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May 17, 2016

Mr. Pablo Valentin
United States Environmental Protection Agency (USEPA)
Region 5
Mail Code: SR-6J
77 West Jackson Boulevard
Chicago, Illinois 60604-3507

RE: SME Serial Letter #29
Sheboygan River and Harbor Site
SME Project No. 069638.00.018.001

Dear Mr. Valentin:

The following provides our responses to your comments regarding the Tecumseh Sampling and Analysis Plan Review in your letter dated May 2, 2016.

Comment 1. *In general, please make sure that each report references the dewatering facility being addressed. A lot of references to the Maryland Avenue Facility were found throughout the draft SAP which was developed to address the Tecumseh Dewatering Site only. Please make necessary corrections.*

The revisions have been made.

Comment 2. *Section 2.1 Site History, page 1, second paragraph. This text appears to have been written for the Maryland Avenue dewatering site in the City of Sheboygan. While flooding could potentially deposit impacted material at the Maryland Avenue site, deposits of material at the Sheboygan Falls site from flooding appears unlikely since the Sheboygan Falls site is the source of the impacted material. While flooding can inundate parts of the site, the site is the source of the impacted material, not the upstream river where soils would originate from. Please revise the source of impacted material from flood events.*

The paragraph discussing flooding was deleted.

Comment 3. *Section 3.2, Sampling Procedures and Methods. Please provide a reference for the QAPP*.

The QAPP was referenced.

Comment 4. Section 3.2.1, *Soil and Concrete Sampling, page 2, first paragraph. The soil sampling interval (page 2 and Table 1) skips a soil interval in the sampling approach. The SAP includes a surface sample at 0 to 6 inches, but then skips to 1 foot depth missing the 0.5 to 1.0 foot interval. Recommend having the 0 to 6 inch sample, and then the 1 foot interval go from 0.5 to 1.5 feet, 2 foot interval go from 1.5 to 3.5 feet, etc.*

We concur with your recommendation and the table has been revised accordingly.

Comment 5. Section 3.2.1, *Soil and Concrete Sampling, page 2, first paragraph. The PID threshold says 5 ppm. However, two paragraphs later, 10 ppm is used for a threshold. Please clarify and be consistent in describing screening levels and rational for such*.

The screening threshold was revised to 5 ppm on both cases and a rationale was added after the second reference.

Comment 6. Section 3.2.1, *Soil and Concrete Sampling, page 3, first paragraph. The SAP states "if surface soils are impacted, SME will direct the labs to analyze the other samples from that boring." Please add the parameter values that will be used for determining if soils are impacted.*

This was clarified. If the shallow surface soil is impacted, the deeper intervals will be analyzed for the parameter that was impacted.

Comment 7. Section 5.0, Data Evaluation and Reporting. *Document sample locations with GPS coordinates, and provide photo documentation of the soil or concrete collected from each sample location and interval. Provide this data in the report.*

We will do this and the SAP has been revised accordingly in Sections 3.2 and 5.0.

Comment 8. Section 5.1, Evaluation Criteria and Decision Making Matrix, page 4, second paragraph. *The section (Section 5.1) refers to the Maryland Avenue site in Sheboygan not the Tecumseh Site as it should, please correct. The remedial action for source control at the site included removal of surface soils (top 1 foot) greater than 1 ppm and sub-surface soils with PCB concentration above 10 ppm. Surface PCB concentrations greater than 1 ppm should have been removed previously from the site. Consequently a lower threshold than the 10 to 25 ppm proposed is needed for making decisions on spills at the site.*

The Maryland Avenue reference was removed. SME did not propose the use of PCB concentrations of 10 or 25 ppm for decision making; we were just referencing a USEPA guidance document that recommends the use of these concentrations. Lower thresholds were proposed for making decisions on step out sampling.

Comment 9. Figure 1. *Sample locations for the load out and geotextile tube spill areas that are located in pavement will be of little use since runoff over the years will likely have washed material off of the pavement. Defining samples locations should consider drainage paths and place the location to capture sediment runoff of paved areas from load-out or geotextile tube spills. For the geotextile tube spill samples, recommend adjusting sample locations to be outside of pavement, or on pavement where sediment has collected. Samples along the edge of the asphalt berm near GT7 and GT8, samples along the drainage swale near GT11 and samples just off the edge of pavement near GT3 and GT10 are recommended. The northwest load-out area should include a sample in the driveway material and samples S17 and S16 should be placed to collect soil, not pavement. Similarly, for the northeast load-out area, samples should be placed outside of pavement unless sediment has accumulated on the pavement and can be sampled. Please see attached marked up copy of SME Figure 1 showing areas that should be sampled:*

The SAP was designed with input from WDNR since SME was not working on the project during the dewatering period. We must have misinterpreted their recommendations but none of the proposed samples were of asphalt. We will change the locations of the samples as requested.

i. *The north and east sides of the dewatering pad were overtopped a number of times. Soil samples should be collected along the entire length of the sides.*

Agreed. See Figure 1 and Table 1 for edits adding samples along the entire length of the east and north sides in the areas where pavement is/was not present to be consistent with the other sample location revisions that were requested.

ii. *During one of the overtopping events water flowed from the northeast corner of the pad across the concrete paved area into Cleveland Street. Soil samples should be collected through the cracks in the pavement over the entire length of the drainage way.*

Agreed.

iii. *Soil samples should be collected from the area in and around the Confined Treatment Facility (CTF).*

Samples CTF1 – CTF8 were added to the SAP.

iv. *Soil samples should be collected from the area in and around the Sediment Management Facility (SMF). The SMF was a temporary storage facility used to store sediment that was removed from the river during the emergency removal in 1989-90 and would not fit in the CTF. My marked up Figure 1 shows its location. I also attached a copy of the original design plans for the SMF showing its location with respect to the CTF.*

Samples SMW1 – SMF7 were added to the SAP.

v. *The ROD mentions "possible groundwater contamination and additional PCB sources associated with the Tecumseh Products Company (Tecumseh) Plant" (Page 1) and since the dewatering pad was built on the floor slab of the plant the soil beneath the entire dewatering pad should be sampled*.

The soil beneath the floor slab is known to be impacted with PCBs from Tecumseh operations as documented in Blasland, Bouch, & Lee's Technical Memorandum, External Source Assessment, Tecumseh Products Company, November 1999. Four borings were advanced through the floor slab of the plant and PCBs were detected at concentrations ranging from non-detect to 166 mg/kg. Within the upper 3 feet of soil beneath the floor slab, the PCB concentrations were 1.12, 18, 28.6, and 47.2 mg/kg.

Sampling this previously impacted soil will not provide evidence that a release from the dewatering area has impacted the soil. As USEPA has explained to SME and PRS in the several times in the past, the soil impact beneath the floor slab will be addressed in the Institutional Control, Implementation, and Control Plan (ICICP) and the floor slab will act as an engineering control. In addition, sampling and remediation of this soil is not a requirement of PRS as outlined in the Consent Degree of Upper River Statement of Work.

In summary, PRS and SME have not revised the SAP to address this sampling under the slab for the following reasons:

- The data exists that demonstrates this soil is impacted from Tecumseh activities.
- The intent of the SAPs was to evaluate releases from dewatering and the current PCB concentrations in soil would mask any evidence of a release from the dewatering pad.
- This soil impact is not the responsibility of PRS.
- The floor slab is being used as an engineering control to prevent infiltration as documented in the ICICP.

Comment 10. *SME SOP 12A on IDW references Ohio. Please use standards applicable to Wisconsin.*

I reviewed a copy of SOP 12A provided with the SAP and it does not reference Ohio. The Ohio designation, when listed, just indicates which office produced the SOP and the SOP does not reference any Wisconsin or other state standards.

SME is prepared to implement the SAPs for the Tecumseh and Maryland Avenue sites in the summer of 2016. As such, we request and expedited review of the revised Tecumseh site SAP. If you have any questions regarding the SAP or our responses to comments, please feel free to call me at (513) 898-9430. Thanks for your help.

Respectfully,

SME

Keith Egan
Senior Project Manager

Enclosure

Distribution: Mark Mather, PRS
Mark Mittag, CH2M
Tom Wentland, WDNR
Peter Johnson, Johnson Wright, Inc.
Jerry Gray, Chubb

SAMPLING AND ANALYSIS PLAN

SHEBOYGAN RIVER AND HARBOR SUPERFUND SITE
TECUMSEH DEWATERING SITE, SHEBOYGAN FALLS, WISCONSIN

SME Project Number: 069638.00.010.001

May 17, 2016

SME

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APPENDICES

1.0 INTRODUCTION

We prepared this Sampling and Analysis Plan (SAP) in response to a request for additional sampling by the United States Environmental Protection Agency (USEPA) in a letter dated June 4, 2015. This SAP was prepared to describe additional environmental assessment activities of the former Tecumseh Falls dewatering site (Tecumseh Falls Site) located in Sheboygan Falls, Wisconsin "the Site". The SAP was revised per USEPA comments provided in a May 2, 2016, correspondence.

The objective of this assessment is to obtain information required by the USEPA to determine the possible remedial needs and disposal requirements for soil and concrete at the Site. Descriptions of the Site history and known current environmental conditions; strategies and procedures for collection and chemical analyses of soil samples, data evaluation, and reporting; and the estimated project schedule are presented in the following sections.

2.0 SITE HISTORY, CURRENT CONDITIONS, AND PLANNED SITE ASSESSMENT

Summaries of the Site history, current Site conditions, and environmental conditions identified during previous investigations of the Property are presented in the following subsections. The SME Assessment Team's planned subsurface assessment activities to further evaluate the Site are also summarized.

2.1 SITE HISTORY

Tecumseh, a manufacturer of refrigeration and air conditioning compressors and gasoline engines, is located adjacent to the Sheboygan River in Sheboygan Falls, Wisconsin. Polychlorinated biphenyls (PCBs) were found in sewer lines that lead to the River from Tecumseh and in hydraulic fluids used in Tecumseh Products Company's Diecast Division manufacturing processes. Prior to remediation, the contamination level was high in the sediments immediately surrounding the Tecumseh Falls Site, but decreased in concentration downstream.

The Record of Decision (ROD) listed the risks at the Sheboygan River and Harbor Superfund site to be from the chemicals of concern, metals and PCBs. Potential chemicals of concern (PCOC) were listed as metals, PCBs, and polynuclear aromatic hydrocarbons (PAHs). The metals listed as the target of concern for the Remedial Investigations were cadmium, chromium, copper, lead, mercury, nickel, and zinc. Pesticides, dioxins, and dibenzofurans were not present in the sediment and as such, were no longer PCOC.

2.2 CURRENT CONDITIONS

Following remediation the property has remained vacant. There is no current data concerning the concentrations of the PCOCs as defined by the ROD, PCBs, metals, and PAHs in the areas surrounding where loading/ decon of trucks took place, the area where once of the geo-tubes broke outside of the dewatering pad, the waste water treatment facility, and the Confined Treatment Facility (CTF) or Sediment Management Facility (SMF).

2.4 PLANNED SITE ASSESSMENT

We designed the proposed assessment activities to address the following requirements outlined in the June 4, 2015, and May 2, 2016 letters:

- During the implementation of the Upper River Remedial Action at the Sheboygan River and Harbor Superfund Site, one of the geo-tubes broke and material spilled outside of the dewatering pad at Sheboygan Falls, EPA is requiring SME to conduct additional sampling on behalf of PRS to determine whether the spill impacted the surrounding soils with Site related contamination
- EPA is requiring SME, on behalf of PRS, to sample the former areas where loading/ decon of trucks took place.
- EPA is requiring SME, on behalf of PRS, to sample the area where the waste water treatment facility was located.
- Sampling in and around the CTF and SMF.

3.0 SAMPLING PLAN

The sampling plan for the assessment activities is presented in this section. The sampling plan includes a summary of the planned soil and concrete sampling locations, rationales for those locations, and descriptions of procedures and methods for field sampling. Concrete samples will be collected from the floor of the waste water treatment plant (WWTP).

3.1 SUMMARY OF SAMPLING LOCATIONS

Specific sampling objectives, rationales for the sample locations and depths, and target analytes are summarized in Table 1. The planned sampling locations are shown on Figures 1 and 2. We selected the sample locations to satisfy the USEPA requirements. SME's Assessment Team will collect at each location shown on Figure 1. The samples will be collected using a hand auger, sample trowel, or direct push rig. We will also collect concrete core samples at the locations shown on Figure 2. The rationales for the selection of sample intervals at each boring are further discussed in Section 3.2.1.

3.2 SAMPLING PROCEDURES AND METHODS

Soil and concrete sampling, quality control (QC) sampling, and waste management procedures and methods are summarized in this subsection. Sampling activities will be conducted in accordance with the Quality Assurance Project Plan (QAPP)[1]. Sampling locations will be documented in the field with a GPS and the sample locations will be photographed.

[1] Revision 2, Pollution Risk Services, LLC and URS Corp., May 2004.

3.2.1 SOIL AND CONCRETE SAMPLING

SME's Assessment Team will collect soil and concrete samples during sampling activities according to the methods described in SME SOP 2, *Soil Sampling Using a Hand Auger* and SOP 23, *Concrete Sampling*, included in Appendix A. Soil borings will be driven to a depth of 4 feet below ground surface (bgs) and samples will be collected from the ground surface (0 – 6 inches) and from the depth shown in Table 1. If there are field indicators of impact in the upper two feet of soil, such as elevated (>5 ppm) photoionization detector (PID) readings, odors, or discoloration, an additional sample will be collected from the borings at depths between 2 and 4 feet (bgs). Details of our proposed sampling activities are shown on Table 1. SME will submit the samples for laboratory analysis but will request the laboratory to hold the samples from below 0.5 feet bgs pending the results from the surface soils. In the event the surface soils are impacted above the standards, SME will direct the laboratory to analyze the other samples from that boring for the parameters that were exceeded in the shallow surface sample.

Depending on the results, additional "step-out" samples may be needed. Please see Section 5.1 for a discussion of these samples.

According to the regulations, wipe samples are not appropriate for concrete unless the PCBs were released within the last 72 hours[2]. As such, SME will collect solid or core samples. In accordance with USEPA guidance *Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup*., a grid oriented in a North to South direction will be established on the floor of the WWTP using TSCA specific grid spacing. Samples from alternate grids (in pink, Figure 2), will be composited into one sample for each grid.

SME will field screen all soil samples for the presence of organic vapors to assess the need to analyze for volatile organic compounds (VOCs). Samples with elevated VOC field screening results (>5 ppm) will be submitted to the laboratory for analysis of VOCs[3]. If there are no soil samples with elevated field screening results, SME will randomly select 10% of the soil samples for VOC analysis. SME is not proposing to screen or analyze the concrete samples. Spills of water within the treatment area would have led to standing water where VOCs would have evaporated with the water.

SME does not propose that the concrete samples be analyzed for metals since the concrete (stone aggregate and Portland cement) could contain in addition to calcium carbonate, several of the metals that are PCOC.

3.2.2 QUALITY ASSURANCE AND QUALITY CONTROL

We will minimize the potential for cross-contamination by using new, disposable, nitrile sampling gloves for collection of each soil sample; decontaminating soil sampling equipment before each use; and, calibrating field instruments in accordance with manufacturer's instructions.

SME's Assessment Team will collect quality control (QC) samples as described in SOP 6, Field Quality Control Samples, included in appendix A and as summarized in Table 1. The sample handling (SOP 10) and custody requirements, laboratory analytical methods, analysis reporting limits, and reporting protocols will be consistent with those outlined in the QAPP.

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[2] §761.79(b)(4).

[3] It is SME's experience that soil samples that have PID reading less than 5 ppm do not contain VOCs or VOCs at levels posing risks to receptors.

3.2.3 WASTE MANAGEMENT

We will manage investigation derived wastes as described in SOP 12, Investigative Derived Wastes, included in the project QAPP in Appendix A.

4.0 ANALYSIS PLAN

The designated laboratory will analyze soil and concrete samples for PCOC to screen for the potential presence of impact associated with the issues identified in Section 2.3 (see Table 1 for specific analytes for each sample). In addition to PCBs, metals, and PAHs, SME proposes to collect soil samples for analysis of VOCs if field screening indicates the presence of ionizable organic vapors.

Laboratory analyses and field screening will be performed as described in the project QAPP. Pace Analytical in Green Bay, Wisconsin will analyze the soil and concrete samples. The following USEPA methods will be used for soils:

- PCBs – Method SW846-8082,
- Metals – Method SW846-6010 or 6020 for all metals but mercury and SW846-7470 or 7471 for mercury,
- PAHs – Method SW846-8270, and
- VOCs – Method 8260.

The following methods will be used for concrete:

- PCBs – Method SW846-8082, and
- PAHs – Method SW846-8270.

Laboratory testing, the analysis method reporting limits (MRLs), QA/QC procedures, and reporting protocols sued or performed by Pace Analytical will be consistent with those described in the project QAPP.

5.0 DATA EVALUATION AND REPORTING

We will evaluate the data collected during this site assessment as described in Section 4.0 - Data Verification/Validation and Usability of the project QAPP. Following data review, verification, and validation, we will prepare a summary report. The report will include details of the activities performed, procedures followed, and results. The report also will include a sampling location diagram, sample location coordinates, tabulated analytical results, soil boring logs, photographs of samples, a copy of the laboratory analytical report for all samples collected, and a copy of the chain-of-custody (COC) records.

5.1 EVALUATION CRITERIA AND DECISION MAKING MATRIX

Soil cleanup criteria for the Tecumseh Falls Site should be developed that is protective of human health and the environment. This section will describe the proposed criteria.

The USEPA guide, *A Guide on Remedial Actions at Superfund Sites with PCB Contamination*, recommends an analytical starting point for remediation goals of 10 to 25 ppm (mg/kg) for soil[4]. Under the risk-based provisions of 40 CFR §761.61(c), the clean-up goal for industrial re-use is between 5 and 10 ppm. The USEPA Regional Screening Level (RSL) for industrial use is 10 mg/kg at a 10^{-5} risk. According to the USEPA, screening levels (SLs) are *developed using risk assessment guidance from the EPA Superfund program and can be used for Superfund sites. They are risk-based concentrations derived from standardized equations combining exposure information assumptions with EPA toxicity data. SLs are considered by the Agency to be protective for humans (including sensitive groups) over a lifetime.* Screening Levels are used *for site "screening" and as initial cleanup goals, if applicable. SLs are not de facto cleanup standards and should not be applied as such. The SL's role in site "screening" is to help identify areas, contaminants, and conditions* ***that require further federal attention*** *at a particular site. Generally,* ***at sites where contaminant concentrations fall below SLs, no further action or study is warranted under the Superfund program****, so long as the exposure assumptions at a site match those taken into account by the SL calculations.* The exposure assumptions for this Site are the same as those used in developing the Screening Levels.

The WDNR clean-up level, calculated according to their procedures by using the USEPA RSL spreadsheet and using the input parameters listed in PIB-RR-890 is 8.66 mg/kg. SME proposes that the soil cleanup criteria be the most conservative since it also matches State of Wisconsin requirements. The criteria for disposal of concrete or soil should follow TSCA guidance where: Soil or concrete material with concentrations greater than 8.66 ppm and less than 50 ppm will be removed and transported to in-state landfill for disposal. Any material with concentration greater than 50 ppm would be disposed at an out-of-state, TSCA permitted, landfill for disposal.

The proposed soil cleanup criteria for the remaining PCOC are the RSLs based on a 10^{-5} carcinogenic risk and Hazard Quotient of 1.0. If the results are less than the RSL, no additional action is required. If the soil results exceed the RSLs, then additional evaluation of the data will be made that could include a property-specific Risk assessment or a comparison to area background levels.

Depending on the soil results around the foundation slab and the CTF and SMF, additional sampling may be needed that is not specifically discussed in this plan. SME proposes the following decision making matrix:

[4] Publication No. 9355.4-01FS

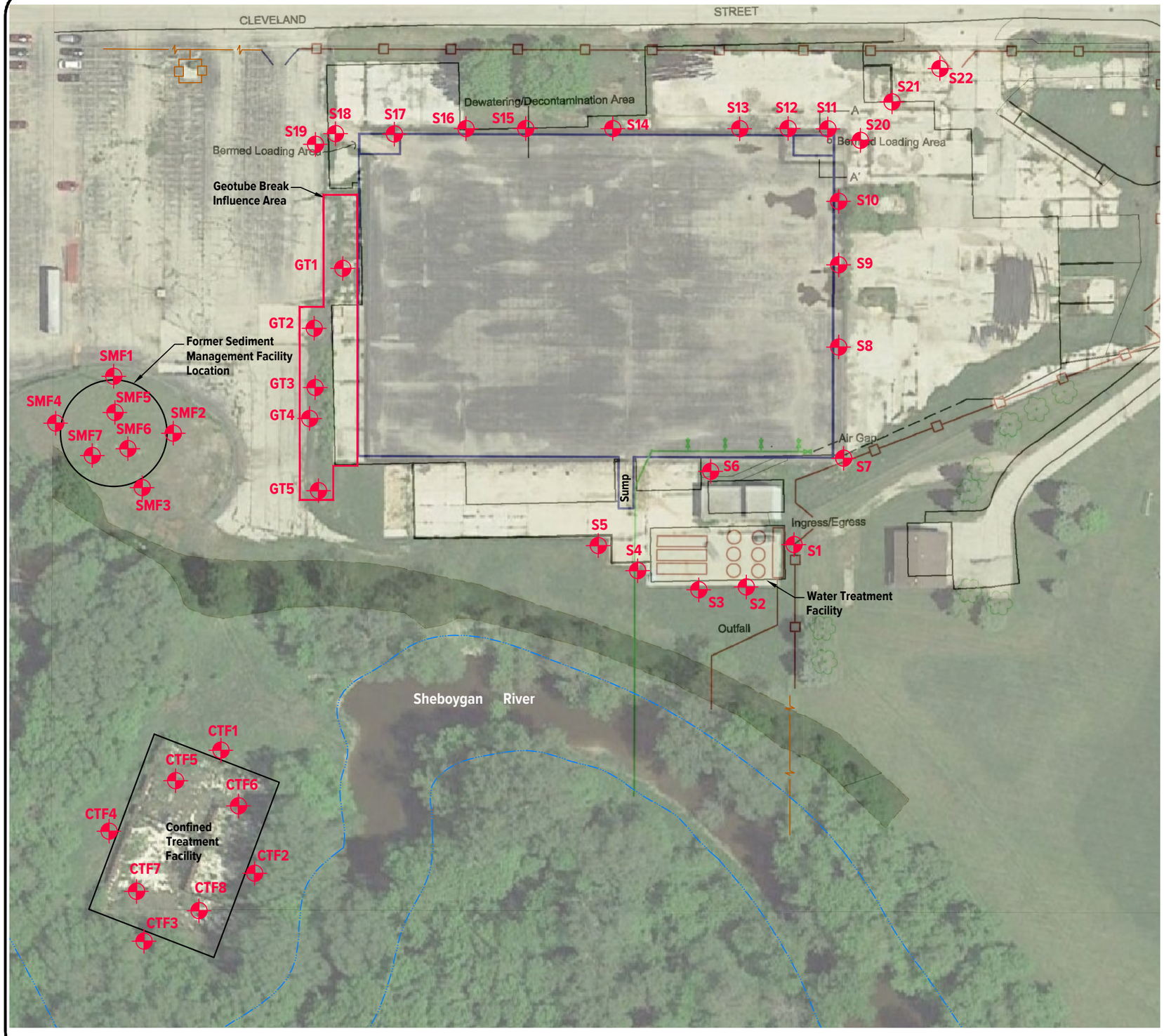
Soil Concentration	Sample Objective			
	Soil Around Waste Water Treatment Facility (WWTF) (samples S1 – S4)	Dewatering Sump (samples S5 and S6)	Northeastern and Northwestern Bermed Loading Areas (samples S11, S12, S20 and S17 – S19)	Soil in Area Where Geo-Tube Broke
>8.66 mg/kg (PCBs) or >RSL (other PCOC)	Step out 15 feet in all 4 cardinal directions possible and collect samples to a depth of 4 feet per Table 1.			
>50 mg/kg (PCBs) > 5X RSL (other PCOC)	Step out 15 and 30 feet in all 4 cardinal directions possible and collect samples to a depth of 4 feet per Table 1.			

6.0 ESTIMATED SCHEDULE

The environmental activities described in this SAP are to be implemented according to the schedule presented below. This schedule is in weeks relative to EPA approval of the SAP.

- Field Sampling ..... Within weeks 1 - 4
- Laboratory Analyses ..... Within 3 weeks of sample receipt
- Data Evaluation and Reporting ..... Within 8 weeks of sample receipt

FIGURES



NORTH

0' 80' 160'

GRAPHIC SCALE: 1" = 80'

LEGEND

- EXISTING TREE AND/OR BRUSH
- EXISTING ROAD
- EXISTING CONCRETE
- EXISTING FENCE
- FORMER DREDGE SLURRY PIPE
- FLOOD CONTROL BERM
- SOIL SAMPLE LOCATION

NOTE:
DRAWING INFORMATION TAKEN FROM PRS 2006 CONSTRUCTION DOCUMENTATION REPORT AND GOOGLE EARTH PRO WITH IMAGE DATE 6-1-2015.

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Project
SHEBOYGAN RIVER SUPERFUND SITE

Project Location
SHEBOYGAN FALLS, WISCONSIN

Sheet Name
PROPOSED SAMPLE LOCATION DIAGRAM

No.	Revision Date
1	5-5-16

Date: 5-12-16
CADD: GBK/JAB
Designer: KE
Scale: 1" = 80'
Project: 069638.00.010.001
Figure No.: 1

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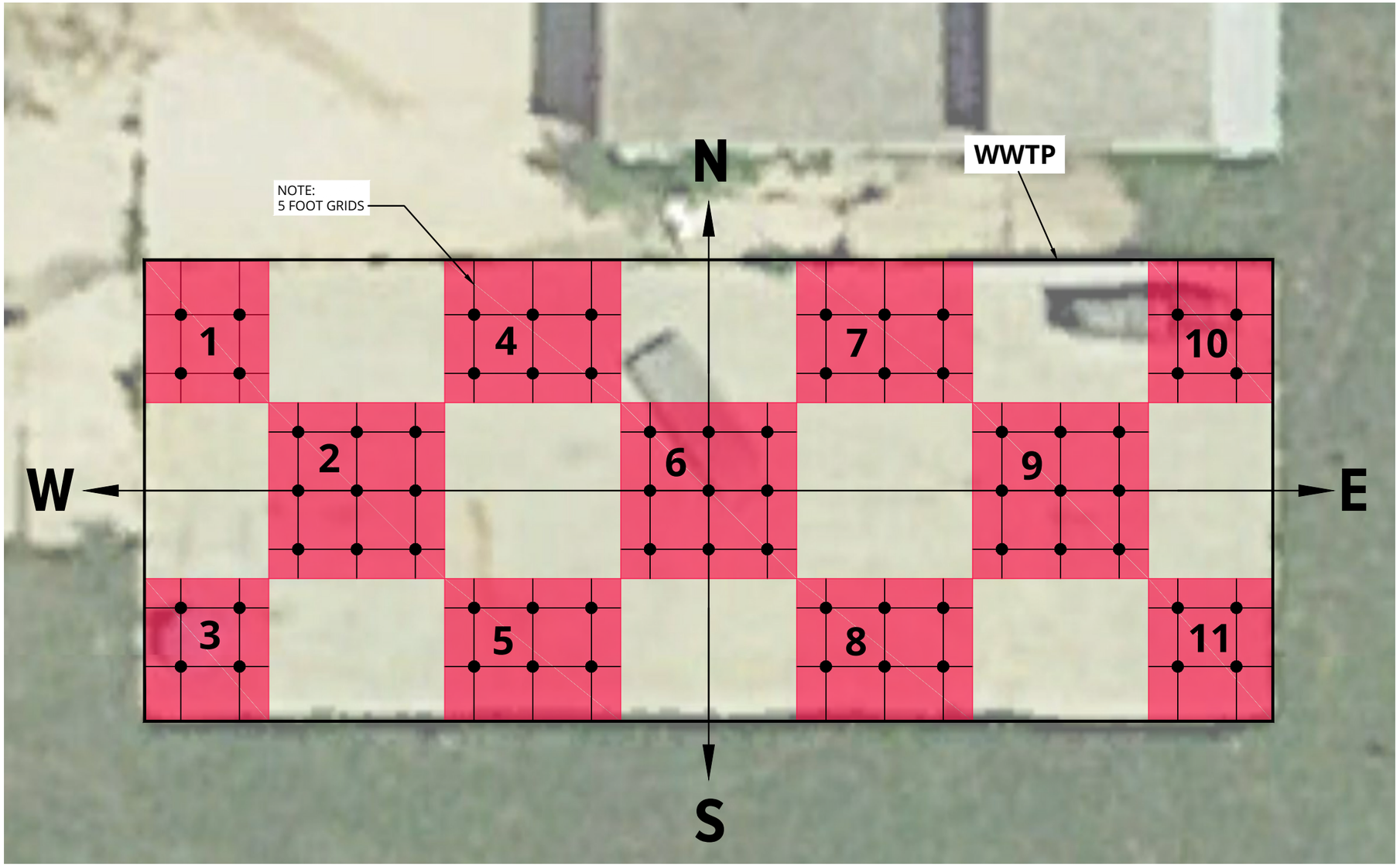

LEGEND

- SAMPLING POINT
- AREA OF INFERENCE
- 1 — COMPOSITE SAMPLING AREA

NORTH

0' 10' 20'

GRAPHIC SCALE: 1" = 10'

NOTE:
DRAWING INFORMATION TAKEN FROM GOOGLE EARTH PRO

PLOT DATE: Oct 23, 2015 - 11:20am - kurdi
FILE LOCATION: \\sme-inc\pz\WIP\069638.00\CAD\069638.00.010.001\DWGS\rev0\69638.00-02.dwg

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Project
SHEBOYGAN RIVER SUPERFUND SITE

Project Location
SHEBOYGAN COUNTY, WISCONSIN

Sheet Name
PROPOSED SAMPLE LOCATION DIAGRAM WASTE WATER TREATMENT FACILITY

No.	Revision Date

Date: 10-23-15
CADD: GBK
Designer: KE
Scale: 1" = 50'
Project: 069638.00.010.001
Figure No.: 2

TABLES

TABLE 1: PROPOSED SAMPLE COLLECTION AND ANALYSIS

TABLE 1
PROPOSED SAMPLE COLLECTION AND ANALYSES
TECUMSEH SITE
SHEBOYGAN, WI

SAMPLING TARGET	SAMPLE LOCATIONS	BORING DEPTH (feet bgs)	TARGET SAMPLE DEPTH (feet bgs)	DEPTH RATIONALE	ANALYTES					
					PCB Soil Samples	PCB Concrete Samples	Metals	PAHs Soil Samples	PAHs Composite Samples	VOCs
Soil Around WWTP	S1 - S4	4	0-0.5, 0.5-1, 1-1.5, 3.5	Releases would be to surface soils.	4	Not Applicable	4	4	Not Applicable	Miminum of 10% of total soil samples
Former Temporary Sump	S5 and S6	4		Release could be to surface or subsurface.	4		4	4		
Area where Geo-Tube Spill Occurred	GT1-GT5	4		Releases would be to surface soils.	5		5	5		
East and West Sides	S7 - S16	4		Releases would be to surface soils.	11		11	11		
Northwest Area	S17 - S19	4			2		2	2		
Northeast Runoff Area	S20 - S22	4			3		3	3		
Confined Treatment Facility	CTF1 - CTF8	4			8		8	8		
Sediment Management Facility	SMF1 - SMF7	4			7		7	7		
Concrete Floor of WWTP	CS1 - CS11	0.16 (2")	0.08 - 0.16 (1" - 2")	Releases would be to surface concrete.	0	11	0	0	11	0
SUBTOTALS			Soil		44	0	29	44	0	4
			Concrete		0	11	0	0	11	0
QA/QC SAMPLES	Duplicate		Soil		2	0	2	2	0	1
			Concrete		0	1	0	0	1	0
QA/QC SUBTOTALS			Soil or Concrete		2	1	2	2	1	1

Metals - cadmium, chromium, copper, lead, mercury, silver, nickel, and zinc.

APPENDICES

APPENDIX A: SOPS

SME SOP 2
STANDARD OPERATING PROCEDURE
SOIL SAMPLING WITH A HAND AUGER

ACTIVITY DESCRIPTION

This Standard Operating Procedure (SOP) describes methods to obtain soil samples utilizing a hand auger for environmental projects.

Contact the appropriate utility locator service to locate subsurface utilities at the site before beginning subsurface activity. Take note of the lead time required by utility locator services to provide utility clearance. In Wisconsin, the Digger's Hotline must be contacted at least 48 hours but no more than 10 working days prior to drilling or other subsurface activity. In addition, ask the owner for all known utility locations. Consider the need to hire a private locator in areas where dangerous utilities are expected. Refer to SME's Safety Manual for additional information regarding utility clearance.

OBJECTIVE

Soil sampling is used to observe and classify subsurface soil conditions and to collect soil samples for laboratory testing. Hand augers are often conducted when a sampling location is inaccessible to a drill rig. The ability to advance a hand auger is dependent on subsurface conditions. Generally, the use of a hand auger is not considered for sampling depths greater than 7 or 8 feet.

EQUIPMENT LIST

To conduct soil sampling utilizing hand auger equipment, the field sampling personnel should bring the following equipment:

1. Project instructions, health and safety plan.
2. Appropriate field forms and logs.
3. Hand Auger consisting of the following items (as appropriate):
    - T-handle
    - Auger extension, total length equal to the proposed boring depth
    - Auger bucket:
        - 3¼-inch diameter, stainless steel bucket auger
        - 2- inch diameter steel split bucket auger
    - 3-inch diameter PVC pipe in length equal to the proposed boring depth
4. A tool box which consists of the following items:
    - utility knife
    - 12 piece ½-inch drive socket set
    - 1-1/2 inch putty knife or spatula
    - flashlight
    - 12-inch channel locks
    - 25-foot weighted fiberglass, plastic or steel measuring tape
    - 100-foot plastic measuring tape
    - duct tape
    - non-phosphate detergent
5. Shovel or pick-ax for potential use at the ground surface
6. Photoionization detector (PID)

7. Cooler with cold packs or ice, depending on project instructions
8. Decontamination equipment as specified in SME SOP 9, *Decontamination of Field Equipment*.
9. Work gloves consisting of latex, nitrile and/or rubber for handling samples. The glove material should be matched to resist the suspected contaminants.
10. A sufficient quantity of geotechnical jars and laboratory jars to accommodate the proposed number of samples to be obtained.
11. Roll of 4 millimeter plastic sheeting for placement beneath sampling equipment.

PROCEDURES

The following describes the procedures and techniques used during soil sampling with a hand auger:

1. Hand auger borings are typically advanced by rotating and applying pressure to the hand auger.
   - For sampling through layers of saturated sand less than 4 feet thick, a 3-inch diameter temporary PVC casing can be used to keep the bore hole open. A 2-inch diameter split bucket hand auger is used to remove soil from inside the PVC casing.
2. Plastic sheeting should be placed adjacent to the borehole to facilitate sample collection. After removing the bucket auger from the borehole, care should be taken to prevent dropping soil on the ground. The soil sample should be extracted from the auger bucket using a pre-cleaned putty knife or spatula. Note that soil samples should generally NOT be collected for analysis of volatile organic compounds (VOCs) from hand augers. However, if the project instructions request sampling for VOCs, the soil sample intended for VOC analysis should be collected with minimal disturbance and preserved with methanol in the field following the procedures outlined in SME SOP 4, *Methanol Preservation of Soil Samples*. For other parameters, the remainder of the sample from the desired depth interval should be placed into a stainless steel, plastic, or other container made of acceptable material and mixed thoroughly to obtain a homogeneous sample representative of the sampling interval unless directed otherwise by the project instructions or person-in-responsible charge. A second portion of the soil sample should be placed into a 6-oz glass jar (geotechnical jar) or resealable plastic bag for visual engineering classification and screening with a PID according to SOP 7, *Field Measurements Using a Photoionization Detector (PID).* Residual soil should be placed in a bucket or on plastic sheeting until the hand auger boring is completed.
3. Field staff should visually classify the encountered soils using SME's General Notes for Soil Classification and the Unified Soil Classification System (USCS) and record this information on field boring logs along with other sampling information.
4. Laboratory samples should be labeled and placed into a cooler with cold packs or ice as provided by SME SOP 10, *Sampling Labeling, Sample Handling, and Chain of Custody.* During winter months geotechnical and environmental samples should be protected from freezing which can result in sample damage and jar breakage.
5. Decontaminate hand augers and sampling equipment as outlined in SME SOP 9, *Decontamination of Field Equipment.*
6. Following completion of the hand auger boring, the borehole should be backfilled with remaining soil cuttings or according to the project instructions. The filled borehole shall be capped according to the project instructions.

7. Wastes shall be managed according to SME SOP 12, *Investigative Derived Wastes* and the project instructions.

GENERAL

This SOP has been developed to provide procedures that represent reasonable practices consistent with the standard of care ordinarily exercised by members of the environmental profession currently practicing under similar conditions. Site specific conditions may exist where this SOP may be modified or an alternative approach may be implemented. Such modifications or alternative approaches should be discussed with the person-in-responsible charge.

REFERENCES

ASTM D 6907-05, Standard Practice for Sampling Soils and Contaminated Media with Hand-Operated Bucket Augers

US EPA Environmental Response Team, Standard Operating Procedures, SOP #2012, February 18, 2000

HEALTH AND SAFETY

THE HEALTH AND SAFETY PLAN (HASP) FOR THE PROJECT SHOULD BE REVIEWED PRIOR TO PERFORMING FIELD ACTIVITIES. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AND FIRST AID SUPPLIES SHOULD BE TAKEN INTO THE FIELD, AS SPECIFIED IN THE HASP, AND USED AS APPROPRIATE. IF A HASP HAS NOT BEEN SUPPLIED, CONSULT THE PERSON-IN-RESPONSIBLE CHARGE.

SME SOP 6
STANDARD OPERATING PROCEDURE
FIELD QUALITY CONTROL SAMPLES

ACTIVITY DESCRIPTION

This Standard Operating Procedure (SOP) provides guidance for the collection of quality control (QC) samples during a sampling event. QC is the set of activities that are performed for the purposes of monitoring, measuring, and controlling the performance of a measurement process. QC samples provide measurable data quality indicators used to evaluate the difference components of the measurement system, including sampling and analysis. The QC samples discussed in this SOP include blanks (field, equipment rinse, and trip), duplicates (including splits), and matrix spike/matrix spike duplicates.

OBJECTIVE

QC samples provide measurable data quality indicators used to evaluate the difference components of the measurement system, including sampling and analysis. During the systematic planning process, each QC sample's value should be determined based on its contribution to measuring based on its contribution to measuring precision, accuracy/bias, contamination, and sensitivity. QC samples may impose significant costs; therefore, it is important to identify which of those samples are not cost-effective (i.e. which provide little additional information regarding data quality, or which duplication information provided by other QC samples). Project QC needs must be determined based on the decision to be made and the related level of data quality required. Deciding the most appropriate QC samples and setting appropriate acceptance limits are a key part of project planning and frequently require some professional judgment; therefore, the QC samples needed for a specific project should be selected by the project manager or specified person-in-responsible charge.

EQUIPMENT LIST

Equipment needed for collection of field quality control samples includes:

1. Project instructions, health and safety plan.
2. Appropriate field forms and logs.
3. Sample bottles appropriate for each type of QC sample and matrix;
4. Distilled water;
5. Deionized water or prepared trip blank(s);
6. Sample collection device for equipment rinse blanks; and
7. SME SOPs for groundwater sampling activities and/or soil sampling activities as appropriate.

PROCEDURES

The sampling procedure for the collection of field quality control samples is identical to the collection of actual field samples. The exact procedure depends on the contaminants of concern, sampling matrix, and sampling method. Refer to individual SOPs for the matrix and type of sampling. The specific QC samples collected should be as specified by individual SOPs and based on project quality objectives.

A. BLANKS

1. Field Blank

- A field blank is a sample container filled in the field during a sampling event with distilled water and preservatives, as appropriate. Field blanks are analyzed for parameters anticipated to be in the on-site atmosphere, such as volatile organics or particulate metals. A field blank collected near the time of potential greatest atmospheric contamination is typical. Examples of sources of atmospheric contamination include emissions from facility operations or heavy equipment operation, and dust from active excavation.
- It is common for a project to combine the field blank and equipment blank into a single QC sample. However, if the combined blank reveals contaminants of concern, it will be impossible to distinguish between atmospheric contamination and contamination caused by improper decontamination.
- Where method volatile analysis for soils, sediments, sludges, and waste container samples is done, methanol blank samples should be provided by the laboratory for each methanol lot used. These lots should be tracked in the field and reported on the laboratory receipt form so laboratory correlations can be made.
- Collect one per 20 or fewer samples per matrix and analytical group per concentration level, at least one per day.

2. Equipment Rinse Blank

- Equipment rinse blanks are collected from non-dedicated equipment. Examples of non-dedicated equipment include bailers, pumps, split barrel samples, trowels and vacuum filtrations units which are frequently reused, requiring decontamination between each use. Refer to SOP 9, *Decontamination of Field Equipment*, for standard decontamination procedures. After decontamination, the sampling device is rinsed again with distilled water and this final rinse water is sampled as the equipment rinse blank.
- To collect equipment rinse blanks from the vacuum filtration unit used to filter groundwater samples for dissolved metal analysis, the unit should be assembled in the same manner as for sample collection, including a new filter. A sample volume of distilled water is then run through the cleaned filtration unit as the equipment rinse blank. Equipment rinse blanks are analyzed for the same parameters of concern as other samples. Note: Filtering samples for metals should only be performed if indicated in the project instructions or by the person-in-responsible charge.
- If needed, further demonstration of the effectiveness of decontamination can be obtained by collecting a second equipment rinse blank after sampling, prior to decontamination. The results of this sample can be compared to the equipment rinse blank collected on decontaminated equipment.
- The frequency of equipment rinse blanks should be increased when higher sample concentrations are expected or when false positive detections are not acceptable.

- Collect one per 10 or fewer samples per matrix and analytical group per sampling procedure per sampling team.

3. Trip Blank

- A trip blank is a sample of deionized water prepared before any sampling is performed and are supplied by the laboratory upon request. Trip blanks are typically filled and capped in the laboratory, and sent to the field with other sample containers in the cooler or other sample transport receptacle. The trip blank remains unopened in the field, is stored with other site samples, and is returned to the laboratory for analysis. Trip blanks are analyzed primarily for volatile organic samples. To avoid cross-contamination between samples, samples which are indicated in the field to contain higher concentrations of volatile organics should be packaged separately from other samples. A spare cooler is useful for this purpose. However, trip blanks may also be used for phthalates, which can be transferred from plastics in sample containers to sample.
- Collect one per every volatile organic sample shipping container.

B. FIELD DUPLICATE (REPLICATE) SAMPLES, CO-LOCATED SAMPLES AND SUBSAMPLES

The difference between field duplicate (replicate), co-located samples and subsamples on most projects is insignificant. If the sample is not mixed together, then split, the sample is a co-located sample; if the sample is mixed together, then split, the sample is a subsample (commonly referred to as a duplicate).

- When collecting soil samples for volatile organic compounds (VOCs), the field duplicate samples should be co-located; if mixed, the VOCs present in the sample may be released due to aeration, yielding inaccurate results.
- When collecting soil samples for semi-VOCs, polynuclear aromatic hydrocarbons (PAHs) or metals, the field duplicate samples may be subsamples.
- When collecting groundwater samples via low-flow sampling, there is no significant difference between co-located samples and subsamples.
- Collect one per 10 or fewer samples per matrix and analytical group per sampling procedure per sampling team.

Split samples are field duplicate (replicate) samples which are sent to two or more different laboratories to be analyzed for the same parameters as other samples. It is common to split samples between a governmental regulatory body (e.g., MDEQ) and a facility owner or liable party. Consult the person-in-responsible charge to determine if split samples will be collected for a specific project. *Note: When evaluating the results of split samples, the results should be evaluated by taking into consideration the acceptance "windows" of the two or more laboratories, plus sampling error, and allowances for heterogeneous matrices (soils and solids). If the laboratories produce results which differ by more than would be expected from random error sources, the laboratories should be contacted to verify that the correct samples were analyzed and the correct analysis methods were used. In addition you may request that the laboratories re-evaluate their calibration and batch QC information. If there is still no explanation for the differences it may be useful for the laboratories to exchange calibration standards or repeat analysis of another split sample set.*

C. MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

MS/MSD samples and surrogates are two or more separate samples, from the same source collected at the same times that are spiked in the laboratory. MS/MSD samples for organic and inorganic water analyses require double sample volume. The actual MS/MSD sample is prepared by the laboratory to evaluate accuracy.

MS/MSD samples should be taken at critical locations, but different from the field blank.

Collect one MS/MSD sample per 20 or fewer samples per matrix and analytical group, at least one per day.

D. DATA RECORDS MANAGEMENT

Quality control samples receive the same documentation as actual samples. They should be listed on the chain-of-custody forms and in field notes, including information on collection date and time, and the sample generation process (i.e., "equipment rinse blank from split barrel sample after completion of SB4").

GENERAL

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REFERENCES

US EPA, Guidance for Preparing Standard Operating Procedures (SOP's), EPA QA/G-6, Office of Environmental Information, March 2001.

US EPA, Guidance on Environmental Data Verification and Data Validation, EPA QA/G-8, Office of Environmental Information, November 2002.

US EPA, Uniform Federal Policy for Quality Assurance Project Plans, EPA-505-B-04-900A, Intergovernmental Data Quality Task Force, March 2005.

HEALTH AND SAFETY

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Field Quality Control Sample Summary Table

The following reference table summarizes the field QC sample information contained in this SOP:

Sampling QC	Data Quality Indicator	Purpose	Recommended Frequency
VOA Trip Blank	Contamination (Accuracy/Bias)	To evaluate contamination introduced during storage and transport.	Minimum 1 per shipment cooler
Field Blank	Contamination (Accuracy/Bias)	To evaluate contamination introduced during sampling, storage, and transport.	Minimum 1 per 20 or fewer samples per matrix and analytical group per concentration level, at least 1 per day
Equipment Blank (rinsate blank)	Contamination (Accuracy/Bias)	To evaluate carryover contamination resulting from successive use of sampling equipment.	Minimum 1 per 10 or fewer samples per matrix and analytical group per sampling procedure per sampling team, at least 1 per day
Field Duplicates -Co-located Samples -Subsamples	Precision	To measure overall precision by evaluating cumulative effects of both field and laboratory precision.	Minimum 1 per 10 or fewer samples per matrix and analytical group per sampling procedure per sampling team, at least 1 per day
Split Samples	Interlaboratory Comparability	To evaluate sample handling procedures from field to laboratory and to evaluate interlaboratory comparability and precision.	As specified by method and based on project quality objectives.
Matrix Spike & Matrix Spike Duplicate	Laboratory Bias/Precision	To determine laboratory preparatory and analytical bias and precision for specific compounds in specific sample matrices.	Minimum 1 per 20 or fewer per matrix and analytical group, at least 1 per day

SME SOP 10
STANDARD OPERATING PROCEDURE
SAMPLE LABELING, SAMPLE HANDLING, AND CHAIN OF CUSTODY

ACTIVITY DESCRIPTION

This Standard Operating Procedure (SOP) provides guidance to properly handle and label sample containers and complete Chain of Custody records.

OBJECTIVES

Proper labeling and handling of samples are crucial to a sampling program. The integrity of a sampling program depends on the completion of accurate and legible labels and the handling of samples in accordance with accepted practices. Sample handling is documented by a Chain of Custody. Because the Chain of Custody provides the primary record of sample handling and conveys other important information, it needs to be completed with care and in detail. Due the importance of the Chain of Custody in a sampling program, following is a list of the various functions of a Chain of Custody.

1. A Chain of Custody documents the method(s) of analyses to be performed by the laboratory and the due date of the analytical results. Because the sample times are recorded on the Chain of Custody forms, it also assists the laboratory in analyzing samples within acceptable holding times and helps to provide a record that each sample was analyzed within acceptable holding times.
2. A Chain of Custody functions as a permanent record of the identity of each sample collected and analyzed. The final laboratory analytical report is not considered complete without including the Chain of Custody forms.
3. A Chain of Custody creates the permanent legal record of the exchange of custody and transportation of each sample between collection in the field and laboratory analyses. During the path between collection and analyses, the Chain of Custody documents personnel who have handled the samples.
4. A Chain of Custody assists in maintaining sample integrity (i.e., the sample accurately represents site conditions at the sampling point and is not reflective of conditions external to the site) and obtaining defensible data because the Chain of Custody records personnel responsible for maintaining sample integrity, thereby reducing opportunities for cross contamination or sample tampering.

EQUIPMENT LIST

1. Project instructions, health and safety plan.
2. Appropriate field form and logs.
3. Custody seal for each container, if required by the project instructions

PROCEDURE

1. Clearly mark each sample container label using a permanent marker with a fine enough point to write legibly. Methanol preserved sample containers are pre-affixed with labels which indicate the pre-measured amount of methanol in the sample container. Non-methanol preserved sample containers should

be affixed with a label in the field. If possible, fill out each label immediately prior to filling the sample container so that the label does not become wet or dirty before the information is recorded. Caution: Filling out labels far in advance of sample collection can create serious problems if great care is not exercised in verifying that the label matches the sample location and that the time of sample collection is accurate. After filling out the label for the sample container, the label can be covered with clear packing tape as an added precaution against damage to the label. At a minimum, the following information should be recorded on each label:

- Unique sample identification number (e.g., SB1-S1 (0-2'), SB1-GW, FB1, MW1, etc.) generated using sample description information, including method of collection (soil boring = SB, hand auger = HA, monitoring well = MW, soil gas = SG, field blank = FB, trip blank = TB, equipment blank = EB, duplicate = Dup), environmental matrix code (soil = S, soil gas = SG, groundwater = GW, surface water = SW, etc.), sample number and depth.
- Unique Project identification number (site specific project number)
- Name of company that collected the sample
- Name or initials of person who collected the sample
- Date sample was collected
- Approximate time sample was collected
- Preservative, if present
- Analyses requested

2. Collect samples according to procedures indicated in the appropriate SME SOPs, being careful to record pertinent field notes on appropriate field logs. Transfer samples into appropriate containers as directed by the analytical laboratory and according to the appropriate SOPs. If desired, each sample container can be affixed with a Chain of Custody seal placed across the container opening, which is then signed and dated. The Chain of Custody seal is any adhesive label or tape that can be used to seal a sample container such that if it is opened or tampered with will be broken. Then place each sample container in a plastic bag and seal the bag.
3. Immediately following completion of sampling activities, fill out the Chain of Custody forms provided by the laboratory at the time the samples are packed for transfer to the laboratory. Each laboratory's Chain of Custody form differs slightly, but usually includes:

- Analytical laboratory name, address and phone number
- A Chain of Custody serial number
- Sampler's name, phone number and company name
- Project Name and/or Number
- Unique sample identification numbers matching the enclosed samples
- Sample matrix (e.g., water, soil, air, wipe, solid, liquid, etc.)
- Preservative present in each sample container, if any
- Date and time each sample was collected
- Container types and/or number of containers for each sample identification number
- Analyses requested for each sample identification number
- Requested turnaround time
- Signatures of responsible persons, and dates and times of transfer of samples
- Special instructions or notes to the laboratory

4. Once the Chain of Custody forms are completed, review each sample container to verify that the sample identification number, date, time, etc. on the labels being sent to the laboratory match the information documented on the Chain of Custody forms. In addition, verify that the sample identification numbers on the Chain of Custody forms match the sample identification numbers recorded on the field map and/or field notes. This serves as a check to verify that no duplicate or incorrect sample labels are present and that sample results can be located spatially at the site.
5. Place sample containers in a sample transfer container (e.g., cooler) and transport samples and Chain of Custody forms to the appropriate location for transfer to laboratory personnel. The Chain of Custody forms should be included with or attached to the sample transfer container. At the time of transfer, sign and date the Chain of Custody forms (including the time) in the appropriate space and verify that the person receiving the sample containers also signs and dates the forms. One copy of the Chain of Custody form should be kept by each party relinquishing control of the samples. The copy kept by the sampler should be placed in the project file for future reference.

   To simplify the Chain of Custody record and reduce the potential for problems, as few people as possible should have custody of the samples. Each of the responsible persons must control access to the samples until the responsibility is transferred by signature and date on the forms. Samples should not be left in unrestricted areas. When out of the personal view of the responsible person, the samples should be placed in a restricted area (e.g., locked vehicle, locked motel room, locked storage room, etc.) until transfer to the appropriate person. If possible, the sample containers should remain in the original transfer container (e.g., cooler) and each responsible person should verify that required temperatures are maintained (usually through the use of ice or ice packs).

   If necessary, interim storage (i.e., a refrigerator) can be used to help maintain required temperatures. However, the sampler should document the transfer of custody to the storage location by recording the location name (e.g., "SME cold storage", "SME refrigerator", etc.) and time of transfer in the appropriate signature and time areas on the forms. In addition, the sampler should go through the check off procedure again when the samples are returned to the laboratory transfer container (e.g., cooler) to verify that all samples are present.
6. Submit SME copy of Chain of Custody to person-in-responsible charge for review.

GENERAL

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REFERENCES

US EPA Publication SW-846. Test Methods for Evaluating Solid Waste, Physical/Chemical Methods. Third Edition, November 2004.

US EPA- Office of Superfund Remediation and Technology Innovation. Contract Laboratory Program Guidance for Field Samplers, August 2004.

Georgia Department of Natural Resources- Environmental Protection Division, Water Protection Branch. Water Quality: Quality Assurance Manual, June 1999.

HEALTH AND SAFETY

THE HEALTH AND SAFETY PLAN (HASP) FOR THE PROJECT SHOULD BE REVIEWED PRIOR TO PERFORMING FIELD ACTIVITIES. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AND FIRST AID SUPPLIES SHOULD BE TAKEN INTO THE FIELD, AS SPECIFIED IN THE HASP, AND USED AS APPROPRIATE. IF A HASP HAS NOT BEEN SUPPLIED, CONSULT THE PERSON-IN-RESPONSIBLE CHARGE.

SME SOP 12A
STANDARD OPERATING PROCEDURE
INVESTIGATIVE DERIVED WASTES

ACTIVITY DESCRIPTION

This Standard Operating Procedure (SOP) describes methods for management of potentially contaminated investigative derived wastes generated during environmental sampling activities in Wisoconsin. Investigative derived wastes include soil cuttings, unused soil samples, purge water, development water, decontamination water and disposable sampling and personal protection equipment.

OBJECTIVE

The management option selected for investigative derived wastes should: 1) be protective of human health and the environment, 2) be cost effective and consider waste minimization, and 3) comply with applicable regulatory requirements.

EQUIPMENT LIST

1. Project instructions, health and safety plan
2. Appropriate field forms and logs
3. Five-gallon bucket
4. Water-proof pen
5. Adhesive Barrel Labels
6. ODOT approved ring or bung top barrels

PROCEDURES

For environmental projects, subsurface sampling methods include collection of soil and groundwater samples using a hand auger, a hydraulically driven soil probe, or a rotary drill rig using hollow-stem augers. Methods for management of investigative derived wastes should be reviewed with the SME person-in-responsible charge prior to mobilizing to the field. In general investigative derived wastes should be handled as follows:

1. Soil cuttings derived from sampling methods. Soil cuttings derived from sampling methods should be placed in an WDOT approved ring top barrel. The barrel should be labeled as "Waste Material, Laboratory Analysis in Progress" with the following information:

    - Site Name
    - Site Address
    - Contents
    - Boring or Well #s
    - Accumulation Date
    - Consultant Phone Number

2. Water purged from temporary or permanent monitoring wells during sampling, well development water, and decontamination water should be placed in an

WDOT approved ring or bung top barrel. The barrel should be labeled as "Waste Material, Laboratory Analysis in Progress" with the following information:

- Site Name
- Site Address
- Contents
- Boring or Well #s
- Accumulation Date
- Consultant Phone Number

3. For non-hazardous waste sites, disposable sampling and used personal protection equipment should be double-bagged and disposed of in an on-site sanitary waste dumpster, or if one is not available on the site, brought back to SME for disposal.

   For hazardous waste sites or when free product is encountered, used sampling and personal protection equipment shall be containerized in an WDOT approved ring top barrel.

   The person-in-responsible charge should instruct field representatives of project-specific requirements for management of used sampling and personal protection equipment.

CONTAINERIZATION

The following guidelines apply:

1. Investigative derived wastes comprised of different media should not be combined in a single barrel or barrels.
2. Barrels containing investigative derived wastes should be clearly labeled as to the content, date generated, borehole locations and contact information. Labels should be filled in with an indelible, waterproof pen.
3. Barrels containing soil or water should not be filled more than 2/3 full due to weight and freezing potential.
4. The Owner and SME person-in-responsible charge should be consulted to determine an onsite storage place for barrels until the contents can be characterized and disposal can be arranged.
5. Review the project instructions for barrel sampling responsibilities and required laboratory analyses for waste characterization necessary to evaluate disposal alternatives. If waste characterization sampling by the field representative is required, representative samples of the contents of the various media stored in barrels should be collected using methodologies that satisfy project objectives.
6. Record the number of barrels and contents in the project notes.

The SME person-in-responsible charge will evaluate the analytical data from the sampling activities to determine disposal options for containerized wastes.

GENERAL

This SOP has been developed to provide procedures that represent reasonable practices consistent with the standard of care ordinarily exercised by members of the environmental profession currently practicing under similar conditions. Site specific

conditions may exist where this SOP may be modified or an alternative approach may be implemented. Such modifications or alternative approaches should be discussed with the person-in-responsible charge.

REFERENCE

US EPA, Guide to Management of Investigation-Derived Wastes, January 1992.

HEALTH AND SAFETY

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SME SOP 23
STANDARD OPERATING PROCEDURE
CONCRETE SAMPLING

ACTIVITY DESCRIPTION

This Standard Operating Procedure (SOP) describes methods to obtain concrete samples from a concrete wall or floor for environmental projects.

OBJECTIVE

Concrete sampling is used to assess the condition of concrete and submit samples for laboratory testing to evaluate potential reuse and disposal options for the concrete. Concrete sampling generally consists of either surface sampling by breaking or chipping off a piece of the concrete surface or collecting a concrete core cut using a coring machine.

EQUIPMENT LIST

To conduct concrete sampling the field sampling personnel should bring the following equipment:

1. Project instructions, health and safety plan.
2. Appropriate field forms and logs.
3. A stainless steel pick-axe or some other tool made of materials appropriate for the proposed sampling to break off or chip a piece of the concrete.
4. A coring machine, if necessary.
5. A tool box which consists of at least the following items:
    - flashlight,
    - 12-inch channel locks,
    - 25-foot weighted fiberglass,
    - plastic or steel measuring tape,
    - 100-foot plastic measuring tape,
    - duct tape,
    - non-phosphate detergent
6. Cooler with cold packs or ice, depending on project instructions
7. Decontamination equipment as specified in SME SOP 9, *Decontamination of Field Equipment*.
8. Work gloves consisting of latex, nitrile and/or rubber for handling samples. The glove material should be matched to resist the suspected contaminants.
9. Roll of 4 millimeter plastic sheeting for placement beneath sampling equipment.

PROCEDURES

The procedure and techniques used during concrete sampling are described below.

1. Chip or break off a piece of concrete from the target surface using the pick-axe or equivalent tool and place the piece of concrete in a four-ounce glass jar provided by the laboratory. If a concrete core will be collected and submitted for laboratory analysis, the core should be placed in a plastic zip-lock bag or equivalent container for transportation to the laboratory.
2. Field staff should note the conditions of the target surface and record the conditions on field logs along with other sampling information.
3. Laboratory samples should be labeled and placed into a cooler, if necessary with cold packs or ice, as provided by SME SOP 10, *Sampling Labeling, Sample Handling, and Chain of Custody.* During winter months samples should be protected from freezing which can result in sample damage and jar breakage.
4. Decontaminate hand augers and sampling equipment as outlined in SME SOP 9, *Decontamination of Field Equipment.*
5. If required by the project, the surface should be restored with new concrete.
6. Wastes shall be managed according to SME SOP 12, *Investigative Derived Wastes* and the project instructions.

GENERAL

This SOP has been developed to provide procedures that represent reasonable practices consistent with the standard of care ordinarily exercised by members of the environmental profession currently practicing under similar conditions. Site specific conditions may exist where this SOP may be modified or an alternative approach may be implemented. Such modifications or alternative approaches should be discussed with the person-in-responsible charge.

REFERENCES

US EPA Environmental Response Team, Standard Operating Procedures, SOP #2012, February 18, 2000

HEALTH AND SAFETY

THE HEALTH AND SAFETY PLAN (HASP) FOR THE PROJECT SHOULD BE REVIEWED PRIOR TO PERFORMING FIELD ACTIVITIES. APPROPRIATE PERSONAL PROTECTIVE EQUIPMENT AND FIRST AID SUPPLIES SHOULD BE TAKEN INTO THE FIELD, AS SPECIFIED IN THE HASP, AND USED AS APPROPRIATE. IF A HASP HAS NOT BEEN SUPPLIED, CONSULT THE PERSON-IN RESPONSIBLE CHARGE.

Passionate People Building
and Revitalizing our World

SME