Florida Department of Environmental Protection

Memorandum

Via Email 3-22-06

To: Nicanor Madrid
Hazardous Waste Permitting Section

From: Silky S. Labie
Environmental Assessment Section

Date: March 22, 2006

Subject: Field Sampling Performance Audit Report
Motorola
Ft. Lauderdale, FL

Please see the attached report and checklist for the field sampling performance audit conducted at the Motorola Plant in Ft. Lauderdale, FL on February 16, 2006. The audit was conducted by the Environmental Assessment Section (EAS) and included a subsequent review submitted by the permittee's consultant as they pertained to the field activities that were audited.

Sampling activities were audited using the DEP SOP ("Standard Operating Procedures for Field Activities", DEP-SOP-001/01), revision February 1, 2004. The consultant indicated the intention to follow this document for the audited sampling event.

Summary of audit deficiencies

Purging and Sampling Procedures
No major deficiencies.

Field Measurements
1. Secondary Turbidity standards have not been assigned values per the DEP SOP.
2. Temperature verifications have not been performed.

Documentation
No major deficiencies.

Other Comments
No major deficiencies.

Response requirements

The permittee or the permittee's consultant should be asked to respond to the audit report by addressing each deficiency noted in the attached checklist, as explained by the checklist legend. The response should include the specific corrective actions to be taken. Some checklist items may indicate that additional information should be provided in order to determine whether the audit criterion is applicable or was satisfied. The response may include discussion of any items in the report for the purposes of clarification or rebuttal.

Issuance of final audit report

When the response has been received from the permittee (or its consultant), the EAS will review it to determine if appropriate corrective actions have been taken. When all responses have been reviewed, the EAS will issue the final audit report package consisting of the preliminary audit report, the response(s) from the permittee (or consultant) and the EAS evaluation of all responses.

Please let me know if you have any questions or need further assistance.

cc: Andy Tintle, EAS (via email)

Field Performance Audit of Sampling Procedures
Audit performed by Environmental Assessment Section, Bureau of Laboratories

Audit Date: February 16, 2004

DEP Auditor: Silky S. Labie, Environmental, Assessment Section

Sampling Team Personnel and Affiliations:
Bob Harrison, Environmental Consulting and Technology, Inc (ECT)

Field Performance Audit Location (Site Location):
Motorola
8000 W Sunrise Blvd.
Ft. Lauderdale, FL

Facility Personnel:
Bill Kierl
Mike Garcia

Field Sampling Locations (Sample Points or Sources)
1. R 45 Field ID R45.21606
2. Q45 Field ID Q45.21606
3. O25 Field ID O25.21606

Purpose of Audit

This audit was conducted in support of the DEP Hazardous Waste Regulation program.

The purpose of the audit was to determine if ECT, the permitted facility's consultant, was capable of properly collecting samples according to established DEP criteria.

This audit of sampling procedure performance was designed to assist DEP staff in determining whether the permitted facility is reporting data that:

- are useable by the Hazardous Waste Regulation program; and,
- are of verifiable and acceptable quality according to criteria outlined in the DEP Quality Assurance rule, 62-160 FAC.

Summary of Audit

Silky Labie with the DEP Environmental Assessment Section (EAS) conducted a field performance audit of groundwater sampling and field testing procedures executed by the permittee's consultant, Bob Harrison, who collects samples on behalf of the facility in response to RCRA permit requirements.

Prior to commencing the audit, Ms. Labie met with Bill Kierl of Motorola who provided her with aerial maps and a brief history of the site. Mr. Kierl escorted Ms. Labie to the monitoring well site locations, where she was met by Mr. Harrison and Mike Garcia with Motorola. Mr. Garcia and Mr. Kierl were not on location for the entire audit; but they did make several trips to the site of the audit to check on the progress of the audit and sampling event.

After observing purging and sampling procedures at three different well locations, an exit interview was held, where Ms. Labie summarized the findings of the audits. In general good sampling techniques were used, and no major deficiencies were observed. Ms. Labie called attention to several documentation and

procedural deficiencies from the October 2003 audit of ECT that had not been corrected, and discussed recommended corrective actions.

The audit findings and a detailed list of procedural and documentary deficiencies are provided in the remainder of this report. The highlighted statements are those that were found to be deficiencies during the February 2003 audit.

Sampling and Field Testing Performance Criteria
Audit Findings and Deficiencies

		FS 1000 & FS 2000 General Sampling Procedures
		PRELIMINARY ACTIVITIES
1.	Y	Equipment construction was appropriate for the analytes of interest. *FS 1001, section 2.2 and Tables FS 1000-1, FS 1000-2, & FS 1000-3*
2.	Y	Equipment was brought precleaned to the field.
3.	Y	Sample container construction and materials were appropriate for the analytes collected. *FS 1001, section 4.1 and Table FS 1000-2, and Tables 1000-4 through FS 1000-9*
4.	Y	All containers and container caps were free of cracks, chips, discoloration and other features that might affect the integrity of collected samples. *FS 1001, section 4.2*
		CONTAMINATION PREVENTION
5.	Y	Every effort was made to prevent cross-contamination of samples and contamination of environment. *FS 1002 section 1.1*
6.	Y	Nothing (pump tubing, measurement probes, fingers, pH paper, etc.) was inserted into the sample containers or samples collected for analysis. *FS 1002, section 1.1.1*
		USE OF PROTECTIVE GLOVES
7.	Y	Gloves were worn by all samplers handling purging equipment, sampling equipment, measurement equipment and sample containers as applicable. *FS 1003, section 2*
8.	Y	Care was taken to avoid contact with samples and sample container interiors. *FS 1003, section 3*
9.	Y	New, clean unpowdered gloves were used for each glove change. *FS 1003, section 4 – 4.3*
10.	Y	Gloves were worn and changed as needed to avoid sample contamination and personal exposure. *FS 1003 sections 5 & 6.*
		HANDLING OF HAZARDOUS WASTE (HW) AND OTHER INVESTIGATION-DERIVED WASTE (IDW)
11.	Y	Wastes generated as a result of the sampling project were containerized and stored for proper disposal according to applicable local, state and federal regulations. *FS 1011, sections 1 – 1.4*
12.	Y	All HW and IDW containers were properly labeled. *FS 1011, section 1.5.2*
		PRESERVATION OF SAMPLES
13.	Y	All sample preservation conformed to DEP SOP requirements. *FS 1006, sections 1 – 1.2 and Tables 1000-4 through FS 1000-9*
14.	Y	All grab samples were preserved within 15 minutes of collection. *FS 1006, section 2*
		pH VERIFICATION
15.	Y	One sample per analyte group requiring pH adjustment was tested for proper pH preservation during repeat sampling for the project. (FS 2000, section 1.4.2.2) (1/mo for weekly; 1/wk for daily)
16.	Y	pH paper was not inserted into sample containers. *FS 2001. section 3.6.2*
		PREVENTIVE MAINTENANCE AND REPAIR OF EQUIPMENT AND INSTRUMENTS
17.	Y	Each equipment or instrument unit requiring documented maintenance or repair is assigned a unique identification code or designation. *FS 1007 section 2.1*
		WELL HEAD INSPECTION AND WATER LEVEL MEASUREMENT
18.	Y	Standing water present in the well head was removed. *FS 2211 section 2.1*
19.	Y	Water levels were measured to the nearest 0.01 foot. *FS 2211 section 3.2.*
20.	Y	The well bottom was not sounded with the measuring tape.
		GENERAL PURGING PROCEDURES
21.	Y	Well volume was correctly determined. *FS 2211 section 5*
22.	Y	The pump, tubing or bailer was not allowed to drop to the bottom of the well. *FS 2201, section 1*
23.	Y	Depth to groundwater was measured at frequent intervals during purging. *FS 2213 sections 2.1.6, 2.2.6, 2.3.5, 2.4.5, 3.1.3 and 3.2.3*
24.	Y	The placement of the pump or tubing intake was correctly determined according to the position of the water level in relation to the well screen interval and the purging procedure used. *FS 2213 sections 1.1 – 1.3*
25.	Y	The placement depth of the pump or tubing intake was recorded for each instance of positioning.
		GENERAL PROCEDURES FOR PURGING WITH A PUMP
26.	Y	Drawdown was stabilized so that the pumping rate matched the formation recharge rate. *FS 2213 sections 2.1.8, 2.2.8, 2.3.7, 2.4.7, 3.1.5 and 3.2.5*
		PURGING FROM THE TOP OF THE WATER COLUMN WITH A PUMP

Note: The audit criteria are derived from the "DEP Standard Operating Procedures for Field Activities", February 2, 2004 (DEP-SOP-001/01). Where applicable, the citations for the criteria appear after each criterion statement.

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27. **Y** The pump or tubing was placed *at the top of the water column above the submerged well screen* and a minimum total of 1½ well volumes was purged. *FS 2212 section 2.1*

FREQUENCY OF MEASUREMENT FOR PURGE STABILIZATION PARAMETERS

28. **Y** A flow cell was used to measure stabilization parameters during pumping.
29. **Y** *If the well was purged from the top of the water column above a fully submerged screen,* at least one well volume was purged prior to commencing purge stabilization measurements and at least ¼ well volumes was purged at the stabilized pumping rate between consecutive purge stabilization measurements. *FS 2212 section 2.1*

DETERMINATION OF PURGING COMPLETION

30. **Y** Three (3) consecutive measurements of the three parameters listed below were within stated limits *FS 2212 section 3.1 and 3.2*

Temperature: ±0.2° C
pH: ±0.2 standard pH units
Specific Conductance: ± 5.0% of reading

31. **Y** Measured dissolved oxygen and turbidity were below the following thresholds. *FS 2212 section 3.1*

DO ≤20% saturation at the measured temperature
Turbidity ≤20 NTU

MAXIMUM ELAPSED TIMES BETWEEN PURGING AND SAMPLING

32. **Y** Samples were collected within 6 hours of purging completion. *FS 2212 section 4*

GENERAL REQUIREMENTS FOR SAMPLE COLLECTION EQUIPMENT

33. **Y** Material construction of pumps, tubing and bailers conformed with requirements of Tables FS 1000-1 through FS 1000-3 and Table FS 2200-1 for the analytes collected. *FS 2220 section 3.1 and FS 2201 section 2.2*

FQ 1000 Quality Control Samples

34. **Y** Precleaned equipment blanks were collected if equipment was decontaminated in the field. *FQ 1230 section 2.1.1*

FT 1000, FD 3000 - General and Documentation Requirements for Calibration Activities

35. **Y** All field-testing equipment and instruments brought to the field appeared to function properly. *FT 1000, section 2.1*
36. **N** All sample measurements were chronologically bracketed between acceptable calibration verifications. *FT 1000, section 2.2.1*

ENDING DO CHECKS ON 2-16-06 EXCEEDED THE ACCEPTANCE CRITERION OF 0.3 MG/L.

37. **Y** All sample measurements were quantitatively bracketed with an appropriate choice of calibration standards for calibrations or verifications. *FT 1000, section 2.2.1*
38. **Y** All acceptable initial calibrations and calibration verifications were documented and linked to the field measurements for the sampling project. *FD 4100 section 2*
39. **?** Historical, instrument-specific data justified calibration verification intervals of greater than 24-hours. *FT 1000, sections 2.2.3 & 2.2.5*

NO CALIBRATION INFORMATION WAS PROVIDED FOR TEMPERATURE.

40. **?** Instruments failing to meet calibration verification acceptance criteria were recalibrated or removed from service. *FT 1000, section 2.4.4.1*
41. **?** Sample measurements were qualified as estimated ("J" data qualifier code) when the instrument calibration could not be verified. *FT 1000, section 2.2.4.2*
42. **?** An explanatory narrative was provided in the field record for all sample "J" values. *FT 1000, section 2.2.4.2*
43. **Y** The time interval between calibration verifications did not exceed one month, or, if less, the life of the sampling project (except for temperature measurements). *FT 1000, section 2.2.5.2*

STANDARDS

44. **Y** Information about all calibration standards and reagents used for field testing were linked to the calibration information associated with the field testing measurements for the project. *FD 4000*
45. **Y** The concentration or other assay value, the vendor catalog number and the description of the standard or reagent were recorded for all preformulated solutions, neat liquids and powders. *FD 4100 sections 1.1 – 1.1.1*
46. **N/R** Certificates of assay, grade and other vendor specifications for all standards and reagents were retained and recorded for the standards and reagents linked to the sampling project. *FD 4100 sections 1.1.2 – 1.1.2.1*

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47. **Y** Expiration dates for all calibration standards and reagents used on the sampling project were recorded. *FD 4100 section 1.3*

For each instrument unit used for the sampling project, the following information was recorded for all calibrations: *FD 4100 sections 2.1 - 2.7*

48. **Y** Unique identification (designation code) for the instrument calibrated
49. **Y** Date and time of each calibration or calibration verification
50. **N** Instrument reading or result (display value) for all calibration verifications, with appropriate measurement units

DEFICIENCY WAS CORRECTED ON-SITE BASED ON AUDITOR'S OBSERVATIONS OF CALIBRATION RECORDS.

51. **Y** Names of analysts performing each calibration for the instrument
52. **Y** Designation of each calibration standard used to calibrate or verify the instrument, linked to the associated records for the calibration standard
53. **N** The acceptance criteria for each calibration and verification used to accept the instrument calibration or verification

THE SAMPLER WAS ABLE TO PROVIDE THE CORRECT CALIBRATION VERIFICATION ACCEPTANCE CRITERIA, ALTHOUGH THESE CRITERIA WERE NOT DOCUMENTED IN FIELD RECORDS.

54. **N** Positive indication in the record of acceptable (successful) initial calibration and acceptable initial and continuing calibration verifications.

INITIAL CALIBRATION ADJUSTMENTS WERE DOCUMENTED. THERE WERE NO RECORDS TO INDICATE A REVIEW OF OR ACCEPTANCE/REJECTION OF SUBSEQUENT VERIFICATIONS.

55. **N** Positive indication of all failed calibrations or verifications

THE FAILURE OF THE ENDING DO VERIFICATIONS ON 2-16-06 WERE NOT NOTED.

56. **N/R** All corrective actions performed on the instrument prior to attempting re-verification or recalibration of the instrument are linked to the records required for preventive maintenance
57. **N/R** Any instances of discontinuation of use of the instrument due to calibration or verification failures
58. **N** A description or citation of the specific calibration and verification procedures used for the instrument (DEP SOP or internal SOP)

DEFICIENCY WAS CORRECTED ON-SITE BASED ON AUDITOR'S OBSERVATIONS OF CALIBRATION RECORDS.

59. **Y** All field measurement tests and related data were recorded and linked to the project, the date and the sample source. *FD 5000 section 2.7*
60. **N** All field measurements were recorded with the appropriate reporting units, the value of the test result, the parameter measured or tested, the name of the analyst performing the test, the time of the measurement and the unique identification for the test instrument used. *FD 5000 section 2.7*

DEFICIENCY WAS CORRECTED ON-SITE BASED ON AUDITOR'S OBSERVATIONS OF CALIBRATION RECORDS.

pH (FT 1100)

61. **Y** The pH meter and electrode system met DEP SOP specifications for accuracy, reproducibility and design. *FT 1100 section 1.1*
62. **Y** All measurements were corrected for temperature (manual or automatic). *FT 1100 sections 1.1 and 2.2.3*
63. **?** The temperature sensor calibration was verified according to FT 1400. *FT 1400 section 2.2.2.1*

THE SAMPLER STATED THAT THE MERCURY THERMOMETER USED TO VERIFY THE METER TEMPERATURE READINGS HAD BEEN BROKEN. NO RECORDS WERE PROVIDED TO INDICATE THAT THE MULTIPROBES WERE EVER VERIFIED FOR TEMPERATURE

64. **Y** A pH 7 buffer was used as the first calibration standard for the initial calibration. *FT 1100, section 2.3.3*
65. **Y** All sample measurements were chronologically bracketed with acceptable calibration verifications. *FT 1100 section 2.3.2*
66. **Y** All sample measurements were quantitatively bracketed with an appropriate choice of at least two calibration buffers for calibrations or verifications. *FT 1100 sections 1.2, 2.3.3 & 2.3.4*
67. **Y** All calibration verifications met the acceptance criteria of $\pm$ 0.2 standard pH units. *FT 1100 sections 2.1.2 & 2.3.4.1*
68. **?** The meter system was checked on a weekly basis to ensure a $\geq$90% theoretical electrode slope. *FT 1100 section 2.1.3*
69. **N** The pH electrode was rinsed with deionized or distilled water between buffer solutions and between sample measurements. *FT 1100 sections 2.3.6 & 2.4.4*

RINSING WAS OBSERVED ONCE, BUT THE PROCEDURE WAS NOT CONSISTENTLY USED BETWEEN MEASUREMENT LOCATIONS.

70. **Y** The instrument pH readings stabilized before pH values were recorded. *FT 1100 section 2.4.6*

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		CONDUCTIVITY (FT 1200)
71.	**Y**	The specific conductance meter and electrode system met DEP SOP specifications for accuracy, reproducibility and design. *FT 1200 section 2.1*
72.	**Y**	All sample measurements were chronologically bracketed with acceptable calibration verifications. *FT 1200 section 3.2*
73.	**Y**	All sample measurements were quantitatively bracketed with an appropriate choice of calibration standards for calibrations or verifications. *FT 1200 section 3.2.1*
74.	**Y**	All continuing calibration verifications were performed using standards within the range of sample measurements. *FT 1200 section 3.2.4*
75.	**Y**	All calibration verifications met the acceptance criteria of ± 5% of the verification standard value. *FT 1200 sections 3.2.2 & 3.2.4*
76.	**Y**	All measurements were corrected for temperature (manual or automatic). *FT 1200 sections 1.2, 3.2.3 & 3.4*
77.	**?**	The temperature sensor calibration was verified according to FT 1400. *FT 1200 section 3.1.2* SEE COMMENT 63 ABOVE.
78.	**N**	The conductivity electrode was rinsed with deionized or distilled water between standard solutions and between sample measurements. *FT 1200 section 3.3.8* SEE COMMENT 69 ABOVE.
79.	**Y**	The instrument conductivity readings stabilized before measurement values were recorded. *FT 1200 sections 3.3.3 & 3.5.1*
		TEMPERATURE (FT 1400)
80.	**Y**	The temperature measurement device met DEP SOP specifications for design and measurement resolution. *FT 1400 section 1.1*
81.	**N**	All sample measurements were quantitatively bracketed with calibration verifications of the temperature measurement device at a minimum of two temperatures using the NIST-traceable thermometer. *FT 1400 section 2.2.2* SEE COMMENT 63 ABOVE.
82.	**N**	All sample measurements were chronologically bracketed with acceptable calibration verifications. *FT 1400 section 2.2.1* SEE COMMENT 63 ABOVE.
83.	**N**	Historical, device-specific data justified calibration verification intervals of greater than one month (extended chronological calibration bracket). *FT 1400 section 2.2.3.1*
84.	**Y**	The temperature device readings stabilized before measurement values were recorded. *FT 1400 section 2.3.2*
85.	**Y**	Groundwater samples were measured *in situ* (downhole) or by using a flow-through container. *FT 1400 section 2.3.2.1*
		DISSOLVED OXYGEN (FT 1500)
86.	**Y**	The dissolved oxygen meter and electrode system met DEP SOP specifications for accuracy, reproducibility and design. *FT 1500 section 1.1*
87.	**N**	All sample measurements were chronologically bracketed with acceptable calibration verifications *FT 1500 sections 2.2 & 2.3* SEE COMMENT 36 ABOVE
88.	**N**	All calibration verifications met the acceptance criteria of ± 0.3 mg/L dissolved oxygen when compared to the table of theoretical values for water-saturated air. *FT 1500 sections 1.1., 2.2.2.2, 2.3.1., 2.4.1, 2.4.2 and 2.4.3* SEE COMMENT 36 ABOVE. FIELD NOTES ON 2-15-06 STATED THAT "D.O. WILL BE CALIBRATED USING % METHOD." AUDITOR DISCUSSED THE CORRECT PROCEDURE FOR VERIFICATION, WHICH WAS CORRECTED ON SUBSEQUENT VERIFICATIONS
89.	**Y**	All measurements were corrected for temperature (manual or automatic). *FT 1500 sections 1.1 & 2.5.4*
90.	**N**	The temperature sensor calibration was verified according to FT 1400. *FT 1500 section 1.1* SEE COMMENT 63 ABOVE.
91.	**N**	The dissolved oxygen electrode was rinsed with deionized or distilled water between sample measurements. *FT 1500 section 2.5.2* SEE COMMENT 69 ABOVE.
92.	**Y**	The dissolved oxygen electrode was stored in a water-saturated air environment when not in use. *FT 1500 sections 2.1.2 & 2.5.2*

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93. **Y** The instrument dissolved oxygen readings stabilized before measurement values were recorded. *FT 1500 sections 2.3.1.3, 2.4.6 & 2.5.3*

TURBIDITY (FT 1600)

94. **Y** The turbidimeter met DEP SOP design specifications. *FT 1600 section 2.1*
95. **N** All sample measurements were chronologically bracketed with acceptable calibration verifications. *FT 1600 section 3.2.1*
    A. RECORDS WERE PROVIDED THAT DOCUMENTED CALIBRATION WITH FORMAZIN STANDARDS ON 2-4-05. THERE IS NO INDICATION THAT A PRIMARY STANDARD WAS USED TO VERIFY THIS CALIBRATION.
    B. THE SECONDARY GEL STANDARDS HAD NOT BEEN ASSIGNED VALUES PER MANUFACTURER AND SOP REQUIREMENTS.
    C. PRIMARY CALIBRATION RECORDS DO NOT INCLUDE THE VENDOR CATALOG NUMBER OR THE DESCRIPTION OF THE PRIMARY STANDARD.
96. **Y** All sample measurements were quantitatively bracketed with an appropriate choice of calibration standards for calibrations and verifications. *FT 1600 section 3.2.1*
97. **Y** Initial calibration of the turbidimeter was performed using formazin or styrene divinylbenzene primary standards, whichever was required by the manufacturer of the instrument. *FT 1600 section 2.3*
98. **Y** All calibration verifications met the DEP SOP acceptance criteria applicable to the NTU ranges associated with the verification standard values. *FT 1600 section 3.2.2*
99. **Y** The sample cells (optical cuvettes) were inspected for scratches and discarded or coated with a silicone oil mask, as necessary. *FT 1600 section 2.2.2*
100. **Y** The sample cells (optical cuvettes) were optically matched for calibrations and sample measurements. *FT 1600 section 2.2.3*
101. **Y** The sample cells (optical cuvettes) were rinsed with deionized or distilled water between standard solutions and between sample measurements, as applicable. *FT 1600 section 3.3.6*
102. **Y** The sample cells (optical cuvettes) were rinsed with sample prior to filling with sample for measurement. *FT 1600 section 3.3.2*
103. **Y** The exterior of the sample cell (optical cuvette) was kept free of fingerprints and dried with a lint-free wipe prior to insertion in the turbidimeter. *FT 1600 sections 2.2..1.1 & 3.3.3*

FD 1000 Universal Documentation Requirements

104. **Y** Waterproof ink was used for all paper documentation. *FD 1100 section 2.5.*
105. **Y** Errors in documentation were corrected without obliteration. *FD 1100 section 2.6.*
106. **N** All instrument calibrations were properly documented. *FD 4100 sections 1 – 2.7*
107. **Y** Names of all sampling personnel were recorded. *FD 5000 section 2.1*
108. **Y** The type(s) of sampling equipment used to collect all samples was recorded in the field record. *FD 5000 section 2.10*
109. **Y** Date of sample collection was recorded for all samples. *FD 5000 section 2.2*
110. **N** Ambient field conditions were recorded for all samples. *FD 5000 section 2.3*
111. **Y** A specific description of all sampling locations (sources) was recorded. *FD 5000 section 2.4*
112. **Y** The matrix collected was recorded for all samples. *FD 5000 section 2.6*
113. **Y** The types, number, collection location and collection sequence of all field quality control samples was recorded in the field record. *FD 5000 section 2.11*
114. **Y** Preservation information and verification was recorded for each sample, as applicable. *FD 5100 section 1 – 1.4*
115. **Y** Each sample container or group of containers was tagged or labeled with a unique field identification code that distinguishes the sample from all other samples. *FD 5000 section 1.1*
116. **Y** Sample containers and labels were attached so as to prevent contact between the sample and the label or tag when pouring or dispensing from the container. *FD 5000 section 1.2*
117. **Y** The unique identification codes for samples were recorded in a manner that linked the codes to all other field records associated with the samples. *FD 5000 sections 1.1.1 & 1.3*

GROUNDWATER MONITORING WELL PURGING AND SAMPLING

Information about the following topics was recorded for each sample, as applicable (*FS 5100, sections 2.1 – 2.3):*

118. **Y** Purging equipment
119. **Y** Purging procedure
120. **N** Well casing composition
121. **Y** Well diameter

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122. **Y** Water table depth
123. **Y** Depth of well
124. **Y** Volume of water in the well
125. **Y** Purge volume calculations
126. **Y** Total volume of water purged
127. **Y** Date of purging
128. **Y** Starting and ending times for purging
129. **Y** Purging rate (pumping or flow rate) and associated calculations
130. **Y** Stabilization measurements for purge completion criteria
131. **Y** Elapsed time for one well volume or equipment volume purge at stabilized flow rate
132. **Y** Water level drawdown measurements during purging (depth to water table)

TRANSMITTAL OF SAMPLES AND SAMPLE INFORMATION TO A LABORATORY OR OTHER PARTY

For all samples, the following information was transmitted to the analyzing lab or other party. *FD 5000 section 3 – 3.9*

133. **Y** Site name and address
134. **Y** Client code substituted for but linked to site name and address, where applicable
135. **Y** Date and time of sample collection
136. **Y** Name of sampler responsible for sample transmittal
137. **Y** Unique field identification code for each sample container or group of containers
138. **Y** Total number of samples transmitted
139. **Y** Required analyses for each sample container or group of containers
140. **N** Sample preservation used for each container or group of containers

THE LABORATORY TRANSMITTAL FORM HAS PROMPTS FOR PRESERVATION, BUT THIS INFORMATION WAS NOT COMPLETED.

DOCUMENTATION FOR REAGENTS AND OTHER CHEMICALS USED FOR CLEANING AND SAMPLE PRESERVATION

141. **N** The lot numbers and inclusive dates of use were recorded for all reagents, detergents, solvents and other chemicals used for decontamination and preservation of samples. *FD 2000 section 3.1*

THE LOT NUMBER OF THE FORMAZIN STANDARD FOR TURBIDITY IS NOT RECORDED.

DOCUMENTATION OF EQUIPMENT AND INSTRUMENT MAINTENANCE

142. **Y** Each applicable instrument or equipment unit (inventory item) was identified with a unique designation or identification code that distinguishes the unit from all others. *FD 3000 section 1.3*
The following information was recorded for all equipment associated with the sampling project:
FD 3000 sections 1, 1.1 – 1.2.1

PROVIDED ONLY FOR THE MULTIPROBE METERS, NOT THE TURBIDIMETER – **EVALUATION BELOW PERTAINS ONLY TO THE YSI METERS**.

143. **Y** Maintenance and repair procedures for equipment or instrument unit
144. **Y** Routine cleaning procedures for each unit
145. **N** Filling solution replacement for probes
146. **Y** Parts replacement for instruments or probes
147. **Y** Calendar date for each procedure performed on each unit
148. **N** Names of personnel performing maintenance and repair tasks for each unit
149. **N** Description of malfunctions associated with any maintenance and repair for each unit
150. **N/R** Vendor service records were retained for all affected equipment or instruments associated with the sampling project. *FD 3000 section 2*
151. **N/R** Manufacturers' operation & maintenance manuals and instructions were retained for all equipment and instruments associated with the sampling project. *FD 3000 section 4*

Note: The audit criteria are derived from the "DEP Standard Operating Procedures for Field Activities", February 2, 2004 (DEP-SOP-001/01). Where applicable, the citations for the criteria appear after each criterion statement.

LEGEND FOR AUDIT FINDINGS:
Y= The audit criterion was met. No further response is necessary.
N=The audit criterion was not met. The item is an observed deficiency and a response is required.
NR= The criterion was not audited for performance and/or documentation. No further response is required.
?= It is uncertain whether the audit criterion was met or is applicable to the audited event. A response is required for clarification.