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TECHNICAL MEMORANDUM REGARDING PRESCRIPTIVE REMEDIAITON SAMPLING AND ANALYSIS PLAN FOR SOLID WASTE MANAGEMENT UNIT 17 (SWMU17) PCB CAPACITOR BURIAL/POLE TARD NSA CRANE IN

4/1/2012

TETRA TECH

Technical Memorandum

Prescriptive Remediation Sampling and Analysis for SWMU 17 - PCB Capacitor Burial/Pole Yard

Naval Support Activity Crane, Indiana

Naval Facilities Engineering Command Midwest
Contract Number N62472-03-D-0057
Contract Task Order F271

April 2012

TECHNICAL MEMORANDUM, FINAL

DATE: April 12, 2012

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Project File – 112G01573, CTO F271

SUBJECT: NSA Crane –Sampling and Analysis to support Prescriptive Remediation for SWMU 17

1.0 BACKGROUND

The polychlorinated biphenyl (PCB) capacitor Burial/Pole Yard [Solid Waste Management Unit (SWMU) 17] has been in use since before 1966. Historically, the site has been used for the following:

- Storage of capacitors, some of which contained PCBs.
- Storage of transformers, some of which contained PCBs.
- Reported burial of capacitors, some of which may have contained PCBs.
- Storage of creosote-impregnated utility poles, some of which may contain PCBs - possibly as a result of burst transformers.

Pure PCBs have never been found in transformers or capacitors at Naval Support Activity (NSA) Crane. The greatest observed concentrations of PCBs have been in the range of 10,000 milligrams per kilogram (mg/kg). Therefore, any releases of capacitor or transformer oil at SWMU 17 would be expected to exhibit concentrations less than 10,000 mg/kg. It is reported that capacitors were buried at SWMU 17 in the early to mid 1970s. However, it is not known whether any capacitors were buried prior to the early 1970s or after mid-1970 or whether other wastes have also been buried at SWMU 17.

Though there are exceptions, within and along drainage channels, the general pattern of contamination is that PCB concentrations are greatest near the surface and decrease with depth, and PCB concentrations

are greatest near the drainage channels and decrease with distance from the channels. This pattern of contamination is consistent with PCBs washing downstream and occasionally being distributed throughout the floodplains during high flow events. Because PCBs preferentially bind to soil and sediment, the PCBs in these environmental media are expected not to migrate deeper into soil or sediment as dissolved species.

This technical memorandum, which describes additional sampling to support removal of PCB contaminated sediment and soil without confirmation sampling to demonstrate satisfactory removal, comprises the memorandum text, Tables 1 and 2, Figures 1 through 11, and Appendices A through D.

2.0 PROJECT DESCRIPTION

Figures 1 and 2 show the area around Building 357 (labeled "0357" on the figures), which constitutes SWMU 17, with an emphasis on the drainage ways that have evidently received overland flow and possibly discharges containing PCBs from SWMU 17 and Building 2721. If a drainage way did not already have a name, over the course of investigations described in this memorandum all or portions of the drainage way was assigned a name such as "Ditch 3, Segment 2". The SWMU 17 drainage way segments are identified on Figures 1 and 4 through 10. Conditions of soil and sediment associated with the drainage ways and other areas of SWMU 17 that are shown on some of these figures are described later.

RFI Work Plan: A Quality Assurance Project Plan (QAPP) [Tetra Tech NUS, Inc. (Tetra Tech), 2001] was prepared for a Phase III Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) at SWMU 17 to provide data regarding PCB contamination in surface and subsurface soil at the PCB Capacitor Burial/Pole Yard. Following approval of the QAPP, Tetra Tech began site activities in March 2002.

2004 Interim Measures: Figure 10 identifies the approximate locations of five areas that were excavated by Toltest, Inc. as an Interim Measure in 2004 (Toltest, 2004). Soil in these areas contained PCB contamination greater than 25 mg/kg prior to excavation. After excavation, surface soil [0 to 2 feet (ft) below ground surface (bgs)] PCB concentrations were generally less than 1 mg/kg, but several locations with PCB concentrations greater than 25 mg/kg remained in the subsurface. Figure 10 shows the level of PCB contamination remaining after excavation.

QAPP Addendum No. 1: In June 2005, the Navy prepared an Addendum to the 2001 QAPP (Tetra Tech, 2005) to address data gaps regarding PCB contamination in surface soil, subsurface soil, perched groundwater, surface water, and sediment at SWMU 17. The QAPP Addendum was implemented but additional sampling was needed to delineate PCB contamination.

QAPP Addendum No. 2: The Navy prepared a QAPP Addendum No. 2 (Tetra Tech, 2006a) to establish the full extent of PCB contamination specifically in several ditches leading into Boggs Creek, Boggs Creek headwaters, Boggs Creek plunge pool, and upper portion of Boggs Creek itself.

QAPP Addendum No. 3: Because PCB contamination was found within the headwaters of Boggs Creek, the Navy prepared a QAPP Addendum No. 3 (Tetra Tech, 2006b) to gather data that would allow the RFI report to be completed, including the delineation of the nature and extent of PCB contamination, primarily in the area around Building 2721 and the tributary flowing west from Building 2721 to Boggs Creek. The delineation of PCB contamination was improved, but not completed. An additional small area of contamination was identified during the RFI as having surface soil contamination of 73 mg/kg total Aroclor 1260 (Tetra Tech, 2007). This sampling location, which appears to represent a relatively small area of contamination, is shown on Figure 9 to be approximately 10 ft. west of the southwest corner of Building 2721.

2006 Interim Measures Work Plan (IMWP): The Navy developed an IMWP for the remediation of PCB contamination in the ditches and Boggs Creek headwaters. This IMWP was focused on removing PCB contamination in drainage ditches and Boggs Creek headwaters. The Media Cleanup Standard (MCS) of 1 mg/kg was used as the basis for developing a hot-spot based strategy for removal of PCB-contaminated soils and sediments. During review of this plan, the United States Fish and Wildlife Service (USFWS) expressed concerns regarding whether historical releases of PCBs had migrated down Boggs Creek to Lake Gallimore, resulting in excessive PCB concentrations in fish that are consumed by bald eagles. The Navy agreed to undertake a study of PCB concentrations in Boggs Creek sediments and the USFWS agreed to conduct a study of PCB concentration in fish from Lake Gallimore.

QAPP Addendum No. 4: In August 2008, the Navy prepared a QAPP Addendum No. 4 (Tetra Tech, 2008) to further delineate the extent of PCB contamination in the surface water and sediment associated with Boggs Creek to its termination into Lake Gallimore. Results from this sampling event demonstrated that PCBs, which may have migrated into Boggs Creek headwaters are not present in downstream Boggs Creek surface waters or sediments. These results are documented in the Field Investigation Report for SWMU 17 – Boggs Creek (Tetra Tech, 2010).

Results of the USFWS Lake Gallimore fish study were documented in an Analytical Results Report dated July 22, 2008. The fillet sample had a PCB concentration of 0.0519 PPM wet weight and the carcass sample contained a PCB concentration of 0.430 ppm wet weight. The transmittal e-mail dated August 13, 2008 (Appendix A) from Dan Sparks to Tom Brent stated the following: *"Although the whole fish tissue concentrations at this level are not ideal and it does show some downstream migration from the PCB*

sources, I think that it clearly shows that emphasizing the cleanup efforts in the upstream areas is most appropriate. The fillet samples are at the threshold of level 1 / level 2 fish consumption advisory so that too is good news."

May 2010 IMWP Status Presentation: A visual presentation was prepared to update and document the status of the IMWP to incorporate the additional data collected by the Navy and USFWS since the 2006 submittal of the IMWP. Removal actions were based on a net environmental benefit analysis (NEBA) to minimize disturbance of the ecological habitat while maximizing the mass of PCB removal. Removal actions were recommended for 411 cubic yards of sediment from the northwestern ditch, Boggs Creek Stream Segment 1, Ditch 3 Stream Segment 2, and Ditch 3, Segment 6. These SWMU 17 drainage way segments are indicated on Figures 1 through 10.

January 2011 Technical Memorandum: A Technical Memorandum (Tetra Tech, 2011a) was prepared in January 2011 to provide recommendations for additional sampling and analyses in accordance with QAPP Addendum No. 4 (Tetra Tech, 2008). The objective was to delineate the extent of sediment contamination in Ditch 3, Segment 6 and the horizontal extent of sediment contamination in the floodplain of the stream sections scheduled for excavation to obtain sufficient data to prepare the IMWP in support of removal actions. In January 2011, the field work described in the January 2011 Technical Memorandum was conducted. During March 2011 a meeting was held among U. S. Environmental Protection Agency (EPA) Region 5, the Navy and Tetra Tech regarding the general approach toward removal strategies at NSA Crane. EPA agreed to consider "prescriptive" removal approaches. In this type of approach delineation sampling is used to finely define the vertical and horizontal extent of contamination. Removal actions are conducted to pre-defined extents as determined by the delineation sampling.

A letter report was written to document the results of the January 2011 sampling event (Tetra Tech, 2011b). The results of the January 2011 sampling and analysis revealed that some portions of creek segments downstream of SMWU 17 were not delineated sufficiently with respect to PCB contamination to support a prescriptive remediation and evaluation of excavation costs.

The results of the previous investigations indicate a need to continue the delineation of PCB contamination to support an estimation of excavation costs and prescriptive remediation. No more PCB contamination delineation is needed within the ditches because it is assumed that the PCB contamination will be removed as part of a scheduled remediation.

This Technical Memorandum identifies additional intrusive activities that are designed to complete the delineation of PCBs at SMWU 17. The targeted sampling areas are the flood plains alongside

contaminated (greater than 1 mg/kg PCB) segments of the drainage network, the contaminated soil area north of Building 357, the small area of contamination near the southwest corner of Building 2721, and the Dump Area west and northwest of Building 357. Test pit excavation is also planned for the Dump Area (see Figures 10 and 11) with a goal of delineating the extent of debris in that area.

A meeting was held with EPA on March 28 and 29, 2012 to discuss sampling locations identified in the draft version of this technical memorandum. Sampling locations and the contamination delineation strategy were discussed. Notes from that meeting are attached as Appendix C. Changes made between the draft and final version of this memorandum reflect the agreements documented in Appendix C.

3.0 SAMPLING AND ANALYSIS PROGRAM

Additional data need to be collected to supplement existing data to more precisely delineate the horizontal and vertical extent of contamination in the ditch and flood plains associated with storm water runoff from Building 2721 and Building 357, and soil PCB concentrations north of Building 357 and southwest of Building 2721. Test pitting and sampling are also needed in the Dump Area to determine the nature and extent of buried materials. If field observations, such as the presence of oils or PCB-containing equipment, indicate the potential for PCB contamination to exist in the Dump Area soils, the extent of PCB contaminated soil in that area must be investigated. These activities will be conducted in accordance with QAPP Addendum 4. However, where the procedures listed in this Technical Memorandum differ from, or are not provided in QAPP Addendum 4, the procedures provided below supersede QAPP Addendum 4.

All samples will be submitted to Southern University/GEL laboratory for PCB analysis as Aroclors. Detection limits will be approximately 0.02 mg/kg per Aroclor. Holding times are indefinite as long as the samples are stored under refrigeration (< 6 ºC) and in the dark. Contact information for the laboratory is:

Heather Shaffer
GEL Laboratories, LLC
2040 Savage Road
Charleston, SC 29407
Email: heather.shaffer@gel.com
Phone: (843) 769-7376 extension 4505 (or dial the main line and ask for extension 4505).
Team email in case of absence: team.shaffer@gel.com

Soil (and if collected, sediment samples) will be stored at a temperature less than 6 degrees Celsius in the dark. There is an indefinite holding time for these samples if stored according to these specifications.

Samples will be collected in the Dump Area (see Figures 10 and 11), near the PCB contaminated location southwest of Building 2721 (see Figure 9), and along at least four different segments of the drainage network: Boggs Creek Segment 1 (see Figure 4), Northwest Ditch and Ditch 3 Segment 2 (see Figure 5), and Ditch 3, Segment 6 (see Figures 9 and 10). In addition, samples may be collected in segments of Ditch 3 that have not been identified for sample collection on the existing figures. These as yet to be determined locations will be identified at the start of the field effort and will be documented on a Field Task Modification Request (FTMR). This documentation (see Appendix D) will identify the proposed sampling locations, sampling depths, and rationale for sampling. The following text provides details regarding the proposed additional sampling.

The overall goal of implementing this Technical Memorandum is to delineate PCB contamination in soil to a concentration of 1 mg/kg so the estimated volume of soil that must be removed to attain a 1 mg/kg cleanup goal is minimized. The 1 mg/kg target represents the lowest cleanup level that is likely to be applied to SWMU 17 soil. It is understood that a cost-benefit analysis conducted after data collection could show that cleaning up to 1 mg/kg throughout all PCB-contaminated areas would be cost-prohibitive or environmentally counterproductive. In that case, NSA Crane will coordinate cleanup efforts with US EPA to ensure that the planned remediation is sufficiently protective of human health and the environment. A supporting goal is to provide enough delineation data to mark all areas of soil that exceed 50 mg/kg so that they can be properly disposed in accordance with the Toxic Substances Control Act.

When selecting sampling locations, consideration was given to the effect of topography and stream flow on potential transport of PCB contamination in the form of overland flow and drainage channel overflow. The 0 to 2-ft surface soil interval was subdivided into 6-inch subintervals to aid in vertical delineation of PCB contamination. In general, wherever PCB contamination in soil has been demonstrated to exceed 1 mg/kg, additional sampling locations were added in a direction away from the known area of contamination and toward locations that are likely to be less contaminated. This strategy was applied to vertical as well as horizontal directions. If existing contamination levels were unknown at a particular depth or lateral position, knowledge of soil PCB migration potential was used to identify locations and depths that would bound the PCB contamination greater than 1 mg/kg in all directions. PCB migration deeper than 3 ft. bgs in flood plains was generally considered to be unlikely, but additional sampling to a maximum of bedrock depth is planned to verify this expectation. Table 1 lists the planned sampling locations, corresponding sample IDs, and sample location coordinates for the new samples. Table 2 lists sample location coordinates for previously sampled locations, some of which are scheduled for additional sampling in this investigation.

At the beginning of the field effort, representatives of EPA Region 5, NAVFAC Midwest, NSA Crane and support contractors will walk the streams and ditches to identify additional locations where sampling would more definitively bound PCB contamination in flood plain soils to a concentration of 1 mg/kg. These locations will be added to the existing schedule of samples. The scheduled soil samples will be collected via direct-push technology (DPT) (primarily near the buildings and readily accessible flood plains) or with hand auger or a scoop and trowel (primarily in the ditches and flood plain areas) at the discretion of the Field Operations Leader (FOL). The FOL will select the sampling method for each location and sample based on field conditions. Standard operating procedures (SOPs) 01 through 11 governing sample labeling, nomenclature, collection using DPT and hand augering, custody, packaging, shipping, compositing, equipment decontamination, investigation derived waste (IDW) management, and global positioning system (GPS) coordinate measurement, are provided in Attachment A. The intent will be to collect representative samples as efficiently as permitted by the field conditions at scheduled sampling locations/depths. Field conditions, however, may require relocation of a particular scheduled sampling point. When relocating a sampling position, the FOL must consider the local topography and, when sampling near creeks, the potential for creek overflows to transport PCB contamination to elevations above the flood plain. The FOL will strive to place sampling locations as close to the scheduled location as practicable and where the new locations are likely to minimize the delineated volume of soil with PCB concentrations greater than 1 mg/kg. Allowance will be made for contamination to exist in unexpected locations. PCB contamination levels in soil and sediment from previous sampling efforts are shown on Figures 4 through 10 and may be useful in making these decisions.

- **Boggs Creek, Ditch 3, Segment 1 (see Figure 4)**

  Sixty-eight discrete surface soil samples will be collected at depths of 0 to 6, 6 to 12, 12 to 18, and 18 to 24 inches bgs, depending on location. These samples will be collected in the flood plain surrounding Boggs Creek Segment 1. Forty-one discrete subsurface soil samples will be collected from the same area, again the depth depending on location. Some locations are scheduled for sampling all the way to bedrock. At those locations some sampling intervals are marked in segments of 6 inches and the deeper intervals are marked in segments of 1-ft (12 inches). Seven of the sampling locations coincide with previously sampled locations.

  Figure 4 shows all planned sampling locations and depths, as well as results from previous sampling events. Table 1 lists planned samples.

  Additional samples may be added at the start of the field effort. It is assumed that as many as 6 additional locations will be added with 6 samples collected at each location for a total of 36 samples. It assumed that 6 of these samples will be surface samples and 30 will be subsurface samples.

An FTMR (see Appendix D) will be prepared at the start of field work to document the agreed upon sampling locations and depths, as well as results from previous sampling events. Table 1 will be updated to list planned samples and a hand marked figure will document these planned sampling locations.

- **Ditch 3, Segment 2 (see Figure 45**

  Seventy-nine discrete surface soil samples will be collected at depths of 0 to 6, 6 to 12, 12 to 18, and 18 to 24 inches bgs, depending on location. These samples will be collected within the estimated flood plain area that surrounds Ditch 3 Segment 2.

  Thirty-three discrete subsurface soil samples will be collected at various depths with some depths extending to bedrock. The shallower depths at the bedrock locations will be collected in 6-inch intervals and the deeper depths will be collected in 12-inch (1-ft) intervals. Six of the sample locations coincide with previously sampled locations.

  Figure 5 shows all planned sampling locations and depths, as well as results from previous sampling events. Table 1 lists planned samples.

  Additional samples may be added at the start of the field effort. It is assumed that as many as 8 additional locations will be added with 6 samples collected at each location for a total of 48 samples. It assumed that 8 of these samples will be surface samples and 40 will be subsurface samples.

  An FTMR (see Appendix D) will be prepared at the start of field work to document the agreed upon sampling locations and depths, as well as results from previous sampling events. Table 1 will be updated to list planned samples and a hand marked figure will document these planned sampling locations.

- **Ditch 3, Segment 3 (see Figure 6)**

  No surface soil samples are scheduled to be collected, however, at the start of the field effort sampling locations may be added. It is assumed that as many as 4 sampling locations will be added with 6 samples collected at each location for a total of 24 samples at depths of 0 to 6, 6 to 12, 12 to 18, 18 to 24, 24 to 30, and 30 to 36 inches bgs. It is assumed that one additional 1-ft soil sample interval will be collected between 36 inches bgs and bedrock depth. These samples will be collected within the estimated flood plain area that surrounds Ditch 3 Segment 3.

Note: The overall intention is to collect samples deeper than 36 inches bgs in 1-ft segments until bedrock is encountered at one or more locations. This strategy could result in collecting more than a single soil sample deeper than 36 inches bgs being collected.

An FTMR (see Appendix D) will be prepared at the start of field work to document the agreed upon sampling locations and depths, as well as results from previous sampling events. Table 1 will be updated to list planned samples and a hand marked figure will document these planned sampling locations.

- **Ditch 3, Segment 4 (see Figure 7)**

  No surface soil samples are scheduled to be collected, however, at the start of the field effort sampling locations may be added. It is assumed that as many as 3 sampling locations will be added with 6 samples collected at each location for a total of 18 samples at depths of 0 to 6, 6 to 12, 12 to 18, 18 to 24, 24 to 30, and 30 to 36 inches bgs. It is assumed that one additional 1-ft soil sample interval will be collected between 36 inches bgs and bedrock depth. These samples will be collected within the estimated flood plain area that surrounds Ditch 3 Segment 4.

  Note: The overall intention is to collect samples deeper than 36 inches bgs in 1-ft segments until bedrock is encountered at one or more locations. This strategy could result in collecting more than a single soil sample deeper than 36 inches bgs being collected.

  An FTMR (see Appendix D) will be prepared at the start of field work to document the agreed upon sampling locations and depths, as well as results from previous sampling events. Table 1 will be updated to list planned samples and a hand marked figure will document these planned sampling locations.

- **Ditch 3, Segment 5 (see Figure 8)**

  No surface soil samples are scheduled to be collected, however, at the start of the field effort sampling locations may be added. It is assumed that as many as 4 sampling locations will be added with 6 samples collected at each location for **a total of 24 samples** at depths of 0 to 6, 6 to 12, 12 to 18, 18 to 24, 24 to 30, and 30 to 36 inches bgs. It is assumed that one additional 1-ft soil sample interval will be collected between 30 inches bgs and bedrock depth. These samples will be collected within the estimated flood plain area that surrounds Ditch 3 Segment 5.

  Note: The overall intention is to collect samples deeper than 36 inches bgs in 1-ft segments until bedrock is encountered at one or more locations. This strategy could result in collecting more than a single soil sample deeper than 36 inches bgs being collected.

An FTMR (see Appendix D) will be prepared at the start of field work to document the agreed upon sampling locations and depths, as well as results from previous sampling events. Table 1 will be updated to list planned samples and a hand marked figure will document these planned sampling locations.

- **Previous Excavation Areas near Building 357 (see Figure 10)**

  The Tetra Tech FOL must contact the NSA Crane Environmental Department prior to gaining site access to ensure that telephone poles and other items that have been stockpiled in the intended sampling areas has been moved.

  Two discrete surface soil samples will be collected from northeast of the Interim Measures excavation area northeast of Building 357.

  One hundred and thirty-nine discrete subsurface soil samples will be collected from the Interim Measures excavation areas northwest of Building 357, immediately north of Building 357, northeast of Building 357, and southwest of Building 357. Shallower sampling is not proposed because the excavations were filled with clean soil; therefore, no surface soil sampling is planned in these areas.

  Four additional discrete subsurface soil samples will be collected from the same locations as the two surface soil samples. At each of the surface soil sampling locations soil samples will be collected from the 2-4 ft bgs interval and the 4-6 ft bgs interval.

  Figure 10 shows all planned sample locations and depths, as well as results from previous sampling events. Table 1 lists planned samples.

- **Ditch 3 Segment 6 (see Figure 8)**

  Fifty-nine discrete surface soil samples will be collected at depths of 0 to 6, 6 to 12, 12 to 18, or 18 to 24 inches bgs, depending on location within the floodplain of Ditch 3 Segment 6. Sixteen discrete subsurface soil samples will be collected between 24 and 36 inches bgs in 6-inch intervals, depending on location, and multiple samples will be collected between 24 inches and bedrock at location 17SB75. Table 1 contains placeholders for four samples between 24 inches bgs and bedrock.

  Two of the sample locations coincide with previously sampled locations.

Figure 8 shows all planned sample locations and depths, as well as results from previous sampling events. Table 1 lists planned samples.

Additional samples may be scheduled at the start of the field effort. It is assumed that 6 additional locations will be added with 6 samples collected at each location for a total of 36 samples. It assumed that 6 of these samples will be surface samples and 30 will be subsurface samples.

- **Area Southwest of Building 2721 (see Figure 9)**

  Eight discrete surface soil samples will be collected in the 0 to 2-ft interval southwest of Building 2721. Sampling location 17SS55 is a previously sampled surface soil location and a surface soil sample will not be collected from this location.

  Nine discrete subsurface soil samples will be collected in the 2 to 4-ft bgs interval, and 9 subsurface soil samples will be collected in the 4 to 6-ft bgs interval southwest of Building 2721. The selected sampling locations are based on local topography that indicates flow toward the west from what could be a drain associated with Building 272, although this could not be verified. Adjustments to these seven sampling locations should be made during sampling to delineate contamination. This means that the outermost locations should be selected to be clean (i.e., total PCB concentration less than 1 mg/kg) and the locations closest to the expected flow path should be selected to detect contamination greater than 1 mg/kg.

  Figure 9 shows all planned sample locations and depths, as well as results from previous sampling events. Table 1 lists planned samples.

- **Dump Area Southwest of Building 3072 (see Figure 11)**

  Test pitting will be conducted in the Dump Area southwest of Building 3072. All field crew members must be especially cognizant of the special dangers associated with test pitting and must adhere to SOP-12 for test pitting. Figure 11 shows the planned minimum number and initial nominal locations of test pits. The size and shape of the actual Dump Area is not necessarily the same as the boundary shown on Figure11.

  Access to the test pitting locations west of the fence line and north of the culvert and drainage channel can be achieved by using a metal gate (not marked on Figure 11) located north of the “A” group of test pits. Access to test pitting locations west and south of the culvert and drainage channel can be achieved by using an opening on the southern end of the parking lot associated with building 3072. Because debris has been observed previously near the “C” and “E” groups of test pits, installation of test pits should begin in that area. **The actual locations of test pits will be dictated**

by field conditions that affect the ability to maneuver the excavator around high voltage line poles and guy wires. The fence shall not be disturbed. The Tetra Tech FOL must contact the NSA Crane Environmental Department prior to gaining site access to ensure that telephone poles and other items that have been stockpiled in the intended excavation areas have been moved.

The intent of this effort will be to determine the nature and delineate the extent of debris associated with the Dump Area. As test pitting progresses, the FOL will direct the test pitting to extend in all directions required to establish the outer limit of Dump Area debris. The FOL will also direct the test pitting effort to obtain a thorough understanding of the type and spatial distribution of debris within the Dump Area. An effort should be made to install all nominal test pits shown on Figure 11 with the possible exception of pits labeled "B4" and "D3". Pits "B4" and "D3" are close enough to pits "D1" and "F1," respectively, that installation of pits "B4" and "D3" may be redundant in terms of the information they can provide regarding distribution and extent of debris or contaminated soil in the Dump Area. If the FOL concludes that installing pits "B4" and "D3" would be redundant, the FOL should consider their installation to be unnecessary and refrain from installing them.

Bedrock will not be excavated. As soil is removed from a test pit it will be placed alongside the pit (see SOP-12). Multiple excavator bucketsful of soil from a given 1-ft lift will be piled on top of each other. Each 1-ft lift of soil will be segregated so that the soil can be placed back into the test pit at the approximate depth from which the soil was excavated upon completion of test pitting. Test pitting will continue in the vertical direction in each test pit until the FOL concludes that continued test pitting would not encounter deeper debris. This may occur when the soil/bedrock interface is reached.

Additional test pits may be added, existing test pits may be extended in length or width, and other adjustments may be made at the FOLs discretion to accomplish the goal of spatially delineating buried debris. The actual number, orientation, and size of each test pit will be documented in the field log book.

During test pitting, one vertical composite sample will be generated per test pit to represent the entire slab of soil removed from the pit. Under no circumstances will personnel enter a pit at any time. For a given pit, collect one discrete soil sample from each 1-ft lift of soil removed from the test pit. To achieve this, pile each bucketful of soil from a given 1-ft lift into a single pile, then collect a cross-section of all excavator bucketsful of soil, e.g., by coring or augering vertically through the pile to obtain a well-mixed, representative sample of the pile. Combine approximately half of each sample obtained in this manner to form a vertical composite sample representing all 1-ft depths of soil in the test pit in accordance with SOP-08. If the vertical composite sample representing the pit exhibits

elevated PCB concentrations (based on laboratory analysis), analyze the samples representing individual 1-ft lifts to delineate the vertical PCB distribution. A vertical composite sample PCB concentration greater than 1 mg/kg divided by the number of 1-ft soil lifts removed from the pit is considered to be elevated. SOP-12 describes test pitting operations in detail, including management of test pit spoils, logging of test pit lithology, marking test pit locations, and sampling. Table 1 shows the composite sample numbers and numbers for samples representing each 1-ft lift of soil. Note that because actual excavation depths are unknown some of the depth information included in sample numbers must be generated at the time of sampling.

Composite samples from test pits will be labeled in accordance with SOP-02 and will be collected in accordance with SOP-08. Note that a "C" must be inserted into the sample numbers of composite samples (see SOP-08). Up to 28 test pit samples are planned as listed on Table 1. Placeholders ('00XX" in the sample numbers) have been left for the depths as actual depths will not be known until test pitting is completed. Additional lines have been included in Table 1 to accommodate the potential for analyzing individual residual samples representing each 1-ft lift of soil removed from each pit. These soil samples will remain after the composite samples described above have been prepared. It is assumed that the maximum pit depth will be 10 ft bgs.

If objects that potentially contain or contained PCBs are encountered during test pitting, the FOL will direct additional discrete soil sample to be collected from soil that could have been contaminated with PCBs from the object. These soil samples will be submitted to the fixed-base laboratory (FBL) for total PCB analysis as Aroclors (see Section 4.0). At least one photograph will also be taken of the excavated object to document its appearance with enough detail that the object can be identified by another viewer.

A GPS unit will be used to measure coordinates of all sampling locations and test pits in accordance with SOP-11 (attached to this Technical Memorandum). Sampling depth intervals will be measured in the field with a ruler, tape measure, or suitable substitute as determined by the FOL.

All samples will be field documented in accordance with the procedures described in Appendix B.

4.0 SAMPLE ANALYSES

All soil samples will be submitted to the FBL for total PCB analysis as Aroclors by SW-846 Method 8082A. This method was used for previous analyses, and its use will ensure comparability of data with previous sampling events. Sample collection and preservation requirements are presented in QAPP Addendum No. 4, except that sample holding times are not mandatory as long as the samples are stored

in the dark under refrigeration. The required refrigeration temperature range is 0 to 6 degrees Celsius (°C).

For all soil samples except the samples obtained from test pits, samples will be analyzed by the FBL in groups, as needed. All soil samples from each sampling location will be submitted to the laboratory but the laboratory will first complete analyses of all samples in the first group. These samples are to be analyzed upon receipt at the laboratory. Each of these "Analyze Upon Receipt" samples is identified with a "1" in the "Analysis Sequence" column of Table 1. Samples not analyzed in the first group will be stored at the laboratory under chain of custody (COC). The data from the "first group" of samples will be reviewed by the Project Team or Project Team designee and, based on those data and previously collected data, the Project Team (or designee) will determine whether the PCB contamination is bounded well enough in three dimensions to support excavation cost estimates for soil with PCB concentrations greater than 1 mg/kg. If the PCB contamination is not sufficiently well bounded, another group of samples will be analyzed to more completely delineate the PCB contamination to 1 mg/kg. This process will continue until the contamination is sufficiently well bounded or all of the samples have been analyzed for PCBs. In general, PCB contamination is sufficiently well bounded when a three dimensional convex hull can be established to separate all areas of soil greater than 1 mg/kg total Aroclor concentration from surrounding areas of less than or equal to 1 mg/kg total Aroclor.

5.0 MANAGEMENT OF INVESTIGATON-DERIVED WASTES

All objects excavated from the Dump Area that are likely to have contained PCBs (e.g., capacitors, lighting ballast, transformers) will be properly containerized and disposed in accordance with the Toxic Substance and Control Act (TSCA). These materials will be managed on site in accordance with SOP-09. Residual soils remaining after sample collection and test pitting will be returned to their original locations. Personal protective equipment will be placed in black trash bags and discarded in NSA Crane trash containers as non-hazardous materials. Decontamination fluids will be analyzed for PCBs and Total Toxic Organics (TTO) and will be discharged to an NSA Crane water treatment plant designated by the NSA Crane point of contact unless the water is contaminated with more than 10 µg/L PCBs or the TTO level is unacceptable. If the PCB concentration exceeds 10 µg/L, regardless of the TTO level, the water will be disposed offsite at an approved PCB disposal facility. If the PCB concentration is less than 10 µg/L but the TTO level is unacceptable, dispose of the water at facility approved for disposal of the determined level of TTO and PCBs (see also SOP-9).

6.0 QUALITY ASSURANCE

Required Quality assurance data are identified in Table 3.

6.1 Field Quality Control

Collection of field duplicate samples is not planned because the resources commonly devoted to collection and analysis of field duplicate samples are believed to be better spent characterizing site conditions. Past data indicate that use of the chosen sampling and analysis methods provides a high level of confidence that the data will be of acceptable quality.

Collection of equipment rinsate blanks is not planned. The Navy accepts liability for any increased estimate of contaminated soil that would result from cross-contamination of samples. Additionally, the remaining PCB concentrations are low enough that the potential for observing measurable concentrations of PCBs as a result of cross-contamination is perceived to be low. Omitting field duplicate samples and rinsate blanks provides more resources for delineation of PCB contamination that will directly support cost estimates for remediation.

6.2 Laboratory Quality Control

All method-required laboratory quality control (QC) measures will be implemented as specified in the PCB analytical method, SW-846 Method 8082A.

REFERENCES

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Tetra Tech, 2006a. Quality Assurance Project Plan Addendum 2 for PCB Capacitor Burial/Pole Yard SWMU 17, Naval Surface Warfare Center Crane, Crane, Indiana. April.

Tetra Tech, 2006b. Quality Assurance Project Plan Addendum 3 for Building 2721 Investigation (Phase 4) PCB Capacitor Burial/Pole Yard SWMU 17, Naval Surface Warfare Center Crane, Crane, Indiana, September.

Tetra Tech, 2007. Resource Conservation and Recovery Act Facility Investigation Report Addendum for SWMU 17 (PCB Capacitor Burial/Pole Yard), Naval Surface Warfare Center Crane, Crane, Indiana, August.

Tetra Tech, 2008. Quality Assurance Project Plan Addendum No. 4 for PCB Capacitor Burial/Pole Yard Building 2721 Investigation (Phase 5) SWMU 17, Naval Surface Warfare Center Crane, Crane, Indiana. August.

Tetra Tech, 2010. Field Investigation Report for SWMU 17 – Boggs Creek, Naval Support Activity Crane, Crane, Indiana. September.

Tetra Tech, 2011a. NSA Crane – Additional Sampling and Analysis for SWMU 17 (Boggs Creek, Ditch 3, Northwest Ditch), January 20

Tetra Tech, 2011b. Letter Report for Results of Additional Sampling and Analysis in SWMU 17 Boggs Creek [Segment 1, Ditch 3 (Segments 2 and 6), and Northwest Ditch], May 24.

TolTest, 2004. Interim Measures Report, PCB Capacitor Burial Pole Yard Remediation, SMWU 17, NSWC Crane, Revision 1, November.

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB085*	17SS0851218	1218	inches	4	3021646.43210	1318231.91900	1
17SB085*	17SS0851824	1824	inches	4	3021646.43210	1318231.91900	TBD
17SB085*	17SB0852430	2430	inches	4	3021646.43210	1318231.91900	TBD
17SB085*	17SB0853648	3648	inches	4	3021646.43210	1318231.91900	TBD
17SB085*	17SB0854860	4860	inches	4	3021646.43210	1318231.91900	TBD
17SB085*	17SB0856072	6072	inches	4	3021646.43210	1318231.91900	TBD
17SB085*	17SB0857284	7284	inches	4	3021646.43210	1318231.91900	TBD
17SB090*	17SS0901218	1218	inches	4	3021801.36000	1318230.98000	1
17SB090*	17SS0901824	1824	inches	4	3021801.36000	1318230.98000	TBD
17SB090*	17SB0902430	2430	inches	4	3021801.36000	1318230.98000	TBD
17SB090*	17SB0903036	3036	inches	4	3021801.36000	1318230.98000	TBD
17SB090*	17SB0903648	3648	inches	4	3021801.36000	1318230.98000	TBD
17SB090*	17SB0904860	4860	inches	4	3021801.36000	1318230.98000	TBD
17SB090*	17SB0906072	6072	inches	4	3021801.36000	1318230.98000	TBD
17SB090*	17SB0907284	7284	inches	4	3021801.36000	1318230.98000	TBD
17SB115	17SS1151218	1218	inches	4	3021590.99000	1318226.09000	1
17SB115	17SB1151824	1824	inches	4	3021590.99000	1318226.09000	TBD
17SB115	17SB1152430	2430	inches	4	3021590.99000	1318226.09000	TBD
17SB116*	17SS1161218	1218	inches	4	3021567.71000	1318197.22000	1
17SB116*	17SB1161824	1824	inches	4	3021567.71000	1318197.22000	TBD
17SB116*	17SB1162430	2430	inches	4	3021567.71000	1318197.22000	TBD
17SB116*	17SB1163648	3648	inches	4	3021567.71000	1318197.22000	TBD
17SB116*	17SB1164860	4860	inches	4	3021567.71000	1318197.22000	TBD
17SB116*	17SB1166072	6072	inches	4	3021567.71000	1318197.22000	TBD
17SB116*	17SB1167284	7284	inches	4	3021567.71000	1318197.22000	TBD
17SB117*	17SS1171218	1218	inches	4	3021587.85000	1318162.60000	1
17SB117*	17SS1171824	1824	inches	4	3021587.85000	1318162.60000	TBD
17SB117*	17SB1172430	2430	inches	4	3021587.85000	1318162.60000	TBD
17SB117*	17SB1173036	3036	inches	4	3021587.85000	1318162.60000	TBD
17SB117*	17SB1173648	3648	inches	4	3021587.85000	1318162.60000	TBD
17SB117*	17SB1174860	4860	inches	4	3021587.85000	1318162.60000	TBD
17SB117*	17SB1176072	6072	inches	4	3021587.85000	1318162.60000	TBD
17SB117*	17SB1177284	7284	inches	4	3021587.85000	1318162.60000	TBD
17SB118	17SS1181218	1218	inches	4	3021607.54000	1318191.58000	1
17SB118	17SS1181824	1824	inches	4	3021607.54000	1318191.58000	TBD
17SB118	17SB1182430	2430	inches	4	3021607.54000	1318191.58000	TBD
17SB118	17SB1183036	3036	inches	4	3021607.54000	1318191.58000	TBD
17SB119	17SS1191218	1218	inches	4	3021637.05000	1318209.85000	1
17SB119	17SS1191824	1824	inches	4	3021637.05000	1318209.85000	TBD
17SB119	17SB1192430	2430	inches	4	3021637.05000	1318209.85000	TBD
17SB119	17SB1193036	3036	inches	4	3021637.05000	1318209.85000	TBD
17SB120	17SS1201218	1218	inches	4	3021662.88000	1318229.75000	1
17SB120	17SS1201824	1824	inches	4	3021662.88000	1318229.75000	TBD
17SB120	17SB1202430	2430	inches	4	3021662.88000	1318229.75000	TBD
17SB120	17SB1203036	3036	inches	4	3021662.88000	1318229.75000	TBD
17SB122	17SS1220006	0006	inches	4	3021565.24446	1318145.00941	1
17SB122	17SS1220612	0612	inches	4	3021565.24446	1318145.00941	TBD
17SB122	17SS1221218	1218	inches	4	3021565.24446	1318145.00941	TBD
17SB122	17SB1221824	1824	inches	4	3021565.24446	1318145.00941	TBD
17SB122	17SB1222430	2430	inches	4	3021565.24446	1318145.00941	TBD
17SB123	17SS1230006	0006	inches	4	3021593.48519	1318137.80135	1
17SB123	17SS1230612	0612	inches	4	3021593.48519	1318137.80135	TBD
17SB123	17SS1231218	1218	inches	4	3021593.48519	1318137.80135	TBD
17SB123	17SS1231824	1824	inches	4	3021593.48519	1318137.80135	TBD
17SB123	17SB1232430	2430	inches	4	3021593.48519	1318137.80135	TBD
17SB123	17SB1233036	3036	inches	4	3021593.48519	1318137.80135	TBD

TABLE 1

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NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB124	17SS1240006	0006	inches	4	3021628.90632	1318137.80026	TBD
17SB124	17SS1240612	0612	inches	4	3021628.90632	1318137.80026	TBD
17SB124	17SS1241218	1218	inches	4	3021628.90632	1318137.80026	TBD
17SB124	17SB1241824	1824	inches	4	3021628.90632	1318137.80026	TBD
17SB124	17SB1242430	2430	inches	4	3021628.90632	1318137.80026	TBD
17SB125	17SS1250006	0006	inches	4	3021621.22270	1318162.68628	1
17SB125	17SS1250612	0612	inches	4	3021621.22270	1318162.68628	TBD
17SB125	17SS1251218	1218	inches	4	3021621.22270	1318162.68628	TBD
17SB125	17SB1251824	1824	inches	4	3021621.22270	1318162.68628	TBD
17SB125	17SB1252430	2430	inches	4	3021621.22270	1318162.68628	TBD
17SB126	17SS1260006	0006	inches	4	3021633.54519	1318191.40840	1
17SB126	17SS1260612	0612	inches	4	3021633.54519	1318191.40840	TBD
17SB126	17SB1261218	1218	inches	4	3021633.54519	1318191.40840	TBD
17SB126	17SB1261824	1824	inches	4	3021633.54519	1318191.40840	TBD
17SB127	17SS1270006	0006	inches	4	3021657.78066	1318185.53733	TBD
17SB127	17SS1270612	0612	inches	4	3021657.78066	1318185.53733	TBD
17SB127	17SS1271218	1218	inches	4	3021657.78066	1318185.53733	TBD
17SB127	17SB1271824	1824	inches	4	3021657.78066	1318185.53733	TBD
17SB127	17SB1272430	2430	inches	4	3021657.78066	1318185.53733	TBD
17SB128	17SS1280006	0006	inches	4	3021657.18424	1318211.81723	1
17SB128	17SS1280612	0612	inches	4	3021657.18424	1318211.81723	TBD
17SB128	17SS1281218	1218	inches	4	3021657.18424	1318211.81723	TBD
17SB128	17SB1281824	1824	inches	4	3021657.18424	1318211.81723	TBD
17SB128	17SB1282430	2430	inches	4	3021657.18424	1318211.81723	TBD
17SB129	17SS1290006	0006	inches	4	3021684.15783	1318208.99760	TBD
17SB129	17SS1290612	0612	inches	4	3021684.15783	1318208.99760	TBD
17SB129	17SS1291218	1218	inches	4	3021684.15783	1318208.99760	TBD
17SB129	17SB1291824	1824	inches	4	3021684.15783	1318208.99760	TBD
17SB129	17SB1292430	2430	inches	4	3021684.15783	1318208.99760	TBD
17SB130	17SS1300006	0006	inches	4	3021683.75492	1318225.21543	1
17SB130	17SS1300612	0612	inches	4	3021683.75492	1318225.21543	TBD
17SB130	17SB1301218	1218	inches	4	3021683.75492	1318225.21543	TBD
17SB130	17SB1301824	1824	inches	4	3021683.75492	1318225.21543	TBD
17SB131	17SS1310006	0006	inches	4	3021601.85276	1318233.25765	1
17SB131	17SS1310612	0612	inches	4	3021601.85276	1318233.25765	TBD
17SB131	17SS1311218	1218	inches	4	3021601.85276	1318233.25765	TBD
17SB131	17SB1311824	1824	inches	4	3021601.85276	1318233.25765	TBD
17SB131	17SB1312430	2430	inches	4	3021601.85276	1318233.25765	TBD
17SB132	17SS1320006	0006	inches	4	3021576.00319	1318220.54692	1
17SB132	17SS1320612	0612	inches	4	3021576.00319	1318220.54692	TBD
17SB132	17SS1321218	1218	inches	4	3021576.00319	1318220.54692	TBD
17SB132	17SB1321824	1824	inches	4	3021576.00319	1318220.54692	TBD
17SB132	17SB1322430	2430	inches	4	3021576.00319	1318220.54692	TBD
17SB133	17SS1330006	0006	inches	4	3021553.33294	1318204.68555	1
17SB133	17SS1330612	0612	inches	4	3021553.33294	1318204.68555	TBD
17SB133	17SS1331218	1218	inches	4	3021553.33294	1318204.68555	TBD
17SB133	17SB1331824	1824	inches	4	3021553.33294	1318204.68555	TBD
17SB133	17SB1332430	2430	inches	4	3021553.33294	1318204.68555	TBD
17SB134	17SS1340006	0006	inches	4	3021540.37598	1318179.21109	1
17SB134	17SS1340612	0612	inches	4	3021540.37598	1318179.21109	TBD
17SB134	17SS1341218	1218	inches	4	3021540.37598	1318179.21109	TBD
17SB134	17SB1341824	1824	inches	4	3021540.37598	1318179.21109	TBD
17SB134	17SB1342430	2430	inches	4	3021540.37598	1318179.21109	TBD
17SB082	17SS0820612	0612	inches	5	3021897.44220	1318229.83240	1
17SB082	17SS0821218	1218	inches	5	3021897.44220	1318229.83240	TBD
17SB082	17SB0821824	1824	inches	5	3021897.44220	1318229.83240	TBD

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NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB082	17SB0822430	2430	inches	5	3021897.44220	1318229.83240	TBD
17SB092	17SS0921218	1218	inches	5	3021841.66000	1318229.76000	1
17SB092	17SB0921824	1824	inches	5	3021841.66000	1318229.76000	TBD
17SB092	17SB0922430	2430	inches	5	3021841.66000	1318229.76000	TBD
17SB094	17SS0941218	1218	inches	5	3021891.42000	1318215.94000	1
17SB094	17SS0941824	1824	inches	5	3021891.42000	1318215.94000	TBD
17SB094	17SB0942430	2430	inches	5	3021891.42000	1318215.94000	TBD
17SB094	17SB0943036	3036	inches	5	3021891.42000	1318215.94000	TBD
17SB105*	17SS1051218	1218	inches	5	3021858.91000	1318189.90000	1
17SB105*	17SS1051824	1824	inches	5	3021858.91000	1318189.90000	TBD
17SB105*	17SB1052430	2430	inches	5	3021858.91000	1318189.90000	TBD
17SB105*	17SB1053036	3036	inches	5	3021858.91000	1318189.90000	TBD
17SB105*	17SB1053642	3642	inches	5	3021858.91000	1318189.90000	TBD
17SB105*	17SB1054860	4860	inches	5	3021858.91000	1318189.90000	TBD
17SB105*	17SB1056072	6072	inches	5	3021858.91000	1318189.90000	TBD
17SB105*	17SB1057284	7284	inches	5	3021858.91000	1318189.90000	TBD
17SB106	17SS1061218	1218	inches	5	3021824.26000	1318203.25000	1
17SB106	17SS1061824	1824	inches	5	3021824.26000	1318203.25000	TBD
17SB106	17SB1062430	2430	inches	5	3021824.26000	1318203.25000	TBD
17SB106	17SB1063036	3036	inches	5	3021824.26000	1318203.25000	TBD
17SB135	17SS1350006	0006	inches	5	3021781.38296	1318191.91140	1
17SB135	17SS1350612	0612	inches	5	3021781.38296	1318191.91140	TBD
17SB135	17SB1351218	1218	inches	5	3021781.38296	1318191.91140	TBD
17SB135	17SB1351824	1824	inches	5	3021781.38296	1318191.91140	TBD
17SB136	17SS1360006	0006	inches	5	3021779.31770	1318209.48675	1
17SB136	17SS1360612	0612	inches	5	3021779.31770	1318209.48675	TBD
17SB136	17SS1361218	1218	inches	5	3021779.31770	1318209.48675	TBD
17SB136	17SS1361824	1824	inches	5	3021779.31770	1318209.48675	TBD
17SB136	17SB1362430	2430	inches	5	3021779.31770	1318209.48675	TBD
17SB136	17SB1363036	3036	inches	5	3021779.31770	1318209.48675	TBD
17SB137	17SS1370006	0006	inches	5	3021805.03365	1318200.21577	1
17SB137	17SS1370612	0612	inches	5	3021805.03365	1318200.21577	TBD
17SB137	17SS1371218	1218	inches	5	3021805.03365	1318200.21577	TBD
17SB137	17SB1371824	1824	inches	5	3021805.03365	1318200.21577	TBD
17SB137	17SB1372430	2430	inches	5	3021805.03365	1318200.21577	TBD
17SB138*	17SS1380006	0006	inches	5	3021837.42391	1318190.68606	1
17SB138*	17SS1380612	0612	inches	5	3021837.42391	1318190.68606	TBD
17SB138*	17SS1381218	1218	inches	5	3021837.42391	1318190.68606	TBD
17SB138*	17SB1381824	1824	inches	5	3021837.42391	1318190.68606	TBD
17SB138*	17SB1382430	2430	inches	5	3021837.42391	1318190.68606	TBD
17SB138*	17SB1383648	3648	inches	5	3021837.42391	1318190.68606	TBD
17SB138*	17SB1384860	4860	inches	5	3021837.42391	1318190.68606	TBD
17SB138*	17SB1386072	6072	inches	5	3021837.42391	1318190.68606	TBD
17SB138*	17SB1387284	7284	inches	5	3021837.42391	1318190.68606	TBD
17SB139	17SS1390006	0006	inches	5	3021875.63999	1318167.20350	1
17SB139	17SS1390612	0612	inches	5	3021875.63999	1318167.20350	TBD
17SB139	17SS1391218	1218	inches	5	3021875.63999	1318167.20350	TBD
17SB139	17SB1391824	1824	inches	5	3021875.63999	1318167.20350	TBD
17SB139	17SB1392430	2430	inches	5	3021875.63999	1318167.20350	TBD
17SB140	17SS1400006	0006	inches	5	3021908.20155	1318171.77744	1
17SB140	17SS1400612	0612	inches	5	3021908.20155	1318171.77744	TBD
17SB140	17SS1401218	1218	inches	5	3021908.20155	1318171.77744	TBD
17SB140	17SB1401824	1824	inches	5	3021908.20155	1318171.77744	TBD
17SB140	17SB1402430	2430	inches	5	3021908.20155	1318171.77744	TBD
17SB141	17SS1410006	0006	inches	5	3021943.09695	1318170.97339	1
17SB141	17SS1410612	0612	inches	5	3021943.09695	1318170.97339	TBD

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Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB141	17SS1411218	1218	inches	5	3021943.09695	1318170.97339	TBD
17SB141	17SB1411824	1824	inches	5	3021943.09695	1318170.97339	TBD
17SB141	17SB1412430	2430	inches	5	3021943.09695	1318170.97339	TBD
17SB142	17SS1420006	0006	inches	5	3021978.33109	1318182.52289	1
17SB142	17SS1420612	0612	inches	5	3021978.33109	1318182.52289	TBD
17SB142	17SS1421218	1218	inches	5	3021978.33109	1318182.52289	TBD
17SB142	17SB1421824	1824	inches	5	3021978.33109	1318182.52289	TBD
17SB142	17SB1422430	2430	inches	5	3021978.33109	1318182.52289	TBD
17SB143	17SS1430006	0006	inches	5	3021995.73015	1318185.62591	1
17SB143	17SS1430612	0612	inches	5	3021995.73015	1318185.62591	TBD
17SB143	17SS1431218	1218	inches	5	3021995.73015	1318185.62591	TBD
17SB143	17SB1431824	1824	inches	5	3021995.73015	1318185.62591	TBD
17SB143	17SB1432430	2430	inches	5	3021995.73015	1318185.62591	TBD
17SB144	17SS1440006	0006	inches	5	3021942.52783	1318199.38490	1
17SB144	17SS1440612	0612	inches	5	3021942.52783	1318199.38490	TBD
17SB144	17SS1441218	1218	inches	5	3021942.52783	1318199.38490	TBD
17SB144	17SB1441824	1824	inches	5	3021942.52783	1318199.38490	TBD
17SB144	17SB1442430	2430	inches	5	3021942.52783	1318199.38490	TBD
17SB145	17SS1450006	0006	inches	5	3021912.07273	1318200.68690	1
17SB145	17SS1450612	0612	inches	5	3021912.07273	1318200.68690	TBD
17SB145	17SS1451218	1218	inches	5	3021912.07273	1318200.68690	TBD
17SB145	17SB1451824	1824	inches	5	3021912.07273	1318200.68690	TBD
17SB145	17SB1452430	2430	inches	5	3021912.07273	1318200.68690	TBD
17SB146	17SS1460006	0006	inches	5	3021908.88294	1318211.60889	1
17SB146	17SS1460612	0612	inches	5	3021908.88294	1318211.60889	TBD
17SB146	17SS1461218	1218	inches	5	3021908.88294	1318211.60889	TBD
17SB146	17SB1461824	1824	inches	5	3021908.88294	1318211.60889	TBD
17SB146	17SB1462430	2430	inches	5	3021908.88294	1318211.60889	TBD
17SB147	17SS1470006	0006	inches	5	3021907.13919	1318234.68616	1
17SB147	17SS1470612	0612	inches	5	3021907.13919	1318234.68616	TBD
17SB147	17SS1471218	1218	inches	5	3021907.13919	1318234.68616	TBD
17SB147	17SB1471824	1824	inches	5	3021907.13919	1318234.68616	TBD
17SB147	17SB1472430	2430	inches	5	3021907.13919	1318234.68616	TBD
17SB148	17SS1480006	0006	inches	5	3021874.46886	1318236.20023	1
17SB148	17SS1480612	0612	inches	5	3021874.46886	1318236.20023	TBD
17SB148	17SS1481218	1218	inches	5	3021874.46886	1318236.20023	TBD
17SB148	17SB1481824	1824	inches	5	3021874.46886	1318236.20023	TBD
17SB148	17SB1482430	2430	inches	5	3021874.46886	1318236.20023	TBD
17SB149	17SS1490006	0006	inches	5	3021849.46569	1318240.37675	1
17SB149	17SS1490612	0612	inches	5	3021849.46569	1318240.37675	TBD
17SB149	17SB1491218	1218	inches	5	3021849.46569	1318240.37675	TBD
17SB149	17SB1491824	1824	inches	5	3021849.46569	1318240.37675	TBD
17SB150	17SS1500006	0006	inches	5	3021815.35848	1318239.04712	1
17SB150	17SS1500612	0612	inches	5	3021815.35848	1318239.04712	TBD
17SB150	17SS1501218	1218	inches	5	3021815.35848	1318239.04712	TBD
17SB150	17SB1501824	1824	inches	5	3021815.35848	1318239.04712	TBD
17SB150	17SB1502430	2430	inches	5	3021815.35848	1318239.04712	TBD
17SB151	17SS1510006	0006	inches	5	3021788.30324	1318239.56000	1
17SB151	17SS1510612	0612	inches	5	3021788.30324	1318239.56000	TBD
17SB151	17SS1511218	1218	inches	5	3021788.30324	1318239.56000	TBD
17SB151	17SS1511824	1824	inches	5	3021788.30324	1318239.56000	TBD
17SB151	17SB1512430	2430	inches	5	3021788.30324	1318239.56000	TBD
17SB151	17SB1513036	3036	inches	5	3021788.30324	1318239.56000	TBD
17SB075*	17SS0750612	0612	inches	8	3023350.67090	1318134.57410	1
17SB075*	17SS0751218	1218	inches	8	3023350.67090	1318134.57410	TBD
17SB075*	17SS0751824	1824	inches	8	3023350.67090	1318134.57410	TBD

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB075*	17SB0752430	2430	inches	8	3023350.67090	1318134.57410	TBD
17SB075*	17SB0753036	3036	inches	8	3023350.67090	1318134.57410	TBD
17SB075*	17SB0753648	3648	inches	8	3023350.67090	1318134.57410	TBD
17SB075*	17SB0754860	4860	inches	8	3023350.67090	1318134.57410	TBD
17SB075*	17SB0756072	6072	inches	8	3023350.67090	1318134.57410	TBD
17SB075*	17SB0757284	7284	inches	8	3023350.67090	1318134.57410	TBD
17SB076	17SS0760612	0612	inches	8	3023264.63920	1318106.11290	1
17SB076	17SS0761218	1218	inches	8	3023264.63920	1318106.11290	TBD
17SB076	17SB0761824	1824	inches	8	3023264.63920	1318106.11290	TBD
17SB076	17SB0762430	2430	inches	8	3023264.63920	1318106.11290	TBD
17SB152	17SS1520006	0006	inches	8	3023251.60010	1318086.68041	1
17SB152	17SS1520612	0612	inches	8	3023251.60010	1318086.68041	TBD
17SB152	17SS1521218	1218	inches	8	3023251.60010	1318086.68041	TBD
17SB152	17SB1521824	1824	inches	8	3023251.60010	1318086.68041	TBD
17SB152	17SB1522430	2430	inches	8	3023251.60010	1318086.68041	TBD
17SB153	17SS1530006	0006	inches	8	3023254.23937	1318096.53551	1
17SB153	17SS1530612	0612	inches	8	3023254.23937	1318096.53551	TBD
17SB153	17SS1531218	1218	inches	8	3023254.23937	1318096.53551	TBD
17SB153	17SB1531824	1824	inches	8	3023254.23937	1318096.53551	TBD
17SB153	17SB1532430	2430	inches	8	3023254.23937	1318096.53551	TBD
17SB154	17SS1540006	0006	inches	8	3023269.05294	1318100.51658	1
17SB154	17SS1540612	0612	inches	8	3023269.05294	1318100.51658	TBD
17SB154	17SS1541218	1218	inches	8	3023269.05294	1318100.51658	TBD
17SB154	17SB1541824	1824	inches	8	3023269.05294	1318100.51658	TBD
17SB154	17SB1542430	2430	inches	8	3023269.05294	1318100.51658	TBD
17SB155	17SS1550006	0006	inches	8	3023287.90059	1318108.45889	1
17SB155	17SS1550612	0612	inches	8	3023287.90059	1318108.45889	TBD
17SB155	17SS1551218	1218	inches	8	3023287.90059	1318108.45889	TBD
17SB155	17SB1551824	1824	inches	8	3023287.90059	1318108.45889	TBD
17SB155	17SB1552430	2430	inches	8	3023287.90059	1318108.45889	TBD
17SB156	17SS1560006	0006	inches	8	3023300.45799	1318108.46367	1
17SB156	17SS1560612	0612	inches	8	3023300.45799	1318108.46367	TBD
17SB156	17SS1561218	1218	inches	8	3023300.45799	1318108.46367	TBD
17SB156	17SB1561824	1824	inches	8	3023300.45799	1318108.46367	TBD
17SB156	17SB1562430	2430	inches	8	3023300.45799	1318108.46367	TBD
17SB157	17SS1570006	0006	inches	8	3023309.38412	1318112.71649	1
17SB157	17SS1570612	0612	inches	8	3023309.38412	1318112.71649	TBD
17SB157	17SS1571218	1218	inches	8	3023309.38412	1318112.71649	TBD
17SB157	17SB1571824	1824	inches	8	3023309.38412	1318112.71649	TBD
17SB157	17SB1572430	2430	inches	8	3023309.38412	1318112.71649	TBD
17SB158	17SS1580006	0006	inches	8	3023362.05133	1318138.82894	1
17SB158	17SS1580612	0612	inches	8	3023362.05133	1318138.82894	TBD
17SB158	17SS1581218	1218	inches	8	3023362.05133	1318138.82894	TBD
17SB158	17SS1581824	1824	inches	8	3023362.05133	1318138.82894	TBD
17SB158	17SB1582430	2430	inches	8	3023362.05133	1318138.82894	TBD
17SB158	17SB1583036	3036	inches	8	3023362.05133	1318138.82894	TBD
17SB159	17SS1590006	0006	inches	8	3023363.78238	1318148.70389	1
17SB159	17SS1590612	0612	inches	8	3023363.78238	1318148.70389	TBD
17SB159	17SS1591218	1218	inches	8	3023363.78238	1318148.70389	TBD
17SB159	17SB1591824	1824	inches	8	3023363.78238	1318148.70389	TBD
17SB159	17SB1592430	2430	inches	8	3023363.78238	1318148.70389	TBD
17SB160	17SS1600006	0006	inches	8	3023351.35698	1318138.98149	1
17SB160	17SS1600612	0612	inches	8	3023351.35698	1318138.98149	TBD
17SB160	17SS1601218	1218	inches	8	3023351.35698	1318138.98149	TBD
17SB160	17SS1601824	1824	inches	8	3023351.35698	1318138.98149	TBD
17SB160	17SB1602430	2430	inches	8	3023351.35698	1318138.98149	TBD

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
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NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB160	17SB1603036	3036	inches	8	3023351.35698	1318138.98149	TBD
17SB161	17SS1610006	0006	inches	8	3023278.37156	1318111.75796	1
17SB161	17SS1610612	0612	inches	8	3023278.37156	1318111.75796	TBD
17SB161	17SS1611218	1218	inches	8	3023278.37156	1318111.75796	TBD
17SB161	17SB1611824	1824	inches	8	3023278.37156	1318111.75796	TBD
17SB161	17SB1612430	2430	inches	8	3023278.37156	1318111.75796	TBD
17SB162	17SS1620006	0006	inches	8	3023260.81943	1318112.46131	1
17SB162	17SS1620612	0612	inches	8	3023260.81943	1318112.46131	TBD
17SB162	17SS1621218	1218	inches	8	3023260.81943	1318112.46131	TBD
17SB162	17SB1621824	1824	inches	8	3023260.81943	1318112.46131	TBD
17SB162	17SB1622430	2430	inches	8	3023260.81943	1318112.46131	TBD
17SB163	17SS1630006	0006	inches	8	3023252.30399	1318104.20966	1
17SB163	17SS1630612	0612	inches	8	3023252.30399	1318104.20966	TBD
17SB163	17SS1631218	1218	inches	8	3023252.30399	1318104.20966	TBD
17SB163	17SB1631824	1824	inches	8	3023252.30399	1318104.20966	TBD
17SB163	17SB1632430	2430	inches	8	3023252.30399	1318104.20966	TBD
17SB164	17SS1640006	0006	inches	8	3023239.32856	1318107.20493	1
17SB164	17SS1640612	0612	inches	8	3023239.32856	1318107.20493	TBD
17SB164	17SS1641218	1218	inches	8	3023239.32856	1318107.20493	TBD
17SB164	17SB1641824	1824	inches	8	3023239.32856	1318107.20493	TBD
17SB164	17SB1642430	2430	inches	8	3023239.32856	1318107.20493	TBD
17SB055*	17SB0550204	0204	feet	9	3023702.82090	1318138.26620	1
17SB055*	17SB0550406	0406	feet	9	3023702.82090	1318138.26620	TBD
17SB055*	17SB0550607	0607	feet	9	3023702.82090	1318138.26620	TBD
17SB055*	17SB0550708	0708	feet	9	3023702.82090	1318138.26620	TBD
17SB055*	17SB0550809	0809	feet	9	3023702.82090	1318138.26620	TBD
17SB055*	17SB0550910	0910	feet	9	3023702.82090	1318138.26620	TBD
17SB165	17SS1650002	0002	feet	9	3023701.07506	1318146.89701	1
17SB165	17SB1650204	0204	feet	9	3023701.07506	1318146.89701	TBD
17SB165	17SB1650406	0406	feet	9	3023701.07506	1318146.89701	TBD
17SB166	17SS1660002	0002	feet	9	3023707.28180	1318129.56575	1
17SB166	17SB1660204	0204	feet	9	3023707.28180	1318129.56575	TBD
17SB166	17SB1660406	0406	feet	9	3023707.28180	1318129.56575	TBD
17SB167	17SS1670002	0002	feet	9	3023691.76911	1318122.62411	1
17SB167	17SB1670204	0204	feet	9	3023691.76911	1318122.62411	TBD
17SB167	17SB1670406	0406	feet	9	3023691.76911	1318122.62411	TBD
17SB168	17SS1680002	0002	feet	9	3023691.63755	1318137.35565	1
17SB168	17SB1680204	0204	feet	9	3023691.63755	1318137.35565	TBD
17SB168	17SB1680406	0406	feet	9	3023691.63755	1318137.35565	TBD
17SB169	17SS1690002	0002	feet	9	3023687.27557	1318154.49616	TBD
17SB169	17SB1690204	0204	feet	9	3023687.27557	1318154.49616	TBD
17SB169	17SB1690406	0406	feet	9	3023687.27557	1318154.49616	TBD
17SB170	17SS1700002	0002	feet	9	3023699.09445	1318160.16208	TBD
17SB170	17SB1700204	0204	feet	9	3023699.09445	1318160.16208	TBD
17SB170	17SB1700406	0406	feet	9	3023699.09445	1318160.16208	TBD
17SB231	17SS2310002	0002	feet	9	3023688.63087	1318145.58587	TBD
17SB231	17SB2310204	0204	feet	9	3023688.63087	1318145.58587	TBD
17SB231	17SB2310406	0406	feet	9	3023689.01861	1318129.68864	TBD
17SB232	17SS2320002	0002	feet	9	3023689.01861	1318129.68864	TBD
17SB232	17SB2320204	0204	feet	9	3023688.63087	1318145.58587	TBD
17SB232	17SB2320406	0406	feet	9	3023689.01861	1318129.68864	TBD
17SB171	17SB1710204	0204	feet	10	3022103.06393	1317756.64280	1
17SB171	17SB1710406	0406	feet	10	3022103.06393	1317756.64280	TBD
17SB172	17SB1720204	0204	feet	10	3022110.07562	1317756.31323	1
17SB172	17SB1720406	0406	feet	10	3022110.07562	1317756.31323	TBD
17SB173	17SB1730204	0204	feet	10	3022098.23725	1317726.32622	1

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PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
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Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB173	17SB1730406	0406	feet	10	3022098.23725	1317726.32622	TBD
17SB173	17SB1730608	0608	feet	10	3022098.23725	1317726.32622	TBD
17SB174	17SB1740204	0204	feet	10	3022110.19370	1317723.73482	1
17SB174	17SB1740406	0406	feet	10	3022110.19370	1317723.73482	TBD
17SB174	17SB1740608	0608	feet	10	3022110.19370	1317723.73482	TBD
17SB175	17SB1750204	0204	feet	10	3022095.18477	1317713.28258	1
17SB175	17SB1750406	0406	feet	10	3022095.18477	1317713.28258	TBD
17SB175	17SB1750608	0608	feet	10	3022095.18477	1317713.28258	TBD
17SB176	17SB1760204	0204	feet	10	3022113.36260	1317711.05541	1
17SB176	17SB1760406	0406	feet	10	3022113.36260	1317711.05541	TBD
17SB176	17SB1760608	0608	feet	10	3022113.36260	1317711.05541	TBD
17SB177	17SB1770204	0204	feet	10	3022172.48829	1317675.21392	1
17SB177	17SB1770406	0406	feet	10	3022172.48829	1317675.21392	TBD
17SB177	17SB1770608	0608	feet	10	3022172.48829	1317675.21392	TBD
17SB178	17SB1780204	0204	feet	10	3022185.23377	1317672.37986	1
17SB178	17SB1780406	0406	feet	10	3022185.23377	1317672.37986	TBD
17SB178	17SB1780608	0608	feet	10	3022185.23377	1317672.37986	TBD
17SB179	17SB1790204	0204	feet	10	3022181.10587	1317686.68165	1
17SB179	17SB1790406	0406	feet	10	3022181.10587	1317686.68165	TBD
17SB179	17SB1790608	0608	feet	10	3022181.10587	1317686.68165	TBD
17SB180	17SB1800204	0204	feet	10	3022185.13011	1317699.24688	1
17SB180	17SB1800406	0406	feet	10	3022185.13011	1317699.24688	TBD
17SB180	17SB1800608	0608	feet	10	3022185.13011	1317699.24688	TBD
17SB181	17SB1810204	0204	feet	10	3022193.10838	1317709.87303	1
17SB181	17SB1810406	0406	feet	10	3022193.10838	1317709.87303	TBD
17SB181	17SB1810608	0608	feet	10	3022193.10838	1317709.87303	TBD
17SB182	17SB1820204	0204	feet	10	3022208.32920	1317710.82983	1
17SB182	17SB1820406	0406	feet	10	3022208.32920	1317710.82983	TBD
17SB182	17SB1820608	0608	feet	10	3022208.32920	1317710.82983	TBD
17SB183	17SB1830204	0204	feet	10	3022238.99829	1317712.51039	1
17SB183	17SB1830406	0406	feet	10	3022238.99829	1317712.51039	TBD
17SB183	17SB1830608	0608	feet	10	3022238.99829	1317712.51039	TBD
17SB184	17SB1840204	0204	feet	10	3022267.96082	1317706.84843	1
17SB184	17SB1840406	0406	feet	10	3022267.96082	1317706.84843	TBD
17SB184	17SB1840608	0608	feet	10	3022267.96082	1317706.84843	TBD
17SB185	17SB1850204	0204	feet	10	3022297.18893	1317703.94468	1
17SB185	17SB1850406	0406	feet	10	3022297.18893	1317703.94468	TBD
17SB185	17SB1850608	0608	feet	10	3022297.18893	1317703.94468	TBD
17SB186	17SB1860204	0204	feet	10	3022326.36427	1317696.89920	1
17SB186	17SB1860406	0406	feet	10	3022326.36427	1317696.89920	TBD
17SB186	17SB1860608	0608	feet	10	3022326.36427	1317696.89920	TBD
17SB187	17SB1870204	0204	feet	10	3022338.60345	1317680.86409	1
17SB187	17SB1870406	0406	feet	10	3022338.60345	1317680.86409	TBD
17SB187	17SB1870608	0608	feet	10	3022338.60345	1317680.86409	TBD
17SB188	17SB1880204	0204	feet	10	3022340.68375	1317694.41696	1
17SB188	17SB1880406	0406	feet	10	3022340.68375	1317694.41696	TBD
17SB188	17SB1880608	0608	feet	10	3022340.68375	1317694.41696	TBD
17SB189	17SB1890204	0204	feet	10	3022356.79685	1317693.06106	1
17SB189	17SB1890406	0406	feet	10	3022356.79685	1317693.06106	TBD
17SB189	17SB1890608	0608	feet	10	3022356.79685	1317693.06106	TBD
17SB190	17SB1900204	0204	feet	10	3022369.62578	1317687.14432	1
17SB190	17SB1900406	0406	feet	10	3022369.62578	1317687.14432	TBD
17SB190	17SB1900608	0608	feet	10	3022369.62578	1317687.14432	TBD
17SB191	17SB1910204	0204	feet	10	3022381.55070	1317682.61989	1
17SB191	17SB1910406	0406	feet	10	3022381.55070	1317682.61989	TBD
17SB191	17SB1910608	0608	feet	10	3022381.55070	1317682.61989	TBD

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Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB192	17SB1920204	0204	feet	10	3022369.21367	1317672.88129	1
17SB192	17SB1920406	0406	feet	10	3022369.21367	1317672.88129	TBD
17SB192	17SB1920608	0608	feet	10	3022369.21367	1317672.88129	TBD
17SB193	17SB1930204	0204	feet	10	3022353.59790	1317678.11386	1
17SB193	17SB1930406	0406	feet	10	3022353.59790	1317678.11386	TBD
17SB193	17SB1930608	0608	feet	10	3022353.59790	1317678.11386	TBD
17SB194	17SB1940204	0204	feet	10	3022224.93200	1317687.82800	1
17SB194	17SB1940406	0406	feet	10	3022224.93200	1317687.82800	TBD
17SB194	17SB1940608	0608	feet	10	3022224.93200	1317687.82800	TBD
17SB195	17SB1950204	0204	feet	10	3022239.48400	1317685.40200	1
17SB195	17SB1950406	0406	feet	10	3022239.48400	1317685.40200	TBD
17SB195	17SB1950608	0608	feet	10	3022239.48400	1317685.40200	TBD
17SB196	17SB1960204	0204	feet	10	3022025.29933	1317578.69878	1
17SB196	17SB1960406	0406	feet	10	3022025.29933	1317578.69878	TBD
17SB197	17SB1970204	0204	feet	10	3022038.37960	1317573.35366	1
17SB197	17SB1970406	0406	feet	10	3022038.37960	1317573.35366	TBD
17SB198	17SB1980204	0204	feet	10	3022052.11192	1317575.58306	1
17SB198	17SB1980406	0406	feet	10	3022052.11192	1317575.58306	TBD
17SB199	17SB1990204	0204	feet	10	3022050.60662	1317587.99367	1
17SB199	17SB1990406	0406	feet	10	3022050.60662	1317587.99367	TBD
17SB200	17SB2000204	0204	feet	10	3022341.73903	1317732.24137	1
17SB200	17SB2000406	0406	feet	10	3022341.73903	1317732.24137	TBD
17SB201	17SB2010204	0204	feet	10	3022336.56886	1317744.26921	1
17SB201	17SB2010406	0406	feet	10	3022336.56886	1317744.26921	TBD
17SB202	17SB2020204	0204	feet	10	3022344.08619	1317759.79049	1
17SB202	17SB2020406	0406	feet	10	3022344.08619	1317759.79049	TBD
17SB203	17SB2030204	0204	feet	10	3022357.50507	1317742.34116	1
17SB203	17SB2030406	0406	feet	10	3022357.50507	1317742.34116	TBD
17SB204	17SB2040204	0204	feet	10	3022370.11641	1317739.85458	1
17SB204	17SB2040406	0406	feet	10	3022370.11641	1317739.85458	TBD
17SB205	17SB2050204	0204	feet	10	3022379.92426	1317752.35620	1
17SB205	17SB2050406	0406	feet	10	3022379.92426	1317752.35620	TBD
17SB206	17SB2060204	0204	feet	10	3022369.24279	1317775.75166	1
17SB206	17SB2060406	0406	feet	10	3022369.24279	1317775.75166	TBD
17SB207	17SB2070204	0204	feet	10	3022380.63352	1317781.91984	1
17SB207	17SB2070406	0406	feet	10	3022380.63352	1317781.91984	TBD
17SB208	17SB2080204	0204	feet	10	3022416.02564	1317713.35221	1
17SB208	17SB2080406	0406	feet	10	3022416.02564	1317713.35221	TBD
17SB209	17SB2090204	0204	feet	10	3022434.78137	1317723.08163	1
17SB209	17SB2090406	0406	feet	10	3022434.78137	1317723.08163	TBD
17SB210	17SB2100204	0204	feet	10	3022440.94691	1317736.95875	1
17SB210	17SB2100406	0406	feet	10	3022440.94691	1317736.95875	TBD
17SB211	17SB2110204	0204	feet	10	3022388.32441	1317690.78916	1
17SB211	17SB2110406	0406	feet	10	3022388.32441	1317690.78916	TBD
17SB212	17SB2120204	0204	feet	10	3022347.6040	1317735.3140	1
17SB212	17SB2120406	0406	feet	10	3022347.6040	1317735.3140	TBD
17SB213	17SB2130204	0204	feet	10	3022350.6680	1317751.0150	1
17SB213	17SB2130406	0406	feet	10	3022350.6680	1317751.0150	TBD
17SB214	17SB2140204	0204	feet	10	3022362.9230	1317731.3570	1
17SB214	17SB2140406	0406	feet	10	3022362.9230	1317731.3570	TBD
17SB215	17SB2150204	0204	feet	10	3022377.0920	1317774.7580	1
17SB215	17SB2150406	0406	feet	10	3022377.0920	1317774.7580	TBD
17SB216	17SB2160204	0204	feet	10	3022394.5800	1317739.3990	1
17SB216	17SB2160406	0406	feet	10	3022394.5800	1317739.3990	TBD
17SB217	17SB2170204	0204	feet	10	3022391.3890	1317771.1840	1

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB217	17SB2170406	0406	feet	10	3022391.3890	1317771.1840	TBD
17SB218	17SB2180204	0204	feet	10	3022379.3890	1317742.7170	1
17SB218	17SB2180406	0406	feet	10	3022379.3890	1317742.7170	TBD
17SB219	17SB2190204	0204	feet	10	3022408.6210	1317766.9710	1
17SB219	17SB2190406	0406	feet	10	3022408.6210	1317766.9710	TBD
17SB220	17SB2200204	0204	feet	10	3022405.8130	1317753.6950	1
17SB220	17SB2200406	0406	feet	10	3022405.8130	1317753.6950	TBD
17SB221	17SB2210204	0204	feet	10	3022410.0260	1317736.0800	1
17SB221	17SB2210406	0406	feet	10	3022410.0260	1317736.0800	TBD
17SB222	17SB2220204	0204	feet	10	3022421.1310	1317749.7380	1
17SB222	17SB2220406	0406	feet	10	3022421.1310	1317749.7380	TBD
17SB223	17SB2230204	0204	feet	10	3022434.7900	1317744.2490	1
17SB223	17SB2230406	0406	feet	10	3022434.7900	1317744.2490	TBD
17SB224	17SB2240204	0204	feet	10	3022425.2160	1317734.0370	1
17SB224	17SB2240406	0406	feet	10	3022425.2160	1317734.0370	TBD
17SB225	17SB2250204	0204	feet	10	3022421.3860	1317720.1230	1
17SB225	17SB2250406	0406	feet	10	3022421.3860	1317720.1230	TBD
17SB226	17SB2260204	0204	feet	10	3022031.2670	1317582.0440	1
17SB226	17SB2260406	0406	feet	10	3022031.2670	1317582.0440	TBD
17SB227	17SB2270204	0204	feet	10	3022039.0130	1317589.1690	1
17SB227	17SB2270406	0406	feet	10	3022039.0130	1317589.1690	TBD
17SB228	17SB2280204	0204	feet	10	3022042.4210	1317576.0020	1
17SB228	17SB2280406	0406	feet	10	3022042.4210	1317576.0020	TBD
17SB229	17SS2290002	0002	feet	10			1
17SB229	17SB2290204	0204	feet	10			1
17SB229	17SB2290406	0406	feet	10			TBD
17SB230	17SS2300002	0002	feet	10			1
17SB230	17SB2300204	0204	feet	10			1
17SB230	17SB2300406	0406	feet	10			TBD
LOCATIONS ADDED DURING APRIL 2012 SITE VISIT							
17SB233							1
17SB233							TBD
17SB233							TBD
17SB233							TBD
17SB233							TBD
17SB233							TBD
17SB234							1
17SB234							TBD
17SB234							TBD
17SB234							TBD
17SB234							TBD
17SB234							TBD
17SB235							1
17SB235							TBD
17SB235							TBD
17SB235							TBD
17SB235							TBD
17SB235							TBD
17SB236							1
17SB236							TBD
17SB236							TBD
17SB236							TBD
17SB236							TBD
17SB236							TBD
17SB237							1

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB237							TBD
17SB237							TBD
17SB237							TBD
17SB237							TBD
17SB237							TBD
17SB238							1
17SB238							TBD
17SB238							TBD
17SB238							TBD
17SB238							TBD
17SB238							TBD
17SB239							1
17SB239							TBD
17SB239							TBD
17SB239							TBD
17SB239							TBD
17SB239							TBD
17SB240							1
17SB240							TBD
17SB240							TBD
17SB240							TBD
17SB240							TBD
17SB240							TBD
17SB241							1
17SB241							TBD
17SB241							TBD
17SB241							TBD
17SB241							TBD
17SB241							TBD
17SB242							1
17SB242							TBD
17SB242							TBD
17SB242							TBD
17SB242							TBD
17SB242							TBD
17SB243							1
17SB243							TBD
17SB243							TBD
17SB243							TBD
17SB243							TBD
17SB243							TBD
17SB244							1
17SB244							TBD
17SB244							TBD
17SB244							TBD
17SB244							TBD
17SB244							TBD
17SB245							1
17SB245							TBD
17SB245							TBD
17SB245							TBD
17SB245							TBD
17SB245							TBD
17SB246							1
17SB246							TBD
17SB246							TBD
17SB246							TBD

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB246							TBD
17SB246							TBD
17SB247							1
17SB247							TBD
17SB247							TBD
17SB247							TBD
17SB247							TBD
17SB247							TBD
17SB248							1
17SB248							TBD
17SB248							TBD
17SB248							TBD
17SB248							TBD
17SB248							TBD
17SB249							1
17SB249							TBD
17SB249							TBD
17SB249							TBD
17SB249							TBD
17SB249							TBD
17SB250							1
17SB250							TBD
17SB250							TBD
17SB250							TBD
17SB250							TBD
17SB250							TBD
17SB250							TBD
17SB251							1
17SB251							TBD
17SB251							TBD
17SB251							TBD
17SB251							TBD
17SB251							TBD
17SB252							1
17SB252							TBD
17SB252							TBD
17SB252							TBD
17SB252							TBD
17SB252							TBD
17SB253							1
17SB253							TBD
17SB253							TBD
17SB253							TBD
17SB253							TBD
17SB253							TBD
17SB253							TBD
17SB254							1
17SB254							TBD
17SB254							TBD
17SB254							TBD
17SB254							TBD
17SB254							TBD
17SB255							1
17SB255							TBD
17SB255							TBD
17SB255							TBD
17SB255							TBD

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17SB255							TBD
17SB256							1
17SB256							TBD
17SB256							TBD
17SB256							TBD
17SB256							TBD
17SB256							TBD
17SB257							1
17SB257							TBD
17SB257							TBD
17SB257							TBD
17SB257							TBD
17SB257							TBD
17SB258							1
17SB258							TBD
17SB258							TBD
17SB258							TBD
17SB258							TBD
17SB258							TBD
17SB259							1
17SB259							TBD
17SB259							TBD
17SB259							TBD
17SB259							TBD
17SB259							TBD
17SB260							1
17SB260							TBD
17SB260							TBD
17SB260							TBD
17SB260							TBD
17SB260							TBD
17SB261							1
17SB261							TBD
17SB261							TBD
17SB261							TBD
17SB261							TBD
17SB261							TBD
17SB262							1
17SB262							TBD
17SB262							TBD
17SB262							TBD
17SB262							TBD
17SB262							TBD
17SB263							1
17SB263							TBD
17SB263							TBD
17SB263							TBD
17SB263							TBD
17SB263							TBD
COMPOSITE SAMPLES FROM TEST PITTING							
17TPA1	17TPA1C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPA2	17TPA2C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPA3	17TPA3C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPA4	17TPA4C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPB1	17TPB1C00XX	TBD	feet	11	TBD[5]	TBD[5]	1

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17TPB2	17TPB2C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPB3	17TPB3C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPB4	17TPB4C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPB5	17TPB5C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPC1	17TPC1C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPC2	17TPC2C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPC3	17TPC3C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPC4	17TPC4C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPD1	17TPD1C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPD2	17TPD2C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPD3	17TPD3C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPD4	17TPD4C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPE1	17TPE1C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPE2	17TPE2C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPF1	17TPF1C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPF2	17TPF2C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPF3	17TPF3C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPF4	17TPF4C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPF5	17TPF5C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPG1	17TPG1C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPG2	17TPG2C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPG3	17TPG3C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
17TPG4	17TPG4C00XX	TBD	feet	11	TBD[5]	TBD[5]	1
GRAB SAMPLES FROM TEST PITTING							
17TPA1	17TPA1G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA1	17TPA1G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA2	17TPA2G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17TPA3	17TPA3G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA3	17TPA3G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPA4	17TPA4G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB1	17TPB1G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB2	17TPB2G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB3	17TPB3G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17TPB4	17TPB4G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB4	17TPB4G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPB5	17TPB5G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC1	17TPC1G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC2	17TPC2G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17TPC3	17TPC3G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC3	17TPC3G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPC4	17TPC4G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD1	17TPD1G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD2	17TPD2G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD3	17TPD3G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
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Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17TPD4	17TPD4G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPD4	17TPD4G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE1	17TPE1G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPE2	17TPE2G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF1	17TPF1G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF2	17TPF2G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17TPF3	17TPF3G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF3	17TPF3G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF4	17TPF4G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPF5	17TPF5G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG1	17TPG1G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]

TABLE 1

PLANNED SAMPLING LOCATIONS AND ASSOCIATED PHYSICAL DATA
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Sampling Location [1]	Sample ID	Depth[2]	Depth Units	Figure[3]	Easting	Northing	Analysis Sequence[4]
17TPG2	17TPG2G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG2	17TPG2G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG3	17TPG3G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0001	0001	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0102	0102	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0203	0203	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0304	0304	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0405	0405	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0506	0506	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0607	0607	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0708	0708	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0809	0809	feet	11	TBD[5]	TBD[5]	TBD[6]
17TPG4	17TPG4G0910	0910	feet	11	TBD[5]	TBD[5]	TBD[6]

(1) Sample locations beginning with "17SB" were adjusted to render the location number a three-digit number by inserting "0" immediately after "17SB" for all location number's from "01" to "99."

(2) The first two digits represent the top of the depth interval and the second two digits represent the bottom of the depth interval.

(3) Figure numbers refer to the figures in this Technical Memorandum.

(4) Analysis sequence indicates the sequence in which samples are designated to be analyzed. Only the first group of samples (indicated with a "1") could be identified prior to mobilization. Those samples that do not have a "1" will be analyzed at the discretion of the Tt PM in accordance with this technical memorandum.

(5) Northing and Easting coordinates for test pit samples will be the center of the test pit.

(6) These samples will be analyzed only if the corresponding test pit composite sample indicates the presence of PCBs greater than 1 mg/kg divided by the number of 1-ft soil lifts removed from the pit. As many grab samples as necessary will be analyzed (1 grab per foot of excavation) for a given test pit to delineate the depth of PCB contamination. Several of these numbers may not be assigned to samples because not all pits will be excavated to 10 ft bgs.

* This location is marked as a "BEDROCK" Location on the figures, which means 1-ft intervals of soil will be collected to bedrock after the first few depths (shown as depths marked in inches or depths marked in 2-ft intervals) are collected.

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
17EW-B-008	10	3022141.21100	1317753.7230	**2.60**
17EW-B-017	10	3022122.7700	1317676.8160	**3.50**
17EW-B-024	10	3022074.8990	**1317684.2710**	0.10
17EW-B-025	10	3022087.4550	1317736.4580	**13.00**
17EW-C-099	10	3022324.7550	1317706.2090	**29.00**
17EW-C-100	10	3022255.1850	1317717.4430	**11.00**
17EW-D-033	10	3022402.4940	1317717.5700	**14.00**
17EW-D-049	10	3022388.1970	1317785.8630	**6.00**
17EW-D-105	10	3022353.6040	1317727.9100	**1.40**
17EW-E-028	10	3022031.2670	1317582.0440	**5.90**
17EWPIT30002	10	3022084.7090	1317793.7450	**41.00**
17FL-A-050	10	3021947.7680	1317798.4540	0.10
17FL-A-051	10	3021949.3380	1317802.3780	0.04
17FL-B-001	10	3022144.3500	1317742.3440	0.40
17FL-B-002	10	3022140.4270	1317725.8640	**1.40**
17FL-B-003	10	3022137.2880	1317712.1300	**1.80**
17FL-B-004	10	3022123.5540	1317715.2690	**1.70**
17FL-B-005	10	3022126.3010	1317731.3570	**8.40**
17FL-B-006	10	3022129.0480	1317745.4830	**2.70**
17FL-B-007	10	3022111.7830	1317734.8880	**5.30**
17FL-B-009	10	3022108.2520	1317717.6240	**81.00**
17FL-B-010	10	3022093.3410	1317720.3700	**55.00**
17FL-B-011	10	3022095.6950	1317734.1040	**8.80**
17FL-B-012	10	3022098.4420	1317748.6220	**6.00**
17FL-B-013	10	3022100.0120	1317763.1400	0.18
17FL-B-014	10	3022120.8080	1317699.5740	**7.00**
17FL-B-015	10	3022117.2760	1317683.8790	**3.30**
17FL-B-016	10	3022115.7070	1317669.3610	**3.00**
17FL-B-018	10	3022101.1890	1317671.3230	**15.00**
17FL-B-019	10	3022103.5430	1317686.6260	**1.20**
17FL-B-020	10	3022105.1120	1317700.7510	0.89
17FL-B-021	10	3022090.2020	1317703.4980	0.95
17FL-B-022	10	3022086.6710	1317689.3720	0.05
17FL-B-023	10	3022076.0760	1317676.8160	0.04
17FL-C-052	10	3022341.2220	1317654.5110	0.08
17FL-C-053	10	3022326.5420	1317656.9360	0.49
17FL-C-054	10	3022312.2450	1317660.2550	0.44
17FL-C-055	10	3022297.3100	1317661.7870	**1.20**
17FL-C-056	10	3022282.2470	1317663.4460	**3.00**
17FL-C-057	10	3022268.9720	1317666.1270	0.37
17FL-C-058	10	3022253.1430	1317667.6590	**2.30**
17FL-C-059	10	3022238.0800	1317669.3180	**3.10**
17FL-C-060	10	3022222.7620	1317671.6160	**4.00**
17FL-C-061	10	3022208.2100	1317673.4030	**1.30**
17FL-C-062	10	3022194.2960	1317676.7220	**1.40**

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
17FL-C-063	10	3022343.5200	1317669.3180	**19.00**
17FL-C-064	10	3022328.5850	1317671.6160	**10.00**
17FL-C-065	10	3022313.3940	1317673.6590	**7.00**
17FL-C-066	10	3022299.8631	1317676.0838	**3.10**
17FL-C-067	10	3022269.3550	1317681.0620	**4.00**
17FL-C-068	10	3022255.1850	1317683.6150	**1.90**
17FL-C-069	10	3022239.4840	1317685.4020	**27.00**
17FL-C-070	10	3022224.9320	1317687.8280	**30.00**
17FL-C-071	10	3022197.1040	1317693.0610	**1.90**
17FL-C-072	10	3022359.2210	1317667.0210	**26.00**
17FL-C-073	10	3022345.6900	1317684.3810	**72.00**
17FL-C-074	10	3022330.6270	1317686.5510	**21.00**
17FL-C-075	10	3022316.8410	1317688.8490	**7.50**
17FL-C-076	10	3022302.5440	1317691.2740	**3.40**
17FL-C-077	10	3022288.1190	1317695.1040	**4.40**
17FL-C-078	10	3022283.9070	1317679.1480	**1.70**
17FL-C-079	10	3022272.1630	1317697.5290	**22.00**
17FL-C-080	10	3022258.3770	1317701.2310	**15.00**
17FL-C-081	10	3022241.6540	1317700.7200	**15.00**
17FL-C-082	10	3022228.6340	1317704.0390	**23.00**
17FL-C-083	10	3022214.0820	1317707.2310	**12.00**
17FL-C-084	10	3022211.2740	1317692.5510	**22.00**
17FL-C-085	10	3022199.1470	1317707.4860	**1.20**
17FL-C-086	10	3022180.1270	1317677.7430	**4.60**
17FL-C-087	10	3022217.6560	1317717.1870	**1.90**
17FL-C-088	10	3022231.0590	1317716.2940	**23.00**
17FL-C-089	10	3022244.8460	1317714.6340	**16.00**
17FL-C-090	10	3022260.9300	1317712.3370	**25.00**
17FL-C-091	10	3022275.7370	1317709.6560	**24.00**
17FL-C-092	10	3022289.3960	1317707.8690	**6.80**
17FL-C-093	10	3022304.2030	1317705.4440	**2.80**
17FL-C-094	10	3022318.7550	1317703.7840	**4.30**
17FL-C-095	10	3022334.8390	1317699.8270	**81.00**
17FL-C-096	10	3022348.1150	1317699.0610	**58.00**
17FL-C-097	10	3022363.8160	1317696.6360	**78.00**
17FL-C-098	10	3022362.6670	1317681.9560	**55.00**
17FL-D-029	10	3022421.3860	1317720.1230	**4.70**
17FL-D-030	10	3022407.4730	1317724.0810	0.89
17FL-D-031	10	3022392.1540	1317726.3780	0.81
17FL-D-032	10	3022377.2190	1317729.6970	0.89
17FL-D-034	10	3022379.3890	1317742.7170	**1.40**
17FL-D-035	10	3022394.5800	1317739.3990	**2.10**
17FL-D-036	10	3022410.0260	1317736.0800	**1.70**
17FL-D-037	10	3022425.2160	1317734.0370	**17.00**
17FL-D-038	10	3022359.6040	1317763.0140	0.33

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
17FL-D-039	10	3022374.7940	1317759.8230	0.46
17FL-D-040	10	3022389.8570	1317756.7590	**8.00**
17FL-D-041	10	3022405.8130	1317753.6950	**2.40**
17FL-D-042	10	3022421.1310	1317749.7380	**13.00**
17FL-D-043	10	3022434.7900	1317744.2490	**1.80**
17FL-D-044	10	3022362.4120	1317777.1830	0.17
17FL-D-045	10	3022377.0920	1317774.7580	**3.90**
17FL-D-046	10	3022391.3890	1317771.1840	**3.80**
17FL-D-047	10	3022408.6210	1317766.9710	**12.00**
17FL-D-048	10	3022379.6450	1317788.6720	0.37
17FL-D-101	10	3022362.9230	1317731.3570	**1.60**
17FL-D-102	10	3022366.2410	1317748.4620	0.27
17FL-D-103	10	3022347.6040	1317735.3140	**2.00**
17FL-D-104	10	3022350.6680	1317751.0150	**1.60**
17FL-E-026	10	3022042.4210	1317576.0020	**1.00**
17FL-E-027	10	3022039.0130	1317589.1690	**3.60**
17SB001	10	3021949.7810	1317823.1870	0.35
17SB002	10	3021947.2810	1317839.4370	0.31
17SB002T	10	3021959.9320	1317803.1620	**31.00**
17SB003	10	3021960.4060	1317794.4370	0.32
17SB003T	10	3021918.7320	1317833.3760	**33.00**
17SB004	10	3021960.4070	1317781.9360	0.31
17SB004T	10	3021892.4430	1317847.8940	**10.00**
17SB005	10	3021942.2810	1317793.8110	0.32
17SB005T	10	3021866.1300	1317869.6440	**15.00**
17SB006	10	3021935.4070	1317783.1860	0.32
17SB006T	10	3022376.0710	1317664.7230	0.16
17SB007	10	3022141.0320	1317769.4370	0.29
17SB007T	10	3022390.3670	1317664.0850	0.74
17SB008	10	3022156.0320	1317737.5620	0.83
17SB008T	10	3022393.0480	1317686.5510	0.91
17SB009	10	3022184.7820	1317733.8120	0.32
17SB010	10	3022207.9075	1317698.8122	0.27
17SB011	10	3022239.7820	1317717.5630	0.31
17SB012	10	3022271.0330	1317691.9380	0.27
17SB013	10	3022312.2830	1317713.1880	0.82
17SB014	10	3022343.5330	1317702.5630	0.69
17SB015	10	3022387.2830	1317720.0630	0.30
17SB016	10	3022403.5330	1317696.3130	0.31
17SB017	10	3022388.5330	1317665.6880	0.29
17SB018	10	3022380.4080	1317641.3130	0.30
17SB019	10	3022153.5330	1317660.0620	0.31
17SB01T	10	3021968.1720	1317795.7070	**3.10**
17SB020	10	3022132.9080	1317630.0610	0.32
17SB021	10	3022106.6576	1317669.4364	0.29

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
17SB022	10	3022140.4070	1317713.1870	0.30
17SB023	10	3022174.1570	1317768.1880	0.31
17SB024	10	3022217.9070	1317748.8130	0.44
17SB025	10	3022212.2820	1317779.4380	0.30
17SB026	10	3022278.5320	1317732.5630	0.60
17SB027	10	3022252.2820	1317757.5630	0.31
17SB028	10	3022257.9070	1317779.4380	0.30
17SB029	10	3022312.2820	1317734.4380	0.32
17SB030	10	3022312.9070	1317765.6880	0.30
17SB031	10	3022297.9090	1317573.1870	0.30
17SB032	10	3022209.7840	1317586.3110	0.32
17SB033	10	3022035.4080	1317615.6860	0.89
17SB034	10	3022065.4083	1317586.9355	0.31
17SB035	10	3022007.9080	1317581.3100	0.31
17SB036	10	3022077.2830	1317681.3110	0.29
17SB037	10	3022083.5320	1317721.3120	0.43
17SB038	10	3022101.6570	1317756.3120	**1.60**
17SB039	10	3022095.4080	1317676.9360	0.29
17SB040	10	3022112.9070	1317709.4370	0.29
17SB041	10	3022122.2820	1317741.3120	0.29
17SB042	10	3022247.9080	1317674.4370	0.28
17SB043	10	3022291.0328	1317675.6875	0.31
17SB044	10	3022350.4080	1317671.3130	0.28
17SB045	10	3022223.9600	1317690.7400	0.03
17SB046/TW01	10	3022230.4075	1317674.4373	0.01
17SB047	10	3022332.4000	1317701.8300	0.06
17SB048	10	3022352.1900	1317682.9100	0.98
17SB049	10	3022112.9600	1317717.8900	0.94
17SB050	9	3023774.2337	1318185.3864	0.01
17SB051	9	3023771.5850	1318216.9115	0.01
17SB052	9	3023773.8498	1318198.7634	0.01
17SB053	9	3023700.2867	1318182.7648	0.08
17SB054	9	3023661.1993	1318252.2329	0.20
17SB055	9	3023702.8209	1318138.2662	**73.00**
17SB056	9	3023725.5921	1318131.7386	0.01
17SB057	9	3023671.7923	1318056.1647	0.08
17SB058	9	3023689.5023	1318021.3153	0.01
17SB059	9	3023680.8356	1317987.0403	0.01
17SB060	9	3023701.0376	1318229.2346	0.54
17SB061	9	3023756.2107	1318233.3240	0.10
17SB062/TW02	9	3023646.2471	1318184.7705	0.05
17SB063	9	3023640.0800	1318181.0707	0.04
17SB064/TW03	9	3023679.3676	1318226.9441	0.10
17SB065	9	3023682.6414	1318216.8119	0.10
17SB066	9	3023637.1666	1318114.9608	0.03

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
17SB067	9	3023548.8257	1317918.5110	0.01
17SB068	9	3023463.7591	1317866.8405	0.05
17SB069	200 ft northeast of B354	3023200.0569	1317734.3208	0.18
17SB070/TW04	1000 ft east of B354	3023231.6878	1317655.5829	0.01
17SB071	10 ft northeast of B354	3023320.5983	1317667.8440	0.04
17SB072	20 ft southeast of B354	3023324.0699	1317625.0648	0.01
17SB075	8	3023350.6709	1318134.5741	**11.00**
17SB076	8	3023264.6392	1318106.1129	**1.60**
17SB077	8	3023109.2391	1318063.2341	**2.30**
17SB078	8	3022922.1872	1318039.8427	0.66
17SB079	7	3022807.9852	1318037.7247	0.64
17SB080	6 and 7	3022460.1512	1318023.5364	0.85
17SB081	5	3021995.4081	1318157.4826	0.14
17SB082	5	3021897.4422	1318229.8324	**14.00**
17SB083	5	3021953.5430	1318012.6686	0.03
17SB084	200 ft upstream of 17SD023	3021776.5697	1317923.5337	0.03
17SB085	4	3021646.4321	1318231.9190	**4.30**
17SB086	4	3021645.9464	1318268.6342	0.03
17SB087	8	3023341.0200	1318138.3400	0.11
17SB088	8	3023331.9400	1318116.8000	0.04
17SB089	8	3023312.3000	1318132.6300	0.25
17SB090	4 and 5	3021801.3600	1318230.9800	**11.70**
17SB091	4 and 5	3021826.2800	1318248.3400	0.20
17SB092	5	3021841.6600	1318229.7600	**12.40**
17SB093	5	3021877.8100	1318245.8300	0.80
17SB094	5	3021891.4200	1318215.9400	**3.05**
17SB095	5	3021905.5700	1318226.9200	**1.51**
17SB096	5	3021928.2400	1318207.3200	0.82
17SB097	5	3021968.2200	1318213.3800	0.27
17SB098	5	3021973.8100	1318238.7300	0.05
17SB099	5	3021999.8900	1318213.8200	0.05
17SB09T	10	3022380.2830	1317689.2320	**31.00**
17SB100	5	3022020.1700	1318179.7300	0.89
17SB101	5	3021975.5000	1318191.0300	**2.04**
17SB102	5	3021966.2900	1318167.2600	0.35
17SB103	5	3021924.6300	1318155.9800	0.08
17SB104	5	3021893.6800	1318183.3500	**5.27**
17SB105	5	3021858.9100	1318189.9000	**41.30**
17SB106	4 and 5	3021824.2600	1318203.2500	**24.50**
17SB107	4 and 5	3021789.9200	1318200.6500	**1.63**
17SB109	4 and 5, Sample not collected	NA	NA	**NA**
17SB110	4 and 5, Sample not collected	NA	NA	**NA**
17SB111	4 and 5	3021712.2500	1318279.2900	0.09
17SB112	4	3021658.0100	1318283.7500	0.05
17SB113	4	3021633.8300	1318263.9000	0.12

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
17SB114	4	3021617.4900	1318237.7800	0.10
17SB115	4	3021590.9900	1318226.0900	**1.75**
17SB116	4	3021567.7100	1318197.2200	**5.27**
17SB117	4	3021587.8500	1318162.6000	**2.38**
17SB118	4	3021607.5400	1318191.5800	**3.73**
17SB119	4	3021637.0500	1318209.8500	**4.83**
17SB120	4	3021662.8800	1318229.7500	**8.19**
17SB121	4 and 5	3021701.8000	1318222.8100	0.05
17SW/SD001	10	3022019.2800	1317770.1600	**37.00**
17SW/SD002	10	3021874.5200	1317871.4300	**25.00**
17SW/SD003	5	3021817.4900	1318073.7800	**17.00**
17SW/SD004	5	3021843.1400	1318216.0000	**3.60**
17SW/SD005	5	3021673.4400	1318254.5942	**1.70**
17SW/SD006	100 ft Upstream of 17SD023	3021781.7800	1318014.6900	0.01
17SW/SD007	10	3022005.9117	1317560.6750	**2.20**
17SW/SD008	In Ditch 1, 200 ft Upstream of 17SD009	3022754.6846	1317662.6953	0.02
17SW/SD009	7	3022679.6500	1317841.4992	0.02
17SW/SD010	7	3022626.4858	1318036.3255	0.02
17SW/SD011	10	3022416.6080	1317791.6522	**1.80**
17SW/SD012	10 - no sample collected	NA	NA	**NA**
17SW/SD013	6 and 7	3022461.7377	1317968.2032	0.53
17SW/SD014	7	3022636.1254	1318082.8346	**1.30**
17SW/SD015	7	3022559.8849	1318030.8635	1.00
17SW/SD016	6 and 7	3022449.5717	1318014.2579	0.48
17SW/SD017	6	3022312.7292	1318081.6785	**2.20**
17SW/SD018	5	3022072.4306	1318147.2228	**3.70**
17SW/SD019	5	3021956.5537	1318190.9140	**3.70**
17SW/SD020	4 and 5	3021798.9105	1318272.3848	0.02
17SW/SD021	5	3021892.9497	1317996.5751	0.03
17SW/SD022	5	3021851.6299	1318045.9716	0.03
17SW/SD023	4 and 5	3021788.5320	1318122.5467	0.03
17SW/SD024	In ditch 7, 30 ft upstream of 17SD036	3021349.6117	1317897.8212	0.02
17SW/SD025	In Ditch 6, 200 ft downstream of 17SD007	3021894.4881	1317364.2409	0.58
17SW/SD026	In Ditch 6, 500 ft downstream of 17SD007	3021741.8530	1317206.7148	**5.30**
17SW/SD027	In Ditch 9, 700 ft downstream of 17SD007	3021480.2152	1317137.3645	0.02
17SW/SD028	In Ditch 9, 1,300 ft downstream of 17SD007	3021222.0583	1317408.6796	0.08
17SW/SD029	In Ditch 9, 1,800 ft downstream of 17SD007	3020972.3233	1317721.2805	0.18
17SW/SD030	4 and 5	3021756.5553	1318232.9581	0.09
17SW/SD031	4 and 5	3021723.1271	1318242.2773	0.11
17SW/SD032	4	3021651.2454	1318242.7116	0.20
17SW/SD033	4	3021567.8080	1318173.4116	**1.30**
17SW/SD034	4	3021520.0624	1318134.2843	0.22
17SW/SD035	In Boggs Cr. 250 ft downstream of SD34	3021429.4655	1317995.6068	0.95
17SW/SD036	In Boggs Cr. 400 ft downstream of SD34	3021306.9271	1317917.4745	0.15
17SW/SD037	In Boggs Cr. 600 ft downstream of SD34	3021051.0744	1317741.0447	0.55

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
17SW/SD038	In Boggs Cr. 900 ft downstream of SD34	3020941.7328	1317665.5544	0.29
17SW/SD039	4 and 5	3021713.5653	1318285.4351	0.03
17SW/SD040	5	3021860.6820	1317969.2770	0.06
17SW/SD041	4 and 5	3021730.7415	1318117.8213	0.50
17SW/SD042	7 and 8	3022931.4409	1318027.2648	0.02
17SW/SD043	7	3022918.3157	1318023.9708	**3.30**
17SW/SD044	7	3022921.5978	1318023.9738	0.57
17SW/SD045	7	3022687.1727	1318064.4559	**6.00**
17SW/SD046	Southeast of B357 upstream of 17SF049	3021799.1745	1317091.4501	0.02
17SW/SD047	Southeast of B357 upstream of 17SF049	3021859.0447	1317113.8766	0.02
17SW/SD048	Downstream of 17SD007	3021782.6216	1317267.2147	0.37
17SW/SD049	Downstream of 17SD007	3021644.4321	1317168.1331	0.32
17SW/SD050	Southeast of B357 upstream of 17SF049	3022464.2422	1317231.9900	0.02
17SW/SD051	Southeast of B357 upstream of 17SF049	3022467.0373	1317285.6756	0.02
17SW/SD052	Southeast of B357 upstream of 17SF049	3022340.7880	1317206.7134	0.04
17SW/SD053	Southeast of B357 upstream of 17SF049	3021949.8351	1316914.4849	0.02
17SW/SD054	Southeast of B357 upstream of 17SF049	3022638.2810	1317094.9298	0.02
17SW/SD055	Southeast of B357 upstream of 17SF049	3022773.4873	1317276.1691	0.03
17SW/SD056	400 ft upstream of 17SD042	3023181.1190	1317761.6468	0.26
17SW/SD057	9	3023584.5890	1318004.8866	0.02
17SW/SD058	9	3023607.3596	1318228.0867	0.29
17SW/SD059	9	3023518.7054	1318270.6724	0.02
17SW/SD060	8	3023361.3080	1318116.2725	0.02
17SW/SD061	8	3023361.2871	1318139.2468	**70.00**
17SW/SD062	8	3023285.8090	1318129.3317	**7.10**
17SW/SD063	8	3023266.1077	1318139.1599	0.72
17SW/SD064	8	3023230.0202	1318122.7167	**4.10**
17SW/SD065	400 ft upstream of SD20	3022003.4637	1318593.8652	0.01
17SW/SD066	700 ft upstream of SD20	3022148.3652	1318816.2286	0.01
17SW/SD067	1,100 ft downstream of SD34	3020729.7939	1317639.6838	0.51
17SW/SD068	1,500 ft downstream of SD34	3020448.3414	1317461.4374	0.12
17SW/SD069	2	3020199.4944	1317444.4096	0.96
17SW/SD070	2	3020154.0080	1276738.8610	0.07
17SW/SD071	2	3021051.2580	1277638.5650	0.07
17SW/SD072	2	3021859.9120	1278592.5020	0.08
17SW/SD073	2	3022049.4640	1280124.4450	0.13
17SW/SD074	2	3022283.3990	1281346.7810	0.06
17SW/SD075	2	3021862.2260	1282473.6330	0.15
17SW/SD076	2	3021067.1570	1283013.2450	0.04
17SW/SD077	2	3020354.4120	1284608.5890	0.03
17SW/SD078	2	3020913.5590	1286297.3150	0.04
17SW/SD079	2	3018464.8060	1287425.4880	0.01
17SW/SD080	2	3019569.4440	1289171.4710	0.07
17SW/SD081	2	3020140.1850	1289777.8850	0.03
17SW/SD082	2	3020645.1960	1290774.4470	0.03

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
17SW/SD083	2	3020245.7160	1292250.1390	0.03
17SW/SD084	2	3019821.3800	1293230.2750	0.23
17SW/SD085	2	3019704.2660	1294537.5870	0.01
17SW/SD086	2	3021155.1720	1295376.3660	0.04
17SW/SD087	2	3022232.6620	1295737.1240	0.09
17SW/SD088	2	3022854.9510	1296541.1020	0.02
17SW/SD089	2	3022338.0440	1297470.2360	0.15
17SW/SD090	2	3021959.1230	1298996.4780	0.05
17SW/SD091	2	3021922.3860	1300090.5420	0.03
17SW/SD092	2	3021228.4190	1302335.3500	0.03
17SW/SD093	2	3020297.3150	1303310.8930	0.04
17SW/SD094	2	3019235.1300	1303668.0230	0.02
17SW/SD095	2	3019546.4290	1305156.9820	0.07
17SW/SD096	2	3019774.5960	1305888.2880	0.09
17SW/SD097	2	3019588.1850	1307165.4280	0.02
17SW/SD098	2	3019536.7920	1308337.8490	0.06
17SW/SD099	2	3019079.5830	1309401.2250	0.19
17SW/SD100	2	3019091.0190	1310645.3070	0.02
17SW/SD101	2	3018445.7910	1311941.2730	0.09
17SW/SD102	2	3018401.1580	1312927.5380	0.19
17SW/SD103	2	3018791.8940	1314392.3040	0.01
17SW/SD104	2	3019029.1940	1315303.2320	0.11
17SW/SD105	2	3019325.1070	1316413.9000	**2.80**
17SW/SD106	8	3023374.5000	1318140.1100	**34.74**
17SW/SD107	8	3023399.7900	1318143.0100	**101.00**
17SW/SD108	8	3023400.6600	1318170.6100	**4.99**
17SW/SD109	8	3023428.3800	1318160.5300	**175.00**
17SW/SD110	8 and 9	3023445.2000	1318155.4800	**26.50**
17SW/SD111	8 and 9	3023460.8400	1318169.9000	**20.41**
17SW/SD112	9	3023480.3800	1318167.7200	**14.48**
17SW/SD113	9	3023496.5500	1318155.6400	**41.70**
17SW/SD114	9	3023530.8100	1318135.0400	**14.87**
17SW/SD115	9	3023573.9500	1318164.5600	**28.62**
17SW/SD116	9	3023599.2900	1318184.7700	**24.90**
17SW/SD117	9	3023609.1700	1318205.9100	**46.82**
17SW/SD118	9	3023621.5200	1318214.3300	**100.00**
17SW/SD119	9	3023635.7300	1318222.1000	**3.55**
17SW/SD120	9	3023660.1000	1318226.6000	0.10
CSS01	Not shown on figures	3022078.7722	1317721.9695	0.05
CSS02	Not shown on figures	3022116.2756	1317704.8051	0.05
CSS03	Not shown on figures	3022161.2598	1317839.9354	0.11
CSS04	Not shown on figures	3022268.5092	1317797.7798	0.07
CSS05	Not shown on figures	3022295.8410	1317677.8926	0.05
CSS06	Not shown on figures	3022454.5272	1317663.5388	0.83
GSS01	10	3022686.6150	1317760.7931	0.05

TABLE 2

EXISTING SAMPLING LOCATIONS AND ASSOCIATED PCB CONCENTRATIONS
SWMU 17 - TECHNICAL MEMORANDUM
NSA CRANE, CRANE INDIANA

Location	Figure	Easting	Northing	PCB, mg/kg
GSS02	10	3022444.3390	1317772.0200	0.65
GSS03	10	3022038.8010	1317592.7750	0.05
GSS04	10	3021950.6620	1317802.8080	0.05
GSS05	10	3022336.4280	1317676.9260	0.05
GSS06	10	3022351.0112	1317683.1309	0.05
GSS07	10	3022485.4700	1317675.4260	0.12
GSS08	10	3022504.7350	1317649.2110	0.05

Black shading indicates values greater than or equal to 1 mg/kg

TABLE 3

SUMMARY OF SAMPLE ANALYSES AND QUALITY CONTROL SAMPLES
SWMU 17 – PCB CAPACITOR BURIAL/POLE YARD
QAPP ADDENDUM NO. 4 – TECHNICAL MEMORANDUM
NSA CRANE
CRANE, INDIANA

Sample Type	PCBs
	SW-8082A (Soil)
Total Samples	350[3]
Matrix Spikes [1]	18
Matrix Spike Duplicates [2]	18

1. Matrix spikes are collected for all organic and inorganic parameters at a frequency of 1 per every 20 field samples.

2. Matrix spike duplicates are collected for all organic parameters. Matrix spike duplicates are collected at a frequency of 1 per every 20 samples.

3. The number in this table is based on 125 soil sampling locations representing 166 surface soil samples and 157 subsurface soil samples, plus one composite soil sample from each of 27 planned test pits. The actual number of soil samples collected may differ from these estimates.

P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU 17-FIGURE 1.MXD 10/10/11 MKB KoP

N

Boggs Creek Stream Segment 1 (0.18 lbs of PCB)

Stream Segment 2 (1.22 lbs of PCB)

Stream Segment 3 (0.41 lbs of PCB)

Stream Segment 4 (0.67 lbs of PCB)

Stream Segment 5 (0.34 lbs of PCB)

Stream Segment 6 (2.04 lbs of PCB)

BOGGS CREEK

DITCH 3

DITCH 3

DITCH 3

Drainage Channel Segment 1 (9.05 lbs of PCB)

Drainage Channel Segment 2 (0.17 lbs of PCB)

Drainage Channel Segment 3 (0.18 lbs of PCB)

Northwest Ditch

Ditch 2

Ditch 8a

Ditch 8b

MATCH LINE FIGURE 2

2219

2220

2221

3072

3161

0357

0356

0355

0354

0353

2721

2516

2516

2624

2984

0301

200 0 200 Feet

Legend

- Building
- Area to be Excavated
- Surface Soil Area Containing PCB Contamination
- Curb Line
- Railroad
- Stream
- Stream Segment Containing PCB Contamination
- Stream Segment Break
- Drainage Ditch Segment Containing PCB Contamination
- Topographic Contour (5-ft Interval)

AREAS OF CONTAMINATION
SWMU 17 PCB CAPACITOR BURIAL/POLE YARD
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER CTO F271

APPROVED BY — DATE —

APPROVED BY — DATE —

FIGURE NO. FIGURE 1

REV 0

NAVFAC

DRAWN BY J. ENGLISH DATE 04/29/10

CHECKED BY T. JOHNSON DATE 10/10/11

REVISED BY MK BOND DATE 10/10/11

SCALE AS NOTED

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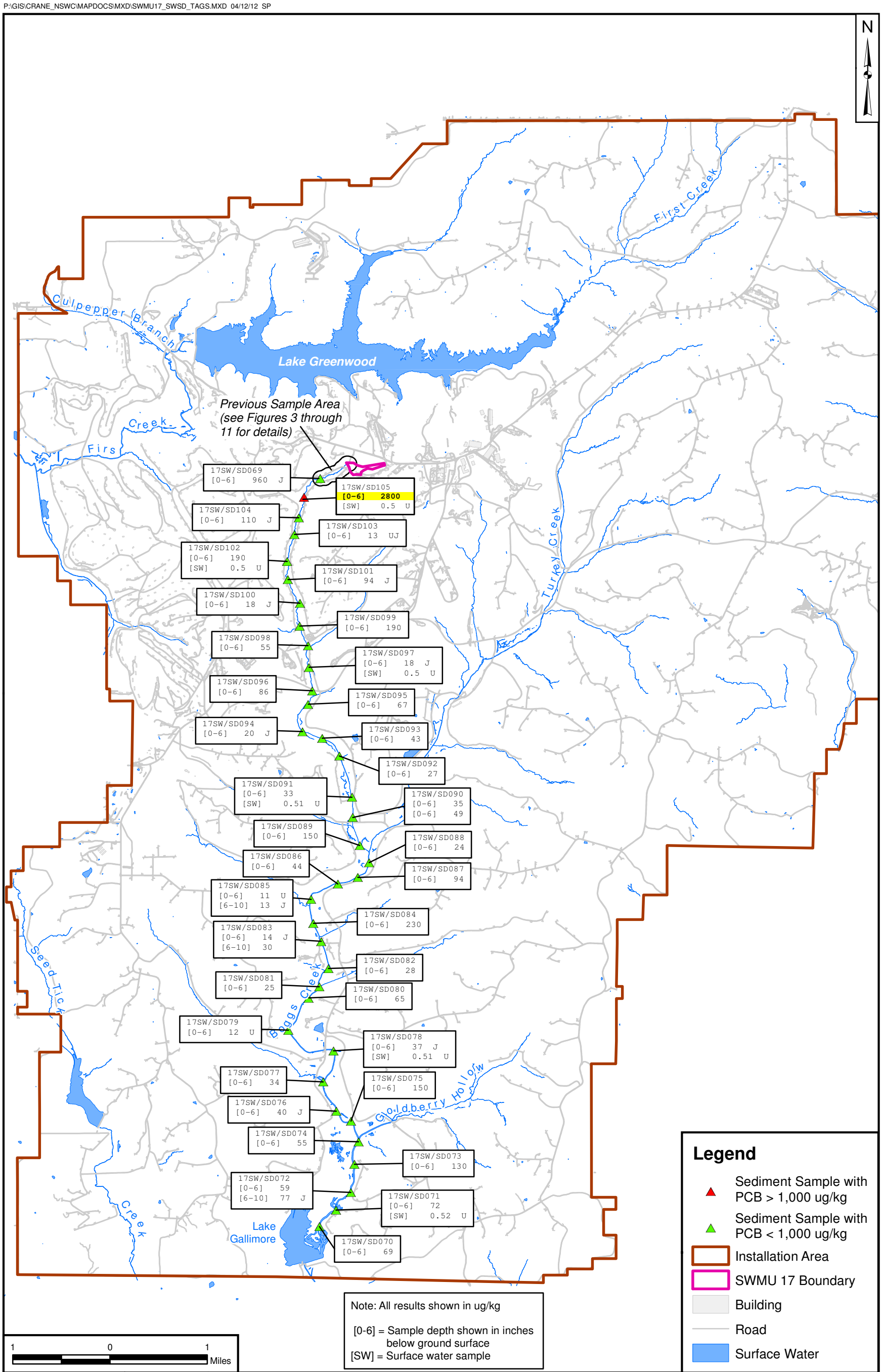


Note: All results shown in ug/kg

[0-6] = Sample depth shown in inches below ground surface
[SW] = Surface water sample

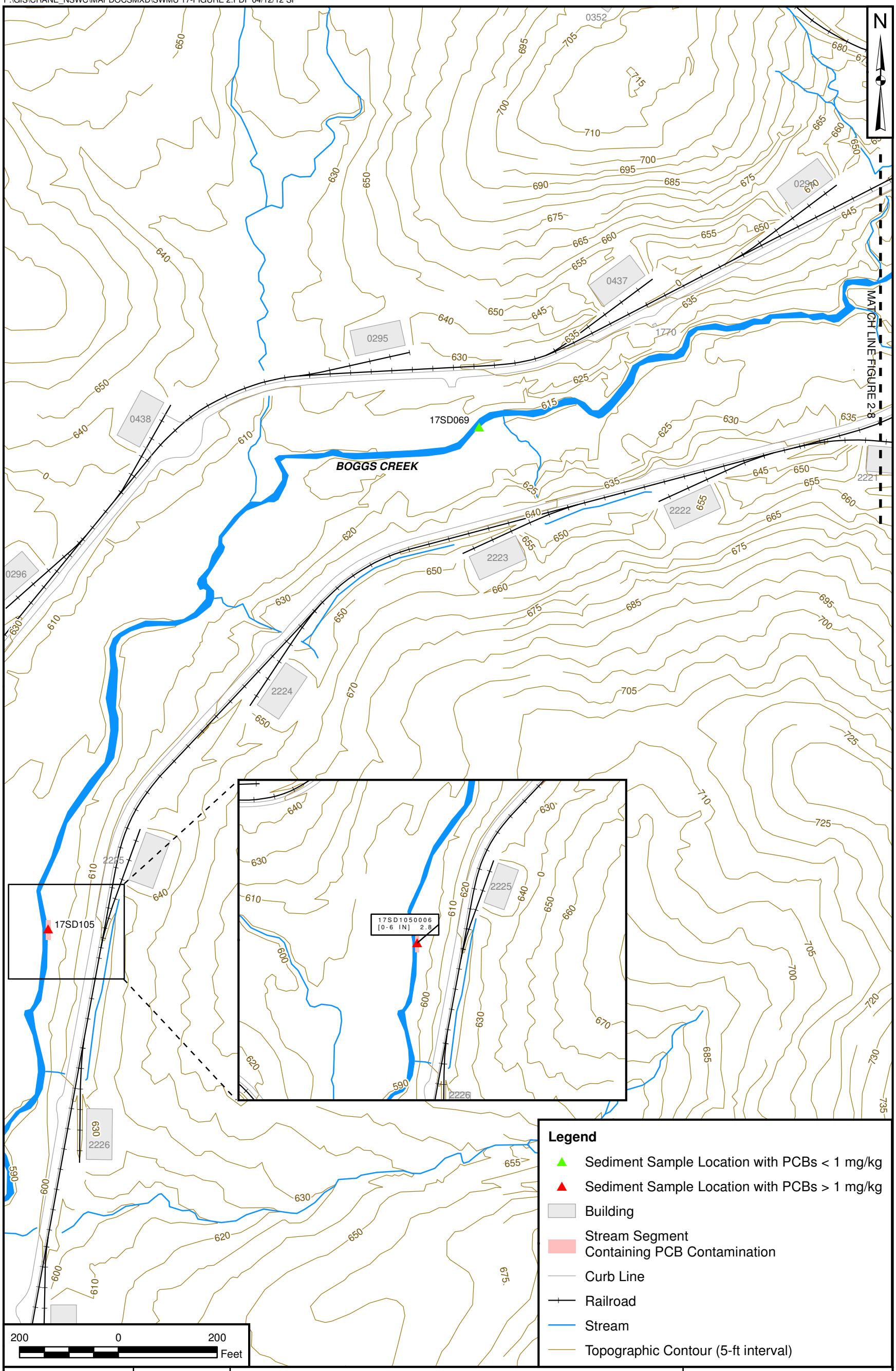
DRAWN BY / DATE	T. WHEATON 05/21/10
CHECKED BY / DATE	B. COLLINS 04/12/12
REVISED BY / DATE	S. PAXTON 04/12/12
SCALE	AS NOTED

NAVFAC

FIELD INVESTIGATION SAMPLE RESULTS - BOGGS CREEK DETAIL
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	F271
APPROVED BY / DATE	___ ___
APPROVED BY / DATE	___ ___
FIGURE NO.	FIGURE 2
REV	0

P:\GIS\CRANE_NSWC\MAPDOCSMXD\SWMU 17-FIGURE 2.PDF 04/12/12 SP



DRAWN BY	DATE	SEDIMENT LOCATION 17SD105 DETAILS SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION NSA CRANE CRANE, INDIANA	CONTRACT NUMBER CTO F271
J. ENGLISH	06/18/10		
CHECKED BY	DATE		APPROVED BY / DATE — / —
T. JOHNSON	04/12/12		
REVISED BY	DATE		APPROVED BY / DATE — / —
S. PAXTON	04/12/12		
SCALE AS NOTED		NAVFAC	FIGURE NO. FIGURE 3 REV 0

P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU17_PCB_JAN2011_3R.MXD 04/11/12 SP

N

Boggs Creek Stream Segment 1

Ditch 3

Northwest Ditch

Stream Flow Direction

MATCH LINE FIGURE 4

17SB85 12-18 IN 18-24 IN 24-30 IN 30-36 IN BEDROCK

17SB85 [0-12 IN] 4.3

17SB86

17SB90 [0-6 IN] 4.2 [6-12 IN] 11.7

17SB90 12-18 IN 18-24 IN 24-30 IN 30-36 IN

17SB91

17SB107 [0-6 IN] 1.6 [6-12 IN] 0.375

17SB106 [0-6 IN] 24.5 [6-12 IN] 8.2

17SB110

17SB109

17SB111

17SB112

17SB113

17SB114

17SB115 12-18 IN 18-24 IN 24-30 IN

17SB115 [0-6 IN] 1.8 [6-12 IN] 1.2

17SB116 [0-6 IN] 5.3 [6-12 IN] 3.7

17SB116 12-18 IN 18-24 IN 24-30 IN BEDROCK

17SB117 [0-6 IN] 1.8 [6-12 IN] 2.4

17SB117 12-18 IN 18-24 IN 24-30 IN 30-36 IN BEDROCK

17SB118 [0-6 IN] 1.9 [6-12 IN] 3.7

17SB118 12-18 IN 18-24 IN 24-30 IN 30-36 IN

17SB119 [0-6 IN] 4.8 [6-12 IN] 4.4

17SB119 12-18 IN 18-24 IN 24-30 IN

17SB120 [0-6 IN] 8.2 [6-12 IN] 5.5

17SB120 12-18 IN 18-24 IN 24-30 IN 30-36 IN

17SB121

17SB122 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB123 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB124 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB125 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB126 0-6 IN 6-12 IN 12-18 IN 18-24 IN

17SB127 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB128 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB129 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB130 0-6 IN 6-12 IN 12-18 IN 18-24 IN

17SB131 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB132 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB133 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SB134 0-6 IN 6-12 IN 12-18 IN 18-24 IN 24-30 IN

17SD005 [0-6 IN] 1.7

17SD020

17SD023

17SD030

17SD031

17SD032

17SD033 [0-6 IN] 1.3

17SD034

17SD039

17SD041

675 670 665 660 655 650 645 640

30 0 30 Feet

Notes:
1) Sample results represent total PCBs (summation of aroclor results). Results reported in mg/kg.
2) Samples without tags were non-detect or < 1 mg/kg for PCBs.

Legend

- Planned Sample Location
- Sample Not Collected (no floodplain present)
- Stream Segment Break
- Railroad
- Topographic Contour (5-ft interval)
- Floodplain Containing PCB Contamination in the Surface Soil
- Area to be Excavated
- Floodplain (based of field observations)
- Stream Segment Containing PCB Contamination
- Building
- Curb Line
- Stream
- Surface Water

CONTRACT NUMBER CTO F271

APPROVED BY — DATE —

APPROVED BY — DATE —

FIGURE NO. FIGURE 4

REV 0

2005-06-11 SAMPLE RESULTS AND PLANNED SAMPLES - STREAM SEGMENT 1
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY	J. NOVAK	DATE	04/05/12	SCALE	AS NOTED
CHECKED BY	T. JOHNSTON	DATE	04/12/12		
REVISED BY	S. PAXTON	DATE	04/12/12		

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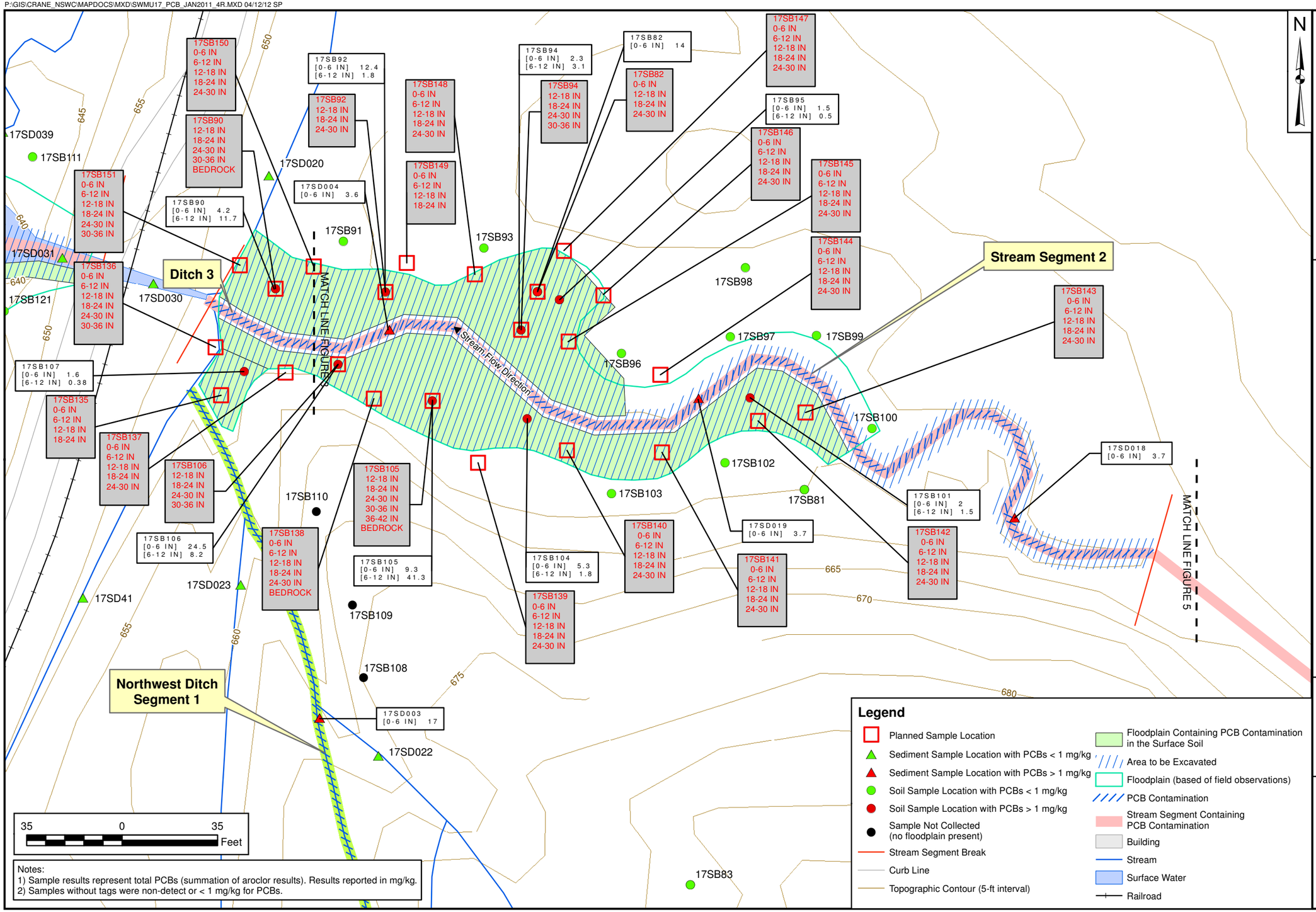

Notes:
1) Sample results represent total PCBs (summation of aroclor results). Results reported in mg/kg.
2) Samples without tags were non-detect or < 1 mg/kg for PCBs.

Legend

- Planned Sample Location
- Sediment Sample Location with PCBs < 1 mg/kg
- Sediment Sample Location with PCBs > 1 mg/kg
- Soil Sample Location with PCBs < 1 mg/kg
- Soil Sample Location with PCBs > 1 mg/kg
- Sample Not Collected (no floodplain present)
- Stream Segment Break
- Curb Line
- Topographic Contour (5-ft interval)
- Floodplain Containing PCB Contamination in the Surface Soil
- Area to be Excavated
- Floodplain (based of field observations)
- PCB Contamination
- Stream Segment Containing PCB Contamination
- Building
- Stream
- Surface Water
- Railroad

CONTRACT NUMBER CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

FIGURE NO. FIGURE 5

REV 0

2005-06-11 SAMPLE RESULTS AND PLANNED SAMPLES - STREAM SEGMENT 2
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY	DATE	CHECKED BY	DATE	REVISED BY	DATE
J. NOVAK	04/05/12	T. JOHNSTON	04/12/12	S. PAXTON	04/12/12

SCALE AS NOTED

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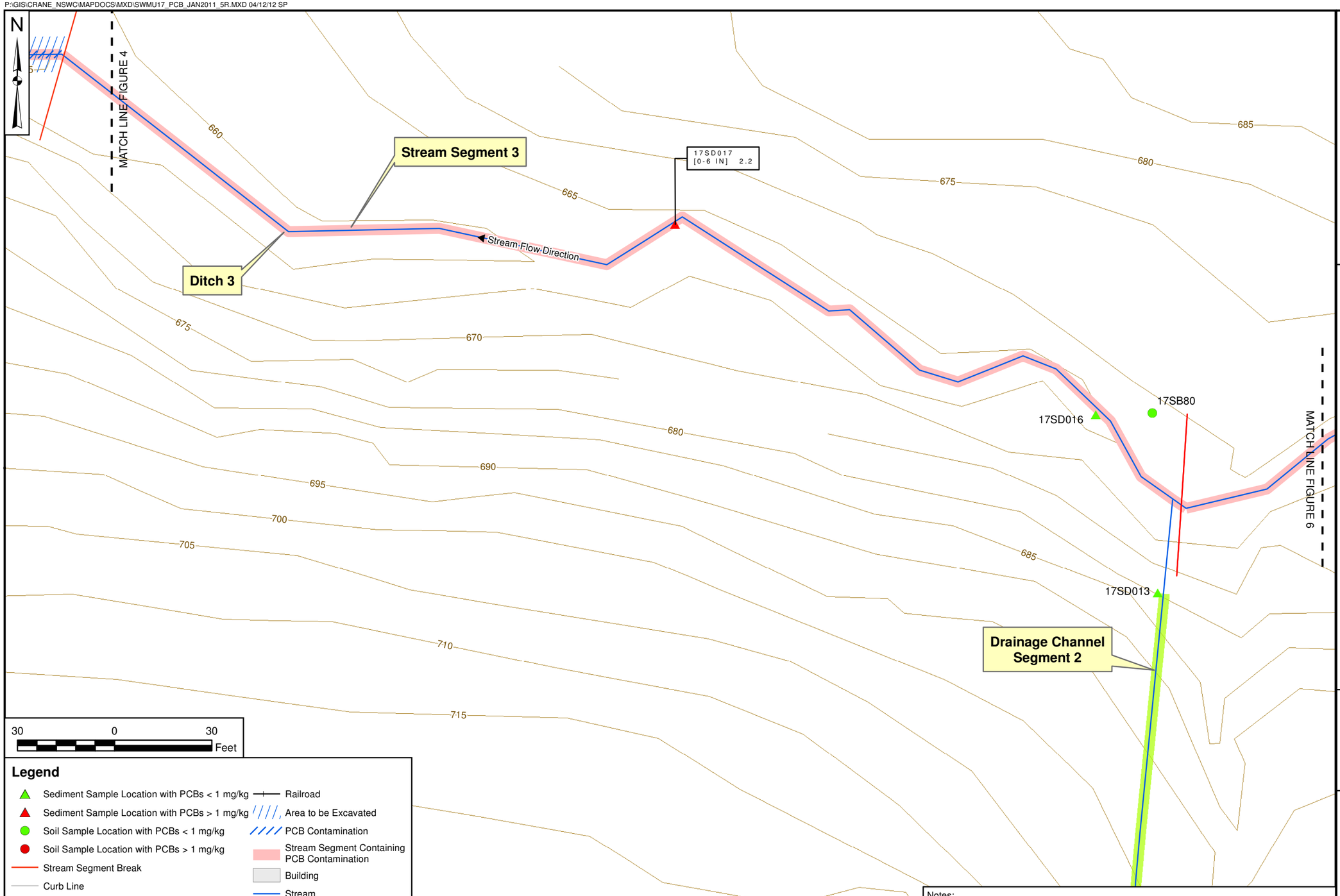

Legend

- Sediment Sample Location with PCBs < 1 mg/kg
- Sediment Sample Location with PCBs > 1 mg/kg
- Soil Sample Location with PCBs < 1 mg/kg
- Soil Sample Location with PCBs > 1 mg/kg
- Stream Segment Break
- Curb Line
- Topographic Contour (5-ft interval)
- Railroad
- Area to be Excavated
- PCB Contamination
- Stream Segment Containing PCB Contamination
- Building
- Stream
- Surface Water

Notes:
1) Sample results represent total PCBs (summation of aroclor results). Results reported in mg/kg.
2) Samples without tags were non-detect or < 1 mg/kg for PCBs.

CONTRACT NUMBER
CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

FIGURE NO. FIGURE 6

REV 0

2005-06-11 SAMPLE RESULTS AND PLANNED SAMPLES - STREAM SEGMENT 3
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY	DATE	CHECKED BY	DATE	REVISED BY	DATE	SCALE
J. NOVAK	04/05/12	T. JOHNSTON	04/12/12	S. PAXTON	04/12/12	AS NOTED

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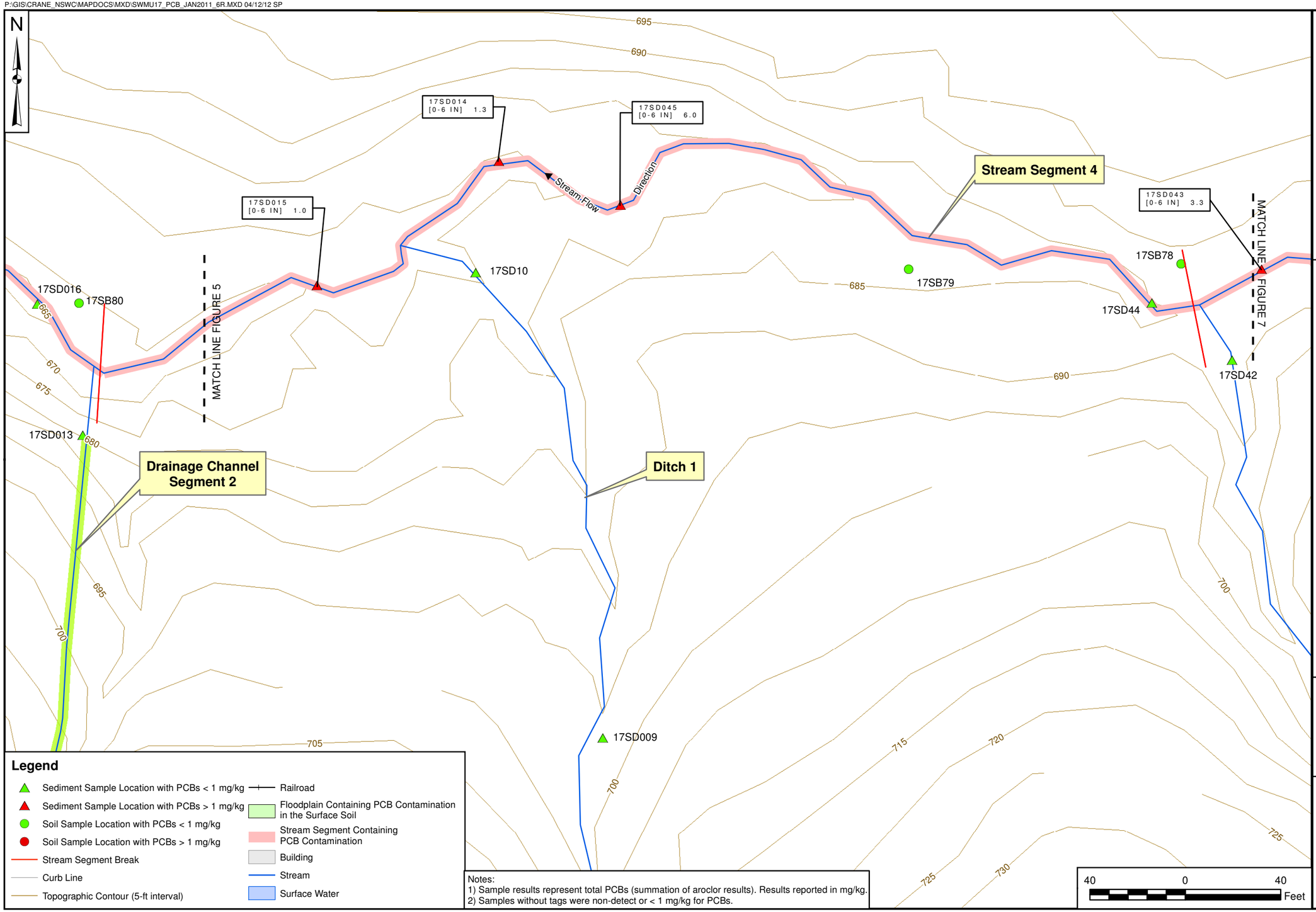


Legend

- Sediment Sample Location with PCBs < 1 mg/kg
- Sediment Sample Location with PCBs > 1 mg/kg
- Soil Sample Location with PCBs < 1 mg/kg
- Soil Sample Location with PCBs > 1 mg/kg
- Stream Segment Break
- Curb Line
- Topographic Contour (5-ft interval)
- Railroad
- Floodplain Containing PCB Contamination in the Surface Soil
- Stream Segment Containing PCB Contamination
- Building
- Stream
- Surface Water

Notes:
1) Sample results represent total PCBs (summation of aroclor results). Results reported in mg/kg.
2) Samples without tags were non-detect or < 1 mg/kg for PCBs.

40 0 40 Feet

CONTRACT NUMBER
CTO F271

APPROVED BY — DATE —

APPROVED BY — DATE —

FIGURE NO. FIGURE 7

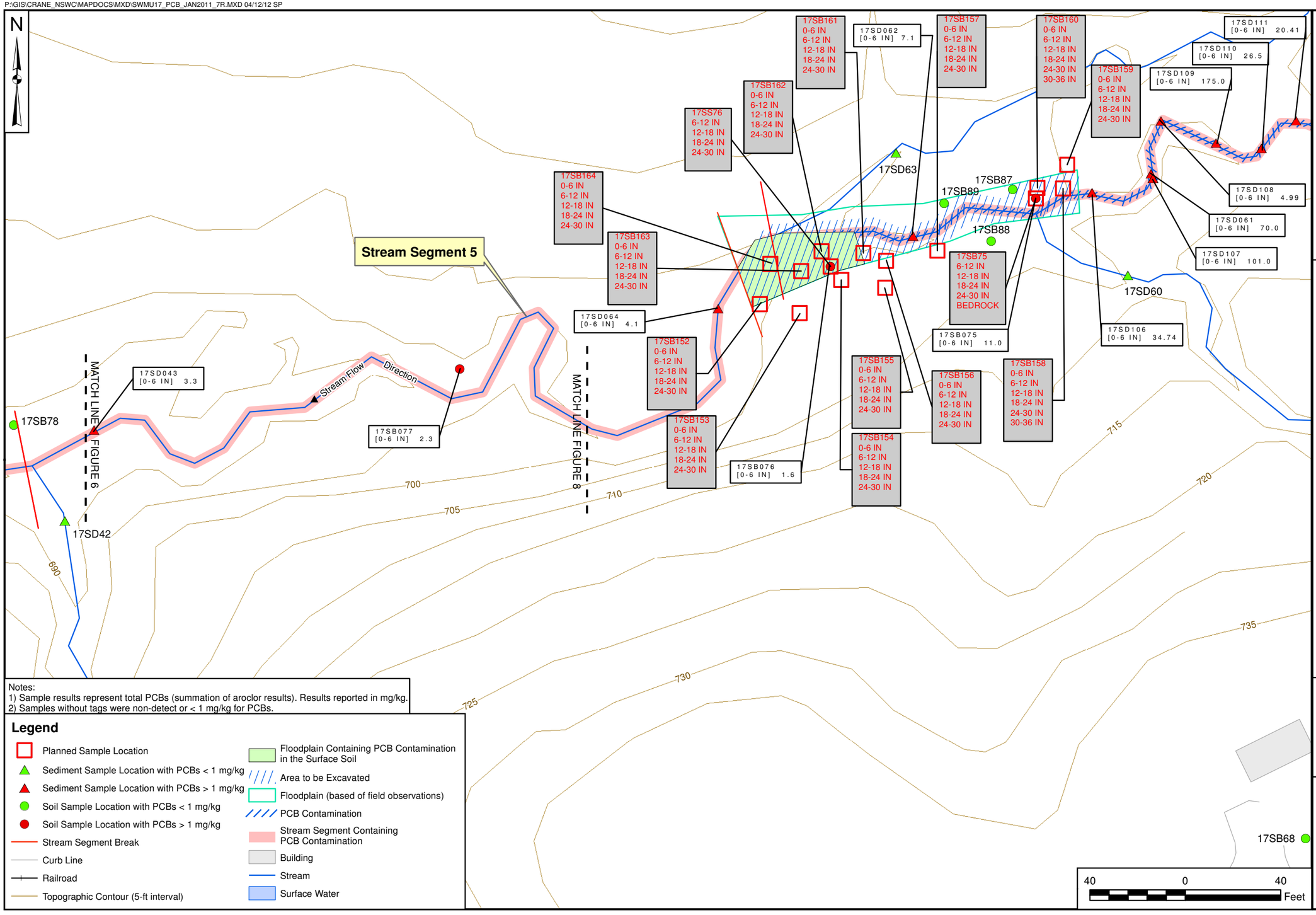
REV 0

2005-06-11 SAMPLE RESULTS AND PLANNED SAMPLES - STREAM SEGMENT 4
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY	DATE	CHECKED BY	DATE	SCALE
J. NOVAK	04/05/12	T. JOHNSTON	04/12/12	AS NOTED
REVISED BY	DATE			
S. PAXTON	04/12/12			

P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU17_PCB_JAN2011_7R.MXD 04/12/12 SP



Notes:
1) Sample results represent total PCBs (summation of aroclor results). Results reported in mg/kg.
2) Samples without tags were non-detect or < 1 mg/kg for PCBs.

Legend

- Planned Sample Location
- Sediment Sample Location with PCBs < 1 mg/kg
- Sediment Sample Location with PCBs > 1 mg/kg
- Soil Sample Location with PCBs < 1 mg/kg
- Soil Sample Location with PCBs > 1 mg/kg
- Stream Segment Break
- Curb Line
- Railroad
- Topographic Contour (5-ft interval)
- Floodplain Containing PCB Contamination in the Surface Soil
- Area to be Excavated
- Floodplain (based of field observations)
- PCB Contamination
- Stream Segment Containing PCB Contamination
- Building
- Stream
- Surface Water

CONTRACT NUMBER
CTO F271

APPROVED BY ___ DATE ___

APPROVED BY ___ DATE ___

FIGURE NO. FIGURE 8

REV 0

2005-06-11 SAMPLE RESULTS AND PLANNED SAMPLES -
STREAM SEGMENTS 5 AND 6
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY	DATE	CHECKED BY	DATE	REVISED BY	DATE
J. NOVAK	04/05/12	T. JOHNSTON	04/12/12	S. PAXTON	04/12/12

SCALE
AS NOTED

PGH P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU17_PCB_JAN2011_8R.MXD 04/12/12 SP

N

17SD59

17SD118
[0-6 IN] 4.7
[6-12 IN] 100

17SD119
[0-6 IN] 2.3
[6-12 IN] 3.6

17SD117
[0-6 IN] 30
[0-6 IN] 9.5
[6-12 IN] 9.3
[12-24 IN] 46.8

17SD116
[0-6 IN] 23
[6-12 IN] 24.9
[12-24 IN] 8.9

17SD110
[0-6 IN] 26.5

17SD111
[0-6 IN] 20.4

17SD112
[0-6 IN] 14.5

17SD113
[0-6 IN] 41.7

17SD115
[0-6 IN] 28.6

17SD114
[0-6 IN] 14.9

Stream Segment 6

17SB54
17SB64
17SB60
17SB61
17SD120
17SD058
17SB65
17SB51
17SB52
17SB50
17SB62
17SB53
17SB63
17SB169
0-2 FT
2-4 FT
4-6 FT
17SB231
0-2 FT
2-4 FT
4-6 FT
17SB165
0-2 FT
2-4 FT
4-6 FT
17SB168
0-2 FT
2-4 FT
4-6 FT
17SB170
0-2 FT
2-4 FT
4-6 FT
17SB56
17SB66
17SB232
0-2 FT
2-4 FT
4-6 FT
17SB55
[0-24 IN] 73
17SB55
2-4 FT
4-6 FT
BEDROCK
17SB167
0-2 FT
2-4 FT
4-6 FT
17SB166
0-2 FT
2-4 FT
4-6 FT
17SB57
17SB58
17SB59
17SD57
17SB67
17SB68
2721

740
730
725
710
735
715
720
740

Notes:
1) Sample results represent total PCBs (summation of aroclor results). Results reported in mg/kg.
2) Samples without tags were non-detect or < 1 mg/kg for PCBs.

Legend

- Planned Sample Location
- Sediment Sample Location with PCBs < 1 mg/kg
- Sediment Sample Location with PCBs > 1 mg/kg
- Soil Sample Location with PCBs < 1 mg/kg
- Soil Sample Location with PCBs > 1 mg/kg
- Stream Segment Break
- Surface Soil Area Containing PCB Contamination
- PCB Contamination
- Curb Line
- Railroad
- Topographic Contour (5-ft interval)
- Stream
- Building
- Surface Water

40 0 40 Feet

DRAWN BY	DATE
J. NOVAK	04/06/12
CHECKED BY	DATE
T. JOHNSTON	04/12/12
REVISED BY	DATE
S. PAXTON	04/12/12
SCALE	
AS NOTED	

NAVFAC

2005-06-11 SAMPLE RESULTS AND PLANNED SAMPLES - STREAM SEGMENT 6
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	CTO NUMBER
—	F271
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 9	0

P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU17_PCB_JAN2011_9R.MXD 04/12/12 SP

N

Northwest Ditch

Ditch 2

Ditch 8a

DUMP AREA

Stream Flow Direction

Sample Location GSS01
Approximately 160' East

17SD002 (0-2 FT) 25
17SB04T (0-2 FT) 10
17SB03T (0-2 FT) 33
17SB02T (0-2 FT) 31
17SB01T (0-2') 3.1
17SD001 (1-6 IN) 37
17SB172 2-4 FT 4-6 FT
17EWPIT30002 (0-1') 41
17SB171 2-4 FT 4-6 FT
17SB38 (2-4 FT) 1.6
17SB173 2-4 FT 4-6 FT 6-8 FT
17FL-B-010 (2 FT) 55
17FL-B-009 (2 FT) 81
17SB175 2-4 FT 4-6 FT 6-8 FT
17SB176 2-4 FT 4-6 FT 6-8 FT
17SB227 2-4 FT 4-6 FT
17SB226 2-4 FT 4-6 FT
17SB228 2-4 FT 4-6 FT
17SB196 2-4 FT 4-6 FT
17SB199 2-4 FT 4-6 FT
17SB198 2-4 FT 4-6 FT
17SB197 2-4 FT 4-6 FT
17SD007 (0-6 IN) 2.2
17SB183 2-4 FT 4-6 FT 6-8 FT
17SB174 2-4 FT 4-6 FT 6-8 FT
17SB181 2-4 FT 4-6 FT 6-8 FT
17SB180 2-4 FT 4-6 FT 6-8 FT
17SB177 2-4 FT 4-6 FT 6-8 FT
17SB179 2-4 FT 4-6 FT 6-8 FT
17SB178 2-4 FT 4-6 FT 6-8 FT
17SB182 2-4 FT 4-6 FT 6-8 FT
17FL-C-091 (2 FT) 24
17FL-C-090 (2 FT) 25
17FL-C-089 (2 FT) 16
17FL-C-088 (2 FT) 23
17FL-C-087 (2 FT) 19
17FL-C-086 (2 FT) 46
17FL-C-096 (2 FT) 58
17FL-C-095 (2 FT) 81
17EW-C-099 (2 FT) 29
17FL-C-094 (2 FT) 43
17EW-C-093 (2 FT) 28
17FL-C-092 (2 FT) 68
17FL-C-070 (2 FT) 30
17SB195 2-4 FT 4-6 FT 6-8 FT
17SB194 2-4 FT 4-6 FT 6-8 FT
17FL-C-069 (2 FT) 27
17SB185 2-4 FT 4-6 FT 6-8 FT
17SB184 2-4 FT 4-6 FT 6-8 FT
17SB186 2-4 FT 4-6 FT 6-8 FT
17SB187 2-4 FT 4-6 FT 6-8 FT
17FL-C-072 (3 FT) 26
17SB193 2-4 FT 4-6 FT 6-8 FT
17FL-C-073 (3 FT) 72
17SB188 2-4 FT 4-6 FT 6-8 FT
17FL-C-098 (3 FT) 55
17SB192 2-4 FT 4-6 FT 6-8 FT
17SB190 2-4 FT 4-6 FT 6-8 FT
17SB191 2-4 FT 4-6 FT 6-8 FT
17SB09T (0-2 FT) 31
17FL-C-097 (2 FT) 78
17SB208 2-4 FT 4-6 FT
17SB209 2-4 FT 4-6 FT
17SB211 2-4 FT 4-6 FT 6-8 FT
17SB189 2-4 FT 4-6 FT 6-8 FT
17SD011 (0-6 IN) 1.8
17SB206 2-4 FT 4-6 FT
17SB204 2-4 FT 4-6 FT
17SB207 2-4 FT 4-6 FT
17SB205 2-4 FT 4-6 FT
17SB203 2-4 FT 4-6 FT
17SB200 2-4 FT 4-6 FT
17SB201 2-4 FT 4-6 FT
17FLD104 (17SB213) 2-4 FT 4-6 FT
17SB202 2-4 FT 4-6 FT
17FLD103 (17SB212) 2-4 FT 4-6 FT
17FLD101 (17SB214) 2-4 FT 4-6 FT
17FLD046 (17SB217) 2-4 FT 4-6 FT
17FLD045 (17SB214) 2-4 FT 4-6 FT
17FLD040 (17DB218) 2-4 FT 4-6 FT
17FLD047 (17SB219) 2-4 FT 4-6 FT
17SB229 0-2 FT 2-4 FT 4-6 FT
17FLD041 (17SB220) 2-4 FT 4-6 FT
17SB230 0-2 FT 2-4 FT 4-6 FT
17FLD042 (17SB222) 2-4 FT 4-6 FT
17FLD036 (17SB221) 2-4 FT 4-6 FT
17FLD043 (17SB223) 2-4 FT 4-6 FT
17FLD037 (17SB224) 2-4 FT 4-6 FT
17SB210 2-4 FT 4-6 FT
17FLD029 2-4 FT 4-6 FT
17FLD034 2-4 IN 4-6 IN
17FLD035 2-4 IN 4-6 IN
3072
0357
3161

Legend

- Soil Boring representing total PCB concentrations < 1 mg/kg in excavation subsurface or in surface soil outside excavation
- Soil Boring with Total PCB concentrations potentially greater than 1 mg/kg deeper than 2 feet below ground surface
- Planned Sample Location
- Stream
- Stream Segment Break
- Topographic Contour (2-ft interval)
- Toltest IM Excavation (approximate)
- Drainage Ditch Segment Containing PCB Contamination

NOTES:
1. Total PCB concentrations in mg/kg.
2. Samples without tags did not have PCBs > 25 mg/kg for subsurface samples (≥ 2 ft), or > 1 mg/kg for surface samples (0-2 ft).
3. Samples CSS01 through CSS06 (interspersed among locations shown on this figure) are not shown. All CSS01 through CSS06 PCB concentrations were less than 1 mg/kg

50 0 50 Feet

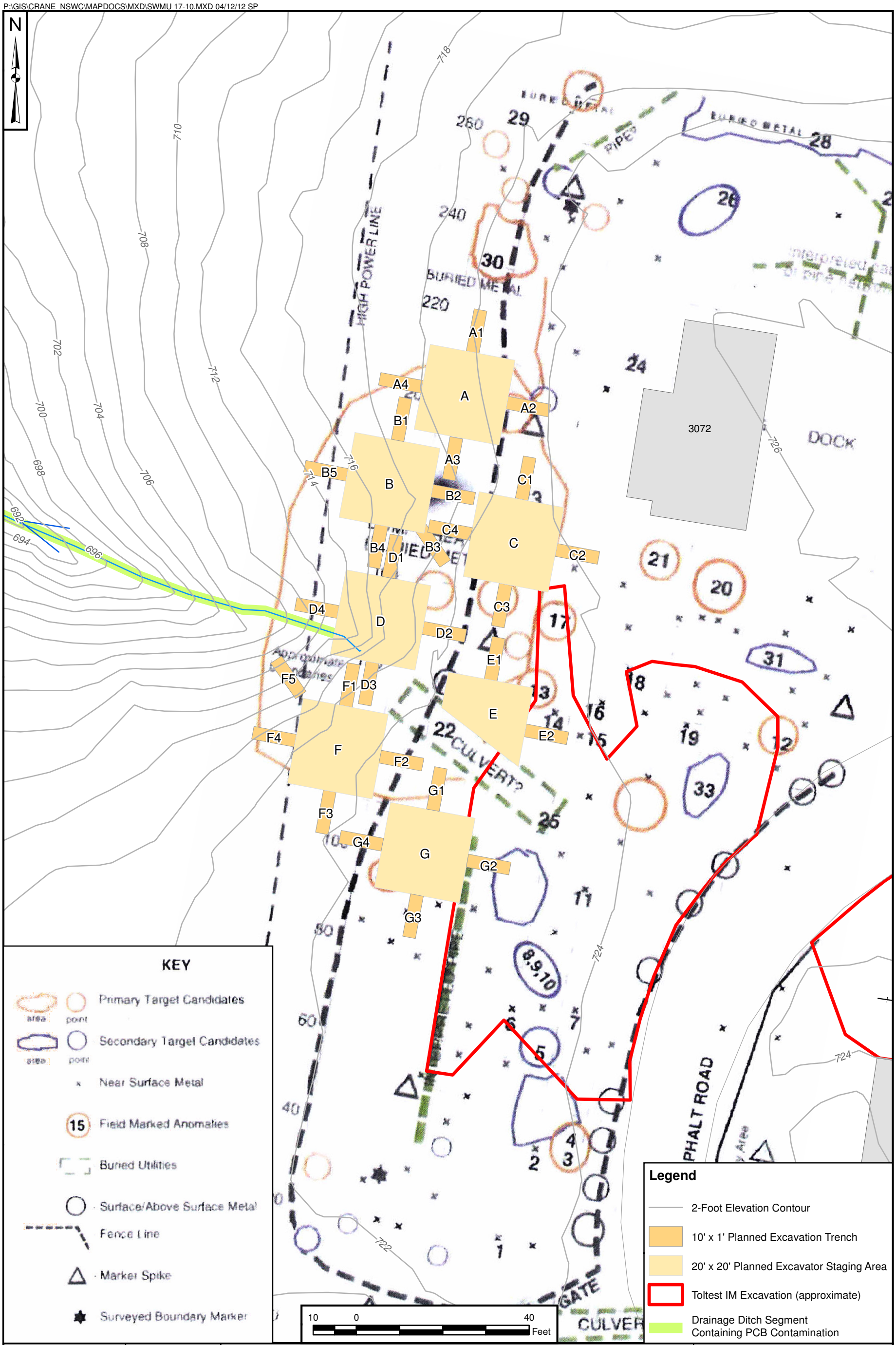
CONTRACT NUMBER CTO F271
APPROVED BY —
APPROVED BY —
FIGURE NO. FIGURE 10
REV 0

PREVIOUS EXCAVATION AREA RESIDUAL PCB CONCENTRATIONS AND PLANNED SAMPLES
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

NAVFAC

DRAWN BY	K. MOORE	DATE	9/20/11	SCALE	AS NOTED
CHECKED BY	T. JOHNSON	DATE	04/12/12		
REVISED BY	S. PAXTON	DATE	04/12/12		

P:\GIS\CRANE_NSWC\MAPDOCS\MXD\SWMU 17-10.MXD 04/12/12 SP



DRAWN BY	DATE
K. MOORE	9/20/11
CHECKED BY	DATE
T. JOHNSON	04/12/12
REVISED BY	DATE
S. PAXTON	04/12/12
SCALE	
AS NOTED	

NAVFAC

NOMINAL TEST PIT OCATIONS
SWMU 17 - PCB CAPACITOR BURIAL/POLE YARD
TECH MEMO FOR SAMPLING TO SUPPORT PRESCRIPTIVE REMEDIATION
NSA CRANE
CRANE, INDIANA

CONTRACT NUMBER	
CTO F271	
APPROVED BY	DATE
—	—
APPROVED BY	DATE
—	—
FIGURE NO.	REV
FIGURE 11	0

APPENDIX A

ELECTRONIC MAIL MESSAGES REGARDING LAKE GALLIMORE FISH TISSUE PCB CONTENT AND ITS EFFECT ON BALD EAGLE REPRODUCTION

From:	Brent, Thomas CIV NAVFAC MW, PWD Crane EV
To:	Johnston, Tom
Subject:	FW: PCB FISH TISSUE ANALYSIS
Date:	Monday, December 12, 2011 3:03:05 PM
Attachments:	3020066-org.pdf

Tom J.,

Attached is the analytical from the Lake Gallimore fish tissue analysis conducted by USFWS. The relevant comment concerning Dan Spark's opinion on the source of the PCBs ("Based on these tissue concentrations, I am back to believing that foraging in the East Fork White River better explains the historic reproductive effects that these Lake Gallimore eagles have sporadically had.") is actually from his email below.

Thanks,
Tom B.

-----Original Message-----
From: Brent, Thomas CIV NSWC Crane Environmental
Sent: Tuesday, August 26, 2008 11:09
To: Hickey, Howard M CIV NAVFAC MW EV
Subject: FW: PCB FISH TISSUE ANALYSIS

My bad. Here's the report.

From: Brent, Thomas CIV NSWC Crane Environmental
Sent: Wednesday, August 13, 2008 12:36
To: Andrews, Steven CIV NAVFAC MW; Ralph Basinski (Ralph.Basinski@ttnus.com)
Cc: Hunsicker, James NAVSEA
Subject: FW: PCB FISH TISSUE ANALYSIS

Ralph/Steve,

Attached (at long last) are the results of the fish tissue analyses from Lake Gallimore. Dan's summary below is quite encouraging. Enjoy!

-Tom

From: Daniel_Sparks@fws.gov [mailto:Daniel_Sparks@fws.gov]
Sent: Wednesday, August 13, 2008 11:24
To: Brent, Thomas CIV NSWC Crane Environmental
Cc: Ramanauskas.Peter@epamail.epa.gov; GRIFFIN, DOUG
Subject: Re: PCB FISH TISSUE ANALYSIS

Tom -

Attached is a copy of the results of our fish tissue analysis. The catalog consisted of 3 composite samples. The first was a whole body composite of spotted suckers and it contained 0.396 ppm total PCBs wet weight. The next two samples are related: one of these was a composite sample of all of the fillets, and the other was a composite sample of the fillet-less carcasses. This was done so that mathematically, these two samples could be combined and a whole body concentration could be

estimated. The fillet sample had a concentration of 0.0519 ppm wet weight and the carcass sample contained 0.430 ppm wet weight. I haven't done the math to put these two back together to get a whole fish estimate, but it will not be much different than the other whole fish composite sample.

Although whole fish tissue concentrations at this level are not ideal and it does show some downstream migration from the PCB sources, I think that it clearly shows that emphasizing the cleanup efforts in the upstream areas is most appropriate. The fillet samples are at the threshold of a level 1 / level 2 fish consumption advisory so that too is good news.

Based on these tissue concentrations, I am back to believing that foraging in the East Fork White River better explains the historic reproductive effects that these Lake Gallimore eagles have sporadically had. (In the mid-1990s we had two eggs from this nest greater than 20 ppm, fresh wet weight).

It looks like the organochlorine pesticide levels are representative of background conditions for Indiana as well.

I apologize that it has taken this long to generate this information. And when the remaining QA/QC information are available I will send this along (see the note below from my analytical control facility folks).

Thanks for your patience.

Dan

Hi Dan,

We are still waiting for GERG to send us the spike and duplicate QA/QC data associated with your results. However, I have included the Analytical Results Report anyway. Our organic chemist, Walt Riley, looked over the results and the QA/QC blank data and did not find any problems.

Because your catalog was small, GERG combined it with another catalog when it was processed, with regards to the spike and duplicate data. Therefore, until the other catalog is completely done, they will not provide us with the rest of the QA/QC data.

APPENDIX B

STANDARD OPERATING PROCEDURES FOR FIELD OPERATIONS

STANDARD OPERATING PROCEDURE
SOP-01

SAMPLE LABELING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures to be used for labeling sample containers. Sample labels are used to document the sample identification number (ID), date, time, analysis to be performed, preservative, matrix, sampler, and the analytical laboratory. A sample label will be attached to each sample container.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Writing utensil (preferably black pen with indelible ink)
- Disposable medical-grade gloves (e.g. latex, nitrile)
- Sample log sheets
- Required sample containers: All sample containers for analysis by a fixed-base laboratory will be supplied and deemed certified-clean by the laboratory.
- Sample labels
- Chain-of-custody records
- Sealable polyethylene bags
- Heavy-duty cooler
- Ice

3.0 PROCEDURE

Note: An example of a sample label is attached at the end of this SOP.

3.1 Include the following container-specific information on each sample label:

- Project Number
- Sample Location ID
- Contract Task Order Number (CTO F271)
- Sample ID

- Sample Matrix
- Preservative
- Analysis to be Performed
- Laboratory Name

3.2 Select the container(s) that are appropriate for a given sample.

3.3 Based on the preservative in the container and type of container material

3.3.1 Affix to each selected container the label containing the sample-specific ID, sample date, time, and sampler name.

3.3.2 Sequentially fill each container with appropriate sample material and securely close each container lid without overtightening.

3.4 Place each filled sample container in a sealable polyethylene bag then place it in a cooler containing ice.

4.0 ATTACHMENTS

1. Sample Label

ATTACHMENT 1
SAMPLE LABEL

<table>
<tr><td colspan="3">Tetra Tech NUS, Inc.
661 Andersen Drive
Pittsburgh, 15220
(412)921-7090
Project:
Location:
CTO:</td></tr>
<tr><td colspan="2">Sample No:</td><td>Matrix:</td></tr>
<tr><td>Date:</td><td>Time:</td><td>Preserve:</td></tr>
<tr><td colspan="3">Analysis:</td></tr>
<tr><td colspan="2">Sampled by:</td><td>Laboratory</td></tr>
</table>

STANDARD OPERATING PROCEDURE

SOP-02

SAMPLE IDENTIFICATION NOMENCLATURE

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to establish a consistent sample nomenclature system that facilitates subsequent data management at Naval Support Activity (NSA) Crane. The sample nomenclature system has been devised to attain the following objectives:

- Unique identification of each sample through assignment of a unique sample tracking number.
- Sorting of data by site, location, or matrix
- Maintenance of consistency (field, laboratory, and database sample numbers)
- Accommodation of all project-specific requirements
- Accommodation of laboratory sample number length constraints
- Ease of sample identification

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Writing utensil (preferably black pen with indelible ink)
- Sample tags
- Sample container labels

3.0 SAMPLE IDENTIFICATION NOMENCLATURE

3.1 Environmental Samples

Note: All environmental samples must be properly labeled with a sample label affixed to the sample container.

3.1.1 Environmental Sample Numbering Scheme for Soil Samples

Assign to each sample a unique sample tracking number. The sample tracking number will consist of a four- or five-segment alpha-numeric code that identifies the sample's associated Solid Waste Management Unit (SWMU) number, matrix code, sample location number, and sample depth interval.

For soil samples collected along Boggs Creek at SWMU 17, the following alphanumeric coding will be utilized:

NN	AA	NNN	NNNN (Soils only)
SWMU Number	Matrix Code	Sample Location Number	Depth interval from freshly exposed surface

Character Type:

A = Alpha
N = Numeric

SWMU Number (NN):

17 = SWMU 17

Matrix Code (AA):

SS = Surface Soil Sample
SB = Subsurface Soil Sample

Location Number (NNN):

Sequential numbering of sample IDs.

075 = Sample location 075

Depth Interval (NNNN):

The final four tracking numbers identify the depth in units of inches for all samples to depths down to 30-inches bgs. For all other sample locations greater than 24-inches bgs, the last four tracking numbers will identify the depth in feet.

Use the depth code to note the depth bgs at which a soil sample is collected. The first two numbers of the four-number code specify the top interval, and the third and fourth specify the bottom interval of the sample depth. Assign depths in whole numbers only; if needed, record further detail on the sample log sheet, boring log, logbook, etc.

Soil Sample Nomenclature Examples

A soil sample collected from soil boring location 119 at SWMU 17, at a depth of 12- to 18-inches bgs would be labeled as "17SS1191218".

A soil sample collected from soil boring location 55 at SWMU 17, at a depth of 4- to 6-feet bgs would be labeled as "17SB0550406".

3.1.2 Environmental Sample Numbering Scheme for Test Pit Samples

Assign sample tracking numbers for test pit composite samples to consist of a five-segment alpha-numeric code that identifies the sample's associated Solid Waste Management Unit (SWMU) number, sample origin, test pit group, location, and sample depth.

For soil samples collected from Test Pits at SWMU 17, the following alphanumeric coding will be utilized:

NN	AA	A	N	NNNN
SWMU Number	Sample Origin	Test Pit Cluster (Group)	Test Pit ID Within A Cluster (Group)	Test Pit Segment Depth Interval preceded by "C" to indicate composite sample

Character Type:

A = Alpha
N = Numeric

SWMU Number (NN):

17 = SWMU 17

Sample Origin (AA):

TP = Test Pit

Test Pit Cluster or Group (A):

B = Test Pit Cluster B

Test Pit ID (A):

3C = Test Pit 3, composite sample

Depth Interval (NNNN):

Use the final four tracking number digits to identify the depth in units of feet for all samples. The depth code is used to note the depth bgs at which a soil sample is collected. The first two numbers of the four-number code specify the top interval (i.e., "00"), and the third and fourth specify the bottom interval of the sample depth (this may vary with test pit). Assign depths in whole numbers only; if needed, record further detail on the sample log sheet, boring log, logbook, etc.

Test Pit Soil Sample Nomenclature Examples

A soil sample collected from Test Pit 3 within cluster (group) C representing a depth interval of 0- to 5-feet bgs at SWMU 17 would be labeled as "17TPC3C0005".

STANDARD OPERATING PROCEDURE

SOP-03

SAMPLE CUSTODY AND DOCUMENTATION OF FIELD ACTIVITIES

1.0 PURPOSE

This Standard Operating Procedure (SOP) establishes the procedures for sample custody and documentation of field sampling and field analyses activities.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

The following logbooks, forms, labels, and equipment are required.

- Writing utensil (preferably black pen with indelible ink)
- Site logbook
- Field logbook
- Sample label
- Chain-of-Custody Form
- Custody seals
- Equipment calibration log
- Soil Boring Log
- Soil and Sediment Sample Log Sheet

3.0 PROCEDURES

This section describes sample custody and documentation procedures. All entries made in the logbooks, custody documents, logs, and log sheets described in this SOP must be made in indelible ink (black is preferred). No erasures are permitted. If an incorrect entry is made, cross out the entry with a single strike mark, initial, and date the correction.

3.1 Site Logbook

The site logbook is a hard-bound, paginated, controlled-distribution record book in which all major on-site activities are documented. The site logbook is initiated at the start of the first on-site activity (e.g., site visit or initial reconnaissance survey).

3.1.1 Record the following information must be recorded on the cover of each site logbook:

- Project name
- Project number
- Book number
- Start date
- End date

3.1.2 At a minimum, record on a daily basis the following activities and events in the site logbook:

- All field personnel present
- Arrival/departure of site visitors
- Arrival/departure of equipment
- Start or completion of sampling activities
- Daily on-site activities performed each day
- Sample pickup information
- Health and safety issues
- Weather conditions

Note: Information recorded daily in the site logbook need not be duplicated in other field notebooks but must summarize the contents of these other notebooks and refer to specific page locations in these notebooks for detailed information (where applicable). At the completion of each day's entries, the site logbook must be signed and dated by the Tetra Tech Field Operations Leader (FOL).

3.2 Field Logbooks

The field logbook is a separate, dedicated notebook used by field personnel to document his or her activities in the field. This notebook is hardbound and paginated.

3.2.1 The following information must be recorded on the cover of each field logbook:

- Project name
- Project number
- Book number

- Start date
- End date

3.2.2 At a minimum, record on a daily basis the following activities and events in the field logbooks:

- Field personnel for activities in the field logbook
- Arrival/departure of site visitors
- Arrival/departure of equipment
- Start or completion of sampling activities
- Daily on-site activities performed each day
- Sample pickup information
- Health and safety issues
- Weather conditions

3.3 Sample Labels

Fill in and affix adhesive sample container labels must to every sample container. Information on the label includes the project name, location, sample number, date, time, preservative (if applicable), analysis, matrix, sampler's initials, and the name of the laboratory performing the analysis. Sample labeling and nomenclature are described in SOP-01 and SOP-02, respectively.

3.4 Chain-of-Custody Form

The Chain-of-Custody (COC) Form is a multi-part form that is initiated as samples are acquired and accompanies a sample (or group of samples) as it is transferred from person to person. This form must accompany any samples collected for laboratory chemical analysis. Each COC will be uniquely numbered. A copy of a blank COC form is attached at the end of this SOP.

3.4.1 Include the name of the laboratory in the upper right hand corner section of the sample label to ensure that the samples are forwarded to the correct location.

3.4.2 If more than one COC is necessary for any cooler, indicate "Page __ of __" on each COC.

3.4.3 Place the original (top) signed copy of the COC inside a sealable polyethylene bag and tape the bag inside the lid of the shipping cooler. Once the samples are received at the laboratory, the sample custodian will check the contents of the cooler(s) against the enclosed COC(s). Any problems will be noted on the enclosed COC Form (bottle breakage, discrepancies between the sample labels, COC form, etc.) and will be resolved through communication between the laboratory point-of-contact and the Tetra Tech Project Manager (PM). The COC form is signed and retained by the laboratory and becomes part of the sample's corresponding analytical data package.

3.5 Custody Seal

The custody seal is an adhesive-backed label and is part of the COC process. Custody seals are used to prevent tampering with samples after they have been collected in the field and sealed in coolers for transit to the laboratory.

Sampler(s) shall sign and date each custody seal and affix the seal across the opening edges of each cooler (two seals per cooler on opposite sides) containing environmental samples. The laboratory sample custodian will examine the custody seal for evidence of tampering and will notify the Tetra Tech PM if evidence of tampering is observed.

3.6 Equipment Calibration Log

The Equipment Calibration Log is used to document calibration of any measuring equipment used in the field. The Equipment Calibration Log documents that the manufacturer's instructions were followed for calibration of the equipment, including frequency and type of standard or calibration device.

Maintain an Equipment Calibration Log for each electronic measuring device requiring calibration.

Record calibration data on the Equipment Calibration Log daily Entries each day the equipment is used.

3.7 Sample Log Sheets

The Soil and Sediment Sample Log Sheets are used to document the sampling of soil. Copies of the sample log sheets are attached at the end of this SOP.

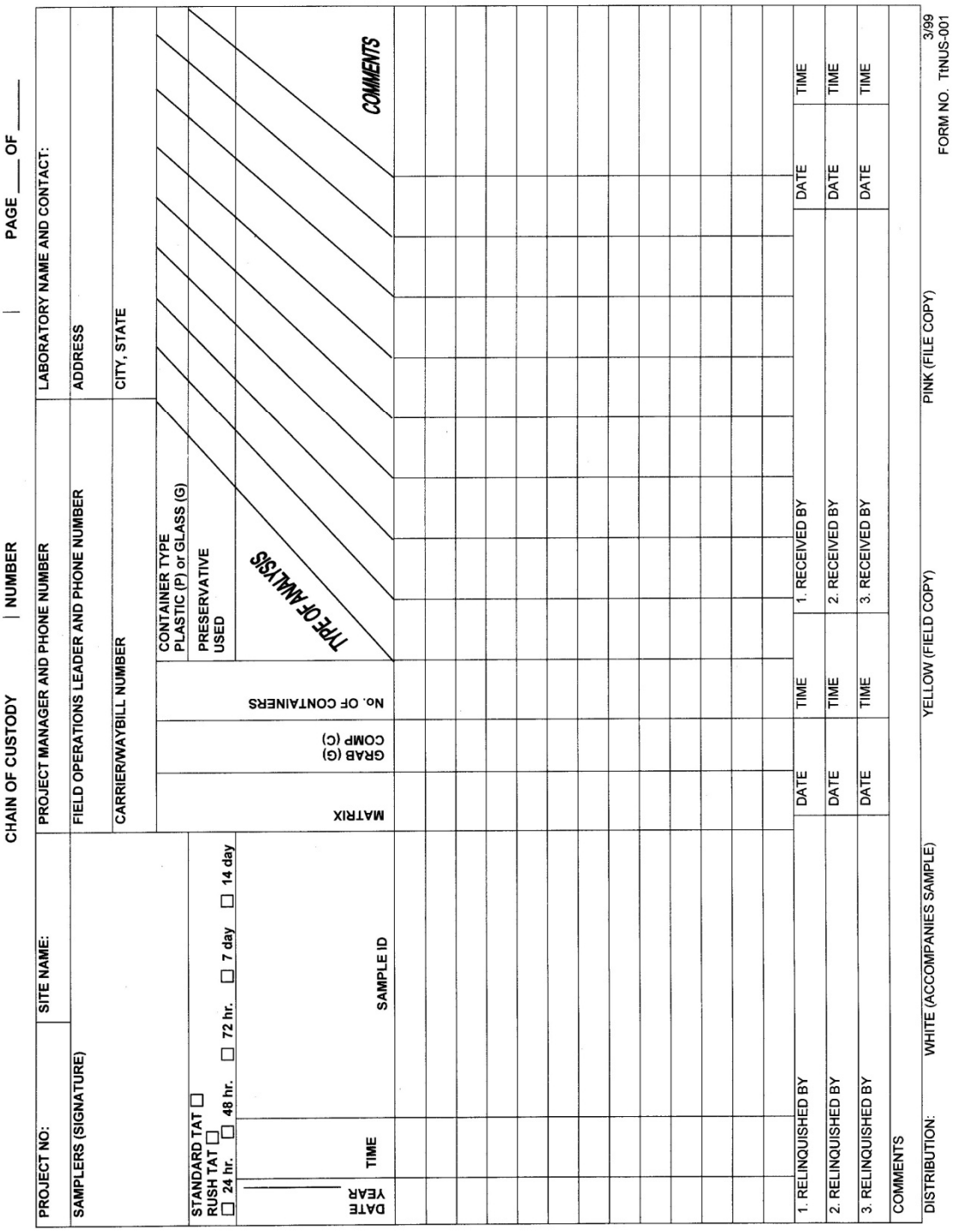
Prepare a sample log sheet for each sample collected and submitted for laboratory analysis.

4.0 ATTACHMENTS

1. Chain-of-Custody Record
2. Equipment Calibration Log
3. Soil and Sediment Sample Log

ATTACHMENT 1

CHAIN-OF-CUSTODY RECORD



EQUIPMENT CALIBRATION LOG

PROJECT NAME : ____________________ INSTRUMENT NAME/MODEL: ____________________

SITE NAME: ____________________ MANUFACTURER: ____________________

PROJECT No.: ____________________ SERIAL NUMBER: ____________________

Date of Calibration	Instrument I.D. Number	Person Performing Calibration	Instrument Settings		Instrument Readings		Calibration Standard (Lot No.)	Remarks and Comments
			Pre-calibration	Post-calibration	Pre-calibration	Post-calibration		

ATTACHMENT 3

SOIL AND SEDIMENT SAMPLE LOG SHEET

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA:

Date: / Method: / Monitor Readings (Range in ppm):	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

STANDARD OPERATING PROCEDURE
SOP-04

SAMPLE PRESERVATION, PACKAGING, AND SHIPPING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures for sample preservation, packaging, and shipping to be used in handling soil samples for PCB analysis at a fixed base laboratory.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Shipping labels
- Custody seals
- Chain-of-custody (COC) form(s)
- Sample containers with preservatives: All sample containers for analysis by fixed-base laboratories will be supplied, with preservatives added (if required) and deemed certified clean by the laboratory.
- Sample shipping containers (coolers): All sample shipping containers are supplied by the laboratory.
- Packaging material: Bubble wrap, sealable polyethylene bags, strapping tape, etc.

3.0 PROCEDURE FOR SAMPLE PRESERVATION, PACKAGING, AND SHIPPING

The laboratory provides sample containers without preservatives for samples that will be analyzed for PCBs only. All samples will be held, stored, and shipped within the temperature range ≤6 degrees Celsius (°C). This will be accomplished through refrigeration (used to hold samples prior to shipment) and/or ice.

The sampler shall maintain custody of the samples until the samples are relinquished to another custodian or to the common carrier in accordance with SOP-03.

3.1 Prior to shipping samples, check that each sample container is properly labeled, the container lid is securely fastened, and the container is sealed in a polyethylene bag.

3.2 Place the sample container into a bubble-out shipping bag and seal the bag using the self-sealing, pressure sensitive tape supplied with the bag.

3.3 Inspect the insulated shipping cooler. Check for any cracks, holes, broken handles, etc. If the cooler has a drain plug, make certain it is sealed shut, both inside and outside of the cooler. If the cooler is questionable for shipping, discard the cooler.

3.4 Line the cooler with a large plastic bag, and line the bottom of the cooler with a layer of bubble wrap. Place the sample containers into the shipping cooler in an upright position. Continue filling the cooler with ice until the cooler is nearly full and the movement of the sample containers is limited.

3.5 Wrap the large plastic bag closed and secure it with tape.

3.6 Place the original (top) signed copy of the COC form inside a sealable polyethylene bag and tape this bag to the inside of the lid of the shipping cooler.

3.7 Close the cooler and seal the cooler with approximately four wraps of strapping tape at each end of the cooler. Prior to wrapping the last wrap of strapping tape, apply a signed and dated custody seal to each side of the cooler (one per side). Cover the custody seal with the last wrap of tape. This will provide a tamper evident custody seal system for the sample shipment.

3.8 Affix shipping labels to each of the coolers, ensuring all of the shipping information is filled in properly.

3.9 Use overnight (e.g., FedEx Priority Overnight) courier services to ship all sample shipments.

STANDARD OPERATING PROCEDURE

SOP-05

BOREHOLE ADVANCEMENT AND SOIL CORING USING DIRECT-PUSH TECHNOLOGY AND HAND AUGER TECHNIQUES

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures for collecting surface and subsurface soil cores from unconsolidated overburden materials using direct-push technology (DPT) and hand augering techniques at the NSA Crane facility.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Cut-resistant non-latex Impermeable Gloves
- Cotton gloves
- Disposable medical-grade gloves (e.g., latex, nitrile)
- Writing utensil
- Boring log sheets: A copy of this form is included in SOP-06.
- DPT Equipment:
    - DPT Probe Rig
    - Geoprobe® Macrocore Sampler or equivalent
    - Geoprobe® Sampling Kit or equivalent
    - Clear acetate liners: one new liner for each soil core
- Hand Auger Equipment:
    - Stainless Steel Auger Buckets
    - Stainless Steel Extension Rods
    - Cross Handle
- Required decontamination materials (see SOP-10)
- Bentonite pellets

3.0 BOREHOLE ADVANCEMENT AND SOIL SAMPLING USING A DPT

DPT will be employed to collect soil cores. DPT refers to sampling tools and sensors that are driven directly into the ground without the use of conventional rotary drilling equipment. DPT typically utilizes

hydraulic pressure and/or percussion hammers to advance the sampling tools. Geoprobe® is a manufacturer of a hydraulically powered, percussion/probing machine utilizing DPT to collect subsurface environmental samples.

3.1 Clear the area to be sampled of any surface debris (herbaceous vegetation, twigs, rocks, litter, etc.).

3.2 Place a new clear acetate liner in the detachable sampling core barrel, and attach the coring device to the DPT rig.

3.3 Drive the sampler (lined with an acetate sleeve) into the ground to the desired depth using hydraulic pressure.

3.4 Retract the sampler from the borehole, and remove the acetate liner and the soil core from the sampler barrel.

3.5 Attach the metal trough from the sampling kit firmly to a suitable surface.

3.6 Place the acetate liner containing the soil core in the trough.

3.7 While wearing cut-resistant gloves (constructed of non-latex over cotton), cut the acetate liner through its entire length using the double-bladed knife that accompanies the Geoprobe® Sampling Kit. Then remove the strip of acetate from the trough to gain access to the collected soils. **CAUTION:** Do not attempt to cut the acetate liner while holding it in your hand.

3.8 Log the soil core on the Boring Log Sheet in accordance with SOP-06.

3.9 Place the soil core in a large sealable polyethylene bag or stainless steel mixing bowl, thoroughly homogenize, and collect the remainder of the soil sample aliquots, as described in SOP-07.

3.10 Repeat steps 3.2 through 3.9 for the next depth intervals.

3.11 Upon completion of the boring, backfill the borehole with any remaining soil from the location. If insufficient soil is available to fill the hole to the ground surface, then use bentonite pellets mixed with the soil to backfill the hole. If soil materials from the boring are suspected of being

contaminated, backfill the soil boring with bentonite pellets up to the ground surface, and securely stage the contaminated material until arrangements are made for proper off-site disposal.

3.12 Decontaminate all soil sampling equipment in accordance with SOP-10 before collecting the next sample.

4.0 BOREHOLE ADVANCEMENT AND SOIL SAMPLING USING A HAND AUGER

Hand augers may be employed to collect soil cores when the area is inaccessible by the drill rig. A hand augering system generally consists of a variety of all stainless steel bucket bits (i.e. cylinders 6-1/2" long and 2-3/4", 3-1/4", or 4" in diameter), a series of extension rods (available in 2', 3', 4' and 5' lengths), and a cross handle.

The hand auger can be used in a wide variety of soil conditions. It can be used to sample soil, both from the surface, or to depths in excess of 12 feet. However, the presence of rock layers and the collapse of the borehole normally contribute to its limiting factors.

4.1 Attach a properly decontaminated bucket bit into a clean extension rod and further attach the cross handle to the extension rod.

4.2 Clear the area to be sampled of any surface debris (vegetation, twigs, rocks, litter, etc.)

4.3 Begin augering to the desired sample depth (periodically removing accumulated soils from the bucket bit into a large sealable polyethylene bag or a properly decontaminated stainless steel mixing bowl), and add additional rod extensions as necessary.

4.4 Discard the top of the core (approximately 1"), which represents any loose material collected by the bucket bit before penetrating the sample material.

4.5 Log the soil core each time soil is placed into the mixing bowl on the Boring Log Sheet in accordance with see SOP-06. Also, note (in a field notebook or on standardized data sheets) any changes in the color, texture, or odor of the soil.

4.6 After reaching the desired sample depth, slowly and carefully withdraw the apparatus from the borehole.

4.7 Utilizing a properly decontaminated stainless steel trowel or disposable trowel, remove the last of the sample material from the bucket bit and place into the large sealable polyethylene bag or properly decontaminated stainless steel mixing bowl and thoroughly homogenize the sample material prior to filling the sample containers, as described in SOP-07.

4.8 Return excess soil core materials to the hole and tamp the returned soil to compact it. If insufficient soil is available to fill the hole to the ground surface, then use bentonite pellets mixed with the soil to backfill the hole.

4.9 If contaminants may be present in the soil materials, then place all excess soil core materials in a plastic bag (or drum for larger quantities) and complete the following tasks:

4.9.1 Tag the bag to identify the date and the locations and depths from where the soils came from.

4.9.2 Place the bag in a 55-gallon drum and store the drum on site until laboratory analysis of the soil is completed and the soil waste can be classified (see SOP-09).

4.10 If soil from a boring are suspected of being contaminated, backfill the soil boring with bentonite pellets up to the ground surface.

4.11 Decontaminate all soil sampling equipment in accordance with SOP-10 before collecting the next sample.

STANDARD OPERATING PROCEDURE

SOP-06

SOIL SAMPLE LOGGING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the standard procedures and technical guidance on the logging of soil samples.

2.0 FIELD FORMS AND EQUIPMENT

- Knife
- Ruler (marked in tenths and hundredths of feet)
- Boring Log: An example of this form is attached.
- Writing utensil (preferably black pen with indelible ink)

3.0 RESPONSIBILITIES

A field geologist or engineer is responsible for supervising all activities and assuring that each soil sample is properly and completely logged.

4.0 PROCEDURES FOR SAMPLE LOGGING

To maintain a consistent classification of soil, it is imperative that the field geologist understands and accurately uses the field classification system described in this SOP. This identification is based on visual examination and manual tests.

4.1 USCS Classification

Soils are to be classified according to the Unified Soil Classification System (USCS). This method of classification is detailed in Figure 1 (attached to this SOP). This method of classification identifies soil types on the basis of grain size and cohesiveness.

Fine-grained soils, or fines, are smaller than the No. 200 sieve and are of two types: silt (M) and clay (C). Some classification systems define size ranges for these soil particles, but for field classification

purposes, they are identified by their respective behaviors. Organic material (O) is a common component of soil but has no distinguishable size range; it is recognized by its composition. The careful study of the USCS will aid in developing the competence and consistency necessary for the classification of soils.

Coarse-grained soils will be divided into categories: rock fragments, sand, or gravel. The terms "sand" (S) and "gravel" (G) not only refer to the size of the soil particles but also to their depositional history. To ensure accuracy in description, the term "rock fragments" will be used to indicate angular granular materials resulting from the breakup of rock. The sharp edges that are typically observed indicate little or no transport from their source area; and therefore, the term provides additional information in reconstructing the depositional environment of the soils encountered. When the term "rock fragments" is used, it will be followed by a size designation such as "(1/4-inch or ½-inch diameter)" or "coarse-sand size" either immediately after the entry or in the remarks column. The USCS classification would not be affected by this variation in terms.

4.2 Color

Soil colors will be described utilizing a single color descriptor preceded, when necessary, by a modifier to denote variations in shade or color mixtures. A soil could therefore be referred to as "gray" or "light gray" or "blue-gray." Because color can be utilized in correlating units between sampling locations, it is important for color descriptions to be consistent from one boring to another.

Colors must be described while the sample is still moist. Soil samples will be broken or split vertically to describe colors. Samplers tend to smear the sample surface, creating color variations between the sample interior and exterior.

The term "mottled" will be used to indicate soils irregularly marked with spots of different colors. Mottling in soils usually indicates poor aeration and lack of good drainage.

4.3 Relative Density and Consistency

To classify the relative density and/or consistency of a soil, the geologist is to first identify the soil type. Granular soils contain predominantly sands and gravels. They are non-cohesive (particles do not adhere well when compressed). Finer-grained soils (silts and clays) are cohesive (particles will adhere together when compressed).

Granular soils are given the USCS classifications GW, GP, GM, SW, SP, SM, GC, or SC (see Figure 1).

The consistency of cohesive soils is determined by performing field tests and identifying the consistency as shown in the following table.

CONSISTENCY FOR COHESIVE SOILS

Consistency	Standard Penetration Resistance (Blows per Foot)	Unconfined Compressive Strength (Tons/Sq. Foot by pocket penetration)	Field Identification
Very soft	0 to 2	Less than 0.25	Easily penetrated several inches by fist.
Soft	2 to 4	0.25 to 0.50	Easily penetrated several inches by thumb.
Medium stiff	4 to 8	0.50 to 1.0	Can be penetrated several inches by thumb with moderate effort.
Stiff	8 to 15	1.0 to 2.0	Readily indented by thumb but penetrated only with great effort.
Very stiff	15 to 30	2.0 to 4.0	Readily indented by thumbnail.
Hard	Over 30	More than 4.0	Indented with difficulty by thumbnail.

Cohesive soils are given the USCS classifications ML, MH, CL, CH, OL, or OH (see Figure 1).

The consistency of cohesive soils is determined by hand by determining the resistance to penetration by the thumb. The thumb determination methods are conducted on a selected sample of the soil, preferably the lowest 0.5-foot of the sample. The sample will be broken in half and the thumb pushed into the end of the sample to determine the consistency. Do not determine consistency by attempting to penetrate a rock fragment. If the sample is decomposed rock, it is classified as a soft decomposed rock rather than a hard soil. One of the other methods will be used in conjunction with it. The designations used to describe the consistency of cohesive soils are shown in the above-listed table.

4.4 Weight Percentages

In nature, soils are consist of particles of varying size and shape and are combinations of the various grain types. The following terms are useful in the description of soil:

Terms of Identifying Proportion of the Component	Defining Range of Percentages by Weight
Trace	0 - 10 percent
Some	11 - 30 percent

Adjective form of the soil type (e.g., sandy)	31 - 50 percent

Examples:

- Silty fine sand: 50 to 69 percent fine sand, 31 to 50 percent silt.
- Medium to coarse sand, some silt: 70 to 80 percent medium to coarse sand, 11 to 30 percent silt.
- Fine sandy silt, trace clay: 50 to 68 percent silt, 31 to 49 percent fine sand, 1 to 10 percent clay.
- Clayey silt, some coarse sand: 70 to 89 percent clayey silt, 11 to 30 percent coarse sand.

4.5 Moisture

Moisture content is estimated in the field according to four categories: dry, moist, wet, and saturated. In dry soil, there appears to be little or no water. Saturated samples obviously have all the water they can hold. Moist and wet classifications are somewhat subjective and often are determined by the individual's judgment. A suggested parameter for this would be calling a soil wet if rolling it in the gloved hand or on a porous surface liberates water (i.e., dirties or muddies the surface). Whatever method is adopted for describing moisture, it is important that the method used by an individual remains consistent throughout an entire field activity.

4.6 Classification of Soil Grain Size for Chemical Analysis

To determine the gross grain size classification (e.g., clay, silt, and sand) from the USCS classification described above, the following table will be used.

Gross Soil Grain Size Classification	USCS Abbreviation	Description
Clay	CL	inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
	CH	inorganic clays of high plasticity, fat clays.
	OH	organic clays of medium to high plasticity, organic silts.
Silt	ML	inorganic silts and very fine sands, rock four, silty or clayey fine sands with slight plasticity.
	OL	organic silts and organic silty clays of low plasticity.
	MH	inorganic silts, micaceous or diatomaceous fine sand or silty soils.
Sand	SW	well graded sands, gravelly sands, little or no fines.
	SP	poorly graded sands, gravelly sands, little or no fines.
	SM	silty sands, sand-silt mixtures.
	SC	clayey sands, sand-clay mixtures.

4.7 Summary of Soil Classification

In summary, soils will be classified in a similar manner by each geologist/engineer at a project site. The hierarchy of classification is as follows:

- Density and/or consistency
- Color
- Plasticity (optional)
- Soil types
- Moisture content
- Other distinguishing features
- Grain size
- Depositional environment

5.0 ATTACHMENTS

1. Figure 1 - Unified Soil Classification System
2. Boring Log

ATTACHMENT 1

FIGURE 1 - UNIFIED SOIL CLASSIFICATION SYSTEM

Unified Soil Classification System

Coarse Grained Soils (more than half of soil > No. 200 sieve)	Gravels (More than half of coarse fraction > no. 4 sieve size)		GW	Well graded gravels or gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines
			GM	Sandy gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-silt mixtures
	Sands (More than half of coarse fraction < no. 4 sieve size)		SW	Well graded sands or gravelly sands, little or no fines
			SP	Poorly graded sands or gravelly sands, little or no fines
			SM	Silty sands, sand-silt mixtures
			SC	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
Fine Grained Soils (more than half of soil < No. 200 sieve)	Silts and Clays LL = < 50		ML	Inorganic silts and very fine sands, rock flour, silty fine sands or clayey silts with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
	Silts and Clays LL = > 50		MH	Inorganic silts, micaceous or diatomaceous fine sand or silty soils, elastic silts
			CH	Inorganic silts of high plasticity, fat clays
			OH	Organic clays of high plasticity, organic silty clays, organic silts
Highly Organic Soils			Pt	Peat and other highly organic soils

Grain Size Chart

Classification	Range of Grain Sizes	
	U.S. Standard Sieve Size	Grain Size In Millimeters
Boulders	Above 12"	Above 305
Cobbles	12" to 3"	305 to 76.2
Gravel	3" to No. 4	76.2 to 7.76
coarse	3" to 3/4"	76.2 to 4.76
fine	3/4"to No.4	19.1 to 4.76
Sand	No. 4 to No. 200	4.76 to 0.074
coarse	No.4 to No. 10	4.76 to 2.00
medium	No. 10 to No. 40	2.00 to 0.420
fine	No. 40 to No. 200	0.420 to 0.074
Silt and Clay	Below No. 200	Below 0.074

Relative Density (SPT)

SANDS AND GRAVELS	BLOWS/FOOT
VERY LOOSE	0 – 4
LOOSE	4 – 10
MEDIUM DENSE	10 – 30
DENSE	32 – 50
VERY DENSE	OVER 50

Consistency (SPT)

SILTS AND CLAYS	BLOWS/FOOT
VERY SOFT	0 – 2
SOFT	2 – 4
MEDIUM STIFF	4 – 8
STIFF	8 – 16
VERY STIFF	16 – 22
HARD	OVER 32

ATTACHMENT 2

BORING LOG

Tetra Tech NUS, Inc.

BORING LOG

Page ___ of ___

PROJECT NAME: _____ BORING No.: _____
PROJECT NUMBER: _____ DATE: _____
DRILLING COMPANY: _____ GEOLOGIST: _____
DRILLING RIG: _____ DRILLER: _____

Sample No. and Type or RQD	Depth (Ft.) or Run No.	Blows / 6" or RQD (%)	Sample Recovery / Sample Length	Lithology Change (Depth/Ft.) or Screened Interval	MATERIAL DESCRIPTION: Soil Density/ Consistency or Rock Hardness	MATERIAL DESCRIPTION: Color	MATERIAL DESCRIPTION: Material Classification	USCS *	Remarks	PID/FID Reading (ppm): Sample	PID/FID Reading (ppm): Sampler BZ	PID/FID Reading (ppm): Borehole**	PID/FID Reading (ppm): Driller BZ**

* When rock coring, enter rock brokeness.
** Include monitor reading in 6 foot intervals @ borehole. Increase reading frequency if elevated reponse read.

Drilling Area Background (ppm): ____

Remarks: _____

Converted to Well: Yes _____ No _____ Well I.D. #: _____

STANDARD OPERATING PROCEDURE

SOP-07

SURFACE AND SUBSURFACE SOIL SAMPLING

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedures to be used for surface and subsurface soil sampling using direct-push technology (DPT) or hand augers during field activities at NSA Crane SWMU 17.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Writing utensil (preferably black pen with indelible ink)
- Disposable medical-grade gloves (i.e. latex, nitrile)
- Boring log
- Soil sample log sheets
- Large sealable polyethylene bags or stainless-steel mixing bowls
- Stainless-steel trowel or soup spoon
- Disposable trowels
- Required sample containers: All sample containers including shipping coolers for analysis by fixed-base laboratories will be supplied and certified clean by the laboratory.
- Required decontamination materials
- Chain-of-custody records
- Required personnel protective equipment (PPE)
- Wooden stakes or pin flags
- Survey tape
- Marking Paint
- Heavy-duty cooler
- Ice
- Razor knife
- DPT Probe Rig and sampling equipment
- Sample labels

3.0 COLLECTION OF NON-VOC SOIL SAMPLE ALIQUOTS USING DPT

3.1 Remove any surface debris (e.g., herbaceous vegetation, twigs, rocks, litter, etc.) from the top of the surface soil core. For other core intervals, the top 2 inches of each core should be discarded because it often contains material scraped from the side of the borehole and not fresh material from the bottom of the borehole.

3.2 Slide the remaining core material out of the acetate liner and into a large sealable polyethylene bag or clean, decontaminated stainless-steel mixing bowl. Mix the soil thoroughly with a stainless-steel spoon and remove gravel, large pebbles, and other coarse materials. Fill the required sample container(s) in accordance with SOP-04.

3.3 Complete all required information on the sample labels and secure the label to the sample container (in accordance with SOP-01.

3.4 Place the sample container in a Ziplock® plastic bag and seal closed. Place the bag in a cooler containing ice and cool to ≤ 6°C.

3.5 Record the required information on the Soil Sample Log Sheet and the COC Record form.

4.0 COLLECTION OF SOIL SAMPLES USING A HAND AUGER

4.1 Utilizing a properly decontaminated stainless steel trowel or disposable trowel, advance the hand auger to the designated depth and then carefully retract the auger bucket from the hole.

4.2 Remove the sample material from the hand auger bucket bit, and remove gravel, large pebbles, and other coarse materials.

4.3 Slide the remaining core material out of the hand auger bucket and into a large sealable polyethylene bag or clean, decontaminated stainless-steel mixing bowl.

4.4 Mix the soil thoroughly with a stainless-steel spoon and remove gravel, large pebbles, and other coarse materials. Fill the required sample container(s).

4.5 Complete all required information on the sample labels and secure the label to the sample container in accordance with SOP-01.

4.6 Place the sample container in a Ziplock® plastic bag and seal closed. Place the bag in a cooler containing ice and cool to ≤ 6°C.

4.7 Record the required information on the Soil Sample Log Sheet and the COC Record form.

5.0 PACKAGING AND SHIPPING OF SAMPLES

Package and Ship samples in accordance with SOP-04.

6.0 ATTACHMENTS

1. Soil and Sediment Sample Log Sheet

ATTACHMENT 1

SOIL AND SEDIMENT SAMPLE LOG SHEET

Tetra Tech NUS, Inc.

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA:

Date: / Method: / Monitor Readings (Range in ppm):	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD	Duplicate ID No.:

Signature(s):

STANDARD OPERATING PROCEDURE
SOP-08

COMPOSITE SAMPLING FOR SOIL

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedure for collecting composite soil samples to support the field investigation at Solid Waste Management Unit (SWMU) 17.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Disposable medical-grade gloves (e.g., nitrile)
- Indelible marker
- Plastic storage bags
- Shipping containers (containing ice)
- Stainless steel bucket auger
- Stainless steel trowels or spoons
- Stainless steel mixing bowls (or similar)
- Decontamination equipment (brushes, 5-gal. bucket, Liquinox®, etc.)
- Sample containers: Sample containers are certified clean by the laboratory supplying the containers.

3.0 SAMPLING PROCEDURES

Hand augering or direct-push technology (DPT) will be employed to collect soil cores. The sampler will wear clean, disposable, medical-grade gloves.

3.1 SOIL COMPOSITE SAMPLING PROCEDURES

3.1.1 Clear the area to be sampled of any surface debris (herbaceous vegetation, twigs, rocks, litter, etc.).

3.1.2 Collect the sample utilizing hand augering techniques or DPT.

3.1.3 Complete the required information on the Soil and Sediment Sample Log Sheet (copy attached at the end of this SOP).

3.1.4 Repeat steps 3.1.1–3.1.3 in the designated sampling area for a specific composite sample until the desired number of discrete soil (typically four) discrete soil cores are collected.

3.1.5 Remove any debris (organic matter, twigs, rocks, etc.) from the samples. Place equal amounts of the discrete soil samples for a given composite sample in a large sealable polyethylene bag or stainless-steel mixing bowl (or similar) and mix thoroughly until visually homogenized using a stainless steel trowel or spoon.

3.1.6 Place a portion of the composite soil sample into the laboratory supplied, pre-labeled sampling container.

3.1.7 For samples that are to be submitted for laboratory analysis, place the labeled sample container into a plastic storage bag and then place the plastic storage bag holding the sample container into a cooler containing ice.

3.1.8 Decontaminate the hand auger bucket, bowl, and spoon/trowel, if employed, in the field between each composite sample location. See SOP-10, Decontamination of Field Sampling Equipment for decontamination method.

4.0 ATTACHMENTS

1. Soil and Sediment Sample Log Sheet

ATTACHMENT 1

SOIL AND SEDIMENT SAMPLE LOG SHEET

SOIL & SEDIMENT SAMPLE LOG SHEET

Page___ of ___

Project Site Name: _____
Project No.: _____

[] Surface Soil
[] Subsurface Soil
[] Sediment
[] Other: _____
[] QA Sample Type: _____

Sample ID No.: _____
Sample Location: _____
Sampled By: _____
C.O.C. No.: _____

Type of Sample:
[] Low Concentration
[] High Concentration

GRAB SAMPLE DATA:

Date: / Time: / Method: / Monitor Reading (ppm):	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)

COMPOSITE SAMPLE DATA:

Date:	Time	Depth Interval	Color	Description (Sand, Silt, Clay, Moisture, etc.)
Method:				
Monitor Readings (Range in ppm):				

SAMPLE COLLECTION INFORMATION:

Analysis	Container Requirements	Collected	Other

OBSERVATIONS / NOTES:

MAP:

Circle if Applicable:

MS/MSD

Duplicate ID No.:

Signature(s):

STANDARD OPERATING PROCEDURE

SOP-09

MANAGEMENT OF INVESTIGATION-DERIVED WASTE

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes how investigation-derived waste (IDW) will be collected, segregated, classified, and managed during the SWMU-wide PCB delineation field investigation at Naval Support Activity (NSA) Crane SWMU 17. The following types of IDW may be generated during this investigation:

- Soil sampling residues
- Test pit soil contaminated with polychlorinated biphenyl (PCB) oil or other oil containing PCBs
- Items removed from test pits, such as electrical equipment, that could be contaminated with PCBs
- Decontamination solutions
- Personal protective equipment (PPE) and clothing
- Miscellaneous trash and incidental items

2.0 SCOPE

Whether an item contains PCBs will not be confirmed through chemical analysis in the field. Instead, visual observation will be used to classify items regarding potential PCB content based on the nature of the item. If necessary, as determined by the Tetra Tech PM, samples of solid or liquid wastes will be collected and analyzed. The sampling and analysis methods will be documented in a Field Task modification Request (FTMR).

Items that may contain PCBs are listed below (taken from http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/about.htm on 11/09/11):

- Transformers and capacitors
- Other electrical equipment including voltage regulators, switches, reclosers, bushings, and electromagnets
- Oil used in motors and hydraulic systems

- Old electrical devices or appliances containing PCB capacitors
- Fluorescent light ballasts
- Cable insulation
- Thermal insulation material including fiberglass, felt, foam, and cork
- Adhesives and tapes
- Oil-based paint
- Caulking
- Plastics
- Carbonless copy paper
- Floor finish

Based on previous investigations, the most likely types of PCB items to be excavated are:

- **Transformers**
- **Capacitors**
- **Light ballasts form fluorescent lights**

Common names used for oil containing PCBs and that might appear on labels of excavated items include:

Aroclor	Hyvol
Apirolio	Inclor
Aroclor B	Inerteen
Asbestol	Kaneclor
Askarel*	Kennechlor
Adkarel	No-Flamol
Chlorextol	Nepolin
Chlorodiphenyl	Nonflammable Liquid
Chlorinol	Phenoclor
Clorphen	Pydraul
Clophen	Phyralene
Diaclor	Pyranol
Dk	Pyroclor
Dykanol	Saf-T-Kuhl
EEC-18	Santotherm FR
Elemex	Santovac 1 and 2
Eucarel	Therminol
Fenclor	

3.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Health and safety equipment (with PPE) as described in the site-specific health and safety plan
- Bucket (for collecting development/purge water)
- Decontamination equipment
- Field logbook
- Plastic sheeting and/or tarps

- 55-gallon drums with sealable lids
- Spill pallets for temporary drum staging
- IDW labels for drums
- Plastic garbage bags
- Blank drum labels and indelible marker

4.0 PROCEDURES

Management of IDW includes the collection, segregation, temporary storage, classification, final disposal, and documentation of the waste-handling activities, as described below.

4.1 Liquid Wastes

Liquid wastes that could be generated during site activities include:

- decontamination solutions from soil sampling equipment and excavator buckets
- fluids that may drain from articles removed from test pits

4.1.1 Collect soil sampling equipment liquid decontamination wastes and analyze them for PCBs and Total Toxic Organics (TTO) level. If the PCB concentration is less than 10 ug/L and the TTO level is acceptable, discharge the wastewater to an NSA Crane water treatment facility designated by the NSA Crane point of contact. If the PCB concentration exceeds 10 ug/L, regardless of the TTO level, dispose of the water at an approved PCB disposal facility. If the PCB concentration is less than 10 ug/L but the TTO level is unacceptable, dispose of the water at a facility approved for disposal of the determined level of TTO.

4.1.2 Containerize in 55-gallon drums any fluid removed from electrical equipment and other equipment that contains or may have contained PCBs (see Sections 1.0 and 2.0, and the note below) and classify these fluids as containing PCBs in excess of 500 mg/L.

Note: It is assumed that excavator decontamination fluids contain PCBs in excess of 50 mg/L if the excavator bucket contacted equipment items or soil contaminated with PCBs; otherwise the excavator bucket decontamination fluids are considered not to be contaminated with PCBs.

4.1.3 Label decontamination fluids containerized in 55-gallon drums as liquid wastes containing PCBs in excess of 50 mg/kg and include on the label the following information:

- a description of the drum contents
- the date the fluid was containerized
- an estimated volume of fluid in the drum

- the name and telephone number of the NSA Crane point of contact for individuals seeking to learn more about the contents of the container
- estimated PCB concentration (assume it is >50 ppm)

4.1.4 Recommend to the Tetra Tech PM that a representative sample of the fluid be collected from each container for laboratory analysis of PCBs by EPA SW-846 Method 8082A. Sampling of fluids will require generation of a Field Task Modification Request (FTMR).

Note: If it does not seem possible to collect a sample that is representative of the average PCB concentration in the fluid container (e.g., because of stratification within the container) contact the Tetra Tech PM to discuss sampling options.

4.2 Solid Wastes

Solid wastes that could be generated during site activities include:

- soil sampling and excavation soil residues
- debris removed from excavations.

Note: If any waste will be shipped off-site, all off-site waste shipments must be accompanied by a waste manifest (obtained from NSA Crane) and an NSA Crane representative must sign the manifest as the waste generator.

4.2.1 Return excess soil core/sampling materials to the hole and tamp the soil to compact it. If insufficient soil is available to fill the hole to the ground surface, then use bentonite pellets hydrated with potable water and mixed with the soil to backfill the hole.

4.2.2 If gross contamination is encountered (e.g., any non-soil contaminated material such as soil contaminated with oil), do not return the grossly contaminated material that is brought to the surface to the excavation; instead:

4.2.2.1 Segregate this material from other excavated soil.

4.2.2.2 Securely containerize the material (in 55-gallon drums), label the drums with the following information, and stage the drums on spill pallets until arrangements are made for proper off-site disposal:

- a description of the drum contents
- the date the waste was containerized
- an estimated volume or weight of waste in the drum
- the name and telephone number of the NSA Crane point of contact for individuals seeking to learn more about the contents of the container

- estimated PCB concentration (assume it is >50 ppm if there is no better estimate)

4.2.3 If articles that potentially contain PCBs (see Section 2) are excavated:

4.2.3.1 Classify them as containing a PCB concentration greater than 50 mg/kg.

4.2.3.2 Segregate the containerized articles, label the drums with the following information, and stage the drums on spill pallets until arrangements are made for proper off-site disposal:

- a description of the drum contents
- the date the waste was containerized
- an estimated volume or weight of waste in the drum
- the name and telephone number of the NSA Crane point of contact for individuals seeking to learn more about the contents of the container
- estimated PCB concentration (assume it is >50 ppm if there is no better estimate)

4.3 PPE and Incidental Trash

If contaminated, decontaminate all PPE wastes and incidental trash materials (e.g., wrapping or packing materials from supply cartons, waste paper, etc.), double bag the non-hazardous material, securely tie the bag shut, and place the bag in a designated waste receptacle at NSA Crane.

4.4 PCB Spills During Test Pitting

Though not expected, spills could occur during test pitting if PCB-contaminated equipment items are breached or partially or wholly emptied. In the event of such a spill, follow the procedure below to manage the spill.

4.4.1 For all spills involving 1 pound or more by weight of PCBs:

4.4.1.1 Report the spill to the National Response Center (1-800-424-8802).

4.4.1.2 If such a spill directly contaminates surface water or sewers, notify the appropriate EPA Region 5 office and obtain guidance for appropriate cleanup measures in the shortest possible time after discovery, but in no case later than 24 hours after discovery.

4.4.2 If more than 10 pounds of PCBs by weight are spilled:

4.4.2.1 Pursuant to 40 CFR 761.125(a)(1), notify the EPA Regional Office of the spill within 24 hours of the spill occurring.

4.4.2.2 Follow the direction of EPA regarding management of the spill.

4.4.3 If a small (about 20 feet in diameter or less) PCB spill occurs:

4.4.3.1 Discuss the terms and applicability of the PCB Spill Cleanup Policy with the EPA Region 5 Office that has jurisdiction over the location where the spill occurred.

4.4.3.2 If directed to do so by EPA, manage the spill in accordance with the EPA PCB Spill Cleanup Policy, available at the following web site: http://www.epa.gov/epawaste/hazard/tsd/pcbs/pubs/guidance.htm), otherwise follow the EPA direction.

STANDARD OPERATING PROCEDURE

SOP-10

DECONTAMINATION OF FIELD SAMPLING EQUIPMENT

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the procedure to be followed when decontaminating non-dedicated field sampling equipment during the field investigations.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Writing utensil (preferably black pen with indelible ink)
- Non-latex rubber or plastic gloves
- Cotton gloves
- Field logbook
- Potable water
- Deionized water
- Isoproponal (optional)
- Liqui-Nox® or Alconox® detergent
- Brushes, spray bottles, paper towels, etc.
- Container to collect and transport decontamination fluids

3.0 DECONTAMINATION PROCEDURES

3.1 Don non-latex and/or cotton gloves and decontaminate sampling equipment (in accordance with the following steps) prior to field sampling and between samples.

3.2 Rinse the equipment with potable water, and collect the potable water rinsate into a container. Rinsing may be conducted by spraying with water from a spray bottle or by dipping.

3.3 Wash the equipment with a solution of Liqui-Nox® or Alconox® detergent wash solution that has been prepared in accordance with the instructions on the detergent container, and collect the wash solution in a container. Use brushes or sprays as appropriate for the equipment. If oily

residue has accumulated on the sampling equipment, remove the residue with an isopropanol wash and repeat the detergent wash.

3.4 Rinse the equipment with potable water and collect the potable water rinsate into a container. Rinsing may be conducted by spraying with water from a spray bottle or by dipping.

3.5 Rinse the equipment with deionized water and collect the deionized water rinsate into a container. Rinsing may be conducted by spraying with water from a spray bottle or by dipping.

3.6 Remove excess water by air drying and shaking or by wiping with paper towels as necessary.

3.7 Document decontamination by recording it in the field logbook.

3.8 Manage containerized decontamination solutions in accordance with the procedures described in SOP-09.

STANDARD OPERATING PROCEDURE

SOP-11

GLOBAL POSITIONING SYSTEM

1.0 PURPOSE

The purpose of this Standard Operating Procedure (SOP) is to provide the field personnel with basic instructions for operating a handheld Global Positioning System (GPS) unit allowing them to set GPS parameters in the receiver, record GPS positions on the field device, and update existing Geographic Information System (GIS) data. This SOP is specific to GIS quality data collection for Trimble®-specific hardware and software.

If possible, the Trimble® GeoXM™ or GeoXH™ operators manual should be downloaded onto the operator's personal computer for reference before or while in the field. The manual can be downloaded at http://trl.trimble.com/docushare/dsweb/Get/Document-311749/TerraSyncReferenceManual.pdf

Unless the operator is proficient in the setup and operation of the GPS unit, the Project Manager (or designee) should have the GPS unit shipped to the project-specific contact listed below in the Pittsburgh, Pennsylvania, office at least five working days prior to field mobilization so project-specific shape files, data points, background images, and correct coordinate systems can be uploaded into the unit.

Tetra Tech NUS, Inc.
Attn: Kevin Moore
661 Anderson Drive, Bldg #7
Pittsburgh, PA 15220

2.0 REQUIRED EQUIPMENT

The following hardware and software should be utilized for locating and establishing GPS points in the field:

2.1 Required GPS Hardware

- Hand-held GPS unit capable of sub-meter accuracy (i.e. Trimble® GeoXM™ or Trimble® GeoXH™). This includes the docking cradle, A/C adapter, stylus, and USB cable for data transfer.

Optional Accessories:

- External antenna
- Range pole
- Hardware clamp (for mounting GPS unit to range pole)
- GeoBeacon

- Writing utensil (preferably black pen with indelible ink)
- Non-metallic pin flags for temporary marking of positions

2.2 Required GPS Software

The following software is required to transfer data from the handheld GPS unit to a personal computer:

- Trimble® TerraSync version 2.6 or later (pre-loaded onto GPS unit from vendor)

- Microsoft® ActiveSync® version 4.5 or later. Download to personal computer from: http://www.microsoft.com/windowsmobile/en-us/downloads/microsoft/activesync-download.mspx

- Trimble® Data Transfer Utility (freeware version 2.1 or later). Download to personal computer from: http://www.trimble.com/datatransfer.shtml

3.0 START-UP PROCEDURES

Prior to utilizing the GPS in the field, ensure the unit is fully charged. The unit may come charged from the vendor, but an overnight charge is recommended prior to fieldwork.

The Geo-series GPS units require a docking cradle for both charging and data transfer. The Geo-series GPS unit is docked in the cradle by first inserting the domed end in the top of the cradle, then gently seating the contact end into the latch. The power charger is then connected to the cradle at the back end using the twist-lock connector. Attach a USB cable as needed between the cradle (B end) and the laptop/PC (A end).

It is recommended that the user also be familiar and check various Windows Mobile settings. One critical setting is the Power Options. The backlight should be set as needed to conserve power when not in use.

Start Up:

1) Power on the GPS unit by pushing the small green button located on the lower right front of the unit.

2) Utilizing the stylus that came with the GPS unit, launch **TerraSync** from the Windows Operating System by tapping on the start icon located in the upper left hand corner of the screen and then tap on **TerraSync** from the drop-down list.

3) If the unit does not default to the Setup screen, tap the Main Menu (uppermost left tab, just below the Windows icon) and select Setup.

4) If the unit was previously shipped to the Pittsburgh office for setup, you can skip directly to Section 4.0. However, to confirm or change settings, continue on to Section 3.1.

3.1 Confirm Setup Settings

Use the Setup section to confirm the TerraSync software settings. To open the Setup section, tap the Main Menu and select Setup.

1) Coordinate System
   a. Tap on the Coordinate System.
   b. Verify the project specs are correct for your specific project by scrolling through the various settings. Edit as needed and then tap OK; otherwise, tap Cancel to return to Setup Menu. **Note:** It is always best to utilize the Cancel tab rather than the OK tab if no changes are made since configurations are easily changed by mistake.
   c. Tap on the Units.
   d. Verify the user preferences are correct for your specific project by scrolling through the various settings. Edit as needed and then tap OK; otherwise, tap Cancel to return to Setup Menu.
   e. Tap Real-time Settings.
   f. Verify the Real-time Settings are correct for your specific project by scrolling through the various settings. Edit as needed and then tap OK; otherwise, tap Cancel to return to Setup Menu.
   g. The GPS unit is now configured correctly for your specific project.

4.0 ANTENNA CONNECTION

1) If a connection has been properly made with the internal antenna, a satellite icon along with the number of usable satellites will appear at the top of the screen next to the battery icon. If no connection is made (e.g.: no satellite icon), tap on the GPS tab to connect antenna.
2) At this point the GPS unit is ready to begin collecting data.

5.0 COLLECTING NEW DATA IN THE FIELD

1) From the Main Menu select Data.
2) From the Sub Menu (located below the Data tab) select New which will bring up the New Data File menu.
3) An auto-generated filename appears and should be edited for your specific project. If the integral keyboard does not appear, tap the small keyboard icon at the bottom of the screen.
4) After entering the file name, tap Create to create the new file.
5) Confirm antenna height if screen appears. Antenna height is the height that the GPS unit will be held from the ground surface (Typically 3 to 4 feet).
6) The Choose Feature screen appears.

5.1 Collecting Features

1) If not already open, the Collect Feature screen can be opened by tapping the Main Menu and selecting Data. The Sub Menu should default to Collect.
2) **Do not begin the data logging process until you are at the specific location for which you intend to log the data.**
3) A known reference or two should be shot at the beginning and at the end of each day in which the GPS unit is being used. This allows for greater accuracy during post-processing of the data.
4) Upon arriving at the specific location, tap on Point_generic as the Feature Name.
5) Tap Create to begin data logging.
6) In the Comment Box enter sample ID or location-specific information.
7) Data logging can be confirmed by viewing the writing pencil icon in the upper part of the screen. Also, the logging counter will begin. As a Rule of Thumb, accumulate a minimum of 20 readings on the counter, per point, as indicated by the logging counter before saving the GPS data.
8) Once the counter has reached a minimum number of counts (i.e. 20), tap on OK to save the data point to the GPS unit. Confirm the feature. All data points are automatically saved within the GPS unit.
9) Repeat steps 2 through 8, giving each data point a unique name or number.

Note: If the small satellite icon or the pencil icon is blinking, this is an indication the GPS unit is not collecting data. A possible problem may be too few satellites. While still in data collection mode, tap on Main Menu in upper left hand corner of the screen and select Status. Skyplot will display as the default showing the number of available satellites. To increase productivity (number of usable satellites) use the stylus to move the pointer on the productivity and precision line to the left. This will decrease precision, but increase productivity. The precision and productivity of the GPS unit can be adjusted as the number of usable satellites changes throughout the day. To determine if GPS is correctly recording data, see Section 5.2.

5.2 Viewing Data or Entering Additional Data Points to the Current File

1) To view the stored data points in the current file, tap on the Main Menu and select Map. Stored data points for that particular file will appear. Use the +/- and <-/-> icons in lower left hand corner of screen to zoom in/out and to manipulate current view.
2) To return to data collection, tap on the Main Menu and select Data. You are now ready to continue to collect additional data points.

5.3 Viewing Data or Entering Data Points from an Existing File

1) To view data points from a previous file, tap on Main Menu and select Data, then select File Manager from the Sub Menu.
4) Highlight the file you want to view and select Map from the Main Menu.
5) To add data points to this file, tap on Main Menu and select Data. Continue to collect additional data points.

6.0 NAVIGATION

This section provides instructions on navigating to saved data points in an existing file within the GPS unit.

1) From the Main Menu select Map.
2) Using the Select tool, pick the point on the map to where you want to navigate.
3) The location you select will have a box placed around the point.
4) From the Options menu, choose the Set Nav Target (aka set navigation target).
5) The location will now have double blue flags indicating this point is you navigation target.
6) From the Main Menu select Navigation.

7) The dial and data on this page will indicate what distance and direction you need to travel to reach the desired target.
8) Follow the navigation guide until you reach the point you select.
9) Repeat as needed for any map point by going back to Step 1.

7.0 PULLING IN A BACKGROUND FILE

This section provides instructions on pulling in a pre-loaded background file. These files are helpful in visualizing your current location.

1) From the Main Menu select Map, then tap on Layers, select the background file from drop down list.
2) Select the project-specific background file from the list of available files.
3) Once the selected background file appears, the operator can manipulate the screen utilizing the +/- and <-/-> functions at the bottom of the screen.
4) In operating mode, the operator's location will show up on the background file as a floating "x".

8.0 DATA TRANSFER

This section provides instructions on how to transfer stored data on the handheld GPS unit to a personal computer. Prior to transferring data from the GPS unit to a computer, Microsoft ActiveSync and Trimble Data Transfer Utility software must be downloaded to the computer from the links provided in Section 2.2 (Required GPS Software). If a leased computer is utilized in which the operator cannot download files, see the Note at the end of Section 8.0.

1) See Attachment A at the end of this SOP for instructions on how to transfer data from the GPS to a personal computer.

Note: If you are unable to properly transfer data from the GPS unit to a personal computer, the unit should be shipped to the project-specific contact listed in Section 1.0 where the data will be transferred and the GPS unit then shipped back to the vendor.

9.0 SHUTTING DOWN

This section provides instruction for properly shutting down the GPS unit.

1) When shutting down the GPS unit for the day, first click on the "X" in the upper right hand corner.

2) You will be prompted to ensure you want to exit TerraSync. Select Yes.
3) Power off the GPS unit by pushing the small green button located on the bottom face of the unit.
4) Place the GPS unit in its cradle to recharge the battery overnight. Ensure the green charge light is visible on the charging cradle.

ATTACHMENT A

How to Transfer Trimble GPS Data between Data Collector and PC
original 11/21/06 (5/1/08 update) – Kevin Moore

Remember – Coordinate System, Datum, and Units are critical!!!

Trimble Data Collection Devices:
Standard rental systems include the Trimble® ProXR/XRS backpack and the newer handheld GeoXT™ or GeoXH™ units. Some of the older backpack system may come with either a RECON "PDA-style" or a TSCe or TSC1 alpha-numeric style data collector.

The software on all of the above units should be Trimble® TerraSync (v 2.53 or higher – current version is 3.20) and to the user should basically look and function similar. The newer units and software versions (which should always be requested when renting) include enhancements for data processing, real-time display functions, and other features.

Data Transfer:
Trimble provides a free transfer utility program to aid in the transfer of GIS and field data. The Data Transfer Utility is a standalone program that will run on a standard office PC or laptop.

To connect a field data collector such as a RECON, GeoXM, GeoXT, GeoXH, or ProXH, you must first have Microsoft® ActiveSync® installed to allow the PC and the data collector to talk to one another. A standard USB cable is also needed to connect the two devices.

A CD or USB drive is provided with the data collector for use in data transfer. If needed, these programs are also available without charge via the web at:

• **Trimble Data Transfer Utility** (v 1.38) program to download the RECON or GeoXH field data to your PC: http://www.trimble.com/datatransfer.shtml

• **ActiveSync** from Microsoft to connect the data collector to the PC. The latest version (v4.5) can be found at: http://www.microsoft.com/windowsmobile/en-us/downloads/microsoft/activesync-download.mspx
(see page 2 for data transfer instructions)

To Transfer Data Collected in the Field:

• Install the Data Transfer and ActiveSync software installed on your PC
• Connect the RECON or GeoXH to your PC via an A/B USB cable (blade end and square end type "HP printer" style)
• ActiveSync should auto-detect the connection and recognize the data collector
• Make sure the data file desired is CLOSED in TerraSync prior to transfer
• Connect via ActiveSync as a guest (not a partnership)
• Run the Trimble Data Transfer Utility program on your PC
• Select "***GIS Datalogger on Windows CE***" or similar selection
• Hit the green connect icon to the right - the far right area should say "***Connected to ....***" if successful
• Select the "***Receive***" data tab (under device)
• Select "***Data***" from file types on the right
• Find the file(s) needed for data transfer. You can sort the data files by clicking on the date/time header
• Select or browse to a C-drive folder you can put this file for emailing
• When the file appears on the list, hit the "***Transfer All***"
• Go to your Outlook or other email, send a message to: John.Wright@tetratech.com (or GIS department)
• Attach the file(s) you downloaded from your C-drive. For each TerraSync data file created you should have a packet of multiple data files. All need to be sent as a group – make sure you attach all files (the number of files may vary – examples include: ssf, obx, obs, gix, giw, gis, gip, gic, dd, and car)

To Transfer GIS Data from PC to the Field Device (must be converted in Pathfinder Office):

• Obtain GIS file(s) desired from GIS Department and have converted to Trimble extension
• Contact Kevin Moore (John.Wright@tetratech.com) if needed for file conversion and upload support
• The GIS file(s) can be quickly converted if requested and sent back to the field user in the needed "Trimble xxx.imp" extension via email – then quickly downloaded from Outlook to your PC for transfer
• Install the Data Transfer and ActiveSync software installed on your PC
• Connect the RECON or GeoXH to your PC via an A/B USB cable (blade end and square end type "HP printer" style)
• ActiveSync should auto-detect the connection and recognize the data collector
• Connect via ActiveSync as a guest (not a partnership)
• Run the Trimble Data Transfer Utility program on your PC
• Select "***GIS Datalogger on Windows CE***" or similar selection
• Hit the green connect icon to the right - the far right area should say "***Connected to ....***" if successful
• Select the "**Send**" data tab (under device)
• Select "**Data**" from file types on the right (you can also send background files)
• Browse to the location of the data on your PC (obtain the file from Pathfinder Office or from the person who converted the data for field use)
• Select the options as appropriate for the name and location of the data file to go on the data collector (usually you can choose main memory or a data storage card)
• When the file(s) appears on the list, hit the "***Transfer All***"
• Run TerraSync on the field device and open the existing data files. Your transferred file should appear (make sure you have selected Main Memory, Default, or Storage Card as appropriate)

STANDARD OPERATING PROCEDURE

SOP-12

TEST PIT EXCAVATIONS

1.0 PURPOSE

This Standard Operating Procedure (SOP) describes the excavation process to be used to install multiple test pits, arranged in groups as presented on Figure 8 of the current Technical Memorandum for NSA Crane SWMU 17 (Technical Memorandum). These pits will be excavated with the use of a backhoe (or similar) to permit detailed descriptions of the nature and extent of the in-situ waste debris (e.g., capacitors, transformers, lighting ballast) within the Dump Area.

2.0 REQUIRED FIELD FORMS AND EQUIPMENT

- Writing utensil (preferably black pen with indelible ink)
- Disposable medical-grade gloves (i.e. nitrile)
- Leather work gloves
- Test pit log sheets
- Photoionization Detector (PID) or similar
- Required personnel protective equipment (PPE) per the Site-specific HASP
- Wooden stakes or pin flags
- Survey tape
- Marking Paint
- Digital Camera
- Plastic sheeting (minimum of 6-mil thickness)
- Global Positioning System (GPS)
- Excavation equipment (e.g., backhoe, trackhoe)

3.0 TEST PIT EXCAVATION

Test pit excavations will be constructed with the intent that they will provide an open view of subsurface lithology and/or disposal conditions that soil borings do not provide. Test pit operations shall be logged and documented (see Attachment 1).

3.1 TEST PITTING PREPARATION, SPECIAL NOTES, AND PRECAUTIONS

PRECAUTIONS

Conduct Utility Location and Excavation Clearance prior to the commencement of any intrusive work to identify the presence of underground utilities.

No personnel shall enter any test pit or excavation, per the Site-specific HASP. Collect soil samples directly from the excavator bucket, or from the excavated soil piles, as described in the procedure below and SOP-07 (attached to the Technical Memorandum).

Review Figure 8 (attached to the Technical Memorandum) to see that each proposed test pit group (i.e., A through F) will consist of two to five discrete test pits aligned perpendicular, or diagonally, to the center excavator staging area. For example, for Test Pit Group A there will be one test pit each to the north (labeled A1), east (labeled A2), south (labeled A3) and west (labeled A4) of the test pit center.

Groundwater is not expected to be encountered during excavation; therefore, dewatering of the excavations is not a concern.

Bedrock must not be excavated.

Additional test pits may be added, existing test pits may be extended in length or width, and other adjustments may be made at FOL discretion to accomplish the goal of spatially delineating buried debris. The actual number, orientation, and size of each test pit will be documented as described in the procedure below.

3.2 PROCEDURE

Note: Soil and encountered debris will be excavated from each pit using 1-foot vertical lifts that are at least 10 feet long and approximately 2 - 3 feet wide (i.e., the excavator bucket width).

3.2.1 Select a location for installing a test pit and determine the excavated material staging area.

3.2.2 Lay plastic sheeting on the ground surface alongside the selected pit location. The plastic sheeting will be used to temporarily stage excavated soil and debris for visual inspection and sampling prior to returning it to the excavation.

3.2.3 During excavation:

3.2.3.1 Log the pit as it is excavated in accordance with the Test Pit Log presented in Attachment 1.

3.2.3.2 Take photographs during test pitting (including a card showing the test pit number) to show the conditions in the pit at nominal depths of: surface, 3 feet below surface, 6 feet below surface, and bottom of excavation. The FOL may adjust these depths in the field depending on field conditions.

3.2.3.3 Add a sketch of the test pit to the Test Pit log (See Attachment 1) to show conditions in the pit, especially the pit's orientation.

3.2.3.4 Complete other documentation specified in Section 5.0 (Records).

3.2.2.5 As the soil and debris from each 1-foot lift are removed from a pit, temporarily stage the soil/debris in discrete piles alongside the pit (on the plastic sheeting), with each pile representing a single 1-ft lift of soil. To prevent material from accidentally returning to the pit and creating a potential safety hazard, do not place these piles closer than 5 feet from the test pit wall.

3.2.3.6 Characterize and segregate in accordance with Section 4.0 all soil and debris that is encountered during excavation. Segregating each 1-ft lift of soil is important so that the soil can be placed back into the test pit at the same approximate depth from which the soil was excavated.

3.2.3.7 Continue vertical excavation until continued test pitting would not encounter deeper debris. This may occur when native soil or the bedrock surface is reached, or visual evidence of debris no longer is observed.

3.2.3.8 During test pitting, extend the pit as far as necessary in a horizontal direction to define the outer limit of the Dump Area or until continued excavation is not furthering the delineation of the Dump Area limit as determined by the FOL. For example, installation of another pit may be

considered sufficient to establish the limit of the Dump Area instead of extending the current excavation to the Dump Area limit. The FOL will keep in mind that obtaining an understanding of the debris distribution within the Dump Area is useful for future investigation or remediation.

3.2.4 When excavation and logging of a test pit has been completed, prepare to backfill the pit as follows:

3.2.4.1 Take photographs of all significant features exposed by the test pit, including a distance scale to show dimensions.

3.2.4.2 Mark each photograph to include site number, test pit number, depth, description of feature, and date of photograph.

3.2.4.3 Enter a geologic description of each photograph in the site logbook.

3.2.4.4 Index the photograph and maintain it as part of the project file for future reference.

3.2.4.5 Mark the four corners and center of the test pit with wooden stakes or pin flags.

3.2.4.6 Using a GPS, measure the coordinates of the wooden stakes or pin flags test pit location in accordance with SOP-11 (attached to the Technical Memorandum).

3.2.5 If test pit installation is not completed by the end of the work day, cover or otherwise protect (e.g., barricades, fencing, etc.) the pit from intrusion. **No excavations shall remain open during non-working hours unless adequately covered or otherwise protected.**

3.2.6 After inspection and photography, return excavated soil that is not unacceptably contaminated with PCBs (See Section 4.0) and non-PCB related debris to the pit in 1-foot lifts at the same approximate depth from which the soil was excavated and compact the returned soil with the excavator bucket. To prevent tearing of the plastic liner on which soil piles are laid, use the backhoe to remove the bulk of the material and use other implements such as shovels or push brooms to move the remaining soil from the plastic liner to the pit.

Note: It should not be necessary to prevent cross contamination of soil because the soil to be replaced is soil that is not unacceptably contaminated with PCBs.

3.2.7 After the pit has been completely backfilled direct the excavator operator to roll over the soil to ensure it is satisfactorily compacted.

3.2.8 Proceed to the next test pit location shown on Figure 8 of the Technical Memorandum.

4.0 CHARACTERIZATION OF EXCAVATED DEBRIS AND SOIL

4.1 As each 1-foot lift is excavated:

4.1.1 Visually inspect the excavated soil for signs of potential PCB-contaminated oil or oil residues (staining). Testing for PCBs will not be done in the field so these categorizations will be based on visual observation only.

4.1.2 Segregate any debris from the soil to the degree necessary to visually determine whether it is a “PCB article” or “PCB container”. PCB articles include capacitors, transformers, light ballasts, and other equipment known to contain PCBs. PCB containers include drums, cans, bags, etc., that actually or potentially contain or contained PCB material.

Note: For Step 4.1.3, soil that does not exhibit visible signs of staining or and does not contain oil will be considered to be suitable for replacement in the excavation. Any stained soil, soil containing oil, and any article removed from the excavation that could have contained or could contain PCBs (see SOP 09), must be considered to be contaminated with PCBs and must be managed in accordance with SOP 09.

4.1.3 Manage soil/debris, which is not returned to the excavation, in accordance with the IDW SOP, SOP-09 (attached to the Technical Memorandum).

4.2 Place soil or debris back into the excavations and complete the test pitting at the selected location as described in Steps 3.2.5 through 3.2.7.

5.0 RECORDS

Data to be recorded in the field logbook include the following:

- Name and location of job

- Date of excavation
- Approximate surface elevation
- Total depth of excavation
- Dimensions of pit
- Method of sample acquisition
- Type and size of samples
- Soil and rock descriptions
- Photographs
- Groundwater levels, if encountered
- PID/FID/LEL/O2 meter readings
- Other pertinent information, such as waste material encountered

8.0 ATTACHMENTS

1. Test Pit Log Sheet

ATTACHMENT 1

Tetra Tech NUS, Inc.

TEST PIT LOG

Page ___ of ___

PROJECT NAME: _____ TEST PIT No.: _____
PROJECT NUMBER: _____ DATE: _____
LOCATION: _____ GEOLOGIST: _____

Depth (Ft.)	Lithology Change (Depth/Ft.)	MATERIAL DESCRIPTION: Soil/Waste Characteristics (lithology, density, color, etc.)	USCS	Remarks	PID/FID READING: Source (ppm)	PID/FID READING: BZ (ppm)

TEST PIT CROSS SECTION AND / OR PLAN VIEW

REMARKS: _____

PHOTO LOG: _____

APPENDIX C

MEETING NOTES FROM MARCH 28 AND 29, 2012 MEETING

MINUTES
NSA CRANE SWMU 17 MEETING
MARCH 28 AND 29, 2012

ATTENDEES

Peter Ramanauskas – EPA Region 5 Remedial Project Manager
Dan Mazur – EPA Region 5 Ecological Risk Assessor
Howard Hickey – NAVFAC Remedial Project Manager
Tom Brent – NAVFAC NSA Crane Environmental Remediation Site Manager
Tom Johnston- Tetra Tech Project Manager
Ralph Basinski – Tetra Tech NSA Crane Activity Coordinator
Jim Riggins (partial)

BACKGROUND

The Navy has conducted RFI investigations at SWMU 17. The results show the presence of PCB contamination in drainage ditches from B-2721 and B-457 and the upper reach of Boggs Creek. The RFI identified excess risk to ecological and human receptors. The PCB concentrations are in excess of the 1 ppm level typically used as media cleanup standard (MCS). The Navy has developed and submitted to the EPA the following documents:

1. Interim Measures Work Plan for SWMU 17 – PCB Capacitor Burial/Pole Yard Floodplains, Ditches, and Streams
2. Technical Memorandum Prescriptive Remediation Sampling and Analysis for SWMU 17 – PCB Capacitor Burial/Pole Yard

The Interim Measures Work Plan (IMWP) proposed removal of the majority but not all of the sediments, with PCBs concentration in excess of 1 ppm PCB. Certain ditches segments, which had relatively low volumes of PCBs and which presented significant access issues were not proposed for remediation. The Sampling Plan was developed to complete PCB delineation to the extent necessary to support a prescriptive remediation without confirmation sampling and in-situ determination of TSCA and non-TSCA materials for disposal purposes. The purpose of the visit was to walk the ditches and assess the site conditions.

MEETING OBJECTIVES

1. Project team walk of SWMU 17 ditches to obtain common vision of site conditions
2. Focus on ditches, which have not been identified for remediation in the IMWP
3. Determine whether additional site specific information is needed to assess draft SWMU 17 Work Plan
4. Identify any additional information to be collected during next sampling event

ACTIVITIES

On Wednesday, March 28 the drainage ditches leading from B-2721 to Boggs Creek were walked by all attendees. The Northwest drainage ditch leading from the Pole Yard was also walked. During the site walk physical features (cobbles, sediments, floodplain areas, etc.) were noted. Figures showing sample locations were used to attempt to locate historic sample locations On Thursday, March 29, discussions were held regarding the IMWP and Sampling Plan based on observations made during the site walk. Draft responses to EPA's comments on the IMWP and Sampling Plan were reviewed. Results of recent delineation sampling in support of interim measures delineation sampling at SWMU 16 and UXO 7 were discussed.

CONCLUSIONS

SWMU 17

1. SWMU 17 IMWP should maximize exposure reduction and minimize release potential to downstream locations.
2. Contamination in floodplains and ditches, which are not proposed for remediation, should be delineated sufficiently in the sampling plan and as necessary in the IMWP to assist the Navy in evaluating the ability to remediate hotspots in accessible locations. Locations of additional delineation samples will be jointly made by EPA/Navy/Tetra Tech during site walk at the start of fieldwork
3. EPA may consider leaving small, inaccessible areas of PCB contamination in place provided migration and risk exposure (i.e., adverse effects to both aquatic life and wildlife) are controlled such that a determination of no unreasonable risk of injury to human health or the environment may be made.
4. Additional information, particularly from floodplains in ditches, which are currently not proposed for remediation, is required for EPA to make the decision associated with item 3.
5. EPA has no problems with responses to comments on the IMWP pending the collection of additional data. However, the IMWP should not be resubmitted until additional data is collected.
6. The RTC for the Sampling Plan is acceptable. However, the Sampling Plan should be modified to include the collection of additional samples at locations to be determined. The RTCs will be revised slightly to include additional detail concerning composite sampling for trenches and other nuances of the plan resolved during the meeting.
7. Removal options using small equipment or innovative techniques should be evaluated, especially in ditch or stream segments not readily accessible with larger equipment.
8. Fieldwork for implementation of the sampling plan was penciled in to start on April 23, 2012, pending availability of field staff and other logistical issues
9. The joint EPA/Navy/Tetra Tech sample location walk is scheduled for two days during the week of April 23, 2012, based on date of EPA visit to GM plant in Bedford, IN.
10. Navy will collect two samples in locations northeast of the area northwest of B-357 to better determinate PCB contamination in that area.
11. Navy does not need to collect additional samples in the road north of B-357.
12. Samplers will collect additional samples in six-inch increments for the first foot and one-foot deeper increments to bedrock. These samples will be held and analyzed sequentially until analytical results show that the clean zone is encountered.

SWMU16

1. Proposed Round 2 sample locations acceptable to EPA

UXO 7

1. Focused hot spot removal to reduce risk to acceptable level is acceptable.

ACTION ITEMS

Tetra Tech

1. Finalize RTC for EPA's comments on Technical Memorandum Prescriptive Remediation Sampling and Analysis for SWMU 17 – PCB Capacitor Burial/Pole Yard
2. Modify SWMU 17 Tech Memo to:
    a. Incorporate responses to EPA's comments
    b. Evaluate whether proposed intrusive subsurface investigations at Pole Yard should be extended to the head of the ditch where disposed material has been observed. This evaluation will include small test pits at the top and top sides of the northwest ditch.
    c. Include provisional samples for ditches, which are not currently proposed for remediation, with locations TBD in the field jointly by EPA/Navy/Tetra Tech at the start of fieldwork

d. Include any additional samples necessary to complete in-situ delineation of TSCA/non-TSCA waste soils/sediments in segments for which remediation is currently proposed.
e. Add samples to the northwest ditch

3. Schedule fieldwork to start April 23, 2012

4. Prepare for EPA/Navy/Tetra site sample location selection site visit:
   - **a.** Prior to site walk for sample location selection re-stake existing sample locations
   - **b.** Clear access to existing sample locations by grubbing as necessary
   - **c.** Prepare stream-segment specific figures showing sample locations and associated data
   - **d.** Tetra Tech FOL/NSA Crane Activity Coordinator/Project Manager to participate in sample selection site walk

5. Interim Measures Work Plan
   - **a.** Investigate small scale remedial option for smaller ditches (NW ditch and inaccessible portions of Ditch 3.
   - **b.** No re-submittal of IMWP until delineation sampling results are available for incorporation.

APPENDIX D

FTMR No. 1

TETRA TECH NUS
FIELD TASK MODIFICATION REQUEST FORM

NSA Crane	CTO F271 112G01573	NA
Project/Installation Name	**CTO & Project Number**	**Task Mod. Number**
Tech Memo for PCB Delineation	SWMU 17 drainages/Bldgs	**4/25/2012**
Modification To (e.g. Work Plan)	**Site/Sample Location**	**Date**

Activity Description: EPA Region 5 wants to ensure that sampling conducted in stream channels, ditches, and around buildings at SMWU 17 will assist the Navy in evaluating the ability to remediate hotspots in accessible locations. EPA also may consider leaving small, inaccessible areas of PCB contamination in place provided migration and risk exposure (i.e., adverse effects to both aquatic life and wildlife) are controlled such that a determination of no unreasonable risk of injury to human health or the environment may be made.

Reason for Change: During an April 24/25 site visit conducted by EPA Region 5, NSA Crane, and Tetra Tech representatives, additional delineation locations were identified that would improve the estimates of contamination that could be left behind after completing an interim measure designed to remove the majority of PCB contamination in soil and sediment. The intent is to minimize the potential for PCB migration to downstream channel segments and to maximize exposure reduction.

Recommended Disposition: The locations and depths identified by EPA and NSA Crane for additional sampling are provided in Attachment 1. Approve the collection of samples at these locations and analyze the samples in accordance with the Technical Memorandum for Sampling and Analysis to Support Prescriptive Remediation for SMWU 17 dated April 2012 (i.e., the Tech Memo for PCB Delineation).

QA Approval (Signature) _____ Date _____

Approved Disposition: Conduct work as describe under "Recommended Disposition."

Project/ Manager (Signature) _____ Date _____

Distribution:

Program/Project File – CTO F271/112G01573
Project/Task Order Manager – Tom Johnston
Field Operations Leaders – Jim Goerdt/&Terry Rojahn

Other: _____EAP Region 5_____
_____NSA Crane_____