Codes
 F L M P R S T W X Z
Flow, Perforated, Wire, Screen, Sand, Walled, Open, Other, Unknown, Point, Hole

3 Casing Material Codes
 B C D G I M P R S T U W Z
Brick, Concrete, Copper, Galv, Wrought, Other, PVC or, Rock or, Steel, Tile, Unstayed, Wood, Other, Iron, Iron, Metal, Plastic, Stone, Steel

4 Type of Material Codes for Open Sections
 B C G I M P R S T Z
Brass or, Concrete, Galv, Wrought, Other, PVC or, Stainless, Steel, Titanium, Bronze, Iron, Iron, Metal, Plastic, Steel

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * add, delete, modify
 Entry No 256 # 601 * Depth to Top 91 = * Depth to Bottom 92 = *
 93 = 120 FLD * 304 = * 96 = LMS * 97 = MARINE *
 Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)

R-94 * T- A D M * add, delete, modify
 Date 95 # / / * Water Level 126 = * % Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A D M * add, delete, modify
 Entry No 256 # * Depth to Top 91 = * Depth to Bottom 92 = *
 93 = * 304 = * 96 = * 97 = *
 Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)

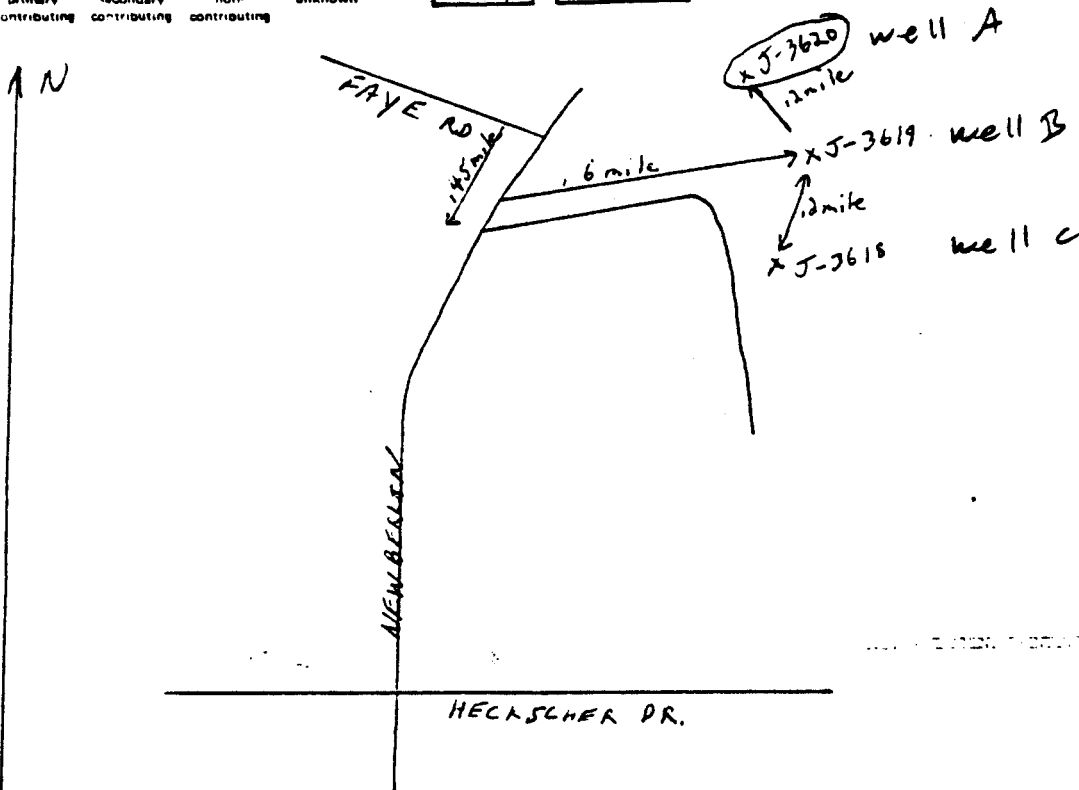
R-94 * T- A D M * add, delete, modify
 Date 95 # / / * Water Level 126 = * % Water Contributed 132 = *

PERTINENT REMARKS

R-183 * T- A D M * add, delete, modify New Card Same R&T
 Remark No. 311 # * 185 = *
 311 # * 185 = *

① Contributing Unit Codes

P S N U
 primary secondary non- unknown
 contributing contributing contributing
 R-212 * T- A * 218 = NEWBERG RD *



Recorded by Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 11-8-79

GENERAL SITE DATA (0)

Check One ☒ English ☐ Metric Units

Site Ident No 302405081342501 RG Number R-0* Transaction T-① D M V*
 Site-Type 2- C D H I M P T ①* Data 3- ① U L M* Reporting Agency 4- FLO39*
 Project No. 5- * District 6- 121* State 7- 12* County (or town) Dav21 8- 031*
 Latitude 9- 302405* Longitude 10- 0813425* Lat-Long Accuracy 11- S ① T M*
 Local Number 12- J-2374* Land Not Loc. 13- SE SE SW 14 T 15 R 22 E*
 Location Map 14- EASTPORT Scale 15- 24000*
 Altitude 16- 101* Method of Measurement 17- A L ①* Accuracy 18- 5*
 Topo Setting 19- D C E F ① K L ① P S T U V W* Hydrologic Unit (OWDC) 20- 03080103*
 Date of First Construction/Completion 21- 00 00 1979* Use of Site 23- A D E G H ① M P R S T U ① X Z*
 Use of Water 24- A B C D E F H I M N P R S T ① Y Z*
 Secondary Water Use 25- * Tertiary Use of Water 26- * Depth of Hole 27- * Depth of Well 28- * Source of Depth Data 29- *
 Water Level 30- * Date Measured 31- */*/ Source 33- *
 Method of Measurement 34- A C E G H L M R S T V Z*
 Site Status 37- D F G H ① P R S T V X Z*
 Source of Geohydrologic Data 36- * Pump Used 35- * Measuring Point 266- */*/ Measuring Point Date 267- */*/

OWNER IDENTIFICATION (1)

R-158* T-① D M* Date of Ownership 159- 00/00/1979*
 Name: Last 161- JEA First 162- * Middle Initial 163- *
Jacksonville Electric Authority

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189* T-① D M* Ident 190- SN Assigner 191- FKA WAD
New Card Same R & T Ident 190- AUGUST Assigner 191- FLO39

SITE VISIT DATA (1)

R-186* T-① D M* Date of Visit 187- 11/06/1979* Name of Person 188- ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R-192* T- A D M* Date 193- */*/ Geohydro-logic Unit 195- *
New Card Same R thru 195 Temperature 196- 00010* Degrees C 197- *
 Conductance 198- 00095* μ Mhos 197- *
 Other (STORET) Parameter 198- * Value 197- *
 Other (STORET) Parameter 198- * Value 197- *

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting driller, owner, other gov't, other logs, geologist, other agency reported,

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- Q D M * Entry No 256 # 001 * Depth to Top 91 = _____ * Depth to Bottom 92 = _____ *

add, delete, modify

Unit Identifier 93 = 1. UNCLRD *

Lithology 96 = LSH *

Lithologic Modifier 97 = MALE *

AQUIFER DATA (2)

R-94 * T- A O M *

add, delete, modify

Geohydrologic Unit Entry No 256 # _____ *

Date 95 # _____ / _____ / _____ *
month day year

Water Level 126 = _____ *

% Water Contributed 132 = _____ *

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GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T- A O M * Entry No 256 # _____ * Depth to Top 91 = _____ * Depth to Bottom 92 = _____ *

add, delete, modify

Unit Identifier 93 = _____ *

Lithology 96 = _____ *

Lithologic Modifier 97 = _____ *

AQUIFER DATA (2)

R-94 * T- A O M *

add, delete, modify

Geohydrologic Unit Entry No 256 # _____ *

Date 95 # _____ / _____ / _____ *
month day year

Water Level 126 = _____ *

% Water Contributed 132 = _____ *

PERTINENT REMARKS

R-183 * T- A * 185 = _____ *

add

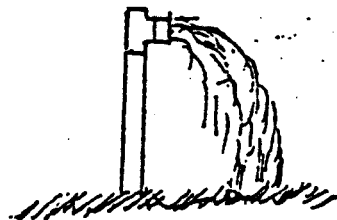
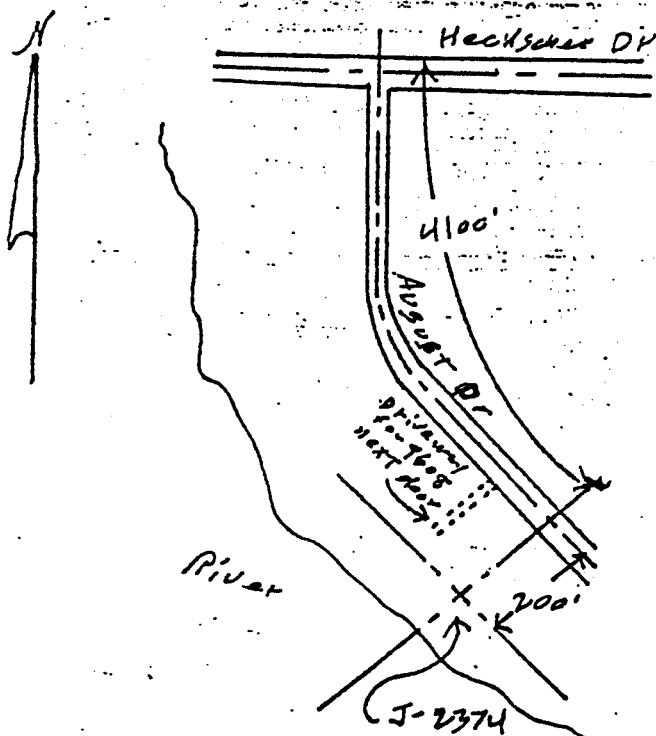
185 = _____ *

New Card Same R&T

185 = _____ *

NOTES:

R-212 * T- A * 218 = _____ AUGUST, DR *



OFFICE: 1376 O - 213-137

Recorded by B. HAMMONDU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 5/24/76Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302745 081 33 59.1 RG Number R-01 Transition T-1 A O M V . *
 Site Type 2 C D H I M P T W . * Data 3 U L M . * Reporting Agency 4 F L D 3 9 . *
 Project No. 5 . * District 6 1 2 . * State 7 1 2 . * County (or town) 8 4 9 . *
 Latitude 9 30 27 45 . * Longitude 10 08 13 59 . * Lat-Long Accuracy 11 5 P T M . *
 Local Number 12 . * Land Use 13 S E S W N E 3 5 . * R 27 C . *
 Location Map 14 E A S T P O R T . * Scale 15 2 4 0 C C . *
 Altitude 16 . * Method of Measurement 17 A L (M) . * Accuracy 18 4 0 5 . *
 Tape Setting 19 D C E S H K L S P S T U V W . * Hydrologic Unit (OWDC) 20 10 3 0 6 2 1 0 3 . *
 Date of First Construction/Completion 21 7 1 4 7 . * Use of Site 23 A D E G H S M P R S T U (W) X Z . *
 Use of Water 24 A B C D E F (H) I M N P R S T U Y Z . *
 Secondary Water Use 25 . * Tertiary Use of Water 26 . * Depth of Hole 27 . * Depth of Well 28 . * Source of Depth Data 29 . *
 Water Level 30 . * Date Measured 31 . * Source 33 . *
 Method of Measurement 34 A C E G H L V R S T V Z . *
 Site Status 35 D G H S P R S T V X Z . *
 Source of Geohydrologic Data 36 . * P:ms Used 35 . * Measuring Point 256 . * Measuring Point Date 267 . *

OWNER IDENTIFICATION (1)

R-158 . * T-1 A D M . * Date of Ownership 159 7 5 1 9 7 . *
 Name: Last 161 S H E T L E D . * First 162 D A I R Y . * Middle Initial 163 . *

OTHER SITE IDENTIFICATION NUMBERS (1)

R-139 . * T-1 A D M . * Ident 190 . * Assigner 191 . *
 New Card Same R & T Ident 190 . * Assigner 191 . *

SITE VISIT DATA (1)

R-196 . * T-1 A D M . * Date of Visit 187 7 5 1 9 7 . * Name of Person 188 B A M M O N D . *

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 . * T-1 A D M . * Date 193 . * Geohydrologic Unit 195 . *
 New Card Same R-192 Temperature 196 3 0 0 1 3 . * Degree C 197 . *
 Conductance 198 3 0 0 9 5 . * Value 199 . *
 Other (SLOPE?) 199 . * Value 200 . *
 Other (SLOPE?) 200 . * Value 201 . *

Source of Data Codes

S O O A R L G Z
 Sampling: driller, owner, other, geologist, other, reported.

Name of Contractor/Owner 63-
 Method of Construction 65- A C O H J P R Y W Z
 Finish 66- C F G H B P S Y W Z
 Bottom of Seal 68-
 Method of Development 69- A B C J N P S Z
 Number of Hours in Development 70-
 Special Treatment During Development 71- C O E F H M Z
 Date of Construction 64- month day year

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72- T- A O M
 add, delete, modify
 Construction Entry No 58-

New Card for Each Hole Segment Same R, T & Field 59

Top of Hole Segment Below LSD
 73-
 73-
 73-
 73-
 73-

Bottom of Hole Segment below LSD
 74-
 74-
 74-
 74-
 74-

Diameter of Hole Segment
 75-
 75-
 75-
 75-
 75-

CASING SCHEDULE (2)

R-76- T- A O M
 add, delete, modify

Construction Entry No 59-

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD
 77-
 77-
 77-
 77-
 77-

Bottom of Casing Segment Below LSD
 78-
 78-
 78-
 78-
 78-

Diameter of Casing Segment
 79-
 79-
 79-
 79-
 79-

Casing Material
 80-
 80-
 80-
 80-
 80-

Thickness of Casing
 81-
 81-
 81-
 81-
 81-

OPENINGS SCHEDULE (2)

R-82- T- A O M
 add, delete, modify

Construction Entry No 59-
 (Openings Data)

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD 83-
 Bottom of Section Below LSD 84-
 Type of Opening 85-
 Type of Material 86-
 Diameter of Open Section 87-
 Width of Opening 88-
 Length of Opening 89-

(Openings Data)
 83-
 84-
 85-
 86-
 87-
 88-
 89-

(Openings Data)
 83-
 84-
 85-
 86-
 87-
 88-
 89-

FOOTNOTES:

① Source of Data Codes:

S O B A R L G Z
 reporting, driver, owner, other gov't, other, local, geologist, other, agency, reported

② Casing Material Codes

B C G I M P R S T U W Z
 brick, concrete, galv, wood, other, PVC or, rock or, steel, tile, stone, wood, other, iron, metal, plastic, stone

③ Type of Openings Codes

F L M P R S T W X Z
 fracture, layered, mesh, perforated, new, screen, sand, welded, stone, other, junction, or slotted, wound (unbroken), point, hole

④ Type of Material Codes for Open Sections

B C G I M P R S T Z
 brick or, concrete, galv, wrought, other, PVC or, stone, steel, tile, other, bronze, iron, metal, plastic, stone

PRODUCTION DATA (1)

R = 134 148 = * T = A I * Entry No 1478 = Date 148 = / /

Discharge: 150 = * Source of Data 151 = *

Method of Measurement 152 = B C E F M O P R T U V W Z *

Production Level 153 = * Stable Level 154 = * Source of Data 155 = * Specific Capacity 272 = *

Method of Measurement 156 = A C E G H L M R T V Z *

Pumping Period 157 = *

LIFT DATA (1)

R = 42 = * T = A O M = * Type of Lift 43 = A B C J P R S T U Z * Entry No 254 = *

Pump Intake Setting 44 = * Type of Power 45 = D E G H N W Z *

Date 38 = / / Horsepower 46 = *

J1058

MAJOR PUMP DATA (2)

R = 47 = * T = A O M = * Type of Lift 438 = * Lift Entry No 254 = * Manufacturer of Pump 48 = *

Serial No of Pump 49 = * Name of Power Company 50 = *

Power Company Account No 51 = * Power Meter No 52 = * Pump Rating 53 = *

Person or Company Who Maintains the Pump 54 = * Additional Lift 255 = * Rated Pump Capacity 256 = *

STANDARD POWER DATA (2)

R = 55 = * T = A O M = * Type of Lift 438 = * Type of Power 56 = * Horsepower 57 = * Lift Entry No 254 = *

AVAILABLE LOG DATA (1)

R = 193 = * T = A O M = * New Card for Each Log Type Same R & T

Type of Log 199 = * Begin Date 200 = * End Date 201 = * Source of Data 202 = *

WATER QUALITY DATA COLLECTION (1)

R = 114 = * T = A O M = * Begin Year 115 = * End Year 116 = * Source Agency 117 = *

Frequency of Collection 118 = * Network Site 257 = * Type of Analysis 119 = *

WATER LEVEL DATA COLLECTION (1)

R = 121 = * T = A O M = * Begin Year 122 = * End Year 123 = * Source Agency 124 = *

Frequency of Collection 125 = * Network Site 258 = *

WATER PUMPAGE WITHDRAWAL DATA COLLECTION (1)

R = 127 = * T = A O M = * Begin Year 128 = * End Year 129 = * Source Agency 130 = *

Frequency of Collection 131 = * Network Site 259 = * Method of Collection 132 = C E M U Z *

OTHER DATA AVAILABLE (1)

R = 123 = * T = A O M = * Type of Data 133 = * Format 251 = F M P Z *

New Card Same R & T Type of Data 181 = * Format 251 = F M P Z *

FOOTNOTES

1 Source of Data Codes:

| | | | | | | | |
|--------|---------|-------|-------|-------|-------|------|--------------------|
| S | D | O | A | R | L | G | Z |
| Source | Driller | Owner | Other | Gov't | Other | Loss | Should list, other |

2 Type of Log Codes:

| | | | | | | | | | | | | | | | | |
|------|------|---------|-------|-------|------|------|---------|-------|-------|------|------|---------|-------|-------|------|------|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| Some | Temp | General | Fluid | Other | Some | Temp | General | Fluid | Other | Some | Temp | General | Fluid | Other | Some | Temp |

3 Frequency of Collection Codes:

| | | | | | | | | | | | | | | | | |
|--------|------------|------------|-------|------|--------------|---------|------------|---------|------|--------|-------|-------|-------|-------|-------|-------|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| Annual | Bi-monthly | Continuous | Daily | Semi | Intermittent | Monthly | Continuous | Quarter | Semi | Annual | Other | Other | Other | Other | Other | Other |

4 Type of Quality Analyses Codes:

| | | | | | | | | | | | | | | | | |
|---------|---------|-------|-----------|-----------|---------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| General | General | Trace | Substance | Nutrients | Organic | Other | Other | Other | Other | Other | Other | Other | Other | Other | Other | Other |

WATER CONSERVATION PROGRAM
WA 3 WELL FIELD INSPECTION C DE

Reason for Inspection:

Complaint W.U. Permit Construction, etc. Permit

J/054
Well Inventory

Free flowing well

Regulatory Status: Received Application to Construct, Modify ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

Received Application for Temporary Water Use Permit ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

DNR/BW-2 Received ☐ Yes N/A ☐ Date _____

Data Submitted to USGS ☐ Yes Date _____

Owner SHEFFIELD DAIRY

Address 3567 NEW BERLIN

Well Drilling Contractor _____ License/Bond No. _____

Location of water well Latitude 30 27.48 N Long 081 37.9 Sequential 01

Ident # of Quad Sheet 1/4 SE SW NE SS 1N 27E
1/4 1/4 1/4 Section Township Range Subdivisio

Depth of Water Well _____ How measured? _____

Diameter/Cross Section 3x2

Depth of Casing _____ Diameter of Casing from LSD _____ to _____ feet and dia-
meter _____ from _____ to _____ feet.

Type of grouting used CEMENT Hole centered in grout? _____

Use of well PDA

Water level _____ How measured _____

Method of well construction ROTARY

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.)

Casing material used GRAV

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' _____

Distance to nearest contaminant - septic tank, etc. if less than 100' _____

Maximum well yield _____ GPM Average well yield _____ GPM

Frequency of well use _____ Hrs./Day _____ Days/Year

Pump Data - Type & Make _____ HP _____ Pump Rating _____

Capacity _____ No. of Bowls or Stages _____

Type of Power _____ Static water level _____

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness _____, and Chloride _____.

General Rating: poor _____ average _____ good _____ excellent _____

Additional Info/Action Required _____

Action taken/Comments _____

Inspector's Name Scott [signature] Date 5/27/76
Field Inspection Date _____

Inventory Complete Date _____

WATER QUALITY DATA SHEET

Field Sheet & Key Location

10/4/74 Tex

DATA CARD

| Type | Station identification number | Date of collection | | | Time of measurement | | |
|------|-------------------------------|--------------------|----|----|---------------------|----|----|
| | | Y | M | D | Y | M | D |
| | | 7 | 6 | | | | |
| | | 17 | 22 | 23 | 28 | 29 | 32 |

Local Number

~~1058~~ 1058 Station 44 Dairy

Calculations

Card 1

| Parameter code | Value | Exp. | Rmk. |
|---|-------|------|------|
| Cl (mg/l) | 33 | 38 | 42 |
| | 00940 | 2000 | 02 |
| Hardness as CaCO ₃ (Ca, Mg) (mg/l) | 45 | 56 | |
| | 00900 | 1340 | 03 |
| Dissolved solids at 180°C (mg/l) | 57 | 68 | |
| | 70300 | | |
| Specific conductance K x 10 ⁶ | 69 | 80 | |
| | 00095 | 3200 | 03 |

Cl
5.7
4.5
1.1
1.0
2.2
20.00

Hard
19.2
15.8
3.4
40
136.0

Duplicate Cols. 1-32

Card 2

| | | |
|---------------|-------|------|
| Water temper- | 33 | 44 |
| | 00010 | |
| pH (units) | 45 | 56 |
| | 00400 | |
| | 57 | 68 |
| | 00000 | |
| Other | 00027 | 9000 |

69

80

Analysis

Date

Checked by

Date

R-266

Recorded by B. HAMMOND

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 1/21/76

36

Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (0)

Site Ident No 30 27 44 081 33 54 01 RG Number R=0* Transaction T=③ D M V*
add, delete, modify, verified

Site-Type 2=C D H I M P T (W)* Data 3=C U L M* Reporting Agency 4=FL039*
collector, drain, sinkhole, connector, multiple, pond, tunnel or, well shaft field checked, unchecked, location not, minimal accurate date

Project No. 5= District 6=121 State 7=12 County (or town) DUAL 8=031*
sec. 5 sec. 10 sec. Min

Latitude 9=30 27 44 Longitude 10=081 33 54 Lat Long Accuracy 11=⑥ T M*
deg min sec deg min sec sec. 5 sec. 10 sec. Min

Local Number 12= J-982 Land Loc. 13= NW NE SE S 35 T 1 N R 27 E
1/4 1/4 1/4 section township range meridian

Location Map 14=EAST T. PORT Scale 15=24 000*

Altitude 16=20.00 Method of Measurement 17=A L (M)* Accuracy 18=M0.5*
altimeter, level, map

Topo Setting 19=D C E (F) H K L O P S T U V W* Hydrologic Unit (OWDC) 20=03080103*
depression, stream, dunes, flat, hilltop, sink, swamp, offshore, pediment, hillside, terrace, undulating, valley, upland channel flat draw

Date of First Construction/Completion 21= / / Use of Site 23=A D E G H (M) P R S T U (W) X Z*
month day year anode, drain, geo, seismic, heat, observ, mine, oil or, recharge, repress, test, unused, with, waste, destroyed thermal reservoir, ation, gas drawal

Use of Water 24=A B C D E F (H) I M N P R S T U Y Z*
air cond., bottling, commercial, dewater, power, fire, domestic, irrigation, medicinal, industrial, public, recreation, stock, institution, unused, desal, other supply

Secondary Water Use 25=* Tertiary Use of Water 26=* Depth of Hole 27=595.00 Depth of Well 28=595.00 Source of Depth Data 29=D*
no

Water Level 30= Date Measured 31= / / Source ① 33=*
month day year

Method of Measurement 34=A C E G H L M R S T V Z*
airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other airline gage pressure gage logs tape tape electric tape

Status 37=D (F) G H (M) P R S T V X Z*
dry, flowing, nearby, nearby, obstruction, pumping, recently, nearby, nearby, surface water other flowing recently pumped pumping pumped recently substance effects pumped

Source of Geohydrologic Data ① 36=* Pump Used 35=no Measuring Point 266= Measuring Point Date 267= / /
month day year

OWNER IDENTIFICATION (1)

R=158* T=A D M* Date of Ownership 159=01/21/1976*
add, delete, modify month day year

Name: Last 161=BRADDOCK First 162=CLAUDE Middle Initial 163=*
month day year

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189* T=③ D M* Ident 190# SJT* Assigner 191=FLA WMD*
add, delete, modify

New Card Same R & T Ident 190# Assigner 191=

SITE VISIT DATA (1)

R=186* T=A D M* Date of Visit 187=01/20/1976* Name of Person 183=B. HAMMOND*
add, delete, modify month day year

FIELD WATER QUALITY MEASUREMENTS (1)

R=192* T=A D M* Date 193# / / Geohydro-logic Unit 195#
add, delete, modify month day year

New Card Same R thru 195 Temperature 196# 0 0 0 1 0 Degrees C 197=

Conductance 194# 0 0 0 9 5 uMhos 197=

Other (STORET) Parameter 198# Value 197=

Other (STORET) Parameter 198# Value 197=

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
reporting, driller, owner, other geol., other agency, geologist, other

WELL CONSTRUCTION DATA (1)

R = 52 *

T = (A) D M *

Entry No 59 # 00.1 *

Date of Construction
Completion

60 - 01 / 21 / 1976 *

Source of (1)
Const. Data 64 - D *Name of
Contractor/Driller

63 - FREEMAN *

Method of
Construction

65 - A B C D (H) J P R T V W Z *

Finish

66 - C F G H B P S T W X Z *

Type of
Seal

67 - B C (G) Z *

Bottom of
Seal

68 - *

Method of
Development

69 - A B C J N P S Z *

Number of Hours
in Development

70 - *

Special Treatment
During Development

71 - C D E F H M Z *

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 *

T = (A) D M *

Construction
Entry No

59 # 00.1 *

Top of Hole Segment Below LSD

| | |
|------|-----------|
| 73 # | 0.00 * |
| 73 # | 1.26.00 * |
| 73 # | * |
| 73 # | * |
| 73 # | * |

Bottom of Hole Segment below LSD

| | |
|------|-----------|
| 74 # | 1.26.00 * |
| 74 # | 5.95.00 * |
| 74 # | * |
| 74 # | * |
| 74 # | * |

Diameter of Hole Segment

| | |
|------|--------|
| 75 # | 4.50 * |
| 75 # | 3.00 * |
| 75 # | * |
| 75 # | * |
| 75 # | * |

New Card for Each Hole Segment
Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 *

T = (A) D M *

Construction
Entry No

59 # 00.1 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

| | |
|------|-----------|
| 77 # | 0.00 * |
| 77 # | 1.26.00 * |
| 77 # | * |
| 77 # | * |
| 77 # | * |

Bottom of Casing Segment Below LSD

| | |
|------|-----------|
| 78 # | 1.26.00 * |
| 78 # | 4.95.00 * |
| 78 # | * |
| 78 # | * |
| 78 # | * |

Diameter of Casing Segment

| | |
|------|--------|
| 79 # | 3.00 * |
| 79 # | 2.00 * |
| 79 # | * |
| 79 # | * |
| 79 # | * |

Casing Material (5)

| | |
|------|---|
| 80 # | * |
| 80 # | * |
| 80 # | * |
| 80 # | * |
| 80 # | * |

Thickness of Casing

| | |
|------|---|
| 81 # | * |
| 81 # | * |
| 81 # | * |
| 81 # | * |
| 81 # | * |

OPENINGS SCHEDULE (2)

R = 82 *

T = (A) D M *

Construction
Entry No

59 # 00.1 *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # 4.95.00 *

Bottom of Section Below LSD

84 # 5.95.00 *

Type of Openings (5)

Type of Material (7)

Diameter of Open Section

Width of Opening

Length of Opening

| | |
|------|-----|
| 85 # | X * |
| 86 # | * |
| 87 # | * |
| 88 # | * |
| 89 # | * |

(Openings Data)

| | |
|------|---|
| 83 # | * |
| 84 # | * |
| 85 # | * |
| 86 # | * |
| 87 # | * |
| 88 # | * |
| 89 # | * |

(Openings Data)

| | |
|------|---|
| 83 # | * |
| 84 # | * |
| 85 # | * |
| 86 # | * |
| 87 # | * |
| 88 # | * |
| 89 # | * |

FOOT NOTES:

① Source of Data Codes:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| S | D | B | A | R | L | G | Z |
|---|---|---|---|---|---|---|---|

reporting, driller, owner, other geol't. other logs, geologist, other reported.

⑤ Casing Material Codes

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| B | C | G | I | M | P | R | S | T | U | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|

brick, concrete, galv. wrought, other, PVC or, rock or, steel, tile, coated, wood, other
iron iron metal plastic stone steel

⑥ Type of Openings Codes

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| F | L | M | P | R | S | T | W | X | Z |
|---|---|---|---|---|---|---|---|---|---|

fracture, lowered, mesh, perforated, w-w, screen, sand, walled, open, other
shuttered or slotted wound (unknown) point hole

⑦ Type of Material Codes for Open Sections

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| B | C | G | I | M | P | R | S | T | Z |
|---|---|---|---|---|---|---|---|---|---|

brass or, concrete, galv. wrought, other, PVC or, stainless, steel, tile, other
bronze iron iron metal plastic steel

| | | | |
|--|-----------------------------|----------------------|-------------------------|
| R = 134 146 * | T = A D M * | Entry No 147 # | Date 148 = / / |
| Flowing, pumped | add, delete, modify | | month day year |
| Discharge: 150 = | Source of Data 151 = | J 982 | |
| Method of Measurement 152 = | B C E F M O P R T U V W Z * | | |
| basin, current, estimated, flume, rotating, orifice, pitot-tube, reported, trajectory, venturi, volumetric, weir, other | | | |
| Production Level 153 = | Static Level 154 = | Source of Data 155 = | Specific Capacity 272 = |
| | | | |
| Method of Measurement 156 = | A C E G H L M R S T V Z * | | |
| airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other | | | |
| airline | pipe pressure gauge logs | Pumping Period 157 = | |

| | | | | | |
|---------------------|----------------------------------|---------------|---|----------|-------|
| R = 42 | T = A D M
add, delete, modify | Type of Lift | 43 = A B C J P R S T U Z | Entry No | 254 # |
| Pump Intake Setting | 44 = | Type of Power | 45 = D E G H L N W Z | | |
| | | | air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other | | |
| | | | diesel, electric, gasoline, hand, LP gas, natural, windmill, other gas | | |
| Date | 38 = | | Horsepower | 46 = | |
| | month / day / year | | | | |

| | | | | |
|----------------------------------|--|--------------------------|------------------------|------------------------------|
| R = 47 = | T = A D M =
add, delete, modify | Type of Lift
43 = | Lift Entry No
254 # | Manufacturer of Pump
48 = |
| Serial No of Pump
49 = | Name of Power Company
50 = | Power Meter No
52 = | Pump Rating
53 = | Rated Pump Capacity
268 = |
| Power Company Account No
51 = | Person or Company Who Maintains the Pump
54 = | Additional Lift
255 = | | |

(See LIFT DATA for codes of fields 43 and 56 below)

R = 55 * T = A D M * Type of Lift 43# * Type of Power 56 = * Horsepower 57 = * Lift Entry No. 254 # *

R = 198 *

T = A D M *

add, delete, modify

New Card for Each Log Type
Same R & T

End Depth

| | | |
|-------|---|---|
| 201 = | . | * |
| 201 = | . | * |
| 201 = | . | * |
| 201 = | . | * |

Source of Data ①

| | |
|-------|---|
| 202 = | * |
| 202 = | * |
| 202 = | * |
| 202 = | * |

Type of Log ②

| | |
|-------|---|
| 199 # | * |
| 199 # | * |
| 199 # | * |
| 199 # | * |

Begin Depth

| | | |
|-------|---|---|
| 200 = | . | * |
| 200 = | . | * |
| 200 = | . | * |
| 200 = | . | * |

R = 114 = T = A D M * Begin Year 115 = End Year 116 = Source Agency 117 =
 add, delete, modify
 Frequency of Collection 3 118 = Network Site 257 = Type of Analyses 120 =

Frequency of Collection: * *
add, delete, modify
 *
Begin Year *
End Year *
Source Agency *
Network Site *

| | | | | |
|----------------------------|---------------------------|--------------------|--|---------------------|
| R = 127 * | T = A D M * | Begin Year 128 * | End Year 129 * | Source Agency 130 * |
| Frequency of Collection 3. | add, delete, modify 131 * | Network Site 259 * | Method of Collection 133 = C E M U Z * | |
| | | | calculated, estimated, metered, unknown, other | |

| | | | | | | | |
|---------------------|------------|--------------|-------|-----|-----------------------------|--------|---------------------------------|
| R=180 * | T= A D M * | Type of Data | 181 # | Loc | 182 = C D Z * | Format | 261 = F M P Z * |
| add, delete, modify | | | | | cooperator, district, other | | file, machine, published, other |
| New Card Same R & T | | Type of Data | 181 # | Loc | 182 = C D Z * | Format | 261 = F M P Z * |
| | | | | | | | readme |

① Source of Data Codes:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| S | D | O | A | R | L | G | Z |
|---|---|---|---|---|---|---|---|

reporting, driller, owner, other gov't, other logs, geologist, other agency reported,

③ Frequency of Collection Codes:

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | F | I | M | O | Q | S | W | Z |
|---|---|---|---|---|---|---|---|---|---|---|---|

annual, bi-monthly, continuous, daily, semi-, intermittent, monthly, one time, quarter, semi-, weekly, other monthly only annual annual

| | | | | | | | | | | | | | | | | |
|-------|---------|----------|------------|-----------|---------|------------|-----------|------------|--------|-----------|-----------|-----------|----------|----------|--------|--------|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
| time, | collar, | caliber, | driller's, | electric, | fluid, | geologist, | magnetic, | induction, | gamma, | dipmeter, | isotopic, | microlog, | neutron, | μ later, | photo, | radio- |
| | | | | | conduct | | | | ray | | | | | | | active |

| | | | | |
|--------|-------|--------|----------|-------|
| S | T | U | V | Z |
| sonic, | temp, | gamma, | fluid, | other |
| | | gamma, | velocity | |

④ Type of Quality Analyses Codes

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| A | B | C | D | E | F | G | H | I | J | K | L | M | N | O | P | Q |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 256 # 001 * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = 1,2,0,FL,R,D * Lithology 96 = * Lithologic Modifier 97 = *

AQUIFER DATA (2)

R = 94 * T = A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # * *

Date 95 # / / *
month day year

Water Level 126 = *

% Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 256 # * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = * Lithology 96 = * Lithologic Modifier 97 = *

AQUIFER DATA (2)

R = 94 * T = A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # * *

Date 95 # / / *
month day year

Water Level 126 = *

% Water Contributed 132 = *

PERTINENT REMARKS

R = 183 * T = A * 185 = *

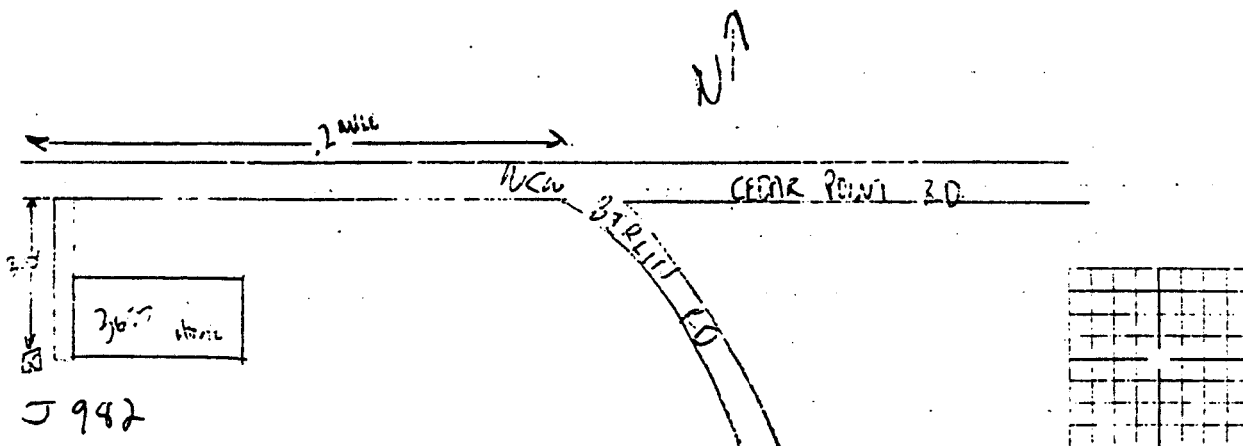
add

New Card Same R&T

185 = *

185 = *

NOTES:

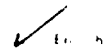


U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date: 13 Nov 80

GENERAL SITE DATA (1)

Check One



☐ Metric Units

Site Ident No 302559081331501 RG Number R=0* Transaction T= (A) D M V *
 Site-Type 2= C D M I M P T (W) * Data 3= (C) U L M * Reporting Agency 4= FL039 *
 collector, drain, sinkhole, connector, multiple, pond, tunnel or, well
 well shaft field checked, unchecked, location not, minimal accurate data
 District 8= 121 * State 7= 12 * County (or town) DUV21 8= 031 *
 Latitude 9= 302559 * Longitude 10= 0813315 * Lat Long Accuracy 11= S 0 T M *
 deg min sec deg min sec sec. base, 10 sec. Min.
 Loc 12= J-2496 Land 13= NE NES NW S 12 T 15 R 27 E
 Loc 14= EASTPORT 15= 24000
 Loc 16= 15. 17= A L (W) * Accuracy 18= 5 *
 Loc 19= D C E F H * 0 0 F S T U V W * 03080103 *
 Loc 20= 08 18 1980 * Use 23= A D E G H (M) P R S T U (X) Z *
 Loc 21= 08 18 1980 * Site 24= A B C D E F H I M (N) P R S T U Y Z *
 Loc 22= 08 18 1980 * Loc 25= P * Tertiary Use 26= T * Depth of Hole 27= 752 * Depth of Well 28= 752 * Source of Depth Data 29= G *
 Loc 23= 08 18 1980 * Loc 24= A B C D E F H I M (N) P R S T U Y Z *
 Loc 25= P * Tertiary Use 26= T * Depth of Hole 27= 752 * Depth of Well 28= 752 * Source of Depth Data 29= G *
 Loc 29= 08 18 1980 * Loc 30= 1-19-153 * Date Measured 31= 08/20/1980 * Source 33= G *
 Loc 32= 08 18 1980 * Loc 33= G *
 Loc 34= A C E G H L (M) R S T V Z *
 Loc 35= 08 18 1980 * Loc 36= G *
 Loc 37= D F G H (M) P R S T V X Z *
 Loc 38= 08 18 1980 * Loc 39= G *
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R-58 T-ADM 59#0

Date of Construction Completion 60-08/18/1960

LAYNE

Layne-Atlantic, Savannah

Method of Development: A - Borehole, B - Drilling, C - Tunneling, D - Mining, E - Other

Number of Hours in Development: 0

Method of Development: A - Borehole, B - Drilling, C - Tunneling, D - Mining, E - Other

Number of Hours in Development: 0

72496

DATA FOR THE HOLE SEGMENT BELOW

R-72 T-ADM 59#001

Top of Hole Segment Below LSD

73# 0.0
73# 80.0
73# 525.0
73#
73#

80.0
525.0
752.0

23.0
17.0
9.87

DATA FOR THE CASE SEGMENT BELOW

R-76 T-ADM 59#001

New Card for Each Open Section With Same R, T & Field 59

Top of Case Segment Below LSD

77# 0.0
77# 0.0
77#
77#
77#

80.0
521.0

18.0
12.0

80.5
80.5
60.0
80.0
80.0

OPENINGS SCHEDULE (2)

R-82 T-ADM 59#

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83#

Bottom of Section Below LSD 84#

Type of Openings

Type of Material

Diameter of Open Section

Width of Opening

Length of Opening

83#
84#
85#
86#
87#
88#
89#

83#
84#
85#
86#
87#
88#
89#

83#
84#
85#
86#
87#
88#
89#

NOTES:

1 Source of Data Codes:

S D O A R L G Z
Soil, Owner, Other, Agency, Reported, Log, Geologist, Other

5 Casing Material Codes

B C G I M P R S T U W Z
Brick, Concrete, Galle, Wrought, Other, PVC or, Rock or, Steel, Tile, Other, Wood, Other

6 Type of Openings Codes

F L M P R S T W X Z
Fracture, Filled, Mesh, Perforated, Wire, Screen, Sand, Walled, Open, Other, Shuttered, or Slotted, Wound (unknown), Point, Hole

7 Type of Material Codes for Open Sections

B C G I M P R S T Z
Brass or, Concrete, Galle, Wrought, Other, PVC or, Stainless, Steel, Tile, Other, Bronze, Iron, Iron, Metal, Plastic, Steel

DATA 1)

R=134 (146) T=ADM

No 147# 001

08 2 1980

Discharge 150= 133.0

Source of Data 151 G

152 B C E F M O P R T U V W Z
153 13.6 Static Level 154 -19.53
155 A C E G H L R S T V Z

DATA 2)

R=42 T=ADM Type of Lift 43# A B C J P R S T U Z
44 Type of Power 45 D E G H L N W Z

J 7496

DATA 3)

R=47 T=ADM Type of Lift 43#
Lift Entry 4 255
Power Meter No 52
Additional Lift 255
Rated Pump Capacity 268

FLUID BY POWER DATA (2)

(See LIFT DATA for codes of fields 43 and 56 below)

R=55 T=ADM Type of Lift 43# Type of Power 56# Horsepower 57# Entry No 264#

AVAILABLE LOG DATA (1)

R=198 T=ADM
Type of Log 2 199#
Begin Depth 200#
End Depth 201#
Source of Data 202#

WATER QUALITY DATA COLLECTION (1)

R=114 T=ADM
Frequency of Collection 3 118#
Begin Year 115#
End Year 116#
Source Agency 117#
Network Site 257#
Type of Analyses 129#

WATER LEVEL DATA COLLECTION (1)

R=121 T=ADM
Frequency of Collection 3 125#
Begin Year 122#
End Year 123#
Source Agency 124#
Network Site 258#

WATER PUMPAGE WITHDRAWAL DATA COLLECTION (1)

R=127 T=ADM
Frequency of Collection 3 131#
Begin Year 128#
End Year 129#
Source Agency 130#
Network Site 259#
Method of Collection 133# C E M U Z

OTHER DATA AVAILABLE (1)

R=180 T=ADM Type of Data 181#
Loc 182# C D Z
Format 261# F M P Z
Type of Data 181#
Loc 182# C D Z
Format 261# F M P Z

DOT NOTES

1 Source of Data Codes

S D O A R L G Z
reporting, driller, owner, other govt, other, logs, geologist, other agency, reported

3 Frequency of Collection Codes

A B C D F I M O S W Z
annual, bi-monthly, continuous, daily, semi-intermittent, monthly, one-time, quarter, semi-weekly, other only, annual, annual

2 Type of Log Codes

A B C D E F G H I J K L M N O P Q
time, collar, caliper, driller's, electric, fluid, geologist, magnetic, induction, gamma, diameter, laterals, microlog, neutron, u later, photo, radio, active
S T U V Z
sonic, temp, gamma, fluid, other gamma velocity

4 Type of Quality Analyses Codes

A B C D E F G H J K L M Z
chemical, common, chemical, trace, pesticides, nutrients, sanitary, andes, andes, cures, cures, codes, other, other

B-273

GEOPHYSIC UNIT DESCRIPTIONS (1)

R=90 *

T= A D M *

Entry

No 2001 *

Depth

to Top 91 *

to

Bottom 92 *

Unit

Identifier

93 *

120 FLAP *

Lithology

LMS *

Lithologic

Modifier

97 *

MARINE *

ACQUISITION DATA (2)

R=94 *

T= A D M *

Geohydrologic

Unit Entry No

256 #

Date

95 #

month day year

Water Level

126 *

% Water

Contributed

132 *

GEOPHYSIC UNIT DESCRIPTIONS (1)

R=90 *

T= A D M *

Entry

No 256 #

Depth

to Top 91 *

Depth

to Bottom 92 *

Unit

Identifier

93 *

Lithology

96 *

Lithologic

Modifier

97 *

ACQUISITION DATA (2)

R=94 *

T= A D M *

Geohydrologic

Unit Entry No

256 #

Date

95 #

month day year

Water Level

126 *

% Water

Contributed

132 *

PERTINENT FEATURES

R=183 *

T= A *

185 *

add

185 *

New Card Same R&T

185 *

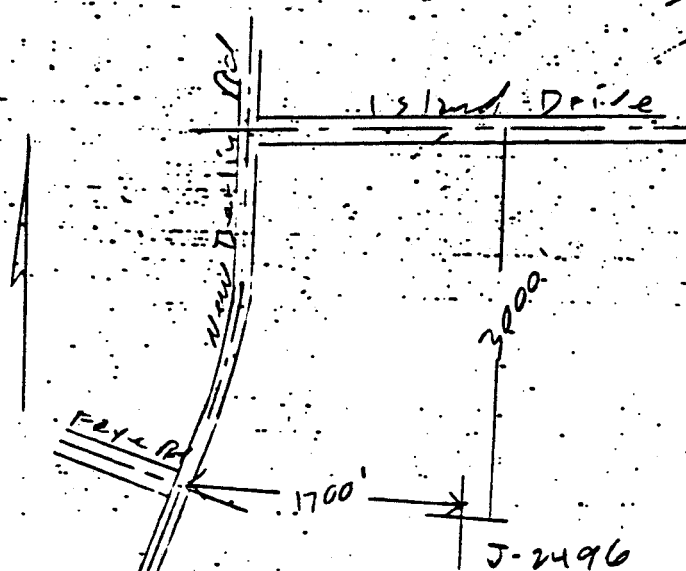
NOTES:

R=215 *

T= A *

215 *

OFF NEW BERLIN AT FAYE RD *



U.S. GOVERNMENT PRINTING OFFICE: 1960 O-215-67

STATE OF FLORIDA
WATER WELL C. TRACTOR'S
WELL COMPLETION REPORT
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES
203 Pennington Building, Tallahassee, Florida 32304
Telephone: (904) 488-8476

No. 68004

Permit No. 80-66

Owner's Well Identification F-1

State Well Number
For Department Use
ONLY

1. OWNER: Jacksonville Electric Authority
Name
233 W. Duval St. Jacksonville, Fla.
Address City State

2. LOCATION OF WELL: Off New Berlin Road
Street Address/Road
Jacksonville Duval
City County
Subdivision Lot No.
12 1-S 27-E
Section Township Range

3. PURPOSE OF WELL:
☐ Domestic ☐ Irrigation ☒ Public Supply
☒ Industrial ☐ Stock ☒ Other test

4. TYPE OF WORK:
☒ New Well ☐ Plugging ☐ Other
☐ Deepening ☐ Reconditioning

5. QUALITY:
☒ Clear ☐ Colored ☒ Sulfur ☐ Salty ☐ Other
CHECK TEST MADE
☐ None ☒ Bacteria ☐ Chemical
Chloride 21 PPM
(Check ☐ if test was for sodium chloride)
Temperature 73 °F
Well Disinfected ☐ Yes ☒ No
Test By:
☐ County Health Dept.
☒ State Health Dept.
☐ U.S.G.S.
☐ Other Technical Services Inc.
Name Jacksonville, Fla.
Address

6. EQUIPMENT:
☐ Rotary ☐ Cable Tool ☐ Other
☐ Jet ☒ Reverse Rotary

7. GROUT: ☐ None ☒ Cement ☐ Other
Describe and give number of bags (94)lb. From (ft) To (ft)
110 0 80
420 0 521

8. CASING AND LINER PIPE:
Diameter (inches) Kind From (ft) To (ft)
18 0 80
12 0 521
(Check One) ☐ Threaded & Coupled ☒ Welded Only
☐ T & C & Welded ☐ Other

9. WATER LEVEL:
Water level after well completed +19.53 feet
☒ Above ☐ Below land surface
Well Flowing: ☒ Yes ☐ No Flow gal/min

10. SCREENS:
Location (ft) Below Surface
Make Materials Diameter (in) Slot Size From (ft) To (ft)
None

11. UPPER END OF WELL:
☐ Pump Installed ☐ Valve ☒ Cap ☐ Other

12. PUMPING TEST:
Date 8-20-80 ☒ Test Pump ☐ Permanent Pump
Measure point is Well Flange

which is feet ☐ above ☐ below land surface
Static water level 19.52 ft ☒ above ☐ below measure point
Maximum Drawdown 13.6 feet below measure point
Discharge at maximum drawdown 1330 gal/min
After 34 hours 20

13. PUMP INSTALLED: No Pump Installed
Type Make Model No.
Motor Power Make H.P.
Capacity Gal/min at ft. of total dynamic head
No. of bowls or stages
Pump setting feet

14. WELL LOG:

| Well bore (in) | Depth (feet) | | Note each type of material, producing zones, & cavities if any. Give description at not less than 20 foot intervals and at changes. |
|----------------|--------------|-----|---|
| | From | To | |
| | 0 | 6 | Sandy clay |
| | 6 | 54 | Sand, loose fine |
| | 54 | 78 | Sandstone, limestone |
| | 78 | 98 | Limestone |
| | 98 | 129 | Clay w/streaks limestone shell, phosphate |
| | 129 | 223 | Coarse sand, w/streaks clay, phosphate |
| | 223 | 348 | Clay w/sand, phosphate, limestone shell |
| | 348 | 380 | Coarse sand & gravel w/clay streaks |
| | 380 | 442 | Clay w/streaks limestone, sand, shell, phosphate |
| | 442 | 473 | Clay w/streaks limestone |
| | 473 | 495 | Limestone, shell w/sand white (Ocala) |
| | 495 | 505 | Limestone w/little sand white |
| | 505 | 525 | Limestone, white |
| | 525 | 738 | Limestone, white |
| | 738 | 750 | Brown limestone (Avon Park) |



15. CONTRACTOR'S CERTIFICATION:

This work was done under my jurisdiction and this report is true to the best of my knowledge and belief. The work commenced on 7-17-80 and was completed on 8-18-80

Layne-Atlantic Co. 1800
Contractor License Number
Signature of Representative P.O. Box 9886
Savannah Chatham Georgia
City County State
912-964-6721 John Disk
Phone Number Driller



ENVIROSPHERE COMPANY

DIVISION OF EBASCO SERVICES INCORPORATED

77496

LOG OF WELL F-1

SHEET 1 OF 6

| | | | | | | | |
|---|--|--------------------|-----------------------------|---|-------------------|---|-------------------------------------|
| PROJECT AND LOCATION
JACKSONVILLE ELECTRIC AUTHORITY - EASTPORT | | | | ELEVATION AND DATUM | | PROJECT NO.
3332 | |
| DRILLING AGENCY
LAYNE ATLANTIC DRILLING CO. | | | | DATE STARTED
7/28/80 (PILOT HOLE) | | DATE FINISHED
8/14/80 | |
| DRILLING EQUIPMENT
LAYNE-ARK | | | | ROD LENGTH
Approx. 30' | | COMPLETION DEPTH
752' | |
| BIT | | SIZE 9 7/8" | DEPTH 48' PILOT HOLE | SIZE 2 3/8" | DEPTH 80' | NO. SOIL SAMPLES
70 | METHOD
GRAB |
| | | SIZE 17" | DEPTH 525' | SIZE 9 7/8" | DEPTH 752' | NO. WATER SAMPLES
3 | WATER LEVEL
+18' (APPROX) |
| CASING | | SIZE 18" | DEPTH 80' | SIZE 12" | DEPTH | FOREMAN
JOHN DISK - driller | |
| | | SIZE 12" | DEPTH 521' | SIZE | DEPTH | INSPECTOR
KL. HAHN - ENVIROSPHERE CO. | |
| SCREEN SETTING | | SIZE N/A | DEPTH | SIZE | DEPTH | | |

| DEPTH | PENE. RATE | CIRC. RET. LOSS | AIRLIFT Q (gpm) | MATERIAL | SYM. BOL. | DESCRIPTION and COMMENTS |
|-------|------------|-----------------|-----------------|---|-----------|---|
| 0 | | | | | | Kelly + sub + bit = 39'3" |
| | | | | | | • total 2.0' c.g. |
| | | | | | | drill collar 28'4" |
| 20 | | | | fine sand
and
silt
+ clay
undiff. | | top hole 0-100' 2 3/8" prior sample |
| | | | | | | reentry, occasional heavy sands |
| | | | | | | drilled quickly to avoid washout & caving |
| 40 | | | | | | circulation broke through to rethole |
| | | | | | | |
| 60 | | | | partially
cemented
s.s. and
l.s. | | harder, sandstone (?) |
| | | | | | | cuttings all sand, no rock chips |
| 80 | | | | | | 18" surface casing to 80' |
| | | | | calc. ss.
and limestone | | |
| 100 | | | | | | Hawthorne Formation |
| | | | | blue s.s.
phos. sand
clay and
l.s. | | |
| 120 | | | | cem. sands
and green
clays | | 12" A-53 Bl. St. Casing |
| | | | | | | CEMENT GROUT. |
| 140 | | | | | | |



ENR "ROSPHERE COMPANY"

DIVISION OF EBASCO SERVICES INCORPORATED

LOG OF WELL F-1

SHEET 2 OF 6

| | | | | | | | | |
|---|------|-------|------|-------|---------------------|--|----------------------------|--|
| PROJECT AND LOCATION
JACKSONVILLE ELECTRIC AUTHORITY - EASTPORT | | | | | ELEVATION AND DATUM | | PROJECT NO.
3332 | |
| DRILLING AGENCY | | | | | DATE STARTED | | DATE FINISHED | |
| DRILLING EQUIPMENT | | | | | ROD LENGTH | | COMPLETION DEPTH | |
| | | | | | | | ROCK DEPTH | |
| BIT | SIZE | DEPTH | SIZE | DEPTH | NO. SOIL SAMPLES | | METHOD | |
| | SIZE | DEPTH | SIZE | DEPTH | NO. WATER SAMPLES | | WATER LEVEL | |
| CASING | SIZE | DEPTH | SIZE | DEPTH | FOREMAN | | | |
| | SIZE | DEPTH | SIZE | DEPTH | | | | |
| SCREEN SETTING | SIZE | DEPTH | SIZE | DEPTH | INSPECTOR | | | |
| | SIZE | DEPTH | SIZE | DEPTH | | | | |

| DEPTH | PENE RATE | CIRC RET | AIRLIFT Q (gpm) | MATERIAL | SYM-BOL | DESCRIPTION and COMMENTS |
|-------|-----------|----------|-----------------|---|---------|---|
| 140 | | | | | | sa. as above, phosphate more abundant, coarse qtz. sand grains calc. cement |
| 160 | | | | H. gr. to gr. phos. ss. w/ clay & occ. calc. cement | | slightly harder, sandier, qtz. well rounded to sub. rounded, coarse, abundant, phosphate, H. gr. to gr. |
| 180 | 17 | | | | | |
| 200 | | | | | | becoming softer, more clay, shell frags. abundant off white clay w/ sand, feldspathic(?) |
| 220 | 12 | | | | | slightly harder, incr. qtz. ss. |
| 240 | 14 | | | gr. clay w/ sand | | clay & sand (60/40) olive, some silt, plastic |
| 260 | | | | | | very hard l.s.(?) ledge |
| 280 | | | | olive gr. silty sand & clay | | olive green silty sand, med - coarse gr. some light gr. layers |
| 300 | 12 | | | | | 12" A-53 Bl. St. Cong |
| 320 | | | | | | CEMENT GRout |



ENROSPHERE COMPANY

A DIVISION OF EBASCO SERVICES INCORPORATED

LOG OF WELL F-1

SHEET 3 OF 6

| | | | | | | | | |
|---|--|------|-------|------|---------------------|-------------------|----------------------------|-------------|
| PROJECT AND LOCATION
JACKSONVILLE ELECTRIC AUTHORITY - EASTPORT | | | | | ELEVATION AND DATUM | | PROJECT NO.
3332 | |
| DRILLING AGENCY | | | | | DATE STARTED | | DATE FINISHED | |
| DRILLING EQUIPMENT | | | | | ROD LENGTH | | COMPLETION DEPTH | |
| BIT | | SIZE | DEPTH | SIZE | DEPTH | NO. SOIL SAMPLES | | METHOD |
| | | SIZE | DEPTH | SIZE | DEPTH | NO. WATER SAMPLES | | WATER LEVEL |
| CASING | | SIZE | DEPTH | SIZE | DEPTH | FOREMAN | | |
| SCREEN SETTING | | SIZE | DEPTH | SIZE | DEPTH | INSPECTOR | | |

| DEPTH | PENE RATE | CIRC RET LOSS | AIRLIFT Q (gpm) | MATERIAL | SYM-BOL | DESCRIPTION and COMMENTS |
|-------|-----------|---------------|-----------------|---|---------|---|
| 280 | 1 1/2 | | | lt gr. to gen. phos. sandy clay | | phos. sandy clay, grn, moderately to slightly hd. |
| 300 | 1 1/2 | | | phos. clay | | very hard ledge |
| 320 | 1 1/2 | | | green phos. clay w/ minor sand | | hard, less clay, cemented ss. l.s. fragments |
| 340 | 1 1/2 | | | ? | | bell clay, with phos. inclusions, w/ld fclsp. ss? |
| 360 | 1 1/2 | | | lt gr. to off white calc sand c. & l.s. | | 12" ATB, Bl. St. Csg |
| 380 | 1 1/2 | | | ? | | CEMENT GRout |
| 400 | 1 1/2 | | | ? | | incr. sand, pred. gtz. becoming coarser. |
| 420 | 1 1/2 | | | ? | | lower 10', ry soft, off-white, sandy clay |
| 440 | 1 1/2 | | | ? | | drilling harder traces of l.s. & shell |
| 460 | 1 1/2 | | | ? | | soft |
| 480 | 1 1/2 | | | ? | | soft tan-yellow/brown clay 418-421 |

LOG OF WELL F-1

SHEET 4 OF 6

| PROJECT AND LOCATION | | | | | ELEVATION AND DATUM | | PROJECT NO. | |
|--|------|-------|------|-------|---------------------|-------------|------------------|--|
| JACKSONVILLE ELECTRIC AUTHORITY - EASTPORT | | | | | | | 3332 | |
| DRILLING AGENCY | | | | | DATE STARTED | | DATE FINISHED | |
| DRILLING EQUIPMENT | | | | | ROD LENGTH | | COMPLETION DEPTH | |
| | | | | | | | ROCK DEPTH | |
| BIT | SIZE | DEPTH | SIZE | DEPTH | NO. SOIL SAMPLES | METHOD | | |
| | SIZE | DEPTH | SIZE | DEPTH | NO WATER SAMPLES | WATER LEVEL | | |
| CASING | SIZE | DEPTH | SIZE | DEPTH | FOREMAN | | | |
| | SIZE | DEPTH | SIZE | DEPTH | | | | |
| SCREEN SETTING | SIZE | DEPTH | SIZE | DEPTH | INSPECTOR | | | |
| | SIZE | DEPTH | SIZE | DEPTH | | | | |

| DEPTH | PENE RATE | CIRC RET LOSS | AIRLIFT O (gpm) | MATERIAL | SYM. BOL | DESCRIPTION and COMMENTS |
|-------|-----------|---------------|-----------------|--|----------|--|
| 420 | | | | | | 420-429 hard ledge ss. (?) |
| 440 | 0.720 min | | | | | incr. l.s. cont. and add'l calc. cement
incr. in clay cont. decr. in sand
becoming greener |
| 460 | 0.747 | | | 14 gr to
low sandy
clay | | mud color lightening
begin drilling and washing every 5 feet
for sampling |
| 480 | 0.750 | | | l.s. and
shell
@ 470' | | shell bed - frags of broken white shells
mud lightening up in color.
limestone - white, circ. from ~464' |
| 500 | 0.750 | | | shell
limestone
& calc
ss.
white, chalky | | 474- mostly fin. blk. shell parts, tr. blue l.s.
479- mostly shell frags, 30% sand (qtz) tr. phosph.
no clay
incr. shell cont w/ l.s. frags, decr. sand cont |
| 520 | 0.750 | | | 0.210 l.s.;
Top of Floridan
Aquifer | | Aug. fossils id'd by GS begin ~470' cuttings
down to well. Few core cuttings, many are fx.
~490-497 drilling attly harder tr. phosph. tr. clay
12" A-SS Bl. S. Cons. To 521 |
| 540 | | | | white
limestone
w/ shal | | TO 17" hole |
| 560 | | | | | | |



ENVIROSPHERE COMPANY

DIVISION OF EBASCO SERVICES INCORPORATED

LOG OF WELL F-1

SHEET 5 OF 6

| | | | | | | | |
|---|--|------------------|--|---------------------|--|----------------------------|--|
| PROJECT AND LOCATION
JACKSONVILLE ELECTRIC AUTHORITY - EASTPORT | | | | ELEVATION AND DATUM | | PROJECT NO.
3332 | |
| DRILLING AGENCY | | | | DATE STARTED | | DATE FINISHED | |
| DRILLING EQUIPMENT | | | | ROD LENGTH | | COMPLETION DEPTH | |
| ROCK DEPTH | | NO. SOIL SAMPLES | | METHOD | | | |
| NO WATER SAMPLES | | WATER LEVEL | | | | | |
| FOREMAN | | | | | | | |
| INSPECTOR | | | | | | | |

| DEPTH | PENE. RATE | CIRC. RET. LOSS | AIRLIFT Q (gpm) | MATERIAL | SYM-BOL | DESCRIPTION and COMMENTS |
|-------|------------|-----------------|-----------------|---|---------|---|
| 560 | | | | white limestone | | white limestone, fossiliferous in places
abundant shell frags. in places |
| 580 | | | | | | |
| 600 | | | 1100 gpm | white limestone w/ shell | | * well drilled to 599. Mud began thinning out
Well began flowing ~ 1330 hrs.
Meas. Q in channel:
channel 2.8' x 0.65' } ~ 1170 gpm
vel. ~ 5' / 3.5 sec.
Water sampled T = 23°C
E = 900 µmhos/cm Sal. < 0.5% |
| 620 | | | 1100 gpm | | | Began drilling @ 599 w/ air & water @ 13 ~ 750 am
air compressor "popping off" switch over to reverse air |
| 640 | | | | soft med hd white to beige shelly limestone | | meas. Q @ 627 = 1100 gpm
Sample @ 659'
T = 23°C
EC = 780
Sal = < 0.5% |
| 660 | | | | | | softer, white to beige shelly |
| 680 | 27 min | | | | | |
| 700 | | | | | | harder beds
meas Q 7.6' x 0.7' 14.5 sec / 15' ~ 1000 gpm |



EN' 'ROSHERE COMPANY

DIVISION OF EBASCO SERVICES INCORPORATED

J 2496

LOG OF WELL FI

SHEET 6 OF 6

| | | | | | | | |
|---|--|------|-------|---------------------|--|----------------------------|--|
| PROJECT AND LOCATION
JACKSONVILLE ELECTRIC AUTHORITY - EASTPORT | | | | ELEVATION AND DATUM | | PROJECT NO.
3332 | |
| DRILLING AGENCY | | | | DATE STARTED | | DATE FINISHED | |
| DRILLING EQUIPMENT | | | | ROD LENGTH | | COMPLETION DEPTH | |
| BIT | | SIZE | DEPTH | NO. SOIL SAMPLES | | METHOD | |
| BIT | | SIZE | DEPTH | NO. WATER SAMPLES | | WATER LEVEL | |
| CASING | | SIZE | DEPTH | FOREMAN | | | |
| SCREEN SETTING | | SIZE | DEPTH | INSPECTOR | | | |

| DEPTH | PENE RATE | CIRC RET LOSS | AIRLIFT Q (gpm) | MATERIAL | SYM BOL | DESCRIPTION and COMMENTS |
|-------|-----------|---------------|-----------------|-----------------------------------|---------|---|
| 700 | | | | WHITE TO BUFF LIMESTONE AND SHELL | | GENUINELY SOFT BUFF TO WHITE L.S. & SHELL |
| 720 | | | | | | ALIGHTING SOFT & HARD LEDGES |
| 740 | | | | AVON PARK (dolomitic) limestone | | w. hd @ 724' - cutting larger - chips 1/4" fr. of chalk? bent. clay(?) white 733' drill fluid dker - cream colored 738 w. hd. gte? dolomite? mild reaction to HCl, along fissures in rock chips H. burn. ruggy dolomite |
| 760 | | | | | | 751 - H. to dk buff. dolomite alt seams |
| 780 | | | | | | TOTAL DEPTH 752' |
| 800 | | | | | | Water Sample @ 752' |
| 820 | | | | | | T = 23°C
tz = 780 cmhos/cm
Sal = < 0.57. |
| 840 | | | | | | MEASURED DISCHARGE:
CHANNEL WIDTH = 2.75' DEPTH = 0.75'
avg vel. = 15' / 13.2 SEC.
Q ≈ 1100 gpm |
| 860 | | | | | | MEAS. JET HEAD = 3 1/2"
Q ≈ 1500 gpm
(probably not valid because of flange on 12") |
| 880 | | | | | | |
| 900 | | | | | | |

Recorded by YOST

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 3-3-1980

GENERAL SITE DATA (0)

Check One ☒ English ☐ Metric Units

Site Ident No 302429081335401 RG Number R=0 Transaction T= (A) D M V
 Site-Type 2= C D H I M P T (W) * Data Reliability 3= (C) U L M * Reporting Agency 4= F.L.O.3.9 *
 Project No. 5= District 6= 1.2.1 * State 7= 1.2 * County (or town) Duval 8= 0.3.1 *
 Latitude 9= 30.24.29 * Longitude 10= 08.13.54 * Lat-Long Accuracy 11= S (F) T M *
 Local Number 12= Land Net Loc. 13= N.W.N.W. S.W.S. 1.4. T. 1.5. R. 2.7. E. *
 Location Map 14= EASTPORT * Scale 15= 240.0.0. *
 Altitude 16= 51.0. * Method of Measurement 17= A L (M) * Accuracy 18= 2.5 *
 Topo Setting 19= D C E F H K (L) O P S T U V W * Hydrologic Unit (OWDC) 20= 030.801.0.3 *
 Date of First Construction/Completion 21= 0.0/0.0/1.9.80 * Use of Site 23= A D E G H O M P R S T U (W) X Z *
 Use of Water 24= A B C D E F (H) I M N P R S T U Y Z *
 Secondary Water Use 25= * Tertiary Use of Water 26= * Depth of Hole 27= * Depth of Well 28= * Source of Depth Data 29= *
 Water Level 30= 22.92 * Date Measured 31= 0.2/2.9/1.9.80 * Source 33= D *
 Method of Measurement 34= A C E (G) H L M R S T V Z *
 Site Status 37= D F G H O P R S T V X Z *
 Source of Geohydrologic Data 36= * Pump Used 35= * Measuring Point 268= -1.0.0 * Measuring Point Date 267= 0.2/2.9/1.9.80 *

OWNER IDENTIFICATION (1)

R=158 * T= (A) D M * Date of Ownership 159= 0.0/0.0/1.9.80 *
 Name: Last 181= JENKINS * First 182= A.L.V.I.N. * Middle Initial 183= *

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 * T= (A) D M * Ident 190= S.J. * Assigner 191= F.L.A.W.M.D. *
 New Card Same R. T Ident 190= N.E.W.B.E.R.L.I.N. * Assigner 191= F.L.O.3.9 *

SITE VISIT DATA (1)

R=186 * T= (A) D M * Date of Visit 187= 0.2/2.9/1.9.80 * Name of Person 188= YOST *

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 * T= A D M * Date 193= / / * Geohydrologic Unit 195= *
 New Card Same R. thru 195
 Temperature 196= 0.0.0.1.0.0 * Degrees C 197= *
 Conductance 196= 0.0.0.9.5.0 * μ Mhos 197= *
 Other (STORET) Parameter 196= * Value 197= *
 Other (STORET) Parameter 196= * Value 197= *

FOOT NOTES:

① Source of Data Codes:

S O O A R L G Z
 reporting, driller, owner, other gov't. other logs, geologist, other agency reported.

R = 90 * T = (A) D M * Entry No 256 # 0.0.1 * Depth to Top 91 = * Depth to Bottom 92 = *

Unit Identifier 93- 1,20, F.L.R.D*

Lithology 96- LMSN *

| | | | |
|------------------------|------|--------|---|
| Lithologic
Modifier | 97 = | MARINE | * |
|------------------------|------|--------|---|

AQUIFER DATA (2)

| | |
|--------|---|
| R = 94 | * |
|--------|---|

| | | | | |
|-----|---|---|---|---|
| T = | A | D | M | * |
|-----|---|---|---|---|

add, delete, modify

Geohydrologic Unit Entry No

| | | | |
|-------|--|--|---|
| 258 # | | | * |
|-------|--|--|---|

Date

| | | | | | | | | |
|------|-------|---|-----|---|------|--|--|---|
| 95 # | | / | | / | | | | * |
| | month | | day | | year | | | |

Water Level 126 =  *

| | | | |
|---------------------|-------|--|---|
| % Water Contributed | 132 = | | * |
|---------------------|-------|--|---|

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M *

Entry No. 256 #

Depth to Top 31 =

| | | | | | | |
|-----------------|------|--|--|--|--|---|
| Depth to Bottom | 92 = | | | | | * |
|-----------------|------|--|--|--|--|---|

| | | | |
|-----------------|------|--|---|
| Unit Identifier | 93 = | | * |
|-----------------|------|--|---|

| | | | | |
|-----------|------|--|--|---|
| Lithology | 96 = | | | * |
|-----------|------|--|--|---|

[illegible]**AQUIFER DATA (2)**

| | | | | |
|---------------------|---|---|---|---|
| R = 94 | * | | | |
| T = | A | D | M | * |
| add, delete, modify | | | | |

Geohydrologic Unit Entry No.

| | | |
|-------|--|---|
| 256 # | | * |
|-------|--|---|

Date **95 #** / / *
month day year

Water Level 126 -

| | | | |
|---------------------|-------|--|---|
| % Water Contributed | 132 = | | * |
|---------------------|-------|--|---|

PERTINENT REMARKS

| | |
|---------|-----|
| R - 183 | * |
| T - | A * |

185-1

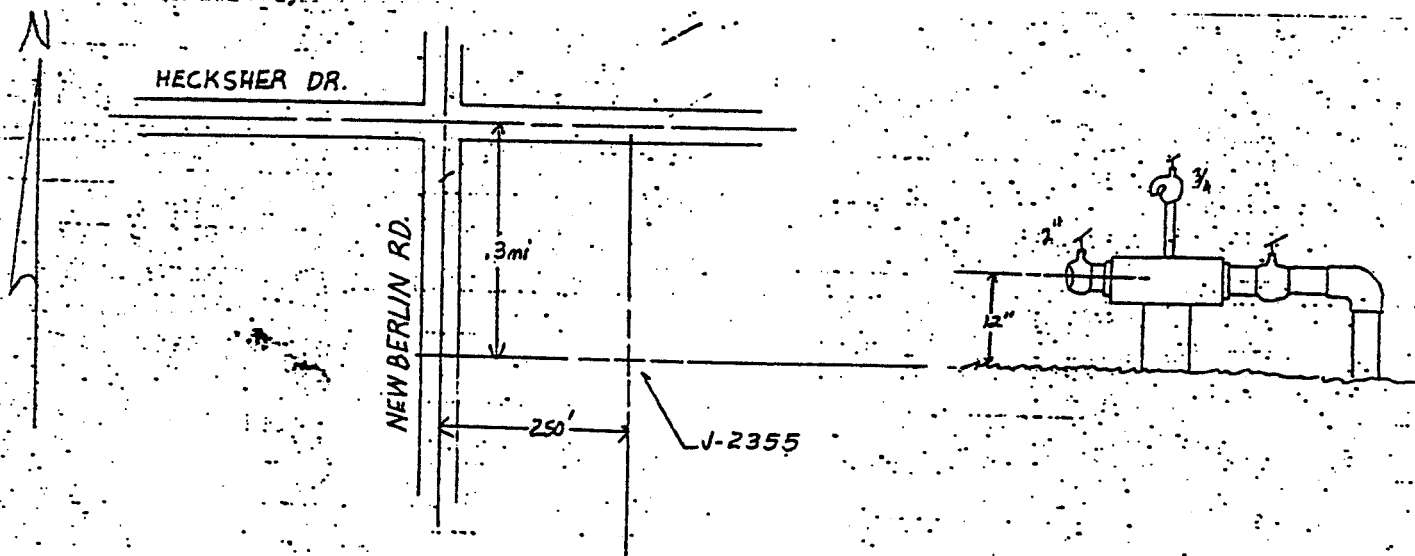
New Card Same R&T

| | | |
|------|--|---|
| 185- | | * |
|------|--|---|

185

NOTES:

| | | | | | | | | | | | | | | | | | |
|------|---|----|-----|---|------|---|---|---|---|----|----|---|---|---|---|---|---|
| R-22 | * | T= | (A) | * | 215= | 9 | 8 | 7 | 7 | IN | EW | B | E | R | L | I | N |
|------|---|----|-----|---|------|---|---|---|---|----|----|---|---|---|---|---|---|



Revised September 1980

SITE NO. 30240408.1342001

Recorded by ESS EXU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULEDate 5-13-85Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (0)

Site Ident No 30240408.1342001 RG Number R=0* Transaction T= D M V
 Site-Type 2= C D E H I M O P S T X Data 3= U Reliability 4= FL039
 Project No. 5= District 6= 121 State 7= 12 County (or town) Duval 8= 031
 Latitude 9= 302404 Longitude 10= 0813420 Lat-Long Accuracy 11= S E T M
 Local Number 12= 4153 Land Net Loc. 13= LND. GATS 46 T 1 S R 27 E
 Location Map 14= EAST PORT Scale 15= 24000
 Altitude 16= 101 Method of Measurement 17= A L Accuracy 18= 5
 Topo Setting 19= A B C D E F G H K L M O P S T U V W Hydrologic Unit (OWDC) 20= 03080103
 Use of Site 23= A C D E G H M O P R S T U X Z Secondary Site Use 301= Tertiary Site Use 302=
 Use of Water 24= A B C D E F H I J K M N P Q R S T Y Z
 Secondary Water Use 25= Tertiary Use of Water 26= Depth of Hole 27= Depth of Well 28= Source of Depth Data 29=
 Water Level 30= Data Measured 31= Source 33=
 Method of Measurement 34= A B C E G H L M N R S T V Z
 Site Status 37= D E F G H I J N O P R S T V W X Z
 Source of Geohydrologic Data 38= Pump Used 35= Date of First Construction/Completion 21= 02/00/1965

OWNER IDENTIFICATION (1)

R=158 T= D M Date of Ownership 159= 00/00/1979
 Name: Last 161= JEA First 162= Middle Initial 163=

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 T= D M Ident 190= SJ Assigner 191= FLA WMD
 New Card Same R & T Ident 190= AUGUST Assigner 191= FL039

SITE VISIT DATA (1)

R=186 T= D M Date of Visit 187= 05/06/1985 Name of Person 188= ESS EX

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 T= A D M Date 193= Geohydrologic Unit 195=
 New Card Same R thru 195
 Temperature 196= 00.010 Degrees C 197=
 Conductance 196= 00.095 μ Mhos 197=
 Other (STORET) Parameter 196= Value 197=
 Other (STORET) Parameter 196= Value 197=

FOOT NOTES:

① Source of Data Codes:

A O G L M O R S Z
 author, driller, geologist, logs, memory, owner, other, reporting, other
 party, reported, agency

WELL CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No 59 # 00 * Date of Construction Completion 60 = 00/00/1965 * Source of ^① Const. Data 64 = R *

Name of Contractor/Driller 63 = *

Method of Construction 65 = A B C D H J P R T V W Z *

Finish 66 = C F G H I P S T W X Z * Type of Seal 67 = B C G N Z *

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *

Special Treatment During Development 71 = C D E F H M Z *

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # *

New Card for Each Hole Segment Same R, T & Field 59

| Top of Hole Segment Below LSD | Bottom of Hole Segment below LSD | Diameter of Hole Segment |
|-------------------------------|----------------------------------|--------------------------|
| <u>73 #</u> * | <u>74 =</u> * | <u>75 =</u> * |
| <u>73 #</u> * | <u>74 =</u> * | <u>75 =</u> * |
| <u>73 #</u> * | <u>74 =</u> * | <u>75 =</u> * |
| <u>73 #</u> * | <u>74 =</u> * | <u>75 =</u> * |
| <u>73 #</u> * | <u>74 =</u> * | <u>75 =</u> * |

CASING SCHEDULE (2)

R = 78 * T = A D M * Construction Entry No 59 # * New Card for Each Casing With Same R, T & Field 59

| Top of Casing Segment Below LSD | Bottom of Casing Segment Below LSD | Diameter of Casing Segment | Casing Material ^⑤ | Thickness of Casing |
|---------------------------------|------------------------------------|----------------------------|------------------------------|---------------------|
| <u>77 #</u> * | <u>78 =</u> * | <u>79 #</u> * | <u>80 =</u> * | <u>81 =</u> * |
| <u>77 #</u> * | <u>78 =</u> * | <u>79 #</u> * | <u>80 =</u> * | <u>81 =</u> * |
| <u>77 #</u> * | <u>78 =</u> * | <u>79 #</u> * | <u>80 =</u> * | <u>81 =</u> * |
| <u>77 #</u> * | <u>78 =</u> * | <u>79 #</u> * | <u>80 =</u> * | <u>81 =</u> * |
| <u>77 #</u> * | <u>78 =</u> * | <u>79 #</u> * | <u>80 =</u> * | <u>81 =</u> * |

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # * New Card for Each Open Section With Same R, T and Field 59

| Top of Section Below LSD | Bottom of Section Below LSD | Type of Openings ^⑥ | Type of Material ^⑦ | Diameter of Open Section | Width of Opening | Length of Opening |
|--------------------------|-----------------------------|-------------------------------|-------------------------------|--------------------------|------------------|-------------------|
| <u>83 #</u> * | <u>84 =</u> * | <u>85 =</u> * | <u>86 =</u> * | <u>87 =</u> * | <u>88 =</u> * | <u>89 =</u> * |
| <u>83 #</u> * | <u>84 =</u> * | <u>85 =</u> * | <u>86 =</u> * | <u>87 =</u> * | <u>88 =</u> * | <u>89 =</u> * |
| <u>83 #</u> * | <u>84 =</u> * | <u>85 =</u> * | <u>86 =</u> * | <u>87 =</u> * | <u>88 =</u> * | <u>89 =</u> * |

DOT NOTES:

① Source of Data Codes:

A D G L M O R S Z

other, driller, geologist, logs, memory, owner, other, reporting, other govt reported agency

⑤ Casing Material Codes

B C D G I M P R S T U W Z

brick, concrete, copper, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other iron iron metal plastic stone steel

⑥ Type of Openings Codes

F L M P R S T W X Z

fracture, louvered, mesh, perforated, wire, screen, sand, walled, open, other shuttered or slotted wound (unknown) point hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z

brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other bronze iron iron metal plastic steel

| | | | |
|--|--------------------------|--------------------------|-----------------------------|
| R = 134 148 * | T = A D M * | Entry No 147# 00. * | Date 148 = 05 06 1985 * |
| Flowing, pumpout | add, delete, modify | | month day year |
| Discharge: 150 = 31.5 * | Source of Data 151 = 5 * | Draw-down 309 = . * | |
| Method of Measurement 152 = B C E F M O P R T U V W Z * | | | |
| bailer, current, estimated, flow, totalizing, orifice, pitot-tube, reported, trajectory, venturi, volumetric, weir, other | | | |
| Production Level 153 = . * | Static Level 154 = . * | Source of Data 155 = . * | Specific Capacity 272 = . * |
| Method of Measurement 156 = A B C E G H L M N R S T V Z * | | | |
| airline, analog, calibrated, estimated, pressure, calibrated, geophysical, manometer, non-rec., reported, test electric, calibrated, other | | | |
| airline | gage pressure gage | logs | logs |

| | | | | |
|---------------------|-----------------------------------|------------------|--|------------------|
| R=42 * | T= A D M *
add, delete, modify | Type of Lift | 43= A B C J P R S T U Z *
air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other | Entry No 254 = * |
| Pump Intake Setting | 44= * | Type of Power | 45= D E G H L N W Z *
diesel, electric, gasoline, hand, LP gas, natural, windmill, other gas | J 4153 |
| Date 38= / / * | | Horsepower 46= * | | |

| | | | | | | | |
|--|---------------|--------------|--------|-----------------------|---------|----------------------|------|
| R = 47 * | T = . A D M * | Type of Lift | 43 # * | Lift Entry No | 254 # * | Manufacturer of Pump | 48 * |
| Serial No of Pump | | 49 * | | Name of Power Company | | 50 * | |
| Power Company Account No | | 51 * | | Power Meter No | | 52 * | |
| Person or Company Who Maintains the Pump | | 54 * | | Additional Lift | | 255 * | |
| | | | | Rated Pump Capacity | | 268 * | |

R=55 * T= A D M * Type of Lift 43# * Type of Power 56# * Horsepower 57# * Lift Entry No 254# *

| | | | | |
|------------------|-------------|--|--------------|---------------------|
| R=198* | T = A O M * | New Card for Each Log Type
Same R & T | End
Depth | Source of
Data ① |
| Type of
Log ② | | Begin
Depth | | |
| 199# * | | 200= | 201= | 202= * |
| 199# * | | 200= | 201= | 202= * |
| 199# * | | 200= | 201= | 202= * |
| 199# * | | 200= | 201= | 202= * |

R = 114 * T = A D M * Begin Year 115 # End Year 116 = Source Agency 117 = Frequency of Collection 3 118 = * Network 5 257 = * Type of Analysis 4 120 = * Analyzing Agency 307 = *

R = 121 * T = A D M * Begin Year 122# End Year 123 = Source Agency 124 =
 add, delete, modify
 Frequency of Collection 3 125 = 5 Network Site 258 =

R = 127 * T = A D M * Begin Year 128 # End Year 129 = Source Agency 130 = Frequency of Collection 131 = * Network Site 5: 259 = * Method of Collection 133 = C E M U Z *
add, delete, modify
calculated estimated matched unknown other

| | | | | | |
|---------------------|----------|------|--|--------------|--------------------------------|
| R-180* | T-A D M* | 312# | 181- | 182-C D R Z* | 261-F M P Z* |
| add, delete, modify | | | add- do nothing, other
erase track, reply | | files, machine, punched, other |
| New Card Same R & T | | 312# | 181- | 182-C D R Z* | 261-F M P Z* |

| | | | | | | | | |
|---|---|---|-----------------|---|---|---|---|---|
| A | D | G | L | M | O | R | S | Z |
| other, driller, geologist, logs, memory, owner, other, reporting, other | | | | | | | | |
| gov't | | | reported agency | | | | | |

| A | B | C | D | F | I | M | Q | S | W | Z | 2 | 3 | 4 | 5 | X |
|-------|----------|---------|--------|----------|----------|----------|------|----------|---------|---------|--------|--------|--------|--------|--------|
| an- | bi- | con- | daily, | semi- | inter- | monthly, | one, | quarter, | semi- | weekly, | other, | every, | every, | every, | every, |
| ness, | monthly, | tinuous | | monthly, | mittent, | | time | annual | annual, | | | 2 | 3 | 4 | 5 |
| | | | | | | | only | | | | | years | years | years | years |

[illegible]

| gamma velocity | | | |
|---------------------------------------|---|---|---|
| 1 | 2 | 3 | 4 |
| national district project coordinator | | | |

| A | B | C | D | E | F | G | H | I | J | K | L | M | N | P | Z |
|--|---|---|---|---|---|---|-----|-----|-----|-----|-------|------|-------|-------|---|
| physical, common, 1700s, postcard, nutrients, sanitary | | | | | | codes, codes, codes, codes, codes, codes, oil or, codes, codes, other | | | | | | | | | |
| and elements | | | | | | S&D | S&E | S&C | S&F | D&E | C&D&E | most | S&C&C | A&S&C | |
| | | | | | | inductive | | | | | | | | | |

-GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= A D M * add, delete, modify
 Entry No 256 # 001 * Depth to Top 91 = * * * * * Depth to Bottom 92 = * * * * *
 93 = 120 FLD * 304 = * * 96 = LMG * 97 = MARINE *
 Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)

R=94 * T= A D M * add, delete, modify
 Date 95 # / / * month day year
 Geohydrologic Unit Entry No 256 # * * * * *
 Water Level 126 = * * * * * % Water Contributed 132 = * *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 * T= A D M * add, delete, modify
 Entry No 256 # * * * * * Depth to Top 91 = * * * * * Depth to Bottom 92 = * * * * *
 93 = * * * * * 304 = * * 96 = * * * * * 97 = * * * * *
 Unit Identifier Contributing Unit Lithology Lithologic Modifier

AQUIFER DATA (2)

R=94 * T= A D M * add, delete, modify
 Date 95 # / / * month day year
 Geohydrologic Unit Entry No 256 # * * * * *
 Water Level 126 = * * * * * % Water Contributed 132 = * *

PERTINENT REMARKS

R=183 * T= A D M * add, delete, modify New Card Same R&T
 Remark No. 311 # * 185 = * * * * *
 311 # * 185 = * * * * *

① Contributing Unit Codes

P S N U
 primary secondary non- unknown
 contributing contributing contributing

R=212 * T= A D M * AUGUST DRIVE



| | |
|--|--|
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| | |
| | |

Revised September 1980

SITE NO 302545081330901

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULERecorded by GLENNDate 1-5-83Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (10)

Site Ident No 302545081330901 RG Number R=0 Transaction T= D M V *
 Site-Type 2=C D E H I M O P S T X * Data 3= C U * Reporting Agency 4= FLC39 *
 Project No 5= * District 6= 121 * State 7= 12 * County (or town) 8= 031 *
 Latitude 9= 30 25 45 * Longitude 10= 08 13 09 * Lat Long Accuracy 11= S O T M *
 Loca Number 12= D-3065 J-3619 * Land Net Loc. 13= N 15 S S E S 12 T 15 R 27 E *
 Location No 14= EAST ROCK * Scale 15= 24000 *
 Altitude 16= 100 * Method of Measurement 17= A L C * Accuracy 18= 5 *
 Topographic 19= A B C D E G H K L M O P S T U V W * Hydrologic Unit (OWDC) 20= 03080103 *
 Site 21= A C D E G H M O P R S T U X Z * Secondary Site Use 301= * Tertiary Site Use 302= *
 Use of Water 24= A B C D E F H I J K M P Q R S T U Y Z *
 Secondary Water Use 25= * Tertiary Use of Water 26= * Depth of Hole 27= * Depth of Well 28= * Source of 29= *
 River Level 30= * Date Measured 31= / / * Source 33= *
 Method of Measurement 34= A B C E G H L M N R S T V Z *
 Site Status 37= D E F G H I J N O P R S T V W X Z *
 Date of First Construction/Completion 21= 12 00 1983 *

OWNER IDENTIFICATION (1)

R=158 * T= D M V * Date of Ownership 159= 12 00 1983 *
 Name Last 161= TEA * First 162= * Middle Initial 163= *

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 * T= D M V * Ident 190# ST * Assigner 191= FLANMP *
 New Card Same R & T Ident 190# NEW RECKIT * Assigner 191= FLC39 *

SITE VISIT DATA (1)

R=186 * T= D M V * Date of Visit 187# 01 05 1984 * Name of Person 188= GLENN *

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 * T= A D M V * Date 193# / / * Geo-hydrologic Unit 195= *
 Temperature 196# 0 0 0 1 0 * Degrees C 197= *
 Conductance 196# 0 0 0 9 5 * μ Mhos 197= *
 Other (STORET) Parameter 196# * Value 197= *
 Other (STORET) Parameter 196# * Value 197= *

FOOTNOTES

R = 58 * T = A D M * Entry No 59 # 001 *

Date of Construction 60 12 00 1983 *

Source of Const. Data 64 D *

Name of Contractor 63 LAYNE

 Method of Construction 65 = A B C D H J P R T V W Z *
 air, rotary, bored, or augered, cable, tool, dug, hydraulic, rotary, jetted, air percussive, reverse, rotary, trenching, driven, driven, wash, other

 Finish 66 = C F G H P S T W X Z * Type of Seal 67 = B C G N Z *
 porous, concrete, gravel, gravel, horizontal, open, perforated, screen, sand point, welded, open, other
 concrete, perl, screen, gallery, end, or slotted, air, none, other, surged, other pump

 Bottom of Seal 68 = * Method of Development 69 = A B C J N P S T *
 air-lift, bailed, compressed, jetted, none, other, surged, other pump

 Special Treatment During Development 71 = C D E F H M Z *
 chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

J3619

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # *

Top of Hole Segment Below LSD

 73 # *
 73 # *
 73 # *
 73 # *
 73 # *

Bottom of Hole Segment below LSD

 74 # *
 74 # *
 74 # *
 74 # *
 74 # *

Diameter of Hole Segment

 75 # *
 75 # *
 75 # *
 75 # *
 75 # *

New Card for Each Hole Segment With Same R, T, & Field 59

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 # *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

 77 # *
 77 # *
 77 # *
 77 # *
 77 # *

Bottom of Casing Segment Below LSD

 78 # *
 78 # *
 78 # *
 78 # *
 78 # *

Diameter of Casing Segment

 79 # *
 79 # *
 79 # *
 79 # *
 79 # *

Casing Material 5

 80 # *
 80 # *
 80 # *
 80 # *
 80 # *

Thickness of Casing

 81 # *
 81 # *
 81 # *
 81 # *
 81 # *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # *

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # *

Bottom of Section Below LSD

84 # *

Type of Openings 6

85 # *

Type of Material 7

86 # *

Diameter of Open Section

87 # *

Area of Opening

88 # *

Length of Opening

89 # *

(Openings Data)

 83 # *
 84 # *
 85 # *
 86 # *
 87 # *
 88 # *
 89 # *

(Openings Data)

 83 # *
 84 # *
 85 # *
 86 # *
 87 # *
 88 # *
 89 # *

FOOTNOTES

5 of Data Codes

 A D G L M O R S Z
 drilled, augered, lost, memory, owner, other, reporting, other
 reported, agency

6 Casing Material Codes

 B C D G I M P R S T U W Z
 brick, concrete, copper, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other
 iron, iron, metal, plastic, stone, steel

7 Type of Material Codes for Open Sections

 F L M P R S T W X Z
 fine, medium, mesh, perforated, wire, screen, sand, welded, open, other
 slotted, or slotted, wound, unknown, point, hole

 B C G I M P R S T Z
 brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tin, other
 bronze, iron, metal, plastic, steel

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 *

T= A D M *

add, delete, modify

Entry No 256 # 601 *

Depth to Top 91 *

Depth to Bottom 92 *

93= 10000000 *

Unit Identifier

304= *

Contributing Unit

96= LMSN *

Lithology

97= MARINE *

Lithologic Modifier

AQUIFER DATA (2)

R=94 *

T= A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *
month day year

Water Level 126 = *

% Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 *

T= A D M *

add, delete, modify

Entry No 256 # *

Depth to Top 91 *

Depth to Bottom 92 *

93= *

Unit Identifier

304= *

Contributing Unit

96= *

Lithology

97= *

Lithologic Modifier

AQUIFER DATA (2)

R=94 *

T= A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # *

Date 95 # / / *
month day year

Water Level 126 = *

% Water Contributed 132 = *

PERTINENT REMARKS

R=183 *

T= A D M *

add, delete, modify

New Card Same R&T

Remark No. 311 # * 185 = *
311 # * 185 = *

Contributing Unit Codes

P S N U
Primary Secondary Non-unknown

R=212 *

T= A *

212 *

NEW BELT ROAD

N

FAYE RD
1.45 mile

XJ-3620
1.2 mile

6 mile

XJ-3619

1.2 mile
XJ-3618

NEW BELT

HECKSCHER DR.

WATER CONSERVATION PROGRAM
WATER WELL FIELD INSPECTION REPORT

D-3065

Complaint No. _____ TWUP No. _____ Construction/Plugging Permit No. 80-66 Well Inventory No. J-3419
Is Well Free Flowing? Yes ☐ No ☒ well "B"
Owner JEA NORTHSTAR COAL PLANT Phone _____
Owner's Address NEW BERLIN RD
Well Location Address _____
Well Drilling Contractor LAYNE-ATLANTIC License/Bond No. _____
Site Identification: 30 2545 081 3309 01 Lat./Long (if different) 30 _____ 081 _____ 01
NW SE SE 12 Section 15 Range 27E Quad Map Name EASTPORT
Depth of Hole Drilled 750 Depth of Well 750 How measured Driller's Rept
Diameter/Cross Section 24 X 18 Depth of Casing 500
Depth and Diameter of Well Segments: 24 " from LSD to 100 ' 18 " Dia. from 100 ' to 750 ' " Dia. from _____ ' to _____ '
Depth and Diameter of Casing Segments: 24 " Dia. from _____ ' Above LSD Below _____ '
To: 100 ' 18 " Dia. from Above LSD 2 ' to 500 '
Type and Quantity of Grouting Used 600 S1 & Cement Well centered in Grout? _____
Use of Well Industrial Number of People Served _____
Water Level 22 ' Above LSD Below _____ ' Measuring Pt. 2 ' Above LSD Below _____ '
How Measured Rept Measured by Driller Date 12-13-83
Method of Construction Reverse Rotary Date of Construction 12-13-83
Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.) New
Casing Material Used Steel
Altitude 10 Interval 10
Topo Setting FLAT
Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer than 300' _____
Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____
Maximum Well Yield _____ GPM Average Well Yield _____ GPM

Free Flow Well Yield _____ GPM How Yield Determined _____

Frequency of Well Use 2 1/2 Hrs/Day 265 Days/Year

Pump Data - Type and Make Test pump Kayne 14 THC line shaft HP _____

Pump Capacity 1800 GPM 20 ft of total dynamic head No. Bowls or Stages 6

Type of Power Elect Static Water Level 22 ft above 65D

Production Water Level _____ Pump Intake Setting _____ = Depth of Section Line

Water Sampled for: Dissolved Solids _____ Conductivity _____

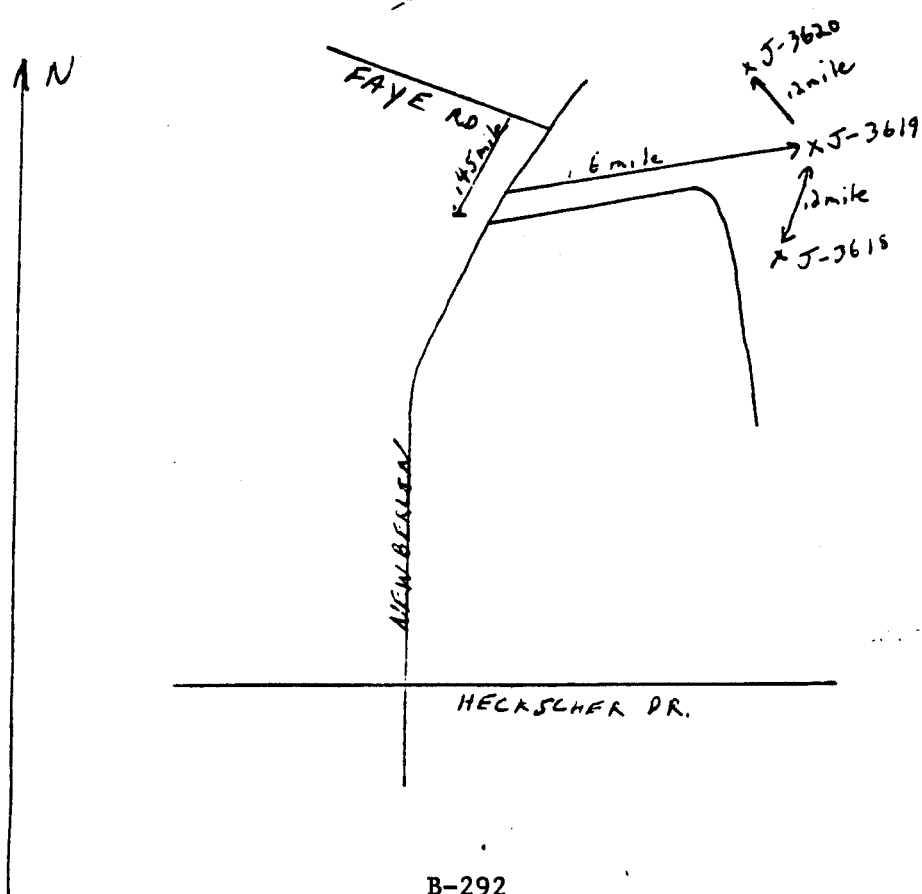
Hardness _____ Chlorides _____ PH= _____ Temperature _____ °C

General Rating: Poor _____ Average _____ Good ✓ Excellent _____

Action Taken/Comments _____

Follow Up Needed _____

Inspector's Name Glen Field Inspection Date 1-5-84



STATE OF FLORIDA
WATERWELL CONTRACTOR'S
WELL COMPLETION REPORT
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES
225 Pennington Building, Tallahassee, Florida 32304
Telephone: (904) 488-3476

No. 68304

Permit No. 1-1000-01

Owner's Well Identification

State Well Number
For Department Use
ONLY

| 1. OWNER'S INFORMATION
Name _____
Address _____
City _____ State _____ | | 2. LOCATION OF WELL
Street Address/Road _____
City _____ County _____
Subdivision _____ Lot No. _____
Section _____ Township _____ Range _____ | | 3. PURPOSE OF WELL
☐ Domestic ☐ Irrigation ☐ Public Supply
☐ Industrial ☐ Stock ☐ Other _____ | | 4. TYPE OF WORK
☐ New Well ☐ Plugging ☐ Other _____
☐ Deepening ☐ Reconditioning | | 5. QUALITY
☐ Clear ☐ Colored ☐ Sulphur ☐ Salty ☐ Other _____
CHECK TEST MADE
☐ Bacteriological ☐ County Health Dept.
☐ Chemical ☐ State Health Dept.
☐ Chloride ☐ U.S.G.S.
(Check if test was for _____)
Temperature _____
Well Disinfected ☐ Yes ☐ No | | 6. EQUIPMENT
☐ Rotary ☐ Chain Tool ☐ Other _____
☐ Jet ☐ Reverse Rotary | | 7. GROUT
☐ None ☐ Cement ☐ Other _____
Describe and give number of bags (54 lb) _____ From (ft) _____ To (ft) _____ | | 8. CASING AND LINER PIPE
Diameter (Inches) _____ From (ft) _____ To (ft) _____
☐ Steel ☐ Cast Iron ☐ Concrete ☐ Other _____
☐ Check Only ☐ Tracked ☐ Checked ☐ Sealed ☐ Other _____ | | 9. WATER LEVEL
☐ Above ☐ Below land surface
☐ Well Flowing ☐ Not Flowing | | 10. SCREENS
Location (ft) _____
Make _____ Material _____ Size _____ From (ft) _____ To (ft) _____ | | 11. UPPER END OF WELL
☐ Pump Installed ☐ Valve ☐ Cap ☐ Other _____ | | 12. PUMPING TEST
Date _____ Test Pump ☐ Permanent Pump
Measure point _____
which is _____ feet _____ above/below land surface
Static water level _____ feet _____ above/below measure point
Maximum Drawdown _____ feet below measure point
Discharge at maximum drawdown _____ gal/min
After _____ hours | | 13. PUMP INSTALLED
Type _____ Make _____ Model No. _____
Motor Power _____ HP
Capacity _____ gal/min at _____ ft. of total dynamic head
No. of bowls or stages _____
Pump setting _____ feet | | 14. WELL LOG
<table border="1"> <thead> <tr> <th>Well bore (in)</th> <th>Depth (feet)</th> <th>Notes each type of material, producing zones, & cave-ins if any; Give description at not less than 20 foot intervals and at changes.</th> </tr> </thead> <tbody> <tr><td>15</td><td>15</td><td>top sandy soil</td></tr> <tr><td>35</td><td>35</td><td>blue clay, silty, shell</td></tr> <tr><td>66</td><td>66</td><td>green limestone, blue clay, shell</td></tr> <tr><td>80</td><td>80</td><td>green limestone, little sand, soft</td></tr> <tr><td>85</td><td>85</td><td>green limestone, blue clay, shell</td></tr> <tr><td>100</td><td>100</td><td>green limestone, blue clay, shell</td></tr> <tr><td>110</td><td>110</td><td>green limestone, blue clay, shell</td></tr> <tr><td>120</td><td>120</td><td>green limestone, blue clay, shell</td></tr> <tr><td>130</td><td>130</td><td>green limestone, blue clay, shell</td></tr> <tr><td>140</td><td>140</td><td>green limestone, blue clay, shell</td></tr> <tr><td>150</td><td>150</td><td>green limestone, blue clay, shell</td></tr> <tr><td>160</td><td>160</td><td>green limestone, blue clay, shell</td></tr> <tr><td>170</td><td>170</td><td>green limestone, blue clay, shell</td></tr> <tr><td>180</td><td>180</td><td>green limestone, blue clay, shell</td></tr> <tr><td>190</td><td>190</td><td>green limestone, blue clay, shell</td></tr> <tr><td>200</td><td>200</td><td>green limestone, blue clay, shell</td></tr> <tr><td>210</td><td>210</td><td>green limestone, blue clay, shell</td></tr> <tr><td>220</td><td>220</td><td>green limestone, blue clay, shell</td></tr> <tr><td>230</td><td>230</td><td>green limestone, blue clay, shell</td></tr> <tr><td>240</td><td>240</td><td>green limestone, blue clay, shell</td></tr> <tr><td>250</td><td>250</td><td>green limestone, blue clay, shell</td></tr> <tr><td>260</td><td>260</td><td>green limestone, blue clay, shell</td></tr> <tr><td>270</td><td>270</td><td>green limestone, blue clay, shell</td></tr> <tr><td>280</td><td>280</td><td>green limestone, blue clay, shell</td></tr> <tr><td>290</td><td>290</td><td>green limestone, blue clay, shell</td></tr> <tr><td>300</td><td>300</td><td>green limestone, blue clay, shell</td></tr> <tr><td>310</td><td>310</td><td>green limestone, blue clay, shell</td></tr> <tr><td>320</td><td>320</td><td>green limestone, blue clay, shell</td></tr> <tr><td>330</td><td>330</td><td>green limestone, blue clay, shell</td></tr> <tr><td>340</td><td>340</td><td>green limestone, blue clay, shell</td></tr> <tr><td>350</td><td>350</td><td>green limestone, blue clay, shell</td></tr> <tr><td>360</td><td>360</td><td>green limestone, blue clay, shell</td></tr> <tr><td>370</td><td>370</td><td>green limestone, blue clay, shell</td></tr> <tr><td>380</td><td>380</td><td>green limestone, blue clay, shell</td></tr> <tr><td>390</td><td>390</td><td>green limestone, blue clay, shell</td></tr> <tr><td>400</td><td>400</td><td>green limestone, blue clay, shell</td></tr> <tr><td>410</td><td>410</td><td>green limestone, blue clay, shell</td></tr> <tr><td>420</td><td>420</td><td>green limestone, blue clay, shell</td></tr> <tr><td>430</td><td>430</td><td>green limestone, blue clay, shell</td></tr> <tr><td>440</td><td>440</td><td>green limestone, blue clay, shell</td></tr> <tr><td>450</td><td>450</td><td>green limestone, blue clay, shell</td></tr> <tr><td>460</td><td>460</td><td>green limestone, blue clay, shell</td></tr> <tr><td>470</td><td>470</td><td>green limestone, blue clay, shell</td></tr> <tr><td>480</td><td>480</td><td>green limestone, blue clay, shell</td></tr> <tr><td>490</td><td>490</td><td>green limestone, blue clay, shell</td></tr> <tr><td>500</td><td>500</td><td>green limestone, blue clay, shell</td></tr> <tr><td>510</td><td>510</td><td>green limestone, blue clay, shell</td></tr> <tr><td>520</td><td>520</td><td>green limestone, blue clay, shell</td></tr> <tr><td>530</td><td>530</td><td>green limestone, blue clay, shell</td></tr> <tr><td>540</td><td>540</td><td>green limestone, blue clay, shell</td></tr> <tr><td>550</td><td>550</td><td>green limestone, blue clay, shell</td></tr> <tr><td>560</td><td>560</td><td>green limestone, blue clay, shell</td></tr> <tr><td>570</td><td>570</td><td>green limestone, blue clay, shell</td></tr> <tr><td>580</td><td>580</td><td>green limestone, blue clay, shell</td></tr> <tr><td>590</td><td>590</td><td>green limestone, blue clay, shell</td></tr> <tr><td>600</td><td>600</td><td>green limestone, blue clay, shell</td></tr> <tr><td>610</td><td>610</td><td>green limestone, blue clay, shell</td></tr> <tr><td>620</td><td>620</td><td>green limestone, blue clay, shell</td></tr> <tr><td>630</td><td>630</td><td>green limestone, blue clay, shell</td></tr> <tr><td>640</td><td>640</td><td>green limestone, blue clay, shell</td></tr> <tr><td>650</td><td>650</td><td>green limestone, blue clay, shell</td></tr> <tr><td>660</td><td>660</td><td>green limestone, blue clay, shell</td></tr> <tr><td>670</td><td>670</td><td>green limestone, blue clay, shell</td></tr> <tr><td>680</td><td>680</td><td>green limestone, blue clay, shell</td></tr> <tr><td>690</td><td>690</td><td>green limestone, blue clay, shell</td></tr> <tr><td>700</td><td>700</td><td>green limestone, blue clay, shell</td></tr> <tr><td>710</td><td>710</td><td>green limestone, blue clay, shell</td></tr> <tr><td>720</td><td>720</td><td>green limestone, blue clay, shell</td></tr> <tr><td>730</td><td>730</td><td>green limestone, blue clay, shell</td></tr> <tr><td>740</td><td>740</td><td>green limestone, blue clay, shell</td></tr> <tr><td>750</td><td>750</td><td>green limestone, blue clay, shell</td></tr> <tr><td>760</td><td>760</td><td>green limestone, blue clay, shell</td></tr> <tr><td>770</td><td>770</td><td>green limestone, blue clay, shell</td></tr> <tr><td>780</td><td>780</td><td>green limestone, blue clay, shell</td></tr> <tr><td>790</td><td>790</td><td>green limestone, blue clay, shell</td></tr> <tr><td>800</td><td>800</td><td>green limestone, blue clay, shell</td></tr> <tr><td>810</td><td>810</td><td>green limestone, blue clay, shell</td></tr> <tr><td>820</td><td>820</td><td>green limestone, blue clay, shell</td></tr> <tr><td>830</td><td>830</td><td>green limestone, blue clay, shell</td></tr> <tr><td>840</td><td>840</td><td>green limestone, blue clay, shell</td></tr> <tr><td>850</td><td>850</td><td>green limestone, blue clay, shell</td></tr> <tr><td>860</td><td>860</td><td>green limestone, blue clay, shell</td></tr> <tr><td>870</td><td>870</td><td>green limestone, blue clay, shell</td></tr> <tr><td>880</td><td>880</td><td>green limestone, blue clay, shell</td></tr> <tr><td>890</td><td>890</td><td>green limestone, blue clay, shell</td></tr> <tr><td>900</td><td>900</td><td>green limestone, blue clay, shell</td></tr> <tr><td>910</td><td>910</td><td>green limestone, blue clay, shell</td></tr> <tr><td>920</td><td>920</td><td>green limestone, blue clay, shell</td></tr> <tr><td>930</td><td>930</td><td>green limestone, blue clay, shell</td></tr> <tr><td>940</td><td>940</td><td>green limestone, blue clay, shell</td></tr> <tr><td>950</td><td>950</td><td>green limestone, blue clay, shell</td></tr> <tr><td>960</td><td>960</td><td>green limestone, blue clay, shell</td></tr> <tr><td>970</td><td>970</td><td>green limestone, blue clay, shell</td></tr> <tr><td>980</td><td>980</td><td>green limestone, blue clay, shell</td></tr> <tr><td>990</td><td>990</td><td>green limestone, blue clay, shell</td></tr> <tr><td>1000</td><td>1000</td><td>green limestone, blue clay, shell</td></tr> </tbody> </table> | | Well bore (in) | Depth (feet) | Notes each type of material, producing zones, & cave-ins if any; Give description at not less than 20 foot intervals and at changes. | 15 | 15 | top sandy soil | 35 | 35 | blue clay, silty, shell | 66 | 66 | green limestone, blue clay, shell | 80 | 80 | green limestone, little sand, soft | 85 | 85 | green limestone, blue clay, shell | 100 | 100 | green limestone, blue clay, shell | 110 | 110 | green limestone, blue clay, shell | 120 | 120 | green limestone, blue clay, shell | 130 | 130 | green limestone, blue clay, shell | 140 | 140 | green limestone, blue clay, shell | 150 | 150 | green limestone, blue clay, shell | 160 | 160 | green limestone, blue clay, shell | 170 | 170 | green limestone, blue clay, shell | 180 | 180 | green limestone, blue clay, shell | 190 | 190 | green limestone, blue clay, shell | 200 | 200 | green limestone, blue clay, shell | 210 | 210 | green limestone, blue clay, shell | 220 | 220 | green limestone, blue clay, shell | 230 | 230 | green limestone, blue clay, shell | 240 | 240 | green limestone, blue clay, shell | 250 | 250 | green limestone, blue clay, shell | 260 | 260 | green limestone, blue clay, shell | 270 | 270 | green limestone, blue clay, shell | 280 | 280 | green limestone, blue clay, shell | 290 | 290 | green limestone, blue clay, shell | 300 | 300 | green limestone, blue clay, shell | 310 | 310 | green limestone, blue clay, shell | 320 | 320 | green limestone, blue clay, shell | 330 | 330 | green limestone, blue clay, shell | 340 | 340 | green limestone, blue clay, shell | 350 | 350 | green limestone, blue clay, shell | 360 | 360 | green limestone, blue clay, shell | 370 | 370 | green limestone, blue clay, shell | 380 | 380 | green limestone, blue clay, shell | 390 | 390 | green limestone, blue clay, shell | 400 | 400 | green limestone, blue clay, shell | 410 | 410 | green limestone, blue clay, shell | 420 | 420 | green limestone, blue clay, shell | 430 | 430 | green limestone, blue clay, shell | 440 | 440 | green limestone, blue clay, shell | 450 | 450 | green limestone, blue clay, shell | 460 | 460 | green limestone, blue clay, shell | 470 | 470 | green limestone, blue clay, shell | 480 | 480 | green limestone, blue clay, shell | 490 | 490 | green limestone, blue clay, shell | 500 | 500 | green limestone, blue clay, shell | 510 | 510 | green limestone, blue clay, shell | 520 | 520 | green limestone, blue clay, shell | 530 | 530 | green limestone, blue clay, shell | 540 | 540 | green limestone, blue clay, shell | 550 | 550 | green limestone, blue clay, shell | 560 | 560 | green limestone, blue clay, shell | 570 | 570 | green limestone, blue clay, shell | 580 | 580 | green limestone, blue clay, shell | 590 | 590 | green limestone, blue clay, shell | 600 | 600 | green limestone, blue clay, shell | 610 | 610 | green limestone, blue clay, shell | 620 | 620 | green limestone, blue clay, shell | 630 | 630 | green limestone, blue clay, shell | 640 | 640 | green limestone, blue clay, shell | 650 | 650 | green limestone, blue clay, shell | 660 | 660 | green limestone, blue clay, shell | 670 | 670 | green limestone, blue clay, shell | 680 | 680 | green limestone, blue clay, shell | 690 | 690 | green limestone, blue clay, shell | 700 | 700 | green limestone, blue clay, shell | 710 | 710 | green limestone, blue clay, shell | 720 | 720 | green limestone, blue clay, shell | 730 | 730 | green limestone, blue clay, shell | 740 | 740 | green limestone, blue clay, shell | 750 | 750 | green limestone, blue clay, shell | 760 | 760 | green limestone, blue clay, shell | 770 | 770 | green limestone, blue clay, shell | 780 | 780 | green limestone, blue clay, shell | 790 | 790 | green limestone, blue clay, shell | 800 | 800 | green limestone, blue clay, shell | 810 | 810 | green limestone, blue clay, shell | 820 | 820 | green limestone, blue clay, shell | 830 | 830 | green limestone, blue clay, shell | 840 | 840 | green limestone, blue clay, shell | 850 | 850 | green limestone, blue clay, shell | 860 | 860 | green limestone, blue clay, shell | 870 | 870 | green limestone, blue clay, shell | 880 | 880 | green limestone, blue clay, shell | 890 | 890 | green limestone, blue clay, shell | 900 | 900 | green limestone, blue clay, shell | 910 | 910 | green limestone, blue clay, shell | 920 | 920 | green limestone, blue clay, shell | 930 | 930 | green limestone, blue clay, shell | 940 | 940 | green limestone, blue clay, shell | 950 | 950 | green limestone, blue clay, shell | 960 | 960 | green limestone, blue clay, shell | 970 | 970 | green limestone, blue clay, shell | 980 | 980 | green limestone, blue clay, shell | 990 | 990 | green limestone, blue clay, shell | 1000 | 1000 | green limestone, blue clay, shell | 15. CONTRACTOR'S CERTIFICATION:
This work was done under my jurisdiction and this report is true to the best of my knowledge and belief. The work commenced on _____ and was completed on _____.
Contractor _____ License Number _____
Signature of Representative _____ P.O. Box or Street _____
City _____ County _____ State _____
one Number _____ Driller _____ | |
|--|--------------|---|--|--|--|--|--|---|--|---|--|---|--|--|--|---|--|---|--|--|--|--|--|--|--|---|--|----------------|--------------|--|----|----|----------------|----|----|-------------------------|----|----|-----------------------------------|----|----|------------------------------------|----|----|-----------------------------------|-----|-----|-----------------------------------|------|------|-----------------------------------|--|--|
| Well bore (in) | Depth (feet) | Notes each type of material, producing zones, & cave-ins if any; Give description at not less than 20 foot intervals and at changes. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 15 | 15 | top sandy soil | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 35 | 35 | blue clay, silty, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 66 | 66 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | 80 | green limestone, little sand, soft | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 85 | 85 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 100 | 100 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 110 | 110 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 120 | 120 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 130 | 130 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 140 | 140 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150 | 150 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 160 | 160 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 170 | 170 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 180 | 180 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 190 | 190 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 200 | 200 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 210 | 210 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 220 | 220 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 230 | 230 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 240 | 240 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 250 | 250 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 260 | 260 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 270 | 270 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 280 | 280 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 290 | 290 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 300 | 300 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 310 | 310 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 320 | 320 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 330 | 330 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 340 | 340 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 350 | 350 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 360 | 360 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 370 | 370 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 380 | 380 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 390 | 390 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 400 | 400 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 410 | 410 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 420 | 420 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 430 | 430 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 440 | 440 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 450 | 450 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 460 | 460 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 470 | 470 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 480 | 480 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 490 | 490 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 500 | 500 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 510 | 510 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 520 | 520 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 530 | 530 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 540 | 540 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 550 | 550 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 560 | 560 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 570 | 570 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 580 | 580 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 590 | 590 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 600 | 600 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 610 | 610 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 620 | 620 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 630 | 630 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 640 | 640 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 650 | 650 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 660 | 660 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 670 | 670 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 680 | 680 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 690 | 690 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 700 | 700 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 710 | 710 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 720 | 720 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 730 | 730 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 740 | 740 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 750 | 750 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 760 | 760 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 770 | 770 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 780 | 780 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 790 | 790 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 800 | 800 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 810 | 810 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 820 | 820 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 830 | 830 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 840 | 840 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 850 | 850 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 860 | 860 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 870 | 870 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 880 | 880 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 890 | 890 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 900 | 900 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 910 | 910 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 920 | 920 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 930 | 930 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 940 | 940 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 950 | 950 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 960 | 960 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 970 | 970 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 980 | 980 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 990 | 990 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1000 | 1000 | green limestone, blue clay, shell | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULERecorded by GLENNDate 1-5-84

GENERAL SITE DATA (1)

Site Idem No. 302536081331301 RG Number R-0 Transaction T- (A) D M V
 add, delete, modify, verified
 Site-Type 2- C D E H I M O P S T (X) Date 3- (C) U Reliability 6- FLD39
 add, delete, modify, verified
 Project No. 5- Distance 8- 12.7 State 7- 12 County (or town) Duval 8- 0.31
 Latitude 0- 30.53.6 Longitude 10- 081.33.17 Lat-Long Accuracy 11- S (C) T M
 add, delete, modify, verified
 Local Number 12- D-3066 Land Net Loc. 13- SUSESES 12 T 15 R 27 E
 Location Map 14- EASTPORT Scale 15- 24000
 Altitude 16- 10 Method of Measurement 17- A L (C) Accuracy 18- 5
 add, delete, modify, verified
 Topo Setting 19- A B C D E (C) G H K L M O P S T U V W Hydrologic Unit (GWDG) 20- 0308010
 add, delete, modify, verified
 Use of Site 23- A C D E G H M B P R S T U (X) Z Secondary Site Use 301- Tertiary Site Use 302-
 add, delete, modify, verified
 Use of Water 24- A B C D E F H I J K M (C) P Q R S T U V Y Z
 add, delete, modify, verified
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- Depth of Well 28- Source of Depth Data 29-
 Water Level 30- Data Measured 31- / / Source 32-
 Method of Measurement 34- A B C E G H L M N R S T V Z
 add, delete, modify, verified
 Site Status 37- D E F G H I J N G P R S T V W X Z
 add, delete, modify, verified
 Source of Geohydrologic Data 38- Pump Used 35- Date of First Construction/Completion 21- 12/00/1983
 add, delete, modify, verified

OWNER IDENTIFICATION (1)

R-150 T- (C) D M Date of Ownership 150- 12/00/1983
 add, delete, modify
 Name: Last 161- JEA First 162- Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-188 T- (C) D M Idem 188- ST Assigner 191- FLAWAD
 add, delete, modify
 New Card Same R & T Idem 188- NEW B. FELT Assigner 191- FLD39

SITE VISIT DATA (1)

R-188 T- (C) D M Date of Visit 187- 01/05/1984 Name of Person 188- GLENN
 add, delete, modify

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T- A D M Date 193- / / Geohydrologic Unit 195-
 add, delete, modify
 New Card Same R thru 195 Temperature 198- 0.0.0.1.0 Degrees C 197-
 Conductance 198- 0.0.0.0.5 μ Mhos 197-
 Other (STORET) Parameter 198- Value 197-
 Other (STORET) Parameter 198- Value 197-

FOOT NOTES.

1 Source of Data Codes:

A D G L M O R S Z
 other: driller geologist logs memory panel: other: recording other: geologic agency

FIELD DATA SHEET (1)

R = 58 * T = A D M * Entry No 59 # 0431 *

Date of Construction Completion 12 00 / 1983

Chart Data 64 D

Name of Contractor-Driller 63 LAYNE

Lma Atlantic

Method of Construction 65 A B C D H J P R T V W Z *
air, rotary, buried, cable, dug, hydraulic, rotary, jetted, air perc, cushion, reverse, rotary, trenching, driven, other

Finish 66 1 C F G H Ø P S T W Z *
plastic, concrete, gravel, screen, horizontal, open, perforated, screen, sand point, walled, open, other

Bottom of Seal 68 * Method of Development 69 A B C J N P S Z *
air lift, bailed, compressed, jetted, none, other, surged, other pump, air, pump

Special Treatment During Development 71 C D E F H M Z *
chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

J.3618

1. DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # *

Top of Hole Segment Below LSD

73 # *
73 # *
73 # *
73 # *
73 # *

Bottom of Hole Segment below LSD

74 # *
74 # *
74 # *
74 # *
74 # *

Diameter of Hole Segment

75 # *
75 # *
75 # *
75 # *
75 # *

New Card for Each Hole Segment Same R, T & Field 59

2. CASING SCHEDULE (2)

R = 78 * T = A D M * Construction Entry No 59 # *

Top of Casing Segment Below LSD

77 # *
77 # *
77 # *
77 # *
77 # *

Bottom of Casing Segment Below LSD

78 # *
78 # *
78 # *
78 # *
78 # *

New Card for Each Casing With Same R, T & Field 59

Diameter of Casing Segment

79 # *
79 # *
79 # *
79 # *
79 # *

Casing Material 5

80 # *
80 # *
80 # *
80 # *
80 # *

Thickness of Casing

81 # *
81 # *
81 # *
81 # *
81 # *

3. OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # *

Top of Section Below LSD

83 # *

Bottom of Section Below LSD

84 # *

Type of Openings 6

85 # *

Type of Material 7

86 # *

Diameter of Open Section

87 # *

Width of Opening

88 # *

Length of Opening

89 # *

New Card for Each Open Section With Same R, T and Field 59

(Openings Data)

83 # *
84 # *
85 # *
86 # *
87 # *
88 # *
89 # *

(Openings Data)

83 # *
84 # *
85 # *
86 # *
87 # *
88 # *
89 # *

FOOTNOTES

1. Source of Data Codes

A D G L M O R S Z
air, rotary, diesel, logs, memory, owner, other, reporting, other, reported, agency

2. Type of Openings Codes

F L M P R S T W X Z
fractured, cement, perforated, wire, screen, sand, walled, open, other, plugged, or slotted, wound, unknown, point, hole

3. Casing Material Codes

B C D G I M P R S T U W Z
brick, concrete, copper, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other, iron, iron, metal, plastic, stone, steel, steel

4. Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other, bronze, iron, iron, metal, plastic, steel

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No 256 # 001 *

Depth to Top 91 = . . . *

Depth to Bottom 92 = . . . *

93 = J.D.C.F.L.R.D. *

Unit Identifier

304 = *

Contributing Unit

96 = L.A.S.N. *

Lithology

97 = H.A.R.T.N.E. *

Lithologic Modifier

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # . . . *

Date 95 # / / *
month day year

Water Level 126 = . . . *

% Water Contributed 132 = . . . *

J-3618

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 *

T- A D M *

add, delete, modify

Entry No 256 # . . . *

Depth to Top 91 = . . . *

Depth to Bottom 92 = . . . *

93 = . . . *

Unit Identifier

304 = *

Contributing Unit

96 = . . . *

Lithology

97 = . . . *

Lithologic Modifier

AQUIFER DATA (2)

R-94 *

T- A D M *

add, delete, modify

Geohydrologic Unit Entry No 256 # . . . *

Date 95 # / / *
month day year

Water Level 126 = . . . *

% Water Contributed 132 = . . . *

PERTINENT REMARKS

R-183 *

T- A D M *

add, delete, modify

New Card Same R&T

Remark No. 311 # . . . *

185 = . . . *

311 # . . . *

185 = . . . *

Contributing Unit Codes

| P | S | N | U |
|----------------------|------------------------|------------------|---------|
| Primary contributing | Secondary contributing | non-contributing | unknown |

R-212 *

T- A *

218 = NEW ARLIN ROAD *

N

FAYE RD
1.45 mile

XJ-3620 - well A
1.2 mile

XJ-3619 well B
1.2 mile

XJ-3618 well C
1.2 mile

NEW ARLIN

HECKSCHER DR.

U.S. GOVERNMENT PRINTING OFFICE : 1981 O - 3-3-832

WATER CONSERVATION PROGRAM
WATER WELL FIELD INSPECTION REPORT

0-3066

Complaint No. _____ TWUP No. _____ Construction/Plugging Permit No. 80-66 Well Inventory No. J-3618
Well "C"

Is Well Free Flowing? Yes No

Owner JEA NORTH-SIDE COAL PLANT Phone _____

Owner's Address New BERLIN

Well Location Address _____

Well Drilling Contractor LAYNE - ATLANTIC License/Bond No. _____

Site Identification: 30 2536 081 3313 01 Lat./Long (if different) 30 _____ 081 _____ 01

SW SE SE 12 Section TWP 15 Range 27E Quad Map Name EASTPORT

Depth of Hole Drilled 750 Depth of Well 750 How measured Driller's
Right

Diameter/Cross Section 18" X 12" Depth of Casing 500

Depth and Diameter of Well Segments: 24 " from LSD to 100 . '

18 " Dia. from 26 LSD 'to 750 . ' " Dia. from _____ 'to _____ . '

Depth and Diameter of Casing Segments: 24 " Dia. from 2 ' Above LSD
Below

To: 100 . ' 18 " Dia. from 2 LSD 'to 500 . '

Type and Quantity of Grouting Used 600 SLS Cement Well centered in Grout? _____

Use of Well Industrial Number of People Served _____

Water Level _____ Above LSD _____ Measuring Pt. _____ , Above LSD _____
Below Below

How Measured _____ Measured by _____ Date _____

Method of Construction _____ Date of Construction 12-13-83

Condition of Casing/Liner Pipes (wall thickness 0.125" min. new, used; etc.)

New

Casing Material Used _____

Altitude 10 Interval 10

Topo Setting FLAT

Distance to Closest Well of 3" Diameter or Over and/or Depth of 250' or Deeper if closer than 300' _____

Distance to nearest Contaminant - Septic Tank; etc., if less than 100' _____

Maximum Well Yield _____ GPM Average Well Yield _____ GPM

Free Flow Well Yield _____ GPM How Yield Determined _____

Frequency of Well Use 24 Hrs/Day 365 Days/Year

Pump Data - Type and Make _____ HP _____

Pump Capacity _____ GPM No. Bowls or Stages _____

Type of Power _____ Static Water Level _____

Production Water Level _____ Pump Intake Setting _____
= Depth of Section Line

Water Sampled for: Dissolved Solids _____ Conductivity _____

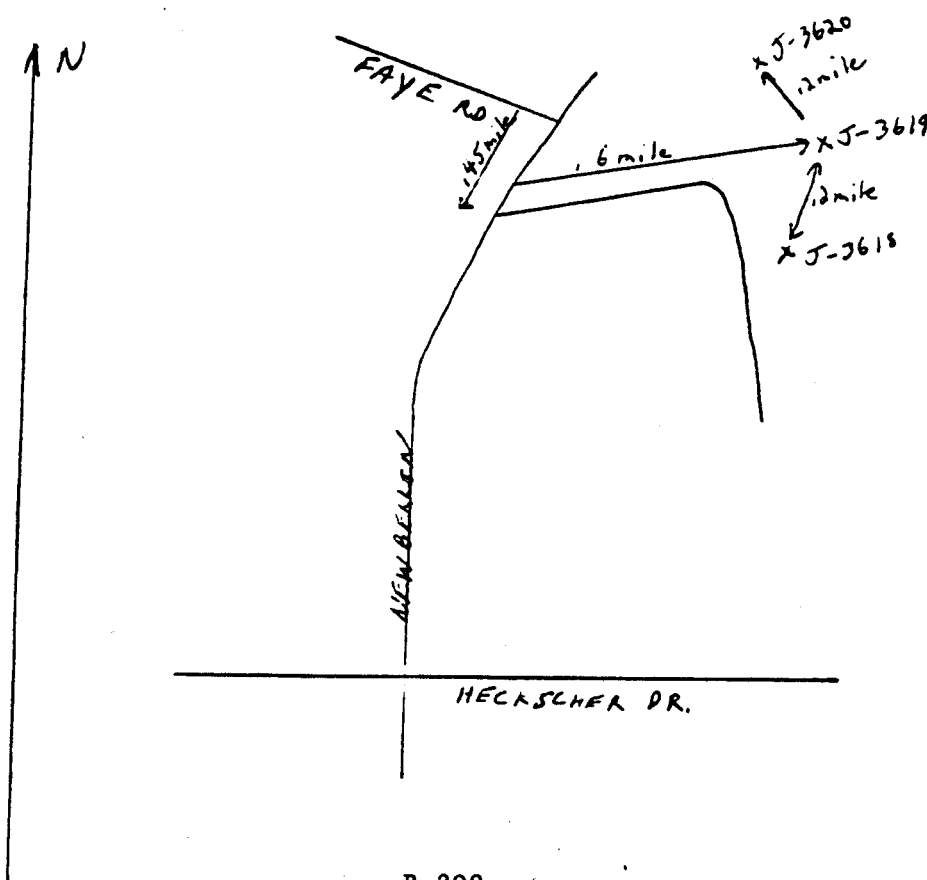
Hardness _____ Chlorides _____ PH= _____ Temperature _____ °C

General Rating: Poor _____ Average _____ Good ☒ Excellent _____

Action Taken/Comments _____

Follow Up Needed _____

Inspector's Name Glen Field Inspection Date 1-5-84



STATE OF FLORIDA
WATER WELL CONTRACTOR'S
WELL COMPLETION REPORT
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES
203 Pennington Building, Tallahassee, Florida 32304
Telephone (904) 488-8478

No. 68305

Permit No. 74-1000-01

Owner's Well Identification

State Well Number
For Department Use
ONLY

| OWNER | | WELL LOG | |
|---|---------|----------|--------------|
| Name | Address | Well No. | Depth (feet) |
| City | State | From | To |
| 2. LOCATION OF WELL | | | |
| Street Address/Road | | | |
| City | | | |
| County | | | |
| Subdivision | | | |
| Lot No. | | | |
| Section | | | |
| Township | | | |
| Range | | | |
| 3. PURPOSE OF WELL | | | |
| ☐ Domestic ☐ Irrigation ☐ Public Supply
☐ Industrial ☐ Stock ☐ Other | | | |
| 4. TYPE OF WORK | | | |
| ☐ New Well ☐ Rehabilitation ☐ Other
☐ Deepening ☐ Reconditioning | | | |
| 5. QUALITY | | | |
| ☐ Clear ☐ Colored ☐ Sulphur ☐ Salty ☐ Other | | | |
| CHECK TEST MADE | | | |
| ☐ None ☐ Bacteria ☐ Chemical ☐ Chloride (Check if test was for sodium chloride) ☐ Temperature | | | |
| ☐ Well Disinfected ☐ Yes ☐ No | | | |
| 6. EQUIPMENT | | | |
| ☐ Rotary ☐ Jet ☐ Cable Tool ☐ Reversing Rotary ☐ Other | | | |
| 7. GROUT | | | |
| ☐ None ☐ Cement ☐ Other | | | |
| Describe and give number of bags (94 lb.) | | | |
| 100 ft. 24" 150 bags 0 100 | | | |
| 500 ft. 14" 50 bags 0 500 | | | |
| 8. CASING AND LINER PIPE | | | |
| Diameter (inches) | | | |
| Kind | | | |
| From (ft) | | | |
| To (ft) | | | |
| 24" 0-375 80 100 | | | |
| 14" 0-375 steel 300 | | | |
| (Check One) ☐ Threaded & Coupled ☐ Welded Only | | | |
| ☐ T & C & Welded ☐ Other | | | |
| 9. WATER LEVEL | | | |
| Water level after well completed | | | |
| ☐ Above ☐ Below land surface | | | |
| Well Flowing ☐ Yes ☐ No Flow | | | |
| gal/min | | | |
| 10. SCREENS | | | |
| NONE | | | |
| Location (ft) Below Surface | | | |
| Make Materials Diameter (in) Slot Size From (ft) To (ft) | | | |
| | | | |
| | | | |
| | | | |
| 11. UPPER END OF WELL | | | |
| ☐ Pump Installed ☐ Valve ☐ Cap ☐ Other | | | |
| 12. PUMPING TEST | | | |
| Date 11-10-83 | | | |
| ☐ Test Pump ☐ Permanent Pump | | | |
| Measure point is head | | | |
| which is 2 feet above below land surface | | | |
| Static water level 10 feet above below measure point | | | |
| Maximum Drawdown 21 feet below measure point | | | |
| Discharge at maximum drawdown 180 gal/min | | | |
| After 1 hours | | | |
| 13. PUMP INSTALLED | | | |
| Type 1 Incher Make Model No. 1000 | | | |
| Motor Power 1/2 HP | | | |
| Capacity 180 gal/min at 25 ft. of total dynamic head | | | |
| No. of bowls or stages | | | |
| Pump setting 10 feet | | | |
| 14. CONTRACTOR'S CERTIFICATION | | | |
| This work was done under my jurisdiction and this report is true to the best of my knowledge and belief. The work commenced on 7-20-83 and was completed on 11-10-83 | | | |
| Contractor's Signature | | | |
| License Number 2382 | | | |
| Signature of Representative | | | |
| P.O. Box or S.O. 9000 | | | |
| Signature of Manager | | | |
| Customer 31412 | | | |

Recorded by

Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 2 Feb 77

Check One

English

Metric Units

GENERAL SITE DATA (8)

Site Name No. 302519081331501
 RG Number R-0
 Transaction T- (A) D M V
 add, delete, modify, verified
 Site Type 2- C D M I M P T (U) Reliability 3- C U L M
 add, delete, modify, verified
 Project No. 5- 121 State 7- 12 County (or town) DUVAL 8- 031
 Latitude 9- 302519 Longitude 10- 0813315 Lat-Long Accuracy 11- S O T M
 mo, 5 mi, 10 mi, 15 mi
 Load Number 12- T-1141 Land Net Loc. 13- NESENN 13 T 15 R 27E
 Location Map 14- EASTPORT Scale 15- 24000
 Altitude 16- 10 Method of Measurement 17- A L (M) Accuracy 18- 5
 Topo Setting 19- D C E (O) H K L S P S T U V W Hydrologic Unit (DWOC) 20- 03980102
 Date of First Construction Completion 21- 02/19/1965 Use of Site 22- A D E G H B M P R S T U (W) X Z
 Use of Water 23- A B C D E F H I M (N) P R S T U Y Z
 Secondary Water Use 24- 25- 26- 27- 1104 Depth of Well 28- 1104 Source of Depth Data 29- D
 Water Level 30- Date Measured 31- Source 32- 33-
 Method of Measurement 34- A C E G H L M R S T V Z
 Site Status 35- D F G H S P R S T V X Z
 Source of Geohydrologic Data 36- D Pump Used 37- Measuring Point 38- Measuring Point Date 39- month day year

OWNER IDENTIFICATION (1)

R-158 T- (A) D M V Date of Ownership 159- 02/19/1965
 Name: Last 161- JEL NORTH First 162- GEL STA Middle Initial 163-
 add, delete, modify

OTHER SITE IDENTIFICATION NUMBERS (1)

R-188 T- (A) D M V Ident 190- ST Assigner 191- FLA WAD
 add, delete, modify
 New Card Same R & T Ident 190- RECHSCHER Assigner 191- FL039

SITE VISIT DATA (1)

R-196 T- (A) D M V Date of Visit 187- 09/10/1976 Name of Person 188- ESSEX
 add, delete, modify

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T- D M V Date 193- month day year Geohydro-logic Unit 195-
 add, delete, modify
 New Card Same R thru 199
 Temperature 196- 0 0 0 1 0 Degrees C 197-
 Conductance 198- 0 0 0 9 5 u Mhos 199-
 Other (STORET) Parameter 196- Value 197-
 Other (STORET) Parameter 196- Value 197-

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
 reporting, driller, owner, other geol. other logs, geologist, other agency reported.

Plotted _____
 Header _____
 Local # _____
 Key punched _____

R-58 * T- AD M * Entry No. 59 001 * Date of Construction Completion 02 19 1965 * Source of ^① Const. Date 64 1 *
 Name of Contractor/Driller 63 DUVAL * DUVAL DRILLING CO
 Method of Construction 65 A B C D H J P R T V W Z *
 Finish 66 C F G H S P S T W X Z * Type of Seal 67 S C G Z *
 Bottom of Seal 68 * Method of Development 69 A B C J N P S Z * Number of Hours in Development 70 *
 Special Treatment During Development 71 C D E F H M Z *

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-721 * T- AD M * Construction Entry No. 59 001 *
 New Card for Each Hole Segment Same R, T & Field 59
 Top of Hole Segment Below LSD
 73# 0 * 73# 1.19 * 73# * 73# * 73# *
 Bottom of Hole Segment below LSD
 74# 1.19 * 74# 1.104 * 74# * 74# * 74# *
 Diameter of Hole Segment
 75# 16 * 75# 12 * 75# * 75# * 75# *

CASING SCHEDULE (2)

R-76 * T- AD M * Construction Entry No. 59 001 *
 New Card for Each Casing With Same R, T & Field 59
 Top of Casing Segment Below LSD
 77# 0 * 77# 1.00 * 77# * 77# * 77# *
 Bottom of Casing Segment Below LSD
 78# 1.19 * 78# 5.20 * 78# * 78# * 78# *
 Diameter of Casing Segment
 79# 16 * 79# 12 * 79# * 79# * 79# *
 Casing Material ^③
 80# * 80# * 80# * 80# * 80# *
 Thickness of Casing
 81# * 81# * 81# * 81# * 81# *

OPENINGS SCHEDULE (2)

R-82 * T- AD M * Construction Entry No. 59 001 *
 New Card for Each Open Section With Same R, T and Field 59
 Top of Section Below LSD
 83# * 83# * 83# *
 Bottom of Section Below LSD
 84# * 84# * 84# *
 Type of Opening ^①
 85# * 85# * 85# *
 Type of Material ^②
 86# * 86# * 86# *
 Diameter of Open Section
 87# * 87# * 87# *
 Width of Opening
 88# * 88# * 88# *
 Length of Opening
 89# * 89# * 89# *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
 reporting, driller, owner, other geo't. other logs, geologist, other agency reported,

② Type of Opening Codes

F L M P R S T W X Z
 fracture, lateral, mesh, perforated, well, screen, sand, welded, open, other shuttled or slotted round (unbored) points hole

③ Casing Material Codes

S C G I M P R S T U W Z
 brick, concrete, galv, wrought, other, PVC or, steel or, steel, tile, cement, wood, other iron iron metal plastic stone steel

④ Type of Material Codes for Open Sections

S C G I M P R S T Z
 brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other bronze iron iron metal plastic steel

PRODUCTION DATA (1)

R-134-48- T-ADM- Entry No 147# 001- Date 148- / / 149-
 Name, number add, delete, modify month day year

Discharge: 150- 1795- Source of Data 151- 0-
 Method of Measurement 152- B C E F M O P R T U V W Z-
 better, current, estimated, flame, rotating, orifice, piston-tube, reported, trajectory, contact, volumetric, wave, other
 Production Level 153- Static Level 154- Source of Data 155- Specific Capacity 272-
 Method of Measurement 156- A C E G H L M R S T V Z-
 orifice, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, and/or other
 active pipe pressure gauge logs tape tape electric tape Pumping Period 157-
 J 1141

LIFT DATA (1)

R-42- T-ADM- Type of Lift 43# A B C J P R S T U Z- Entry No 254# 001-
 add, delete, modify or, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other

Pump Intake Setting 44- Type of Power 45- D E G H L N W Z-
 diesel, electric, gasoline, hand, LP gas, natural, windmill, other gas

Date 38- / / Horsepower 46- 40-
 month day year

MAJOR PUMP DATA (2)

R-47- T-ADM- Type of Lift 43# T- Lift Entry No 254# 001- Manufacturer of Pump 48- ALLI.S. CH-
 add, delete, modify

Serial No. of Pump 49- Name of Power Company 50- JEA-
 Power Company Account No 51- Power Meter No 52- Pump Rating 53-
 Person or Company Who Maintains the Pump 54- Additional Lift 255- Rated Pump Capacity 256- 2000-

STANDBY POWER DATA (2)

R-55- T-ADM- Type of Lift 43# Type of Power 55- Horsepower 57- Lift Entry No 254#
 add, delete, modify (See LIFT DATA for codes of fields 43 and 56 below)

AVAILABLE LOG DATA (1)

R-198- T-ADM- New Card for Each Log Type Same R & T

| Type of Log | Begin Depth | End Depth | Source of Data |
|-------------|-------------|-----------|----------------|
| 199# | 200- | 201- | 202- |
| 199# | 200- | 201- | 202- |
| 199# | 200- | 201- | 202- |
| 199# | 200- | 201- | 202- |

WATER QUALITY DATA COLLECTION (1)

R-114- T-ADM- Begin Year 115# End Year 116# Source Agency 117#
 add, delete, modify

Frequency of Collection 118# Network Site 257# Type of Analysis 120#

WATER LEVEL DATA COLLECTION (1)

R-121- T-ADM- Begin Year 122# End Year 123# Source Agency 124#
 add, delete, modify

Frequency of Collection 125# Network Site 258#

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R-127- T-ADM- Begin Year 128# End Year 129# Source Agency 130#
 add, delete, modify

Frequency of Collection 131# Network Site 259# Method of Collection 133- C E M U Z-
 calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)

R-150- T-ADM- Type of Data 181# 182- C D Z- 261- F M P Z-
 add, delete, modify

New Card Same R & T Type of Data 181# 182- C D Z- 261- F M P Z-
 Log: capacitor, diaphragm, other

FOOT NOTES:

① Source of Data Codes:

S D P A R L G Z
 reporting, drifter, owner, other go's, other logs, geologist, other reported

② Type of Log Codes

A B C D E F G H I J K L M N O P Q
 time, collar, adipar, drifter's, electric, fluid, geologist, magnet, induction, gamma, dip-meter, laterolog, microlog, neutron, μ later, photo, radio, active
 S T U V Z
 sonic, temp, gamma, fluid, other gamma velocity

③ Frequency of Collection Codes

A B C D F I M S Q S W Z
 annual, bi-monthly, continuous, daily, semi-intermittent, monthly, one time, quarter, semi-monthly, other monthly only annual annual

④ Type of Quality Analysis Codes

A B C D E F G H J K L M Z
 physical, common, trace, petroleum, non-petroleum, analytical, radio, radio, radio, radio, radio, or other, other chemical elements, S&D S&S S&P D&S C,D&S man

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 ☐ T- ☒ D M ☐ Entry No 256 # 001 Depth to Top 91 = Depth to Bottom 92 =

Unit Identifier 93 = 120FLRD Lithology 96 = LASH Lithologic Modifier 97 = MARINE

AQUIFER DATA (2)

R-94 ☐ T- A D M ☐ Geohydrologic Unit Entry No 256 #

Date 95 # / /

Water Level 126 =

% Water Contributed 132 =

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 ☐ T- A D M ☐ Entry No 256 # Depth to Top 91 = Depth to Bottom 92 =

Unit Identifier 93 = Lithology 96 = Lithologic Modifier 97 =

AQUIFER DATA (2)

R-94 ☐ T- A D M ☐ Geohydrologic Unit Entry No 256 #

Date 95 # / /

Water Level 126 =

% Water Contributed 132 =

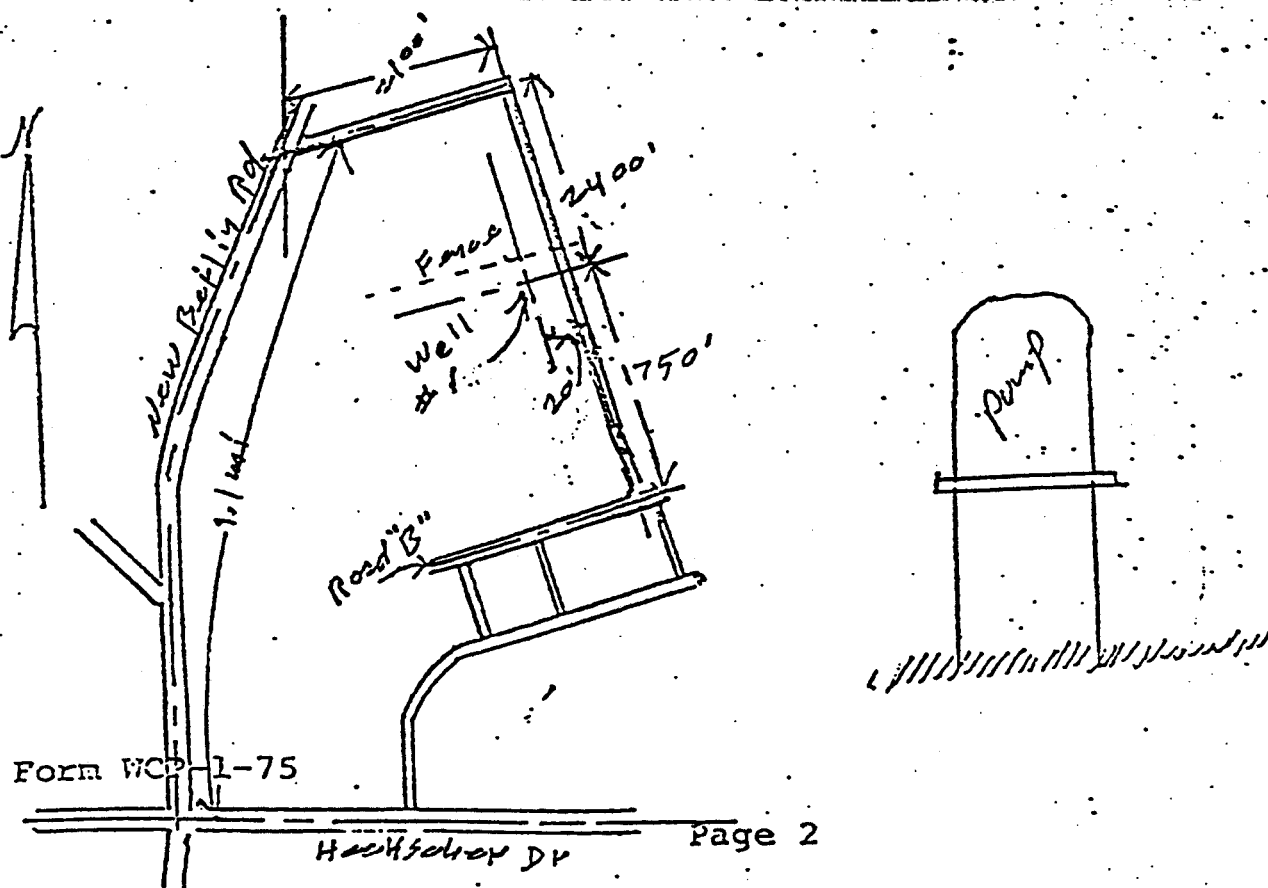
PERTINENT REMARKS

R-183 ☐ T- A ☐ 185 =

New Card Same R&T 185 =

185 =

NOTES:



Recorded by

Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATA

Date 2 Feb 77

Check One

☒ English☐ Metric Units

Site Ident No

302519081331501

COOPERATOR DATA (1)

R = 212 *

T = A D M *

add, delete, modify

Cooperators
Site identifier

213 =

J-1141

Registration No.

214 =

Inspection Status

215 =

Reason Unapproved

216 =

Inspection Date

217 =

month day year

Remarks

218 = 43.77 HECKSCHER DR

DATA ON MINOR SITE REPAIRS (1)

R = 164 *

T = A D M *

add, delete, modify

New Card for each Repair
Same R&T

Entry No

165 #

166 #

167 #

Nature of Repair ①

168 =

169 =

170 =

Date Completed

167 =

168 =

169 =

Contractor

169 =

170 =

% Performance Chg

170 =

171 =

172 =

(Minor Repair)

(Minor Repair)

Entry No.

165 #

166 #

167 #

Nature of Repair ①

168 =

169 =

170 =

Date Completed

167 =

168 =

169 =

Contractor

169 =

170 =

% Performance Chg

170 =

171 =

172 =

(Minor Repair)

(Minor Repair)

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 *

T = A D M *

add, delete, modify

No. Wells in Group

204 =

205 =

Deepest Depth

206 =

207 =

Shallowest
Depth

208 =

209 =

210 =

Construction
Method

207 =

D J V W Z

211 =

212 =

213 =

214 =

215 =

Size of
Well Field

262 =

263 =

264 =

265 =

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208 *

T = A D M *

add, delete, modify

Longest
Dimension

209 =

210 =

211 =

Other (Width)
Dimension

210 =

211 =

Depth

211 =

212 =

213 =

Orientation

263 =

264 =

Dip

264 =

265 =

DATA FOR COLLECTOR WELLS (1)

R = 219 *

T = A D M *

add, delete, modify

New Card for each Lateral
Same R&T

Entry No.

220 #

221 #

222 #

220 #

221 #

222 #

220 #

221 #

222 #

220 #

221 #

222 #

220 #

221 #

222 #

220 #

221 #

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220 #

221 #

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220 #

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220 #

221 #

222 #

220 #

221 #

222 #

Depth to the Lateral

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

221 =

222 =

Length of Lateral

222 =

223 =

222 =

223 =

222 =

223 =

222 =

223 =

222 =

223 =

222 =

223 =

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223 =

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223 =

222 =

223 =

222 =

223 =

Diameter of Lateral

223 =

224 =

223 =

224 =

223 =

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223 =

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223 =

224 =

223 =

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223 =

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224 =

Screen Mesh

224 =

225 =

224 =

225 =

224 =

225 =

224 =

225 =

224 =

225 =

224 =

225 =

224 =

225 =

224 =

225 =

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224 =

225 =

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225 =

224 =

225 =

224 =

225 =

FOOT NOTES:

① Nature of repair

| | | | | | | |
|-----------------|---------|----------|----------------------|--------------------|----------------------|------------------|
| B | C | D | L | P | S | Z |
| blocked,
off | cleaned | deepened | liner,
perforated | slotted or
back | plugged,
replaced | screen,
other |

Reason for Inspection:

Complaint W.U. Permit Construction, etc. Permit Well Inventory J-1141

Free flowing well

Regulatory Status: Received Application to Construct, Modify ☐ Yes N/A ☐ Date

Permit Issued for Above ☐ Yes N/A ☐ Date

Received Application for Temporary Water Use Permit ☐ Yes N/A ☐ Date

Permit Issued for Above ☐ Yes N/A ☐ Date

DNR/BW-2 Received ☐ Yes N/A ☐ Date

Data Submitted to USGS ☐ Yes Date

Drilled 2-19-65

Owner JEA Northside #1

Address 4377 Heckscher Dr

Well Drilling Contractor Dural Drilling Co License/Bond No.

Location of water well Latitude 30°25'19"N Longitude 88°13'31"W Sequential 1

Ident # of Quad Sheet NE 1/4 SE 1/4 NW 1/4 Section 13 Township 15 Range 27E Subdivis: East Port

Depth of Water Well 1104 How measured? Driller's Log

Diameter/Cross Section 16 X 10

Depth of Casing 520 Diameter of Casing from LSD 16" to 119 feet and diameter 10" from 100 to 520 feet.

Type of grouting used Hole centered in grout?

Use of well Number of People Served

Water level 18.456 ft H₂O 2/19/65 How measured pressure gauge
8 PSI 1250078 MP=0

Method of well construction

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc

Average

Casing material used Steel

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' 114'

Distance to nearest contaminant - septic tank, etc. if less than 100' _____

Maximum well yield Reported 1795 GPM Average well yield _____ GPM

Frequency of well use _____ Hrs./Day _____ Days/Year _____

Pump Data - Type & Make A/C Turbine HP 40 Pump Rating 2000

Capacity _____ No. of Bowls or Stages 1

Type of Power Elect. Static water level _____

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____, Hardness _____, and Chloride _____ Temp 23.5°C 13 Sep 78

General Rating: poor _____ average ☒ good _____ excellent _____

Additional Info/Action Required _____

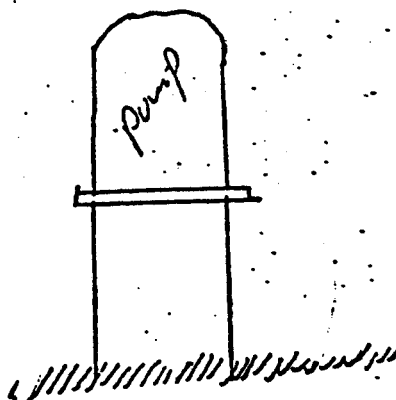
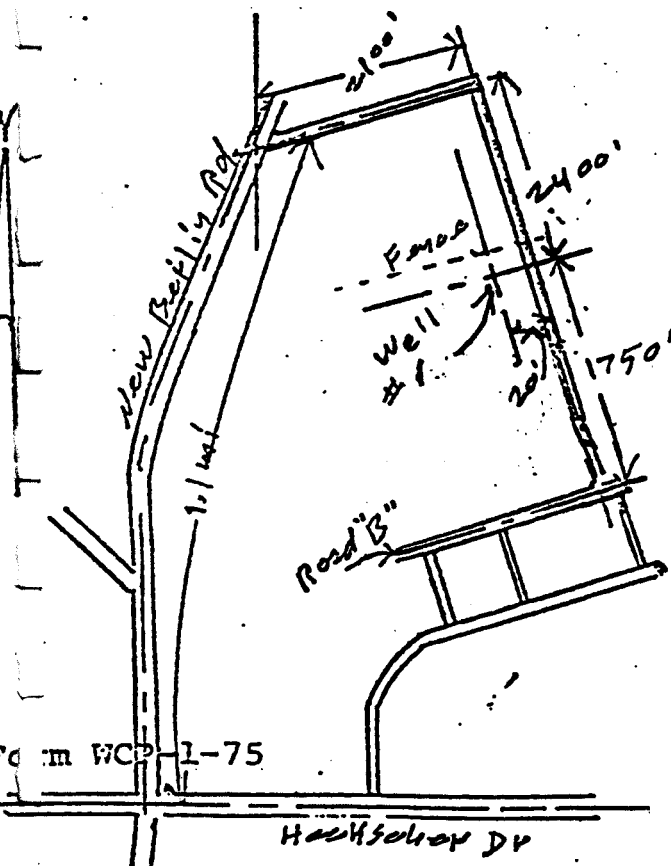
Action taken/Comments 13 Sep 78 Pump repaired, blank flange w/ 2" sample

Port. Flange Level = 15" below LSD mark

_____ Date _____

Inspector's Name W R Essex Field Inspection Date 10 Sep 78

Inventory Complete Date _____



Recorded by Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 2 Feb 77

GENERAL SITE DATA (0)

Check One ☒ English ☐ Metric Units

Site Ident No 302503081332001 RG Number R=0 Transaction T= 0 D M V *
 Site-Type 2= C D H I M P T (1) * Data 3= 0 U L M * Reporting Agency 4= FLO39 *
 Project No. 5= * District 6= 121 * State 7= 12 * County DUVAL * 8= 031 *
 Latitude 9= 302503 * Longitude 10= 0813320 * Lat-Long Accuracy 11= S 0 T M *
 Local Number 12= J-1138 * Land Net Loc. 13= NEHE SW 13 T 15 R 27E *
 Location Map 14= EASTPORT * Scale 15= 24000 *
 Altitude 16= 10 * Method of Measurement 17= A L (M) * Accuracy 18= 5 *
 Topo Setting 19= 0 C E (F) H K L 0 P S T U V W * Hydrologic Unit (OWDC) 20= 03080103 *
 Date of First Construction/Completion 21= 02/06/1965 * Use of Site 23= A D E G H 0 M P R S T U (W) X Z *
 Use of Water 24= A B C D E F H I M (N) P R S T U Y Z *
 Secondary Water Use 25= * Tertiary Use of Water 26= * Depth of Hole 27= 1104 * Depth of Well 28= 1104 * Source of Depth Data 29= D *
 Water Level 30= 117 * Date Measured 31= 09/10/1976 * Source 33= S *
 Method of Measurement 34= A C E (0) H L M R S T V Z *
 Site Status 37= D F G H 0 P R S T V X Z *
 Source of Geohydrologic Data 36= D * Pump Used 35= * Measuring Point 268= -1.83 * Measuring Point Date 267= 09/10/1976 *

OWNER IDENTIFICATION (1)

R=158 * T= 0 D M * Date of Ownership 159# 02/06/1965 *
 Name: Last 161= JEAN NORTH * First 162= GEN STA * Middle Initial 163= *

OTHER SITE IDENTIFICATION NUMBERS (1)

R=189 * T= 0 D M * Ident 190# ST * Assigner 191= FLA WWD *
 New Card Same R & T Ident 190# HECKSCHER * Assigner 191= FLO39 *

SITE VISIT DATA (1)

R=186 * T= 0 D M * Date of Visit 187# 09/10/1976 * Name of Person 188= ESSEX *

FIELD WATER QUALITY MEASUREMENTS (1)

R=192 * T= A D M * Date 193# / / * Geohydrologic Unit 195# *
 New Card Same R thru 195 Temperature 196# 00010 * Degrees C 197= *
 Conductance 196# 00095 * μ Mhos 197= *
 Other (STORET) Parameter 196# * Value 197= *
 Other (STORET) Parameter 196# * Value 197= *

Plotted _____
 Header _____
 Local # _____
 Key punched _____

FOOT NOTES:

① Source of Data Codes:

S O O A R L G Z
 reporting, driller owner, other gov't, other logs, geologist, other agency report-d.

WELL CONSTRUCTION DATA (1)

R = 53 * T = A D M * Entry No 59 = 001 * Date of Construction Completion 60 = 02 / 06 / 1965 * Source of ① Const. Data 64 = D *

Name of Contractor/Driller 63 = D. UVAL * DUAL Drilling Co

Method of Construction 65 = A B C D H J P R T V W Z *

Finish 66 = C F G H Ø P S T W X Z *

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z *

Special Treatment During Development 71 = C D E F H M Z *

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 = 001 *

Top of Hole Segment Below LSD

| | | |
|------|-------------|---|
| 73 # | <u>0</u> | * |
| 73 # | <u>1.19</u> | * |
| 73 # | | * |
| 73 # | | * |
| 73 # | | * |

Bottom of Hole Segment below LSD

| | | |
|------|--------------|---|
| 74 = | <u>1.19</u> | * |
| 74 = | <u>1.104</u> | * |
| 74 = | | * |
| 74 = | | * |
| 74 = | | * |

Diameter of Hole Segment

| | | |
|------|-----------|---|
| 75 = | <u>16</u> | * |
| 75 = | <u>10</u> | * |
| 75 = | | * |
| 75 = | | * |
| 75 = | | * |

New Card for Each Hole Segment Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 = 001 *

Top of Casing Segment Below LSD

| | | |
|------|-------------|---|
| 77 = | <u>0</u> | * |
| 77 = | <u>1.10</u> | * |
| 77 = | | * |
| 77 = | | * |
| 77 = | | * |

Bottom of Casing Segment Below LSD

| | | |
|------|-------------|---|
| 78 = | <u>1.19</u> | * |
| 78 = | <u>52.0</u> | * |
| 78 = | | * |
| 78 = | | * |
| 78 = | | * |

Diameter of Casing Segment

| | | |
|------|-----------|---|
| 79 # | <u>16</u> | * |
| 79 # | <u>10</u> | * |
| 79 # | | * |
| 79 # | | * |
| 79 # | | * |

Casing Material 80 = S *

Thickness of Casing

| | | |
|------|--|---|
| 81 = | | * |
| 81 = | | * |
| 81 = | | * |
| 81 = | | * |
| 81 = | | * |

New Card for Each Casing With Same R, T & Field 59

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # * New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD 83 # * (Openings Data)

Bottom of Section Below LSD 84 = * (Openings Data)

Type of Openings 85 = * (Openings Data)

Type of Material 86 = * (Openings Data)

Diameter of Open Section 87 = * (Openings Data)

Width of Opening 88 = * (Openings Data)

Length of Opening 89 = * (Openings Data)

FOOT NOTES:

① Source of Data Codes:

| | | | | | | | |
|------------------|---------|-------|--------------|----------------|------|-----------|-------|
| S | D | Ø | A | R | L | G | Z |
| reporting agency | driller | owner | other gov't. | other reported | logs | geologist | other |

③ Casing Material Codes

| | | | | | | | | | | | |
|-------|----------|-------|---------|-------|-------------|---------------|-------|------|--------|------|-------------|
| B | C | G | I | M | P | R | S | T | U | W | Z |
| brick | concrete | galv. | wrought | other | PVC or iron | rock or metal | steel | tile | coated | wood | other steel |

⑤ Type of Openings Codes

| | | | | | | | | | |
|-----------|---------|------|------------|-----------------|--------|------|--------|------|-------|
| F | L | M | P | R | S | T | W | X | Z |
| fracture | lowered | mesh | perforated | www | screen | sand | walled | open | other |
| shuttered | | | or slotted | wound (unknown) | point | hole | | | |

⑦ Type of Material Codes for Open Sections

| | | | | | | | | | |
|-----------------|----------|-------|---------|-------|-------------|-----------------|-------|------|-------|
| B | C | G | I | M | P | R | S | T | Z |
| brass or bronze | concrete | galv. | wrought | other | PVC or iron | stainless metal | steel | tile | other |

J-1138

R = 134 (145) * T = 5 D M * Entry No 147 # 001 * Date 148 = / / *
flowing, pumped add, delete, modify month day year

Discharge: 150 = 21.20. * Source of Data 151 = 0 *
boiler, current, estimated, flame, rotating, orifice, piston-tube, reported, trajectory, venturi, volumetric, weir, other

Method of Measurement 152 = B C E F M O P R T U V W Z *
boiler, current, estimated, flame, rotating, orifice, piston-tube, reported, trajectory, venturi, volumetric, weir, other

Production Level 153 = * Static Level 154 = * Source of Data 155 = * Specific Capacity 272 = *
airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other

Method of Measurement 156 = A C E G H L M R S T V Z * Pumping Period 157 = *
airline, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other

LIFT DATA (1)
 R = 42 * T = A D M * Type of Lift 43 # A B C J P R S T U Z * Entry No 254 # *
add, delete, modify air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other

Pump Intake Setting 44 = * Type of Power 45 = D E G H L N W Z *
diesel, electric, gasoline, hand, LP gas, natural, windmill, other

Date 38 = / / * Horsepower 46 = *
month day year

MAJOR PUMP DATA (2)
 R = 47 * T = A D M * Type of Lift 43 # * Lift Entry No 254 # * Manufacturer of Pump 48 = *
add, delete, modify

Serial No of Pump 49 = * Name of Power Company 50 = *
 Power Company Account No 51 = * Power Meter No 52 = * Pump Rating 53 = *
 Person or Company Who Maintains the Pump 54 = * Additional Lift 255 = * Rated Pump Capacity 258 = *

STANDBY POWER DATA (2) (See LIFT DATA for codes of fields 43 and 56 below)
 R = 55 * T = A D M * Type of Lift 43 # * Type of Power 56 = * Horsepower 57 = * Lift Entry No 254 # *
add, delete, modify

AVAILABLE LOG DATA (1)
 R = 198 * T = A D M * New Card for Each Log Type Same R & T
add, delete, modify

| Type of Log | Begin Depth | End Depth | Source of Data |
|-------------|-------------|-----------|----------------|
| 199 # * | 200 = * | 201 = * | 202 = * |
| 199 # * | 200 = * | 201 = * | 202 = * |
| 199 # * | 200 = * | 201 = * | 202 = * |
| 199 # * | 200 = * | 201 = * | 202 = * |

WATER QUALITY DATA COLLECTION (1)
 R = 114 * T = A D M * Begin Year 115 # * End Year 116 = * Source Agency 117 = *
add, delete, modify

Frequency of Collection 118 = * Network Site 257 = * Type of Analyses 120 = *

WATER LEVEL DATA COLLECTION (1)
 R = 121 * T = A D M * Begin Year 122 # * End Year 123 = * Source Agency 124 = *
add, delete, modify

Frequency of Collection 125 = * Network Site 258 = *

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)
 R = 127 * T = A D M * Begin Year 128 # * End Year 129 = * Source Agency 130 = *
add, delete, modify

Frequency of Collection 131 = * Network Site 259 = * Method of Collection 133 = C E M U Z *
calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)
 R = 180 * T = A D M * Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *
add, delete, modify cooperator, district, other files, machine, published, other

New Card Same R & T Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *
cooperator, district, other files, machine, published, other

FOOT NOTES:

① Source of Data Codes:

S O O A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency

③ Frequency of Collection Codes

A B C D F I M # Q S W Z
annual, bi-monthly, continuous, daily, semi-monthly, intermittent, monthly, one time, quarter, semi-weekly, other only annual annual

② Type of Log Codes

A B C D E F G H I J K L M N # P Q
time, collar, caliper, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, laterolog, microlog, neutron, μ later, photo, radio, active

S T U V Z
sonic, temp, gamma, fluid, other gamma velocity

④ Type of Quality Analyses Codes

A B C D E F G H J K L M Z
physical, common, trace, pesticides, nutrients, inventory, codes, codes, codes, codes, codes, oil or, other
S&O S&E S&F O&E C,D&E met

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 256 # 001 * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

add, delete, modify

Unit Identifier 93 = 120FLRD *

Lithology

| | |
|------|-------|
| 96 = | LMSH* |
|------|-------|

Lithologie Modifier 97 MARINE *

AQUIFER DATA (2)

| | | | | |
|--------|---|---|---|---|
| R = 34 | * | | | |
| T = | A | D | M | * |

add, delete, modify

Geohydrologic Unit Entry No

| | | | | |
|-----|---|--|--|---|
| 256 | # | | | * |
|-----|---|--|--|---|

Date 05 / 11 / 2011 *

| | | | | | | |
|-------------|-----|--|--|--|--|---|
| Water Level | 126 | | | | | * |
|-------------|-----|--|--|--|--|---|

| | | | | |
|---------------------|-----|---|---|---|
| % Water Contributed | 132 | . | 1 | * |
|---------------------|-----|---|---|---|

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 = T = A D M *

Entry No 256 # * Depth to Top 91 =

Depth to Top 91 = . * Depth to Bottom 92 = . *

Unit 93 *

| | | | | |
|-----------|------|--|--|---|
| Lithology | 96 - | | | * |
|-----------|------|--|--|---|

Lithologic
Modifier 97 = *

AQUIFER DATA (2)

R = 91 * T = A D M *

Geohydrologic Unit Entry No

| | | | |
|-----|---|--|--|
| 256 | 2 | | |
|-----|---|--|--|

Date 95 / / *

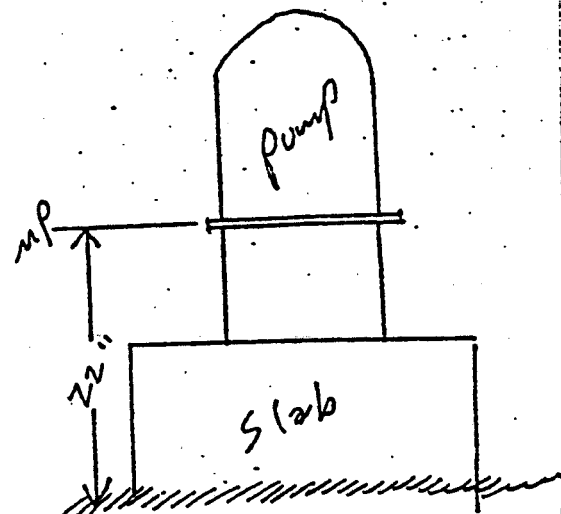
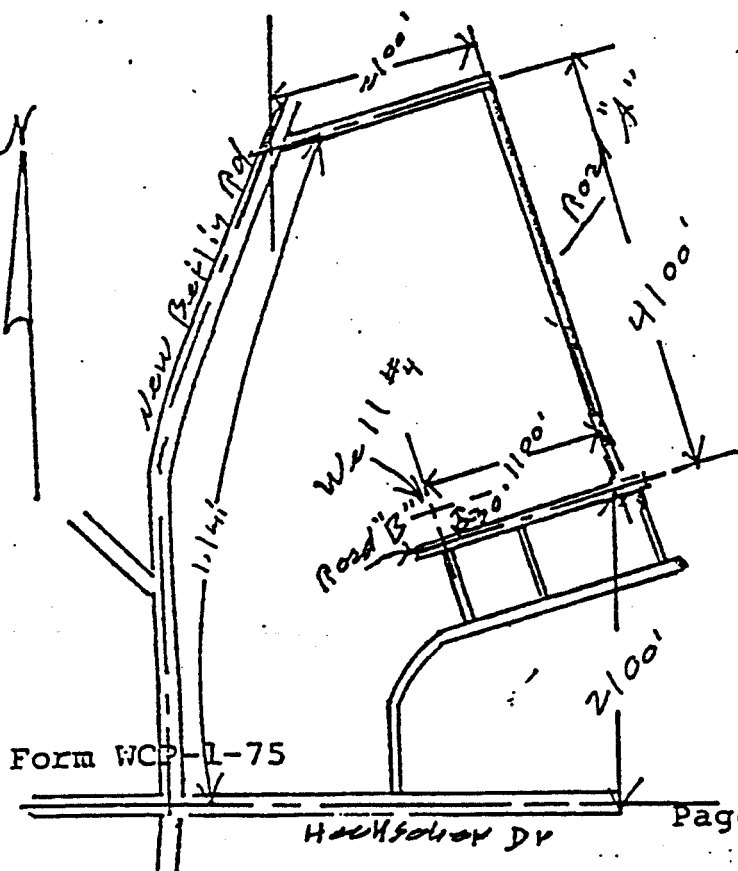
Water Level 126

| | | | |
|------------------------|-------|--|---|
| % Water
Contributed | 132 = | | * |
|------------------------|-------|--|---|

PERTINENT REMARKS

| | | | | | | |
|----------------------------------|-----|--|------|--|---|--|
| R=183: | T=A | | 185- | | * | |
| <div>New Card Same R&T</div> | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |

NOTES.



Date 2 FEB 77

Size Ident No 302503081332001

| | |
|---------|---|
| R = 212 | * |
|---------|---|

| | | | | |
|-----|--------------|---|---|---|
| T = | A | O | M | * |
|-----|--------------|---|---|---|

add, delete, modify

| | | | |
|-------------------------------|------|--------|---|
| Cooperator
Site identifier | 213- | J-1138 | * |
|-------------------------------|------|--------|---|

| | | | |
|------------------|-----|--|---|
| Registration No. | 214 | | * |
|------------------|-----|--|---|

Inspection Status: 215 = * Reason Unapproved: 216 = * Inspection Date: 217 = / / *
month day year

| | | |
|---------|-------------------------|--|
| Remarks | 218 - 4377 HECHSCHER DP | |
|---------|-------------------------|--|

| | |
|---------|---|
| R = 184 | * |
|---------|---|

| | | | | |
|-----|---|---|---|---|
| T = | A | D | M | * |
|-----|---|---|---|---|

add, delete, modify

**New Card for each Repair
Same A&T**

| | | | | |
|-------------------|-------|---|---|---|
| Entry No | 165 # | | | * |
| Nature of Repair | 165 = | * | | |
| Date Completed | 167 = | / | / | * |
| Contractor | 169 = | | | * |
| % Performance Chg | 170 = | * | | |

| (Minor Repair) | | | | | | | | | |
|----------------|--|--|---|---|---|---|---|---|---|
| 165 # | | | | | | | | | * |
| 166 = | | | * | | | | | | |
| 167 = | | | / | / | / | / | / | / | * |
| 169 = | | | | | | | | | * |
| 170 = | | | * | | | | | | |

| | (Minor Repair) | | | | | | | | | |
|--------------------|----------------|---|--|---|--|--|--|--|--|---|
| Entry No. | 166 # | | | | | | | | | * |
| Nature of Repair | 166 = | * | | | | | | | | |
| Date Completed | 167 = | | | | | | | | | * |
| Contractor | 168 = | | | | | | | | | * |
| % Performance Chg. | 170 = | | | * | | | | | | |

| (Minor Repair) | |
|----------------|-------------|
| 165 # | * |
| 166 = | * |
| 167 = | / / / / / * |
| 168 = | / / / / / * |
| 170 = | * |

| | | | | |
|---------|---|---|---|---|
| R - 203 | * | | | |
| T - | A | D | M | * |

| | | | | | | | | | |
|--------------------|-------|--|--|---|---------------|-------|--|--|---|
| No. Wells in Group | 204 = | | | * | Deepest Depth | 205 = | | | * |
|--------------------|-------|--|--|---|---------------|-------|--|--|---|

| | | | |
|------------------|-------|--|---|
| Shallowest Depth | 206 = | | * |
|------------------|-------|--|---|

| | | | | | | | |
|---------------------|-------|----------|---------|---------|--------|-------|---|
| Construction Method | 207 = | D | J | V | W | Z | * |
| | | drilled, | jacked, | driven, | drive, | other | |
| | | | | | wash | | |

| | | | | | | | |
|---------------------------|-------|--|--|--|--|--|---|
| Size of Well Field | 262 " | | | | | | * |
|---------------------------|-------|--|--|--|--|--|---|

| | |
|---------|---|
| R = 208 | * |
|---------|---|

| | | | | |
|-----|---|---|---|---|
| T = | A | D | M | * |
|-----|---|---|---|---|

add, delete, modify

Longest Dimension 208 = *

Other (Width) Dimension 210 = *

Depth 211 = *

| | | | | |
|-------------|-------|--|--|---|
| Orientation | 283 = | | | * |
| Dir | 284 = | | | * |

| | |
|---------|---|
| R - 219 | * |
|---------|---|

| | | | | |
|-----|---|---|---|---|
| T = | A | D | M | * |
|-----|---|---|---|---|

add. doing. modify

**New Card for each Lateral
Same R&T**

[illegible]

| Depth to the Lateral | |
|----------------------|---|
| 221 = | • |
| 221 = | • |
| 221 = | • |
| 221 = | • |
| 221 = | • |
| 221 = | • |
| 321 = | • |
| 221 = | • |
| 221 = | • |
| 221 = | • |
| 221 = | • |

[illegible][illegible]

| Screen | Mash | |
|--------|------|---|
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |

① **Nature of repair**

| B | C | D | L | S | P | S | Z |
|-----------------|----------|--------------|---------|------------------------|------------------|---------------------|-------|
| blebbed,
off | cleaved, | degenerated, | linear, | stuffed or
perfumed | plugged,
back | screen,
retained | other |

WATER WELL FIELD INSPECTION GUIDE

Reason for Inspection:

Complaint W.U. Permit Construction, etc. Permit J-1138
Well Inventory

Free flowing well

Regulatory Status: Received Application to Construct, Modify ☐ Yes ☒ N/A ☐ Date

Permit Issued for Above ☐ Yes ☒ N/A ☐ Date

Received Application for Temporary Water Use Permit ☐ Yes ☒ N/A ☐ Date

Permit Issued for Above ☐ Yes ☒ N/A ☐ Date

DNR/BW-2 Received ☐ Yes ☒ N/A ☐ Date

Data Submitted to USGS ☐ Yes ☒ No ☐ Date

Owner J EA Northside #4

Address 4377 Heckel Dr

Well Drilling Contractor DVZ1 Drilling Co License/Bond No.

Location of water well Latitude 32°50'3" N Longitude 92°13'22" W Sequential 1

Ident # of Quad Sheet NE 1/4 NE 1/4 SW 1/4 13 15 27E E23R20T
Section Township Range Subdivision

Depth of Water Well 1104 How measured? Driller's Report

Diameter/Cross Section 16 X 10

Depth of Casing 520 Diameter of Casing from LSD 16" to 119 feet and diameter 10" from 110 to 520 feet.

Type of grouting used Hole centered in grout?

Use of well Number of People Served

Water level 9.25 x 2.307 + 1.83 = 17 ft H₂O + LSD How measured pressure Gage
MP = 1.83 PSI = 9.25

Method of well construction

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.)

Average

Casing material used Steel

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' _____

Distance to nearest contaminant - septic tank, etc. if less than 100' _____

Maximum well yield 2120 GPM Average well yield _____ GPM

Frequency of well use _____ Hrs./Day _____ Days/Year

Pump Data - Type & Make A/C Turbine HP 40 Pump Rating 2000

Capacity 2000 No. of Bowls or Stages 1

Type of Power Elect Static water level 17 FT H₂O

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness ✓, and Chloride ✓.

General Rating: poor _____ average ✓ good _____ excellent _____

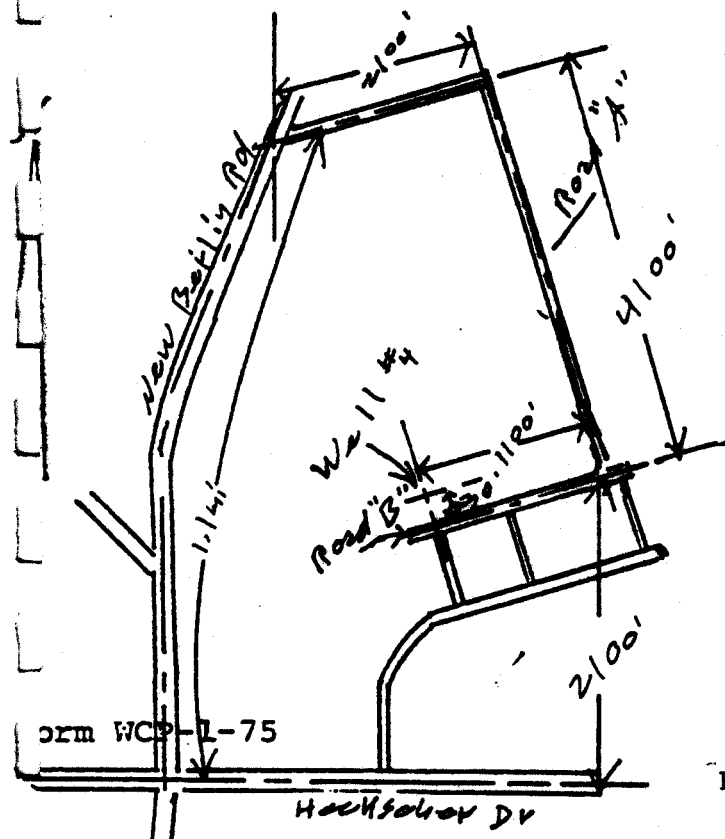
Additional Info/Action Required _____

Action taken/Comments _____

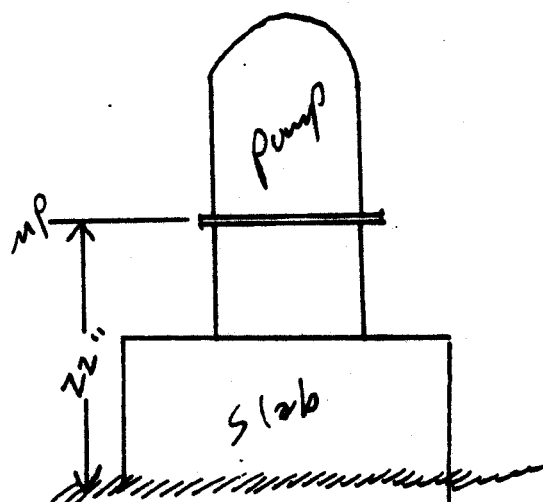
Date _____

Inspector's Name W.R. Essex Field Inspection Date 10 Sept 76

Inventory Complete Date _____



B-313



WATER-QUALITY DATA
Field Sheet & Key Punch Form

10/4/74 *Box*

DATA CARD

| | | | | | | | | | |
|------------------|-------------------------------|---------------|---------------|---------------|---|---------------|---------------|---------------|---------------------|
| Type
2 | Station identification number | Y
7 | M
6 | D
1 | Date of collection
Y
0 M
0 D
1 | Y
3 | M
3 | D
3 | Time of measurement |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 |

Local Number **J-1138**

Card 1

| Parameter code | Value | Exp. | Rmk. |
|--|------------------------|----------------------|------------------|
| Cl (mg/l) | 33
0 0 9 4 0 | 38
1 1 0 0 | 42
0 2 |
| Hardness as CaCO ₃ (Ca, Mg)(mg/l) | 48
0 0 9 0 0 | 52
2 2 4 0 | 56
0 3 |
| Dissolved solids at 180°C (mg/l) | 57
7 0 3 0 0 | | 68 |
| Specific conductance K x 10 ⁶ | 69
0 0 0 9 5 | 70
4 2 5 0 | 80
0 3 |

Calculations

HARD

22.2
- 16.6

5.6
x 40

224.0

Cl
5.1
- 4.2

.9
- .1

.8
x 2.0

1.6

Duplicate Cols. 1-32

Card 2

| | | | |
|----------------------|------------------------|--|-----------|
| Water temperature °C | 33
0 0 0 1 0 | | 44 |
| pH (units) | 48
0 0 4 0 0 | | 56 |
| Dissolved Oxygen DO | 57
0 0 3 0 0 | | 68 |
| Other | | | |

69

80

Analysis by

.112

Date

Well No. 3Q2841N - 813733.1

WELL SCHEDULE GEOLOGICAL SURVEY

WATER RESOURCES DIVISION

MASTER CARD

[illegible]

| | | | | | | |
|---|-----|-----|-----|-----|-----|-----|
| Ownership: County, Fed Gov't, <u>City</u> Corp or Co, Private, State Agency, Water Dist | (C) | (F) | (G) | (P) | (S) | (M) |
| Use of Air cond, Bottling, Comm, Dweller, Power, Farm, Gen, Inf, Ind, Lab, P & Rec, <u>water</u> | (A) | (C) | (D) | (E) | (F) | (N) |
| Stock, Insist, Unused, Reproducts, Recharge, Diesel-P & Diesel-Other, Other | (S) | (T) | (U) | (V) | (W) | (P) |
| Use of Amos, Bricks, Paints, Heat Res, Gas, Oil-gas, Recharge, Test, Unused, <u>Waste</u> | (G) | (H) | (I) | (J) | (K) | (L) |
| DATA AVAILABLE: Well data ☒ Free, W/L meas. ☐ Field squifer char. ☐ | | | | | | |
| Pub. by date: <u>Feb 1964</u> | | | | | | |
| Qual. water, date: <u>1964</u> | | | | | | |
| Free. sampling: <u>Original</u> ☒ Purchase inventory: <u>yes</u> | | | | | | |
| Spent cards: <u>yes</u> | | | | | | |
| See date: <u>1964</u> | | | | | | |

WELL-DESCRIPTION CARD

[illegible]

Well Inc 30.2841N 081.3733.1

HYDROLOGIC CARD

HYDROGRAPHIC SURVEY: COASTAL PLAIN SECTION: FLORIDIAN
 NAME AS ON MASTER CARD: SECTION C FLORIDIAN ST. JOHNS RIVER 0:9:15 Below OKLAWAHA
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Type of deposit, stream channel, dunes, (H) hilltop, sink, swamp.
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Well site: offshore, pediment, hillside, terrace, undulating, valley floor, flat
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 NAME: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 Aquifer: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 System: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 System: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS: 4 4 4 4 4 4 4 4 4
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 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
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 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 System: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 System: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 System: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 System: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 System: FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN FLORIDIAN
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Lithology: Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone Limestone
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 Length of well open to: 4 4 4 4 4 4 4 4 4
 (B) (C) (D) (E) (F) (G) (H) (I) (J)
 MEASUREMENTS

3276

L.E.

L.E.

L.E.

1-2

Shamrock Ave.

234 Shamrock

Pump House

Water-Tanks

Well No. 302841 N 0813733.1

Recorded by ESSEXU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 2 Feb 77Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (40)

Site Ident No 302511081331201 RG Number R=0 Transmittal T=0 D M V
 add, delete, modify, verified
 Site Type 2=C D H I M P T Data 3=0 U L M Reporting Agency 4=FL039
 add, delete, modify, verified
 Project No. 5= District 6=121 State 7=12 County (or town) DUNAL 8=031
 Latitude 9=30 25 11 Longitude 10=08 33 12 Lat-Long Accuracy 11=5 0 T M
 add, delete, modify, verified
 Local Number 12= Land Use 13=SW SW SW 13 15 R 27 E
 add, delete, modify, verified
 Location Map 14=East Port Scale 15=2400.0
 add, delete, modify, verified
 Altitude 16=10 Method of Measurement 17=A L Accuracy 18=5
 add, delete, modify, verified
 Topo Setting 19=D C E H K L S P S T U V W Hydrologic Unit (HUC) 20=03080103
 add, delete, modify, verified
 Date of First Construction/Completion 21=03/05/1965 Use of Site 22=A D E G H S M P R S T U W X Z
 add, delete, modify, verified
 Use of Water 23=A B C D E F H I M N P R S T U Y Z
 add, delete, modify, verified
 Secondary Water Use 24= Tertiary Use of Water 25= Depth of Hole 26=110.4 Depth of Well 27=110.4 Source of 28=D
 add, delete, modify, verified
 Water Level 29=1.7.89 Date Measured 30=09/10/1976 Source 31=S
 add, delete, modify, verified
 Method of Measurement 32=A C E H L M R S T V Z
 add, delete, modify, verified
 Site Status 33=D F G H S P R S T V X Z
 add, delete, modify, verified
 Source of Geohydrologic Data 34=D Pump Used 35=4 Measuring Point 36=1.17 Measuring Point Date 37=09/10/1976
 add, delete, modify, verified

OWNER IDENTIFICATION (1)

Owner R=158 T=0 D M Date of Ownership 159=03/05/1965
 add, delete, modify, verified
 Name: Last 161=JEL NORTH First 162=GEN STA Middle Initial 163=
 add, delete, modify, verified

OTHER SITE IDENTIFICATION NUMBERS (1)

Ident R=188 T=0 D M Assigner 190=ST Assigner 191=FLA WMD
 add, delete, modify, verified
 New Card Same R & T Ident 190=B. ECKSCHER Assigner 191=FL039
 add, delete, modify, verified

SITE VISIT DATA (1)

Visit R=186 T=0 D M Date of Visit 187=09/10/1976 Name of Person 188=ESSEX
 add, delete, modify, verified

FIELD WATER QUALITY MEASUREMENTS (1)

Visit R=192 T=0 D M Date 193= / 194= / 195= Geohydrologic Unit 196=
 add, delete, modify, verified
 New Card Same R thru 199 Temperature 198=00.01.0 Degrees C 197=
 add, delete, modify, verified
 Conductance 199=00.03.5 μ Mhos 197=
 add, delete, modify, verified
 Other (STORET) Parameter 196= Value 197=
 add, delete, modify, verified
 Other (STORET) Parameter 196= Value 197=
 add, delete, modify, verified

FOOT NOTES:

① Source of Data Codes:

S O S A R L G Z
 reporting, driller, owner, other geol. other logs, geological, other agency reported

 Plotted _____
 Header _____
 Local # _____
 Key punched _____

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

DIMENSIONS OF THE HOLE CONSTRUCTED IS
 R=72. • T= ADM • Construction Entry No. 59 # 0011 •
 rad, d, cote, modify

| Top of Hole Segment Below LSD | | Bottom of Hole Segment below LSD | | Diameter of Hole Segment | |
|-------------------------------|---------------|----------------------------------|----------------|--------------------------|--------------|
| 73# | <u>2.</u> • | 74# | <u>1.18</u> • | 75# | <u>16.</u> • |
| 73# | <u>1.08</u> • | 74# | <u>1.104</u> • | 75# | <u>10.</u> • |
| 73# | • | 74# | • | 75# | • |
| 73# | • | 74# | • | 75# | • |
| 73# | • | 74# | • | 75# | • |

New Card for Each Hole Segment
 Same R, T & Field 59

CASING SCHEDULE (2)

Control Form 59-1000-10 (Rev. 1-65)

R = 78 ☐ T = ☒ D M = ☐
add, delete, modify

Construction Entry No. 59 ☐ 001 ☐

New Card for Each Casing With Same R, T & Field 59

| Top of Casing Segment Below LSD | Bottom of Casing Segment Below LSD | Diameter of Casing Segment | Casing Material ^① | Thickness of Casing |
|---|---|--|--|--|
| 77 ☐ 0 ☐ | 78 ☐ 1.8 ☐ | 79 ☐ 1.6 ☐ | 80 ☐ S ☐ | 81 ☐ ☐ |
| 77 ☐ 1.02 ☐ | 78 ☐ 5.22 ☐ | 79 ☐ 1.9 ☐ | 80 ☐ S ☐ | 81 ☐ ☐ |
| 77 ☐ ☐ | 78 ☐ ☐ | 79 ☐ ☐ | 80 ☐ ☐ | 81 ☐ ☐ |
| 77 ☐ ☐ | 78 ☐ ☐ | 79 ☐ ☐ | 80 ☐ ☐ | 81 ☐ ☐ |
| 77 ☐ ☐ | 78 ☐ ☐ | 79 ☐ ☐ | 80 ☐ ☐ | 81 ☐ ☐ |

OPENINGS SCHEDULE (2)

| OPENING SURVEY CARD | | Construction Entry No. | | New Card for Each Open Section With Same R, T and Field S | |
|-----------------------------|-----------|------------------------|---|---|--|
| R = 82 | T = A D M | 59 | 5 | | |
| add, delete, modify | | (Opening Done) | | (Opening Done) | |
| Top of Section Below LSD | 83 | 5 | | | |
| Bottom of Section Below LSD | 84 | | | | |
| Type of Opening ① | 85 | | | | |
| Type of Material ② | 86 | | | | |
| Diameter of Open Section | 87 | | | | |
| Width of Opening | 88 | | | | |
| Length of Opening | 89 | | | | |

FOOT NOTES:

① **Source of Data Codes:**

| S | D | B | A | R | L | G | Z |
|--|---|---|---|-----------|---|------------------------|---|
| reporting, dealer, owner, other gov't, other | | | | | | leg., geologist, other | |
| agency | | | | reported, | | | |

③ Type of Openings Codes

| | | | | | | | | | |
|-----------|--------------|-------|-------------|---------|-------------|-------|---------|-------|-------|
| F | L | M | P | R | S | T | W | X | Z |
| fracture, | louvered, | mesh, | perforated, | wire, | screen, | sand, | walled, | open, | other |
| | slant or end | | or slotted | without | with flange | point | | hole | |

⑤ Casting Material Costs

| B | C | G | I | M | P | R | S | T | U | W | Z |
|------------------|-------|----------|--------|---------|----------|--------|-------|--------|-------|-------|---|
| brisk, concrete, | galv, | wrought, | ether, | PVC or, | rock or, | steel, | tile, | metal, | wood, | other | |
| iron | iron | iron | metal | plastic | stone | | | metal | | | |

⑦ Type of Material Codes for Open Sections

| B | C | G | I | M | P | R | S | T | Z |
|--------------------|----------|---------------|-----------------|----------------|-------------------|----------------|-------|------|-------|
| brass or
bronze | concrete | galv.
iron | wrought
iron | other
metal | PVC or
plastic | rubber
seal | steel | tile | other |

PRODUCTION DATA (1)

R = 134 148 * T = A D M * Entry No 1478 Date 148- / / *
Remove, delete, add, delete, modify
 Discharge 150- Source of Data 151- *
 Method of Measurement 152- B C E F M O P R T U V W Z *
better, current, estimated, flow, totalling, orifice, pilot-tube, reported, trajectory, venturi, volumetric, well, other
 Production Level 153- * Static Level 154- * Source of Data 155- * Specific Capacity 272- *
 Method of Measurement 156- A C E G H L M R S T V Z * Pumping Period 157- *
active, estimated, pressure, calculated, conventional, measured, reported, steel, electric, submerged, other type type static flow

LIFT DATA (1)

R = 42 * T = A D M * Type of Lift 43- A B C J P R S T U Z * Entry No 254 # *
add, delete, modify
 Pump Intake Setting 44- * Type of Power 45- D E G H L N W Z *
direct, electric, gasoline, hand, LP gas, natural, windmill, other gas
 Date 38- / / * Horsepower 46- *
month day year

MAJOR PUMP DATA (2)

R = 47 * T = A D M * Type of Lift 43- * Lift Entry No 254 # * Manufacturer of Pump 48- *
add, delete, modify
 Serial No of Pump 49- * Name of Power Company 50- *
 Power Company Account No 51- * Power Motor No 52- * Pump Rating 53- *
 Person or Company Who Maintains the Pump 54- * Additional Lift 256- * Rated Pump Capacity 268- *
add, delete, modify

STANDBY POWER DATA (2)

R = 56 * T = A D M * Type of Lift 43- * Type of Power 56- * Horsepower 57- * Lift Entry No 254 # *
add, delete, modify

AVAILABLE LOG DATA (1)

R = 198 * T = A D M * New Card for Each Log Type Same R & T
add, delete, modify
 Type of Log 199- * Begin Depth 200- * End Depth 201- * Source of Data 202- *
add, delete, modify

WATER QUALITY DATA COLLECTION (1)

R = 114 * T = A D M * Begin Year 115- * End Year 116- * Source Agency 117- *
add, delete, modify
 Frequency of Collection 118- * Network Site 257- * Type of Analysis 120- *

WATER LEVEL DATA COLLECTION (1)

R = 121 * T = A D M * Begin Year 122- * End Year 123- * Source Agency 124- *
add, delete, modify
 Frequency of Collection 125- * Network Site 258- *

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R = 127 * T = A D M * Begin Year 126- * End Year 129- * Source Agency 130- *
add, delete, modify
 Frequency of Collection 131- * Network Site 259- * Method of Collection 133- C E M U Z *
calculated, estimated, measured, unknown, other

OTHER DATA AVAILABLE (1)

R = 180 * T = A D M * Type of Data 181- * Loc 182- C D Z * Format 261- F M P Z *
add, delete, modify
 New Card Same R & T Type of Data 181- * Loc 182- C D Z * Format 261- F M P Z *
add, delete, modify

FOOT NOTES:

① Source of Data Codes:

S D D A R L G Z
reporting, driller, owner, other go't, other logs, geologist, other agency reported

② Type of Log Codes

A B C D E F G H I J K L M N P Q
time, collar, log, driller's, observe, flow, geologist, magnetic, induction, gamma, diameter, logging, microlag, neutron, μ meter, photo, radio, active
 S T U V Z
sonic, temp, gamma, fluid, other gamma velocity

③ Frequency of Collection Codes

A B C D F I M S Q S W Z
annual, bi-monthly, continuous, daily, semi, intermittent, monthly, one time, quarter, semi, weekly, other monthly only annual annual

④ Type of Quality Analysis Codes

A B C D E F G H J K L M Z
physical, common, iron, pesticides, nutrients, sanitary, acids, gases, solids, other, all or, other chemical elements

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 T-③ D M Entry No 256 # 001 Depth to Top 91 Depth to Bottom 92

add, delete, modify

Unit Identifier 93= FLO39 Lithology 96= L4SM Lithologic Modifier 97= MARINE

AQUIFER DATA (2)

R-94 T- A D M Geohydrologic Unit Entry No 256 #

add, delete, modify

Date 95 # / /

month day year

Water Level 126 #

% Water Contributed 132 #

J 1140

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-93 T- A D M Entry No 256 # Depth to Top 91 Depth to Bottom 92

add, delete, modify

Unit Identifier 93= Lithology 96= Lithologic Modifier 97=

AQUIFER DATA (2)

R-94 T- A D M Geohydrologic Unit Entry No 256 #

add, delete, modify

Date 96 # / /

month day year

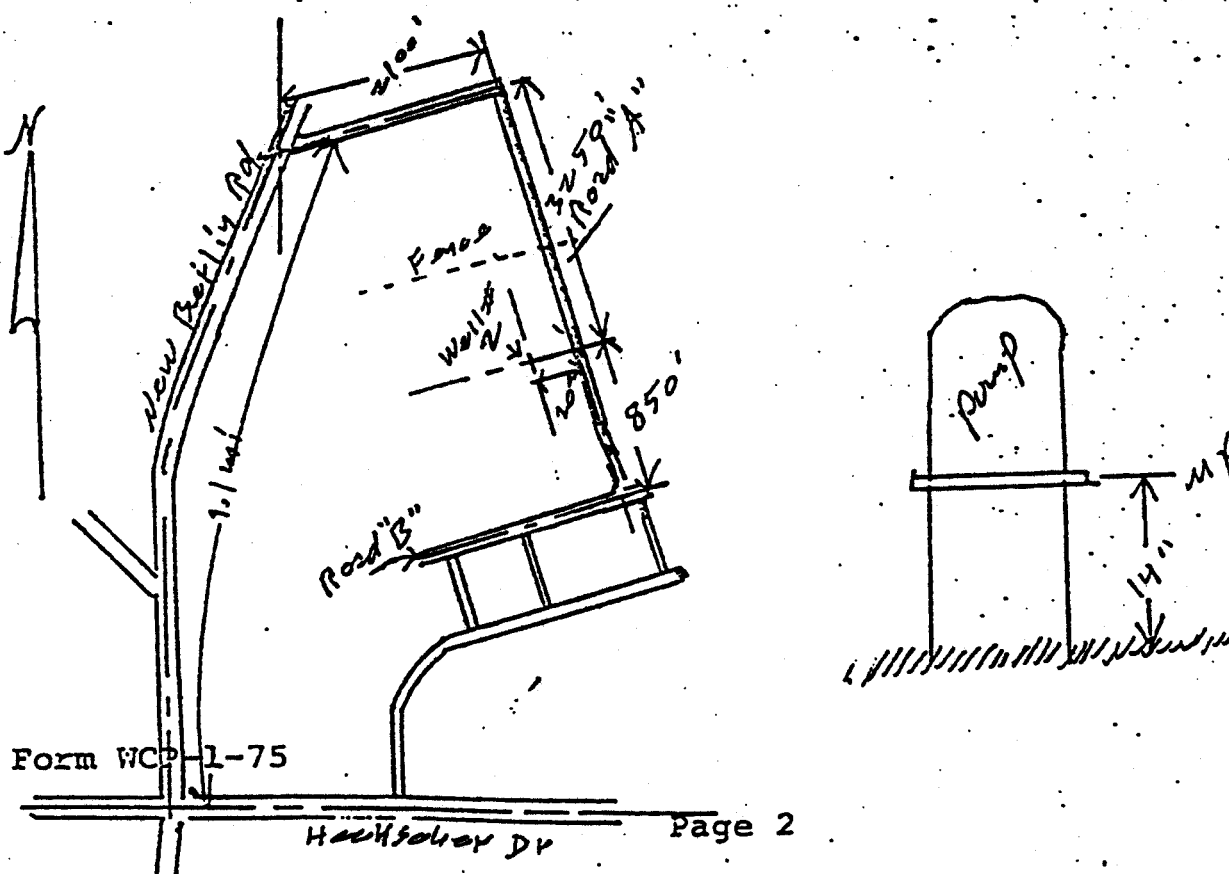
Water Level 126 #

% Water Contributed 132 #

PERTINENT REMARKS

R-1831 T- A 185-
add
New Card Same R&T
185-
185-

NOTES:



Recorded by

EssexU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATADate 2 Feb 77

Check One

☒ English☐ Metric UnitsSite Ident No 3025.1.108.133.120

19

COOPERATOR DATA (1)

R = 212 * T = ② D M *Cooperator
Site Identifier213 = T-1140 *

Registration No. 214 = _____ *

Inspection Status 215 = _____ *

Reason Unapproved 216 = _____ *

Inspection Date 217 = _____ / _____ / _____
month day yearRemarks 218 = 43.77 HECKSCHER DR *

DATA ON MINOR SITE REPAIRS (1)

R = 164 * T = A D M *

add, delete, modify

New Card for each Repair
Same R&T

Entry No.

Nature of Repair ①

Date Completed

Contractor

% Performance Chg.

(Minor Repair)

| | | | |
|-------|--|---|---|
| 165 # | | | * |
| 166 = | | * | |
| 167 = | | | * |
| 168 = | | | * |
| 170 = | | * | |

(Minor Repair)

| | | | |
|-------|--|---|---|
| 165 # | | | * |
| 166 = | | * | |
| 167 = | | | * |
| 168 = | | | * |
| 170 = | | * | |

Entry No.

Nature of Repair ①

Date Completed

Contractor

% Performance Chg.

(Minor Repair)

| | | | |
|-------|--|---|---|
| 165 # | | | * |
| 166 = | | * | |
| 167 = | | | * |
| 168 = | | | * |
| 170 = | | * | |

(Minor Repair)

| | | | |
|-------|--|---|---|
| 165 # | | | * |
| 166 = | | * | |
| 167 = | | | * |
| 168 = | | | * |
| 170 = | | * | |

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 * T = A D M *

add, delete, modify

No. Wells in Group 204 = _____ *

Deepest Depth 205 = _____ *

Shallowest
Depth

206 = _____ *

Construction
Method

207 = D J V W Z *

drilled, jetted, driven, drive, other
washSize of
Well Field

208 = _____ *

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208 * T = A D M *

add, delete, modify

Longest
Dimension 209 = _____ *Other (Width)
Dimension 210 = _____ *

Depth 211 = _____ *

Orientation 203 = _____ *

Dip 204 = _____ *

DATA FOR COLLECTOR WELLS (1)

R = 219 * T = A D M *

add, delete, modify

New Card for each Lateral
Same R&T

Entry No.

Depth to the Lateral

Length of Lateral

Diameter of Lateral

Screen Mesh

| | | | |
|-------|--|--|---|
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |
| 220 # | | | * |

| | | |
|-------|--|---|
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |
| 221 = | | * |

| | | |
|-------|--|---|
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |
| 222 = | | * |

| | | |
|-------|--|---|
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |
| 223 = | | * |

| | | |
|-------|--|---|
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |
| 224 = | | * |

FOOT NOTES:

① Nature of repair

| | | | | | | | |
|-----------------|---------|----------|----------------------|---------------------|------------------|---------------------|-------|
| B | C | D | L | S | P | S | Z |
| blocked,
off | cleaned | disposed | liner,
perforated | slotted or,
both | plugged,
both | screen,
replaced | other |

WATER WELL FIELD INSPECTION GUIDE

Reason for Inspection:

| Complaint | W.U. Permit | Construction, etc. Permit | Well Inventory |
|-----------|-------------|---------------------------|----------------|
|-----------|-------------|---------------------------|----------------|

J-1140
Well Inventory

Free flowing well

Regulatory Status: Received Application to Construct, Modify ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

Received Application for Temporary Water Use Permit ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

Drilled 3-5-65 DNR/BW-2 Received ☐ Yes N/A ☐ Date _____

Data Submitted to USGS ☐ Yes _____ Date _____

Owner TEA Northside #2

Address 4377 Heckscher Dr

Well Drilling Contractor Dural Drilling Co License/Bond No.

Location of water well Latitude 302511N Long 0813312 Sequential 1

Ident # of Quad Sheet SW SW NE 13 15 27E East Por-
1/4 1/4 1/4 Section Township Range Subdivisi

Depth of Water Well 1104 How measured? Driller's Report

Diameter/Cross Section 16 X 10

Depth of Casing 520 Diameter of Casing from LSD 16" to 118 feet and diameter 10" from 100 to 520 feet.

Type of grouting used _____ Hole centered in grout? _____

[illegible]

7.25 X 2.307 + 1.167 = 17.84 ft H₂O + LSD
Water level MD = 1.167 DSI = 7.25 How measured Pressure Gauge

Method of well construction

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.

Casing material used _____

J 1190

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300'

Distance to nearest contaminant - septic tank, etc. if less than 100'

Maximum well yield _____ GPM Average well yield _____ GPM

Frequency of well use _____ Hrs./Day _____ Days/Year

Pump Data - Type & Make A/C Turbine HP 40 Pump Rating 2000

Capacity 2000 No. of Bowls or Stages 1

Type of Power Elect Static water level _____

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness ✓, and Chloride ✓.

General Rating: poor _____ average ✓ good _____ excellent _____

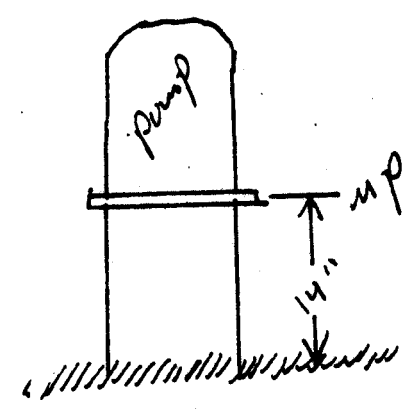
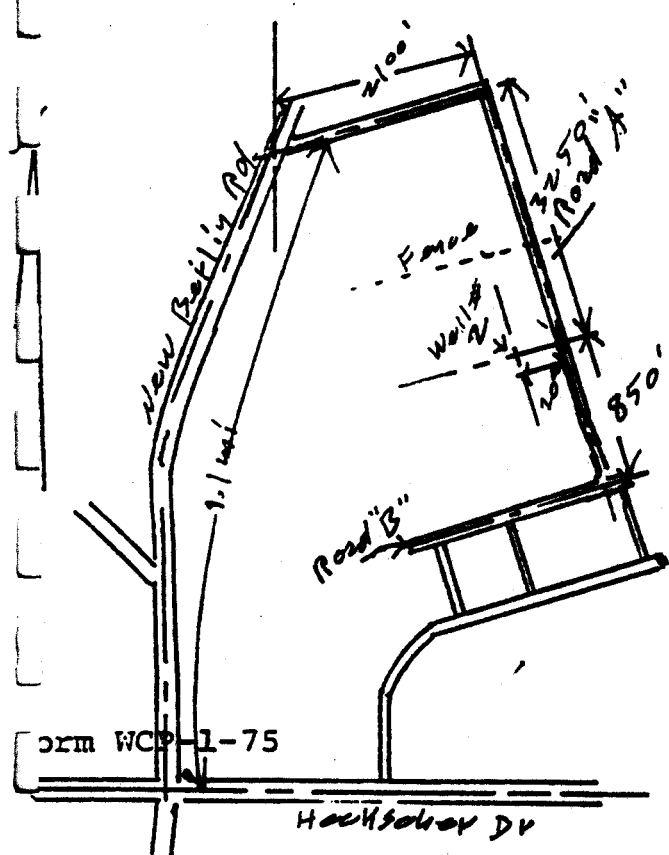
Additional Info/Action Required _____

Action taken/Comments _____

Date _____

Inspector's Name W.P. Essex Field Inspection Date 10 Sep 76

Inventory Complete Date _____



WATER-QUALITY DATA
Field Sheet & Key Punch Form

10/4/74 Tax

DATA CARD

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|-------------------------------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|--------------------|----|----|----|-----|----|---------------------|----|----|----|----|----|----|----|----|
| Type | Station identification number | | | | | | | | | | | | | | | | Date of collection | | | | | | Time of measurement | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 |
| | | | | | | | | | | | | | | | | | Y | M | D | Y | M | D | | | | | | | | | |
| | | | | | | | | | | | | | | | | | Begin | | | | End | | | | | | | | | | |

Local Number

J 1140

Card 1

| Parameter code | Value | Exp. | Rmk |
|--|-----------|---------|-------|
| Cl (mg/l) | 33 | 38 | 42 44 |
| | 0 0 9 4 0 | 2 0 0 0 | 0 2 |
| Hardness as CaCO ₃ (Ca, Mg)(mg/l) | 43 | | 56 |
| | 0 0 9 0 0 | 2 0 0 0 | 0 2 |
| Dissolved solids at 180°C (mg/l) | 57 | | 63 |
| | 7 0 3 0 0 | | |
| Specific conductance K x 10 ⁶ | 69 | | 80 |
| | 0 0 0 9 5 | 2 0 0 0 | 0 2 |

Calculations

| | |
|-------|-------|
| Cl | |
| 12.90 | 19.10 |
| 15.80 | 13.10 |
| 1.10 | 6.00 |
| | 8.40 |
| 1.00 | 2.40 |
| 2.20 | |

Duplicate Cols. 1-32

Card 2

| | | | |
|----------------------|-----------|--|----|
| Water temperature °C | 33 | | 44 |
| | 0 0 0 1 0 | | |
| pH (units) | 45 | | 56 |
| | 0 0 4 0 0 | | |
| Dissolved Oxygen % | 57 | | 63 |
| | 0 0 3 0 0 | | |
| Other | 69 | | 80 |
| | 0 0 0 0 0 | | |

Analysis by

112

Date

11-13-74

Recorded by EssexU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULEDate 2 Feb 77Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (1)

Site Ident No 302505081331001 RG Number R-0 Transaction T-0 D M V
 Site-Type 2-C D H I M P T Data 3-C U L M Reporting Agency 4-FL039
 Project No. 5- District 6-121 State 7-12 County (or town) DUNAL 8-031
 Latitude 9-30.2505 Longitude 10-08.13310 Lat-Long Accuracy 11-S O T M
 Local Number 12-J-1139 Land Net Loc. 13-NW1/4 SE1/4 T1S R27E
 Location Map 14-EAST PORT Scale 15-24000
 Altitude 16-10 Method of Measurement 17-A L M Accuracy 18-5
 Type Setting 19-D C E H K L O P S T U V W Hydrologic Unit (IOWDC) 20-03080103
 Date of First Construction/Completion 21-02/06/1965 Use of Site 23-A D E G H M P R S T U X Z
 Use of Water 24-A B C D E F H I M N P R S T U Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27-11.04 Depth of Well 28-11.04 Source of Depth Data 29-D
 Water Level 30-23.65 Date Measured 31-09/10/1976 Source 33-S
 Method of Measurement 34-A C E G H L M R S T V Z
 Site Status 37-D F G H M P R S T V X Z
 Source of Geohydrologic Data 38-D Pump Used 35- Measuring Point 266-58 Measuring Point Date 267-09/10/1976

OWNER IDENTIFICATION (1)

R-158 T-0 D M Date of Ownership 159-02/06/1965
 Name Last 161-JEA NORTH First 162-GEN STA Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-189 T-0 D M Ident 190-ST Assigner 191-FLA WND
 New Card Same R & T Ident 190-HECKSCHER Assigner 191-FL039

SITE VISIT DATA (1)

R-186 T-0 D M Date of Visit 187-09/10/1976 Name of Person 188-ESSEX

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-A D M Date 193- Geohydrologic Unit 196-
 New Card Same R thru 195
 Temperature 198-0.0.0.1.0 Degrees C 197-
 Conductance 196-0.0.0.9.5 u Mhos 197-
 Other (STORET) Parameter 198- Value 197-
 Other (STORET) Parameter 198- Value 197-

Plotted _____
Header _____
Local # _____
Keypunched _____

FOOT NOTES:

① Source of Data Codes:

| | | | | | | | |
|--|-------|------------------------|--------|----------|---|---|---|
| S | D | O | A | R | L | G | Z |
| reporting, driller, owner, other geol. | other | logs, geologist, other | agency | reported | | | |

WELL CONSTRUCTION DATA (1)

R = 58 * T = A D M * Entry No 59 # 001 *

Date of Construction Completion 60 = 02/06/1965 *

Source of ① Const. Data 64 = D *

Name of Contractor/Driller 63 = DUVAL *

DUVAL Drilling Co.

Method of Construction 65 = A B C D H J P R T V W Z *

Finish 66 = C F G H B P S T W X Z * Type of Seal 67 = B C G Z *

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z * Number of Hours in Development 70 = *

Special Treatment During Development 71 = C D E F H M Z *

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R = 72 * T = A D M * Construction Entry No 59 # 001 *

Top of Hole Segment Below LSD

73 # 2 *
73 # 1.18 *
73 # *
73 # *
73 # *

Bottom of Hole Segment below LSD

74 = 1.18 *
74 = 1.104 *
74 = *
74 = *
74 = *

Diameter of Hole Segment

75 = 16 *
75 = 10 *
75 = *
75 = *
75 = *

New Card for Each Hole Segment Same R, T & Field 59

CASING SCHEDULE (2)

R = 76 * T = A D M * Construction Entry No 59 # 001 *

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77 # 2 *
77 # 1.05 *
77 # *
77 # *
77 # *

Bottom of Casing Segment Below LSD

78 = 1.18 *
78 = 520 *
78 = *
78 = *
78 = *

Diameter of Casing Segment

79 # 16 *
79 # 10 *
79 # *
79 # *
79 # *

Casing Material ③

80 = S *
80 = S *
80 = *
80 = *
80 = *

Thickness of Casing

81 = *
81 = *
81 = *
81 = *
81 = *

OPENINGS SCHEDULE (2)

R = 82 * T = A D M * Construction Entry No 59 # * (Openings Data)

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83 # * Bottom of Section Below LSD 84 = *

Type of Openings ⑤

Type of Material ⑦

Diameter of Open Section

Width of Opening

Length of Opening

85 = *
86 = *
87 = *
88 = *
89 = *

(Openings Data) *

83 # *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

(Openings Data)

83 # *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency, reported

③ Casing Material Codes

B C G I M P R S T U W Z
brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, coated, wood, other iron iron metal plastic stone steel

⑥ Type of Openings Codes

F L M P R S T W X Z
fracture, fractured, mesh, perforated, wire screen, sand, walled, open, other shuttered or slotted wound (unknown) point hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other bronze iron iron metal plastic steel

PRODUCTION DATA (1)

R = 134 146 * T = A D M * Entry No 147 # 001 * Date 148 = / / *
flowing, pumped add, delete, modify month day year

Discharge: 150 = 1970 * Source of Data 151 = 6 *
add, delete, modify

Method of Measurement 152 = B C E F M O P R T U V W Z *
boiler, current, estimated, flume, totaling, orifice, pitot-tube, reported, trajectory, venturi, volumetric, weir, other

Production Level 153 = * Static Level 154 = * Source of Data 155 = * Specific Capacity 272 = *
add, delete, modify

Method of Measurement 156 = A C E G H L M R S T V Z *
airline, calibrated, estimated, pressure, geophysical, manometer, reported, steel, electric, calibrated, other

Pumping Period 157 = *
airline pipe pressure gage logs tape tape electric tape

J 1139

LIFT DATA (1)

R = 42 * T = A D M * Type of Lift 43 # A B C J P R S T U Z *
add, delete, modify air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other

Pump Intake Setting 44 = * Type of Power 45 = D E G H L N W Z *
add, delete, modify diesel, electric, gasoline, hand, LP gas, natural, windmill, other

Date 38 = / / * Horsepower 46 = 40.0 *
month day year

MAJOR PUMP DATA (2)

R = 47 * T = A D M * Type of Lift 43 # T * Lift Entry No 254 # 001 * Manufacturer of Pump 48 = ALLIS CH *
add, delete, modify

Serial No of Pump 49 = * Name of Power Company 50 = JEA *
add, delete, modify

Power Company Account No 51 = * Power Meter No 52 = * Pump Rating 53 = *
add, delete, modify

Person or Company Who Maintains the Pump 54 = * Additional Lift 255 = * Rated Pump Capacity 268 = 2000 *
add, delete, modify

STANDBY POWER DATA (2)

(See LIFT DATA for codes of fields 43 and 56 below)

R = 55 * T = A D M * Type of Lift 43 # * Type of Power 56 = * Horsepower 57 = * Lift Entry No 254 # *
add, delete, modify

AVAILABLE LOG DATA (1)

R = 198 * T = A D M *
add, delete, modify

New Card for Each Log Type Same R & T

| Type of Log | Begin Depth | End Depth | Source of Data |
|-------------|-------------|-----------|----------------|
| 199 # | 200 = | 201 = | 202 = |
| 199 # | 200 = | 201 = | 202 = |
| 199 # | 200 = | 201 = | 202 = |
| 199 # | 200 = | 201 = | 202 = |

WATER QUALITY DATA COLLECTION (1)

R = 114 * T = A D M * Begin Year 115 # * End Year 116 = * Source Agency 117 = *
add, delete, modify

Frequency of Collection 118 = * Network Site 257 = * Type of Analysis 120 = *
add, delete, modify

WATER LEVEL DATA COLLECTION (1)

R = 121 * T = A D M * Begin Year 122 # * End Year 123 = * Source Agency 124 = *
add, delete, modify

Frequency of Collection 125 = * Network Site 258 = *
add, delete, modify

WATER PUMPAGE WITHDRAWAL DATA COLLECTION (1)

R = 127 * T = A D M * Begin Year 128 # * End Year 129 = * Source Agency 130 = *
add, delete, modify

Frequency of Collection 131 = * Network Site 259 = * Method of Collection 133 = C E M U Z *
add, delete, modify calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)

R = 180 * T = A D M * Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *
add, delete, modify operator, district, other files, machine, published, other

New Card Same R & T Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *
add, delete, modify

FOOT NOTES:

① Source of Data Codes:

S D O A R L G Z
reporting, driller, owner, other govt, other logs, geologist, other agency reported,

③ Frequency of Collection Codes

A B C D F I M S Q S W Z
annual, bi-monthly, continuous, daily, semi, intermittent, monthly, one time, quarter, semi, weekly, other monthly only annual annual

② Type of Log Codes

A B C D E F G H I J K L M N S P Q
time, collar, caliper, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, laterolog, microlog, neutron, μ later, photo, radio, conduct ray active

S T U V Z
sonic, temp, gamma, fluid, other gamma velocity

④ Type of Quality Analyses Codes

A B C D E F G H J K L M Z
physical, common, trace, petroleum, nutrients, sanitary, acids, gases, organics, solids, all or, other chemical aluminum

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 256 # 001 * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = 120 FLRD * Lithology 96 = LASH * Lithologic Modifier 97 = MARINE *

AQUIFER DATA (2)

R = 94 * T = A D M * GeoHydrologic Unit Entry No 256 # * J 1139

add, delete, modify

Date 95 # / / * Water Level 128 = * % Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R = 90 * T = A D M * Entry No 256 # * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = * Lithology 96 = * Lithologic Modifier 97 = *

AQUIFER DATA (2)

R = 94 * T = A D M * GeoHydrologic Unit Entry No 256 # *

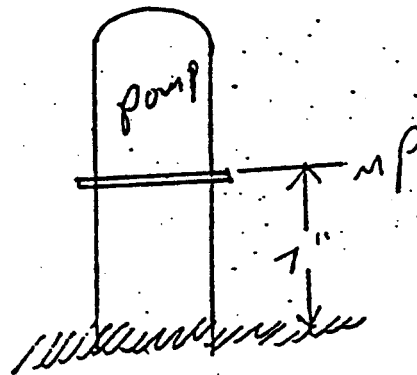
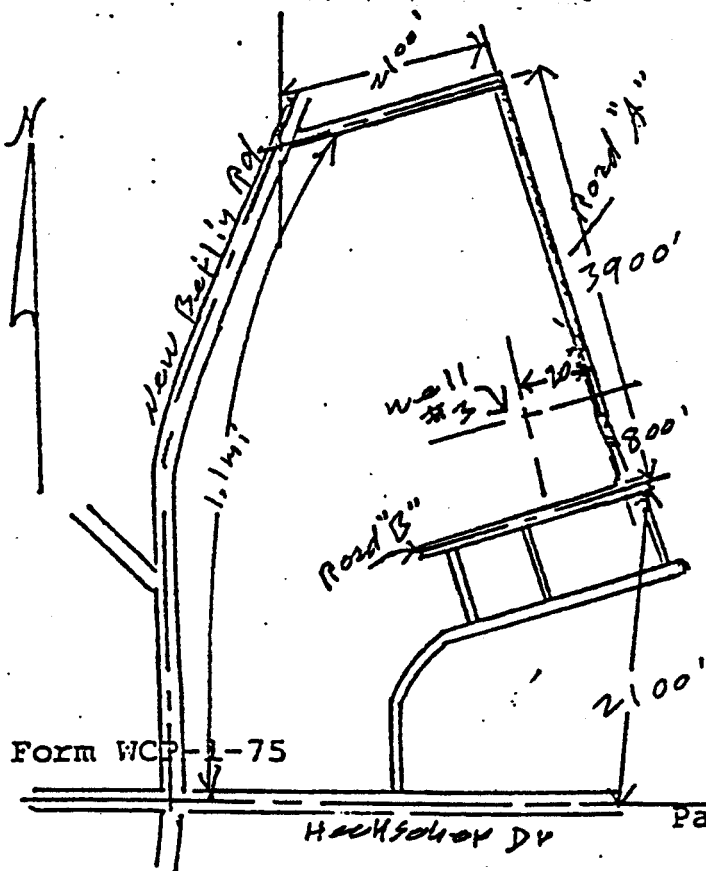
add, delete, modify

Date 95 # / / * Water Level 126 = * % Water Contributed 132 = *

PERTINENT REMARKS

R = 183 * T = A * 185 = *
add
New Card Same R&T
185 = *
185 = *

NOTES:



Form WCP-3-75

Recorded by ESSEXU.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
MISCELLANEOUS DATADate 2 Feb 77Site Ident No 302505081331001

Check One

☒ English☐ Metric Units

COOPERATOR DATA (1)

R = 212 *

T = 0 D M *

add, delete, modify

Cooperator
Site identifier213 = JE 1139 *

Registration No.

214 = _____ *

Inspection Status 215 = _____ *

Reason Unapproved

216 = _____ *

Inspection Date

217 = _____ / _____ / _____ *

month day year

Remarks 218 = 43.77 HEC-HSCHER D.R. *

DATA ON MINOR SITE REPAIRS (1)

R = 164 *

T = A D M *

add, delete, modify

New Card for each Repair
Same R&T

Entry No

(Minor Repair)
165 # _____ *

Nature of Repair ①

166 = _____ *

Date Completed

167 = _____ / _____ / _____ *

Contractor

168 = _____ *

% Performance Chg

170 = _____ *

(Minor Repair)

165 # _____ *

166 = _____ *

167 = _____ / _____ / _____ *

168 = _____ *

170 = _____ *

Entry No.

(Minor Repair)
165 # _____ *

Nature of Repair ①

166 = _____ *

Date Completed

167 = _____ / _____ / _____ *

Contractor

168 = _____ *

% Performance Chg.

170 = _____ *

(Minor Repair)

165 # _____ *

166 = _____ *

167 = _____ / _____ / _____ *

168 = _____ *

170 = _____ *

DATA FOR MULTIPLE WELL GROUPS (1)

R = 203 *

T = A D M *

add, delete, modify

No. Wells in Group

204 = _____ *

Deepest Depth

205 = _____ *

Shallowest
Depth

206 = _____ *

Construction
Method

207 = D J V W Z *

drilled, jetted, driven, drive, other
washSize of
Well Field

208 = _____ *

DATA FOR POND, TUNNEL OR DRAIN SITES (1)

R = 208 *

T = A D M *

add, delete, modify

Longest
Dimension

209 = _____ *

Other (Width)
Dimension

210 = _____ *

Depth

211 = _____ *

Orientation

203 = _____ *

Dip

204 = _____ *

DATA FOR COLLECTOR WELLS (1)

R = 219 *

T = A D M *

add, delete, modify

New Card for each Lateral
Same R&T

Entry No.

220 # _____ *

Depth to the Lateral

221 = _____ *

Length of Lateral

222 = _____ *

Diameter of Lateral

223 = _____ *

Screen Mesh

224 = _____ *

FOOT NOTES:

① Nature of repair

B C D L P S Z
blocked, cleaned, deepened, liner, dotted or, plugged, screen, other
off perforated both replaced

WATER WELL FIELD INSPECTION GUIDE

Reason for Inspection:

Complaint W.U. Permit Construction, etc. Permit

J-1139
Well Inventory

Free flowing well

Regulatory Status: Received Application to Construct, Modify ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

Received Application for Temporary Water Use Permit ☐ Yes N/A ☐ Date _____

Permit Issued for Above ☐ Yes N/A ☐ Date _____

DNR/BW-2 Received ☐ Yes N/A ☐ Date _____

Data Submitted to USGS ☐ Yes Date _____

*Drilled
2-6-65*

Owner JE A Northside #3

Address 4377 Heckscher Dr

Well Drilling Contractor Dural Drilling Co License/Bond No. _____

Location of water well Latitude 302505 N Long 0813310 Sequential 01

Ident # of Quad Sheet NW 1/4 NW 1/4 SE 1/4 13 15 27E Eastport
Section Township Range Subdivisi

Depth of Water Well 1104 How measured? Driller's Report

Diameter/Cross Section 16 X 10

Depth of Casing 520 Diameter of Casing from LSD 16" to 118 feet and dia
meter 10" from 105 to 520 feet.

Type of grouting used _____ Hole centered in grout? _____

Use of well _____ Number of People Served _____

Water level 10 X 2.307 + .58 = 23.65 ft. H₂O + LSD
mp = .58 PSI = 10 How measured pressure Gage

Method of well construction _____

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.)

Average

Casing material used Steel

J 1139

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' _____

Distance to nearest contaminant - septic tank, etc. if less than 100' _____

Maximum well yield 1970 GPM Average well yield _____ GPM

Frequency of well use _____ Hrs./Day _____ Days/Year

Pump Data - Type & Make A/C Turbine HP 40 Pump Rating 2000

Capacity 2000 No. of Bowls or Stages 1

Type of Power Elect Static water level 23.65

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness ✓, and Chloride ✓.

General Rating: poor _____ average ✓ good _____ excellent _____

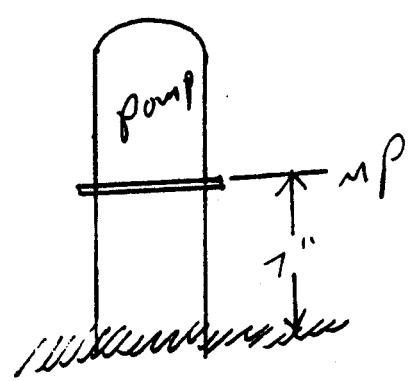
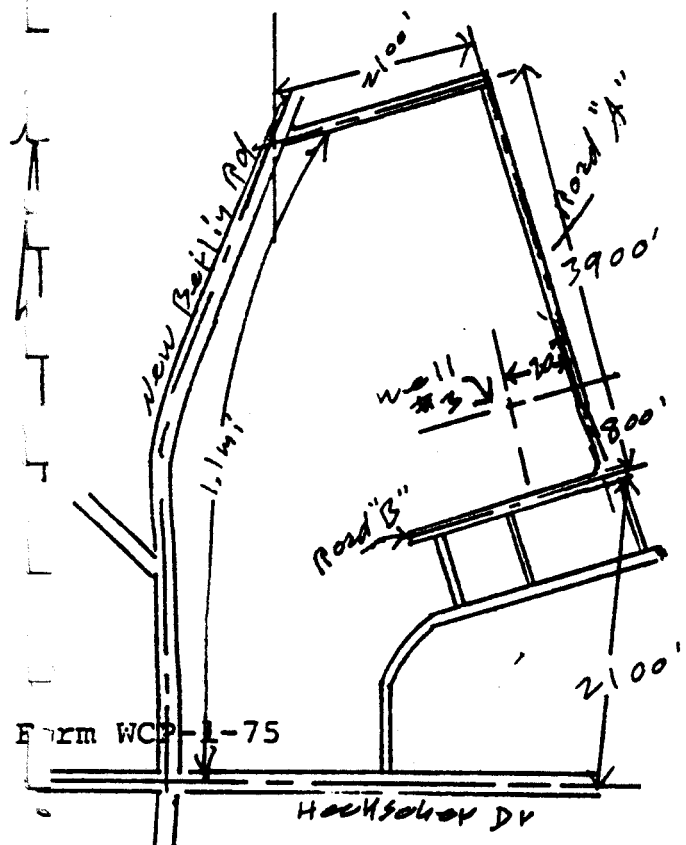
Additional Info/Action Required _____

Action taken/Comments _____

Date _____

Inspector's Name W.P. Essex Field Inspection Date 10 Sep 76

Inventory Complete Date _____



WATER-QUALITY DATA
Field Sheet & Key Punch Form

10/4/74 Tax

DATA CARD

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------|-------------------------------|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|--------------------|----|----|---------------------|----|----|----|----|----|----|----|----|----|----|----|---|---|--|--|--|
| Type | Station identification number | | | | | | | | | | | | | | | | Date of collection | | | Time of measurement | | | | | | | | | | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | | | | | |
| | | | | | | | | | | | | | | | | Y | M | D | Y | M | D | Y | M | D | Y | M | D | Y | M | D | Y | M | D | | | |
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Local Number 3-1139

Card 1

| Parameter code | Value | Exp. | Rmk |
|---|-----------|---------|-------|
| Cl (mg/l) | 33 | 38 | 42 44 |
| | 0 0 9 4 0 | | |
| Hardness as CaCO ₃ (Ca, Mg) (mg/l) | 45 | | 56 |
| | 0 0 9 0 0 | | |
| Dissolved solids at 180°C (mg/l) | 57 | | 68 |
| | 7 0 3 0 0 | | |
| Specific conductance K x 10 ⁶ | 69 | | 80 |
| | 0 0 0 9 5 | 4 4 0 0 | 0 3 |

Calculations

$$\begin{array}{r}
 9.6 \\
 - 8.5 \\
 \hline
 1.1 \\
 - .1 \\
 \hline
 1.0 \\
 20 \\
 \hline
 20.0
 \end{array}$$

Duplicate Cols. 1-32

Card 2

| | | | |
|----------------------|-----------|-----------|-----------|
| Water temperature °C | 33 | | 44 |
| | 0 0 0 1 0 | | |
| pH (units) | 45 | | 56 |
| | 0 0 4 0 0 | | |
| Dissolved Oxygen % | 57 | | 68 |
| | 0 0 3 0 0 | | |
| Other | 69 | | 80 |
| | 0 0 0 0 7 | 0 0 0 0 0 | 0 0 0 0 0 |

Analysis by WHP

Date 10-20-74

RAF

Recorded by

Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 2 Feb 77

Check One

✓ English

Metric Units

GENERAL SITE DATA (G)

Site Name No. 302502091330701 RG Number R-00 Transaction T- A D M V
add, delete, modify, verified

Site Type 2- C D H I M P T 19 Data 3- U L M Reporting Agency 4- FLO39
cellular, drain, subsalt, streamer, multiple, pond, tunnel or, well
Notes checked, uncheck, located not, minimal
accuracy date

Project No. 5- District 6- State 7- County (or town) 8-
Latitude 9- 3024.59 Longitude 10- 081330.3 Lat-Long Accuracy 11- S O T M
deg min sec deg min sec sec, 5 min, 10 sec, mile

Local Number 12- D-228 J-295 Land Not Loc. 13- S T R
1/4 1/4 1/4 section, township, range, meridian

Location Map 14- EASTPORT Scale 15-
Altitude 16- Method of Measurement 17- A L M Accuracy 18-
altimeter, level, map

Type Setting 19- D C E F H K L S P S T U V W Hydrologic Unit (OWDC) 20-
depression, stream, delta, flat, hilltop, sink, swamp, offshore, piedmont, bluffs, terrace, undulating, valley, upland
flow

Date of First Construction/Completion 21- month / day / year Use of Site 22- A O E G H S M P R S T U V W X Z
made, drain, gas, schalk, heat, observ- mine, oil or, recharge, repress, test, untested, with- waste, destroyed
thermal rears action gas drowal

Use of Water 24- A B C D E F H I M N P R S T U V Y Z
air cond., heating, manufacturing, domestic, power, fire, domestic, irrigation, medicinal, industrial, public, recreation, stock, institution, untested, dental, other
supply

Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27- Depth of Well 28- Source of 29-
Source of Depth Data

Water Level 30- -24.8 Date Measured 31- 09/10/1976 Source 32- S
month day year

Method of Measurement 34- A C E H L M R S T V Z
airline, calibrated, chemical, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other
type type electric type

Site Status 37- D F G H S P R S T V X Z
dry, flowing, nearby, nearby, observation, pumping, recently, nearby, nearby; foreign surface water other
flowing, recently flowing pumped pumping recently subsurface offsite

Source of Geohydrologic Data 36- Pump Used 35- Measuring Point 206- -58 Measuring Point Date 207- 09/10/1976
month day year

OWNER IDENTIFICATION (I)

R-158 T- A D M Date of Ownership 159- month / day / year
add, delete, modify

Name: Last 161- First 162- Middle Initial 163-
164- 165- 166- 167- 168- 169- 170- 171- 172- 173- 174- 175- 176- 177- 178- 179- 180- 181- 182- 183- 184- 185- 186- 187- 188- 189- 190- 191- 192- 193- 194- 195- 196- 197- 198- 199- 200- 201- 202- 203- 204- 205- 206- 207- 208- 209- 210- 211- 212- 213- 214- 215- 216- 217- 218- 219- 220- 221- 222- 223- 224- 225- 226- 227- 228- 229- 230- 231- 232- 233- 234- 235- 236- 237- 238- 239- 240- 241- 242- 243- 244- 245- 246- 247- 248- 249- 250- 251- 252- 253- 254- 255- 256- 257- 258- 259- 260- 261- 262- 263- 264- 265- 266- 267- 268- 269- 270- 271- 272- 273- 274- 275- 276- 277- 278- 279- 280- 281- 282- 283- 284- 285- 286- 287- 288- 289- 290- 291- 292- 293- 294- 295- 296- 297- 298- 299- 300- 301- 302- 303- 304- 305- 306- 307- 308- 309- 310- 311- 312- 313- 314- 315- 316- 317- 318- 319- 320- 321- 322- 323- 324- 325- 326- 327- 328- 329- 330- 331- 332- 333- 334- 335- 336- 337- 338- 339- 340- 341- 342- 343- 344- 345- 346- 347- 348- 349- 350- 351- 352- 353- 354- 355- 356- 357- 358- 359- 360- 361- 362- 363- 364- 365- 366- 367- 368- 369- 370- 371- 372- 373- 374- 375- 376- 377- 378- 379- 380- 381- 382- 383- 384- 385- 386- 387- 388- 389- 390- 391- 392- 393- 394- 395- 396- 397- 398- 399- 400- 401- 402- 403- 404- 405- 406- 407- 408- 409- 410- 411- 412- 413- 414- 415- 416- 417- 418- 419- 420- 421- 422- 423- 424- 425- 426- 427- 428- 429- 430- 431- 432- 433- 434- 435- 436- 437- 438- 439- 440- 441- 442- 443- 444- 445- 446- 447- 448- 449- 450- 451- 452- 453- 454- 455- 456- 457- 458- 459- 460- 461- 462- 463- 464- 465- 466- 467- 468- 469- 470- 471- 472- 473- 474- 475- 476- 477- 478- 479- 480- 481- 482- 483- 484- 485- 486- 487- 488- 489- 490- 491- 492- 493- 494- 495- 496- 497- 498- 499- 500- 501- 502- 503- 504- 505- 506- 507- 508- 509- 510- 511- 512- 513- 514- 515- 516- 517- 518- 519- 520- 521- 522- 523- 524- 525- 526- 527- 528- 529- 530- 531- 532- 533- 534- 535- 536- 537- 538- 539- 540- 541- 542- 543- 544- 545- 546- 547- 548- 549- 550- 551- 552- 553- 554- 555- 556- 557- 558- 559- 560- 561- 562- 563- 564- 565- 566- 567- 568- 569- 570- 571- 572- 573- 574- 575- 576- 577- 578- 579- 580- 581- 582- 583- 584- 585- 586- 587- 588- 589- 590- 591- 592- 593- 594- 595- 596- 597- 598- 599- 600- 601- 602- 603- 604- 605- 606- 607- 608- 609- 610- 611- 612- 613- 614- 615- 616- 617- 618- 619- 620- 621- 622- 623- 624- 625- 626- 627- 628- 629- 630- 631- 632- 633- 634- 635- 636- 637- 638- 639- 640- 641- 642- 643- 644- 645- 646- 647- 648- 649- 650- 651- 652- 653- 654- 655- 656- 657- 658- 659- 660- 661- 662- 663- 664- 665- 666- 667- 668- 669- 670- 671- 672- 673- 674- 675- 676- 677- 678- 679- 680- 681- 682- 683- 684- 685- 686- 687- 688- 689- 690- 691- 692- 693- 694- 695- 696- 697- 698- 699- 700- 701- 702- 703- 704- 705- 706- 707- 708- 709- 710- 711- 712- 713- 714- 715- 716- 717- 718- 719- 720- 721- 722- 723- 724- 725- 726- 727- 728- 729- 730- 731- 732- 733- 734- 735- 736- 737- 738- 739- 740- 741- 742- 743- 744- 745- 746- 747- 748- 749- 750- 751- 752- 753- 754- 755- 756- 757- 758- 759- 760- 761- 762- 763- 764- 765- 766- 767- 768- 769- 770- 771- 772- 773- 774- 775- 776- 777- 778- 779- 780- 781- 782- 783- 784- 785- 786- 787- 788- 789- 790- 791- 792- 793- 794- 795- 796- 797- 798- 799- 800- 801- 802- 803- 804- 805- 806- 807- 808- 809- 810- 811- 812- 813- 814- 815- 816- 817- 818- 819- 820- 821- 822- 823- 824- 825- 826- 827- 828- 829- 830- 831- 832- 833- 834- 835- 836- 837- 838- 839- 840- 841- 842- 843- 844- 845- 846- 847- 848- 849- 850- 851- 852- 853- 854- 855- 856- 857- 858- 859- 860- 861- 862- 863- 864- 865- 866- 867- 868- 869- 870- 871- 872- 873- 874- 875- 876- 877- 878- 879- 880- 881- 882- 883- 884- 885- 886- 887- 888- 889- 890- 891- 892- 893- 894- 895- 896- 897- 898- 899- 900- 901- 902- 903- 904- 905- 906- 907- 908- 909- 910- 911- 912- 913- 914- 915- 916- 917- 918- 919- 920- 921- 922- 923- 924- 925- 926- 927- 928- 929- 930- 931- 932- 933- 934- 935- 936- 937- 938- 939- 940- 941- 942- 943- 944- 945- 946- 947- 948- 949- 950- 951- 952- 953- 954- 955- 956- 957- 958- 959- 960- 961- 962- 963- 964- 965- 966- 967- 968- 969- 970- 971- 972- 973- 974- 975- 976- 977- 978- 979- 980- 981- 982- 983- 984- 985- 986- 987- 988- 989- 990- 991- 992- 993- 994- 995- 996- 997- 998- 999- 1000- 1001- 1002- 1003- 1004- 1005- 1006- 1007- 1008- 1009- 1010- 1011- 1012- 1013- 1014- 1015- 1016- 1017- 1018- 1019- 1020- 1021- 1022- 1023- 1024- 1025- 1026- 1027- 1028- 1029- 1030- 1031- 1032- 1033- 1034- 1035- 1036- 1037- 1038- 1039- 1040- 1041- 1042- 1043- 1044- 1045- 1046- 1047- 1048- 1049- 1050- 1051- 1052- 1053- 1054- 1055- 1056- 1057- 1058- 1059- 1060- 1061- 1062- 1063- 1064- 1065- 1066- 1067- 1068- 1069- 1070- 1071- 1072- 1073- 1074- 1075- 1076- 1077- 1078- 1079- 1080- 1081- 1082- 1083- 1084- 1085- 1086- 1087- 1088- 1089- 1090- 1091- 1092- 1093- 1094- 1095- 1096- 1097- 1098- 1099- 1100- 1101- 1102- 1103- 1104- 1105- 1106- 1107- 1108- 1109- 1110- 1111- 1112- 1113- 1114- 1115- 1116- 1117- 1118- 1119- 1120- 1121- 1122- 1123- 1124- 1125- 1126- 1127- 1128- 1129- 1130- 1131- 1132- 1133- 1134- 1135- 1136- 1137- 1138- 1139- 1140- 1141- 1142- 1143- 1144- 1145- 1146- 1147- 1148- 1149- 1150- 1151- 1152- 1153- 1154- 1155- 1156- 1157- 1158- 1159- 1160- 1161- 1162- 1163- 1164- 1165- 1166- 1167- 1168- 1169- 1170- 1171- 1172- 1173- 1174- 1175- 1176- 1177- 1178- 1179- 1180- 1181- 1182- 1183- 1184- 1185- 1186- 1187- 1188- 1189- 1190- 1191- 1192- 1193- 1194- 1195- 1196- 1197- 1198- 1199- 1200- 1201- 1202- 1203- 1204- 1205- 1206- 1207- 1208- 1209- 1210- 1211- 1212- 1213- 1214- 1215- 1216- 1217- 1218- 1219- 1220- 1221- 1222- 1223- 1224- 1225- 1226- 1227- 1228- 1229- 1230- 1231- 1232- 1233- 1234- 1235- 1236- 1237- 1238- 1239- 1240- 1241- 1242- 1243- 1244- 1245- 1246- 1247- 1248- 1249- 1250- 1251- 1252- 1253- 1254- 1255- 1256- 1257- 1258- 1259- 1260- 1261- 1262- 1263- 1264- 1265- 1266- 1267- 1268- 1269- 1270- 1271- 1272- 1273- 1274- 1275- 1276- 1277- 1278- 1279- 1280- 1281- 1282- 1283- 1284- 1285- 1286- 1287- 1288- 1289- 1290- 1291- 1292- 1293- 1294- 1295- 1296- 1297- 1298- 1299- 1300- 1301- 1302- 1303- 1304- 1305- 1306- 1307- 1308- 1309- 1310- 1311- 1312- 1313- 1314- 1315- 1316- 1317- 1318- 1319- 1320- 1321- 1322- 1323- 1324- 1325- 1326- 1327- 1328- 1329- 1330- 1331- 1332- 1333- 1334- 1335- 1336- 1337- 1338- 1339- 1340- 1341- 1342- 1343- 1344- 1345- 1346- 1347- 1348- 1349- 1350- 1351- 1352- 1353- 1354- 1355- 1356- 1357- 1358- 1359- 1360- 1361- 1362- 1363- 1364- 1365- 1366- 1367- 1368- 1369- 1370- 1371- 1372- 1373- 1374- 1375- 1376- 1377- 1378- 1379- 1380- 1381- 1382- 1383- 1384- 1385- 1386- 1387- 1388- 1389- 1390- 1391- 1392- 1393- 1394- 1395- 1396- 1397- 1398- 1399- 1400- 1401- 1402- 1403- 1404- 1405- 1406- 1407- 1408- 1409- 1410- 1411- 1412- 1413- 1414- 1415- 1416- 1417- 1418- 1419- 1420- 1421- 1422- 1423- 1424- 1425- 1426- 1427- 1428- 1429- 1430- 1431- 1432- 1433- 1434- 1435- 1436- 1437- 1438- 1439- 1440- 1441- 1442- 1443- 1444- 1445- 1446- 1447- 1448- 1449- 1450- 1451- 1452- 1453- 1454- 1455- 1456- 1457- 1458- 1459- 1460- 1461- 1462- 1463- 1464- 1465- 1466- 1467- 1468- 1469- 1470- 1471- 1472- 1473- 1474- 1475- 1476- 1477- 1478- 1479- 1480- 1481- 1482- 1483- 1484- 1485- 1486- 1487- 1488- 1489- 1490- 1491- 1492- 1493- 1494- 1495- 1496- 1497- 1498- 1499- 1500- 1501- 1502- 1503- 1504- 1505- 1506- 1507- 1508- 1509- 1510- 1511- 1512- 1513- 1514- 1515- 1516- 1517- 1518- 1519- 1520- 1521- 1522- 1523- 1524- 1525- 1526- 1527- 1528- 1529- 1530- 1531- 1532- 1533- 1534- 1535- 1536- 1537- 1538- 1539- 1540- 1541- 1542- 1543- 1544- 1545- 1546- 1547- 1548- 1549- 1550- 1551- 1552- 1553- 1554- 1555- 1556- 1557- 1558- 1559- 1560- 1561- 1562- 1563- 1564- 1565- 1566- 1567- 1568- 1569- 1570- 1571- 1572- 1573- 1574- 1575- 1576- 1577- 1578- 1579- 1580- 1581- 1582- 1583- 1584- 1585- 1586- 1587- 1588- 1589- 1590- 1591- 1592- 1593- 1594- 1595- 1596- 1597- 1598- 1599- 1600- 1601- 1602- 1603- 1604- 1605- 1606- 1607- 1608- 1609- 1610- 1611- 1612- 1613- 1614- 1615- 1616- 1617- 1618- 1619- 1620- 1621- 1622- 1623- 1624- 1625- 1626- 1627- 1628- 1629- 1630- 1631- 1632- 1633- 1634- 1635- 1636- 1637- 1638- 1639- 1640- 1641- 1642- 1643- 1644- 1645- 1646- 1647- 1648- 1649- 1650- 1651- 1652- 1653- 1654- 1655- 1656- 1657- 1658- 1659- 1660- 1661- 1662- 1663- 1664- 1665- 1666- 1667- 1668- 1669- 1670- 1671- 1672- 1673- 1674- 1675- 1676- 1677- 1678- 1679- 1680- 1681- 1682- 1683- 1684- 1685- 1686- 1687- 1688- 1689- 1690- 1691- 1692- 1693- 1694- 1695- 1696- 1697- 1698- 1699- 1700- 1701- 1702- 1703- 1704- 1705- 1706- 1707- 1708- 1709- 1710- 1711- 1712- 1713- 1714- 1715- 1716- 1717- 1718- 1719- 1720- 1721- 1722- 1723- 1724- 1725- 1726- 1727- 1728- 1729- 1730- 1731- 1732- 1733- 1734- 1735- 1736- 1737- 1738- 1739- 1740- 1741- 1742- 1743- 1744- 1745- 1746- 1747- 1748- 1749- 1750- 1751- 1752- 1753- 1754- 1755- 1756- 1757- 1758- 1759- 1760- 1761- 1762- 1763- 1764- 1765- 1766- 1767- 1768- 1769- 1770- 1771- 1772- 1773- 1774- 1775- 1776- 1777- 1778- 1779- 1780- 1781- 1782- 1783- 1784- 1785- 1786- 1787- 1788- 1789- 1790- 1791- 1792- 1793- 1794- 1795- 1796- 1797- 1798- 1799- 1800- 1801- 1802- 1803- 1804- 1805- 1806- 1807- 1808- 1809- 1810- 1811- 1812- 1813- 1814- 1815- 1816- 1817- 1818- 1819- 1820- 1821- 1822- 1823- 1824- 1825- 1826- 1827- 1828- 1829- 1830- 1831- 1832- 1833- 1834- 1835- 1836- 1837- 1838- 1839- 1840- 1841- 1842- 1843- 1844- 1845- 1846- 1847- 1848- 1849- 1850- 1851- 1852- 1853- 1854- 1855- 1856- 1857- 1858- 1859- 1860- 1861- 1862- 1863- 1864- 1865- 1866- 1867- 1868- 1869- 1870- 1871- 1872- 1873- 1874- 1875- 1876- 1877- 1878- 1879- 1880- 1881- 1882- 1883- 1884- 1885- 1886- 1887- 1888- 1889- 1890- 1891- 1892- 1893- 1894- 1895- 1896- 1897- 1898- 1899- 1900- 1901- 1902- 1903- 1904- 1905- 1906- 1907- 1908- 1909- 1910- 1911- 1912- 1913- 1914- 1915- 1916- 1917- 1918- 1919- 1920- 1921- 1922- 1923- 1924- 1925- 1926- 1927- 1928- 1929- 1930- 1931- 1932- 1933- 1934- 1935- 1936- 1937- 1938- 1939- 1940- 1941- 1942- 1943- 1944- 1945- 1946- 1947- 1948- 1949- 1950- 1951- 1952- 1953- 1954- 1955- 1956- 1957- 1958- 1959- 1960- 1961- 1962- 1963- 1964- 1965- 1966- 1967- 1968- 1969- 1970- 1971- 1972- 1973- 1974- 1975- 1976- 1977- 1978- 1979- 1980- 1981- 1982- 1983- 1984- 1985- 1986- 1987- 1988- 1989- 1990- 1991- 1992- 1993- 1994- 1995- 1996- 1997- 1998- 1999- 2000- 2001- 2002- 2003- 2004- 2005- 2006- 2007- 2008- 2009- 2010- 2011- 2012- 2013- 2014- 2015- 2016- 2017- 2018- 2019- 2020- 2021- 2022- 2023- 2024- 2025- 2026- 2027- 2028- 2029- 2030- 2031- 2032- 2033- 2034- 2035- 2036- 2037- 2038- 2039- 2040- 2041- 2042- 2043- 2044- 2045- 2046- 2047- 2048- 2049- 2050- 2051- 2052- 2053- 2054- 2055- 2056- 2057- 2058- 2059- 2060- 2061- 2062- 2063- 2064- 2065- 2066- 2067- 2068- 2069- 2070- 2071- 2072- 2073- 2074- 2075- 2076- 2077- 2078- 2079- 2080- 2081- 2082- 2083- 2084- 2085- 2086- 2087- 2088- 2089- 2090- 2091- 2092- 2093- 2094- 2095- 2096- 2097- 2098- 2099- 2100- 2101- 2102- 2103- 2104- 2105- 2106- 2107- 2108- 2109- 2110- 2111- 2112- 2113- 2114- 2115- 2116- 2117- 2118- 2119- 2120- 2121- 2122- 2123- 2124- 2125- 2126- 2127- 2128- 2129- 2130- 2131- 2132- 2133- 2134- 2135- 2136- 2137- 2138- 213

WELL CONSTRUCTION DATA (1)

R-52 T- A D M Entry No 59 J Date of Construction Completion 80- / / Source of ① 64- Conct. Date 64- *

Name of Contractor/Driller 63- *

Method of Construction 65- A B C D H J P R T V W Z *
sur. rotary bored, or augered cable-tool dug. hydrostatic rotary jetted, sur-pen. suction reverse rotary trenching, driven, drive, wash other

Finish 66- C F G H B P S T W X Z * Type of Seal 67- B C G Z *
porous, gravel w. concrete, gravel, sand, horizontal, open, perforated, screen, sand point, welded, open, other bottom, clay, cement, other great

Bottom of Seal 68- * Method of Development 69- A B C J N P S Z * Number of Hours in Development 70- *
sur-lift, bailed, compressed, jetted, ram, other, surged, other pump

Special Treatment During Development 71- C D E F H M Z *
chemicals, dry ice, explosives, deflocculant, hydrofracturing, mechanical, other

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72 T- A D M Construction Entry No 59 J

New Card for Each Hole Segment Same R, T & Field 59

| Top of Hole Segment Below LSD | Bottom of Hole Segment Below LSD | Diameter of Hole Segment |
|-------------------------------|----------------------------------|--------------------------|
| 73# | 74# | 75# |
| 73# | 74# | 75# |
| 73# | 74# | 75# |
| 73# | 74# | 75# |
| 73# | 74# | 75# |

CASING SCHEDULE (2)

R-76 T- A D M Construction Entry No 59 J

New Card for Each Casing With Same R, T & Field 59

| Top of Casing Segment Below LSD | Bottom of Casing Segment Below LSD | Diameter of Casing Segment | Casing Material ③ | Thickness of Casing |
|---------------------------------|------------------------------------|----------------------------|-------------------|---------------------|
| 77# | 78# | 79# | 80# | 81# |
| 77# | 78# | 79# | 80# | 81# |
| 77# | 78# | 79# | 80# | 81# |
| 77# | 78# | 79# | 80# | 81# |
| 77# | 78# | 79# | 80# | 81# |

OPENINGS SCHEDULE (2)

R-82 T- A D M Construction Entry No 59 J

New Card for Each Open Section With Same R, T and Field 59

| Top of Section Below LSD | Bottom of Section Below LSD | Type of Openings ⑤ | Type of Material ⑦ | Diameter of Open Section | Width of Opening | Length of Opening |
|--------------------------|-----------------------------|--------------------|--------------------|--------------------------|------------------|-------------------|
| 83# | 84# | 85# | 86# | 87# | 88# | 89# |
| 83# | 84# | 85# | 86# | 87# | 88# | 89# |
| 83# | 84# | 85# | 86# | 87# | 88# | 89# |
| 83# | 84# | 85# | 86# | 87# | 88# | 89# |
| 83# | 84# | 85# | 86# | 87# | 88# | 89# |

FOOT NOTES:

① Sources of Data Codes:

S D B A R L G Z

renting, driller, owner, other gov't. other logs, geologic, other agency reported.

② Casing Material Codes

B C G I M P R S T U W Z

brick, concrete, galv, wrought, other, PVC or, rock or, steel, tile, masonry, wood, other iron metal plastic stone

③ Type of Openings Codes

F L M P R S T W X Z

fracture, lateral, mesh, perforated, wire screen, sand, welded, open, other shutters or slotted sound (acoustic) point hole

④ Type of Material Codes for Open Sections

B C G I M P R S T Z

brass or, bronze, concrete, galv, wrought, other, PVC or, stainless, steel, tile, other iron metal plastic stone

PRODUCTION DATA (1)

R-124 148 T- A D M Entry No 1478 Date 148 / / month day year

Discharge 150 Source of Data 151

Method of Measurement 152 B C E F M O P R T U V W Z
bottle, current, estimated, flow, timing, orifice, piezo-tube, reported, tripomatic, vacuum, volumetric, weir, other

Production Level 153 Serial Level 154 Source of Data 155 Specific Capacity 272

Method of Measurement 156 A C E G H L M R S T V Z
orifice, estimated, pressure, estimated, piezometer, reported, used, orifice, estimated, other
pipe pressure pipe logs

Pumping Period 157

LIFT DATA (1)

R-42 T- A D M Type of Lift 43 A B C J P R S T U Z
add, delete, modify or, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other

Pump Intake Setting 44 Type of Power 45 D E G H L N W Z
direct, electric, gasoline, hand, LP gas, natural, windmill, other

Date 38 / / month day year Horsepower 48

MAJOR PUMP DATA (2)

R-47 T- A D M Type of Lift 43 Lift Entry No 254 Manufacturer of Pump 48
add, delete, modify

Serial No. of Pump 49 Name of Power Company 50

Power Company Account No 51 Power Meter No 52 Pump Rating 53

Person or Company Who Maintains the Pump 54 Additional Lift 256 Rated Pump Capacity 268

STANDBY POWER DATA (2)

R-55 T- A D M Type of Lift 43 Type of Power 56 Horsepower 57 Lift Entry No 254
add, delete, modify (See LIFT DATA for codes of fields 43 and 56 below)

AVAILABLE LOG DATA (1)

R-198 T- A D M New Card for Each Log Type Same R & T

Type of Log 199

Begin Depth 200

End Depth 201

Source of Data 202

WATER QUALITY DATA COLLECTION (1)

R-114 T- A D M Begin Year 115 End Year 116 Source Agency 117
add, delete, modify

Frequency of Collection 118 Network Site 257 Type of Analysis 120

WATER LEVEL DATA COLLECTION (1)

R-121 T- A D M Begin Year 122 End Year 123 Source Agency 124
add, delete, modify

Frequency of Collection 125 Network Site 258

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R-127 T- A D M Begin Year 128 End Year 129 Source Agency 130
add, delete, modify

Frequency of Collection 131 Network Site 259 Method of Collection 132 C E M U Z
calculated, estimated, metered, unknown, other

OTHER DATA AVAILABLE (1)

R-180 T- A D M Type of Data 181
add, delete, modify

New Card Same R & T

Type of Data 182 C D Z
L 182 C D Z
F 261 F M P Z
L 182 C D Z
F 261 F M P Z

FOOT NOTES:

① Source of Data Codes:

S D G A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other reported, agency

② Type of Log Codes

A B C D E F G H I J K L M N P Q
bore, collar, depth, driller's, electric, fluid, geological, magnetic, induction, gamma, dipmeter, logging, monitoring, neutron, p. level, photo, radio, other
conductivity ray

S T U V Z
sonar, temp, gamma, fluid, other gamma velocity

③ Frequency of Collection Codes

A B C D F I M S Q S W Z
annual, bi-monthly, continuous, daily, same, intermittent, monthly, one time, quarter, semi, weekly, other monthly only annual annual

④ Type of Quality Analysis Codes

A B C D E F G H J K L M Z
physical, chemical, trace, particulate, nutrients, quantity, codes, codes, codes, codes, codes, all or, other
SSD SSE SFP SAE C.DSE man

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 T= A D M Entry No 256 # Depth to Top 91 Depth to Bottom 92

Unit Identifier 93 Lithology 98 Lithologic Modifier 97

AQUIFER DATA (2)

R=94 T= A D M Geohydrologic Unit Entry No 256 #

Date 95 # / / Water Level 128 # % Water Contributed 132 #

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 T= A D M Entry No 256 # Depth to Top 91 Depth to Bottom 92

Unit Identifier 93 Lithology 98 Lithologic Modifier 97

AQUIFER DATA (2)

R=94 T= A D M Geohydrologic Unit Entry No 256 #

Date 95 # / / Water Level 128 # % Water Contributed 132 #

PERTINENT REMARKS

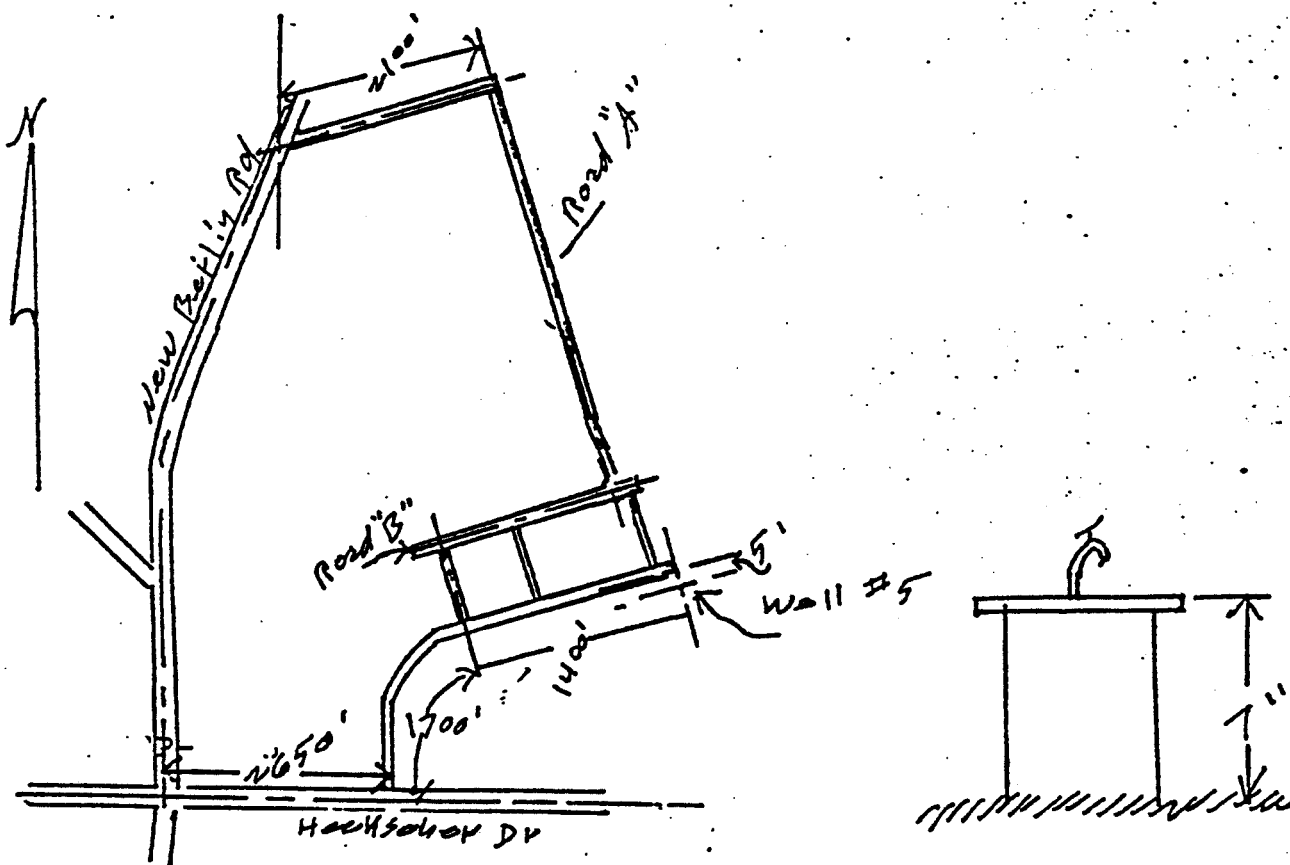
R=183 T= A 185

185

New Card Same R&T 185

185

NOTES:



Date 2 Feb 77

Check One ☒ English ☐ Metric Units

Site Ident No 302502081330701

R = 212 * T = ADM * Cooperators Site identifier 213 = J-295 * Registration No. 214 = *
add, delete, modify

Inspection Status: 215 = *

Reason Unapproved: 216 = *

Inspection Date: 217 = / / *

month day year

| | | |
|---------|----------------------------|---|
| Remarks | 218 - 4377 HECKSCHER DRIVE | * |
|---------|----------------------------|---|

| | | | | | |
|-----------|-----|---|---|---|---|
| R = 164 * | T = | A | D | M | * |
|-----------|-----|---|---|---|---|

add, delete, modify

**New Card for each Repair
Same R&T**

| (Minor Repair) | | | | | | | | | |
|--------------------|-------|--|---|--|--|--|--|--|---|
| Entry No | 165 # | | | | | | | | * |
| Nature of Repair ① | 166 = | | * | | | | | | |
| Date Completed | 167 = | | | | | | | | * |
| Contractor | 169 = | | | | | | | | * |
| % Performance Chg | 170 = | | * | | | | | | |

| (Minor Repair) | | | | | | | | | |
|----------------|--|--|---|---|---|---|---|---|---|
| 165 # | | | | | | | | | * |
| 166 = | | | * | | | | | | |
| 167 = | | | / | / | / | / | / | / | * |
| 169 = | | | | | | | | | * |
| 170 = | | | * | | | | | | |

| | (Minor Repair) | | | | | | | | | |
|--------------------|----------------|--|---|---|--|--|--|--|--|---|
| Entry No. | 165 # | | | | | | | | | * |
| Nature of Repair ① | 166 = | | * | | | | | | | |
| Date Completed | 167 = | | | | | | | | | * |
| Contractor | 169 = | | | | | | | | | * |
| % Performance Chg. | 170 = | | | * | | | | | | |

| (Minor Repair) | | | | | | | | | |
|----------------|--|---|---|---|---|---|---|--|---|
| 165 # | | | | | | | | | * |
| 166 = | | * | | | | | | | |
| 167 = | | | / | / | / | / | / | | * |
| 169 = | | | | | | | | | * |
| 170 = | | | * | | | | | | |

| | | | | | |
|-------------|-----|---|---|---|---|
| R = 203 ; * | T = | A | D | M | * |
|-------------|-----|---|---|---|---|

add, delete, modify

| | | | | |
|--------------------|-------|--|--|---|
| No. Wells in Group | 204 = | | | * |
| Deepest Depth | 205 = | | | * |

| | | | | | | | |
|---------------------|-------|---------|--------|--------|-------|-------|---|
| Shallowest Depth | 206 = | | | | * | | |
| Construction Method | 207 = | D | J | V | W | Z | * |
| | | drilled | jacked | driven | drive | other | |
| | | | | | with | | |
| Size of Well Field | 262 = | | | | | | * |

| | | | | | |
|-----------|-----|---|---|---|---|
| R = 208 * | T = | A | D | M | * |
|-----------|-----|---|---|---|---|

add. delete. modify

Longest Dimension 209 = *

Other (Width) Dimension 210 = *

Depth 211 = *

| | | | | |
|-------------|-------|--|--|---|
| Orientation | 263 = | | | * |
|-------------|-------|--|--|---|

| | | | | | |
|-----------|-----|---|---|---|---|
| R = 219 * | T = | A | D | M | * |
|-----------|-----|---|---|---|---|

add, delete, modify

New Card for each Lateral
Same R&T

[illegible]

① Nature of repair

| B | C | D | L | P | S | Z | |
|------------------|----------|-----------|-------|----------------------|------------------|---------------------|-------|
| bleed ed.
off | cleaned. | designed, | liner | set or
perforated | plugged,
back | screen,
replaced | other |

10/4/74 Tax

| Type | Station identification number | | | | | | | | | | | | | | | Day of broadcast | | | Time of measurement | | | | |
|------|-------------------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|------------------|-------|----|---------------------|-----|----|----|----|
| | Y | M | D | Y | M | D | Y | M | D | Y | M | D | Y | M | D | Y | M | D | | | | | |
| 1 | 2 | 0 | 0 | 5 | 0 | 2 | 0 | 2 | 1 | 5 | 3 | 0 | 7 | 0 | 1 | 17 | Begin | 22 | 23 | End | 28 | 29 | 32 |

Local Number J-275 D-228

calculations

| | |
|-------|-------|
| 15.80 | 15.80 |
| 14.70 | 14.70 |
| <hr/> | <hr/> |
| 1.10 | 1.10 |
| - .1 | - .1 |
| <hr/> | <hr/> |
| 1.00 | 1.00 |
| 870 | 870 |
| <hr/> | <hr/> |
| 20.00 | 20.00 |

Card 1

| Parameter code | Value | Exp. | Rmk |
|----------------|-------|------|-----|
|----------------|-------|------|-----|

| Cl (mg/l) | 33 | 38 | 42 | 44 |
|-----------|-----------|---------|-----|----|
| | 0 0 9 4 0 | 2 0 0 0 | 2 2 | |

Hardness as CaCO_3 (Ca, Mg) (mg/l) 48 56

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 9 | 0 | 0 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|---|---|---|

Dissolved solids at 180°C (mg/l) 68

| | | | | | | | | |
|---|---|---|---|---|--|--|--|--|
| 7 | 0 | 3 | 0 | 0 | | | | |
|---|---|---|---|---|--|--|--|--|

Specific conductance
K x 10⁶

Duplicate Cols. 1-32

Card 2

Water temperature °C

| | | | | |
|---|---|---|---|---|
| 0 | 0 | 0 | 1 | 0 |
| | | | | |
| | | | | |
| | | | | |

| | | | | |
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| | | | | |
| | | | | |

pH (units)

| | | | | | | | | | | | |
|----|---|---|---|---|--|--|--|--|--|----|--|
| 45 | | | | | | | | | | 56 | |
| 0 | 0 | 4 | 0 | 0 | | | | | | | |

Disinfectant 57 68
 Oxidation 00 0 0 3 6 0 0 0 0 0

Other

67

80

Analysis by

1912

Date

22

WATER CONSERVATION PROGRAM
WATER WELL FIELD INSPECTION GUIDE

J295

J 295
Well Inventory
D - 228'

Reason for Inspection:

Complaint W.U. Permit Construction, etc. Permit

Free flowing well

Regulatory Status: Received Application to Construct, Modify ☐ Yes N/A ☐ Date _____
Permit Issued for Above ☐ Yes N/A ☐ Date _____
- Drilled 3-16-65 Received Application for Temporary Water Use Permit ☐ Yes N/A ☐ Date _____
Permit Issued for Above ☐ Yes N/A ☐ Date _____
DNR/BW-2 Received ☐ Yes N/A ☐ Date _____
Data Submitted to USGS ☐ Yes Date _____

Owner JEA Northside #5

Address 4377 Heckscher Dr

Well Drilling Contractor

License/Bond No.

Location of water well Latitude 302459N Longitude 0813303 Sequential /

Ident # of Quad Sheet SE 1/4 NW 1/4 SE 1/4 Section 13 Township 1S Range 27E Subdivision East Port

Depth of Water Well 850 How measured? Reported - old ABC Survey

Diameter/Cross Section

Depth of Casing _____ Diameter of Casing from LSD _____ to _____ feet and diameter _____ from _____ to _____ feet.

Type of grouting used _____ Hole centered in grout? _____

Use of well _____ Number of People Served _____

Water level $10.5 \times 2.307 + .58 = 24.8 \text{ ft H}_2\text{O} + \text{LSD}$ MP = .58' PSI = 10.5 How measured Pressure Gauge

Method of well construction

Condition of Casing/Liner Pipes (Wall Thickness 0.125" minimum new-used etc.)

Casing material used

41T = 10' 14T = 10'

J295

Distance to closest well of 3" diameter or over and/or depth of 250' or greater. If closer than 300' _____

Distance to nearest contaminant - septic tank, etc. if less than 100' _____

Maximum well yield _____ GPM Average well yield _____ GPM

Frequency of well use _____ Hrs./Day _____ Days/Year

Pump Data - Type & Make _____ HP _____ Pump Rating _____

Capacity _____ No. of Bowls or Stages _____

Type of Power _____ Static water level _____

Pump Intake Setting _____ = (depth of suction line) _____

Water samples for: Dissolved Solids _____, pH _____, Conductivity _____
Hardness _____, and Chloride _____.

General Rating: poor _____ average _____ good _____ excellent _____

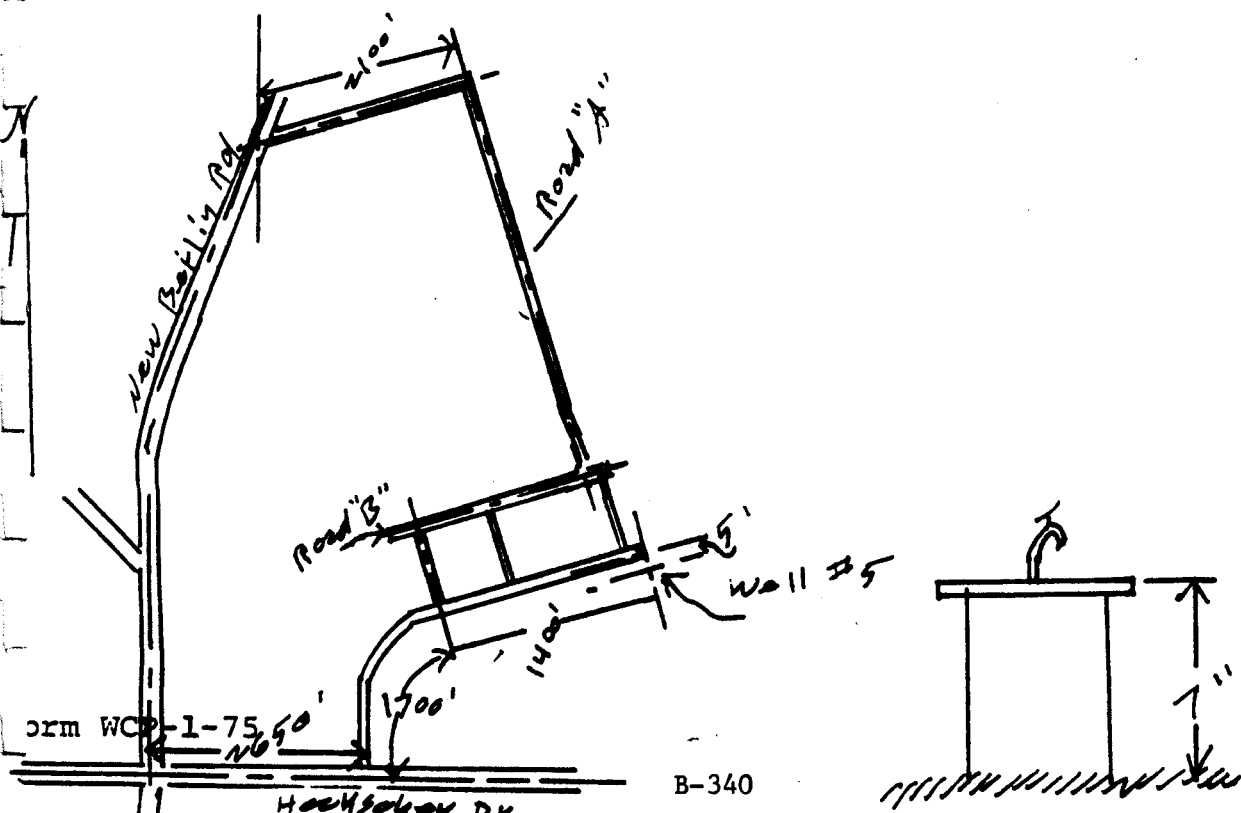
Additional Info/Action Required _____

Action taken/Comments _____

_____ Date _____

Inspector's Name W.R. Essex Field Inspection Date 10 Sep 76

Inventory Complete Date _____



Revised September 1980

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SITE SCHEDULE

SITE NO 30275408139000

Recorded by CRANTDate 5-16-84Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (I)

Site Ident No 30275408139000 RG Number R-0 Transaction T-A D M V
 add, delete, modify, verified
 Site-Type 2-C D E H I M O P S T (W) X Reliability 3-1 (C) U Reporting Agency 4-FL039
 collector, drain, escape, sink, connector multiple, outcrop, pond, spring, tunnel, well, test
 tion, hole, well, or shaft, hole
 field checked, unchecked
 Project No 5- District 6-121 State 7-12 County (or town) DUVAL 8-031
 Latitude 9-302754 Longitude 10-0813906 Lat-Long Accuracy 11-5 (B) T M
 deg min sec deg min sec sec. 5 sec 10 sec. Min
 Local Number 12-33675 Land Net 13-4406RTS38 T 1N R27E
 Loc. 1/4 1/4 1/4 section township range, meridian
 Location Map 14-TROUT RIVER Scale 15-24000
 Altitude 16-20 Method of Measurement 17-A L (M) Accuracy 18-5
 altimeter, level, map
 Topo Setting 19-A B C D E F G H K (L) M O P S T U V W Hydrologic Unit (GWD) 20-03080103
 alluvial, delta, stream, dunes, flat, flood, hill, sink, swamp, mangrove, off, beach, hill, terrace, undulating, valley, island
 alluvial, channel, wash, drain, top, swamp, shore, ment, side, flat, draw
 Use of Site 23-A C D E G H M O P R S T U (W) X Z Secondary Site Use 301- Tertiary Site Use 302-
 road, standby, drain, gen., seismic, heat, mine, oil or, recharge, repress, test, unused, with- waste, destroyed
 supply, thermal, mine, tion, gas, drawal
 Use of Water 24-A B C D E F (H) I J K M N P Q R S T U Y Z
 air, bot- com- de- cooler fire, de- irr- industrial mini- medi- intus public, aqua- recreation, stock, institution, unused, desert, other
 cond, ting, material, water, metic, sation, (cooling), cinal, trial, supply, culture
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27-6.80 Depth of Well 28-6.80 Source of Depth Data 29-D
 Water Level 30- Date Measured 31- / / Source 33-
 month day year
 Method of Measurement 34-A B C E G H L M N R S T V Z
 airline, analog, calibrated, estimated, pressure, calibrated, geophysical, manometer, non-rec, reported, steel, electric, calibrated, other
 airline, page, pressure page, logs, page, tape, tape, metric tape
 Site Status 37-D E F G H I J N O P R S T V W X Z
 dry, recently, flowing, nearby, nearby, injector, in-site, meas, obstruction, pumping, recently, nearby, nearby, foreign, well, surface water, other
 flowing, flowing, flowing, site, monitor, disson, pumped, pumped, pumped, recently, substance, destroyed, affects
 Source of Geohydrologic Data 38- Pump Used 35- Date of First Construction/Completion 21-04/01/1984
 month day year

OWNER IDENTIFICATION (II)

R-158 T-A D M Date of Ownership 159-04/01/1984
 add, delete, modify
 Name: Last 161-CLANLEY First 162-DALE Middle Initial 163-O

OTHER SITE IDENTIFICATION NUMBERS (I)

R-189 T-A D M Ident 190-55 Assigner 191-FLAWMD
 add, delete, modify
 New Card Same R & T Ident 190-DUVAL LAKE Assigner 191-FL039

SITE VISIT DATA (I)

R-186 T-A D M Date of Visit 187-05/16/1984 Name of Person 188-EJEX
 add, delete, modify
 month day year

FIELD WATER QUALITY MEASUREMENTS (I)

R-192 T-A D M Date 193-05/16/1984 Geohydrologic Unit 195-
 add, delete, modify
 New Card Same Return 195
 Temperature 196-00010 Degrees C 197-21
 Conductance 196-00095 μ Mhos 197-460
 Other (STORET) Parameter 196- Value 197-
 Other (STORET) Parameter 196- Value 197-

FOOT NOTES

Source of Data Codes

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
 other, other, geohydro, high, memory, none, other, existing, other,
 job, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 *

T= 6 D M *

add, delete, modify

Entry No 256 # 1 *Depth
to Top

21

Depth to
Bottom

92

93= 1,2,0,F,L,K,D, *

Unit Identifier

304= *
Contributing Unit96= LMSN *
Lithology97= MALINE *
Lithologic Modifier

AQUIFER DATA (2)

R=94 *

T= A D M *

add, delete, modify

Geohydrologic
Unit Entry No

256 # *

Date 95 # / / *
month day year

Water Level 126 = *

% Water

Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R=90 *

T= A D M *

add, delete, modify

Entry No 256 # *

Depth
to Top

91

Depth to
Bottom

92

93= *
Unit Identifier304= *
Contributing Unit96= *
Lithology97= *
Lithologic Modifier

AQUIFER DATA (2)

R=94 *

T= A D M *

add, delete, modify

Geohydrologic
Unit Entry No

256 # *

Date 95 # / / *
month day year

Water Level 126 = *

% Water

Contributed 132 = *

PERTINENT REMARKS

R=183 *

T= A D M *

add, delete, modify

New Card Same R&T

Remark
No.

311 # *

185 = *

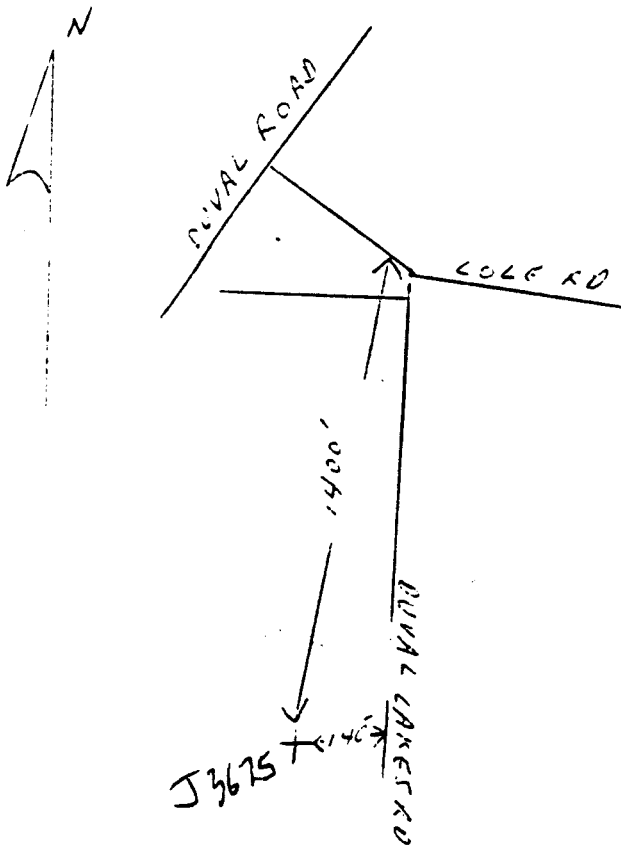
311 # *

185 = *

Contributing Unit Codes

| P | S | N | U |
|-------------------------|---------------------------|----------------------|---------|
| Primary
contributing | Secondary
contributing | Non-
contributing | Unknown |

R=212 *

T= A *218= 13,020 DUVAL LAKES ROAD *

STATE OF FLORIDA
DEPARTMENT OF ENVIRONMENTAL REGULATION
WELL COMPLETION REPORT

OWNER: Clarey, D. Nale
Last Name First Name Initial
310 4477090 AVE
Number Street
381 FLA
City State
904 352 3724 32204
Area Code Phone Number Zip Code

WELL LOCATION:
% % % of Section MOA
1 (N-S) 21 (E-W)
Township Range
Latitude Deg. Min. Sec. N
Longitude Deg. Min. Sec. W
Locate in Section
Number Street/Road
DW 91-6400-22
Lot No. Subdivision
City County

OWNER WELL NUMBER OR NAME:

DRILL METHOD: ☒ Rotary ☐ Cable Tool ☐ Jet ☐ Auger
☐ Other:

SURFACE CASING, CASING, AND LINER MATERIAL:

| Steel Dia. (in.) | Steel Wt. (lb./ft.) | PVC | Other? | From (Ft.) | To (Ft.) | Schedule No. | Joints* |
|------------------|---------------------|-----|--------|------------|----------|--------------|---------|
| 3 | | | | 0 | 105 | | TC |
| 2 | | | | 105 | 567 | | TC |

* Describe Material:

* TC = Threaded and Coupled, TCW = Threaded, Coupled, and Welded,
W = Welded, B = Bonded (PVC), O = Other:

GROUT: ☐ None ☒ Neat Cement ☐ Other:

Type and Percent of Additives and Grout Volume or Number of 94 lb. Bags
12 Bags From (Ft.) To (Ft.)

FINISH: ☒ Open Hole ☐ Perforated or Slotted Casing ☐ Gravel Pack
☐ Sandpoint or Screen Attached to Well Casing ☐ Sandpoint or Screen
Telescoped with Packer Inside Casing (Packer Material:)

| Sandpoint/Screen Material | Dia. (in.) | Slot Size (in.) | From (Ft.) | To (Ft.) |
|---------------------------|------------|-----------------|------------|----------|
| | | | | |

☐ Other Finish:

QUALITY TEST: ☐ None ☐ Bacteria Date Chemical Date

By: ☐ Health Dept. ☐ USGS ☐ Other

☐ Clear ☐ Colored ☐ Sulphur ☐ Salty ☐ Iron ☐ Other

Conductance (Micromhos) Chloride ppm

Hardness ppm as calcium carbonate pH Temp °F

Well Disinfected: ☐ No ☐ Yes (Date)

WELL TEST, by: ☒ Natural Flow G.P.M. ☐ Airlift

☐ Bailor ☐ Permanent Pump ☐ Test Pump ☐ None

Discharge Measured By: ☐ Bailor ☐ Estimated ☐ Current Meter

☐ Orifice ☐ Trajectory ☐ Venturi ☐ Volumetric ☐ Other

Measured Static Water Level Ft.

Measured Pumping Water Level Ft.

After Hours At G.P.M.

Specific Capacity G.P.M./Ft. of Drawdown

Measuring Pt. (Describe):

Which is Ft. ☐ Above ☐ Below Land Surface

Elevation of Measuring Pt. = Ft. ☐ Above ☐ Below MSL

WELL EQUIPMENT: ☐ Open ☒ Capped ☐ Valved

☐ Permanent Pump ☐ Temporary Pump

Type Pump: ☐ Centrifugal ☐ Cylinder ☐ Jet ☐ Submersible

☐ Turbine ☐ Other:

Power: ☐ Diesel ☐ Electric ☐ Gasoline ☐ Other:

Horsepower Capacity G.P.M.

Intake/Injection Depth Ft.

GER Form 17-1.213(2) Effective November 30

TYPE OF WORK:
☒ New Construction ☐ Repair
☐ Deepening ☐ Plugging
☐ Other:

PERMIT NUMBER:

87-41

J-3675

WELL NUMBER

TYPE OF WELL: ☒ Water Well ☐ Test Well ☐ Recharge ☐ Drainage
☐ Waste Disposal ☐ Observation ☐ Other

USE: ☒ Domestic ☐ Irrigation ☐ Industrial ☐ Livestock ☐ Public Supply
☐ Other:

SKETCH LOCATION OF WELL in relation to local landmarks, giving distance and direction from nearest town, road, or other reference point.

North

GEOPHYSICAL LOGS: Type: By:

| WELL LOG | | | Examine cuttings at 20 ft. or smaller intervals and at changes. Give color, grain-size and type of material. Note any cavities. Indicate producing zones. Attach additional sheets if necessary. |
|-----------------|-------------------|-------------|--|
| Bore Hole (in.) | Casing Size (in.) | Depth (Ft.) | |
| | | From To | |
| | | 0 40 | Sand |
| | | 40 50 | Blue mud |
| | | 50 80 | Blue mud, sand |
| | | 80 99 | Rock |
| | | 99 110 | Rocky white mud |
| | | 110 180 | Blue mud |
| | | 180 200 | Stiff blue mud |
| | | 200 260 | Blue mud |
| | | 260 280 | Soft blue mud, sand |
| | | 280 300 | Blue mud |
| | | 300 340 | Blue mud, little sand |
| | | 340 406 | Blue mud, sand |
| | | 406 410 | Rock |
| | | 410 420 | Sand, blue mud |
| | | 420 510 | Blue mud, sand |
| | | 510 525 | white mud |
| | | 525 550 | Rock, white mud |
| | | 550 555 | Rock |
| | | 555 560 | Sand |
| | | 560 680 | Thin rock |

Total Depth 680 Ft. Producing Zone Material: ☐ Sand ☐ Shell

☐ Broken Shell ☐ Limestone ☐ Other:

Top of Producing Zone Ft., Bottom of Producing Zone Ft.

☐ Drill Cuttings Sent to Bureau of Geology

10/1/87 George O. Smith Pres.
License No. Water Well Contractor's Signature Position
 Driller Signature
Completion Date

Flowing, pumped 134 146 * 1 A D M * Entry No 147 # * Date 1980 / 10 / 10 * J 717 43

Age: 150 = * Source of Data 151 = *

Kind of Measurement 152 = B C E F M O P R T U V W Z *
 bell, current, estimated, flow, totaling, orifice, piezo-tube, reported, trajectory, venturi, volumetric, wave, other

Production Level 153 = * State Level 154 = * Source of Data 155 = * Specific Capacity 272 = *

Method of Measurement 156 = A C E G H L M R S T V Z *
 active, calibrated, estimated, pressure, calibrated, geophysical, manometer, reported, steel, electric, calibrated, other

Pumping Period 157 = *

LIFT DATA (1)

R=42 * T= A D M * Type of Lift 43 # A B C J P R S T U Z * Entry No 254 # 601 *
 add, delete, modify air, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other

Pump Intake Setting 44 = * Type of Power 45 = D E G H L N W Z *
 diesel, electric, gasoline, hand, LP gas, natural, windmill, other

Date 38 = 08 / 05 / 1975 * Horsepower 46 = 60.00 *

MAJOR PUMP DATA (2)

R=47 * T= A D M * Type of Lift 43 # * Lift Entry No 254 # * Manufacturer of Pump 48 = *

Serial No of Pump 49 = * Name of Power Company 50 = *

Power Company Account No 51 = * Power Meter No 52 = * Pump Rating 53 = *

Person or Company Who Maintains the Pump 54 = * Additional Lift 255 = * Rated Pump Capacity 268 = *

STANDBY POWER DATA (2) (See LIFT DATA for codes of fields 43 and 56 below)

R=55 * T= A D M * Type of Lift 43 # * Type of Power 56 = * Horsepower 57 = * Lift Entry No 254 # *

ABLE LOG DATA (1)

R=198 * T= A D M * New Card for Each Log Type Same R & T

| | | | |
|---------------------|--------------------------|---------------------------|--------------------------|
| Type of Log 199 # 1 | Begin Depth 200 = 0.00 * | End Depth 201 = 1000.00 * | Source of Data 202 = 1 * |
| 199 # * | 200 = * | 201 = * | 202 = * |
| 199 # * | 200 = * | 201 = * | 202 = * |
| 199 # * | 200 = * | 201 = * | 202 = * |

WATER QUALITY DATA COLLECTION (1)

R=114 * T= A D M * Begin Year 115 # 1975 * End Year 116 = * Source Agency 117 = *

Frequency of Collection 118 = 1 * Network Site 257 = * Type of Analysis 120 = A *

WATER LEVEL DATA COLLECTION (1)

R=121 * T= A D M * Begin Year 122 # * End Year 123 = * Source Agency 124 = *

Frequency of Collection 125 = * Network Site 258 = *

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R=127 * T= A D M * Begin Year 128 # * End Year 129 = * Source Agency 130 = *

Frequency of Collection 131 = * Network Site 259 = * Method of Collection 133 = C E M U Z *

OTHER DATA AVAILABLE (1)

R=180 * T= A D M * Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *
 add, delete, modify computer, direct, other file, machine, published, other

New Card Same R & T Type of Data 181 # * Loc 182 = C D Z * Format 261 = F M P Z *

NOTES:

Source of Data Codes: S D G A R L G Z
 reporting, driller, owner, other gov't, other logs, geologist, other reported.

Frequency of Collection Codes: A B C D F I M Q S W Z
 annual, bi-monthly, continuous, daily, semi, intermittent, monthly, one time, quarter, semi, weekly, other monthly only annual annual

Type of Log Codes: A B C D E F G H I J K L M N P Q
 time, collar, casing, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, logging, microlog, neutron, photo, radio, ray

Type of Quality Analysis Codes: S T U V Z

R-58 * T- (A) D M * Entry No 59 # 0.0.1 *

Date of Construction Completion 60 = 0.6/0.0/1.9.75 *

Source of Const. Data 64 D *

of star/Driller 63 MERIDITH *

Kind of Construction 65 = A B C D (H) J P R T V W Z *

Finish 66 = C F G H B P S T W (X) Z * Type of Seal 67 = B C (G) Z *

Bottom of Seal 68 = * Method of Development 69 = A B C J N P S Z *

Special Treatment During Development 71 = C D E F H M Z *

5717

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72 * T- (A) D M * Construction Entry No 59 # 0.0.1 *

Top of Hole Segment Below LSD

73 # 0.0.0.0 *

Bottom of Hole Segment below LSD

74 = 1.0.0.0.0.0 *

Diameter of Hole Segment

75 = 1.2.0.0 *

New Card for Each Hole Segment Same R, T & Field 59

CASING SCHEDULE (2)

R-76 * T- (A) D M * Construction Entry No 59 # 0.0.1 *

Top of Casing Segment Below LSD

77 # 0.0.0.0 *

Bottom of Casing Segment Below LSD

78 = 5.75.0.0 *

New Card for Each Casing With Same R, T & Field 59

Diameter of Casing Segment

79 # 1.2.0.0 *

Casing Material

80 = S *

Thickness of Casing

81 = *

OPENINGS SCHEDULE (2)

R-82 * T- (A) D M * Construction Entry No 59 # 0.0.1 *

Top of Section Below LSD

83 # 5.75.0.0 *

Bottom of Section Below LSD

84 = 1.0.0.0.0.0 *

Type of Openings

Type of Material

Diameter of Open Section

Width of Opening

Length of Opening

85 = X *

86 = *

87 = 1.2.0.0 *

88 = *

89 = *

(Openings Data)

83 # *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

(Openings Data)

83 # *
84 = *
85 = *
86 = *
87 = *
88 = *
89 = *

FOOT NOTES:

① Source of Data Codes:

S D B A R L G Z
reporting, driller, owner, other gov't, other logs, geologist, other agency, reported,

③ Casing Material Codes

B C G I M P R (S) T U W Z
brick, concrete, gels, wrought, other, PVC or, rock or, steel, tile, coated, wood, other
iron iron metal plastic stone steel

⑥ Type of Openings Codes

F L M P R S T W (X) Z
fracture, lowered, man, perforated, wire, screen, sand, walled, open, other
shuttered or slotted mound (unknown) point hole

⑦ Type of Material Codes for Open Sections

B C G I M P R S T Z
brass or, concrete, gels, wrought, other, PVC or, manila, steel, tile, other
brass iron iron metal plastic steel

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

Entry No 258 # 201 * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = 120FLRD * Lithology 96 = LMSN * Lithologic Modifier 97 = MARINE LMSN *

AQUIFER DATA (2)

R-94 * T-ADM * add, delete, modify

Geohydrologic Unit Entry No 258 # *

Date 95 # / / * month day year

Water Level 128 = * *

% Water Contributed 132 = *

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

Entry No 258 # * Depth to Top 91 = * Depth to Bottom 92 = *

add, delete, modify

Unit Identifier 93 = * Lithology 96 = * Lithologic Modifier 97 = *

AQUIFER DATA (2)

R-94 * T-ADM * add, delete, modify

Geohydrologic Unit Entry No 258 # *

Date 95 # / / * month day year

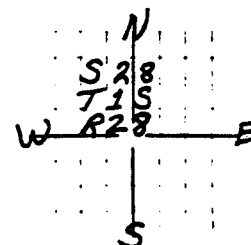
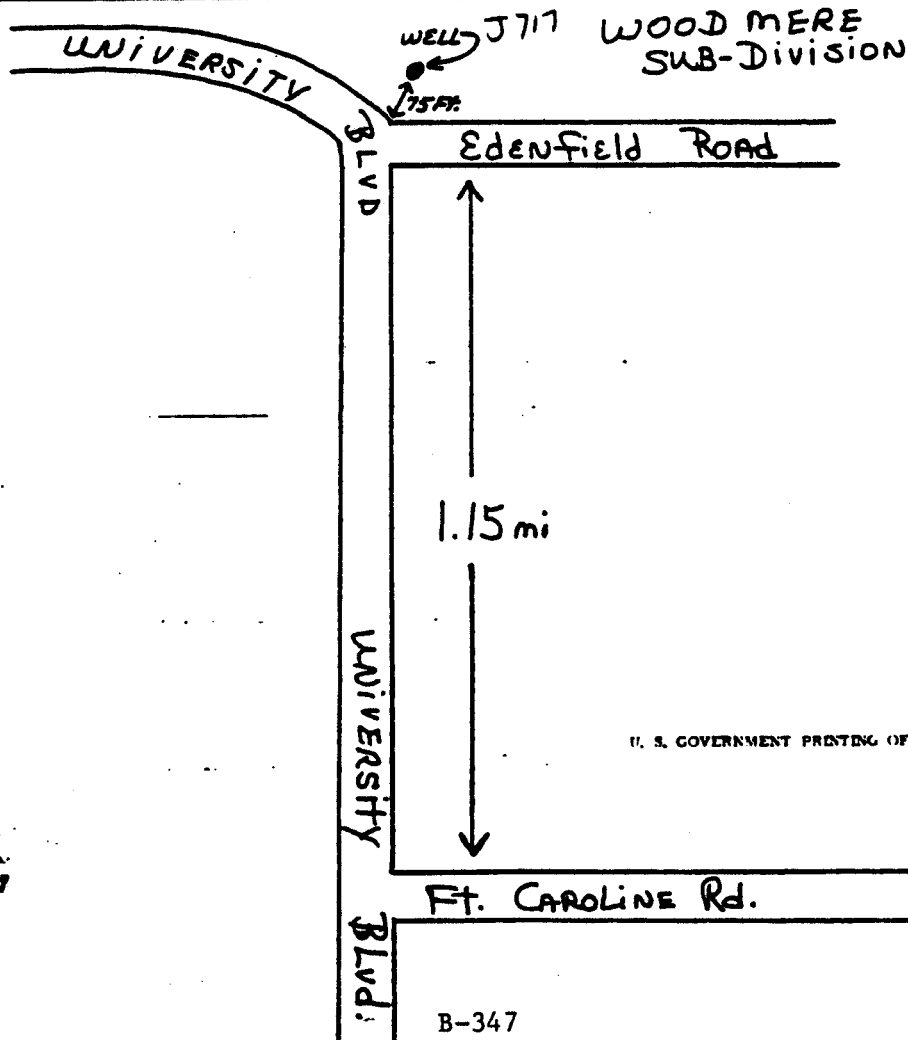
Water Level 128 = * *

% Water Contributed 132 = *

PERTINENT REMARKS

R-183 * T-A * 185 - *
add
New Card Same R&T
185 - *
185 - *

NOTES:



No. 11 No. 302313 NO 813309.1

U. S. DEPT. OF THE INTERIOR

MASTER CARD (S. ZENDER) 7.5' QUAD.

Record by R. FAIRCCHILD ^{Source} of this DRINKERS LOG 9-11-69 NEW EASTPORT

FLORIDA 9:9 7:6
COUNTY (of zone) DUYAL

Latitude: 3°02'31"N
Longitude: 018°13'09"E

Date: 08-11-2019
Time: 17:00:00
Frequency: 170.000 MHz
Mode: FM

2, 16, 279, TALLA.

[illegible]

Local use: 012375

NAME OF NAME: DR. P. R. T. DUBATH: R
500 X 300
500 X 300

Ownership: County, Fed Gov't, City (1) (2) (3) (4) (5) (6) Private, State Agency, Water Dist (7) (8) (9) (10) (11) (12)

(A) (B) (C) (D) (E) (F) (G) (H) (I) (J)
 of Air cond., Boiling, Conn., Doctor, Paper, Pipe, Saw, Ind., P. B. Soc.

| | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) |
|--|-----|-----|-----|-----|-----|-----|-----|------|
| Stock, Invt. Used, Deprec, Deval-2 5, Resal-Other, Other | | | | | | | | |

[illegible]

DATA AVAILABLE: ☒ Well logs ☐ Free. W/E meas.: 0816.5-23-68 ☐ Field seuffer chaf. ☐

Fed. lab. data:

Qual. water data; type: _____

Spec. sampling: _____

Pumpage inventory: ☐ **Period:** ☒ **ves**

☐

Aperture cards: 700 100

104 00101 DRILLERS LOG (SAMPLES TO U.S.G.S.)

WELL-DESCRIPTION CARD

1270

17328

1003

NAME AS ON MASTER CARD
Birth date: 7-8-60
Birth place: NEW YORK

NAME AS ON MASTER CARD
Birth date: 7-8-60
Birth place: NEW YORK

☒ (0) ☒ (1) ☒ (2) ☒ (3) ☒ (4) ☒ (5) ☒ (6) ☒ (7) ☒ (8) ☒ (9)

[illegible]

| | |
|-----------------|-------------------------|
| Prilled: | rot, |
| air | bored, cable, bog- |
| ing | ing jetted, |
| the | recess trenching, drive |
| to | persecution, rotary, |
| at | quab, |
| the | study |

9168
5-23-68
9168
5-23-68

Driller: Duval Drilling Co., Jacksonville, Florida

| | | | | | |
|--------|---------------------------------|---|---|---------|----|
| 1111 | (A) (B) (C) (D) | multiple, none, piston, oil, submerg, turb, other | 3 | shallow | 44 |
| (1992) | air, bucket, coal, jet, (cont.) | (cont.) | | | |

(Type): diesel, elec, gas, gasoline, head, gas, wind, L.L.
(Date): _____
(Time): _____

Baseball, MT ELANGE, 4.33 9.33
 (above) it to say 1.30, Ali. W.P.

5. Topo Map

[illegible]

5-23-68 05:08 11:10 030 0

[illegible][illegible]

(Dr. Condit) d = 10" 7' Applied

552

Recorded by

Essex

U.S. DEPT. OF THE INTERIOR
GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
GROUND WATER SITE INVENTORY
SITE SCHEDULE

Date 3 Nov 76

Check One ☒ English ☐ Metric Units

GENERAL SITE DATA (0)

Site Ident No 302233081394901 RG Number R-01 Transcription T-01
 Site-Type 2-C D H I M P T W Data 3-C U L M Reporting Agency 4-FL039
 Project No. 5- Division 6-121 State 7-12 County (or town) DUVAL 8-031
 Latitude 9-302233 Longitude 10-081394 Lat-Long Accuracy 11-S 0 T M
 Local Number 12-T919 Land Not Loc. 13-LUDGERT 50 T 1 S R 26 E
 Location Map 14-TROUT RIVER Scale 15-24000
 Altitude 16-20 Method of Measurement 17-A L M Accuracy 18-5
 Type Setting 19-O C E H K L B P S T U V W Hydrologic Unit (OWOC) 20-03080103
 Date of First Construction/Completion 21-01/26/1976 Use of Site 23-A D E G H B M P R S T U X Z
 Use of Water 24-A B C D E F H I M N R S T U Y Z
 Secondary Water Use 25- Tertiary Use of Water 26- Depth of Hole 27-1212 Depth of Well 28-1212 Source of Depth Data 29-D
 Water Level 30-19 Date Measured 31-02/25/1976 Source 33-D
 Method of Measurement 34-A C E H L M R S T V Z
 Site Status 37-D F G H B P R S T V X Z
 Source of Geohydrologic Data 36-A Pump Used 35- Measuring Point 266-0 Measuring Point Date 267-02/25/1976

OWNER IDENTIFICATION (1)

R-158 T-01 D M Date of Ownership 159-01/26/1976
 Name: Last 161-JACKSONVILLE First 162-CITY OF Middle Initial 163-

OTHER SITE IDENTIFICATION NUMBERS (1)

R-159 T-01 D M Ident 190-ST Assigner 191-FL039
 New Card Same R & T Ident 190-CARLTON ST Assigner 191-FL039

SITE VISIT DATA (1)

R-166 T-01 D M Date of Visit 167-01/26/1976 Name of Person 168-HAMMOND

FIELD WATER QUALITY MEASUREMENTS (1)

R-192 T-A O M Date 193- Geohydrologic Unit 195-
 New Card Same R thru 199 Temperature 196-00010 Degrees C 197-
 Conductance 198-00055 μ Mhos 199-
 Other (STORET) Parameter 196- Value 197-
 Other (STORET) Parameter 196- Value 197-

FOOT NOTES:

① Source of Data Codes:

S D G A R L G Z
 reporting, drifter, owner, other go't, other logs, geologist, other reported, agency

WELL CONSTRUCTION DATA (1)

R-59 T-0 D M Entry No 59 001

Date of Construction Completion 80-21/21/1976

Source of ① 84-0

Name of Contractor/Owner 63- LAYNE

Method of Construction 65- A B C D (M) J P R T V W Z

Finish 66- C F G H S P S T W Z Type of Seal 67- B C Z

Bottom of Seal 68- 5.5

Method of Development 69- A B C N P S Z

Number of Hours in Development 70-

J919

Special Treatment During Development 71- C D E F H M Z

DIMENSIONS OF THE HOLE CONSTRUCTED (2)

R-72 T-0 D M Construction Entry No 59 001

New Card for Each Hole Segment Same R, T & Field 59

Top of Hole Segment Below LSD

73- 2.0

Bottom of Hole Segment below LSD

74- 121.2

Diameter of Hole Segment

75- 1.8

CASING SCHEDULE (2)

R-78 T-0 D M

Construction Entry No 59 001

New Card for Each Casing With Same R, T & Field 59

Top of Casing Segment Below LSD

77- 0

Bottom of Casing Segment Below LSD

78- 5.5

Diameter of Casing Segment

79- 1.8

Casing Material ③

80- S

Thickness of Casing

81-

OPENINGS SCHEDULE (2)

R-82 T-0 D M

Construction Entry No 59 001

New Card for Each Open Section With Same R, T and Field 59

Top of Section Below LSD

83- 5.5

Bottom of Section Below LSD

84- 121.2

Type of Openings ④

Type of Material ⑤

Diameter of Open Section

87- 1.8

Width of Opening

Length of Opening

85- X

(Openings Data)

83- 84- 85- 86- 87- 88- 89-

(Openings Data)

83- 84- 85- 86- 87- 88- 89-

FOOT NOTES:

① Source of Data Codes:

S O B A R L G Z

reporting, driller, owner, other geol., other logs, geological, other reported

② Type of Openings Codes

F L M P R S T W X Z

fracture, lateral, mesh, perforated, wire screen, sand, walled, open, other shuttered or slotted wound (unscreened) point hole

③ Casing Material Codes

B C G I M P R S T U W Z

brass, concrete, galv, wrought, other, PVC or, rock or, steel, tile, mason, wood, other iron iron metal plastic stone steel

④ Type of Material Codes for Open Sections

B C G I M P R S T Z

brass or, concrete, galv, wrought, other, PVC or, mason, steel, tile, other bronze iron iron metal plastic steel

PRODUCTION DATA (1)

R-124-48- T-AD Entry No 1478-001 Date 148-0212 1976-
 Name, project add, delete, modify
 Discharge: 150-3002- Source of Data 151-D-
 Method of Measurement 152-B C E F M O P (R) T U V W Z-
 boiler, current, estimated, flame, isotopic, orifice, pitot-tube, reported, trajectory, venturi, volumetric, weir, other
 Production Level 153-19- Static Level 154-19- Source of Data 155-D- Specific Capacity 272-
 Method of Measurement 156-A C E G H L M (R) S T V Z-
 orifice, calibrated, pressure, calibrated, piezometric, manometer, reported, stand, electric, calibrated, other
 outlet pipe pressure gage tap
 Pumping Period 157-5.5-

J 919

LIFT DATA (1)

R-42- T-ADM- Type of Lift 43-A B C J P R S (R) U Z- Entry No 254-002-
 add, delete, modify or, bucket, centrifugal, jet, piston, rotary, submersible, turbine, unknown, other
 Pump Intake Setting 44-74- Type of Power 45-D (R) G H L N W Z-
 diesel, electric, gasoline, hand, LP gas, natural, windmill, other
 Date 38-0225 1976- Horsepower 46-50-

MAJOR PUMP DATA (2)

R-47- T-ADM- Type of Lift 43-T- Lift Entry No 254-002- Manufacture of Pump 48-L3Y HE-
 add, delete, modify
 Serial No of Pump 49- Name of Power Company 50-JEA-
 Power Company Account No 51- Power Motor No 52- Pump Rating 53-
 Person or Company Who Maintains the Pump 54-WATER SERVICE- Additional Lift 255- Rated Pump Capacity 256-2250-

STANDBY POWER DATA (2)

R-55- T-ADM- Type of Lift 43- Type of Power 56- Horsepower 57- Lift Entry No 254-61-
 add, delete, modify

AVAILABLE LOG DATA (1)

R-198- T-ADM- New Card for Each Log Type Same R & T
 Type of Log 199-C- Begin Depth 200-9- End Depth 201-1070- Source of Data 202-A-
 199-J- 200-0- 201-1089- 202-A-
 199- 200- 201- 202-
 199- 200- 201- 202-

WATER QUALITY DATA COLLECTION (1)

R-114- T-ADM- Begin Year 115- End Year 116- Source Agency 117-
 add, delete, modify
 Frequency of Collection 118- Network Site 257- Type of Analysis 120-

WATER LEVEL DATA COLLECTION (1)

R-121- T-ADM- Begin Year 122- End Year 123- Source Agency 124-
 add, delete, modify
 Frequency of Collection 125- Network Site 258-

WATER PUMPAGE/WITHDRAWAL DATA COLLECTION (1)

R-127- T-ADM- Begin Year 126- End Year 129- Source Agency 130-
 add, delete, modify
 Frequency of Collection 131- Network Site 259- Method of Collection 133-C E M U Z-
 calculated, estimated, measured, unknown, other

OTHER DATA AVAILABLE (1)

R-180- T-ADM- Type of Data 181- Loc 182-C O Z- Format 261-F M P Z-
 add, delete, modify
 New Card Same R & T Type of Data 181- Loc 182-C O Z- Format 261-F M P Z-
 cooperator, district, other file, magazine, published, other
 readable

FOOTNOTES:

① Source of Data Codes:

S D G A R L G Z
 reporting, driller, owner, other govt., other logs, geologist, other
 agency reported.

② Type of Log Codes

A B C D E F G H I J K L M N O P Q
 time, color, color, driller's, electric, fluid, geologist, magnetic, induction, gamma, dipmeter, laserlog, microlog, neutron, μ later, photo, radio,
 conduct ray
 S T U V Z
 sand, temp, gamma, fluid, other
 gamma velocity

③ Frequency of Collection Codes

A B C D F I M S Q S W Z
 annual, bi-monthly, continuous, daily, semi, intermittent, monthly, one time, quarter, semi, weekly, other
 monthly only annual annual

④ Type of Quality Analysis Codes

A B C D E F G H J K L M Z
 physical, chemical, trace, petroleum, nutrients, sanitary, solid, solid, solid, solid, solid, all or, other
 chemical, distilling B&B B&B B&B B&B C&B&B none

GEOHYDROLOGIC UNIT DESCRIPTIONS (1)

R-90 * T-B D M * Entry No 258 # 201 * Depth to Top 91 = * * * * * Bottom -2 = * * * * *

Unit Identifier 93 = 120 FLD * Lithology 96 = LASH * Lithologic Modifier 97 = MARINE * * * * *

AQUIFER DATA (2)

R-94 * T-A D M * Geohydrologic Unit Entry No 258 # * * * * *

Date 95 # / / * Water Level 128 = * * * * * % Water Contributed 132 = * * * * *

HYDROLOG: UNIT DESCRIPT (1)

R-90 * T-A D M * Entry No 258 # * * * * * Depth to Top 91 = * * * * * Depth Bottom = * * * * *

Unit Identifier 93 = * * * * * Lithology 96 = * * * * * Lithologic Modifier 97 = * * * * *

AQUIFER DATA (2)

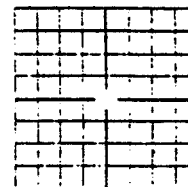
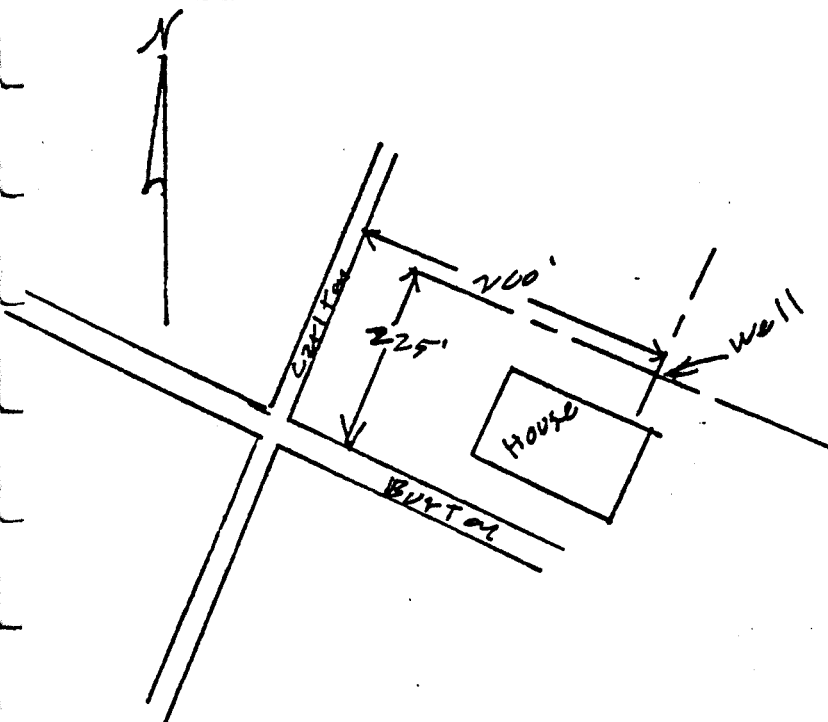
R-94 * T-A D M * Geohydrologic Unit Entry No 258 # * * * * *

Date 95 # / / * Water Level 128 = * * * * * % Water Contributed 132 = * * * * *

PERTINENT REMARKS

R-123 * T-A * 185 = * * * * *
add 185 = * * * * *
New Card Same R&T 186 = * * * * *

NOTES:



U. S. GOVERNMENT PRINTING OFFICE : 1975 O - 373-019

ST. JOHNS RIVER WATER MANAGEMENT DISTRICT

ROUTE 2 BOX 695
PALATKA, FLORIDA 32077

TELEPHONE 904-328-8383

*note:
logs as file*

REPORT ON GEOPHYSICAL LOGGING

- (1). Ft. George Island Country Club well, Duval County.

J-228

Total Depth Logged:(TDL): 619 ft. below MP
Casing: 8" i.d. to 448 ft. below MP
Measuring Point: Top of casing extender section above
cap location.
Caliper log: no evidence of break in casing. flowmeter
log was attempted, however due to lack of time and the
fact that the impeller became fouled quickly no results
were obtained. Well bottom is in Ocala Group, Crystal
River Formation. Well is cased into top of Crystal
River Formation.

- (2). Norwood/Carlton Well

J-919

Total Depth Logged: 1093 ft. below MP
Casing: 17" i.d. to 554 ft. below MP
Measuring Point: Top of Flange
Well Flow: approximately 3600 gpm (estimated)
As logged, well ends in Lake City Limestone.
Formation Depths: Top Ocala Group: 522 ft.
Top Avon Park LS: 761 ft.
Top Lake City LS: 807 ft.
Caliper tool stopped at 1093 and became fouled by mud and
grains of limestone at that depth. Neither Gamma Ray or
Caliper probe would pass the obstruction.
Largest diameter encountered in well: 26" at depth
of 1021 feet.

RJ/jba

STATE OF FLORIDA
WATER WELL CONTRACTOR'S
WELL COMPLETION REPORT
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF INTERIOR RESOURCES

203 Pennington Building Tallahassee, Florida 32304
(904) 488-8476

No. 68222

Permit No. 75-100

Owner's Well Identification Notwood

State Well Number
For Department Use
ONLY

1. OWNER: City of Jacksonville

Name
220 2 Bay St., Jacksonville, Fla.
Address City State

2. LOCATION OF WELL: Burton & Carlton

Street Address/Road
Jacksonville Duval
City County
Subdivision Lot No.
Section Township Range

3. PURPOSE OF WELL:

☐ Domestic ☐ Irrigation ☐ Public Supply
☐ Industrial ☐ Stock ☐ Other

4. TYPE OF WORK:

☐ New Well ☐ Plugging ☐ Other
☐ Deepening ☐ Reconditioning

5. QUALITY:

☐ Clear ☐ Colored ☐ Sulfur ☐ Salty ☐ Other

CHECK TEST MADE

☐ None ☐ Test By:
☐ Bacteria ☐ County Health Dept.
☐ Chemical ☐ State Health Dept.
Chloride _____ PPM ☐ U.S.S.
(Check ☐ if test was for ☐ Other Name
sodium chloride) Address
Temperature _____
Well Disinfected ☐ Yes ☐ No

6. EQUIPMENT:

☐ Rotary ☐ Cable Tool ☐ Other
☐ Jet ☐ Reverse Rotary

7. GROUT:

☐ None ☒ Cement ☐ Other
Describe and give number of bags (54 lb.) From (ft) To (ft)
610 sacks, neat 0 555

8. CASING AND LINER PIPE:

Diameter (inches) Kind From (ft) To (ft)
18" carbon steel 0 555
Open Hole 555 1211
(Check One) ☐ Threaded & Coupled ☐ Welded Only
☐ T & C & Welded ☐ Other

9. WATER LEVEL:

Water level after well completed _____ feet
☐ Above ☐ below land surface
Well Flowing: ☐ Yes ☐ No Flow _____ gal/min

10. SCREENS: none used

Location (ft) Below Surface
Make Materials Diameter (in) Slot Size From (ft) To (ft)

11. UPPER END OF WELL:

☐ Pump Installed ☐ Valve ☐ Cap ☐ Other

12. PUMPING TEST:

Date 2-25-76 ☐ Test Pump ☐ Permanent Pump

Measure point is ground level

which is _____ feet ☐ above ☐ below land surface

Static water level 19 feet ☐ above ☐ below measure point

Maximum Drawdown 19 feet below measure point

Discharge at maximum drawdown 3002 gal/min

After 5 1/2 hours

13. PUMP INSTALLED:

Type 12 SDH Make Layne Model No. 90317
Motor Power 1750 Make HIS H.P. 30
Capacity 2250 gal/min at 60 ft. of total dynamic head
No. of bowls or stages 1
Pump setting 94 feet

14. WELL LOG:

| Well bore (in) | Depth (feet) | From | To | Type of material, producing zones, & cavities. Give description at not less than 20 foot intervals and at changes. |
|----------------|--------------|------|----|--|
| 000 | 010 | | | Fine sand |
| 010 | 044 | | | Coarse sand, little clay |
| 044 | 085 | | | Rock, limestone, sand (Lost circulation 48') |
| 085 | 100 | | | Clay, sand, limrock |
| 100 | 168 | | | Clay, sand, limrock, phosphate |
| 168 | 260 | | | Clay, sand, limestone, phosphate |
| 260 | 328 | | | Sand, clay, limestone, phosphate |
| 328 | 420 | | | Pepper sand, clay, sandstone phosphate |
| 420 | 475 | | | Sandy clay, little limestone, phosphate |
| 475 | 488 | | | Sandy clay, little limestone, phosphate |
| 488 | 498 | | | Brown limestone, sand, clay |
| 498 | 511 | | | Brown limestone, sand, clay |
| 511 | 534 | | | Brown & white limestone, little clay |
| 534 | 545 | | | Gray Ocala limestone |
| 545 | 555 | | | Gray limestone, Med. drill |
| 555 | 565 | | | Gray limestone, hard drill |
| 565 | 582 | | | Gray limestone, Med. drill |
| 582 | 764 | | | Gray limestone, Med. drill |
| 764 | 810 | | | Brown limestone, Med. hard |
| 810 | 825 | | | Brown limestone, Med. |
| 825 | 916 | | | Brown limestone, hard |
| 916 | 955 | | | Brown & gray limestone, Med. |
| 955 | 1007 | | | Brown limestone, hard |
| 1007 | 1120 | | | Brown limestone, hard |
| 1120 | 1212 | | | Brown limestone, very hard |

15. CONTRACTOR'S CERTIFICATION:

This work was done under my jurisdiction and this report is true to the best of my knowledge and belief. The work commenced on 12-15-75 and was completed on 10-26-76

Layne Atlantic Company
Div. of Layne Western Co. 1800
Contractor License Number
Signature of Representative Bob M. Massey P.O. Box 9886
Bob M. Massey- Vice Pres., Reg. Mgr.
Savannah Chatham Georgia 31402
City County State
912-964-6721 D. Rivers.
Phone Number Driller

Well No. 3222 B-108/4015.1

WELL SCHEDULE
GEOLOGICAL SURVEY

MASTER CARD E.W.

Recorded by A.W. Love Source Field obs. Date 5-12-66 Trust River
State Florida County Dade
Latitude: 30° 22' 33.6" N Longitude: 81° 47' 07.5" W Seasonal number: 7
Let-long reference: Q.R. 17075
Local soil number: Q. r. 19-268 Date Tally
Local use: Q. 336, 0. 557, Other numbers: 0-336, 0-557
Owner or name: Citation of Max Address: Jacksonville Fla.

| | | |
|--|------|-----|
| Quarantine: County, Fed Govt. <i>State</i> Corp of Co, Prefecture, State Agency, Mest of State | (C) | (A) | (B) | (C) | (D) | (E) | (F) | (G) | (H) | (I) | (J) | (K) | (L) | (M) | (N) | (O) | (P) | (Q) | (R) | (S) | (T) | (U) | (V) | (W) | (X) | (Y) | (Z) | (AA) | (AB) | (AC) | (AD) | (AE) | (AF) | (AG) | (AH) | (AI) | (AJ) | (AK) | (AL) | (AM) | (AN) | (AO) | (AP) | (AQ) | (AR) | (AS) | (AT) | (AU) | (AV) | (AW) | (AX) | (AY) | (AZ) | (BA) | (BB) | (BC) | (BD) | (BE) | (BF) | (BG) | (BH) | (BI) | (BJ) | (BK) | (BL) | (BM) | (BN) | (BO) | (BP) | (BQ) | (BR) | (BS) | (BT) | (BU) | (BV) | (BW) | (BX) | (BY) | (BZ) | (CA) | (CB) | (CC) | (CD) | (CE) | (CF) | (CG) | (CH) | (CI) | (CJ) | (CK) | (CL) | (CM) | (CN) | (CO) | (CP) | (CQ) | (CR) | (CS) | (CT) | (CU) | (CV) | (CW) | (CX) | (CY) | (CZ) | (DA) | (DB) | (DC) | (DD) | (DE) | (DF) | (DG) | (DH) | (DI) | (DJ) | (DK) | (DL) | (DM) | (DN) | (DO) | (DP) | (DQ) | (DR) | (DS) | (DT) | (DU) | (DV) | (DW) | (DX) | (DY) | (DZ) | (EA) | (EB) | (EC) | (ED) | (EE) | (EF) | (EG) | (EH) | (EI) | (EJ) | (EK) | (EL) | (EM) | (EN) | (EO) | (EP) | (EQ) | (ER) | (ES) | (ET) | (EU) | (EV) | (EW) | (EX) | (EY) | (EZ) | (FA) | (FB) | (FC) | (FD) | (FE) | (FF) | (FG) | (FH) | (FI) | (FJ) | (FK) | (FL) | (FM) | (FN) | (FO) | (FP) | (FQ) | (FR) | (FS) | (FT) | (FU) | (FV) | (FW) | (FX) | (FY) | (FZ) | (GA) | (GB) | (GC) | (GD) | (GE) | (GF) | (GG) | (GH) | (GI) | (GJ) | (GK) | (GL) | (GM) | (GN) | (GO) | (GP) | (GQ) | (GR) | (GS) | (GT) | (GU) | (GV) | (GW) | (GX) | (GY) | (GZ) | (HA) | (HB) | (HC) | (HD) | (HE) | (HF) | (HG) | (HH) | (HI) | (HJ) | (HK) | (HL) | (HM) | (HN) | (HO) | (HP) | (HQ) | (HR) | (HS) | (HT) | (HU) | (HV) | (HW) | (HX) | (HY) | (HZ) | (IA) | (IB) | (IC) | (ID) | (IE) | (IF) | (IG) | (IH) | (II) | (IJ) | (IK) | (IL) | (IM) | (IN) | (IO) | (IP) | (IQ) | (IR) | (IS) | (IT) | (IU) | (IV) | (IW) | (IX) | (IY) | (IZ) | (JA) | (JB) | (JC) | (JD) | (JE) | (JF) | (JG) | (JH) | (JI) | (JJ) | (JK) | (JL) | (JM) | (JN) | (JO) | (JP) | (JQ) | (JR) | (JS) | (JT) | (JU) | (JV) | (JW) | (JX) | (JY) | (JZ) | (KA) | (KB) | (KC) | (KD) | (KE) | (KF) | (KG) | (KH) | (KI) | (KJ) | (KK) | (KL) | (KM) | (KN) | (KO) | (KP) | (KQ) | (KR) | (KS) | (KT) | (KU) | (KV) | (KW) | (KX) | (KY) | (KZ) | (LA) | (LB) | (LC) | (LD) | (LE) | (LF) | (LG) | (LH) | (LI) | (LJ) | (LK) | (LL) | (LM) | (LN) | (LO) | (LP) | (LQ) | (LR) | (LS) | (LT) | (LU) | (LV) | (LW) | (LX) | (LY) | (LZ) | (MA) | (MB) | (MC) | (MD) | (ME) | (MF) | (MG) | (MH) | (MI) | (MJ) | (MK) | (ML) | (MN) | (MO) | (MP) | (MQ) | (MR) | (MS) | (MT) | (MU) | (MV) | (MW) | (MX) | (MY) | (MZ) | (NA) | (NB) | (NC) | (ND) | (NE) | (NF) | (NG) | (NH) | (NI) | (NJ) | (NK) | (NL) | (NM) | (NN) | (NO) | (NP) | (NQ) | (NR) | (NS) | (NT) | (NU) | (NV) | (NW) | (NX) | (NY) | (NZ) | (OA) | (OB) | (OC) | (OD) | (OE) | (OF) | (OG) | (OH) | (OI) | (OJ) | (OK) | (OL) | (OM) | (ON) | (OO) | (OP) | (OQ) | (OR) | (OS) | (OT) | (OU) | (OV) | (OW) | (OX) | (OY) | (OZ) | (PA) | (PB) | (PC) | (PD) | (PE) | (PF) | (PG) | (PH) | (PI) | (PJ) | (PK) | (PL) | (PM) | (PN) | (PO) | (PP) | (PQ) | (PR) | (PS) | (PT) | (PU) | (PV) | (PW) | (PX) | (PY) | (PZ) | (QA) | (QB) | (QC) | (QD) | (QE) | (QF) | (QG) | (QH) | (QI) | (QJ) | (QK) | (QL) | (QM) | (QN) | (QO) | (QP) | (QQ) | (QR) | (QS) | (QT) | (QU) | (QV) | (QW) | (QX) | (QY) | (QZ) | (RA) | (RB) | (RC) | (RD) | (RE) | (RF) | (RG) | (RH) | (RI) | (RJ) | (RK) | (RL) | (RM) | (RN) | (RO) | (RP) | (RQ) | (RR) | (RS) | (RT) | (RU) | (RV) | (RW) | (RX) | (RY) | (RZ) | (SA) | (SB) | (SC) | (SD) | (SE) | (SF) | (SG) | (SH) | (SI) | (SJ) | (SK) | (SL) | (SM) | (SN) | (SO) | (SP) | (SQ) | (SR) | (SS) | (ST) | (SU) | (SV) | (SW) | (SX) | (SY) | (SZ) | (TA) | (TB) | (TC) | (TD) | (TE) | (TF) | (TG) | (TH) | (TI) | (TJ) | (TK) | (TL) | (TM) | (TN) | (TO) | (TP) | (TQ) | (TR) | (TS) | (TT) | (TU) | (TV) | (TW) | (TX) | (TY) | (TZ) | (UA) | (UB) | (UC) | (UD) | (UE) | (UF) | (UG) | (UH) | (UI) | (UJ) | (UK) | (UL) | (UM) | (UN) | (UO) | (UP) | (UQ) | (UR) | (US) | (UT) | (UU) | (UV) | (UW) | (UX |
|--|------|-----|

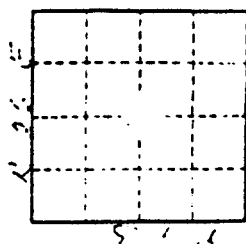
| | | | | | | | |
|-------------------------|-----------|---|-------------------|-------------|----|---------------------|----|
| DATA AVAILABLE: | Well data | 8 | Free. v/l. anal.: | NO. 5-12-66 | LP | Field aquifer char. | 21 |
| Hyd. lab. data: | | | | | | | 22 |
| Qual. water data, type: | | | | | | | 23 |
| Free. sampling: | | | | | | | 24 |
| Aperture cards: | | | | | | | 25 |
| | | | | | | | 26 |
| | | | | | | | 27 |
| | | | | | | | 28 |
| | | | | | | | 29 |
| | | | | | | | 30 |

WELL-DESCRIPTION CARD

[illegible][illegible]**tooth, color, etc.**

HYDROGEOLOGIC CARD

| | | | | | | | | | |
|-------------------------|--|---|--|---|--|--------------------------|--|-------------------------|--|
| SPEC. AS ON MASTER CARD | | Section <u>C</u> | | St. John's <u>C-17</u> | | Subbasin: <u>Bethel</u> | | Section: <u>Florida</u> | |
| POLYMERIZABLE RESINCE: | | Basin: <u>Florida</u> | | (C) (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21) (22) (23) (24) (25) (26) (27) (28) (29) (30) (31) (32) (33) (34) (35) (36) (37) (38) (39) (40) (41) (42) (43) (44) (45) (46) (47) (48) (49) (50) (51) (52) (53) (54) (55) (56) (57) (58) (59) (60) (61) (62) (63) (64) (65) (66) (67) (68) (69) (70) (71) (72) (73) (74) (75) (76) (77) (78) (79) (80) (81) (82) (83) (84) (85) (86) (87) (88) (89) (90) (91) (92) (93) (94) (95) (96) (97) (98) (99) (100) | | Subbasin: <u>Bethel</u> | | Section: <u>Florida</u> | |
| Length of well open to: | | Deposition, stream channel, dunes, hills, hilltop, etc., swamp, offshore, pediment, hillside, terrace, undulating, valley floor | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| MAJOR AQUIFER: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Lithology: | | Limestone | | T.C. <u>Florida</u> | | Aquifer formation, group | | Aquifer thickness | |
| Length of well open to: | | 730 | | T.C. <u>Florida</u> | | | | | |



Ex Pressway 1-95

kommiss:

147/24

51

well located on Keweenaw Avenue
Arden & Endicott

**GROUND WATER INVESTIGATION
REPORT**

**THE CEDAR BAY COGENERATION
PROJECT**

**APPENDIX C
LAYNE — ATLANTIC SITE INVESTIGATION
REPORT**



INTRODUCTION

WELL TESTING AT SEMINOLE KRAFT

Layne was recently contracted to obtain certain information concerning the production wells at Seminole Kraft Paper Company in Jacksonville, Florida.

The data to be collected is as follows:

1. Perform geophysical surveys on well #1, #5, #7, and #8 as follows:

Natural Gamma, Spontaneous Potential, Resistivity, Caliper logs, Temperature Logs and Flow Meter Logs.

NOTE: Conductance Logs were performed on #1, #7 and #8.
2. Video survey of #1 well.
3. Collect water samples out of the middle floridan aquifer and upper floridan aquifer using inflatable packers to isolate zones.
4. Perform 72 hour pumping test at a rate of approximately 4000 - 5000 GPM. Collect water samples during the test at specified intervals. Record pumping levels at each production well.
5. Submit a report containing raw data and interpretations of data.

All of the above were completed per the time frame outlined in Layne's proposal. The data collected during this project can be found on subsequent pages of this report.



There was some question whether the middle floridan aquifer was encountered in these wells. It is known to be 1200' or more below surface in the Duval County area and it is confined by intermittent layers of Dolemite. It is this writers belief that the upper section of the middle floridan aquifer was indeed encountered. The primary factor is that the video survey of Well #1 clearly indicates a tight, fairly thick region of Dolemite in the 1200 to 1300 ft. depth range.

The video survey of #1 Well also indicates that a section of 14" diameter suction pipe has fallen off the pump and lodged in the open hole portion of the well. If full production of #1 well is expected then this piece of pipe should be removed. The capacity of Well #1 has dropped due to wear in the bowls and quite possible due to calcium carbonate encrustation on the face of the borehole walls. Therefore, before full production resumes, the pump should be rebuilt and well cleaning should be considered.

Basically the project went smoothly and without conflict. The personnel at Seminole Kraft were very cooperative and attended our every need. I hope you will find the information you need in this report, however, please do not hesitate to ask if you do have questions.

Respectfully,
LAYNE-ATLANTIC COMPANY

Robert J. Zahorscak
Robert J. Zahorscak
Assistant District Manager

RJZ/jd



WELL TESTING AT SEMINOLE KRAFT
OUTLINE OF EVENTS

- 5-11-89 Spotted drill rod and equipment on job site.
- 5-15-89 Mobe crew and remaining equipment to job site, pull motor on #5 pump.
- 5-16-89 Pulled #5 Well pump, set flow control device in #5 Well, performed geophysical surveys on #5 Well, disconnected and pulled motor on #1 pump. Blowoff valve cracked at #1 Well, therefore, we could not pull pump. Waited on replacement valve from Seminole Kraft.
- 5-17-89 Replacement 16" valve arrived @ 11:30, pulled pump performed geophysical log, conductance log requested by Black & Veatch. Trip in Well #5 with packer.
- 5-18-89 Video Well #1, collected first sample out of Well #5 at 1290'.
- 5-19-89 Assembled straddle packer, trip in hole.
- 5-20-89 Collect sample, straddle set @ 1290 and 881.
- 5-22-89 Set #5 Well pump, move crane to #1 Well, start tripping into #1 Well.
- 5-23-89 Collected sample @ 1320' in Well #1, pulling out of hole packer caught on casing and broke loose, packer suspended by airline. Unwire motor on #7 pump.
- 5-24-89 Prepare to fish for packer. Pull #7 pump and perform Geophysical log.
- 5-25-89 Try to set #7 Well pump, well seal won't make seal. Pull pump back out to work on seal. Fishing for packer in Well #1.
- 5-26-89 Repair seal and set pump on #7 Well, prepare to pull pull #8 pump. Remove fish from well, trip back in with new straddle packer into #1 Well.

WELL TESTING AT SEMINOLE KRAFT
OUTLINE OF EVENTS CONTINUED

- 5-27-89 Collect last sample in #1 Well, trip out of well. Unwired motor, remove pump and motor and set flow control device in #8 well.
- 5-30-89 Trip out of #1 Well with packer, load equipment for move to next well. Tear down #8 pump.
- 5-31-89 Remove flow control device, set #1 Well pump. Move to Well #8 trip in packer.
- 6-01-89 Collect first sample @ 1278' trip out, trip back into 400' with straddle packer.
- 6-02-89 Trip in with rest of assembly, collect last sample on Well #8 and trip out of well, set flow control device.
- 6-03-89 Breakdown equipment, prepare to demobe.
- 6-04-89 Reassemble pump, prepare to set #8 pump.
- 6-05-89 Set #8 pump, install pressure gauges on wells, demobe equipment, prepare for pumping test.
- 6-06-89 Begin pumping test.
- 6-07-89 -
- 6-08-89 Collect pumping level data.
- 6-09-89 Discontinue pumping test, collect recovery data.

SEMINOLE KRAFT

PIEZOMETRIC LEVEL MEASUREMENT

PROCEDURE

0 - 15 PSI calibrated pressure gauges were installed on each well on existing taps located on the 16" blowoff lines. The elevation of each gauge is referenced to the top of the concrete slab at each well. For wells that we anticipated having drawdowns exceeding the bottom of the blowoff line, an electric water level indicator was available. The probe was to be inserted through a vent in the well seal or through the open blowoff line. We anticipated having to use the probe in #4, #5 and #7 Wells. However, the water level in #7 never dropped below positive pressure.

At 7:30 a.m. on 6-06-89 pumps #4, #5 and #7 were operating. At approximately 8:30 #5 pump was stopped and #8 pump was started in its place. Then at 9:30 #9 Well was started in order to provide storage for the short time #5 Well production was curtailed. At approximately 10:15 pumping stopped at #9 Well and #8 Well. Then at 11:05 a.m. #5 Well was started and we began to collect pumping levels with #5 pumping approximately 4500 GPM as measured through Seminole Kraft's annubar. Our intention was to operate the same 3 wells for the 72 hour pumping period, which in fact we were able to do.

The only glitch in the test occurred at well #4. This is one of the well pumps which was not removed for testing purposes, therefore, we were unable to predict that inserting a probe in the well was impossible. Evidently the top column coupling had an obstruction or encrustation buildup which blocked the progress of the electric probe. The pumping level was below the blowoff line, therefore, no reading was available.

SEMINOLE KRAFT
PIEZOMETRIC LEVEL MEASUREMENTS

ELEVATION OF PRESSURE GAUGES

| | |
|---------|--------|
| Well #1 | 9.41' |
| Well #2 | 17.01' |
| Well #4 | 16.50' |
| Well #5 | 16.33' |
| Well #7 | 15.16' |
| Well #8 | 16.67' |
| Well #9 | 17.83' |

DISTANCE BETWEEN WELLS

| | |
|---------------|-------|
| Well #1 to #5 | 3736' |
| Well #2 to #5 | 1998' |
| Well #4 to #5 | 1021' |
| Well #7 to #5 | 1887' |
| Well #8 to #5 | 2827' |
| Well #9 to #5 | 3770' |

* Basic data supplied by Seminole Kraft

SEMINOLE KRAFT

PUMPING LEVEL DATA

NOTE: All readings are positive head unless otherwise noted.

| ACTUAL READING CONVERTED TO ELEVATIONS | | | | | | | | | | | | | Pumping Rate |
|--|-------|-------|-------|-------|-------|-------|----|----|-------|------|----|----|--------------|
| DRAWDOWN | | | | | | | | | | | | | |
| | #1 | #2 | #5 | #7 | #8 | #9 | #1 | #2 | #5 | #7 | #8 | #9 | |
| Stabilization | 32.51 | 34.91 | 33.65 | 17.47 | 32.84 | 36.89 | | | | | | | 4500 GPM |
| Start 11:05am | | | | 16.32 | 32.84 | 36.89 | 0 | 0 | | | 0 | 0 | 4500 GPM |
| 11:06 | 32.51 | 34.91 | 18.64 | 16.32 | 32.84 | 36.89 | 0 | 0 | 15.01 | 1.2' | 0 | 0 | 4500 GPM |
| 11:07 | 32.51 | 34.91 | 18.64 | 16.32 | 32.84 | 36.89 | 0 | 0 | 15.01 | 1.2' | 0 | 0 | 4500 GPM |
| 11:08 | 32.51 | 34.91 | 18.64 | 17.47 | 32.84 | 36.89 | 0 | 0 | 15.01 | 1.2' | 0 | 0 | 4500 GPM |
| 11:09 | 32.51 | 34.91 | 16.50 | 17.47 | 32.84 | 36.89 | 0 | 0 | 17.15 | 0 | 0 | 0 | 4500 GPM |
| 11:10 | 32.51 | 34.91 | 15.11 | 17.47 | 32.84 | 36.89 | 0 | 0 | 17.99 | 0 | 0 | 0 | 4500 GPM |
| 11:15 | 32.51 | 34.91 | 14.33 | 18.62 | 32.84 | 36.89 | 0 | 0 | 19.32 | 1.2' | 0 | 0 | 4500 GPM |
| 11:20 | 32.51 | 34.91 | 14.33 | 18.62 | 32.84 | 36.89 | 0 | 0 | | 1.2' | 0 | 0 | 4500 GPM |
| 11:25 | 32.51 | 34.91 | 13.60 | 18.62 | 32.84 | 36.89 | 0 | 0 | 20.05 | 1.2' | 0 | 0 | 4500 GPM |
| 11:30 | 32.51 | 34.91 | 13.60 | 17.47 | 32.84 | 36.89 | 0 | 0 | | 0 | 0 | 0 | 4500 GPM |
| 11:35 | 32.51 | 34.91 | N.D. | 18.62 | 32.84 | 36.89 | 0 | 0 | | 1.2' | 0 | 0 | 4500 GPM |
| 11:40 | 32.51 | 34.91 | N.D. | 17.47 | 32.84 | 36.89 | 0 | 0 | | 0 | 0 | 0 | 4500 GPM |
| 11:45 | 32.51 | 34.91 | N.D. | 18.62 | 32.84 | 36.89 | 0 | 0 | | 1.2' | 0 | 0 | 4500 GPM |
| 11:50 | 32.51 | 34.91 | N.D. | 18.62 | 32.84 | 36.89 | 0 | 0 | | 1.2' | 0 | 0 | 4500 GPM |
| 11:55 | 32.51 | 34.91 | N.D. | 17.47 | 32.84 | 36.89 | 0 | 0 | | 0 | 0 | 0 | 4500 GPM |
| 12:00 PM | 32.51 | 34.91 | N.D. | 17.47 | 32.84 | 36.89 | 0 | 0 | | 0 | 0 | 0 | 4500 GPM |
| 12:05 | 32.51 | 34.34 | N.D. | 17.47 | 32.84 | 36.89 | 0 | 0 | | 0 | 0 | 0 | 4500 GPM |
| 12:20 | 32.51 | 34.34 | N.D. | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.07 | 0 | 0 | 0 | 4500 GPM |
| 12:35 | 32.51 | 34.34 | 11.58 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.07 | 0 | 0 | 0 | 4500 GPM |
| 12:50 | 32.51 | 34.34 | 11.58 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.15 | 0 | 0 | 0 | 4500 GPM |
| 1:05 | 32.51 | 34.34 | 11.50 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.15 | 0 | 0 | 0 | 4500 GPM |

ACTUAL READING CONVERTED TO ELEVATIONS

| DRAWDOWN | | | | | | | | | | | | | Pumping Rate |
|--------------|-------|-------|-------|-------|-------|-------|----|----|-------|------|------|----|--------------|
| | #1 | #2 | #5 | #7 | #8 | #9 | #1 | #2 | #5 | #7 | #8 | #9 | |
| 1:25 | 32.51 | 34.34 | 11.50 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.15 | 0 | 0 | 0 | 4500 GPM |
| 1:45 | 32.51 | 34.34 | 11.50 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.15 | 1.2+ | 0 | 0 | 4500 GPM |
| 2:05 | 32.51 | 34.34 | 11.50 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.15 | 0 | 0 | 0 | 4500 GPM |
| 3:05 | 32.51 | 34.34 | 11.50 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.15 | 0 | 0 | 0 | 4500 GPM |
| 4:05 | 32.51 | 34.34 | ----- | 17.47 | 32.84 | 36.89 | 0 | 0 | ----- | 0 | 0 | 0 | 4500 GPM |
| 5:05 | 32.51 | 34.34 | 11.50 | 17.47 | 32.84 | 36.89 | 0 | 0 | ----- | 0 | 0 | 0 | 4500 GPM |
| 6:05 | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 7:05 | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 8:05 | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 9:05 | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 10:05 | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 11:05 | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 12:05 AM WED | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 1:05 | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 2:05 | 32.51 | 34.34 | 11.54 | 17.47 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 3:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 0 | 0 | 4500 GPM |
| 4:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 5:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 6:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 7:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 8:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 9:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 10:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 11:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 12:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 1:05 PM | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 2:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 3:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 4:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 5:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 6:05 | 32.51 | 34.34 | 11.54 | 18.62 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |

ACTUAL READING CONVERTED TO ELEVATIONS

DRAWDOWN

Pumping Rate

| | #1 | #2 | #5 | #7 | #8 | #9 | #1 | #2 | #5 | #7 | #8 | #9 | |
|----------------|-------|-------|-------|-------|-------|-------|----|----|-------|----|------|----|----------|
| 7:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 8:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 9:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 10:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 11:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 12:05 AM THURS | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 1:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 2:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 3:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 4:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 5:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 6:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 7:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 8:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 9:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 10:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 11:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 12:05 AM FRI | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 1:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |

ACTUAL READING CONVERTED TO ELEVATIONS

| DRAWDOWN | | | | | | | | | | | | Pumping Rate | |
|----------------|-------|-------|-------|-------|-------|-------|----|----|-------|----|------|--------------|----------|
| | #1 | #2 | #5 | #7 | #8 | #9 | #1 | #2 | #5 | #7 | #8 | #9 | |
| 2:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 3:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 4:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 6:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 7:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 8:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 9:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 10:05 | 32.51 | 34.34 | 11.54 | 18.04 | 32.84 | 36.89 | 0 | 0 | 22.11 | 0 | 1.2+ | 0 | 4500 GPM |
| 11:05 END TEST | | | | | | | | | | | | | |

RECOVERING WATER LEVELS

| | #1 | #2 | #5 | #7 | #8 | #9 |
|-------|------|------|-------|-------|------|------|
| 11:06 | N.C. | N.C. | 34.81 | FL | N.C. | N.C. |
| 11:07 | N.C. | N.C. | 35.96 | 16.31 | N.C. | N.C. |
| 11:08 | N.C. | N.C. | 36.54 | 15.16 | N.C. | N.C. |
| 11:09 | N.C. | N.C. | 37.12 | 15.16 | N.C. | N.C. |
| 11:10 | N.C. | N.C. | 36.54 | 15.73 | N.C. | N.C. |
| 11:12 | N.C. | N.C. | 36.54 | FL | N.C. | N.C. |
| 11:13 | N.C. | N.C. | 36.54 | FL | N.C. | N.C. |
| 11:14 | N.C. | N.C. | 35.96 | 18.04 | N.C. | N.C. |
| 11:15 | N.C. | N.C. | 36.54 | 18.04 | N.C. | N.C. |
| 11:16 | N.C. | N.C. | 36.54 | 18.04 | N.C. | N.C. |
| 11:17 | N.C. | N.C. | 35.96 | 18.04 | N.C. | N.C. |
| 11:18 | N.C. | N.C. | 35.96 | 18.04 | N.C. | N.C. |
| 11:19 | N.C. | N.C. | 35.96 | 18.04 | N.C. | N.C. |
| 11:20 | N.C. | N.C. | 35.96 | 18.04 | N.C. | N.C. |

NOTE: Car wash pump would cycle on #2 Well which caused the pressure to fluctuate 1/2 PSI.

FL = FLUCTUATING

N.C. = NO CHARGE

N.D. = NO DATA

WATER SAMPLE COLLECTION

Two water samples were collected from each well and sent to a lab in sample containers supplied by the lab. The zones of the well to be sampled were selected by locating dolomite formations in the well using geophysical logs. The caliper log was utilized to choose a tight formation in which to set the packer. The gamma and resistivity logs were then used to verify zones of limestone and dolomite in conjunction with the caliper log.

The lower samples were collected in the 1300' depth range. A single inflatable packer was set which isolated the lower formation. The natural flow from that formation was allowed to travel through the drill rod to the surface. The flow continued for 20 minutes to obtain an unpolluted sample. It is interesting to note that when the lower packer was inflated, the flow from the well casing visibly slowed to approximately 1/2 it's prior volume.

The second sample was collected by constructing a straddle packer which consisted of a perforated drill rod connecting an upper and lower packer assembly. This isolated the lower formation and the upper ocala formation.

Each sample was collected and stored in an insulated container until delivered to the lab. The lab then tested for the following parameters:

P. H.
Bicarbonate Alkalinity
Carbonate Alkalinity
Chloride
Conductivity (Lab)
Sulfate

Total Dissolved Solids
Total Hardness
Calcium
Iron
Magnesium
Potassium
Sodium

PACKER LOCATION ZONES FOR WATER QUALITY SAMPLING

| | <u>WELL #1</u> | <u>WELL #5</u> | <u>WELL #8</u> |
|-----------|----------------|----------------|----------------|
| Sample #1 | 1320' | 1291' | 1278' |
| Sample #2 | 978 and 1320 | 881 and 1291 | 980 and 1278 |

ENVIROPACT, INC.

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LAYNE ATLANTIC
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SAVANNAH, GA 31412

Page 1 of 1
June 15, 1989
Report 3365
LAB I.D. 82223

ATT : CLIFF FREEMAN
Sample Collected: 5/27/89
Sample Received: 5/30/89
Sample Description: LAYNE ATLANTIC SAMPLE

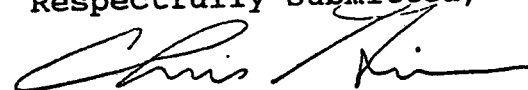
Collected By: YOUR REP.

| REPORT OF ANALYSIS : WELL #2 | | UNITS | DATE |
|------------------------------|------|------------------------|---------|
| pH (Field) | 7.0 | S.U. | 5/27/89 |
| Temperature | 80 | F | 5/27/89 |
| pH (Lab) | 7.51 | S.U. | 5/30/89 |
| Bicarbonate Alkalinity | 156 | mg/l CaCO ₃ | 6/08/89 |
| Carbonate Alkalinity | <1 | mg/l CaCO ₃ | 6/09/89 |
| Chloride | 37 | mg/l | 6/05/89 |
| Conductivity (Lab) | 626 | umhos/cm | 5/30/89 |
| Sulfate | 89 | mg/l | 6/13/89 |
| Total Dissolved Solids | 372 | mg/l | 6/09/89 |
| Total Hardness | 308 | mg/l CaCO ₃ | 6/05/89 |
| Calcium | 72.5 | mg/l | 6/05/89 |
| Iron | 0.19 | mg/l | 6/05/89 |
| Magnesium | 30.3 | mg/l | 6/05/89 |
| Potassium | <0.5 | mg/l | 6/05/89 |
| Sodium | 17.5 | mg/l | 6/05/89 |

#1 WELL UPPER SAMPLE

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.

Respectfully Submitted,



Chris Given
Laboratory Manager
Enviropact Services, Inc.



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LAYNE ATLANTIC
266 ALFRED ST.
SAVANNAH, GA 31412

Page 1 of 1
June 9, 1989
Report: 3314
LAB I.D. 82223

ATT : CLIFF FREEMAN
Sample Collected: 5/18/89
Sample Received: 5/19/89
Sample Description: GROUNDWATER

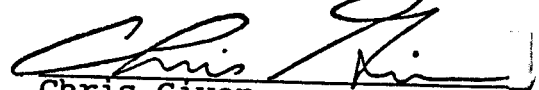
Collected By: YOUR REP.

REPORT OF ANALYSIS : MW-5, 1290 FT

| | | UNITS | DATE |
|------------------------|------|------------|---------|
| pH (Lab) | 7.5 | S.U. | 5/19/89 |
| Bicarbonate Alkalinity | 159 | mg/l CaCO3 | 5/17/89 |
| Carbonate Alkalinity | <1 | mg/l CaCO3 | 5/17/89 |
| Chloride | 30 | mg/l | 6/05/89 |
| Conductivity (Lab) | 520 | umhos/cm | 5/19/89 |
| Sulfate | 82 | mg/l | 5/26/89 |
| Total Dissolved Solids | 382 | mg/l | 6/08/89 |
| Total Hardness | 322 | mg/l CaCO3 | 5/24/89 |
| Calcium | 61.0 | mg/l | 5/23/89 |
| Iron | 0.16 | mg/l | 6/05/89 |
| Magnesium | 27.4 | mg/l | 5/23/89 |
| Potassium | 1.0 | mg/l | 5/24/89 |
| Sodium | 16.3 | mg/l | 5/23/89 |

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.

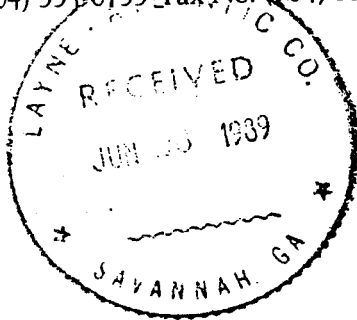
Respectfully Submitted,


Chris Given
Laboratory Manager
Enviropact Services, Inc



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LAYNE ATLANTIC
266 ALFRED ST.
SAVANNAH, GA 31412

Page 1 of 1
June 12, 1989
Report '3328
LAB I.D. 82223

ATT : CLIFF FREEMAN
Sample Collected: 5/20/89
Sample Received: 5/22/89
Sample Description: GROUNDWATER

Collected By: YOUR REP.

REPORT OF ANALYSIS : MW-5, 881-1290

| | | UNITS | DATE |
|------------------------|------|------------------------|---------|
| pH (Field) | 7.0 | S.U. | 5/20/89 |
| Temperature | 80 | F | 5/20/89 |
| pH (Lab) | 7.55 | S.U. | 5/26/89 |
| Bicarbonate Alkalinity | 158 | mg/l CaCO ₃ | 5/25/89 |
| Carbonate Alkalinity | <1 | mg/l CaCO ₃ | 5/25/89 |
| Chloride | 21 | mg/l | 6/05/89 |
| Conductivity (Lab) | 510 | umhos/cm | 5/24/89 |
| Sulfate | 72 | mg/l | 5/26/89 |
| Total Dissolved Solids | 340 | mg/l | 6/09/89 |
| Total Hardness | 315 | mg/l CaCO ₃ | 5/24/89 |
| Calcium | 56.2 | mg/l | 5/23/89 |
| Iron | 0.10 | mg/l | 6/05/89 |
| Magnesium | 25.2 | mg/l | 5/23/89 |
| Potassium | 1.1 | mg/l | 5/24/89 |
| Sodium | 14.8 | mg/l | 5/23/89 |

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.

Respectfully Submitted,

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Laboratory Manager
Enviropact Services, Inc.



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Page 1 of 1
June 15, 1989
Report 3385
LAB I.D. 82223

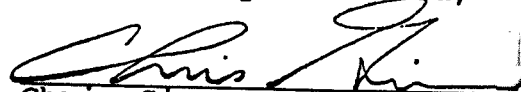
ATT : CLIFF FREEMAN
Sample Collected: 6/01/89
Sample Received: 6/01/89
Sample Description: SEMINOLE KRAFT SAMPLE

Collected By: YOUR REP.

| REPORT OF ANALYSIS : WELL #8 | SAMPLE #1 | UNITS | DATE |
|------------------------------|-----------|------------|---------|
| pH (Field) | 7 | S.U. | 6/01/89 |
| Temperature | 80 | F | 6/01/89 |
| pH (Lab) | 7.6 | S.U. | 6/01/89 |
| Bicarbonate Alkalinity | 158 | mg/l CaCO3 | 6/08/89 |
| Carbonate Alkalinity | <1 | mg/l CaCO3 | 6/09/89 |
| Chloride | 29 | mg/l | 6/05/89 |
| Conductivity (Lab) | 633 | umhos/cm | 6/01/89 |
| Sulfate | 93 | mg/l | 6/13/89 |
| Total Dissolved Solids | 380 | mg/l | 6/09/89 |
| Total Hardness | 301 | mg/l CaCO3 | 6/05/89 |
| Calcium | 68.3 | mg/l | 6/05/89 |
| Iron | 0.13 | mg/l | 6/05/89 |
| Magnesium | 29.3 | mg/l | 6/05/89 |
| Potassium | <0.5 | mg/l | 6/05/89 |
| Sodium | 16.0 | mg/l | 6/05/89 |

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.

Respectfully Submitted,


Chris Given
Laboratory Manager
Enviropact Services, Inc



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Page 1 of 1
June 15, 1989
Report 3392
LAB I.D. 82223

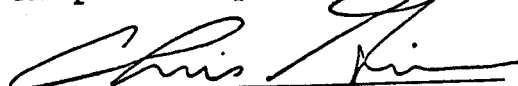
ATT : CLIFF FREEMAN
Sample Collected: 6/02/89
Sample Received: 6/02/89
Sample Description:

Collected By: YOUR REP.

| REPORT OF ANALYSIS : WELL #8, SAMPLE #2 | UNITS | DATE |
|---|-------|--------------------------------|
| pH (Field) | 7.0 | S.U. 6/02/89 |
| Temperature | 80 | F 6/02/89 |
| pH (Lab) | 7.6 | S.U. 6/02/89 |
| Bicarbonate Alkalinity | 159 | mg/l CaCO ₃ 6/08/89 |
| Carbonate Alkalinity | <1 | mg/l CaCO ₃ 6/09/89 |
| Chloride | 33 | mg/l 6/05/89 |
| Conductivity (Lab) | 620 | umhos/cm 6/02/89 |
| Sulfate | 88 | mg/l 6/13/89 |
| Total Dissolved Solids | 395 | mg/l 6/09/89 |
| Total Hardness | 308 | mg/l CaCO ₃ 6/05/89 |
| Calcium | 67.3 | mg/l 6/05/89 |
| Iron | 0.12 | mg/l 6/05/89 |
| Magnesium | 29.7 | mg/l 6/05/89 |
| Potassium | <0.5 | mg/l 6/05/89 |
| Sodium | 16.5 | mg/l 6/05/89 |

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.

Respectfully Submitted,


Chris Given
Laboratory Manager
Enviropact Services, Inc.



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LAYNE ATLANTIC
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SAVANNAH, GA 31412

Page 1 of 3
June 20, 1989
Report 3441
LAB I.D. 82223

ATT : CLIFF FREEMAN
Sample Collected: 6/06/89
Sample Received: 6/09/89
Sample Description: WELL #5

Collected By: YOUR REP.

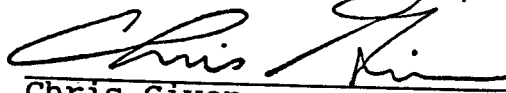
REPORT OF ANALYSIS : PT #2

| | | UNITS | DATE |
|------------------------|-------|------------------------|---------|
| pH (Field) | 7.0 | S.U. | 6/06/89 |
| Temperature | 80 | F | 6/06/89 |
| pH (Lab) | 7.7 | S.U. | 6/12/89 |
| Bicarbonate Alkalinity | 150 | mg/l CaCO ₃ | 6/15/89 |
| Carbonate Alkalinity | <1 | mg/l CaCO ₃ | 6/15/89 |
| Chloride | 26 | mg/l | 6/13/89 |
| Conductivity (Lab) | 504 | umhos/cm | 6/12/89 |
| Hardness | 197 | mg/l CaCO ₃ | 6/15/89 |
| Sulfate | 85 | mg/l | 6/13/89 |
| Total Dissolved Solids | 394 | mg/l | 6/14/89 |
| Calcium | 40.7 | mg/l | 6/13/89 |
| Iron | <0.05 | mg/l | 6/12/89 |
| Magnesium | 23.2 | mg/l | 6/13/89 |
| Potassium | 1.4 | mg/l | 6/12/89 |
| Sodium | 16.9 | mg/l | 6/12/89 |

WELL #5 36hrs INTO PUMPING TEST

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods, or other approved methods.

Respectfully Submitted,


Chris Given
Laboratory Manager
Enviropact Services, Inc.



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LAYNE ATLANTIC
P.O. BOX 9886
SAVANNAH, GA 31412

Page 2 of 3
June 20, 1989
Report 3441
LAB ID. 82223

ATT : CLIFF FREEMAN
Sample Collected: 6/06/89
Sample Received: 6/09/89
Sample Description: WELL #5

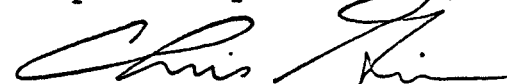
Collected By: YOUR REP.

| REPORT OF ANALYSIS : PT #1 | | UNITS | DATE |
|----------------------------|------|------------|---------|
| pH (Field) | 7.0 | S.U. | 6/06/89 |
| Temperature | 80 | F | 6/06/89 |
| pH (Lab) | 7.6 | S.U. | 6/12/89 |
| Bicarbonate Alkalinity | 148 | mg/l CaCO3 | 6/15/89 |
| Carbonate Alkalinity | <1 | mg/l CaCO3 | 6/15/89 |
| Chloride | 23 | mg/l | 6/13/89 |
| Conductivity (Lab) | 484 | umhos/cm | 6/12/89 |
| Hardness | 202 | mg/l CaCO3 | 6/13/89 |
| Sulfate | 78 | mg/l | 6/13/89 |
| Total Dissolved Solids | 376 | mg/l | 6/14/89 |
| Calcium | 43.1 | mg/l | 6/13/89 |
| Iron | 0.05 | mg/l | 6/12/89 |
| Magnesium | 22.9 | mg/l | 6/13/89 |
| Potassium | 1.5 | mg/l | 6/12/89 |
| Sodium | 16.5 | mg/l | 6/12/89 |

WELL #5 20 MINUTES INTO PUMPING TEST

Analyses performed in accordance with E.P.A., A.S.T.M., Standard
Methods or other approved methods.

Respectfully Submitted,



Chris Given
Laboratory Manager
Enviropact Services, Inc.

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LAYNE ATLANTIC
P.O. BOX 9886
SAVANNAH, GA 31412

Page 3 of 3
June 20, 1989
Report 3441
LAB ID. 82223

ATT : CLIFF FREEMAN
Sample Collected: 6/06/89
Sample Received: 6/09/89
Sample Description: WELL #5

Collected By: YOUR REP.

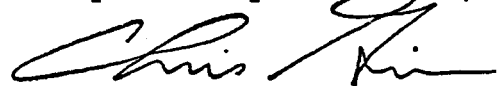
REPORT OF ANALYSIS : PT #3

| | | UNITS | DATE |
|------------------------|-------|------------|---------|
| pH (Field) | 7.0 | S.U. | 6/06/89 |
| Temperature | 80 | F | 6/06/89 |
| pH (Lab) | 7.7 | S.U. | 6/12/89 |
| Bicarbonate Alkalinity | 148 | mg/l CaCO3 | 6/15/89 |
| Carbonate Alkalinity | <1 | mg/l CaCO3 | 6/15/89 |
| Chloride | 27 | mg/l | 6/13/89 |
| Conductivity (Lab) | 473 | umhos/cm | 6/12/89 |
| Hardness | 210 | mg/l CaCO3 | 6/15/89 |
| Sulfate | 78 | mg/l | 6/13/89 |
| Total Dissolved Solids | 392 | mg/l | 6/14/89 |
| Calcium | 47.3 | mg/l | 6/13/89 |
| Iron | <0.05 | mg/l | 6/12/89 |
| Magnesium | 22.4 | mg/l | 6/13/89 |
| Potassium | 1.6 | mg/l | 6/12/89 |
| Sodium | 16.6 | mg/l | 6/12/89 |

WELL #5 72 hrs INTO PUMPING TEST

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.

Respectfully Submitted,



Chris Given
Laboratory Manager
Enviropact Services, Inc

A.E.S. @ SEMINOLE KRAFT
NOTES ON GEOPHYSICAL INTERPRETATIONS

The geophysical interpretations are our best estimate of the lithology encountered during the well testing at Seminole Kraft. Utilizing the geophysical logs, caliper logs, original driller logs and various publications we have formed a general lithological map of the 4 wells which were surveyed. Of course without core samples the exact nature of the formation cannot be reported. Please find attached the original drillers logs and please find listed below a publication used to verify formations.

RE: Florida Geologic Survey
Report Of Investigation #43: Groundwater in Duval and
Nassau County Florida

WELL #1 GEOPHYSICAL INTERPRETATIONS

| <u>DEPTH</u> | <u>STRATIGRAPHIC UNIT</u> | <u>LITHOLOGY</u> |
|--------------|---------------------------|---|
| -568 | Crystal River (Ocala) | Hard, brown fossiliferous marine limestone, slightly porous. |
| 568-848 | Williston (Ocala) | Hard, brown fossiliferous marine limestone. Medium porosity, some dolemite layers. |
| 848-975 | Inglis (Ocala) | Brown, medium argillaceous limestone. Intermittent dolemite. |
| 975-1080 | Avon Park | Soft, brown and white fossiliferous limestone with alternating layers of dolemite. Limestone is medium to high porosity. |
| 1080-1370 | Lake City | Soft, brown and white highly fractured, highly porous, fossiliferous limestone with alternating layers of very dense dolemite inbeds from 6" to 5' thick. |

WELL #7 GEOPHYSICAL INTERPRETATIONS

| <u>DEPTH</u> | <u>STRATIGRAPHIC UNIT</u> | <u>LITHOLOGY</u> |
|--------------|---------------------------|---|
| -568 | Crystal River (Ocala) | Hard, brown, fossiliferous, slightly porous marine limestone. |
| 568-845 | Williston (Ocala) | Hard gray and brown fossiliferous marine limestone, medium porosity. |
| 845-960 | Inglis (Ocala) | Brown, hard medium porosity, slightly fractured argillaceous limestone with intermittent dolemite streaks. |
| 960-1075 | Avon Park | Soft brown fossiliferous marine limestone. Medium to high porosity with layers of dense blue-gray dolemite. |
| 1075-1368 | Lake City | Soft brown tulite, highly porous, highly fractured fossiliferous marine limestone with alternating beds of very hard dolemite. Some fine sand intermingled in the soft poorly cemented limestone. |

WELL #5 GEOPHYSICAL INTERPRETATIONS

| <u>DEPTH</u> | <u>STRATIGRAPHIC UNIT</u> | <u>LITHOLOGY</u> |
|--------------|---------------------------|---|
| 560-618 | Crystal River (Ocala) | Hard brown fossiliferous, marine limestone, slightly porous. |
| 618-865 | Williston (Ocala) | Hard gray and brown fossiliferous marine limestone, medium porosity. |
| 865-982 | Inglis (Ocala) | Brown, hard argillaceous limestone with intermittent dolemite streaks. Medium porosity. |
| 982-1100 | Avon Park | Soft, brown fossiliferous marine limestone with layers of dense blue-gray dolemite. Medium to high porosity. |
| 1100-1340 | Lake City | Soft, brown and white highly fractured fossiliferous marine limestone with alternating beds of very hard dolemite. Porosity of limestone is very high with some signs of intermingled fine quartz sand. |

WELL #8 GEOPHYSICAL INTERPRETATIONS

| <u>DEPTH</u> | <u>STRATIGRAPHIC UNIT</u> | <u>LITHOLOGY</u> |
|--------------|---------------------------|--|
| -588 | Crystal River (Ocala) | Hard, brown, slightly porous, fossiliferous marine limestone. |
| 588-852 | Williston (Ocala) | Hard, gray and brown, medium porosity, fossiliferous marine limestone. |
| 852-960 | Inglis (Ocala) | Brown, hard, medium porosity, slightly fractured argillaceous limestone with intermittent dolemite streaks. |
| 960-1068 | Avon Park | Soft, brown, medium to high porosity, fossiliferous marine limestone with intermittent layers of dense blue-gray dolemite. |
| 1068-1367 | Lake City | Soft, brown and white, highly fractured fossiliferous limestone with alternating beds of very dense dolemite. Some fine quartz sand intermingled in the soft, poorly cemented limestone. |

WELL TESTING AT SEMINOLE KRAFT
FLOW METER RESULTS

| WELL #1 | | WELL #5 | |
|-------------|---------------|-------------|---------------|
| Depth (Ft.) | Flow (G.P.M.) | Depth (Ft.) | Flow (G.P.M.) |
| 560 | 2200 | 600 | 5300 |
| 700 | 1800 | 720 | 5000 |
| 780 | 1150 | 800 | 5000 |
| 1000 | 1000 | 1080 | 4750 |
| 1135 | 1500 | 1120 | 4700 |
| 1295 | 830 | 1310 | 4100 |
| 1360 | 68 | | |

| WELL #7 | | WELL #8 | |
|-------------|---------------|-------------|---------------|
| Depth (Ft.) | Flow (G.P.M.) | Depth (Ft.) | Flow (G.P.M.) |
| 590 | 5200 | 590 | 5800 |
| 700 | 4800 | 725 | 5600 |
| 890 | 4500 | 980 | 5000 |
| 1035 | 4500 | 1190 | 4800 |
| 1220 | 4500 | 1250 | 3650 |
| 1310 | 1050 | 1340 | 2930 |
| 1360 | 107 | | |

NOTE: Velocities recorded with propeller type flowmeter and converted to capacities by calculating the cross sectional area obtained with the caliber logs.

AQUIFER TEST @ SEMINOLE KRAFT

As indicated in the data collected during the pumping tests the well reached stabilization relatively quickly at a pumping rate of 4500 G.P.M. Once reached, the water level did not fluctuate during the entire pumping test. Therefore, when interpreting the pumping test, results are indeterminate in a sense. The one clear observation obtained from the tests is that the aquifer is not being pumped at a rate which will show short term water level depletion. There were three wells pumping 4500 to 5000 G.P.M. for 72 hours.

The influence upon one another over this time frame was essentially non-existent as can be seen in the pumping test data. The Variation in the pumping levels at #7 well during start up and shutdown of #5 pump can be attributed to the increase in line pressure due to the increase of flow in the piping system. In fact, the pumping level in #7 well actually increased when #5 pump began operating.

Since #5 well had virtually no influence on any other well, #5 well data was used to calculate a range of transmissivity's. The pumping levels were plotted on semi-log paper with drawdown (ft) on the vertical axis and time (minutes) on the horizontal axis. As shown on the attachments, the slope of the line became horizontal after approximately 90 minutes into the test. Since the slope is zero, the transmissivity would therefore be infinite which is not accurate. Therefore, two lines were plotted in the transition zones which should yield transmissivities in the lower range of that actually encountered.

The Jacob Method of calculating transmissivity was then used to calculate a range of transmissivities. The equations used can be found on attached calculation sheets. Correspondingly, the storage coefficient was calculated using the same method. Standard assumptions were made considering the actual well parameters, namely: 1. Well is under artesian conditions. 2. The aquifer is homogeneous and isotropic. 3. The aquifer has infinite and areal extent. 4. The coefficient of transmissibility is constant at all times and at all places. 5. Water removed from storage is discharged instantaneously with decline in head. 6. The well penetrates, and receives water from the entire thickness of the aquifer. 7. The well has an infinitesimal diameter.

AQUIFER TEST @ SEMINOLE KRAFT
PAGE TWO

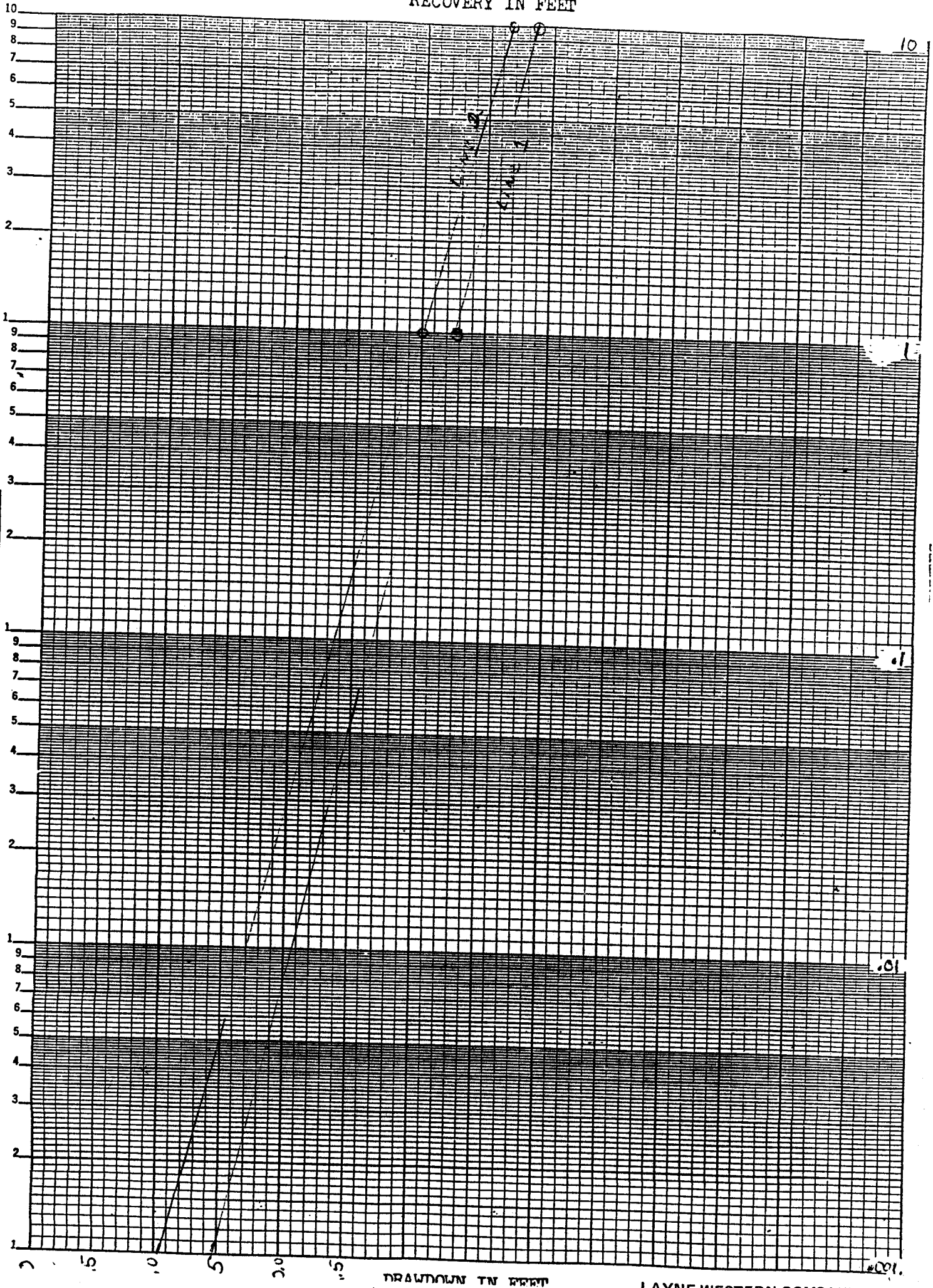
Obviously, none of the assumptions were actually met and flow from fracture zones most probably affect the results of the tests. However, the methods of the test are recognized procedures and should be sufficient to demonstrate the productivity of the aquifer.

Attachment Index

- Attachment 1 - Time vs drawdown plot
- Attachment 2 - Extension of Line to obtain to
- Attachment 3 - Extension of Line to obtain to
- Attachment 4 - Calculation sheet

RECOVERY IN FEET

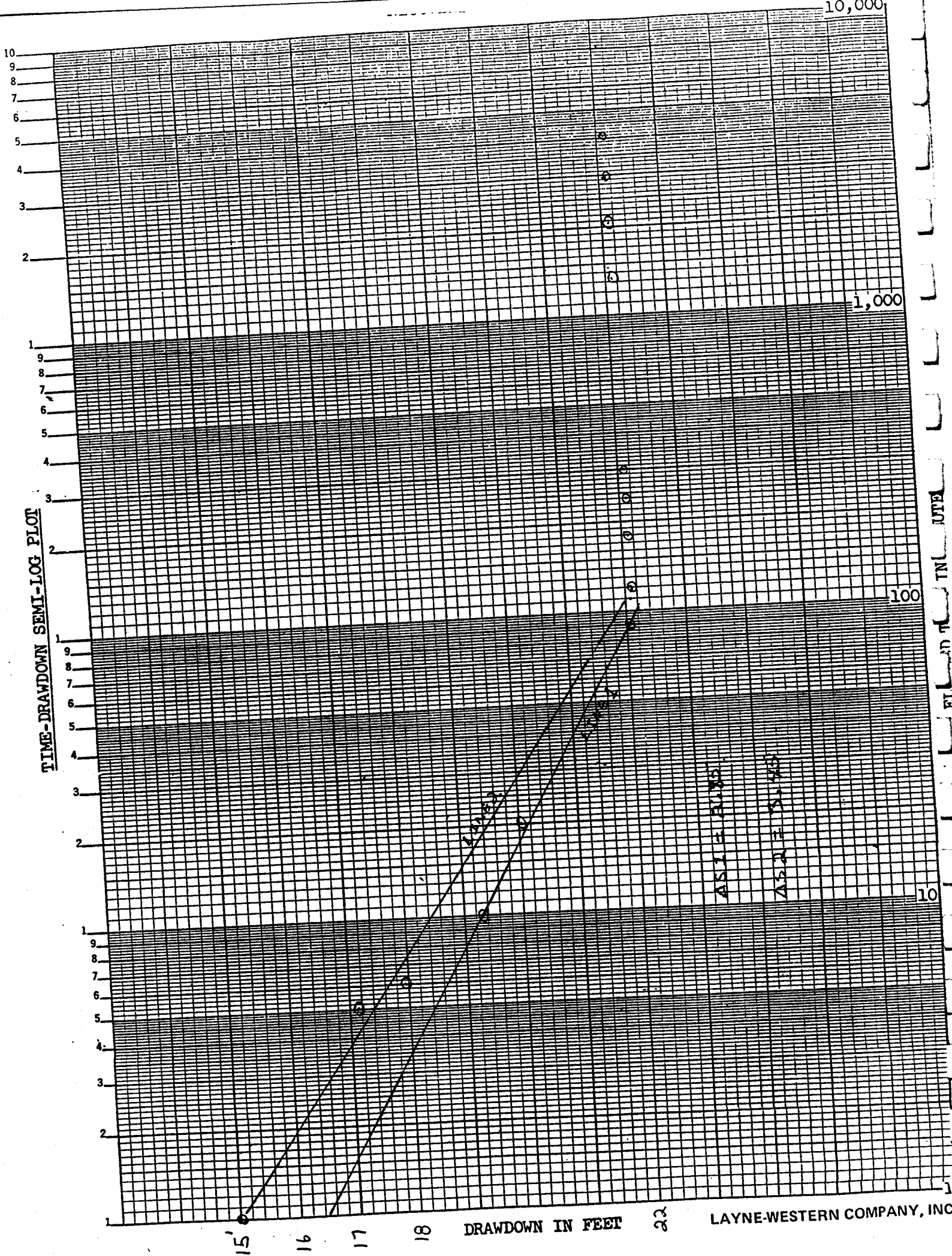
TIME-DRAWDOWN SEMI-LOG PLOT



DRAWDOWN IN FEET

LAYNE-WESTERN COMPANY, INC.

TIME-DRAWDOWN SEMI-LOG PLOT



AS1 = 3.14

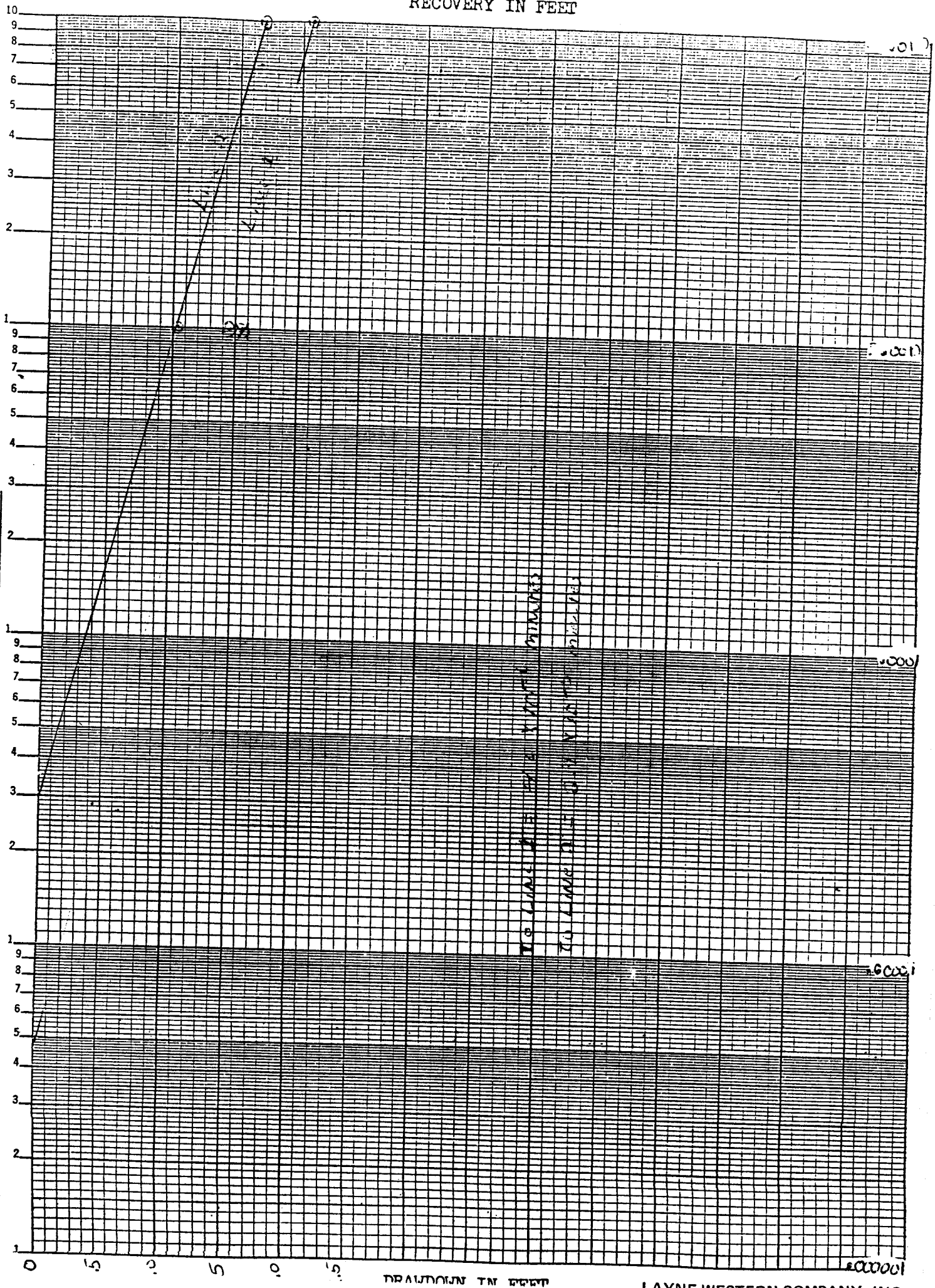
AS2 = 5.43

DRAWDOWN IN FEET

LAYNE-WESTERN COMPANY, INC

RECOVERY IN FEET

TIME-DRAWDOWN SEMI-LOG PLOT



AES AT SEMINOLE KRAFT

ATTACHMENT #4

Calculation Sheet

Line 1 Calculations are noted by 1 subscript

Line 2 Calculations are noted by 2 subscript

T = Transmissivity Coefficient (GPD/FT)

s = Drawdown (FT)

S = Storage Coefficient (dimensionless)

r = Radius of well (FT)

To = Zero drawdown intercept (days)

Q = pumping rate (G.P.M.)

$$T_1 = \frac{264 Q}{s} = \frac{264 (4500)}{2.85} = 416842 \text{ GPD/FT}$$

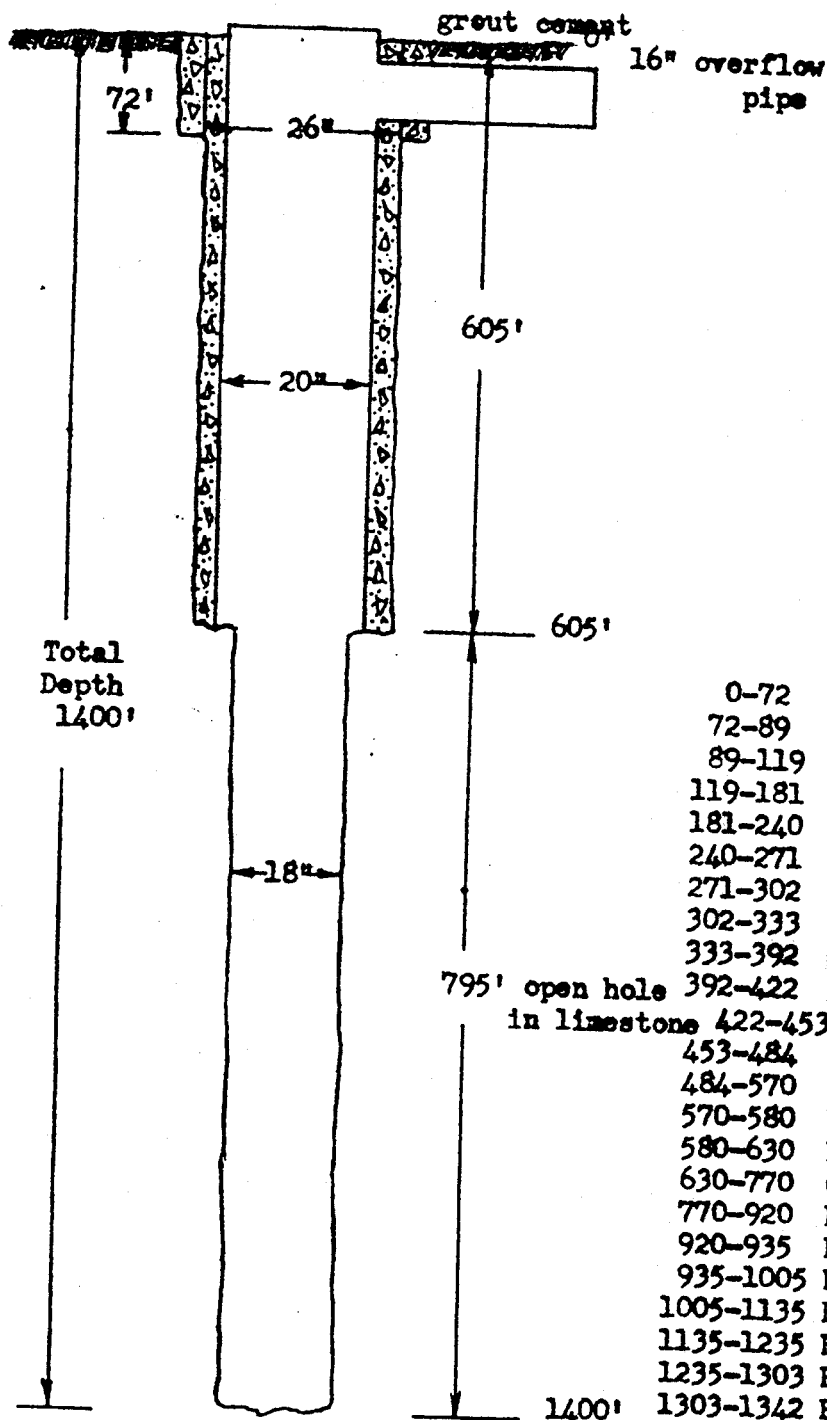
$$T_2 = \frac{264 Q}{s} = \frac{264 (4500)}{3.45} = 344348 \text{ GPD/FT}$$

$$S_1 = \frac{.3 T_1 t_{o1}}{r^2} = \frac{.3(416842) (3.0 \times 10^{-9})}{(.833)^2} = .000576$$

$$S_2 = \frac{.3 T_2 t_{o2}}{r^2} = \frac{.3(344348) (2 \times 10^{-8})}{(.833)^2} = .00143$$

WELL NO. 7

WELL DIAGRAM



WELL DATA

Total depth of well 1400'
 Casing 72' of 26" pit casing
 605' of 20" steel casing
 Cement 350 bags pumped around casing

PUMPING DATA

Static water level
 Pumping level
 Drawdown
 Production 7600 gpm flowing

PUMP# 33693

FORMATION DATA

0-72 Yellow sand
 72-89 White sand, shell rock
 89-119 Limestone, streaks blue clay
 119-181 Blue clay streaks limestone
 181-240 Blue clay with streaks sand
 240-271 Fine pepper sand
 271-302 Fine sand, soft
 302-333 Fine sand streaks blue clay
 333-392 Blue sandy clay and rock
 392-422 Blue and white clay with sand
 422-453 Blue clay and sand
 453-484 Blue clay and rock, hard
 484-570 Blue clay and limestone
 570-580 Limestone, soft
 580-630 Limestone, hard
 630-770 Gray limestone
 770-920 Brown limestone, soft
 920-935 Br. limestone, med. hard
 935-1005 Br. limestone, hard
 1005-1135 Br. limestone, soft
 1135-1235 Br. limestone, hard and soft
 1235-1303 Br. limestone streaks sandstone
 1303-1342 Br. and white limestone
 1342-1355 Br. limestone streaks sandstone
 1355-1387 Br. limestone, hard and soft
 1387-1400 Br. limestone, very hard drill

CHKD. BY _____ DATE _____

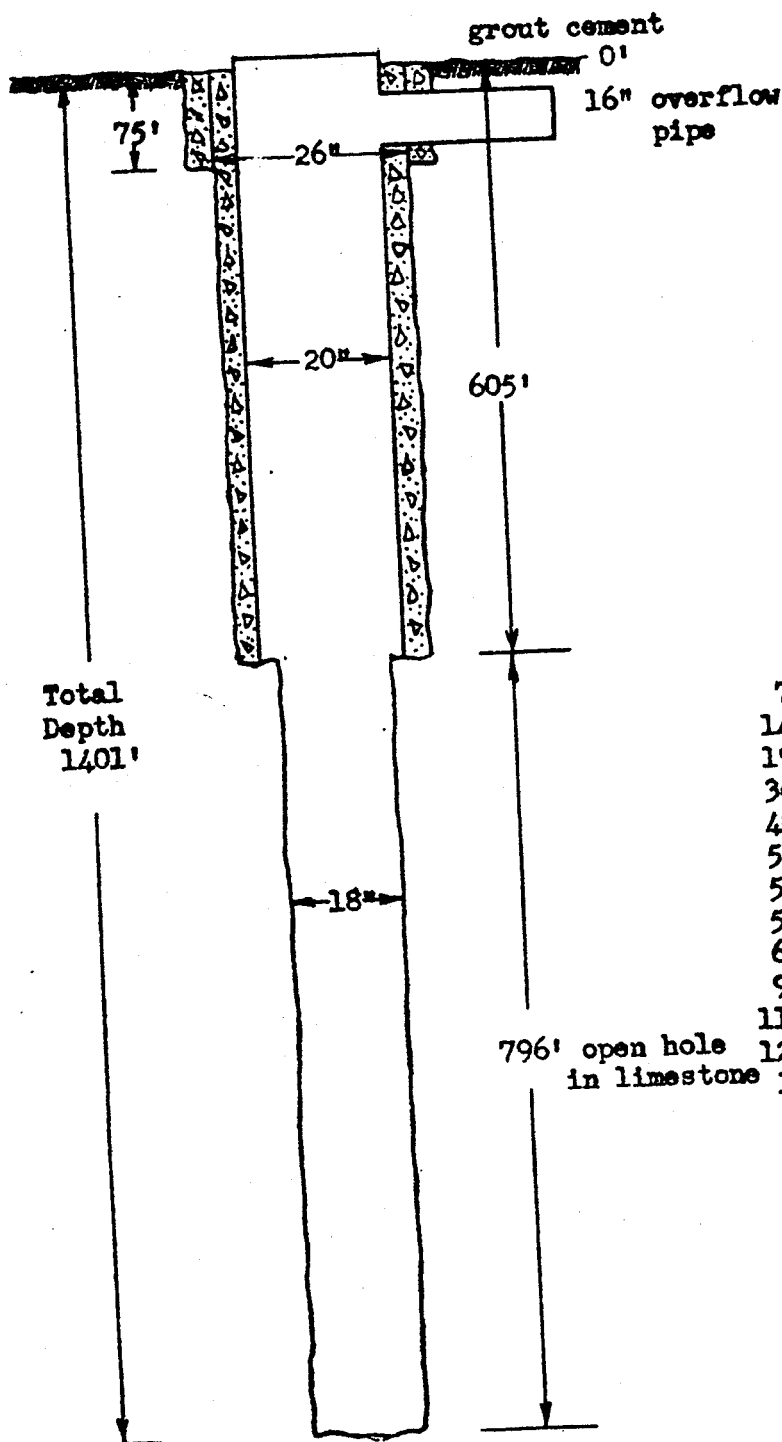
COMPANY JACKSONVILLE, FLORIDA
BY: LAYNE ATLANTIC CO.

JOB NO. 963
JULY 3, 1956

WELL NO. 9

WELL DIAGRAM

WELL DATA



Total depth of well 1401'
Casing 75' of 26" pit casing
605' of 20" steel casing
Cement 400 bags pumped around casing

PUMPING DATA

Static water level
Pumping level
Drawdown
Production 7600 gpm flowing

PUMP# 33695

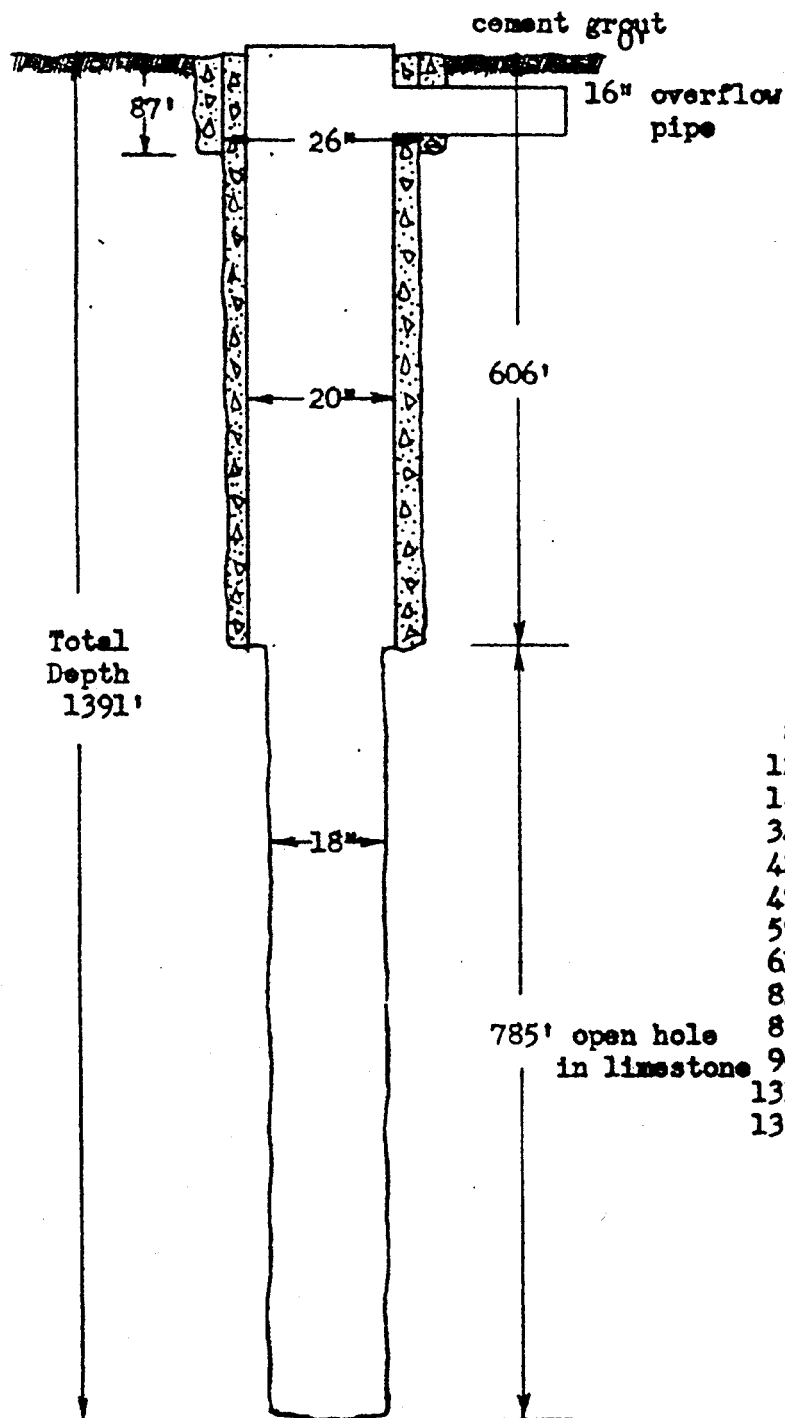
FORMATION DATA

0-75 Sand
75-145 Limestone, streaks blue clay
145-190 Blue clay streaks limestone
190-364 Blue clay streaks sand
364-408 Blue clay, soft
408-528 Blue clay, sand and shell
528-558 Sand and shell, med.
558-579 Sand and streaks limestone
579-614 Limestone, med.
614-947 White limestone, hard and
947-1187 Br. limestone, med. hard
1187-1288 Br. limestone streaks white
1288-1340 Br. limestone, hard
1340-1401 Br. limestone and flint &
drilled very hard

WELL NO. 4

WELL DIAGRAM

WELL DATA



Total depth of well 1391'
 Casing 606' of 20" steel casin
 87' of 26" pit casing
 Cement 400 bags pumped around casing

PUMPING DATA

Static water level
 Pumping level
 Drawdown
 Production 4600 gpm flowing

PUMP# 34172

FORMATION DATA

| | |
|-----------|--|
| 0-87 | Sand |
| 87-128 | White limestone |
| 128-189 | Limestone and clay |
| 189-342 | Blue clay, soft and med. |
| 342-420 | Blue sandy clay and rock |
| 420-490 | Blue clay and rock, hard |
| 490-595 | Blue clay and limestone |
| 595-617 | White limestone, med. |
| 617-828 | Limestone, med. and hard |
| 828-887 | Br. limestone, soft and med. |
| 887-960 | White limestone, med. |
| 960-1310 | Br. limestone, med. drill |
| 1310-1330 | Br. limestone, very hard d |
| 1330-1391 | Br. limestone and flint ro drill very hard |

WELL WATER ANALYSIS # 8 WELL

| <u>DEPTH IN FEET</u> | <u>SILICA PPM</u> | <u>CL PPM</u> | <u>TOT. HARD. PPM</u> | <u>SO₄ PPM</u> |
|----------------------|-------------------|---------------|-----------------------|---------------------------|
| 650 | 31.0 | 20.6 | 264 | 84.3 |
| 700 | 32 | 20.6 | 264 | 86.2 |
| 750 | 32 | 20.6 | 266 | 89.2 |
| 800 | 33 | 21.2 | 658 | 95.4 |
| 850 | 32.5 | 20.6 | 280 | 104.9 |
| 900 | 30.0 | 20.6 | 272 | 82.3 |
| 950 | 31.0 | 17 | 274 | 80.5 |
| 1000 | 30 | 19.4 | 268 | 82.3 |
| 1050 | 30 | 21.8 | 300 | 67.7 |
| 1100 | 18 | 19.4 | 296 | 73.7 |
| 1150 | 17 | 17.0 | 520 | 70.4 |
| 1200 | | | | |
| 1250 | 20.5 | 21.9 | 276 | 57.8 |
| 1300 | 33 | 22 | 278 | 69.3 |
| 1350 | 32.0 | 28 | 272 | 81.5 |
| 1400 | | | | |

WELL WATER ANALYSIS 6/6/56

| <u>DATE</u> | <u>WELL</u> | <u>MG PPM</u> | <u>SILICA PPM</u> | <u>CL PPM</u> | <u>TOT. HARD PPM</u> | <u>PH</u> | <u>SO₄ PPM</u> | <u>CA PPM</u> |
|-------------|-------------|---------------|-------------------|---------------|----------------------|-----------|---------------------------|---------------|
| 4/24 | 7 | | | 25.5 | 272 | | 74 | |
| 4/24 | 5 | | | 23.0 | 262 | | 78 | |
| 4/25 | 7 | | | 34 | 274 | | 57 | |
| 4/26 | 7 | | | 49 | 276 | | 40 | |
| 4/26 | 7 | | | 31 | 278 | | 47 | 51 |
| 4/30 | 7 | 34 | | 29 | 270 | | 86 | 52 |
| 5/1 | 7 | 32.3 | | 31 | 258 | 7.6 | 84 | 50 |
| 5/2 | 7 | 34 | | 31 | 268 | 7.6 | 82 | 51 |
| 5/3 | 7 | 31 | | 38 | 256 | 7.5 | 64 | 51 |
| 5/4 | 7 | 30 | | 25 | 254 | | 69 | 52 |
| 5/8 | 7 | 30 | | -- | 248 | 7.6 | 79 | 50 |
| 5/9 | 7 | 35 | | 26 | 282 | | 77 | 56 |
| 5/10 | 7 | | | 29 | 286 | | 78 | |
| 5/11 | 7 | | | 28 | 278 | | 58 | 50 |
| 5/14 | 7 | | | 30 | 284 | | 58 | 50 |
| 5/15 | 7 | | | 30 | 254 | | 73 | |
| 5/17 | 7 | | 32 | 22 | 278 | | 102 | |
| 5/18 | 7 | | 32.5 | 19.4 | 284 | | 86.4 | |
| 5/21 | 7 | | 26.5 | 27.3 | 266 | | 80.2 | |
| 5/22 | 7 | | 21.5 | 26.1 | 286 | | 82.7 | |

WELL WATER ANALYSIS AT INDICATED DEPTHS #8 Well

| <u>DEPTH IN FEET</u> | <u>CL</u> | <u>SiO₂</u> | <u>TOT. HARDNESS</u> | <u>SO₄</u> |
|----------------------|-----------|------------------------|----------------------|-----------------------|
| 698 | 26.7 | 31.5 | 274 | 89.7 |
| 788 | 26.7 | 30.5 | 292 | 86.4 |
| 878 | 25.5 | 33.0 | 284 | 95.0 |
| 968 | 26.7 | 32.5 | 274 | 82.3 |
| 1058 | 27.9 | 33.0 | 272 | 87.2 |
| 1148 | 26.7 | 33.0 | 290 | 86.9 |
| 1238 | 27.9 | 27.0 | 284 | 85.6 |
| 1348 | 27.9 | 33.0 | 280 | 85.6 |

PUMPING TEST ON NO. 3 WELL

St. Regis Paper Co.

February 3, 1956

PUMPING RATE

PUMPING LEVEL

2600 G.P.M.

6.5 feet

3300 G.P.M.

16 "

4000 G.P.M.

24 "

4650 G.P.M.

36 "

5900 G.P.M.

58 "

WELL ANALYSIS #9 WELL

DEPTHS AS INDICATED

7/9/56

| DEPTH | CL. | SO ₄ | SiO ₂ | TOT. HARD. | CA. | Mg | PH. |
|-------|------|-----------------|------------------|------------|-----|-------|------|
| 700' | 26 | 71.8 | 32.5 | 300 | 49 | 43.1 | 8.3 |
| 750' | 25.4 | 75.9 | 29.0 | 260 | 48 | 34.0 | 8.35 |
| 800' | 24.8 | 81.5 | 30.5 | 286 | 50 | 39.1 | 8.38 |
| 850' | 24.8 | 73.4 | 30.0 | 580 | 49 | 111.1 | 8.20 |
| 900' | 26.7 | 76.9 | 28.0 | 280 | 48 | 38.9 | 8.32 |
| 950' | 25.4 | 78.2 | 28.0 | 292 | 49 | 41.2 | 8.38 |
| 1000' | 21.2 | 175.6 | 28.5 | 286 | 49 | 39.7 | 8.31 |
| 1050' | 22.4 | 165.2 | 28.0 | 280 | 50 | 37.7 | 8.28 |
| 1100' | 23.0 | 174.2 | 26.0 | 280 | 49 | 38.2 | 8.30 |
| 1150' | 23.0 | 165.4 | 32.0 | 276 | 51 | 36.1 | 8.35 |
| 1200' | 23.0 | 153.0 | 28.5 | 276 | 50 | 36.7 | 8.30 |
| 1250' | 22.8 | 154.3 | 27.5 | 280 | 48 | 38.9 | 8.41 |
| 1300' | | | | | | | |
| 1350' | | | | | | | |
| 1400' | 32.2 | 158.6 | 32.5 | 276 | 57 | 32.4 | 8.5 |

ALL VALUES IN P P M EXCEPT PH

NOTE: NO SAMPLES PICKED UP AT 1300' AND 1350' DEPTH

CHKD. BY

DATE

St. Regis-Florida Pulp and Paper Corp. JOB NO.
Eastport, Florida

CENTER

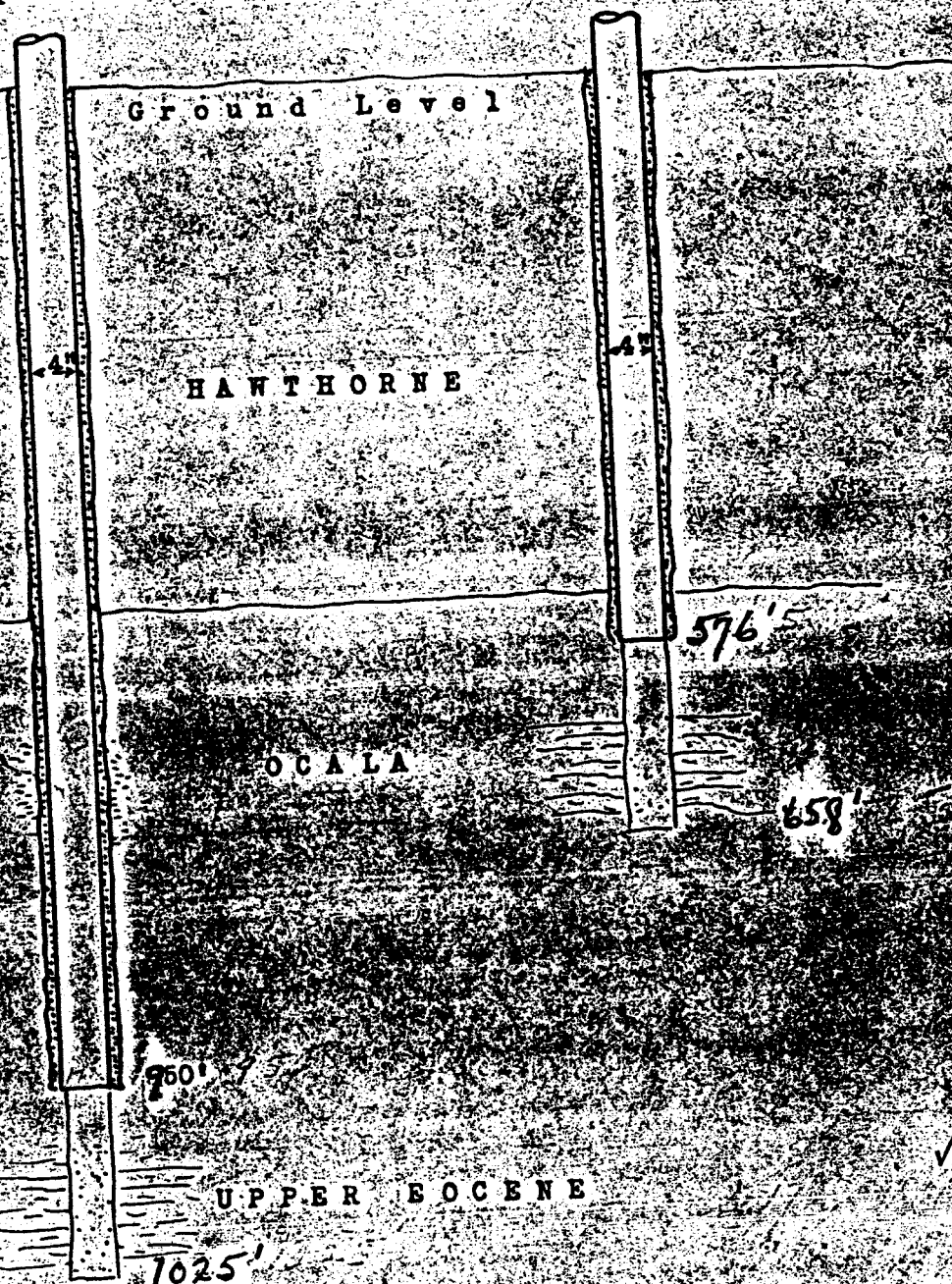
Well No. 2 sealed
into Upper Eocene only. 168 p.p.m.

HARDNESS

WEST

Well No. 1 sealed
into Ocala only. 240 p.p.m.

HARDNESS 240 p.p.m.



(All vertical dimensions
are estimates, location
and extent of principle
aquifers will be determined
by cores and test.)

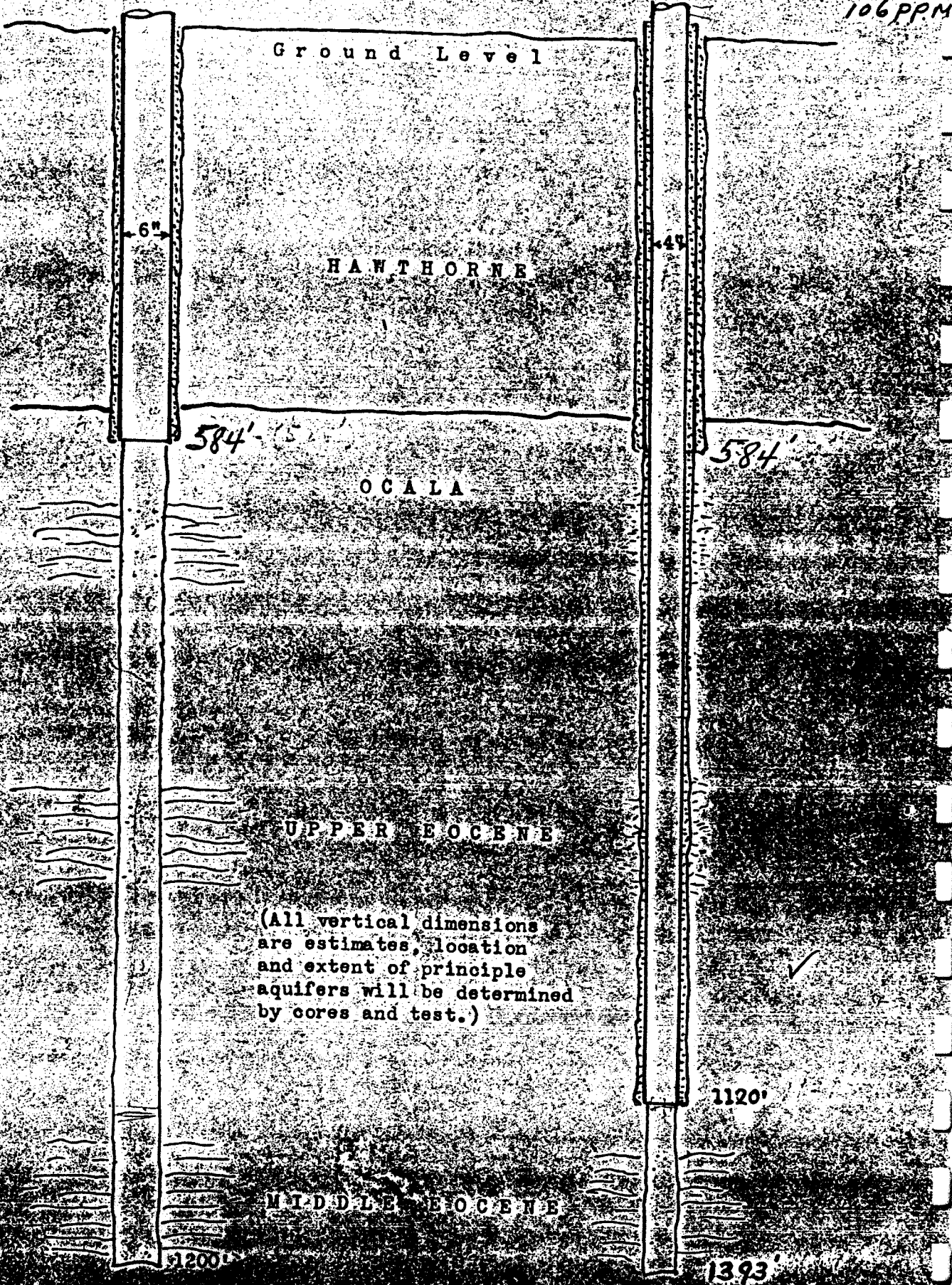
Eastport, Florida

First stage to recover cores,
record flow between aquifers,
electric log for resistivity.

EAST

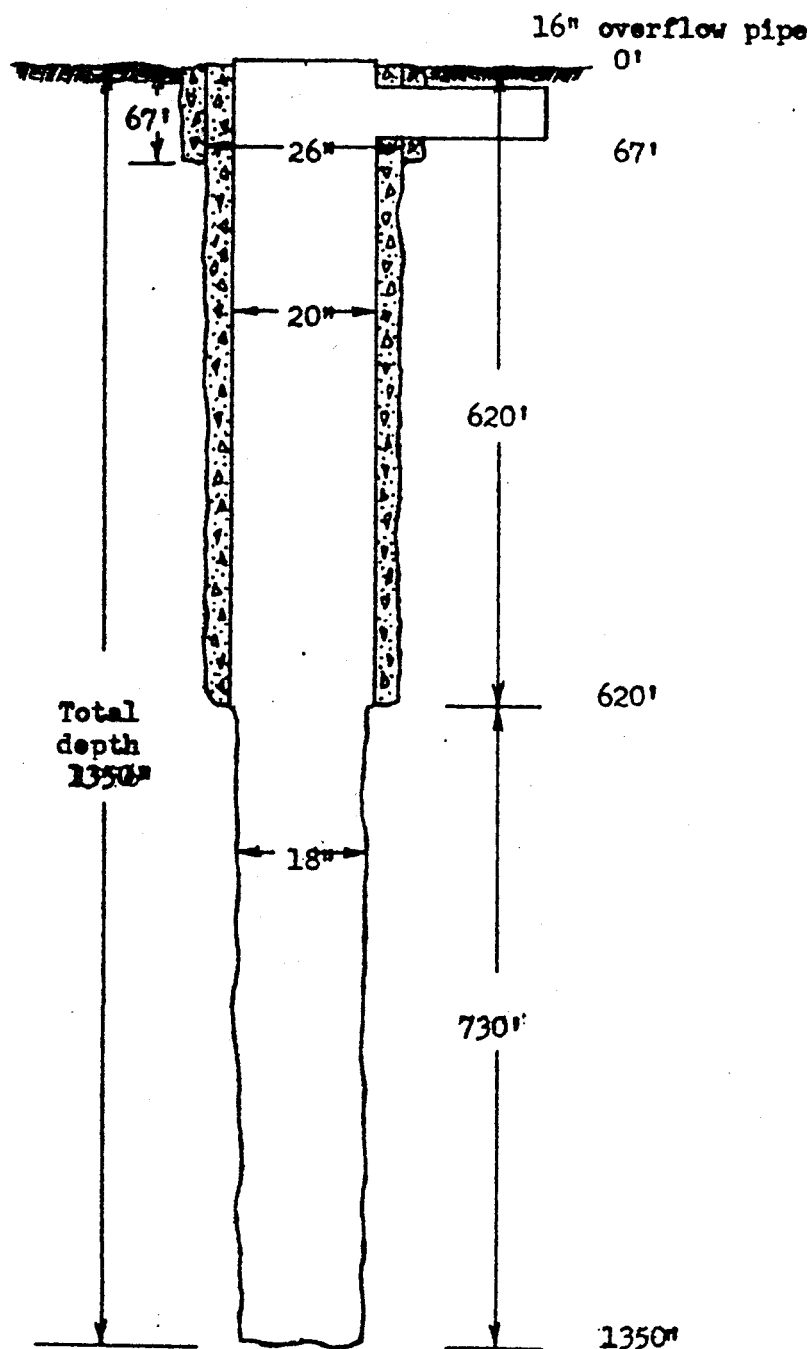
Completed No. 3 observation
Well connected to middle
Eocene only.

*HARDNESS
106 PPM.*



WELL No. 5

WELL DIAGRAM



WELL DATA

Total depth of well 1350'
Casing 67' of 26" pit casing
620' of 20" steel casing
Cement 400 bags pumped around casing

PUMPING DATA

Static water level flowing 2000 gpm
Pumping level 22.5' lost.
Drawdown 22.5'
Production 7500 gpm (app.)

PUMP# 33692

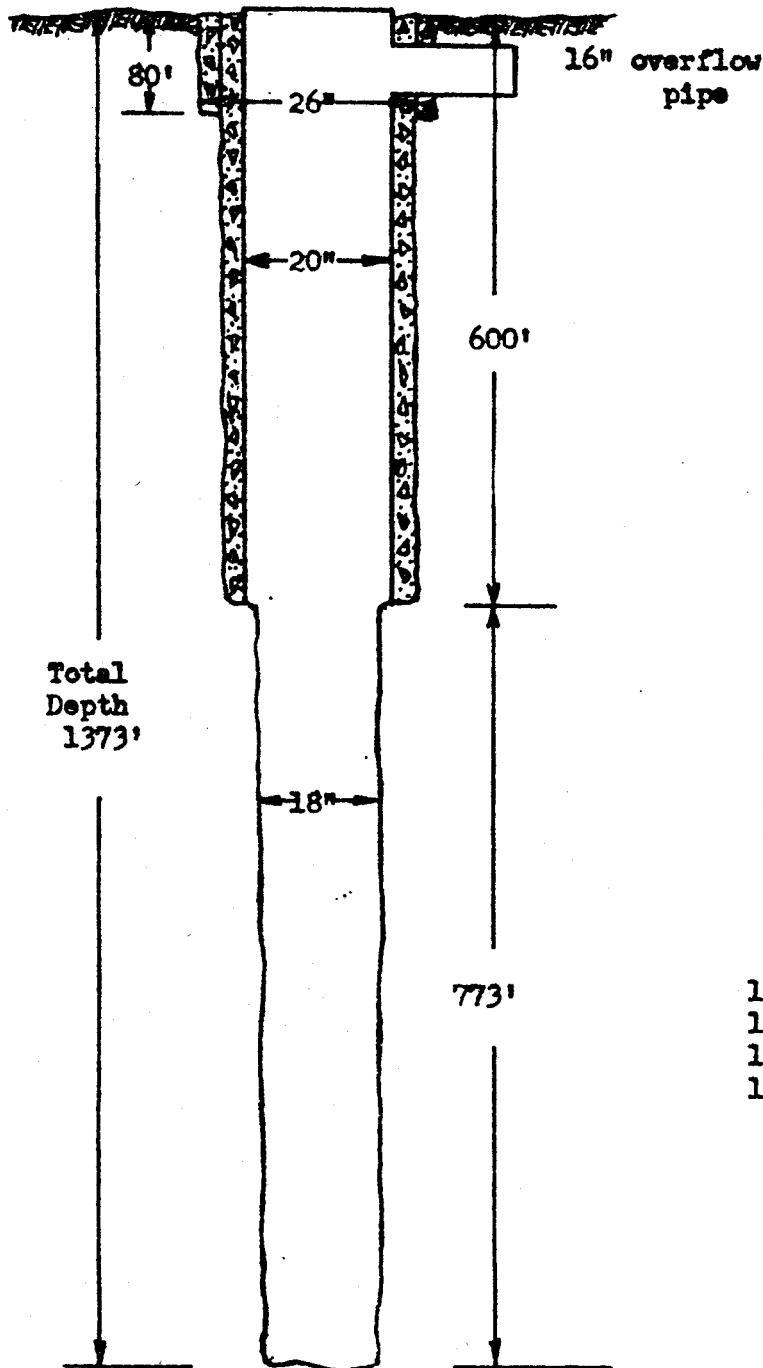
FORMATION DATA

0-67 Sand
67-145 Brown limestone, hard & soft
145-230 Fine sand
230-305 Sandy gray and white clay
305-338 Gray and white clay
338-368 Blue clay
368-400 Sandy clay
400-418 Sandy clay
418-430 Blue clay and rock
430-461 Sand and limestone
461-532 Blue sandy clay
532-584 Sandy clay, limestone
584-608 Limestone and blue clay
608-630 Limestone, white
630-666 White limestone, soft
666-690 White limestone, med.
690-880 White limestone
880-978 Gray limestone
978-1256 Brown limestone, hard and soft streaks.
1256-1350 White limestone and flint rock, drilled very hard

WELL NO. 8

WELL DIAGRAM

WELL DATA



Total depth of well 1373'
 Casing 80' of 26" pit casing
 600' of 20" steel casing
 Cement 350 bags pumped around casing

PUMPING DATA

Static water level
 Pumping level
 Drawdown
 Production

PUMP# 33694

FORMATION DATA

0-80 Sand
 80-100 White sand, soft
 100-180 Grey limestone, hard soft
 180-210 Clay streaks limestone
 210-300 Blue clay and sand
 300-360 Blue clay and shell, hard
 360-520 Blue clay and sand
 520-590 Blue and white clay, limestone
 590-1054 Limestone, med. hard
 1054-1268 Br. limestone, hard and s
 1268-1282 Br. limestone, hard
 1283-1293 Limestone and flint rock
 1293-1373 Brown limestone and flint rock, drilled very hard

BLACK & VEATCH

ENGINEERS - ARCHITECTS

TEL. (913) 339-2000

8400 WARD PARKWAY
MAILING ADDRESS: P.O. BOX 8405
KANSAS CITY, MISSOURI 64114

AES Cedar Bay, Inc.
Cedar Bay Cogeneration Project
Location of Underground Storage Tanks

B&V Project 14573.230
B&V File 14.0600
January 11, 1990

Bio-Environmental Services Division
Dept of Health, Welfare & Bio-Environmental Services
421 West Church Street
Jacksonville, Florida 32202

RECEIVED

JAN 17 1990

Attention: Mr. Richard Robinson

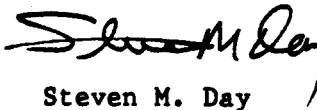
DER-BAQM

Gentlemen:

Enclosed is the site arrangement map showing the locations of the underground storage tanks from the G. Warren Leve, Inc. report of November 12, 1987. Site 2 (as numbered in the G. Warren Leve, Inc. report of November 12, 1987) is outside the estimated maximum radius of influence using very conservative assumptions to calculate this radius of influence. The enclosed memorandum from L. J. Almaleh to me dated January 11, 1990 describes the two calculation assumptions which make the estimated radius of influence conservatively large.

Very truly yours,

BLACK & VEATCH


Steven M. Day

jd
Enclosure

cc: Julie Blunden, w/enclosure
Terry Cole, w/enclosure
Buck Oven, w/enclosure
R. S. Pace, w/o
Richard Maguire, w/o

Black & Veatch

RECEIVED

JAN 11 1990

MEMORANDUM

Applied Energy Services, Inc.
Cedar Bay Cogeneration Plant
BESD Dewatering Comments

BLACK & VEATCH

B&V Project 14573
B&V File 32.0401
January 11, 1990

To: S. M. Day

From: L. J. Almaleh

for SA

This memorandum provides a response to the request by Mr. Rich Robinson of BESD concerning the effects of the dewatering of railcar unloading structure on underground tank site 2.

The enclosed drawing shows the location of the underground storage tanks from the G. Warren Leve, Inc., report of November 12, 1987. The estimated maximum radius of influence for the railcar dewatering does not reach the location of site 2. This radius is conservative due to the following assumptions.

1. The radius is calculated for a uniform homogeneous soil with no adjacent water sources. The close proximity of the Broward River will reduce the radius of influence. The estimated dewatering flows were calculated assuming the close proximity of the Broward River.
2. The permeability used for the calculations is the highest value found during onsite investigations. The maximum permeability value of 0.0149 ft/min. is twice the average value of 0.007 ft/min. Using the average coefficient of permeability would reduce the calculated radius of influence by approximately 30 percent to 900 feet.

dh

cc: File

AN OVERVIEW OF

AES JACKSONVILLE

COGENERATION FACILITY

FEBRUARY 1988

OVERVIEW

- AES has been developing a cogeneration facility on an existing industrial site in Jacksonville, Florida
 - Steam will be sold to the Seminole Kraft paper mill that was refurbished by Stone Container Corporation in the fall of 1986 and restarted in February 1987, and
 - 225 MW of electricity will be wheeled through Jacksonville Electric Authority (JEA) and sold to Florida Power and Light
- The new power facility, valued at approximately \$400 million, will consist of the following:
 - one new low-odor recovery boiler and an associated turbine, and
 - three new circulating fluidized bed (CFB) boilers and associated turbine
- The project will replace older, less efficient equipment, improving Seminole Kraft's competitive position and reducing odor emissions.
- Bark and coal will be fired in the CFB boilers to generate steam
- This document provides information about the planned cogeneration facility and AES.

ATTRACTIVE FEATURES OF THE PROJECT

Economic

- Provides attractively priced electricity to Florida ratepayers under a stable rate structure
- Steam at below-market prices improves Seminole Kraft's competitive position, thus improving employment stability.
- \$400 million cogeneration project provides up to 660 construction jobs and 95 new permanent jobs at the AES plant;
- Facility increases the tax base in the City of Jacksonville, resulting in expanded tax revenues.
- Supports diversification of industrial mix in Jacksonville

Energy

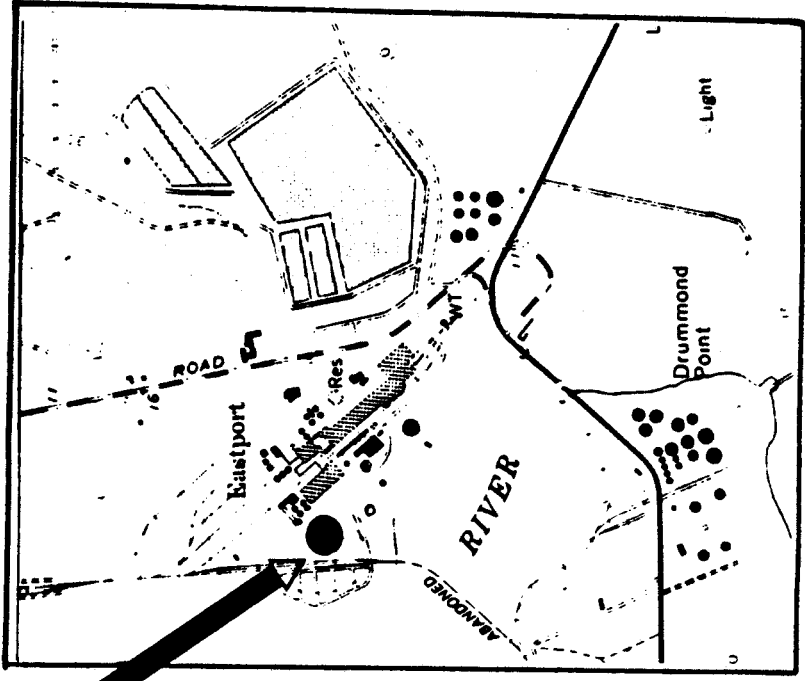
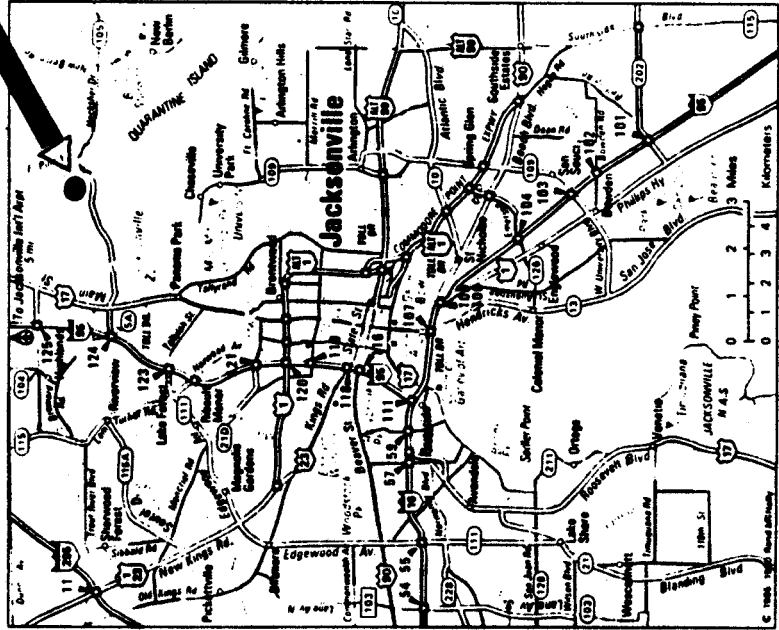
- Facility displaces oil use at the Seminole Kraft mill
- Coal abundantly available and not dependent on foreign suppliers
- Adds needed electric generating capacity in Florida for mid 1990's and beyond
- Consistent with State energy policy that favors coal in new generating facilities

Environmental

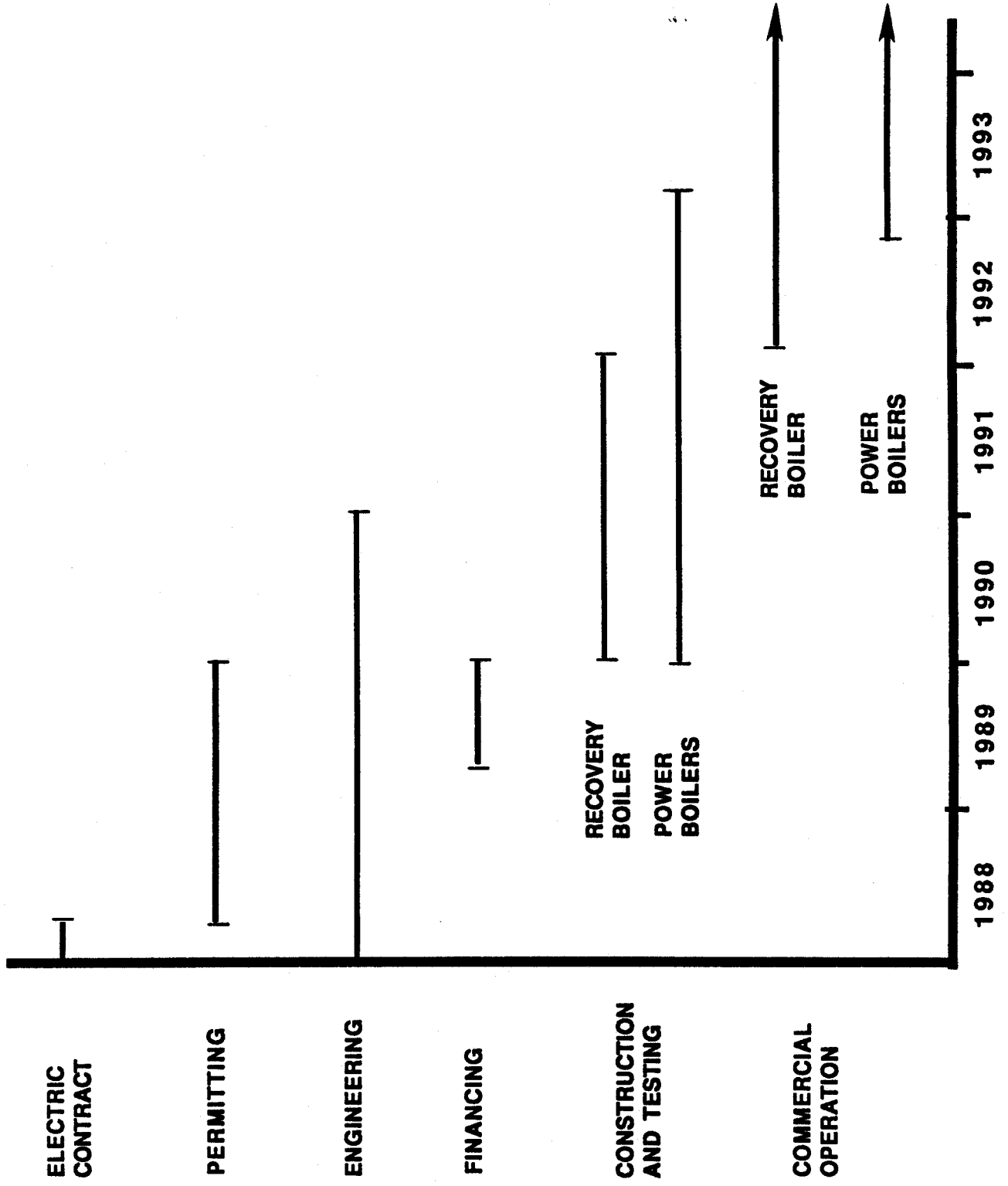
- Located on an existing industrial site
- New recovery boiler reduces odor and particulate emissions from the mill
- Offsets emissions from oil-fired boilers at Seminole Kraft mill
- Allows coal to be used with minimal air pollution through application of new technology (i.e., circulating fluidized bed boilers)

AES JACKSONVILLE LOCATION

- The plant will be located on the site of the Seminole Kraft paper mill on Eastport Road



PROJECT SCHEDULE



NEXT STEPS

- Signing of power supply contract with Florida Power and Light (FP&L) expected in the next several weeks
- Initiating site certification and permitting effort; looking forward to working closely with appropriate agencies to facilitate the permitting process
- Engineering, Fuel Procurement, Steam and Wheeling Contract development efforts are underway
- AES looks forward to developing a plant adjacent to Stone Container in Jacksonville as we did in Connecticut (see enclosed press release)
- Questions regarding AES Jacksonville can be directed to Jeffrey V. Swain, Project Director, AES Jacksonville at (703-522-1315)

AES OFFICERS AND DIRECTORS

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Retired Chairman of the Board and Chief Executive Officer of Arabian American Oil Company (ARAMCO).

Frank Gunsalus Professor of Engineering at Illinois Institute of Technology and Former President of the Gas Research Institute.

Former Senior Vice President of Gulf Oil Corporation, and former President of General Atomic Company and General Atomic International.

Chairman/CEO of AES, Former Assistant Administrator for Energy Conservation and Environment at the Federal Energy Administration.

President and Chief Executive Officer of World Wildlife Fund, U.S. and former Administrator, Environmental Protection Agency.

Managing Director of the Investment Banking Division of Shearson Lehman Brothers, Inc.

Founder of Waterman & Company, former director of McKinsey & co-author of the bestseller In Search of Excellence, and author of The Renewal Factor published in September 1987.

Chairman and Chief Executive Officer

President and Chief Operating Officer

Executive Vice President

Senior Vice President for Business Development

Vice President for Design and Construction

Vice President for New Ventures

Vice President for Planning

Vice President and Chief Financial Officer

Vice President for Project Development

APPLIED ENERGY SERVICES, INC.

AES EXPERIENCE

| <u>AES FACILITY/
LOCATION</u> | <u>CUSTOMERS</u> | <u>COST
Million
\$</u> | <u>FUEL</u> | <u>STEAM
(#/HR)</u> | <u>POWER
(MW)</u> | <u>CONT.
START</u> | <u>ON
LINE</u> |
|--|--|--------------------------------|-------------|-------------------------|-----------------------|------------------------|--------------------|
| Deepwater
Houston, Texas | Texas Utilities
Lyondell
Petrochemical | 280 | Petcoke | 30,000 | 139 | December
1983 | June
1986 |
| Beaver Valley
Monaca, Pennsylvania | West Penn Power
Arco Chemical | 116 | Coal | 145,000 | 118 | September
1985 | July
1987 |
| Placerita
Newhall, California | Southern California
Edison, TOSCO | 120 | Gas | 250,000 | 99 | July
1986 | July
1987 |
| Thames
Montville, Connecticut | Northeast Utilities
Stone Container | 250 | Coal | 65,000 | 180 | December
1986 | November
1989 |
| Shady Point
Poteau, Oklahoma | Oklahoma G&E
AES CO ₂ Plant | 475 | Coal | 100,000 | 320 | June
1987 | January
1991 |
| Riverside
Woonsocket,
Rhode Island | New England Electric
Boston Edison
Eastern Utilities
Associates | 260 | Coal | 50,000 | 180 | 1989 | 1991 |
| Barbers Point
Oahu, Hawaii | Hawaiian Electric
Chevron* | 250 | Coal | 30,000 | 146 | 1989 | 1992 |
| Petrolia
Petrolia, Pennsylvania | West Penn
Power | 280 | Coal | 30,000 | 180 | 1992 | 1995 |
| Ballinger Creek
Frederick, Maryland | Potomac Electric* | 270 | Coal | 30,000 | 180 | 1990 | 1993 |
| Jacksonville | Florida Power & Light
Stone Container* | 400 | Coal | 600,000 | 225 | 1990 | 1993 |
| TOTAL | | <u>\$2701 Million</u> | | <u>1,330,000 lb/hr</u> | <u>1767 MW</u> | | |

* Letter of Intent agreements signed

This announcement appears as a matter of record only.

Non-Recourse Project Financing for a 180 Megawatt Cogeneration Facility

\$250,000,000

AS Thames Inc.

a wholly-owned subsidiary of

Applied Energy Services, Inc.

Senior Debt Provided by:

Agent

The Fuji Bank, Limited
New York Branch

Lead Managers

The Fuji Bank, Limited
New York Branch

Bank of New England N.A.

The Bank of Nova Scotia

The Nippon Credit Bank, Limited
New York Branch

Westpac Banking Corporation

Participants

The Chuo Trust & Banking Co., Limited
New York Agency

The Daiwa Bank, Limited
New York Branch

The Hokkaido Takushoku Bank, Limited
New York Branch

The Saitama Bank, Ltd.
New York Branch

The Tokai Bank, Limited
New York Branch

Subordinated Debt Provided by:

Marubeni America Corporation

Combustion Engineering, Inc.

CSX Transportation, Inc.

Toshiba International Corporation

The undersigned acted as financial advisor to Applied Energy Services, Inc.

Salomon Brothers Inc

One New York Plaza, New York, New York 10004
Atlanta, Boston, Chicago, Dallas, Los Angeles, San Francisco, Zurich.
Affiliates: Frankfurt, London, Tokyo.
Member of Major Securities and Commodities Exchanges.

Contact: Mr. Robert F. Hemphill, Jr.
703/522-1315
November 26, 1986

For Immediate Release

AES AWARDS \$180 MILLION POWER PLANT CONSTRUCTION
CONTRACT TO JAPANESE-AMERICAN JOINT VENTURE.
\$250 MILLION PROJECT FINANCING COMPLETE.

ARLINGTON, VA, November, 1986: Applied Energy Services, Inc. (AES) announced today that it has awarded a \$180 million contract to a joint venture of Marubeni, Toshiba and Pritchard to construct its AES Thames Cogeneration plant in Montville, Connecticut. "We are pleased not only because the Thames plant is our largest project to date but because it incorporates many advanced features to minimize impact on the environment," stated Roger Sant, President and CEO of AES.

The project will cost \$250 million and is being financed by a syndicate of banks led by Fuji Bank, Ltd. as Agent. Other participating banks include the Bank of New England, N.A., the Nippon Credit Bank, Ltd., the Bank of Nova Scotia, the Westpac Banking Corporation, the Chuo Trust & Banking Co., Ltd., the Daiwa Bank, Ltd., the Hokkaido Takushoku Bank, Ltd., and the Saitama Bank, Ltd. Salomon Brothers Inc. is serving as Financial Advisor for AES. AES Executive Vice President Dennis W. Bakke praised the leadership of Fuji and the cooperation of the bank group. "Additionally, the subordinated lenders including Marubeni America Corporation, Combustion Engineering Corporation, CSX Transportation and Toshiba International were also critical to a timely and successful financing."

The plant, which is being engineered by Black and Veatch of Kansas City, Missouri, consists of two Combustion Engineering circulating fluidized bed boilers and a Toshiba steam turbine-generator. The plant is scheduled to begin operation in mid-1989. It is expected to produce 180 megawatts of electricity (sufficient to supply 36,000 homes) for sale to Connecticut Light & Power on a 25-year contract, and 60,000 pounds an hour of steam to be sold to a

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AES is a privately held company formed in 1981. The company is an independent supplier of steam and electricity and was recently designated the twelfth fastest growing private company in the United States by INC. Magazine. It operates a 140 megawatt petroleum coke fired cogeneration plant in Houston, Texas, is refurbishing a 120 megawatt coal fired cogeneration plant near Pittsburgh, Pennsylvania and is constructing a 100 megawatt natural gas-fired cogeneration plant near Los Angeles, California. In addition, AES is developing several other power plants around the country.

AES Meeting @ Seminole Kraft 7/28/88

| <u>Name</u> | <u>Company/Affiliation</u> | <u>Phone</u> |
|--------------------|----------------------------|----------------|
| Michael I Riddle | Seminole Kraft | 904/751-6400 |
| Larry Alfred | Black & Veatch | 913-339-2325 |
| GEORGE R. SAVAGE | BLACK & VEATCH | 913-339-2881 |
| WAYNE E. TUTT | JACKSONVILLE BESD | (904) 630-3666 |
| RONALD L. ROBERSON | JACKSONVILLE BESD | 904-630-3666 |
| STEVEN M. DAY | Black & Veatch | 913-339-2880 |
| Buck Owen | Fla. DER | 904-488-1344 |
| ALLEN KOLEFF | STONE CONTAINER | (404) 621-6704 |
| BOB HOWARD | US EPA | 404 347-3776 |
| KERRY VARKONDA | AES | 703 522 1315 |
| JEFF SWAIN | AES | 703-522-1315 |

7/27/88

AES Cedar Bay Cogeneration Project

Summary

The AES Cedar Bay Cogeneration project is being constructed to meet the needs of two customers - Florida Power and Light, who will purchase 225 MW of electricity, and Seminole Kraft, who will purchase approximately 639,000 lb/hr of steam for process needs.

The project will include three new circulating fluidized bed boilers and associated turbine, and one new chemical recovery boiler and associated turbine, allowing the shutdown of older, less efficient power, bark and chemical recovery boilers at the mill.

Numerous benefits will result from the project, particularly in the environmental area. Expected environmental improvements include reductions in the ambient impact of Sulfur Dioxide, Particulate Matter, Volatile Organic Compounds and Total Reduced Sulfur and reductions in thermal impact on the St. Johns River.

These improvements are possible due to offsets available from the equipment to be shut down, improvements in technology, and the installation of stacks which will be constructed to a height consistent with good engineering practices. The existing mill stacks are relatively short and subject to building downwash effects.

The plant will be constructed on land which has been extensively disturbed by prior industrial activities, and adverse impacts to wildlife and vegetation are expected to be minimal.

The project will provide attractively priced electricity for the state. In addition, the CFB boilers will be coal fired, eliminating fuel oil as a primary fuel source at the site. Due to the abundant availability of coal in the United States, dependence on foreign suppliers will be reduced. Changes of this nature are strongly supported by the state of Florida, which recently designated a coal-fired plant as the statewide avoided unit.

Additional permanent and temporary construction jobs will be created as a result of the project. In addition, attractively priced steam will improve Seminole Kraft's competitive position, resulting in improved employment stability at the mill.

Startup of the Chemical Recovery boiler is scheduled for early 1992 with the circulating fluidized bed boilers following in mid-1992, assuming permit issuance in late 1989. A consent decree between Seminole Kraft, FDER and BES requires that the chemical recovery boiler meet TRS new source performance standards by November 1992.

Issuance of environmental permits is the critical path item on the project schedule as project funding and construction start cannot occur until permits are received.

7/27/88

AES Cedar Bay Cogeneration Project

Overview of Key Areas of Impact

Land Use

- The project site has been extensively disturbed by prior industrial activities and fill, and has been used for industrial purposes since before construction of the mill in the early 1950s. The site is zoned for heavy industrial (IH) use and is designated for continued IH use in the Jacksonville Planning Department's 2010 North District Plan. A small portion of land (3 acres) may require rezoning from Open Rural to Industrial Heavy.
- A bio-physical assessment of the site is underway. The initial assessment indicates that no endangered species exist on the proposed plant site. However, a gopher tortoise habitat appears to exist on land adjacent to the CSX railyard north of the site. In the event additional rail spur(s) must be constructed, affected tortoises could be relocated to the large adjacent habitat without adverse impacts to the tortoises moved or the remainder of the population.
- A small wetlands area exists to the north of the site which will be impacted in the event new rail construction is needed. However, this area contains a relatively small number of plant species, all of which are disturbance tolerant. The area appears to have been man-made at the time the rail bed was constructed. No other wetlands impacts are expected.
- Archaeological and historical information on the site area has been requested from the state of Florida.

Air Quality

- A significant improvement to ambient air quality is anticipated as a result of the project.
 - Older, less environmentally efficient equipment will be replaced with advanced chemical recovery boiler and clean coal technology.

- The new plant stacks will be 425 feet high, consistent with Good Engineering Practices, vs the existing stack heights of 130 feet. This change will further reduce ambient impacts.
- Maximum potential sulfur dioxide (SO₂) annual emissions may be slightly higher than representative actual mill emissions, but maximum ambient impacts will be greatly reduced as a result of the project.
- Total suspended particulate (TSP) emissions are expected to net out. Ambient impacts will be significantly reduced.
- Emissions of particulate matter less than 10 um (PM-10) are expected to increase somewhat relative to representative mill emissions, but ambient impacts are expected to be reduced. An effort is underway to determine the portion of historical TSP emissions which were PM-10.
- Volatile organic compound (VOC) emissions are expected to net out. Ambient impacts will be significantly reduced.
- Nitrogen oxide (NO_x), carbon monoxide (CO) and trace element emissions are expected to increase. NO_x emissions will be well within New Source Performance Standards. Net ambient impacts for CO and NO_x are expected to be significantly below applicable air quality standards.
- Total reduced sulfur (TRS) emissions will be reduced. The new recovery boiler will emit 5 ppm TRS or less vs a rate of 17.5 ppm from the existing recovery boilers. Maximum predicted ambient impacts will be significantly reduced.

Water Consumption and Wastewater Discharge Impacts

- The existing mill uses approximately 30,000 gpm of Broward River water in a once-through turbine condenser cooling system. The project's cooling tower system will discharge only 633 gpm. Thermal loading in the river will be reduced by 90% or more, depending upon river temperature and meteorological conditions. Discharge will be through the mills existing discharge structure.

Overview of Key Areas of Impact
July 27, 1988
Page 3

- The volume of wastewater generated from sources other than the cooling tower blowdown (e.g., boiler blowdown) will be essentially unchanged from current operations.
- Ground water consumption will be increased at the site from 19.5 mgd to 24.5 mgd. An analysis will be conducted to assure that this increased usage will not significantly impact nearby wells.
- Coal and limestone pile and site run-off will be collected and treated before discharge to the St. Johns River to insure compliance with water quality standards.

Coal Handling

- Coal delivery will be either by rail or water borne vessel. Supplier bids have been received and are being evaluated. Minor track modifications may be needed if by rail; a conveyor will be required if delivered by water borne vessel.
- The conveyor (if needed) will be constructed from the nearby Gulf Oil dock to the project site crossing Heckscher Drive and the Broward River. Impacts to boat traffic are expected to be minimal since access to the St. Johns River from the Broward is already limited by the Heckscher Drive Bridge. We will work closely with the Corps of Engineers and Coast Guard to minimize navigation impacts.
- The conveyor system will be designed to minimize the potential for coal spillage (e.g., pipe or enclosed conveyor).
- Transfer points will be enclosed and controlled by a fabric filter system.

Ash Disposal

- Several options are being evaluated for the sale or disposal of the combustion ash:
 - Sale in the engineering materials market
 - Backhaul to coal supplier's mine for use as mine fill
 - Local landfill
- In the event the most attractive option is local landfill, adequate measures will be taken to ensure compliance with all groundwater quality standards, including use of a liner or ash fixation, if required.

Need for Power

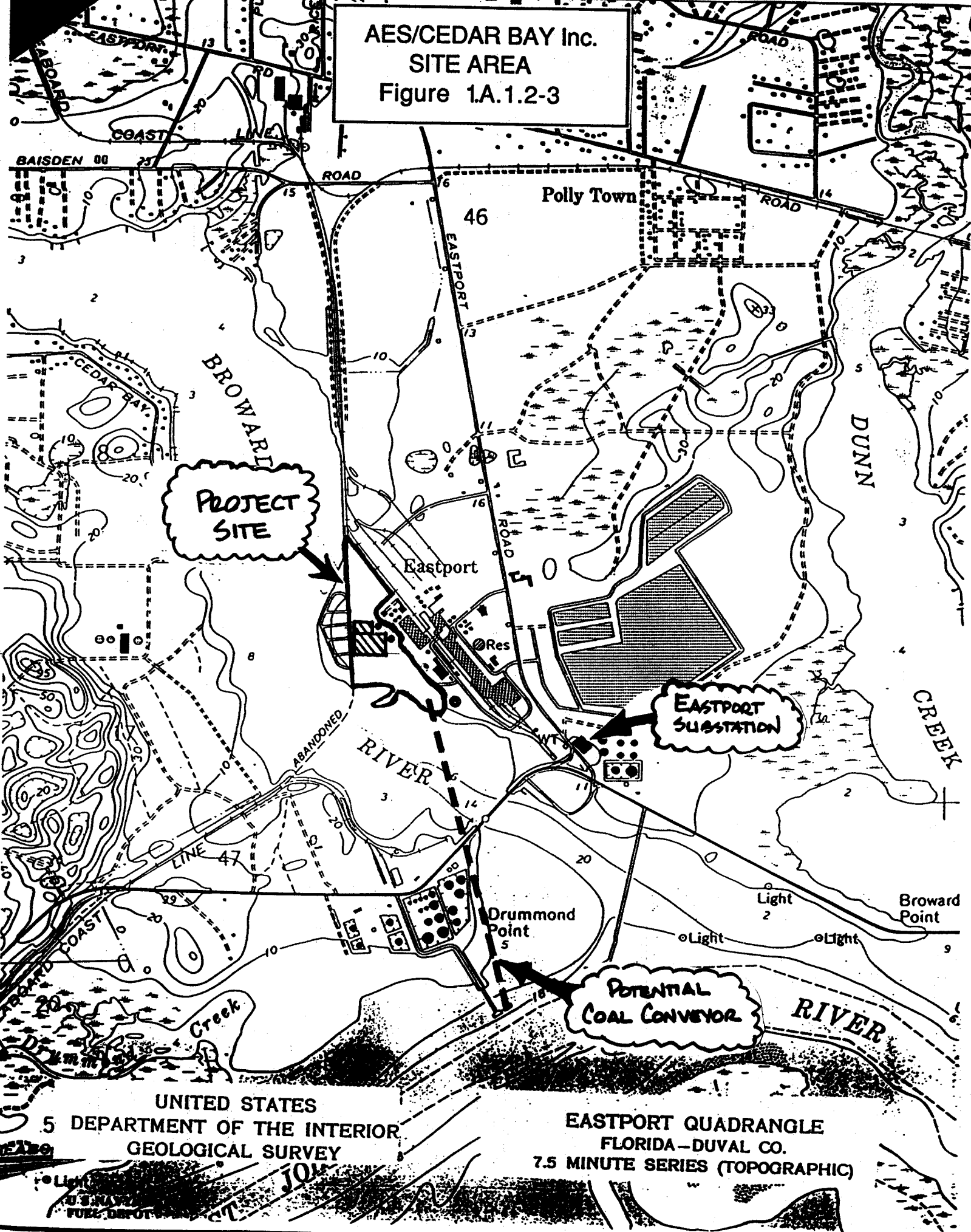
- In April 1987, the Florida Public Service Commission (FPSC) stated that a need exists for additional generating capacity of 220 MW, 440 MW and 500 MW in years 1993, 1994 and 1995 respectively. FPSC staff has indicated that capacity above this amount is needed based upon recent data.
- FPSC has designated a coal-fired plant as the state-wide avoided unit and strongly supports reductions in Florida's dependence on oil and gas in the electric industry.
- The price of electricity to be sold to FP&L is below the state-wide avoided unit cost, thereby providing a benefit to ratepayers. In addition, funding for construction of the plant will be from private sources, eliminating ratepayer investment risk.
- Preliminary meetings with the FPSC and staff indicate strong support for the AES Cedar Bay project, due to its use of advanced clean coal technology, the environmental benefits offered and the attractive price of electricity generated.

Overview of Key Areas of Impact
July 27, 1988
Page 5

Socio-Economics

- The net direct employment effect of the project will be creation of an additional 58 permanent jobs for plant operations and 300 full-time positions during the peak period of construction.
- The project will enhance Seminole Kraft's competitive position, improving employment stability at the mill.

AES/CEDAR BAY Inc.
SITE AREA
Figure 1.A.1.2-3



UNITED STATES
5 DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

EASTPORT QUADRANGLE
FLORIDA - DUVAL CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

225 MW- Sale - FPL
Need ?

AES Cedar Bay

Project Overview and Site Visit

July 28, 1988

ATTENDEES:

AES

Kerry Varkonda
Jeff Swain
Steve Day (Black & Veatch)
Larry Alfred (Black & Veatch)
George Savage (Black & Veatch)

BESD

~~Steve Pace~~
Wayne Tutt
Ron Roberson

EPA

Bob Howard

FDER

Buck Oven

SEMINOLE KRAFT

Al Koleff
Mike Riddle

AGENDA:

- * Project Overview
- * Site Tour
- * Review of SCA/EID inputs
 - Overview of key areas of impact and mitigation planned:
 - Land use
 - Air quality
 - Water consumption and waste water disposal
 - Coal handling
 - Ash disposal
 - Need for power
 - Socio Economics
 - Identification of EPA, FDER, BES areas of emphasis

SCA- due 8/31/88

**AN OVERVIEW OF
AES CEDAR BAY
COGENERATION FACILITY**

JUNE 1988

APPLIED ENERGY SERVICES, INC.

RECEIVED

JUN 30 1988

**DIVISION OF
ENVIRONMENTAL PERMITTING**

OVERVIEW

AES is developing a cogeneration facility on an existing industrial site in Jacksonville, Florida

- Steam will be sold to the Seminole Kraft paper mill that was refurbished by Stone Container Corporation in the fall of 1986 and restarted in February 1987, and
- 225 MW of electricity will be wheeled through Jacksonville Electric Authority (JEA) and sold to Florida Power and Light

The new power facility, valued at approximately \$450 million, will consist of the following:

- one new low-odor recovery boiler and an associated turbine, and
- three circulating fluidized bed (CFB) boilers and associated turbine

The project will replace older, less efficient equipment, improving Seminole Kraft's competitive position and reducing odor emissions.

Bark and coal will be fired in the CFB boilers to generate steam

This document provides information about the planned cogeneration facility and AES.

ATTRACTIVE FEATURES OF THE PROJECT

Economic

- Provides attractively priced electricity to Florida ratepayers under a stable rate structure
- Steam at below-market prices improves Seminole Kraft's competitive position, thus improving employment stability.
- \$450 million cogeneration project provides up to 660 construction jobs and 70 new permanent jobs at the AES plant;
- Facility increases tax base in the city of Jacksonville, resulting in expanded tax revenues.
- Supports diversification of industrial mix in Jacksonville

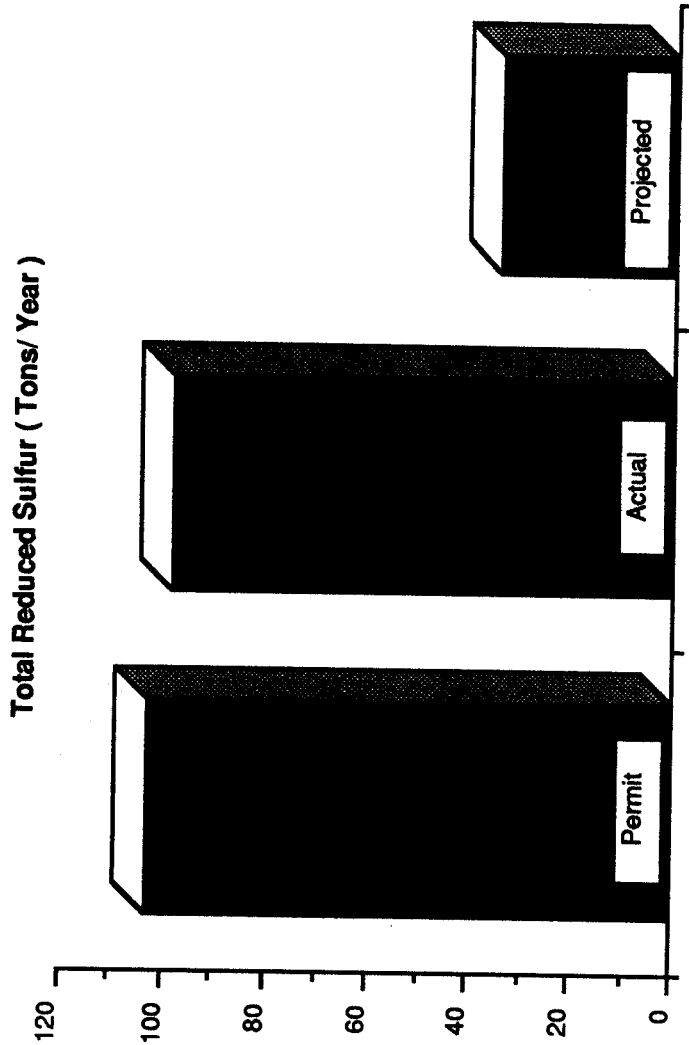
Energy

- Facility displaces oil use at the Seminole Kraft mill
- Coal abundantly available and not dependent on foreign suppliers
- Adds needed electric generating capacity in Florida for mid 1990's and beyond
- Consistent with State energy policy that favors coal in new generating facilities

ENVIRONMENTAL

- Located on an existing industrial site
- New Recovery Boiler Total Reduced Sulfur (TRS) emissions will be less than half of those possible with existing equipment:
 - Existing direct contact evaporator, which uses flue gas to concentrate Black Liquor, will be replaced with closed evaporation system
 - The attached chart shows a comparison of odor emissions from the recovery boiler
- Air and water quality impacts resulting from the project are expected to be low.
 - New technology (circulating fluidized bed boilers and associated emission control equipment) will replace older, less efficient controls
 - For most types of impacts, environmental improvements will occur as a result of the project

AES CEDAR BAY - ODOR COMPARISON

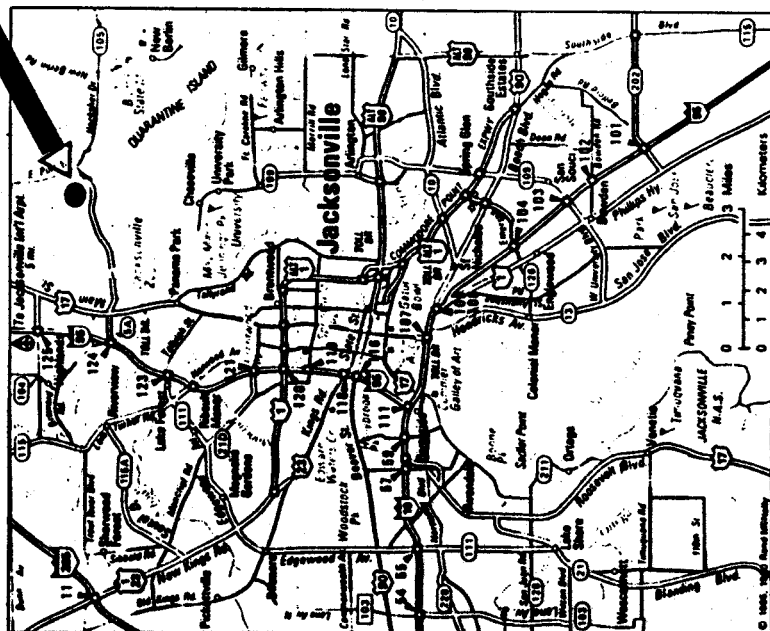
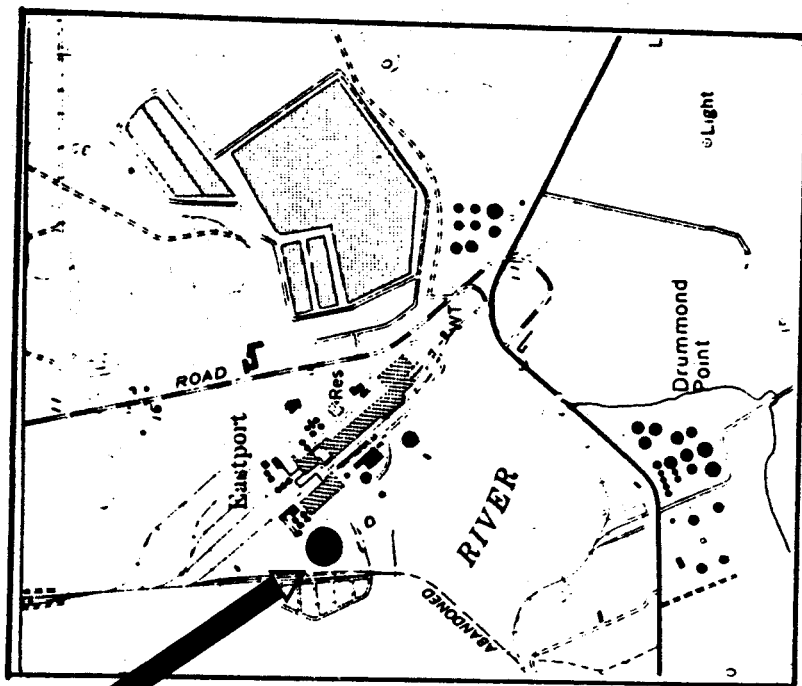


NOTES:

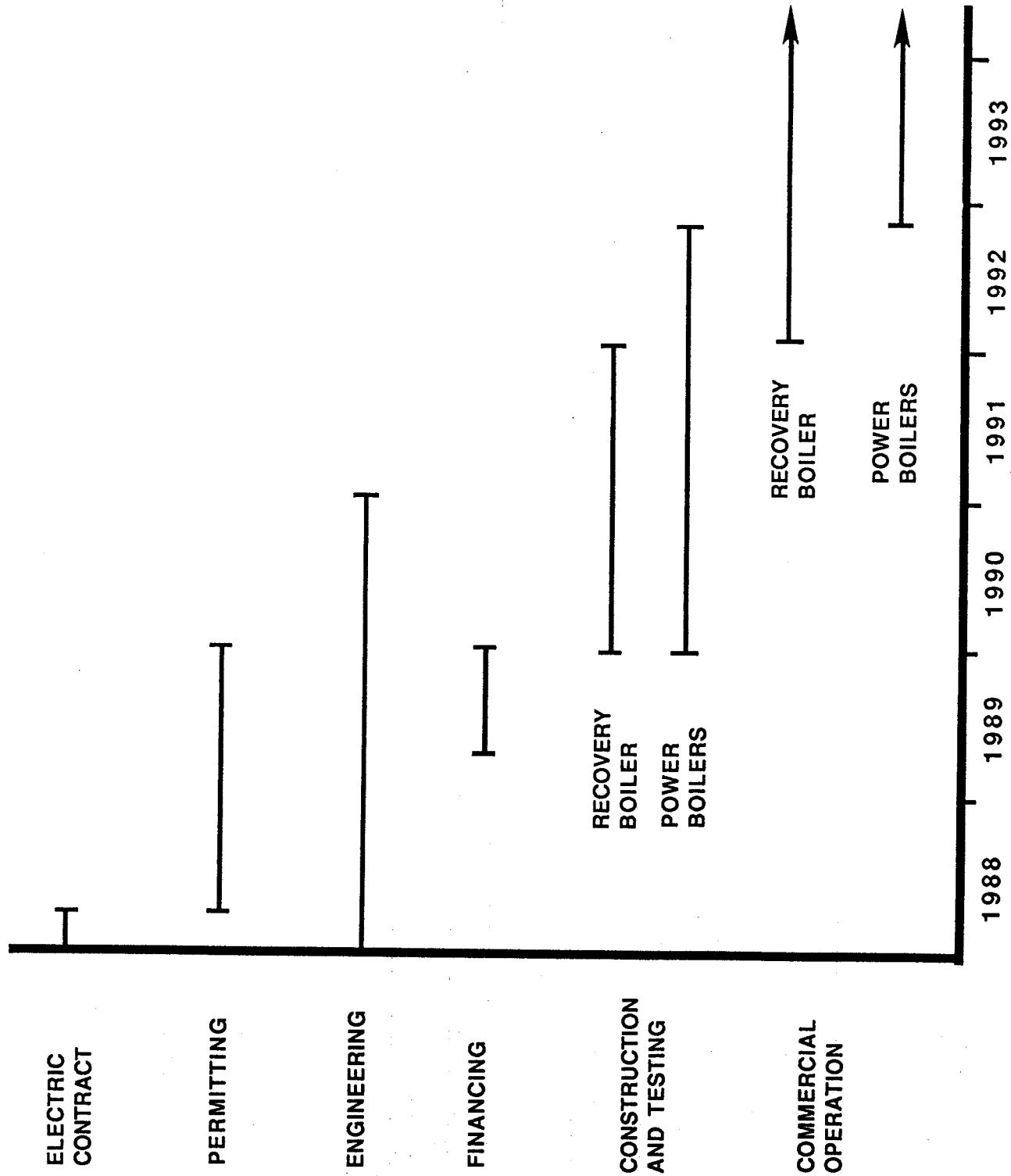
- Permit = maximum allowable emissions from the existing Seminole Kraft mill Recovery Boilers under the current environmental permits.
- Actual = actual emissions from the existing Seminole Kraft mill Recovery Boilers (1985 data prorated for one full year of operation).
- Projected = emissions from the new low-odor Recovery Boiler (to replace the existing Recovery Boilers) provided by the AES project.

AES CEDAR BAY LOCATION

- The plant will be located on the site of the Seminole Kraft paper mill on Easport Road



PROJECT SCHEDULE



NEXT STEPS

- Power supply contract signed with Florida Power and Light (FP&L) in May; PSC approval expected soon.
- Site certification and permitting effort underway; anticipate filing permit applications in August of this year.
- Engineering, Fuel Procurement, Steam and Wheeling Contract development efforts are underway
- AES looks forward to developing a plant adjacent to Stone Container in Jacksonville as we did in Connecticut (see enclosed press release)
- Questions regarding AES Cedar Bay can be directed to Jeffrey V. Swain, Project Director, AES Cedar Bay at (703) 522-1315

AES EXPERIENCE

| AES FACILITY/
LOCATION | CUSTOMERS | FUEL
TYPE | COST
Million | STEAM
(#/HR) | NET POWER
(M.W.) | CONST.
START | ON
LINE |
|--|--|----------------------|-------------------------|-------------------------|-----------------------------|-------------------------|--------------------|
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Houston, Texas | Texas Utilities
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| Cedar Bay
Jacksonville, Florida | Florida Power & Light
Stone Container | Coal | 480 | 600,000 | 225 | 1990 | 1993 |
| TOTAL | | | \$2781M | 1,330,000 | 1,767 | | |

APPLIED ENERGY SERVICES, INC.

BOARD OF DIRECTORS

DENNIS W. BAKKE

FRANK JUNGERS

HENRY R. LINDEN

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KENNETH R. WOODCOCK

MARK FITZPATRICK

JEFFREY R. HAMBURG

ROGER F. NAILL

BARRY J. SHARP

AES OFFICERS AND DIRECTORS

COO of AES, Former Deputy Assistant Administrator at the Federal Energy Administration

Retired Chairman of the Board and Chief Executive Officer of Arabian American Oil Company (ARAMCO).

Frank Gunsalus Professor of Engineering at Illinois Institute of Technology and Former President of the Gas Research Institute.

Former Senior Vice President of Gulf Oil Corporation, and former President of General Atomic Company and General Atomic International.

Chairman/CEO of AES, Former Assistant Administrator for Energy Conservation and Environment at the Federal Energy Administration.

President and Chief Executive Officer of World Wildlife Fund, U.S. and former Administrator, Environmental Protection Agency.

Managing Director of the Investment Banking Division of Shearson Lehman Brothers, Inc.

Founder of Waterman & Company, former director of McKinsey & co-author of the bestseller In Search of Excellence, and author of The Renewal Factor published in September 1987.

Chairman and Chief Executive Officer

President and Chief Operating Officer

Executive Vice President

Senior Vice President

Vice President for Design and Construction

Vice President for New Ventures

Vice President for Planning

Vice President and Chief Financial Officer
APPLIED ENERGY SERVICES, INC.

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Salomon Brothers Inc

One New York Plaza, New York, New York 10004
Atlanta, Boston, Chicago, Dallas, Los Angeles, San Francisco, Zurich.
Affiliates: Frankfurt, London, Tokyo.
Member of Major Securities and Commodities Exchanges.
APPLIED ENERGY SERVICES, INC.

Contact: Mr. Robert F. Hemphill, Jr.
703/522-1315
November 26, 1986

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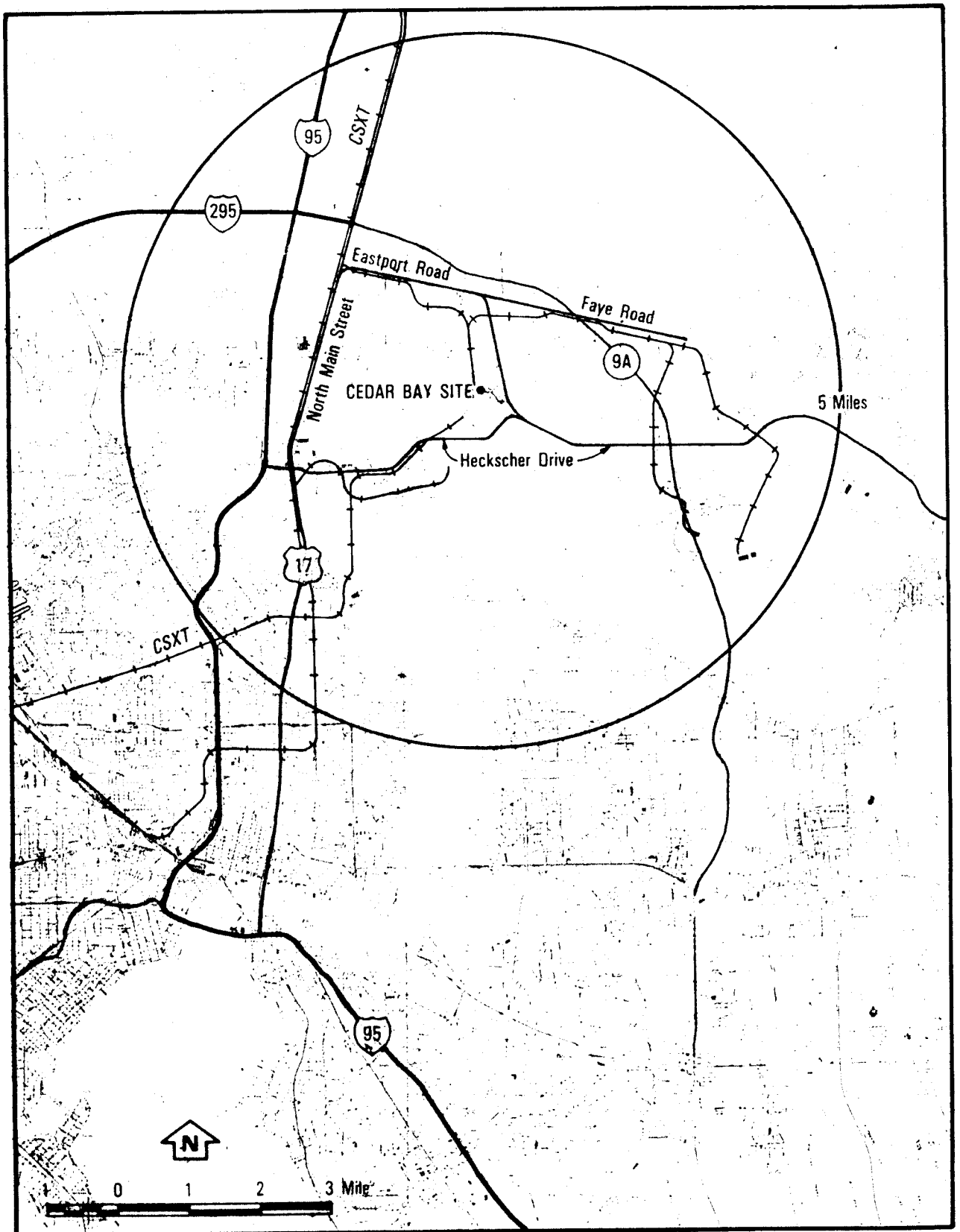
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Amendment 2
070789

**REGIONALLY SIGNIFICANT
ROADWAYS AND RAILROADS**

Figure 2.2-10A

June 7, 1989

Hamilton S. Oven
Chief, Power Plant Siting Group
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32207

Dear Buck:

As part of the environmental review associated with the Power Plant Siting Process, attached is the environmental assessment performed on the site of the proposed AES Cedar Bay cogeneration facility. This site is located on the property of Seminole Kraft Corporation in Jacksonville, Florida. The report has been reviewed by Seminole Kraft, and they are aware that it is being forwarded to you. The environmental assessment was prepared by Micheal Glowacz of the Boca Raton office of Dames and Moore, an environmental consulting firm.

As a preface to the report, we would like to state what we believe to be the applicable regulatory rules for this site, located on land owned by Seminole Kraft Corporation, adjacent to their paper mill facilities.

The paper mill owned by Seminole Kraft Corp. is an existing installation as defined by Rule 17-28.700(1)(c), FAC. This existing installation includes the lime mud storage areas, the settling ponds, and the abandoned construction debris disposal area investigated in the accompanying study.

As an existing installation, Seminole Kraft is exempt from complying with secondary drinking water standards when discharged into Class G-II groundwater (Rule 17-28.700(8)(a), FAC).

Primary drinking water standards apply to discharges to Class G-II groundwater only outside a zone of discharge (Rule 17-28.700(2)(a) and Rule 17-3.403(3), FAC). For this existing installation, the zone of discharge extends to the Seminole Kraft property line (Rule 17-28.700(4)(b), FAC).

Therefore, Seminole Kraft's discharge to Class G-II groundwater must comply with primary drinking water standards at the boundary of its property, but need not meet secondary drinking water standards.

After you have had an opportunity to study the report, I would like to meet with you, Ernest Frey and James McNeal, who have also received a copy of this report. We believe this matter should be dealt with as part of the Power Plant Siting Certification process. We would like to meet with you in the near future to discuss our interpretation of the groundwater rules as stated above and our plans for handling the lime mud piles and ponds. I will call you to set up a date. Two extra copies of the report are attached for distribution to any other reviewers.

Sincerely,



Julie Blunden
AES Cedar Bay

cc: Ernest E. Frey, DER Jacksonville
James McNeal, DER Tallahassee

June 26, 1989

Hamilton S. Owen
Chief, Power Plant Siting Group
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

RECEIVED
JUN 27 1989
DER-DW

Dear Buck:

Thank you for taking the time to meet with Curt Barton, Terry Cole and me on June 15 to discuss the Cedar Bay Cogeneration Project Site Assessment. My understanding is that Jerry Owen would like us to compare the water quality of the water table aquifer previously tested to Class III surface water quality standards since the water table discharges into the Broward River and is not used as a source of drinking water.

As we discussed, AES Cedar Bay will move the suspected source of the metals in the groundwater, the lime mud and lime sludge, offsite in order to construct and operate the cogeneration facility. The material will be stored for potential reuse on Seminole Kraft's property north of the cogeneration plant and paper mill. The sludge will be dried before placing it on this new site following current procedures. The dry material will be covered with a liner and a groundwater monitoring system will be installed to ensure that the material does not leach. This effort, associated with the project, will improve groundwater quality in the area.

During construction, dewatering of the site will be necessary, in large part due to the construction of the rail car coal unloading facility. As we discussed, temporary variances for the discharge of this water may be required as they were for the St. Johns River Power Park. On June 23, we submitted notice of the known parameters in the groundwater that may require a variance, depending on the levels of these parameters in the Broward River.

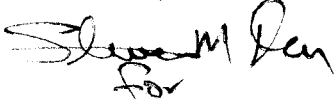
At the request of Larry Schwartz, enclosed is the information we have collected on the water quality of the surficial aquifer and the Broward River. Included are the data from the Dames & Moore site assessment compared to Class III, Marine surface water quality standards, the data from ERM's testing of the Broward River and the applicable Storet data.

AES/Cedar Bay Inc.

1925 North Lynn Street • Arlington, Virginia 22209 • (703) 522-1315 • Telecopier — (703) 528-4510

We would appreciate notice of any additional data DER requires for its analysis. Thank you for your cooperation.

Sincerely,

A handwritten signature in dark ink, appearing to read "Julie Blunden", with a stylized flourish at the end.

Julie Blunden
Development Manager

lar
Enclosures

cc: Jerry Owen, DER Jacksonville
Frank Watkins, DER Jacksonville
Larry Schwartz, DER Tallahassee
Curtis Barton, Stone Container
Terry Cole, Oertel, Hoffman, Fernandez & Cole
Steven Day, Black & Veatch

25021
ERM-SOUTH, INC.
9501 PRINCESS PALM AVE.
SUITE 100
TAMPA, FL 33619
ATT : BOB BRETNALL
Sample Collected: 7/09/88
Sample Received: 7/09/88
Sample Description: EPA METHOD 624

Page 24 of 67
August 1, 1988
Report 980

LAB ID. 82223

Collected By: YOUR REP.

REPORT OF ANALYSIS : SW-1

| | | UNITS | DATE |
|---------------------------|------|-------|---------|
| Acrolein | <25 | ug/l | 7/14/88 |
| Acrylonitrile | <25 | ug/l | 7/14/88 |
| Benzene | <1.0 | ug/l | 7/14/88 |
| Bromodichloromethane | <1.0 | ug/l | 7/14/88 |
| Bromoform | <1.0 | ug/l | 7/14/88 |
| Bromomethane | <1.0 | ug/l | 7/14/88 |
| Carbon Tetrachloride | <1.0 | ug/l | 7/14/88 |
| Chlorobenzene | <1.0 | ug/l | 7/14/88 |
| Chloroethane | <1.0 | ug/l | 7/14/88 |
| Chloroform | <1.0 | ug/l | 7/14/88 |
| Chloromethane | <1.0 | ug/l | 7/14/88 |
| Cis-1,3-Dichloropropene | <1.0 | ug/l | 7/14/88 |
| Dibromochloromethane | <1.0 | ug/l | 7/14/88 |
| Ethyl Benzene | <1.0 | ug/l | 7/14/88 |
| Methylene Chloride | <1.0 | ug/l | 7/14/88 |
| Tetrachloroethene | <1.0 | ug/l | 7/14/88 |
| Toluene | <1.0 | ug/l | 7/14/88 |
| Trans-1,2-Dichloroethene | <1.0 | ug/l | 7/14/88 |
| Trans-1,3-Dichloropropene | <1.0 | ug/l | 7/14/88 |
| Trichloroethene | <1.0 | ug/l | 7/14/88 |
| Trichlorofluoromethane | <1.0 | ug/l | 7/14/88 |
| Vinyl Chloride | <1.0 | ug/l | 7/14/88 |
| Xylene | <1.0 | ug/l | 7/14/88 |
| 1,1-Dichloroethene | <1.0 | ug/l | 7/14/88 |

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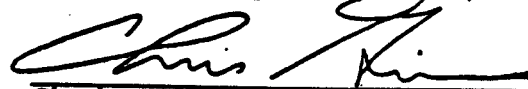
Collected By: YOUR REP.

REPORT OF ANALYSIS : SW-1

| | | UNITS | DATE |
|---------------------------|------|-------|---------|
| 1,1-Dichloroethane | <1.0 | ug/l | 7/14/88 |
| 1,1,1-Trichloroethane | <1.0 | ug/l | 7/14/88 |
| 1,1,2-Trichloroethane | <1.0 | ug/l | 7/14/88 |
| 1,1,2,2-Tetrachloroethane | <1.0 | ug/l | 7/14/88 |
| 1,2-Dichlorobenzene | <1.0 | ug/l | 7/14/88 |
| 1,2-Dichloroethane | <1.0 | ug/l | 7/14/88 |
| 1,2-Dichloropropane | <1.0 | ug/l | 7/14/88 |
| 1,3-Dichlorobenzene | <1.0 | ug/l | 7/14/88 |
| 1,4-Dichlorobenzene | <1.0 | ug/l | 7/14/88 |
| 2-Chloroethylvinyl Ether | <1.0 | ug/l | 7/14/88 |

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.

Respectfully Submitted,



Chris Given
Laboratory Manager
Enviropact Services, Inc.

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Collected By: YOUR REP.

REPORT OF ANALYSIS : SW-1

| | | UNITS | DATE |
|-------------------------------|------|-------|---------|
| a-BHC | <50 | ug/l | 7/19/88 |
| b-BHC | <50 | ug/l | 7/19/88 |
| d-BHC | <50 | ug/l | 7/19/88 |
| g-BHC | <50 | ug/l | 7/19/88 |
| Acenaphthene | <100 | ug/l | 7/19/88 |
| Acenaphthylene | <100 | ug/l | 7/19/88 |
| Aldrin | <50 | ug/l | 7/19/88 |
| Anthracene | <100 | ug/l | 7/19/88 |
| Benzidine | <100 | ug/l | 7/19/88 |
| Benzo (a) Anthracene | <100 | ug/l | 7/19/88 |
| Benzo (a) Pyrene | <100 | ug/l | 7/19/88 |
| Benzo (b) Fluoranthene | <100 | ug/l | 7/19/88 |
| Benzo (g,h,i) Perylene | <250 | ug/l | 7/19/88 |
| Benzo (k) Fluoranthene | <100 | ug/l | 7/19/88 |
| Benzyl Butyl Phthlate | <100 | ug/l | 7/19/88 |
| Bis (2-chloroisopropyl) Ether | <100 | ug/l | 7/19/88 |
| Bis (2-chloroethyl) Ether | <100 | ug/l | 7/19/88 |
| Bis (2-chloroethoxy) Methane | <100 | ug/l | 7/19/88 |
| Bis (2-ethyl hexyl) Phthalate | <100 | ug/l | 7/19/88 |
| Chlordane | <400 | ug/l | 7/19/88 |
| Chrysene | <100 | ug/l | 7/19/88 |
| Di-n-butylphthalate | <100 | ug/l | 7/19/88 |
| Di-n-octylphthalate | <100 | ug/l | 7/19/88 |
| Dibenzo(a,h)Anthracene | <100 | ug/l | 7/19/88 |

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Collected By: YOUR REP.

REPORT OF ANALYSIS : SW-1

| | | UNITS | DATE |
|---------------------------|------|-------|---------|
| Dieldrin | <100 | ug/l | 7/19/88 |
| Diethyl Phthalate | <100 | ug/l | 7/19/88 |
| Dimethyl Phthalate | <100 | ug/l | 7/19/88 |
| Endosulfan I | <50 | ug/l | 7/19/88 |
| Endosulfan II | <50 | ug/l | 7/19/88 |
| Endosulfan Sulfate | <50 | ug/l | 7/19/88 |
| Endrin | <50 | ug/l | 7/19/88 |
| Endrin Aldehyde | <50 | ug/l | 7/19/88 |
| Fluoranthene | <100 | ug/l | 7/19/88 |
| Fluorene | <100 | ug/l | 7/19/88 |
| Heptachlor | <50 | ug/l | 7/19/88 |
| Heptachlor Epoxide | <50 | ug/l | 7/19/88 |
| Hexachlorobenzene | <100 | ug/l | 7/19/88 |
| Hexachlorobutadiene | <100 | ug/l | 7/19/88 |
| Hexachlorocyclopentadiene | <100 | ug/l | 7/19/88 |
| Hexachloroethane | <100 | ug/l | 7/19/88 |
| Indeno (1,2,3-cd) Pyrene | <250 | ug/l | 7/19/88 |
| Isophorone | <100 | ug/l | 7/19/88 |
| N-Nitrosodi-n-Propylamine | <100 | ug/l | 7/19/88 |
| N-Nitrosodimethylamine | <100 | ug/l | 7/19/88 |
| N-Nitrosodiphenylamine | <100 | ug/l | 7/19/88 |
| Naphthalene | <100 | ug/l | 7/19/88 |
| Nitrobenzene | <100 | ug/l | 7/19/88 |
| Pentachlorophenol | <100 | ug/l | 7/19/88 |
| Phenanthrene | <100 | ug/l | 7/19/88 |

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August 1, 1988
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REPORT OF ANALYSIS : SW-1

| | | UNITS | DATE |
|----------------------------|------|-------|---------|
| Phenol | <50 | ug/l | 7/19/88 |
| Pyrene | <100 | ug/l | 7/19/88 |
| PCB-1016 | <400 | ug/l | 7/19/88 |
| PCB-1221 | <400 | ug/l | 7/19/88 |
| PCB-1232 | <400 | ug/l | 7/19/88 |
| PCB-1242 | <400 | ug/l | 7/19/88 |
| PCB-1248 | <400 | ug/l | 7/19/88 |
| PCB-1254 | <400 | ug/l | 7/19/88 |
| PCB-1260 | <400 | ug/l | 7/19/88 |
| Toxaphene | <100 | ug/l | 7/19/88 |
| 1,2-Dichlorobenzene | <100 | ug/l | 7/19/88 |
| 1,2,4-Trichlorobenzene | <100 | ug/l | 7/19/88 |
| 1,3-Dichlorobenzene | <100 | ug/l | 7/19/88 |
| 1,4-Dichlorobenzene | <100 | ug/l | 7/19/88 |
| 2-Chloronaphthalene | <100 | ug/l | 7/19/88 |
| 2-Chlorophenol | <50 | ug/l | 7/19/88 |
| 2-Methyl-4,6-Dinitrophenol | <150 | ug/l | 7/19/88 |
| 2-Nitrophenol | <50 | ug/l | 7/19/88 |
| 2,4-Dichlorophenol | <50 | ug/l | 7/19/88 |
| 2,4-Dimethylphenol | <50 | ug/l | 7/19/88 |
| 2,4-Dinitrophenol | <200 | ug/l | 7/19/88 |
| 2,4-Dinitrotoluene | <100 | ug/l | 7/19/88 |
| 2,4,6-Trichlorophenol | <50 | ug/l | 7/19/88 |
| 2,6-Dinitrotoluene | <100 | ug/l | 7/19/88 |
| 3,3-Dichlorobenzidine | <100 | ug/l | 7/19/88 |

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August 1, 1988
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LAB ID. 82223

Collected By: YOUR REP.

REPORT OF ANALYSIS : SW-1

| | | UNITS | DATE |
|-----------------------------|------|-------|---------|
| 4-Bromophenyl Phenyl Ether | <100 | ug/l | 7/19/88 |
| 4-Chloro-3-Methylphenol | <50 | ug/l | 7/19/88 |
| 4-Chlorophenyl Phenyl Ether | <100 | ug/l | 7/19/88 |
| 4-Nitrophenol | <150 | ug/l | 7/19/88 |
| 1,4'-DDD | <50 | ug/l | 7/19/88 |
| 1,4'-DDE | <50 | ug/l | 7/19/88 |
| 1,4'-DDT | <50 | ug/l | 7/19/88 |

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methods or other approved methods.

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August 1, 1988
Report 980

LAB ID. 82223

Collected By: YOUR REP.

REPORT OF ANALYSIS : SW-1

| | | UNITS | DATE |
|------------------------|--------|-------|---------|
| Total Dissolved Solids | 29212 | mg/l | 7/26/88 |
| Antimony | <0.05 | mg/l | 7/19/88 |
| Arsenic | <0.005 | mg/l | 7/19/88 |
| Beryllium | <0.005 | mg/l | 7/19/88 |
| Cadmium | <0.005 | mg/l | 7/19/88 |
| Chromium | <0.01 | mg/l | 7/19/88 |
| Copper | <0.01 | mg/l | 7/19/88 |
| Lead | <0.02 | mg/l | 7/19/88 |
| Mercury | 7.73 | ug/l | 7/19/88 |
| Nickel | <0.02 | mg/l | 7/19/88 |
| Selenium | <0.005 | mg/l | 7/19/88 |
| Silver | <0.01 | mg/l | 7/19/88 |
| Thallium | <0.01 | mg/l | 7/19/88 |
| Zinc | <0.01 | mg/l | 7/19/88 |

Analyses performed in accordance with E.P.A., A.S.T.M., Standard Methods or other approved methods.

Respectfully Submitted,


Chris Given
Laboratory Manager
Enviropact Services, Inc.

WATER-QUALITY TEST RESULTS (mg/l)
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

TABLE 4

| <u>Number</u> | <u>Phenol</u> | <u>Naphthalene</u> | <u>Toluene</u> | <u>Sulfide</u> | <u>PH(Corrosivity)</u> | <u>Sulfate</u> |
|---------------|--------------------------------------|--------------------|----------------|----------------|------------------------|----------------|
| PZ-1 | ND | ND | ND | ND | 7.5 | 530 |
| PZ-2 | ND | ND | ND | ND | 7.5 | 140 |
| PZ-3 | 0.031 | ND | ND | ND | 8.0 | 140 |
| MW-1 | ND | ND | ND | 1.6 | 9.5 | 57 |
| MW-2 | 0.028 | ND | ND | 460 | 12.0 | 2000 |
| MW-4 | ND | ND | 0.037 | NT | NT | NT |
| MW-5 | ND | ND | ND | 0.62 | 7.8 | 150 |
| MW-6 | ND | 0.051 | ND | 2.4 | 10.7 | 510 |
| TMW-4 | 0.023 | ND | ND | 3.5 | 8.6 | 990 |
| TMW-5 | 0.029 | ND | ND | 0.62 | 10.8 | 650 |
| TMW-6 | ND | ND | ND | 1.5 | 7.1 | 360 |
| TMW-7 | NT | NT | ND | NT | NT | NT |
| TMW-8 | ND | ND | ND | ND | 6.7 | 140 |
| TMW-9 | ND | ND | ND | 0.83 | 8.1 | 1200 |
| TMW-10 | ND | 0.086 | ND | 0.72 | 9.7 | 530 |
| MCL | NP | 0.100 | NP | NP | | 250 |
| CLASS III | WQC | | | | | |
| BROWARD | RIVER | | | | | |
| ND = | Not detected | NP | NP | NP | 6.5-8.5 | NP |
| NT = | Not tested | NP | NP | NP | ± 1.0 | |
| NP = | No published drinking water standard | | | | 7.5 | 200 |
| MCL = | Maximum contaminant level | | | | | |

Concentrations shown in bold type exceed the secondary drinking water standard for that compound.

TABLE 4
WATER-QUALITY TEST RESULTS (mg/l)
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

| <u>Number</u> | <u>Copper</u> | <u>Zinc</u> | <u>Mercury</u> | <u>Arsenic</u> | <u>Antimony</u> | <u>Beryllium</u> | <u>Cadmium</u> | <u>Chromium</u> | <u>Lead</u> | <u>Nickel</u> |
|---|---------------|-------------|----------------|----------------|-----------------|------------------|----------------|-----------------|-------------|---------------|
| PZ-1 | 0.011 | 0.28 | ND | 0.024 | ND | ND | ND | 0.1 | 0.054 | 0.028 |
| PZ-2 | 48 | 88 | ND | 0.061 | ND | ND | ND | 0.017 | 0.008 | 0.014 |
| PZ-3 | 0.026 | 0.023 | ND | 0.014 | 0.14 | ND | ND | 0.3 | 4.2 | 0.37 |
| MW-1 | 0.023 | 0.380 | ND | ND | ND | ND | ND | 0.085 | ND | 0.019 |
| MW-2 | ND | 0.032 | ND | ND | ND | ND | ND | 0.028 | 0.021 | 0.029 |
| MW-4 | 0.031 | 0.032 | 0.0005 | ND | ND | ND | ND | 0.021 | 0.005 | 0.052 |
| MW-5 | 0.016 | 0.049 | 0.0003 | ND | ND | ND | ND | 0.091 | 0.035 | 0.016 |
| MW-6 | 0.047 | 0.11 | 0.0006 | ND | ND | ND | ND | 0.220 | 0.058 | 0.067 |
| TMW-4 | 0.98 | 15 | 0.0068 | 0.025 | 0.083 | 0.013 | 0.027 | 0.98 | 4.6 | 0.16 |
| TMW-5 | 0.64 | 2.1 | 0.0005 | 0.017 | ND | 0.011 | ND | 0.64 | 0.47 | 0.35 |
| TMW-6 | 1.3 | 2.00 | 0.0005 | 1.8 | ND | 0.017 | 0.022 | 0.140 | 0.063 | 0.083 |
| TMW-7 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT |
| TMW-8 | 0.023 | 0.93 | 0.0038 | 0.010 | ND | 0.019 | ND | 0.33 | 0.180 | 0.29 |
| TMW-9 | ND | 2.6 | 0.0004 | ND | 0.068 | 0.010 | ND | 0.29 | 1.0 | 0.24 |
| TMW-10 | 0.19 | 0.2 | 0.0067 | ND | ND | ND | ND | 0.29 | 0.080 | 0.10 |
| MCL | NP | 5.0 | 0.002 | 0.050 | NP | NP | 0.010 | 0.050 | 0.050 | NP |
| CLASS II WQC | 0.015 | 1.0 | 0.0001 | 0.05 | 0.2 | NP | 0.005 | 0.05 | 0.05 | 0.1 |
| ND = Not detected | | | | | | | | | | |
| NT = Not tested | | | | | | | | | | |
| NP = No published drinking water standard | | | | | | | | | | |
| MCL = Maximum contaminant level | | | | | | | | | | |

Concentrations shown in bold type exceed the drinking water standard for that compound.
Mercury, arsenic, cadmium, chromium and lead have primary standards and zinc has a secondary standard.

BROWARD NP NP 0.0003 NP NP NP NP NP NP NP

20030145

STORET System

30 26 13.2 081 38 34 3 1
12031 FLORIDA
SOUTH-EAST
ST JOHNS
21FLA 03080103006 0002.260 DN /TYFA/AMBN/STREAM

DEPTH 0

INDEX

MILES

| PARAMETER | IDENT. | NUMBER | NOBS | AVE | MAX | MIN | BEG-DATE | END-DATE |
|-----------|--------|--------|------|-----|-----|-----|----------|----------|
| LAB | TEMP. | CE | 4 | 240 | 737 | 26 | 84/08/27 | 85/01/14 |
| WATER | | | | | | | | |

0'hhhhhhfzpfzpf s"K-K"*(JZ3C+2

{#hhf i.\j u*NjP qP 3C:CO67

8031 76/11/02 85/01/14

| | | | | | | | | |
|-----------------|----------|----------|---|-------|--------|-------|----------|----------|
| 28 ANALYZE | AGENCY | CODE | 5 | 8031 | 8031 | 8031 | 84/05/14 | 85/01/14 |
| 55 STREAM | VELOCITY | FT/SEC | 2 | 0.8 | 1.0 | 0.5 | 84/08/27 | 85/01/14 |
| 67 TIDE | STAGE | CODE | 1 | 3210 | 3210 | 3210 | 76/11/02 | 76/11/02 |
| 70 TURB | JKSN | JTU | 1 | 4.0 | 4.0 | 4.0 | 72/09/26 | 72/09/26 |
| 76 TURB | TRIDMTR | HACH FTU | 2 | 8.0 | 11.0 | 5.0 | 84/08/27 | 85/01/14 |
| 78 TRANSP. | SECCHI | METERS | 2 | 0.78 | 1.15 | 0.42 | 84/08/27 | 85/01/14 |
| 81 AP COLOR | PT-CO | UNITS | 2 | 70 | 100 | 40 | 84/08/27 | 85/01/14 |
| 94 CONDUCTIV | FIELD | MICROMHO | 2 | 13850 | 18000 | 9700 | 84/08/27 | 85/01/14 |
| 95 CONDUCTIV | AT 25C | MICROMHO | 2 | 16140 | 18400 | 13880 | 84/08/27 | 85/01/14 |
| 300 DO | | MG/L | 3 | 4.8 | 8.7 | 5.8 | 72/09/26 | 85/01/14 |
| 310 BOD | 5 DAY | MG/L | 3 | 1.9 | 2.0 | 1.8 | 76/11/02 | 85/01/14 |
| 400 PH | | SU | 2 | 7.38 | 7.50 | 7.25 | 84/08/27 | 85/01/14 |
| 403 PH | | SU | 3 | 7.5 | 7.6 | 7.2 | 76/11/02 | 85/01/14 |
| 480 SALINITY | TOTAL | PPTH | 2 | 10.5 | 12.0 | 9.0 | 84/08/27 | 85/01/14 |
| 500 RESIDUE | DISS-105 | MG/L | 1 | 16560 | 16560 | 16560 | 72/09/26 | 72/09/26 |
| 515 RESIDUE | TOT NFLT | MG/L | 1 | 16250 | 16250 | 16250 | 72/09/26 | 85/01/14 |
| 530 RESIDUE | VOL NFLT | MG/L | 3 | 121 | 306 | 5 | 72/09/26 | 85/01/14 |
| 535 RESIDUE | FIX NFLT | MG/L | 2 | 2 | 3 | 1 | 84/08/27 | 85/01/14 |
| 540 RESIDUE | N TOTAL | MG/L | 2 | 27 | 50 | 4 | 84/08/27 | 85/01/14 |
| 610 NH3+NH4- | TOTAL | MG/L | 1 | 0.060 | 0.100 | 0.060 | 84/08/27 | 85/01/14 |
| 615 NO2-N | TOTAL | MG/L | 1 | 0.100 | 0.100 | 0.100 | 85/01/14 | 85/01/14 |
| 620 NO3-N | TOTAL | MG/L | 1 | 0.210 | 0.210 | 0.210 | 76/11/02 | 76/11/02 |
| 625 TOT KJEL | N | MG/L | 2 | 0.540 | 0.630 | 0.450 | 84/08/27 | 85/01/14 |
| 630 NO2&NO3 | N-TOTAL | MG/L | 1 | 0.18 | 0.27 | 0.08 | 84/08/27 | 85/01/14 |
| 660 ORTHOP04 | PO4 | MG/L | 1 | 0.03 | 0.03 | 0.03 | 76/11/02 | 76/11/02 |
| 665 PHOS-TOT | | MG/L | 3 | 0.199 | 0.250 | 0.156 | 72/09/26 | 85/01/14 |
| 940 CHLORIDE | TOTAL | MG/L | 1 | 8100 | 8100 | 8100 | 72/09/26 | 72/09/26 |
| 945 SULFATE | SO4-TOT | MG/L | 1 | 200 | 200 | 200 | 72/09/26 | 72/09/26 |
| 1045 IRON | FE-TOT | UG/L | 1 | 0 | 0 | 0 | 72/09/26 | 72/09/26 |
| 31501 TOT COLI | MEMENDO | /100ML | 1 | 1800 | 1800 | 1800 | 76/11/02 | 76/11/02 |
| 31505 TOT COLI | MPN CONF | /100ML | 2 | 6610 | 13000 | 220 | 84/08/27 | 85/01/14 |
| 31615 FEC COLI | MEMECMED | /100ML | 2 | 170 | 220 | 120 | 84/08/27 | 85/01/14 |
| 31616 FEC COLI | MEM-FCBR | /100ML | 1 | 130 | 130 | 130 | 76/11/02 | 76/11/02 |
| 32211 CHLRPHYL | A UG/L | CORRECTD | 2 | 32.78 | 57.19 | 8.37 | 84/05/14 | 85/01/14 |
| 71850 NITRATE | TOT-NO3 | MG/L | 2 | 2.5 | 2.5 | 2.5 | 72/09/26 | 72/09/26 |
| 71900 MERCURY | HG-TOTAL | UG/L | 2 | 0.3 | 0.4 | 0.1 | 84/08/27 | 85/01/14 |
| 71921 MERCURY | SEDMG/KG | UG/L | 1 | 0.0 | 0.0 | 0.0 | 85/01/14 | 85/01/14 |
| 72016 BOT DPTH | OF SMPLE | FT | 2 | 5.5 | 8.0 | 3.0 | 84/08/27 | 85/01/14 |
| 82246 DIVERSITY | NAT.SUB. | INDEX | 3 | 2.056 | 2.371 | 1.686 | 84/05/14 | 85/01/14 |
| 82250 NO. SPF. | NAT.SUB. | INDEX | 3 | 9.333 | 15.000 | 4.000 | 84/05/14 | 85/01/14 |

"NEXT STATION", OR "ALL"

ENTER PARAM CODE,

20030146
30 26 19.3 091 39 32.8 1

SECRET System

NEAST FLORIDA
SOUTH-EAST
ST JOHNS
21FLA 03080103006 0003.480 ON /TYPA/AMENT/STREAM
DEPTH 0

| INDEX | MILES | PARAMETER | TEMP | CENT | NOBS | AVE | MAX | MIN | BEG-DATE | END-DATE |
|-------|----------|-----------|--------|------|-------|-------|-------|----------|----------|----------|
| 10 | WATER | AGENCY | CODE | 1 | 19.0 | 19.0 | 19.0 | 76/11/02 | 76/11/02 | |
| 27 | COLLECT | STAGE | CODE | 1 | 8067 | 8067 | 8067 | 76/11/02 | 76/11/02 | |
| 67 | TIDE | S DAY | MG/L | 1 | 3210 | 3210 | 3210 | 76/11/02 | 76/11/02 | |
| 310 | BOD | LAB | SU | 1 | 2.0 | 2.0 | 2.0 | 76/11/02 | 76/11/02 | |
| 403 | PH | TOTAL | MG/L | 1 | 7.0 | 7.0 | 7.0 | 76/11/02 | 76/11/02 | |
| 620 | NO3-N | PO4 | MG/L | 1 | 0.350 | 0.350 | 0.350 | 76/11/02 | 76/11/02 | |
| 660 | ORTHOP04 | MFIMENDO | MG/L | 1 | 0.01 | 0.01 | 0.01 | 76/11/02 | 76/11/02 | |
| 31501 | TOT COLI | MFIMENDO | /100ML | 1 | 1100 | 1100 | 1100 | 76/11/02 | 76/11/02 | |
| 31616 | FEC COLI | MFIMENDO | /100ML | 1 | 150 | 150 | 150 | 76/11/02 | 76/11/02 | |

ENTER PARM CODE, "NEXT STATION", OR "ALL"

TABLE 5.2-6. CLASS III WATER QUALITY CRITERIA (MARINE WATERS)

| Parameter | Concentration |
|---------------------------|--|
| Aluminum | 1.5 mg/l |
| Antimony | 0.2 mg/l |
| Arsenic | 0.05 mg/l |
| Bromates | 100 mg/l |
| Bromine (Free Molecular) | 0.1 mg/l |
| Cadmium | 5.0 ug/l |
| Chlorides | <10 percent increase over normal background levels in predominately marine waters |
| Chlorine (Total Residual) | 0.01 mg/l |
| Chromium, Total | 0.05 mg/l |
| Coliforms, Fecal | 200 counts/100 ml monthly average; 400 counts/100 ml <10 percent of samples per month; 800 counts/100 ml on any one day |
| Coliforms, Total | 1,000 counts/100 ml monthly average; 1,000 counts/100 ml <20 percent of samples per month; 2,400 counts/100 ml at any time |
| Copper | 15 ug/l |
| Cyanide | 5.0 ug/l |
| Detergents | 0.5 mg/l |
| Dissolved Gases, Total | <110 percent saturation |
| Dissolved Oxygen | >5.0 mg/l 24 hour average; >4.0 mg/l instantaneous |
| Fluoride | 5.0 mg/l |
| Iron | 0.3 mg/l |
| Lead | 50 ug/l |
| Manganese | -- |
| Mercury | 0.1 ug/l |
| Nickel | 100 ug/l |
| Nutrients | Shall not be altered so as to cause an imbalance in natural populations of aquatic flora and fauna |

TABLE 5.2-6 (Continued). CLASS III WATER QUALITY CRITERIA (MARINE WATERS)

| <u>Parameter</u> | <u>Concentration</u> |
|----------------------------------|--|
| Oil and Grease | |
| Dissolved or Emulsified | 5.0 mg/l |
| Undissolved | No visible oil to interfere with
beneficial use |
| Pesticides and Herbicides | |
| Aldrin Plus Dieldrin | 0.003 ug/l |
| Chlordane | 0.004 ug/l |
| DDT | 0.001 ug/l |
| Demeton | 0.1 ug/l |
| Endosulfan | 0.001 ug/l |
| Endrin | 0.004 ug/l |
| Guthion | 0.01 ug/l |
| Heptachlor | 0.001 ug/l |
| Lindane | 0.004 ug/l |
| Malathion | 0.1 ug/l |
| Methoxychlor | 0.03 ug/l |
| Mirex | 0.001 ug/l |
| Parathion | 0.04 ug/l |
| Toxaphene | 0.005 ug/l |
| pH Range | 6.5 to 8.5 |
| pH Variation from Background | ±1.0 |
| Phenolic Compounds | 1.0 ug/l |
| Phosphorous (Elemental) | 0.1 ug/l |
| Polychlorinated Biphenyls | 0.001 ug/l |
| Radioactive Substances | |
| Radium 226 and 228 | <5 pCi/l |
| Gross Alpha | <15 pCi/l |
| Selenium | 25 ug/l |
| Silver | 0.05 ug/l |
| Transparency | <10 percent reduction from background |
| Temperature (Summer) | 2 F above ambient (92 F maximum) |

TABLE 5.2-6 (Continued). CLASS III WATER QUALITY CRITERIA (MARINE WATERS)

| <u>Parameter</u> | <u>Concentration</u> |
|----------------------|----------------------------------|
| Temperature (Winter) | 4 F above ambient (90 F maximum) |
| Turbidity | <29 NTU increase from background |
| Zinc | 1.0 mg/l |

| 1

TABLE 4

WATER-QUALITY TEST RESULTS (mg/l)
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

| <u>Number</u> | <u>Phenol</u> | <u>Naphthalene</u> | <u>Toluene</u> | <u>Sulfide</u> | <u>pH(Corrosivity)</u> | <u>Sulfate</u> |
|---------------|---------------|--------------------|----------------|----------------|------------------------|----------------|
| PZ-1 | ND | ND | ND | ND | 7.5 | 530 |
| PZ-2 | ND | ND | ND | ND | 7.5 | 140 |
| PZ-3 | 0.031 | ND | ND | ND | 8.0 | 140 |
| MW-1 | ND | ND | ND | 1.6 | 9.5 | 57 |
| MW-2 | 0.028 | ND | ND | 460 | 12.0 | 2000 |
| MW-4 | ND | ND | 0.037 | NT | NT | NT |
| MW-5 | ND | ND | ND | 0.62 | 7.8 | 150 |
| MW-6 | ND | 0.051 | ND | 2.4 | 10.7 | 510 |
| TMW-4 | 0.023 | ND | ND | 3.5 | 8.6 | 990 |
| TMW-5 | 0.029 | ND | ND | 0.62 | 10.8 | 650 |
| TMW-6 | ND | ND | ND | 1.5 | 7.1 | 360 |
| TMW-7 | NT | NT | ND | NT | NT | NT |
| TMW-8 | ND | ND | ND | ND | 6.7 | 140 |
| TMW-9 | ND | ND | ND | 0.83 | 8.1 | 1200 |
| TMW-10 | ND | 0.086 | ND | 0.72 | 9.7 | 530 |
| MCL | NP | 0.100 | NP | NP | | 250 |

ND = Not detected

NT = Not tested

NP = No published drinking water standard

MCL = Maximum contaminant level

Concentrations shown in bold type exceed the secondary drinking water standard for that compound.

TABLE 4
WATER-QUALITY TEST RESULTS (mg/l)
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

| Number | Copper | Zinc | Mercury | Arsenic | Antimony | Beryllium | Cadmium | Chromium | Lead | Nickel |
|--------|------------|-----------|---------------|--------------|----------|-----------|---------|----------|-------|--------|
| PZ-1 | 0.011 | 0.28 | ND | 0.024 | ND | ND | ND | 0.1 | 0.054 | 0.028 |
| PZ-2 | 48 | 88 | ND | 0.061 | ND | ND | ND | 0.017 | 0.008 | 0.014 |
| PZ-3 | 0.026 | 0.023 | ND | 0.014 | 0.14 | ND | ND | 0.3 | 4.2 | 0.37 |
| MW-1 | 0.023 | 0.380 | ND | ND | ND | ND | ND | 0.085 | ND | 0.019 |
| MW-2 | ND | 0.032 | ND | ND | ND | ND | ND | 0.028 | 0.021 | 0.029 |
| MW-4 | 0.031 | 0.032 | 0.0005 | ND | ND | ND | ND | 0.021 | 0.005 | 0.052 |
| MW-5 | 0.016 | 0.049 | 0.0003 | ND | ND | ND | ND | 0.091 | 0.035 | 0.016 |
| MW-6 | 0.047 | 0.11 | 0.0006 | ND | ND | ND | ND | 0.220 | 0.058 | 0.067 |
| TMW-4 | 0.98 | 15 | 0.0068 | 0.025 | 0.083 | 0.013 | 0.027 | 0.98 | 4.6 | 0.16 |
| TMW-5 | 0.64 | 2.1 | 0.0005 | 0.017 | ND | 0.011 | ND | 0.64 | 0.47 | 0.35 |
| TMW-6 | 1.3 | 2.00 | 0.0005 | 1.8 | ND | 0.017 | 0.022 | 0.140 | 0.063 | 0.083 |
| TMW-7 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT |
| TMW-8 | 0.023 | 0.93 | 0.0038 | 0.010 | ND | 0.019 | ND | 0.33 | 0.180 | 0.29 |
| TMW-9 | ND | 2.6 | 0.0004 | ND | 0.068 | 0.010 | ND | 0.29 | 1.0 | 0.24 |
| TMW-10 | 0.19 | 0.2 | 0.0067 | ND | ND | ND | ND | 0.29 | 0.080 | 0.10 |
| MCL | 1.0 | 5.0 | 0.002 | 0.050 | NP | NP | 0.010 | 0.050 | 0.050 | NP |

ND = Not detected

NT = Not tested

NP = No published drinking water standard

MCL = Maximum contaminant level

Concentrations shown in bold type exceed the drinking water standard for that compound.
Mercury, arsenic, cadmium, chromium and lead have primary standards and zinc and copper have a secondary standard.

Karen Samples Ft Lauderdale News
309-522-2077

Kerri Barsh

Kaplan - Cooling Towers

Temp of S.K. Aerat. Pond??

Discharge Rate - vs - River Ver.

Metal Cleaning Wastes

(No Applicat or No Discharge)

Periodic Water Wash Operation

(Not covered)

Neutralization Pond - Not adequate

in size, PO₄ problem

Page 8-6 - contractor needs to
apply for a permit

Oil-Storage Tank area - every year
or discharge

Runoff Pond size - not for 10^{yr} 24 hr
storm event

S.K. cooling in AES? CT

Not covered in Applicat.

Emergency Overflow Yard Ponds to

Broward River. Not shown

December 21, 1989

Mr. Hamilton S. Oven, Jr.
Administrator, Siting Coordination Section
Division of Air Resources Management
Department of Environmental Regulation
2000 Blair Stone Road
Tallahassee, Florida 32399

Dear Mr. Oven:

Enclosed are the original and 45 copies of Amendment 5 to the Site Certification Application for the Cedar Bay Cogeneration Project. Also enclosed is a summary description of the changes made by this amendment.

This amendment includes a minor refinement of the project site arrangement. Figure 3.2-1 is revised. Other figures which show the proposed site arrangement should also be considered as incorporating these refinements.

The amendment also includes a revised construction dewatering plan. The dewatering water is now directed to the St. Johns River via the Seminole Kraft existing once through cooling water rather than to the Broward River via the construction runoff pond. Considerable additional detail is included to describe the estimates of construction dewatering water quality and the expected interactions with onsite test well data.

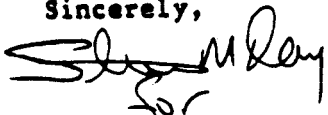
The variance and mixing zone requests associated with the construction dewatering discharges are revised through the use of the latest water quality sampling results from the onsite test wells and the Broward River. Existing water quality of the St. Johns River is also considered. Mixing zones calculations are not included with this letter, but will be submitted during the week of January 2, 1990.

This letter also serves as official notification that AES Cedar Bay, Inc., agrees to reduce NO_x emissions for the CFB boilers from 0.36 to 0.29 lb/MBtu. This reduced emission rate is made possible by the most recent guarantee of 0.29 lb/MBtu provided by the intended boiler manufacturer. This proposed limitation is revised on page 3-19 of the application, even though analyses within the application are based on 0.36 lb/MBtu. The currently proposed emissions of 0.29 lb/MBtu will reduce the NO_x emissions from the cogeneration plant given in Table 3.4-2 from 4,676 to 3,767 tons per year. In addition, the BACT evaluation will change so that the additional incremental cost for removal of NO_x , when comparing the CFB boilers alone and when equipped with SNCR, increases from about \$1,400 per ton to about \$2,000 per ton of NO_x removal. Ambient air quality impacts

The logo for AES Cedar Bay Inc. features the letters "AES" in a bold, stylized font, followed by a diagonal line and the words "Cedar Bay Inc." in a serif font.

also will show an even greater improvement with this proposed lower emission limit. This reduced emission limit is possible through the use of CFB boilers and innovative combustion technology. The proposed emission rate is less than half of the applicable New Source Performance Standard (NSPS) and will be the lowest NO_x emission rate for any coal fired plant in Florida.

Sincerely,



Jeffrey V. Swain
Project Director

Enclosure

cc: Mr. Robert Cooper, Environmental Protection Agency (5 copies)
Mr. Steve Tribble, Florida Public Service Commission (3 copies plus
3 Volume 1 only)
Mr. Steven M. Day, Black & Veatch
Mr. Terry Cole, Esq., Oertel Hoffman Fernandez & Cole
Mr. Richard Maquire, Esq., City of Jacksonville
Ms. Kathryn Menella, Esq., St. Johns River Water Management District
Ms. L. Kathryn Funchess, Esq., Department of Community Affairs
Mr. William Bostwick, Esq.
Mr. Earl L. Barker, Jr., Esq.

DIRECTIONS FOR INSERTING AMENDMENT 5, DECEMBER 22, 1989

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| Volume 3 | |
| Section 10.1.1, NPDES Application | |
| 4th Page and 5th Page | 4th Page and 5th Page |
| 16 Page | 16 Page |
| Section 10.6.2, Operate/Construct Industrial Wastewater Treatment and Disposal System | |
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AMENDMENT 5--SUMMARY DESCRIPTION OF CHANGES

Amendment 5 provides revisions and additions for the Cedar Bay Cogeneration Project's Site Certification Application submitted to the Florida Department of Environmental Regulation by AES Cedar Bay, Inc., and Seminole Kraft Corporation. The changes result from a reduction in the proposed NO_x emissions, minor refinements to the site arrangement, and revisions to the construction dewatering discharge system. Amendment 5 makes the following revisions.

1. Refined the site arrangement (Figure 3.2-1). Other figures which show the proposed site arrangement should also be considered as incorporating these changes.
2. Modified construction dewatering plan so that discharge is directed to the St. Johns River via the Seminole Kraft once through cooling water.
3. Revised the proposed surface water monitoring program to sample only the construction dewatering waste stream on a monthly basis.
4. Added further detail regarding the proposed construction dewatering activities.
5. Revised the variance request associated with the construction dewatering discharge by using the latest water quality sampling results from the onsite test wells and the Broward River. Existing water quality of the receiving water body (St. Johns River) is also considered.
6. Revised the proposed NO_x emission limitation from 0.36 lb/MBtu to 0.29 lb/MBtu (page 3-19).
7. Revised NPDES application and Florida Application to Operate/Construct Industrial Wastewater Treatment and Disposal Systems to include proposed changes to the construction dewatering discharge.

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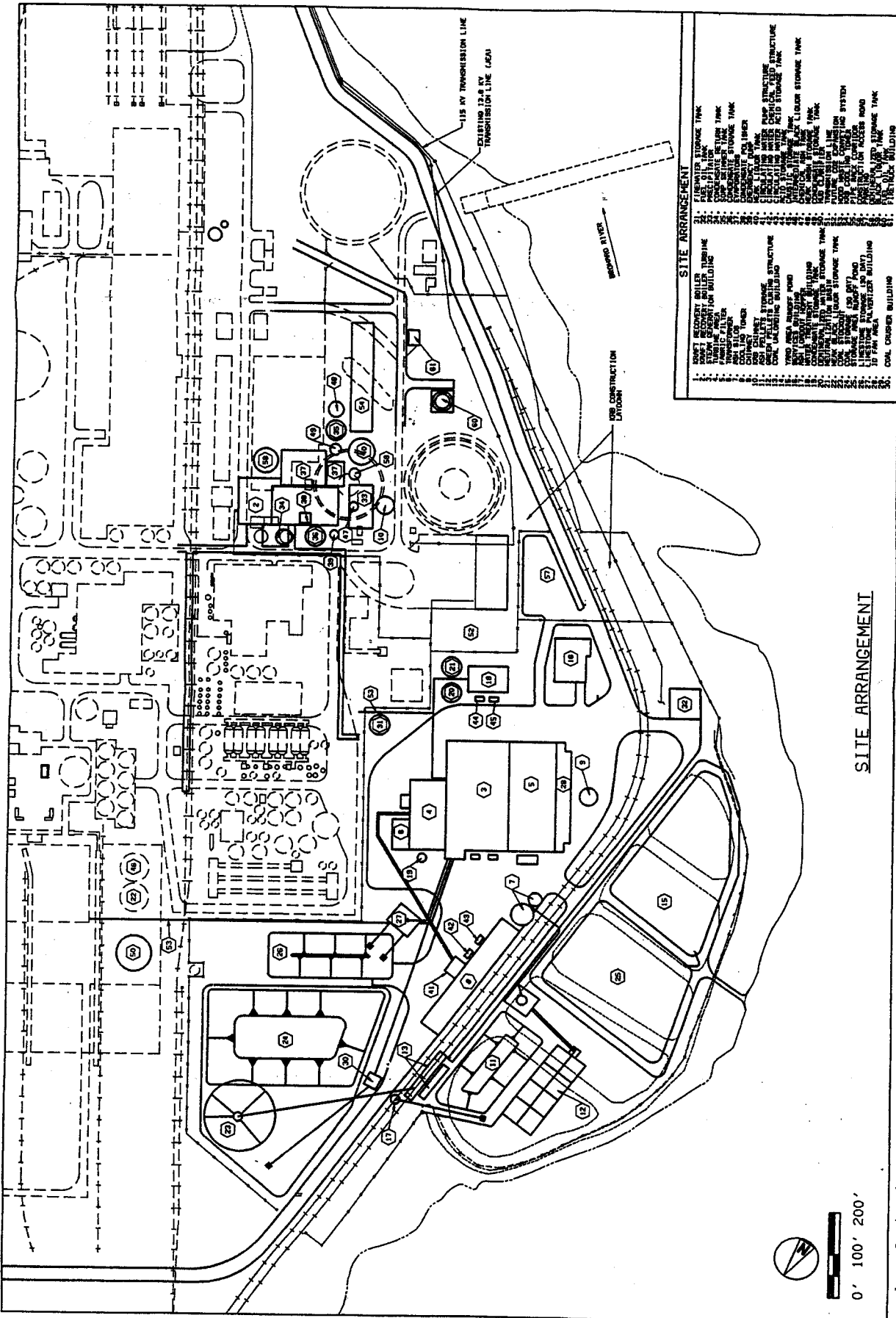
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SITE ARRANGEMENT

0' 100' 200'

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| SITE ARRANGEMENT | |
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| 1 | 115 KV TRANSMISSION LINE |
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| 100 | 115 KV TRANSMISSION LINE |

Figure 3.21

load for the entire year. The emission estimates for the fluidized bed boilers are based on a capacity factor of 93 percent.

Annual emissions listed in Table 3.4-2 are based on the following emission rates.

- Cogeneration plant.

- Sulfur dioxide = 0.31 lb/MBtu.
- Nitrogen oxides = 0.29 lb/MBtu.
- Carbon monoxide = 0.19 lb/MBtu.
- Particulate = 0.02 lb/MBtu.
- VOC = 0.016 lb/MBtu.

- Kraft recovery boiler.

- Sulfur dioxide = 120 ppmvd corrected to 8 percent oxygen.
- Nitrogen oxides = 180 ppmvd corrected to 8 percent oxygen.
- Carbon monoxide = 400 ppmvd corrected to 8 percent oxygen.
- Particulate = 0.044 gr/dscf corrected to 8 percent oxygen.
- TRS = 5 ppmvd corrected to 8 percent oxygen.
- VOC = 80 ppmvd corrected to 8 percent oxygen.

- Smelt dissolving tank.

- TRS = 0.032 lb/ton black liquor solids.
- Particulate = 0.20 lb/ton black liquor solids.

Emissions of nitrogen oxides are based on 0.29 lb/MBtu, even though analyses in the remainder of the application are based on 0.36 lb/MBtu. The results of all analyses, as given, represent a conservative approach to the assessment.

Applicable new source performance standards (NSPS) and Best Available Control Technology (BACT) emissions are given in Table 3.4-2a for comparison. Estimated maximum annual emissions resulting from use of fuel oil (startup, shutdown, flame stabilization) are presented in Table 3.4-2b.

The material handling emissions are estimated using AP-42 fugitive dust emission factors and conservative assumptions. The fugitive dust emissions from this project are minimized by numerous dust control methods. These methods vary from wet suppression of the active storage piles (50 percent control) to full enclosure and dust collectors (99 percent

control). To conservatively estimate the potential controlled emissions, minimum control efficiencies are assumed for each control method. For example, conveyor covers are reported to control 70 to 90 percent of the fugitive dust generated. Also, dust collectors are generally considered 99 to 99.9 percent efficient. For this project, the lower range control efficiencies, 70 and 99 percent, are assumed for conveyor covers and dust collectors. Table 3.4-3 shows the material consumption during worst-case conditions and typical material characteristics that are assumed.

Table 3.4-5 identifies the fugitive dust sources and their associated emissions at the Cedar Bay facility. This table shows that the dust control methods limit the fugitive dust emissions to approximately 8.0 tons per year or 1.8 pounds per hour. The major fugitive dust sources at the plant are the active coal storage pile (about 2.5 tons per year) and the coal crusher (about 1.8 tons per year). The fugitive dust from the active coal storage pile will be controlled by wet suppression to the pile. Controls for the coal crusher include enclosures and dust collection to a fabric filter baghouse.

will consist of 60 mil (minimum) synthetic liner placed on a prepared sub-grade layer, creating a stable, highly impermeable liner.

In accordance with National Pollution Discharge Elimination System permit requirements, the Storage Area Runoff Pond will be designed to contain the runoff resulting from a 10-year, 24-hour rainfall event for the entire storage and associated facilities areas, and the direct precipitation on the pond area. Runoff from precipitation exceeding the 10-year, 24-hour event will be detained and directed to the existing outfall to be discharged at a rate which will not exceed the peak rate of discharge from the undeveloped site resulting from a 25-year, 24-hour storm. Flows which exceed that resulting from the 25-year, 24-hour storm event will be discharged via an emergency overflow chute directly to the Broward River. | 1

Runoff and direct precipitation retained within the Storage Area Runoff Pond will be directed to the Seminole Kraft treatment facilities as described in Subsection 3.6.9. Controlled drawdown of the runoff pond to its normally empty condition will be accomplished through a buried pressure pipeline routed to the runoff treatment facilities.

The Storage Area Runoff Pond will be built early during construction to serve as a construction runoff retention pond. A system of temporary construction ditches and piping will direct the construction area storm-water runoff flow to the pond. The construction period will last for approximately 2 years. Yard runoff will be directed to the Yard Area Runoff Pond as soon as it is operational (approximately halfway through the construction period). This sequencing will allow time for the Storage Area Runoff Pond to be cleaned out and the synthetic liner installed prior to the initial delivery of coal. Once the liner is in place, runoff from storage areas will be collected and treated as discussed above. | 1 | 5

3.8.2 Yard Area Runoff Pond

Surface runoff from the main plant complex area and yard areas not affected by bulk materials handling will be collected and directed to the Yard Area Runoff Pond. This pond will be located in the western portion of the new facilities area. The pond will be designed to retain, without | 1

4.2 IMPACT ON SURFACE WATER BODIES AND USES

4.2.1 Impact Assessment

The construction of the Cedar Bay Cogeneration Plant will have no appreciable impact on any surface waters. There are no bodies of water on the plant construction site. The area is presently a storage area for lime mud from the paper mill, with very sparse vegetation. A silt fence will be installed along the western perimeter of the site to prevent the deposition of silt in the river as a result of soil erosion during construction.

As described in Section 3.8, the Storage Area Runoff Pond will be built early during construction to serve as a construction runoff retention pond. A system of temporary construction ditches and piping will direct the flow to the pond. Therefore, no increase in runoff to the Broward River is expected, as a result of construction activities.

4.2.2 Measuring and Monitoring Programs

During construction, water samples from the dewatering discharge will be collected and tested monthly and compared to the water quality standards for Class III water.

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4.3 GROUND WATER IMPACTS

4.3.1 Ground Water Impact Assessment

4.3.1.1 Water Table Zone. Ground water quality impacts due to construction activities will be negligible. Studies show that any water infiltrating the site flows to the water table, then nearly horizontally toward the Broward or St. Johns River.

Construction water will be collected in ponds, treated as necessary, and discharged into the St. Johns River by way of the existing Seminole plant outfall. Seepage from these ponds to the ground will flow to the water table, then to the Broward River. Any water not collected by the ponds will also seep to the water table and be discharged into that river.

4.3.1.2 Shallow Aquifer. Dewatering for the coal receiving structure, circulating water pipes, and cooling tower basin will be required. The expected dewatering activities include a one-month period of initial draw-down at about 2,000 gpm for the railcar unloading facility, an additional five to eight-month period of dewatering for this same facility at about 1,000 gpm, and the remaining 15 months with miscellaneous dewatering varying from 0 to 350 gpm.

Several underground gasoline, fuel oil and diesel storage tanks exist in the Seminole Kraft Mill. All underground tanks will be emptied, cleaned and sand filled prior to start of construction. At three tank locations, two diesels and one heavy fuel oil, significant contaminated ground water or free hydrocarbon product was detected. The two diesel storage tanks are included in the State EDI program. No free product was detected at the fuel oil tank location. Removal of the contaminated ground water and free hydrocarbon product will be started prior to the start of construction dewatering operations at the one diesel tank location that is within the radius of influence of the dewatering operations. The dewatering operations are not anticipated to have any effect on the remaining two sites. The removal technique will create a small localized depression, and reverse ground water gradient, in the surficial ground water table by pumping water below the contaminated zone. This will prevent continued expansion of the contaminated zone due to the natural ground water gradient, or any future construction dewatering operations. The contaminated water and free hydrocarbons will be removed by a surface skimmer system in a well centered in the localized ground water table depression.

The site is on a peninsula and is surrounded by the Broward and St. Johns Rivers and Dunn Creek. Two shallow wells have been installed on the site, in the little league field along Kraft Road and in the Champion Garage. The radius of influence for dewatering the coal receiving structure is estimated to be 1,300 feet on the shoreside. The nearest of the shallow wells is 2,000 feet from the coal receiving structure and is not within the radius of influence of the dewatering activities. Therefore,

there should be no effect on any offsite shallow wells. Water from dewatering operations will be mixed with the Seminole Kraft once-through cooling water and discharged to the St. Johns River as described in Section 4.11.

4.3.1.3 Floridan Aquifer. Construction water will be withdrawn from the existing Seminole Kraft paper mill wells. The additional quantity of water required for construction will not cause the paper mill wells to exceed the permitted withdrawal rates.

4.3.2 Measuring and Monitoring Programs

Background water quality was described in Subsection 2.3.2.1, Subsurface Hydrologic Data for the Site. New monitoring wells will be installed and ground water will be monitored as described in Subsection 5.3.5.

4.4 ECOLOGICAL IMPACTS

4.4.1 Impact Assessment

4.4.1.1 Wildlife. The proposed cogeneration plant site currently is a lime mud storage area for the paper mill. There is minimal wildlife habitat present. No noticeable impacts on wildlife will result from the construction of the main cogeneration plant facility.

4.8 IMPACT ON ARCHAEOLOGICAL AND HISTORIC SITES

No impacts are anticipated on the archaeological or historic sites in the vicinity of the Cedar Bay Cogeneration Project site. At this time, no archaeological studies are planned during the construction and operation of the facility. However, should any unforeseen discoveries occur, the Florida Secretary of State, Division of Archives, History and Records Management will be promptly notified, and an appropriate program will be developed. The Director of the Archives, History and Records Management will provide assistance by indicating the significance of the discovery and the appropriate preservation method to employ. The construction activities will be monitored to the extent that if a discovery occurs during construction, the activities in the immediate area of the discovery will be halted until the significance is determined and a method of preservation, if necessary, is put into place.

4.9 SPECIAL FEATURES

Trash and garbage will be collected in appropriate containers and removed from the site by a contractor for disposal at an approved facility. There will be no unusual products or raw materials used during construction which may affect the environment.

4.10 BENEFITS FROM CONSTRUCTION

The construction of the Cedar Bay Cogeneration Plant will have a beneficial impact on the local and regional economy. Construction materials will be purchased locally, within the state, and regionally. There will be increased employment opportunities, additional income, and more tax revenue. A detailed discussion of benefits from construction is given in Section 7.0.

4.11 VARIANCES

Law Engineering has performed several subsurface investigations at the Seminole Kraft mill site. Law performed insitu permeability tests during the development of the ground water monitoring plan for the mill, at the

time owned by the St. Regis Corporation, during 1983. The results of their tests indicated an insitu permeability averaging 0.007 fpm, with a maximum value of 0.0149 fpm. Previous analyses to determine the quantity of dewatering water have conservatively used the highest permeability value.

In order to determine the contributory flow areas, a horizontal flow net analysis was developed. This method of analysis is described in Seepage, Drainage and Flow Nets, by Harry R. Cedergren and "Dewatering and Ground Water Control for Deep Excavations" NAVFAC P-418. This is a graphical method that determines equipotential lines and flow streamlines to develop the drainage pattern to the excavation.

Figure 4.11-1 provides the flow net developed for the coal unloading structure. Eleven flow channels were developed. By this technique, each flow channel carries equal flows showing, as anticipated, that a large portion of the flow to the dewatering system will come from the existing Seminole Kraft lime mud ponds and the Broward River.

An analysis was performed to determine when ground water from the various sources (the Broward River, lime mud ponds, or ground water from the locations of the monitoring wells) will reach the coal unloading structure excavation. The velocity of ground water flow through a soil medium is described by the equation:

$$K_i/n = V$$

K = permeability

V = velocity

i = gradient

n = porosity

where

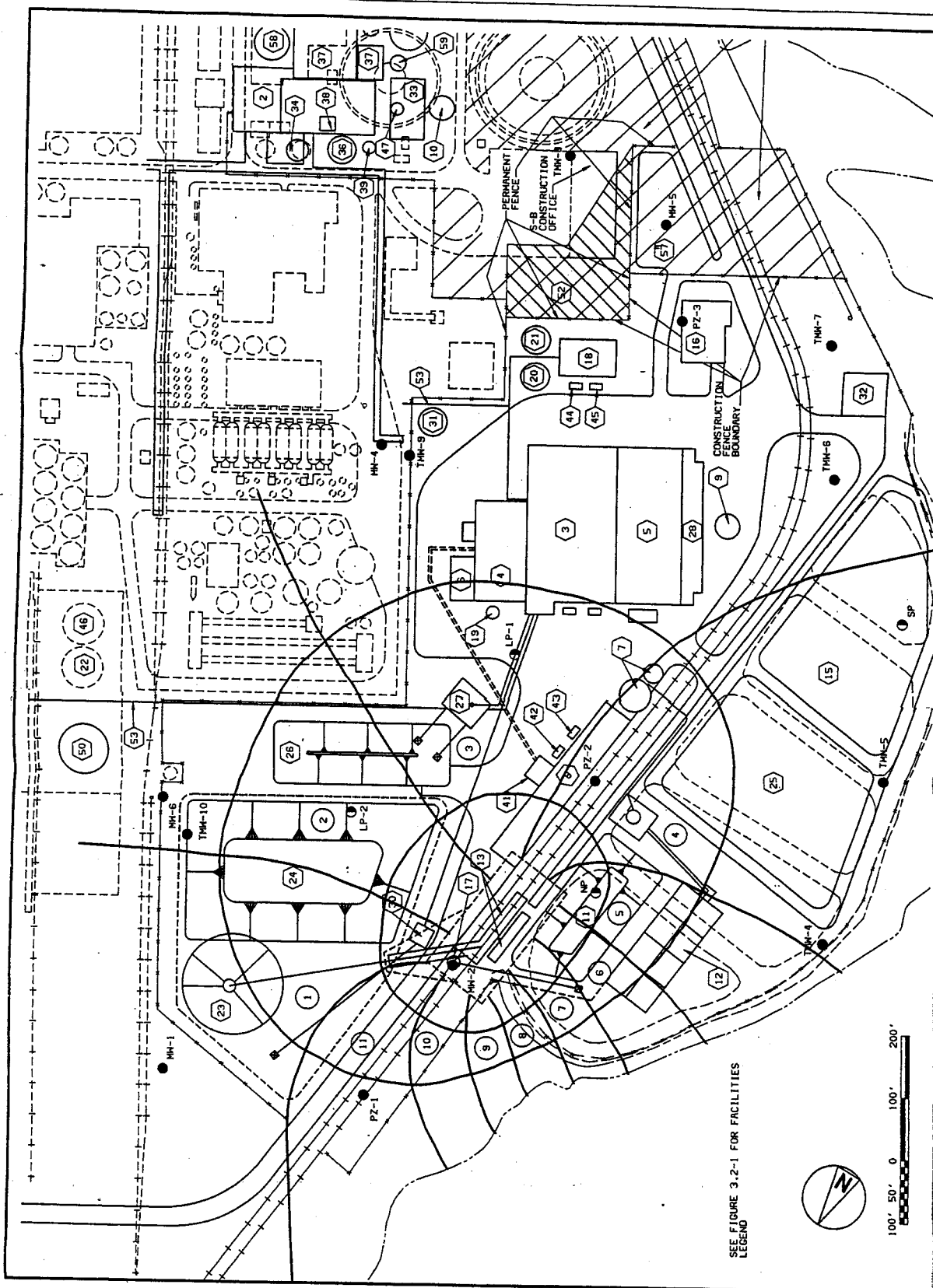
i = H/L

H = change in head

L = change in length

Due to the proximity of the existing lime mud ponds and the Broward River, water from these sources arrives at the excavation relatively soon. Based on the velocity equation previously defined, the time for Broward River water to reach the excavation for each flow channel is as follows.

4-12a



SEE FIGURE 3.2-1 FOR FACILITIES
LEGEND



100' 50' 0 100' 200'

Amendment 5
122189

RAILCAR UNLOADING FACILITY
DEWATERING ANALYSIS

4-12b

Figure 4.11-1

| <u>Flow Path</u> | <u>Time (Days)</u> |
|------------------|--------------------|
| 4 | 202 |
| 5 | 55 |
| 6 | 34 |
| 7 | 21 |
| 8 | 16 |
| 9 | 13 |
| 10 | 36 |
| 11 | 117 |

Flow from the lime mud ponds will also form part of the water contribution for Flow Paths 4 through 8. Since the water from their ponds is of lesser quality than the Broward River, for a conservative analysis all water from these flow paths was assumed to come from the lime mud ponds. Due to the proximity of these ponds, the water from these ponds will reach the excavation within the first month of dewatering for Flow Paths 4 through 8.

The time for ground water to reach the coal unloading structure excavation from the vicinity of the monitoring wells was calculated in a similar manner. The maximum gradient for each well location to the excavation was used to minimize the time for the ground water to reach the excavation. In Flow Paths 1 through 3 and 11, only the wells were considered as the water sources for the remaining flow paths is either the lime mud ponds or the Broward River. The time for ground water to reach the excavation for each monitoring well is as follows.

| <u>Well No.</u> | <u>Time (Days)</u> |
|-----------------|--------------------|
| MW-1 | 78 |
| MW-2 | 0 |
| MW-4 | 180 |
| MW-5 | 418 |
| MW-6 | 93 |
| TMW-6 | 238 |
| TMW-7 | 362 |

| <u>Well No.</u> | <u>Time (Days)</u> |
|-----------------|--------------------|
| TMW-8 | 495 |
| TMW-9 | 170 |
| TMW-10 | 90 |
| PZ-1 | 19 |
| PZ-2 | 12 |
| PZ-3 | 318 |

Initially, ground water will come from the vicinity of Well MW-2. To determine the quality of the dewatering discharge versus time, the water quality of each flow channel was determined by the time for the water to reach the excavation from each well or water source within the boundaries of the flow channel. Table 4.11-1 indicates the factors applied to each well to determine the "typical dewatering" analysis as a function of time. The quality of water from the lime mud ponds is assumed to be the average of Wells TMW-4 and TMW-5, since they are presently immediately downgradient of the lime mud ponds.

Table 4.11-2 indicates all available water quality analysis results from sampling of the Broward River and the various ground water monitoring wells. The table includes six values for the Broward, three at high tide and three at low tide. The sampling program undertaken by Savannah Laboratories for Black & Veatch on certain wells in October 1989 is included as well as tests run by Dames & Moore (D&M) in December 1988 and Environmental Resources Management-South Inc. (ERM) in July 1988. Note that values for certain metals are not included in the D&M and ERM data as their testing addressed only drinking water standards for potential hazardous wastewater determinations, not the Florida Class III surface water standards.

Only those wells which will impact the dewatering waste quality are included in Table 4.11-1. Monitoring Wells PZ-3, MW-5, TMW-6, TMW-7, and TMW-8 are not included because, as indicated previously, the ground water in their vicinity will not reach the dewatering location within the 180 day time frame.

Table 4.11-3 indicates the average value determined for the Broward River and each monitoring well used in this analysis. Since no data are

TABLE 4.11-1. MONITORING WELLS USED TO APPROXIMATE DEWATERING WATER QUALITY

| <u>Days</u> | <u>Sectors</u> | <u>Monitoring Wells Used to Approximate Quality</u> |
|-------------|----------------|---|
| Initial | 1 through 11 | MW-2 |
| 30 Days | 1, 11 | PZ-1 |
| | 2 | MW-1, MW-6, and TMW-10 |
| | 3 | PZ-2 |
| | 4, 5, 6, 7, 8 | TMW-4 and TMW-5 |
| | 9, 10 | Broward River |
| 60 Days | 1 | MW-1 |
| | 2 | MW-1, MW-6, TMW-10 |
| | 3 | PZ-2 |
| | 4, 5, 6, 7, 8 | TMW-4 and TMW-5 |
| | 9, 10 | Broward River |
| | 11 | PZ-1 |
| 90 Days | 1 | MW-1 |
| | 2 | MW-6 and TMW-10 |
| | 3 | MW-6, MW-10, PZ-2, MW-4, and TMW-9 |
| | 4, 5, 6, 7, 8 | TMW-4 and TMW-5 |
| | 9, 10 | Broward River |
| | 11 | PZ-1 |
| 120 Days | 1 | MW-1 |
| | 2 | MW-6, and TMW-10 |
| | 3 | MW-4 and TMW-9 |
| | 4, 5, 6, 7, 8 | TMW-4 and TMW-5 |
| | 9, 10, 11 | Broward River |
| 180 Days | 1 | MW-1 |
| | 2 | MW-6 and TMW-10 |
| | 3 | MW-4 and TMW-9 |
| | 4, 5, 6, 7, 8 | TMW-4 and TMW-5 |
| | 9, 10, 11 | Broward River |

4-12e

TABLE 4.11-2. MONITORING RESULTS

| Parameter | Class III | Hi Tide
Broward
BAV | Lo Tide
Broward
BAV | Hi Tide
Broward
BAV | Lo Tide
Broward
BAV | Hi Tide
Broward
BAV | Lo Tide
Broward
BAV | PZ-1
DAM
122288 | PZ-2
DAM
122288 | PZ-2
BAV
101889 | PZ-2
BAV
102089 | Lo Tide
Broward
BAV | Hi Tide
Broward
BAV | PZ-1
DAM
122288 | PZ-2
DAM
122288 | PZ-2
BAV
101889 | PZ-2
BAV
102089 | PZ-2
BAV
102489 | MU-1
DAM
122288 | MU-1
ERM
080188 | MU-2
DAM
122288 |
|----------------------------|-----------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|---------------------------|---------------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|
| Aluminum, mg/l | 1.5 | 0.12 | 0.33 | 0.36 | 5.3 | 0.21 | 0.23 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Antimony, mg/l | 0.2 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Arsenic, mg/l | 0.05 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Bromate, mg/l | 100 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 | < 2500 |
| Cadmium, mg/l | 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Chloride, mg/l | <10% inc | 3800 | 2800 | 3700 | 5000 | 4700 | 4700 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 |
| Chromium, mg/l | 0.05 | < 0.01 | < 0.01 | < 0.01 | 0.015 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Copper, mg/l | 0.015 | < 0.09 | 0.072 | 0.031 | 0.065 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Cyanide, mg/l | 0.005 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Fluoride, mg/l | 5 | 0.5 | 0.5 | 0.32 | 0.42 | 0.48 | 0.4 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Iron, mg/l | 0.3 | 0.13 | 0.4 | 0.48 | 6.8 | 0.17 | 0.25 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 |
| Lead, mg/l | 0.05 | 0.005 | 0.0062 | 0.0058 | 0.02 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 |
| Mercury, mg/l | 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 |
| Nickel, mg/l | 0.1 | < 0.01 | 0.014 | 0.01 | < 0.01 | < 0.01 | 0.014 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Oil/grease, mg/l | 5 | < 1 | < 1 | < 1 | < 1.6 | < 1 | < 1 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| pH | 6.5-8.5 | 7.6 | 7.7 | 7.6 | 7.6 | 7.5 | 7.6 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Phenol, mg/l | 0.001 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Tot Phos, mg/l (as needed) | 0.13 | 0.13 | 0.1 | 0.24 | 1.1 | 0.13 | 0.14 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Selenium, mg/l | 0.025 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Silver, mg/l | 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 |
| Turbidity, NTU | <29 inc | 11 | 11 | 12 | 250 | 3.1 | 5.9 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc, mg/l | 1 | < 0.01 | < 0.01 | < 0.01 | 0.026 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 |

(2) Silver below detection limits.

TABLE 4.11-2 (Continued). MONITORING RESULTS

| Parameter | Class III | MI-2
ERM
080188 | MI-2
B&V
101889 | MI-2
B&V
102089 | MI-2
B&V
102489 | MI-4
ERM
080188 | MI-4
B&V
101889 | MI-4
B&V
102089 | MI-4
B&V
102489 | MI-6
D&M
122288 | TM-4
D&M
122288 | TM-5
D&M
122288 | TM-9
D&M
122288 | TM-10
D&M
122288 |
|----------------------------|-----------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|-----------------------|------------------------|
| Aluminum, mg/l | 1.5 | < 0.05 | 4.9 | 8.9 | 3.2 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | < 0.05 | 0.083 | < 0.05 | < 0.068 | < 0.05 |
| Antimony, mg/l | 0.2 | < 0.005 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.025 | 0.017 | < 0.01 | < 0.01 |
| Arsenic, mg/l | 0.05 | < 0.005 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.025 | 0.017 | < 0.01 | < 0.01 |
| Bromate, mg/l | 100 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.027 | < 0.005 | < 0.005 | < 0.005 |
| Cadmium, mg/l | <10% inc | < 0.01 | 260 | 120 | 310 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.3 | 0.22 | 0.29 | 0.29 |
| Chloride, mg/l | 0.05 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.98 | 0.64 | 1.8 | 0.19 |
| Chromium, mg/l | 0.015 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Copper, mg/l | 0.005 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Cyanide, mg/l | 5 | < 0.02 | < 0.2 | < 0.32 | < 0.41 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Fluoride, mg/l | 0.3 | < 0.02 | 1.1 | 1.9 | 0.87 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Iron, mg/l | 0.05 | < 0.005 | 0.054 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Lead, mg/l | 0.001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | < 0.0001 | 0.0068 | 0.0005 | 0.0004 | 0.0067 |
| Mercury, mg/l | 0.1 | < 0.02 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.16 | 0.35 | 0.24 | 0.1 |
| Nickel, mg/l | 5 | < 0.02 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Oil/grease, mg/l | 6.5-8.5 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| pH | 0.001 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Phenol, mg/l | 0.001 | < 0.005 | 12.0 | 12.1 | 12.0 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Tot Phos, mg/l (as needed) | 0.025 | < 0.005 | 0.066 | 0.06 | 0.1 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Selenium, mg/l | 0.0005 | < 0.005 | 0.96 | 0.56 | 0.51 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Silver, mg/l | <29 inc | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Turbidity, NTU | 1 | < 0.01 | 350 | 120 | 23 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |
| Zinc, mg/l | 1 | < 0.01 | 0.023 | < 0.05 | < 0.018 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | < 0.01 | 0.01 | < 0.01 | < 0.01 | < 0.01 |

(2) Silver below detection limits.

TABLE 4.11-3. AVERAGE VALUES FOR BROWARD RIVER AND MONITORING WELLS

| Parameter | Class III | Average Broward | PZ-1 | Average PZ-2 | Average MI-1 | Average MI-2 | Average MI-4 | MI-6 | TM-4 | TM-5 | TM-9 | TM-10 | Average MI-2 PZ-2 * |
|----------------------------|-----------|-----------------|----------|--------------|--------------|--------------|--------------|---------|---------|---------|---------|---------|---------------------|
| Aluminum, mg/l | 1.5 | 1.09 | * | 5.80 | * | 5.7 | 16.7 | * | * | * | * | * | 5.7 |
| Antimony, mg/l | 0.2 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.083 | < 0.050 | * | < 0.050 | |
| Arsenic, mg/l | 0.05 | < 0.010 | 0.024 | 0.064 | < 0.008 | < 0.009 | < 0.009 | < 0.010 | 0.025 | 0.017 | < 0.010 | < 0.010 | |
| Bromate, mg/l | 100 | < 2500 | * | < 10.0 | * | 66.7 | 50.0 | * | * | * | * | * | < 38.3 |
| Cadmium, mg/l | 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | < 0.005 | 0.027 | < 0.005 | < 0.005 | < 0.005 | |
| Chloride, mg/l | <10% inc | 4117 | * | 5.30 | * | 230 | 157 | * | * | * | * | * | 118 |
| Chromium, mg/l | 0.05 | < 0.011 | 0.10 | < 0.016 | < 0.048 | < 0.014 | < 0.048 | 0.22 | 0.30 | 0.22 | 0.29 | 0.290 | |
| Copper, mg/l | 0.015 | < 0.046 | 0.011 | < 0.011 | < 0.047 | < 0.010 | < 0.026 | 0.047 | 0.980 | 0.640 | 1.800 | 0.190 | |
| Copper (I), mg/l | 0.015 | < 0.046 | 0.011 | < 0.010 | 0.047 | < 0.010 | < 0.026 | 0.047 | 0.980 | 0.640 | 1.800 | 0.190 | |
| Cyanide, mg/l | 0.005 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | * | < 0.010 |
| Fluoride, mg/l | 5 | 0.44 | * | < 0.200 | * | < 0.31 | 0.25 | * | * | * | * | * | < 0.26 |
| Iron, mg/l | 0.3 | 1.37 | * | 2.37 | * | 1.29 | 8.33 | * | * | * | * | * | 1.83 |
| Lead, mg/l | 0.05 | < 0.008 | 0.054 | < 0.008 | 0.066 | < 0.015 | < 0.034 | 0.058 | 4.600 | 0.470 | 1.000 | 0.080 | |
| Mercury, mg/l | 0.0001 | < 0.0001 | < 0.0002 | < 0.00013 | < 0.00049 | < 0.00032 | < 0.00052 | 0.00060 | 0.00680 | 0.00050 | 0.00040 | 0.007 | |
| Nickel, mg/l | 0.1 | < 0.011 | 0.028 | < 0.014 | 0.055 | < 0.021 | 0.043 | 0.067 | 0.160 | 0.350 | 0.240 | 0.100 | |
| Oil/grease, mg/l | 5 | < 1.10 | * | < 1.0 | * | < 1.0 | 3.7 | * | * | * | * | * | < 1.0 |
| pH | 6.5-8.5 | 7.60 | 7.50 | 7.19 | 9.50 | 12.0 | 9.96 | 10.70 | 8.60 | 10.80 | 8.10 | 9.700 | |
| Phenol, mg/l | 0.001 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | 0.075 | < 0.013 | < 0.010 | 0.023 | 0.029 | < 0.010 | < 0.010 | |
| Tot Phos, mg/l (as needed) | 0.31 | 0.31 | * | 0.37 | * | 0.68 | < 0.062 | * | * | * | * | * | 0.52 |
| Selenium, mg/l | 0.025 | < 0.010 | < 0.010 | < 0.010 | < 0.008 | < 0.017 | < 0.009 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | |
| Silver, mg/l | 0.00005 | < 0.00005 | * | < 0.0000 | * | < 0.000 | 0.000 | * | * | * | * | * | 0.00004 |
| Turbidity, NTU | <25 inc | 48.8 | * | 26.1 | * | 164 | 89.0 | * | * | * | * | * | 95.2 |
| Zinc, mg/l | 1 | < 0.013 | 0.28 | < 22.0 | < 0.20 | < 0.027 | < 0.069 | 0.11 | 15 | 2.1 | 2.6 | 0.20 | |
| Zinc (I), mg/l | 1 | < 0.013 | 0.28 | < 0.010 | < 0.20 | < 0.027 | < 0.069 | 0.11 | 15 | 2.1 | 2.6 | 0.20 | |

* Average of MI-2 and PZ-2 used where there are no data available for Al, Br, Cl, F, Fe, Oil/Grease, Tot P, Ag, and Turbidity in PZ-1, MI-1, MI-6, TM-4, TM-5, and TM-9. Silver is below detection limits.

(1) Excluding DEN 12/28/88 values for copper and zinc in PZ-2

available for aluminum, bromate, chloride, fluoride, iron, oil and grease, total phosphorus, and turbidity in the wells analyzed by D&M and ERM, the values for these constituents are assumed to be the average of MW-2 and PZ-2. Also, since the D&M and ERM silver tests had detected limits several orders of magnitude above the Class III Standard value, the MW-2 and PZ-2 average silver value is also substituted for silver.

Two values are shown in Table 4.11-3 for average copper and zinc in well PZ-2. D&M reported copper and zinc at 48 mg/l and 88 mg/l, respectively, for PZ-2. Three additional samples by Black & Veatch on this well did not confirm these high values; the values obtained were below detection limits in all cases. Thus, Table 4.11-3 indicates a second average value for copper and zinc with subscript (1) which excludes the outlying values.

Table 4.11-4 shows the typical dewatering water, calculated by using Table 4.11-1 and the average values determined for each well.

The dewatering water will be mixed with Broward River water from the Seminole Kraft once-through cooling discharge prior to routing to the St. Johns River. Table 4.11-5 shows the expected analysis of the mixed effluent as a function of time. The maximum value of the six tests run by Black & Veatch is used for the Broward River cooling water.

Approximately 2,000 gpm will be required to be pumped from the shallow aquifer for approximately 30 days during initial dewatering and approximately 1,000 gpm will be required to be pumped for approximately 5 months thereafter. The dewatering water will be directed to an existing Seminole Kraft manhole where it will mix with 43.2 million gallons per day (30,000 gpm) of Seminole Kraft once-through cooling water. Seminole Kraft once-through cooling water is obtained from the Broward River. The combined effluent will then be discharged to the St. Johns River through the existing Seminole Kraft wastewater discharge structure. The existing outfall structure consists of a single 72-inch concrete pipe which splits and reduces to four separate 36-inch pipes with open ends located near the edge of the ship channel.

Table 4.11-5 shows that, at times, the mixed effluent to be above the Class III Standards for aluminum, cadmium, copper, iron, lead, mercury,

TABLE 4.11-4. CALCULATED VALUES FOR TYPICAL DEWATERING WATER VERSUS TIME

| Parameter | Class III | Cooling Water Maximum Broward | Typical Dewatering Water | | | | | |
|----------------------------|-----------|-------------------------------|--------------------------|----------|----------|----------|----------|----------|
| | | | Initial | 30 days | 60 days | 90 days | 120 days | 180 days |
| Aluminum, mg/l | 1.5 | 5.3 | 5.67 | 4.90 | 4.90 | 5.10 | 4.96 | 4.96 |
| Antimony, mg/l | 0.2 | < 0.05 | < 0.050 | < 0.058 | < 0.058 | < 0.058 | < 0.058 | < 0.058 |
| Arsenic, mg/l | 0.05 | < 0.01 | < 0.009 | < 0.022 | < 0.021 | < 0.021 | < 0.015 | < 0.015 |
| Bromate, mg/l | 100 | ** | < 67 | ** | ** | ** | ** | ** |
| Cadmium, mg/l | 0.005 | < 0.0050 | < 0.0050 | < 0.0100 | < 0.0100 | < 0.0100 | < 0.0100 | < 0.0100 |
| Chloride, mg/l | <100 inc | 5000 | 230 | 835 | 835 | 833 | 1210 | 1210 |
| Chromium, mg/l | 0.05 | 0.015 | < 0.014 | < 0.16 | < 0.15 | < 0.16 | < 0.16 | < 0.16 |
| Copper, mg/l | 0.015 | 0.090 | < 0.010 | < 1.479 | < 1.482 | < 1.739 | < 0.479 | < 0.479 |
| Copper (I), mg/l | 0.015 | 0.090 | < 0.010 | < 0.388 | < 0.391 | < 0.430 | < 0.479 | < 0.479 |
| Cyanide, mg/l | 0.005 | < 0.01 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 |
| Fluoride, mg/l | 5 | 0.50 | < 0.31 | < 0.28 | < 0.28 | < 0.28 | < 0.30 | < 0.30 |
| Iron, mg/l | 0.3 | 6.80 | 1.29 | 1.79 | 1.79 | 1.92 | 2.00 | 2.00 |
| Lead, mg/l | 0.05 | 0.020 | < 0.015 | < 1.170 | < 1.171 | < 1.188 | < 1.214 | < 1.214 |
| Mercury, mg/l | 0.0001 | <0.00010 | <0.00032 | <0.0020 | <0.0020 | <0.0022 | <0.0021 | <0.0021 |
| Nickel, mg/l | 0.1 | 0.014 | < 0.021 | < 0.131 | < 0.133 | < 0.140 | < 0.144 | < 0.144 |
| Oil/grease, mg/l | 5 | 1.6 | < 1.00 | < 1.02 | < 1.02 | < 1.07 | < 1.15 | < 1.15 |
| pH | 6.5-8.5 | 7.7 | 12.03 | 7.77 | 7.86 | 7.91 | 8.10 | 8.10 |
| Phenol, mg/l | 0.001 | < 0.010 | 0.075 | < 0.017 | < 0.017 | < 0.017 | < 0.017 | < 0.017 |
| Tot Phos, mg/l (as needed) | 1.1 | 1.1 | 0.68 | 0.47 | 0.47 | 0.46 | 0.44 | 0.44 |
| Selenium, mg/l | 0.025 | <0.00001 | < 0.017 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 |
| Silver, mg/l | 0.00005 | <0.00005 | <0.00004 | <0.00004 | <0.00004 | <0.00004 | <0.00004 | <0.00004 |
| Turbidity, NTU | <29 inc | 250 | 164.3 | 80.5 | 80.5 | 79.1 | 82.3 | 82.3 |
| Zinc, mg/l | 1 | 0.026 | < 0.027 | < 6.0 | < 5.9 | < 6.4 | < 4.0 | < 4.0 |
| Zinc (I), mg/l | 1 | 0.026 | < 0.027 | < 4.0 | < 3.9 | < 4.0 | < 4.0 | < 4.0 |

** Bromate could not be measured accurately in Broward River due to interferences.
(1) Excluding DMA 12/28/88 values for copper and zinc in PI-2

TABLE 4.11-5. BLENDED DEWATERING WATER AND ONCE-THROUGH COOLING WATER EFFLUENT TO THE ST. JOHNS

| Seminole-Kraft Cooling Water Flow: 43.2 mgd | | | | | | | | | | | | | St. Johns River Quality (2) | | |
|---|-----------|-----------------|-------------------|-----------------------------|---------------------|-----------|-----------|-----------|-----------|-----------|-----------|---------|-----------------------------|--|--|
| Parameter | Class III | Cooling Water | | Effluent to St. Johns River | | | | | | | | | | | |
| | | Maximum Broward | 2000 gpm Dewater. | | 1000 gpm Dewatering | | | | | | | | | | |
| | | | Initial | 30 days | 31 days | 60 days | 90 days | 120 days | 180 days | Minimum | Maximum | Average | | | |
| Aluminum, mg/l | 1.5 | 5.3 | 5.32 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 5.29 | 0.49 | 0.033 | | |
| Antimony, mg/l | 0.2 | < 0.05 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | < 0.050 | 0.00019 | 0.00019 | | |
| Arsenic, mg/l | 0.05 | < 0.01 | < 0.011 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | 0.00069 | 0.00069 | | |
| Bromate, mg/l | 100 | ** | ** | ** | ** | ** | ** | ** | ** | ** | ** | 0.001 | 0.00069 | | |
| Cadmium, mg/l | 0.005 | < 0.005 | < 0.0050 | < 0.0052 | < 0.0052 | < 0.0052 | < 0.0052 | < 0.0052 | < 0.0052 | < 0.0052 | < 0.0052 | 0.004 | 0.033 | | |
| Chloride, mg/l | <108 Inc | 5000 | 4702 | 4866 | 4866 | 4866 | 4866 | 4866 | 4866 | 4866 | 4878 | 330 | 7328 | | |
| Chromium, mg/l | 0.015 | 0.015 | < 0.024 | < 0.020 | < 0.019 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | < 0.020 | 0 | 0.475 | | |
| Copper, mg/l | 0.015 | 0.09 | 0.085 | 0.177 | 0.135 | 0.135 | 0.135 | 0.143 | 0.143 | 0.103 | 0.103 | 0.018 | 0.169 | | |
| Copper (I), mg/l | 0.015 | 0.09 | < 0.085 | 0.109 | 0.100 | 0.100 | 0.100 | 0.101 | 0.101 | 0.103 | 0.103 | 0.018 | 0.054 | | |
| Cyanide, mg/l | 0.005 | < 0.01 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | 0.09 | 0.01 | | |
| Fluoride, mg/l | 5 | 0.5 | < 0.49 | < 0.49 | < 0.49 | < 0.49 | < 0.49 | < 0.49 | < 0.49 | < 0.49 | < 0.49 | 0.23 | 0.51 | | |
| Iron, mg/l | 0.3 | 6.8 | 6.46 | 6.49 | 6.64 | 6.64 | 6.64 | 6.64 | 6.65 | 6.65 | 6.65 | 0 | 0.401 | | |
| Lead, mg/l | 0.05 | < 0.020 | < 0.0197 | < 0.092 | < 0.057 | < 0.057 | < 0.057 | < 0.058 | < 0.059 | < 0.059 | < 0.059 | 0 | 0.148 | | |
| Mercury, mg/l | 0.0001 | < 0.0001 | < 0.00011 | < 0.00022 | < 0.00016 | < 0.00016 | < 0.00016 | < 0.00017 | < 0.00016 | < 0.00016 | < 0.00016 | 0.0 | 0.0032 | | |
| Nickel, mg/l | 0.1 | 0.014 | < 0.014 | < 0.021 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | < 0.018 | 0 | 0.0064 | | |
| Oil/grease, mg/l | 5 | 1.6 | < 1.56 | < 1.56 | < 1.58 | < 1.58 | < 1.58 | < 1.58 | < 1.59 | < 1.59 | < 1.59 | 0 | 0.04 | | |
| pH | 6.5-8.5 | 7.7 | 7.73 | 7.70 | 7.70 | 7.70 | 7.71 | 7.71 | 7.71 | 7.71 | 7.71 | 6.00 | 8.00 | | |
| Phenol, mg/l | 0.001 | < 0.01 | < 0.014 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | < 0.010 | 0.012 | 0.79 | | |
| Total Phos, mg/l (as needed) | 1.1 | 1.1 | 1.07 | 1.06 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 1.08 | 0.0075 | 0.0005 | | |
| Selenium, mg/l | 0.025 | < 0.00001 | < 0.00108 | < 0.00063 | < 0.00033 | < 0.00032 | < 0.00032 | < 0.00032 | < 0.00032 | < 0.00032 | < 0.00032 | 0.00075 | 0.0005 | | |
| Silver, mg/l | 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | < 0.00005 | 0.00035 | 0.00016 | | |
| Turbidity, NTU | <29 Inc | 250 | 245 | 239 | 245 | 245 | 245 | 244 | 244 | 245 | 245 | 2.5 | 8.7 | | |
| Zinc, mg/l | 1 | 0.026 | < 0.026 | < 0.40 | < 0.22 | < 0.22 | < 0.22 | < 0.23 | < 0.16 | < 0.16 | < 0.16 | 0.003 | 0.4 | | |
| Zinc (I), mg/l | 1 | 0.026 | < 0.026 | < 0.15 | < 0.15 | < 0.15 | < 0.15 | < 0.15 | < 0.16 | < 0.16 | < 0.16 | 0.003 | 0.4 | | |

** Bromate could not be measured accurately in Broward River due to interferences.

(1) Excluding BSM 12/28/88 values for copper and zinc in P2-2

(2) From EPA Stored Retrieval Data and Ebasco "Water and Wastewater Study" performed for St. Johns Power Park, 1981.

and turbidity. The high values for aluminum, copper iron, and turbidity are influenced to a great extent by high values in the once-through Broward River cooling water.

Calculated cadmium and mercury values are only slightly above the Class III standards. In the case of cadmium, the analyzed detection limit is at the Class III standard. All samples except one were analyzed to be below the detection limit, thus below the Class III standard. Therefore, the calculated combined effluent values are overstated and no variance is requested for cadmium. The situation is similar for mercury. The analyzed detection limit is at the Class III standard for the samples recently analyzed by Savannah Laboratory, while the detection limit is above the Class III standard for the remaining samples analyzed previously by Savannah Laboratory (Dames & Moore study) and Enviropact Services, Inc. (ERM study). Additionally, the Broward River samples were all analyzed below the lower detection limit (Class III standard). Therefore, the calculated combined effluent values are also likely overstated, and no variance is requested for mercury.

Mixing zones and variances from applicable Florida DER water quality standards are being requested for aluminum, iron, and turbidity in the construction dewatering combined discharge since these constituents are above Class III standards and the maximum St. Johns River concentrations are below the anticipated maximum discharge concentrations but above Class III standards. A variance only is requested for copper and lead since these constituents in the combined discharge are above Class III standards but the discharge concentrations are below the maximum concentrations in the St. Johns River. The combined dewatering discharge will pose no additional risk to the environment, marine life, public health, or to existing and potential drinking water supplies.

A Notice (corrected) of Variances Sought as Condition of Certification was submitted to DER on July 23, 1989.

No other variances from applicable standards due to construction activities have been identified at this time as being required for the AES Cedar Bay Cogeneration Project (see Section 5.12 for operation phase variances).

DEPARTMENT OF ENVIRONMENTAL REGULATION

ROUTING AND TRANSMITTAL SLIP

ACTION NO

ACTION DUE DATE

1. TO: (NAME, OFFICE, LOCATION)

Buck Owen

2.

3.

4.

Cedar Bay Cogeneration Project

RECEIVED
AUG 1 1989
DER-BADM

Initial

Date

Initial

Date

Initial

Date

Initial

Date

REMARKS:

As you may recall the Jacksonville District Office reviewed this site's ground water monitor plan and they have whatever monitor data exists.

The enclosed documents more directly respond to water mgt. District issues associated with the consumption use permit for the production wells. Thus, the VIC, Criteria & Standards Section has 'no comments' on these documents.

INFORMATION

Review & Return

Review & File

Initial & Forward

DISPOSITION

Review & Respond

Prepare Response

For My Signature

For Your Signature

Let's Discuss

Set Up Meeting

Investigate & Report

Initial & Forward

Distribute

Concurrence

For Processing

Initial & Return

FROM:

Jim McNeal

DATE

7/31

PHONE

Applied Energy Services - Seminole Kraft
Owner operator

180 MW - Circulating FB - Thomas - Conn.

2 Boilers operat 1989

Shady Pt. O.K. 300 MW. 4 Boilers

Stone Container - Operates Seminole Kraft

New 275 Co Gen, Circ FB Not to Grid

Replace power boiler, bank boiler &

Recovery boiler with new low color
Bark & coal as fuel

Recovery boiler & Turbine - elec to Seminole

March 10 Mtg - Tax - SO₂ Modeling

Violations - 1:00 pm - District Office

NPOES -

Feb 2, 1988

DER OFFICES - Tallahassee FL

| | | |
|----------------|---------------------------|--|
| Steven M. Day | Black & Veatch | 913-339-2880 |
| Buck Owen | DER | 904- 488 ⁴⁸⁷ -2522 |
| JOHN MILLICAN | AES/ENV. SERVICES | 904-584-5137 |
| JEFF SWAIN | AES | 703-522-1315 |
| Terry Cole | AES - Antel + Hoffman | 904 877 0099 |
| Bunny Andrews | DER/BAQM | 904 488-1344 |
| KERRY VARKONDA | AES | 703-522-1315 |
| Max Linn | BAQM | 904 488 1344 |
| Pradeep Raval | BAQM | 904 488 1344 |
| Sara Brumbaugh | Public Service Commission | 904 488 8501 |
| Paul Dorst | DCA | 904 488-4925 |

BLACK & VEATCH
ENGINEERS-ARCHITECTS

TEL. (913) 339-2000

1500 MEADOW LAKE PARKWAY
MAILING ADDRESS P.O. BOX NO. 8405
KANSAS CITY, MISSOURI 64114

Applied Energy Services
AES Cedar Bay Cogeneration Plant
Ground Water Investigation Report

B&V Project 14573
B&V File 14.0600
July 28, 1989

RECEIVED

JUL 31 1989

DER-BAQM

Mr. Hamilton S. Oven
Chief, Power Plant Siting Group
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Buck:

Enclosed is an addendum to the Groundwater Investigation Report for the Cedar Bay Cogeneration Project submitted for your review on July 21, 1989. This addendum includes the following items.

1. The following errors should be corrected.
 - o The north corner of the plant site shown on Figure 1-1 has been slightly modified. Refer to Figure 2.1-2 in the Site Certification Application, Amendment 3, for the corrected boundary.
 - o The symbols in the legend on Figures 4-11 and 4-12 are reversed. Corrected Figures are enclosed. Also enclosed are legend stickers which can be used to correct the existing figures without removal.
 - o In the paragraph on page 1-4 which begins "The last case simulated,," the phrase ".... 7 mg/L above current conditions," should read ".... 8 mg/l above current conditions."
2. The last paragraph on page 1-3 has been expanded to provide a comparison of the projected reduction in the piezometer head to the actual piezometric head to provide a better perspective to this minimal drawdown impact. A revised executive summary is attached to this letter.

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Applied Energy Services
Mr. Hamilton S. Oven

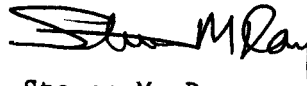
2

B&V Project 14573
July 28, 1989

By copy of this letter, these changes and corrections are also being sent to the St. Johns River Water Management District and the Bio-Environmental Services Division of the Jacksonville Department of Health, Welfare and Bio-Environmental Services.

Very truly yours,

BLACK & VEATCH



Steven M. Day

dh
Enclosure

cc: J. C. Elledge, SJRWMD, w/enc
R. S. Pace, BES, w/enc
M. L. Riddle, Seminole Kraft, w/enc
Curtis Barton, Stone Container, w/enc
Terry Cole, Oertel, Hoffman, Fernandez & Cole, w/enc
J. Blunden, AES Cedar Bay, Inc., w/enc
U. S. Geological Survey, w/enc
Tracy Arpen, Marks, Gray, Conroy and Gibbs, w/enc
Marion Jones, EPA, (2 copies of enc)

1.0 INTRODUCTION

AES Cedar Bay, Inc. and Seminole Kraft Corporation are proposing to construct and operate the Cedar Bay Cogeneration Project as an integrated power complex to be built on an existing industrial site in Jacksonville, Florida (Figure 1-1). The cogeneration plant will produce 225 MW of electricity for sale to Florida Power and Light Company (FP&L) as well as process steam for sale to the adjacent Seminole Kraft Corporation paper mill. The project also includes installation of a new kraft recovery boiler system required to modernize the paper mill and reduce odor emissions.

Ground water consumption at the site will be increased from the current average mill consumption of 19.5 million gallons per day (mgd) up to an average of 25 mgd. The current Seminole Kraft Corporation permit allows withdrawal of 25 mgd. The increase is required for the circulating water makeup, cycle makeup, and other miscellaneous plant uses. Ground water will be withdrawn from the existing Seminole Kraft wells in the upper and middle water-bearing units of the Floridan Aquifer. No new wells will be drilled.

This report presents the results of the hydrogeologic investigation of the Floridan Aquifer at the Cedar Bay Cogeneration Project site and surrounding area.

1.1 EXECUTIVE SUMMARY

The hydrogeologic investigation of the Floridan Aquifer at the Cedar Bay Cogeneration Project site included compiling and reviewing existing data, performing a field aquifer testing and sampling program, and using the field data to model the response of the Floridan Aquifer to 40 years of additional pumping at the site.

The data collected in the field investigation were used to generate existing piezometric surface and chloride concentration maps. In comparison of these maps to historical data, it is apparent that site conditions

have not significantly changed in the past 27 years of pumping at the Seminole Kraft mill.

The USGS flow and transport models, MODFLOW and MOC, approved by the St. Johns River water, were used to simulate the effects of pumping on water level elevations and water quality for the upper water-bearing zone of the Floridan Aquifer. The flow and transport models were calibrated to the site and run for a background case and three pumping rates.

A background case was modeled to determine projected chloride concentrations within the study area. This case was run for 40 years assuming no ground water withdrawal from any of the Seminole Kraft mill wells. The regional reduction in the piezometric surface of the Floridan Aquifer permits increased flow from the high chloride content lower water-bearing zone of the Floridan Aquifer to the middle and upper water-bearing zones. The projected increase in chloride concentrations at the Seminole Kraft mill site attributable to 40 years of offsite ground water withdrawals is 5 mg/l.

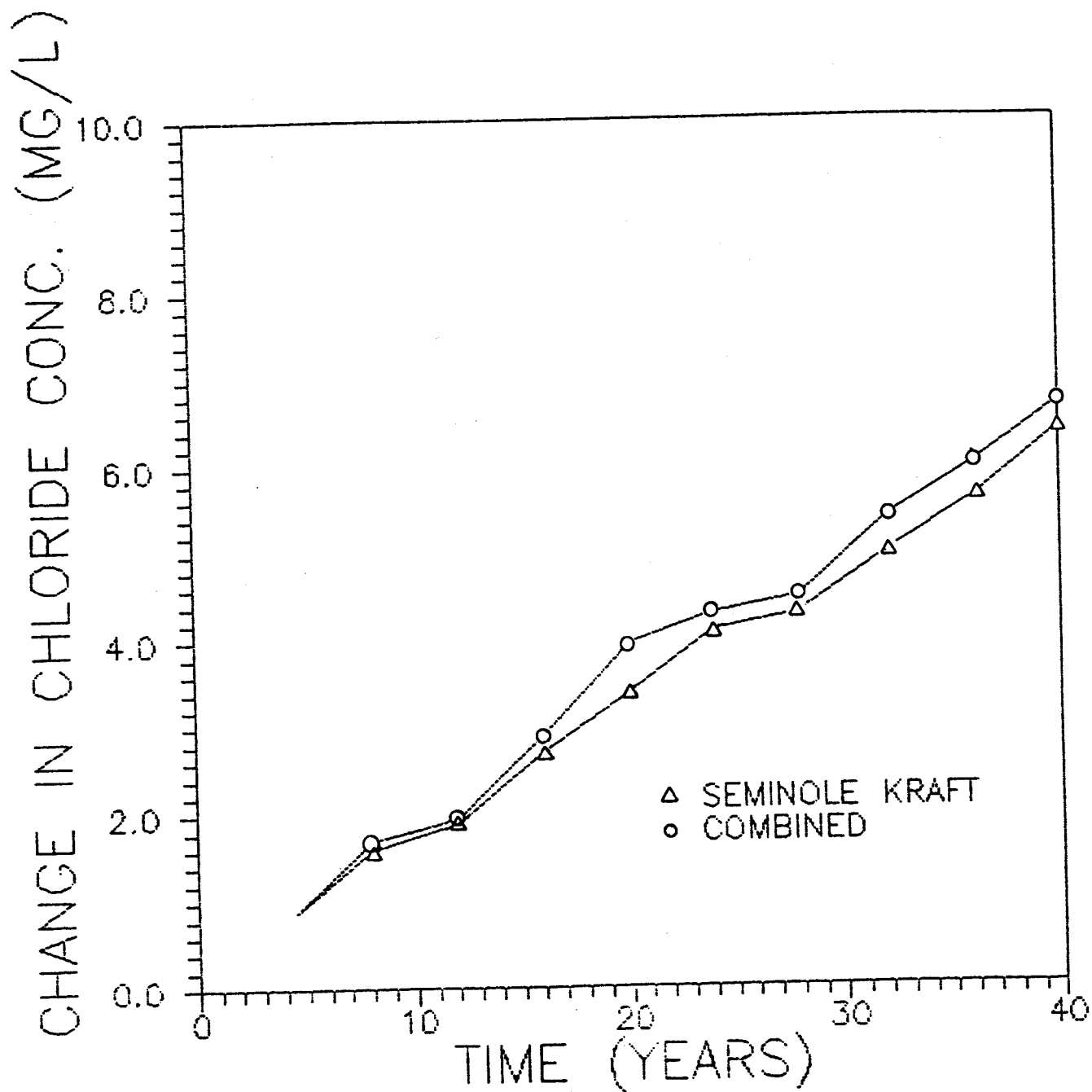
The first case simulated the current average daily pumping rate, 19.5 mgd, at the Seminole Kraft mill. The results of the flow model showed that the drawdown at the wells and in the surrounding area is approximately the same as the existing conditions, signifying steady-state has been achieved at the site. The chloride concentration is projected to increase 1 mg/l (1 percent of the drinking water quality standards) over the background case, for a total increase of 6 mg/l over a 40-year pumping period.

The second case simulates the anticipated long-term pumping rate or the average combined daily pumping rate of the Seminole Kraft mill and the Cedar Bay Cogeneration Project for a total of 25 mgd. This is also equal to the peak pumping rate of the Seminole Kraft mill alone. The results of the flow and transport model, for the 40-year pumping period, for this case indicate that the drawdown at the well field will increase approximately 1.5 feet. This compares with an average piezometric level of approximately 30 feet (msl) in the study region, or a piezometric head of approximately 575 feet above the surface of the upper water bearing zone of the Floridan Aquifer. The model conservatively estimates a drawdown of 0.6 foot, one

mile from the well field even though pump tests showed no drawdown at adjacent wells within the Seminole Kraft well field. Projected chloride concentrations will increase 1 mg/l (1 percent of the drinking water quality standards) over the Seminole Kraft average pumping conditions, or 7 mg/l total. Therefore, the additional 5.5 mgd required by the Cedar Bay Cogeneration Project will have minimal effect on chloride concentration after 40 years of pumping.

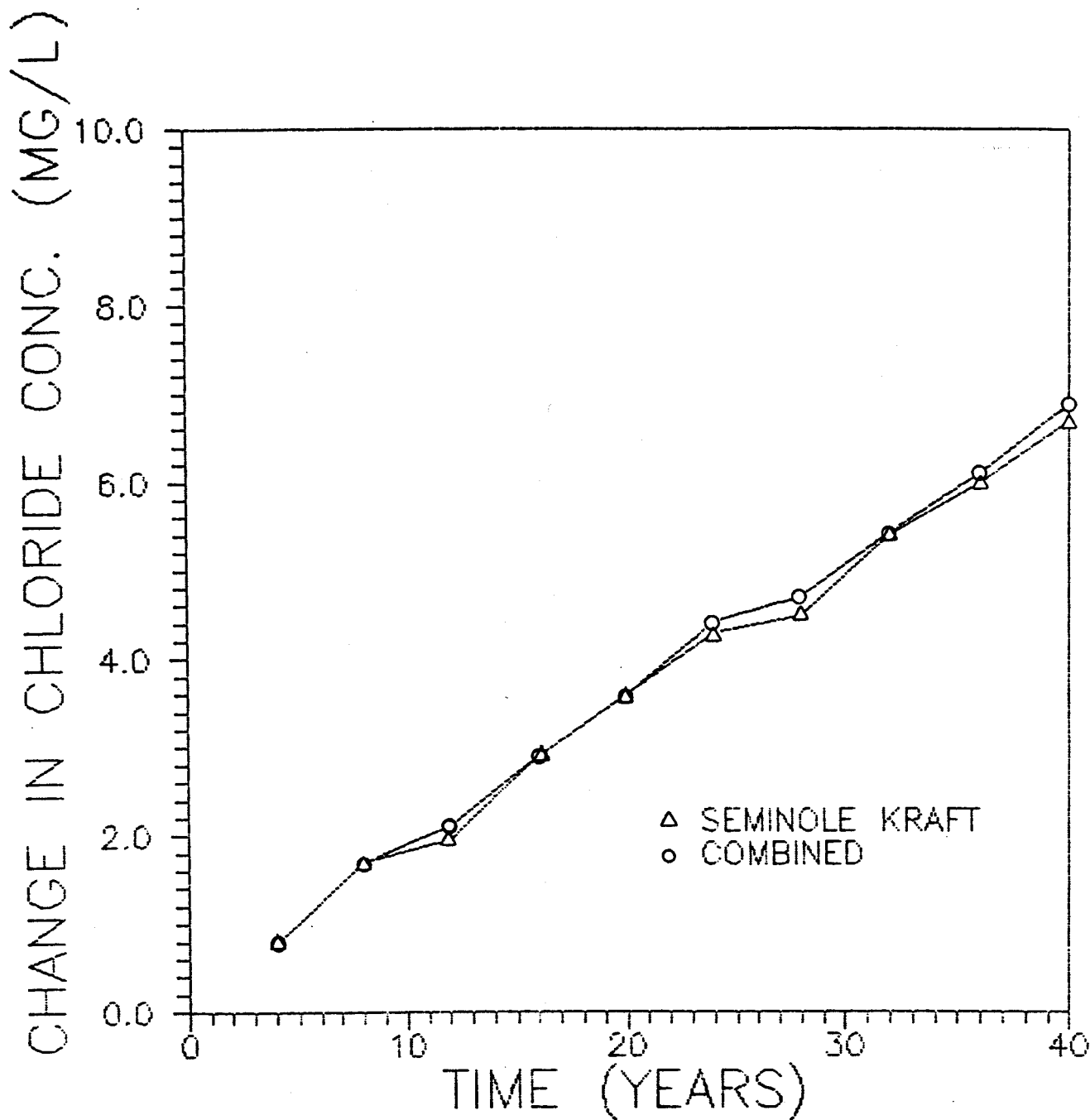
The last case simulated the maximum combined daily pumping rate of the Seminole Kraft mill (25 mgd) and the Cedar Bay Cogeneration Project (7 mgd) for a total of 32 mgd for the 40-year pumping period. This case assumes a combination of maximum instantaneous withdrawals occurring continuously, and, therefore, is extremely conservative. The anticipated actual flows will average only 78 percent of these maximums. The results of the flow and transport models indicate that the drawdown at the well field will increase approximately 3.4 feet and the chloride concentration will increase 8 mg/l above current conditions. This contributes an additional 1 mg/l (1 percent of the drinking water standards) for this very conservative case, over the maximum Seminole Kraft mill pumping rates.

In conclusion, the results of the modeling effort indicate that continued pumping at the Seminole Kraft well field will not decrease water levels or increase chloride concentrations any significant amount in the upper water-bearing zone, and that the additional water supply required for the Cedar Bay Cogeneration Project will have minimal effect on the well field and surrounding area.



COMPARISON OF SEMINOLE KRAFT
AVERAGE DAILY PUMPING RATE
19.5 MGD AND COMBINED AVERAGE
DAILY PUMPING RATE, 25 MGD

Figure 4-11



COMPARISON OF SEMINOLE KRAFT
MAXIMUM DAILY PUMPING RATE,
25 MGD AND COMBINED MAXIMUM
DAILY PUMPING RATE, 32 MGD

Figure 4-12

BLACK & VEATCH
ENGINEERS-ARCHITECTS

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AES Cedar Bay Cogeneration Plant
Ground Water Investigation Report

B&V Project 14573
B&V File 14.0600
July 21, 1989

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JUL 24 1989

DER-BAQM

Mr. Hamilton S. Oven
Chief, Power Plant Siting Group
Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Dear Buck:

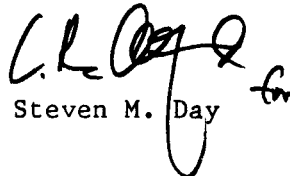
Enclosed is a copy of the Ground Water Investigation Report for the Cedar Bay Cogeneration project.

This report has been prepared with guidance from the staff of the St. Johns River Water Management District with respect to data collection, study area, and assessment technique. This report shall complete the information requirements for a sufficiency determination of the site certification application for this project.

By copy of this letter, this report is also being sent to the St. Johns River Water Management District and the Bio-Environmental Services Division of the Jacksonville Department of Health, Welfare and Bio-Environmental Services.

Very truly yours,

BLACK & VEATCH


Steven M. Day

lar
Enclosures

cc: J. C. Elledge, SJRWMD, (Federal Express w/enc)
R. S. Pace, BES, (Federal Express w/enc)
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1.0 INTRODUCTION

AES Cedar Bay, Inc. and Seminole Kraft Corporation are proposing to construct and operate the Cedar Bay Cogeneration Project as an integrated power complex to be built on an existing industrial site in Jacksonville, Florida (Figure 1-1). The cogeneration plant will produce 225 MW of electricity for sale to Florida Power and Light Company (FP&L) as well as process steam for sale to the adjacent Seminole Kraft Corporation paper mill. The project also includes installation of a new kraft recovery boiler system required to modernize the paper mill and reduce odor emissions.

Ground water consumption at the site will be increased from the current average mill consumption of 19.5 million gallons per day (mgd) up to an average of 25 mgd. The current Seminole Kraft Corporation permit allows withdrawal of 25 mgd. The increase is required for the circulating water makeup, cycle makeup, and other miscellaneous plant uses. Ground water will be withdrawn from the existing Seminole Kraft wells in the upper and middle water-bearing units of the Floridan Aquifer. No new wells will be drilled.

This report presents the results of the hydrogeologic investigation of the Floridan Aquifer at the Cedar Bay Cogeneration Project site and surrounding area.

1.1 EXECUTIVE SUMMARY

The hydrogeologic investigation of the Floridan Aquifer at the Cedar Bay Cogeneration Project site included compiling and reviewing existing data, performing a field aquifer testing and sampling program, and using the field data to model the response of the Floridan Aquifer to 40 years of additional pumping at the site.

The data collected in the field investigation were used to generate existing piezometric surface and chloride concentration maps. In comparison of these maps to historical data, it is apparent that site conditions

have not significantly changed in the past 27 years of pumping at the Seminole Kraft mill.

The USGS flow and transport models, MODFLOW and MOC, approved by the St. Johns River water, were used to simulate the effects of pumping on water level elevations and water quality for the upper water-bearing zone of the Floridan Aquifer. The flow and transport models were calibrated to the site and run for a background case and three pumping rates.

A background case was modeled to determine projected chloride concentrations within the study area. This case was run for 40 years assuming no ground water withdrawal from any of the Seminole Kraft mill wells. The regional reduction in the piezometric surface of the Floridan Aquifer permits increased flow from the high chloride content lower water-bearing zone of the Floridan Aquifer to the middle and upper water-bearing zones. The projected increase in chloride concentrations at the Seminole Kraft mill site attributable to 40 years of offsite ground water withdrawals is 5 mg/l.

The first case simulated the current average daily pumping rate, 19.5 mgd, at the Seminole Kraft mill. The results of the flow model showed that the drawdown at the wells and in the surrounding area is approximately the same as the existing conditions, signifying steady-state has been achieved at the site. The chloride concentration is projected to increase 1 mg/l (1 percent of the drinking water quality standards) over the background case, for a total increase of 6 mg/l over a 40-year pumping period.

The second case simulates the anticipated long-term pumping rate or the average combined daily pumping rate of the Seminole Kraft mill and the Cedar Bay Cogeneration Project for a total of 25 mgd. This is also equal to the peak pumping rate of the Seminole Kraft mill alone. The results of the flow and transport model, for the 40-year pumping period, for this case indicate that the drawdown at the well field will increase approximately 1.5 feet. The model conservatively estimates a drawdown of 0.6 foot 1 mile from the well field even though pump tests showed no drawdown at adjacent wells within the Seminole Kraft well field. Projected chloride concentrations will increase 1 mg/l (1 percent of the drinking water quality

standards) over the Seminole Kraft average pumping conditions, or 7 mg/l total. Therefore, the additional 5.5 mgd required by the Cedar Bay Cogeneration Project will have minimal effect on chloride concentration after 40 years of pumping.

The last case simulated the maximum combined daily pumping rate of the Seminole Kraft mill (25 mgd) and the Cedar Bay Cogeneration Project (7 mgd) for a total of 32 mgd for the 40-year pumping period. This case assumes a combination of maximum instantaneous withdrawals occurring continuously, and, therefore, is extremely conservative. The anticipated actual flows will average only 78 percent of these maximums. The results of the flow and transport models indicate that the drawdown at the well field will increase approximately 3.4 feet and the chloride concentration will increase 7 mg/l above current conditions. This contributes an additional 1 mg/l (1 percent of the drinking water standards) for this very conservative case, over the maximum Seminole Kraft mill pumping rates.

In conclusion, the results of the modeling effort indicate that continued pumping at the Seminole Kraft well field will not decrease water levels or increase chloride concentrations any significant amount in the upper water-bearing zone, and that the additional water supply required for the Cedar Bay Cogeneration Project will have minimal effect on the well field and surrounding area.

2.0 REGIONAL SETTING

2.1 PHYSIOGRAPHY

Jacksonville, Florida, is within the northern or Proximal physiographic zone, typified by continuous high ground between the Gulf Coastal lowlands and Eastern Valley (Figures 2-1 and 2-2). The site is marginally between the St. Mary's Meander Plain and Eastern Valley. The Broward River and the St. Johns River form western and southern site boundaries and are subject to tidal fluctuations.

Geomorphology is composed of marine terraces formed when the ocean level dropped. Low scarps at relatively uniform elevations are remnants of ancient shorelines. The Pamlico and Silver Bluff Marine terraces are found on the site (Figure 2-3).

2.2 STRUCTURAL GEOLOGY

Northeastern Florida, including the site area, is located on the northeastern flank of the Peninsular Arch (Figure 2-4). The regional dip of the top of the limestone formations of Eocene age that comprises the Floridan Aquifer is toward the northeast; however, east of the St. Johns River the formations dip locally toward the north to northwest from a structural high, termed the Sanford High by Vernon (1951).

Two concealed inferred faults were mapped by Leve (1978) from interpretation of geologic and geophysical well logs. One fault trends $N10^{\circ}E$ along the St. Johns River and displaces the top of the limestone more than 45 meters in northeastern Clay County. Two freshwater springs, Green Cove Springs and Wadesboro Springs, are aligned along this fault in eastern Clay County. The other fault trends $N5^{\circ}W$ in eastern St. Johns and Duval counties and displaces the top of the limestone more than 30 meters in east-central Duval County. The faults bound a graben trending generally north-south through east-central Duval County (Figure 2-5).

According to Miller (1982), none of the faults shown in Florida appear to have any major effect on the flow system of the limestone aquifer, probably because there is no great contrast in the permeability among any of the units shown that make up the upper part of the aquifer system. Accordingly, small displacements juxtaposing different rock units would not change the flow system appreciably because the abutting permeabilities are similar.

2.3 STRATIGRAPHY

Florida's stratigraphy consists of unconsolidated sediments overlying a sedimentary rock sequence which overlies crystalline basement rocks. Table 2-1 describes these units. The sedimentary stratigraphic sequence of peninsular Florida is made up of about 8,000 feet of marine, littoral, and terrestrial deposits. Of this total, approximately 5,000 feet of these sediments are of Paleozoic and Mesozoic age. The Cenozoic strata extend to over 3,000 feet below the ground surface. These strata contain all of the geologic and hydrologic formations of primary importance to this project. Figures 2-6 and 2-7 show a generalized geologic section and geologic map of Duval County.

The Cedar Keys limestone is the oldest stratum in the Cenozoic series. The limestone was deposited in an open Paleocene sea. Generally, its composition is believed to be of evaporites and hard bioclastic limestones, some of which have likely been dolomitized. It serves as the regional aquiclude for the overlying Floridan Aquifer.

The Eocene Epoch deposits overlying the Cedar Keys limestone, in ascending order, include the Oldsmar limestone, Lake City limestone, Avon Park limestone, and Ocala group. The Oldsmar, Lake City, and Avon Park limestones are dolomitic, crystalline dolomitic, and granular calcitic limestones. The Ocala group consists of chalk, fossiliferous marine limestone, and marine limestone, and represents the last deposition of the Eocene Epoch.

The Ocala group is the oldest deposit to outcrop in Florida. Exposures of the group are visible along the structure known as the Ocala Arch, located some 60 to 70 miles west-southwest of the Jacksonville area.

The Hawthorn formation deposited during the Miocene Epoch overlies the Ocala group. Thickness of the Hawthorn varies from 290 to 490 feet. It is identified by gray to blue-green phosphatic, sandy clays, and clayey sands with fine to medium phosphatic sand lenses and limestone beds more prevalent near the formation's base.

Resting conformably on top of the Hawthorn are deposits 20 to 110 feet thick of Upper Miocene to Pliocene age. These deposits are silty clays and clayey sands grading to soft, white, friable limestone beds.

Pleistocene and Holocene deposits make up the upper 150 feet of sediments in Northern Peninsular Florida. These unconsolidated sediment deposits are marine terraces, and materials are loose to dense sands, sandy clays, and silty clays. Marine terrace depositional environments produce deposits which are quite variable so stratigraphic uniformity is not expected.

2.4 HYDROGEOLOGY

Two aquifer systems of significance underlie the site. Table 2-2 provides a description of the stratigraphic and aquifer systems underlying Duval County. The Floridan Aquifer is encountered at depths ranging from 400 to 600 feet in the Duval County area. It is the principal source of fresh water for northeast Florida. The other aquifer is the surficial or shallow aquifer. It extends from the surface to an approximate depth of 100 feet.

2.4.1 Floridan Aquifer

The Floridan Aquifer is composed chiefly of limestone and dolomite and includes the following geologic formations: Lake City limestone, Avon Park limestone, and Ocala group, all of Eocene age; Suwannee limestone of Oligocene age; and Tampa limestone and lower part of the Hawthorn formation of Miocene age where it contains limestone beds that are hydrologically connected to the older limestones (Parker et al., 1955). The aquifer ranges in thickness from about 500 feet in west-central Florida to about 2,000 feet in central and northeast Florida (Lichtler, 1972; and Healy, 1975).

In the Jacksonville area, the Floridan Aquifer consists of all the Eocene Epoch deposits overlying the Cedar Keys limestone. The Cedar Keys limestone serves as the lower confining unit, and the Hawthorn formation serves as the aquiclude between the Floridan and the surface aquifer. The Floridan Aquifer is artesian. Figure 2-5 shows the elevation of the top of the Floridan.

The top of the first water-bearing interval (the upper water-bearing zone [UWBZ]) generally occurs at depths 400 to 600 feet below mean sea level. Transmissivity of this permeable zone ranges from 1.5×10^5 to 1.5×10^6 gallons per day per foot, based on an analysis of 20 aquifer tests in Duval County (Franks and Phelps, 1979). An average transmissivity of 6.0×10^5 gallons per day per foot was estimated for the Duval County area. A specific storage of 10^{-6} ft^{-1} was calculated from data for this zone and is considered to be fairly uniform for the Duval County area.

The top of the second water-bearing interval (the middle water-bearing zone [MWBZ]) generally occurs at depths 750 to 1,100 feet below mean sea level. Transmissivity of this zone ranges from 3.0×10^5 to 6.0×10^5 gallons per day per foot, and the storativity ranges between 10^{-3} to 10^{-4} (Environmental Science and Engineering, Inc., 1985).

Recharge occurs as direct infiltration of rainfall where the Floridan sequence is exposed at the surface. This occurs to the west and southwest of Duval County in the areas of Putnam, Clay, Alachua, and Bradford counties. Water percolates downward where confining beds are breached by sink holes and fractures. It also occurs through underlying and overlying confining beds where the Floridan Aquifer piezometric surface is lower than that of adjacent water-bearing strata. Discharge from the aquifer occurs naturally as spring discharge and as discharge to the Atlantic Ocean.

The hydraulic head in the vicinity of Jacksonville was approximately 65 feet msl prior to development in northeast Florida (Johnston et al., 1980) as shown on Figure 2-8. Major pumping centers at Fernandina Beach and in Jacksonville have lowered the piezometric pressure in the Floridan Aquifer and have caused major changes in the shape of the original, predevelopment piezometric surface. Today, water within the Floridan Aquifer generally moves laterally to the northeast.

Figures 2-9 and 2-10 show the piezometric surface of Duval County in May 1962 and May 1979, respectively.

In the northeast and eastern part of Duval County, chloride concentrations have increased, as shown on Figures 2-11 and 2-12. Chloride concentrations generally increased in these areas from 10 to 20 ppm between 1940 and 1962.

2.4.2 Surficial Aquifer

Overlying the artesian Floridan Aquifer is the Hawthorn formation. The Hawthorn formation, which has a low permeability, serves as a confining unit to severely limit movement of water between the surficial aquifer and the underlying Floridan Aquifer. The Hawthorn formation consists of silt, sand, shell, and limestone beds. Vertical hydraulic conductivity was estimated to be 1.0×10^{-3} ft/d. Specific storage was estimated to be 1.0×10^{-5} ft⁻¹ (Franks and Phelps, 1979).

The Hawthorn formation is overlain by the surficial aquifer system. This system underlies the Duval County area to depths of 100 to 200 feet. The USGS reports that the local surficial aquifer system is divided into three zones, shown on Figure 2-13. The water table zone occurs in the upper part of the aquifer where water is in an unconfined condition. Below the water table is a discontinuous semi-confining zone of sediments with lower permeability which partially confines water in the lowest limestone unit. Underlying the limestone unit is the Hawthorn formation which has low permeability and serves as the lower confining unit.

Recharge to the surficial aquifer system is principally by infiltration of rainfall and percolation from surface water bodies. The confining and semi-confining beds in the surficial aquifer system and boundary conditions around the site will tend to provide a predominantly horizontal direction of flow for water within the aquifer and minimize vertically downward flow. Any shallow ground water is expected to discharge into the contiguous surface water bodies, the Broward River, St. Johns River, and Dunn Creek.

Most wells in the Jacksonville area producing water from the surficial aquifer system have been completed in the limestone unit or "shallow rock zone" lying at approximately 40 to 100 feet below land surface.

Transmissivity of the limestone unit of the surficial aquifer system ranges from 2,000 to 10,000 gallons per day per foot. The average thickness of the unit was approximately 17 feet in 13 test wells drilled in Duval County for the purpose of evaluating the unit's hydrologic properties (Causey and Phelps, 1978). The aquifer conditions within the limestone unit range from full artesian to unconfined. The storage coefficient is expected to range from 10^{-1} to about 10^{-5} .

2.5 WATER USE IN DUVAL COUNTY

Major ground water users within the study area are summarized in Table 2-3. In 1986, the Floridan Aquifer provided 153.49 mgd for Duval County. Of the total, 69 percent was for water supply, 15 percent for industrial/commercial use, 10 percent for agricultural use, 2 percent for power, and 4 percent for miscellaneous use. Since then, the Seminole Kraft mill resumed operation, consuming about 20 mgd. Revised percentages are 61 percent for water supply, 25 percent for industrial/commercial, 9 percent for agriculture, 1.5 percent for power, and 3.5 percent for miscellaneous.

See 2-22
for 22823

TABLE 2-3. MAJOR GROUND WATER USERS IN STUDY AREA

| | |
|--|-------------------------------------|
| City of Jacksonville | |
| Highlands | 4 wells at 1.94 mgd each = 7.76 mgd |
| Norwood | 4 wells at 0.63 mgd each = 2.52 mgd |
| Jacksonville Suburban Utilities | |
| Cavanaugh & Bradshaw | 0.4 mgd |
| Columbine & Pine Summit | 1.01 mgd |
| Greenfern | 0.47 mgd |
| Jacksonville Electric Authority | |
| Well A | 0.45 mgd |
| Well B | 2.59 mgd |
| Northside Generating Station | 4 wells at 0.4 mgd each = 1.6 mgd |
| Mayport Naval Air Station | 2.9 mgd |
| SCM Glidco Organics | 3 wells at 0.83 mgd each = 2.49 mgd |
| Wonderwood Mobile Home Park | 0.1 mgd |
| Wonderwood Village Water Treatment Plant | 0.1 mgd |
| Bennett Estates Water Treatment Plant | 0.12 mgd |
| Free Flowing Well D-431 | 0.1 mgd |
| Beacon Hills Water Treatment Plant | 0.29 mgd |
| Ft. George Island Club House | 0.1 mgd |
| Seminole Kraft | 19.5 mgd |

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APPLIED ENERGY SERVICES, INC.
ENVIRONMENTAL ASSESSMENT
JACKSONVILLE, FLORIDA

DATED: JUNE 7, 1989
JOB NO.: 18191-003-024

Dames & Moore

BOCA RATON, FLORIDA



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Appendix (separate enclosure)

- A. Underground Storage Tank Information
- B. Laboratory Reports

INTRODUCTION

In December 1988, AES Cedar Bay, Inc. (AESCB) contracted with Dames & Moore to conduct an Environmental Assessment on a portion of land that AESCB intends to lease on a long term basis at the Seminole Kraft Corporation (SKC), pulp mill in Jacksonville, Florida. The objective of this study is to provide AESCB with a conclusive, comprehensive environmental assessment report of their proposed site.

Background

Prior to Dames & Moore's involvement at the AESCB site, Environmental Resources Management - South (ERM) conducted a site assessment and prepared a draft report dated October 1988. According to the report, ERM completed a history of the site, which included a records search and interviews with plant employees; installation of 15 monitoring wells/piezometers and two boreholes (one in each of two lime mud storage piles located on site); and installation of six trenches and one monitoring well in an area described as "the construction debris disposal area".

The ERM report provided limited geologic and geotechnical information and was inconclusive regarding the ground water quality of the areas that they investigated. A summary of their relevant and pertinent conclusions is as follows:

1. The construction debris disposal area was found to contain wood, paper, plastic, and other demolition debris. No visual evidence of hazardous waste was noted during the trenching operation. Based on visual observations during the trenching operations, ERM concluded that no hazardous wastes were disposed in this area. However, the interferences with the analyses of the ground water samples from the area did not permit laboratory confirmation that priority pollutants were absent.
2. Even though lime mud spoil pile samples are not considered hazardous due to the characteristics of corrosivity or EP Toxicity (metals), it was concluded that this material will probably not be accepted at the City of Jacksonville's sanitary landfills due to space restrictions at the landfill.
3. Ground water analysis around the lime mud spoil piles was inconclusive because of the presence of dissolved gases and/or an emulsion in the ground water. Dissolved gases

and an emulsion in the ground water, which increased the laboratory detection limit; prevented the accurate analysis of actual priority pollutant organic parameter concentrations which may have exceeded the method detection limit".

The following ERM recommendations for additional work form the basis of Dames & Moore study.

1. "Spoil pile: Wells MW-1, MW-2, MW-4, and MW-6 should be reanalyzed for EPA Method 624/625 parameters. Prior to sampling, the analytical laboratory should be informed of the past analytical difficulties. The laboratory may have an alternative analytical technique to avoid previous problems;
2. Construction debris disposal area: Well MW-5 should be reanalyzed for EPA Method 624/625 parameters to confirm that no organic contaminants are present in the construction debris disposal area";

Scope of Work

The project scope includes review of ERM's information, collection and analysis of additional information, and preparation of this report containing conclusions evaluating the environmental risks of the proposed site. It contains an assessment of the presence or absence of priority pollutant compounds that Dames & Moore was informed could possibly be present at the site. The report also contains the information recommended by ERM in their report dated October 1988.

Summary of Conclusions

Analytical results obtained from fourteen (14) ground water monitoring locations within the site indicate that the ground water quality exceeds the State of Florida primary and secondary drinking water standards for certain heavy metals and/or sulfate at many locations. Most of the concentrations reported are only slightly above the drinking water standards. The metals that exceed the standards in at least one well include arsenic, cadmium, chromium, copper, lead, mercury, and zinc. It appears that the Lime Mud Storage piles and the settling pond sediments may be the primary sources of these metals.

PHYSICAL SETTING

Site Location and Description

The SKC mill is located north of Heckscher Drive in north Jacksonville, Florida, on a peninsula which is bounded on the east by Dunn Creek, on the south by the St. Johns River, and on the west by the Broward River. The location of the facility is shown in Figures 1 and 2. AESCB intends to build a cogeneration facility on the portion of the SKC outlined in Figure 2. The north portion of the area outlined in Figure 2 defines the "Area of Investigation."

The area that AESCB intends to occupy is an active part of the SKC facility, presently used for industrial waste treatment, storage, and disposal. Waste treatment takes place in a series of five settling ponds located along the westernmost part of the proposed AESCB tract. Lime waste materials are stored in two large piles in the central part of the proposed facility. An inactive construction debris disposal area, that contains construction and demolition debris, is located along the southern boundary of the proposed AESCB tract.

Areas of Investigation

The area of investigation has been subdivided into three physical areas, based upon their past or existing function; the lime mud storage areas, the settling ponds, and the abandoned construction debris disposal area. The approximate boundaries of these areas are shown in Figure 3.

Area Geology and Hydrogeology

The hydrogeology of the site and general area was summarized in the ERM report as follows:

"Seminole Kraft has a ground water monitoring plan for operation of its wastewater disposal fields (Law Engineering, 1983). ERM reviewed the ground water monitoring plan to establish a hydrogeologic framework of the site. Generally, the report states that there exists approximately one foot of sandy topsoil overlying 8 to 12 feet of clean fine sands. A dense sand layer exists below this layer to a depth of 30 feet. Below this interval, to the top of bedrock at the 50 foot depth, there exists a dense to very dense sand interbedded with clayey sand lenses.

The USGS reports that the local surficial aquifer in the area is divided into three zones (USGS, 1981). The water table zone occurs in the upper part of the aquifer where water is in an unconfined condition. Below the water table is a zone comprised of sand and clay overlying limestone. This latter zone acts as a semiconfining unit to the lowermost zone. The lowermost zone is the Floridan aquifer.

ERM contoured the water level elevations in all wells to produce a water table map. The map shows ground water to be predominantly flowing toward the Broward River. ERM noted that the lime ditch and the two holding ponds that contain water are presented as having an influence on the ground water flow pattern under the study area. These surface water bodies have created ground water mounds from which ground water moves outward. It is presumed that these bodies are in direct hydraulic connection with the underlying aquifer and, therefore, the measured water elevations of these bodies and the immediately surrounding ground water elevations are the same."

ERM's testing indicated TDS lower than 10,000 mg/l in all wells with the exception of MW-2 and less than 3,000 mg/l in MW-3. The elevated TDS in MW-2 could be attributed to non-naturally occurring dissolved solids, such as sulfate concentrations of 2000 mg/l, in addition to other compounds. Therefore, it appears that the aquifer is classified by definition as a G-II, according to Rule 17-3.402, FAC.

SITE INVESTIGATION SUMMARY

Preliminary Site Survey

On December 8, 1988, prior to initiation of all field work, the site was visited by Mr. Michael E. Glowacz, a Dames & Moore Senior Hydrogeologist; Ms. Julie Blunden, the AESCB project coordinator; and Mr. Bert Rhyne, a SKC field engineer. The site was visited to further develop the assessment strategy, plan the field investigation, and point out the proposed temporary monitoring well locations to the SKC field engineer. The SKC field engineer approved all of the temporary monitoring well locations.

Also, on December 8, 1988, water quality samples were collected from MW-4 and the surface water drainage system at the first settling pond. The water quality samples were preserved in accordance with Dames & Moore's Generic Quality Assurance Plan in the field and sent to Savannah Laboratory in Tallahassee, Florida by overnight express courier. The samples were tested to evaluate the identity of the "interference" reported by ERM and to devise a methodology to eliminate the interference and attain the lowest possible detection limits of the subsequent water quality samples obtained at the AESCB site.

During the site visit, the presence of several underground fuel storage tanks (UST's) were noted east of the proposed AESCB tract. The information regarding SKC's UST's was made available by plant personnel, along with a November 12, 1987 report entitled "Preliminary Contamination Assessment" provided in Appendix A. According to the report, the UST nearest to the site is designated as #5 and the surrounding ground water is "mildly contaminated." According to SKC personnel, SKC is in compliance with all state UST regulations and UST #5 is located beneath a concrete slab. The UST observed near the proposed site of December 8 is designated as #4 in the report. No hydrocarbons were found in the four (4) monitoring wells surrounding the #4 UST in November, 1987 testing. Therefore, there is no apparent potential risk to the proposed AESCB site.

The above-ground fuel storage area located adjacent to the east side of the north lime mud storage area was surrounded by petroleum stained soils.

Temporary Monitoring Well Installation

The existing ground water monitoring array at the proposed AESCB site, consisting of five (5) monitoring wells (MW-1, MW-2, MW-4, MW-5 and MW-6) and three piezometers (PZ-1, PZ-2, and PZ-3) that were installed by ERM, was supplemented with seven additional temporary monitoring wells (Figure 3). The temporary monitoring

wells (TMW-4 through TMW-10) were installed to provide one (1) time sampling points for the collection of water level and water quality information at the shallow water table interface (approximately 5 to 10 feet below land surface). The wells were installed for a relatively inexpensive, one time testing program. They were not installed for the purpose of establishing a long term monitoring network.

Precautions were taken during the drilling operations and well construction procedures to minimize the potential of cross contamination. Decontamination of the drilling equipment and well components was performed prior to and between each well installation by steam cleaning.

The seven wells (TMW-4 through TMW-10) were installed to a depth of approximately 10 feet by a hydraulic cone-penetrometer rig. Each well was constructed of 1-inch diameter, Schedule 40 PVC with 5 feet of PVC #10 slot (0.010-inch) screen. A sand pack, made up of clean quartz sand (20/40 filter sand), was emplaced around the screen, extending approximately one foot above the screen where possible. The remaining annular space between the casing and the borehole was filled with a cement slurry to the ground surface as a seal to prevent vertical migration of surface water through the annulus.

The monitoring wells were developed after installation to optimize flow through the sand pack and remove fine soil particles from the well screens. The development process was accomplished by bailing. Each well was developed until samples withdrawn were as visibly free of sediment as possible.

Ground Water Sampling Procedures

The ground water sampling program consisted of measuring water levels and sampling of ten (10) monitoring wells (TMW-4, TMW-5, TMW-6, TMW-7, TMW-8, TMW-9, MW-1, MW-2, MW-4, MW-5, and MW-6) and three (3) piezometers (PZ-1, PZ-2 and PZ-3). The locations of these sampling points are shown in Figure 3.

On December 21, 1988, the total depth and water levels of all wells were measured and recorded prior to sampling. The water level measurements were checked on December 29, 1988. Prior to sampling, the wells were purged using a teflon coated bailer until three well volumes had been removed. The water quality samples were obtained using a teflon bailer. The samples were not filtered in the field.

The pH, temperature, and specific conductance were measured in the field at the time the ground water samples were collected. The water quality samples were collected on December 21, 1988. Each sample was poured into the container containing any necessary preservative provided by the laboratory and placed into

an insulated cooler containing wet ice. The samples were sent by overnight express courier to Savannah Laboratory in Tallahassee, Florida, for analysis.

All ground water samples were analyzed for inorganic and organic priority pollutant compounds: The organics tested by EPA Methods 624 and 625; and the metals tested by EPA Methods 6010 and 200.7. Sulfate, cyanide and pH were tested using standard methods. The test results are provided in Appendix B.

A library search was performed for the purpose of tentative identification, on samples containing unknown constituents. Up to ten (10) of these non-target compounds, with responses equal to or greater than 10% of the nearest internal standard, were searched in each GC/MS fraction (volatile or semivolatile). Compounds listed as Tentatively Identified Compounds (TICs) in this report were identified only by comparison of the unknown peak with mass spectra stored in the National Bureau of Standards (NBS) Library. The concentration reported is estimated and based only on the response factor of the nearest internal standard.

Lime Mud Storage Area and Settling Pond Sampling Procedures

On December 20, 1988, a sediment sample was obtained from the south and the north ponds by inserting a dedicated 1.5 inch diameter PVC pipe through the sludge. After the pipe was removed from the sludge pond sediments, the sludge was removed from the pipe with a wooden rod.

On December 20, 1988, a sediment sample was obtained from each of the two lime mud storage areas. The samples were collected at the 4 foot depth using a hand auger that was decontaminated prior to each use according to the methodology contained in Dames & Moore's Generic Quality Assurance Plan. A visual estimate of the water content of each sample was made by the senior hydrologist as the sample was obtained from the borehole.

After spooning each of the four (4) sediment samples into the container provided by the laboratory, it was placed into an insulated cooler containing wet ice and sent to Savannah Laboratory in Tallahassee, Florida, by overnight express courier. The samples were analyzed for organic priority pollutant compounds using EPA Methods 8240 and 8270. The samples also were tested for heavy metals, sulfate, and cyanide and pH. EPA Method 3550 (SW-846, November 1986) was used in testing pH of the sediment samples.

Water-Level Elevations

The elevations of all installed and existing monitoring wells and piezometers were ascertained by a licensed surveyor. The survey datum was mean sea level (MSL). This information is used in estimating the likely ground water flow patterns under the AESCB site and for defining the hydrologic relationships between the surficial aquifer, the settling ponds, the lime mud spoil piles, and the Broward River.

On December 21, 1988, the water levels in the five (5) existing monitoring wells (MW-1, MW-2, MW-4, MW-5, and MW-6), six (6) temporary monitoring wells (TMW-4 through TMW-9) and three (3) piezometers PZ-1, PZ-2, and PZ-3 were measured by Dames & Moore using an electronic water level measuring tape. The locations of the wells and piezometers are shown in Figures 3 and 4. The water level information is provided in Table 1.

Later, on January 17, 1989, after reinstallation of TMW-10, the water levels in MW-6 and TMW-10 were measured. This information is also shown in Table 1.

RESULTS OF THE INVESTIGATION

Ground Water Flow Potential

Using the water level elevations measured on December 21, 1988, a potentiometric map was prepared. The water level elevations measured on January 11, 1989 were not used in preparation of this map. The map indicates a westward flow potential toward the Broward River. The map depicting the ground water flow potential is provided as Figure 5.

Analytical Test Results

Settling Pond Area

Sediment Test Results: The results are shown in Table 3.

Ground Water Quality Test Results: The results are shown in Tables 2, 4, 5, and 6.

Lime Mud Storage Area

Soil Test Results: The results are shown in Table 3.

Ground Water Quality Test Results: The test results are provided in Tables 2, 4, 5, and 6.

Well TMW-10 was sampled in January 1989 after it was reinstalled, because it had been destroyed before it could be sampled.

Construction Debris Disposal Area

Ground water quality test results were obtained in the field from three (3) wells and one (1) piezometer in the construction debris disposal area from wells TMW-8, MW-5, and PZ-3. TMW-7 was tested only for volatile organic compounds because only a very small volume of liquid could be obtained from the well.

The field measurements are shown in Table 2.

Ground water quality test results are provided in Tables 4, 5, and 6.

ANALYSIS OF INFORMATION

Settling Pond Area

The information obtained in the Settling Pond Area suggests the following:

1. The concentrations of the parameters tested are greater in the south pond than the north pond;
2. The potentiometric map indicates that ground water flows toward the Broward River;
3. The pH in the ponds is greater than the ground water. The pH level of the water percolating from the lime mud ponds is apparently being reduced as it migrates toward the Broward River;
4. The pond sediments contain chromium, copper, lead, nickel, zinc, and sulfides. The ground water contains chromium, copper, lead, nickel, zinc, sulfides, and sulfates. A comparison of the water quality test results of the ponds and the ground water generally show the same heavy metals to be present. The only exceptions to the comparison are concentrations of cadmium, beryllium, and antimony which are found in TMW-4 located next to the river, but not in the ponds. Figure 6 shows the distribution of the metals found in the pond sediments and monitoring wells;
5. Potential sources of the metals reaching the downgradient monitoring wells TMW-4 and TMW-5 are the pond sediments and river sediments;
6. Because the ground water appears to flow from the ponds toward the Broward River, it is likely that heavy metals and phenols are migrating with the ground water into the Broward River.

Lime Mud Storage Area

The information obtained in the Lime Mud Storage Area suggests the following:

1. Generally, the pH of the pile sediments, as tested in solution by EPA Method 3550, is greater than the pH in the ground water surrounding the piles. This suggests that the piles are contributing to the high pH levels measured in the groundwater.

2. The sediments contain beryllium, cadmium, chromium, copper, lead, nickel, zinc and sulfides and the ground water surrounding the piles contain the same compounds. Mercury, which was found in wells MW-4, MW-6, TMW-6 and TMW-10, was not found in the sediment samples. Figure 6 shows the distribution of the compounds in the sediments and ground water;
3. It appears that the ground water flows laterally away from the piles toward the Broward River;
4. It appears that the sediments are leaching into the ground water and are the most likely source of the heavy metals that are reaching the monitoring wells due to the proximity to the lime mud storage area and ground-water flow pattern;
5. The concentrations of some heavy metals found in the water-table aquifer exceed drinking water standards;
6. Dames & Moore observed stained soils in the above ground storage tank area, which is located directly east of the lime mud storage area and north of the Seminole Kraft lime kilns. The staining appears, by visual inspection, to have been caused by spills of petroleum products rather than leakage from the tank. Analytical results indicate that the petroleum spills may be slightly impacting the ground water. The extent of the impact is not known because the ground water flow gradient is westward beneath the north pile. The naphthalene concentrations found in wells MW-6 and TMW-10 are found in Table 4.

Construction Debris Disposal Area

The analytical results suggest that the disposal area is not significantly contaminated with priority pollutant compounds. Only low concentrations of a few heavy metals (chromium, lead, and mercury) were detected.

CONCLUSIONS AND RECOMMENDATIONS

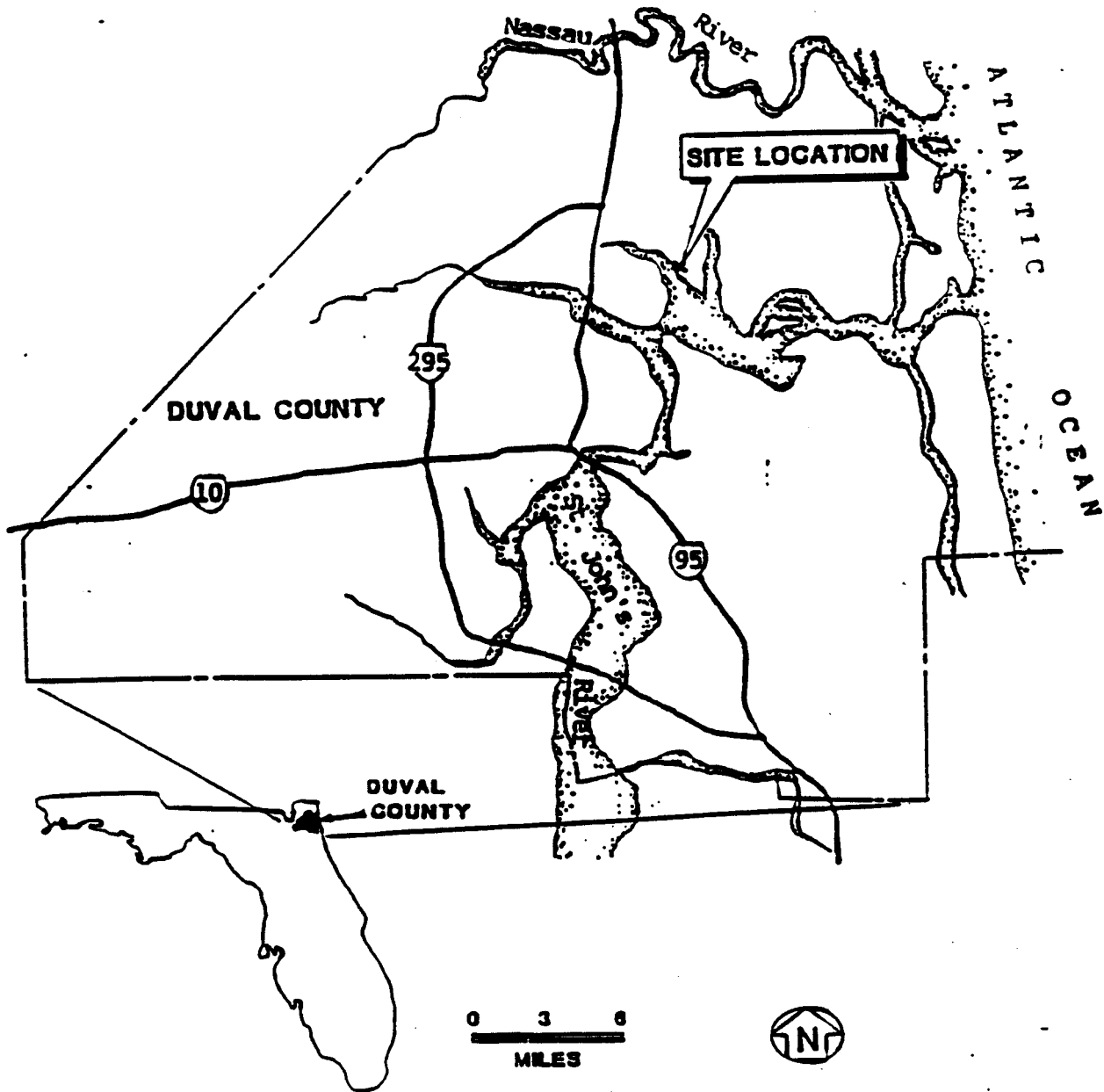
Based upon this environmental assessment, the site is appropriate for the proposed cogeneration facility. However, there appear to be conditions on the proposed AESCB site that could create environmental concerns which should be evaluated and dealt with in the permitting process.

Dames & Moore recommends the following actions be taken to start on a course of action to eliminate the potential environmental concerns:

- 1) Remove lime mud from the site and lime sludge from the settling ponds;
- 2) Install and monitor permanent ground water monitoring network;
- 3) Meet with FDER to discuss the results and the relevant regulatory standards.

FIGURES

FIGURE 1
SITE LOCATION WITHIN DUVAL COUNTY
SEMINOLE KRAFT MILL
JACKSONVILLE, FLORIDA



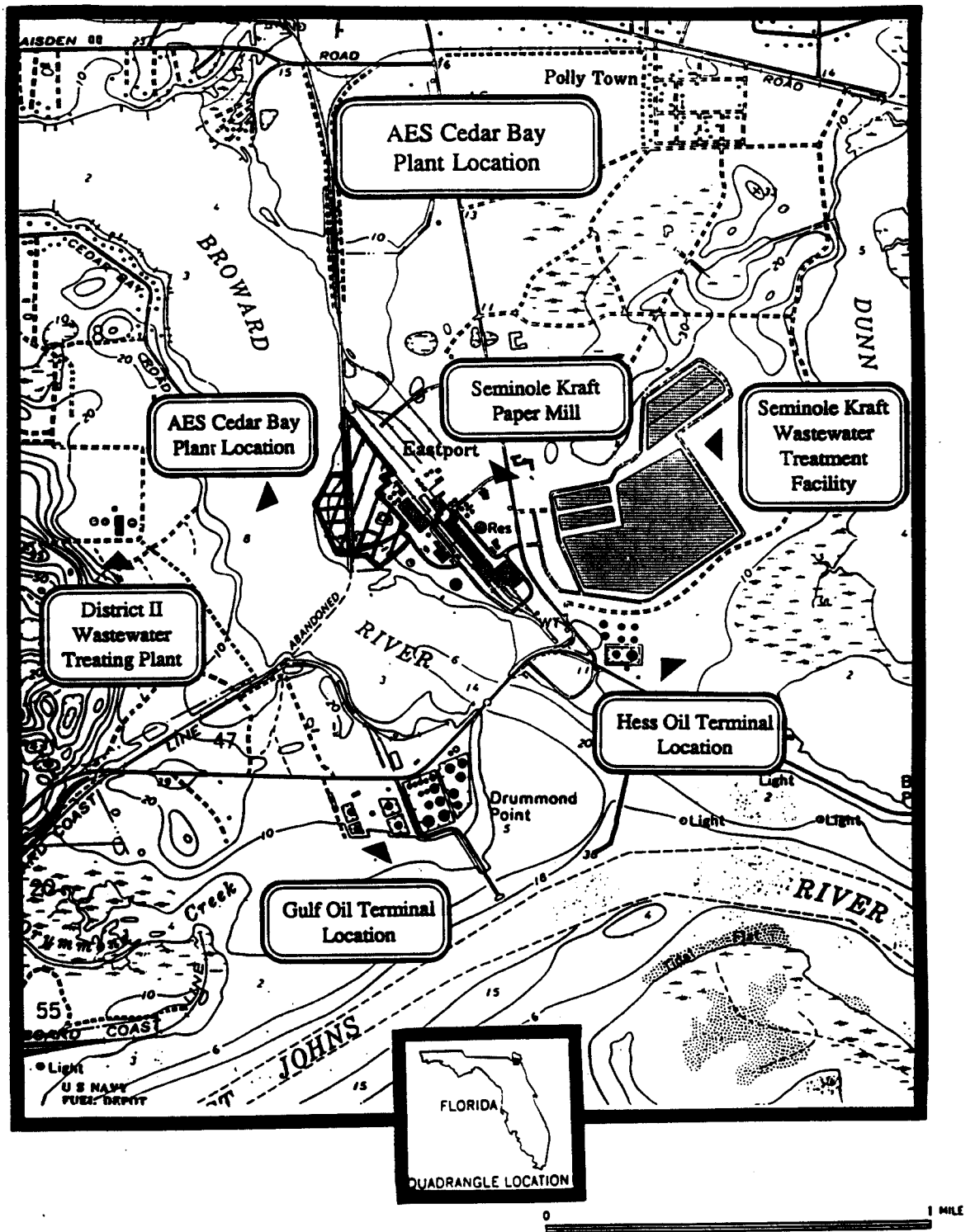
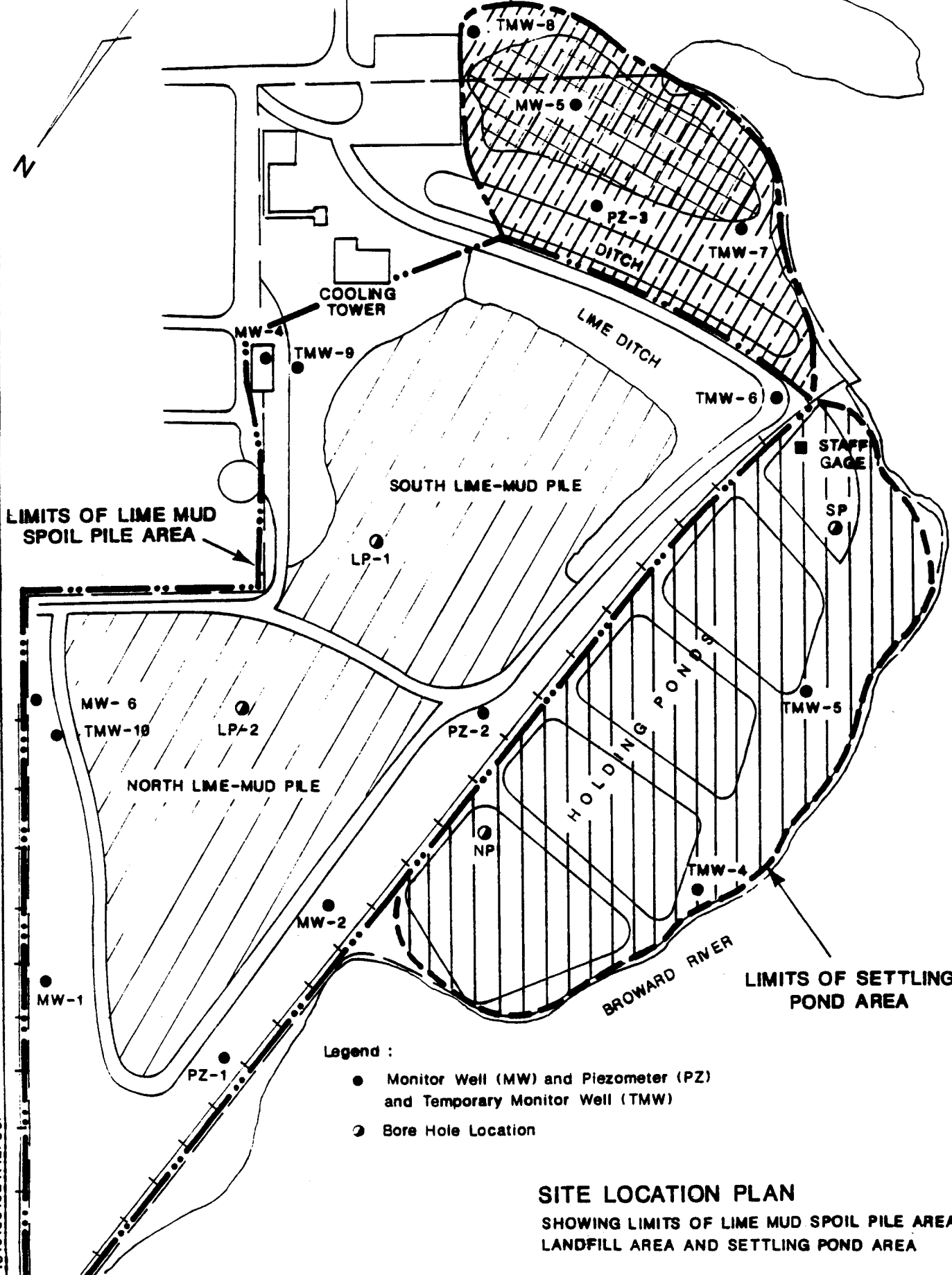


Figure 2

LIMITS OF CONSTRUCTION DEBRIS DISPOSAL AREA



Legend :

- Monitor Well (MW) and Piezometer (PZ) and Temporary Monitor Well (TMW)
- Bore Hole Location

SITE LOCATION PLAN

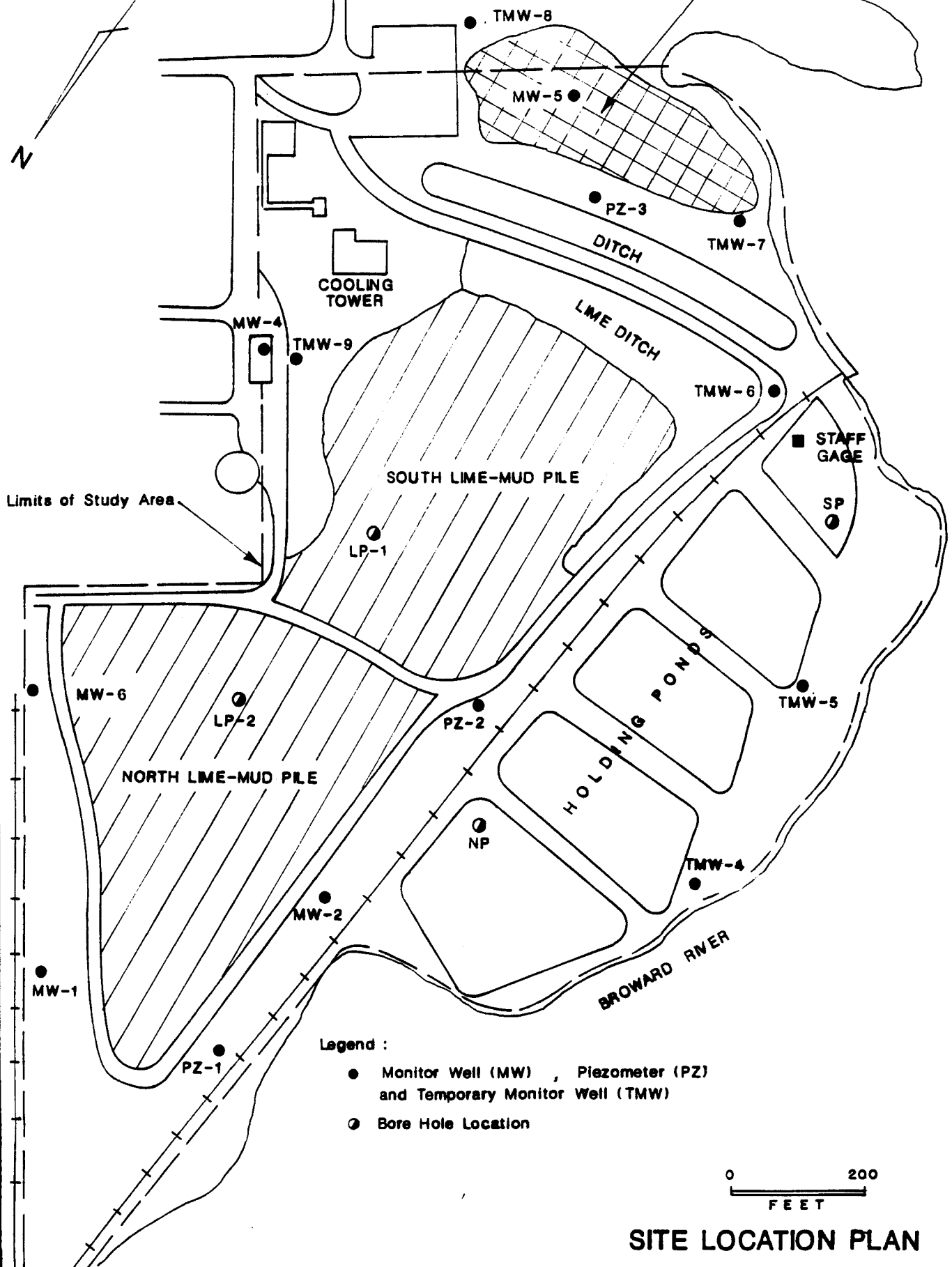
SHOWING LIMITS OF LIME MUD SPOIL PILE AREA, LANDFILL AREA AND SETTLING POND AREA

JOB No. 18191001024(12/88)

PROJECT : AES, CEDAR BAY
LOCATION : JACKSONVILLE, FL.

DAMES & MOORE
FIGURE 3

CONSTRUCTION DEBRIS DISPOSAL AREA



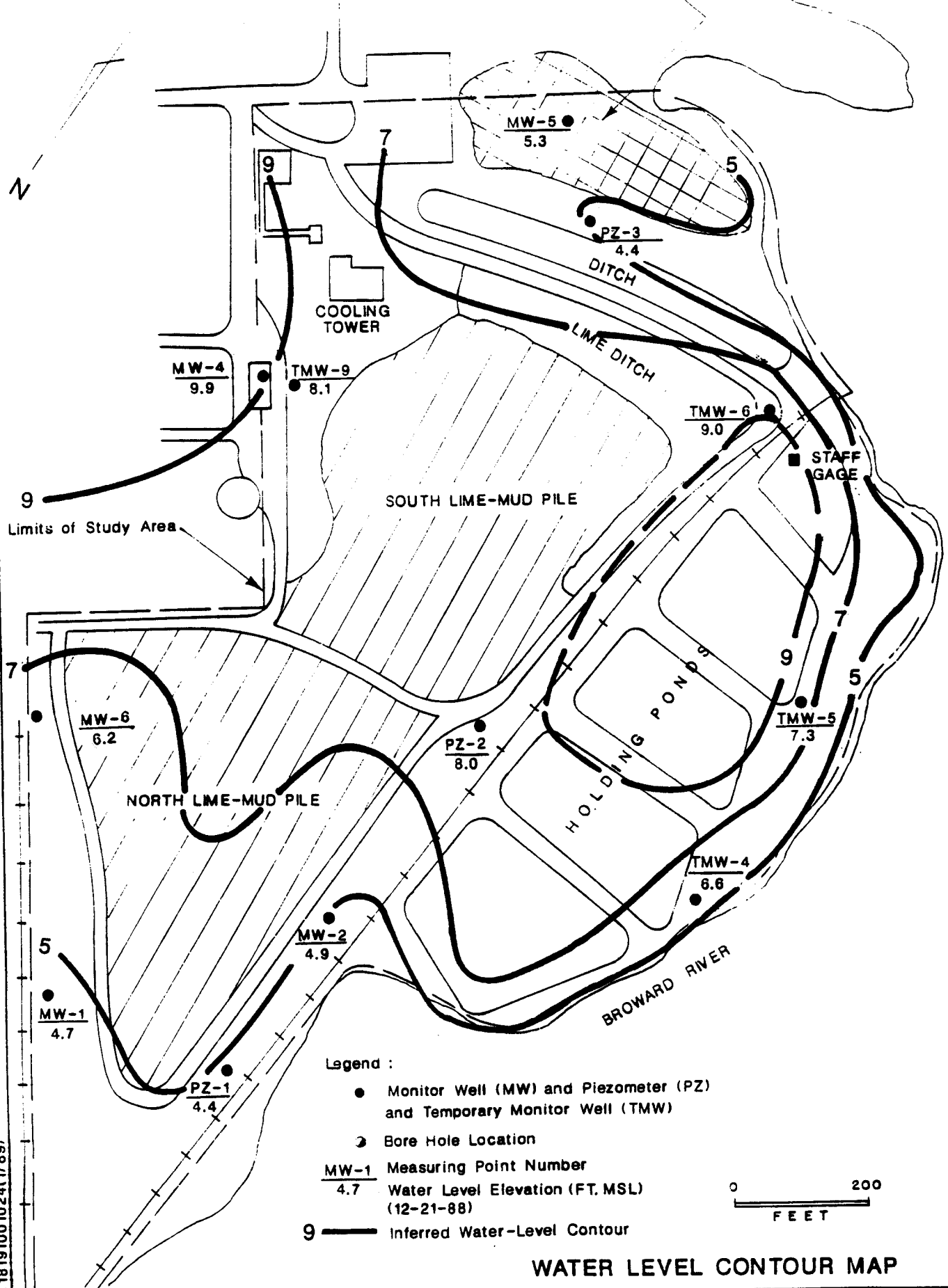
SITE LOCATION PLAN

PROJECT : AES, CEDAR BAY
LOCATION : JACKSONVILLE, FL.

DAMES & MOORE
FIGURE 4

JOB No. 18191001024(12/88)

CONSTRUCTION DEBRIS DISPOSAL AREA



Legend :

- Monitor Well (MW) and Piezometer (PZ) and Temporary Monitor Well (TMW)
- Bore Hole Location
- MW-1 Measuring Point Number
- 4.7 Water Level Elevation (FT. MSL) (12-21-88)
- 9 — Inferred Water-Level Contour

0 200
FEET

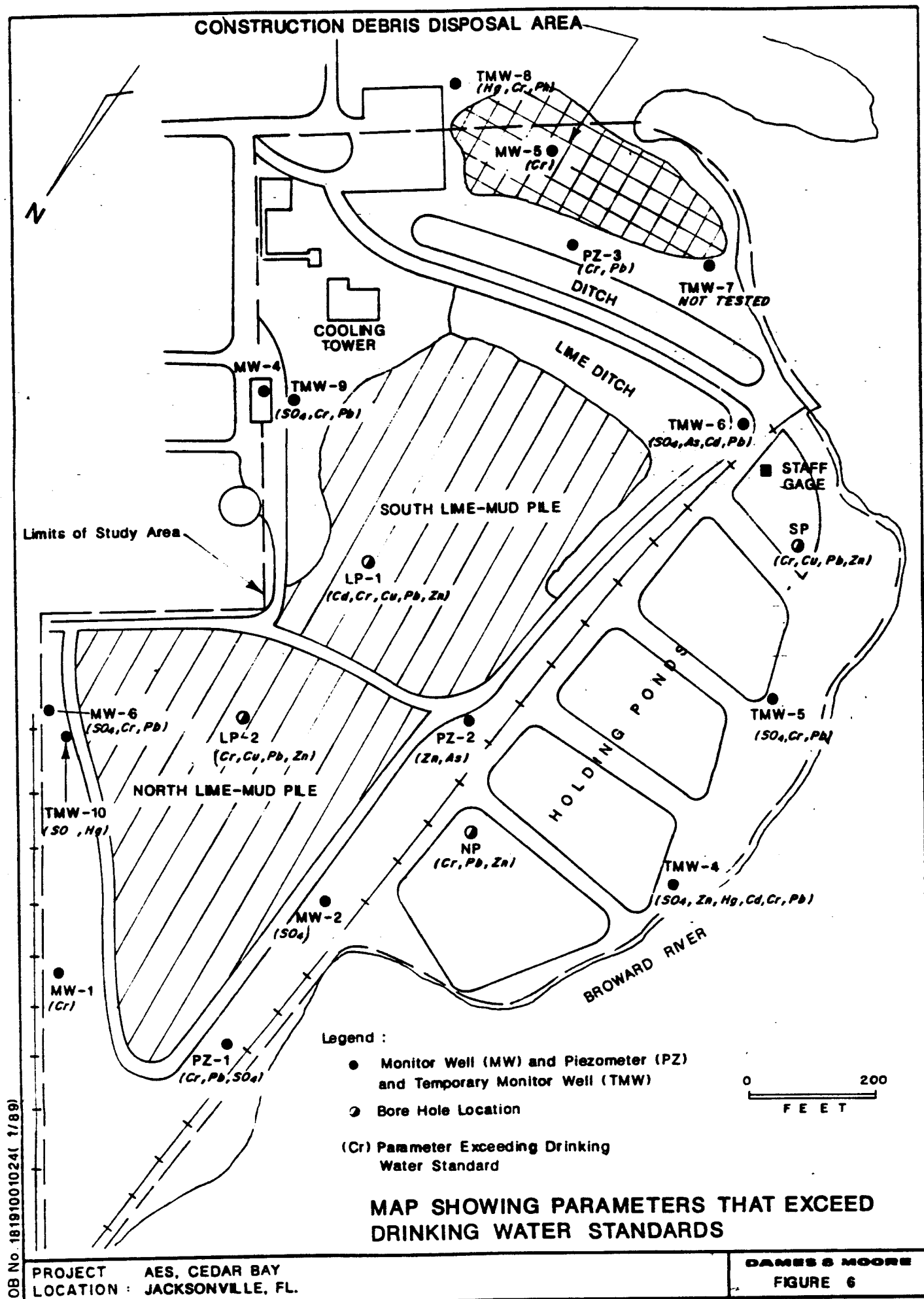
WATER LEVEL CONTOUR MAP

PROJECT AES, CEDAR BAY
LOCATION : JACKSONVILLE, FL.

DAMES & MOORE
FIGURE 5

JOB No. 18191001024(1/89)

APPROVED _____ DATE _____
CHECKED _____ DATE _____
BY _____ DATE _____



JOB No. 18191001024(1/89)

BY DATE 1/89

CHECKED DATE

APPROVED DATE

TABLES

TABLE 1
WELL CONSTRUCTION AND WATER-LEVEL INFORMATION
SEMINOLE KRAFT PAPER COMPANY
EASTPORT, FLORIDA
DECEMBER 21, 1988

| WELL/PIEZOMETER | TOTAL
DEPTH
(FT) | TOC
ELEVATION
(FT) | DEPTH TO
WATER (TOC)
(FT) | WATER-LEVEL
ELEVATION
(FT) |
|------------------------|---------------------------------|-----------------------------------|--|---|
| PZ-1 | 10.5 | 14.9 | | |
| PZ-2 | 8.8 | 12.9 | 6.5 | 4.4 |
| PZ-3 | 19.4 | 14.6 | 4.9 | 8.0 |
| | | | 10.2 | 4.4 |
| MW-1 | 18.0 | 16.3 | | |
| MW-2 | 14.4 | 12.9 | 11.6 | 4.7 |
| MW-4 | 7.8 | 15.7 | 8.0 | 4.9 |
| MW-5 | 18.9 | 16.1 | 5.8 | 9.9 |
| MW-6 | 15.8 | 19.6 | 10.8 | 5.3 |
| | | | 13.4 | 6.2 |
| TMW-4 | 10.0 | 11.2 | | |
| TMW-5 | 10.0 | 11.3 | 4.6 | 6.6 |
| TMW-6 | 10.0 | 12.8 | 3.9 | 7.3 |
| TMW-7* | 10.0 | 16.5 | 3.8 | 9.0 |
| TMW-8* | 10.0 | 16.7 | 14.1 | (-2.5) * |
| TMW-9 | 10.0 | 13.7 | 11.4 | (0.4) * |
| TMW-10** | 10.0 | 14.6 | 4.9 | 8.1 |

January 17, 1989

| | | | | |
|--------|------|-------|------|-----|
| MW-6 | 15.8 | 19.6 | 13.6 | 6.0 |
| TMW-10 | 13.5 | 20.73 | 15.1 | 5.6 |

All screens are five feet in length and have a slot size of 0.010 inches.
Each PZ and MW has a 2-inch diameter and each TMW has a 1-inch diameter.

* Screen clogged.

** Destroyed before water level could be measured. Reinstalled 1-16-89.

TOC = Top of Casing.

TABLE 2
FIELD INSTRUMENT READINGS
SEMINOLE KRAFT PAPER COMPANY
EASTPORT, FLORIDA
DECEMBER 21, 1988

| <u>WELL/PIEZOMETER</u> | <u>pH</u> | <u>CONDUCTIVITY</u> | <u>TEMPERATURE</u> |
|------------------------|-----------|---------------------|--------------------|
| PZ-1 | 7.7 | 600 | 23.5 |
| PZ-2 | 6.7 | 335 | 20 |
| PZ-3 | 6.7 | 4850 | 22 |
| MW-1 | 9.6 | 3090 | 26 |
| MW-2 | 12.0 | 7000 | 23 |
| MW-4 | 10.6 | 6000 | 23 |
| MW-5 | 7.7 | 1950 | 22 |
| MW-6 | 10.6 | 2800 | 24 |
| TMW-4 | 10.6 | 5000 | 22.5 |
| TMW-5 | 11.2 | 5000 | 23 |
| TMW-6 | 7.1 | 1200 | 23 |
| TMW-7 | 7.1 | 4600 | 26 |
| TMW-8 | 6.9 | 1350 | 23.5 |
| TMW-9 | 8.4 | 5000 | 25 |
| Pond 2 | 11.8 | | |
| Pond 4 | 12.5* | | |

pH = units; conductivity = micromhos/cm; temperature = degrees centigrade

The pH limits for drinking water are 6.5 and 12.5 units.

* On April 25 and 26, 1989, SKC measured the pH in this Lime Mud Pond using a portable pH meter and found it to be 11.9 and 12.2 units, respectively.

TABLE 3

SOLID OR SEMISOLID SAMPLE TEST RESULTS
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

| <u>Sample Location</u> | <u>pH</u> | <u>Sulfide</u> | <u>Beryl.</u> | <u>Cadmium</u> | <u>Chromium</u> | <u>Copper</u> | <u>Lead</u> | <u>Nickel</u> | <u>Zinc</u> |
|------------------------|-----------|----------------|---------------|----------------|-----------------|---------------|-------------|---------------|-------------|
| North Pond (NP) | 10.4 | 830 | ND | ND | 2.0 | ND | 1.2 | ND | 4.2 |
| South Pond (SP) | 11.7 | 5000 | ND | ND | 46 | 9.9 | 7.6 | 9.9 | 58 |
| South Lime Pile (LP-1) | 8.6 | 38 | 0.71 | 1.6 | 76 | 70 | 6.6 | 65 | 440 |
| North Lime Pile (LP-2) | 12.9 | 210 | ND | ND | 19 | 14 | 0.92 | 29 | 39 |

ND = Not detected

All concentrations are mg/kg except pH which is expressed in units.
All detection limits are provided in Appendix B with the analytical results.

TABLE 4

WATER-QUALITY TEST RESULTS (mg/l)
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

| <u>Number</u> | <u>Phenol</u> | <u>Naphthalene</u> | <u>Toluene</u> | <u>Sulfide</u> | <u>pH(Corrosivity)</u> | <u>Sulfate</u> |
|---------------|---------------|--------------------|----------------|----------------|------------------------|----------------|
| PZ-1 | ND | ND | ND | ND | 7.5 | 530 |
| PZ-2 | ND | ND | ND | ND | 7.5 | 140 |
| PZ-3 | 0.031 | ND | ND | ND | 8.0 | 140 |
| MW-1 | ND | ND | ND | 1.6 | 9.5 | 57 |
| MW-2 | 0.028 | ND | ND | 460 | 12.0 | 2000 |
| MW-4 | ND | ND | 0.037 | NT | NT | NT |
| MW-5 | ND | ND | ND | 0.62 | 7.8 | 150 |
| MW-6 | ND | 0.051 | ND | 2.4 | 10.7 | 510 |
| TMW-4 | 0.023 | ND | ND | 3.5 | 8.6 | 990 |
| TMW-5 | 0.029 | ND | ND | 0.62 | 10.8 | 650 |
| TMW-6 | ND | ND | ND | 1.5 | 7.1 | 360 |
| TMW-7 | NT | NT | ND | NT | NT | NT |
| TMW-8 | ND | ND | ND | ND | 6.7 | 140 |
| TMW-9 | ND | ND | ND | 0.83 | 8.1 | 1200 |
| TMW-10 | ND | 0.086 | ND | 0.72 | 9.7 | 530 |
| MCL | NP | 0.100 | NP | NP | | 250 |

ND = Not detected

NT = Not tested

NP = No published drinking water standard

MCL = Maximum contaminant level

Concentrations shown in bold type exceed the secondary drinking water standard for that compound.

TABLE 4
WATER-QUALITY TEST RESULTS (mg/l)
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

| <u>Number</u> | <u>Copper</u> | <u>Zinc</u> | <u>Mercury</u> | <u>Arsenic</u> | <u>Antimony</u> | <u>Beryllium</u> | <u>Cadmium</u> | <u>Chromium</u> | <u>Lead</u> | <u>Nickel</u> |
|---------------|---------------|-------------|----------------|----------------|-----------------|------------------|----------------|-----------------|-------------|---------------|
| PZ-1 | 0.011 | 0.28 | ND | 0.024 | ND | ND | ND | 0.1 | 0.054 | 0.028 |
| PZ-2 | 48 | 88 | ND | 0.061 | ND | ND | ND | 0.017 | 0.008 | 0.014 |
| PZ-3 | 0.026 | 0.023 | ND | 0.014 | 0.14 | ND | ND | 0.3 | 4.2 | 0.37 |
| MW-1 | 0.023 | 0.380 | ND | ND | ND | ND | ND | 0.085 | ND | 0.019 |
| MW-2 | ND | 0.032 | ND | ND | ND | ND | ND | 0.028 | 0.021 | 0.029 |
| MW-4 | 0.031 | 0.032 | 0.0005 | ND | ND | ND | ND | 0.021 | 0.005 | 0.052 |
| MW-5 | 0.016 | 0.049 | 0.0003 | ND | ND | ND | ND | 0.091 | 0.035 | 0.016 |
| MW-6 | 0.047 | 0.11 | 0.0006 | ND | ND | ND | ND | 0.220 | 0.058 | 0.067 |
| TMW-4 | 0.98 | 15 | 0.0068 | 0.025 | 0.083 | 0.013 | 0.027 | 0.98 | 4.6 | 0.16 |
| TMW-5 | 0.64 | 2.1 | 0.0005 | 0.017 | ND | 0.011 | ND | 0.64 | 0.47 | 0.35 |
| TMW-6 | 1.3 | 2.00 | 0.0005 | 1.8 | ND | 0.017 | 0.022 | 0.140 | 0.063 | 0.083 |
| TMW-7 | NT | NT | NT | NT | NT | NT | NT | NT | NT | NT |
| TMW-8 | 0.023 | 0.93 | 0.0038 | 0.010 | ND | 0.019 | ND | 0.33 | 0.180 | 0.29 |
| TMW-9 | ND | 2.6 | 0.0004 | ND | 0.068 | 0.010 | ND | 0.29 | 1.0 | 0.24 |
| TMW-10 | 0.19 | 0.2 | 0.0067 | ND | ND | ND | ND | 0.29 | 0.080 | 0.10 |
| MCL | 1.0 | 5.0 | 0.002 | 0.050 | NP | NP | 0.010 | 0.050 | 0.050 | NP |

ND = Not detected

NT = Not tested

NP = No published drinking water standard

MCL = Maximum contaminant level

Concentrations shown in bold type exceed the drinking water standard for that compound.
Mercury, arsenic, cadmium, chromium and lead have primary standards and zinc and copper have a secondary standard.

TABLE 5

WATER QUALITY TEST RESULTS - LIBRARY SEARCH PARAMETERS
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

MW-1

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|--------------------------|---------------------------------------|
| 2-Propanol | 0.032 |
| unknown hydrocarbons | 0.103 |
| 1-Methyl-2-pyrrolidinone | 0.024 |
| d-Fenchone | 0.080 |
| complex hepta-2-ol | 0.026 |
| complex hexanol | 0.019 |
| complex alcohol | 0.031 |
| complex benzene | 0.032 |
| 4 unknown semivolatiles | 0.148 |

MW-2

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|-------------------------------|---------------------------------------|
| Methanethiol | 0.0056 |
| Thiobismethane | 0.0059 |
| Acetone | 0.094 |
| unknown hydrocarbon | 0.097 |
| unknown dimethylethyl benzene | 0.037 |
| 1-methyl-2-pyrrolidinone | 0.040 |
| d-Fenchone | 0.027 |
| Camphor | 0.057 |
| complex ethanone | 0.022 |
| unknown semivolatiles | 0.321 |

MW-5

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|--------------------------|---------------------------------------|
| Carbon disulfide | 0.0084 |
| unknown volatile organic | 0.0055 |
| 1-Methyl-2-pyrrolidinone | 0.043 |
| Hexathiepane | 0.039 |
| unknown semivolatile | 0.011 |

TABLE 5

WATER QUALITY TEST RESULTS - LIBRARY SEARCH PARAMETERS
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

MW-6

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|--------------------------|---------------------------------------|
| 1-Methyl-2-Pyrrolidinone | 0.036 |
| d-Fenchone | 0.010 |
| Camphor | 0.074 |
| 2-Methylnaphthalene | 0.014 |
| 1-Methylnaphthalene | 0.010 |
| unknown semivolatile | 0.027 |

TMW-4

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|-------------------------|---------------------------------------|
| Carbon disulfide | 0.150 |
| 2-Methylfuran | 0.013 |
| 3-Methylthiophene | 0.087 |
| unknown hydrocarbon | 0.027 |
| unknown ketone | 0.014 |
| d-Fenchone | 0.016 |
| Camphor | 0.080 |
| unknown ethyl phenol | 0.040 |
| Hexathiepane | 0.055 |
| unknown Carbolic acid | 0.034 |
| 2 unknown semivolatiles | 0.147 |

TMW-5

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|--------------------------|---------------------------------------|
| Acetone | 0.260 |
| Isopropanol | 0.190 |
| unknown hydrocarbon | 0.0078 |
| unknown benzene | 0.0088 |
| 1-Methyl-2-pyrrolidinone | 0.170 |
| Hexathiepane | 0.080 |
| gamma-Sitosterol | 2.000 |
| 6 unknown semivolatiles | 1.250 |

TABLE 5

WATER QUALITY TEST RESULTS - LIBRARY SEARCH PARAMETERS
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

TMW-6

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|--------------------------|---------------------------------------|
| Carbon disulfide | 0.019 |
| 1-Methyl-2-pyrrolidinone | 0.080 |
| 3 unknown semivolatiles | 0.086 |

TMW-7

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|----------------------|---------------------------------------|
| Acetone | 0.380 |
| 2-Propanol | 0.390 |

TMW-8

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|----------------------|---------------------------------------|
| Acetone | 0.110 |
| 2-Propanol | 0.013 |

TMW-9

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|----------------------------------|---------------------------------------|
| Carbon disulfide | 0.0074 |
| 5 unknown semivolatile compounds | 0.194 |

TMW-10

| <u>Compound Name</u> | <u>Estimated Concentration (mg/l)</u> |
|----------------------------|---------------------------------------|
| Isopropanol | 0.048 |
| Acetone | 5.5 |
| Carbon Disulfide | 0.010 |
| 1 unknown volatile organic | 0.0086 |
| 10 unknown semivolatiles | 0.322 |

TABLE 5

WATER QUALITY TEST RESULTS - LIBRARY SEARCH PARAMETERS
SEMINOLE KRAFT CORPORATION
AES CEDAR BAY SITE
EASTPORT, FLORIDA
DECEMBER 21, 1988

PZ-3

| <u>Compound Name</u> | <u>Estimated Concentration mg/l</u> |
|--------------------------|-------------------------------------|
| Methanethiol | 0.014 |
| Acetone | 0.130 |
| 2-Propanol | 0.015 |
| 2-Propanethiol | 0.0055 |
| unknown hydrocarbon | 0.052 |
| Hexanioc acid | 0.120 |
| Camphor | 0.120 |
| Hexathiepane | 0.180 |
| 3-(2-Phenylethyl) phenol | 0.400 |
| 6 semivolatile unknowns | 1.248 |



G. Warren Leve, Inc.

HYDROGEOLOGISTS

WATER RESOURCES STUDIES — GROUNDWATER INVESTIGATIONS

6501 ARLINGTON EXPRESSWAY

SUITE 114

JACKSONVILLE, FLORIDA 32211

PHONE (904) 725-4140

November 12, 1987

Mr. Bert Rhyne
SEMINOLE KRAFT CORPORATION
9469 Eastport Road
Jacksonville, Florida 32218

RE: PRELIMINARY CONTAMINATION ASSESSMENT

Dear Bert:

The following information describes the results of our preliminary contamination assessment at five buried underground fuel storage tank sites at the Seminole Kraft Corporation on Eastport Road, Jacksonville, Florida.

SITE DESCRIPTION

The Seminole Kraft Corporation is located at 9469 Eastport Road, Jacksonville, Florida. Four 2-inch diameter monitor wells were installed at each of five sites within the mill complex to comply with FDER requirements for underground storage tank as outlined in FAC 17-61. The location of all of the monitor wells are shown on the attached site plans.

FIELD ASSESSMENT

During the drilling operation, soil samples were inspected to detect any possible contamination from spills or leaking tanks. After the wells were installed, water samples were obtained from each well in a teflon bailer and inspected to detect any free product or contaminated ground water. Free product was detected at two sites and dissolved hydrocarbon contamination in the ground water was detected at four sites.

The following results are listed by site and well number.

SITE #1

Monitor Well Number

| | |
|---|--|
| 1 | Moderate hydrocarbon odor in soil and water |
| 2 | Strong hydrocarbon odor with free product in soil and water |
| 3 | Strong hydrocarbon odor and sheen in water |
| 4 | Strong hydrocarbon odor with approximately one foot of free product. |

SITE #2

Monitor Well Number

| | |
|---|---|
| 1 | Slight hydrocarbon odor in soil and water |
| 2 | Clean |
| 3 | Strong hydrocarbon odor with 2-1/2 feet of free product (clean golden diesel) |
| 4 | Strong hydrocarbon odor with 2 feet of free product |

SITE #3

Monitor Well Number

| | |
|---|-------------------------|
| 1 | Clean |
| 2 | Clean |
| 3 | Slight hydrocarbon odor |
| 4 | Slight hydrocarbon odor |

SITE #4

Monitor Well Number

| | |
|---|-------|
| 1 | Clean |
| 2 | Clean |
| 3 | Clean |
| 4 | Clean |

SITE #5

Monitor Well Number

BUNKER 2"
NOT FOR
VEHICLES

| | |
|---|--|
| 1 | Slight hydrocarbon odor in soil, water is black with a soapy feel and burns the skin |
| 2 | Slight hydrocarbon odor in soil and water |
| 3 | Slight hydrocarbon odor in soil and water |
| 4 | Slight hydrocarbon odor in soil and water |

CONCLUSIONS

The results of our test program indicates that the ground water at sites 1, 2, 3, and 5 is contaminated with hydrocarbon constituents. Sites 3 and 5 are only slightly to moderately contaminated. However, sites 1 and 2 are moderately to heavily contaminated and both sites contain free floating product on the ground water. It is recommended that all of the contaminated sites be reported to FDER under the State's Early Detection Incentive (EDI) program and possibly some emergency remediation be initiated at sites 1 and 2 to remove the free floating product.

Please call if you have any questions concerning this assessment or if we can be of any further assistance.

Sincerely,


G. Warren Leve
President

GWL/km

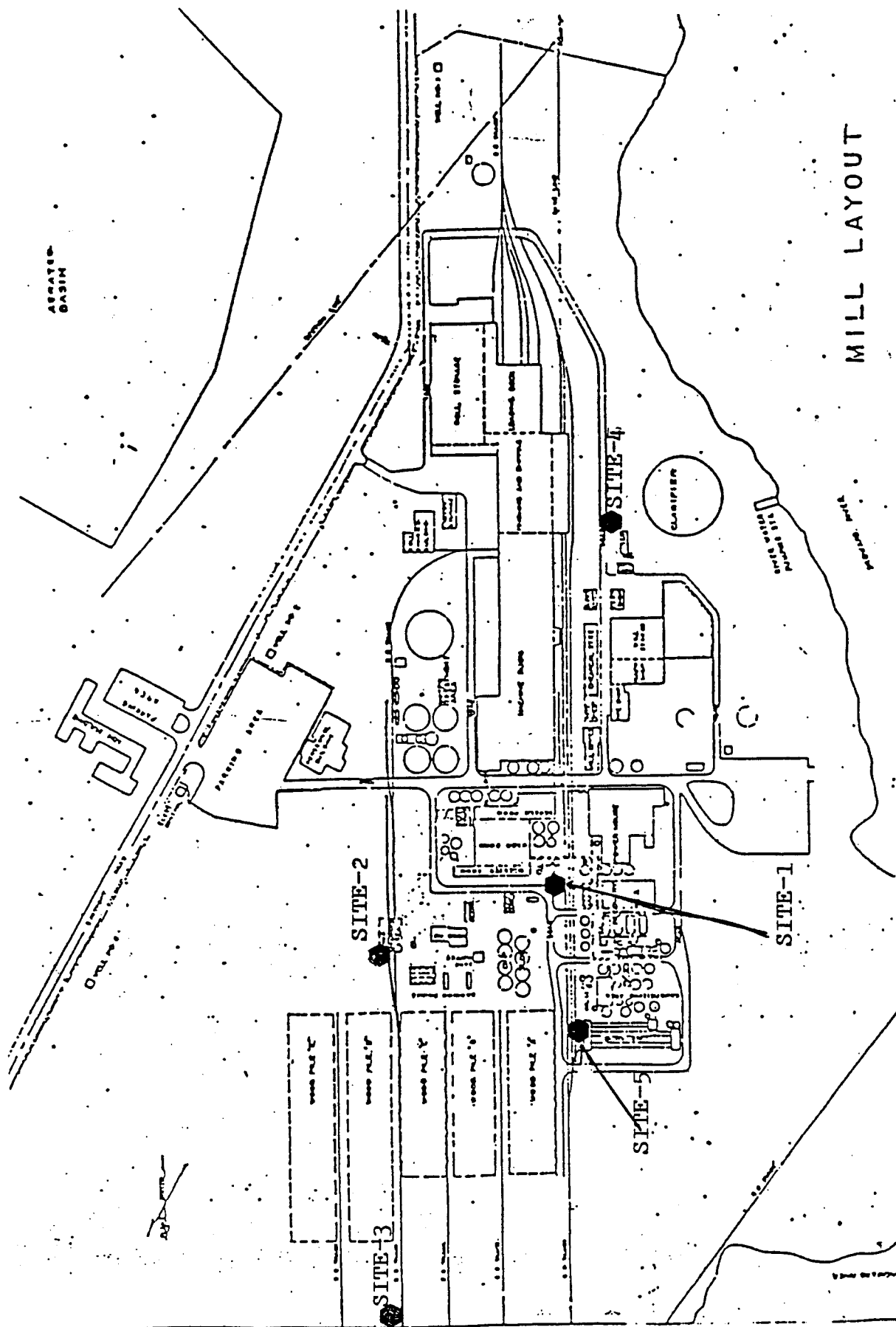


FIGURE-1

JACKSONVILLE KRAFT PAPER COMPANY MILL LAYOUT WITH TANK SITE LOCATIONS



G. Warren Leve, Inc.

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LOG NO: 88-7549

Received: 22 DEC 88

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REPORT OF ANALYTICAL RESULTS

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| LOG NO | SAMPLE DESCRIPTION , LIQUID SAMPLES | | | | | SAMPLED BY |
|--------------------------------|-------------------------------------|--------|--------|--------|--------|------------|
| 7549-1 | PZ-1 | | | | | Client |
| 7549-2 | PZ-2 | | | | | |
| 7549-3 | PZ-3 | | | | | |
| 7549-4 | TMW-4 | | | | | |
| 7549-5 | TMW-5 | | | | | |
| PARAMETER | 7549-1 | 7549-2 | 7549-3 | 7549-4 | 7549-5 | |
| Volatile Organic Compounds | | | | | | |
| Acrolein, ug/l | <250 | <250 | <250 | <250 | <250 | |
| Acrylonitrile, ug/l | <250 | <250 | <250 | <250 | <250 | |
| Benzene, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Bis(chloromethyl)Ether, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Bromoform, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Carbon Tetrachloride, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Chlorobenzene, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Chlorodibromomethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Chloroethane, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2-Chloroethylvinyl Ether, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Chloroform, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Dichlorobromomethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Dichlorodifluoromethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,1-Dichloroethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,2-Dichloroethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,1-Dichloroethylene, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,2-Dichloropropane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,3-Dichloropropene, ug/l | <5 | <5 | <5 | <5 | <5 | |

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|--------------------------------------|-------------------------------------|------------|--------|--------|--------|
| | | Client | | | |
| 7549-1 | PZ-1 | | | | |
| 7549-2 | PZ-2 | | | | |
| 7549-3 | PZ-3 | | | | |
| 7549-4 | TMW-4 | | | | |
| 7549-5 | TMW-5 | | | | |
| PARAMETER | 7549-1 | 7549-2 | 7549-3 | 7549-4 | 7549-5 |
| Ethylbenzene, ug/l | <5 | <5 | <5 | <5 | <5 |
| Methyl Bromide, ug/l | <10 | <10 | <10 | <10 | <10 |
| Methyl Chloride, ug/l | <10 | <10 | <10 | <10 | <10 |
| Methylene Chloride, ug/l | <5 | <5 | <5 | <5 | <5 |
| 1,1,2,2-Tetrachloroethane, ug/l | <5 | <5 | <5 | <5 | <5 |
| Tetrachloroethylene, ug/l | <5 | <5 | <5 | <5 | <5 |
| Toluene, ug/l | <5 | <5 | <5 | <5 | <5 |
| cis/trans-1,2-Dichloroethylene, ug/l | <5 | <5 | <5 | <5 | <5 |
| 1,1,1-Trichloroethane, ug/l | <5 | <5 | <5 | <5 | <5 |
| 1,1,2-Trichloroethane, ug/l | <5 | <5 | <5 | <5 | <5 |
| Trichloroethylene, ug/l | <5 | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane, ug/l | <5 | <5 | <5 | <5 | <5 |
| Vinyl Chloride, ug/l | <10 | <10 | <10 | <10 | <10 |

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|--------|-------------------------------------|------------|
| 7549-1 | PZ-1 | |
| 7549-2 | PZ-2 | Client |
| 7549-3 | PZ-3 | |
| 7549-4 | TMW-4 | |
| 7549-5 | TMW-5 | |

| PARAMETER | 7549-1 | 7549-2 | 7549-3 | 7549-4 | 7549-5 |
|-------------------------------------|--------|--------|--------|--------|--------|
| Base neutrals/pesticides GC/MS | | | | | |
| Acenaphthene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Acenaphthylene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Anthracene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Benzidine, ug/l | <80 | <80 | <10 | <10 | <10 |
| Benzo(a)Anthracene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Benzo(a)Pyrene, ug/l | <10 | <10 | <10 | <10 | <10 |
| 3,4-Benzofluoranthene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Benzo (g,h,i) Perylene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Benzo (k) Fluoranthene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Bis (2-Chloroethoxy) Methane, ug/l | <10 | <10 | <10 | <10 | <10 |
| Bis (2-Chloroethyl) Ether, ug/l | <10 | <10 | <10 | <10 | <10 |
| Bis (2-Chloroisopropyl) Ether, ug/l | <10 | <10 | <10 | <10 | <10 |
| Bis (2-Ethylhexyl) Phthalate, ug/l | <10 | <10 | 30 | 21 | 26 |
| 4-Bromophenyl Phenyl Ether, ug/l | <10 | <10 | <10 | <10 | <10 |
| Butyl Benzyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 |
| 2-Chloronaphthalene, ug/l | <10 | <10 | <10 | <10 | <10 |
| 4-Chlorophenyl Phenyl Ether, ug/l | <10 | <10 | <10 | <10 | <10 |
| Chrysene, ug/l | <10 | <10 | <10 | <10 | <10 |

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|---------------------------------|-------------------------------------|------------|--------|--------|--------|--|
| 7549-1 | PZ-1 | Client | | | | |
| 7549-2 | PZ-2 | | | | | |
| 7549-3 | PZ-3 | | | | | |
| 7549-4 | TMW-4 | | | | | |
| 7549-5 | TMW-5 | | | | | |
| PARAMETER | 7549-1 | 7549-2 | 7549-3 | 7549-4 | 7549-5 | |
| Dibenzo (a,h) Anthracene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,2-Dichlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,3-Dichlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,4-Dichlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 3,3-Dichlorobenzidine, ug/l | <20 | <20 | <20 | <20 | <20 | |
| Diethyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Dimethyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Di-N-Butyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2,4-Dinitrotoluene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2,6-Dinitrotoluene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Di-N-Octyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,2-Diphenylhydrazine, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Fluoranthene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Fluorene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Hexachlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Hexachlorobutadiene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Hexachlorocyclopentadiene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Hexachloroethane, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Indeno (1,2,3-cd) Pyrene, ug/l | <10 | <10 | <10 | <10 | <10 | |

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|---------------------------------|-------------------------------------|------------|--------|--------|--------|--|
| | | Client | | | | |
| 7549-1 | PZ-1 | | | | | |
| 7549-2 | PZ-2 | | | | | |
| 7549-3 | PZ-3 | | | | | |
| 7549-4 | TMW-4 | | | | | |
| 7549-5 | TMW-5 | | | | | |
| PARAMETER | 7549-1 | 7549-2 | 7549-3 | 7549-4 | 7549-5 | |
| Isophorone, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Naphthalene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Nitrobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| N-Nitrosodimethylamine, ug/l | <10 | <10 | <10 | <10 | <10 | |
| N-Nitrosodi-N-Propylamine, ug/l | <10 | <10 | <10 | <10 | <10 | |
| N-Nitrosodiphenylamine, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Phenanthrene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Pyrene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,2,4-Trichlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Aldrin, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Alpha-BHC, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Beta-BHC, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Gamma-BHC, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Delta-BHC, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Chlordane, ug/l | <20 | <20 | <20 | <20 | <20 | |
| 4,4'-DDT, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 4,4'-DDE, ug/l | <30 | <30 | <30 | <30 | <30 | |
| 4,4'-DDD, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Dieldrin, ug/l | <10 | <10 | <10 | <10 | <10 | |

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| LOG NO | SAMPLE DESCRIPTION , LIQUID SAMPLES | SAMPLED BY | | | |
|--------------------------|-------------------------------------|------------|--------|--------|--------|
| 7549-1 | PZ-1 | Client | | | |
| 7549-2 | PZ-2 | | | | |
| 7549-3 | PZ-3 | | | | |
| 7549-4 | TMW-4 | | | | |
| 7549-5 | TMW-5 | | | | |
| PARAMETER | 7549-1 | 7549-2 | 7549-3 | 7549-4 | 7549-5 |
| Alpha-Endosulfan, ug/l | <10 | <10 | <10 | <10 | <10 |
| Beta-Endosulfan, ug/l | <100 | <100 | <100 | <100 | <100 |
| Endosulfan Sulfate, ug/l | <10 | <10 | <10 | <10 | <10 |
| Endrin, ug/l | <10 | <10 | <10 | <10 | <10 |
| Endrin Aldehyde, ug/l | <10 | <10 | <10 | <10 | <10 |
| Heptachlor, ug/l | <10 | <10 | <10 | <10 | <10 |
| Heptachlor Epoxide, ug/l | <10 | <10 | <10 | <10 | <10 |
| PCB-1242, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1254, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1221, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1232, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1248, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1260, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1016, ug/l | <100 | <100 | <100 | <100 | <100 |
| Toxaphene, ug/l | <200 | <200 | <200 | <200 | <200 |

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|---|-------------------------------------|------------|---------|--------|--------|
| | | Client | | | |
| 7549-1 | PZ-1 | | | | |
| 7549-2 | PZ-2 | | | | |
| 7549-3 | PZ-3 | | | | |
| 7549-4 | TMW-4 | | | | |
| 7549-5 | TMW-5 | | | | |
| PARAMETER | 7549-1 | 7549-2 | 7549-3 | 7549-4 | 7549-5 |
| Mercury, mg/l | <0.0002 | <0.0002 | <0.0002 | 0.0068 | 0.0005 |
| Nickel, mg/l | 0.028 | 0.014 | 0.37 | 0.16 | 0.35 |
| Selenium, mg/l | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Silver, mg/l | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Thallium, mg/l | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Zinc, mg/l | 0.28 | 88 | 0.023 | 15 | 2.1 |
| Total cyanide (9010), mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Sulfide (RCRA-SW-846-9030), mg/l | <0.1 | <0.1 | <0.1 | 3.5 | 0.62 |
| Corrosivity-pH (EPA Method 9040), units | 7.5 | 7.5 | 8.0 | 8.6 | 10.8 |
| Sulfate as SO ₄ , mg/l | 530 | 140 | 140 | 990 | 650 |

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|------------------------------|-------------------------------------|------------|---------|--------|---------|--|
| 7549-1 | PZ-1 | Client | | | | |
| 7549-2 | PZ-2 | | | | | |
| 7549-3 | PZ-3 | | | | | |
| 7549-4 | TMW-4 | | | | | |
| 7549-5 | TMW-5 | | | | | |
| PARAMETER | 7549-1 | 7549-2 | 7549-3 | 7549-4 | 7549-5 | |
| PP-Acid Extractable Organics | | | | | | |
| 2-Chlorophenol, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2,4-Dichlorophenol, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2,4-Dimethylphenol, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 4,6-Dinitro-o-cresol, ug/l | <50 | <50 | <50 | <50 | <50 | |
| 2,4-Dinitrophenol, ug/l | <50 | <50 | <50 | <50 | <50 | |
| 2-Nitrophenol, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 4-Nitrophenol, ug/l | <50 | <50 | <50 | <50 | <50 | |
| P-Chloro-m-cresol, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Pentachlorophenol, ug/l | <50 | <50 | <50 | <50 | <50 | |
| Phenol, ug/l | <10 | <10 | 31 | 23 | 29 | |
| 2,4,6-Trichlorophenol, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Antimony, mg/l | <0.050 | <0.050 | 0.14 | 0.083 | <0.050 | |
| Arsenic, mg/l | 0.024 | 0.061 | 0.014 | 0.025 | 0.017 | |
| Beryllium, mg/l | <0.0050 | <0.0050 | <0.0050 | 0.013 | 0.011 | |
| Cadmium, mg/l | <0.0050 | <0.0050 | <0.0050 | 0.027 | <0.0050 | |
| Chromium, mg/l | 0.10 | 0.017 | 0.30 | 0.30 | 0.22 | |
| Copper, mg/l | 0.011 | 48 | 0.026 | 0.98 | 0.64 | |
| Lead, mg/l | 0.054 | 0.008 | 4.2 | 4.6 | 0.47 | |

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| LOG NO | SAMPLE DESCRIPTION , LIQUID SAMPLES | SAMPLED BY | | | | |
|--------------------------------|-------------------------------------|------------|--------|--------|---------|--|
| 7549-6 | TMW-6 | Client | | | | |
| 7549-7 | TMW-8 | | | | | |
| 7549-8 | TMW-9 | | | | | |
| 7549-9 | MW-1 | | | | | |
| 7549-10 | MW-2 | | | | | |
| PARAMETER | 7549-6 | 7549-7 | 7549-8 | 7549-9 | 7549-10 | |
| Volatile Organic Compounds | | | | | | |
| Acrolein, ug/l | <250 | <250 | <250 | <250 | <250 | |
| Acrylonitrile, ug/l | <250 | <250 | <250 | <250 | <250 | |
| Benzene, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Bis(chloromethyl)Ether, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Bromoform, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Carbon Tetrachloride, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Chlorobenzene, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Chlorodibromomethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Chloroethane, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2-Chloroethylvinyl Ether, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Chloroform, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Dichlorobromomethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| Dichlorodifluoromethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,1-Dichloroethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,2-Dichloroethane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,1-Dichloroethylene, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,2-Dichloropropane, ug/l | <5 | <5 | <5 | <5 | <5 | |
| 1,3-Dichloropropene, ug/l | <5 | <5 | <5 | <5 | <5 | |

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LOG NO: 88-7549

Received: 22 DEC 88

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| LOG NO | SAMPLE DESCRIPTION , LIQUID SAMPLES | SAMPLED BY | | | |
|--------------------------------------|-------------------------------------|------------|--------|--------|---------|
| 7549-6 | TMW-6 | Client | | | |
| 7549-7 | TMW-8 | | | | |
| 7549-8 | TMW-9 | | | | |
| 7549-9 | MW-1 | | | | |
| 7549-10 | MW-2 | | | | |
| PARAMETER | 7549-6 | 7549-7 | 7549-8 | 7549-9 | 7549-10 |
| Ethylbenzene, ug/l | <5 | <5 | <5 | <5 | <5 |
| Methyl Bromide, ug/l | <10 | <10 | <10 | <10 | <10 |
| Methyl Chloride, ug/l | <10 | <10 | <10 | <10 | <10 |
| Methylene Chloride, ug/l | <5 | <5 | <5 | <5 | <5 |
| 1,1,2,2-Tetrachloroethane, ug/l | <5 | <5 | <5 | <5 | <5 |
| Tetrachloroethylene, ug/l | <5 | <5 | <5 | <5 | <5 |
| Toluene, ug/l | <5 | <5 | <5 | <5 | <5 |
| cis/trans-1,2-Dichloroethylene, ug/l | <5 | <5 | <5 | <5 | <5 |
| 1,1,1-Trichloroethane, ug/l | <5 | <5 | <5 | <5 | <5 |
| 1,1,2-Trichloroethane, ug/l | <5 | <5 | <5 | <5 | <5 |
| Trichloroethylene, ug/l | <5 | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane, ug/l | <5 | <5 | <5 | <5 | <5 |
| Vinyl Chloride, ug/l | <10 | <10 | <10 | <10 | <10 |

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|-------------------------------------|-------------------------------------|------------|--------|--------|---------|--|
| 7549-6 | TMW-6 | Client | | | | |
| 7549-7 | TMW-8 | | | | | |
| 7549-8 | TMW-9 | | | | | |
| 7549-9 | MW-1 | | | | | |
| 7549-10 | MW-2 | | | | | |
| PARAMETER | 7549-6 | 7549-7 | 7549-8 | 7549-9 | 7549-10 | |
| Base neutrals/pesticides GC/MS | | | | | | |
| Acenaphthene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Acenaphthylene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Anthracene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Benzidine, ug/l | <80 | <80 | <80 | <80 | <80 | |
| Benzo(a)Anthracene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Benzo(a)Pyrene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 3,4-Benzofluoranthene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Benzo (g,h,i) Perylene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Benzo (k) Fluoranthene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Bis (2-Chloroethoxy) Methane, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Bis (2-Chloroethyl) Ether, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Bis (2-Chloroisopropyl) Ether, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Bis (2-Ethylhexyl) Phthalate, ug/l | <10 | <10 | <10 | 14 | <10 | |
| 4-Bromophenyl Phenyl Ether, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Butyl Benzyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2-Chloronaphthalene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 4-Chlorophenyl Phenyl Ether, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Chrysene, ug/l | <10 | <10 | <10 | <10 | <10 | |

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|---------------------------------|-------------------------------------|------------|--------|--------|---------|--|
| 7549-6 | TMW-6 | Client | | | | |
| 7549-7 | TMW-8 | | | | | |
| 7549-8 | TMW-9 | | | | | |
| 7549-9 | MW-1 | | | | | |
| 7549-10 | MW-2 | | | | | |
| PARAMETER | 7549-6 | 7549-7 | 7549-8 | 7549-9 | 7549-10 | |
| Dibenzo (a,h) Anthracene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,2-Dichlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,3-Dichlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,4-Dichlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 3,3-Dichlorobenzidine, ug/l | <20 | <20 | <20 | <20 | <20 | |
| Diethyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Dimethyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Di-N-Butyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2,4-Dinitrotoluene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 2,6-Dinitrotoluene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Di-N-Octyl Phthalate, ug/l | <10 | <10 | <10 | <10 | <10 | |
| 1,2-Diphenylhydrazine, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Fluoranthene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Fluorene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Hexachlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Hexachlorobutadiene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Hexachlorocyclopentadiene, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Hexachloroethane, ug/l | <10 | <10 | <10 | <10 | <10 | |
| Indeno (1,2,3-cd) Pyrene, ug/l | <10 | <10 | <10 | <10 | <10 | |

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| 7549-6 | TMW-6 | Client | | | |
| 7549-7 | TMW-8 | | | | |
| 7549-8 | TMW-9 | | | | |
| 7549-9 | MW-1 | | | | |
| 7549-10 | MW-2 | | | | |
| PARAMETER | 7549-6 | 7549-7 | 7549-8 | 7549-9 | 7549-10 |
| Isophorone, ug/l | <10 | <10 | <10 | <10 | <10 |
| Naphthalene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Nitrobenzene, ug/l | <10 | <10 | <10 | <10 | <10 |
| N-Nitrosodimethylamine, ug/l | <10 | <10 | <10 | <10 | <10 |
| N-Nitrosodi-N-Propylamine, ug/l | <10 | <10 | <10 | <10 | <10 |
| N-Nitrosodiphenylamine, ug/l | <10 | <10 | <10 | <10 | <10 |
| Phenanthrene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Pyrene, ug/l | <10 | <10 | <10 | <10 | <10 |
| 1,2,4-Trichlorobenzene, ug/l | <10 | <10 | <10 | <10 | <10 |
| Aldrin, ug/l | <10 | <10 | <10 | <10 | <10 |
| Alpha-BHC, ug/l | <10 | <10 | <10 | <10 | <10 |
| Beta-BHC, ug/l | <10 | <10 | <10 | <10 | <10 |
| Gamma-BHC, ug/l | <10 | <10 | <10 | <10 | <10 |
| Delta-BHC, ug/l | <10 | <10 | <10 | <10 | <10 |
| Chlordane, ug/l | <20 | <20 | <20 | <20 | <20 |
| 4,4'-DDT, ug/l | <10 | <10 | <10 | <10 | <10 |
| 4,4'-DDE, ug/l | <30 | <30 | <30 | <30 | <30 |
| 4,4'-DDD, ug/l | <10 | <10 | <10 | <10 | <10 |
| Dieldrin, ug/l | <10 | <10 | <10 | <10 | <10 |

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| LOG NO | SAMPLE DESCRIPTION , LIQUID SAMPLES | SAMPLED BY | | | |
|--------------------------|-------------------------------------|------------|--------|--------|---------|
| 7549-6 | TMW-6 | Client | | | |
| 7549-7 | TMW-8 | | | | |
| 7549-8 | TMW-9 | | | | |
| 7549-9 | MW-1 | | | | |
| 7549-10 | MW-2 | | | | |
| PARAMETER | 7549-6 | 7549-7 | 7549-8 | 7549-9 | 7549-10 |
| Alpha-Endosulfan, ug/l | <10 | <10 | <10 | <10 | <10 |
| Beta-Endosulfan, ug/l | <100 | <100 | <100 | <100 | <100 |
| Endosulfan Sulfate, ug/l | <10 | <10 | <10 | <10 | <10 |
| Endrin, ug/l | <10 | <10 | <10 | <10 | <10 |
| Endrin Aldehyde, ug/l | <10 | <10 | <10 | <10 | <10 |
| Heptachlor, ug/l | <10 | <10 | <10 | <10 | <10 |
| Heptachlor Epoxide, ug/l | <10 | <10 | <10 | <10 | <10 |
| PCB-1242, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1254, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1221, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1232, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1248, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1260, ug/l | <100 | <100 | <100 | <100 | <100 |
| PCB-1016, ug/l | <100 | <100 | <100 | <100 | <100 |
| Toxaphene, ug/l | <200 | <200 | <200 | <200 | <200 |

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| LOG NO | SAMPLE DESCRIPTION , LIQUID SAMPLES | SAMPLED BY | | | |
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| 7549-6 | TMW-6 | Client | | | |
| 7549-7 | TMW-8 | | | | |
| 7549-8 | TMW-9 | | | | |
| 7549-9 | MW-1 | | | | |
| 7549-10 | MW-2 | | | | |
| PARAMETER | 7549-6 | 7549-7 | 7549-8 | 7549-9 | 7549-10 |
| PP-Acid Extractable Organics | | | | | |
| 2-Chlorophenol, ug/l | <10 | <10 | <10 | <10 | <10 |
| 2,4-Dichlorophenol, ug/l | <10 | <10 | <10 | <10 | <10 |
| 2,4-Dimethylphenol, ug/l | <10 | <10 | <10 | <10 | <10 |
| 4,6-Dinitro-o-cresol, ug/l | <50 | <50 | <50 | <50 | <50 |
| 2,4-Dinitrophenol, ug/l | <50 | <50 | <50 | <50 | <50 |
| 2-Nitrophenol, ug/l | <10 | <10 | <10 | <10 | <10 |
| 4-Nitrophenol, ug/l | <50 | <50 | <50 | <50 | <50 |
| P-Chloro-m-cresol, ug/l | <10 | <10 | <10 | <10 | <10 |
| Pentachlorophenol, ug/l | <50 | <50 | <50 | <50 | <50 |
| Phenol, ug/l | <10 | <10 | <10 | <10 | 28 |
| 2,4,6-Trichlorophenol, ug/l | <10 | <10 | <10 | <10 | <10 |
| Antimony, mg/l | <0.050 | <0.050 | 0.068 | <0.050 | <0.050 |
| Arsenic, mg/l | 1.8 | 0.010 | <0.010 | <0.010 | <0.010 |
| Beryllium, mg/l | 0.017 | 0.019 | 0.010 | <0.0050 | <0.0050 |
| Cadmium, mg/l | 0.022 | <0.0050 | <0.0050 | <0.0050 | <0.0050 |
| Chromium, mg/l | 0.14 | 0.33 | 0.29 | 0.085 | 0.028 |
| Copper, mg/l | 1.3 | 0.20 | 1.8 | 0.023 | <0.010 |
| Lead, mg/l | 0.063 | 0.18 | 1.0 | 0.011 | 0.021 |

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| 7549-6 | TMW-6 | Client | | | |
| 7549-7 | TMW-8 | | | | |
| 7549-8 | TMW-9 | | | | |
| 7549-9 | MW-1 | | | | |
| 7549-10 | MW-2 | | | | |
| PARAMETER | 7549-6 | 7549-7 | 7549-8 | 7549-9 | 7549-10 |
| Mercury, mg/l | 0.0005 | 0.0038 | 0.0004 | <0.0002 | <0.0002 |
| Nickel, mg/l | 0.083 | 0.29 | 0.24 | 0.019 | 0.028 |
| Selenium, mg/l | <0.010 | <0.010 | <0.010 | <0.010 | 0.011 |
| Silver, mg/l | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Thallium, mg/l | <0.010 | <0.010 | <0.010 | <0.010 | <0.010 |
| Zinc, mg/l | 2.0 | 0.93 | 2.6 | 0.38 | 0.032 |
| Total cyanide (9010), mg/l | <0.01 | <0.01 | <0.01 | <0.01 | <0.01 |
| Sulfide (RCRA-SW-846-9030), mg/l | 1.8 | <0.10 | 0.83 | 1.6 | 460 |
| Corrosivity-pH (EPA Method 9040), units | 7.1 | 6.7 | 8.1 | 9.5 | 12.0 |
| Sulfate as SO ₄ , mg/l | 360 | 140 | 1200 | 57 | 2000 |

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|---------|-------------------------------------|------------|
| 7549-11 | MW-5 | Client |
| 7549-12 | MW-6 | |

| PARAMETER | 7549-11 | 7549-12 |
|--------------------------------|---------|---------|
| Volatile Organic Compounds | | |
| Acrolein, ug/l | <250 | <250 |
| Acrylonitrile, ug/l | <250 | <250 |
| Benzene, ug/l | <5 | <5 |
| Bis(chloromethyl)Ether, ug/l | <5 | <5 |
| Bromoform, ug/l | <5 | <5 |
| Carbon Tetrachloride, ug/l | <5 | <5 |
| Chlorobenzene, ug/l | <5 | <5 |
| Chlorodibromomethane, ug/l | <5 | <5 |
| Chloroethane, ug/l | <10 | <10 |
| 2-Chloroethylvinyl Ether, ug/l | <10 | <10 |
| Chloroform, ug/l | <5 | <5 |
| Dichlorobromomethane, ug/l | <5 | <5 |
| Dichlorodifluoromethane, ug/l | <5 | <5 |
| 1,1-Dichloroethane, ug/l | <5 | <5 |
| 1,2-Dichloroethane, ug/l | <5 | <5 |
| 1,1-Dichloroethylene, ug/l | <5 | <5 |
| 1,2-Dichloropropane, ug/l | <5 | <5 |
| 1,3-Dichloropropene, ug/l | <5 | <5 |
| Ethylbenzene, ug/l | <5 | <5 |
| Methyl Bromide, ug/l | <10 | <10 |
| Methyl Chloride, ug/l | <10 | <10 |

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| 7549-11 | MW-5 | Client | |
| 7549-12 | MW-6 | | |
| PARAMETER | 7549-11 | 7549-12 | |
| Methylene Chloride, ug/l | <5 | <5 | |
| 1,1,2,2-Tetrachloroethane, ug/l | <5 | <5 | |
| Tetrachloroethylene, ug/l | <5 | <5 | |
| Toluene, ug/l | <5 | <5 | |
| cis/trans-1,2-Dichloroethylene, ug/l | <5 | <5 | |
| 1,1,1-Trichloroethane, ug/l | <5 | <5 | |
| 1,1,2-Trichloroethane, ug/l | <5 | <5 | |
| Trichloroethylene, ug/l | <5 | <5 | |
| Trichlorofluoromethane, ug/l | <5 | <5 | |
| Vinyl Chloride, ug/l | <10 | <10 | |

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|-------------------------------------|-------------------------------------|------------|---------|
| 7549-11 | MW-5 | Client | |
| 7549-12 | MW-6 | | |
| PARAMETER | | 7549-11 | 7549-12 |
| Base neutrals/pesticides GC/MS | | | |
| Acenaphthene, ug/l | | <10 | <10 |
| Acenaphthylene, ug/l | | <10 | <10 |
| Anthracene, ug/l | | <10 | <10 |
| Benzidine, ug/l | | <80 | <80 |
| Benzo(a)Anthracene, ug/l | | <10 | <10 |
| Benzo(a)Pyrene, ug/l | | <10 | <10 |
| 3,4-Benzofluoranthene, ug/l | | <10 | <10 |
| Benzo (g,h,i) Perylene, ug/l | | <10 | <10 |
| Benzo (k) Fluoranthene, ug/l | | <10 | <10 |
| Bis (2-Chloroethoxy) Methane, ug/l | | <10 | <10 |
| Bis (2-Chloroethyl) Ether, ug/l | | <10 | <10 |
| Bis (2-Chloroisopropyl) Ether, ug/l | | <10 | <10 |
| Bis (2-Ethylhexyl) Phthalate, ug/l | | <10 | <10 |
| 4-Bromophenyl Phenyl Ether, ug/l | | <10 | <10 |
| Butyl Benzyl Phthalate, ug/l | | <10 | <10 |
| 2-Chloronaphthalene, ug/l | | <10 | <10 |
| 4-Chlorophenyl Phenyl Ether, ug/l | | <10 | <10 |
| Chrysene, ug/l | | <10 | <10 |
| Dibenzo (a,h) Anthracene, ug/l | | <10 | <10 |
| 1,2-Dichlorobenzene, ug/l | | <10 | <10 |
| 1,3-Dichlorobenzene, ug/l | | <10 | <10 |

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|---------------------------------|-------------------------------------|------------|--|
| 7549-11 | MW-5 | Client | |
| 7549-12 | MW-6 | | |
| PARAMETER | 7549-11 | 7549-12 | |
| 1,4-Dichlorobenzene, ug/l | <10 | <10 | |
| 3,3-Dichlorobenzidine, ug/l | <20 | <20 | |
| Diethyl Phthalate, ug/l | <10 | <10 | |
| Dimethyl Phthalate, ug/l | <10 | <10 | |
| Di-N-Butyl Phthalate, ug/l | <10 | <10 | |
| 2,4-Dinitrotoluene, ug/l | <10 | <10 | |
| 2,6-Dinitrotoluene, ug/l | <10 | <10 | |
| Di-N-Octyl Phthalate, ug/l | <10 | <10 | |
| 1,2-Diphenylhydrazine, ug/l | <10 | <10 | |
| Fluoranthene, ug/l | <10 | <10 | |
| Fluorene, ug/l | <10 | <10 | |
| Hexachlorobenzene, ug/l | <10 | <10 | |
| Hexachlorobutadiene, ug/l | <10 | <10 | |
| Hexachlorocyclopentadiene, ug/l | <10 | <10 | |
| Hexachloroethane, ug/l | <10 | <10 | |
| Indeno (1,2,3-cd) Pyrene, ug/l | <10 | <10 | |
| Isophorone, ug/l | <10 | <10 | |
| Naphthalene, ug/l | <10 | 51 | |
| Nitrobenzene, ug/l | <10 | <10 | |
| N-Nitrosodimethylamine, ug/l | <10 | <10 | |
| N-Nitrosodi-N-Propylamine, ug/l | <10 | <10 | |
| N-Nitrosodiphenylamine, ug/l | <10 | <10 | |

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|------------------------------|-------------------------------------|------------|--|
| 7549-11 | MW-5 | Client | |
| 7549-12 | MW-6 | | |
| PARAMETER | 7549-11 | 7549-12 | |
| Phenanthrene, ug/l | <10 | <10 | |
| Pyrene, ug/l | <10 | <10 | |
| 1,2,4-Trichlorobenzene, ug/l | <10 | <10 | |
| Aldrin, ug/l | <10 | <10 | |
| Alpha-BHC, ug/l | <10 | <10 | |
| Beta-BHC, ug/l | <10 | <10 | |
| Gamma-BHC, ug/l | <10 | <10 | |
| Delta-BHC, ug/l | <10 | <10 | |
| Chlordane, ug/l | <20 | <20 | |
| 4,4'-DDT, ug/l | <10 | <10 | |
| 4,4'-DDE, ug/l | <30 | <30 | |
| 4,4'-DDD, ug/l | <10 | <10 | |
| Dieldrin, ug/l | <10 | <10 | |
| Alpha-Endosulfan, ug/l | <10 | <10 | |
| Beta-Endosulfan, ug/l | <100 | <100 | |
| Endosulfan Sulfate, ug/l | <10 | <10 | |
| Endrin, ug/l | <10 | <10 | |
| Endrin Aldehyde, ug/l | <10 | <10 | |
| Heptachlor, ug/l | <10 | <10 | |
| Heptachlor Epoxide, ug/l | <10 | <10 | |
| PCB-1242, ug/l | <100 | <100 | |
| PCB-1254, ug/l | <100 | <100 | |

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| 7549-11 | MW-5 | Client | |
| 7549-12 | MW-6 | | |
| PARAMETER | 7549-11 | 7549-12 | |
| PCB-1221, ug/l | <100 | <100 | |
| PCB-1232, ug/l | <100 | <100 | |
| PCB-1248, ug/l | <100 | <100 | |
| PCB-1260, ug/l | <100 | <100 | |
| PCB-1016, ug/l | <100 | <100 | |
| Toxaphene, ug/l | <200 | <200 | |
| PP-Acid Extractable Organics | | | |
| 2-Chlorophenol, ug/l | <10 | <10 | |
| 2,4-Dichlorophenol, ug/l | <10 | <10 | |
| 2,4-Dimethylphenol, ug/l | <10 | <10 | |
| 4,6-Dinitro-o-cresol, ug/l | <50 | <50 | |
| 2,4-Dinitrophenol, ug/l | <50 | <50 | |
| 2-Nitrophenol, ug/l | <10 | <10 | |
| 4-Nitrophenol, ug/l | <50 | <50 | |
| P-Chloro-m-cresol, ug/l | <10 | <10 | |
| Pentachlorophenol, ug/l | <50 | <50 | |
| Phenol, ug/l | <10 | <10 | |
| 2,4,6-Trichlorophenol, ug/l | <10 | <10 | |
| Antimony, mg/l | <0.050 | <0.050 | |
| Arsenic, mg/l | <0.010 | <0.010 | |
| Beryllium, mg/l | <0.0050 | 0.0065 | |
| Cadmium, mg/l | <0.0050 | <0.0050 | |

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| 7549-11 | MW-5 | Client | |
| 7549-12 | MW-6 | | |
| PARAMETER | 7549-11 | 7549-12 | |
| Chromium, mg/l | 0.091 | 0.22 | |
| Copper, mg/l | 0.016 | 0.047 | |
| Lead, mg/l | 0.035 | 0.058 | |
| Mercury, mg/l | 0.0003 | 0.0006 | |
| Nickel, mg/l | 0.016 | 0.067 | |
| Selenium, mg/l | <0.010 | <0.010 | |
| Silver, mg/l | <0.010 | <0.010 | |
| Thallium, mg/l | <0.010 | <0.010 | |
| Zinc, mg/l | 0.049 | 0.11 | |
| Total cyanide (9010), mg/l | <0.01 | <0.010 | |
| Sulfide (RCRA-SW-846-9030), mg/l | 0.62 | 2.4 | |
| Corrosivity-pH (EPA Method 9040), mg/l | 7.8 | 10.7 | |
| Sulfate as SO ₄ , mg/l | 150 | 510 | |

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| 7549-13 | TMW-7 | Client |
| PARAMETER | 7549-13 | |
| Volatile Organic Compounds | | |
| Acrolein, ug/l | <250 | |
| Acrylonitrile, ug/l | <250 | |
| Benzene, ug/l | <5 | |
| Bis(chloromethyl)Ether, ug/l | <5 | |
| Bromoform, ug/l | <5 | |
| Carbon Tetrachloride, ug/l | <5 | |
| Chlorobenzene, ug/l | <5 | |
| Chlorodibromomethane, ug/l | <5 | |
| Chloroethane, ug/l | <10 | |
| 2-Chloroethylvinyl Ether, ug/l | <10 | |
| Chloroform, ug/l | <5 | |
| Dichlorobromomethane, ug/l | <5 | |
| Dichlorodifluoromethane, ug/l | <5 | |
| 1,1-Dichloroethane, ug/l | <5 | |
| 1,2-Dichloroethane, ug/l | <5 | |
| 1,1-Dichloroethylene, ug/l | <5 | |
| 1,2-Dichloropropane, ug/l | <5 | |
| 1,3-Dichloropropene, ug/l | <5 | |
| Ethylbenzene, ug/l | <5 | |
| Methyl Bromide, ug/l | <10 | |
| Methyl Chloride, ug/l | <10 | |
| Methylene Chloride, ug/l | <5 | |

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|--------------------------------------|-------------------------------------|------------|
| 7549-13 | TMW-7 | Client |
| PARAMETER | 7549-13 | |
| 1,1,2,2-Tetrachloroethane, ug/l | <5 | |
| Tetrachloroethylene, ug/l | <5 | |
| Toluene, ug/l | <5 | |
| cis/trans-1,2-Dichloroethylene, ug/l | <5 | |
| 1,1,1-Trichloroethane, ug/l | <5 | |
| 1,1,2-Trichloroethane, ug/l | <5 | |
| Trichloroethylene, ug/l | <5 | |
| Trichlorofluoromethane, ug/l | <5 | |
| Vinyl Chloride, ug/l | <10 | |

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|------------------------------------|---|------------|---------|---------|--|
| 7549-14 | North Pond | Client | | | |
| 7549-15 | South Pond | | | | |
| 7549-16 | Lime Pit #1 | | | | |
| 7549-17 | Lime Pit #2 | | | | |
| PARAMETER | 7549-14 | 7549-15 | 7549-16 | 7549-17 | |
| Volatile Organic Compounds | | | | | |
| Acrolein, ug/kg dw | <250 | <250 | <250 | <250 | |
| Acrylonitrile, ug/kg dw | <250 | <250 | <250 | <250 | |
| Benzene, ug/kg dw | <5 | <5 | <5 | <5 | |
| Bis(chloromethyl)Ether, ug/kg dw | <5 | <5 | <5 | <5 | |
| Bromoform, ug/kg dw | <5 | <5 | <5 | <5 | |
| Carbon Tetrachloride, ug/kg dw | <5 | <5 | <5 | <5 | |
| Chlorobenzene, ug/kg dw | <5 | <5 | <5 | <5 | |
| Chlorodibromomethane, ug/kg dw | <5 | <5 | <5 | <5 | |
| Chloroethane, ug/kg dw | <10 | <10 | <10 | <10 | |
| 2-Chloroethylvinyl Ether, ug/kg dw | <10 | <10 | <10 | <10 | |
| Chloroform, ug/kg dw | <5 | <5 | <5 | <5 | |
| Dichlorobromomethane, ug/kg dw | <5 | <5 | <5 | <5 | |
| Dichlorodifluoromethane, ug/kg dw | <5 | <5 | <5 | <5 | |
| 1,1-Dichloroethane, ug/kg dw | <5 | <5 | <5 | <5 | |
| 1,2-Dichloroethane, ug/kg dw | <5 | <5 | <5 | <5 | |
| 1,1-Dichloroethylene, ug/kg dw | <5 | <5 | <5 | <5 | |
| 1,2-Dichloropropane, ug/kg dw | <5 | <5 | <5 | <5 | |
| 1,3-Dichloropropene, ug/kg dw | <5 | <5 | <5 | <5 | |
| Ethylbenzene, ug/kg dw | <5 | <5 | <5 | <5 | |

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|---------|---|------------|
| 7549-14 | North Pond | Client |
| 7549-15 | South Pond | |
| 7549-16 | Lime Pit #1 | |
| 7549-17 | Lime Pit #2 | |

| PARAMETER | 7549-14 | 7549-15 | 7549-16 | 7549-17 |
|--|---------|---------|---------|---------|
| Methyl Bromide, ug/kg dw | <10 | <10 | <10 | <10 |
| Methyl Chloride, ug/kg dw | <10 | <10 | <10 | <10 |
| Methylene Chloride, ug/kg dw | <5 | <5 | <5 | <5 |
| 1,1,2,2-Tetrachloroethane, ug/kg dw | <5 | <5 | <5 | <5 |
| Tetrachloroethylene, ug/kg dw | <5 | <5 | <5 | <5 |
| Toluene, ug/kg dw | <5 | <5 | <5 | <5 |
| cis/trans-1,2-Dichloroethylene, ug/kg dw | <5 | <5 | <5 | <5 |
| 1,1,1-Trichloroethane, ug/kg dw | <5 | <5 | <5 | <5 |
| 1,1,2-Trichloroethane, ug/kg dw | <5 | <5 | <5 | <5 |
| Trichloroethylene, ug/kg dw | <5 | <5 | <5 | <5 |
| Trichlorofluoromethane, ug/kg dw | <5 | <5 | <5 | <5 |
| Vinyl Chloride, ug/kg dw | <10 | <10 | <10 | <10 |

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| 7549-14 | North Pond | Client | | | |
| 7549-15 | South Pond | | | | |
| 7549-16 | Lime Pit #1 | | | | |
| 7549-17 | Lime Pit #2 | | | | |
| PARAMETER | 7549-14 | 7549-15 | 7549-16 | 7549-17 | |
| Base neutrals/pesticides GC/MS | | | | | |
| Acenaphthene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Acenaphthylene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Anthracene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Benzidine, ug/kg dw | <3400 | <5000 | <4400 | <4400 | |
| Benzo(a)Anthracene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Benzo(a)Pyrene, ug/kg dw | <420 | <620 | <550 | <550 | |
| 3,4-Benzofluoranthene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Benzo (g,h,i) Perylene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Benzo (k) Fluoranthene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Bis (2-Chloroethoxy) Methane, ug/kg dw | <420 | <620 | <550 | <550 | |
| Bis (2-Chloroethyl) Ether, ug/kg dw | <420 | <620 | <550 | <550 | |
| Bis (2-Chloroisopropyl) Ether, ug/kg dw | <420 | <620 | <550 | <550 | |
| Bis (2-Ethylhexyl) Phthalate, ug/kg dw | <420 | <620 | <550 | <550 | |
| 4-Bromophenyl Phenyl Ether, ug/kg dw | <420 | <620 | <550 | <550 | |
| Butyl Benzyl Phthalate, ug/kg dw | <420 | <620 | <550 | <550 | |
| 2-Chloronaphthalene, ug/kg dw | <420 | <620 | <550 | <550 | |
| 4-Chlorophenyl Phenyl Ether, ug/kg dw | <420 | <620 | <550 | <550 | |
| Chrysene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Dibenzo (a,h) Anthracene, ug/kg dw | <420 | <620 | <550 | <550 | |

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| 7549-15 | South Pond | | | | |
| 7549-16 | Lime Pit #1 | | | | |
| 7549-17 | Lime Pit #2 | | | | |
| PARAMETER | | 7549-14 | 7549-15 | 7549-16 | 7549-17 |
| 1,2-Dichlorobenzene, ug/kg dw | | <420 | <620 | <550 | <550 |
| 1,3-Dichlorobenzene, ug/kg dw | | <420 | <620 | <550 | <550 |
| 1,4-Dichlorobenzene, ug/kg dw | | <420 | <620 | <550 | <550 |
| 3,3-Dichlorobenzidine, ug/kg dw | | <840 | <1200 | <1100 | <1100 |
| Diethyl Phthalate, ug/kg dw | | <420 | <620 | <550 | <550 |
| Dimethyl Phthalate, ug/kg dw | | <420 | <620 | <550 | <550 |
| Di-N-Butyl Phthalate, ug/kg dw | | <420 | <620 | <550 | <550 |
| 2,4-Dinitrotoluene, ug/kg dw | | <420 | <620 | <550 | <550 |
| 2,6-Dinitrotoluene, ug/kg dw | | <420 | <620 | <550 | <550 |
| Di-N-Octyl Phthalate, ug/kg dw | | <420 | <620 | <550 | <550 |
| 1,2-Diphenylhydrazine, ug/kg dw | | <420 | <620 | <550 | <550 |
| Fluoranthene, ug/kg dw | | <420 | <620 | <550 | <550 |
| Fluorene, ug/kg dw | | <420 | <620 | <550 | <550 |
| Hexachlorobenzene, ug/kg dw | | <420 | <620 | <550 | <550 |
| Hexachlorobutadiene, ug/kg dw | | <420 | <620 | <550 | <550 |
| Hexachlorocyclopentadiene, ug/kg dw | | <420 | <620 | <550 | <550 |
| Hexachloroethane, ug/kg dw | | <420 | <620 | <550 | <550 |
| Indeno (1,2,3-cd) Pyrene, ug/kg dw | | <420 | <620 | <550 | <550 |
| Isophorone, ug/kg dw | | <420 | <620 | <550 | <550 |
| Naphthalene, ug/kg dw | | <420 | <620 | <550 | <550 |

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| 7549-15 | South Pond | | | | |
| 7549-16 | Lime Pit #1 | | | | |
| 7549-17 | Lime Pit #2 | | | | |
| PARAMETER | 7549-14 | 7549-15 | 7549-16 | 7549-17 | |
| Nitrobenzene, ug/kg dw | <420 | <620 | <550 | <550 | |
| N-Nitrosodimethylamine, ug/kg dw | <420 | <620 | <550 | <550 | |
| N-Nitrosodi-N-Propylamine, ug/kg dw | <420 | <620 | <550 | <550 | |
| N-Nitrosodiphenylamine, ug/kg dw | <420 | <620 | <550 | <550 | |
| Phenanthrene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Pyrene, ug/kg dw | <420 | <620 | <550 | <550 | |
| 1,2,4-Trichlorobenzene, ug/kg dw | <420 | <620 | <550 | <550 | |
| Aldrin, ug/kg dw | <420 | <620 | <550 | <550 | |
| Alpha-BHC, ug/kg dw | <420 | <620 | <550 | <550 | |
| Beta-BHC, ug/kg dw | <420 | <620 | <550 | <550 | |
| Gamma-BHC, ug/kg dw | <420 | <620 | <550 | <550 | |
| Delta-BHC, ug/kg dw | <420 | <620 | <550 | <550 | |
| Chlordane, ug/kg dw | <840 | <1200 | <1100 | <1100 | |
| 4,4'-DDT, ug/kg dw | <420 | <620 | <550 | <550 | |
| 4,4'-DDE, ug/kg dw | <1300 | <1900 | <1700 | <1700 | |
| 4,4'-DDD, ug/kg dw | <420 | <620 | <550 | <550 | |
| Dieldrin, ug/kg dw | <420 | <620 | <550 | <550 | |
| Alpha-Endosulfan, ug/kg dw | <420 | <620 | <550 | <550 | |
| Beta-Endosulfan, ug/kg dw | <4200 | <6200 | <5500 | <5500 | |
| Endosulfan Sulfate, ug/kg dw | <420 | <620 | <550 | <550 | |

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SAVANNAH LABORATORIES
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P. O. Box 13056 • Tallahassee, FL 32317-3056
(904) 878-3994



LOG NO: 88-7549

Received: 22 DEC 88

Mr. Mike Glowacz
Dames & Moore
350 West Camino Gardens Boulevard
Boca Raton, FL 33432

Project: Seminole Kraft

REPORT OF ANALYTICAL RESULTS

Page 31

| LOG NO | SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES | SAMPLED BY | | | |
|------------------------------|---|------------|---------|---------|---------|
| | | Client | | | |
| 7549-14 | North Pond | | | | |
| 7549-15 | South Pond | | | | |
| 7549-16 | Lime Pit #1 | | | | |
| 7549-17 | Lime Pit #2 | | | | |
| PARAMETER | | 7549-14 | 7549-15 | 7549-16 | 7549-17 |
| Endrin, ug/kg dw | | <420 | <620 | <550 | <550 |
| Endrin Aldehyde, ug/kg dw | | <420 | <620 | <550 | <550 |
| Heptachlor, ug/kg dw | | <420 | <620 | <550 | <550 |
| Heptachlor Epoxide, ug/kg dw | | <420 | <620 | <550 | <550 |
| PCB-1242, ug/kg dw | | <4200 | <6200 | <5500 | <5500 |
| PCB-1254, ug/kg dw | | <4200 | <6200 | <5500 | <5500 |
| PCB-1221, ug/kg dw | | <4200 | <6200 | <5500 | <5500 |
| PCB-1232, ug/kg dw | | <4200 | <6200 | <5500 | <5500 |
| PCB-1248, ug/kg dw | | <4200 | <6200 | <5500 | <5500 |
| PCB-1260, ug/kg dw | | <4200 | <6200 | <5500 | <5500 |
| PCB-1016, ug/kg dw | | <4200 | <6200 | <5500 | <5500 |
| Toxaphene, ug/kg dw | | <8400 | <12000 | <11000 | <11000 |

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REPORT OF ANALYTICAL RESULTS

Page 32

| LOG NO | SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES | SAMPLED BY | | | |
|---------------------------------|---|------------|---------|---------|--|
| 7549-14 | North Pond | Client | | | |
| 7549-15 | South Pond | | | | |
| 7549-16 | Lime Pit #1 | | | | |
| 7549-17 | Lime Pit #2 | | | | |
| PARAMETER | 7549-14 | 7549-15 | 7549-16 | 7549-17 | |
| PP-Acid Extractable Organics | | | | | |
| 2-Chlorophenol, ug/l | <420 | <620 | <550 | <550 | |
| 2,4-Dichlorophenol, ug/kg dw | <420 | <620 | <550 | <550 | |
| 2,4-Dimethylphenol, ug/kg dw | <420 | <620 | <550 | <550 | |
| 4,6-Dinitro-o-cresol, ug/kg dw | <2100 | <3100 | <2800 | <2800 | |
| 2,4-Dinitrophenol, ug/kg dw | <2100 | <3100 | <2800 | <2800 | |
| 2-Nitrophenol, ug/kg dw | <420 | <620 | <550 | <550 | |
| 4-Nitrophenol, ug/kg dw | <2100 | <3100 | <2800 | <2800 | |
| P-Chloro-m-cresol, ug/kg dw | <420 | <620 | <550 | <550 | |
| Pentachlorophenol, ug/kg dw | <2100 | <3100 | <2800 | <2800 | |
| Phenol, ug/kg dw | <420 | <620 | <550 | <550 | |
| 2,4,6-Trichlorophenol, ug/kg dw | <420 | <620 | <550 | <550 | |
| Antimony, mg/kg dw | <3.9 | <5.2 | <6.1 | <5.6 | |
| Arsenic, mg/kg dw | <0.69 | <1.3 | <1.1 | <1.0 | |
| Beryllium, mg/kg dw | <0.39 | <0.53 | 0.71 | 0.58 | |
| Cadmium, mg/kg dw | <0.39 | <0.53 | 1.6 | <0.56 | |
| Chromium, mg/kg dw | 2.0 | 46 | 76 | 19 | |
| Copper, mg/kg dw | <0.78 | 9.9 | 70 | 14 | |
| Lead, mg/kg dw | 1.2 | 7.6 | 6.6 | 0.92 | |
| Mercury, mg/kg dw | <0.019 | <0.027 | <0.033 | <0.029 | |

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REPORT OF ANALYTICAL RESULTS

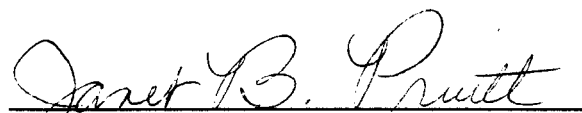
Page 33

| LOG NO | SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES | SAMPLED BY | | | |
|---|---|------------|---------|---------|--|
| 7549-14 | North Pond | Client | | | |
| 7549-15 | South Pond | | | | |
| 7549-16 | Lime Pit #1 | | | | |
| 7549-17 | Lime Pit #2 | | | | |
| PARAMETER | 7549-14 | 7549-15 | 7549-16 | 7549-17 | |
| Nickel, mg/kg dw | <0.78 | 9.9 | 65 | 29 | |
| Selenium, mg/kg dw | <0.69 | <1.3 | <1.1 | <1.0 | |
| Silver, mg/kg dw | <0.78 | <1.1 | <1.2 | <1.1 | |
| Thallium, mg/kg dw | <0.69 | <1.3 | <1.1 | <1.0 | |
| Zinc, mg/kg dw | 4.2 | 58 | 440 | 39 | |
| Total cyanide (9010), mg/kg dw | <0.30 | <0.30 | <0.30 | <0.30 | |
| Sulfide (RCRA-SW-846-9030), mg/kg dw | 830 | 5000 | 38 | 210 | |
| Corrosivity-pH (EPA Method 9040), units | 10.4 | 11.7 | 8.6 | 12.9 | |

Method: EPA SW-846

Method: EPA 40 CFR Part 136

HRS Certification #'s: 81291, 87279, E81005, E87052


Janet B. Pruitt

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole Kraft

LOG NO.: 88-7549-1 SAMPLE DESCRIPTION: PZ-1

MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/l) |
|------------|-----------------------|------------------------------------|
| | VOLATILE ORGANICS | |
| 1. | No TICs were detected | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | No TICs were detected | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole Kraft
LOG NO.: 88-7549-2 SAMPLE DESCRIPTION: PZ-2
MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/l) |
|------------|------------------------|------------------------------------|
| | VOLATILE ORGANICS | |
| 1. | No TIC's were detected | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | No TIC's were detected | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore-Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-3 SAMPLE DESCRIPTION: PZ3MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/ l) |
|---------------|--|-------------------------------------|
| | VOLATILE ORGANICS | |
| 1. 74-93-1 | Methanethiol | 14 |
| 2. 67-64-1 | Acetone | 130 |
| 3. 67-63-0 | 2-Propanol | 15 |
| 4. 75-33-2 | 2-Propanethiol | 5.5 |
| 5. | unknown hydrocarbon, C ₁₀ H ₁₈ | 52 |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | unknown | 100 |
| 2. 142-62-1 | Hexanoic Acid | 120 |
| 3. | unknown | 140 |
| 4. 21368-68-3 | Camphor | 120 |
| 5. | unknown | 68 |
| 6. 17233-71-5 | Hexathiepane | 180 |
| 7. | unknown | 110 |
| 8. 33675-75-1 | 3-(2-Phenylethyl)phenol | 140 |
| 9. | unknown | 570 |
| 10. | unknown 1-Phenanthrene carboxylic acid isomer | 260 |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-4 SAMPLE DESCRIPTION: TMW-4MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/ l) |
|-----------------------|--|-------------------------------------|
| VOLATILE ORGANICS | | |
| 1. 75-15-0 | Carbon disulfide | 150 |
| 2. 534-22-5 | 2-Methylfuran | 13 |
| 3. 616-44-4 | 3-Methylthiophene | 87 |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| SEMIVOLATILE ORGANICS | | |
| 1. | unknown hydrocarbon, C ₆ -C ₈ | 27 |
| 2. | unknown ketone, C ₈ H ₁₂ O | 14 |
| 3. 1195-79-5 | d-Fenchone | 16 |
| 4. 21368-68-3 | Camphor | 80 |
| 5. | unknown ethyl phenol, C ₈ H ₁₀ O | 18 |
| 6. | unknown | 110 |
| 7. 621-27-2 | 3-Propyl phenol | 40 |
| 8. 17233-71-5 | Hexathiepane | 55 |
| 9. | unknown | 37 |
| 10. | unknown 1-Phenanthrene Carboxylic acid isomer | 34 |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-5 SAMPLE DESCRIPTION: TMW-5MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/l) |
|---------------|---|------------------------------------|
| | VOLATILE ORGANICS | |
| 1. 67-64-1 | Acetone | 260 |
| 2. 67-63-0 | Isopropanol | 190 |
| 3. | unknown hydrocarbon C ₁₀ H ₁₆ | 7.8 |
| 4. | unknown dimethylethyl benzene | 8.8 |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. 872-50-4 | 1-Methyl-2-pyrrolidinone | 170 |
| 2. | unknown | 120 |
| 3. 17233-71-5 | Hexathiepane | 80 |
| 4. | 3-(2-Phenylethyl) phenol | 68 |
| 5. | unknown | 270 |
| 6. | unknown | 360 |
| 7. | unknown | 210 |
| 8. | unknown | 100 |
| 9. | unknown | 190 |
| 10. 83-47-6 | .gamma.-Sitosterol | 2000 |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-6 SAMPLE DESCRIPTION: TMW-6MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/l) |
|-------------|--------------------------|------------------------------------|
| | VOLATILE ORGANICS | |
| 1. 75-15-0 | Carbon disulfide | 19 |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. 872-50-4 | 1-Methyl-2-pyrrolidinone | 80 |
| 2. | unknown | 25 |
| 3. | unknown | 11 |
| 4. | unknown | 50 |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore-Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-7 SAMPLE DESCRIPTION: TMW-8

MATRIX: _____

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/ l) |
|------------|------------------------|-------------------------------------|
| | VOLATILE ORGANICS | |
| 1. 67-64-1 | Acetone | 110 |
| 2. 67-63-0 | 2-Propanol | 13 |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | No TIC's were detected | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-8 SAMPLE DESCRIPTION: TMW-9MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/l) |
|------------|-----------------------|------------------------------------|
| | VOLATILE ORGANICS | |
| 1. 75-15-0 | Carbon disulfide | 7.4 |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | unknown | 72 |
| 2. | unknown | 16 |
| 3. | unknown | 12 |
| 4. | unknown | 92 |
| 5. | unknown | 12 |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole Kraft
 LOG NO.: 88-7549-9 SAMPLE DESCRIPTION: MW-1
 MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/l) |
|-----------------------|---|------------------------------------|
| VOLATILE ORGANICS | | |
| 1. 67-63-0 | 2-Propanol | 32 |
| 2. | unknown hydrocarbon, C ₁₀ H ₁₆ | 27 |
| 3. | unknown hydrocarbon, C ₁₀ H ₁₈ | 19 |
| 4. | unknown hydrocarbon, C ₁₀ H ₁₈ | 13 |
| 5. | unknown dimethyl ethyl benzene | 24 |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| SEMIVOLATILE ORGANICS | | |
| 1. | unknown dimethyl ethyl benzene, C ₁₀ H ₁₄ | 32 |
| 2. 872-50-4 | 1-Methyl-2-pyrrolidinone | 24 |
| 3. 1195-79-15 | d-Fenchone | 80 |
| 4. 1632-73-1 | 1,3,3,-Trimethyl bicyclo
[2.2.1]heptan-2-ol | 26 |
| 5. | unknown cyclic alcohol, C ₁₀ H ₁₈ O | 31 |
| 6. | unknown | 26 |
| 7. | unknown dimethylethylcyclo-
hexanol, C ₁₀ H ₂₀ O | 19 |
| 8. | unknown | 33 |
| 9. | unknown | 53 |
| 10. | unknown | 36 |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-10 SAMPLE DESCRIPTION: MW2MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/l) |
|-----------------------|---|------------------------------------|
| VOLATILE ORGANICS | | |
| 1. 74-93-1 | Methanethiol | 5.6 |
| 2. 75-83-3 | Thiobismethane | 5.9 |
| 3. 67-61-1 | Acetone | 94 |
| 4. | unknown hydrocarbon, C ₁₀ H ₁₆ | 97 |
| 5. | unknown dimethylethyl benzene | 37 |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| SEMIVOLATILE ORGANICS | | |
| 1. | unknown hydrocarbon, C ₁₀ H ₁₆ | 54 |
| 2. | unknown dimethyl-ethyl benzene,
C ₁₀ H ₁₄ | 29 |
| 3. 872-50-4 | 1-Methyl-2-pyrrolidinone | 40 |
| 4. 4695-62-9 | d-Fenchone | 27 |
| 5. 21368-68-3 | Camphor | 57 |
| 6. | unknown | 16 |
| 7. | unknown | 68 |
| 8. | unknown | 80 |
| 9. | unknown hydroxy methoxy benzaldehyde isomer, C ₈ H ₈ O ₃ | 74 |
| 10. 498-02-2 | 1-(4-hydroxy-3-methoxy phenyl)-ethanone | 22 |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore-Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-11 SAMPLE DESCRIPTION: MW5MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/ 1) |
|---------------|--------------------------|-------------------------------------|
| | VOLATILE ORGANICS | |
| 1. 75-15-0 | Carbon disulfide | 8.4 |
| 2. | unknown | 5.5 |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. 872-50-4 | 1-Methyl-2-pyrrolidinone | 43 |
| 2. | unknown | 11 |
| 3. 17233-71-5 | Hexathiepane | 39 |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore-Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-12 SAMPLE DESCRIPTION: MW-6MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/l) |
|---------------|--------------------------|------------------------------------|
| | VOLATILE ORGANICS | |
| 1. 67-63-0 | 2-Propanol | 5.8 |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. 872-50-4 | 1-Methyl-2-Pyrrolidinone | 36 |
| 2. 4695-62-9 | d-Fenchone | 10 |
| 3. 21368-68-3 | Camphor | 74 |
| 4. | unknown | 27 |
| 5. 91-57-6 | 2-Methylnaphthalene | 14 |
| 6. 90-12-0 | 1-Methylnaphthalene | 10 |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-13 SAMPLE DESCRIPTION: TMW-7MATRIX: Water

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/ l) |
|------------|-----------------------|-------------------------------------|
| | VOLATILE ORGANICS | |
| 1. 67-64-1 | Acetone | 380 |
| 2. 67-63-0 | 2-Propanol | 390 |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-14 SAMPLE DESCRIPTION: North PondMATRIX: Soil

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/ kg dw) |
|------------|-----------------------|---|
| | VOLATILE ORGANICS | |
| 1. | unknown | 16 |
| 2. 67-64-1 | Acetone | 390 |
| 3. | unknown | 33 |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | unknown | 2400 |
| 2. | unknown | 610 |
| 3. | unknown | 480 |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-15 SAMPLE DESCRIPTION: South PondMATRIX: Soil

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/ kg dw) |
|-------------|--|---|
| | VOLATILE ORGANICS | |
| 1. | unknown | 8.4 |
| 2. | unknown | 11 |
| 3. | unknown | 7.8 |
| 4. | unknown | 7.8 |
| 5. | unknown | 14 |
| 6. | unknown | 17 |
| 7. 67-64-1 | Acetone | 190 |
| 8. 75-15-0 | Carbon, disulfide | 8.3 |
| 9. | unknown hydrocarbon, C ₁₀ H ₁₈ | 41 |
| 10. | unknown | 12 |
| | SEMIVOLATILE ORGANICS | |
| 1. | unknown hydrocarbon, C ₁₀ H ₁₆ | 6500 |
| 2. | unknown hydrocarbon, C ₁₅ H ₂₄ | 4800 |
| 3. | unknown | 6800 |
| 4. | unknown substituted phenanthrene,
C ₂₀ H ₃₂ | 5000 |
| 5. | unknown | 4800 |
| 6. | unknown | 16,000 |
| 7. | unknown | 11,000 |
| 8. | unknown | 170,000 |
| 9. | unknown | 60,000 |
| 10. 83-47-6 | .gamma. - Sitosterol | 1,200,000 |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-16 SAMPLE DESCRIPTION: Lime Pit #1MATRIX: Soil

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/kg dw) |
|------------|-----------------------|--|
| | VOLATILE ORGANICS | |
| 1. 67-64-1 | Acetone | 1100 |
| 2. | unknown | 15 |
| 3. | unknown | 9.4 |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | unknown | 1900 |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

TENTATIVELY IDENTIFIED COMPOUNDS (TIC)

CLIENT: Dames & Moore - Boca Raton PROJECT: Seminole KraftLOG NO.: 88-7549-17 SAMPLE DESCRIPTION: Lime Pit 2MATRIX: Soil

| CAS NUMBER | COMPOUND NAME | ESTIMATED CONCENTRATION
(ug/ kg dw) |
|---------------|------------------------|---|
| | VOLATILE ORGANICS | |
| 1. | unknown | 13 |
| 2. | unknown | 18 |
| 3. 67-64-1 | Acetone | 430 |
| 4. | unknown | 45 |
| 5. 127-91-3 | B-Pinene | 1400 |
| 6. 13466-78-9 | 3-Carene | 6800 |
| 7. 5989-27-5 | d-Limonene | 1100 |
| 8. | | |
| 9. | | |
| 10. | | |
| | SEMIVOLATILE ORGANICS | |
| 1. | No TIC's were detected | |
| 2. | | |
| 3. | | |
| 4. | | |
| 5. | | |
| 6. | | |
| 7. | | |
| 8. | | |
| 9. | | |
| 10. | | |

From
John K. Gentry
Deputy Director, Division of Waste Management



Robert Frost

I'm not sure how much cleanup will be required at this site. Tim Bahn tells me some of the samples show pH of 12.9. Will they be required to address and disposal of those materials under RCRA? Please call Buck and discuss with him.

Thanks

JAG

From
John K. Gentry
Deputy Director, Division of Waste Management



Jim CRANE

This looks like it belongs
in your Section. Please assign
someone to coordinate w Buck

Thad. Discuss with 1/17/90
John G.
Jim McNeal
RCRA
Buck Owen (8-1344)

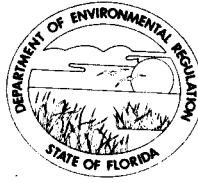
Twactman

Is site a Hazardous waste under 111
or is it toxic site
who should do cleanup
previous pulp mill owners

FB 1/16/90

Not a known site or neither
according to Robert Frost, Bumper
1/16/90

From
Rick Wilkins
Director, Division of Waste Management



John Lentry

1/12/70

Please assign this to appropriate staff for review and comment back to Buck Owen (8-1344). This is for a power plant siting act certification. It is a co-generation facility associated with a paper mill.

Two questions:

- 1) Does the data indicate that this is a toxic site?
- 2) What are the cleanup criteria?

Need to have staff work with Buck to develop conditions for certification. Of course he needs this by Wed. of next week.

Rick



AS Cedar Bay

Presentation Outline

- **Project Description** Page 3
 - **AES Company Background** Page 8
 - **Status and Schedule** Page 13
 - **Appendices** Page 16
-

**AS Cedar Bay
Project Description**



Cedar Bay Cogeneration Project

Project Overview

- Cogeneration project to meet needs of two customers:
 - 225 MW of electricity to Florida Power & Light for resale
 - 639,000 lb/hr of steam to Seminole Kraft paper mill for process uses and a *new low-odor chemical recovery boiler*
 - Project to use advanced chemical recovery boiler and clean coal technology
 - Anticipate significant air and odor improvements to the Jacksonville area as a result of AES Cedar Bay
 - Operation to begin in 1992 with approximately 70 full-time workers
-

Cedar Bay Cogeneration Project

Project Location

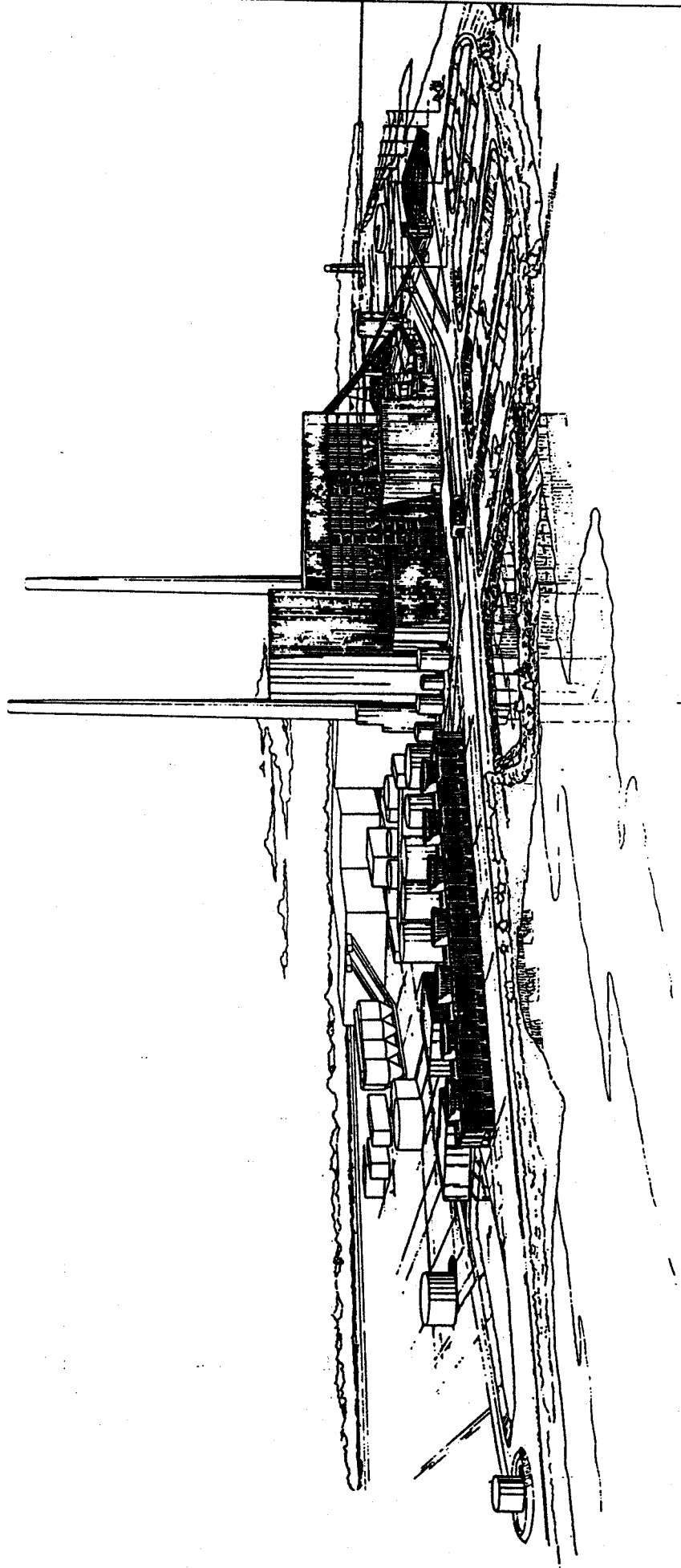
- Northeast Jacksonville, on the site of the Seminole Kraft paper mill on Eastport Road
 - Site is used for heavy industrial facilities
 - Coal will be delivered by:
 - Rail delivery to site
 - Waterborne vessel
-

Cedar Bay Cogeneration Project

Environmental:

- Coal-fired boilers use environmentally advanced circulating fluidized bed technology, replacing existing boilers with higher emissions
 - New chemical recovery boiler will reduce odor-causing emissions by more than half that of existing boilers
 - SO₂, NO_x, particulates and other emissions will be maintained below regulated levels by using advanced environmental controls and maintaining optimum operating conditions at the plant
- Neither hazardous nor toxic waste will be produced by the plant
- Non-toxic ash will be disposed of out of state
- Cooling tower use will reduce thermal impacts on the St. John river by 90% or more

**Cedar Bay
Project Description**

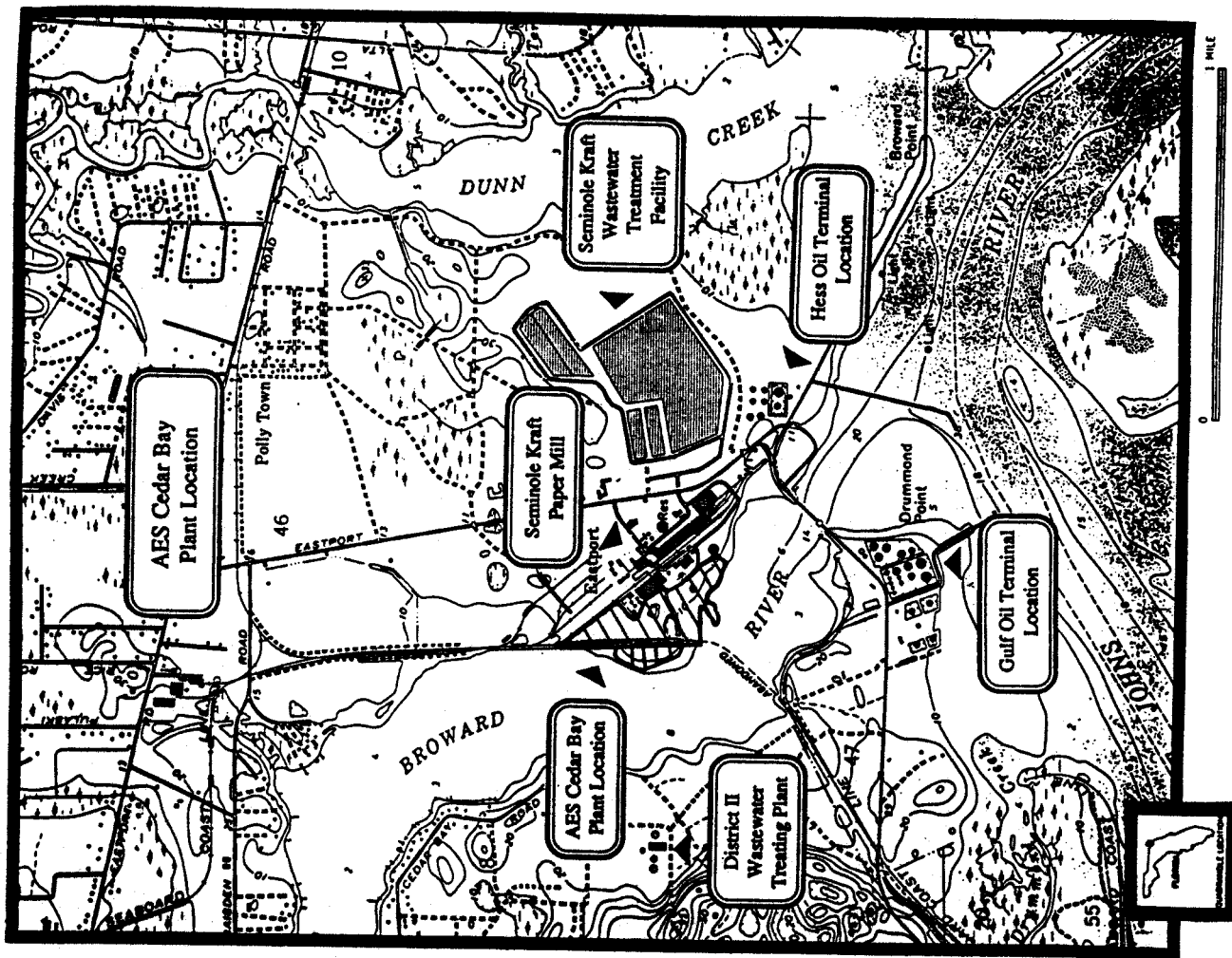




Cedar Bay Cogeneration Project

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Cedar Bay Cogeneration Project

Project Location

- Northeast Jacksonville, on the site of the Seminole Kraft paper mill on Eastport Road
 - Site is used for heavy industrial facilities
 - Coal will be delivered by:
 - Rail delivery to site
 - Waterborne vessel
-

Cedar Bay Cogeneration Project

Project Features

Economic:

- Provides low-cost, reliable electricity while reducing Florida's dependence on high cost imported oil
 - Provides low cost steam to the Seminole Kraft paper mill, keeping it competitive, and protecting the jobs of the workers
 - Significantly increases the tax base of Jacksonville
 - Creates 660 temporary jobs during peak construction year and 70 full-time positions
-

Cedar Bay Cogeneration Project

Environmental:

- Coal-fired boilers use environmentally advanced circulating fluidized bed technology, replacing existing boilers with higher emissions
 - New chemical recovery boiler will reduce odor-causing emissions by more than half that of existing boilers
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Applied Energy Services, Inc.
Company Background

THE 500

APPLIED ENERGY SERVICES INC.
ARLINGTON, VA



WALTER F. CALAHAN

Roger Sant

In his capacity as an energy adviser to President Ford and head of the Mellon Institute's Energy Productivity Center, Roger Sant thought he saw a way to make money shipping coals to Newcastle.

It's called cogeneration. Like most other electric companies, Applied Energy Services burns coal or oil or gas to generate heat that turns turbines that generate electricity. And like most electric companies, that process produces a fair amount of waste heat. But unlike most electric companies, Sant doesn't just let the heat go up into the air.

He turns it into steam and sells it to his neighbors—an oil refinery in Houston, for example, or a chemical plant in western Pennsylvania.

"We are part of a major restructuring of a huge industry," says Sant, who estimates cogeneration, on average, cuts the cost of generating a kilowatt of electricity by as much as 10%. Nor is selling such power much of a problem: a 1978 federal law requires large utility companies to buy the electricity from these free-lance competitors at a price equal to the cost of the utility's own energy.

INC./DECEMBER 1987 77

| Company (1985 only)
Business description | Sales growth
1981-85 | | Profit margin*
1985 | No. of employees
1985 | Date
founded | |
|---|-------------------------|-----------------------|------------------------|--------------------------|-----------------|-------------|
| | '85 sales
(\$1000) | '81 sales
(\$1000) | | | | |
| 1. ABC Supply (2) Beloit, WI
Dist. building supplies | 109,737 | \$183,428 | \$167 | D | 600 | 2 1979 |
| 2. Eastern Gas Transmission Inc. TX
Pipelines, transports natural gas | 47,481 | 80,412 | 169 | D | 27 | 3 1980 |
| 3. AmeriGroup Stamford, CT
Ins. syndication | 18,518 | 23,273 | 125 | D | 50 | 4 1981 |
| 4. IRI Research & Evaluation Eagan, MN
Technology transfer database | 17,232 | 18,545 | 107 | A | C | 92 16 1972 |
| 5. Lane Enterprises Los Angeles, CA
Water-purification systs. | 11,176 | 11,840 | 105 | C | D | 25 2 1981 |
| 6. Chemwell Holding San Francisco, CA
Fuel oil trading & supply | 11,169 | 183,795 | 1,631 | D | E | 21 4 1981 |
| 7. Gibson Group Cincinnati, OH
Mkts. paper & paperboard | 10,860 | 36,607 | 334 | D | D | 8 7 1981 |
| 8. Tempa Washington, DC
Temporary svcs. | 9,157 | 12,774 | 138 | D | F | 42 2 1981 |
| 9. Morris Decision Systems New York, NY
Computer sales, inc. | 9,008 | 21,131 | 232 | E | F | 90 6 1980 |
| 10. Mail & Sons Irvine, CA
Mfrs. men's wear | 8,031 | 8,456 | 104 | C | D | 9 2 1981 |
| 11. Zymark Hopkinton, MA
Automated lab instruments | 7,555 | 11,482 | 150 | D | F | 152 8 1981 |
| 12. Applied Energy Services Arlington, VA
Operates nonregulated utilities | 7,079 | 9,189 | 128 | D | F | 176 8 1981 |
| 13. Advanced Medical Systems Hingham, PA
Dist. medical equipment | 6,906 | 7,847 | 112 | C | D | 15 12 1980 |
| 14. Independent Container Louisville, KY
Mfrs. corrugated prod. | 6,648 | 7,558 | 112 | D | F | 49 16 1981 |
| 15. Ennis Broadcasting Indianapolis, IN
Radio broadcasting | 6,513 | 19,245 | 291 | F | F | 121 18 1981 |
| 16. Direct Marketing Technology Rolling Meadows, IL
Computer svcs. to mktg. industry | 6,502 | 8,120 | 123 | A | F | 139 29 1981 |
| 17. Unileversa Detroit, MI
Construction services | 6,493 | 7,252 | 110 | D | E | 3 2 1978 |
| 18. Information Systems & Networks Bethesda, MD
Telecommunications engineering | 6,410 | 19,789 | 304 | B | B | 200 15 1980 |
| 19. May-Curt Information Systems Dallas, TX
Data communications | 6,189 | 7,272 | 116 | D | F | 18 7 1978 |
| 20. Integrated Systems Analysis Arlington, VA
Defense systems engineering | 6,005 | 15,689 | 257 | D | E | 259 6 1980 |
| 21. Core International Boca Raton, FL
Computer mfr. & retailer | 5,940 | 15,341 | 254 | A | A | 23 2 1973 |
| 22. All American Hens (15) Fort Lauderdale, FL
Fast-food franchisor | 5,723 | 18,925 | 325 | B | E | 11 5 1980 |
| 23. Interactive Business Systems Oak Brook, IL
Data-processing software | 5,622 | 6,351 | 111 | D | F | 100 6 1981 |
| 24. Mental Health Management McLean, VA
Mental-health units | 5,618 | 16,755 | 293 | C | F | 300 15 1981 |
| 25. Iron Systems, WA
Hand-held computer systs. | 5,522 | 27,999 | 498 | C | F | 280 35 1977 |

*Inc. estimates A 10% or more, B 15% to 19%, C 20% to 24%, D 25% to 29%, E 30% to 34%, F 35% or more.

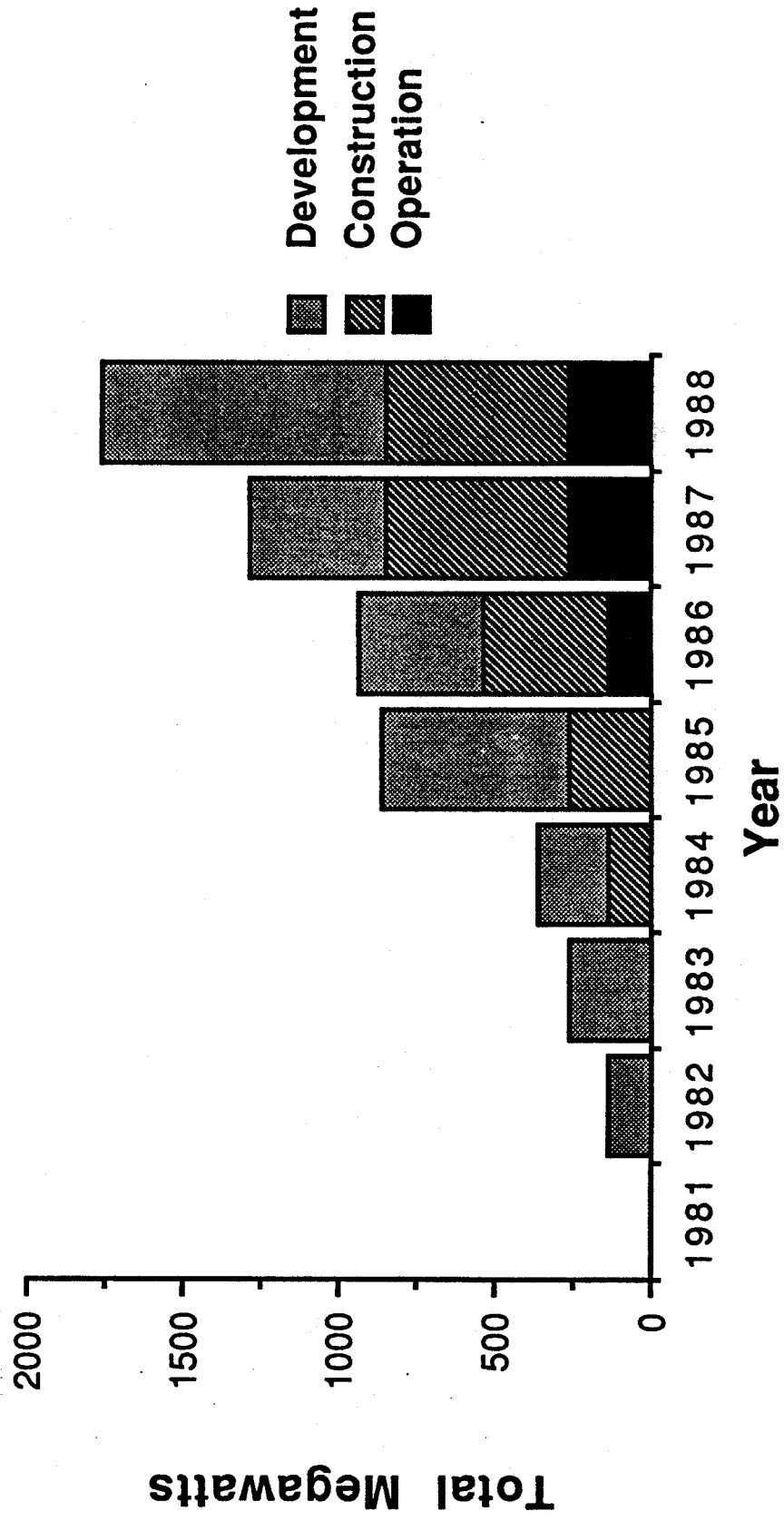
INC./DECEMBER 1986 57

Applied Energy Services, Inc.

Arlington, Virginia

| | |
|--------------------|---|
| Background: | Privately held corporation founded in 1981 by Roger Sant and Dennis Bakke to be a supplier of electricity & steam |
| Business: | Develops, owns and operates cogeneration facilities |
| Customers: | Electric utilities and industrial companies |
| Markets: | Domestic and International |

Generating Capacity



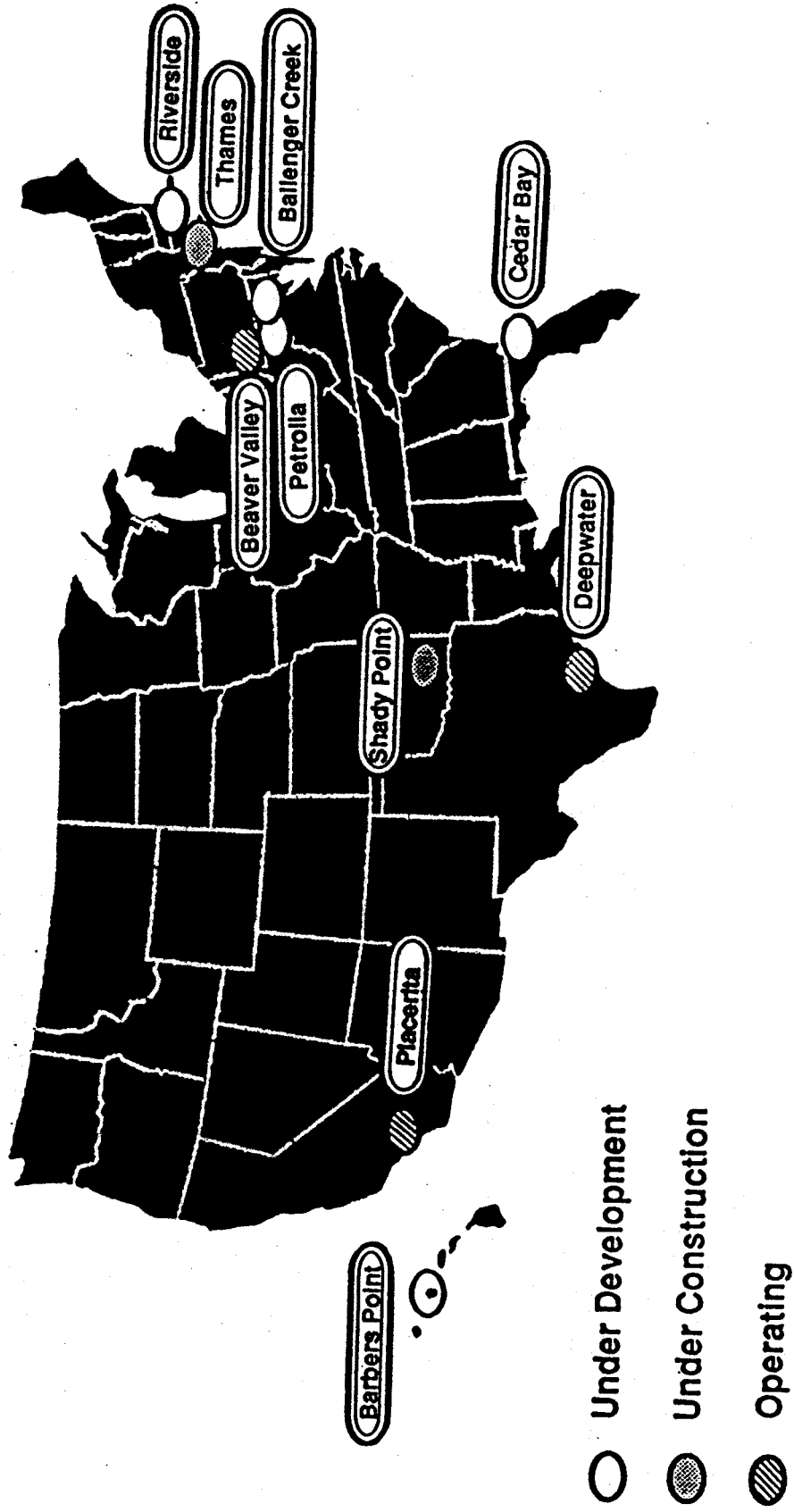


Project Development Philosophy

- Structure project to benefit all parties -- consumers, ratepayers and local community
 - Establish understanding and support among concerned people
 - Local citizens
 - All levels of government
 - The media, environmental and other groups
 - Establish and maintain a cooperative relationship with regulatory agencies
 - Design and build the plant to follow through on commitments to customers and to the community
-
-



Project Locations



Experience

- AES has three plants now in operation with combined capacity of about 360 megawatts
 - AES has two plants under construction with a combined capacity of 500 megawatts
 - AES has signed power purchase agreements with utilities for more than 730 additional megawatts
-

Projects

| AES FACILITY/
LOCATION | CUSTOMERS | FUEL
TYPE | COST
Million | STEAM
(#/HR) | POWER
(MW) | CONST.
START | ON
LINE |
|--|---|--------------|-----------------|-----------------|---------------|-------------------|------------------|
| Deepwater
Houston, TX | Texas Utilities
Lyondell Petrochem. | Petcoke | \$275 | 30,000 | 135 | December
1983 | June
1986 |
| Beaver Valley
Monaca, PA | West Penn Power
Arco Chemical | Coal | 116 | 145,000 | 121 | September
1985 | July
1987 |
| Placerita
Newhall, CA | Southern California
Edison, TOSCO | Gas | 121 | 250,000 | 99 | July
1986 | August
1988 |
| Thames
Montville, CT | Northeast Utilities
Stone Container | Coal | 250 | 65,000 | 180 | December
1986 | November
1989 |
| Shady Point
Poteau, OK | Oklahoma G&E
AES CO2 Plant | Coal | 475 | 100,000 | 320 | June
1987 | January
1991 |
| Riverside
Woonsocket,
Rhode Island | New England Electric
Boston Edison
Eastern Utilities Assoc. | Coal | 260 | 50,000 | 180 | 1989 | 1991 |
| Barbers Point
Oahu, Hawaii | Hawaiian Electric
Chevron | Coal | 250 | 30,000 | 146 | 1989 | 1992 |
| Cedar Bay
Jacksonville, FL | Florida Power & Light
Seminole Kraft | Coal | 480 | 640,000 | 225 | 1990 | 1992 |
| Petrolia
Cumberland, MD | Potomac Edison | Coal | 300 | 30,000 | 180 | 1992 | 1995 |
| TOTAL | | | \$2781M | | 1767 | | |

**Cedar Bay
Status and Schedule**

Cedar Bay Status

- Long term electrical sales to Florida Power & Light at price below the avoided cost of the utility -- approval by Florida's Public Service Commission expected soon
 - Agreement reached for steam sales to Seminole Kraft paper mill
 - Design and construction contractor to be selected in early, 1989
 - Coal supplier to be selected in late fall, 1988
 - State and federal permit applications filed in November, 1988
 - Construction expected to begin in late fall, 1989
-

Cedar Bay Schedule



Power Purchase Agreement

PUC
 Signed Approval
 5/88 10/88

Permitting

All Permits
 Received
 2/88 12/89

Financing

Financing
 Completed
 10/88 12/89

Construction

| | | | | | |
|-----------------|---------------------|------|------------------------|-------|-----------|
| Recovery Boiler | Construction Begins | 2/92 | Construction Completed | 12/92 | Operation |
| Power Boiler | | | | | |

**Cedar Bay
Cogeneration Project
Appendices**



Board of Directors

Dennis W. Bakke

President/COO of AES, Former Deputy Assistant Administrator at the Federal Energy Administration

Frank Jungers

Retired Chairman of the Board and CEO, ARAMCO

Dr. Henry Linden

Frank Gunsalus Professor of Engineering at Illinois Institute of Technology, Former President, Gas Research Institute

Hazel R. O'Leary

International Energy Consultant; Former Administrator for the Economic Regulatory Administration at the Department of Energy

C. Arthur Rolander

Former Senior Vice President, Gulf Oil Corporation

Roger W. Sant

Chairman of the Board/CEO of AES, Former Assistant Administrator for Energy Conservation and Environment at the Federal Energy Administration

Russell E. Train

Chairman of the Board, World Wildlife Fund and the Conservation Foundation; Former Administrator, Environmental Protection Agency

Thomas I. Unterberg

Managing Director of the Investment Banking Division, Shearson Lehman Brothers

Robert H. Waterman, Jr.

Private Consultant; Former Principal in McKinsey & Co.; Co-Author, In Search of Excellence and author The Renewal Factor

Roger Sant, former civil servant in the US department of energy and now a pioneer among the new independent producers of electricity, has been much in demand in the UK recently.

Ministers, officials and at least three chairman of area boards have been eager to discover whether he holds the key to a new era of competition when British Electricity is privatised.

Sant is chief executive and co-founder of a small US company called Applied Energy Services (AES), which is moving rapidly into the business of owning and operating power stations. The output is sold under contract to much larger utilities.

Although AES started modestly in 1981, mainly to promote the conservation of energy, it now has seven power plants operating or under construction in the US, with a total capacity of 1,250MW. In seven years' time it expects revenues to have multiplied 10 times to more than \$1bn a year.

The question on the lips of British pilgrims to his offices in Arlington, Virginia, is: "How did you do it?" How did his David without campaign experience carry off business from the Goliaths of a \$400bn industry?

Sant's first answer is a pleasant, almost self-deprecating smile. It seems to say that he was lucky to have spotted the opportunities when electric utilities were starting to open up the power generation market to competitive bidding.

It was a time when many of the private utilities were reeling from the blows inflicted by rate regulators which had been refusing to allow them to pass on the full cost of nuclear power plants to their customers.

At the same time, environmental lobbies made it increasingly difficult for them to site or build large coal-burning power stations.

Companies like AES moved in with small, quickly-built plants which removed much of the risk from the shoulders of the utilities. "What we know how to do is to build particularly clean gas or fluidised bed coal-burning plants using the most modern technology," he says.

"We carry the risk of building and operating the plant. So we are like any other supplier; we do not produce, we don't get paid."

This is becoming an attractive trouble-free way for some utilities to fulfil their obligation to supply power, even

Electricity

Putting power in the hands of the small independent

Max Wilkinson on a US company which may offer a useful option to UK utilities

though it means forgoing the return on capital which the regulatory commissions would allow them on any plant they build themselves.

Bill Berry, chief executive of Dominion Resources, parent company of Virginia Electric, says that on present plans almost all new capacity will be met by contracts from independent suppliers like AES.

If Dominion itself wants to build power plant, it will join the competitive bidding in another area where there would be no conflict of interests, he says.

When Sant's company started in the generation business it was helped by a Federal law which said that utilities must offer to buy electricity from any approved plant at a price equal to the utility's own generating cost. Approval was given to plant which could demonstrate that some of the "waste" heat from generation was being put to productive use.

However, for many coal plants it was only necessary to

divert a few per cent of the output from their boilers to direct heating. So Sant believes the US law's distinction between the so-called "qualifying facilities" and ordinary plant is now artificial. In any case the new markets for Sant's kind of power plant in Britain and elsewhere do not depend on such legal niceties.

After privatisation, the UK's 12 area boards will become distributors buying power from suppliers. "I think they will be looking for contracts in the 200MW to 400MW range, which would suit us fine," says Sant.

In the US, the company has been able to sign 15- to 20-year contracts to supply electricity at a fixed price in real terms. That is to say the price of electricity from the plant is guaranteed to rise at a little less than the rate of inflation.

AES has protected itself by signing up contracts for the supply of coal on similar terms. "It is easy to argue that a rise in the cost of coal should be related to the inflation rate. In the case of coal it is not



Roger Sant: carrying the risk

reserves that cost money, but production. A lot of that is labour costs which should be a function of inflation," he says.

One reason for pricing power in this way, he says, is that politicians and utilities feel "comfortable" with an energy price indexed to inflation.

Another important reason for pushing the fuel price risk back to the supplier is that companies like AES are very highly geared, with bank debts typically equal to 80 to 85 per cent of their total capital, and banks need to be assured that risks have been minimised.

This high debt means that any improvements in the company's operating performance can have a magnified effect on shareholders' earnings. "We make our money out of saving a few mills (a tenth of a cent) per kilowatt/hour," he says.

But with such huge gearing it is necessary to convince the banks that all the major risks have been offset. This is easier with coal than with plant fuelled by gas where the price is more closely linked to a volatile oil market.

This question of how risks should be shared becomes even more acute when a utility wants an electricity supply that is "despatchable" - that is, it can be shut off at times of slack demand. In this case, companies like AES must negotiate two separate contracts, one for when the generator is switched off and one for when it is switched on.

The first contract, usually called a "capacity charge", compensates the independent generator for building the plant and keeping it manned ready to go when needed. The second contract adds the cost

of running the plant - nearly all of which is fuel.

Sant's trick is to squeeze out all the risk by hedging forward the cost of his fuel supplies for 15 years or so, at exactly the price allowed him by his customer. Risk can also be reduced in the longer run by "front-loading" the capital charges. This means that the project is paid for after, say, 15 years. Higher fuel costs after that would be less important because the debt would be largely amortised.

Since AES has its plant built for it by established industry suppliers, the opportunity for getting rich depends mainly on efficient running and on cutting maintenance "pit-stops" down to the minimum.

The company's first plant, a 140MW unit in Houston, Texas, has been available to produce power for 90 per cent of its first 21 months. The second, a coal plant near Pittsburgh, achieved an availability of 86 per cent of the possible running time.

Although this is impressive stuff, it does not answer the question of whether these fairly small plants can ever match the performance of the huge turbines 10 times their size now being built in Europe.

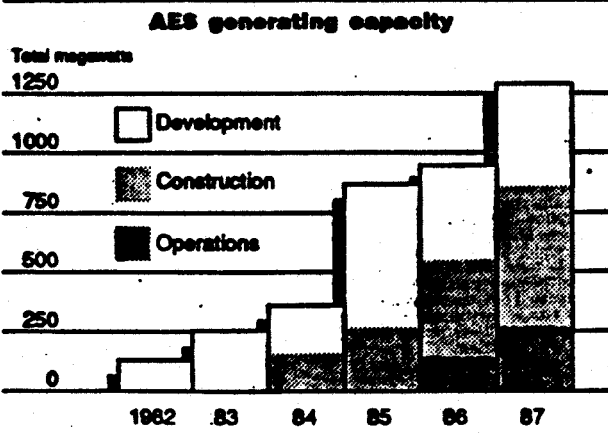
A preliminary answer is that at a cost of \$1,400 per kw of capacity, Sant's plant compares well with average costs for the US, and for Europe, mainly because a large part of the machinery is standardised and factory built. Construction times of two and a half to three and a half years are much quicker than for large plant, particularly nuclear.

So far it also seems that availability is much better. The efficiency with which these new plant convert heat into power is not up with the best, however, though it is close to the US average.

So will companies like AES be able to take on the mighty Central Electricity Generating Board (CEGB) in the UK, with its experience of building big, highly efficient coal-fired plant like that at Drax near Selby?

"There clearly are economies of scale in electricity generation which cannot be denied," says Sant. "That is the reason the CEGB has done such a fabulous job getting costs down."

"At the moment we represent only 1 per cent of the US market. It is fun to be part of an experiment, but we have not yet proved that competition in electricity generation works. I think it would be better to do a little more experimenting before changing the whole thing."



Money Matters

Vol. 5, No.1

Published by Working Assets Money Fund

Spring 1988



AES went well beyond county ordinance to preserve this 100-year-old oak tree.

Positive Power

Applied Energy Services added to Working Assets portfolio

Bob Muir of Applied Energy Services Inc. (AES) is not your typical power plant manager. Last year, Muir spent considerable time and money to prevent the destruction of two 100-year-old oak trees at the company's plant site in Newhall, California. It was an act that would have pleased his distant cousin, naturalist John Muir.

It also pleased Muir's supervisors at AES, which is not your typical power company. In an industry dominated by huge utilities, Applied Energy Services is an independent power producer with a strong record of environmental responsibility.

Founded in 1981 by two former members of the Mellon Institute's Energy Productivity Center, the Arlington, Virginia-based company owns and operates several independent cogeneration plants throughout the U.S.

Cogeneration is a century-old process that produces two kinds of energy from one fuel source. Typically, a cogeneration plant

will burn coal or natural gas for electricity and then capture the steam byproduct for use as a heating source. At its Thames River plant in Montville, Connecticut, AES will sell electricity to the local utility and then sell the steam to heat a recycled paperboard plant. That kind of arrangement helps ratepayers as well as the companies. Instead of building new power plants at citizens' expense, some utilities are turning to privately owned cogeneration facilities—which are as much as 70 percent more efficient than conventional power plants.

"From an energy standpoint, cogeneration is very good," says Nancy Hirsh of Environmental Action in Washington, D.C. "It's one of the most energy-efficient sources of power. And AES is a reputable company. We would support them as a provider of cogeneration."

AES is also a successful company. *Inc.* magazine ranked it 12th on its 1986 list of the fastest growing privately-owned com-

panies in America. But AES Project Director Stuart Ryan says that the company places a higher value on environmental protection than profit-making. "Social responsibility is one of our primary concerns," reports Ryan. "We tell our shareholders outright that our job is not to maximize the value of their shares. We're in business for other reasons."

AES has backed up that rhetoric with action on several occasions, including Bob Muir's preservation of the oak trees in Newhall. County ordinances would have permitted AES to destroy the trees and simply replace them with saplings. But Muir opted instead to spend \$29,000 and seven months to move the trees to a new spot just 400 feet away. The county forester said the transplanting was unprecedented in Los Angeles County.

On a larger scale, the Newhall plant's state-of-the-art pollution control system uses one of the largest known catalytic converters to keep emissions far below EPA standards. And AES predicts that its Thames River plant in Connecticut will be the cleanest coal-burning facility in New England, with sulfur emissions 75 percent below EPA standards.

AES also has a clean record of labor relations. For its project in Monaca, Pennsylvania, AES received a construction loan from the trust fund of the International Brotherhood of Electrical Workers' Local 71. The plant employs members of the local Oil, Chemical and Atomic Worker's Union. "That was a fortunate situation," says Ryan. "The plant is in an economically depressed area and we were able to provide some jobs and work out a good arrangement with the unions."

Ultimately, adds Ryan, AES's approach is governed by both ethics and economics. "We do these things because we think they're right, not because they're profitable. We also believe, however, that they will help us financially in the long run."

Builder moves 2 oaks

Trees transplanted at new energy plant

By JULIE PRICE
Daily News Staff Writer

Maybe it's just in his genes but Bob Muir, a distant cousin of naturalist John Muir, is a businessman with an environmental conscience.

Muir oversaw the transplanting Tuesday of two ancient oaks that would have been destroyed to make way for a two-acre electrical generation plant. Muir is the assistant plant manager of Applied Energy Services Placerita, Inc., which is building a plant on Placerita Canyon Road in Newhall.

"I appreciate 100- and 120-year-old oak trees, and the residents of Placerita Canyon do, too," he said. "Last year, I walked door-to-door to talk about our project plans, and people made it very clear that they were very concerned about oaks."

The transplanting is believed to be unprecedented for a builder in Los Angeles County, according to County Forester Robert E. Johnson, who has been on the job for 32 years.

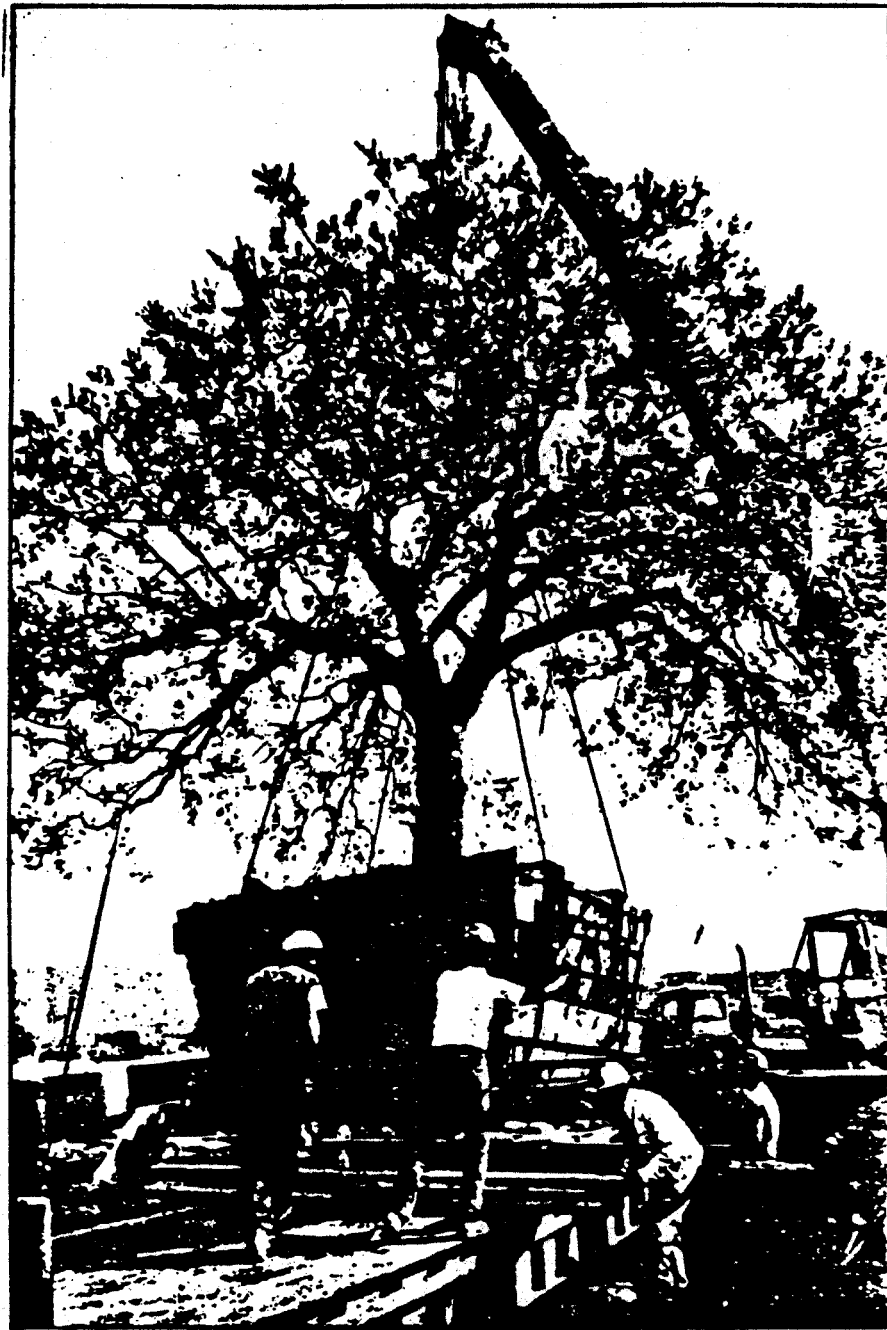
Neither the transplanting operation, nor an additional \$260,000 in landscaping at the plant site was required in the county building permit for the project. But Muir said the improvements were the responsible thing to do for the environment.

"We lived near the ocean in New York State when I grew up," Muir said.

Controversy over the preservation of Santa Clarita's oak trees surfaced this month when another developer proposed destroying 337 oaks in a 790-tree grove to make way for new homes.

County planners are drafting a more restrictive oak preservation ordinance than the one on the books. But that won't be ready for adoption for months, planners said. For now, builders are only required to replace every mature oak that is destroyed with two new saplings.

But for Muir, replacing the two big oaks with four little saplings was out of the question. Moving the oaks to a new location was neither simple nor



Workmen use a giant crane as they transplant two century-old oak trees on a two-acre build-

ing site for an electrical generation plant on Placerita Canyon Road in Newhall.

cheap, it cost Muir's company nearly \$29,000 and took seven months to accomplish, but it was worth it, he said.

"Yeah, I think it's my roots," said Muir, whose distant cousin, John Muir, was largely responsible for establishing California's Sequoia and Yosemite national parks in 1890. The Muir Woods National Monument, a cluster of

trees along the Pacific coast, was dedicated to John Muir in Marin County in 1908.

The two oaks were the only ones of the 48 on the plant site that required removal to make way for construction, scheduled for completion in 20 months.

Johnson said county foresters will follow the progress of the transplants to see if the

procedure could be used to advantage elsewhere.

Workers for Valley Crest Tree Co. of Sepulveda first built boxes around the tree roots last spring. They fertilized and inspected them almost weekly until Tuesday, when a giant crane lifted them from their homes of more than a century to new spots about 400 feet away.

Generating cash from trash

Conservationist entrepreneurs have jolted electric utilities with small-scale plants that run on coal, cow dung—even old tires

For electric utilities, better has always meant bigger. Recently, though, dozens of "electric entrepreneurs"—whose sometimes exotic, often low-tech minigenerators now pepper the nation from coast to coast—have discovered that small is not only beautiful, it's profitable.

Once scorned as hippie conservationists, businessmen such as William Koch, Roger Sant, Dennis Bakke and Paul Elston have forged a burgeoning new industry from small-scale power plants that run on everything from coal and natural gas to wind, water, garbage and cow manure. One California generator even feeds on the world's largest pile of discarded tires. Their enterprises may be diminutive, but these electric entrepreneurs promise to play a major role in staving off another economically devastating energy crisis—one marked not by long lines at gas stations but by brownouts and astronomical bills for the nation's 100 million electrical consumers.

The real crunch may not hit until the mid-1990s. But demand for electricity is soaring during this record-hot summer (see chart, page 39). Utilities in New England called for voluntary conservation measures in early August to prevent overloads. And to keep Chicago's air conditioners going, Commonwealth Edison is buying power from other utilities.

Ironically, electric entrepreneurs owe their existence to similar shortages—namely, the oil shortfalls of the 1970s that sparked interest in conservation and renewable energy resources. Congress responded with the 1978 Public Utility Regulatory Policies Act. The law forced utilities to purchase electricity at favorable rates from "qualifying facilities"—power plants that rely on such renewables as wind and water, or cogeneration units that make electricity along with steam.

At first, the behemoth power companies—those regulated monopolies that control all phases of the electricity business from production to distribution and sales—bitterly fought the newcomers both in Congress and in the courts. They claimed they were being forced to buy power they didn't need; indeed, conservation efforts had saddled utilities with surplus generating capacity while flatten-

ing demand. Moreover, argued the giants, state utility commissions had set overly generous rates for the smaller facilities, thus upping the bill to consumers. The Supreme Court overrode these complaints in 1983, and the alternative-energy industry was off and running.

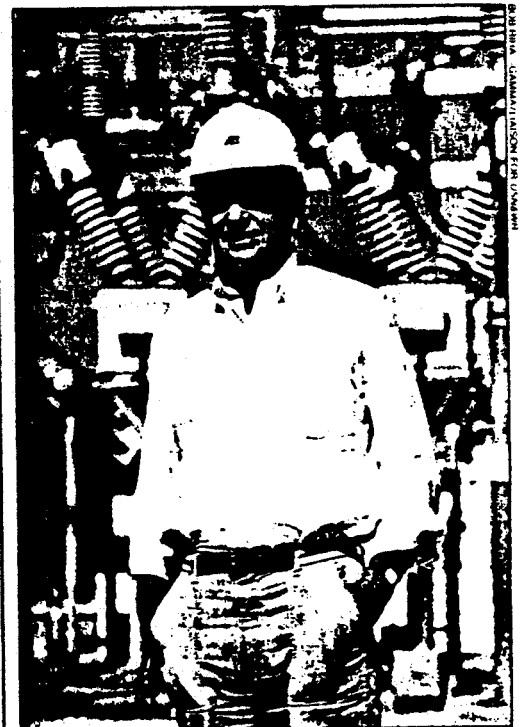
Power plays. Today, more than 52 firms have built some 321 power projects, from hydroelectric minidams to big coal-fired furnaces boasting the latest in antipollution technology. All told, these plants can generate more than 12 billion watts of power—an output equal to 12 nuclear generators. Capacity is expected to double over the next five years, and if all 4,000 applications received by the Federal Energy Regulatory Commission since 1978 see completion, the power generated would rival the output of 62 nuclear plants.

Still, even with a government-mandated market and favorable prices, electric entrepreneurs have experienced intense growing pains. Before the first boiler could be installed, the fledgling enterprises had to deal with the bureaucracy to secure FERC permits. Funds had to be cadged from friends, family and skeptical venture capitalists. Finally, the firms had to tie up with balky utilities. "We didn't sign a contract until 1983," recalls Paul Elston, 43-year-old president of Long Lake Energy, the New York-based firm he founded in 1980 with \$30,000 from his own pocket and loans from acquaintances. "Nothing was coming in, and we were always flirting with bankruptcy."

Like many electric entrepreneurs, Elston started out as a public servant grappling with the energy problems of the 1970s. He spent 12 years as a budget-and-management officer at the Environmental Protection Agency in Washington, D.C., before deciding to strike out on his own as a developer of small-scale hydroelectric projects. "I worked out of my house and spent the first three months traveling the rivers of Upstate New York," he remembers. Today, Long Lake is a publicly traded company with 36 employees. It operates four small, water-driven turbines, has licenses for four others and is awaiting approval on 10 cogeneration projects, mostly on the East Coast.



Oxbow Power founder William Koch spies new opportunities in New England's power shortfall



Interest in energy conservation led Roger Sant from government service to private enterprise

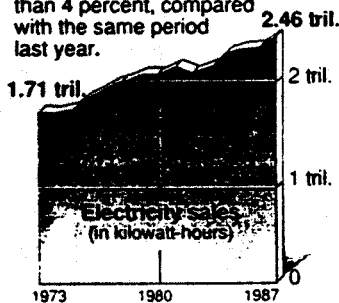


Seas of discarded auto tires—40 million

in all—could be an ecological nightmare, but in Modesto, Calif., they generate electricity

WATT'S UP

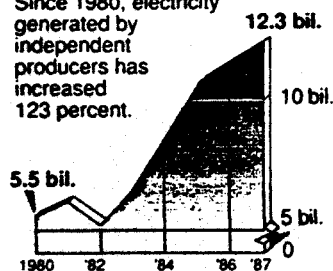
Because of a cold winter, hot summer and increased industrial activity, electricity use during the first half of 1988 is up more than 4 percent, compared with the same period last year.



USN&WR—Basic data: U.S. Dept. of Energy; Data Resources, Inc.

SMALL IS BEAUTIFUL

Since 1980, electricity generated by independent producers has increased 123 percent.



Energy generated for electric utilities by independent producers (in kilowatt-hours)

USN&WR—Basic data: U.S. Dept. of Energy

One of the hottest new enterprises—Applied Energy Services of Arlington, Va.—drew both its chief executive officer, 57-year-old Roger Sant, and its president, Dennis Bakke, 42, from the Federal Energy Administration, predecessor of the U.S. Department of Energy. Pondering the nation's energy problems, Sant and Bakke concluded that cogeneration technology could save Americans billions in energy costs. "If there was so much potential, there had to be a way to make money at it," recalls Sant. He and his partner started Applied Energy in 1985 with \$1 million in capital. "We tried to raise \$3 million but decided \$1 million was better than nothing," says Sant. It was. The firm now boasts 230 employees and made *Inc.* magazine's 1987 list of America's 20 fastest-growing companies.

Targets of opportunity. A technical education—an M.B.A. from Harvard and a doctorate in chemical engineering from the Massachusetts Institute of Technology—figured in the founding of Oxbow Power in 1984 by William Koch, 47, scion of the family-controlled Koch Industries in Kansas City. His Dedham, Mass., firm approaches a power project the way a

real-estate developer puts up a hotel. "You identify the opportunity, get all the necessary permits, raise the financing, then build and operate it," observes Vice President William Siderewicz. Oxbow became one of the first independents to get into the transmission end of the business in 1987, when it built a 213-mile power line from a geothermal plant in Nevada's Dixie Valley to Southern California.

One sure sign that the independent power industry has come of age is its grudging acceptance by an old enemy—the giant utility companies. Still reeling from the financial and regulatory blows caused by their decision to go nuclear in the 1970s, utilities are reluctant to commit the billions of dollars required to construct new plants. Many now view independent energy suppliers as a way to meet future demand in small increments—without committing a cent of their own. Virginia Power, for example, is counting on independents to cover almost all its growth in demand between now and the year 2000. The Virginia utility company recently asked for bids for an additional 1,750 megawatts; a tidal wave of applicants responded with

offers to build nearly 14,000 megawatts of generating capacity.

Virginia Power is so enamored of the new industry that its parent company, Dominion Resources, has set up a subsidiary to build and operate small power plants outside its service area. It recently paid \$104.1 million to buy a cogeneration unit from Enron, the Houston natural-gas company.

Other big concerns, too, are getting in on the action. A consortium led by General Electric and Brooklyn Union Gas is building a \$64 million cogenerating plant at Grumman's Bethpage, N.Y., headquarters-and-manufacturing complex. Riley Consolidated, a Worcester, Mass., supplier of boilers and other steam-generating equipment, just set up a subsidiary to build power plants.

In some communities, electric entrepreneurs are creating jobs as well as power. Applied Energy is building a plant in Poteau, Okla., that will use steam from a nearby coal-fired generation unit to manufacture carbon dioxide for the food industry. Foster Wheeler, a

New Jersey engineering firm, will create 120 jobs in Mount Carmel, Pa., when it completes a 40-megawatt cogeneration plant that will heat a mammoth greenhouse complex. Long Lake Energy believes it can help create new jobs on Long Island, where the decision to shut down the Shoreham nuclear power plant has left a huge gap between supply and demand. If all of Long Lake's projects in the area are completed, they will produce enough power to replace the 810 megawatts of power that Shoreham would have generated.

Rags to riches. In other communities, independent power companies are helping to solve longstanding environmental problems. More than 100 power plants that burn municipal garbage are now operating in the U.S., and an additional 181 facilities will begin operating in the next five years, according to a recent study published by Governmental Advisory Associates, a New York research firm. At Modesto, Calif., General Electric and Oxford Energy operate a plant that will burn 40 million tires from the

world's largest tire-disposal dump. The facility also reclaims metal from steel-belted radials and sells it as scrap. In Cornwall, Pa., Oxbow will break ground next year for a plant that will generate 80 megawatts of power by burning anthracite culm, a gritty coal waste that has been piling up for generations in the northeastern part of the state.

Despite the industry's impressive growth, experts say that independent power companies alone will not be able to meet the future demand for electricity. At some point, utilities and state regulatory agencies will have to overcome their reluctance to build new generation facilities. But until then, electric entrepreneurs, large and small, will be called upon to keep the nation's lights aglow and its computers, microwave ovens, television sets, washing machines and thousands of other household appliances plugged in and running. If they succeed, they could become heroes—some of them, rich heroes. ■

by Kenneth R. Sheets with Robert F. Black

From helping the poor to a \$1.5 billion business

Power to the people—right on the money

Maybe it's the luck of the Irish, but Joseph Kennedy II, 35, is one energy entrepreneur who has managed to do well by doing good. Bored with a government job in 1979, the eldest son of the late Robert F. Kennedy found himself being moved by news photos of Boston's freezing poor people, so battered by the energy crisis they couldn't pay their heating bills. He decided to put the legendary family name and sense of social justice to work.

Unfamiliar with the Byzantine complexity of the international petroleum business, Kennedy got the names of world oil ministers from newspapers and brashly wrote them about the possibility of buying oil. A fair amount of wrangling later, he managed to purchase almost a million barrels from Venezuela at \$23 to \$26 a barrel—well below the open-market price.

That deal launched a small, nonprofit company that would buy oil, have it refined, sell the byproducts such as gasoline but let the state fuel-assistance pro-

grams have the heating oil at 40 percent below the average retail price. "God, we made a lot of money that first deal," recalls Kennedy, now a first-term representative from Massachusetts. "I lived and breathed that company. I miss it."

A decade later, Kennedy's Boston-based Citizens Energy Corporation has blossomed into a miniconglomerate boasting sales of \$1.5 billion in 1987.

Not only does the firm continue to provide low-cost heating oil to the Bay State, it has expanded operations to include oil trading on the spot market, natural-gas distribution, energy-conservation services and selling electricity purchased from utilities with surplus supplies.

Take two aspirin. Recently, the company entered into a joint venture with Medco Containment Services, a New Jersey firm specializing in mail-order pharmaceuticals. The goal is to provide medication by mail to health-insurance programs at prices one third less than what participants would



Joseph Kennedy: Doing good can also mean doing well

pay at the corner drugstore.

Earnings from these ventures are plowed back into good works. Last year, for example, the Massachusetts fuel-assistance program purchased 3 million gallons of heating oil from Citizens Energy at 30 percent below the average retail cost.

Citizens Energy now is exporting ideas to the Third World. In Nigeria, it supports a prototype farm where former Peace Corps volunteers show local growers how to cultivate new crops, such as zucchini, using modern agricultural techniques. The inspiration behind the African venture came from company cofounder William

James, a Colorado College alumnus who was serving as a Peace Corps worker in Kenya when Joe showed up on tour. Explains Michael Kennedy, who took over the business when his brother went to Capitol Hill last year: "We want to be able to put something back in those countries instead of just exploiting their resources."

Soft hearts, hard heads. As Citizens Energy has matured, it has managed to temper the founders' idealism with a healthy dose of realism. While the initial years were dominated by the gung-ho spirit and charisma of Joe Kennedy and William James, the focus under new chief Michael Kennedy is on making Citizens Energy a professionally run company that can survive in an intensely competitive industry. As James puts it: "We've taken what was once a business that should have only lasted a couple years and made it a real business."

Now, the firm is tackling environmental problems. Projects include water cleanup and waste disposal and recycling—intended to do good and produce profits for other ventures. Who said altruism couldn't be a growth business? ■

by Rita Koseika

AES Backs Greenhouse Mitigation Plan

BY JOHN EGAN

Applied Energy Services Inc. will spearhead a 10-year, \$14 million program to plant 52 million trees in Guatemala as a way of offsetting expected carbon dioxide (CO₂) emissions from the independent power producer's 180 megawatt coal-fired power plant currently under construction in Connecticut. Arlington, Virginia-based AES will contribute \$2 million to the effort, with additional support coming from CARE, the U.S. Agency for International Development, the Guatemalan government and the Peace Corps, Roger Sant, the company's chief executive officer, told a Washington press conference on Tuesday.

The power plant, located in Uncasville, Connecticut, will produce approximately 387,000 tons of CO₂ per year, or a total of slightly over 15 million tons over a 40 year period, Sant estimated. The World Resources Institute helped develop the program with AES, and WRI staffers estimated that the trees would remove approximately 15 million tons of carbon dioxide over the next 40 years.

The tree-planting plan is experimental, Sant acknowledged: "We're not sure it works totally, but on paper it appears to mitigate and fix the carbon dioxide produced by this plant." If the tree-planting program works as planned, AES "fully intends" to repeat the program for future power plants, he added.

The independent power producer, one of the largest in the U.S., currently has three power plants operating, two under construction and five more under contract, for a total of 1,600 MW of capacity, Sant commented. Nearly all of AES' actual and planned capacity is coal-fired. "Using coal makes a good deal of sense for power plants: we have a lot of it...and the price of coal tends to be set by [its] cost rather than by political or other means.

"It's not enough to offset the CO₂ of new plants—we're going to have to reduce CO₂ production, and that's going to come from a variety of ways," he continued. "One way will be for us to over-absorb CO₂," rather than offset new emissions through tree planting.

Tree planting alone will not solve the greenhouse problem, conceded John Michael Kramer, a senior staffer at CARE: In order to remove all the CO₂ currently produced through power production, the world's forested areas would have to double. However, the program could be replicated approximately 100 times throughout the world, he said, significantly reducing the amount of carbon in the atmosphere.

"If we could replicate this [program] all over the world, it would add about \$80 per kilowatt to the cost of constructing [coal-fired] capacity," Sant said. "If coal-fired capacity costs about \$1,500 per kilowatt, then we're adding something like five percent to the costs of construction." This would raise the price of a kilowatt-hour of electricity by one-tenth of one cent, or 1 mil, the energy executive added.

"A lot of people are talking about nuclear as being the only answer, and that the greenhouse problem will cause a nuclear resurgence," he observed. "But if my numbers are right there's not a lot of room for [nuclear power] to come in and compete. We don't have anything against nuclear power—we'd even build nuclear [plants] ourselves if it made any sense, but it doesn't."

AES' estimated revenues this year will total \$75 million, with operating profits under \$2 million, Sant said in an interview. The company incorporated the costs of the tree-planting into the financing for the Connecticut power plant.

U.S. Utility Turns to Guatemala to Aid Air

By PHILIP SHABECOFF
Special to The New York Times

WASHINGTON, Oct. 11 — Concerned that its new coal-burning power plant in Connecticut will add to the global trend toward a warming of the atmosphere around the globe, an electric utility has come up with an unusual response: It will pay to have trees planted in Guatemala.

The idea is that trees, 52 million of them, will do battle with carbon dioxide, the principal gas implicated in the warming of the globe, as though it were in a greenhouse.

"Given the scientific consensus on the seriousness of the greenhouse problem, we decided that it was time to stop talking and act," said Roger Sant, chief executive of Applied Energy Services, at a news conference here today. Applied Energy Services of Arlington, Va., is the parent of AES Thames, a Connecticut based concern that is to contribute \$2 million toward the planting of the trees over 385 square miles in Guatemala.

Trees will absorb carbon dioxide from sources all over the world, no matter where they are planted.

'An Imaginative Experiment'

James G. Speth, president of the World Resources Institute, a Washington based research and policy group that helped design the tree planting program, said that "this is an imaginative experiment in the quest for solutions to the greenhouse effect."

"The project is also a viable solution to the serious deforestation problems of a developing country," he said.

In a related development, the American Forestry Association, a conservation group whose members include foresters and woodland owners, will hold a rally here tomorrow to open a national campaign to encourage Americans to plant 100 million trees around the country by 1992. The association hopes the tree planting program will part of "a major public policy effort aimed at reversing the greenhouse effect."

Advances Will Be Slow

The two programs are among the first in which business and industry has responded to the growing alarms being sounded by scientists and policy makers about the anticipated onset of global warming. But both would hardly make a dent in the problem.

It is estimated that six billion tons of carbon dioxide from fossil fuels is entering the atmosphere each year. At the same time, 26 million acres of trees, which would otherwise absorb some of the carbon dioxide, are being cut down annually.

To compensate for that much carbon

dioxide being put into the atmosphere and that many trees being cut down, it would be necessary to plant as many as 3 billion acres of trees, an area bigger than all of the United States, according to the World Resources Institute.

The tree planting program in Guatemala will be managed by CARE, the international relief and development organization, working together with the Guatemalan Forestry Service and the United States Peace Corps. The sponsors said that some 40,000 small farmers in Guatemala would be involved in planting the tree plantations and woodlots.

In addition to the \$2 million from the utility, \$2 million cash or services will be contributed by CARE, \$1.2 million by the Guatemalan government, \$3.6 million by the United States Agency for International Development and \$7.5 million by the Peace Corps.

Mr. Sant said the number of trees to be planted would be able to absorb at least as much carbon dioxide as would be emitted by a new generating plant being built in Uncasville, Conn. The 180 megawatt plant will emit an estimated 15 million tons of carbon dioxide over its 40-year lifetime.

The consensus view at the moment is that if current trends in the emissions of carbon dioxide and other trace gases continue and if forests continue to be felled at the present rate, the global average temperature would rise by 3 to 8 degrees Fahrenheit toward the middle of the next century. This temperature, scientists believe, is likely to cause major changes in global climate patterns and cause the sea level to rise because of thermal expansion of the oceans and the melting of glaciers.

Sponsors of the tree-planting program in Guatemala said that in addition to offsetting carbon dioxide, emissions, the project would help reach other goals, including the economic growth in Guatemala and the preservation of the biological diversity of Latin America's rapidly disappearing tropical forests.

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May 18, 1990

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DER-BAQM

Hamilton S. Oven
State of Florida
Department of Environmental Regulation
Twin Towers Office Building
2600 Blair Stone Rd
Tallahassee, Florida 32301

Dear Buck:

An air quality analysis workplan for the Applied Energy Services Cedar Bay Cogeneration Project was initially submitted to FDER in June 1988. The initial workplan documented the modeling methodology used to assess the project impacts for the Site Certification Application (SCA)/PSD permit application and associated hearing. The SCA hearing was held in February 1990. In response to subsequent agency comments, additional ambient air quality modeling will be performed. The enclosed workplan describes the additional requested modeling and proposed methodology. Also enclosed with Max Linn's copy is a diskette copy of modeling output files supporting the significant impact area determination described in the workplan.

If you have any questions regarding the workplan, please call Steve Day at Black & Veatch (913-339-2880) or me at 703-358-0514.

Sincerely,


for
Julie Blunden

alc

cc: Max Linn, FDER w/enclosure and diskette
S. M. Day, B&V w/enclosure



1001 North 19th Street • Arlington, Virginia 22209 • (703) 522-1315 • Telecopier—(703) 528-4510

APPLIED ENERGY SERVICES
CEDAR BAY COGENERATION PROJECT
AMBIENT AIR QUALITY ANALYSIS WORKPLAN

B&V PROJECT 14573
MAY 1990

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1.0 INTRODUCTION

Applied Energy Service (AES) proposes to construct, own and operate a 225 MW electric generating (cogeneration) plant on an existing industrial site in Jacksonville, Florida. The AES Cedar Bay Project (Project) will incorporate three circulating fluidized bed (CFB) boilers and two limestone dryers. The electrical power will be sold to Florida Power and Light Company (FP&L) as well as process steam for sale to the adjacent Seminole Kraft paper mill. Commercial operation of the proposed facility is scheduled for early 1993.

An air quality analysis workplan for the Project was initially submitted to FDER in June 1988. The initial workplan documented the modeling methodology used to assess the project impacts for the Site Certification Application (SCA)/PSD Permit application. The modeling in support of the SCA hearing has been completed. The SCA hearing was held in February 1990. In response to subsequent agency comments, additional ambient air quality modeling will be performed. This workplan has been developed to describe the additional requested modeling.

This ambient air quality analysis workplan and subsequent changes, based on Florida Department of Environmental Resources (FDER) comments, will result in a mutually agreed upon protocol for the additional ambient air quality modeling.

2.0 PROJECT DESCRIPTION

The AES Cedar Bay Project will be located in Jacksonville, Florida, along the Broward River at the confluence with the St. Johns River. The project will be situated on approximately 35 of the 425 acres of land owned by Seminole Kraft. The land is currently zoned heavy industrial and is part of an existing paper processing operation. The approximate UTM coordinates of the facility are: 3365.6 kilometers (North) and 441.7 kilometers (East).

The Project will include three CFB boilers which burn fuel made up of approximately 96 percent coal and 4 percent bark in the presence of limestone. This technology greatly reduces sulfur dioxide (SO_2) emissions and also results in reduced formation of nitrogen oxides (NO_x) due to low combustion temperatures. The boilers will be coupled with high efficiency fabric filters which will minimize the emission of particulate matter from the facility, both total suspended particulate (TSP) and fine particulate (PM_{10}). Well water will be used for makeup water for the boilers and cooling tower.

The Project will use two limestone dryers to remove moisture from the limestone by direct contact with the exhaust gas. The dryers will burn No. 2 fuel oil and will generally be operated for about 8 hours per day.

The cogeneration plant will supply process steam to the Seminole Kraft facility.

There have not been any changes in the Project from those operations described in the SCA as amended through Amendment 5.

3.0 PROJECT APPLICABILITY

An analysis was conducted to determine if a proposed source is subject to the EPA's Prevention of Significant Deterioration (PSD) regulations. To determine if PSD regulations are applicable, a source must be considered a new major stationary source or a major modification to an existing facility and located in an area which is designated as "attainment" or "unclassifiable" for at least one pollutant emitted by the source and regulated under the Clean Air Act. If a source is determined to be subject to PSD regulations, then each regulated pollutant that is emitted in excess of designated "significant emission rates" is subject to additional PSD review.

3.1 SOURCE APPLICABILITY

A new major stationary source is defined as any one of 28 source categories listed in 40 CFR 52.21 which emits, or has the potential to emit, 100 tons per year or more of any regulated pollutant. In addition, any stationary source not listed in 40 CFR 52.21 which emits 250 tons per year or more of any regulated pollutant is also considered a major stationary source. The proposed Project is one of the 28 listed source categories, specifically, a fossil-fuel fired steam electric plant with more than 250 MBtu/h heat input.

The estimated emissions for the new facilities at the Project are listed in Table 3-1. The annual emissions are based on the CFBs and limestone dryers operating at 93 percent and maximum load, respectively for 8,760 hours per year. It should be noted that the CFB pollutant emission rates are identical to those given in the SCA. However, the limestone dryer annual emissions were adjusted to conservatively reflect continuous daily operation, although it is expected that the dryers will not operate for more than 8 hours per day.

If the credits for the shutdown of existing fossil fuel fired steam generators are ignored, then the Project will have at least one pollutant with annual emissions in excess of 100 tons per year and the source would be classified as a new major stationary source. The worst-case emissions for the limestone dryers are based on firing No. 2 fuel oil.

TABLE 3-1. SIGNIFICANT AND MAXIMUM EMISSION RATES FOR THE NEW UNITS AT THE PROPOSED FACILITY

| Pollutant | Significant
Emission
Rates
tpy | Estimated Maximum
Emissions | | Applicable
Pollutant
Yes/No |
|-----------------------------------|---|--------------------------------|------------------------|-----------------------------------|
| | | CFB ^a
tpy | L.Dryers
Oil
tpy | |
| Carbon Monoxide (CO) | 100 | 2,468 | 4.9 | Yes |
| Nitrogen Oxide (NO _x) | 40 | 4,676 | 19.7 | Yes |
| Sulfur Dioxide (SO ₂) | 40 | 4,015 | 41.6 | Yes |
| Particulate (TSP) | 25 | 260 | 0.002 | Yes |
| Particulate (PM ₁₀) | 15 | 257 | 0.002 | Yes |
| Ozone (VOC) | 40 | 208 | 0.18 | b |
| Lead | 0.6 | 91 | 0.0009 | Yes |
| Asbestos | 0.007 | -- | -- | No |
| Beryllium | 0.0004 | 1.5 | 0.09 | Yes |
| Mercury | 0.1 | 3.4 | <0.0001 | Yes |
| Fluorides | 3 | 1,122 | 0.01 | Yes |
| Sulfuric Acid Mist | 7 | 308 | 0.78 | Yes |
| Vinyl Chloride | 1.0 | -- | -- | No |
| Total Reduced | | | | |
| Sulfur (TRS) | 10.0 | -- | -- | No |
| Reduced Sulfur | 10 | -- | -- | No |
| Hydrogen Sulfide | 10 | -- | -- | No |
| Arsenic | 0 | 154 | -- | Yes |

^aBased on 8,760 hours per year of operation at 93 percent capacity factor for cogeneration plant, full load for limestone dryers.

^bNonattainment area, therefore, volatile organic compound (VOC) emissions are not subject to PSD requirements, but will be subject to nonattainment review.

Table 3-2 gives the current air quality status for the immediate project area. The proposed project site is located in the Duvall County Air Quality Control Region (AQCR).

An area is designated as "attainment" for a criteria pollutant if ambient air quality standards for that pollutant are being met and "nonattainment" if they are not. An area is designated as "unclassifiable" for a regulated pollutant if the attainment status cannot be determined.

The Project area is currently designated as attainment or unclassifiable with regard to CO, PM₁₀, NO_x, and SO₂. The entire Duvall County is designated as nonattainment for ozone (VOCs).

Recent air quality dispersion modeling of the Jacksonville area by a permit applicant has indicated areas with modeled SO₂ concentrations in excess of AAQS exist for existing sources modeled at their permitted emission rates. However, ambient air quality monitoring has not shown a SO₂ monitoring violation.

When emission reductions from the shutdowns of existing sources are ignored, then PSD regulations are applicable to the Project since it is a major source with the potential to emit more than 100 tons per year of a regulated pollutant that is currently in attainment.

3.2 POLLUTANT APPLICABILITY

If a source is determined to be subject to PSD regulations, each regulated pollutant must be assessed for applicability of the PSD program to that specific pollutant. Table 3-1 also shows the estimated maximum emissions for the new sources at the Project along with the EPA's PSD significant emission rate criteria used to establish pollutant applicability. Any pollutant with net emissions above the PSD significant emission rates is subject to further PSD review including an Ambient Air Quality Impact Analysis (AAQIA).

At least six major pollutants will be emitted from the new sources at levels above the PSD significant emission rates. If the credits for the shutdown of existing sources are ignored, then these pollutants would be subject to further PSD review. These pollutants are SO₂, CO, NO_x, TSP, PM₁₀, and Pb. It was demonstrated in the SCA that the project would not be

TABLE 3-2. DUVALL COUNTY AIR QUALITY CONTROL REGION (AQCR)
ATTAINMENT/NONATTAINMENT STATUS

| <u>Pollutant</u> | <u>Attainment or
Unclassified *</u> | <u>Non-attainment</u> |
|----------------------|---|-----------------------|
| CO | X | |
| NO ₂ | X | |
| SO ₂ ** | X | |
| PM ₁₀ *** | X | |
| Ozone (VOC) | | X |

*Unclassified is treated as attainment.

**Modeled SO₂ exceedance areas exist in Jacksonville.

***Designated nonattainment for TSP in parts of Jacksonville.

a significant emitter of CO. Also, it was shown in the SCA, that conservative 24-hour Pb impacts fell below the Pb quarterly standard. Therefore, Pb and CO impacts will not be discussed further.

Emissions and applicability of ozone are treated in terms of volatile organic compounds (VOCs). As indicated in Table 3-2, the site area is nonattainment for ozone. FDER has indicated that approximately 1,400 tpy of VOC are available as a new source allowance in Duvall County. Air quality modeling for ozone will not be required.

4.0 PROPOSED MODELING METHODOLOGY

This section describes the proposed modeling methodology for determining the ambient air quality impacts due to pollutant emissions from the proposed project. The proposed methodology is based on FDER and EPA guidelines and will use the UNAMAP 6 dispersion models. The dispersion models have been revised to include the most recent changes associated with EPA dispersion modeling guidelines. The modeling methodology includes a determination of the appropriate dispersion models and the definition of modeling assumptions and meteorological data.

The previous modeling performed for the SCA assumed net emission modeling credit because of Seminole Kraft (SK) sources being shutdown. Thus, only the existing and proposed sources on the immediate plant site were modeled. The impacts from all existing SK sources (sources to be retired plus sources to remain in operation) were subtracted from the combined impacts of the proposed AES sources and the SK sources that will remain in operation. This analysis conclusively demonstrated compliance with all increment requirements of the PSD program.

The modeling methodology has been revised slightly for NAAQS purposes to incorporate the impacts of other existing major sources. The concept of net modeling will be used in this assessment, incorporating existing major Jacksonville SO₂ sources. This is being done so that ambient air quality can be determined as well as the previously established net project benefits.

The air quality modeling runs and supporting computer files will be submitted to the FDER, as required.

4.1 GEP STACK HEIGHT DETERMINATION

A Good Engineering Practice (GEP) stack height is defined as the height at which emissions are not significantly influenced by building downwash. The effect of each nearby building and therefore the GEP stack height, is calculated as the building height plus the 1.5 times the lesser of the building height or maximum projected width. The resultant GEP stack height is the highest calculated stack height based on all influencing building dimensions.

Two 10-foot limestone dryer vents will be located on the limestone pulverizer building (20 feet in height). Emissions from these vents may be influenced by several buildings, including the limestone pulverizer, steam generation building, and turbine building. The GEP stack height for the dryer, based on the steam generation building is 425 feet. Therefore, emissions from the limestone dryer vents will be influenced by building downwash. The CFB boiler stack will be located adjacent to the fabric filters. The GEP stack height, based on the steam generation building will also be 425 feet.

4.2 PROPOSED SOURCE DATA

The proposed emissions associated with this project will originate from material handling (fugitive dust) and the combustion of fuel in the three CFBs and two limestone dryers.

4.2.1 Fugitive Dust Emissions

The SCA fugitive dust emission inventory (SCA Table 3.4-5) was revised and is included as Table 4-1. This table now provides more detail in materials handling operations and accounts for other fugitive dust controls. However, operational parameters and annual material throughputs remain identical to those given in the SCA. Worst-case short-term operations were also established to determine maximum 24-hour modeling impacts. Emission factors and typical dust control efficiencies were obtained from EPA's Compilations of Air Pollutant Emission Factors (AP-42).

The generation of particulate emissions from the handling and storage of coal, limestone, and combustion waste will be controlled by storing materials in enclosures, vent filters, dust collectors and other mitigation measures.

The fugitive dust emissions will be included with the stack particulate emissions to perform air quality modeling for significant impact area determination and standards compliance.

TABLE 4-1. PARTICULATE EMISSION ESTIMATES FROM MATERIAL HANDLING AND STORAGE OPERATIONS - COAL

| No. | Activity | Source | Point/
Area | AP-42 Equation | Emission
Factor | Use Rate | Uncontrolled
Emissions | Control
ID | Control Method | Control
Effcy. | Annual
Controlled
Emissions | 24-Hour
Worst-Case
Controlled
Emissions | Emission
Factor
Ref.* | Control
Effcy.
Ref.** |
|-----|--|--|----------------|---------------------------------|--|------------------------------|---------------------------|---------------|--|-------------------|-----------------------------------|--|-----------------------------|-----------------------------|
| 1 | Rail Car Unloading Thru
Bottom Dump Railcars | Unloading Structure | Area | Batch Drop | 0.001 lb/t | 1,105,074 t/yr
9,000 t/dy | 0.50 t/yr
0.34 lb/hr | N/A
N/A | Partial Enclosure &
Wet Suppression | 85.0%
85.0% | 0.07 t/yr | 0.05 lb/hr | a | --- |
| 2 | Drop From Coal Hopper
Feeder to Conveyor 1 | Rail Car Unloader
Dust Collector | Point | Continuous Drop | 0.001 lb/t | 1,105,074 t/yr
9,000 t/dy | 0.50 t/yr
0.34 lb/hr | C1
C1 | Collector & Baghouse
Collector & Baghouse | 99.9%
99.9% | 0.00 t/yr | 0.00 lb/hr | a
a | 1
1 |
| 3 | Coal Hopper Feeder
To Lowering Well | Conveyor 1 | Area | Conveying | 0.004 lb/t | 1,105,074 t/yr
9,000 t/dy | 2.21 t/yr
1.50 lb/hr | N/A
N/A | Underground & Covers
Underground & Covers | 90.0%
90.0% | 0.22 t/yr | 0.15 lb/hr | c
c | --- |
| 4 | Conveyor Drop to Lowering
Well, Thru to Coal Pile | Lowering Well &
Coal Receiving Pile | Area | Continuous Drop | 0.001 lb/t | 1,105,074 t/yr
9,000 t/dy | 0.50 t/yr
0.34 lb/hr | N/A
N/A | Partial Enclosure &
Previous Wetting | 85.0%
85.0% | 0.07 t/yr | 0.05 lb/hr | a
a | --- |
| 5 | Coal Stockout By
Scraper | Active Coal Pile | Area | Sfc Coal Mining | 0.384 lb/WMT
0.384 lb/WMT | 2,721 WMT/yr
12 WMT/dy | 0.52 t/yr
0.19 lb/hr | N/A
N/A | Precipitation & P Wet
Previous Wetting | 81.8%
50.0% | 0.09 t/yr | 0.10 lb/hr | d
d | --- |
| 7 | Wind Erosion on
Coal Pile | Coal Receiving Pile
(active pile) | Area | Wind Erosion
Scraper | (see attached worksheet)
(pile surface area = 0.15 ac.) | | 0.004 t/yr
0.20 lb/hr | N/A
N/A | Precipitation
Precipitation | 100.0%
100.0% | 0.00 t/yr | 0.00 lb/hr | e
e | --- |
| | | Coal Receiving Pile
(inactive pile) | Area | Wind Erosion
Unscrusted Coal | (see attached worksheet)
(pile surface area = 0.31 ac.) | | 0.00 t/yr
0.00 lb/hr | N/A
N/A | Precipitation
Precipitation | 100.0%
100.0% | 0.00 t/yr | 0.00 lb/hr | e
e | --- |
| | | Coal Storage Pile
(active pile) | Area | Wind Erosion
Scraper | (see attached worksheet)
(pile surface area = 0.47 ac.) | | 0.014 t/yr
0.634 lb/hr | N/A
N/A | Precipitation
Precipitation | 100.0%
100.0% | 0.00 t/yr | 0.00 lb/hr | e
e | --- |
| | | Coal Storage Pile
(inactive pile) | Area | Wind Erosion
Unscrusted Coal | (see attached worksheet)
(pile surface area = 1.40 ac.) | | 0.00 t/yr
0.00 lb/hr | N/A
N/A | Precipitation
Precipitation | 100.0%
100.0% | 0.00 t/yr | 0.00 lb/hr | e
e | --- |
| | | Other "yard area"
(active pile) | Area | Wind Erosion
Scraper | (see attached worksheet)
(pile surface area = 0.05 ac.) | | 0.001 t/yr
0.067 lb/hr | N/A
N/A | Precipitation
Precipitation | 100.0%
100.0% | 0.00 t/yr | 0.00 lb/hr | e
e | --- |
| | | Other "yard area"
(inactive pile) | Area | Wind Erosion
Unscrusted Coal | (see attached worksheet)
(pile surface area = 0.95 ac.) | | 0.00 t/yr
0.00 lb/hr | N/A
N/A | Precipitation
Precipitation | 100.0%
100.0% | 0.00 t/yr | 0.00 lb/hr | e
e | --- |
| 8 | Coal Reclaim By
Scraper | Active Coal Pile | Area | Sfc Coal Mining | 0.384 lb/WMT
0.384 lb/WMT | 2,721 WMT/yr
12 WMT/dy | 0.52 t/yr
0.19 lb/hr | N/A
N/A | Precipitation & P Wet
Previous Wetting | 81.8%
50.0% | 0.09 t/yr | 0.10 lb/hr | d
d | --- |
| 9 | Coal Reclaim Hopper to
Reclaim Feeder | Reclaim Hopper | Area | Batch Drop | 0.001 lb/t | 1,105,074 t/yr
3,480 t/dy | 0.50 t/yr
0.13 lb/hr | N/A
N/A | Previous Wetting
Previous Wetting | 50.0%
50.0% | 0.25 t/yr | 0.07 lb/hr | a
a | --- |
| 10 | Coal Reclaim Hopper to
to Coal Feeder Belt | Reclaim Hopper | Area | Continuous Drop | 0.001 lb/t | 1,105,074 t/yr
3,480 t/dy | 0.50 t/yr
0.13 lb/hr | C4
C4 | Collector & Baghouse
Collector & Baghouse | 99.9%
99.9% | 0.00 t/yr | 0.00 lb/hr | a
a | 1
1 |
| 11 | Coal Feeder Belt to
Conveyor 2 Feeder | Reclaim Hopper | Area | Continuous Drop | 0.001 lb/t | 1,105,074 t/yr
3,480 t/dy | 0.50 t/yr
0.13 lb/hr | C5
C5 | Collector & Baghouse
Collector & Baghouse | 99.9%
99.9% | 0.00 t/yr | 0.00 lb/hr | a
a | 1
1 |
| 12 | Conveyor 2 Feeder
to Coal Crusher | Conveyor 2 | Area | Conveying | 0.004 lb/t | 1,105,074 t/yr
3,480 t/dy | 2.21 t/yr
0.58 lb/hr | N/A
N/A | Covers
Covers | 90.0%
90.0% | 0.22 t/yr | 0.06 lb/hr | c
c | --- |

| No. | Activity | Source | Point/
Area | AP-42 Equation | Emission
Factor | Use Rate | Uncontrolled
Emissions | Control
ID | Control Method | Control
Effcy. | Annual
Controlled
Emissions | 24-Hour
Worst-Case
Controlled
Emissions | Emission
Factor
Ref.* | Control
Effcy.
Ref.** |
|-----|--|-------------------------------|----------------|-----------------|--------------------|------------------------------|----------------------------|---------------|--|-------------------|-----------------------------------|--|-----------------------------|-----------------------------|
| 13 | Conveyor 2 to Coal
Crusher Chute to Crusher | Crusher Bldg | Point | Continuous Drop | 0.001 lb/t | 1,105,074 t/yr
3,480 t/dy | 0.50 t/yr
0.13 lb/hr | C2 | Collector & Baghouse
Collector & Baghouse | 99.9%
99.9% | 0.00 t/yr | 0.00 lb/hr | a | 1 |
| 14 | Coal Crushing | Crusher Bldg | Point | Stone Crushing | 0.28 lb/t | 1,105,074 t/yr
3,480 t/dy | 154.71 t/yr
40.60 lb/hr | C2 | Enclosure & Baghouse
Enclosure & Baghouse | 99.9%
99.9% | 0.15 t/yr | 0.04 lb/hr | b | 1 |
| 15 | Crusher to Plant Supply
Conveyor 3 Feeder | Crusher Bldg | Point | Continuous Drop | 0.001 lb/t | 1,105,074 t/yr
3,480 t/dy | 0.50 t/yr
0.13 lb/hr | C2 | Collector & Baghouse
Collector & Baghouse | 99.9%
99.9% | 0.00 t/yr | 0.00 lb/hr | a | 1 |
| 16 | Conveyor 3 Feeder to
Generation Building | Conveyor 3 | Area | Conveying | 0.004 lb/t | 1,105,074 t/yr
3,480 t/dy | 2.21 t/yr
0.58 lb/hr | N/A | Covers
Covers | 90.0%
90.0% | 0.22 t/yr | 0.06 lb/hr | c | --- |
| 17 | Conveyor 3 to Generation
Building Conveyor System | Generation Bldg | Area | Continuous Drop | 0.001 lb/t | 1,105,074 t/yr
3,480 t/dy | 0.50 t/yr
0.13 lb/hr | N/A | Total Enclosure
Total Enclosure | 100.0%
100.0% | 0.00 t/yr | 0.00 lb/hr | a | --- |
| 18 | Generation Plant
Conveying | Generation Bldg | Point | Conveying | 0.004 lb/t | 1,105,074 t/yr
3,480 t/dy | 2.21 t/yr
0.58 lb/hr | N/A | Total Enclosure
Total Enclosure | 100.0%
100.0% | 0.00 t/yr | 0.00 lb/hr | c | --- |
| 19 | Generation Bldg Conveyor
System to Coal Silos 1-6 | Generation Bldg
Coal Silos | Point | Continuous Drop | 0.001 lb/t | 1,105,074 t/yr
3,480 t/dy | 0.50 t/yr
0.13 lb/hr | C3 | Collector & Baghouse
Collector & Baghouse | 99.9%
99.9% | 0.00 t/yr | 0.00 lb/hr | a | 1 |
| | | | | | | | | | | | ----- | ----- | | |
| | | | | | | | | | | | 1.41 t/yr | 0.67 lb/hr | | |

- a Compilation of Air Pollutant Emission Factors - AP-42, Fourth Edition (9/85)
Including Supplements A & B (10/86, 9/88) Section 11.2.3
- b Compilation of Air Pollutant Emission Factors - AP-42, Fourth Edition (9/85)
Including Supplements A & B (10/86, 9/88) Section 8.19.2
- c United Engineers & Contractors Reference 2 "Workbook on Estimation of Emission
and Dispersion Modeling for Fugitive Particulate Sources", Utility Air Regulatory
1. Manufacturer's Guarantees
2. "Fugitive Emissions From Integrated Iron and Steel Plants" Midwest
Research Institute, Kansas City, Missouri

TABLE 4-1. PARTICULATE EMISSION ESTIMATES FROM MATERIAL HANDLING AND STORAGE OPERATIONS- ASH

| No. | Activity | Source | Point/
Area | Point | AP-42 Equation
Handling | Emission
Factor | Use Rate | Uncontrolled
Emissions | Control
ID | Control Method | Control
Effcy. | Annual
Controlled
Emissions | 24-Hour
Worst-Case
Controlled
Emissions | Emission
Factor
Ref.* | Control
Effcy.
Ref.** |
|--------|---|-------------------------------|----------------|-------|----------------------------|--------------------|--------------------------|---------------------------|---------------|--|-------------------|--|--|-----------------------------|-----------------------------|
| 1 | Fly Ash from F.F. to
Reinjection Surge Hopper | Generation Bldg | Point | Point | Pneumatic
Handling | nil | 260,000 t/yr
818 t/dy | 0.00 t/yr
0.00 lb/hr | N/A | Sealed System | 100.0% | 0.000 t/yr | 0.000 lb/hr | --- | --- |
| 2 | Fly Ash Drop to
Reinjection Surge Hopper | Generation Bldg | Point | Point | Continuous Drop | 0.005 lb/t | 260,000 t/yr
818 t/dy | 0.66 t/yr
0.17 lb/hr | N/A | Vent Filter
Vent Filter | 99.9%
99.9% | 0.001 t/yr | 0.000 lb/hr | a
a | 1
1 |
| 3 | Fly Ash from Surge Hopper
To Mechanical Collector | Generation Bldg | N/A | N/A | Complete
Entrainment | nil | 260,000 t/yr
818 t/dy | 260,000 t/yr
818 t/dy | N/A | Mechanical Collector
Mechanical Collector | 98.0%
98.0% | (to Fly Ash Bag Filter)
(to Fly Ash Bag Filter) | 0.000 lb/hr | --- | 1
1 |
| 4 | Fly Ash from Mechanical
Coll. to Bag Ftr to
Mechanical Exhauster | Generation Bldg | Point | Point | Complete
Entrainment | 0.001 lb/t | 5,200 t/yr
16 t/dy | 5,200 t/yr
16 t/dy | N/A | Fly Ash Bag Filter
Fly Ash Bag Filter | 99.99%
99.99% | 0.520 t/yr | 0.136 lb/hr | --- | 1
1 |
| 5 | Mech. Coll./Bag Filter
to Fly Ash Silo | Generation Bldg | Point | Point | Continuous Drop | 0.005 lb/t | 260,000 t/yr
818 t/dy | 0.66 t/yr
0.17 lb/hr | N/A | Vent Filter
Vent Filter | 99.9%
99.9% | 0.001 t/yr | 0.000 lb/hr | a
a | 1
1 |
| 6 | Fly Ash Silo to
Ash Pelletizer | Pelletizer Bldg | Point | Point | Pneumatic
Handling | nil | 260,000 t/yr
818 t/dy | 0.00 t/yr
0.00 lb/hr | N/A | Sealed System
Sealed System | 100.0%
100.0% | 0.000 t/yr | 0.000 lb/hr | --- | --- |
| 7 | Bed Ash from Boiler
To Bed Ash Conveyor | Generation Bldg | Point | Point | Continuous Drop | 0.001 lb/t | 65,000 t/yr
204 t/dy | 0.05 t/yr
0.01 lb/hr | N/A | Sealed System
Sealed System | 100.0%
100.0% | 0.000 t/yr | 0.000 lb/hr | a
a | 1
1 |
| 8 | Bed Ash from Boiler to
Bed Ash Storage Hopper | Generation Bldg | Point | Point | Conveying | 0.004 lb/t | 65,000 t/yr
204 t/dy | 0.13 t/yr
0.03 lb/hr | N/A | Sealed System
Sealed System | 100.0%
100.0% | 0.000 t/yr | 0.000 lb/hr | c
c | --- |
| 9 | Bed Ash from Conveyor
to Bed Ash Storage Hopper | Generation Bldg | Point | Point | Continuous Drop | 0.001 lb/t | 65,000 t/yr
204 t/dy | 0.05 t/yr
0.01 lb/hr | N/A | Vent Filter
Vent Filter | 99.9%
99.9% | 0.000 t/yr | 0.000 lb/hr | a
a | 1
1 |
| 10 | Bed Ash Storage Hopper
To Mechanical Collector | Generation Bldg | N/A | N/A | Complete
Entrainment | nil | 65,000 t/yr
204 t/dy | 65,000 t/yr
204 t/dy | N/A | Mechanical Collector
Mechanical Collector | 99.0%
99.0% | (to Bed Ash Bag Filter)
(to Bed Ash Bag Filter) | 0.000 lb/hr | --- | 1
1 |
| 11 | Bed Ash from Mechanical
Collector to Bag Filter
to Mechanical Exhauster | Generation Bldg | Point | Point | Complete
Entrainment | 0.001 lb/t | 650 t/yr
2 t/dy | 650 t/yr
2 t/dy | N/A | Bed Ash Bag Filter
Bed Ash Bag Filter | 99.99%
99.99% | 0.065 t/yr | 0.017 lb/hr | --- | 1
1 |
| 12 | Mech. Coll./Bag Filter
to Bed Ash Silo | Generation Bldg | Point | Point | Continuous Drop | 0.001 lb/t | 65,000 t/yr
204 t/dy | 0.05 t/yr
0.01 lb/hr | C14
C14 | Vent Filter
Vent Filter | 99.9%
99.9% | 0.000 t/yr | 0.000 lb/hr | a
a | 1
1 |
| 13 | Bed Ash Silo to
Ash Pelletizer | Pelletizer Bldg | Point | Point | Pneumatic
Handling | nil | 0 t/yr
0 t/dy | 0.00 t/yr
0.00 lb/hr | N/A | Sealed System
Sealed System | 100.0%
100.0% | 0.000 t/yr | 0.000 lb/hr | --- | --- |
| 14 | Pelletization | Pelletizer Bldg | Point | Point | Pelletization | 110 lb/t | 65,000 t/yr
204 t/dy | 3,575 t/yr
937 lb/hr | C19
C19 | Collctr, Bghs, Wetting
Collctr, Bghs, Wetting | 100.0%
100.0% | 0.000 t/yr | 0.000 lb/hr | --- | --- |
| 15 | Pellet Handling | Conveyor/Storage
& Loadout | Area | Area | Pelletization | nil | 65,000 t/yr
204 t/dy | 0.00 t/yr
0.00 lb/hr | N/A | Pelletization
Pelletization | 100.0%
100.0% | 0.000 t/yr | 0.000 lb/hr | --- | 1
1 |
| TOTALS | | | | | | | | | | | | 0.586 t/yr | 0.154 lb/hr | ===== | |

4.2.2 Proposed Combustion Sources

The operating conditions of the CFBs and limestone dryers will be preliminarily evaluated at maximum design capacity for 8,760 hours per year. In addition, the CFBs and limestone dryers will be modeled at 75 percent and 50 percent load with screening-level modeling to determine the worst-case operational mode. Source parameters based on the worst-case load will be used to perform refined air quality modeling to demonstrate compliance with the PSD increments, NAAQS, and Florida Air Pollution Regulations.

Modeling parameters for the two proposed sources are given in Table 4-2. These are based on 100 percent load operating conditions and the worst-case fuel.

4.3 MODEL SELECTION AND DESCRIPTION

EPA has established a modeling guideline document to provide a common basis for assessing air quality impacts, Guideline On Air Quality Models (Revised), 1986.

Following the recommended EPA modeling guidance for refined models, the ISCST (Industrial Source Complex Short-Term) dispersion model is used to determine impacts for the applicable pollutants. The ISCST model is a steady-state Gaussian plume model which can be used to assess pollutant concentrations from a wide variety of sources associated with an industrial source complex. This model can account for gravitational settling and dry deposition of particulates; building downwash conditions; point, area, line, and volume sources; plume rise as a function of downwind distance; separation of source and limited terrain adjustments.

ISCST will be used with five years of hourly sequential meteorological data for refined modeling. The applicable interacting sources identified in Section 5.2 will be included in the modeling analysis.

4.4 MODEL OPTIONS AND ASSUMPTIONS

ISCST's building downwash model option is used as appropriate to consider the effects of nearby buildings for both the existing and proposed sources. Several of the existing sources have stacks that are below the Good Engineering Practice (GEP) height and are, therefore,

TABLE 4-2. SOURCE DATA FOR THE PROPOSED CEDAR BAY PROJECT

| <u>Model Parameters</u> | <u>CFBs</u> | <u>Limestone Dryers*</u> |
|---------------------------------|-------------|--------------------------|
| Building Height, feet | 170 | 170 |
| Maximum Projected Width, feet | 280 | 280 |
| GEP Stack Height, feet | 425 | 425 |
| Modeled Stack Height, feet | 425 | 30 |
| Stack Exit Diameter, feet | 14 | 3.42 (each) |
| <u>100 percent load</u> | | |
| Stack Flow Volume, acfm | 1,004,000 | 38,681 (each) |
| Stack Exit Velocity, fpm | 6,540 | 4,200 |
| Stack Exit Temperature, F | 265 | 180 |
| Total Emissions | | |
| SO ₂ emissions, lb/h | 1913.4 | 9.5 |
| NO _x emissions, lb/h | 1147.9 | 4.5 |
| CO emissions, lb/h | 605.9 | 1.1 |
| TSP emissions, lb/h | 63.8 | 0.49 |
| VOC emissions, lb/h | 47.5 | 0.04 |
| Pb emissions, lb/h | 22.3 | -- |
| <u>Conditions</u> | | |
| Load | 100 | 100 |
| Fuel Input, MBtu/h | 3,189 | 31 (total) |
| Model Coordinates, km | | |
| (East - x) | 441.7 | 441.639 |
| (North - y) | 3365.6 | 3365.692 |

*No. 2 fuel oil firing.

subjected to the turbulence surrounding the building. This situation can cause pollutants to be brought to the ground before appreciable mixing and dilution can occur.

The largest SO₂ emitters, such as Jacksonville Electric Association (JEA) Northside and Seminole Kraft will include building downwash parameters if appropriate. The proposed boilers will utilize GEP stack heights and thus will disperse pollutants above the building turbulence. The proposed limestone dryer vents will be shorter and located on the limestone pulverizer building. These vents will be within the building turbulence and, therefore, will be modeled with building downwash parameters.

The following include additional options that will be included in the assessment.

- o The proposed modeling site is considered rural for modeling purposes based on the land use within 3-kilometer radius.
- o Standard EPA default modeling options are used for this analysis including building downwash parameters for the proposed sources and the JEA Northside and Seminole Kraft existing sources.
- o For downwash modeling, the building dimensions are conservatively based on the maximum projected width regardless of the wind direction. Also, no terrain effects are included since the surrounding area is nearly flat.
- o For the particulate dispersion modeling, the gravitational settling modeling option will be employed for fugitive dust sources.

The modeled sources will be grouped into two source groups representing the "before" and "after" impacts: 1) All applicable existing and permitted Jacksonville sources; 2) All applicable existing and permitted Jacksonville sources, minus the Seminole Kraft power and bark boilers, plus the proposed new sources (AES). The concentrations for each receptor are assumed to be represented by the second-highest concentration predicted from the five years of meteorological data for the short-term impacts. Annual impacts will be represented by the highest concentration.

When credits for the shutdown of existing sources are ignored, modeling for the proposed new sources has demonstrated that the Project has only SO₂ and NO_x significant impacts. (When using the credits, there are not significant impact areas for any pollutant). The SO₂ significant impact area would extend to 26.5 km and thus, the existing SO₂ sources will be included in the modeling analysis. Because the NO_x significant impact area extends to only 743 meters, the existing source group will only include the Seminole Kraft facility. Particulate modeling, including fugitive dust sources, demonstrated that the project will have predicted impacts less than significance at offsite receptors. Thus, the particulate emissions will not need to be modeled further.

4.5 RECEPTOR DATA

The ISCST model allows the use of either a polar or rectangular receptor grid to predict ground-level concentrations. A polar receptor grid was used initially to establish pollutant significant impact areas. Receptors were placed at 10 degree intervals and rings at distances of 428, 564, 743, 979, and 1273 m for the NO_x significant area determination. The rings for the SO₂ significant impact analysis extended to 20.2, 26.5, 35.0, and 46.1 km. Two rings were placed at 428 and 564 m for the particulate analysis. In addition, receptors were also placed along the restrictive plant boundary for the TSP analysis. The plant boundary being defined as the outermost boundary where the public access is physically restricted. A diskette copy of these polar grid modeling results were included with this workplan.

Rectangular receptor coordinates will be used for the refined SO₂ analysis with the proposed CFB stack located at the center of the receptor array. The center of the receptor grid will be designated by UTM coordinates (441.7 km East, 3365.6 km North). Proposed receptor locations have been established at appropriate distances to ensure sufficient density and aerial extent to adequately characterize the pattern of ambient air quality within the significant impact area. A rectangular receptor grid with 2.5 kilometer increments from the center and dimensions of 55 km by 55 km for a total of 483 receptors will be used for the SO₂ analysis.

To characterize the NO_x concentrations, a rectangular receptor grid will be used with offsite receptors placed at 100 m increments within the significant impact area (800 meters) and along the plant boundary.

4.6 METEOROLOGICAL DATA

The ISCST model is generally used with a complete year of hourly, sequential meteorological surface data and twice daily mixing depths. Five consecutive years of meteorological data from a nearby National Weather Service station will be considered representative of the dispersion patterns at the site. The same meteorological data used for the SCA modeling will be used for this additional analysis. Specifically, Jacksonville surface and upper air data for the period 1981 through 1985 will be used. This information was obtained from the FDER.

5.0 AMBIENT AIR QUALITY IMPACT ANALYSES

5.1 PRELIMINARY MODELING

The operating conditions of the CFBs were evaluated at 50 and 75 percent load capacity plus the maximum design for the plant. The maximum CFB operation was determined to be the worst case operating condition and is the only operating level conservatively used for the refined air quality modeling.

The proposed facility, operating at the worst-case load, was preliminarily modeled with ISCST and the five years of meteorological data. The modeling was based on the stack parameters and all the modeling assumptions given in Section 4.2 and 4.4, respectively.

For each applicable pollutant, the extent of the significant impact area was defined. The radii of significant impact was determined by extending the receptor array outward until the predicted pollutant concentration at the farthest receptor distance is less than the appropriate significance level. The highest modeled annual and highest second-highest short-term concentrations were used to determine the significant impact area. The greatest significant impact area for each pollutant will be used to represent the most conservative area for all averaging periods.

SO₂ and NO_x emissions were preliminarily demonstrated to have a significant impact area. The SO₂ and NO_x significant impact areas will extend to 26.5 km and 0.7 km, respectively.

5.2 POTENTIAL INTERACTING SOURCES

The proposed CFBs and limestone dryers had modeled impacts for specific pollutants that exceeded the significant ambient air quality impact criteria. Thus, potential interacting sources will also be assessed for those pollutants. The potential interacting sources evaluated will be the major existing sources within the significant impact area.

SO₂ emission inventories for Jacksonville sources were obtained from KBN Engineering, JEA, and FDER. KBN compiled their inventory for the Jefferson Smurfitt permit application. The FDER inventory is the same one

that resulted in the identification of modeled SO₂ exceedances. Table 6-1 gives the composite SO₂ emission inventory.

Source applicability for refined SO₂ modeling was determined using a North Carolina guidance document. An applicability factor was computed for all major sources within the significant impact area. The factor Q is given as

$$Q = 20D.$$

Where,

Q = maximum emissions (tpy)

D = distance from source to proposed source in km

Those sources that met the above criteria are shown in Table 6-1 and will be included in the NAAQS modeling analysis. Table 6-1 also lists the modeling data for the individual existing Seminole Kraft paper mill sources. These parameters were previously included in the FDER modeling study for the major SO₂ sources in the Jacksonville area.

For convenience, similar Seminole Kraft sources can be combined into "composite" sources for modeling purposes. Composite Seminole Kraft sources were used for the SCA modeling. EPA's Guide for Compiling a Comprehensive Emission Inventory (March 1973) gives a refined method for "lumping" similar sources together. The procedure calculates a plume buoyancy term (K) for each individual stack using stack height (H), flow volume (V), exhaust gas temperature (T), and emission rates (a) in the following equation.

$$K = (H)(V)(T)/(a)$$

When combining sources, the stack with the lowest K value is selected and its stack parameters are used to represent the composite source. Emissions from all sources are added and used for the composite source. This method simplifies the dispersion modeling.

Table 5-2 shows the simplified source configuration for the existing Seminole Kraft SO₂ sources. These sources are within the influence of the existing KRB building and have stacks less than the GEP height. Therefore,

TABLE 5-1. DUVALL COUNTY EXISTING AND PERMITTED SO2 SOURCES

| <u>Source</u> | <u>UTM Coordinates</u> | | <u>Stack Parameters</u> | | <u>Exit Gas Parameters</u> | | Maximum |
|---------------------------------------|------------------------|--------------------|-------------------------|-------------------|----------------------------|------------------------|-----------------------------|
| | <u>East</u>
km | <u>North</u>
km | <u>Height</u>
m | <u>Diam.</u>
m | <u>Temp.</u>
K | <u>Velocity</u>
m/s | <u>SO2 Emissions</u>
g/s |
| <u>JEA ST. JOHNS RIVER POWER PARK</u> | | | | | | | |
| UNITS 1,2 | 446.9 | 3366.3 | 194.2 | 10.13 | 328 | 18.29 | 1176.6 |
| <u>JEA NORTHSIDE*</u> | | | | | | | |
| UNIT 1 | 446.9 | 3365.0 | 73.2 | 5.03 | 401 | 20.12 | 690.3 |
| UNIT 2 | | | 88.4 | 5.13 | 394 | 13.11 | 586.8 |
| UNIT 3 | | | 103.6 | 7.01 | 439 | 19.20 | 1255.6 |
| C TURBINES 3-6 | | | 10.1 | 6.56 | 780 | 18.30 | 231.6 |
| <u>JEA SOUTHSIDE*</u> | | | | | | | |
| UNITS 1,2 | 437.6 | 3353.8 | 40.7 | 2.44 | 433 | 11.70 | 105.4 |
| UNIT 3 | | | 40.7 | 3.05 | 407 | 10.30 | 79.8 |
| UNIT 4 | | | 43.7 | 3.35 | 422 | 11.80 | 110.3 |
| UNIT 5 | | | 44.2 | 3.05 | 417 | 13.70 | 207.9 |
| <u>JEA KENNEDY*</u> | | | | | | | |
| UNITS 8,9 | 440.0 | 3359.1 | 45.7 | 3.20 | 414 | 7.80 | 150.0 |
| UNIT 10 | | | 41.5 | 2.74 | 405 | 15.50 | 199.0 |
| C TURBINES 3-6 | | | 13.7 | 5.84 | 714 | 11.80 | 191.2 |
| C TURBINE 1 | | | 6.3 | 3.13 | 767 | 11.80 | 13.8 |
| <u>CONTAINER CORP OF AMERICA</u> | | | | | | | |
| REC BOILER 4 | 4585.1 | 3386.70 | 80.8 | 3.51 | 493 | 18.84 | 222.9 |
| REC BOILER 5 | | | 88.1 | 5.49 | 493 | 9.48 | 222.9 |
| POWER BOILER 4 | | | 75.6 | 2.44 | 485 | 14.41 | 128.8 |
| POWER BOILER 5 | | | 75.6 | 3.35 | 480 | 16.20 | 273.5 |
| POWER BOILER 7 | | | 103.6 | 4.51 | 441 | 12.90 | 154.4 |
| <u>CELOTEX</u> | | | | | | | |
| 020207 | 446.4 | 3362.5 | 22.9 | 0.91 | 728 | 5.03 | 6.85 |
| 020208 | | | 15.2 | 0.94 | 436 | 7.57 | 15.71 |
| <u>U.S. NAVAL STATION</u> | | | | | | | |
| 21302 | 460.4 | 3362.8 | 12.2 | 0.91 | 544 | 14.38 | 41.42 |
| 21304 | | | 14.0 | 1.22 | 561 | 8.09 | 24.48 |
| <u>GEORGIA PACIFIC</u> | | | | | | | |
| (later) | | | | | | | |
| <u>ANCHOR HOCKING</u> | | | | | | | |
| 000503 | 431.5 | 3357.5 | 33.2 | 1.71 | 541 | 7.87 | 10.36 |
| 000504 | | | 35.7 | 1.58 | 469 | 9.40 | 8.83 |
| <u>ANHEISER BUSCH</u> | | | | | | | |
| 000603 | 437.9 | 3366.8 | 30.5 | 1.07 | 483 | 17.49 | 15.25 |
| 000605 | | | 21.3 | 1.68 | 322 | 9.88 | 8.69 |

TABLE 5-1 (Continued). DUVALL COUNTY SO2 SOURCES

| <u>Source</u> | <u>UTM Coordinates</u> | | <u>Stack Parameters</u> | | <u>Exit Gas Parameters</u> | | Maximum |
|---------------------------|------------------------|--------------------|-------------------------|-------------------|----------------------------|------------------------|-----------------------------|
| | <u>East</u>
km | <u>North</u>
km | <u>Height</u>
m | <u>Diam.</u>
m | <u>Temp.</u>
K | <u>Velocity</u>
m/s | <u>SO2 Emissions</u>
g/s |
| <u>SCM CORP.</u> | | | | | | | |
| 003904 | 435.6 | 3360.7 | 12.2 | 1.10 | 405 | 14.25 | 19.91 |
| 003905 | | | 15.2 | 1.10 | 536 | 12.93 | 20.94 |
| 003906 | | | 15.2 | 1.22 | 514 | 10.45 | 24.45 |
| <u>WILEY JACKSON</u> | | | | | | | |
| 004201 | 428.7 | 3361.4 | 11.6 | 0.98 | 376 | 31.34 | 13.26 |
| <u>JAX BULK TERM</u> | | | | | | | |
| 014805 | 439.3 | 3359.8 | 18.3 | 0.91 | 427 | 10.14 | 3.85 |
| <u>JEFFERSON SMURFITT</u> | | | | | | | |
| POWER BOILER 10 | 439.9 | 3359.3 | 61.0 | 3.05 | 341 | 9.70 | 66.62 |
| REC. BOILER 9 | | | 53.3 | 3.20 | 410 | 12.15 | 23.98 |
| <u>SEMINOLE KRAFT</u> | | | | | | | |
| RECOVERY BOILERS** | 441.8 | 3365.5 | 129.5 | 3.4 | 478 | 20.4 | 64.8 |
| SMELT TANK** | | | 73.2 | 1.5 | 344 | 14.2 | 0.29 |
| POWER BOILER 1*** | | | 32.3 | 1.83 | 433 | 20.12 | 54.6 |
| POWER BOILER 2*** | | | 32.3 | 2.13 | 450 | 21.34 | 72.7 |
| POWER BOILER 3*** | | | 32.3 | 2.13 | 450 | 22.86 | 72.7 |
| BARK BOILER 1&2*** | | | 41.5 | 2.44 | 329 | 13.72 | 114.0 |

*JEA data will be updated from these values by JEA.

**Based on Seminole Kraft PSD Permit Application for Kraft Recovery Boilers and Smelt Dissolving Tanks (August 1989).

***Based on FDER data; confirmed by AES calculations.7

TABLE 5-2. EXISTING COMPOSITE SOURCE DATA

| <u>Source</u> | <u>SO₂</u>
<u>Emission</u>
<u>Rate</u>
g/sec | <u>Stack</u>
<u>Height</u>
m | <u>Stack Exit</u>
<u>Temperature</u>
K | <u>Stack</u>
<u>Exit</u>
<u>Velocity</u>
m/sec | <u>Stack</u>
<u>Diameter</u>
m |
|---------------|--|------------------------------------|--|---|--------------------------------------|
| Power Boilers | 200.0* | 32.3 | 433 | 20.12 | 1.83 |
| Bark Boilers | 114.0* | 41.5 | 329 | 13.72 | 2.44 |

*Based upon FDER data; confirmed by AES calculations.

it is necessary to include building downwash modeling for these sources. The modeled building height and projected width are 99 and 194 feet, respectively.

Because the NO_x significant impact area extended just beyond the plant boundaries (743 meters), the NAAQS analysis for this pollutant will only incorporate proposed and existing sources on the immediate plant site.

5.3 AAQS ANALYSIS

A refined air quality assessment will be performed for applicable pollutants to predict the total impact on ambient air quality. This analysis must show compliance with the applicable National Ambient Air Quality Standards (NAAQS). The State of Florida has SO₂ ambient air quality standards that are more stringent than the NAAQS. The NAAQS and State Ambient Air Quality Standards (SAAQS) are summarized in Table 5-3.

5.3.1 Background Ambient Air Pollutant Concentrations

As part of this assessment, it will be necessary to establish representative values for pollutant background concentrations. The FDER has indicated that representative background data obtained from state monitors in the area will be sufficient.

TABLE 5-3. NATIONAL AND STATE AMBIENT AIR QUALITY STANDARDS

| <u>Pollutant</u> | <u>Averaging
Period</u> | <u>NAAQS Standards</u> | | <u>State
Standards</u>
ug/m ³ |
|--|-----------------------------|-------------------------------------|---------------------------------------|---|
| | | <u>Primary</u>
ug/m ³ | <u>Secondary</u>
ug/m ³ | |
| Sulfur Dioxide (SO ₂) | Annual | 80 | -- | 60 |
| | 24-Hour | 365 | -- | 260 |
| | 3-Hour | -- | 1,300 | 1,300 |
| Nitrogen Dioxide (NO ₂) | Annual | 100 | 100 | 100 |
| Particulate Matter (PM ₁₀) | Annual | 50 | 50 | 50 |
| | 24-Hour | 150 | 150 | 150 |
| Carbon Monoxide (CO)* | 8-Hour | 10 | -- | -- |
| | 1-Hour | 40 | -- | -- |
| Ozone (O ₃) | 1-Hour | 235 | 235 | -- |
| Lead (Pb) | Calendar Quarter | 1.5 | 1.5 | 1.5 |
| Hydrocarbons | 3-Hour (6-9 a.m.) | 160 | 160 | |

*Units for CO are mg/m³

The State of Florida has been conducting air quality monitoring for criteria pollutants at locations throughout the state for many years. The FDER document Ambient Air Quality in Florida 1986 (1987) provides monitoring data for use in establishing background concentrations for the criteria pollutants. These data were previously approved for use by the FDER.

FDER and EPA guidance would generally require the use of the highest or second-highest monitored concentrations to establish conservative background concentrations for the project area. For this analysis, 1986 data from all Duvall County monitoring sites were reviewed for each pollutant. Generally, data with the highest concentrations were selected; however, locations of the samplers and monitoring objectives were also considered. Table 5-4 summarizes the existing monitoring data being proposed as conservative values of the background SO₂ and NO_x concentrations for the plant area. These monitoring sites are all located within the vicinity of the proposed plant site or in the Jacksonville metropolitan area. The background concentrations will be subject to agency approval.

5.3.2 NAAQS Impacts and Comparison

All of the applicable interacting sources will be combined for modeling by ISCST into the two source groupings as described in Section 5.4 to determine the net "before" and "after" modeled ambient air quality levels.

The FDER-provided background concentrations will be added to the modeled results to present the current and future predicted maximum ambient air quality levels in the significant impact areas.

TABLE 5-4. EXISTING AMBIENT AIR QUALITY MONITORING DATA*

| | Measured
<u>Concentration</u> | <u>Location</u> | <u>Year</u> |
|---------------------------------------|----------------------------------|-----------------|-------------|
| Sulfur Dioxide (ug/m ³) | | | |
| Annual | 10 | 1960-081-H | 1986 |
| 24-Hour | 63 | 1960-081-H | 1986 |
| 3-Hour | 321 | 1960-081-H | 1986 |
| Nitrogen Dioxide (ug/m ³) | | | |
| Annual | 29 | 1960-032-H | 1985** |

*From Ambient Air Quality in Florida 1986, Florida Department of Environmental Regulation, November 1987.

**1986 Not available



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET, N.E.
ATLANTA, GEORGIA 30365

March 7, 1990

Mr. Hamilton Oven, Administrator
Office of Siting Coordination
Florida Department of Environmental Regulation
2600 Blair Stone Road
Tallahassee, FL 32399

Dear Buck:

Enclosed is the preliminary draft EIS/SAR for the AES/Cedar Bay Cogeneration project. I received the revised Conditions of Certification dated 2/16/90. I understand another revision is forthcoming. We will try to work these revisions into the draft EIS/SAR. Any help you can give us will be greatly appreciated.

Regards,

A handwritten signature in cursive script, reading "Marion Jones", is written over the typed name.

Marion Jones, Project Monitor
Environmental Policy Section

Rec'd 3/2/90
mjs

United States
Environmental Protection
Agency

Region 4
345 Courtland St., N.E.
Atlanta, GA 30365

EPA
February 1990



Environmental Impact Statement



FDER State Analysis Report

DRAFT

PRELIMINARY
FOR REVIEW ONLY

**Cedar Bay Cogeneration Project
Applied Energy Services, Inc.**

EPA
NPDES Application Number:
FL 0041173

Florida Power Plant Siting
Application Number:
PA 88-25

Draft
Environmental Impact Statement
for
Proposed Issuance of a New Source National
Pollutant Discharge Elimination System Permit

Florida State Analysis Report
for
Proposed Certification by the Governor and Cabinet
to

Applied Energy Services, Inc.
Cedar Bay Cogeneration Project

Jointly Prepared by:

U.S. Environmental Protection Agency Region IV
and
Florida Department of Environmental Regulation

Applied Energy Services, Inc. propose to construct and operate a New Source cogeneration facility on an existing industrial site within the North District of Duval County, approximately eight miles north of Jacksonville, Florida. The plant will produce 225 megawatts of electricity for sale to the Florida Power and Light Company. In addition, steam will be sold to the adjacent Seminole Kraft Corporation paper mill. This document assesses the proposed project and alternatives with respect to impacts on the natural and man-made environments. Potential mitigative measures are also evaluated.

The comment period will end on _____.

Comments or inquiries should be directed to:

Heinz Mueller
EIS Project Officer
U.S. EPA, Region IV
345 Courtland St., N.E.
Atlanta, Georgia 30365
(404)

Hamilton S. Oven, Administrator
Power Plant Siting
Florida DER
2600 Blair Stone Road
Tallahassee, Florida 32301
(904) 488-0130

Approved by:

Greer C. Tidwell
Regional Administrator

Date

EXECUTIVE SUMMARY

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| G | ST. JOHNS RIVER WATER MANAGEMENT DISTRICT, FINAL REPORT | |
| H | FLORIDA GAME AND FRESH WATER FISH COMMISSION, FINAL REPORT | |
| I | REGIONAL PLANNING COUNCIL STATEMENT (None Provided) | |
| J | THE CEDAR BAY COGENERATION PROJECT SITE CERTIFICATION APPLICATION, ENVIRONMENTAL IMPACT DOCUMENT (INCORPORATED BY REFERENCE) | |
| K | GLOSSARY | ← started but need to be expanded |
| L | AIR RESOURCES | |
| M | SURFACE WATER RESOURCES | |
| N | GROUNDWATER RESOURCES | |
| O | EARTH RESOURCES/SOLID WASTE | |
| P | BIOLOGICAL RESOURCES | |
| Q | CULTURAL RESOURCES | |
| R | SOCIOECONOMIC CONDITIONS | |
| S | LAND USE, RECREATION, AND AESTHETICS | |
| T | TRANSPORTATION | |
| U | SOUND QUALITY | |
| V | ENERGY | |
| W | HUMAN HEALTH | |
| X | SUMMARY OF SITE SELECTION PROCESS | |
| Y | SELECTION OF ALTERNATIVES TO THE CEDAR BAY COGENERATION PROJECT | |
| Z | ECONOMIC ANALYSIS OF CEDAR BAY COGENERATION PROJECT ALTERNATIVES | |
| AA | ENGINEERING DESCRIPTION OF ALTERNATIVES TO THE CEDAR BAY COGENERATION PROJECT | |

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LIST OF ACRONYMS AND ABBREVIATIONS

| | |
|--------|---|
| AAQS | Ambient Air Quality Standards |
| AES-CB | Applied Energy Services Cedar Bay, Inc. |
| AREA | American Railroad Engineering Association |
| As | Arsenic |
| B | Boron |
| BACT | Best Available Control Technology |
| Be | Beryllium |
| BOD | Biochemical Oxygen Demand |
| Btu | British thermal unit |
| Btu/h | British thermal unit per hour |
| CAA | Clean Air Act |
| CAAA | Clean Air Act Amendments |
| CBCP | Cedar Bay Cogeneration Project |
| Cd | Cadmium |
| CFB | Circulating Fluidized Bed |
| CFR | Code of Federal Regulations |
| cfs | Cubic feet per second |
| CO | Carbon Monoxide |
| COD | Chemical Oxygen Demand |
| COM | Coal-Oil Mixture |
| CWA | Clean Water Act |
| dBA | Decibels (A-weighted) |
| ECFRPC | Eastern Central Florida Regional Planning Commission |
| EID | Environmental Information Document |
| EIS | Environmental Impact Statement |
| ERA | Economic Regulatory Administration |
| ESP | Electrostatic Precipitator |
| F | Degrees Fahrenheit |
| FAA | Federal Aviation Administration |
| FAC | Florida Administrative Code |
| FAWPCA | Florida Air and Water Pollution Control Act |
| FCG | Florida Electric Power Coordinating Group |
| FCREPA | Florida Committee on Rare & Endangered Plants & Animals |
| FDA | Florida Department of Agriculture |

LIST OF ACRONYMS AND ABBREVIATIONS

(Cont'd.)

| | |
|--------------|--|
| FDS DHR | Florida Department of State, Division of Historical Resources |
| FDAHR | Florida Division of Archives, History and Records |
| FDCA | Florida Department of Community Affairs |
| FDER | Florida Department of Environmental Regulation |
| FDOT | Florida Department of Transportation |
| FECL | Florida East Coast Line |
| FEECA | Florida Energy Efficiency and Conservation Act |
| FEPPSA | Florida Electrical Power Plant Siting Act (also referred to as the Siting Act) |
| FERC | Federal Energy Regulatory Commission |
| FGD | Flue Gas Desulfurization |
| FGFWFC | Florida Game and Fresh Water Fish Commission |
| F1 | Flouride |
| FPC | Florida Power Corporation |
| FP&L | Florida Power & Light |
| FPSC | Florida Public Service Commission |
| F.S. | Florida Statutes |
| Fuel Use Act | Federal Power Plant and Industrial Fuel Use Act of 1978 |
| g | Grams |
| GEP | Good Engineering Practice |
| GU | Government Use |
| gpd | Gallons per day |
| gpm | Gallons per minute |
| HC | Hydrocarbons |
| HCl | Hydrochloric acid |
| Hg | Mercury |
| IH | Industrial Heavy Zone |
| ISCST | Industrial Source Complex Short Term air pollutant dispersion model |
| IW | Industrial Waterfront Zone |
| JAPB | Jacksonville Area Planning Board |
| JEA | Jacksonville Electric Authority |
| Km | Kilometers (1 Km = 0.6214 mile) |
| KRB | Kraft Recovery Boiler |

LIST OF ACRONYMS AND ABBREVIATIONS

(Cont'd.)

| | |
|----------------------|---|
| lb/h | Pounds per hour |
| lb/MBtu | Pounds per million British thermal units |
| LC50 | Lethal Concentration at which 50% of the test population die |
| mgd | Million gallons per day |
| mg/l | Milligrams per liter |
| mg/m ³ | Milligrams per cubic meter |
| Mo | Molybdenum |
| MW | Megawatts |
| MWh | Megawatt hour |
| NAAQS | National Ambient Air Quality Standards |
| NDP | North District Plan |
| NEA | National Energy Act of 1978 |
| NEPA | National Environmental Policy Act of 1969 |
| NOx, NO ₂ | Nitrogen Oxides, Nitrogen Dioxide |
| NPDES | National Pollution Discharge Elimination System |
| NSPS | New Source Performance Standards |
| Pb | Lead |
| POD | Point of Discharge |
| ppm | Parts per million |
| PSD | Prevention of Significant Deterioration |
| PURPA | Public Utility Regulatory Policies Act of 1978 |
| SAR | State Analysis Report |
| SAR/EIS | State Analysis Report/Environmental Impact Statement |
| SCA/EID | Site Certification Application/Environmental Information Document |
| prepared by AES-CB | |
| SCR | Selective Catalytic Reduction |
| SERC | Southeastern Electric Reliability Council |
| SHPO | State Historic Preservation Officer |
| SJRPP | St. Johns River Power Park |
| SJRWMD | St. Johns River Water Management District |
| SK | Seminole-Kraft Corporation |

LIST OF ACRONYMS AND ABBREVIATIONS

(Cont'd.)

| | |
|-----------------------------------|--|
| Siting Act | Florida Electrical Power Plant Siting Act |
| SNCR | Selective Non-Catalytic Reduction |
| SO ₂ , SO _x | Sulfur dioxide, Sulfur Oxides |
| SOU | Southern Company |
| TDS | Total Dissolved Solids |
| TSP | Total Suspended Particulates |
| TSS | Total Suspended Solids |
| TVA | Tennessee Valley Authority |
| ug | Microgram |
| ug/m ³ | Micrograms per cubic meter |
| USCG | U.S. Coast Guard |
| USCOE | U.S. Corps of Engineers |
| USDOE | U.S. Department of Energy |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| USEPA
(or EPA) | U.S. Environmental Protection Agency |
| USSCS | U.S. Department of Agriculture Soil Conservation Service |
| VOC | Volatile Organic Compounds |
| WTP | Wastewater Treatment Plant |

CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

Applied Energy Services Cedar Bay, Inc. (AES-CB) and Seminole Kraft Corporation (SK) propose to jointly construct and operate a new source cogeneration facility known as the Cedar Bay Cogeneration Project (CBCP). This facility will consist of three circulating fluidized bed boilers burning coal and woodwaste, a new chemical recovery boiler, multiple effect evaporators and a smelt dissolving tank. The 256 MW circulating fluidized bed boilers will produce 225 MW of electricity for sale to Florida Power and Light (FP&L) and process steam for use by the SK paper mill. The new chemical recovery boiler will produce 42 MW of electricity and steam for use by the paper mill. These facilities will be located on a 35 acre site adjacent to the existing SK paper mill in northern Duval County, Florida. AES-CB and SK have applied to the U.S. Environmental Protection Agency (USEPA), the Florida Department of Environmental Regulation (FDER), and other federal agencies for permits necessary to operate and construct the proposed facility.

This document constitutes both the FDER Staff Analysis Report (SAR) and the USEPA Environmental Impact Statement (EIS) prepared jointly by USEPA and FDER for the proposed project. This chapter provides an introduction to the project including: (1) a summary of USEPA's and FDER's responsibilities for the SAR/EIS; (2) a discussion of other federal requirements relevant to the proposed project; (3) a summary of the coordination conducted between the USEPA and FDER during preparation of the SAR/EIS; (4) a description of the background and need for the proposed project; and (5) a summary of the issues to be addressed in the SAR/EIS.

1.1 USEPA'S AND FDER'S RESPONSIBILITY FOR THE SAR/EIS

1.1.1 USEPA's Responsibility for the EIS

Under Section 511(c) of the Clean Water Act (CWA), USEPA must comply with the National Environmental Policy Act of 1969 (NEPA) prior to issuance of a New Source National Pollution Discharge Elimination System (NPDES) permit. NEPA requires federal agencies to prepare an EIS on every major Federal action significantly affecting the quality of the human environment. In this

particular case, USEPA has determined that the new cogeneration facility proposed by AES-CB and SK has a potential for significant impact on the human environment and that an EIS must be prepared.

1.1.2 FDER's Responsibility for the SAR

Under provisions of the Florida Electrical Power Plant Siting Act (Siting Act, Chapter 403.501-519, F.S.), FDER must prepare an SAR upon which the State's decision to license any new steam electric power plant will be made. The purpose of the power plant siting program is to provide an efficient, comprehensive, coordinated, one-stop permitting approach to the State evaluation of electric power plant location and operation. In accordance with the Siting Act, no construction or expansion of a new electrical power plant may be initiated without certification by the State. Following submittal of FDER's recommendations regarding State certification, the final certification for all activities requiring State permits must be issued by the Governor and the State Cabinet.

1.1.3 Memorandum of Understanding for Preparation of a Joint SAR/EIS Document

In previous years, USEPA and FDER published separate reports to meet their responsibilities under NEPA and the Siting Act. In 1980, a Memorandum of Understanding was executed between USEPA and FDER whereby it was agreed that a single document would be produced to serve both as the SAR and EIS and that the two agencies would take steps to minimize duplication of effort and to maximize cooperation of effort in the licensing of new power plants in Florida. This joint document will meet the responsibilities of both agencies and will be known as the Cedar Bay Cogeneration Project State Analysis Report/Environmental Impact Statement (CBCP SAR/EIS).

The objectives of the joint SAR/EIS are as follows:

- o to describe the need for the new generating station as determined by the Florida Public Service Commission (FPSC);

- o to develop and evaluate all reasonable alternatives to the project;
- o to fully describe the selected project and its resulting impacts; and
- o to investigate and describe measures that could be taken to eliminate or minimize identified adverse impacts.

1.2 OTHER FEDERAL REQUIREMENTS

Several other Federal requirements must also be met for the complete licensing of the proposed CBCP. These include Prevention of Significant Deterioration (PSD) under the Clean Air Act (CAA); a Section 10 dredging permit under the Rivers and Harbors Act; compliance with the Endangered Species Act of 1973 (as amended); compliance with Executive Order No. 11990 for protection of wetlands, and Executive Order No. 11988 concerning development in flood prone areas; and Federal Aviation Administration (FAA) approval for emission stack heights.

1.3 COORDINATION BETWEEN USEPA AND FDER

Extensive coordination between the USEPA and FDER occurred during the preparation of the SAR/EIS. This coordination consisted primarily of several preliminary planning sessions and formal meetings between USEPA, its consultants, and FDER. USEPA and FDER jointly sponsored the public scoping meeting on January 24, 1989, in order to obtain input on key issues for determining the scope of the project. Both agencies will also conduct public hearings on the SAR/EIS. Additional coordination was also conducted via an exchange of technical information concerning the proposed project. In general, FDER took the responsibility of evaluating the environmental impacts of the proposed project while USEPA was responsible for defining and evaluating the alternatives to the project and preparing the SAR/EIS. Through mutual review of each output, FDER and USEPA satisfied the goals of the Memorandum of Understanding by complying with each agency's responsibilities for permitting while avoiding duplication of effort.

1.4 BACKGROUND OF THE PROJECT

This section provides an overview of the proposed Cedar Bay Cogeneration Project. Included are an identification of the applicants and a history of the project.

1.4.1 Identification of the Applicants

The proposed project is a joint effort of AES/Cedar Bay Incorporated and Seminole Kraft Corporation. AES is the lead applicant for the necessary permits.

1.4.1.1 AES/Cedar Bay Incorporated (AES-CB)

AES is a wholly owned subsidiary of Applied Energy Services, Inc., a privately held corporation that builds, owns and operates cogeneration facilities that sell steam and electricity to industrial and utility customers. AES currently operates 350 MW of capacity at three facilities in California, Pennsylvania and Texas. Two more plants with a combined capacity of 500 MW are under construction in Connecticut and Oklahoma. AES's objective is to be a long-term, low cost, reliable supplier of energy concentrating on innovative coal-burning technology.

1.4.1.2 Seminole Kraft Corporation (SK)

Seminole Kraft Corporation is a privately held corporation which owns and operates the Seminole Kraft paper mill. The mill produces unbleached liner board and kraft paper and has been in operation under Seminole Kraft since April 1987. Stone Container Corporation, which owns 49 percent of Seminole Kraft's common stock, has management responsibility for the mill and buys all of the mill's output. The mill was operated for 33 years prior to ceasing operation in 1985 prior to being purchased by Seminole Kraft. After rehabilitation and modernization the mill reopened in 1987 and now employs approximately 350 people.

1.4.2 History of the Project

The proposed project was developed after a series of extensive studies conducted by AES and SKC. AES was searching for a suitable cogeneration site. SKC was seeking to modernize the existing mill and to replace the existing chemical recovery boiler to comply with new air emission limitations on total reduced sulfur which is a significant source of odors.

1.4.3 Permit Applications

On November 14, 1988, AES concurrently submitted an NPDES permit application to USEPA and a Site Certification Application to FDER for the proposed cogeneration project at the Seminole Kraft site. In response to these applications, USEPA began cooperative efforts with the FDER to prepare the SCA/EIS in order to satisfy the legal responsibilities of both agencies for licensing the New Source power plant. A joint public scoping meeting was held in Jacksonville on January 24, 1989, to solicit public input to the scoping of the SAR/EIS and publication of the report was scheduled for September 1989.

1.5 NEED FOR THE PROJECT

In the case of a new power plant in Florida, the determination of need for the project is made by the Florida Public Service Commission (FPSC). According to Sections 403.508 and 403.519, Florida Statutes a formal Determination of Need must be made by the FPSC prior to certification of a power plant subject to the Power Plant Siting Act. This determination serves as the report required of the PSC as part of the state power plant siting proceedings.

The FPSC received the petition for determination of need as included in the Site Certification Application on November 14, 1988, from AES-CK and SK for the 225 MW fluidized bed cogeneration facility. The 225 MW would be sold to Florida Power and Light Company via transmission line interconnections through the Jacksonville Electric Authority system. Section 403.519, Florida Statutes requires the FPSC to consider the following criteria in making a determination of need for the project:

- o Need for electric system reliability and integrity;
- o Need for adequate electricity at reasonable cost;
- o Whether the proposed plant is the most cost-effective alternative available;
- o Conservation measures taken by or reasonably available to the applicant or its members which might mitigate the need for the proposed plant; and
- o Other matters within its jurisdiction which the PSC deems relevant.

On April 24, 1989, the FPSC conducted a public hearing to determine the need of the proposed Cedar Bay Cogeneration Project. On June 30, 1989, the FPSC granted AES-CB and SK their petition for Determination of Need in the FPSC Order No. 21491 (Docket No. 881472-EQ). A copy of the order is attached and included herein as Appendix E.

The order stated that the cogeneration project is a qualifying facility pursuant to FPSC's Rule 25-17.083. The FPSC's rules implementing the Federal Energy Regulatory Commission's (FERC) regulations adopted under Public Utility Regulatory Policies Act (PURPA) define "qualifying facilities" as cogenerators or small power producers. The order asserted that the criterion for cost effectiveness was met without a description of alternatives and their costs. It was stated that the CBCP was a qualifying facility pursuant to their rules and that AES has negotiated a contract with FP&L for the sale of firm capacity and energy at less than the statewide avoided cost. This being the case, the FPSC found the proposed facility "to be most cost-effective alternative available". The discussion of the conservation criterion concluded that, since cogeneration is not necessarily a conservation method, "conservation and other demand-side alternatives as envisioned by FEECA are not germane to qualifying facility needs determinations."

It is recognized that the FPSC's order satisfies the Commission's responsibilities in evaluating the need for the CBCP. However, this does not preclude the EIS process, which requires a clear definition of need for a project in order to evaluate a No-Action alternative (refer to Section 2.5) and the alternative means of satisfying the need (refer to Section 2.8). For the purposes of demonstrating need for the project in this EIS, only the 225

MW fluidized bed cogeneration facilities were addressed, since the generation from the chemical recovery boiler only replaces existing internal generation and the 42 MW generation is below the 75 MW threshold in the Siting Act (Section 403.506 F.S.).

The need for the cogeneration facilities was stated in the SCA in three (3) ways:

- (1) additional capacity is needed to provide reliable service to utility customers by increasing Peninsular Florida's reserve margin;
- (2) use of coal-fired cogeneration facilities displaces the future consumption of oil and natural gas from 1993 to 2025;
- (3) process steam is needed by SK for their papermaking process.

After evaluating relevant documents prepared by the FPSC and the FCG, it has been determined that for this SAR/EIS the need for the project will be based on the following:

- (1) need for additional base load capacity of 225 MW for increased reliability in service, and
- (2) need for displacement of the future consumption of 2.2 million barrels of oil per year.

These needs are defined to be needs to be met during the period between plant startup (1993) and the year 2025. The system alternatives as presented in Section 2.8, Alternative Means of Satisfying the Need for the Project, were developed using these needs as the basis.

The need for the project to provide process steam to the SK paper mill was not considered in the EIS process because it was concluded that this need can be met external to any proposed electrical power generation alternative. The needs of the SK paper mill can be met by the installation of the kraft recovery boiler system at the mill to generate 42 MW of electricity for

internal consumption and the installation of a new power boiler system at the mill to replace the proposed power generation required to produce the 640,000 lb/hr of process steam. These components will fulfill the SK paper mill's needs to conform to the FDER Consent Order (SK to demonstrate compliance with the total reduced sulfur emission limiting standards by November 1992) and to replace the existing oil-fired boilers that have neared the end of their useful life and, therefore, have low reliability.

1.6 ISSUES TO BE ADDRESSED IN THE SAR/EIS

Several key issues to be addressed in the SAR/EIS concerning the proposed project were identified through internal agency review by USEPA and FDER and as a result of the public scoping meeting held in Jacksonville on January 24, 1989. The following is a summary of these issues:

- o Concern about the air quality impacts of plant emissions of sulfur dioxide (SO₂), carbon dioxide (CO₂), oxides of nitrogen (NO_x), total reduced sulfur (TRS), and particulates (from coal, ash and limestone handling).
- o Effect of plant operation on ambient odor and air quality.
- o Local weather patterns and cumulative effects on air quality, acid rain and Greenhouse Effect.
- o Concern about water quality impacts and recreational fishing in the Broward River.
- o Concern about the destruction of wetlands and construction in the 100 year flood plain which might violate the local comprehensive plan.
- o Concern about consumption of groundwater and drawdown impacts on private wells.
- o Concern about waste disposal including disposal of lime sludge.
- o Concern about the noise and vibrations caused by rail traffic, conveyor operation and plant operation and construction.
- o Concern about plant discharges and operation on Manatees.
- o Concern about operation of the power plant if the paper mill were too close.

- o Concern about the plant's appearance, impacts of plant lighting at night including the potential annoyance of aircraft warning lights at night
- o Concern about the interruption of boat traffic into the Broward River and potential conflict with the scheduled improvements to Hecksher Drive and bridge replacement due to the proposed coal conveyor.
- o Concern about the effects of increased truck, rail, and barge traffic to the site.
- o Concern about the handling of coal, ash, and other dusty materials on site.
- o Concern about the socioeconomic impact of the project including effects on property values and tax rates.

**CHAPTER 2
ALTERNATIVES,
INCLUDING THE
PROPOSED PROJECT**

2.0 ALTERNATIVES, INCLUDING THE PROPOSED PROJECT

2.1 REGULATORY PREROGATIVES

In order for AES-CB and SK to construct and operate a new cogeneration electric power plant and a new chemical recovery boiler, the companies must comply with a number of local, State, and Federal laws, regulations and ordinances. The agencies primarily involved in permitting activities are USEPA and FDER. The US Coast Guard (USCG) is another major permitting agency. The permitting alternatives available to these agencies are outlined in the following sections.

2.1.1 Alternatives Available to USEPA

The alternatives available to the USEPA in accordance with its regulatory and permitting authority pursuant to Section 402 of the CWA are to issue or to deny the New Source NPDES Permit requested by AES-CB for the CBCP discharge into the St. Johns River.

2.1.1.1 Issuance of the NPDES Permit

Issuance of the New Source NPDES Permit will allow the CBCP to operate as proposed and to add its cooling water discharge to the existing SK discharge to the St. Johns River and to add its industrial waste discharges to the SK wastewater treatment system and eventual discharge to the St. Johns River up to the limits set forth in the permit (Appendix B, Draft NPDES Permit). The issuance of the permit may be modified by certain conditions which could require that additional monitoring and reporting be undertaken during the operation of the plant in order to evaluate the effectiveness of the pollution control systems. Such conditions will be added to the permit if the environmental impacts of the construction and/or operation of the plant require special mitigation practices and additional monitoring and reporting.

2.1.1.2 Denial of the NPDES Permit

If it is determined that the proposed CBCP discharge into the St. Johns River will violate effluent limitations or water quality standards, USEPA may deny the New Source NPDES permit. Furthermore, USEPA could deny the permit if environmental resources such as endangered species, historic or archeological sites, wetlands, or floodplains are significantly impacted and measures for mitigating the impacts are unacceptable. The denial of the permit would be equivalent to the No-Action Alternative and would result in not allowing the discharge of the wastewater effluent to the St. Johns River. If the permit is denied by USEPA, AES-CB would have the options of redesigning the project, including the pollution control facilities, to meet the water quality standards and resubmitting the application; locating and evaluating another site; or pursuing the No-Action Alternative.

2.1.2 Alternatives Available to FDER

The FDER administers the PSD permit program pursuant to the Clean Air Act (CAA) and a State wastewater discharge permit program under the Florida Air and Water Pollution Control Act and also provides State Certification of all Federally issued permits in Florida. In the case of new power generating facilities, review and permitting under these and other environmental programs in Florida have been coordinated into a one-stop process pursuant to the Florida Electrical Power Plant Siting Act (Chapter 403, Part II, Florida Statutes). Under the Siting Act, FDER conducts a coordinated review for each New Source power plant project which incorporates all State agency reviews. A final written report known as the State Analysis Report (SAR) is prepared which includes FDER's recommendation concerning final State certification of the project. This analytical report contains: (1) reports from the Department of Community Affairs (FDCA), the Public Service Commission (FPSC), the Water Management District (SJRWMD), and other State agencies; (2) results of studies of the project conducted by FDER; (3) a statement of compliance with FDER rules; (4) Conditions of Certification; and (5) a recommendation for final action.

2.1.2.1 PSD Permit

The CAA Amendments of 1977 require that a PSD permit be secured for the CBCP from the FDER before construction begins. New Source Performance Standards (NSPS) and Best Available Control Technologies (BACT) must be met for the emission of air pollutants. FDER has given tentative approval to the PSD permit application for the CBCP, but has not issued the permit and maintains the right to deny the permit based on final review. The final determination will not be made until after the site certification public hearing. Should FDER recommend denial of the permit, AES-CB would be given the opportunity to reduce facility emissions or to make efforts to reduce emissions from other facilities to reduce projected impacts and meet the goals of the CAA Amendments which relate to PSD. Further, the PSD permit and the power plant site certification can not be issued if the National Ambient Air Quality Standards (NAAQS) are predicted to be exceeded in the impact area of the project. If the NAAQS for any criteria pollutant are exceeded or if a significant increase in the level of a pollutant in a non-attainment area should occur as a result of the operation of the facility, the applicant would be given the opportunity to mitigate those impacts.

2.1.2.2 State Certification

The final State certification of a power plant is issued by the Governor and the Cabinet of State Officers. This certification represents the final State approval for all State and Federally permitted activities of the project and may mandate specific requirements pursuant to compliance with various State standards and regulations. Under the certification process, the alternatives available to FDER pursuant to the Siting Act are to recommend certification of the project as proposed, certification of the project with revisions, or denial of certification. The ramifications of certification or denial of certification would be similar to those described for issuance or denial of the NPDES permit described in Section 2.1.1

2.1.3 Alternatives Available to Other Permitting Agencies

The Florida Public Service Commission (FPSC), the Florida Department of Community Affairs (FDCA), and the St. Johns River Water Management District (SJRWMD) are required by statute or rule to prepare reports on the application for site certification on matters within their jurisdiction. Copies of these reports are provided in Appendices E, F, and G. AES-CB has deleted the use of a coal conveyor and its construction in U.S. waters from its application and subsequently the U.S. Coast Guard (USCG) and the U.S. Corps of Engineers (USCOE) have lost jurisdiction over the project. Copies of the SCA were also sent to the following State, regional, and municipal agencies with a request for comments:

- o Florida Department of Agricultural and Consumer Services
- o Florida Department of Commerce
- o Florida Department of Transportation
- o Florida Department of Natural Resources
- o Florida Department of Health and Rehabilitative Services
- o Florida Department of State, Division of Historical Resources
- o Florida Game and Fresh Water Fish Commission
- o Northeast Florida Regional Planning Council
- o Jacksonville Area Planning Board
- o Jacksonville Department of Health, Welfare and Bio-Environmental Services

2.2 THE APPLICANT'S PROPOSED PROJECT

AES-CB proposes to construct and operate a new circulating fluidized bed (CFB) 225 MW stream electric generating station approximately seven miles north-northeast of downtown Jacksonville in Duval County, Florida. The site and the proposed power project including its associated transmission and railroad unloading facilities are described in this section. The reader is referred to the applicant's Site Certification Application/Environmental Information Document (SCA/EID) for more detailed information.

2.2.1 The Project Site

It is proposed that a new 225 MW class coal burning, CFB power steam electric cogeneration facility be constructed on the site of the existing Seminole Kraft Paper Mill in northern Duval County (refer to Figure 2-1). The site is owned by SK. The total existing paper mill site consists of 425 acres. Heckscher Drive forms the southern boundary of the mill site. Eastport Road bisects the mill property from north to south before merging with Heckscher Drive.

The new cogeneration facilities will occupy approximately 35 acres at the site and is to be located west of the existing mill power plant and east of the Broward River and the mill lime settling ponds. The area to be occupied by the cogeneration plant is currently used for storage of lime mud from the mill and construction debris. An oil tank is located south of the proposed cogeneration plant. A rail yard is located to the north and west of the proposed plant site. Due to previous disturbances, there is little vegetation on site. Most of the existing vegetation is mostly grasses, weeds and shrubs.

2.2.2 Plant Orientation and Appearance

The proposed plant will consist of three 75 MW class CFB boilers, a single steam turbine driven electrical generator, steam pipelines to supply the papermill, mechanical draft cooling tower, coal handling facilities, coal and limestone storage facilities, stormwater runoff control ponds and a 138 KV transmission line to transfer the power from the plant to the JEA and FPL power network systems. The cogeneration plant will blend in with the profile of the existing paper mill with the exception of the exhaust stacks. The cogeneration plant will be newer and more modern looking than the existing paper mill. The cogeneration facility will be located west of the existing paper mill. The mechanical draft cooling tower array will be located at the center of the CBCP plant area. Existing vegetation along the Broward River will provide a partial screen for the plant facilities.

Figure 2-1

2.2.3 Power Generation System

The cogeneration plant will employ a single steam turbine-driven electrical generator using steam produced by the three CFB boilers. The boilers will produce steam at 1800 pounds per square inch guage (psig) for the double automatic extraction condensing turbine generator. This system will produce 225 MW for sale as well as electricity for operation of cogeneration plant facilities and 640,000 lb/h of 175 psig and 75 psig steam for the paper mill.

2.2.4 Fuel Transportation and Handling

The CBCP project will burn approximately 1.1 million tons of coal per year. The coal is proposed to be delivered to the site by train using the existing CSX railroad lines. Two (2) of the CFB boilers will also be designed to burn wood waste from the paper mill. It is estimated that 198,000 tons per year of wood waste could be burned. The railcar unloading system will employ an enclosed bottom dumping type facility.

The bottom dumping facility will unload coal by positioning slow moving cars over a receiving hopper and opening the railcar hopper doors to drop the coal. Cars will be unloaded at a rate of 6 to 15 cars per hour.

The coal stockout system for rail car unloading will consist of an automatically loaded conveyor which moves the coal from the receiving hopper to the coal storage lowering well. Mobile equipment will be used to move the coal from the lowering well to the lined storage area. The coal storage area is to be located south of the the steam generation building. It is designed to hold 105,000 tons of coal which is approximately a 30 day supply.

2.2.5 Emission Control System

AES-CB proposes to incorporate air pollution control equipment into their facilities to control emissions of sulfur oxides, nitrogen oxides, particulates (flyash), carbon monoxide, hydrocarbons, fugitive dust, and total reduced sulfur (TRS). Other trace pollutants will be removed from plant emissions along with the major criteria pollutants. All air pollution control systems are designed to meet New Source Performance Standards (NSPS) and the Best Available Control Technology (BACT) requirements of State and Federal regulations.

2.2.5.1 Particulate Emission Controls

Particulate emissions from the circulating fluidized bed boilers will be controlled by a fabric filter system. Particulate emissions from the chemical recovery boiler will be controlled by an electrostatic precipitator. The smelt dissolving tank emissions will be controlled by a wet scrubber. Fugitive emissions from the coal, ash, and lime handling facilities will be controlled by fabric filters, water sprays and enclosures.

2.2.5.2 Sulfur Oxide Controls

Sulfur oxides (SOx) from the circulating fluidized boilers will be controlled by a form of limestone injection. The coal will be burned within a fluidized bed of limestone. Combustion within the fluidized bed places the sulfur compounds in direct contact with calcium. The chemical reaction between sulfur oxides and calcium effectively removes the SOx from the exhaust gases. SOx and TRS from the recovery boiler will be controlled by proper boiler design and combustion controls.

2.2.5.3 Control of other Boiler Emissions

Emissions of nitrogen oxides (NOx) from the fluidized bed boilers will be controlled by their design and operation controls. Combustion of coal in a fluidized bed occurs at temperatures low enough to reduce the amount of NOx formation significantly when compared to a conventional coal fired boiler. Carbon monoxide and other criteria pollutants from the fluidized bed boilers

will also be controlled by combustion controls. Emissions of NO_x, CO and VOC from the recovery boiler will also be controlled via combustion controls.

2.2.5.4 Fugitive Dust

Fugitive dust will be produced by a number of sources including the coal handling, limestone handling, flyash handling and the FGD waste handling and disposal systems. Fugitive particulates will also be generated by the dissolved and suspended solids in the cooling tower. Controls for these sources of particulates are planned as follows:

- o Coal Handling. Fugitive dust will be controlled by different methods at each point in the coal handling system. Wetting agents (90-99% efficient) will be used on the various coal piles; fabric filters (99.9% efficient) will be used at conveyor transfer points; water spray systems (97% efficient) will be used at the stacker reclaimer and coal unloading area. Conveying systems will be enclosed.
- o Limestone Handling. Dust from unloading rail cars of limestone and for handling of limestone by mobile equipment will be suppressed with water sprays. Limestone will be transported on enclosed conveyors where fugitive dust at transfer points will be controlled by fabric filters.
- o Fly Ash and Spent Limestone Handling. A covered conveyor with fabric dust collectors will be used to control fugitive dust from transporting ash from storage silos to rail cars in dry form. Water sprays will be used to control dust from loading pellets into trucks whenever rail removal of ash is not used.

- o Cooling Tower Drift. Fugitive particulates in the cooling tower drift will be controlled by the use of drift eliminators and by limiting the cycles of concentration in the cooling system.

2.2.6 Cooling System

Plant waste heat will be rejected to the atmosphere by a circulating water system using mechanical draft cooling towers. The cooling towers will be rectangular, mechanical draft, counterflow towers utilizing 200,000 gpm of circulating water as a cooling fluid. The cooling tower will require an estimated 2,883 gpm of makeup water to replace the 2250 gpm of water lost to evaporation and the 633 gpm of cooling tower blowdown. Cooling tower blowdown will be discharged from the cold side of the cooling tower to maintain the chemical concentration of the cooling water at levels that will not cause formation of excessive scale to inhibit heat transfer efficiency. The cooling tower will recycle the cooling water approximately 4.6 times prior to blowdown to conserve water. The maximum discharge temperature of cooling tower blowdown is expected to be 95° F.

2.2.7 Wastewater Treatment Systems

Wastewater from the cogeneration plant and the paper mill will originate from a number of sources such as cooling tower blowdown, boiler water, metal cleaning wastes, sanitary wastes, site runoff, construction dewatering, mill effluent, and low volume sources such as demineralizer blowdown, floor drains and laboratory wastes. Most of the wastewater will be disposed of via existing paper mill treatment and discharge facilities. Cooling tower blowdown will be discharged to the St. Johns River through the existing paper mill outfall. Wastes from the demineralizer, metal cleaning, boiler blowdown, and condensate polishing will be sent to the Seminole Kraft clarifier for treatment after neutralization. Site runoff will be collected in new stormwater runoff ponds where a certain amount of sedimentation and clarification will take place prior to disposal in the paper mill clarifier. Chemical wastes will be collected and sent to a 150,000 gallon neutralization

basin before being sent to the paper mill clarifier. Oily wastewater will be treated in an oil separator prior to transmission to the mill clarifier. Blowdown from the chemical recovery boiler steam system will also be sent to the paper mill treatment system. All waste waters sent to the mill clarifier will then be sent to the mill's large oxidation pond prior to discharge to the St. Johns River in the same outfall as the cooling tower blowdown. Construction dewatering effluent will be sent to the runoff control ponds for treatment prior to discharge. Sanitary waste water from the Cedar Bay facility will be sent to the paper mill sanitary waste treatment system.

2.2.8 Solid Waste Handling and Disposal

Solid waste generated by the CBCP will consist primarily flyash, bed ash and spent limestone. This material is to be disposed of by the coal supplier at an approved disposal location outside of the State of Florida or sold to the building materials industry. The quantities of the waste produced will depend on the properties of the coal and limestone used in the combustion process. Flyash will be conveyed to storage silos by a vacuum transport system. Bed ash will be conveyed to a storage hopper by mechanical conveyors and from the storage hopper to silo by a vacuum system.

Ash from the storage silos may be sent directly to railcars in a dry form, or ash may be formed into pellets by mixing it with water and allowing it to cure. After curing, the pelletized ash would be stored before removal by truck or rail. It is estimated that approximately 354,000 tons per year of flyash and 88,000 tons per year of bed ash could be generated.

2.2.9 Transmission Facilities

An interconnection from the CBCP to the Jacksonville Electric Authority (JEA) electric power grid will be made by constructing a 138 KV transmission line from the cogeneration plant to the JEA's Eastport substation. The Eastport substation is located directly southeast and adjacent to the paper mill. Since the interconnecting transmission line will be constructed over already disturbed paper mill property or on the JEA right-of-way, the environmental impacts will be slight.

2.2.10 Resource Requirements

The major resource requirements of the, CBCP on a yearly and lifetime basis are summarized in Table 2-1. Coal will be burned in the boilers along with wood waste. No 2 fuel oil will be used for boiler startup. Limestone will be used as fluidized bed material. Consumptive uses of groundwater include boiler makeup, cooling tower makeup, and potable water. There will be no consumptive use of surface water.

2.3 SITE ALTERNATIVES

The SCA stated that the proposed site for the CBCP was an ideal construction site because of its proximity to the steam customer, the SK paper mill, and because the industrial nature of the proposed site (an IH zone) has been extensively disturbed by previous industrial use over the last 35 years.

Even though the CBCP is in compliance with local zoning ordinances, it must also be found to be consistent with the North District Plan (NDP), prepared by the planning department of the City of Jacksonville. The NDP requires that every effort be made to reduce or mitigate the negative environmental impacts of the project. Potential adverse impacts of the proposed CBCP are specified in Chapter 5 of this document. Chapter 5 also identifies available mitigative measures.

Assuming that the project conforms to the NDP and acknowledging that an alternative site would lengthen the steam delivery line, thereby increasing heat loss and reducing plant fuel use efficiency, further evaluation of alternative sites was determined not to be necessary.

Site design alternatives are defined in Section 2.4 for the respective plant systems and sites for alternative power generating sources are defined in Section 2.8 for the alternative means of satisfying need for the project.

Table 2-1

Major Resource Requirements of the CBCP

| <u>Resource</u> | <u>Yearly</u> | <u>Lifetime (6)</u> |
|-----------------|---------------|---------------------|
| Coal (1) | 1.105 Mtons | 33.15 Mtons |
| Wood Waste (2) | 0.198 Mtons | 5.94 Mtons |
| Fuel Oil (3) | 0.160 MGals | 4.80 MGals |
| Limestone (4) | 0.100 Mtons | 3.00 Mtons |
| Groundwater (5) | 1.99 BGals | 59.70 BGals |

- (1) Based on a coal consumption rate of 145 tons per hour, a design capacity factor of 87 percent and coal properties of 15% ash (maximum) and 3.3% sulfur (maximum).
- (2) Based on operating with a combination of coal and wood waste, a consumption rate for steam generation of 8 tons per hour and the operation of 3 steam generators. Also assumes availability of sufficient fuel with a heating value of 6,791 BTU/lb.
- (3) Assumes that each of the 3 steam generators will experience 5 cold or 12 hot startups per year.
- (4)
- (5) Based on average daily use of 5.44 MGals for 365 days a year.
- (6) Based on a service life of 30 years

2.4 PLANT SYSTEMS ALTERNATIVES

Within the framework of the 225 MW cogeneration facility being proposed, alternatives were developed for evaluation for every major aspect of plant design for which some flexibility existed. The alternative processes presented in this section are limited to the environmental controls which are required to meet standards and those plant units with designs which are of environmental concern. For each system, an attempt was made to describe alternatives which merit serious consideration and to describe the advantages and disadvantages of each.

2.4.1 Cooling Systems

2.4.1.1 Cooling Facilities

Waste heat from the condensation of turbine exhaust steam is disposed into the atmosphere by a heat rejection system referred to here as a cooling system. The CBCP has proposed the use of wooden, rectangular mechanical draft towers. A number of alternative cooling systems exist. Below is a list of alternatives considered along with comments from the initial screening of the alternatives.

2.4.1.1.1 Once-Through Cooling

A once-through cooling system would use cooling water from the Broward River or the St. Johns River and pump it through a condenser to condense the turbine exhaust steam. The heated water would then be discharged back to the source river. A cooling pond could be used as an intermediate discharge point. This alternative is eliminated because of potential conflicts with the NPDES permit and the costs associated with avoiding such conflicts. Also the large land area requirements and high capital cost of cooling ponds make the use of ponds undesirable.

2.4.1.1.2 Dry and Wet-Dry Cooling Towers

Dry cooling towers are very advantageous when water supplies for cooling are limited because the system does not require makeup water to replace water lost by evaporation. The system dissipates heat from the condenser by conduction and convection directly to the atmosphere via banks of metal finned-tube heat exchangers. These cooling towers are approximately an order of magnitude more expensive than wet towers and required a very large physical structure.

Wet-dry cooling towers use a combination of dry and evaporative cooling. The resulting air leaving the tower is in a warm but unsaturated condition. The reduced evaporation minimizes makeup requirements. These cooling towers are also more expensive than the traditional wet cooling towers.

2.4.1.1.3 Wet Natural Draft Cooling Towers

Natural draft cooling towers use a large chimney to create an upward draft to pull air through the tower fill. Circulating water is pumped to the fill elevation of the tower and allowed to fall. Water is distributed over the fill and heat exchange occurs by evaporation and convection. The density difference between the warm air inside the tower and the cooler air outside creates a "natural draft" and airflow occurs without using mechanical draft fans. Natural draft cooling towers generally are higher in capital cost but lower in operating cost and energy consumption than rectangular and round mechanical draft cooling towers. This can result in natural draft towers having a slightly lower annualized equivalent cost. From an environmental perspective, natural draft towers exhibit a higher vapor plume rise and a longer drift. Because of their greater height, however, the vapor plume reaches the ground at a distance and the potential for ground fogging as compared to mechanical draft towers is reduced.

2.4.1.1.4 Mechanical Draft Cooling Towers

Mechanical draft towers use large fans to pull air through the tower fill. Water is distributed over the fill, and heat exchange takes place by evaporation and convection. Since airflow is produced by mechanical fans, the structure of the tower is smaller than a natural draft tower. Subsequently, initial capital costs are lower but operating costs and energy consumption are higher. Two types of mechanical draft towers are used in the power generation industry, rectangular towers built of treated wood and round towers built of concrete. The rectangular towers generally have a lower initial capital cost and a lower energy consumption rate than round towers. Operating costs are comparable. Round towers have a slightly better drifting characteristic with lower fogging potential.

2.4.1.2 Cooling Water Sources

The SCA states that the primary cooling water source will be groundwater from the Floridan aquifer. AES-CB proposes to use existing Seminole Kraft water supply wells to supply the well water needs of the CBCP. These wells are approximately 1,400 feet deep, and are located on the site. The water mass balance chart prepared for the SCA indicates that the cooling towers will require approximately 4.147 MGD (estimated annual average for 100 percent load) of water. This includes 3.990 MGD of groundwater and 0.157 MGD of boiler blowdown. Of this water use, 3.236 MGD is expected to evaporate in the towers and 0.911 MGD will be disposed of as cooling tower blowdown to the St. Johns River. The following sections describe alternatives to the groundwater source.

2.4.1.2.1 Surface Water

Use of surface water from the Broward River or the St. Johns River would require the construction of new intake facilities. In addition, the brackish waters would require treatment to meet the water quality requirements of the cooling towers.

2.4.1.2.2 Recycled Wastewater

The water mass balance chart in the SCA indicates that a total of 1.147 MGD of wastewater will be discharged from the CBCP facilities. Of this flow 0.911 MGD is cooling tower blowdown; 0.229 MGD is sanitary treatment plant effluent, and 0.007 MGD is stormwater runoff collected from the roof and yard areas. This volume rate would only meet 28% of the cooling towers needs and therefore require a supplemental water source. In addition, recycling would require treatment to meet the water quality requirements of the cooling towers.

2.4.1.3 Cooling Water Discharge Alternatives

An existing outfall structure located in the St. Johns River is currently used to discharge effluent from the SK mill. The SCA proposes to discharge the CBCP's 0.911 MGD of untreated cooling tower blowdown via this outfall. The SCA states that since the CBCP proposes to use well water as its raw water source, there will be no screened organisms or trash for disposal. Alternatives to this discharge scenario are described below.

2.4.1.3.1 Discharge to the Broward River

Discharge to the Broward River would require the construction of a new outfall. In addition, an evaluation would need to be made to determine the effect of the discharge on this smaller river. This evaluation would include an analysis of the minimization of thermal plume entrainment, thermal plume attraction, cold shock, salinity and biocidal and chemical effects.

2.4.1.3.2 Recycle Cooling Water

The alternative is similar to the Cooling Water Source alternative described in Section 2.4.1.2.2. Not only could the 0.911 MGD of cooling water be treated and recycled to the cooling towers, but it could also be treated and recycled to the steam cycle and/or service water system of the CBCP which use 1.385 MGD and 0.065 MGD of water, respectively.

2.4.2 Air Pollution Control System

The evaluation of emission control alternatives with regard to energy, environmental, engineering, and economic objectives is a requirement of the Best Available Control Technology (BACT) portions of the applicable federal Prevention of Significant Deterioration (PSD) regulations and their counterparts in the rules of the FDER (Chapter 17.2, FAC). PSD permit requirements apply to the CBCP because the net emissions increase of at least one regulated pollutant exceeds the "significant" levels defined by USEPA and FDER. The SCA states that a circulating fluidized bed boiler (CFB) with limestone injection and combustion controls, followed by a fabric filter, has been determined as BACT for the cogeneration plant.

The air pollution emission-generating components of the cogeneration plant facilities are the only components of the CBCP to be considered in this SAR/EIS. This facility is to consist of three (3) coal fired CFB boilers and various material handling operations. The emission-generating components of the SK paper mill are not included in this development of alternatives. The CFB is considered a "concurrent-combustion emission-control process" technology. Much of the sulfur is removed during combustion by a sorbent material, in this case limestone. Also in this process nitrogen oxides (NO_x) production is low because of the relatively low temperature at which the combustion reaction takes place.

2.4.2.1 Particulate Control

A fabric filter is proposed as the particulate control unit following the CFB boilers for limiting TSP emissions. An alternative to the use of fabric filters is the use of electrostatic precipitators (ESP). ESP's tend to have a higher capital cost than fabric filters, but this difference is compensated with their lower operation and maintenance costs. Fabric filter operation and maintenance costs tend to be higher as a result of filter replacement costs and higher fuel costs required for operations. The use of fabric filters as proposed in the SCA, though maybe more expensive, is a desirable control method because of its high particulate control rate of 0.02 lb/MBTu as compared to the 0.03 lb/MBTu control rate of ESP's.

2.4.2.2 Sulfur Dioxide Control

TRS and SO₂ is proposed to be controlled by proper boiler design and combustion controls in the CFB boilers. The SCA summarizes the results of the BACT analysis completed for the cogeneration facilities. The analysis compared three CFB boilers (each providing 33 percent of the total capacity) to a single full-capacity pulverized coal (PC) fired boiler. The SO₂ removal alternatives evaluated included the PC boiler followed by a wet limestone scrubber system (designed for both 90 and 94 percent SO₂ removal) and the PC boiler followed by a lime spray dryer system (designed for 90 percent SO₂ removal). The SCA stated that "based on economics, energy, and environmental considerations, a CFB boiler air quality control system designed to meet a 90 percent SO₂ removal requirement represents BACT.

2.4.2.3 Alternative Controls for Other Emissions

Other emissions of concern include NO_x, CO, VOC, and lead (Pb). The SCA states that CFB boilers have lower NO_x emission levels than PC boilers (0.36 lb/MBtu as compared to 0.40 lb/MBtu) with no air quality control unit. It also stated that a CFB or a PC boiler should be capable of meeting a CO emission rate of 0.19 lb/MBtu (CFB boiler) or 0.11 lb/MBtu (PC boiler) while meeting previously discussed NO_x and SO₂ emission levels. To employ NO_x emission limiting techniques such as lower combustion temperatures and excess combustion air are counterproductive relative to CO emissions because the emission levels of NO_x and CO are inversely related to each other.

Alternatives to controlling NO_x emissions after combustion include selective catalytic reduction (SCR) and selective noncatalytic reduction (Thermal DeNO_x) control technologies. These technologies are relatively new with very few in application, except in Japan, which has the lowest NO_x emission level in the world. The BACT analysis presented in the SCA states that the use of these control systems would result in the emission of various amine compounds formed by the unreacted ammonia exiting these NO_x reduction systems. This could result in a potential adverse human health effect, since many amine compounds are known or suspected carcinogens.

Fugitive particulates will be generated by fuel handling, waste handling, and salt drift from the cooling towers. Control measures for these sources include coal pile wetting, enclosed conveyors, fabric filters at transfer points, and mist eliminators on the cooling towers.

2.4.3 Water System Alternatives

The water requirements of the CBCP are described in Section 2.2 and the water system alternatives for the condenser cooling system, the primary water use, were described in Section 2.4.1. This section analyzes the other alternative water systems proposed for the CBCP which include water use for potable water, general plant uses, fire water, and makeup to the steam cycle.

The proposed primary source of water for all systems of the CBCP is groundwater from the Floridan aquifer. The groundwater used by the CPCP with the exception of cooling tower usage, will be softened and filtered in the SK pretreatment system.

2.4.3.1 Potable Water Systems

Potable water uses include water for drinking, washing and for toilets. The annual average expected usage is 4,100 gpd based on an average plant staff of 75 people and an average potable water requirement of 55 gallons per capita per day. This flow includes use at both the cogeneration plant and the SK paper mill. Because of the high quality water needed for potable water uses and the low volume of flow involved, no alternative to groundwater use is proposed.

2.4.3.2 Makeup Demineralizer System

Other than cooling water, the major use of water in the CBCP will be for demineralized water makeup to the boiler/turbine/condenser cycles. Demineralized makeup water is required to replace water lost to SK process steam uses, boiler blowdown, and miscellaneous steam losses.

An annual average of 1.385 MGD of water will be demineralized using three ion exchange demineralizer trains. The resulting 0.147 MGD regenerant waste stream will be routed to the neutralization basin for pH adjustment and then to the SK WTP. The regenerant is not considered suitable for reuse because of its high dissolved solids content. Because of the demand for high quality water in the steam cycle, no alternatives to groundwater use are proposed. A portion (1.263 MGD) of the steam produced for the SK mill processes will be returned to the steam cycle for reuse after it is polished using a powdered resin type condensate polishing system.

2.4.3.3 Other Water Uses

The fire protection system water requirements are negligible. Even though groundwater is the source proposed, no alternatives are considered here. High quality water is required to prevent corrosion and scaling in the storage and distribution system.

65,000 gpd of treated groundwater is expected to be used in the service water system which includes water for water seals, cleaning, and flushing. No alternatives are provided for this water use.

2.4.4 Wastewater Treatment Systems Alternatives

The CBCP will utilize the SK's existing wastewater treatment plant (WTP) for treatment of demineralizer regeneration wastewater, condensate polisher regeneration wastewater, miscellaneous wastewater, and coal, limestone, and ash area runoff. Stormwater runoff from roofs and yard area will be diverted to a holding pond after which it will be disposed of along with the WTP effluent and the cooling tower blowdown, into the St. Johns River.

2.4.4.1 Sanitary, Plant Process, and Chemical Wastewater Collection

Separate collection systems are proposed to collect chemical wastewater and miscellaneous plant wastewater. Collected flows and their destinations include the following:

- o Miscellaneous flow drains will direct water service system wastewater to an oil separator and then to the WTP.
- o All sanitary wastewater from the potable water system will be routed directly to the WTP.
- o Surface runoff from the coal, limestone, and ash storage areas will be collected in the fuel storage area retention basin and then routed to the WTP.
- o Regeneration wastewater from the demineralizer will be directed to the neutralization basin after which it will be routed to the WTP.
- o Wastewater from the condensate polisher will be routed directly to the WTP.
- o Effluent from the WTP will be routed to the St. Johns Rivers outfall.
- o Surface runoff from the roof and yard drains will be directed to the retention pond after which it will be routed to the St. Johns River outfall.
- o Cooling tower blowdown will be routed directly to the St. Johns River outfall.

Alternatives to these conveyance systems would include possible recycling of wastewater or treated wastewater flows.

2.4.4.2 Wastewater Treatment Plant

The existing facility consists of a clarifier followed by aeration ponds. Wastewater from the CBCP routed to the WTP is expected to average 229,000 gpd of flow, 75 lb/day of suspended solids (SS), and 20 lb/day of BOD₅. Wet weather flow is expected to be 622,000 gpd.

Alternatives to using the existing SK WTP include the construction of a new, separate WTP for the cogeneration plant and/or upgrading of the existing WTP to meet more stringent pollutant controls.

2.4.4.3 Treatment of Recirculating Cooling Water

Cooling water is to be treated with sulfuric acid and an organic phosphate type scale inhibitor to control the scaling tendency of the circulating water system. Also, intermittent shock chlorination will be used to prevent biological fouling of the water. The blowdown will be dechlorinated prior to disposal via the St. Johns River outfall, using either sulfur dioxide or sodium sulfite.

Chlorination is the industry standard for control of biological fouling in cooling waters. Chlorine is an inexpensive and effective biocide. It can be added to the recirculating cooling water either as gaseous chlorine, solid calcium hypochlorite, or liquid sodium hypochlorite to form hypochlorous acid and hypochlorite ions which are the effective biocides. In order to control biological fouling, a sufficient concentration of residual chlorine biocides must be maintained in the system for a long enough period of time (typically 2 hours) to destroy microorganisms in the system. Chlorine residuals (TRC) in the form of free available chlorine and other residual oxidants remaining in the system are discharged in the system blowdown. The toxic effects of chlorine residuals (TRC) and other residual oxidants (TRO) on the aquatic environment are of concern and must be minimized by careful management of chlorine dosing or by using a dechlorination unit. Alternatives to chlorination are bromochlorination and oxonation as presented below.

2.4.4.3.1 Bromochlorination

The use of bromine chloride as a cooling system biocide is relatively new. The bromine chloride hydrolysis in water to hypobromous acid (an effective biocide) and hydrochloric acid. This hydrolysis results in a lower level of residual chlorine and chloramines than does the hydrolysis of chlorine and thereby reduces the toxic effects of residual chlorine from the cooling system blowdown. In addition, although bromine chloride is more

effective than chlorine as a biocide for microorganisms, it exhibits a lower toxicity effect on fish. The major drawback in the use of bromine chloride as a biocide is that it has not been demonstrated for use in cooling towers.

2.4.4.3.2 Ozonation

Ozone (O_3) is one of the most powerful biocides known. It is very effective and decomposes to oxygen after a short time in the water, thereby improving water quality. However, ozonation has several drawbacks including the need for expensive on-site production facilities (it cannot be stored), corrosiveness to iron alloys and slightly less effectiveness than chlorine on some biological slimes which foul cooling towers. There is no operating experience with ozone for this purpose and the capital and O&M costs are high.

2.4.5 Solid Waste Management Alternatives

The combustion products to be generated by the CBCP include fly ash and bed ash. The quantities of waste to be produced will depend on the properties of the coal and limestone used in the combustion process. The SCA states that both the bed ash and the fly ash will be disposed of by the coal supplier at an approved disposal location outside of the State of Florida or sold within the building materials industry.

2.4.5.1 Bed Ash

The SCA estimates that bed ash production will be approximately 88,000 tons per year. It is to be conveyed from the boiler ash coolers to a storage hopper by mechanical ash conveyors. From the hopper, the bed ash will be conveyed via a vacuum transport system to a silo.

As stated above, it is proposed that the coal supplier will dispose of the bed ash outside of Florida or to the building materials industry which seems to relieve AES-CB of responsibility. Because no disposal means has yet been defined, alternatives are to be considered including: (1) wet sluicing to a lined ash pond for disposal; (2) wet sluicing to dewatering bins and

landfill disposal; and (3) mechanical ash removal with landfill disposal. The first alternative, wet sluicing to a lined ash pond, is the industry standard. In this system, ash laden sluicing water is routed from the ash hoppers to the pond where the ash settles out and the water is recirculated back to the plant. The second alternative is similar except that the ash is separated from the sluicing water in bins and then trucked to a landfill for disposal. The third alternative accomplishes simultaneous ash removal and dewatering by means of a conveyor system. The ash is trucked from the conveyor discharge point to a landfill. This alternative requires less water and power than the other systems and is consistent with the design of the CBCP. The major concern is the location of a landfill that could receive the dry bed ash.

2.4.5.2 Fly Ash

The SCA estimates that fly ash will be produced at a rate of 354,000 tons per year. Most (336,000 tons per year) is to be collected using a fabric filter after which it will be conveyed by an enclosed vacuum transport system to a storage silo. Bag filters are proposed to control fugitive dust emissions from the ash silo and vacuum system. Fly ash expected to accumulate in the air heater hoppers (18,000 tons per year) will also be conveyed to the silo via the vacuum transport system.

As is the case with bed ash, even though the SCA states that final disposal is to be the responsibility of the coal supplier, alternative disposal means must be defined.

Two fly ash disposal alternatives were considered: (1) wet sluicing to an ash pond for disposal and (2) vacuum conveyance with landfill disposal. Since the fly ash will be collected dry and sold if possible, it appears that the first alternative would create an unnecessary wastewater stream. Further, a complete recycle system would be required for the fly ash transport water because proposed USEPA regulations prohibit any discharge of TSS and oil and grease from the system. Because of dissolved solids buildup in the transport water and associated scaling problems, a complete recycling system would be expensive and difficult to operate. The second alternative requires the need for a landfill site which can receive the dry fly ash.

2.4.5.3 Hazardous Waste

The SCA states that there will be no hazardous waste produced by the CBCP. Demineralizer wastes, which can contain up to 10 percent sulfuric acid (H_2SO_4) or up to 5 percent sodium hydroxide (NaOH), will be routed to the neutralization basin for pH adjustment. The neutralization basin serves as an "elementary neutralization unit" allowing the cogeneration plant an exemption from permitting as a hazardous waste facility. Furthermore, because the demineralizer wastes are not stored prior to pH adjustment, they are not counted as generated hazardous waste, and the plant is therefore not subject to regulation as a hazardous waste generator. Neutralization of acidic boiler cleaning wastes will be accomplished by the chemical cleaning contractor.

2.4.6 Materials Handling Systems Alternatives

2.4.6.1 Construction Materials and Equipment

The SCA states that construction materials and equipment will be delivered to the site using existing roads and railroads. A new access road is to be constructed on the mill site to provide access to the construction areas from Eastport Road. Construction material is to be stored in areas currently used to store lime mud, logs and debris which are located north of the SK mill's woodyard. Materials are to be unloaded and moved around the site using portable cranes and trucks. Heavy items will be delivered via rail and handled using special rigging. Pollution control measures are to include runoff detention ponds to hold and clarify storm runoff prior to release to natural drainage. Main roads at the site are to be gravel surfaced and treated with dust palliative to reduce dust. Also, water sprays will be used, as required, to control dust due to traffic.

2.4.6.2 Limestone Handling

Limestone handling consists of delivery, unloading, stockout, reclaiming, preparation, and storage. Fugitive dust control from the handling processes is to be accomplished by fabric filter dust collectors. The limestone belt conveyors and feeders are to have covers over the belt to control fugitive dust. If limestone is delivered by rail, a lowering well is to be used for limestone stockout. Water sprays are proposed to be used to control dust from mobile equipment operators. Storm runoff from the storage area is to be collected and routed to a lined retention basin.

2.4.6.3 Ash Handling

Ash generation and handling is described in Sections 2.4.5.1 and 2.4.5.2. Up to seven (7) days of dry ash pellet (9,700 tons) may be stored on-site in an area that is to be lined with a synthetic liner. The liner is to be protected with a soil cover and storm runoff will be collected and diverted to the lined retention basin. Removal of ash pellets or silo-stored ash from the site will use either closed truck or railcars. Water sprays will be used, as required, to reduce fugitive dust from pellet handling and fabric filters will be used to collect dust from dry ash handling.

2.4.6.4 Coal Delivery and Handling

Coal is to be delivered via rail. The CSX Railroad currently serves the SK mill site. The line from which the mill spur branches is currently used for unit train coal delivery to the JEA St. Johns Power Park a few miles east of the mill site. This line is not expected to need upgrading for the proposed CBCP. Modifications will be necessary to the mill spur. In general, the CBCP will require one parallel rail line placed to the west of the existing rail sidings located north of the plant site and an extension along the southern portion of the site as illustrated in Figure 2-2.

Coal handling systems remove coal from the coal delivery system, in this case railcars, and convey it to a storage site. In addition, handling of coal is necessary to take coal from the storage site to in-plant silos. Of major concern is the control of fugitive dust and storage area runoff.

Figure 2-2

2.5 NO-ACTION ALTERNATIVE

Conventionally, the No-Action Alternative is the baseline for evaluating the environmental impacts of the proposed project and the various structural alternatives in the EIS process. It represents how existing conditions would be altered in the future in the absence of federal action, in this case permit approval. As is the case for developing alternative means of satisfying the need for the project, the definition of the No-Action Alternative components depends on the definition of need for the project. As presented in Section 1.5, the need for the project as defined for this SAR/EIS is additional electricity-generating capacity and displacement of oil-fired generation from 1993 to 2025.

As defined, the No-Action scenario can be one in which no electrical power generation plant is constructed and, therefore, the needs of the project are not met or one in which the needs are met by an alternative power source that would supply FP&L with 225 MW of electricity and displace the future consumption of oil by 2.2 million barrels per year. The first scenario involves a lowered reserve margin (below 15 percent) for Peninsular Florida's electrical-generating capacity in 1993 and an increased future dependence on oil as a generating fuel. This scenario is considered to be the No-Action Alternative for the EIS/SAR. The second scenario is addressed in a variety of alternative means of satisfying the need of the project as presented in Section 2.8.

2.6 POWER GENERATION ALTERNATIVES

Power generation alternatives as presented in this section are composed of two components, fuel type and power production technology. Section 2.6.1 identifies fuel type alternatives. Oil is not considered a viable fuel type alternative since the need for the project has been defined to include the displacement of oil consumption (refer to Section 1.5). Section 2.6.2 identifies commercially-available technology alternatives. It should be noted that some technology alternatives are presented as a fuel type alternative because the fuel type and technology are not uniquely separate components. Section 2.6.3 describes the screening process used to develop a list of feasible power generation alternatives for use in Florida based on the

information provided in Sections 2.6.1 and 2.6.2. Fuel types and power production technologies that are not available to Florida and/or are not commercially feasible were not considered for this development of alternatives.

2.6.1 Fuel Types

These are alternatives to the use of coal and biomass/wood as proposed for the CBCP. The coal for the proposed project is to be crushed prior to combustion. Generally speaking, the domestic coal supply is fairly stable with a market characterized by many small companies with abundant reserves in all sulfur grades and excess production capacity.

2.6.1.1 Nuclear

Nuclear fission produces energy when the heat released from a controlled chain reaction of atom-splitting is used to boil water and converted to electricity. Nuclear fission involves the splitting of heavy atoms, usually uranium, and produces large amounts of energy.

Nuclear power plants are currently in use throughout the United States, and can produce anywhere from 100 to 1500 MW of electricity. The thermal efficiency of the process averages about 32 percent. Current costs of nuclear fuels per unit of power generated are lower than all fossil fuels and are predicted to remain so.

Construction of nuclear powerplants has declined sharply in the United States. The major handicaps to nuclear powerplants are rising construction costs and construction time and public concern over powerplant safety and radioactive-waste disposal.

The nuclear industry has been promoting the use of a "second generation" of nuclear power plants that are supposed to be safer. Nuclear-powered energy sources could replace the use of fossil fuels which add carbon dioxide to the atmosphere and thereby contribute to the planet warming phenomenon known as the "greenhouse effect".

The time required to build a nuclear powerplant has risen from four years in 1970 to ten years today, after licensing. Since licensing takes approximately four years, a power producer would have had to begin planning a new nuclear powerplant by 1979 in order to have it on line in 1993. Because of this time requirement and the financial risk resulting from licensing difficulties, nuclear power was not considered to be a feasible alternative.

2.6.1.2 Natural Gas

Traditionally, natural gas is burned in a boiler to produce steam which drives a turbine. In the boiler, heat from natural gas firing is transferred to water to produce high-pressure, high-temperature steam. The steam enters the turbine where it expands to a low-pressure and low-temperature steam which drives the generator to produce electricity. The output capacity per boiler is dependent on the output capacity of the existing boiler, which could range from 100 MW to 1500 MW. The typical energy efficiency of a natural gas boiler ranges from 38 to 40 percent. Other uses of natural gas include combustion turbines (also called gas turbines) which are described in Section 2.6.2.4.

The Federal Fuel Use Act of 1978 prohibits the use of natural gas as the primary energy source in any new electric power plant. In the original legislation, exemptions were available only in limited situations, and existing power plants using natural gas were required to stop using the fuel by 1990. Recently, the rules for obtaining exemptions to natural gas prohibitions for new facilities have been streamlined, making it administratively easier to obtain both temporary and permanent exemptions. Testimony given at the FPSC's annual hearings for the FCG's 1986 load forecasts and generating expansion plans concluded that the economic analysis done by the Economic Regulatory Administration (ERA) for a gas burning facility indicates that the facility would qualify for a permanent economic exemption from the Fuel Use Act. In addition, the 1990 "off-gas" provision has been repealed which has effectively removed any obstacle for retrofitting an existing plant from oil to natural gas.

The current world-wide "bubble" of actual gas is expected to continue. Natural gas costs per unit of power generated are lower than those for oil fuels. Factors contributing to this include the deregulation of domestic natural gas production, significant increases in the supply of domestic natural gas and decrease in consumption. Over time, however, the domestic supply of natural gas is expected to decline. The only threat to current supplies appears to be the limited capacity in pipeline systems. The expanded 925 million cubic feet per day pipeline of the Florida Gas Transmission Pipeline System is expected to have about 600 million cubic feet per day of natural gas available to peninsular Florida's electric utilities on an average annual daily basis through the planning period.

2.6.1.3 Coal Gas

Low- or medium-Btu gas is produced from pulverized coal by heating the coal in a pressurized chamber with steam with either air or pure oxygen. The products of this reaction are, principally, carbon dioxide, carbon monoxide, methane, and hydrogen. To produce gas with a higher Btu value (synthetic natural gas), the medium-Btu gas must be upgraded.

An average medium-Btu coal gasifier can produce from 7 to 10 billion Btu's per day, but multiple-user facilities exist which can produce upwards of 30 billion Btu's per day. Low-Btu gasifiers are currently used in a number of industries in the United States to produce heat for industrial processes, including brick ovens and lime kilns.

To use a coal gas as an alternative fuel for producing electricity, it would have to be gasified, burned and converted to electricity in an integrated electric power plant. In the first, or gasification stage, the coal is partially reacted with a deficiency of oxygen to produce a low-heat-value fuel gas that can be readily cleaned. In the second stage, the cleaned fuel gas is burned in a boiler that produces steam for a steam turbine that generates the electric power. Some of the fuel gas can also be burned in a combustion turbine as part of a combined-cycle unit as described in Section 2.6.2.4. Heat produced in the gasification stage is recovered by generating steam. The gasifier steam is merged with the steam generated in the power

boiler. Such integration is necessary for high plant efficiency regardless of whether the gasification system is retrofit to an existing power plant or whether the system is applied to a new steam or combined-cycle power plant.

Coal gasification is considered a pre-combustion emission-control process because sulfur and ash are removed in the gasification process which produces a clean gas fuel for the boiler and/or combustion turbine. The energy efficiency of the coal gasifier in an integrated system is about 96 percent.

2.6.1.4 Solar

Solar radiation can be converted directly into electrical energy using photovoltaic cells, or it can be used to heat water which is then vaporized to steam to power conventional turbines. These technologies are described in Section 2.6.2. Solar power generation is technically feasible in Florida. Florida has an insolation value (mean annual total direct and diffuse radiation at the earth's surface) between 140 and 160 (kilogram-calorie per square centimeter per year in a horizontal surface) which is favorable for solar power generation.

2.6.1.5 Wind

Wind energy systems convert the kinetic energy of wind into rotary, translational, or oscillatory mechanical motion which can be converted to electricity or heat. The output capacity from wind-powered electricity generating units ranges from 500 KW to 4 MW with a thermal efficiency between 15 and 25 percent. Wind energy systems are technically feasible and commercially viable.

Small wind energy systems for residential application are possible but due to low wind speeds in Florida, they are not considered a viable energy alternative for utility application. The U.S. Department of Energy (USDOE, Office of Solar Energy Programs - Wind Systems Branch) estimates that the average wind speed must be between 12 to 14 miles per hour to be considered a valuable wind resource. The wind resource in Florida is minimal, as the

average wind speed is approximately 8.6 mph. The potential of wind as a large-scale alternate energy source in Florida is among the lowest of the 48 contiguous states.

2.6.1.6 Hydroelectric

In hydroelectric power generation, the kinetic energy of falling water is trapped and used to drive a turbine which generates electricity. The water may be falling from a natural waterfall, or across a man-made dam built for that purpose. In either case, there must be sufficient hydraulic head to produce the energy of the falling water.

Hydroelectric powerplants are currently in extensive use across the United States. Florida is quite flat, and few rivers have an adequate natural head to generate significant amounts of energy. Therefore, the potential in Florida is only for about 9 MW of electricity, with an energy efficiency of 66 to 80 percent.

2.6.1.7 Ocean Tides

Tidal-electrical power is obtained from the oscillatory flow of water in the filling and emptying of partially enclosed coastal basins during the semidiurnal rise and fall of oceanic tides. The water flow while the basin is filling or emptying can drive turbines propelling electric generators. Atlantic Ocean tides in Florida are only a few feet, which is far below the practical level for tidal power application. Because there is not a sufficient ocean tidal resource in Florida for large scale application, ocean-tidal power will not be considered a viable energy alternative.

2.6.2 Technology Types

The following techniques are alternatives to the fluidized bed combustion technology proposed for the CBCP. The CBCP is a concurrent-combustion emission-control process in that sulfur is stripped and NOx formation is controlled during the combustion process. These boilers produce steam to drive an automatic extraction condensing turbine generator that produces electricity and process steam.

2.6.2.1 Conventional Coal-Fired Steam Turbine

A conventional coal-fired electric power plant produces steam to drive a high-speed turbine. It is considered a post-combustion emission-control process because emissions are controlled after combustion, in as removed from the boiler exhaust gases. Traditional emission-control processes include dispersion (tall stacks) and lime/limestone scrubbers for SO₂ removal and mechanical cyclone collectors, scrubbers, electrostatic precipitators, and baghouses for particulate removal. Processes and equipment for removing NO_x from the flue gas leaving a conventional coal-fired boiler are in developmental stages. Boiler designs have been modified in some applications to reduce oxide formation. Post-boiler gas treatment techniques currently being used include catalytic decomposition, selective catalytic reduction (SCR), selective noncatalytic reduction, and absorption.

The design of the steam-producing combustion unit of a conventional system must be suitable for optimum performance in burning the particular coal available. Coals with high-fusion temperatures are inherently suitable for burning, when pulverized, in dry-ash-removal hopper-bottom furnaces. Low ash-fusion coals, in crushed form, are burned in the Cyclone Furnace with slag-tap ash removal.

The conventional subcritical coal-fired unit selected for analysis in the FCG studies burns pulverized coal in a conventional boiler designed to produce high pressure steam. The steam is then expanded through a multi-staged turbine which is directly coupled to an electrical generator which produces energy for the utility grid.

Because of the complexity of the conventional coal-fired unit's systems (including the emissions-control systems), they have long start-up times and are not readily adaptable for cyclic operation. These units are highly efficient and are capable of burning low-cost, widely available coal.

2.6.2.2 Combustion Turbine

Combustion turbines have been used by electric utilities and other major industries for many years. Traditionally, utilities installed them for peaking service, as their low capital costs, higher operating costs and quick-start capabilities made them appropriate for low capacity factor operation. Many combustion turbine installations utilize an axial flow compressor which compresses outside air into a combustion area where fuel is burned. The hot gases from the burning fuel-air mixture drive the turbine, which in turn rotates a generator which produces electrical energy for the utility grid. The hot exhaust gases from the turbine are then discharged into the air.

Combustion turbines have the flexibility to burn natural gas, distillate oil (No. 2 fuel oil), and in some cases residual oil which has been treated to remove impurities. Additionally, gasified coal as described in Section 2.6.2.2 could be burned if the economics of the fuel conversion are justified. They have rapid start-up times compared to conventional fossil steam generating units but are relatively inefficient compared to conventional fossil steam or combined cycle units.

2.6.2.3 Combined Cycle

A combined cycle plant is a hybrid of combustion turbines and a steam driven turbine generator. The hot exhaust gases produced by the combustion turbines that would otherwise be discharged into the air are passed through a heat recovery steam generator which produces steam. This steam is used to drive an additional turbine generator combination. This utilization of the waste heat provides an overall plant efficiency that is much better than that of a combustion turbine. The overall annual average heat rate is approximately 8,400 Btu/kWh, which is more efficient than a base load coal unit.

Combined cycle plants have the same fuel flexibility available to a combustion turbine: gas, distillate fuel, treated residual fuel and potentially gasified coal. The capital investment is higher than that of a

combustion turbine, but is still substantially less than that of a conventional coal-fired unit. Because of the modular configuration of combustion turbines and heat recovery/steam turbines, combined cycle units may also be operated as simple cycle combustion turbines, increasing dispatch flexibility and yielding high unit availabilities.

2.6.2.4 Photovoltaic Cells

Photovoltaic cells convert solar radiation directly into electrical energy. They have no moving parts and have been used for decades to power satellites and other spaceships. Traditionally, the use of photovoltaic cells as an alternative to a coal-powered electrical generating facility would involve installation of photovoltaic cells in the homes of utility customers, at the utility's expense. Customers would then pay a rental user fee. The size of a photovoltaic cell can vary greatly, so that a cell could supply all the electricity needs of a home. Recently, development has been looking at the possibility of constructing central stations using the photovoltaic technology. The commercial availability of centralized power generation, though, is not expected to be available until 1996.

Like all solar residential units, photovoltaic cells must have a backup electrical system or an energy storage system (such as batteries) for times when the sun does not provide sufficient energy. The costs of these cells have dropped by about two orders of magnitude since the early 1970's, which has made their use more attractive.

2.6.2.5 Passive Collection Panels

A centralized facility for solar power generation can be constructed by assembling a number of passive collection panels at a specific site, and using the total energy collected to heat water. The hot water is then vaporized, and the resulting steam is used to power conventional turbines for electricity generation. Central solar generators can produce up to 10 MW, but higher production requires high capital costs, as well as a large geographic area. Although the solar collection efficiency can be very high, the energy

efficiency of the system as a whole, (including collectors, storage facilities, and generators) averages only about 20 percent. Solar power generation is feasible in Florida with an expected capacity factor of 60 percent but the negative impact of committing large areas of land makes this technology an improbable alternative.

An alternative to a centralized facility is the installation of individual residential solar water heating systems with small (approximately 40 square feet) collection panels. These systems can be expected to replace the use of approximately 2,100 kwh of electricity per year. Also they require a backup system for times when the weather rendered them ineffective.

2.7 MANAGEMENT ALTERNATIVES

2.7.1 Purchase of Power

As used in this EIS/SAR, the management alternative of purchasing power is having FP&L purchase power from an existing power plant not owned by FP&L to replace the 225 MW needed capacity that the CBCP was expected to fulfill. The proposed project is by definition a purchased-power alternative in itself, but is different in that it requires construction of a new plant. The identification of feasible power suppliers that could be contracted by FP&L are provided in Section 2.8 along with a description of any additional transmission capacity needs.

The alternative of purchasing power is valid only if there is transmission capability available. The Florida transmission systems are part of SERC and the overall electric power systems of the eastern United States. The peninsular Florida systems can exchange assistance with the Southern Company (SOU) and the Tennessee Valley Authority (TVA) through several transmission interconnections.

Purchasing power from power generators offer some advantages to a utility such as FP&L including reduction of generation investment, diversification of investment base, and becoming a selling service. Possible risks to FP&L in such an arrangement include paying too much for power, reduction of system reliability, investment in interconnections yielding insufficient payback, and the need for self-service/retail sales wheeling.

2.7.2 Joint Projects

Joint ownership of a project is an arrangement normally undertaken to diversify risk and, in some cases, to take advantage of the tax and financial market changes that may occur.

For the proposed CBCP the entities involved include AES-CB (the applicant, a wholly owned subsidiary of Applied Energy Services, Inc., a privately held corporation), SK (privately held corporation which owns and operates the paper mill that is to receive the CBCP's process steam), JEA (a municipally owned electric utility that is to wheel the 225 MW of generated electricity), and FP&L (an investor owned utility that is to buy the 225 MW electricity to fulfill its future capacity needs). Joint ownership of the CBCP or any of the proposed alternative means presented in Section 2.8 could be undertaken between any combination of the involved entities.

2.7.3 Conservation

Conservation as a management alternative includes conservation practices for reducing the demand of the product and for increasing the efficiency in supplying the product. The product being, in this case, electrical energy. The legislative intent of FEECA to reduce "the growth rates of electric consumption and weather-sensitive peak demand"; to increase "the overall efficiency and cost-effectiveness of electricity and natural gas production and use"; and to conserve "expensive resources, particularly petroleum fuels" reflects this understanding of conservation. Both conservation approaches are addressed below.

2.7.3.1 Demand-Side Conservation Practices

The forecasting of long-term energy sales and peak demands is generally based on historical data. The models used for such forecasting can contain several variables to reflect changes in consumption (demand) due to variations in measurable parameters. In terms of electrical energy, FP&L has defined the following parameters as part of their load forecasting in their "Ten Year Power Plant Site Plan, 1989-1998".

- o Price term - reflects changes in consumption due to changing prices of produced electricity;
- o Weather term - reflects changes in consumption due to variation in the weather (accounts for minimum and maximum temperatures);
- o Per capita income - reflects changes in consumption due to changes in the service area's economic prosperity; and
- o Appliance term - reflects changes in consumption due to improved appliance efficiencies and/or increase appliance use.

In the plan, FP&L stated that demand forecast models cannot predict the effects of future technological advancements or changes in consumer lifestyle. In order to account for these anticipated changes in their load projections, FP&L has evaluated their seven (7) conservation programs and estimated the cumulative effects of these programs on the peak demand forecasts. These programs, which are listed in Table 2-2, are generally implemented by encouraging monetary savings for the consumer. No legislation exists for enforcing demand side conservation. Subsequently, quantifying the effects of such programs for forecasting purposes is difficult and incurs the risk of understating future demands.

2.7.3.2 Supply-Side Conservation Practices

Pursuant to FEECA, Section 366.82 F.S., enacted by the 1980 Legislature, the FPSC has the responsibility to establish conservation goals for the electric utilities of Florida. In QF need determination cases prior to the CBCP hearing, the FPSC has concluded that "cogeneration is a conservation measure". Since then the FPSC has rethought this position. In the FPSC Order No. 21491 it is stated that there is a recognition in the industry that cogeneration does not "conserve" fuel in the traditional sense, it merely utilizes fuel to "deliver a service at the least cost". In some instances the fuel efficiency of a cogeneration unit will be the factor that makes a cogeneration project a cost-effective means of producing power, but that is not necessarily the case. The price of the electricity produced by a cogeneration unit could be lower than that of comparable noncogeneration units simply because the sales price of the steam produced by the QF and sold to the steam host is high and produces a great deal of profit.

Table 2-2

Long-Term Forecast
Conservation Programs
FP&L, "Ten Year Power Plant Site Plan 1989-1998"

1. Commercial/Industrial Lighting Incentive Program

This is an incentive program which began in mid-1984 to encourage demand and non-demand commercial/industrial customers to replace their fluorescent lamps with reduced wattage energy efficient lamps.

2. Residential Pool Usage Moderation Program (Pool Pump Timer)

The Residential Pool Pump Program was developed by FPL for the purpose of lowering both the annual energy usage (KWH) and peak demand requirements (KW) of residential customers who own swimming pools.

FPL began offering pool audits to its residential customers in June, 1981. The auditors place timing devices on swimming pool pumps. The timers shut off the pool pumps during the time of the day when the system normally experiences its peak demand; furthermore, they reduce the number of hours of daily operation of most swimming pool pumps, while still maintaining pool cleanliness.

3. Commercial/Industrial Customer Audit Program

This is an energy audit program designed to assist commercial/industrial customers in making their facilities more energy efficient through the installation of conservation measures and the implementation of conservation practices.

Each year, FPL offers energy audits to small (peak demand of 20 KW or less), medium (21 through 499 KW peak demand) and large (peak demand of 500 KW or more) commercial/industrial customers. The savings for each customers are commensurate with its size.

Residential Customer Incentive Programs

In an effort to induce customers to upgrade the thermal efficiency of their dwellings and/or to purchase more energy efficient appliances, FPL has initiated incentive programs in each of the following areas:

4. Home energy loss prevention.
5. Window film treatment.
6. Water heating.
7. Residential ceiling insulation.

2.8 ALTERNATIVE MEANS OF SATISFYING THE NEED FOR THE PROJECT

2.8.1 Need for Analysis of Alternatives

As stated in Section 1.5, the determination of need for the CBCP is based on the need for additional electricity generating capacity and for the displacement of future oil consumption. Analyses of alternative means of satisfying the need for the project are to determine if the proposed project represents the lowest cost and most environmentally-sound alternative available to provide 225 Mw of electric power to FP&L and to displace 2.2 million barrels of future oil consumption. The FPSC did not consider any alternatives to fulfill these requirements during their evaluation of need for this project. The FPSC stated that the CBCP was a qualifying facility pursuant to the PURPA regulations and therefore was the most cost-effective alternative. Subsequently, the FCG's 1989 Generation Expansion Planning Studies document was used as the basis for alternative development for this SAR/EIS.

The environmental evaluation of alternatives to the CBCP was identified at the public scoping meeting as a major issue for consideration in the SAR/EIS. In addition, USEPA is required by the regulations of NEPA to identify and assess reasonable alternatives to the proposed action that could potentially avoid or minimize adverse effects on the quality of the human environment.

The purpose of the EIS alternative analysis is to consider feasible alternatives that would meet the CBCP's objections of supplying electricity and displacing oil consumption with a less expensive supply of electricity for the FP&L customers. The economic and environmental ramifications of these alternatives were examined.

2.8.2 Available Technologies for Oil Displacement

In order to develop alternatives, the technologies appropriate for use in Florida during the current time frame had to be identified. These technologies must meet the following criteria:

- o Technology must be implementable by 1992;
- o Technology must be technically and commercially proven;
- o Technology should displace the use of oil as a fuel source; and
- o Needed fuel resource must be available in Florida or a transportation network must exist to bring in the fuel.

Many alternative technologies can be removed from further consideration based on extensive lead time requirements, regulatory and/or environmental constraints, high operation and/or construction costs, or the unproven nature of the technology. Those technologies which were considered as viable alternatives to the CBCP were not subject to these regulatory, environmental, or technological constraints; were relatively cost-effective; and could be brought on-line within the required time frame.

In summary, the technologies which met the criteria and were identified as feasible technologies for alternatives to the CBCP included the following:

- o purchase of power;
- o reduction in electrical demand by installing residential solar hot water heaters;
- o construction of a combustion turbine power plant (natural gas- or gasified coal-fueled);
- o construction of a combined cycle power plant (gasified coal-fueled); and
- o construction of a conventional coal-fired power plant.

2.8.3 Development of Alternatives

Based on the analysis of technologies for displacement of oil-fired electric power generation conducted by AES-CB and the planning studies conducted by the FP&L and by the Florida Electric Power Coordinating Group, Inc. (FCG), a number of alternative power systems were developed which could satisfy the oil displacement goals of FP&L and its customers. These alternatives could not be developed to the level of detail provided by AES-CB for the proposed project, but they were developed to a level of detail sufficient to determine the basic engineering and economic factors required to make a meaningful comparison of their relative environmental impacts.

2.8.3.1 Criteria for Alternative Development

The feasible technologies were combined into alternatives which met the following criteria:

- o the alternative must supply at least 225 MW of electric power;
- o the alternative must displace at least 2.2 million barrels of oil consumption; and
- o the alternative must be implementable by 1992.

Large-scale technologies such as construction of a combustion turbine power plant were proposed for the CBCP site. In this way, the environmental impacts of the alternative could be evaluated for a particular site. Small-scale technologies (i.e., installation of residential solar hot water heaters) could not reasonably be tied to a particular site or even a particular area within the service area of the utility because their application would be so widely dispersed. Therefore, assessment of the alternatives involving a small-scale alternative was treated generally.

2.8.3.2 Alternative 1 - Purchase of Power

The purchase of power is dependent on the availability of power from an outside utility and the availability of power transmission. As documented in the FCG's 1989 Generation Planning Studies, in September 1985, a detailed study of the economic viability of additional transmission capacity into the state of Florida was completed. This study was entitled the Cost Effective Oil Backout Study. This study evaluated the cost-effectiveness of constructing additional transmission facilities in order to raise the transfer capability above the current 3,200 MW level. The study was produced through the cooperative efforts of representatives of the Florida Electric Power Coordinating Group, Inc., Southern Company (SOU), the Tennessee Valley Authority (TVA) and the Florida Public Service Commission (FPSC) staff.

Two incremental 500 MW blocks of energy transfers above the existing 3,200 MW transfer limit were analyzed. Savings in the study were identified in two areas: energy savings and transmission loss savings. The energy savings were calculated by detailed comparison of the incremental costs of increased generation in either Southern or TVA's systems in order to offset oil-fired generation in Florida. Transmission loss savings were calculated by analyzing the potential increase in efficiency of the transmission system through the addition of the new transmission facilities. The energy savings and transmission loss savings were compared with the incremental costs associated with the transmission facilities required to accomplish the additional transfers to Florida. As with the energy and transmission loss savings, the cost of incremental transmission facilities was studied and amortized over the 1988-1995 period.

The study showed 500 MW and 1,000 MW of additional sales above the 3,200 MW limit would not be economical. In all cases, the increased costs of the incremental transmission facilities exceeded the savings from energy and reduced transmission losses.

One of the major driving forces in the economics of the cost-effective oil backout study was the assumed difference between the price of coal and the price of oil during the 1988-1995 study period. If the assumed coal/oil differential had been higher, the energy savings associated with the additional transfers would have been higher. Conversely, lower coal/oil differentials would have caused the energy savings associated with the transfers to be lower.

The FCG's current high-band fuel forecast shows coal/oil differentials that are lower than those assumed at the time of the 1985 Cost Effective Oil Backout Study. This leads to the conclusion that it is unlikely that additional transfers from either Southern or TVA above the existing 3,200 MW transfer capability would be economical given the current fuel price outlook. In addition to the economic analysis of increased transfer capability, a sensitivity analysis which analyzed the reliability impact of additional transfer capability was conducted. This sensitivity showed minimal reliability benefit from an increase in transfer capability.

2.8.3.3 Alternative 2 - Residential Solar Hot Water Heaters

Under this alternative, it is assumed that FP&L would sponsor a retrofitting of solar water heaters for 50% of all new and 10% of all existing customers in its service areas. In case of a retrofit unit, the utility is assumed to pay for the manufacture and installation of the flat-plate collector, the additional piping, the pump, and the storage tank. New units would be very similar, although the additional storage tank is not absolutely necessary.

By 1998, this program would result in the installation of approximately 729,600 solar water heating units in the FP&L service area. The construction of the solar units is assumed to occur evenly throughout a nine-year period (1990-1998) and would require FP&L to build about 81,000 units/year. Each solar water heater unit is expected to replace the use of approximately 2,100 kwh of electricity per year at the end of the installation period. This replacement would save FP&L approximately 2.4 million barrels of oil per year. The solar water heaters would displace oil-fired generating capacity, and would generate no air pollutants, wastewater discharges, and solid wastes. In addition, they would require no increase in groundwater consumption. The implementation of the solar water heater program can also be expected to boost employment by about 1,650 new jobs for each year of the program in the area of manufacturing and installation of these units.

The use of these units, however, would require provision for backup power in case weather conditions render them ineffective for an extended period of time. These backup systems would have to provide peak capacity sufficient to meet demand. Table 2-3 lists the assumption and calculations used for the development of this alternative.

2.8.3.4 Alternative 3 - Construction of a Combustion Turbine Power Plant

FP&L or the applicant would build a combustion turbine power facility with a capacity of 230 MW at the proposed project site. The facility would be comprised of two 115 MW combustion turbines and 2 heat recovery steam generators (HRSG's). The estimated project lead time is estimated to be 3 years.

Table 2-3
Solar Water Heating Units
Assumptions and Calculations

| | | | |
|---|--|--|---|
| o | Estimated Number of FP&L Customers for 1990 (1) | 3,194,466 customers | |
| o | Assume 50% live in single family units and 20% of these "existing" homes will be retrofitted with a solar hot water system | $\begin{array}{r} \times .50 \\ \times .20 \\ \hline 319,447 \end{array}$ | Existing customers to receive systems |
| o | Estimated Number of FP&L Customers for 1998 (1) | 4,014,689 | Total projected customers |
| | | - <u>3,194,466</u> | Existing estimated customers |
| | | 820,223 | New Customers |
| o | Assume 50% of these customers will be fitted with solar hot water systems | $\begin{array}{r} \times .50 \\ \hline 410,112 \end{array}$ | Future customers to receive systems |
| o | Total number of units (homes) | 729,559 | (319,447 + 410,112) |
| o | Assume a solar hot water system that has an average collector size of 40 sq. ft. will replace 2,100 kwh/year/home | | x 2.1 Mwh/year/home |
| o | Assume heat rate of backed out oil units = 10 MBtu/Mwh | | x 10 MBtu/Mwh |
| o | Assume heating value of oil = 0.151 MBtu/gal | | / .151 MBtu/gal |
| o | Assume barrel size = 42 gal | $\begin{array}{r} / 42 \text{ gal/barrel} \\ \hline 2,415,758 \end{array}$ | barrels of oil (2.4 Mbarrels) |
| o | Assume 81,062 units built/year (729,559/9) | 81,062 units | |
| o | Assume 42.3 person hours to be invested per system for design, manufacture, installation, and maintenance. | | x 42.3 person hours/system |
| o | Assume 2080 work hours/year/person | $\begin{array}{r} \div 2,080 \\ \hline 1,649 \end{array}$ | hours/year/person
employees required |

(1) Source: FP&L's Ten Year Power Plant Site Plan, 1989 - 1998

The condenser cooling system would require a freshwater or a brackish water source. Primary plant stack emissions would be SO₂ and NO₂.

2.8.3.5 Alternative 4 - Construction of a Combined Cycle Coal Gasification Power Plant

FP&L or the applicant would build a combined cycle coal gasification power facility with a capacity of 230 MW at the proposed project site. Gasification is the process by which coal is converted into a combustible gaseous fuel for consumption. The facility would be comprised of a combined cycle power plant with two 115 MW combined cycle units and a gasification combined cycle plant with two 114 MW combined cycle units and a gasification unit. Each combined cycle unit consist of two simple cycle gas turbines with associated heat recovery steam generators (HRSG's) and a steam turbine. The estimated project lead time is 4 years. The condenser cooling system would require a freshwater source to cool through evaporation and heat transfer. Plant stack emissions would primarily be SO₂ and NO₂.

The combined cycle technology has many advantages: relatively low investment requirements, phased construction, high operating efficiency and fuel flexibility (natural gas, fuel oil, or gas derived from coal). The phase construction can begin with the construction of the combustion turbines followed by the steam cycle and then the gasifier.

2.8.3.6 Alternative 5 - Construction of a Conventional Coal-Fired Power Plant

FP&L or the applicant would build a conventional coal-fired power plant with a capacity of 225 MW at the same site as the proposed project. The estimated project lead time is 9 years.

2.8.4 Economic Analysis of the Alternatives Including the Proposed Project

The basis of an economic analysis in the evaluation of the alternatives should be an analysis of the impact on the customer. The FCG in their studies, measures this impact by the cumulative present worth of future revenue requirements (PWRR). In addition, the FCG evaluates alternatives by considering "strategic issues" including the following:

- o Capital investment and financial risk;
- o Construction flexibility;
- o Potential changes in governmental regulations;
- o Statewide fuel diversity;
- o Unit fuel flexibility; and
- o Project lead time.

CHAPTER 3

AFFECTED ENVIRONMENT

3.0 AFFECTED ENVIRONMENT

This chapter describes the existing environment at those locations which could potentially be affected by the proposed project or other alternatives under evaluation. Because the project involves modifications at an existing papermill and because of the cogeneration aspects of the project, certain alternatives are not available.

3.1 AIR RESOURCES

This section provides a summary of the existing air resources at the proposed plant site. Detailed information concerning air resources is presented in Appendix L.

3.1.1 Climatological/Dispersion Characteristics

The terrain surrounding the AES/SKC site is level. Easterly maritime winds blow about 40% of the time which produces a moderate climate. Summers are long, warm and relatively humid. Winters are mild, but occasionally interrupted by invasions of cool to occasionally cold air from the north. The following summary of existing climatological conditions in the Jacksonville area is based on past weather data.

The annual mean temperature at Jacksonville is 68.4°F. June, July, and August are the hottest months, with temperatures averaging near 80°F. December, January, and February are the coolest months with mean temperatures near 55° F. In winter, temperatures fall to freezing or below about 12 times per year. Annual rainfall averages about 54 to 55 inches per year. Rainfall averages over seven inches per month during the summer. Infrequently, heavy rains associated with tropical storms can deposit several inches of rain in a short period of time. The driest months are November, December, and January when precipitation averages less than three inches per month. The highest annual average 10-year, 24-hour rainfall event is about 7.5 inches. The 100-year, 24-hour rainfall event is about 11 inches.

The average relative humidity is about 75%. In the early morning relative humidities average about 90% while afternoon humidities average 55%. Daily sunshine in December averages 5.5 hours; in May the average daily sunshine is 9.0 hours.

Prevailing winds are northeasterly in the autumn and early winter shifting to northwesterly in late winter and early spring. In spring and summer winds move to the southwest then to the southeast as sea breezes exert their influences. Wind speeds average slightly less than nine mph overall. Wind speed are slightly higher during spring than in other seasons. The mean annual morning mixing height at Jacksonville is 1,600 feet. Afternoon mixing heights average about 4,600 feet annually.

3.1.2 Air Quality

The area of Jacksonville bounded by the St. Johns River to the east and south, Trout River on the north and I-95 on the west is a designated non-attainment area for TSP. Violations of both the annual standard (60 ug/m³) and the 24-hour standard (150 ug/m³) are indicated. Average annual TSP values of less than 40 ug/m³ and average 24-hour values of less than 90 ug/m³ are indicative of the outlying areas of Jacksonville.

Annual values of SO₂ in outlying areas of Jacksonville are 5 to 15 ug/m³. Annual values in areas close to major sources have been reported to be in the range of 20 ug/m³. Highest 24-hour values in outlying areas are primarily in the range of 30 to 60 ug/m³, whereas monitors close to the major emissions sources have recorded highest 24-hour averages of 100 to 200 ug/m³ and highest 1-hour averages of 400 to 900 ug/m³. Most of the monitors are significantly influenced by the existing major sources of SO₂. While Jacksonville is considered attainment for SO₂, recent modelling submitted with consideration of downwash have indicated potential violations of air quality standards in certain of the industrial areas.

Annual NO₂ concentrations in outlying areas average less than 20 ug/m³, whereas downtown values are about 40 ug/m³. Some monitors are affected by major point sources and others are presumably influenced by transportation

sources. These values are well below the standard of 100 ug/m³. Maximum CO levels are about 8000 ug/m³ (8-hour average) and 14,000 ug/m³ (1-hour average). These levels are well below the allowable standard of 10,000 ug/m³ (8-hour average) and 40,000 ug/m³ (1-hour average). The 1-hour average State standard for ozone of 160 ug/m³ is often exceeded in the warm summer months; however, maximum values reported have been nearly 300 ug/m³. The entire Jacksonville area is designated non-attainment of the NAAQS for ozone.

Sulfates are associated with acidic precipitation and therefore have received more attention in recent years even though there are no ambient sulfate standards. In 1979 FDER determined that concentrations of sulfate had a mean of 9.06 ug/m³ with a range of 2.90 ug/m³ to 18.20 ug/m³. Acid rain measurements in the Jacksonville area during 1978 to 1979 indicated a volume weighted pH of 4.74.

3.1.3 Existing Air Pollution Sources

The locations of major air pollution sources in the area is depicted in Figure 3-1. In addition to these major sources, there are a large number of minor sources in the area which also contribute to air pollution. The emission characteristics, stack parameters, and locations of the significant existing sources in the area for SO and TSP are presented in Appendix L along with the sources from the proposed project. The FDER is working with a number of the existing sources to resolve the modeled SO₂ violations.

3.1.4 Regulatory Framework

This section summarizes the Federal and State regulatory requirements for air emissions that the CBCP must meet. Also included is a summary of air emission regulations which would have to be met for alternatives.

Figure 3-1

3.1.4.1 Federal Regulatory Requirements

The Cedar Bay facility will have to meet two major Federal requirements: National Ambient Air Quality Standards (NAAQS) and Prevention of Significant Deterioration (PSD). The NAAQS establishes a limit for air quality degradation in areas of the United States. The PSD program limits the amounts of increase (increment) over a baseline level above which a new source may not deteriorate air quality.

The 1970 Clean Air Act Admendments (CAAA) required the Federal Government to set standards for ambient air quality for the principal type pollutants (criteria pollutants) and the levels of each that should not be exceeded for the protection of public health and welfare (Table 3-1). In areas where the air quality does not meet these standards (non-attainment), new pollution sources are restricted through the requirements of pollution offsets. Prior to the construction of a new significant contributor of the non-attainment pollutant in or near a non-attainment area, an equal or greater reduction of that pollutant from another pollution source in the area must be secured. This generally precludes the development of major industries in a non-attainment area due to the expense of obtaining the required emissions offset.

In areas with air quality cleaner than the NAAQS, PSD applies. PSD restricts the amount of air quality degradation in an area to a specific amount (increment). PSD applies to sulfur dioxide (SO₂), particulates (TSP), and nitrogen oxides (NO_x). The amount of incremental increase depends on the classification of the area affected (Table 3-2). In Class I areas, which are predominately large national parks, the increment is very small. A moderate increment is allowed in Class II areas, while the greatest increments are allowed in Class III areas. Presently there are no Class III areas in Florida.

Two additional Federal regulations associated with PSD include the New Source Performance Standards (NSPS) and Best Available Control Technology (BACT). Fossil fuel-fired steam generating units of more than 250 MMBtu/hr of

Table 3-1

Table 3-2

heat input produce three types of emissions for which USEPA has established NSPS (44 CFR (113) 3357933624, June 11, 1979). The applicable NSPS for these pollutants from coal-fired units are as follows:

- o Particulate Matter - 0.03 lb/MMBtu heat input and 20% opacity based on a six minute average.
- o Sulfur Dioxide - 1.2 lb/MMBtu heat input and a 90% reduction in potential SO₂ emissions is required at all times except when atmospheric emissions are less than 0.60 lb/MMBtu per hour heat input. When SO₂ emissions are less than 0.60 lb/MMBtu heat input, a 70% reduction in potential emissions is required. Compliance with the emission limit and percent reduction requirements is determined by continuous monitoring to obtain a 30-day rolling average.
- o Nitrogen Oxides - 0.6 lb/MMBtu heat input for bituminous coal and a 65% reduction in potential NO_x emissions based on a 30-day rolling average expressed as NO₂. The percent reduction is not controlling as USEPA has determined that compliance with the emission limitation will assure compliance with the percent reduction requirement.

In addition to these requirements, the Clean Air Act (CAA) as amended in 1977 and the implementing PSD regulations require a case-by-case evaluation of BACT for projects the size of the CBCP. BACT is defined as follows in the Federal regulations:

"Best available control technology means an emission limitation (including a viable emission standard) based on the maximum degree of reduction for each pollutant subject to regulation under the Act which would be emitted from any proposed major stationary source or major modification, which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs determines is achievable for such source or modification through application of production processes or available methods, systems, and techniques, including fuel cleaning or treatment or innovative fuel combustion techniques, for control of such pollutant. In no event shall application of best available control technology result in emissions of any pollutant which would exceed the emissions allowed by any applicable standard under 40 CFR Part 60 and Part 61."

3.1.4.2 State Regulatory Requirements

The Florida rules and regulations pertaining to air quality are similar to the Federal regulations. The Florida Air Quality Regulations are defined in Florida Administrative Code Chapter 17-2, and administered by the FDER. The primary difference between the Federal requirements and Florida's requirements is in the NSPS. Florida's NSPS are as follows:

- o Particulate Matter 0.1 lb/MMBtu, two hour average and 20% opacity.
- o Sulfur Dioxide 1.2 lb/MMBtu, maximum two-hour average, no percent reduction requirement.
- o Nitrogen Oxides 0.7 lb/MMBtu, maximum two-hour average.

3.2 SURFACE WATER RESOURCES

This section describes the existing water resources which may be affected by the proposed Cedar Bay project. Detailed information concerning the surface water resources is presented in Appendix M. The waters of concern include the St. Johns River and the Broward River. The proposed will share the existing paper mill discharge pipeline to the St. Johns River. The Broward River serves as the western boundary of the proposed site. These rivers have been classified by the State of Florida as Class III waters designated for recreation fish and wildlife propagation (Florida Administrative Code Chapter 17-3.161). Where a discharge to these waters occurs, the water quality criteria may apply beyond a designated mixing zone. In addition, at the point of discharge (POD) the concentration of any toxic pollutant must be less than the 96-hour LC50 for a species significant to the indigenous aquatic community. Florida statutes allow variances or other relief from water quality criteria if ambient levels of constituents in State waters exceed the specified water quality standards (FAC Chapter 17-3.031). This allowance is significant since AES-CB has applied for a variance for the discharge of iron from the CBCP.

3.2.1 St. Johns River at Jacksonville

At the CPCP site, the St. Johns River runs in an east-west direction lying south of the site. The existing paper mill discharge pipeline extends into the river approaching the main shipping channel. The river in the vicinity of the proposed project is greatly influenced by the Atlantic Ocean. Due to the tidal influence, currents are highly varied and the flow in the St. Johns River may change direction up to four times per day. The estimated freshwater flow in the St. Johns River is approximately 9300 cuboc feet per second (cfs). In 1979-1980 flow measurements were made in the river approximately three miles east of the site. Velocities varied from 0.45 ft/sec to 1.76 ft/sec during flood tide and 0.43 to 1.79 ft/sec and ebb tide. Flows varied from 40,000 cfs at flood stage to 29,000 at ebb stage. On some occasions during a dry fall with strong northeast winds, the river may reverse flow for a period of time.

Data collected over the past few years in the river showed that ambient water quality concentrations of the following pollutants were found to exceed the State water quality standards for Class III marine waters: Aluminum, Total residual chlorine, Copper, Total coliform, Cyanide, Iron, Mercury, Oil and grease, Silver.

3.2.2 Broward River

Water quality data for the Broward River just up stream of its confluence with the St. Johns River was obtained from the Jacksonville Department of Health, Welfare And Bio-Environmental Services. Data indicates occasional violations of State water quality standards for pH, Iron, Lead, and Copper.

3.2.3 Surface Water Uses

The St. Johns River is under the jurisdiction of the St. Johns River Water Management District (SJRWMD). The SJRWMD has formulated policies to ensure a continued adequate supply of surface water for various uses including public, industrial, power generation, irrigation, rural, and recreational. Primary surface water uses in the site vicinity include cooling, navigation, and recreation. Population growth in the region as well as increased leisure time has resulted in a high demand for recreational uses. The St. Johns River is a prime recreational resource. Boating, water skiing, and fishing are enjoyed by both residents and tourists in the area. The St. Johns River is also used for commercial navigation serving domestic and foreign cargo lines at the Port of Jacksonville including Blount Island as well as ports up stream as far as Sanford.

3.2.3.1 Water Withdrawal

Total freshwater use in the Lower St. Johns River Basin (from Lake St. George to the Atlantic Ocean) in 1975 was estimated to be 398.8 mgd. Of this total, groundwater use was estimated to be 213.2 mgd and surface water use was estimated to be 185.6 mgd. In 1975, nearly all freshwater consumption for rural water use, irrigation, and public drinking water supply was developed from groundwater resources, principally from the Floridan aquifer.

In 1986, a total of 133.72 mgd was withdrawn from the Floridan aquifer for power generation uses. A significant portion of water use for industry and power generation was developed from surface water sources, principally the St. Johns River.

The Northside Generating Station, St. Johns River Power Park, and the Seminole Kraft paper mill are the major users of surface water from the St. Johns River in the area. JEA withdraws approximately 806 mgd and Seminole Kraft presently uses up to 60 mgd for cooling purposes. Groundwater uses are substantially less than surface water uses within a five mile radius, although groundwater consumption represents a significant portion of total water use at Seminole Kraft.

3.2.3.2 Water Discharges

When the CBCP goes into operation, the existing Seminole Kraft Corporation power boilers, bark boilers, and chemical recovery boilers will be taken out of service. As a result, the existing once-through cooling system will no longer discharge 30,000 gpm of heated water to the St. Johns River. Seminole Kraft currently discharges 13,889 gpm of wastewater from its industrial wastewater treatment system to the St. Johns River.

3.3 GROUNDWATER RESOURCES

This section summarizes the groundwater resources in the Jacksonville area. Detailed information on groundwater resources can be found in Appendix N.

3.3.1 Regional Groundwater Systems

Peninsular Florida's sedimentary rock sequences consist of about 8,000 feet of marine, littoral, and terrestrial deposits. The Paleozoic and Mesozoic sequences comprise about 5,000 feet while Cenozoic strata extend from the ground surface down to a depth of approximately 3,000 feet. The Cenozoic sediments include the following geologic and hydrologic formations pertinent to this project:

- o The Cedar Keys Limestone which is the lowest confining unit (aquiclude) for the Floridan aquifer;
- o The Floridan aquifer which includes the Lake City Limestone, the Avon Park Limestone, and the Ocala Group;
- o The Hawthorn Formation which is the upper confining unit for the Floridan aquifer; and
- o The Choctawhatchee Formation.

The post-Miocene sediments in peninsular Florida are characterized by a complex series of unconsolidated sands, clays, and shell. Where present, undifferentiated upper Miocene and Pliocene sediments consist of poorly sorted sands, gray clays, and shell beds with abundant mollusks. Pleistocene and Holocene comprise the upper 10 to 90 feet in northern peninsular Florida. These are yellow to tan sands with scattered thin clay layers. These sediments contain a second important source of fresh water known as the shallow aquifer system. This aquifer lies between the ground surface and a depth of approximately 100 feet.

The proposed CBCP site is underlain by the shallow aquifer system and the deeper Floridan aquifer. The Floridan aquifer lies between 400 and 600 feet deep and consists of two distinctly separate zones referred to as the upper and lower permeable zones. The upper permeable zone is the principle source of fresh water in Duval County. Wells penetrating the full depth of this zone typically yield 1,000 to 2,000 gpm by artesian flow. Development of the lower permeable zone has been limited since adequate yields of fresh water are obtained from the upper zone. Recharge to the Floridan aquifer in this region occurs in western Putnam and Clay Counties and eastern Alachua and Bradford Counties. Recharge occurs where rain and surface water enter the Floridan aquifer through breaches in the overlying aquicludes. Groundwater movement in the Floridan is from these recharge areas to the north and east.

Two shallow aquifers underlie the Cedar Bay/Seminole Kraft site, the water table aquifer (-7 to -30 feet) and the shallow rock aquifer (-40 to -100 feet). They are collectively referred to as the shallow aquifer system. The shallow aquifer produces water that is generally acceptable for most domestic, commercial, and industrial uses. Well yields in the shallow aquifer zone are generally less than 100 gpm although yields of up to 200 gpm have been reported. Water wells completed in surficial sands (water table aquifer) generally yield less than 10 gpm. One well completed in a sand bed yielded in excess of 40 gpm. Recharge to the shallow aquifer system occurs from rainfall and surface water. Movement of ground water at the plant site is generally towards the rivers (Broward River or St. Johns River). The water table aquifer lies about seven feet below the ground surface in the plant area.

3.3.2 Groundwater Use

The Floridan aquifer is the principal source of fresh water for the Jacksonville area. Users include utilities, private domestic water systems, the military, commercial businesses and industry. In 1988, the Floridan aquifer provided approximately 163 mgd for Duval County. A breakdown of groundwater use in the surrounding area includes the following estimates:

| <u>User</u> | <u>Amount (mgd)</u> |
|-----------------------------|---------------------|
| Public Water Supply Systems | 84.9 |
| Other Domestic Uses | 15.5 |
| Industry | 38.1 |
| Agriculture/Irrigation | 18.8 |
| Thermal Electric | 5.6 |
| Total | 162.9 |

The potentiometric surface for the Floridan aquifer in Jacksonville was observed to be declining at a rate of 0.5 to 2.0 feet per year between the 1940's and 1962 due to increased pumping. Wells on Fort George Island to the East of the site have shown evidence of salt water intrusion. Localized depressions have been observed in the vicinity of Eastport and Jacksonville

where heavy pumping occurs. U.S. Geological Survey (USGS) files indicated in 1979 that the potentiometric surface near the site would be about 35 feet above sea level. Water levels in a nearby USGS observation well has varied from 41 feet to 32 feet over the last nine years. Pumping for the Busch Brewery located several miles to the west of the site has been blamed by local residents for adversely affecting their wells.

3.3.3 Groundwater Quality

State water quality standards for groundwater are contained in rules of the Florida Department of Environmental Regulation Chapter 17-3, Florida Administrative Code, (Sections 17-3.401 to 17-3.404 and 17-22.104, F.A.C.). These standards state that "all groundwater with total dissolved solids of less than 10,000 mg/l are classified as Class 1-B." The water quality criteria (Table 3-3) for Class 1-B are to be applied except within zones of discharge.

The quality of the water from the Floridan aquifer is variable depending on the sampling location, sampling depth, and date of sampling. Average concentrations are listed in Table 3-4. Contaminants such as hydrogen sulfide gas (1-3 mg/l) and chlorides (10-30 mg/l) have been found in wells in the Floridan aquifer in Duval County. Increases in chloride concentrations have been documented in several high yield wells and are attributed to high rates of pumping which cause a distinct cone of depression and lower the potentiometric surface. Chloride concentrations increased during the 1940 to 1962 time period due to heavy pumping. Wells penetrating permeable zones deeper than the Ocala Group generally have higher chloride concentrations because there is less hydrologic separation from the inferior quality water within the Cedar Key Limestone and underlying formations. In some areas, however, confining beds may retard movement between the zones of high and low salinity.

Table 3-3

Table 3-4

Testing of water samples from Floridan aquifer wells on or near the Seminole Kraft site indicate that the water is of the calcium bicarbonate type. Seminole Kraft well No. 2 showed increases in concentrations of sodium, conductivity, dissolved and total solids in the 1972-1975 time period. That well displayed higher values than other wells located at a greater distance from the River. Sampling in 1983 also indicated that the conductivity in Well No.'s 1 and 2 had significantly higher conductivity values than other wells tested.

Water in the "shallow-rock" aquifer and the intermediate sand zone at the site is also of the calcium-bicarbonate type. Some sodium and chloride ions are present as a higher percentage of the total ionic weight in the water. Water in the water table aquifer has a lower concentration of total dissolved solids than that of deeper aquifers and other shallow aquifers. In general water produced from the water table and shallow rock aquifer has a quality that compares favorably with both State criteria for Class 1-B waters. In the instance of the existing Seminole Kraft property, however, the long term accumulation of spent lime mud has led to contamination of the shallow aquifer. The pH has been elevated in some areas. Metallic ions such as zinc, mercury, arsenic, cadmium, chromium, and lead show values in excess of State water quality criteria. Copper and nickel levels are elevated as is phenol and certain hydrocarbon compounds due to oil spills on site.

3.4 EARTH RESOURCES

This section includes descriptions of the existing local and regional physiography, topography, soils, and geology of the proposed CBCP site. The site is located in the St. Johns River Basin, an elongated area of approximately 11,200 square miles in northeast Florida. The area is underlain by limestone and sands of Pleistocene to Eocene age and the surface is generally comprised of sands and gravels of Pleistocene and Holocene terrace deposits. The terrace deposits parallel the shoreline and form the topography of northeast Florida.

3.4.1 Physiography and Topography

Florida can be divided into three major transpenninsular physiographic zones: the Northern or Proximal Zone; the Central or Mid-peninsular Zone; and the Southern or Distal Zone. The CBCP site is in the Northern Zone. The topography of the site is controlled by Pleistocene marine terraces and beach ridges bordered by tidal marsh and estuaries of the St. Johns River. The site topography is gently sloping from the northeast to the southwest with surface elevations varying between 20 feet and sea level. Surficial deposits are sands, silty sands, and clayey sands to depths of 55 to 80 feet.

3.4.2 Soils and Geotechnical Conditions

Borings made on site show that the natural deposits are very erratic. In some areas the site has been used to store lime mud and wood chips. Borings show that these materials may be as much as 19 feet deep, overlying the natural soils. Natural soils are medium to dense sands and silty sands that vary greatly with depth and from one location to another, typical of marine terrace deposits. These soils are about 80 feet deep and overlie the Hawthorne formation. The Hawthorne formation consists of interbedded sandy clays, clayey sands, and limestone. It serves as the Floridan aquifers confining unit. Due to the high water table (three to eight feet below ground level) and the loose, unconsolidated nature of the soils, special construction techniques will be necessary to provide a firm foundation.

Foundations for heavy structures may be a combination of friction and bearing piles, driven into the dense sands or the Hawthorne formation. More lightly loaded structures could be placed on shallow footings, mats, or piles as necessary. Site improvements using ground modification techniques, such as deep dynamic compaction, vibroflotation, or vibro-replacement are possibilities to reduce or eliminate deep foundations. Removal of lime mud and wood chips will also be necessary.

3.4.3 Regional Geology

Peninsular Florida is part of the Eastern Gulf Coast Sedimentary Basin with a sedimentary sequence of limestones, dolomites, evaporites, and unconsolidated sands, gravels, and clays that ranges in depth from 8,000 feet in northern Florida to 18,000 in the southern portion of the state. These strata are of late Mesozoic to Recent ages. The present land surface is covered with Pliocene and younger unconsolidated sediments resulting from fluctuations in sea level. They are generally marine terrace and beach ridge deposits. Eocene and younger rocks comprise the strata encountered at the surface and are penetrated by most water wells in the area. The principal aquifers used in the Jacksonville area are of Eocene or younger age.

3.4.4 Site Geology

The site is covered with unconsolidated sediments of the Pleistocene to Recent age that are primarily marine terrace and beach ridge deposits. These sands and gravel overlie Mio-Pliocene deposits and the Hawthorne formation. The Mio-Pliocene strata consist of semi-consolidated sands, gravels, shells, and clay materials. The Hawthorne formation is the upper confining layer for the Floridan aquifer in most areas and consists of clays, sands and some limestones.

Unconformably beneath the Hawthorne formation lies the Ocala Group. At the site the Ocala is approximately 450 feet deep. The Ocala Group overlies, in descending order, the Avon Park Lime-stone, the Lake City Limestone, and usually the Oldsmar Limestone. These strata are limestones and dolomites, generally very permeable, and yield high quantities of groundwater.

3.5 AQUATIC AND TERRESTRIAL ECOLOGY

This section provides a summary of the existing biological resources in the vicinity of the CBCP site. Since the site is presently in use as a paper mill, on site terrstrial resources are limited.

3.5.1 Aquatic Ecology

The proposed CBCP site is adjacent to the extreme northern portion of the St. Johns River. Aquatic communities near site are typical of southeastern estuaries, but are currently stressed by poor water quality caused by elevated nutrient and pollutant loadings. Aquatic plants important to the ecology of the estuary include phytoplankton, periphyton, and emergent marsh vegetation. These primary producers support animal life within the estuary either directly or via production of detritus (dead plant material). Aquatic animal life in the area includes zooplankton, benthic invertebrates, fish, and marine mammals, including an occasional manatee. Although stressed by poor water quality, the St. Johns River in the vicinity of the Seminole Kraft paper mill is nevertheless a highly productive estuarine area.

The CBCP will utilize the existing Seminole Kraft discharge system. The Seminole Kraft discharge must be considered as part of the existing environment. The CBCP will reduce the volume of SKC's discharge and slightly change the chemical concentrations of the combined discharge. The elimination of once-through cooling water flow due to use of the off-stream cooling towers will reduce negative impacts on aquatic organisms due to entrainment and impingement.

3.5.1.1 Flora

Phytoplankton are the most important primary producers in the open waters of the St. Johns River estuary. Densities, rates of production, and species composition of phytoplankton populations all indicate that the River is subject to excessive nutrient and pollutant loadings. The USCOE (1976) reported that diatoms were the most abundant phytoplankton in waters of Duval County. Studies at the JEA Northside Generating Station a few miles east of the site, showed that phytoplankton communities were dominated by pennate and centric diatoms, dinoflagellates, and cryptomonads with occasional reports of green and bluegreen algae blooms (JEA 1976). JEA (1976) indicated that total densities of algae ranged from 200 to 6,750 organisms/ml during a one-year study period. Periphyton populations in the upper St. Johns River are composed primarily of diatoms (Weston, Inc. 1978). Periphyton are important primary producers in area salt marshes (JEA/FP&L 1981a).

Tidal salt marshes border the CBCP site on both the south and east sides. The dominant emergent plants in these areas are black needlerush (*Juncus roemerianus*) and salt marsh cordgrass (*Spartina alterniflora*; *S. patens*). Areas of the Broward River and the St. Johns River in the vicinity of the Cedar Bay site are bordered by narrow marshy areas with growths of black needlerush and cordgrass. Extensive undisturbed tidal salt marshes also border Dunn's Creek to the east of the site. Submerged aquatic vascular plants occur in seasonally flooded wetlands on one small area of the site. Tidal salt marsh communities provide nursing, spawning, and/or feeding habitats for many species of commercially important fish and shellfish. Salt marshes also produce large amounts of dead plant material (detritus) which supports the estuarine food web. These communities also maintain the ecological balance of the estuary by helping to filter pollutants, nutrients, and sediments which otherwise might flow directly into sensitive nursery and spawning grounds. Wetlands also act as aquifer recharge zones and help to maintain salinity patterns.

3.5.1.2 Fauna

Zooplankton. The principal zooplankton in the St. Johns River estuary are copepods of the genus *Acartia*, cladocerans, larval forms of benthic animals (primarily barnacle nauplii and cypris larvae), arrow worms (*Sagitta* sp., and mysid shrimp (JEA/FP&L 1981a). Zooplankton are an important intermediate component of estuarine food webs. They are preyed upon intensively by many commercially important species (e.g., menhaden) as well as by non-commercial but ecologically important fishes (e.g., anchovies, silversides).

Macroinvertebrates. Benthic macroinvertebrate populations in the study area are dominated by polychaetes, obligochaetes, and small crustaceans (JEA/FP&L 1981a). Benthic population densities in the vicinity of the site are generally low with scattered, high density patches of several opportunistic species. Benthic invertebrates are consumed by redfish, sea trout, croakers, and many other predators.

Oysters, shrimp, and crabs are abundant in the St. Johns River estuary. Commercial shrimp and blue crab spawn offshore and move into tidal creeks and salt marsh areas of the St. Johns River near the site where they grow and mature. Commercially important species include white shrimp (*Penaeus setiferus*), brown shrimp (*P. aztecus*), pink shrimp (*P. duorarum*), and blue crab (*Callinectes sapidus*). A limited amount of oysters are commercially harvested from a small area in northeast Duval County (USCOE 1980). The FDER has not approved the St. Johns River in Duval County for shellfish harvesting, however (JEA/FP&L 1981a).

Fish and Ichthyoplankton. The St. Johns River estuary supports an abundant and varied fish community both seasonal and permanent residents of the estuary (mummichog, menhaden, weakfish, perch, spot, spotted seatrout), anadromous species (shad, striped bass), occasional oceanic species (bluefish, tarpon, jacks) and strays from freshwater areas (gars, catfish). Freshwater creeks, tidal creeks, and the St. Johns River have been previously surveyed in the vicinity of the site (JEA/FP&L 1981a). This study lists 113 fish species of fish from the estuarine portion of the St. Johns River. Many of these species are commercially important and use the area near the site as spawning and nursery grounds during different seasons of the year. The availability of these areas is essential to the maintenance of a visible commercial fisheries industry.

3.5.2 Terrestrial Ecology

Northeastern Florida falls within the southern mixed forest category as defined by Kuchler (1964). The region is characterized as a tall forest with broadleaf deciduous and evergreen species. Dominant trees are sweetgum, southern magnolia, slash pine, loblolly pine, and oaks. The following discussion deals with the proposed site. Communities on most of the surrounding CBCP site have been either highly disturbed or eliminated.

3.5.2.1 Site Area Vegetation

The proposed project site is located on industrialized land which has been used for pulp mill operations for at least 30 years. During that period complete alteration of the natural vegetation of the area has occurred. The majority of the onsite vegetation consists of a mix of annual and perennial weedy invasive species. A narrow band of trees has grown up along the bank of the Broward River. A majority of the site is covered by weedy species such as briar, ragweed, dog fennel, and Bermuda grass. Shrubby grounse trees occur along the river and on certain isolated portions of the site. Other species in shrubby wooded sections consist of black cherry, wax myrtle, and cabbage palm. Along the shore of the Broward River is a *Spartina-Juncus* marsh.

3.5.2.2 Site Wildlife

Onsite wildlife habitat is limited, scattered in small patches, and is of poor quality. Wildlife use of the site is limited to those species which are able to adapt to human activity and a disturbed, industrial environment. Animals observed on site include rabbits, snakes, tortoises, and armadillos. Raccoons, skunks, mice, and opossums are likely onsite. Larger mammals such as deer may occasionally visit fringe areas of the pulp mill site due to lack of useful habitat.

3.5.2.3 Biologically Sensitive Areas and Resources

Biologically sensitive areas on the CBCP site include the *Spartina-Juncus* marsh bordering the river and habitats for rare, threatened, or endangered species. The marsh system bordering the Broward River is a part of the estuarine system of the St Johns River. It provides habitat for breeding and nursery functions for aquatic organisms.

According to the Florida Natural Areas Inventory, there are no records of federally or Florida listed threatened or endangered species onsite. However, the West Indian Manatee, a federally and Florida endangered species, inhabits the waters of the St. Johns River and has been observed in

the Broward River. On the northern portion of the Seminole Kraft site occurs habitat suitable for the gopher tortoise. The gopher tortoise harbors in its burrows at least 30 types of commensal animals, including the indigo snake. It is a federal C2 candidate species and a species of special concern in Florida. Avian species of concern that may visit the site include Bachman's sparrow, snowy egret, Louisiana or tricolored heron, and the red cockaded woodpecker. The American alligator inhabits ponds, lakes, and rivers. It may potentially be onsite near the river or north of the site in a small wetland area. Due to a recent increase in population it has been reduced in rank to a federal listing of "threatened due to similarity of appearance" and a Florida listing of special concern. Its superficial resemblance to the rarer American crocodile has resulted in its current continued federal listing.

Shallow freshwater, brackish, and saltwater wetlands are the habitats of wading birds such as the little blue heron, snowy egret, and Louisiana heron. These wading birds are species of special concern to Florida and may utilize the shallow waters and low-tide mudflats near the proposed site. The water adjacent to the site may also be a hunting area for osprey.

No rare, threatened or endangered specie of vegetation are found on site.

3.6 CULTURAL RESOURCES

A summary of the available cultural resources in the vicinity of the CBCP site is presented in this section and in Appendix Q. Cultural resource data, including comments from the State Historic Preservation Officer (SHPO) of the Florida Department of State Division of Historical Resources (FDS DHR), are available to describe the existing environment at the proposed CBCP site.

The CBCP site is located within the Northern St. Johns Archaeological Area. This region between the mouths of the St. Johns and St. Marys Rivers is referred to as a transition zone between the Georgia Coastal tradition and the St. Johns tradition of East Florida (Wood and Rudolph 1980b). Many of the

recorded prehistoric shell middens and mounds along the St. Johns River have been destroyed by residential and industrial development (FDAHR 1980). Sources of information on the project area include the 1976 cultural resource survey of Duval County (FDAHR 1980), a cultural reconnaissance report (Wood and Rudolph 1980a), a report of the testing of eleven archaeological sites (Wood and Rudolph 1980b), and the applicants' SCA/EID (AES/SKC 1988). These sources indicate no presence of an archaeological district within the project area which would be eligible for nomination to the National Register of Historic Places (Percy/Tesar 1988).

Site-specific cultural resources information for the CBCP site was requested from the Florida SHPO. The SHPO stated in a letter dated August 4, 1988:

"A review of the Florida Master Site File indicates that no significant archaeological and/or historical sites are recorded for or considered likely to be present within the project area. Therefore... it is the opinion of this office that the proposed projects will have no effect on any sites listed, or eligible for listing, in the National Register of Historic Places, or otherwise of national, state, or local significance. The project is consistent with the historic preservation aspects of Florida's coastal zone program, and may proceed without further involvement of this agency."

3.7 EXISTING SOCIAL AND ECONOMIC CONDITIONS

The analysis of existing socioeconomic conditions focuses primarily on the CBCP region. Because the locations associated with the other alternatives are not limited to specific sites or communities, the socioeconomic analysis of existing conditions is restricted to this region. A detailed discussion of socioeconomic conditions is presented in Appendix R.

The primary impact area of the CBCP project is considered to be the City of Jacksonville and Duval County. This area will be referred to as the project area. The six surrounding counties which include Baker, Clay,

Flagler, Nassau, Putnam, and St. Johns Counties are considered to be secondary impact areas and will be referred to as the project region. The following analysis identifies the existing social and economic conditions of both the project area and project region which could be affected by the proposed CBCP projects.

3.7.1. Population Levels

The population of the seven counties of the CBCP project region grew from approximately 662,705 in 1970 to 798,981 in 1980, an increase of about 20.5%. The population of this region is expected to reach 1,116,684 by the year 2000 with Duval County continuing to be the most densely populated county throughout the time period. Duval County is not expected to experience the greatest rate of growth, however; instead, Flagler County is expected to increase in population by 30% and Clay County is projected to increase over 250% by 2000 (Table 3-5).

The most densely populated areas within a five mile radius of the proposed site are located south of the St. Johns River. The majority of the area within five miles of the proposed project is rather sparsely populated and lies north of the St. Johns River. The 1980 population within this five-mile radius was estimated by the Jacksonville Area Planning Board to be 20,800 with a projected growth to 33,120 by the year 2000 (JEA/FP&L 1981a).

3.7.2 Economic Conditions

Employment in the project region from 1970 to 1978 increased at a rate slightly greater than the nation. The growth of employment for the State, however, occurred at a rate slightly higher than that of the project region. The growth of the civilian labor force of each county in the project region varied greatly with the labor force of Duval County increasing 20% (232,630) by 1978 while Flagler's more than doubled (3,450). Overall, Flagler and Clay counties showed the greatest rate of growth for this time period although Flagler was the lowest in terms of absolute numbers of individuals (Table 3-6).

Table 3-5

Table 3-6
Estimated and Projected
Civilian Labor Force
(NEFRPC 1979 in JEA/FP&L 1981a).

| <u>Year</u> | <u>County</u> | | | | | | | <u>Total</u> |
|-------------|---------------|-------------|--------------|----------------|---------------|---------------|------------------|--------------|
| | <u>Baker</u> | <u>Clay</u> | <u>Duval</u> | <u>Flagler</u> | <u>Nassau</u> | <u>Putnam</u> | <u>St. Johns</u> | |
| 1970 | 3,092 | 9,531 | 220,070 | 1,470 | 7,143 | 13,091 | 11,058 | 265,455 |
| 1978 | 5,220 | 21,540 | 232,630 | 3,450 | 12,500 | 16,590 | 15,620 | 307,550 |
| 1980 | 5,950 | 25,520 | 254,060 | 4,290 | 14,050 | 17,260 | 18,120 | 339,250 |
| 1985 | 7,590 | 34,030 | 275,910 | 6,020 | 17,640 | 19,930 | 22,450 | 383,570 |
| 1990 | 9,050 | 39,700 | 296,250 | 7,010 | 20,550 | 23,130 | 26,390 | 422,080 |
| 1995 | 10,300 | 44,750 | 316,880 | 7,910 | 22,770 | 25,955 | 29,310 | 457,875 |
| 2000 | 11,630 | 49,740 | 336,530 | 8,840 | 25,150 | 28,820 | 32,490 | 493,200 |

The rate of unemployment for the project region from 1973 to 1979 has not changed as drastically as for the State or nation as a whole (Table 3-7). Over the time period, the national rate increased from 4.9% in 1973 to 8.5% in 1975 and then dropped steadily to 5.8% in 1979. The unemployment rate in Florida varied even greater than the nation between 1973 and 1975, rising from 4.3% to 10.7%, and then declining to 6.0% by 1979. The rate for the project region also showed significant fluctuation. The rate increased from 4.8% to only 6.7% in 1975, dropped to 6.3% in 1976, increased again to 6.8% in 1977, and then declined to 5.7% by 1979.

The average gross weekly earnings for production and/or nonsupervisory workers from 1970 to 1978 were higher for the project region than for either the State or the nation (Table 3-8). The average weekly earnings in the Jacksonville SMSA rose from \$122.36 in 1970 to \$243.36 in 1978 (98% increase). In contrast, the State average rose from \$118.78 in 1970 to \$207.36 in 1978 (75% increase), while the national average rose from \$119.83 to \$203.70 (59% increase). The 1970 per capita income of each county in the region, however, was below the national and State averages. Duval County is expected to maintain the highest per capita income while Baker is expected to continue having the lowest per capita income. Similarly, Duval County has accounted for over 86% of the total personal income of the seven county region since 1970.

3.7.3 Community Services

Minor project-related impacts on community services and facilities are expected to occur in Jacksonville/Duval County. While there may be some secondary impacts realized in other counties of the project region, it is not expected that their public or private services and community infrastructure will be directly affected by the CBCP project. Consequently, this analysis only addresses the community services of Jacksonville/Duval County.

Table 3-7

Table 3-8
Weekly Earnings
(U.S. Department of Labor 1980 in JEA/FP&L 1981 (1))

| Area | 1970 | 1978 | % Increase |
|----------------------|----------|----------|------------|
| Jacksonville SMSA(2) | \$122.36 | \$243.36 | 98.9 |
| Florida | \$118.78 | \$207.46 | 74.6 |
| National | \$119.83 | \$203.70 | 58.8 |

- (1) Earnings are for production and/or nonsupervisory workers.
- (2) Jacksonville SMSA is the Jacksonville Standard Metropolitan Statistical Area and includes Baker, Clay, Duval, Nassau, and St. Johns Counties.

3.7.3.1 Water Supply and Wastewater Treatment

The Jacksonville/Duval County public works service function includes sewage, water, and sanitation services. At present, each component is operating with excess capacity. The sewage component has a current service level capacity of approximately 71.1 million gallons per day (mgd) while the current demand is about 50.7 mgd or an excess of approximately 21 mgd. The current service level capacity of the water component is about 178.3 mgd while the current resident demand is approximately 57.1 mgd or an excess of over 121 mgd. The current service level capacity of the sanitation component is 1,112,800 total pounds per day. Resident demand for this public service function is about 863,920 total pounds per day, resulting in an excess capacity of approximately 248,880 total pounds per day (Duval County Public Works Department 1979 in JEA/FP&L 1981a).

3.7.3.2 Public Safety

The public safety service function includes law enforcement and fire protection. Based on US Department of Commerce standards, the law enforcement component for 1979-80 has adequate personnel to meet public demand in the Jacksonville/Duval area. A city of this size reportedly requires 1,325 enforcement officers and support personnel to satisfy the public demand. Jacksonville/Duval County currently has a staff of 1,485 which actually represents an excess of 160 full-time personnel (JEA/FP&L 1981a).

The fire protection component is also currently operating well within protection standards for a city of this size. The Jacksonville/Duval County Fire Department has a first due response radius of 2 miles or less for engine companies and 3 miles or less for ladder companies with each having a pumping capacity of 500 to 1,500 gallons per minutes (Duval County Fire Department 1980 in JEA/FP&L 1981a).

3.7.3.3 Education

The public school system of Jacksonville/Duval County currently has the physical capacity to accommodate the project total enrollment of approximately 102,600 students for the 1980-1981 school year. The current physical capacity of the school system in pupil stations is slightly more than

107,000, resulting in an excess of approximately 4,400 pupil stations (Duval County Public School System 1980 in JEA/FP&L 1981a). There are also approximately 60 private and parochial schools located in Duval County. These schools range from 3 grades to 13 grades (k-12) and include two special education centers (Jacksonville Area Planning Board 1979 in JEA/FP&L 1981a). The Jacksonville area also has several postsecondary educational institutions.

3.7.3.4 Health Care

Based on US Department of Commerce standards, a city of Jacksonville's size should maintain a public health staff of approximately 750 personnel. At present, the public health service function of Jacksonville/Duval County has a staff of only 165, resulting in a deficiency of approximately 590 personnel (JEA/FP&L 1981a). One explanation for this public health service deficiency could be the abundance of non-public health facilities (hospitals) in the city. The various private hospitals in Jacksonville/Duval County are currently maintaining a service level of approximately 1,065,000 patient days. With a current resident demand of about 779,200, this equates to a current excess of approximately 286,000 patient days or a 73% capacity level. The capacity benchmark utilized by a majority of the area's hospitals is 80% (JEA/FP&L 1981a).

3.7.3.5 Housing

At present, there are approximately 223,000 total available housing units in Jacksonville/Duval County (JEA/FP&L 1981a). The types of housing units considered in this analysis are single family homes (owned or rented), apartments, and mobile homes. The resident demand for housing in Jacksonville/Duval County is approximately 211,800 which results in a current housing surplus of over 11,000 units (Jacksonville Area Planning Board 1978 in JEA/FP&L 1981a). The predominant type of residence in Duval County is single-family units, comprising 64.3% of the total housing stock (JEA/FP&L 1981a). Mobile homes account for 6.7% of the total stock while multi-family dwellings make up the remaining 20%. Of 211,506 units surveyed in 1976, 94.4% were determined to be in standard condition, 3.9% were substandard but suitable for rehabilitation, and the remaining 1.7% were substandard beyond

repair (JEA/FP&L 1981a). The apartment boom of the early seventies created a larger supply of multi-family units than demand could support, resulting in a high vacancy rate. This rate has lessened somewhat over the past few years, but is still quite high compared to single family units. Data for October 1979 reveal a vacancy rate of 1.9% for single family homes while multi-family units exhibit a vacancy rate of 5.0% (Jacksonville Area Planning Board 1980a in JEA/FP&L 1981a).

3.8 LAND USES, RECREATIONAL RESOURCES, AND AESTHETIC CONDITIONS

This section addresses the existing land uses, recreational resources and aesthetic conditions of the areas surrounding the CBCP site. Because the other alternatives considered are not restricted to specific sites and communities, a detailed analysis of existing conditions for any other affected areas is not presented. A detailed analysis of land use, recreational, and aesthetic resources is presented in Appendix S.

3.8.1 Cedar Bay Cogeneration Project Area

The primary impact area of the CBCP is considered to be Jacksonville/Duval County. This area is referred to as the project area. The six surrounding counties which include Baker, Clay, Flagler, Nassau, Putnam, and St. Johns Counties are considered to be secondary impact areas and are referred to as the project region. Land use in the seven county project region is predominantly agricultural with approximately 233,650 acres (82%) devoted to this use. Other land uses in the region include residential; commercial; industrial; and extractive (Table 3-9). The greatest urban-related use in the Northeast Region is residential land use (approximately 102,930 acres or 4%). Low density development are located primarily near the St. Johns River and transportation corridors throughout the region. Medium and high density residential areas are found along the coast and near downtown Jacksonville as well as St. Augustine, Jacksonville Beach, and Atlantic Beach.

In contrast to the region, Duval County has only 58.8% of its land in agricultural uses. The most predominant land use in Duval County is

Table 3-9
Existing Land Use Acreage - Northeast Florida Region
(Jacksonville area Planning Board 1977a in JEA/FP&L 1981a).

| Classification | County | | | | | | | Region |
|-----------------------------------|--------------|-------------|--------------|----------------|---------------|---------------|------------------|-----------|
| | <u>Baker</u> | <u>Clay</u> | <u>Duval</u> | <u>Flagler</u> | <u>Nassau</u> | <u>Putnam</u> | <u>St. Johns</u> | |
| Residential (1) | 2,568 | 11,382 | 58,247 | 1,774 | 7,316 | 10,304 | 11,234 | 102,934 |
| Commercial &
Services | 84 | 845 | 5,754 | 244 | 416 | 534 | 740 | 8,617 |
| Industrial | 83 | 674 | 4,819 | 110 | 300 | 545 | 446 | 6,978 |
| Transportation(2) | 3,849 | 4,284 | 20,677 | 3,296 | 5,167 | 4,288 | 54,564 | 47,125 |
| Communication
& Utilities | 321 | 175 | 843 | 39 | 42 | 1,145 | 176 | 2,741 |
| Institutional | 315 | 67,991 | 26,378 | 188 | 255 | 729 | 673 | 94,530 |
| Recreational (3) | 161 | 1,884 | 6,660 | 264 | 1,861 | 525 | 791 | 12,146 |
| Mixed | - | - | 318 | - | 63 | 430 | 11 | 822 |
| Extractive | 182 | 3,891 | 2,214 | - | 76 | 666 | - | 7,029 |
| Total Developed | 7,674 | 91,126 | 125,909 | 5,916 | 15,495 | 19,166 | 19,637 | 284,922 |
| Total Land Area | 374,144 | 379,520 | 490,048 | 311,872 | 416,000 | 498,368 | 387,008 | 2,856,960 |
| Developed as %
of Total Land | 2.1 | 24.0 | 25.7 | 1.9 | 3.7 | 3.8 | 5.1 | 10.0 |
| Agriculture | 357,562 | 346,971 | 288,240 | 282,378 | 348,452 | 379,452 | 333,306 | 233,652 |
| Agriculture as %
of Total Land | 95.6 | 91.4 | 58.8 | 90.5 | 83.8 | 76.2 | 86.1 | 81.8 |

(1) Includes local streets right-of-way

(2) Includes an estimated 11,316 acres of rights-of-way

(3) Excludes national forest and/or swamp lands and game management areas or refuge

Note: Columns may not total exactly due to rounding.

residential comprising 58,247 acres (11.8%) while industrial institutional, and commercial uses constitute 36,950 acres or approximately 9% of the total land area (Jacksonville Area Planning Board 1977a in JEA/FP&L 1981a).

3.8.1.1 Existing Land Cover

Most of the land within the five mile radius of the proposed CBCP site is within the North District of the City of Jacksonville. A total of 116,545 acres can be considered suitable for development. Of this total, 30,951 acres were covered with urban development in 1985. Of this urban development, some 9997 acres is residential; mostly single family. Most of the residential areas are south or west of the St. Johns River or west of Main Street. Transportation facilities covers 9651 acres within this district. Parks and recreational areas cover 4992 acres.

3.8.1.2 Existing Land Uses

The land use within a five mile radius of the proposed CBCP is concentrated primarily in the northern half of Duval County located near the St. Johns River. Land use in the vicinity of the proposed CBCP is highly related to uses of the St. Johns River and is expected to continue in such related uses (Table 3-10). Demands are heavy for that land which is easily accessible to the river. These demands are primarily for industrial, commercial, residential, and recreational land uses. Recent land use trends in the vicinity of the site since 1985 can be ascertained from building permit data for census tracts 102.01 and 102.02. These tracts are bordered by Duval Station road on the north, by Dunn Creek on the East, by Main Street on the West and by the St. Johns River on the South.

The proposed site is currently zoned for heavy industrial use which may include, by exception, power plant siting. The land contiguous to the north, east, and south of the proposed site is zoned industrial as well. The Broward River is to the west of the site. Approximately 969 acres of the total land in the two census tracts is currently identified as industrial use. Industries are locating in this area not only because of the St. Johns River, but also because of the proximity to interstate highways and the Jacksonville International Airport. In 1985, 10.6% of developable land in Census tracts

Table 3-10
Summary of 1985 Land Use Existing in the Area Surrounding the Plant
(Census Tracts 102.01 and 102.02)(AES/SKC 1988)

| | <u>Census Tracts</u> | | | |
|------------------------------|-------------------------------|-------------------------------|------------------------------|---|
| <u>Land Use</u> | <u>102.01</u>
<u>Acres</u> | <u>102.02</u>
<u>Acres</u> | <u>Total</u>
<u>Acres</u> | <u>Percent</u>
<u>of</u>
<u>Total</u> |
| <u>Controls</u> | | | | |
| Gross Area | 5,565.24 | 5,777.92 | 11,343.16 | |
| Less Water | 624.91 | 938.90 | 1,563.81 | |
| Less Salt Marsh | <u>294.17</u> | <u>362.01</u> | <u>656.18</u> | |
| Net Land Area | 4,646.16 | 4,477.01 | 9,123.17 | 100.0 |
| <u>Urbanized Development</u> | | | | |
| Single Family | 1,089.70 | 436.32 | 1,526.02 | 16.7 |
| Multi-Family | 0.00 | 0.00 | 0.00 | 0.0 |
| Parks and Recreation | 36.05 | 77.39 | 113.44 | 1.2 |
| Institutional | 20.19 | 158.00 | 178.19 | 2.0 |
| Commercial and Service | 44.52 | 30.65 | 75.17 | 0.8 |
| Communications and | | | | |
| Utilities | 33.00 | 13.63 | 44.63 | 0.5 |
| Major Transportation | 186.90 | 316.85 | 503.75 | 5.5 |
| Industrial | <u>179.55</u> | <u>789.01</u> | <u>968.56</u> | <u>10.6</u> |
| Total Urban Development | 1,589.91 | 1,821.25 | 3,411.16 | 37.4 |
| Remaining Developable | | | | |
| Land | 3,056.25 | 2,655.16 | 5,711.41 | 62.6 |

Source: Jacksonville Planning Department, North District Plan.
Jacksonville, Florida, June 1986.

102.01 and 102.02 was devoted to industrial use. Between 1985 and 1988, 24 building permits were issued for industrial sites in this area representing over 44 acres of new industrial development. Most of this industrial development occurred along Hecksher Drive, Eastport and Busch Roads, and Main Street.

Residential land use constituted 16.7% of the developable land in this area in 1985, encompassing 1526 acres and 2977 dwelling units. By September of 1988, residential land use had expanded to approximately 18% of the developable land area due to issuance of an additional 237 residential permits, about 4 miles from the site. The closer residential areas are a mixture of house trailers and single-family dwellings of varying conditions and ages. The area farther from the site is separated by commercial districts and consists primarily of well-maintained, middle to upper income dwellings.

In 1985, less than one percent of the developable land in Census tract 102.01 and 102.02 was used for commercial or service activities. Between 1985 and 1988, 72 building permits were issued representing over 57 acres of industrial development. this development occurred primarily along Main Street, New Berlin Road, and Busch Drive, with some development along Eastport Road and Hecksher Drive.

3.8.1.3 Projected Land Uses

The Northeast Region is expected to experience an increase in urban-related land uses as the decline in agricultural uses continues. However, the growth of urban-related land uses is likely to occur in a restricted pattern. Natural resource factors such as the availability of adequate water supplies may condition the location of such future development. Future land uses within the five mile radius are expected to continue focusing on activities associated with the St. Johns River. Heavy demands are projected for the shores of the river by industry, water-related commercial, and residential land uses. The 2005 Comprehensive Plan by the Jacksonville Area Planning Board calls for port- and water-related industry as well as protected wetland areas in the vicinity of the proposed project (JEA/FP&L 1981a). The area along Heckscher Drive from Interstate 95 east to just north of Blount Island is expected to continue developing as industrial and storage

facilities. By the year 2005, the area of the proposed CBCP should have experienced major industrial development even without the proposed project. Blount Island is expected to continue developing as a center for water-related industries.

3.8.1.4 Existing Zoning

Land in the primary project area is zoned for industrial uses. The proposed CBCP site has been zoned for heavy industrial use (IH). Power plants are permissible uses in IH zones. A 1.9 acre portion of the original site is zoned Open Rural (OR). The City Council declined to rezone this parcel. Consequently AES deleted the 1.9 acre parcel from the site and added a one acre parcel on the pulp mill property that was zoned IH. The paper mill's existing wastewater treatment ponds are located on property zoned OR. The use of the OR land for a wastewater treatment plant was allowed for the paper mill as an essential service. Existing land use ordinances refers to a single industrial use under the Essential Services definition. The City granted an exception on March 16, 1989, to allow the wastewater treatment facility to treat wastewater from the cogeneration plant. The Siting Board found the site to be in compliance with local land use and zoning plans on June 27, 1989.

3.8.1.5 Recreational Resources

Recreational areas in the region center around the coast and the river. Within the five mile radius of the proposed CBCP is the Jacksonville Municipal Zoo between two to three miles southwest of the site. Also within this radius is Yellow Bluff Fort, an undeveloped State park at the site of Confederate Army gun placements which were used in 1862 to protect Jacksonville from Union gunboats. A number of areas also exist that are not officially designated as parks. These areas are normally used for fishing, sunbathing, and picnicking.

Between 7 and 10 miles from the proposed site are two regional parks. One of these parks is the Kingsley Plantation, a State historic and recreational site located on Fort George Island near the beaches. The Jacksonville Area Planning Board (JAPB) estimates that over 35,000 people

visit the plantation each year (JEA/FP&L 1981a). Also located on Fort George Island is the Rollins Bird and Plant Sanctuary. To the east is the 2,500 acre Little Talbot Island State Park. This park provides beach recreation to over 35,000 visitors each year (JEA/FP&L 1981a). The Fort Caroline National Memorial is located approximately eight miles southeast of the site. It is a 120-acre reconstruction of a French fort built in 1564. The JAPB estimates that visitation to the fort averages around 400,000 people per year.

North of Jacksonville on the Florida/Georgia border is the Okefenokee Swamp, a National Wildlife Area. The swamp is over 40 miles long and 20 miles wide and contains abundant wildlife including rare species of flora and fauna. Also located north of Jacksonville at St. Mary's, Georgia is the Cumberland Island National Seashore. Cumberland Island is a National Park offering camping, biking, swimming, and fishing in a natural wildlife setting.

3.8.1.6 Aesthetic Conditions

The site of the proposed CBCP is a relatively flat area on the eastern shore of the Broward River and the western portion of an industrial area. The general vista is open to the south and west due to the rivers. To the south the vista is influenced by industrial development associated with existing oil terminals. Adjacent to the proposed site is the Seminole Kraft Corporation paper mill. The existing view toward the proposed site is dominated by the buildings and stacks of the paper mill.

The viewshed of the proposed site extends mostly to the south because of the St. Johns River and the marshes. Homes located on the western shore of the Broward River are most affected by the view of industrial structures in the area. The only major road south of the St. Johns River that offers a view of the industrial structures close to the proposed site is Fort Caroline Road which runs contiguous up to the marshes and Mill Cove. On the north side of the River south of the proposed site, a view of the proposed CBCP will be possible from Heckscher Drive. This view is presently dominated by the paper mill in the foreground and is typical of the industrialized section of Heckscher Drive. East of the site, the tree cover allows only a limited view of the structures.

3.9 EXISTING TRANSPORTATION

The study area of northeast Florida was considered in order to determine the existing transportation facilities available to the proposed CBCP. The study area includes the transportation facilities of Jacksonville, Florida which will serve the proposed project.

Transportation systems of importance to the Jacksonville area are highways, railroads, airports, and ship facilities (Figure 3-2). Major highways include Interstate Highways 10 and 95 and US Highways 1, 17, 23, and 90. Three rail systems serve the area: the Southern Railway; the Atlantic Coast Line Railroad; and the Seaboard Coast Line Railroad. Only the Seaboard Coast Line (SCX) serves the Cedar Bay area. Major airports include Jacksonville International Airport, Craig Airport, Herlong Airport, and the Mayport Naval Air Field. Major port facilities include Blount Island and the Talleyrand Docks and Terminals.

Roads expected to provide access to the proposed CBCP site are Heckscher Drive, Eastport Road, and Main Street. Traffic counts indicate that (under existing conditions) all signalized locations and roadways in the area operate at level of service C or better with additional capacity available. Level of service C is defined as stable traffic flow where most drivers are restricted in selecting their speed, but where all stopped traffic will clear a signalized intersection. The intersection of I-95 to Heckscher Road and its intersection with Heckscher Drive going toward Main Street, however, is congested during peak periods (JEA/FP&L 1981a).

Jacksonville International Airport is a major asset to the region. This Airport provides commercial service directly to Atlanta and other southeastern cities as well as to several other major airports. In addition, this Airport provides general aviation facilities. It is the only civil airport in the region that is capable of accommodating higher performance, more sophisticated general aviation aircraft (JEA/FP&L 1981a).

Figure 3-2

Jacksonville functions as a major port facility serving the southeastern United States. Port facilities include Blount Island and the Talleyrand Docks and Terminals. Many Jacksonville industries are dependent upon barge and oceangoing vessels for transportation of raw materials and finished products. Port facilities serve as an asset in attracting new industries to the City. The USCOE maintains a channel depth of 38 feet in the St. Johns River near the project area (Moulding 1981).

3.10 SOUND QUALITY

This section describes the existing ambient sound environment for the proposed site. The study area includes noise receptors that could be possibly affected by noise from the CBCP. Noise sources in the area include roadways, railroads, industrial plants, SK paper mill, and airports. A noise survey was performed in March and July 1988, at three locations around the site. One location was at the Junction of Eastport Road and the northeast entrance to the SK paper mill site. Another location was at the junction of Hecksher Drive and Eastport Road. The last location was in a residential area along Cedar Bay Road. Ambient noise levels are listed in Table 3-11. and monitoring locations are shown on Figure 3-3. The noise receptor most likely to be affected by the proposed CBCP is site 3 located near residences along Cedar Bay Road some 2,000 feet west of the site. Measured noise levels ranged from a Leq of 46.3 dBA during nighttime hours to 65.7 dbA during daytime hours. Lmax values ranged from 48.3 dba during nighttime hours to 83.1 dBA during daytime hours. While making measurements, insect noise, a sewage treatment plant and the pulp mill were the most identifiable noise sources. The Cedar Bay Road area would be the most sensitive area for plant induced noises. Other noise sensitive locations would be residential areas along the rail line to the northwest of the site.

Table 3-11

Figure 3-3

3.11 ENERGY RESOURCES

This section summarizes the energy situation in Florida.

3.11.1 Florida

3.11.1.1 Traditional Energy Sources

In 1987, the state of Florida relied on petroleum and natural gas for 59.3% of its energy needs. Petroleum constituted 48.2% and natural gas constituted 11.1% of the total consumption of primary energy. Coal supplies 20.8% and nuclear 7.2% of Florida's energy needs. The state uses less coal, natural gas, petroleum, and nuclear energy on a per capita basis than the average U.S. citizen. Floridians used 26% less energy than the average U.S. citizen in 1987. Part of this difference may be attributed to the lack of heavy industry in the state. Since most of the energy in Florida must be imported, industries which use less energy or renewable resources have a competitive advantage over more energy intensive industries.

In 1987, coal supplied 23.6% of the nations energy, but only 20.8% of Florida's. Nationwide, 84.3% of all coal consumption is for electric generation, compared with 95.6% in Florida. The state's small industrial sector uses relatively less coal. Florida purchased more interstate electricity in 1987, a direct result of higher prices for residual oil.

In Florida homes, air conditioning and water heating are the primary electrical energy consumers. These uses consume a much higher percentage of total residential energy than in other states. Conversely, heating of Florida homes uses far less energy than the national average for heating (Florida Governors Energy Office 1981).

In 1987, 41.5% of Florida's electricity was generated from coal, more than any other fuel. Until 1984, petroleum was the primary generating fuel. Petroleum supplied only 13.5% of the energy used for generation in 1987, compared to the high of 58.3% in 1972. Nuclear fuel provided another 15% of the energy used for generation, while natural gas accounted for 13.6% , both down from 1986. The use of wood and waste as a generating fuel increased significantly over the 1986 level.

Electricity produced by non-utility generators also contributes to the state's total electric supply. Cogeneration is the combined production of heat and electricity from one energy source. Heat and electricity can be produced together at a lower cost than either alone. Several of Florida's businesses and industries that use process heat also generate electricity. Cogeneration can ensure an uninterrupted supply of power.

Cogeneration is encouraged by the Public Utility Regulatory Policies Act of 1978 (PURPA P.I. 95617). This law requires utilities to purchase electricity from qualifying cogenerators at mutually agreeable prices or at the utility's avoided cost ("Avoided cost" is the energy and capacity costs that a utility avoids by purchasing power from the cogenerator.) At this time, Florida has over 800 Mw of cogenerating capacity. Net generation from cogenerators totaled 8.5 million Btu during 1987.

Interstate purchases are an important component of Florida's electric supply. Due to rising petroleum prices these imports increased 44.6% from 1986, but still provided 14.6% of Florida's electricity in 1987. Purchases of out-of-state electricity during 1987 totaled 65 trillion Btu. The majority of interstate purchases are from coal-fired plants located in Georgia, and are frequently referred to as "coal-by-wire."

Electric sales rose 5% in 1987, to a total of 122.128 GWh. The largest increases were in the commercial and industrial sectors both up 6%. Residential sales of electricity were up 4% in 1987.

Within Florida there is a heavier reliance on petroleum in the production of electrical energy than in the nation as a whole. Conversely, coal utilization nationally is significantly higher than in Florida. In the production of electrical energy for Florida's consumers in 1979, petroleum was used for 47.4% and coal was used for 18.6% of the energy production. On a national basis, petroleum was only used to produce 14.5% of the electricity while coal was used to produce 46.1% (Florida Governor's Energy Office 1981).

3.11.1.2 Other Energy Sources

Other energy sources are currently being developed in Florida. These include direct solar, indirect solar (primarily wood burning), alcohol, crop residue, and hydropower. These sources represented only 1.8% (24 trillion Btu's) of the total energy consumption in Florida in 1987. Total energy from direct solar (0.7 trillion Btu's), alcohol (0.2 million Btu's), crop residues, and hydropower (2.7 trillion Btu's) is small. The remainder is attributable to wood and municipal waste burning (21.6 trillion Btu's) (Florida Governor's Energy office 1981).

3.11.2 Peninsular Florida

Peninsular Florida is the portion of Florida east of the Apalachicola River. The utility industry in Peninsular Florida consists of 42 utility systems with 17 utility systems providing nearly 100% of the electric energy generated in the region. In 1987, the net electrical energy capacity in peninsular Florida was 33,913 MW. In order to allow for scheduled and unscheduled interruptions in output from one or more units, reserve margins must be at least between 20% and 25%. Higher reserve margins are suggestive of excess capacity.

3.11.2.1 FP&L

FP&L is an investor owned utility which services retail customers in 35 counties in southern and eastern portions of Florida. As of 31 December 1988, FP&L served a total of 2,953,621 customers. During 1988, the net energy for load generated by FP&L was used as follows (FPSC 1981b):

| <u>User Category</u> | <u>% of Net Energy Used</u> |
|-------------------------------|-----------------------------|
| . Residential | 46.5% |
| . Commercial | 36.9% |
| . Industrial | 6.4% |
| . Street and Highway Lighting | 0.5% |
| . Sales and Resale | 1.9% |
| . Utility Use and Losses | 7.5% |
| Total | 99.7 |

Existing generating capacity and planned additions through 1983 consist of 13 active plants comprised of the following types and numbers of units:

| <u>Unit Type</u> | <u>Number of Units</u> |
|---------------------|------------------------|
| . Nuclear steam | 4 |
| . Fossil steam | 24 |
| . Solid Waste steam | 2 |
| . Gas Turbines | 48 |
| . Diesel | 2 |
| . Combined cycle | 2 |
| . Coal | 2 |
| Total | 84 |

Fuels used to produce a total of 45,000 gigawatt hours (GWH) of electricity in 1979 included 23.0% residual oil, 30% nuclear, 2% coal, and 21% natural gas (FP&L 1980a). As discussed in Section 1.5, FP&L is expected to need additional generating capacity by 1992 (FPSC 1981b).

3.11.2.2 JEA

JEA is a municipally-owned electric utility serving retail customers in Duval County and parts of St. Johns and Clay Counties. As of 31 December 1988, JEA served a total of 278,675 customers. During 1988, the net energy for load generated by JEA was used as follows:

| <u>User Category</u> | <u>% of Net Energy Uses</u> |
|-------------------------------|-----------------------------|
| . Residential | 40.8% |
| . Commercial | 11.1% |
| . Industrial | 39.3% |
| . Street and Highway Lighting | 0.7% |
| . Sales and Resale | 2.2% |
| . Utility Use and Losses | 5.9% |
| Total | 100.0 |

Existing generating capacity in the JEA system consists of four power plants comprised of 2 coal-fired units, 11 oil-fired steam-generating units and 9 gas turbines. In 1988, 4.5 million barrels of oil were consumed. Total energy production from oil amounted to 2,732 GWH. JEA consumed 2.2 million tons of coal in 1988.

3.12 HUMAN HEALTH

A number of studies on mortality have been carried out on a county-by-county basis for the entire United States and for metropolitan areas of the United States. In addition, analyses have been made on the effects on human health of specific chemical elements and compounds. The results of these studies and analyses are summarized in this baseline health section. A more detailed discussion of human health is presented in Appendix W.

3.12.1 Mortality and Morbidity

The mortality data for Duval, Volusia, and Seminole Counties, State of Florida, and the United States are presented in Table 3-12. The data indicate that mortality rates of selected causes during 1978 in Duval County are comparable to national rates except that deaths due to chronic obstructive lung disease and cirrhosis of the liver are higher for Duval, Seminole, and Volusia Counties. The chronic obstructive lung disease group includes bronchitis, emphysema, asthma, and chronic obstructive pulmonary disease. The four causes combined constituted the fifth leading cause of death in 1978 in Florida and in Duval, Volusia, and Seminole Counties. This cause group is probably more directly related to cigarette smoking and/or air pollution than any other with the exemption of lung cancer (State of Florida 1978). The death rate due to heart disease and stroke for Duval County during 1978 was lower than for Volusia and Seminole Counties and the State of Florida.

3.12.2 Lung Cancer in the Jacksonville Area

A county-by-county survey of mortality in the United States (1950-1969) revealed that Duval County has one of the highest rates of lung cancer in the United States. An update of the same survey for the period 1970 to 1975 also indicated that lung cancer mortality among white males in Duval County was the highest recorded among all metropolitan counties of the United States, and was greater than the national average by more than 50% (Table 3-13). A study (Blot et al. 1981) to identify reasons for the high cancer mortality in Duval County and along the northeast coast of Florida concluded that increased risks on the order of 40% to 50% were associated with employment in the shipbuilding, construction, and lumber/wood industries, particularly among

Table 3-12
 Death Rates Per 100,000 Population For Selected Causes
 During 1978 (National Center for Health Statistics 1978
 and State of Florida Department of Health 1978)

| <u>Cause</u> | <u>Duval
County</u> | <u>Volusia/Seminole
Counties</u> | <u>Florida</u> | <u>U.S.A.</u> |
|-------------------------------------|-------------------------|--------------------------------------|----------------|---------------|
| Heart Disease | 376.0 | 550.8 | 530.4 | 334.3 |
| Cancer | 175.4 | 239.1 | 241.3 | 181.9 |
| Stroke | 64.6 | 110.5 | 99.1 | 80.5 |
| Accidents | 40.1 | 44.6 | 47.8 | 48.4 |
| Chronic Obstructive
Lung Disease | 28.7 | 31.4 | 32.4 | 23.1 |
| Influenza | 23.2 | 27.9 | 27.1 | 26.7 |
| Cirrhosis of Liver | 22.8 | 16.5 | 18.5 | 13.8 |
| Arteriosclerosis | 8.4 | 11.7 | 13.4 | 13.3 |
| Diabetes | 12.4 | 16.9 | 17.2 | 15.5 |
| Suicide | 14.6 | 18.0 | 17.1 | 12.5 |
| Homicide | 13.6 | 9.6 | 11.4 | 9.4 |
| Prenatal Condition | <u>11.0</u> | <u>5.</u> | <u>7.6</u> | <u>10.1</u> |
| All Causes | 840.0 | 1,075.0 | 1,103.7 | 883.4 |

Table 3-13
 Morality Rates For Lung Cancer
 (listing of the 10 metropolitan counties (1) in the U.S.A.
 with the highest age-adjusted rates among white males. 1970-75 (2) (3))

| <u>Ranking</u> | <u>County</u> | <u>Mortality Rate</u>
<u>(deaths/yr/100)</u> |
|----------------|-----------------------|---|
| 1 | Duval, Fl. | 93.2 |
| 2 | St. Louis City, Mo. | 90.9 |
| 3 | Baltimore City, Md. | 88.4 |
| 4 | Chesapeake, Va.(4) | 87.2 |
| 5 | Orleans, La. | 86.1 |
| 6 | Mobile, Al. | 83.8 |
| 7 | Jefferson, Ky. | 82.8 |
| 8 | James City, Va. (5) | 80.4 |
| 9 | Chesterfield, Va. (6) | 79.3 |
| 10 | Marion, In. | 77.6 |

(1) Includes all counties with at least 500,000 person-years of observation among white males during 1970-75

(2) Deaths for 1972 are excluded since not all were ascertained for this year

(3) Source, Blot et. al. 1981

(4) Includes the independent cities of Norfolk and Portsmouth

(5) Includes the independent city of Newport News

(6) Includes the independent city of Richmond

workers with reported exposures to asbestos or wool dust. Excess risks were also linked to fishing and forestry occupations, although the number of cases involved was small. It should be noted that although Duval County leads the nation in lung cancer incidence, the overall cancer rate is lower than Volusia and Seminole Counties and the nation.

CHAPTER 4
ENVIRONMENTAL CONSEQUENCES
OF THE ALTERNATIVES AND THE
PROPOSED PROJECT

4.0 ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES AND THE PROPOSED PROJECT

This chapter summarizes the potential impacts of the No Action Alternative and the proposed CBCP on the natural and man-made environment. Section 4.1 defines the criteria used to analyze the impacts of all alternatives and summarizes the criteria applied to each resource area. The remaining sections summarize potential impacts for each resource area.

4.1 CRITERIA FOR THE EVALUATION OF IMPACTS

This section describes the criteria and general approach used to evaluate the potential impacts of the proposed CBCP and the alternatives on the natural and man-made environment. The potential impacts of all alternatives are discussed in Sections 4.2 through 4.13 on a resource by resource basis.

The potential impacts of the CBCP are analyzed in detail using information presented by the applicant and large amounts of information and other analyses gathered and performed during the course of the preparation of the SAR/EIS including the SAR/EIS performed for the Jacksonville Electric Authority St. Johns River Power Park (SJRPP). The large amount of information about the site and details of the proposed project allowed a detailed, relatively quantitative assessment of impacts of the CBCP including estimates of potential changes in the concentration of air and water pollutants in the environment based on modeling. Using this approach, impacts were estimated by comparing the potential changes in the air quality, water quality, and other resource categories to applicable governmental standards. Due to limitations on the amount of information that could be reasonably gathered, however, this approach could not be used to identify impacts of all possible alternatives. Instead, the relative impacts of the alternatives were identified by comparing their resource requirements and general waste generation characteristics to provide indicators of potential harmful effects on each resource category. The general types of criteria used in this analysis are identified in Table 4-1 and their impact is explained in each of the impact analysis sections.

Table 4-1.
Criteria For Estimating Potential Impacts On Resources

| <u>Resource Category</u> | <u>Criteria Employed</u> |
|--------------------------|---|
| Air Resources | . Net change in emissions of SO ₂ , NO _x , CO, HC, and particulates. |
| Surface Water Resources | . Net change in discharge of chloride, heat, trace metals, oil and grease. |
| Earth Resources | . Net changes in total amounts of groundwater used.
. Net changes in total amount of solid waste generated.
. Changes in topography.
. Net change in landfill area. |
| Biological Resources | . Number of acres of habitat required for plant sites and solid waste disposal areas.
. Net changes in air emissions and wastewater discharges.
. Potential occurrence of rare, threatened, or endangered species.
. Potential occurrence of wetlands. |
| Sound Quality | . Predicted increases in equipment noise levels.
. Predicted traffic noise levels. |
| Cultural Resources | . Potential for occurrence of archaeological, historic, or cultural resources based upon criteria of effect defined in 36 CFR 800. |
| Socioeconomic Conditions | . Changes in influx of population in relation to housing availability and capacity of community services.
. Changes in employment (number of permanent and temporary jobs)
. Amount of property tax paid by the utilities and employees.
. Amount of State educational aid.
. Service demands |

Table 4-1.
Criteria For Estimating Potential Impacts On Resources
(con't)

Land Use, Recreation and
Aesthetics

- . Degree of changes of existing land use patterns
- . Changes in zoning required.
- . Consistency with comprehensive land use plans.
- . Total land required.
- . Changes in recreational uses.
- . Changes in aesthetic environment.

Transportation

- . Changes in coal train traffic.
- . Changes in amount of highway traffic.
- . Changes in barge traffic.

Human Health

- . Net changes in air emissions of criteria pollutants.

In order to understand the use of the criteria in the assessment of impacts, it is necessary to understand several basic assumptions and underlying methodologies. The basic alternatives to the CBCP involve maintaining the status quo at the existing pulp mill, constructing new power generation sources at the pulp mill, or purchasing power from another source. It is difficult to ascribe alternatives to cogeneration sites because of the limited industrial plants that require steam as well as electric power and who have sufficient space to allow construction of cogeneration facilities. Seminole Kraft must replace the chemical recovery boiler to comply with state air quality regulations or shut down. The old power boilers and bark boilers are nearing their practical economic life. The Seminole Kraft site is uniquely qualified for a cogeneration facility. The CBCP will allow the facility to modernize and reduce adverse environmental impacts.

4.2 AIR QUALITY IMPACTS

This section considers the potential air impacts due to the construction and operation of the CBCP and the alternatives. Included are discussions of impacts of construction-related emissions, uncontrolled operation emissions, and controlled operation emissions.

4.2.1 Construction-Related Impacts

This section summarizes the emissions due to construction activities, mitigative measures, and resulting impacts. The analysis primarily considers the emissions of fugitive dust.

4.2.1.1 CBCP

Emissions of air pollutants associated with the construction of a power generating station result from clearing and grubbing, excavation, material haulage and handling, and open burning. These activities are common to most major construction projects. The CBCP and its alternatives, with the exception of the No Action Alternative and the Purchase Power Alternative, are therefore assumed to have similar construction-related emissions. Because air emissions from construction activities are difficult to quantify and vary

significantly depending on the control measures implemented, no attempt has been made to quantify these emissions. The production of actual emissions is not critical since control measures for construction-related air emissions have been shown to be highly effective.

The primary air pollutant emitted during each phase of construction is fugitive dust. Control of fugitive dust is primarily accomplished by watering and soil stabilization. Stabilization includes paving or laying down a surface (such as rock or shell) which will reduce the opportunity for particles to become airborne. Other measures for fugitive dust control include careful operation of on-site equipment, reduction of vehicle speeds on unpaved areas, and rapid revegetation of cleared areas after construction.

Open burning is another source of air emissions during construction. Typical emissions from burning activities include particulate matter, carbon monoxide, hydrocarbons, sulfur oxides, and nitrogen oxides. The quantity of these emissions depends largely on the amount and moisture content of the material burned. There are no specific control measures for open burning, although to reduce impacts, burning should be conducted during periods of good atmospheric dispersion.

Exhausts of heavy machinery and truck traffic also are a source of air pollutants, consisting mainly of carbon monoxide, hydrocarbons, nitrogen oxides, sulfur oxides, and particulate matter. These emissions would be minor due to the small number of pieces of equipment and their wide distribution over the project site.

Construction-related air quality impacts are expected to be minimal and of short duration if standard mitigative measures are implemented. Fugitive dust production should be minimized through the use of watering, stabilization, good equipment operational practices, and rapid revegetation of cleared areas. In addition, fugitive emissions from construction activities generally consist of large particles which rapidly settle rather than remain suspended for long distances. This rapid settling will keep fugitive dust impacts restricted to the project site in most instances.

Only minor short-term air quality impacts are expected to result from burning since these operations will be conducted only during periods of good atmospheric dispersion. Burning should be conducted in compliance with local and State regulations, however (Section 5.2 outlines appropriate mitigative measures). Because of the mitigative measures which will be employed, it is not expected that vehicular emissions, fugitive dust, or smoke from burning operations will present any significant air quality problems.

The relative level of construction-related emissions can be correlated with the total amount of land disturbed and the length of time that construction takes place.

4.2.1.2 Alternatives

4.2.2 Operational Impacts

4.2.2.1 CBCP

4.2.2.1.1 Emissions Generated

Pursuant to Chapter 17-2, FAC, and 40 CFR 52.21, the CBCP units 1 and 2 are subject to a review for the Prevention of Significant Deterioration (PSD) of air quality. The Clean Air Act Amendments of 1977 prescribe incremental limitations on the air quality impacts of a new source.

The proposed CBCP will emit seven pollutants in PSD-significant amounts. These criteria pollutants include carbon monoxide (CO), nitrogen oxides (NOx), and lead (Pb) and non-criteria pollutants beryllium (Be), mercury (Hg), fluoride (F1), and sulfuric acid (H₂SO₄) mist.

The FDER has reviewed the PSD analysis submitted by AES-CB and has found that the cogeneration facility would not violate State PSD regulations as contained in Section 17-204, FAC. Additionally, the Preliminary Determination for the CBCP was completed in December of 1989. Federal regulations on PSD (40 CFR 52.21) require the following air quality impacts to be addressed:

- o National Ambient Air Quality Standards (NAAQS)
- o PSD increment impact
- o Visibility, soils and vegetation impacts
- o Impacts due to growth caused by the proposed source
- o "Good Engineering Practice "(GEP) Stack height
- o Best Available Control Technology (BACT)
- o Class I area impacts

After their review, FDER has made a preliminary determination that the construction can be approved provided certain conditions are met. A discussion of the modeling methodology and required analyses can be found in Appendix L.

The predicted impact of the CBCP on the Okefenokee Wilderness area (PSD Class I area) increments is presented as follows:

| <u>Increment</u> | <u>Pollutant</u> | |
|------------------|--------------------|------------|
| | <u>Particulate</u> | <u>SO2</u> |
| Annual | 20% | 50% |
| 24 Hour | 10% | 80% |
| 3 Hour | N/A | 72% |

It appears that the CBCP would not violate the Class I PSD increments in the Okefenokee Wilderness.

The percent consumption of the applicable Class II PSD increments caused by the CBCP and other new sources are as follows:

| <u>Increment</u> | <u>Pollutant</u> | |
|------------------|--------------------|------------|
| | <u>Particulate</u> | <u>SO2</u> |
| Annual | 12% | 12% |
| 24 Hour | 46% | 46% |
| 3 Hour | N/A | 65% |

The CBCP should not violate the increments or cause significant deterioration in the Jacksonville area.

Table 4-2 lists the significant and net emission rates for the entire industrial site and Table 4-3 lists the stack parameters and emission rates for each proposed source of the CBCP and for the existing paper mill sources. Carbon monoxide and lead were modeled using the maximum emissions for the facility alone. The NO₂ modeling was based on the net emission change (proposed minus existing) using an emission rate of 0.36 lb/MBtu which is higher than the revised proposed rate of 0.29/MBtu.

The predicted maximum air quality impacts of the proposed CBCP for those pollutants subject to PSD review are listed in Table 4-4. Sulfuric acid mist is not listed because there is no de minimus level for this pollutant.

Given existing air quality in the area of the proposed facility, emissions from the CBCP are not expected to cause or contribute to a violation of an applicable AAQS. The results of the AAQS analysis are contained in Table 4-5.

Of the pollutants subject to review, only the criteria pollutants CO, NO_x, and Pb have an AAQS. Dispersion modeling was performed as detailed in Appendix L for the proposed CBCP. The results indicate that, except for Pb, the maximum impacts of these pollutants were less than the significant impact levels defined in Rule 17-2.100 (170), FAC. As such, no modeling of other sources was necessary for CO and NO_x. For Pb, there is no significant impact defined in the rule. The maximum 24-hour Pb concentration was used as a conservative estimate of the quarterly concentration. When combined with the background concentration of 0.3 ug/m³ (the highest quarterly average between 1986 and 1987 in Duval County), this results in a total concentration of 0.43 ug/m³ which is well below the Pb AAQS. Therefore, no additional modeling for Pb was required.

The total impact on ambient air is obtained by adding a "background" concentration to the maximum modeled concentration. This "background" concentration takes into account all sources of a particular pollutant that are not explicitly modeled. These "background" concentrations were obtained from Department approved monitors near the CBCP site for 1986 (1985 for NO_x).

Table 4-2
Significant And Net Emission Rates (Tons Per Year) (1)

| Pollutant | Significant
Emission
Rates | Emission
Basis
lb/MBtu(5) | Existing
Seminole Kraft
Power Boilers | Proposed
Maximum
Emissions(2) | Net
Emissions | Applicable
Pollutant |
|--|----------------------------------|---------------------------------|---|-------------------------------------|------------------|-------------------------|
| Carbon Monoxide (CO) | 100.0 | 0.19 | 606 | 2,470 | 1864 | Yes |
| Nitrogen Oxides (NO _x) | 40.0 | 0.29 | 1,201 | 3,774 | 2573 | Yes |
| Sulfur Dioxide (SO ₂) | 40.0 | 0.60(3) | -- | 7,796 | -- | No |
| | | 0.31(4) | 4,472 | 4,029 | -384 | No |
| Particulate Matter (TSP) | 25.0 | 0.02 | 325 | 268 | -57 | No |
| Particulate Matter (PM ₁₀) | 15.0 | 0.02 | 254 | 265 | 11 | No |
| Ozone, Volatile Organic
Compounds (NOC) | 40.0 | 0.016 | 200 | 208 | 8 | No |
| Lead (Pb) | 0.6 | 0.007 | -- | 91 | 91 | Yes |
| Asbestos | 0.007 | -- | -- | -- | <0.007 | No |
| Beryllium (Be) | 0.0004 | 0.00011 | -- | 2 | 2 | Yes |
| Mercury (Hg) | 0.1 | 0.00026 | -- | 3 | 3 | Yes |
| Vinylchloride | 1.0 | -- | -- | -- | <1 | No |
| Fluorides (Fl) | 3.0 | 0.086 | -- | 1,122 | 1,222 | Yes |
| Sulfuric Acid Mist (H ₂ SO ₄) | 7.0 | 0.024 | -- | 308 | 308 | Yes |
| Total Reduced Sulfur (TRS) | 10.0 | (Negligible) | -- | -- | -- | No |

(1) Assumes coal within 3.3% sulfur content and 18.0% ash content and a minimum heating value of 11,000 BTU/lb. At 93% capacity the cogeneration plant will consume .93 x 145 = 135 T/hr of coal.

(2) Assumes a 100% capacity factor for the modified paper mill (kraft recovery boiler, smelt dissolving tank, limestone dryers, and the multiple effects evaporator) and a 93% capacity factor for the cogeneration plant. Also operations will continue 24 hr/days 365 days a year.

(3) 3 hour average

(4) 12 month rolling average

(5) Cogeneration plant's CFB's only

Table 4-3
Stack Parameters and Emission Rates

| <u>Source</u> | <u>Stack
Hgt.
(m)</u> | <u>Exit
Temp.
(K)</u> | <u>Exit
Vel.
(m/s)</u> | <u>Stack
Dia.
(m)</u> | <u>Emission Rates (g/s)</u> | | |
|---|-------------------------------|-------------------------------|--------------------------------|-------------------------------|-----------------------------|-----------|-----------|
| | | | | | <u>NOx</u> | <u>CO</u> | <u>Pb</u> |
| <u>Proposed Sources</u> | | | | | | | |
| CFB Boiler | 129.5 | 403 | 33.22 | 4.27 | 145 | 76.4 | 2.8 |
| Limestone Dryer | 9.1 | 355 | 21.34 | 1.04 | 0.6 | 0.1 | --- |
| <u>Existing Composite
Source Data</u> | | | | | | | |
| Power Boilers | 32.3 | 433 | 20.12 | 1.83 | 23.2 | 1.7 | --- |
| Bark Boilers | 41.5 | 329 | 13.72 | 2.44 | 11.3 | 15.7 | --- |

Table 4-4
Maximum Air Quality Impacts Versus the de minimus Ambient
Levels

| <u>Pollutant Averaging Time</u> | <u>Predicted Impact
(ug/m³)</u> | <u>De minimus Ambient
Impact Level (ug/m³)</u> |
|---------------------------------|--|---|
| CO (8-hour) | 25.0 | 575 |
| NO ₂ (Annual) | <0 | 14 |
| SO ₂ (24-hour) | <0 | 13 |
| Pb (3-month) | 0.13 (1) | 0.1 |
| Be (24-hour) | 0.0017 | 0.0005 |
| Hg (24-hour) | 0.004 | 0.25 |
| Fl (24-hour) | 1.375 | 0.25 |

- (1) The Pb impact is based on a 24-hour modeling value and, therefore, the 3-month Pb average is expected to be significantly less than this value.

Table 4-5
Comparison Of Total Impacts With The AAQS

| <u>Pollutant and
Averaging Time</u> | <u>Maximum
Predicted
Impact
(ug/m³)</u> | <u>Existing
Background
(ug/m³)</u> | <u>Maximum
Total
Impact
(ug/m³)</u> | <u>Florida
AAQS
(ug/m³)</u> |
|---|--|---|--|--|
| CO (1-hour) | 94.10 | 13.0 | 107.10 | 40000.0 |
| CO (8-hour) | 25.00 | 6.0 | 31.00 | 10000.0 |
| NO ₂ (Annual)(1) | 3.80 | 29.0 | 32.80 | 60.0 |
| Pb (3-month) | 0.13 | 0.3 | 0.43 | 1.5 |

(1) Modeled at 0.36 lb/MBtu. Revised emission basis - 0.29 lb/MBtu.

4.2.2.1.2 Impacts on Soils and Vegetation

The maximum ground-level concentrations predicted to occur for the criteria pollutants as a result of the proposed CBCP and a background concentration will be at or below all applicable AAQS including the national secondary standards developed to protect public welfare-related values. As such, these pollutants are not expected to have a harmful impact on soils and vegetation.

4.2.2.1.3 Impacts on Visibility

The proposed CBCP may have an impact on visibility in the area. Visibility is defined as the greatest distance at which it is possible to see and identify with the unaided eye a prominent dark object against the sky at the horizon in the daytime or a known unfocused moderately intense light source at night. Visibility is diminished by four major processes: light scattering by gas molecules, light scattering by particles, light absorption by gases not naturally occurring in the atmosphere, and light absorption by particles. Coal-fired power plants affect visibility through the three major combustion related pollutants: particulates, sulfur dioxide, and nitrogen dioxide. Visibility is decreased by particulates primarily through light scattering due to conversion of gaseous nitrogen dioxide to particulate nitrites; and by sulfur dioxide when it converts to particulate sulfates.

The frequency distribution of the visibility observed at the Jacksonville Imeson Airport over a five-year period is summarized in the application. The average quarterly background visibility at Jacksonville Airport is seldom greater than twelve miles or less than two miles. Visibility conditions greater than or equal to those measured at Jacksonville can be expected at St. Augustine (70 km southeast) and the Okefenokee Wilderness (PSD Class I area) (60-70 km northwest). Equations can be used to calculate background conditions and the impacts of SO_4 , TSP, and visibility at the Okefenokee (PSD Wilderness Class I area) and the St. Augustine historical area. For purposes of this simplified analysis, it was necessary to assume that SO_4 and TSP are the only pollutants contributing to visibility reduction. It was also assumed that the background visibility is twelve miles. The calculated new visibility due to the CBCP was 11.7 miles.

This corresponds to a reduction of approximately two percent (2%) in the visual range at the Okefenokee Wilderness Class I area during worst-case conditions therefore it was concluded that the emissions from the CBCP will not significantly alter the visibility in this area.

4.2.2.1.4 Nonattainment Areas Impacts

The extent of the contribution of the proposed CBCP to the formation of ozone and, therefore, its' impact on the Jacksonville ozone nonattainment areas cannot be estimated through modelling. However, because of the plant's low emission levels of oxidants and hydrocarbons (the primary precursors of ozone), it was assumed by AES-CB that the impacts of the proposed CBCP on ozone concentrations in the Jacksonville area will not be significant.

The impact of the CBCP on the Jacksonville particulate nonattainment area was estimated through modelling and compared with the EPA "significance levels" which are one ug/m^3 for an annual average and five ug/m^3 for a 24-hour average. The TSP nonattainment area basically covers the central downtown area and is at its' closest point ten kilometers from the proposed CBCP.

The annual average impact was calculated using the total TSP emissions from the operation of the proposed plant including fugitive dust emissions from coal handling, waste disposal and cooling towers. The results of the analysis indicate that the annual average TSP impact on the nonattainment area would be less than one ug/m^3 , the EPA significance level. The maximum 24-hour TSP impact would be four ug/m^3 , which is less than the five ug/m^3 EPA significance level.

It, therefore, appears that the proposed CBCP will not have a significant adverse effect on the downtown Jacksonville area.

4.2.2.1.5 Growth-Related Air Quality Impacts

The proposed CBCP is not expected to significantly change employment, population, housing or commercial/industrial development in the area to the extent that an air quality impact will result.

4.2.2.1.6 GEP Stack Height Determination

Good Engineering Practice (GEP) stack height means the greater of: 1) 65 meters or 2) the maximum nearby building height plus 1.5 times the building height or width, whichever is less. The GEP stack height determination is dependent on the distance and orientation to the various buildings near the stack because the projected building width can change.

The applicant calculated the GEP heights for each proposed source based on the dimension of nearby buildings. The GEP height of 129.5m was used in the modelling for the kraft recovery boiler and the CFB boiler. The proposed stack heights for the smelt dissolving tanks is 73.1m, which is less than the calculated GEP height of 129.5m. The stacks for the limestone dryers and the lime kilns are below the GEP limit of 65m. Each of the stacks that had proposed heights less than their GEP limits were subjected to modelling downwash routines.

4.2.2.1.7 Best Available Control Technology (BACT)

The CBCP is to consist of three coal/bark fired circulating fluidized bed (CFB) boilers, coal handling equipment and limestone dryers. The CFB boilers, rated at 3,189 MMBtu, are to burn fuel made up of approximately 96 percent coal and 4 percent bark.

Rule 17-2.500(2)(f)(3) of the FAC requires a BACT review for all regulated pollutants emitted in an amount equal to or greater than the significant emission rates listed in Table 4-2. The NOx emissions from the smelt dissolving tank and the multiple effect evaporators are negligible and were not considered as part of the BACT analysis. The emissions of heavy metals, H₂SO₄, VOC's, and fluorides from the limestone dryers are also negligible compared to that emitted from the CFB boiler and were not considered in the BACT analysis for the CBCP. Details of the BACT Determination procedure and analysis are provided in Appendix L. Generally the air pollutant emissions from cogeneration facilities can be grouped into categories based on what control equipment and techniques that are

available to control emissions from the facilities. The emissions are classified as follows:

- o Combustion Products (Particulates and Heavy Metals).
Controlled generally by particulate control devices.
- o Products of Incomplete Combustion (CO, VOC, Toxic Organic Compounds). Control is largely achieved by proper combustion techniques.
- o Acid Gases (SO_x, NO_x, HCl, F_l). Controlled generally by gaseous control devices.

A review of the impacts associated with the proposed CBCP and the recovery boiler installation indicates that there will be a reduction in the maximum annual impacts. This reduction in the impacts will be attributed to the replacement of three old power boilers and there old recovery boilers which are now exhibiting higher impacts than what will be expected from the CBCP.

The FDER has determined that the levels of control proposed by the applicant for the CFB cogeneration facility represents BACT in most cases. The review indicates that the level of particulate control clearly is justified as BACT for particulate matter, PM₁₀, and other heavy metals. In addition, the levels of control proposed for the coal handling facilities, and for products of incomplete combustion is also representation of BACT.

A review of the proposed control for SO₂ indicates that the inherent removal efficiency provided by the CFB boiler represents BACT. The analyses of alternative control technologies indicates that both the cost of using wet scrubbers and switching to a lower sulfur content coal are cost prohibitive based on BACT cost of control guidelines. In addition to the greater cost of using wet scrubbing, such an alternative has the disadvantage of having to handle and dispose of the scrubber sludge produced.

In addition to the greater cost of using a lower sulfur coal, such an alternative presents the difficulties encountered to establish a coal contract which allows for the handling and transport of ash produced by the CFB boiler.

The CBCP will be located in Duval County which is classified nonattainment for the pollutant Ozone (17-2.16(1)(c) F.A.C.). It will be located in the area of influence of the Jacksonville particulate nonattainment area (17-2.13(1)(b) F.A.C.), however, the plant will not significantly impact the nonattainment area and is, therefore exempt from the requirements of Section 17-2, 17 & 18 & 19 with respect to particulate emissions. The facility must comply with the provisions of PSD (17-2.04 F.A.C.).

The proposed level of control for NO_x from the CBCP, however, is not representative of BACT. The review of the costs associated with using post combustion controls indicates that the cost per ton of using SNCR for NO_x removal from a CFB boiler just slightly exceeds the \$1,000 guideline that is used for NSPS and is well below that which has been justified as BACT for other facilities.

In general, the use of post-combustion NO_x controls has been a strategy which has been evaluated in every BACT review since the "top down" BACT policy was introduced by the EPA in December 1987. In each case, the use of post-combustion controls was rejected due to being cost prohibitive, or on the basis that there was not sufficient operating experience for a particular technical application to demonstrate that the specific application was proven.

For the cases in which the use of post-combustion controls was rejected because of being cost prohibitive, the cogeneration unit was being constructed for peaking purposes only. As this was the case, the facility in question would be operated well below full capacity (peaking units), thereby resulting in cost per ton figures which were well above what has been established as justifiable for BACT.

With regard to the technology being proven, both SCR and SNCR have had operating experience in both Japan and Europe. More recently, several facilities in California have been permitted with SNCR. Compliance testing has indicated that one of the facilities which is now operating (Corn Products) has passed its compliance test. Another operating facility (Cogeneration National) has had trouble meeting the NO_x emission limitation while also maintaining compliance with the CO and SO₂ emission requirements. This plant has continued with adjustments targeted at achieving coincidental compliance.

The applicant has stated that SNCR systems emit various amine compounds formed by unreacted ammonia which represents a potential adverse human health effect. Although it has been demonstrated that ammonia slip does occur, this does not indicate that the technology has not been proven. The use of both SCR and SNCR as representing BACT is becoming more and more prevalent for internal combustion engines, boilers, and turbines. Based on the experience that has been demonstrated on other facilities and the cost effectiveness, it has been determined that the CBCP should incorporate SNCR as BACT for NO_x control.

In addition to the reasons stated above, the use of better than proposed NO_x control is further substantiated based on the location of the proposed CBCP site. The site is located in an area which is designated as being nonattainment for ozone. NO_x are known to be a precursor to ozone and should be controlled to the greatest extent which is deemed to be justified. Based on this analysis, FDER determined that the CFB boiler in conjunction with a baghouse and the SNCR represents BACT for the facility. Assuming a NO_x removal efficiency of 60%, the emission rate for NO_x is lowered from 0.29 to 0.144 lb/MBtu.

Fugitive dust is produced by a number of sources associated with the project. These include the coal handling system, limestone and spent limestone handling system, and pelletized waste handling systems. Also since fresh water cooling towers will be used, EPA has indicated that dissolved and suspended solids in the small droplets fraction (less than 50 microns diameter) of cooling tower drift would be considered fugitive dust in the impact assessment. Appendix L includes descriptions of the control systems and/or methods proposed as BACT for these fugitive dust sources.

The dissolved and suspended solids in the small droplet size fraction of fresh water cooling tower drift is considered by EPA to contribute to total suspended particulates. This contribution is minimized by using high efficiency drift eliminators in the two natural draft towers (which limit drift to approximately .005 percent of circulating water flow) and by maintaining the cycles of concentration of the circulating water to a low level such as a maximum of 1.5. Additionally, a drift eliminator will be provided to mitigate the potential effects of blow-through. Upon reviewing the preceeding information, the FDER also finds that the CBCP will not contribute to significant adverse air quality impacts.

4.2.2.1.8 Acid Rain

In recent years the increase of rainfall acidity levels across Florida and other parts of the country has been ascribed in part to the air emissions from coal-fired power plants. Hence the requirement for emission controls on these plants, designed to reduce the potential acid causing factors. Generally, SO_2 and NO_x are believed to be the primary anthropogenic agents contributing to rainfall acidification. However, a great deal remains unknown about the amount that these two gases contribute to the problem, as well as how and where the acidification takes place.

It should be noted that rainfall under unpolluted conditions tends to be somewhat acidic, on the order of pH 5.6 to 5.7. This is due to the absorption of water in the atmosphere. Also, neither SO_2 nor NO_x in and of themselves are acidic. It appears that after a certain amount of time, estimated to be on the order of 3 to 4 days, these gases interact with sunlight, water vapor, ammonia, and many other chemical compounds in the atmosphere, which converts them to sulfuric acid and nitric acid. Scientists around the world are attempting to determine the rate of these reactions, which catalytic aids (sunlight, water, etc.) have the most effect driving the conversion, ways to prevent the acidic end-product from affecting the environment, where the end product eventually makes it's impacts, and numerous other questions relating to the conversion reactions. It is universally agreed that the entire cause-effect-control relationship is very complex.

There are three issues relevant to the licensing of the CBCP as emission sources in relation to acidic rainfall. These are: (1) why is the problem of concern, (2) what will be the projects contribution to the regional, state and country wide problem, and (3) what controls are required to mitigate the problem?

The following effects have been ascribed to above-normal acidic rainfall. Acid rain is listed as a cause for destabilization of clay minerals, reduction of soil cation exchange capacity, promotion of chemical denudation of soils, and promotion of runoff. Vegetational effects tend to be quite varied, ranging from a few cases of reported beneficial effects, to the more prevalent harmful effects. The harmful effects include foliage damage, alteration of responses to pathogens, symbionts and saprophytes, leaching of essential materials from plant surfaces, and destruction of the protective waxy leaf coatings. Impacts to wildlife are generally indirect, but nonetheless potentially significant via habitat alteration. Effects on aquatic ecosystems begin with changes in water quality. The water quality changes are brought about by acidification via direct input of rainfall (or snow melting in the northern states), indirect changes from erosion and previously impacted soil contributions, as well as a cascading effect wherein the addition of acid components and soil-based catalytic materials frees up often-times toxic metals or other wastes which were previously chemically bound. These problems then effect population balances of aquatic organisms by interfering with breeding and reproduction, poisoning, or elimination of food supplies, which frequently result in termination of particular species within those aquatic ecosystems. These population shifts also occur in the aquatic vegetation, further compounding the problem.

Second, the pH levels in Florida lakes, primarily those in the northern part of the state, have been dropping, e.g., becoming more acidic, over the past two decades. Many Florida's perched sand lakes have little or no buffering capacity and are therefore very susceptible to acid rain.

Trends in data seem to indicate that most of the acidity is derived from SO₂ sources in the northeastern United States. Conversion from SO₂ into sulfuric acid appears to start affecting the environment more than 50 km from the source, and the acid is susceptible to long range transport. Florida is subject to frequent cold fronts moving into the state in the winter months, which are suspected of bringing in northern-based pollutants.

Florida itself has relatively few coal-fired industries at this time, but combustion of oil and gas as well as emissions from heavy industries such as pulp mills and the phosphate industry make significant contributions to SO_x and NO_x loadings. Normal sources of atmospheric sulfur in this state are derived from sea-salt, a non-polluting source which tends to obscure the acidic sulfur components. Hence, in terms of Florida's impact on other parts of the country, this state tends to be the recipient rather than the donor. As more coal-fired industry is utilized, this balance may begin to shift. The impact from a source such as the CBCP would be to contribute slightly to the problem, but would not be registered until some distance from the plant, perhaps 100 km or more. The degree of impact, as implied earlier, is extremely hard to quantify. Some studies indicate that the majority of acidic fallout impacts may occur 200-300 kilometers from the source.

One feature that will mitigate some of the impact of the CBCP is the use of stringent sulfur emission controls during operation. The CBCP will utilize flue gas desulfurization (FGD) via a fluidized bed of limestone sulfur emissions. NO_x will be controlled by boiler design. Such control will also help mitigate the rainfall acidification problem. The primary source of NO_x appears to be automobile emissions.

Construction of new coal fired units may have a slightly positive effect on the acid rain problem in Florida. Data collected during the Florida Sulfur Oxides Study indicated that the conversion of SO₂ to sulfuric acid forms two to three times faster in the exhaust plume from an oil fired plant than from a coal fired plant. Oil fired power plants in Florida do not have emission controls for SO_x or NO_x in most instances. As new coal fired power plants are built with pollution control devices, and as these new coal plants replace the oil plants that emit greater quantities of SO_x and NO_x, then air pollution levels and acidic rainfall may decrease.

4.2.2.1.9 Coal Dust from Trains

The movement of coal supply trains to the proposed CBCP from coal mines outside the state will result in increased fugitive dust levels in areas near the railroad tracks. These increases in fugitive dust levels will be primarily the result of road bed dust emissions and coal dust blowing from the exposed coal contained within each hopper car. The only other quantifiable emissions associated with the coal trains result from the diesel locomotive emissions, which are relatively minor.

For an impact analysis of the coal trains as they move through Jacksonville, it was assumed that trains will travel 500 miles from the mines and that there will be a maximum of one train every three days with 90 cars per train, and a maximum of 106 tons of coal per car. An estimated one percent of coal by weight will be lost as fugitive dust over a journey of about 500 miles with an estimated 90 percent of the total losses escaping during the first few hours of train transit. This implies that only 0.1 percent of the original coal weight will be dispersed as fugitive dust during the rest of the trip, and only a small fraction of the 0.1 percent will be dispersed in the Jacksonville area.

The fugitive dust emissions from agitated road bed dust in the Jacksonville area were estimated using USEPA Publication AP-42 (1979), assuming that the road bed dust emissions are conservatively approximated by emissions from motor vehicles traveling on unpaved roads and that each train will travel at an average speed of ten miles per hour.

The 24-hour average TSP level in the Jacksonville area resulting from the operation of one coal train per day (a conservative estimate) was calculated to be 22 ug/m³ at a distance of 100 meters downwind of the railroad tracks under light wind conditions. When added to the Jacksonville area background level of 50 ug/m³, this total is relatively small compared to the NAAQS secondary standard and Florida standard of 150 ug/m³. It is noteworthy that the amount of the fugitive coal dust which was estimated to blow off the coal cars is about half of the expected emissions resulting from agitation of roadbed dust. This is primarily because of the very conservative method that was employed to estimate roadbed dust emissions.

Trace Elements

Eighteen trace elements were selected for review on the basis of reported high concentrations in coal, capability for volatilization during combustion, potential for toxicity, and existence of regulatory guidelines. Since a coal source analysis has not been provided, trace element concentrations in coal were obtained from a report on trace elements in coal samples from the eastern United States.

The predicted deposition rates were determined on the basis of coal consumption, trace element concentration, and SO₂ emission rates. Elements considered to be volatile were assumed to exit the stack in an uncontrolled manner. Those trace elements typically occurring as particulates or absorbed on particulates were also assumed to exit in an uncontrolled state. These assumptions were utilized due to the lack of information on the behavior of trace elements passing through an FGD system. In addition, the use of these assumptions introduced a degree of conservatism to the assessment.

Studies of model power plants in most cases predicted increases in soil trace element levels of less than 10 percent of the total endogenous concentrations over the life of the model plant. It was concluded that uptake by vegetation would not increase dramatically unless the forms of deposited trace elements were considerably more available than the endogenous forms.

The estimated increases ranged from 1.5×10^{-5} to 1.2×10^{-2} percent, using average soil background concentrations. The estimated increases over the 40 year life of the cogeneration plant, assuming that the elements remained concentrated in the top 25 cm of soil over this period ranged from 5.9×10^{-4} to 4.7×10^{-1} . The assessment of these increases was based on a number of worst case conditions. Under these conditions there should not be a perceptible increase on an annual bases. Over the 40 year cogeneration plant life, those elements exhibiting a higher percent increase relative to the others studied included: arsenic (As), boron (B), cadmium (Cd), lead (Pb), mercury (Hg), and molybdenum (Mo).

The estimated soil concentration increase for As would be 1.48×10^{-2} mg per kg of soil over the 40 year plant life. Naturally occurring As levels in soils average about 6 ppm. Soil As concentrations greater than 2 ppm, soluble form, have been shown to produce injury symptoms on alfalfa and barley and as such no effect could be expected under worst case conditions.

The estimated soil concentration increase for B would be 2.5×10^{-2} mg per kg of soil over the 40 year plant life under worst case conditions. Naturally occurring B concentrations range from 2-1000 ppm with the highest levels found in saline and alkaline soils. The average value is considered to be about 10 ppm. Using a toxicity level of 0.5-10 ppm for plants sensitive to B as a means for comparison, no adverse effects to sensitive species such as citrus would be expected under worst case operating conditions.

The estimated soil concentration increase for Cd would be 1.43×10^{-4} mg per kg of soil concentration over the average background level of 0.06 ppm, which is high in comparison with the other elements addressed. Toxicity to plants is reported to occur when Cd concentration in plant tissues reaches about 3 ppm and it is unlikely that the estimated soil concentration will be high enough for the accumulation of 2 ppm in leaf tissue within the vicinity of the proposed plant.

The estimated soil increase for Pb would be 3.49×10^{-2} mg per kg of soil over the 40 year plant life. Naturally occurring Pb concentrations in soil averages about 10 ppm. Based on reported threshold concentrations of 10 ppm lead in solution culture, the addition of 3.49×10^{-2} mg Pb per kg of soil to soils containing as much as 5 ppm Pb should not result in any adverse effects. It is thought that Pb enters the plant primarily through the leaf surface. However, the effect of such accumulations cannot be predicted due to the lack of information concerning the concentration of Pb in plants due to leaf deposition.

The estimated soil increase for Hg would be 1.19×10^{-4} mg per kg of soil. Naturally occurring Hg concentrations in soil average 0.1 ppm. Most higher vascular plants are resistant to toxicity from high Hg concentrations even though high concentrations are present in plant tissue. Concentrations of 0.5-50 ppm are found to inhibit the growth of cauliflower, lettuce, potato, and carrots. The addition of 1.19×10^{-4} mg per kg of soil is not considered to result in any adverse effect.

The estimated soil increase for molybdenum (Mo) would be 2.73×10^{-3} mg per kg of soil over the 40 year life. Naturally occurring background concentrations average about 2 ppm. Mo toxicity is rarely observed in the field since most plants seem to be able to tolerate high tissue concentration. A Mo concentration of 5 ppm in nutrient solution was found to be toxic to clover and lettuce. It would appear to be unlikely that the contribution of Mo from the proposed plant would result in adverse effects.

Fugitive Dust Impacts

Some of the predominant soils within the boundaries of the proposed CBCP site are highly erodible and as such are considered to have a potential for dust formation.

Various construction activities, including land clearing, open burning, heavy machine operation, vehicle traffic, and road construction will discharge certain amounts of pollutants into the atmosphere. The pollutant generated in greatest quantities by site construction is suspended particulates, also termed fugitive dust. The quantities of dust emitted by the site construction vehicular traffic will be dependent on a number of factors, including the frequency of operations, specific operations being conducted, weather and soil conditions. A large portion of the construction operations, such as land clearing and foundation excavation, will be intermittent and usually of short duration.

Open burning will emit quantities of particulate matter, CO, hydrocarbons, SO_x and NO_x. The burning of cleared land debris will be conducted for short periods. These pollutant emissions will depend on the amount and moisture content of the debris.

Exhausts of heavy machine and truck traffic will be a minor source of air pollutants, consisting of mainly CO, hydrocarbons, NO_x, SO_x, and particulate matter.

The impact of heavy construction activities and site preparation on air quality will be short term and will be confined to the immediate vicinity of the construction activity. This is primarily because most of the fugitive dust created by construction traffic and earthmoving operations consists of relatively large particulates. These large particles tend to settle quickly rather than remaining suspended for long distances. To minimize dust: 1) construction personnel will enter the CBCP site over prepared surfaces and will park in a surfaced lot; 2) there are presently no plans for on-site concrete production; 3) wetting will be employed on dust prone areas, as needed; and 4) laydown areas will be appropriately stabilized. Frequent rain showers will also help to reduce dust levels.

Only minor short-term air quality impacts are expected to result from burning since these operations will be conducted only during periods of good atmospheric dispersion. Burning will be conducted in compliance with local and state regulations.

Since coal unloading, stacking and reclaiming operations can contribute significant pollution problems to the nearby estuary via fallout of airborne emissions, a strong quality assurance program should be implemented. It will be necessary to establish NPDES monitoring stations in the vicinity of the coal facilities at the storm water runoff, sedimentation ponds.

Because of the mitigative measures which will be employed, it is not expected that vehicular emissions, fugitive dust or smoke from burning operations will present any significant air quality problems.

4.2.2.2 Alternatives

4.2.3 Comparism of Impacts

4.3 SURFACE WATER RESOURCES

The potential impacts of the proposed CBCP and the alternatives on surface water resources are summarized in this section. For futher information refer to Appendix M.

4.3.1 Construction-Related Impacts

This section summarizes the potential construction-related impacts that could result from the proposed CBCP and the alternative. The potential effects of surface runoff, and dewatering activities during construction on surface water resources are described. No change from existing conditions is expected under the No Action Alternative and therefore no further discussion of this alternative is provided.

4.3.1.1 CBCP

The construction of the Cedar CBCP will have no appreciable impact on any surface waters. There are no bodies of water on the plant construction site. The area is presently a storage area for lime mud from the paper mill, with very sparse vegetation. Approximately 35 acres of land west of the SK paper mill will be cleared, grubbed or filled. Approximately 10 acres within this area will be covered by coal, ash and limestone storage and handling facilities. A silt fence will be installed along the western perimeter of the site to prevent the deposition of silt in the Broward River as a result of soil erosion during construction.

The Storage Area Runoff Pond will be built early during construction to serve as a construction runoff retention pond. A system of temporary construction ditches and piping will direct the stormwater runoff and the dewatering flow to the pond. Therefore, no increase in runoff to the Broward River is expected, as a result of construction activities.

During construction, temporary sedimentation ponds will be located southwest of the railroad spur. All runoff waters generated within the general boundaries of the rail loop during construction will be directed to these ponds. This runoff is expected to contain little chemical contamination, but will contain suspended solids from soil erosion as well as BOD and nutrients from runoff.

Runoff from areas of the site not disturbed by construction activities will be directed to the natural drainage systems within the area. Runoff from areas of the site disturbed by construction activities or plant operations will be collected in a ditch system and/or catchbasin and underground piping system and directed to ponds as described in the following paragraphs. Drainage systems will be designed for gravity flow wherever site conditions allow.

Generally, the drainage in the area of the new facility will be directed away from the structures and routed to either of the two onsite storage ponds as described below. The drainage along the entrance road for the new facilities will follow the existing drainage pattern, to the south and west. Where required, culverts will be placed under the road to allow for these drainage patterns.

Surface runoff from the coal, limestone, and ash storage areas will be collected and directed into the Storage Area Runoff Pond which is located on the western portion of the site. The coal storage pile, limestone storage pile, and the ash storage pile will occupy approximately 3 acres, 1 acre, and 1 acre, respectively.

The Storage Area Runoff Pond will be designed to contain the runoff resulting from a 10-year, 24-hour rainfall event for the entire storage and associated facilities areas, and the direct precipitation on the pond area. Runoff from precipitation exceeding the 10-year, 24-hour event will be detained and directed to the existing outfall to be discharged at a rate which will not exceed the peak rate of discharge from the undeveloped site resulting from a 25-year, 24-hour storm. Flows which exceed that resulting from the 25-year, 24-hour storm event will be discharged via an emergency overflow chute directly into the Broward River.

Runoff and direct precipitation retained within the Storage Area Runoff Pond will be directed to the Seminole Kraft wastewater treatment facilities. Controlled drawdown of the runoff pond to its normally empty condition will be accomplished through a buried pressure pipeline routed to the runoff treatment facilities.

Yard runoff will be directed to the Yard Area Runoff Pond as soon as it is operational (approximately halfway through the 2-year construction period). This sequencing will allow time for the Storage Area Runoff Pond to be cleaned out and the synthetic liner installed prior to the initial delivery of coal. Once the liner is in place, runoff from storage areas will be collected and treated as discussed above.

Surface runoff from the main plant complex area and yard areas not affected by bulk materials handling will be collected and directed to the Yard Area Runoff Pond which will be located in the western portion of the new facilities area. This pond will be designed to retain, without direct discharge, the volume of stormwater associated with 0.5 inch of runoff from tributary site areas. The Yard Area Runoff Pond will also be sized to detain the runoff volume resulting from the 25-year, 24-hour storm. This volume will be discharged at a rate not to exceed the maximum rate of discharge from the undeveloped site for the 25-year, 24-hour storm. This controlled drainage will be accomplished through a buried pressure pipe system routed to the existing discharge outfall. Any flows in excess of the 25-year, 24-hour storm runoff will be discharged via an emergency overflow chute directly to the Broward River.

Surface runoff from site areas north of the mill dewatering building currently drains to the lime settling ponds located west of the rail spurs. The supernatant from the lowest (northernmost) of these ponds is pumped into the paper mill sewage collection system. After being routed through the existing clarifier and receiving biological treatment, the runoff is discharged at the outfall structure located in the St. Johns River south of the site.

The site area between the dewatering building and the clarifier would naturally drain to the Broward River, Seminole Kraft has constructed berms along the river to provide containment for potential oil spills. Therefore, rainfall which lands on this area collects in localized depressions and eventually percolates to the ground water table.

Offsite runoff will not be collected in the onsite drainage system. Swales will be provided to direct runoff which originates in offsite, upgradient areas around the site perimeter and into existing drainage patterns. These swales will be designed to preserve the existing drainage conditions and water quality to the maximum extent possible.

During plant construction, the peak manpower is expected to be approximately 990 people. Of this number, approximately 274 people are expected to use portable, self-contained toilet facilities. Wastes from the portable facilities will be disposed of off-site by licensed contractors. The remainder of the work force is expected to use temporary and permanent toilet facilities. Wastewater from these facilities will be collected by the existing SK sanitary system which conveys wastewater to the SKC industrial wastewater treatment facility before discharge to the St. Johns River.

Pre-operational boiler and condensate system cleaning wastes will be treated on-site after neutralization in the existing SKC clarifier. The waste cleaning solutions, flush waters, and associated debris will be piped to the retention basin for the neutralization and precipitation of iron oxides. The supernatant will then be treated in the SKC facility. It is anticipated that the effluent will be discharged to the St. Johns River via the SKC discharge pipe.

4.3.1.2 Alternatives

4.3.2 Operation-Related Impacts

4.3.2.1 Proposed Project (CBCP)

The primary source of water for the CBCP is to be groundwater from the Floridan Aquifer. The discharges from cooling tower blowdown and the

wastewater treatment system will be through the paper mills discharge pipe to the St. Johns River. Primary concerns with respect to surface water quality are discharges of arsenic, chromium, heat, copper, iron, mercury, silver, oil and grease, cadmium, aluminum, lead, zinc, pH, and residual chlorine.

4.3.2.1.1 Cooling Tower Blowdown

The dilution flow from the existing paper mill is a main factor in determining the impact of the thermal discharge from the CBCP. The discharge from the proposed plant will be mixed with the paper mill's discharge water and diluted before being discharged to the St. Johns River. Mathematical modeling was performed to predict the average and extreme characteristics of the thermal plumes in the St. Johns River. Under average conditions, the extent of the plume from the combined discharge is predicted to be less than that for the paper mill's discharge alone when operating in the once-through cooling mode. The extent of the thermal plume would decrease over baseline conditions during all months of the year. The modeling performed for the CBCP discharge was based on the assumptions that the CBCP discharged into the paper mill's once-through cooling system, and discharged to the St. Johns River with the industrial waste effluent. The proposed plan is expected to be in compliance with present regulatory requirements for thermal discharges from the paper mill's point of discharge (POD) to the St. Johns River.

The concentration of chemical and physical constituents in the cooling tower blowdown from CBCP will be directly proportional to those in the makeup water. Individual chemical and physical characteristics of the blowdown were calculated by multiplying the corresponding parameter in the makeup water by the 46 or less cycles of concentration estimated for the cooling towers. The circulating water will be treated with chemicals to protect the system and to prevent excessive scaling and corrosion. Sulfuric acid will be added at the cooling tower basin to reduce alkalinity and to control the scaling tendency of the circulating water system. The estimated maximum use of sulfuric acid will be 5,112 pounds per day based on maximum load conditions and expected water quality. Control of sulfuric acid feed will be in proportion in the makeup water flow with a pH basis. Sulfuric acid reacts with alkalinity present in the well water to produce a circulating

water in the desired pH range (7.0 to 8.0). To further inhibit scale deposition, an organic phosphate type scale inhibitor will be automatically fed at the cooling tower basin as a sequestering agent. The estimated maximum use of scale inhibitor based on maximum load conditions is 152 pounds per day as product. Scale inhibitor will be fed automatically on the basis of blowdown flow. The sulfuric acid and organic phosphate will be stored in tanks located in a curbed area beside the cooling towers. The curbed areas will be routed to the existing paper mill waste clarifier via the chemical drains system.

To prevent biofouling of the circulating water system, intermittent shock chlorination will be used. A chlorine solution will be fed into the circulating pump basin through diffusers. The estimated average usage of chlorine will be 493 pounds per day based on a feed rate of 5 mg/l for a total period of one hour per day.

Dechlorination of the cooling tower blowdown will be practiced to preclude discharge of residual chlorine in excess of discharge limits to the St. Johns River. SO_2 or sodium sulfite will be fed to the blowdown for dechlorination. The estimated use of sodium sulfite is approximately 2.3 pounds per day. If SO_2 is used, the estimated usage will be approximately 1.1 pounds per day.

4.3.2.1.2 Other Plant Effluent Streams

Wastewaters from CBCP will originate from a number of sources other than the cooling towers. These include area runoff, coal handling, ash handling, metal cleaning, sanitary wastes, boiler blowdown, and miscellaneous low volume wastes. Effluents from particular operations will be reused where feasible, and when necessary they will be treated prior to reuse. Effluents not suitable for reuse will be collected in lined retention basins or sediment ponds and treated at the paper mill's chemical wastewater treatment facility prior to discharge to the paper mill's oxidation pond. The chemical wastewater treatment facility (Section 2.2.7.2) will be capable of providing treatment for metal cleaning wastes, area runoff, and small volume process wastewaters. In addition, facilities will be provided for sanitary wastewater

treatment and removal of oil and grease. Chemical characteristics of the effluent from the CBCP wastewater treatment system are difficult to predict since the coal and coal waste characteristics have not been identified. The final effluent quality will depend on the type of coal used, intensity and duration of rainfall, and operating characteristics of the treatment process. Nevertheless, effluent concentrations have been estimated on conservative values reported in the literature for waste streams resulting from similar plant operations and average treatment levels achieved by similar processes. These are presented as the combined concentration of all wastewater effluents at the pump sump (Table 4-6).

The cooling tower blowdown and all normal operational wastewater treatment system effluents will be combined as NPDES discharge #001 and discharged to the St. Johns River through the paper mill's discharge channel. At the point of discharge to the St. Johns River, average concentrations are projected by the applicant to comply with Class III water quality criteria. Maximum iron concentrations may exceed the 0.3 mg/l water quality criteria. A variance has been requested when ambient river conditions exceed 0.29 mg/l which would preclude use of a mixing zone.

4.3.2.1.3 Steam Cycle Water Treatment

The CBCP's steam cycle water will be treated with an oxygen scavenger, such as hydrazine, for dissolved oxygen control and with an amine, such as ammonia, for pH control. Sodium phosphate may also be fed to the cycle. Residual phosphate will react with calcium hardness in the boiler to form a nonadherent precipitate. The oxygen scavenger, amine, and sodium phosphate will be stored in the Generation Building. Estimated maximum usages are 8.6 pounds per day of hydrazine and 17.2 pounds per day of ammonia, based on maximum load conditions. The estimated sodium phosphate usage will be approximately 3.9 pounds per day. Boiler blowdown will be reused by routing to the cooling towers for use as makeup.

Table 4-6

4.3.2.1.4 Sanitary Wastewater Treatment

The sanitary wastewater produced by the CBCP will be routed to the existing sanitary facilities at the paper mill. The annual average expected flow of sanitary wastewater is 4,100 gpd (3 gpm) based on an average plant staff of 75 people and an average requirement of 55 gallons per capita per day. The average expected biological loading is 5.6 pounds of BOD₅ per day, based on 0.075 pound of BOD₅ per capita per day.

4.3.2.1.5 Makeup Water Demineralization

The makeup water to the steam cycle will be demineralized using three ion exchanger type demineralizer trains. The demineralizer system will use sulfuric acid for cation resin regeneration and sodium hydroxide for anion resin regeneration. The sulfuric acid and sodium hydroxide will be stored in tanks located in or adjacent to the Water Treatment Building. The use of these chemicals will be on an intermittal basis dependent on demineralizer operation. Based on the maximum plant capacity and makeup requirements, the estimated usage rate for 66 degree Baume' sulfuric acid will be 5,660 pounds per day, and the rate of 100 percent sodium hydroxide will be 4,717 pounds per day. The wastes from this system will be regenerant water containing unreacted sulfuric acid and caustic plus sodium and sulfate salts of the ions removed from the ion exchange resins during regeneration. The estimated regenerant waste flow will average 147,000 gpd based on maximum load conditions. These wastes will be routed to the neutralization basin for pH adjustment and then to the existing Seminole Kraft waste clarifier.

4.3.2.1.6 Return Condensate Polishing

A powered resin type condensate polishing system will be used to remove both suspended and dissolved solids from the process condensate being returned from the paper mill. The wastes from this system will consist of condensate quality water containing the spent powered resin. The production of these wastes will be on an intermittent basis and will depend on the quality and quantity of the condensate being returned. The estimated wastewater flow will average 730 gpd. This wastewater, which contains high

suspended solids, is not suitable for reuse within the water system and will be routed to the existing paper mill's wastewater clarifier.

4.3.2.1.7 Metal Cleaning

The steam generator and preboiler cycle piping will be chemically cleaned initially commissioning and also periodically during the life of the plant. The chemicals used will not be stored onsite and will be administered by means of a temporary system. The chemical cleaning solutions to be used for acid and alkaline cleaning of the boiler will be somewhat dependent on the boiler manufacturer selected. The actual cleaning solutions used must be consistent with the boiler manufacturer's recommendations. Chemicals typically used in boiler and preboiler cleaning include the following.

- . Inhibited hydrochloric acid.
- . Ammonia bifluoride.
- . Hydroxyacetic acid.
- . Formic acid.
- . Disodium phosphate.
- . Trisodium phosphate.
- . Soda ash.
- . Nonfoaming wetting agents.
- . Foam inhibitors.

Wastewaters will consist of the cleaning solutions and material removed during the cleaning process. Since cleaning the metal piping is an infrequent maintenance operation, it does not contribute to the liquid wastes produced by the normal operation of the plant. The preoperational chemical cleaning wastes are estimated to be approximately 180,000 gallons, with subsequent acid cleaning resulting in an estimated additional 105,000 gallons for each cleaning operation. The chemical cleaning contractor will be required to haul offsite and properly dispose of the wastes resulting from chemical cleaning which have metal concentrations in excess of the requirements of 40 CFR Part 423 for new sources. Chemical cleaning wastes that meet the requirements of 40 CFR Part 423 for new sources will be routed to the paper mill's wastewater treatment facility.

Nonchemical metal cleaning wastes will result from periodic washing of the boiler firesides and air preheaters. The frequency of these cleaning operations will be a function of the cleanliness of the equipment and will be determined once the plant is in operation. The air preheater wash water and the boiler fireside wash water will contain dissolved and suspended solids. It is anticipated that both fireside wash water and air preheater wash water will tend to be basic because of the injection of limestone into the fluidized bed boiler and the resulting reaction of sulfur with the limestone to form calcium sulfate. Because the wash waters will not be acidic, the metal content of the wash waters will be minimal. Nonchemical cleaning wastes will be routed to a neutralization basin for pH adjustment and then to the paper mill's wastewater treatment facility.

4.3.2.1.8 Miscellaneous Chemical Drains

Chemical wastewater can result from draining a chemical storage tank, overflowing a chemical tank during a filling operation, or from maintenance operations such as hosing down chemical storage areas. These wastes will be routed to the neutralization basin via the chemical drains system. Flows from the miscellaneous chemical drains will be intermittent and will not normally contribute to the wastewater flows.

4.3.2.1.9 Neutralization Basin

A neutralization basin of approximately 150,000 gallons capacity will be provided for treatment of chemical wastes prior to their ultimate disposal. A basin of this capacity will be sufficient to accommodate the wastewaters produced during regeneration of the makeup demineralizer. The neutralization basin will be a reinforced concrete basin lined with chemical resistant membrane, brick, and mortar. A chemical waste mixer, mounted on a walkway spanning the basin, will be provided to hasten pH adjustment of the chemical wastes. Sulfuric acid and sodium hydroxide, as required to neutralize the pH will be added.

4.3.2.2 Alternatives

Under the No Action Alternative, no cogeneration plant would be built at the proposed project site and no other action would be taken to bring power to FP&L's system. The existing paper mill, would continue to operate. The paper mills once-through cooling water would continue to be withdrawn from the Broward River and discharged to the St. Johns River. Wastewaters would continue to be discharged to the oxidation pond prior to being discharged to the St. Johns River. In the river, ambient concentrations of the pollutants identified in Section 3.2.1 would continue at times to exceed the State water quality criteria for Class III marine waters.

4.3.3 Comparism of Impacts

4.4 GROUNDWATER IMPACTS

4.4.1 Construction - Related Impacts

4.4.1.1 CBCP

4.4.1.2 Alternatives

4.4.2 Operation - Related Impacts

4.4.2.1 CBCP

Any increased production from the Floridan aquifer in Duval County, including the CBCP has the potential for inducing increased chloride concentrations within the aquifer. As noted in the application, on a regional basis higher chloride concentrations in the Floridan aquifer can generally be correlated with high rates of production from the aquifer, particularly from deeper zones (i.e., the lower part of the upper permeable zone of the Floridan aquifer). There is correlation of higher chloride concentrations in the Floridan aquifer with areas of higher production, such as Fernandina Beach, the City of Jacksonville well field, and the Eastport area west of the Seminole Kraft site.

Within the immediate site vicinity, chloride concentrations in Floridan aquifer wells are generally about 40 mg/l. There are exceptions such as a well located on Blount Island where the chloride concentration was 71 mg/l in 1978. This well is 1051 feet deep. Increases in chloride concentrations with time have been observed at other wells near the site (from about 25 mg/l in 1973 to 40 mg/l in 1979; from 23 mg/l in 1973 to 40 mg/l in 1975). One such well is 1025 feet deep, while the depth of the southwestern well is unreported.

Current plans call for using SK paper mill's Florida aquifer production well network consisting of seven (7) wells. CBCP groundwater usage for plant operation and cooling is expected to average 5.44 mgd with an instantaneous maximum demand of 7.0 mgd.

Freshwater use in Duval County is 173.5 Mgal/day, with 158.01 Mgal/day from the Floridan Aquifer. Power generation in Duval County requires 3.09 Mgal/day. The CBCP would increase the daily requirement for power generation to 10 Mgal/day.

Total water withdrawn from the Floridan Aquifer for power generation within the St. Johns Water Management District was 133.72 Mgal/day in 1986. The CBCP would increase the total withdrawn for power generation to 143.72 Mgal/day.

The increased withdrawal from the Floridan Aquifer by the CBCP will increase the core of depression in the piezometric surface of the Floridan aquifer in the area of the present paper mill's well field. The free flowing production capacity of each of the seven wells is approximately 7,500 gpm. Wells 1 & 2 are equipped with pumps; however, they are used on a standby emergency basis. Wells 4, 5, 7, 8, and 9 are used on a rotating basis to produce 20 mgd with a maximum 25 mgd. At maximum individual well production, this would require utilization of two wells at 7,500 gpm and one well at 2,400 gpm.

The CBCP's requirement of an additional withdrawal of 7 mgd (4,900 gpm) from the well field would be equivalent to three wells at a full design withdrawal rate of 7,500 gpm per well. This assumes the paper mill is at maximum usage and would require full capacity of Wells 7, 8, and 9. Since the paper mill will at times use Wells 9 and 8 at full capacity, the additional CBCP usage would be to add full capacity usage of Well 7.

The calculated radius of influence of Well 7 is approximately 800 feet at full capacity production. SK has noted no drawdown effects from adjacent production wells during actual pump operation at a well spacing of approximately 1,000 feet. No wells other than the paper mill's wells are included in a mile radius of influence of Well 7. No wells outside the paper mills well field will therefore be affected. The additional drawdown at the existing wells, due to the added usage of Well 7, will not affect the production capacity of the paper mill's wells.

It should be emphasized that the maximum drawdown effect will be a very short term effect lasting for a period of less than 24 hours.

It would appear that only limited groundwater impacts may be felt by the homes and farms located north and west of the plant site. Due to existing drought conditions the water pressure in artesian wells has dropped significantly. The drawdown caused by the paper mill's production wells could cause an additional slight reduction in artesian flow.

4.4.2.2 Alternatives

4.4.3 Comparism of Impacts

4.5 GEOLOGICAL RESOURCES

4.5.1 Construction - Related Impacts

4.5.1.1 Topography

4.5.1.2 Soils

4.5.1.3 Geology

4.5.2 Operation - Related Impacts

4.5.3 Generation and Disposal of Solid Waste

Solid waste is generated from a number of sources at a power plant. The largest quantity of solid wastes produced by the operation of the CBCP is generated by the fluidized bed system. Coal combustion ash, in the form of fly ash, is the other major solid waste. Collectively, spent fluidized bed media and coal ash are referred to as "high volume solid wastes". Other comparatively small quantities of solid wastes, generated on an infrequent basis by the operation of the plant, include sludges from the sedimentation ponds, retention basins, cooling towers, and wastewater treatment facilities.

Ash is the residue produced by the combustion of coal. It consists of the unburned organic matter and the inorganic mineral constituents present in the coal. The quantity and chemical characteristics of ash depend on the coal, boiler operating conditions, and air pollution control devices among others. Two types of ash are produced during combustion, fly ash and bottom ash. Fly ash consists of the finer particles that are entrained in the flue gas stream. Bottom ash is the coarser, heavier material that accumulates in the fluidized bed media in the form of a loose ash or slag.

Approximately 315,000 million tons per year of bottom ash and spent media are expected to be generated. Maximum rate of production of spent fluidized bed media is expected to be about 56 tons/hour for all units. The spent media will be transported to the pelletizing facility. After pelletizing, the material will be transported to the solid waste holding area.

Fly ash will be generated at a maximum rate of about 38 tons/hour for three units. Fly ash will be pneumatically conveyed to temporary storage silos, before mixing with spent fluidized bed media and water to form pellets.

Compared to the high volume solid wastes, quantities of other miscellaneous solid wastes will be insignificant. These miscellaneous solid wastes will be disposed of in SKC's engineered landfill on-site section.

Periodic removal of sediments from the sedimentation pond will generate a solid waste. Due to the number of variables involved, such as rainfall frequency and duration, concentration of suspended solids in the influent, etc., it is difficult to predict the quantities of sediment removed. Frequency of sediment removal should be once per year or less. Removed solids will consist mainly of coal dust and ash.

Suspended solids in the metal cleaning wastes that settle in the retention basin will also be removed periodically. Solids will consist primarily of ash and iron particles. Removal is expected to occur once every three to five years.

Cooling towers are expected to be drained approximately once per year and the accumulated solids removed. The solids will contain suspended solids from the makeup water and particulates from the atmosphere.

Sludge from the chemical wastewater treatment facility, produced during treatment of metal cleaning wastes, will primarily consist of calcium carbonate and magnesium hydroxide. Quantities will depend on the influent wastewater characteristics and length of operation of the facility. The sludge will be removed as required.

Oil-bearing wastes from the oil-water separators will be collected for off-site disposal or reused by licensed vendors. These wastes may also be incinerated in the boilers along with the coal at selected times.

4.5.3.1 Construction - Related Impacts

Construction activities, such as clearing of the site, building temporary or permanent roads, waste disposal and laydown areas for building materials, are all phases of construction that will affect the site area.

Clearing the site of natural vegetation will be kept to a minimum to minimize erosion and to reduce the negative impacts to terrestrial communities. A relatively small buffer approximately fifty feet wide will be placed around each of the wetland areas contiguous with the Broward River. The natural buffer which results will serve to slightly filter any noise from plant operations and will serve as a slight visual barrier to the plant itself. However, the validity of using such a small buffer to protect the adjacent wetlands and estuary remains dubious.

The paper mill operation has already affected much of the site. Construction areas will be cleared and grubbed. Clearing and grubbing wastes will be disposed of either by burning or burial. If burning is chosen as the best approach, burning operations will be conducted in accordance with local and state requirements. After clearing and grubbing, the construction areas will be graded and appropriate measures will be employed to control erosion such as seeding and grassing the lightly traveled laydown areas. Heavily traveled construction areas and roads will be stabilized with shell or rock. Dust from high traffic areas will be controlled with water sprinkling.

The entrance from East Port Road during construction will be a paved or coated surface road used primarily by construction personnel. It will provide a route to the employee parking area which is to be located to the east of the boiler building.

The access road from Eastport Road will be paved both during and after construction. During construction, this entrance will be for material receiving. The road will be 20 to 24 feet wide. Once the CBCP is complete, this access road will be rerouted and will serve as the main entrance for the proposed plant.

The railroad spur will come off the existing SCX spur to the paper mill. The spur will approach the plant from the north.

Waste materials will be disposed of in accordance with applicable rules and regulations. A number of waste materials such as scrap wood and iron will be taken to a specified open area of the site where they will be separated and stock piled for possible salvage. General waste materials will be disposed of in dumpsters for collection and possible disposal at the city landfill adjacent to the site or other suitable and approved local landfill areas. Lime mud waste will be excavated and moved to a secured landfill on the north of the paper mill property.

4.5.3.2 Operation-Related Impacts

4.6 IMPACTS ON SOUND QUALITY

4.6.1 Construction - Related Impacts

4.6.1.1 CBCP

Noise impact projections were made for construction activities. The highest noise levels will result from earthmoving activities, which will be conducted concurrently for all units.

Estimated construction noise levels (excluding pile driving and steam blowout) at the nearest residence will vary throughout the course of the construction period. The maximum noise level predicted at that residence is 65 dB(A). This level will be attained only during normal working hours for approximately 1 and 1/2 years and will be in compliance with the Jacksonville noise control ordinance. The construction noise impact at this location will be noticable. However, this 65 db(A) level is above EPA's guideline of 55 dB(A) for protecting against outdoor activity interference. This means that occasionally there may be some interference of outdoor activity at this location. There should be less of an effect on indoor activity since about a 15 dB(A) reduction in noise levels can be achieved by closing windows and doors.

Two other construction activities which will have noise impacts are pile driving and blowout of the steam lines just prior to start-up of the plant. One pile driver operating intermittently during the first year will produce peak impact levels of 101 dB at 50 feet as the hammer strikes the pile. This level will be reduced to between 60 and 65 dB at the nearest residence and will sound like a distant thumping at a frequency of several blows per minute.

Steam blowout is the procedure whereby the steam lines in the plant will be cleared of welding and any other debris by blowing them out with high pressure steam prior to plant start-up. This activity will generate the greatest noise levels, 129 dB(A) at 50 feet, associated with plant construction. However, the duration is short, less than 3 minutes per blow, and the total number of blows is estimated to be 20.

4.6.1.2 Alternatives

4.6.2 Operation-Related Impacts

4.6.2.1 CBCP

4.6.2.2 Alternatives

4.6.3 Comparism of Alternatives

4.7 AQUATIC AND TERRESTRIAL ECOLOGY

4.7.1 Construction - Related Impacts

4.7.1.1 CBCP

4.7.1.1.1 Terrestrial Wildlife

Construction of the proposed CBCP and it's associated disposal areas will disturb or eliminate approximately thirty acres of poor quality, previously disturbed wildlife habitat, with the pine flatwoods being most affected. Since the paper mill operations have cleared most of the area already, and thereby reduced the value of this community as a habitat for wildlife, additional destruction of these areas will certainly hasten the demise of the biota associated with these areas. Site preparation will also destroy smaller, less mobile mammalian, reptilian, and amphibian populations in those areas designated for development. Based upon the applicant's field studies, these groups generally exhibited low population densities, and few species were encountered in each taxa. However, no data were provided on how important these animals are in relation to the ecology and the trophic structure of various communities at the site.

No wide spread negative impacts on ecologically sensitive areas can be expected. Mitigative measures will be utilized to minimize adverse impacts such as the construction of a storage area runoff pond to intercept runoffs from site preparation and plant construction which will prevent significant impacts resulting from increased turbidity and TSS inputs to the river populations dependent on the marsh and river for food or cover. The pond will be designed to provide a 24 hour retention of runoff produced by a 10 year, 24 hour design storm and retain accumulated solids. Effluent from the pond is to overflow a weir into the Broward River.

The construction will impact some of the resident gopher tortoise (*Gopherus polyphemus*) population. The den of a Gopher Tortoise is extremely important as a retreat or hibernaculum to no less than 30 vertebrate and invertebrate species, and many of these organisms rely exclusively on the tortoise burrow. While the Eastern Indigo Snake (*Drymarchon corais*; Threatened) and Florida Gopher Frog (*Rana aroleata aesopus*; Rare) were not encountered on the site, no studies were designed to determine whether or not these species were present. The Gopher Frog is a nocturnal amphibian which emerges from its retreat only after dark, and hence, may be more abundant than previously indicated. Moler (1980) has noted, however, that the Indigo snake populations are quite low in Duval County, but no data are available for the CBCP site. Because tortoise populations have already been significantly reduced as a result of operations which are currently underway, and because the significance of the impacts incurred by this species due to additional disturbances cannot be firmly predicted, it is important that maximum protection be afforded the gopher tortoise. It may be necessary to relocate gopher tortoise populations as well as some of the associated commensal species.

The marshes adjacent to the site appear to be ecologically important as feeding grounds for numerous aquatic and terrestrial species. Many wading birds such as the Great Blue Heron (*Ardea herodias*), Great Egret (*Casmerodius albus*), Louisiana and Night Herons (*Hydranassa tricolor* and *Nicticorax* spp, respectively), and Wood Stork (*Mycteria americana*), which are commonly observed in the marsh areas, are increasingly faced with widespread habitat losses in Duval County (over 200,000 acres of marsh have already been diked or drained along the St. John's).

4.7.1.1.2 Aquatic Life

Site preparation and plant construction activities may adversely affect aquatic biota encountered in one on-site freshwater pond. While this area is only a directly important habitat to those species with short life cycles (due to the ephemeral nature of ponds), such organisms are essential components of the terrestrial food webs. Although no commercially important, rare, or endangered species were observed in the freshwater habitat, American alligator (*Alligator mississippiensis*) could, theoretically, be expected to inhabit this area occasionally.

Aquatic organisms inhabiting rivers bordering potentially be affected by increased turbidity resulting from surface runoff. Smaller, non-motile organisms would be expected to incur the greatest damage, and it is not clear how the loss of this food source would affect predators in aquatic food webs. If adequate storm water runoff controls are exercised as proposed by the applicant, these effects could be minimized.

Construction dewatering pumpage and runoff from rainfall would be diverted to a storage area runoff pond which is to be constructed in an area adjacent to the Broward River. Effluents from such a pond would overflow a weir and eventually empty into the Broward River. However, dewatering pumpage will contain concentrations of iron, arsenic, copper, mercury, nickel and zinc which exceed State standards for Class III Waters. Since the pond is only designed to control TSS and turbidity problems, there is a serious concern about introducing these toxic heavy metals into the riverine ecosystem. Surface water drainage from the site will be controlled in order to insure that drainage waters will conform to applicable standards.

Estuarine areas adjacent to the CBCP site provide valuable feeding and nursery grounds for numerous finfish and shellfish, some of which are commercially important. The American Alligator (*Alligator mississippiensis*), a threatened species, regularly frequents the area. Marine mammals observed in the area are protected by federal, state and international law and include the West Indian Manatee (*Trichechus manatus*) and common dolphin (*Delphinus delphus*). Since these nearshore estuarine environments and the biota which inhabit them would ultimately receive the brunt of the runoff wastewaters associated with plant activities, it is crucial that extensive precautionary measures be seriously considered and implemented. Site preparation and plant construction are not expected to adversely affect biota encountered in the Broward River or St. Johns River since this area is well removed from the construction activities. Furthermore, these waters are not expected to receive storm water or sanitary waste discharges or other effluents resulting from construction-related activities.

4.7.1.2 Alternatives

4.7.2 Operation-Related Impacts

- 4.7.2.1 CBCP
- 4.7.2.2 Alternatives

4.7.3 Comparison of Impacts

4.8 IMPACTS ON CULTURAL RESOURCES

4.8.1 Construction-Related Impacts

- 4.8.1.1 CBCP
- 4.8.1.2 Alternatives

4.8.2 Operation-Related Impacts

- 4.8.2.1 CBCP
 - 4.8.2.2 Alternatives
- #### 4.8.3 Comparison of Impacts

4.9 SOCIOECONOMIC IMPACTS

4.9.1 Population Impacts

- 4.9.1.1 CBCP

The number and pattern of settlement of the immigrant construction workers will have certain positive and negative effects on the Jacksonville area. Immigrant workers are defined as those skilled or semi-skilled workers who will immigrate to the Jacksonville area to work on the proposed project and will remain in the area as long as project work is available. It is assumed by the applicant that the secondary employment generated by the proposed CBCP will be filled by local employables. The only population increase attributable to the proposed CBCP was assumed to be the immigrant construction and operational workers and their families.

During the peak construction year of 1991, the immigrant population would total approximately 300 persons. The greatest concentration of immigrant population in the region during the construction phase would occur in Duval County. During the peak construction year, most immigrants are expected to locate in Duval County. Clay and Nassau Counties would have the second and third most significant total population effects, respectively. The remaining four counties in the region are projected to experience minimal population impacts as a result of the construction phase.

4.9.1.2 Alternatives

4.9.2 Economic Impacts

4.9.2.1 CBCP

During the peak construction year of 1991, the proposed CBCP is expected to generate a total of 633 new basic jobs and 1000 new non-basis secondary jobs. The cumulative income effect of the proposed facility during the entire construction period (1982-1987) is projected to be in excess of \$288 million.

4.9.2.2 Alternatives

4.9.3 Community Services Impacts

4.9.3.1 CBCP

Construction activities associated with the proposed CBCP will induce additional public costs for Duval County. The most significant of these costs will be road repair and improvements. Due to increased traffic during construction, the roads and major intersections in the vicinity of the proposed CBCP may need upgrading. There will also be public costs incurred because of the additional demand on various public services by the immigrant work force and their families. Providing reclaimed water to the facility will be an initial cost to the city that could be reclaimed via fees charged to CBCP.

4.9.3.2 Alternatives

4.9.4 Comparism of Impacts

4.10 IMPACTS ON LAND USE, RECREATION, AND AESTHETIC CONDITIONS

4.11 TRANSPORTATION IMPACTS

4.11.1 Construction - Related Impacts

4.11.1.1 CBCP

The impacts of construction related traffic in the site area will affect Heckscher Drive, Main Street, and Eastport Road. Little or no barge traffic is expected on the St. Johns River during construction.

The year of 1991 will be the peak employment period (633 workers) with 90 percent of the workforce expected to arrive between the hours of 7:00 and 8:00 A.M. and leave between 3:30 and 4:30 p.m. Assuming an average of 1.2 persons riding in each car, approximately 522 trips. These 1044 daily trips were assigned to the roadways based on the projected location of the work force, and the area from which it would be coming. In addition to the work force, many trucks are expected to enter and leave the site during 1991, the peak construction year.

Based on the comparison between the peak hour volume and th capacity, two of the roadways, Heckscher Drive and Eastport Road, will be exceeding the level permitting free flowing traffic. This would indicate that the intersections along Heckscher Drive, particularly the intersection with Eastport Road, will probably exceed intersection capacity.

The influx of the CBCP work force and the continued growth in this particular area will temporarily (through the construction period) affect traffic conditions along these roadways. The existing intersections of the I-95 spur to Heckscher Road and it's intersection with Hechscher Drive going toward Main Street are presently experiencing some congestion during peak periods. With additional traffic, this problem will become more severe as will the left turn lane from the north at the intersections of Heckscher Drive and Main Street. Additionally, turning traffic at the intersection of Eastport Road and Hechscher Drive, presently an intersection of two-lane roads, will also experience delays. Traffic control will become necessary.

4.11.1.2 Alternatives

4.12 ENERGY IMPACTS

4.13 HUMAN HEALTH IMPACTS

**CHAPTER 5
SUMMARY OF POTENTIAL
ADVERSE IMPACTS OF THE
PROPOSED PROJECT AND
APPLICABLE MITIGATIVE
MEASURES**

CHAPTER 6
SUMMARY OF SAR / EIS
FINDINGS

CHAPTER 7

LIST OF PREPARERS

CHAPTER 8
PUBLIC PARTICIPATION
AND COORDINATION
EFFORTS

CHAPTER 9

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9.0 BIBLIOGRAPHY

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APPENDICES

APPENDIX K: GLOSSARY

ALLOWANCE FOR FUNDS USED DURING CONSTRUCTION (AFUDC) - The cost of financing the construction of new facilities before the facilities are included in the rate base. When regulated utilities are not allowed to earn a return to cover their financing costs during construction, they are allowed to accumulate these costs during construction for future recovery through AFUDC.

AVOIDED UNIT - A hypothetical unit that would have to be built if no new qualifying facilities were placed in service in peninsular Florida after 1988.

BITUMINOUS COAL - The most common coal; it is soft, dense and black with well-defined bands of bright and full material.

BLOWDOWN - Contaminated water removed periodically or continuously from a boiler and/or cooling tower. This water volume is replaced by higher quality feedwater to maintain a desired quality of water in the unit. See Makeup.

BRITISH THERMAL UNIT (Btu) - A standard unit for measuring the quantity of heat required to raise the temperature of one pound of water by one degree Fahrenheit.

BTU CONTENT OF FUEL (Average) - An average heat value per unit quantity of fuel expressed in Btu as determined from tests of fuel samples or defined by contract specifications. (Example: Btu per pound of coal, Btu per gallon of oil, Btu per cubic foot of gas).

CAPACITY - The load for which a generating unit, generating station or other electrical apparatus is rated either by the user or by the manufacturer.

CAPACITY FACTOR - The ratio of the average load placed on a machine or piece of equipment for the period of time considered, to the capability of the machine or equipment.

CAPACITY MARGIN - The difference between generating capacity and peak system load expressed as a percent of generating capacity. It is a variation of the reserve margin.

CERTIFIED UNIT - A proposed unit that has received a certificate of need from the FPSC and the utility has committed to the construction of the unit.

CIRCULATING FLUIDIZED BED BOILER (CFB) - A coal fired boiler in which crushed coal is burned on a bed of crushed limestone. The limestone is introduced into the boiler for the purpose of stripping sulfur out of the combustion gases prior to emission through the plant's stack.

COGENERATOR - A power generating unit that produces electrical energy and steam or other energy such as heat.

COMBINED CYCLE PLANT - A combination of combustion turbines and steam generating units.

COMBUSTION TURBINE - Similar to a steam turbine, except it expands hot gases (ignited fuel-air mixture) instead of steam through the turbine. These turbines also have a compressor to increase the pressure of the air which increases the temperature of the fuel-air mixture.

DEMAND - The rate at which electric energy is delivered to or by a system, part of a system, or piece of equipment at a given instant or averaged over any designated period of time (see LOAD).

DISTILLATE FUEL - The lighter fuel oils, such as kerosene and jet fuel, which are distilled off during the refining process. Virtually all of the oil used in internal combustion and gas turbine engines is distillate, or "light", fuel oil.

EMERGENCY FORCED OUTAGE - Occurs when a unit must be quickly removed from service because of an equipment problem.

ENERGY BROKER - A mechanism for marketing electric energy among electric utilities that have sufficient generating capacity to meet their individual loads. It matches potential sellers of electric energy with potential buyers every hour.

EQUIVALENT FORCED OUTAGE RATE - The percent of time a unit is on forced outage.

EXPECTED UNSERVED ENERGY (EUE) - Expected amount of energy that will not be served due to insufficient generation. This figure includes all 8,760 hours of the year.

FIRM DEMAND OR FIRM POWER - Power or power producing capacity intended to be available at all times during the period covered by the associated commitment, even under adverse conditions.

FIXED OPERATION COST - Monies other than those associated with investment in plant which do not vary or fluctuate with changes in operation or utilization of plant.

FORCED OUTAGE - An outage of generating equipment that results from the failure of one or more components of the facility, rendering it inoperable.

FOSSIL FUEL - Any naturally occurring fuel of an organic nature, such as coal, crude oil and natural gas.

FUEL INVENTORY - A supply of fuel accumulated for future use.

FUEL EFFICIENCY - See Thermal Efficiency.

GENERATING UNIT - A collection of fuel feeders, heat producers, energy converters and electrical generators which must be operated as a single entity in order for electricity to be produced. A unit may consist of several boilers supplying steam to one or more turbines that drive one or more electric generators.

GIGAWATT-HOURS (GWh) - One billion watt-hours.

HEAT RATE - A measure of generating station thermal efficiency, generally expressed in Btu per kilowatt hour. It is computed by dividing the total Btu content of fuel burned for electric generation by the resulting kilowatt-hour of electricity generated.

HIGH-BAND FORECAST - A forecast which represents more growth than the "base" forecast.

INCREMENTAL GENERATING COST - The ratio of the additional cost incurred in producing an increment of generation to the magnitude of that increment of generation. (Note: All variable costs should be taken into account including maintenance).

INSTALLED GENERATING CAPACITY - The guaranteed continuous output of a generator at full load, under specified conditions, as designated by the manufacturer.

INTERRUPTIBLE LOAD - That load which may be disconnected at the supplier's discretion.

INVESTOR-OWNED ELECTRIC UTILITY - Those electric utilities organized as tax-paying businesses usually financed by the sale of securities in the free market and whose properties are managed by representatives regularly elected by their shareholders. Investor-owned electric utilities may be owned by an individual proprietor or a small group of people but are usually corporations owned by the general public.

KILOVOLT (kV) - One thousand volts.

KILOWATT (kW) - One thousand watts.

LEVELIZED FIXED CHARGE RATE OR FIXED CHARGES - A fraction which is a function of the AFUDC amount, the book life of the technology and other financial factors. The fraction, when multiplied by the capital cost of the equipment, will yield an annual amount (levelized) that will have the same present worth as the present worth of the actual annual capital costs (not levelized) of the equipment).

LOAD - The amount of electric power delivered or required at any specific point or points on a system.

LOAD FACTOR - In percent, is calculated by multiplying the annual net energy for load (NEL) by 100 and dividing it by the product of the peak demand and the number of hours in the year.

LOAD SERVING CAPABILITY - The additional amount of load that a system can serve as a result of the addition of a generating unit while still providing the same level of reliability. The load serving capability is always less than the rated capacity of the unit since the unit capacity must be reduced by the additional system capacity margin required because of the addition of the unit.

LOSS OF ENERGY PROBABILITY (LOEP) - An alternate method of expressing the Expected Unserved Energy (EUE); it is adjusted so the effect of system size can be removed.

LOSS OF LOAD HOURS (LOLH) - A variation on the LOLP method, it represents the expected number of hours by considering all the hours in the year, not just the daily peak hours.

LOSS OF LOAD PROBABILITY (LOLP) - A mathematical reference which represents the expected number of days per year when the generation will be insufficient to serve the daily peak load. This indicates the relative reliability of electric power systems. Generally the availability of assistance from inter-connected neighboring utilities is included in the calculation of the LOLP whereas voltage reductions, requests for voluntary load reductions and load curtailments are not modeled in the calculations.

LOW-BAND FORECAST - A forecast which represents less growth than the "base" forecast.

MAINTENANCE OUTAGE - Occurs when a generating unit is taken out of service for routine maintenance.

MAKEUP - Water taken in by a power generating unit to "makeup" for water losses resulting from evaporation, contamination (blowdown), absorption, etc.

MEGAWATT (MW) - One million watts.

NATURAL GAS - A mixture of hydrocarbon gases, principally methane, occurring in porous geologic formations beneath the earth's surface, often found in association with petroleum.

NET CAPACITY OR NET CAPACITY - The continuous gross capacity, less power required by all auxiliaries associated with the unit, or the capacity as specified by "SERC Guideline Number 2 for Uniform Generator Ratings for Reporting".

NET ENERGY FOR LOAD (NEL) - Net system generation plus energy received from Class I and Class II systems less energy delivered to Class I and Class II systems.

NET ENERGY FOR SYSTEM (NES) - NEL plus energy received from Class III and Class V - energy delivered to Class III and Class V systems.

OIL - A mixture of hydrocarbons existing in the liquid state in natural underground reservoirs. Oil is often found in association with gas.

OUTAGE - Describes the state of a generating transmission or distribution component when it is not available to perform its intended function due to some event directly associated with the component. An outage may or may not cause an interruption of service to consumers, depending on system configuration.

OUTAGE RATE - For a particular system component, the number of outages per unit of time.

PEAK DEMAND OR PEAK LOAD - The net 60-minute integrated demand, actual or adjusted. Forecasts are for normal weather conditions.

PENINSULAR FLORIDA - Those utilities located east of the Apalachicola River.

PERCENT CAPACITY MARGIN - The difference between capacity and peak load expressed as a percentage of capacity. Does not explicitly evaluate the effects of unit size or performance, the size of the system or the strength of its interconnections.

PUBLICLY-OWNED ELECTRIC UTILITY - Electric systems owned by municipals and federal and state public power projects and cooperatives that are owned by their customers.

PURPA - Public Utility Regulatory Policies Act of 1978. Enacted to give preferential rights to non-utility developers of qualifying facilities (QF). QF status enables the developer of production facilities to receive backup power, to claim state and federal exemptions and to sell electricity to a utility at its avoided cost, i.e., the cost that the utility avoids in generating electricity itself or not purchasing it from another source.

QUALIFYING FACILITY (QF) - Defined in the federal law known as the Public Utility Regulatory Policies Act of 1978 (PURPA). It includes small-power producers and cogenerators of electricity and steam (or other form energy) that are not themselves electric utilities.

RATED CAPACITY - See Capacity.

RESERVE MARGIN - The difference between generating capacity and peak system load expressed as a percent of the peak system load.

RESIDUAL FUELS - The fuel oils remaining after the lighter oils have been distilled off during the refining process. Except for start-up and flame stabilization, virtually all the oil used in steam plants is residual, or "heavy", fuel oil.

SMALL POWER PRODUCER - A power generating unit with a capacity of 80 MW or less and uses as its primary energy source, biomass, waste, renewable resources or geothermal resources.

STATE OF FLORIDA - Peninsular Florida utilities plus Gulf Power Company, West Florida Electric Cooperative, Choctawhatchee Electric Cooperative, Escambia River Electric Cooperative, Gulf Coast Electric Cooperative, City of Blountstown, Florida Public Utilities Company (Marianna) and Alabama Electric Cooperative.

STEAM TURBINE - Steam expands and cools as it passes through the turbine blades, turning the blades which are connected to a shaft. This turbine shaft turns the electric generator shaft.

SUMMER - June 1 through September 30.

THERMAL EFFICIENCY - A measure of the amount of electrical energy obtained (the work) per unit of input (the fuel); it is measured in the generating station by the heat rate (see Heat Rate).

WATT - The electrical unit of power or rate of doing work.

WINTER - December 1 through March 31.

YEAR - The calendar year from January 1 through December 31.

APPENDIX L AIR RESOURCES

I. Impact Analysis

- A. Modeling Methodology
- B. Analysis of Existing Air Quality

II. BACT Determination Procedure and Analysis

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I. IMPACT ANALYSIS

A. Modeling Methodology

The PSD increment and AAQS analysis depend on air quality dispersion modeling carried out in accordance with EPA guidelines. The EPA-approved screening level model PTPLU-2 and the EPA document entitled "Procedures for Evaluating Air Quality Impact of New Stationary Sources" (Volume 10-revised) were used to determine the highest predicted ground level concentration for various plant operating conditions.

The operating conditions of the circulating fluidized bed (CFB) boilers were evaluated at 50 and 75 percent load capacity plus the maximum designed for the plant. The maximum CFB operation was determined to be the worst case operating condition and is the only operating level included in the refined air quality modeling.

The EPA-approved Industrial Source Complex Short-Term (ISCST) dispersion model was used in the refined air quality impact analysis. This model determines ground-level concentrations of inert gases or small particles emitted into the atmosphere by point, area, and volume sources. The model incorporates elements for plume rise, transport by the mean wind, Gaussian dispersion, and pollutant removal mechanisms such as deposition and transformation. The ISCST model allows for the separation of sources, building wake downwash, and various other input and output features. A series of specific model features, recommended by the EPA, are referred to as the regulatory options. These features were used in the refined modeling analyses.

The modeling primarily used polar receptors with the proposed CFB boiler stack at the center. Radials were spaced at 10° increments from 10° to 360°. The initial receptor distances modeled were 0.979, 1.273, 1.664, 2.252, 2.937, 3.818, 5.091, 6.657, and 8.811 km. Depending on the applicable averaging times and pollutants, additional receptor distances were included at 80-meter intervals from 0.220 km to 0.940 km. These distances represent locations near the plant boundary.

The meteorological data used in the ISCST model consisted of five years (1981-1985) of hourly surface data taken at Jacksonville, FL. Mixing heights used in the model were based on upper air data from Waycross, Georgia.

B. Analysis of Existing Air Quality

Preconstruction ambient air quality monitoring, in accordance with EPA - approved methods, is required for all pollutants subject to PSD review. In general, one year of quality assured data using an EPA reference monitor, or the equivalent, must be submitted. Sometimes less than one year of data, but no less than four months, may be accepted when FDER approval is given.

An exemption to the monitoring requirement can be obtained if the maximum air quality impact, as determined by air quality modeling, is less than a pollutant-specific "de minimus" concentration. In addition, if current monitoring data already exist and these data are representative of the proposed source area, then at the discretion of FDER, these data may be used.

Based on the modeling results, no monitoring is required for CO, NO_x, or Hg. Department lead monitoring results for 1986 through 1987 were used to determine existing lead levels. While the modeled impacts for Be and Fl are greater than their respective de minimus values, they are much below FDER's guideline for acceptable ambient concentrations, 0.0025 ug/m³ (annual) and 11.90 ug/m³ (24-hour), respectively. Therefore, monitoring for these pollutants is not necessary. Sulfuric acid mist was modeled and showed a maximum 24-hour concentration of 0.73 ug/m³. This value is significantly less than the acceptable ambient concentration of 4.76 ug/m³ (24-hour). Consequently, monitoring for this pollutant is not required.

II. BACT DETERMINATION PROCEDURE AND ANALYSIS

In accordance with FAC Code Chapter 17-2, Air Pollution, BACT determination is based on the maximum degree of reduction of each pollutant emitted which the FDER taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In

addition, the regulations state that in making the BACT determination the FDER shall give consideration to:

(a) Any EPA determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 (Standards of Performance for New Stationary Sources) or 40 CFR Part 61 (National Emission Standards for Hazardous Air Pollutants).

(b) All scientific, engineering, and technical material and other information available to the Department.

(c) The emission limiting standards or BACT determinations of any other state.

(d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine for the emission source in question the most stringent control available for a similar or identical source or source category. If it is shown that this level of control is technically or economically infeasible for the source in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from cogeneration facilities can be grouped into categories based upon what control equipment and techniques that are available to control emissions from these facilities. Using this approach, the emissions are classified as follows:

- o Combustion Products (Particulates and Heavy Metals).
Controlled generally by particulate control devices.
- o Products of Incomplete Combustion (CO, VOC, Toxic Organic Compounds). Control is largely achieved by proper combustion techniques.

- o Acid Gases (SO_x, NO_x, HCl, F_l). Controlled generally by gaseous control devices.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "nonregulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutants (i.e., particulates, sulfur dioxide, fluorides, sulfuric acid mist, etc.), if a reduction in "nonregulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

A. Combustion Products

The CBCP's is projected emissions of particulate matter, PM₁₀, lead, beryllium, and mercury surpass the significant emission rates given in FAC Code Rule 17-2.500, Table 500-2. A review of the BACT/LAER Clearinghouse indicates that the particulate emission rates range from 0.011 (LAER) to 0.05 lb/MMBtu for other CFB boilers permitted in the United States. As this is the case, the applicants proposal for particulate emissions (0.02 lb/MMBtu) is representative of the most stringent BACT determinations and is thereby justified as being BACT for this facility.

In general, the BACT/LAER clearinghouse does not contain specific emission limits for lead, beryllium, and mercury from CFB boilers. BACT for heavy metals from these facilities is typically represented by the level of particulate control. As this is the case, the applicants proposal of 0.02 lb/MMBtu for particulate matter and PM₁₀ is judged to represent BACT for lead, beryllium and mercury.

A review of the coal handling facilities indicates that all practical measures will be employed to control fugitive dust emissions. Fugitive dust associated with the handling of coal will be controlled with enclosures, water sprays, compaction, and bag filter dust collection. All coal conveyers not located underground or within enclosed buildings will have covers.

The control measures employed to minimize the fugitive dust measures from coal handling is judged to represent BACT for the facility.

B. Products of Incomplete Combustion

The emissions of CO, VOC and other organics from coal fired boilers are largely dependent upon the completeness of combustion. A review of the BACT/LAER Clearinghouse indicates that the emission levels of 0.19 lb/MMBtu and 0.016 lb/MMBtu for CO and VOC, respectively, are representatives of previous BACT determinations. In each case the BACT was represented by combustion control and proper bed operation. The emissions of CO could be reduced by increasing the combustion temperatures in the CFB boiler.

This, however, would lead to higher NO_x emissions and additional limestone would be needed for acid gas reduction resulting in a cost which would not warrant the additional CO control. The use of combustion control in conjunction with the proposed acid gas control is also deemed as representing BACT for the other organic compounds which would be emitted from the facility.

C. Acid Gases

The emissions of SO₂, NO₂, F1, and sulfuric acid mist, as well as other acid gases which are not "regulated" under the PSD Rule, represent significant potential pollutants which must be subjected to appropriate control. SO₂ emissions from coal fired boilers are directly related to the sulfur content of the coal which is combusted. The addition of "add on" control equipment and the utilization of combustion technologies which serve to control SO₂ emissions in the combustion chamber itself are other techniques that can be used to minimize emissions.

1. Sulfur Dioxide

The applicant has proposed the use of a CFB boiler to control SO₂ emissions. SO₂ is removed in a CFB boiler by injecting limestone into the boiler bed. The limestone calcines to calcium oxide at the temperatures present in the fluidized bed. The calcium oxide then reacts with the SO₂ in the flue gas to form calcium sulfate. SO₂ is removed in this manner with efficiencies up to 90 percent based on a 30-day rolling average.

In keeping with the "top down" BACT approach the applicant has identified three alternative technologies that would control SO₂ emissions:

- 1) Pulverized coal fired boiler followed by a wet limestone scrubber system designed for a maximum of 94 percent SO₂ removal on a 30-day rolling average basis.
- 2) Pulverized coal fired boiler followed by a wet limestone scrubber system designed for a maximum of 90 percent SO₂ removal on a 30-day rolling average basis.
- 3) Pulverized coal fired boiler followed by a lime spray dryer system designed for a maximum of 90 percent SO₂ removal on a 30-day rolling average basis.

A review of alternatives 2 and 3 indicates that the level of SO₂ control would be equivalent to that proposed by the applicant and no further review is needed. Alternative 1, however, would provide additional control of SO₂, thus a cost benefit analysis of using this type of control is warranted.

In order to justify the cost effectiveness of any air pollution control, the EPA has developed cost guidelines to obtain the highest reduction of emissions per dollar invested. Achievement of maximum emission reductions for capital invested is a major consideration when New Source Performance Standards (NSPS) are developed by the EPA. For SO₂ emissions, EPA has determined that a cost rate of up to \$2,000 per ton of emissions controlled (\$1.00/lb) is reasonable for NSPS.

The use of a wet limestone scrubber having an efficiency of 94% has a levelized total annual cost (capital and operating) which is \$7.72 million dollars greater than that of the proposed CFB boiler by the applicant. The applicant has indicated that the additional SO₂ removal from using the wet scrubber would be 3,353 tons per year based on a 94% efficiency. In addition, the use of a wet limestone scrubber would eliminate the need for lime dryers which are expected to emit 38 tons per year of SO₂. Taking these reductions into consideration with the increased annual cost, the cost per ton of SO₂ controlled is approximately \$2,277. This increased cost is not unreasonable based on the NSPS guideline of \$2,000 per ton removal.

Another control alternative that should be considered is the use of coal with a lower sulfur content. A review of the BACT/LAER Clearinghouse indicates that BACT for CFB boilers has been established in some cases by limiting both the mass emission rate and the sulfur content of the fuel.

The applicant has indicated that the CFB boiler will fire coal with a sulfur content ranging from 1.7 to 3.3 percent which will result in the proposed SO₂ emission rates of 0.6 lb/MMBtu heat input and 0.31 lb/MMBtu heat input on a three hour and 12-month rolling average, respectively.

The BACT/LAER Clearinghouse indicates that the lowest determination for coal sulfur content is 0.5 percent for a CFB boiler, with other determinations ranging up to 3.0 percent taking into consideration the availability of low sulfur coal.

Based on the previous cost benefit analysis of the wet scrubber alternative, it seems reasonable to investigate the cost of using a coal with a lower than proposed sulfur content which would result in the same emission rate as the wet scrubber option.

In order to provide the same level of control as the wet scrubber alternative, it has been determined that the CFB boiler would need to utilize coal with a sulfur content ranging from 1.0 to 2.0 percent. This would result in sulfur dioxide emission rate of 0.36 lb/MMBtu and 0.186 lb/MMBtu for a three-hour and 12-month rolling average, respectively.

Based on the capacity factor of 93 percent as provided by the applicant, the use of coal with an average annual sulfur content of 1.0 percent would result in an sulfur dioxide emission reduction of 1,653 tons/year. When this reduction is taken into consideration with the increased cost of purchasing coal with a lower sulfur content the cost per ton of sulfur dioxide reduction can be determined.

In a recent application in which the cost of switching to a lower sulfur content coal was evaluated, the cost of switching from a 2.0 to 1.0% sulfur coal was determined to be \$4.90 greater per ton of coal purchased. Using this figure as an approximation of using coal with an annual average sulfur content of 1.0% as compared to the proposed 1.7% the cost benefit analysis is computed as follows. Based on the applicant's maximum consumption rate of 248,000 lbs/hr and the 93% capacity factor, the increased cost of using 1.0% sulfur coal would be approximately \$4.95 million. Taking this cost into consideration with the expected reduction the cost per ton of control would be \$2,995. The actual cost would be slightly less than \$2,995 when taking into consideration the greater heating value from lower sulfur content coal but would still be well above the \$2,000 per ton guideline.

2. Nitrogen Oxides (NO_x)

The emissions of NO_x from coal fired boilers are controlled by combustion control and post combustion control equipment. In a CFB boiler, low combustion temperatures coupled with staged combustion effectively limit the formation of NO_x. Low combustion temperatures primarily limit the formation of thermal NO_x, and staged combustion (creating a reducing atmosphere in the lower portion of the boiler) inhibits the formation of fuel NO_x.

The applicant has proposed the use of the CFB boiler with an emission limit of 0.36 lb/MMBtu as BACT for NO_x. The alternatives to further reduce NO_x emissions are discussed and evaluated on a cost/benefit basis as follows:

- o Post-combustion NO_x control processes are based on the reaction of ammonia or urea with conversion of NO_x to form nitrogen and water. Selective noncatalytic reduction and selective catalytic reduction NO_x reduction technologies are the only technologies adequately demonstrated to be considered for installation on CFB boilers.
- o Selective catalytic reduction (SCR) is a post-combustion method for control of NO_x emissions which is being developed by a number of companies, principally in Japan and Europe. The SCR process combines vaporized ammonia with NO_x in the presence of a catalyst to form nitrogen and water. The SCR process can achieve between 80 and 90 percent reduction of NO_x. The vaporized ammonia is injected into the exhaust gases prior to passage through a catalyst bed. The optimum flue gas temperature range for SCR operation is approximately 700 to 850°F. The SCR catalyst is housed in a reactor vessel which is separate from the boiler.
- o Selective noncatalytic reduction (SNCR) is another post-combustion method controlling NO_x emissions. The process selectively reduces NO_x by reaction with ammonia or urea without the use of a catalyst bed. A SNCR system could potentially reduce NO_x emissions generated by a coal fired CFB boiler by 40 to 60 percent.

The applicant has indicated that a SCR system would remove an additional 4,525 tons of NO_x per year. When this removal rate is taken into consideration with the total levelized annual cost (capital and operating) of \$14.35 million, the cost per ton of NO_x controlled is approximately \$3,171. This is well above the NSPS guideline of \$1,000 per ton, yet less than previous BACT determinations in which post-combustion NO_x control was justified at costs up to approximately \$4,200 per ton.

For SNCR the applicant has indicated that an additional 3,017 tons of NO_x per year would be controlled at a total levelized annual cost of \$4.11 million. This results in a cost per ton of NO_x controlled of approximately \$1,362 which is just slightly above the NSPS guideline and well below the cost of previous BACT determinations.

D. Fugitive Dust

1. Coal Handling Fugitive Dust Collection

Control and collection of fugitive particulates in the coal handling system will be accomplished by several different methods, including totally enclosed conveying systems, water spray dust suppression systems, and dust collection systems utilizing fabric filters.

The coal unloading facility will have dry dust collection systems capable of 99.9 percent control efficiency on the unloader receiving hoppers. All conveyors will be totally enclosed and each transfer point fitted with dry dust collection systems, with the exception of the stacker-reclaimer which will be fitted with a water spray dust suppression system capable of 97 percent efficiency.

Coal will be unloaded at the plant site by a rotary car dumper which will be housed in an unloading building with a wet dust suppression system. This is expected to have a dust control efficiency of 97 percent. From the delivery point, totally enclosed belt conveyors will be used to transport the coal to the coal handling building. Surge bins in the coal handling building will be vented with fabric filter dust collectors (efficiency of 99.9 percent), and similar collectors will be located at all conveyor discharge points. Conveyors between the coal handling building and the stacker-reclaimer will be enclosed, but coal dust associated with these conveyors will be controlled by a water spray dust suppression system. Dust releases in the stacker-reclaimer area (active coal pile) will be controlled by wetting agents for an efficiency of 90 percent. Dust releases from the inactive coal pile will also be controlled by wetting agents.

All conveyors from the coal handling building to the power house will be enclosed, and fabric filter dust collectors will be utilized to vent the storage silos in the power house and all conveyor transfer points. Tripper conveyors will be enclosed in a gallery.

2. Limestone Fugitive Dust Collection

Control and collection of fugitive dust particulates from the limestone addition system for the boilers will be accomplished by appropriate types of fabric filter dust collectors.

Limestone will be transported at the site by totally enclosed belt conveyors. All silos and hoppers utilized by the limestone system will be vented to fabric filter dust collectors. Similar collectors will be located at all conveyor discharge points.

All fabric filter dust collectors in the lime or limestone additive system will have an efficiency of 99.9 percent.

3. Control and Collection of Fugitive Fly Ash Particulates

In the fly ash handling system, fugitive fly ash particulate will be controlled at all transfer and discharge locations by fabric filters. The fly ash handling system consists essentially of ash hoppers located beneath the flue gas particulate collection equipment. Pneumatic conveyors are utilized to transfer fly ash to and from ash storage silos, and to mixers which prepare the ash and FGD wastes for disposal. Pneumatic conveyors are by their nature enclosed. Discharge for the conveyor's blower(s) will be equipped with fabric filters with greater than 99 percent collection efficiency.