ALTUS AIR FORCE BASE

PERMIT ATTACHMENT 2

PERFORMANCE MONITORING

SAMPLING AND ANALYSIS PLAN

PERFORMANCE MONITORING SAMPLING AND ANALYSIS PLAN FOR ALTUS AIR FORCE BASE, OKLAHOMA

February 2021

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1. INTRODUCTION

This document replaces the *Attachment B* of the *Final Performance Monitoring Field Sampling Plan* (Earth Tech AECOM, June 2009). The document includes general sampling and analysis (SAP) procedures and performance requirements for compliance monitoring at the Further Action Sites identified in Attachment 2(a) of the Altus AFB Resource Conservation and Recovery Act Corrective Action Permit No. 9571824045-CA. This document *w*as prepared to ensure (1) the specified project data quality objectives are met, (2) the field sampling protocols are documented and reviewed in a consistent manner, and (3) the data collected are scientifically valid and defensible.

This *SAP* is required reading for all staff participating in the fieldwork associated with the performance monitoring effort. The objectives of the performance monitoring are to: (a) provide the data needed to evaluate plume stability and monitor the effects of a remedial action and the rate of contaminant reduction; (b) evaluate plume stability; and (c) evaluate the potential for further impacts. All contractor and subcontractor personnel will be required to comply with the procedures documented in this *SAP* in order to maintain comparability and representativeness of the collected and generated data.

Sampling and analytical activities will be documented in accordance with this plan and Environmental Resources Program Information Management System (ERPIMS) protocols which is the current Air Force system for validation and management of data from environmental projects at all Air Force bases. Analytical methods and target compounds for compliance monitoring activities are provided in *Final Performance Monitoring Field Sampling Plan Part II* (Earth Tech AECOM, June 2009).

2. FIELD ACTIVITIES

2.1 Field Measurement Equipment

All air and water quality monitoring equipment will be calibrated (two point) each day prior to use and a post use calibration (single point) check will be completed at the end of each day (Table 1). The calibration of all field instruments will be documented on the field equipment calibration form included in Attachment A.

All field measurement equipment will be decontaminated prior to any measurement activities and will be protected from contamination until ready for use.

2.2 Water Level Measurement

Water-level measurements will be taken in all monitoring wells being sampled. An air/water interface probe will be used to measure depth to ground water from the surface reference location to the nearest 0.0l foot. (Two or more sequential measurements will be taken at each location until two measurements agree to within + or - 0.01 foot.) Water levels will be measured from the north side of the top of the well casing and recorded on the ground water collection form and the field notebook.

2.3 Groundwater Sampling

Ground water samples from the performance monitoring wells will be analyzed for volatile organic compounds (VOCs) listed on Table 2. Information regarding laboratory methods and procedures are included in *Final Performance Monitoring Quality Assurance Project Plan*, Earth Tech AECOM, June 2009. A subset of monitoring wells will also have samples collected to monitor natural attenuation (MNA) parameters listed on Table 3. All groundwater sample collection will be in accordance with USEPA document EPA/540/S-95/504 (April 1996) and ASTM D 6771-02 (March 2002). Low-flow groundwater sampling involves the establishment of a low velocity flow regime between the pump intake and the formation. This low velocity flow technique minimized the disturbance of solids and the mixing of stagnant well water with the formation water.

When numerous monitoring wells are to be sampled in succession, those wells expected to have low levels of contamination or no contamination will be sampled prior to those wells expected to have higher levels of contamination. This practice will help reduce the potential for cross contamination between wells. All sampling activities will be recorded in the field logbook. Additionally, all sampling data will be recorded on a well sampling form. A copy of the form is included in Attachment A.

Before ground water sampling begins, wells will be inspected for signs of tampering or other damage. If tampering is suspected, (i.e., casing is damaged, lock or cap is missing) this will be recorded in the field logbook and on the well sampling form, and reported to the Field Operations Leader or Project Manager. Plastic sheeting will **not** be placed on the ground surrounding the well to prevent the possibility of the sheeting becoming windborne, creating foreign object debris (FOD) and potentially being pulled into the aircraft engines.

Remove water in the protective casing or in the vaults around the well casing prior to opening the well. Every time a casing cap is removed to measure water level or to collect a sample, the air in the breathing zone and the air in the well casing will be monitored with a photoionization detector (PID). Action levels and procedures are available in the Altus AFB *Health and Safety Plan (HASP)*. When sustained concentrations of organic vapors or explosive gases are detected, appropriate personal protective equipment (PPE) adjustments will be made at this time. Air monitoring data will be recorded on the ground water sample collection form.

Purging and sampling will be performed in a manner that minimizes aeration in the well and the agitation of sediments in the well and formation. Equipment will not be allowed to free-fall into a well during placement or any other time during sample collection.

2.4 Sample Collection

Ground water samples will be collected by low-flow, minimal drawdown techniques. This methodology is based on parameter stabilization, not well volumes removed. The low-flow guidance is presented below. **If excessive drawdown is observed during the low-flow purging process, the well will be pumped dry and a grab sample will be collected with a disposable Teflon bailer when a sufficient volume of water has accumulated in the well, but no more than 24 hours after purging.**

2.5 Low-Flow, Minimal Drawdown Groundwater Sampling

Low-flow (minimal drawdown) groundwater sampling procedures are presented in USEPA document EPA/540/S-95/504, April 1996 and ASTM D 6771-02, March 2002. Low-flow ground water sampling involves the establishment of a low velocity flow regime between the pump intake and the formation. This low velocity flow technique minimizes the disturbance of solids and mixing of stagnant well water with the formation water. Flow rates generally range from 0.1 Liter per minute (L/min) to 0.5 L/min, however, in some cases they can be higher. **Low-flow pumping rates at Altus AFB range from 0.040 L/min to 0.200 L/min but must never exceed 0.250 L/min.**

Ground water quality field parameters are monitored in real time during purging to determine when stabilization has occurred. Water quality field parameters used to indicate stabilization include water level, temperature, specific conductivity, dissolved oxygen (DO), pH, and oxidation- reduction potential (ORP). Turbidity will be monitored and recorded, but is not considered a stabilization parameter.

The water level within the well being sampled is also monitored to ensure no excessive drawdown occurs. **Drawdown must not exceed one half the length of submerged screen. In wells with fully submerged screens, drawdown must never expose the screen to the atmosphere.** Once water quality field parameters have stabilized within the recommended ranges, sample collection may begin. Sampling collection must occur immediately after stabilization is observed with no interruption or disturbance of the established flow regime until sample collection is completed. Stabilization is defined as three successive field readings of stable water level, temperature + 0.5 C, specific conductivity within + 3%, DO to within + 10%, pH within + 0.1, ORP within + 10mv, and turbidity as low as possible (USEPA, April 1996, ASTM:2018).

2.6 Purging

Avoid creating foreign object debris (FOD). Take precautions so loose objects do not become airborne.

Before opening well cap, remove any standing water from within the protective casing. **Do not allow any standing water to enter the well casing.**

Remove well cap and use PID to check for volatile organic compounds (VOCs) in breathing zone and in the well casing. Record all data on the monitoring well sample collection form.

If well is pressurized, allow at least several minutes for the water level to equilibrate and note this information on the well sampling form.

Measure depth-to-water from the top of the well casing. Consult previous sample collection form or well database to determine the depth of the screened interval for the well. Record all the information on the monitoring well sample collection form.

When placing the pump in the well to be sampled, lower the pump with one continuous smooth motion to minimize the disturbance of any sediment that may have accumulated in the well. The water level meter probe may be lowered with the pump to monitor the depth. The pump should be placed within three feet of the bottom of the screened interval. **Do not raise and lower the pump in the well.** It is important to minimize mixing of stagnant borehole water and disturbing sediment which may have collected at the bottom of the well. Secure the pump at the well head when it reaches the appropriate depth.

Set up the water quality meter and flow-through cell:

1. Attach the pump tubing to the flow-through cell.
2. Retract the water level meter to the top of the water and record the water level. If the water level has not changed significantly (< 0.3 feet), the well will likely sustain low-flow sampling. Secure the water level meter at the appropriate depth to monitor draw-down as pumping proceeds.
3. Record the pump controller settings.
4. Record the time, the depth to water, and estimated pump intake depth on the Monitoring Well Sample Collection Form (Attachment A).
5. Begin pumping. Bypass the flow-through cell and monitor the pump discharge. Adjust the discharge to a rate that is just high enough to pump water to the surface. Attach flow through cell and adjust the flow rate as necessary to maintain flow through the cell. **The flow rate**

must be set and maintained constant throughout the purge and sampling process.

6. Monitor the flow rate and draw down. The highest flow rate that produces **NO DRAWDOWN** is ideal. The flow rate must be less than 0.02 L/min and create drawdown of no more than half the length of submerged screened portion of the well. **The water level should never be allowed to drop to within 2 feet of the top of the pump.**
7. If the well will not sustain a 40 mL/min purge rate with no drawdown, the well will be pumped dry and a grab sample will be collected with a disposal Teflon bailer. The standard suite of water quality parameters will be recorded at the time of sample collection.

While purging, initially measure and record the stabilization parameters every 5 minutes. As the readings begin to stabilize, begin recording the parameters every three minutes. The monitoring well will be considered purged when all parameters are stabilized for three consecutive readings. The three readings should be within:

± 0.5 degrees C for Temperature
± 3% for specific conductivity
± 10% for DO
± 0.1 for pH
± 10mv ORP

Turbidity as low as possible (<10 NTU ideal)

Once stabilization has been confirmed with three consecutive readings, sample collection may begin. **All monitoring wells should be purged for a minimum of 40 minutes before sample collection should be considered.**

2.7 Groundwater Discharge Measurements

Ground water discharge measurements will be obtained during monitoring well purging. Ground water discharge will be measured with containers of known volume, in-line meters, flumes, or weirs.

2.8 Surface Water Sampling

Surface water samples will be collected so as not to cause cross-contamination. Measure and record pH, temperature, specific conductance, turbidity, ORP, and dissolved oxygen at each surface water sampling point. The sample location will be marked with several redundant markings (e.g., flagged stake in stream bank, paint, survey tape, etc.) to facilitate locating the sample location at a later date. Surface water samples will be analyzed for VOCs.

The sample collection sequence is as follows: (1) start at the most downstream point and proceed upstream; (2) if sampling water only and the sample can be taken without disturbing the creek or tributary bottom, obtain any applicable background samples first, then the farthest downstream sample, and then move upstream toward the source or discharge point; (3) if sampling water only and the creek or tributary bottom must be disturbed, start at the most downstream point and proceed upstream; and (4) surface water and sediment samples are not to be collected within 10 feet of a roadway or bridge due to potential runoff.

Samples will be collected from the active portion of the stream on the side nearest the source of contamination or suspected plume. Surface water samples shall be collected using a glass pitcher, bailer, or by submerging the non-preserved sample bottle into the stream (do not disturb the sediment).

The following records will be maintained in addition to those on the field form: (1) the width, depth, and estimated flow rate of streams; (2) surface water conditions (e.g., floating oil or debris, gassing); (3) the location of any discharge pipes, sewers, or tributaries; and (4) instrument calibration.

2.9 Quality Assurance/Quality-Control (QA/QC) Samples

Quality assurance/quality control samples will be collected as described in the *Final Performance Monitoring Quality Assurance Project Plan*, (Earth Tech/AECOM, 2009). The sampling team will provide the designated field QA/QC samples for analysis of VOCs to the subcontracted laboratory. The QA/QC samples will be collected at the following rates:

- Trip Blanks – Collect a target frequency of one sample per each shipment of samples to be analyzed by an off-site laboratory.
- Ambient Blanks – Collect one ambient blank each time the ambient conditions change (e.g., adjacent to a building that represents a potential VOC source).
- Equipment Rinsate Samples – Collect one equipment rinsate sample from each sampling equipment set-up.
- Duplicate Samples – Collect one duplicate that represents approximately a target frequency of 10 percent of project samples analyzed using an off-site laboratory.

3. SAMPLE COLLECTION and PRESERVATION

3.1 Sample Containers

Prior to beginning sample collection, be sure to label all sample containers appropriately. While maintaining the pumping rate, cut tubing before the flow-through cell. **Do not sample water that has passed through the flow-through cell.** Carefully begin filling the sample containers in the following order:

1. Glass vials (unpreserved) for VOC analysis;
2. Glass vials (unpreserved) for dissolved gasses analysis;
3. Biological analysis;
4. Metals analysis;
5. Cation analysis;
6. Anion analysis;
7. Total organic carbon analysis; and
8. Other physical or chemical parameter analysis.

If the well has been pumped dry due to excessive drawdown, and a grab sample will be collected with a disposable Teflon bailer, a single set of water quality parameters will be collected at the time of sample collection. VOC grab samples must be collected within 24 hours from the time the well is purged dry. If insufficient water volume is available within 24 hours, the water level in the well will be monitored and the samples will be collected when sufficient water volume has accumulated in the well. Record all the information on the monitoring well sample collection form.

Deviations from the procedures, such as collecting a sample if the turbidity is >10 Nephelometric Turbidity Units (NTU), are discussed with the field site supervisor and are noted on the field forms and/or field logbook.

3.2 Sample Preservation

VOC samples are not preserved with hydrochloric acid (HCl) at Altus AFB because HCl causes the groundwater samples to effervesce, resulting in headspace issues. For this reason, the VOC samples are only preserved with ice. Ice is checked and replenished as needed, fresh ice is used for shipping to protect the integrity of the samples.

4.0 SAMPLE DOCUMENTATION AND TRACKING

Documentation of observations and data acquired in the field will provide information on the acquisition of samples and also provide a permanent record of field activities. The observations and data will be recorded with ink in a permanently bound, weatherproof, field logbook containing consecutively numbered pages.

The information that should be recorded in the field logbook includes the following:

- Location of sample,
- Date and time of sample collection,
- Sample identification code, including QC and QA identification,
- Description of samples (matrix sampled),
- Sample depth (if applicable),
- Number and volume of samples,
- Sampling method used,
- Special sample handling, and
- Field observations.

Changes or deletions in the field logbook should be lined out with a single strike mark, initialed, and remain legible. Sufficient information should be recorded to allow the sampling event to be reconstructed without relying on the sampler's memory. Each page in the field logbooks will be signed by the person making the entry at the end of the day, as well as on the bottom of each page. Anyone making entries in another person's field logbook will sign and date those entries. Specific logbook guidance is provided in Section 8.1 of the *Final Performance Monitoring Field Sampling Plan,* (Earth Tech AECOM, 2009).

4.1 Field Custody Procedures

After sample collection, each container will be labeled. Sample labels must be completed for each sample with waterproof ink, ensuring that the labels are legible and affixed firmly on the sample container. All sample-related information must be recorded in the project logbook. The field sampler must retain custody of samples until they are transferred or properly dispatched. Samples will be stored on ice in an insulated cooler until samples can be returned to the field trailer. Once at the field trailer, the samples will be packed for shipment to the off-site laboratory.

4.2 Sample Custody

Traceability of the sample must be maintained from the time that samples are collected until laboratory data are issued. Information concerning collection of the samples will be recorded in the field logbook and/or sample log. A sample is under custody under the following conditions:

- It is in one's actual possession
- It is in one's view, after being in one's physical possession
- It was in one's physical possession and that person locks it up to prevent tampering It is in a designated and identified secure area

4.3 Sample Shipping

The sample containers will be placed in reclosable plastic storage bags and wrapped in protective packing material (bubble wrap). Samples will then be placed right side up in a cooler with ice. The cooler will be sealed with tape and a custody seal for delivery to the laboratory. Samples will be shipped via overnight express carrier for delivery to the analytical laboratory.

All samples must be shipped for laboratory receipt and analyses within specific holding times. An original chain-of-custody (CoC) form will accompany each cooler. The temperature of all coolers will be measured upon receipt at the laboratory. A copy of the CoC form is included in Attachment A.

Samples will be delivered to the designated laboratories by local courier or by a common carrier such as Federal Express. Hard plastic ice chests or coolers with similar durability will be used for shipping samples. The coolers must be able to withstand a 4-foot drop onto solid concrete in the position most likely to cause damage. The samples must be cushioned to cause the least amount of damage if such a fall occurs.

5. DECONTAMINATION PROCEDURES

All equipment that may directly or indirectly contact samples will be decontaminated. This includes water level meters and pumps. Only individually packaged equipment designated as “single use” or “disposable” with “factory clean” certification are exempt from the decontamination policy. In addition, care will be taken to prevent the sample from coming into contact with potentially contaminating substances, such as tape, oil, engine exhaust, corroded surfaces, and soil. The following procedure will be used to decontaminate sampling equipment:

1. Scrub the equipment with a solution of potable water and laboratory grade detergent (Alconox or Liquinox).
2. Rinse the equipment with copious quantities of potable water.
3. Rinse the equipment with copious quantities of deionized (DI) water.
4. If equipment has come in contact with free product, rinse the equipment with pesticide grade methanol followed by pesticide-grade hexane and repeat steps 1, 2, and 3.
5. Air dry the equipment on a clean surface or rack.
6. If the sampling device will not be used immediately after being decontaminated, it will be wrapped in oil-free aluminum foil.

Reagent-Grade II water, methanol, and hexane will be purchased, stored, and dispensed only in clean, contaminant-free containers. It is the sample personnel’s responsibility to assure the decontamination materials remain free of contaminants. If any question of purity exists, new materials will be used.

- Ambient Blanks - Collect one ambient blank each time the ambient conditions change (e.g., adjacent to a building that represents a potential VOC source).
- Equipment Rinsate Samples - Collect one equipment rinsate sample from each sampling equipment set-up.
- Duplicate Samples - Collect one duplicate that represents approximately a target frequency of 10 percent of project samples analyzed using an off-site laboratory.

6. WASTE HANDLING

Waste may be classified as non-investigative waste or investigative-derived waste (IDW). Non-investigative waste, such as litter and household garbage, will be collected on an as-needed basis to maintain each site in a clean and orderly manner. This waste will be containerized and transported to a collection bin.

IDW will be segregated at the site according to matrix (solid or liquid) and as to how it was derived (drill cuttings, drilling fluid, decontamination fluids, and purged ground water). Each container will be properly labeled with container identification, sampling location IDs, start date, end date, and any other pertinent information for handling.

IDW will be properly containerized and temporarily stored on site, prior to transportation and disposal. All soil cuttings will be placed in roll-off containers with fixed covers. All aqueous IDW will be placed in holding tanks and the water processed through the on-base granular activated carbon (GAC) treatment system at SS-17. If sediment (sludge) is observed to accumulate in the tanks, the water will be decanted off to the extent possible and processed through the on-site GAC treatment system.

7. REFERENCES

References used in the preparation of this SAP include the following:

1 American Society for Testing and Materials (ASTM), March 2002, Standard Practice for Low-Flow Purging and Sampling for Wells and Devices Used for Ground-Water Quality Investigations, ASTM D 6771-02.

2 Earth Tech AECOM, June 2009, Final Performance Monitoring Sampling and Analysis Plan.

3 U.S. Environmental Protection Agency, April 1996, Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures, EPA/540/S-95/504.

4 U.S. Environmental Protection Agency, December 1996, Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846 (Third Edition).

5 U.S. Army Corps of Engineers, February 2001, Engineer Manual EM 200-1-3, Engineering and Design - Requirements for the Preparation of Sampling and Analysis Plans.

II. TABLES

A. **Table 1 -- Field Equipment Calibration, Maintenance, Testing and Inspection**
B. **Table 2 -- Reporting Limits and Method Detection Limits for Method SW8260C**
C. **Table 3 -- Method RSK-175 – Soil Gases (Volatile Organics) in Water**
D. **Table 4 – GWMU 1 Monitoring Well Network**
E. **Table 5 -- GWMU 2 Monitoring Well Network**
F. **Table 6 – GWMU 3 Monitoring Well Network**
G. **Table 7 – GWMU 4 Monitoring Well Network**

Table 1 -- Field Equipment Calibration, Maintenance, Testing, and Inspection

The following are commonly used field equipment. Additional field testing equipment may be required on a site-specific basis.

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA[2]	Responsible Person	SOP Reference[3]
ORP meter[1]	NA	NA	Single standard calibration check	NA	Daily, before sampling	Two successive reading within ±10 mV	Recalibrate instrument	Field sampling team	TBD
	NA	NA	Sensitivity verification	NA	Daily, before sampling	ORP should decrease as pH is increased	If ORP increases, correct the polarity of electrodes. If ORP still does not decrease, clean electrodes and repeat procedure	Field sampling team	TBD
Turbidity meter[1]	Single standard calibration with formazin standard per instrument range used	NA	NA	NA	Daily, before sampling	±5 units, 0–100 range; ±0.5 units, 0–20 range; ±0.2 units, 0–1 range	Recalibrate instrument	Field sampling team	TBD
DO meter[1]	NA	NA	Function check	NA	Daily, before sampling	Meter reads 8% ±2%	Replace instrument	Field sampling team	TBD

Table 1 (Continued) -- Field Equipment Calibration, Maintenance, Testing, and Inspection

Field Equipment	Calibration Activity	Maintenance Activity	Testing Activity	Inspection Activity	Frequency	Acceptance Criteria	CA[2]	Responsible Person	SOP Reference[3]
Aqueous pH meter[1]	2-point calibration with pH buffers	NA	NA	NA	Daily, before sampling	±0.05 pH units for every buffer	If calibration is not achieved, check meter, buffer solutions, and probe; replace if necessary; repeat calibration	Field sampling team	TBD
Conductance meter[1]	Calibration with potassium chloride standard	NA	NA	NA	Daily, before sampling	±5%	If calibration is not achieved, check meter, standards, and probe; recalibrate	Field sampling team	TBD
Photoionization detector	NA	NA	Calibration check with ambient air and 100 ppm isobutylene	NA	Daily, before sampling	Response within 10% of expected value	Adjust instrument settings, recheck	Field sampling team	TBD
Ferrous iron colorimeter	NA	NA	Field duplicates	NA	Collected at 10% frequency	RPD 20%	Examine measurement system for problems, repeat measurement	Field sampling team	TBD

[1] Direct reading from real-time probe associated with a flow-through cell.
[2] If CA does not solve the problem, the equipment will be removed from service and replaced until proper function can be restored.
[3] See Project Sampling SOP References table (Worksheet #21), presented on a site-specific basis.

DO = dissolved oxygen mv = millivolt

ORP = oxidation-reduction potential ppm = parts per million

Table 2
Reporting Limits and Method Detection Limits for
Method SW8260C

		Water			
Parameter[1]	**Analyte**	**MCL**	**RL**	**DL**	**Unit**
SW8260C	1,1,1,2-Tetrachloroethane	--	1.0	0.30	µg/L
	1,1,1-Trichloroethane	200	1.0	0.20	µg/L
	1,1,2,2-Tetrachloroethane	--	1.0	0.50	µg/L
	1,1,2-Trichloroethane	5	1.0	0.30	µg/L
	1,1-Dichloroethane	--	1.0	0.20	µg/L
	1,1-Dichloroethene	7	1.0	0.20	µg/L
	1,2,3-Trichloropropane	--	1.0	0.50	µg/L
	1,2-Dibromo-3-Chloropropane	0.2	1.0	0.20	µg/L
	1,2-Dichloroethane	5	1.0	0.20	µg/L
	1,2-Dichloroethene, Total	--	1.0	0.20	µg/L
	1,2-Dichloropropane	5	1.0	0.50	µg/L
	1,4-Dioxane	--	5.0	5.0	µg/L
	2-Butanone (Methyl Ethyl Ketone)	--	2.0	0.50	µg/L
	2-Chloro-1,3-Butadiene	--	2.0	2.0	µg/L
	2-Hexanone	--	2.0	1.0	µg/L
	3-Chloropropene (Allyl Chloride)	--	1.0	0.20	µg/L
	4-Methyl-2-Pentanone (MIBK)	--	2.0	0.70	µg/L
	Acetone	--	2.0	0.40	µg/L
	Acetonitrile	--	10	3.0	µg/L
	Acrolein	--	2.0	2.0	µg/L
	Acrylonitrile	--	2.0	0.30	µg/L
	Benzene	5	1.0	0.20	µg/L
	Bromodichloromethane	80	1.0	0.20	µg/L
	Bromoform	80	1.0	0.40	µg/L
	Bromomethane	--	1.0	0.40	µg/L
	Carbon Disulfide	--	2.0	0.60	µg/L
	Carbon Tetrachloride	5	1.0	0.50	µg/L
	Chlorobenzene	100	1.0	0.30	µg/L
	Chloroethane	--	1.0	0.30	µg/L
	Chloroform	80	1.0	0.20	µg/L
	Chloromethane	--	1.0	0.20	µg/L
	cis-1,2-Dichloroethene	70	1.0	0.20	µg/L
	cis-1,3-Dichloropropene	--	1.0	0.10	µg/L
	Dibromochloromethane	80	1.0	0.30	µg/L
	Dibromomethane	--	1.0	0.20	µg/L
	Dichlorodifluoromethane	--	1.0	0.30	µg/L
	Ethyl Methacrylate	--	1.0	1.00	µg/L
	Ethylbenzene	700	1.0	0.30	µg/L
	Ethylene Dibromide (EDB) (1,2-Dibromoethane)	0.050	1.0	0.20	µg/L
	Iodomethane	N/A	2.0	1.0	µg/L
	Isobutanol (Isobutyl Alcohol)	--	20	10	µg/L
	Methyl Acrylonitrile (Methacrylonitrile)	--	2.0	0.50	µg/L
	Methyl Methacrylate	--	2.0	0.40	µg/L
	Methylene Chloride	5	2.0	0.40	µg/L
	Propionitrile	N/A	10	5.0	µg/L
	Styrene	100	1.0	0.30	µg/L

	Water				
	Analyte	**MCL**	**RL**	**DL**	**Unit**
	Tetrachloroethene	5	1.0	0.30	µg/L
	Toluene	1000	1.0	0.20	µg/L
	trans-1,2-Dichloroethene	100	1.0	0.20	µg/L
	trans-1,3-Dichloropropene	N/A	1.0	0.20	µg/L
	trans-1,4-Dichloro-2-Butene	--	1.0	1.0	µg/L
	Trichloroethene	5	1.0	0.20	µg/L
	Trichlorofluoromethane	--	1.0	0.30	µg/L
	Vinyl Acetate	--	1.0	0.50	µg/L
	Vinyl Chloride	2	1.0	0.20	µg/L
	Xylenes, Total	10000	1.0	0.30	µg/L
SW1311/SW8260C	1,1-Dichloroethene	5	0.0010	0.00050	mg/L
	1,2-Dichloroethane	5	0.0010	0.00030	mg/L
	2-Butanone (Methyl Ethyl Ketone)	100	0.0020	0.00040	mg/L
	Benzene	80	0.0010	0.00020	mg/L
	Carbon tetrachloride	5	0.0010	0.00030	mg/L
	Chlorobenzene	7	0.0010	0.00020	mg/L
	Chloroform	--	0.0010	0.00030	mg/L
	Tetrachloroethene	5	0.0010	0.00040	mg/L
	Trichloroethene	5	0.0010	0.00020	mg/L
	Vinyl chloride	2	0.0010	0.00040	mg/L

[1]EPA Method SW8260C or approved equivalent method

Table 3

Table 3 – METHOD RSK-175 – SOIL GASES (VOLATILE ORGANICS)IN WATER

Soil gases in water are sampled and analyzed using method RSK-175. This method uses GC coupled to one or more appropriate detectors. The analytes and RLs for this method are listed below in Table 3, which provides acceptance criteria for Method RSK-175. Table 3 identifies the QC checks, minimum frequencies, acceptance criteria, corrective actions, and flagging criteria. Second-column confirmation is not required.

Table 3
Reporting Limits and Method Detection Limits for Method RSK-175

Analyte	Water		
	RL	MDL	Unit
Methane	5	0.218	μg/L
Ethane	5	0.245	μg/L
Ethene	5	0.398	μg/L
Acetylene	5	0.301	μg/L

Table 3
Quality Control Acceptance Criteria for Method RSK-175

Analyte	Accuracy Water (% R)	Precision Water RPD (%)
Methane	60–120	:: 20
Ethane	65–115	:: 20
Ethene	65–115	:: 20
Acetylene	65-115	:: 20

Table 4 – Monitoring Well Network for Groundwater Management Unit 1

Well ID	Site	Screen Interval	Type[a]	Basewide Grid	Current Performance Monitoring Frequency[b]	Optimization	Reassigned Site
000I17-MW3	SS-17	Upper Intermediate	Body*	B-5(g)	Annual		
MW3D	SS-17	Lower	Body	C-6(i)	Annual		
MW3S	SS-17	Upper	Body	C-6(i)	Annual		
WL066	SS-17	Lower	Body	C-6(i)	Annual		
WL072	SS-18	Lower	Body	A-5(g)	Annual		
WL073	SS-18	Upper	Body	A-5(g)	Annual		
WL078	SS-17	Lower	Body	B-5(g)	Annual		
WL079	SS-17	Upper	Body	B-5(g)	Annual		
WL080	SS-17	Lower	Body*	B-5(g)	Annual		
WL081	SS-17	Upper	Body	B-5(g)	Annual		
WL082	SS-17	Lower	Body	B-5(h)	Annual		
WL083	SS-17	Upper	Body	B-5(h)	Annual		
WL086	SS-17	Lower	Body	B-6(i)	Every 3rd year		
WL087	SS-17	Upper	Body	B-6(i)	Every 3rd year		
WL090	SS-17	Lower	Body	B-6(i)	Annual		
WL091	SS-17	Upper	Body	B-6(i)	Annual		
WL094	SS-17	Lower	Body	B-6(i)	Annual		
WL095	SS-17	Upper	Body	B-6(i)	Annual		
WL132R	SS-17	Upper	Body	B-5(e)	Annual		
WL138	SS-17	Upper	Body	B-5(f)	Annual		
WL139	SS-17	Upper	Body	B-5(f)	Annual		
WL158	SS-17	Upper	Body*	B-6(i)	Annual		
WL159	SS-17	Lower	Body*	B-6(i)	Annual		
WL178	SWMU 21/SS-10	Upper	Body	B-4(a)	Annual	NFA site; reassign well	SS-22
WL191	AOC 6/SS-16	Lower	Body	A5(e)	Annual	NFA site; reassign well	SS-18
WL193	AOC 6/SS-16	Upper	Body	A5(e)	Annual	NFA site; reassign well	SS-18
WL289	SS-22	Upper	Body	B-4(b)	Annual		
WL303	SS-22	Lower	Body*	B-4(b)	Annual		
WL318	SS-17	Lower	Body	B-5(g)	Annual		
WL319	SS-17	Upper	Body	B-5(g)	Annual		
WL383	SS-17	Lower	Body	B-5(f)	Annual		
WL384	SS-17	Upper	Body	B-5(f)	Annual		
WL386	SS-22	Lower	Body	B-5(e)	Every 3rd year		
WL387	SS-17	Lower	Body	B-5(f)	Every 3rd year		

Table 4 Monitoring Well Network for Groundwater Management Unit 1 (Continued)

Well ID	Site	Screen Interval	Type[a]	Basewide Grid	Current Performance Monitoring Frequency[b]	Optimization	Reassigned Site
WL388	SS-17	Upper	Body	B-5(f)	Every 3rd year		
WL413	SS-22	Upper	Body	B-4(d)	Every 3rd year		
WL424	SS-22	Upper	Body	B-4(b)	Annual		
WL430	SS-22	Upper	Body	B-4(c)	Every 3rd year		
WL461	SS-22	Lower	Body	B-4(b)	Annual		
WL466	SS-22	Lower	Body	B-4(d)	Every 3rd year		
WL467	SS-22	Upper	Body	B-4(d)	Every 3rd year		
WL468	SS-22	Lower	Body	B-4(d)	Every 3rd year		
WL469	SS-22	Upper	Body	B-5(e)	Every 3rd year		
WL481	SS-17	Upper	Body	B-6(i)	Annual		
WL482	SS-17	Lower	Body	B-6(i)	Annual		
WL485	SS-17	Lower	Body	B-6(i)	Annual		
WL486	SS-17	Lower	Body*	B-6(j)	Annual		
WL487	SS-17	Upper	Body	B-6(j)	Annual		
WL503	SS-22	Lower	Body	A-4(d)	Every 3rd year		
WL504	SS-22	Upper	Body	A-4(d)	Every 3rd year		
WL507	SS-22	Upper	Body*	B-4(b)	Annual		
WL519	SS-17	Lower	Body	B-5(f)	Annual		
WL535	SS-18	Upper	Body	A-5(g)	Every 3rd year		
WL536	SS-18	Lower	Body	A-5(g)	Every 3rd year		
WL543	SS-17	Upper	Body	B-5(g)	Annual		
WL544	SS-17	Lower	Body	B-5(g)	Annual		
WL552	SS-22	Upper	Body	A-4(c)	Every 3rd year		
WL553	SS-22	Lower	Body	A-4(c)	Every 3rd year		
WL555	SS-22	Lower	Body*	B-4(b)	Annual		
WL556	SS-22	Lower	Body	B-4(c)	Annual		
WL559	SS-22	Lower	Body	B-4(c)	Every 3rd year		
WL571	SS-18	Upper	Body	A-5(f)	Annual		
WL572	SS-18	Lower	Body	A-5(f)	Annual		
WL595	SS-18	Upper	Body	A-5(f)	Every 3rd year		
WL596	SS-18	Lower	Body	A-5(f)	Every 3rd year		
WL599	SS-23	Lower	Body	C-5(h)	Annual		
WL629	SS-23	Upper	Body	B-5(f)	Every 3rd year		
WL630	SS-23	Lower	Body	B-5(f)	Every 3rd year		

Table 4 Monitoring Well Network for Groundwater Management Unit 1 (Continued)

Well ID	Site	Screen Interval	Type[a]	Basewide Grid	Current Performance Monitoring Frequency[b]	Optimization	Reassigned Site
WL678	SS-18	Lower	Body	A-5(g)	Annual		
WL679	SS-18	Upper	Body	A-5(g)	Annual		
WL680	SS-18	Lower	Body	A-5(g)	Annual		
WL681	SS-18	Upper	Body	A-5(g)	Annual		
WL704	SS-23	Upper	Body	C-6(i)	Annual		
WL705	SS-23	Lower	Body*	C-6(i)	Annual		
WL723	SS-23	Lower	Body	Abandoned	Annual	Abandoned	
WL725	SS-23	Upper	Body	C-5(f)	Annual		
WL726	SS-23	Lower	Body*	C-5(f)	Annual		
WL782	SS-17	Lower Intermediate	Body	B-5(h)	Annual		
WL785	SS-18	Upper Intermediate	Body	A-5(g)	Annual		
WL786	SS-17	Upper Intermediate	Body	B-6(i)	Annual		
WL789	SS-17	Upper Intermediate	Body*	B-5(g)	Annual		
WL790	SS-17	Upper Intermediate	Body	B-5(f)	Annual		
WL792	SS-17	Upper Intermediate	Body	B-5(f)	Every 3rd year		
WL795	SS-17	Upper Intermediate	Body*	B-5(h)	Annual		
WL797	SS-18	Upper Intermediate	Body	A-5(g)	Annual		
WL801	SS-17	Upper Intermediate	Body	B-5(h)	Annual		
WL802	SS-17	Lower Intermediate	Body	B-6(i)	Annual		
WL803	SS-17	Upper Intermediate	Body	B-6(i)	Annual		
WL805	SS-17	Upper Intermediate	Body*	B-6(j)	Annual		
WL860	SS-23	Upper Intermediate	Body	C-5(f)	Annual		
WL494	SS-17	Lower	POC	C-6(l)	Semi-annual		
WL495	SS-17	Lower	POC	C-6(l)	Semi-annual		
WL787	SS-17	Upper Intermediate	POC	C-7(m)	Semi-annual		
WL818	SS-17	Upper Intermediate	POC	C-6(l)	Semi-annual		
WL819	SS-17	Upper Intermediate	POC*	C-6(l)	Semi-annual		
WL820	SS-17	Upper Intermediate	POC	C-6(l)	Semi-annual		
WL852	SS-17	Upper Intermediate	POC	C-6(l)	Semi-annual		
WL853	SS-17	Lower	POC	C-6(l)	Semi-annual		
WL854	SS-17	Upper Intermediate	POC	C-6(l)	Semi-annual		
WL855	SS-17	Lower	POC	C-6(l)	Semi-annual		
WL856	SS-17	Lower	POC	C-6(l)	Semi-annual		
WL857	SS-17	Upper	POC	C-6(l)	Semi-annual		

Table 4 Monitoring Well Network for Groundwater Management Unit 1 (Continued)

Well ID	Site	Screen Interval	Type[a]	Basewide Grid	Current Performance Monitoring Frequency[b]	Optimization	Reassigned Site
WL858	SS-17	Lower	POC	C-6(l)	Semi-annual		
WL190	AOC 6/SS-16	Upper	Sentinel	A-5(e)	Annual	NFA site; reassign well	SS-18
WL488	SS-17	Lower	Sentinel	C-6(k)	Annual		
WL489	SS-17	Upper	Sentinel	C-6(k)	Annual		
WL490	SS-17	Lower	Sentinel*	C-6(k)	Annual		
WL491	SS-17	Upper	Sentinel*	C-6(k)	Annual		
WL492	SS-17	Lower	Sentinel	B-6(j)	Annual		
WL493	SS-17	Upper	Sentinel	B-6(j)	Annual		
WL498	AOC 6/SS-16	Upper	Sentinel	A-5(e)	Annual	NFA site; reassign well	SS-18
WL499	AOC 6/SS-16	Lower	Sentinel	A-5(e)	Annual	NFA site; reassign well	SS-18
WL533	SS-18	Upper	Sentinel	A-5(h)	Annual		
WL534	SS-18	Lower	Sentinel	A-5(h)	Annual		
WL676	SS-18	Lower	Sentinel	A-5(g)	Annual		
WL677	SS-18	Upper	Sentinel	A-5(g)	Annual		
WL682	SS-18	Lower	Sentinel	A-5(h)	Annual		
WL683	SS-18	Upper	Sentinel	A-5(h)	Annual		
WL845	SS-17	Upper Intermediate	Sentinel	B-5(h)	Annual		
WL846	SS-17	Lower	Sentinel	B-5(h)	Annual		
WL847	SS-17	Upper	Sentinel	B-5(h)	Annual		
WL848	SS-17	Upper Intermediate	Sentinel	B-6(j)	Annual		
WL849	SS-17	Upper Intermediate	Sentinel	B-6(k)	Annual		
WL850	SS-17	Lower	Sentinel	B-6(k)	Annual		
WL851	SS-17	Upper	Sentinel	B-6(k)	Annual		
WL859	SS-23	Upper Intermediate	Sentinel	C-6(i)	Annual		
WL187	AOC 6/SS-16	Upper	Source*	A-5(e)	Annual	NFA site; reassign well	SS-18
WL189	AOC 6/SS-16	Lower	Source*	A-5(e)	Annual	NFA site; reassign well	SS-18
WL337	SS-23	Upper	Source	B-5(e)	Annual		
WL349	SWMU 21/SS-10	Upper	Source	B-4(a)	Annual	NFA site; reassign well	SS-22
WL377	SS-17	Upper	Source*	B-5(e)	Annual		
WL378	SS-17	Lower	Source*	B-5(e)	Annual		
WL400	SWMU 21/SS-10	Upper	Source	B-4(a)	Annual	NFA site; reassign well	SS-22
WL460	SS-22	Lower	Source	B-4(b)	Annual		
WL478	SS-23	Lower	Source	B-5(e)	Annual		
WL511	SS-22	Upper	Source*	B-4(b)	Annual		

Table 4 Monitoring Well Network for Groundwater Management Unit 1 (Continued)

Well ID	Site	Screen Interval	Type[a]	Basewide Grid	Current Performance Monitoring Frequency[b]	Optimization	Reassigned Site
WL512	SS-22	Lower	Source*	B-4(b)	Annual		
WL515	SS-23	Upper	Source	B-5(e)	Annual		
WL516	SS-23	Lower	Source	B-5(e)	Annual		
WL583	SWMU 21/SS-10	Upper	Source	B-4(a)	Annual	NFA site; reassign well	SS-22
WL607	SS-17	Upper	Source	B-5(f)	Annual		
WL608	SS-17	Lower	Source	B-5(f)	Annual		
WL611	SS-22	Upper	Source	B-4(b)	Annual		
WL612	SS-22	Lower	Source*	B-4(b)	Annual		
WL617	SS-22	Lower	Source*	B-4(b)	Annual		
WL618	SS-22	Upper	Source*	B-4(b)	Annual		
WL619	SS-22	Upper	Source	B-4(b)	Annual		
WL759	SS-18	Upper	Source*	A-5(e)	Annual		
WL760	SS-18	Lower	Source*	A-5(e)	Annual		
WL778	SS-18	Upper	Source*	A-5(e)	Annual		
WL779	SS-18	Lower	Source*	A-5(e)	Annual		
WL791	SS-18	Upper Intermediate	Source*	A-5(e)	Annual		

a Performance monitoring wells that are also used for RA-O sampling are denoted by an *. These wells may change as needed to reflect assessment of remedy performance.
b Denotes frequency for performance monitoring only. Wells also utilized for RA-O may be sampled more frequently as required by specific remedies. NA = not applicable.

Table 5 Monitoring Well Network for Groundwater Management Unit 2

Well ID	Site	Screen Interval	Type	Basewide Grid	Performance Monitoring Frequency	Optimization	Reassigned Site
WL234	SWMU 2/FT005	Upper	Body	C-2	Every 3rd year	NFA site; reassign well	SS-13
WL240	AOC 2 - C-5/SS-13	Upper	Source	B-3	Annual		
WL241	AOC 2 - C-5/SS-13	Lower	Source	B-3	Annual		
WL242	AOC 2 - C-5/SS-13	Upper	Body	C-3	Every 3rd year		
WL539	AOC 2 - C-5/SS-13	Lower	Body	C-3	Every 3rd year		
WL581	AOC 2 - C-5/SS-13	Upper	Body	B-3	Every 3rd year		
WL582	AOC 2 - C-5/SS-13	Lower	Body	B-3	Every 3rd year		
WL755	AOC 2 - C-5/SS-13	Lower	Body	B-3	Annual		
WL757	AOC 2 - C-5/SS-13	Lower	Body	B-3	Every 3rd year		
WL763	SWMU 2/FT005	Lower	Body	B-2	Every 3rd year	NFA site; reassign well	SS-13
WL766	SWMU 2/FT005	Lower	Body	C-2	Every 3rd year	NFA site; reassign well	SS-13

Table 6 Monitoring Well Network for Groundwater Management Unit 3

Well ID	Site	Screen Interval	Type	Basewide Grid	Performance Monitoring Frequency	Optimization
WL708	SS-24	Upper	Source	D-4	Annual	
WL709	SS-24	Lower	Source	D-4	Annual	
WL720	SS-24	Upper	Source	D-4	Every 3rd year	
WL721	SS-24	Lower	Source	D-4	Every 3rd year	
WL729	SS-24	Upper	Body	D-4	Annual	
WL730	SS-24	Lower	Body	D-4	Annual	
WL751	SS-24	Upper	Sentinel	D-4	Every 3rd year	
WL752	SS-24	Lower	Sentinel	D-4	Every 3rd year	
WL753	SS-24	Upper	Sentinel	D-4	Annual	
WL754	SS-24	Lower	Sentinel	D-4	Annual	

Table 7 Monitoring Well Network for Groundwater Management Unit 4

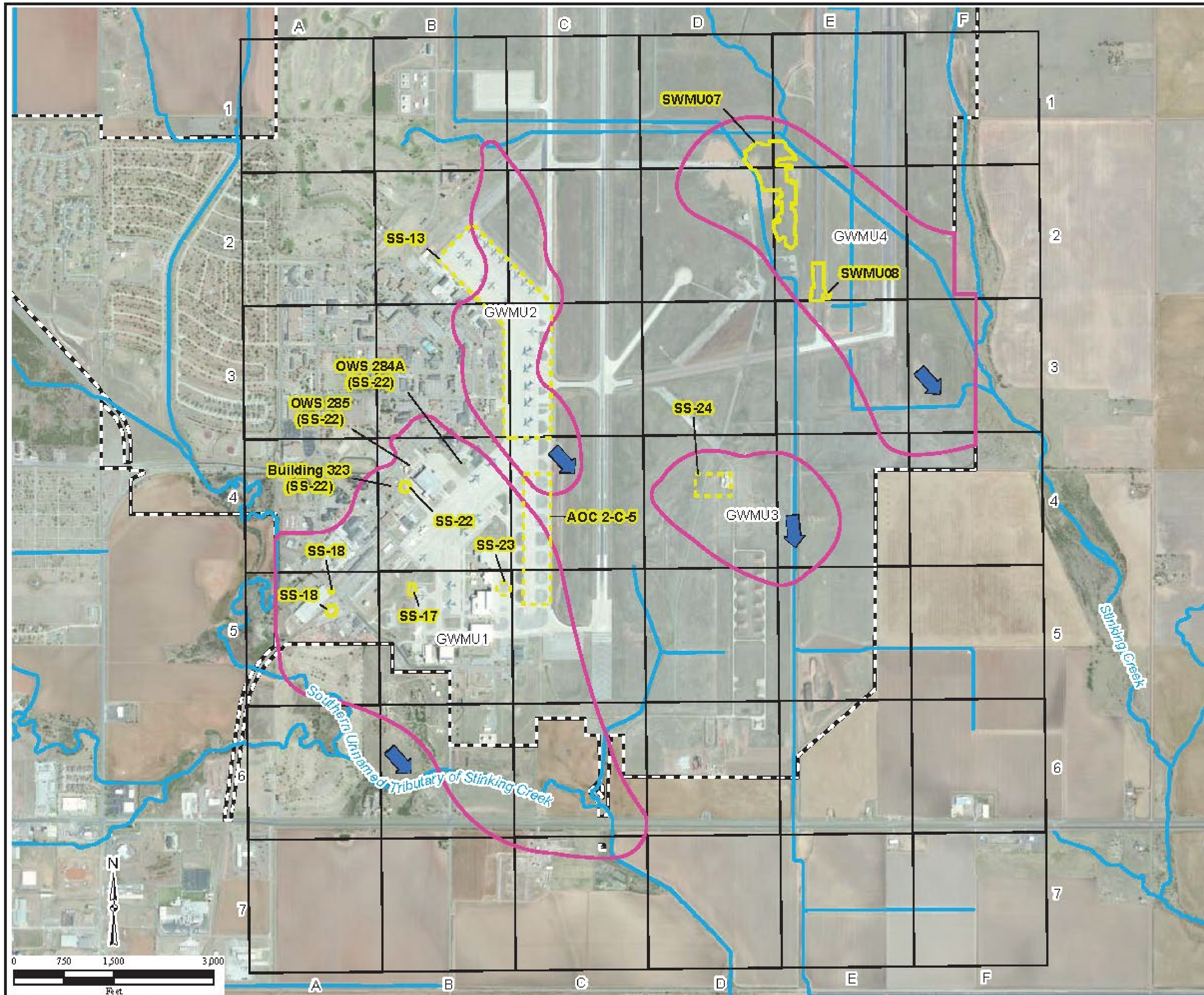
Well ID	Site	Screen Interval	Type	Basewide Grid	Performance Monitoring Frequency	Optimization	Reassigned Site
OU-1-01	SWMU 7/LF004	Upper	Source	E-2	Annual		
OU-1-06	SWMU 7/LF004	Lower	Body	E-2	Annual		
WL015	SWMU 3/FT003	Upper	Source	D-1	Annual	NFA site; reassign well	SWMU 7/LF004
WL021	SWMU 7/LF004	Upper	Body	E-1	Every 3rd year		
WL060	SWMU 7/LF004	Upper	POC	F-2	Semi-annual		
WL061	SWMU 7/LF004	Lower	POC	F-3	Semi-annual		
WL062	SWMU 7/LF004	Upper	POC	F-3	Semi-annual		
WL068	SWMU 3/FT003	Upper	Body	D-2	Annual	NFA site; reassign well	SWMU 7/LF004
WL110	SWMU 3/FT003	Lower	Source	D-1	Annual	NFA site; reassign well	SWMU 7/LF004
WL123	SWMU 3/FT003	Lower	Body	D-2	Annual	NFA site; reassign well	SWMU 7/LF004
WL249	SWMU 7/LF004	Lower	Source	E-2	Annual		
WL250	SWMU 7/LF004	Upper	Source	E-2	Annual		
WL253	SWMU 8/LF014	Upper	Body	E-2	Annual		
WL254	SWMU 8/LF014	Lower	Body	E-2	Annual		
WL272	SWMU 7/LF004	Lower	Body	E-2	Annual		
WL276	SWMU 7/LF004	Upper	Sentinel	F-2	Every 3rd year		
WL279	SWMU 7/LF004	Lower	Sentinel	F-3	Every 3rd year		
WL280	SWMU 7/LF004	Upper	Sentinel	F-3	Every 3rd year		
WL359	SWMU 8/LF014	Upper	Body	E-2	Annual		
WL453	SWMU 7/LF004	Upper	Body	E-2	Annual		
WL454	SWMU 7/LF004	Lower	Body	E-2	Annual		
WL455	SWMU 7/LF004	Upper	Body	E-2	Annual		
WL458	SWMU 7/LF004	Lower	POC	F-2	Semi-annual		
WL459	SWMU 7/LF004	Upper	POC	F-2	Semi-annual		
WL527	SWMU 7/LF004	Upper	Body	E-2	Every 3rd year		
WL528	SWMU 7/LF004	Lower	Body	E-2	Every 3rd year		
WL566	SWMU 7/LF004	Lower	Source	E-2	Annual		
WL590	SWMU 7/LF004	Upper	Body	E-2	Every 3rd year		
WL591	SWMU 7/LF004	Lower	Body	E-2	Every 3rd year		
WL812	SWMU 7/LF004	Upper Intermediate	Body	C-5	Annual		
WL814	SWMU 7/LF004	Upper Intermediate	POC	F-3	Semi-annual		

WL816	SWMU 7/LF004	Upper Intermediate	POC	F-3	Semi-annual		
RV015	SWMU 7/LF004	Surface Water	POC	F-3	Semi-annual		

III. Figure 1

RCRA Corrective Action Permit Renewal Application
Altus Air Force Base, OK

Figure 1
Groundwater Management Units



Legend

- Groundwater Flow Direction
- Surface Water Course
- Suspected Source Area
- Restoration Site
- Groundwater Management Unit (GWMU)
- Base Grid
- Altus Air Force Base

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4/30/2019 JG
Source: HGL, Altus AFB, USGS NHD
ArcGIS Online Imagery

IV. ATTACHMENT A -- FORMS

EQUIPMENT CALIBRATION DAILY LOG

Date:	**Project Name:**
Project Number:	**Recorded By:**

PID	Model:		Bulb:		**Morning Calibration**	**Evening Check**	**Additional Calib./Check (if necessary)**
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	**Time:**	**Time:**	**Time:**
First Point Calibration	Vapor conc. (ppm)	0.0 (ambient air)	NA	NA	Initials:	Value:	
Second Point Calibration	Vapor conc. (ppm)	(isobutylene)			Initials:	Value:	

WATER QUALITY METER	Model:				**Morning Calibration/Check**	**Evening Check (one point only)**	**Additional Calib./Check (if necessary)**
	Equipment ID #:						
	Parameter	Standard	Exp. Date	Lot #	**Time:**	**Time:**	**Time:**
First Point Calibration (Auto)	pH				Initials:	Value:	
	Turbidity (NTU)					Value:	
	Conductivity (mS/cm)					Value:	
	ORP					Value:	
	DO (mg/L)	8.9-9.1 (ambient air)	NA	NA		Value:	
Second Piont Calibration	pH				Initials:	Value:	
	Turbidity (NTU)					Value:	
	Conductivity (mS/cm)					Value:	
Third Piont Calibration					Initials:	Value:	
						Value:	
						Value:	

Additional Remarks:

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	**Site:**	**LocID:**	Date:
	Project Name:	Project #:	Recorded By: Checked By:
EQUIPMENT	H2O Quality Meter Type/ID #:	Sampling Equipment:	PID Type/ID #:
	Water Level Indicator Type/ID #:	Equipment Decon.:	
WELL INFO	Casing I.D. (in):	Ambient PID (ppm):	Initial Depth to Water (ft):
	Condition of Well:	Well Mouth PID (ppm):	Total Well Depth (ft):
	Approximate Pump Intake Depth (FTOC):		
	Remarks:		

Date (mm/dd/yy)	Time (24 hr)	Water Level (FTOC)	Volume Removed (Gals)	Pumping Rate (Lpm)	Temp. (C)	Specific Conduct. (mS/cm)	DO (mg/L)	pH	ORP (mv)	Turb. (NTU)	Pump Refill/Discharge (Seconds)	PSI (pump)	Note

Pumping Rate:<=0.5 L/min **Measurements:**3-5 min **Stabilization:**+/- 0.5 C, +/- 3% conductivity, +/- 10% DO, +/- 0.1 pH, +/-10 mv ORP, turb=as low as possible (< 10 NTU ideal) **All for 3 consecutive readings**

Sample ID #(s)/Time(s)	Number of Containers/Vol./Type	Preservative	Parameter(s)

MONITORING WELL SAMPLE COLLECTION FORM

LOCATION	Site:	LocID:
	Project Name:	Project #:

Date (mm/dd/yy)	Time (24 hr)	Water Level (FTOC)	Volume Removed (Gals)	Pumping Rate (Lpm)	Temp. (C)	Specific Conduct. (mS/cm)	DO (mg/L)	pH	ORP (mv)	Turb. (NTU)	Pump Refill/Discharge (Seconds)	PSI (pump)	Note

Pumping Rate:<=0.5 L/min **Measurements:**3-5 min **Stabilization:**+/- 0.5 C, +/- 3% conductivity, +/- 10% DO, +/- 0.1 pH, +/-10 mv ORP, turb=as low as possible (< 10 NTU ideal) **All for 3 consecutive readings**

Chain of Custody

Laboratory

PAGE ___ OF ___

Project Name	Chain of Custody No.
Address	Batch Nov02
Point of Contact / Phone No.	Comment
City / State / Zip Code / Site Contact / Phone No.	

ERPIMS Information					Other Sample Information						Analysis									
LOCID	SBD	SED	SACode	SampNo	Sample I.D.	Date	Time	Matrix	No. of Con.	Cooler No.	Appendix IX VOCs (SW8260B)	Diss Gas + Acetylene (RSK175)	Mn and Total Iron (SW6010B)	Total Organic Carbon (SW9060)	Total Sulfide (SW9034)	Total Alkalinity (E310.2)	Sulfate (SW9056)			Comment

1. Relinquished By / Company	Date	Time	1. Received By / Company	Date	Time
2. Relinquished By / Company	Date	Time	2. Received By / Company	Date	Time
3. Relinquished By / Company	Date	Time	3. Received By / Company	Date	Time
4. Relinquished By / Company	Date	Time	4. Received By / Company	Date	Time
5. Relinquished By / Company	Date	Time	5. Received By / Company	Date	Time

Comments

Shipment Method/Airbill No.

DISTRIBUTION: WHITE - Stays with sample; CANARY - Returned to Client with Report; PINK - Field Copy