REGION 5 RAC2

REMEDIAL ACTION CONTRACT FOR

Remedial, Enforcement Oversight, and
Non-Time Critical Removal Activities at Sites of Release
or Threatened Release of Hazardous Substances in Region 5

FINAL

Field Sampling Plan
Lower River and Inner Harbor of the Sheboygan River
Remedial Investigation
Sheboygan, Wisconsin

WA No. 075-RICO-1507 / Contract No. EP-S5-06-01

September 2010

PREPARED FOR

U.S. Environmental Protection Agency

PREPARED BY

CH2M HILL
Ecology and Environment, Inc.
Environmental Design International, Inc.
Teska Associates, Inc.

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FIELD SAMPLING PLAN

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Acronyms and Abbreviations

°C	degrees Celsius
AOC	area of concern
ARAR	applicable or relevant and appropriate requirements
ASL	Applied Services Laboratory
ASTM	American Society of Testing and Materials
C&NW	Chicago and Northwestern (Railroad)
cfs	cubic feet per second
CLP	Contract Laboratory Program
COC	contaminant of concern
DOT	Department of Transportation
DPT	direct-push technology
DQO	data quality objective
EDD	electronic data deliverable
EDMAN	Comprehensive Manual for Electronic Data
EQuIS	Environmental Quality Information Systems
EVS	Environmental Consultants
FOP	field operating procedure
FORMS	Field Operations Reporting Management System
FSP	Field Sampling Plan
FTL	field team leader
GIS	geographic information system
GLNPO	Great Lakes National Program Office
GPS	global positioning system
HASP	Health and Safety Plan
MGP	manufactured gas plant
IDW	investigation-derived waste
MS/MSD	matrix spike/matrix spike duplicate
NAD83	North American Datum of 1983
NAVD 88	North American Vertical Datum of 1988
NEIC	National Enforcement Investigations Center
NOAA	National Oceanic and Atmospheric Association
OSHA	U.S. Occupational and Safety Hazard Administration
OSWER	Office of Solid Waste and Emergency Response
PAH	polynuclear aromatic hydrocarbon
PCB	polychlorinated biphenyl
PPE	personal protective equipment
ppm	parts per million (approximately equivalent to mg/kg)
PRS	Pollution Risk Services
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
RI	remedial investigation

ROD	Record of Decision
SVOC	semivolatile organic compound
SWAC	surface-weighted average concentration
TCLP	toxicity characteristic leaching procedure
TOC	total organic carbon
USACE	U.S. Army Corps of Engineers
USCS	Unified Soil Classification System
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VOC	volatile organic compound
WA	work assignment
WDNR	Wisconsin Department of Natural Resources

SECTION 1

1 Introduction

This Field Sampling Plan (FSP) presents the procedures for the environmental sediment sampling activities that will be performed as part of the Lower River and Inner Harbor remedial investigation (RI), within the Sheboygan River Area of Concern (AOC). Specifically, this investigation covers the river reach from the 8th Street Bridge downstream to the end of the Inner Harbor. The work is being conducted for the U.S. Environmental Protection Agency's (USEPA's) Great Lakes National Program Office (GLNPO) in accordance with Work Assignment (WA) No. 075-RICO-1507 under Contract No. EP-S5-06-01. This FSP describes the scope of the sediment sampling and analysis program, which will provide information required to support the remedial design activities. This FSP is accompanied by a Quality Assurance Project Plan (QAPP). Procedures and approaches specified in the QAPP will be consistent with those presented in this FSP.

1.1 Site Setting

The Sheboygan River watershed covers approximately 260 square miles. The Sheboygan River originates in east-central Fond du Lac County and flows generally southeast through the City of Sheboygan where it enters Lake Michigan. The Onion and Mullet rivers, together with Otter and Weedens creeks, are tributaries of the Sheboygan River (Wisconsin Department of Natural Resources [WDNR], 2001). Land use in the area is dominantly agricultural (68 percent); however, industrial and residential areas also line the rivers. The Sheboygan River AOC includes the lower Sheboygan River downstream of the Sheboygan Falls Dam, and the entire harbor (GLNPO, 2010).

The Sheboygan River and Harbor Superfund site includes the lower 14 miles of the Sheboygan River from the Sheboygan Falls Dam through the Inner Harbor. The Lower River portion of the site is 11 miles long, extending from the Waelderhaus Dam to Lake Michigan. The Lower River portion comprises the Middle River, Lower River, and Inner Harbor reaches. These reaches were defined by USEPA based on physical characteristics such as average depth, width, and level of polychlorinated biphenyl (PCB) contamination in the sediments.

- Middle River—extends from the Waelderhaus Dam to the former Chicago & Northwestern (C&NW) railroad bridge.
- Lower River—extends from the railroad bridge to the Pennsylvania Avenue Bridge.
- Inner Harbor—extends from the Pennsylvania Avenue Bridge to the river's outlet at the Outer Harbor.

The Outer Harbor is defined as the area within the two break-walls. This RI focuses on the Inner Harbor subreach from the 8th Street Bridge to the confluence with the Outer Harbor, as shown on Figure 1. Also shown are defining river reach features, including (upstream to downstream) the 14th Street Bridge, the Camp Marina Manufactured Gas Plant (MGP) site

(Upland Operable Unit shown), Boat Island, the Pennsylvania Avenue Bridge, and the 8th Street Bridge.

1.2 Background

The primary contaminants of concern (COCs) in the Sheboygan River are PCBs, the primary source of which has been previously identified as the Tecumseh Products Company, a die-casting plant near the river in Sheboygan Falls. The plant used hydraulic fluids containing PCBs from approximately 1966 to 1971; materials containing Aroclor 1248 and 1254 were released to soils near the site. The State of Wisconsin initially discovered elevated PCB levels in fish in 1977 during a statewide monitoring program; fish and waterfowl consumption advisories were later issued based on additional data. Between 1989 and 1991, areas of the river with the highest observed PCB concentrations in sediment underwent sediment removal or armoring (Environmental Consultants [EVS] and National Oceanic and Atmospheric Administration [NOAA], 1998).

Sediment characterization and remediation associated with the Sheboygan River and Harbor Superfund site has been progressing in phases since 2003, as performed by Pollution Risk Services (PRS). Sediment deposits were removed from the Upper River reach through hydraulic dredging. The Record of Decision (ROD) signed in 2000 specified monitored natural recovery for the Middle River and limited dredging, followed by backfilling, of the continuous soft sediment of Lower River and Inner Harbor. The depth of dredging is dependent on a variety of factors, including water depth, scour potential, other sediment transportation mechanisms such as prop wash, and the presence of principal threat wastes (PCBs over 50 parts per million [ppm]). The ultimate objective of the remedy is to reach a surface-weighted average concentration (SWAC) of 0.5 part per million total PCBs over time, and to eventually remove fish consumption advisory limits. As part of the Sheboygan River Superfund project, PRS collected sediment cores in 2009 for the Lower River reach. The cores were advanced to either refusal, or 4 feet below the soft sediment surface, whichever came first. For the Inner Harbor reach, the cores were advanced to either refusal or 8 feet below the soft sediment surface, whichever came first.

Within the footprint of the Sheboygan River and Harbor Superfund site, and upstream of the reach of the river that is the focus of this investigation, lies the Campmarina MGP site, which is being managed by Integrys for the Wisconsin Public Service Corporation, within USEPA's Superfund Alternative Site Program. Sediment and toxicity testing characterization associated with the Campmarina MGP site was conducted in 2008 by Natural Resource Technology, Inc. (NRT) for Integrys. Coal tar deposits were encountered at depth in various locations adjacent to, and downstream of the former MGP facility. A feasibility study has been prepared for the Campmarina River Operable Unit but has not yet received agency approval.

The sediment contamination affects several beneficial use impairments in the Sheboygan River AOC, including restrictions on fish and wildlife consumption, and restrictions on dredging activities.

1.3 Nature and Extent of Contamination

Investigations performed by various entities over several decades, including Tecumsah, PRS, the U.S. Army Corps of Engineers (USACE), and WDNR, have established that PCBs are the primary COC in the Sheboygan River. Polynuclear aromatic hydrocarbons (PAHs) are also a COC and have been detected in the vicinity of the Campmarina MGP site, located upstream of the Pennsylvania Avenue Bridge.

The earliest data reviewed for the preparation of this FSP was a 1983 PCB profile provided by USACE for the length of the river between the 8th Street Bridge and the end of the Inner Harbor. The Total PCB concentrations in the surface sediment ranged from 3 to 80 ppm, at sampling location 52C, which is on the northern boundary of the navigation channel, opposite 52A. The subsurface sample interval represented sediment between 3 and 5 feet below the sediment water interface at the time of the sampling; this interval was approximately 19 to 21 feet below the low water datum. The total PCB concentrations reported in the sub-surface sample data set ranged from nondetect to 110 ppm; the latter concentration (from 52A) was observed near the southern boundary of the navigation channel approximately 300 feet downstream of the 8th Street Bridge.

Three areas with PCB concentrations greater than 50 ppm were identified from the 1983 USACE data. In all three areas, the sediments with the highest PCB levels were located approximately 25 feet below the low water datum and were between 5 and 8 feet below the sediment surface. The first of the three areas was located approximately 950 feet downstream of the 8th Street Bridge (USACE locations 44A and 44B); the sediment coring locations were in the center of and on southeastern edge of the navigation channel. The second area with PCB concentrations greater than 50 ppm was immediately downstream of where the river channel bends and heads nearly due east; this area is prone to shoaling, as indicated by recent bathymetry. These two cores (USACE locations 37A and 37B) were also collected from the center and southern boundary of the navigation channel. The third location was along the southern edge of the navigation channel, approximately 600 feet upstream of the outlet to the Outer Harbor. This data set indicated a general trend of increasing PCB concentrations in the sediment with depth.

The WDNR compiled total PCB data collected between 1994 and 1999, as well as data collected in 2002 for the Sheboygan River downstream of the Pennsylvania Avenue Bridge. The total PCB concentrations for the reach downstream of the 8th Street Bridge from this data set ranged from 0.1 to 180 ppm. These data also exhibited a general trend of increasing total PCB concentrations with sediment depth, and the locations at which the highest PCB concentrations were observed were generally consistent with the results reported by USACE in 1983. Subsurface samples collected between 1994 and 1999 in the general area of USACE locations 44A and 44B yielded similar results, with total PCB concentrations above 50 ppm in the sediment between 8 and 12 feet below the sediment surface. The location with the highest total PCB concentration in the WDNR compilation was from the central portion of the navigation channel, approximately 300 feet upstream from the point where the river channel turns eastward. The sampling interval was from 6 to 8 feet below the sediment surface.

PRS conducted an investigation in this reach of the river during 2009 in which sediment cores were collected from 114 locations to a maximum depth of 8 feet below the sediment surface.

The total PCB results reported by PRS ranged from 0.05 to 19.5 ppm and indicated that essentially the entire sediment column sampled within that reach contained total PCB concentrations above 0.5 ppm. The average total PCB concentration by depth interval ranged from 1.13 ppm (2 to 3 feet) to 2.32 ppm (6 to 7 feet), and overall trends of concentration change with depth were not readily discernable based on this data set.

In summary, the highest total PCB concentrations in sediments within the investigation area have been generally detected at depths of between 6 and 10 feet below the sediment surface at the time of sampling. Many, but not all, of these detections were in areas that recent bathymetry indicate to be depositional (Figure 2). The collective data reviewed indicate that the PCB contamination in the accumulated soft sediment is widespread in terms of both the lateral and vertical distribution. The data collected by USACE and WDNR indicate general trends of increasing concentrations with depth.

1.4 River and Channel Characteristics

The elevation of the Sheboygan River basin is variable, ranging from 50 to 150 feet in elevation above lake level. The topography within the basin is also variable, ranging from a low, flat moraine in the east to a central area of kettle moraine. The western area of the Sheboygan River watershed contains numerous wetlands located in pockets between low rounded hills. The basin generally slopes to the east with gradients ranging from 0 to 21 feet per mile; the average gradient is 7 feet per mile. The soils in the eastern portion of the basin are dominated by heavy, low-permeability clays. The central moraine generally contains till or gravely soil, and the soils in the western portion of the basin are generally loamy and light textured (WDNR, 2001).

The banks of the river within the study area for this RI are dominated by constructed bulkheads and reinforced or armored shorelines. The USACE navigation channel covers most of the width of the existing river channel in the Lower River and Inner Harbor area that is the focus of this RI; however, the most recent dredging within the study area was conducted in 1969. The bathymetry data collected by USACE in 2009 illustrates the location of the present-day channel (Figure 2). The existing river channel follows the southeastern bank of the river between the 8th Street Bridge to where the river changes course and flows more eastward (approximately in line with the end of Virginia Avenue), after this point, the channel follows the northern bank of the river until it reaches the Outer Harbor. Sediment deposits are also identifiable from the bathymetric map, generally on the opposite bank that the existing channel is occupying and on the inside bends of the river channel. The two primary depositional features are along the northwestern bank between the 8th Street Bridge downstream to just before the end of Virginia Avenue and a shoal that has formed along the southern side of the river just downstream of the bend in the channel near the end of Virginia Avenue. The water depths within study area for this RI generally range from approximately 3 to 13 feet; there is a localized deeper area at the eastern end of the river with depths of 15 to 16 feet. Peak flows occur in March and April, when daily means have reached 995 cubic feet per second (cfs). The historical monthly mean flows for March and April are 685 and 711 cfs, respectively (U.S. Geological Survey [USGS], 2010). The 2-year storm discharge was calculated to be 3,140 cfs, and the 100-year storm discharge was reported to be 9,480 cfs (Walker and Krug, 2003).

SECTION 2

2 Sample Network Rationale

2.1 Sampling Objectives and Approach

The purpose of this investigation is to systematically collect analytical data from the entire accumulated sediment profile and the surface of the native sediment or subsoil throughout the Inner Harbor reach. The data collected will facilitate refinement of the current understanding of the nature and extent of the PCB concentrations, fill in data gaps, and provide the site-specific information needed to support development of a remedial design. PAH, total organic carbon (TOC), and particle size data will also be collected to better characterize the chemical and physical properties of the sediment. The specific objectives of this sediment sampling and chemical analysis program include the following:

- Collect field data including sediment thickness and elevation measurements to determine sediment distribution and volume.
- Characterize total PCB Aroclor concentrations and distribution to estimate the volume of material with total PCB concentrations exceeding 1.0 and 50 ppm. The computer application Mining Visualization System (MVS) v9.22 by CTECH (www.ctech.com) will be used to generate a three-dimensional (3D) model using the kriging interpolation method to delineate the horizontal and vertical extent of sediment containing total PCB concentrations.
- Conduct analytical sampling of suspected site contaminants (priority pollutant PAHs) to refine the understanding of the nature and extent of contamination. If concentrations of PAHs in sediments outside of the potential removal area determined by PCB concentrations exceed the respective screening criteria, then additional evaluation might be necessary to examine human health and ecological risk.
- Perform analytical sampling on a subset (approximately 10 percent) of samples for an expanded list of PAHs that includes alkylated PAHs (isomers and homologs) to better understand the PAH composition and distribution.
- Characterize sediment particle size and TOC that affect cohesion and erosion in sediment environments. TOC is also a factor that impacts bioavailability of contaminants to receptors.
- Conduct waste characterization (total PCBs, toxicity characteristic leaching procedure [TCLP] volatile organic compounds [VOCs], TCLP semivolatile organic compounds [SVOCs], TCLP pesticides, TCLP herbicides, TCLP metals, pH, percent solids, flash point, and specific gravity) on the investigation-derived waste (IDW).

2.2 Analytical Program

The chemical analytical program for the Lower River and Inner Harbor RI was developed based on the project objectives and the following elements:

- The list of target compounds that were identified by the previous investigations
- The appropriate and acceptable analytical methodology that will meet the data quality objectives (DQOs) discussed in the QAPP
- The appropriate quality assurance/quality control (QA/QC) requirements

2.2.1 Contaminants of Concern

For this project, chemicals of interest are defined as those chemicals most likely to contribute a risk as a result of exposure. Based on the results of the previous investigations, the primary chemical of interest within the Lower River and Inner Harbor area of the Sheboygan River AOC are PCBs. PAHs are also of interest because of the historical activities of the Campmarina MGP site located upstream of the study area.

2.2.2 Laboratory Program

Analytical laboratories in USEPA's Contract Laboratory Program (CLP) will be used to the extent possible. The use of CLP is dependent on the media to be analyzed, specific analyses, and required turnaround times. The ability for the CLP to meet the specific media objectives will be discussed in the QAPP.

Sediment samples to be analyzed for PCB Aroclors, PAHs, and waste characterization (and associated QA/QC samples) will be submitted to the assigned CLP laboratory. Sediment samples collected for TOC and particle size analysis will be submitted to CH2M HILL's Applied Services Laboratory (ASL). Field equipment blanks (rinse water) for PCB Aroclors and PAHs will be submitted to the assigned CLP laboratory to assess the effectiveness of field decontamination procedures.

The specific analyte lists and required reporting limits for the CLP laboratory analyses are presented in the QAPP. The analytical methods will be selected such that the quantitation limits for each analysis achieve the investigation objectives.

2.3 Sediment Investigation

2.3.1 Investigation Objectives

The overall objective for the sediment investigation activities is to evaluate the chemical and physical characteristics of the sediment within the Lower River and Inner Harbor of the Sheboygan River between the 8th Street Bridge and the beginning of the Outer Harbor. The focus of this investigation is to conduct additional site characterization to thoroughly characterize (vertically as well as horizontally) the extent of sediment contamination.

2.3.2 Investigative Approach

The RI activities include conducting sediment coring to determine sediment thickness and collect sediment samples for laboratory analyses of PCB Aroclors, PAHs, TOC, and particle size. A total of 40 proposed sampling locations (Figure 2) were selected based on a triangular grid pattern that allows for equal coverage of the historical navigation channel and the areas on either side of the navigation channel. Five locations (SD002, SD015, SD018, SD024, and SD034) will be analyzed for TOC and particle size. Approximately 10 percent of the locations will be analyzed for the expanded list of PAHs. These locations will be selected by the sampling team

based on sample recovery and field observations (e.g., odor, sheen). Additional details on the selection of these samples are presented in Section 3.2.3.

This sampling design provides reasonable spatial coverage of the depositional areas described in Section 1.4. Four proposed locations will be co-located with previous PRS sampling locations PRS-2, -47, -81, -93, to evaluate temporal changes of PCB profiles.

The field activities are briefly summarized below and are further detailed in Section 4.

2.3.3 Sediment Core Sampling

Sediment cores will be collected using vessel-mounted direct-push technology (DPT) equipment. The x, y coordinates and z elevations of each sampling location will be surveyed to meet accuracy requirements. Prior to initiating core collection, the water depth at each location will be measured using a weighted line or a rigid measuring rod (e.g., stadia pole) with a 6-inch round plate affixed to the bottom. Sediment thickness will be measured and recorded during the coring process. A total of 40 locations will be sampled and each sediment core sample interval will be analyzed for PCB Aroclors and PAHs. TOC and particle size data will be collected from five core locations. It is anticipated that, on average, seven unique field samples will be collected per sediment core location resulting in approximately 280 unique field samples collected for PCB and PAH analyses.

SECTION 3

3 Field Investigation Program

The field investigation program was developed based on investigation objectives, current site conditions, available information on past activities, and available physical and chemical data.

3.1 Tasks

The following tasks will be performed to complete the investigation objectives:

- **Site Reconnaissance**—A site reconnaissance will be conducted prior to the start of investigation activities to identify potential staging areas.
- **Mobilization**—This task will consist of site preparation (setting up the staging area) and mobilizing equipment to the site prior to the field activities.
- **Sediment Core Sampling**—Sediment sampling will be conducted to generate sample data to define the current extent of sediments containing PCB Aroclor concentrations exceeding 1 ppm and 50 ppm and to determine the nature and extent of PAH contamination in the sediments. TOC and particle size data will be collected to evaluate the feasibility of various remedial methods; TOC data will also be used to normalize contaminant concentrations for comparison with appropriate screening values or sediment quality guidelines.
- **Surveying**—This task will be performed concurrently with sediment coring activities. Surveying will include all necessary measurements to determine horizontal (x, y coordinates) and vertical (z elevation) positions of each location.
- **Demobilization**—Upon completion of fieldwork, personnel, equipment, and supplies will be demobilized from the site.

3.2 Field Operations and Procedures

This section provides an overview of the equipment, operations, and procedures for the field investigation. It also references specific field operating procedures (FOPs) in Appendix A that provide step-by-step procedures for conducting the given field task. In the instances where FOPs are not referenced, the text of that section will act as the FOP.

3.2.1 Site Reconnaissance

Site reconnaissance tasks will be completed before the start of sampling activities. Site reconnaissance tasks will include the following:

- Confirming health and safety information including the route and travel time to the hospital specified in the Health and Safety Plan (HASP) and the addresses of local fire and police departments

- Locating the Federal Express office nearest the site, noting its hours of operation and determining whether the office will provide sample pickup service
- Selecting a location to be used as a staging area for sediment sampling activities
- Confirming that the subcontractor has identified and located utilities underlying the channel
- Mapping the transect locations and conditions of survey benchmarks surrounding the site for use as daily survey checkpoints
- Inspecting proposed sampling areas to determine if modifications are necessary based on structural limitations (e.g., low overhead clearances, docks) or other potential hazards (e.g., underground utilities) and recording necessary modifications in the field logbook along with the reason for the modification

The level of health and safety protection during the site reconnaissance activities will be Level D.

3.2.2 Mobilization

Prior to initiating any fieldwork, the following preparatory activities must be completed:

- Mobilize field equipment and supplies.
- Identify and set up temporary IDW storage area.
- Identify and contact utility companies to obtain underground utility clearance for sampling locations.
- Obtain and transport the identified field supplies to the site (e.g, personal protective equipment [PPE], sample containers, preservatives, sample forms, and other related items) and field monitoring equipment.
- Set up the project within USEPA's Field Operations Reporting Management System (FORMS) II LITE software on the field computer.
- Prepare detailed geographic information system (GIS) field maps from the FSP and load the field global positioning system (GPS) systems with target coordinates and aerial imagery.
- Mobilize subcontractor, supplies, and materials.
- Confirm that analyses are scheduled through the USEPA CLP and subcontracted laboratory.
- Confirm that field equipment is in proper working order and has received appropriate QC checks.
- Collect and analyze samples of water that will be used for decontamination purposes.

During mobilization activities, the field team leader (FTL) will perform a walk-through inspection of the site. The level of health and safety protection during the mobilization activities will be Level D.

3.2.3 Sediment Core Sampling

Sediment cores will be collected using the procedures provided in FOP-02, DPT Drilling and Sediment Sample Collection. The vessel will be held in position with a spud system and/or anchors in accordance with FOP-01, Sediment Sampling Vessel Operation and Station Positioning. Water depth measurements will be conducted using a weighted line or survey rod with a 6-inch plate affixed at the end of the measuring device. The sediment thickness will be measured during the coring process as the depth of penetration from the barge surface to the end boring. All necessary measurements (e.g., x, y coordinates, z elevations, surface elevation, depth to sediment surface, depth of boring) will be recorded on a field form for each sampling location (Appendix B).

Sediment cores will be collected at a total of 40 locations (Figure 2, Table 1). The target core penetration is one foot into the native sediment, which is expected to be a plastic clay. Sediment core sample intervals will be collected continuously throughout the sediment core. The surface sample interval will be collected from 0 to 0.5 foot below the top of sediment and will continue in 2-foot increments to the top of the native sediment. The last sample interval from each location will consist of the top 1 foot of native sediment. When sampling the last two intervals, care will be taken to not composite the transition zone between the accumulated soft sediment and the underlying native material.

Each sample interval from the sediment cores will be analyzed for PCB Aroclors and priority pollutant PAHs. It is anticipated that one core from each location will provide sufficient volume for the subsurface sampling intervals; however, because the surface sampling interval is much smaller (0.5 foot) a grab sampler, such as Ponar, VanVeen, or Eckman grab, will be kept on hand to collect additional surface sediment, if required. Particle size and TOC will be conducted for each sample interval at five sediment core locations.

Samples for the expanded PAH analysis will be collected from approximately 10 percent of the sampling locations (approximately four core locations). These selections will be made in the field and will be based on sample volume available and observed sediment characteristics. Approximately one-third of the expanded PAH samples will be collected from areas with no or minimal observable petroleum impacts, one-third from areas with moderate observable impacts, and one-third from heavily impacted locations (e.g., strong odor, sheen). The samples will be collected from locations throughout the sampling area and from various depths to provide spatial coverage.

The following will be recorded in field notes at each location: date, time, personnel, weather conditions, station ID, location information (x, y coordinates and z elevations), water elevation, sediment surface elevation, water depth, sediment thickness, sediment core penetration, sediment core recovery, core descriptions, and photographs taken.

TABLE 1
Proposed Sample Coordinates
Lower River and Inner Harbor of the Sheboygan River Remedial Investigation

Station ID	Easting	Northing
SD001	2575117	645866.6
SD002	2575101	645763
SD003	2575114	645690.5
SD004	2574923	645657.9
SD005	2574807	645738.4
SD006	2574955	645853.8
SD007	2574663	645829.3
SD008	2574510	645701
SD009	2574683	645596.1
SD010	2574390	645529.6
SD011	2574223	645722.3
SD012	2574359	645816.5
SD013	2574003	645803.7
SD014	2573497	645099.5
SD015	2574134	645473.6
SD016	2573883	645395.5
SD017	2573754	645607.8
SD018	2573682	645389.7
SD019	2573553	645330.2
SD020	2573631	645271.6
SD021	2573518	645140.9
SD022	2573436	644982.9
SD023	2573543	645008.9
SD024	2573455	644849.3
SD025	2573383	644679.6
SD026	2573480	644647.6
SD027	2573392	644544.3
SD028	2573283	644422.9
SD029	2573349	644373.1
SD030	2573135	644256.6
SD031	2573227	644280.2
SD032	2573119	644133.9
SD033	2572985	644140.9
SD034	2572875	644187.4
SD035	2572872	644113.9
SD036	2572895	644027.3
SD037	2574254	645589.3
SD038	2573993	645525.6
SD039	2574034	645674.2
SD040	2573334	644525

3.2.3.1 Sediment Processing and Characterization Procedures

Sediment core samples will be collected in 4-foot-long disposable polycarbonate liners within a macrocore sampler outfitted for a DPT drill rig. In order to retain the sediments, the sampler will be equipped with a sediment core catcher or another device designed to maximize sediment core recovery. Initially, if the sediment core recovery is less than 70 percent, then the sampling position will be offset and a second sampling attempt will be made. If no acceptable core is obtained after three attempts, the FTL or designee will contact the site manager for further instruction. If after a representative number of locations have been sampled the site-specific core recoveries are consistently less than 70 percent, this requirement will be revisited with the site manager to determine if an adjustment to the requirement is warranted.

Sediment cores will be processed either on the vessel or at an onshore staging area by placing the sediment cores on a decontaminated processing table (or other stable surface) and slitting a section of the liner sufficient to examine and remove the sample. The sediment cores will be visually characterized for sediment type, color, moisture content, texture, particle size and shape, consistency, visible evidence of staining, and other observations. The sediment will be described using the Unified Soil Classification System (USCS) (modified slightly for sediment characterization) based visual manual identification in accordance with American Society of Testing and Materials (ASTM)-2488 standard practice. Digital photographs of each core sample will be taken to document the undisturbed core structure. Each photograph will include a scale (e.g., tape measure), station ID, and date of core collection.

Collection of Samples for Analysis

The specified sample interval of each sediment core collected from the same location will be homogenized using pre-cleaned utensils and aluminum pans. Rocks, twigs, leaves, and other debris will be removed, and the sediments will be thoroughly mixed until uniform texture and color is achieved. Sampling personnel will avoid decanting off the excess liquid while homogenizing the sample. Once the sediment has been thoroughly homogenized, aliquots will be transferred to the appropriate sample containers. Any reusable equipment used during the core processing or for the collection of the samples will be decontaminated between samples. Sediment samples will be shipped on ice at 4 degrees Celsius (°C) to the laboratories for overnight delivery. Additional requirements for sample packaging, shipment, and chain-of-custody procedures are detailed in the QAPP. Sampling procedures for collecting QC samples are discussed in Section 5.5.

3.2.4 Surveying

To meet the goals of the sediment sampling event, precise positioning of sediment coring locations is required. Both accuracy (i.e., ability to define position) and repeatability (i.e., ability to return to a sampling station) are essential. Sediment sampling locations will be referenced horizontally to the Wisconsin State Plane Coordinate System, South Zone, NAD83, with an accuracy of +/- 3 feet and a vertical accuracy of less than or equal to 0.1 foot. Vertical surveys will be collected to compare data with the NAVD88 and IGLD85. The survey equipment will be referenced to at least one onshore reference monument near the study area with known x-, y-coordinate and z-elevation values each day prior to the start and end of surveying activities.

Existing onshore reference benchmark(s) will be used for surveying sediment core locations, if possible. Additional onshore benchmarks will be established within the project boundary area by methods determined by the subcontractor to obtain the required horizontal and vertical accuracy. Established benchmarks will be used to survey each sediment core location to the horizontal and vertical tolerances stated above. Coordinates (x, y) and elevations (z) of the benchmarks used for surveying activities will be recorded in the same coordinate system and datum as the sample locations.

Sediment surface elevation will be determined either using a series of surveyed staff gauges in increments of 0.1 foot to determine the water surface elevation or by surveying the work surface (barge deck) at each location. Positioning of the vessel will be accomplished with the use of a GPS unit capable of a horizontal accuracy of +/- 3 feet. Procedures for GPS requirements and operation are located in FOP-03, GPS Procedures.

3.2.5 Field Instrument Calibration

A navigation check of the GPS and survey equipment will be performed each morning by recording the position of a benchmark with known x, y coordinates and z elevations. The coordinates will be recorded in the field logbook and compared with the benchmark to verify that the GPS and survey equipment is functioning consistently. No additional equipment outside of that used for surveying purposes (collection of x, y coordinates and z elevations) during the remedial investigation will require calibration.

3.2.6 Field Equipment Decontamination

All non-disposable sampling equipment will be decontaminated on arrival at the site and prior to each use. Decontamination will be performed in accordance with FOP-04, Field Decontamination Procedures, and will follow these general procedures:

- Potable water rinse
- Wash in Alconox/Liquinox detergent solution
- Potable water rinse
- Methanol rinse
- Deionized water rinse
- Air drying or drying with clean paper towels
- Storage until further use on a clean, plastic-covered surface or wrapped in aluminum foil

Dedicated, single use sampling equipment will be used during sediment sample collection and processing where possible. Portions of the sampling device that will be used at all the stations will be decontaminated with a thorough scrub using Alconox/Liquinox and site water between stations.

3.2.7 Investigation-derived Waste Characterization and Disposal

Excess sediment and water generated during investigation and decontamination activities will be containerized in 5-gallon buckets with Department of Transportation (DOT)-approved lids. The buckets will be transferred to 55-gallon DOT-approved drums at the PRS dewatering facility on Maryland Avenue, where they will be temporarily stored while being characterized for disposal. Waste characterization parameters (total PCBs, TCLP VOCs, TCLP SVOCs, TCLP pesticides, TCLP herbicides, TCLP metals, pH, percent solids, flash point, and specific gravity) will be collected on sediments designated as IDW for disposal

parameters. When drums are filled, they will be labeled with "analysis pending" and the media (water or soil), date generated, and generator contact information. IDW handling, profiling, and disposal will completed by a certified waste hauler. Removal of IDW will be completed within 90 days of receipt of analytical data.

3.2.8 Demobilization

When field activities conclude, all of the support facilities and equipment from the site will be demobilized. All equipment and tools will be properly decontaminated before they are demobilized from the area. No site restoration activities are anticipated to be necessary.

SECTION 4

4 General Field Operations

4.1 Health and Safety

CH2M HILL and its subcontractors will abide by U.S. Occupational Safety and Health Administration (OSHA) regulations and the site-specific HASP (CH2M HILL, 2010). General topics covered in the HASP include site location and scope of work, safety and health risk analysis, field team organization and responsibilities, PPE, site control measures, decontamination procedures, emergency response plan, employee training, and medical monitoring. The HASP will be kept onsite during all field activities and a copy will be maintained in the project files.

4.2 Sample Management

This section describes the procedures to be implemented so that environmental samples are properly containerized, preserved, shipped, and otherwise handled in a manner that will maintain sample integrity. These techniques will result in representative samples and will reduce the possibility of sample contamination from external sources.

4.2.1 Sample Identification

A sample numbering system will be used to identify each sample, including duplicate and blank samples. The sample number will provide a unique identifier for each sample, required by Earthsoft's Environmental Quality Information Systems (EQuIS) site management software, which is compatible with USEPA's Comprehensive Manual for Electronic Data (EDMAN) electronic data deliverable (EDD) format.

Each sample, regardless of analytical protocol, will also be assigned a CH2M HILL site-specific identifier, which will contain a property and sample-specific location identifier that indicates where the sample was obtained. Subsurface soil samples will also be tagged using a numbering system that will include the sample depth.

The sample number and station location identifier will be included on the sample tag and the traffic report and chain-of-custody record.

The site-specific identifier is based on the following system:

- **Site** – SRIH – (Sheboygan River Inner Harbor)
- **Station Location** – The standard station location code consists of five characters: two letters and a three number location code.
  - The first two letters indicate one of the types of sample locations as follows:
    - SD = sediment sample
    - EB = equipment blank
    - WD = IDW disposal sample

  - An example sediment sampling location is SD001.

- **Sample Depth**—The depth from which the sample was collected will be added to the station location at the end after a dash and with a backslash (/) between the starting and end depths:

  - For example, a sample collected from the 0- to 0.5-foot interval at the location above would be indicated as SRIH-SD001-0.0/0.5.

- **QA/QC Identifier**—Field QA/QC samples will be identified using the following QA/QC identifiers:

  - Field equipment blanks, which are not associated with an individual station location, will be numbered sequentially and identified by the site ID and the first two letters of the station location code (e.g., SRIH-EB001 would be the first equipment blank).

  - Field duplicates, which are associated with the same station location as the native sample, will be identified with an "R" (for "replicate") appended to the end of the location code. For example, the duplicate of sample SRIH-SD001-0.0/0.5 would be labeled as SRIH-SD001-0.0/0.5R.

4.2.2 Sample Containers

The contaminant-free sample containers used in this sampling effort will be purchased from an approved vendor or prepared by the laboratory. All sample containers for laboratory analyses will meet or exceed USEPA requirements specified in *Specifications and Guidance for Obtaining Contaminant-Free Containers* (USEPA, 1990). Containers used for the sampling activity will not contain target organic and inorganic contaminants exceeding the level specified in the above-mentioned document. Specifications for the bottles will be verified by checking the supplier's certified statement and analytical results for each bottle lot.

Table 2 presents a summary of sample containers needed for the various field investigations to be performed as part of the monitoring effort.

4.2.3 Sample Preservation and Holding Times

Sample preservatives and sample holding times will meet the requirements set forth by USEPA. Ice will be used to maintain the internal cooler temperature at 4°C ($\pm$2°C) during sample collection and shipment to the laboratory. A summary of preservation and storage requirements, and holding times for the analyses to be performed are provided in Table 2.

TABLE 2
Sample Containers, Preservation, and Holding Times
Lower River and Inner Harbor of the Sheboygan River Remedial Investigation

Analyte	Container and Minimum Quantity	Preservation	Holding Time[a]
Soil/Sediment			
PCBs	8 oz G-TLC	4°C	14 days to extraction, 40 days to analysis
PAHs	8 oz G-TLC	4°C	14 days to extraction, 40 days to analysis
TOC	2 oz G-TLC	4°C	28 days
Particle Size	4 oz HDPE or 1 gal plastic bag	4°C	1 year
TCLP VOCs	8 oz G-TLC	4°C	14 days to TCLP extraction, 14 days to analysis
TCLP SVOCs	8 oz G-TLC	4°C	14 days to TCLP extraction, 7 days to extraction, 40 days to analysis
TCLP Pesticides	8 oz G-TLC	4°C	14 days to TCLP extraction, 7 days to extraction, 40 days to analysis
TCLP Herbicides	8 oz G-TLC	4°C	14 days to TCLP extraction, 7 days to extraction, 40 days to analysis
TCLP Metals	8 oz G-TLC	4°C	180 days (28 days Hg) to TCLP extraction, 180 days (28 days Hg) to analysis
pH	4 oz HDPE	4°C	As soon as possible
Percent Solids	4 oz HDPE	4°C	7 days
Flash Point	4 oz HDPE	4°C	10 days
Specific Gravity	4 oz HDPE	4°C	None
Water			
PCBs	1 × 1 liter G-A	4°C	7 days to extraction, 40 days to analysis
PAHs	2 × 1 liter G-A	4°C	7 days to extraction, 40 days to analysis

Notes:
[a] The technical holding time reported for each analysis could vary from contractual laboratory holding times.
Abbreviations: NA = not applicable, P = polyethylene; G = glass; G-TLC = glass with Teflon-lined cap; G-A = glass amber; HDPE = high-density polyethylene

4.2.4 Sample Handling, Packaging, and Shipment

Sample handling, packaging, and shipping procedures are described in FOP-05. Sample coolers will be shipped to arrive at the specified laboratories the morning after sampling (priority overnight) or will be sent by a courier to arrive the same day. The respective laboratory will be notified of the sample shipment and the estimated date of arrival of the samples being delivered.

4.3 Field Activity Documentation and Logbook

Several procedures will be implemented by CH2M HILL to document the location, media, and parameters of samples collected in the field. These procedures include recording the acquisition of each sample for laboratory analysis, photographing sediment samples, completing chain-of-custody forms for the environmental samples and field QC samples, maintaining a file of parameter data generated as a result of sampling activities, and recording field sampling location survey data. Field notes at each location may include the following information (if applicable): date, time, personnel, weather conditions, station ID, x coordinate, y coordinate, z-elevations (top of water/ice, top of sediment), water depth, probe/core refusal depth, and sample descriptions. The following describes the sample documentation methods that will be used at the Lower River and Inner Harbor site.

4.3.1 Field Logbook

A field sampling logbook will be initiated at the start of the first onsite activity and maintained to document field activities throughout the field effort in accordance with FOP-06.

4.3.2 Field Forms

Standard forms will be used in addition to the field logbooks to ensure that necessary data are recorded consistently and provide a more detailed record. No blank spaces will appear on completed forms. If information requested is not applicable, the space will be marked with a dashed line or marked "N/A." All forms are to be completed in the field and placed in the project files. The following standard field forms will be completed as necessary and are provided in Appendix B:

- Sediment core logs will provide information necessary to document survey information (x, y coordinates and z elevations), sediment thickness, sediment description (texture, color, relative density, and structure), sample IDs, percent recovery, and other observations (e.g., staining, odor).

4.3.3 Photographic Documentation

The FTL or designee will selectively photograph field activities, as well as each sediment sample, to complement descriptions of field activities in the field logbook and sediment core log descriptions. The following information will be recorded in the logbook when photographs are taken:

- Date and time
- Exposure number/roll number or digital file name
- Location of the photograph
- Description and identification of the subject
- The initials of the person who took the photograph

CH2M HILL will maintain digital picture files for reference during the project. At the submission of a final report, CH2M HILL will deliver the captioned photographs in an album to USEPA.

4.3.4 Sample Chain-of-custody

For samples collected for analysis, USEPA chain-of-custody protocols will be followed, as described in the *National Enforcement Investigations Center (NEIC) Policies and Procedures* (USEPA, 1985). Chain-of-custody forms will be completed through the use of USEPA's FORMS II Lite software. Custody procedures are described in Section 2.3 of the QAPP. The protocol for filling out the chain-of-custody form is provided in FOP-07.

4.4 Field Parameter Documentation

Information collected in the field through visual observation, manual measurement, and/or field instrumentation will be recorded in field logbooks and data forms. Data will be reviewed by the FTL for consistency and adherence to the QAPP/FSP. Concerns identified will be corrected and incorporated into the data evaluation process.

Field data calculations, transfers, and interpretations conducted by the field team will also be reviewed by the FTL. Original field documents will be kept in the project file.

Field documents will be checked for the following:

- General completeness
- Readability
- Clearly stated use of appropriate procedures and modifications to sampling procedures
- Appropriate instrument calibration and maintenance records (as appropriate)
- Reasonableness of data collected
- Correctness of sample locations
- Correctness of reporting units, calculations, and interpretations

4.5 Quality Control Sample Procedures

Each of the offsite laboratories identified in the QAPP will have a QC program to ensure the reliability and validity of the analyses being performed. Field sampling precision and bias will be evaluated by collecting field duplicate and equipment blank samples for laboratory analysis.

4.5.1 Field Duplicates

Field duplicate samples will be used to measure the heterogeneity of the sample matrix and the precision of the field sampling and analytical process. Field duplicate samples will be collected from the same core following sample homogenization. Duplicate samples will be collected from locations throughout the sampling area and from various depths at a frequency of 10 percent to assess sample variability.

4.5.2 Equipment Blanks

Equipment blanks will be collected and analyzed to determine whether the decontamination procedure has been adequately performed and whether cross contamination of samples occurred from the equipment or residual decontamination solutions. A consistent volume of demonstrated analyte-free distilled and deionized water will be poured directly into or over the decontaminated sampling equipment and then collected in a sample container. The sample bottles will be labeled as described in Section 4.2.1. At least one equipment blank

will be collected per piece of nondedicated equipment used during field activities and analyzed for the same parameters as the sediment samples.

4.5.3 Decontamination Water

Water will be used to decontaminate nondedicated sampling equipment after each use. To ensure that this water will not cause cross contamination, the source water will be demonstrated analyte-free. The criteria for analyte-free water will be determined by the detection limits of the laboratory methods used for analysis of the sample analytes.

4.5.4 Matrix Spike / Matrix Spike Duplicate

Matrix spike/matrix spike duplicate (MS/MSD) samples will be used by the laboratories to assess the precision and accuracy of sample analysis. The MS/MSD samples will be fortified by the laboratories in accordance with the specifications of the analytical methods. Sample containers will be filled and stored in the same manner as field duplicate samples. The frequency for collection of MS/MSD samples will be at least 5 percent. MS/MSD samples will not be collected for particle size samples.

4.5.5 Temperature Blanks

A temperature blank will be included in each cooler to allow the laboratory receiving the shipment of samples to determine if the samples have been maintained at the proper temperature. Temperature blanks will consist of an unpreserved sample container filled with distilled water. One temperature blank will accompany each sample cooler being shipped to the laboratory.

4.6 Decontamination Procedures

Decontamination of personnel and sampling and monitoring equipment will follow the procedures presented in FOP-04 and FOP-08. The potable water to be used in equipment decontamination will be obtained from a public water supply system located at the mobilization area.

4.7 Disposal of Investigation-derived Wastes

Materials that may become IDW and that require proper treatment, storage, and disposal include the following:

- PPE, including disposable coveralls, gloves, booties
- Disposable equipment, including plastic ground and equipment covers, aluminum foil, aluminum pans, broken or unused sample containers, tape
- Decontamination water and liquids

IDW and related materials will be managed in accordance with the *Guide to Management of Investigation-Derived Wastes* (USEPA, 1992) and the site IDW management protocols outlined in the Site Management Plan. Disposable equipment (including PPE) and debris will be containerized and appropriately labeled during the sampling events and disposed of accordingly. Water and sediment generated during equipment decontamination will be containerized and staged onsite in a 55-gallon drum or "poly" tank and disposed of

appropriately based on analytical results. Equipment will be decontaminated as appropriate, as described in FOP-04.

SECTION 5

5 References

American Society of Testing and Materials (ASTM). *Standard Practice for Description and Identification of Soils (Visual - Manual Procedure).* D2488-00.

CH2M HILL. 2010. *Health and Safety Plan, Lower River and Inner Harbor of the Sheboygan River, Sheboygan, Wisconsin.* July.

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Great Lakes National Program Office (GLNPO). 2010. Sheboygan River Area of Concern Website: http://www.epa.gov/glnpo/aoc/sheboygan.html. Accessed on 7/19/2010.

U.S. Environmental Protection Agency (USEPA). 1992. *Guide to Management of Investigation-Derived Wastes,* 9345.3-03FS. January.

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U.S. Environmental Protection Agency (USEPA). 1985. *National Enforcement Investigations Center (NEIC) Policies and Procedures.* EPA-330/9-78-DDI-R. June.

U.S. Geological Survey (USGS). 2010. USGS Daily Surface Water Statistics for Wisconsin Website - USGS 04086000 Sheboygan River at Sheboygan, Wisconsin. http://waterdata.usgs.gov/wi/nwis/dvstat/?search_site_no=04086000&agency_cd=USGS &referred_module=sw&format=sites_selection_links. Accessed on 7/19/2010.

Walker, J. F. and W. R. Krug. 2003. *Flood-Frequency Characteristics of Wisconsin Streams.* USGS Water-Resource Investigations Report 03-4250. http://pubs.usgs.gov/wri/wri034250/. Accessed on 7/19/2010.

Wisconsin Department of Natural Resources (WDNR). 2001. *The State of the Sheboygan River Basin.* PUBL WT 669 2001. http://dnr.wi.gov/org/gmu/sheboygan/Sheboygan_Final_10_01.pdf. Accessed on 7/19/2010.

Figures

North

0 600 1,200

Approximate scale in feet

Figure 1
Lower River and Inner Harbor of the Sheboygan River - Site Map
Project Features and Boundaries
Sheboygan, WI

Figure 2
Proposed Sediment Sampling Locations
Lower River and Inner Harbor of the Sheboygan River
Remedial Investigation
Sheboygan, WI

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Appendix A

Field Operating Procedures

APPENDIX A

Field Operating Procedures

This appendix presents the following field operating procedures (FOPs) to perform the field investigation at the Lower River and Inner Harbor of the Sheboygan River remedial investigation project site are attached.

FOP Number	Title
FOP-01	Sediment Sampling Vessel Operation and Station Positioning
FOP-02	Direct-push Technology Drilling and Sediment Sample Collection
FOP-03	Global Positioning System Procedures
FOP-04	Field Equipment Cleaning and Decontamination Procedures
FOP-05	Sample Handling, Packaging, and Shipping
FOP-06	Field Logbook
FOP-07	Documentation and Chain-of-custody Procedure
FOP-08	Decontamination of Drilling Rigs and Equipment

FOP-01

Sediment Sampling Vessel Operation and Station Positioning

Precise positioning of station locations is required to meet the sampling goals. Both accuracy (the ability to define position) and repeatability (the ability to return to a sampling station) are essential. Positioning for all surveys will be achieved using a global position system (GPS) capable of locating stations with an accuracy and repeatability of plus or minus 1 meter.

Positioning of the Sampling Vessel

1. Prior to daily departure of the sampling vessel, the sampling crew will be informed of the planned sampling locations and the number of samples required at each location. The sampling team will verify that the GPS is referenced to known survey control monuments (x, y, and z) surrounding the project site prior to departure from the dock or launch ramp and upon returning after sampling activities.
2. Vessel navigation and positioning will be accomplished using GPS methodology.
3. The GPS system antenna will be in a "transit" mount, which will allow it to be removed and manually repositioned over the sampling point to acquire final "as-sampled" x, y position measurements.
4. After the sampling vessel is anchored or spudded, the sampling team will measure and record the water depth to the top of sediment using a survey rod attached to a 12-inch metal plate.
5. The above information will be recorded on the sample log form prior to acquisition of the sample. The sample log will also be annotated with the exact sampling location coordinates, date, time, weather and water surface conditions, as well as any relevant other information associated with the acquisition of each sample.

FOP-02

Direct-push Technology Drilling and Sediment Sample Collection

Purpose

This FOP provides a general guideline for the collection of sediment samples using direct-push technology (DPT) drilling methods. Work will be conducted on land and from a barge over open water.

Scope

The method described for DPT sediment sampling is applicable for sediment sampling over exposed sediments and below the sediment-water interface within a water body. Specific equipment and the responsibilities of DPT drilling subcontractors are described in the contracting documentation.

Equipment and Materials

- Drilling equipment and tools for hydraulic DPT rig using continuous samplers
- A 0.75-inch-diameter steel rod for sediment probing
- Survey rod with a 6-inch round plate affixed to the bottom
- Equipment and supplies required for logging sediment core
- Analytical sample containers and sampling supplies
- Personal protective equipment (PPE)

Procedures and Guidelines

1. Position the DPT drill rig over the proposed sampling location. Record the Location ID, station positioning (x and y coordinates) within 3 feet, weather conditions, personnel, and other relevant information.
2. If working from a barge over open water, measure the depth to the top of sediment from the DPT drill rig work platform surface using a survey rod with a 6-inch round plate affixed to the bottom. Record the distance from the working surface to the top of sediment to the nearest 0.01 foot.
3. Measure the sediment probe refusal depth from the ground surface or the same working surface used in Step 2 to obtain the top of sediment measurement. Record the sediment probe refusal distance and corresponding sediment thickness.

4. Ensure that non-dedicated downhole equipment and sampling equipment are decontaminated in accordance with FOP-08, Decontamination of Drilling Rigs and Equipment.
5. Wear appropriate PPE, as required by the Health and Safety Plan. Change gloves between sampling locations.
6. Collect subsurface sediment samples continuously to the refusal depth using a macrocore sampler with a polycarbonate liner. Between sediment core locations, the macrocore sampler and downhole tools will be decontaminated in accordance with the procedures outlined in FOP-08, Decontamination of Drilling Rigs and Equipment.
7. Ensure the drilling operators open the polycarbonate liner once removed from the macrocore sampler and present it to the field staff for logging and sampling. Log the sediment sample according to visual methods outlined in American Society of Testing and Materials (ASTM) Method D-2487-98.
8. Fill all sample containers using decontaminated sampling equipment. Sediment samples for inorganic and nonvolatile organic analyses will be separated and transferred into disposable aluminum pans, homogenized by mixing with a stainless-steel spoon, and transferred to the appropriate sample container. Remove large pebbles and cobbles from the samples before placing in jars.
9. Label, handle, and store the samples according to procedures outlined in the Field Sampling Plan (FSP). Record sampling data such as depth, time, and date as specified in the FSP. Discard unused sample according to the guidelines for IDW outlined in the Waste Management Plan.
10. Advance the DPT rig to the next sampling interval after a subsurface sediment sample is collected.
11. Obtain accurate and representative sediment samples. The drilling subcontractor will be responsible for obtaining accurate and representative sediment samples, informing the geologist/field technician of changes in drilling conditions, and keeping a separate general log of the sediment core locations.
12. Decontaminate all non-dedicated downhole equipment (e.g., rods, sampling tubes) in accordance with FOP-08, Decontamination of Drilling Rigs and Equipment.

References

- None.

Key Checks and Items

- Verify that the DPT rig is clean and in proper working order.
- Monitor that the DPT operator thoroughly completes the decontamination process between sampling locations.
- Determine if a quality control (QC) sample will be required at a sampling location (refer to the FSP).

FOP-03

Global Positioning System Procedures

Purpose

This FOP provides guidelines for the collection of horizontal coordinates during field activities using a GPS unit. Accurate surveys of sampling locations and boundaries are necessary in order to determine precise spatial reference points for characterization of site conditions and evolution of the Site Conceptual Model.

Scope

The method described for the collection of horizontal coordinates is applicable to a Trimble® Pathfinder Geo XH or comparable GPS receivers. The program precision and accuracy requirement for location coordinates is $\pm$ 1 meter (3.3 feet). To achieve real-time data with a submeter accuracy level with no post-processing of data using GPS Pathfinder Office, the following criteria must be met:

- Minimum number of satellites = 4
- Maximum Position Dilution of Precision (PDOP) = 6
- Minimum Signal to Noise Ratio (SNR) = 4
- Minimum elevation = 15 degrees

If any of the above criteria cannot be met because of weather conditions, time of day, or obstructions of the sky such as buildings or foliage resulting in a less than submeter accuracy, the following should be performed:

- Mark the location on the applicable aerial photograph or map and estimate the distance from two known locations and note in the field logbook so that, at a minimum, a general location position can be obtained. The location should also be marked using a weighted buoy and a reading taken when conditions are optimal.

Equipment and Materials

- Trimble® Pathfinder Geo XH or comparable GPS receiver and compatible data-logger
- Field logbook
- Buoy with anchor and rope
- Aerial photograph or map of sampling area

Procedures and Guidelines

1. Assemble and turn on unit in accordance to manufacturer's instructions.
2. Verify that the GPS horizontal datum is set to Wisconsin South Zone State Plane Coordinate System, North American Datum of 1983 (NAD83) and the vertical datum is set to North American Vertical Datum of 1988 (NAVD88).
3. Verify that the GPS is referenced to known survey control monuments (x, y, and z) surrounding the project site within the level of accuracy specified prior to field activities and upon return.
4. Place the GPS antenna over the location where coordinates are to be collected and record coordinates in the field logbook and/or log coordinates into the GPS receiver. If locations are to be logged into the receiver, readings must be collected every 5 seconds for a period of 1 minute (see manufacturer instructions on position logging). The data files recorded for each position must be named including both the sample location identification and date recorded.
5. Download the data from the GPS unit to a personal computer daily record in the field logbook or appropriate field form as they are collected.

Reference

U.S. Environmental Protection Agency (USEPA). 2008. *USEPA Interim Guidance for Developing Global Positioning System Data Collection Standard Operating Procedures and Quality Assurance Project Plans, Revision 1.0.* February.

Key Checks and Items

- Charge and check batteries daily.

FOP-04

Field Equipment Cleaning and Decontamination Procedures

Materials

- Health and safety equipment (as required in the Health and Safety Plan)
- Distilled water
- Non-phosphate soap (Alconox® or equivalent)
- Tap water
- Appropriate cleaning solvent (e.g., methanol or acetone)
- Rinse collection plastic containers
- Knife
- Brushes
- Aluminum foil
- Garbage bags
- Spray bottles
- Ziploc®-type bags
- Plastic sheeting

Cleaning Procedures for Small Equipment and Sampling Devices

1. Follow the health and safety procedures specified in the Health and Safety Plan.
2. Clean reusable sampling equipment per the following decontamination procedures:
   a. Wash all small equipment and sampling devices with non-phosphate detergent and distilled water.
   b. Rinse with distilled water.
   c. Rinse equipment with solvent (methanol or acetone).
   d. Rinse with distilled water.
   e. Allow to air dry and wrap in aluminum foil.
3. Conduct all cleaning and decontamination in plastic containers. These containers will be transported to each sampling location and will also be used to collect all decontamination rinsate.

Cleaning Procedures for Large Equipment (if applicable)

1. Follow the health and safety procedures specified in the Health and Safety Plan.
2. Clean large sampling equipment per the following decontamination procedures:
   a) Wash all large sampling equipment with a high-pressure steam cleaner or water wash using a brush as deemed necessary to remove any particles.
   b) Rinse with distilled water.
   c) Rinse with solvent.

FOP-05

Sample Handling, Packaging, and Shipping

Purpose

The purpose of this FOP is to delineate protocols for the packing and shipping of samples to the laboratory for analysis.

Scope

This FOP is applicable for all samples collected and prepared for analysis at an offsite laboratory.

Equipment and Materials

- Waterproof hard plastic coolers
- Plastic Ziploc®-type bags
- Plastic garbage bags
- Absorbent packing material (not vermiculite)
- Inert cushioning material (not vermiculite)
- Ice
- USEPA Region 5 sample tags
- Chain-of-custody forms (generated by USEPA's Field Operations Reporting Management System [FORMS] II Lite software)
- USEPA Region 5 custody seals
- Airbills and shipping pouches (e.g., Federal Express)
- Clear tape
- Strapping tape
- Mailing labels

Procedures and Guidelines

Prepare Bottles for Shipment

1. Arrange decontaminated sample containers in groups by sample number.
2. Check that sample container lids are tight.
3. Secure appropriate USEPA Region 5 sample tags around lids of container with string or wire.
4. Arrange containers in front of assigned coolers.
5. Affix appropriate adhesive labels to each container. Protect label with clear tape.
6. Enclose each sample in a clear, resealable Ziploc®-type bag and ensure that sample labels are visible.

Prepare Coolers for Shipment

1. Tape drains shut, inside and out.
2. Affix "This Side UP" labels on all four sides and "Fragile" labels on at least two sides of each cooler.
3. Place mailing label with laboratory address on top of the coolers.
4. Place inert cushioning material (e.g., bubble wrap, preformed poly-foam liner) in the bottom of the cooler. Do not use vermiculite.
5. Place appropriate chain-of-custody records with corresponding custody seals on top of each cooler.
6. Place all the samples inside a garbage bag and tie the bag.
7. Double bag and seal loose ice in resealable, plastic, Ziploc®-type bags to prevent melting ice from leaking and soaking the packing material. Place the ice outside the garbage bags containing the samples. Place sufficient ice in cooler to maintain the internal temperature at 4 degrees Celsius (°C) (±2°C) during transport.
8. Fill cooler with enough absorbent material (e.g., Perlite, kitty litter) and packing material to prevent breakage of the sample bottles and to absorb the entire volume of the liquid being shipped (offsite sample shipment only).
9. Sign each chain-of-custody form (or obtain signature) and indicate the time and date the cooler was custody sealed. Record the USEPA Region 5 custody seals on the chain-of-custody forms.
10. Seal the laboratory copies of the chain-of-custody forms in a large resealable plastic Ziploc®-type bag and tape to the inside lid of the cooler. Retain the Region 5 copies of the chain-of-custody forms for return to USEPA. Each cooler must contain a chain-of-custody form (or forms) that correspond to the contents of the cooler.
11. Close lid and latch.
12. Peel custody seals carefully from backings and place intact over lid openings (right front and left back). Cover seals with clear protection tape.
13. Tape cooler shut on both ends, making several complete revolutions with strapping tape. **Do not** cover custody seals.
14. Relinquish to carrier (e.g., Federal Express). Place airbill receipt inside the mailing envelope and send to sample documentation coordinator, along with the other documentation.

High Concentration Samples or NAPL Samples

When shipping high concentration samples or samples of nonaqueous phase liquid (NAPL), the CH2M HILL dangerous goods shipping handbook should be consulted for reference. In addition, the CH2M HILL dangerous goods shipping coordinator, Rob Strehlow, can be contacted at the Milwaukee, Wisconsin, equipment warehouse (414-257-4615) for assistance.

Attachments

None.

Key Checks and Items

None.

FOP-06

Field Logbook

Purpose

The purpose of this FOP is to delineate protocols for recording field survey and sampling information in a field logbook.

Scope

Data generated from the use of this FOP may be used to support the following activities: site characterization, risk assessment, and evaluation of remedial alternatives.

Equipment and Materials

- Field logbook
- Indelible black ink pen

Procedures and Guidelines

All information pertinent to a field survey or sampling effort will be recorded in a bound field logbook that will be initiated at the start of the first onsite activity. The field logbook will consist of a bound notebook with consecutively numbered pages that cannot be removed. The outside front cover of the logbook will contain the project (site) name and the specific activity (e.g., remedial design sampling). The inside front cover will include the following:

- Site name and USEPA work assignment number
- Project number
- Site manager's name and mailing address
- Sequential logbook number
- Start date and end date of logbook

Each page will be consecutively numbered, dated, and initialed. All entries will be made in indelible black ink, and all corrections will consist of line-out deletions that are initialed and dated. If only part of a page is used, the remainder of the page should have an "X" drawn across it. At a minimum, entries in the logbook will include the following:

- Time of arrival and departure of site personnel, site visitors, and equipment
- Instrument calibration information, including make, model, and serial number of the equipment calibrated
- Field observations (e.g., sample description, weather, unusual site conditions or observations, sources of potential contamination)
- Detailed description of the sampling location, including a sketch

- Details of the sample site (e.g., coordinates [x, y], water elevation [z], casing diameter and depth, integrity of the casing)
- Sampling methodology and matrix, including distinction between grab and composite samples
- Names of samplers and crew members
- Start or completion time of sample collection activities
- Field measurements (e.g., water depths, sediment probe depths)
- Type of sample (e.g., sediment)
- Number, depth, and volume of sample collected
- Field sample number
- Requested analytical determinations
- Sample preservation
- QC samples
- Sample shipment information including chain-of-custody form number, carrier, date, and time
- Health and safety issues (including level of PPE)
- Signature and date by personnel responsible for observations

Sampling situations vary widely. No general rules can specify the extent of information that must be entered in a logbook. Records should, however, contain sufficient information so that someone can reconstruct the sampling activity without relying on the collector's memory. The field team leader will keep a master list of all field logbooks assigned to the sampling crew.

Attachments

None.

Key Checks and Items

None.

FOP-07

Documentation and Chain-of-custody Procedure

Purpose

The purpose of this FOP is to provide a definition of "custody" and describe protocols for documenting the transfer of custody from one party to the next (e.g., from the site to the laboratory). A documented custody trail is established through the use of sample tags and a USEPA chain-of-custody form that uniquely identifies each sample container, and who has possession of it from the sample's origin to its final destination. The chain-of-custody form also describes the sampling point, date, time, and analysis parameters.

Scope

Sample personnel should be aware that a sample is considered to be in a person's custody if the sample meets the following conditions:

- It is in a person's actual possession
- It is in view after being in a person's possession
- It is locked up so that no one can tamper with it after it has been in physical custody

When samples leave the custody of the sampler, the cooler must be custody-sealed and possession must be documented.

Data generated from the use of this FOP may be used to support the following activities: site characterization, risk assessment, and evaluation of remedial alternatives.

Equipment and Materials

- Computer with FORMS II Lite software loaded
- Printer with paper (8.5 by 11 inch) and ink cartridge (black or color)
- USEPA Region 5 sample tag
- FORMS II Lite-generated tag label (encouraged, but not mandatory)
- Indelible black ink pen

Procedures and Guidelines

Chain-of-custody Forms

The chain-of-custody form must contain the following information:

- CASE NUMBER/CLIENT NUMBER: If a CLP laboratory is used, enter the case number provided by USEPA's RSCC. If the CLP is not used, enter the SAS number provided by CH2M HILL's sample and analytical coordinator.
- EPA REGION: Enter Region "5."

- CERCLIS ID: If applicable
- SPILL ID: If applicable
- SITE NAME/STATE: This will be "LOWER RIVER AND INNER HARBOR-SHEBOYGAN RIVER."
- PROJECT LEADER: Enter the CH2M HILL site manager.
- ACTION: Choose "Remedial Investigation."
- SAMPLING CO.: "CH2M HILL."
- SAMPLE NO.: This is the unique number that will be used for sample tracking. For CRL and Contract Laboratory Program (CLP), this number is taken from a block of numbers assigned by the USEPA RSCC. For non-CRL and CLP, the CH2M HILL sample and analytical coordinator will assign this number.
- MATRIX: Describes the sample media (e.g., surface water).
- SAMPLER NAME: The name of the sampler or sample team leader.
- CONCENTRATION: Low (L), low/medium (M), or high (H).
- SAMPLE TYPE: "Grab" or "Composite."
- ANALYSIS: This indicates the analyses required for each sample.
- TAG NO.: This number appears on the bottom of the sample tag and includes a prefix ("5") followed by a series of numbers. The entire number must appear on the chain-of-custody form.
- PRESERVATIVE: Document what preservative has been added to the sample (e.g., "HCl," "Ice Only," "None").
- STATION LOCATION: This is the CH2M HILL station location identifier.
- SAMPLE COLLECT DATE/TIME: Use military time.
- QC TYPE: This is for field quality control only, and includes field duplicate, field blanks, equipment blanks, and trip blanks.
- DATE SHIPPED: The date that samples are relinquished to the shipping carrier.
- CARRIER NAME: This is the carrier used for shipping samples (e.g., "FedEx").
- AIRBILL: Airbill number used for shipping (if samples are hand delivered to their destination, "Hand Delivered" should appear in this field).
- SHIPPED TO: This is the laboratory name and full address, including the laboratory contact. If the contact is not known, use "Sample Custodian."
- CHAIN OF CUSTODY RECORD fields: The sampler's signature must appear in the "Sampler Signature" and the "Relinquished By" fields. The date and time (military time) must also be included. If additional personnel were involved in sampling, their signatures should appear in the "Additional Sampler Signature(s)" field.

- Although the samples are "relinquished" to the shipping carrier, the shipping carrier does not have access to the samples as long as the shipping cooler is custody sealed. Consequently, the shipping carrier does not sign the chain-of-custody form.
- SAMPLE(S) TO BE USED FOR LABORATORY QC: This identifies which samples are to be used for matrix spike/matrix spike duplicate (MS/MSD) analyses.
- Indicate if shipment for case is complete: Use "Y" or "N."
- CHAIN-OF-CUSTODY SEAL NUMBER: Record the custody seal numbers that appear on the USEPA Region 5 custody seals that can be found on the shipping container. There are usually a minimum of two per shipping container.

Sample Tags

Each sample container will be identified with a uniquely numbered sample tag issued by USEPA Region 5. Each tag will contain the following information:

- Case/SAS number
- The unique sample number for sample tracking
- CH2M HILL station location (i.e., the sample identifier)
- Date of sampling
- Time the sample was collected (in military time)
- All parameters for which the sample will be analyzed
- Preservative used (if any)
- Sample type (grab or composite)
- Sample concentration (low, medium, high)
- Sample matrix (e.g., sediment)
- The signature of sample team leader
- Identification when sample is intended to be used by the lab for MS/MSD

Attachments

- Attachment 1: FORMS II Lite Quick Reference Guide
- Attachment 2: Example Chain-of-custody Form, Sample Tag, Custody Seal

Key Checks and Items

- All sample containers must be properly tagged.
- Each cooler must have a chain-of-custody form and the samples in the cooler (as identified by the sample tags) must match what is on the chain-of-custody form.
- Each chain-of-custody form must be properly relinquished (signature, date, time).
- The custody seal numbers must be written on each chain-of-custody form.
- The shipping cooler must be custody sealed in at least two places.

FOP-07, Attachment 1
FORMS II Lite Quick Reference Guide

Getting Started

a) Click on the **Start** button on the Windows Desktop and select **Programs**. Select **FORMS II Lite** and click on the FORMS II Lite item. The FORMS II Lite application will begin.

b) Click **File** on the Main Menu bar. Click on the **New Site** item. The first data entry screen will appear.

Step 1 - Enter Site Information

a) Enter all relevant information necessary for chain-of-custody paperwork (in accordance with regional guidance). For CLP and CRL Traffic Reports (TRs), this includes the following:

- Site Name
- State
- EPA Region Number
- CLP or CRL Case Number
- Lead Sampler

b) Click the **Next** button to proceed to Step 2.

Step 2 - Select Sampling Team

a) Select sampling team members from the **Unassigned Team Members** window by clicking on each name.

b) Click the ">" button. The selected name will move to the **Selected Team** window. Repeat until all team members for this sampling event are selected.

c) Click the **Add/Edit Team Members** button to add any remaining sampling team member names that do not appear in the **Unassigned Team Members** window.

d) Enter the first and last name of each sampler. If you would like to add the sampler to the permanent list, click the **Add to Permanent List** box. After you have entered the samplers' names, click the **OK** button. These samplers will appear in the **Selected Team Members** window on the Select Sampling Team screen.

e) Click the **Next** button to proceed to Step 3.

Step 3 - Select Analysis

a) Select an analysis from the **Available Analyses** window by clicking on the analysis.

b) Click the ">" button. The selected analysis will move to the **Selected Analyses** window. Repeat until all analyses to be performed on samples collected for this sampling event are selected.

c) To edit Turnaround Time, click the **Edit Turnaround Days** button. The **Edit Project and Turnaround** screen will appear.

d) Click on the **Turnaround Time** drop-down menu to select the number of days or type in a value. Click **Close** to close the screen.

e) Click the **Next** button to proceed to Step 4.

Step 4 – Enter Station

a) Enter all relevant information necessary for chain-of-custody paperwork (in accordance with regional guidance). For CLP or CRL TRs, this includes the following:

- Station Name and Location
- Sample Matrix
- Sample Date/Time
- Sample Type
- Sampler Name

b) The Sample Date/Time field is strictly military time. You may click on the System Date/Time checkbox to populate the current system date/time value into the sample date/time.

c) Click the **Add Station** button to enter the name of a new station and continue with the station locations. To enter a new station location associated with a previously entered station, click on the station name, then click the **Add Location** button, and enter the name of the new station location.

d) Click the **Next** button to proceed to Step 5.

Step 5 – Assign Bottles and Samples

a) Select the Station Location from the **Station/Location** window.

b) Select the analyses associated with the containers from the **Analysis** window. If more than one analysis is associated with a container, select the additional analysis(es) by holding down the control key, and clicking on the additional analysis(es).

c) Enter the number of bottles that will be assigned a specific analysis or set of analyses.

d) Enter the sample tag prefix and starting tag number. Click **Auto Increment Tag Number** if you wish to assign sequential tag numbers for your sampling event. Sample numbers are automatically and sequentially assigned for your sampling event and are unique per Station Location.

e) By default, CLP and CRL sample numbers are automatically used for CLP and CRL analyses, respectively. Note that FORMS II Lite generates CLP and CRL sample numbers using a BASE 32 system, which differs from the SMO-generated CLP and CRL sample numbers.

f) Edit the sample number and other pertinent information for these samples in the space provided. After you have confirmed your entries, click the down arrow.

g) Repeat Steps 5b through 5f until all desired analyses have been assigned to bottles.

h) Click the **Next** button to proceed to Step 6.

Generate Labels

a) Click the **Generate Labels** button in Step 5. The application automatically displays samples for the current Station Location. These are the samples for which labels will be generated. Click the appropriate checkbox at the bottom of the screen to select all samples for the station or site. Enter the number of labels to print next to each record if more than one is required.

b) Click the **Generate Labels** button and select the appropriate label template to view, then click **OK.** Edit an existing template by clicking the **Edit Label** button. If a new label template needs to be added, click the **Add New Label** button and follow the wizard to create a new template. Enter the number of blank labels to control printing on a label other than the first one on the page.

c) View the labels at the end of the edit label or new label process. If labels are not acceptable, close the view and edit the label template. If the labels are acceptable, print the labels.

d) Select **File** and then **Print** from the Main Menu bar. Select the desired number of copies to be printed and click the **OK** button to print the labels. Click **Close** to return to Step 5.

Step 6 - Select Samples and Assign Lab

a) Select a laboratory from the **Lab Code** drop-down menu. If the laboratory where samples will be shipped does not appear in the list, click the **Add Lab** button and add the lab information.

b) Select samples from the **Unassigned Samples** window by holding down the [Ctrl] key and clicking on each sample that will be shipped to this laboratory. After you have selected all the samples for the laboratory, click the down arrow.

c) Repeat Steps 6a and 6b until all samples have been assigned to laboratories.

d) Click the **Next** button to proceed to Step 7.

Step 7 - Select Labs and Assign Shipping

a) Enter the carrier, date of shipment, and airbill number.

b) Select samples from the **Unassigned** window by holding down the [Ctrl] key and clicking on each sample that will be shipped using this airbill. After the samples to be shipped are selected, click the down arrow.

c) Repeat Steps 7a and 7b until all samples have been assigned airbill numbers.

d) Click the **Finish** button for system generated TRs. FORMS II Lite will then display a screen that will allow the TRs for the site to be viewed and printed.

e) Click **Next** and proceed to Step 8 to customize TRs for specific sets of samples.

Step 8 - Customize Traffic Report

a) Confirm the last four digits of the TR number. (The first two digits represent the Region number, the next nine digits are a random number, the next six digits are the date the TR

was created, and the last four digits are automatically incremented by the system but may be edited by the user.)

b) Select a shipment from the **Shipping** window. Select the samples from the **Samples** window that will be assigned to this TR. After the samples are selected, click the down arrow. (NOTE: samples must be of the same program type and must have the same project code to be assigned to a single TR.)

c) Repeat steps 8a and 8b until all samples have been assigned.

d) Click the **Finish** button. FORMS II Lite will display a screen that will allow the TRs to be viewed, printed, archived, and exported. Follow the directions to print the TRs.

Quick Edit

a) On the **View/Print TR** screen displayed after completion of Step 8, click the **Quick Edit** button.

b) The user may edit most data fields, except those in red, prior to printing a TR, and sort and filter any column and print a report.

Helpful Hints to Use FORMS II Lite 4.0

This Quick Reference Guide is designed to help FORMS II Lite users enter information for their sampling events and generate bottle labels and chain-of-custody paperwork. FORMS II Lite provides users the flexibility to enter most of their information ahead of the sampling event.

FORMS II Lite allows users to perform the following:

- Add values that are not included in the "list and pick" menus: Select **Admin** from the Main Menu bar, enter the password to log in. **Admin** now shows the user as being **(logged in)**. Select **Reference Tables**, and choose the table that requires editing.
- Customize screens and disable non-key fields: While logged into **Admin** on the Main Menu Bar, select **Custom Features** and click on **Field Name**s. Field names and non-key fields can be renamed or hidden on the screen.
- Review the data entered throughout the data entry process by clicking on the **Quick View** button in Steps 4 through 8.
- Select multiple items by highlighting the first item, then hold down the [Ctrl] key and click on the additional items. Or simply click and drag to highlight multiple items.
- Sort data displayed in windows by clicking on the column label. Click on a second column label for a secondary sort.
- Specify more than one sampler's name for samples collected at a specific station location.
- In Step 4, select a sampler's name, then click within the data entry field after the name. Type a comma and type in the second name.
- Export Site information as either a text or (.dbf) file.

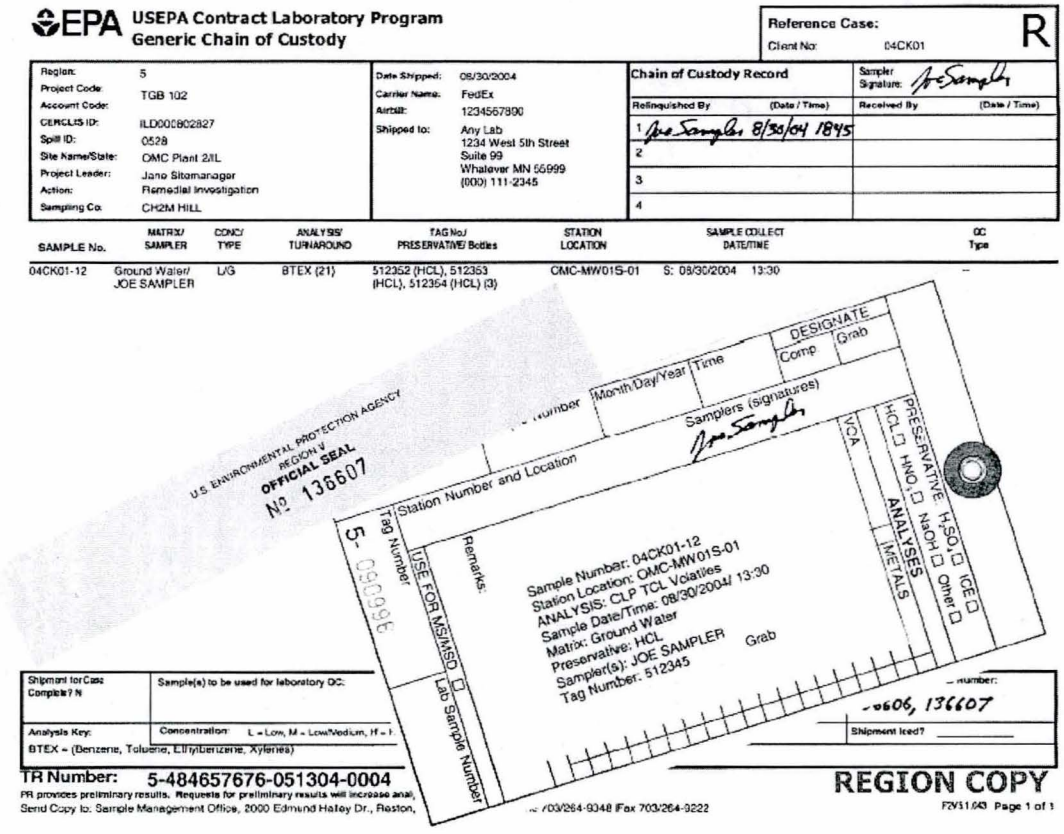
- **Note:** FORMS II Lite will not allow information that has been typed over to be saved as a separate file. Once a value in a field has been replaced (edited) with a new value, the original value is lost.

User Preferences

The following features are maintained in **User Preferences** under **Admin** on the Main Menu bar and can be turned on or off:

- Select **Copy Station** to make the button available in Step 4 to duplicate the current station and its station location information. **Copy Location** duplicates station locations.
- Select the option **Use Default Number of Bottle**s, set in the Analysis Reference Tables, to populate the number of containers for each analysis in Step 5.
- Select **Assign All** to make the button available in Step 5 to assign each of the analyses to a separate container. Set the number of containers for each analysis in the bottles field or define through User Preferences.
- Select **One-Step Printing** to make this button available in Step 5 to print labels or tags with a single click. Label template and number of copies are defined in User Preferences.

FOP-07, Attachment 2
Chain-of-custody Form, Sample Tag, Custody Seal



EPA USEPA Contract Laboratory Program
Generic Chain of Custody

Reference Case: R
Client No: 04CK01

Region:	5	Date Shipped:	08/30/2004	Chain of Custody Record	Sampler Signature: Joe Sampler
Project Code:	TGB 102	Carrier Name:	FedEx	Relinquished By (Date / Time)	Received By (Date / Time)
Account Code:		Airbill:	1234567890	1 Joe Sampler 8/30/04 1845	
CERCLIS ID:	ILD000802827	Shipped to:	Any Lab 1234 West 5th Street Suite 99 Whatever MN 55999 (000) 111-2345	2	
Spill ID:	0528			3	
Site Name/State:	OMC Plant 2/IL			4	
Project Leader:	Jane Sitemanager				
Action:	Remedial Investigation				
Sampling Co:	CH2M HILL				

SAMPLE No.	MATRIX/ SAMPLER	CONC/ TYPE	ANALYSIS/ TURNAROUND	TAG No./ PRESERVATIVE/ Bottles	STATION LOCATION	SAMPLE COLLECT DATE/TIME	QC Type
04CK01-12	Ground Water/ JOE SAMPLER	L/G	BTEX (21)	512352 (HCL), 512353 (HCL), 512354 (HCL) (3)	OMC-MW01S-01	S: 08/30/2004 13:30	-

U.S. ENVIRONMENTAL PROTECTION AGENCY REGION V
OFFICIAL SEAL
No 136607

DESIGNATE Comp Grab
Month/Day/Year Time
Samplers (signatures) Joe Sampler
Station Number and Location
PRESERVATIVE HCL HNO3 NaOH H2SO4 ICE Other
VOA
ANALYSES METALS
Tag Number 5- 090998
USE FOR MS/MSD
Remarks:
Sample Number: 04CK01-12
Station Location: OMC-MW01S-01
ANALYSIS: CLP TCL Volatiles
Sample Date/Time: 08/30/2004/ 13:30
Matrix: Ground Water
Preservative: HCL
Sampler(s): JOE SAMPLER Grab
Tag Number: 512345
Lab Sample Number

Shipment for Case Complete? N	Sample(s) to be used for laboratory QC:
Analysis Key:	Concentration: L = Low, M = Low/Medium, H = H
BTEX = (Benzene, Toluene, Ethylbenzene, Xylenes)	

Shipment Iced? _____

TR Number: 5-484657676-051304-0004
PR provides preliminary results. Requests for preliminary results will increase anal
Send Copy to: Sample Management Office, 2000 Edmond Halley Dr., Reston, ... 703/264-9348 /Fax 703/264-9222

REGION COPY
FZV31.043 Page 1 of 1

FOP-08

Decontamination of Drilling Rigs and Equipment

Purpose and Scope

The purpose of this guideline is to provide methods for the decontamination of drilling rigs and drilling tools. Personnel decontamination procedures are not addressed in this FOP. For a detailed list of personnel decontamination procedures, please refer to the Health and Safety Plan and FOP-04, Field Equipment Cleaning and Decontamination Procedures. Sample bottles will not be field-decontaminated; instead, they will be purchased with certification of laboratory sterilization.

Equipment and Materials

- Portable steam cleaner and related equipment
- Potable water
- Phosphate-free detergent such as Alconox® or Liquinox®
- Buckets
- Brushes
- Distilled water
- 10 percent methanol solution
- Methanol
- ASTM–Type II Reagent-Grade Water
- Aluminum foil

Procedures and Guidelines

Drilling Rigs

Before the onset of drilling, after each core location, and before leaving the site, heavy equipment and machinery will be decontaminated using a phosphate-free detergent solution and high pressure hot water at a designated area. The equipment will then be rinsed with potable water. The steam cleaning area will be designed to contain decontamination wastes and wastewater, and can be a high-density polyethylene (HDPE)-lined, bermed pad. A pumping system will be used to convey decontamination water from the pad to the drums.

Surface casings may be steam-cleaned in the field if they are exposed to contamination at the site before use.

Drilling Tools

At the following times, drilling tools will be decontaminated as described above: (1) before the onset of drilling, and (2) between core locations. Decontamination will include, but is not

limited to, rods, split spoons or similar samplers, coring equipment, auger bolts, augers, and casing.

Before the use of a sampling device such as a split-spoon sampler to collect sediment samples for physical characterization or chemical analysis, the sampler will be cleaned by scrubbing with a potable water and phosphate-free detergent solution, rinsing with potable water, and then rinsing with distilled water. If equipment has come in contact with oil or grease, rinse the equipment with methanol, and then distilled water.

Attachments

None.

Key Checks and Preventive Maintenance

The effectiveness of field cleaning procedures will be monitored by rinsing decontaminated equipment with distilled water and then submitting the rinse water in standard sample containers for analysis as equipment blanks. Each time a sampling event occurs, at least one such QC sample will be collected, as specified in the QAPP. At least one piece of field equipment will be selected for this procedure each time the equipment is washed. An attempt should be made to select different pieces of equipment for this procedure.

Appendix B
Field Forms

CH2MHILL

SEDIMENT CORE LOG

SHEET OF

STATION ID:

PROJECT : Lower River and Inner Harbor - Sheboygan River

PROJECT NUMBER : 406504.FI.01

CONTRACTOR :

EQUIPMENT :

LOGGER :

DATE : START : END :

TOP OF ICE/BARGE TO SED SURF (FT) :

TOP OF BARGE TO WATER (FT) :

WATER DEPTH (FT) :

TOP OF BARGE/ICE TO REFUSAL (FT) :

SED THICKNESS TO REFUSAL (FT) :

SURFACE ELEVATION (Water, Ice, Soil) :

DEPTH BELOW SURFACE (FT)	PENETRATION (FT)	RECOVERY (FT)	#/TYPE	SEDIMENT DESCRIPTION	COMMENTS
				SEDIMENT TEXTURE, COLOR, RELATIVE DENSITY OR CONSISTENCY, & STRUCTURE	SAMPLE ID, QA/QC, ETC

NOTES :

STAFF GAUGE No :

STAFF GAUGE ELEV :

STAFF GAUGE READING (FT) :

WATER/ICE/SOIL ELEVATION :

X - COORDINATE :

Y - COORDINATE :