MEMORANDUM MAR 08 1990

DATE:

SUBJECT: Gulf Power Company-Plant Scholz, Sneads, Florida Short-Term Chronic Test Results, September 27-October 3, 1989. NPDES #FL0002283

FROM: Ronald Weldon RW
Toxics Evaluation Section
Ecological Support Branch

THRU: Linda Anderson-Carnahan, Chief LAC
Toxics Evaluation Section
Ecological Support Branch

TO: John Marlar, Chief
Facilities Performance Branch
Water Management Division

As requested by the Water Management Division, personnel from the Toxics Evaluation Section coordinated the sampling and shipping of effluent samples from the subject facility. The effluent samples were collected by plant personnel and shipped to the EPA laboratory located in Athens, Georgia. Chronic tests were conducted on daphnids (Ceriodaphnia dubia) and fathead minnows (Pimephales promelas) using samples collected from the ash pond and cooling water effluents. A third test was conducted on a mixture of ash pond effluent and cooling water. Twenty-four hour composite samples of each effluent were collected September 25-26, 28-29, and October 1-2, 1989 for use in the static renewal toxicity tests. Algal (Selenastrum capricornutum) growth tests were conducted on the effluent samples collected on October 1-2. Procedures followed were Methods 1002.0, 1000.0,and 1003.0 from the USEPA manual "Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms" EPA/600/4-89/001.

Significant mortality did not occur to the daphnids or minnows during the initial 48-hour exposure period in any sample or sample combination (Tables 1,2,6,7,11,and 12). The daphnid survival-reproduction and minnow survival-growth data were analyzed using Fisher's Exact and Dunnett's Procedures. The no observed effect concentration (NOEC) for all the daphnid survival-reproduction tests was 100% (Tables 3,8,and 13). The NOEC for all of the minnow survival-growth tests was also 100% (Tables 4,9,and 14). The 100% cooling water concentration produced 17% lethality in the exposed fathead minnows (Table 9). This mortality was not considered significant as a lesser degree of minnow mortality occurred in the 100% concentration of cooling water used in the combination test (Table 14).

The algal growth test results indicated the ash pond effluent was increasingly stimulatory through the 50.0% concentration. The 100% effluent was inhibitory to the algae (Table 16). All cooling water concentrations stimulated algal growth except the 6.3% concentration which showed a slight retardation effect. The combination test was conducted using a 1-1 ratio of ash pond and cooling water as the highest concentration. All of the combination concentrations stimulated algal growth.

According to plant personnel the September ash pond discharge was 1.2 million gallons per day (mgd) or 1.9 cubic feet per second (cfs). The ash pond discharges into the cooling water which had an average flow of 129.3 mgd or 200.4 cfs in September. Using these flows, the ash pond effluent is only 0.94% of the total discharge. Plant Scholz has a total effluent flow of 202.3 cfs and discharges into the Apalachicola River which has a 7Q10 of 7000.0 cfs. Using the September monthly average effluent and 7Q10 flows, the Apalachicola River has a receiving stream concentration of 2.9%. The NOEC of all three species indicate that organisms as sensitive as these would not be adversely affected during low flow conditions by the cooling water, ash pond discharge or any combination of the two.

A summary of test conditions, test results, and pertinent physical-chemical water data in included in the attached Tables 1-16.

If you have any questions, please call me at 250-2489.

cc: Charles H. Kaplan, P.E.

Table 1. Data recorded during a 48-hour, daphnid acute lethality static renewal test conducted on ash pond effluent (collected 9/25-26/89) at Gulf Power Company--Plant Scholz, Sneads, Florida, September 27-29, 1989

Conc. Waste-Water (%)	Number of Live Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			Initial Water Quality				
	0	24	48	0	24	48	0	24	48	pH (SU)	Total Alk. (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
0	10	10	10	8.0	8.2	7.5	26	26	26	8.1	72	92	215	--
6.25	10	10	10	8.0	7.8	7.4	26	26	26	7.8	69	100	238	--
12.5	10	10	10	8.0	8.0	7.4	26	26	26	--	--	--	265	--
25.0	10	10	10	8.0	8.1	7.4	26	26	26	--	--	--	315	--
50.0	10	10	10	8.0	8.3	7.3	26	26	26	7.8	52	166	416	--
100.0	10	10	10	8.0	8.9	7.3	26	26	26	7.6	47	236	604	0.02

Table 2. Data recorded during a 48-hour, minnow larval acute lethality static renewal test conducted on ash pond effluent (collected 9/25-26/89) at Gulf Power Company--Plant Scholz, Sneads, Florida, September 27-29, 1989

Conc. Waste-Water (%)	Number of Live Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			Initial Water Quality				
	0	24	48	0	24	48	0	24	48	pH (SU)	Total Alk. (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
0	30	30	30	8.0	8.2	7.5	26	26	26	8.1	72	92	215	--
6.25	30	30	30	8.0	7.8	7.7	26	26	26	7.8	69	100	238	--
12.5	30	30	30	8.0	8.0	7.8	26	26	26	--	--	--	265	--
25.0	30	30	30	8.0	8.1	7.8	26	26	26	--	--	--	315	--
50.0	30	30	30	8.0	8.3	7.8	26	26	26	7.8	52	166	416	--
100.0	30	30	30	8.0	8.9	7.8	26	26	26	7.6	47	236	604	0.02

Table 3. Data for the Ceriodaphnia dubia Survival and Reproduction Test Conducted During September 27-October 3, 1989, on Ash Pond Effluent Collected from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	Survival % 48 hrs.	120 hrs.	Mean Number of Young Per Female
0	100	100	28.6
6.25	100	100	28.2
12.5	100	100	28.2
25.0	100	100	28.8
50.0	100	100	28.9
100.0	100	100	29.6

Table 4. Data for the Pimephales promelas Larval Survival and Growth Test Conducted During September 27-October 4, 1989, on Ash Pond Effluent Collected from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	Survival % 48 hrs.	168 hrs.	Mean Dry Weight (mg)
0	100	93	0.65
6.25	100	100	0.67
12.5	100	97	0.75
25.0	100	100	0.65
50.0	100	100	0.62
100.0	100	97	0.60

Table 5. Initial Chemical and Physical Data Reported as a Mean and Range for Chronic Tests Conducted September 27-October 4, 1989 on Ash Pond Effluent Collected from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	DO (mg/L)	pH (SU)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
0	8.6	7.9	75	95	216	--
	8.0-9.1	7.6-8.1	72-78	92-96	213-220	------
6.25	8.4	7.8	72	105	240	--
	7.8-9.0	7.7-7.9	69-75	100-110	234-247	------
50.0	8.4	7.8	59	164	411	--
	8.1-9.0	7.8-7.8	52-62	160-168	408-416	------
100.0	8.8	7.6	48	231	591	0.02
	8.0-9.8	7.6-7.7	43-50	228-236	575-604	0.01-0.02

Table 6. Data recorded during a 48-hour, daphnid acute lethality static renewal test conducted on cooling water effluent (collected 9/25-26/89) at Gulf Power Company--Plant Scholz, Sneads, Florida, September 27-29, 1989

Conc. Waste-Water (%)	Number of Live Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			Initial Water Quality				
	0	24	48	0	24	48	0	24	48	pH (SU)	Total Alk. (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
0	10	10	10	8.0	8.2	7.5	26	26	26	8.1	72	92	215	--
6.25	10	10	9	8.0	8.0	7.5	26	26	26	7.8	72	90	208	--
12.5	10	10	10	8.0	7.9	7.5	26	26	26	--	--	--	204	--
25.0	10	10	10	7.8	8.0	7.5	26	26	26	--	--	--	195	--
50.0	10	10	10	7.6	7.8	7.4	26	26	26	7.7	62	76	178	--
100.0	10	10	10	7.5	7.7	7.3	26	26	26	7.5	52	54	145	0.02

Table 7. Data recorded during a 48-hour, minnow larval acute lethality static renewal test conducted on cooling water effluent (collected 9/25-26/89) at Gulf Power Company--Plant Scholz, Sneads, Florida, September 27-29, 1989

Conc. Waste-Water (%)	Number of Live Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			Initial Water Quality				
	0	24	48	0	24	48	0	24	48	pH (SU)	Total Alk. (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
0	30	30	30	8.0	8.2	7.9	26	26	26	8.1	72	92	215	--
6.25	30	30	30	8.0	8.0	7.7	26	26	26	7.8	72	90	208	--
12.5	30	30	30	8.0	7.9	7.6	26	26	26	--	--	--	204	--
25.0	30	29	29	7.8	8.0	7.5	26	26	26	--	--	--	195	--
50.0	30	30	30	7.6	7.8	7.5	26	26	26	7.7	62	76	178	--
100.0	30	30	30	7.5	7.7	7.5	26	26	26	7.5	52	54	145	0.02

Table 8. Data for the Ceriodaphnia dubia Survival and Reproduction Test Conducted During September 27-October 3, 1989, on Cooling Water Effluent Collected from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	Survival % 48 hrs.	120 hrs.	Mean Number of Young Per Female
0	100	100	26.3
6.25	90	60	15.0
12.5	100	100	25.3
25.0	100	100	26.3
50.0	100	100	27.2
100.0	100	100	27.6

Table 9. Data for the Pimephales promelas Larval Survival and Growth Test Conducted During September 27-October 4, 1989, on Cooling Water Effluent Collected from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	Survival % 48 hrs.	168 hrs.	Mean Dry Weight (mg)
0	100	100	0.81
6.25	100	100	0.79
12.5	100	97	0.82
25.0	97	97	0.73
50.0	100	100	0.71
100.0	100	83 *	0.76

*Significant difference from the control

Table 10. Initial Chemical and Physical Data Reported as a Mean and Range for Chronic Tests Conducted September 27-October 4, 1989 on Cooling Water Effluent Collected from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	DO (mg/L)	pH (SU)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
0	8.6 8.0-9.1	7.9 7.6-8.1	75 72-78	95 92-96	216 213-220	-- ------
6.25	8.3 7.8-9.0	7.9 7.8-7.9	73 70-77	93 90-96	211 205-220	-- ------
50.0	8.2 7.6-8.9	7.7 7.6-7.8	59 53-63	72 68-76	172 163-178	-- ------
100.0	8.3 7.5-9.0	7.4 7.3-7.5	43 34-52	45 36-54	127 109-145	0.04 0.02-0.10

Table 11. Data recorded during a 48-hour, daphnid acute lethality static renewal test conducted on combined effluents (collected 9/25-26/89) at Gulf Power Company--Plant Scholz, Sneads, Florida, September 27-29, 1989

Conc. Waste-Water (%)	Number of Live Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			Initial Water Quality				
	0	24	48	0	24	48	0	24	48	pH (SU)	Total Alk. (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
* 0	10	10	10	7.8	7.7	7.4	26	26	26	7.5	52	54	145	0.02
12.5	10	10	10	7.6	7.5	7.3	26	26	26	--	--	--	212	--
25.0	10	10	10	7.8	7.7	7.3	26	26	26	--	--	--	267	--
50.0	10	10	10	7.8	8.1	7.4	26	26	26	7.5	50	140	383	--
75.0	10	10	10	7.8	8.2	7.3	26	26	26	--	--	--	495	--
87.5	10	10	10	8.1	8.4	7.3	26	26	26	7.6	49	210	546	--
100.0	10	10	10	8.2	8.4	7.4	26	26	26	7.6	47	236	604	0.02

* Cooling water was used as the diluent.

Table 12. Data recorded during a 48-hour, minnow larval acute lethality static renewal test conducted on combined effluents (collected 9/25-26/89) at Gulf Power Company--Plant Scholz, Sneads, Florida, September 27-29, 1989

Conc. Waste-Water (%)	Number of Live Organisms			Dissolved Oxygen (mg/L)			Temperature (°C)			Initial Water Quality				
	0	24	48	0	24	48	0	24	48	pH (SU)	Total Alk. (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
* 0	30	30	30	7.8	7.7	7.4	26	26	26	7.5	52	54	145	0.02
12.5	30	30	30	7.6	7.5	7.1	26	26	26	--	--	--	212	--
25.0	30	30	30	7.8	7.7	7.4	26	26	26	--	--	--	267	--
50.0	30	30	30	7.8	8.1	7.4	26	26	26	7.5	50	140	383	--
75.0	30	30	30	7.8	8.2	7.6	26	26	26	--	--	--	495	--
87.5	30	30	29	8.1	8.4	7.4	26	26	26	7.6	49	210	546	--
100.0	30	30	30	8.2	8.4	7.3	26	26	26	7.6	47	236	604	0.02

* Cooling water was used as the diluent.

Table 13. Data for the Ceriodaphnia dubia Survival and Reproduction Test Conducted During September 27-October 3, 1989, on Combined Effluents Collected from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	Survival % 48 hrs.	120 hrs.	Mean Number of Young Per Female
* 0	100	100	30.4
12.5	100	100	29.5
25.0	100	100	29.9
50.0	100	100	29.6
75.0	100	100	24.6
87.5	100	100	27.5
100.0	100	100	27.9

* Cooling water was used as the diluent.

Table 14. Data for the Pimephales promelas Larval Survival and Growth Test Conducted During September 27-October 4, 1989, on Combined Effluents Collected from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	Survival % 48 hrs.	168 hrs.	Mean Dry Weight (mg)
* 0	100	97	0.73
12.5	100	97	0.72
25.0	100	97	0.71
50.0	100	100	0.68
75.0	100	93	0.83
87.5	97	93	0.75
100.0	100	93	0.65

* Cooling water was used as the diluent.

Table 15. Initial Chemical and Physical Data Reported as a Mean and Range for Chronic Tests Conducted September 27-October 4, 1989 on Combined Effluents from Gulf Power Company--Plant Scholz, Sneads, Florida

Concentration %	DO (mg/L)	pH (SU)	Alkalinity (mg/L)	Hardness (mg/L)	Conductivity (umhos/cm)	TRC (mg/L)
0	8.2 4.7-9.0	7.4 7.3-7.5	43 34-52	45 36-54	127 109-145	0.04 0.02-0.10
50.0	8.4 7.8-9.1	7.6 7.5-7.6	45 41-50	134 124-142	373 362-383	-- ------
87.5	8.5 8.1-9.2	7.6 7.5-7.7	48 43-49	207 200-210	536 523-548	-- ------
100.0	8.6 8.2-9.4	7.6 7.6-7.7	48 43-50	231 228-236	590 575-604	0.02 0.01-0.02

Table 16. Data for the Algal Selenastrum capricornutum Growth Tests Conducted During October 3-7, 1989, on Ash Pond, Cooling Water, and Combination Effluents Collected from Gulf-Power Company--Plant Scholz, Sneads, Florida

SAMPLE	PERCENT SAMPLE CONCENTRATION	PERCENT RETARDATION or STIMULATION
Ash Pond	6.3	+107
	12.5	+201
	25.0	+203
	50.0	+241
	100.0	-82
Cooling Water	6.3	-5
	12.5	+139
	25.0	+130
	50.0	+80
	100.0	+84
Combination (50% cooling water and 50% ash pond effluent)	100.0	+140