REVISION TO APPENDIX C
TUTU SERVICE STATION INVESTIGATION
WORK PLAN
ST. THOMAS, U.S. VIRGIN ISLANDS

PRIVILEGED AND CONFIDENTIAL
ATTORNEY WORK PRODUCT

Revision to Appendix C
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APPENDIX C

FIELD GAS CHROMATOGRAPH ANALYSIS AND CALIBRATION PROCEDURES

All of the soil samples obtained during drilling will be analyzed for volatile organic compounds (VOCs) using a field gas chromatograph (GC). Water samples from the monitoring wells may also be analyzed for VOCs using the field GC, in order to provide a preliminary evaluation of ground-water quality.

1.0 SAMPLING AND ANALYSIS

1.1 Soil samples to be analyzed using the field GC will be collected from the split-spoon using a stainless-steel trowel. Approximately 15 grams (g) of the soil sample will be placed in a 40 - milliliter (ml) VOC vial which contains 15 ml of organic-free distilled and deionized water making a one to two dilution. The sample will be shaken vigorously for 60 seconds. A 300-microliter (ul) headspace sample will be collected from the vial with a gas-tight syringe and injected into the GC.

1.2 Water samples to be analyzed using the field GC will be collected by pouring the water from the bailer directly into the 40-ml vial. The vial will be half-filled with water. The sample will be shaken vigorously for 60 seconds. A 300-ul headspace will be collected from the vial with a gas-tight syringe and injected into the GC.

1.3 The GC will identify all peak areas greater than 0.005 volt seconds (vs) as unknowns on the GC chromatogram.

1.4 The GC integrater will compare the retention time(s) of the unknowns with the most recent established calibration curve retention time window(s). If the retention times match, the compounds will be identified and quantified relative to the daily calibration curve stored within the GC reference library. The final concentration will

be reported in micrograms per kilogram (ug/kg) for soil and in micrograms per liter (ug/L) for water samples.

2.0 QUALITY ASSURANCE/QUALITY CONTROL

2.1 GC blank samples will be analyzed to ensure a steady baseline. A blank will be run by starting the GC without injecting a sample. Blanks will be run at the start of each day's sampling.

2.2 GC syringe blank samples will be analyzed to determine if there are carry-over effects from previous samples and standards. Syringe blanks will be analyzed following all samples where high VOC concentrations are detected. Contamination of the GC will be removed by purging the GC with ultra-zero air until the contamination is no longer detected. Contamination of the gas-tight syringe will be cleaned using methanol and organic-free water.

2.3 A duplicate GC sample will be run every ten samples to evaluate the precision of the analyses.

2.4 Approximately 10 percent of the samples analyzed by the field GC will have field replicates sent to the laboratory for analyses. These analyses will allow for a comparison between field GC and laboratory results. Those samples selected will include samples with both the highest and lowest GC results to confirm the presence and absence of VOC compounds.

3.0 CALIBRATION PROCEDURES

3.1 The GC will be calibrated with aqueous, mixed standards of the following compounds: benzene, toluene, ethylbenzene, m-xylene, o-xylene, tetrachloroethene (PCE), trichloroethene (TCE), and trans-1,2-dichloroethene (DCE).

3.2 The mixed calibration standards will be prepared in the concentration range expected to be present in the samples analyzed on-site (Table C-1). The mixed, stock standard will be prepared by introducing a known volume of the compounds from purchased individual 5,000 part per million (ppm) standards dissolved in methanol. Once the mixed, stock standard in methanol has been prepared, known volumes of the mixed stock standard will be introduced into organic-free water to prepare three concentration levels of aqueous calibration standards.

3.3 Fresh aqueous calibration standards will be prepared daily. These daily standards will be prepared from the mixed stock standard which will be kept refrigerated and prepared fresh at a minimum of once per week.

3.4 The GC will be calibrated at the beginning of each daily GC analysis event. Initial calibration will consist of establishing a three point calibration curve using the aqueous calibration standards, discussed previously in Sections 3.1 through 3.3.

3.5 Continuing calibration of the field GC will be maintained by the analysis of the aqueous, mid-point standard every 4 hours or more frequently, at the operator's discretion, in order to ensure accurate calibration of the instrument.

4.0 RECORD KEEPING

4.1 The Geraghty & Miller field hydrogeologist will maintain a list of samples collected for field GC analysis using the List for Field Gas Chromatograph Analyses (attached).

4.2 The field GC operator will maintain a list of all analyses performed (including blanks, standards, samples and duplicates) using the Field Gas Chromatograph Analytical Sheet (attached).

4.3 Chromatograms of field GC analysis will be attached in a bound notebook. The date and time of analysis, compounds identified, concentrations, sample volume and any other important instrument or interpretation notes will be recorded.

Table C–1. Calibration Standard Ranges for Site–Specific, Target Volatile Oragnic Compunds to be Analyzed by Field Gas Chromatography, Tutu Service Station Investigation, St. Thomas, U.S. Virgin Islands.

Parameter	Standard Level 1 (detection limit standard)	Standard Level 2 (mid–point standard)	Standard Level 3 (high standard)
Benzene	1	5	50
Ethylbenzene	3	15	150
trans–1,2–Dichloroethene	1	5	50
cis–1,2 Dichloroethene	2	10	100
Tetrachloroethene	2	10	100
Trichloroethene	1	5	50
Toluene	2	10	100
M,P–Xylene	3	15	150
O–Xylene	3	15	150

Concentration in parts per billion (ppb) or micrograms per kilogram (ug/kg).

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