INTERIM CORRECTIVE MEASURES SOIL VAPOR EXTRACTION AND IN-SITU CHEMICAL OXIDATION DESIGN AND IMPLEMENTATION WORK PLAN

RADIO MATERIALS CORPORATION
ATTICA, INDIANA

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1.0 INTRODUCTION

1.1 BACKGROUND

Conestoga-Rovers & Associates (CRA) completed a Phase IIB Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) in compliance with the U.S. Environmental Protection Agency (U.S. EPA) Region 5 RCRA 3008(h) Consent Order No. IND 005 477 021. The Consent Order was issued to Radio Materials Corporation (RMC), U.S. EPA identification number IND005477021, and applies to the RMC manufacturing facility located in west-central Indiana at 1095 East Summit Street in the eastern portion of the City of Attica, in Fountain County, Section 5, Township 21 North, Range 7 West (Site). The location of the Site is depicted in Figure 1.1.

The purpose of the Phase IIB RFI was to delineate the vertical and horizontal extent of potential contamination from five Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs) at the Site. The Phase IIB RFI was conducted in accordance with the document entitled Phase IIB RFI Work Plan, Radio Materials Corporation Facility, Attica, Indiana (CRA 2003) as amended by the letter to the U.S. EPA dated June 10, 2003 (Phase IIB Work Plan) and approved by the U.S. EPA in a letter dated June 16, 2003. The locations of the SWMUs and AOCs are depicted on the Site plan on Figure 1.2.

Based on the findings of the Phase IIB RFI, CRA developed an Interim Corrective Measures (ICMs) Work Plan. ICMs are defined by the U.S. EPA as measures to control or abate threats to human health and/or the environment from releases and/or to prevent or minimize the further spread of contamination while long-term remedies are pursued.

The ICM Work Plan identified the areas of the Site that would be amenable to ICMs, the stabilization technologies selected and the rationale for selection, and the activities required to investigate the technologies and obtain the data and information required to design and implement the stabilization technologies. Soil vapor extraction (SVE) and in-situ chemical oxidation (ISCO) were identified as stabilization technologies that would be potentially applicable to specific areas of the Site.

ISCO is a cost-effective method for treating source material (free product), is relatively easy to implement, and is effective on chlorinated ethenes. In an oxidation reaction, the oxidizing agent breaks the carbon bonds in chlorinated compounds and converts them into non-hazardous or less-toxic compounds, primarily carbon dioxide, water, and chloride. Commonly used oxidizing reagents include potassium permanganate

($KMnO_4$), Fenton's Reagent (hydrogen peroxide in a solution of ferrous salts), ozone, and catalyzed sodium persulfate. SVE applies a vacuum to unsaturated soils to volatilize VOCs that are adsorbed to the soil matrix. The vacuum is applied through the use of a vacuum extraction blower connected to vacuum extraction wells via above or below grade piping. VOCs are removed from the air stream via treatment methods or discharged to the atmosphere following regulatory approval. This technology takes advantage of the volatile characteristics of certain contaminants for their removal in permeable soils.

1.2 PURPOSE

The purpose of this report is to describe the design and implementation of the SVE and ISCO Interim Corrective Measures for SWMUs 1 and 2, SWMU 5 and SWMU 11/AOC 2. This approach has been developed using data from the Phase IIB RFI, the ICM Work Plan, the Soil Vapor Extraction Pilot Study Report, and the Chemical Oxidation Treatability Study.

It has been determined that implementation of the SVE and ISCO ICMs in SWMUs 1 and 2, SWMU 5, and SWMU 11/AOC 2 as described herein would control or abate potential threats to human health and/or the environment by reducing the concentrations of VOCs present in soil and, therefore:

- reducing the potential threat from direct contact to soil;
- minimizing potential for leaching of VOCs from soil to groundwater; and
- minimizing the potential of vapor-phase transport of VOCs from the source areas.

2.0 CURRENT CONDITIONS

2.1 SITE BACKGROUND

In 1947, Mr. Joseph Riley, Sr. reportedly purchased the Site and in 1948, began the manufacture of television tubes and ceramic capacitors in the main plant (located south of Summit Street). (Description of Current Conditions Report [DOCC], 1999). P.R. Mallory Company, Inc. purchased RMC in 1957 and owned the company and facility until 1978. The Riley family repurchased the facility in 1978 and continued to manufacture ceramic capacitors.

Currently, there are no active manufacturing operations at the Site. The Site buildings, including the main building, are used for general storage of equipment and supplies. Office space in the main building is in use by the Site owner, Mr. Joe Riley, Jr.

2.2 DESCRIPTION OF SWMUS AND AOCS

The following describes the SWMUs and AOCs at the Site to be addressed through implementation of SVE. All of the SWMUs at the Site are inactive as there are no ongoing manufacturing activities at this facility. Figure 1.2 depicts the locations of the SWMUs and AOCs.

SWMU 1 (FORMER OUTDOOR DRUM STORAGE AREA)

SWMU 1 was an outdoor drum storage area located north of Summit Road to the east of Buildings 6 and 7. According to the DOCC, the area of SWMU 1 appears to have varied in size over time to encompass an area ranging from 150 feet by 150 feet square to an area of 250 feet in length by 150 feet in width. The area within the footprint of SWMU 1 is currently grass covered. The footprint of SWMU 1 overlies the apparent (and older) footprint of SWMU 2 (Area A). According to the DOCC, SWMU 1 (the former drum storage area) operated from 1981 to 1988.

SWMU 2 (DISPOSAL AREA A)

According to the DOCC, SWMU 2 located east of Buildings 6 and 7 was operated from approximately 1963 to 1980 as an open unlined pit for placement of Site-generated manufacturing byproducts. The approximate dimensions of SWMU 2 are 40 feet long, 30 feet wide and 6 feet deep. Materials reportedly placed in SWMU 2 contained PCE and TCE, acetone, alcohol, phenolic resin and ceramic sludges.

SWMU 5 (DISPOSAL AREA B)

SWMU 5, which is currently grass covered, reportedly was used from approximately 1950 to 1963 for the placement of Site generated manufacturing byproducts. The manufacturing byproducts reportedly placed in SWMU 5 contained chlorinated solvents, acetone, isopropyl alcohol, phenolic resins, ceramic byproduct, waxes and paints. SWMU 5 is located approximately 200 feet southwest of the main plant building.

Approximately 7,000 cubic yards of impacted soil were excavated from the SWMU 5 area and transported off-Site between November 1995 and February 1996. The excavation was reported to be 100 feet by 120 feet, with a maximum depth of 20 feet. Reportedly, 6 inches of granular soil was then placed to protect the clay layer at the base of the excavation because the clay layer was considered to be a barrier to vertical migration of contaminants.

SWMU 11 (PCE VAPOR DEGREASING)

SWMU 11 is located on a wooden floor underlain by concrete in the north central portion of Building 1 of the main plant. The area of SWMU 11, once the location of a vapor degreasing unit, is approximately 22 feet in length by 7 feet in width. This degreasing unit reportedly was in operation from the early 1970s to 1986 and is no longer present at the facility. According to Mr. Joe Riley, Jr., TCE was initially used as the degreasing chemical in the vapor degreaser and, at some point; PCE replaced TCE as the degreasing chemical. Additionally, according to Mr. Riley, drums containing virgin and spent TCE were formerly staged east of the main building along the east property line in the 1950s and 1960s.

AOC 2 (USTs)

The Preliminary Assessment/Visual Site Inspection (PA/VSI) identified AOC 2 as three 6,000-gallon underground storage tanks (USTs) J, K, and L, located on the east side of the main building. According to the PA/VSI, the USTs were installed in 1955 with the contents of these USTs described as being product (J - heating oil; K – Hoosier, an acetone/alcohol mixture; and L - PCE). USTs K and L were temporarily taken out of service, cleaned and then refilled with heating oil in 1991. USTs K and L are currently in use to store heating oil.

The DOCC report expanded AOC 2 to include 11 former USTs (UST A through UST I, and USTs M and N). All of these USTs, except J, K, and L, were closed by removal. The

only reported release was from UST C, one of five USTs formerly located at the former fuel pump house. A closure report and a Corrective Action Plan (CAP) for UST C were submitted to IDEM. The CAP was never implemented by RMC and the UST C area was investigated during the RFI. A No Further Action (NFA) letter request was submitted to IDEM in July 2005. IDEM has conditionally approved the NFA pending recording of environmental land-use controls.

2.3 SITE PHYSICAL SETTING

This section provides a summary of the Site physical setting that was previously submitted to the U.S. EPA. This summary is not intended to be comprehensive summary and more information and specific references can be found in the Phase IIB RFI Report (CRA, October 2005).

2.3.1 PHYSIOGRAPHY

The Site is located within the Middle Wabash River Basin, which occupies 3,453 square miles within west central Indiana. The Wabash River is located approximately 3,500 feet northwest of the Site. This section of the Wabash River flows northeast to southwest until it reaches the "Great Bend", where it turns southward.

The Site lies along the northwest border of the Tipton Till Plain physiographic province of Indiana. The Tipton Till Plain physiographic province is characterized as a featureless, flat to gently rolling plain with extensive areas of ice disintegration features that resulted from the most recent Wisconsinan glacial advancement (Gray 2000).

The northwest borderline of the Tipton Till plain is marked by the Wabash River located northwest of the Site. The Wabash River valley can be up to 3-miles wide and serves as a dominant physiographic feature in the area of the Site.

2.3.2 TOPOGRAPHY

The Site is located at the edge of Wabash River basin on a local topographic high. From this local high, there is a gentle slope to the south toward an intermittent stream (approximately 650 feet above mean sea level (amsl)) in Ravine Park and a steeper slope to the northwest toward the Wabash River (approximately 500 feet amsl). The Site is located on a topographic rise approximately 670 feet amsl. The immediate area located

around the main plant building is rather flat with only slight sloping to the south. The southern property boundary is marked by a steep grade that slopes to the south toward the intermittent stream in Ravine Park. Just north of the main plant building there is another steep grade (approximately 11 percent) over about 500 feet that then levels to a more moderate grade (approximately 2.5 percent) in a northwest direction.

2.3.3 SURFACE WATER

Riley Lake is the only surface water body at the Site (see Figure 1.2). This lake is an approximately 1.8-acre manmade pond located 300 feet west-northwest of the main plant. An intermittent stream is located 1,000 feet south of the main plant in Ravine Park. There are also various other intermittent surface channels that drain the area around the Site, but many of these are much farther from the Site and receive little direct runoff from the Site.

The most significant surface water body in the area of the Site is the Wabash River, which is located over 4,000 feet northwest of the main plant building. The river channel follows a pre-glacial buried valley. As a result of continental glaciation, this paleochannel is now composed of approximately 150 feet of sand and gravel valley train and outwash plain deposits. A wetland, located within the Wabash River flood plain, is present approximately 2,400 feet northwest of the facility.

2.3.4 GEOLOGY AND HYDROGEOLOGY

The local geology consists of Pleistocene glacial deposits of till and glaciofluvial sands and gravels underlain by Paleozoic sedimentary rocks (primarily shale with interbedded limestone, siltstone and sandstone) of Pennsylvanian and Mississippian age. In general, the glacial overburden deposits are up to 60 feet thick in the southern portion of the Site but thin to approximately 10 feet in the northern portion of the Site. The Site lies above the contact between Pennsylvanian and the Mississippian age bedrock units. The Pennsylvanian age bedrock of the Raccoon Creek and Carbondale Groups consists of complexly interbedded shale and sandstone with thin beds of limestone and coal. The Mississippian age bedrock of the Borden Group consists of siltstone and shale with minor sandstone and discontinuous limestone. The combined thickness of these units exceeds 1,300 feet.

The depth to groundwater across the Site varies from approximately 60 feet below ground surface (bgs) in the far southern portions to approximately 10 feet bgs in the

northern portion of the Site. Groundwater flow was observed to be towards the northwest in the overburden and bedrock units investigated during the Phase IIB RFI. This is consistent with the regional groundwater flow reported in the background literature, which is generally toward the northwest in the direction of the Wabash River. Closely spaced horizontal fractures are predominant in the shales, siltstones, and sandstones deposited beneath the study area. Groundwater flow would occur primarily through these horizontal fracture zones.

2.4 SUMMARY OF KEY RFI FINDINGS

This section provides a summary of the key findings that was previously reported to the U.S. EPA. This summary is not intended to be comprehensive summary and more information and specific references can be found in the Phase IIB RFI Report (CRA, October 2005).

2.4.1 OVERVIEW

This subsection summarizes the key findings of the investigations completed in those SWMUs and AOCs that are considered amenable to SVE. These findings are reported in the Phase IIB RFI Report (CRA, October 2005) and the Interim Corrective Measures Report (CRA, July 2006). The SWMUs and AOCs that were determined to be amenable to SVE include SWMUs 1 and 2, SWMU 5, and SWMU 11/AOC 2.

2.4.2 SWMU 1 AND SWMU 2

Investigations at SWMUs 1 and 2 were combined because SWMU 2 is located within the footprint of SWMU 1. Buried wastes and volatile organic compound (VOC) contaminated soils were identified within the boundaries of SWMUs 1 and 2 during the Phase IIB RFI. The test pit investigation revealed areas of buried wastes including miscellaneous debris, gray and yellow sludge-like materials, stained soils, two buried drums, and drum remnants.

Total VOC concentrations are highest (above 10 milligrams per kilogram [mg/kg]) in the central portion of SWMUs 1 and 2, but total VOC concentrations above 1 mg/kg are common in soils within SWMUs 1 and 2. Tetrachloroethene (PCE) is the VOC detected most frequently and at the highest concentrations in the soil samples collected from SWMUs 1 and 2. VOC concentrations above 0.1 mg/kg at depth extend to the northwest

of SWMUs 1 and 2. These detections appear to be related to vapor-phase transport and/or VOC off-gassing from groundwater.

ICMs are warranted in the SWMU 1 and 2 areas to reduce the VOC concentrations in soil and to minimize potential for leaching of VOCs to groundwater. There are isolated areas of shallow waste deposits that can be effectively addressed with soil vapor extraction (SVE). Additionally, because vapor-phase VOC contamination is present within and may migrate through permeable sands and gravels in the SWMU 1 and 2 areas, SVE would reduce the concentrations of VOCs in soil and minimize potential the migration of VOCs in soil and groundwater.

2.4.3 SWMU 5

Subsurface soil VOC impacts are present within and outside the boundary of SWMU 5 identified in the Description of Current Conditions Report (Bodine, May 1999). PCE, trichloroethene (TCE), and cis-1,2-dichloroethene (cDCE) were the VOCs most commonly detected in SWMU 5 soil samples, although other chlorinated aliphatic compounds also were detected less frequently in soil.

The most elevated concentrations of total and individual VOCs (above 100 mg/kg) are present in the central portion of SWMU 5 between approximately 15 and 25 feet bgs. Free product was observed in one boring (B-518) at 16 to 20 feet bgs. There are separate upper and lower sand and gravel units present in this area. These units are separated by a continuous, low permeability silt layer at 20 to 25 feet bgs. Free product, if present in sufficient quantity, will migrate vertically through the upper sand and gravel unit and accumulate along the top of this silt layer. VOC concentrations above 1 mg/kg are present at depth over a relatively broad area surrounding SWMU 5. Elevated concentrations of VOCs extend to the top of bedrock (approximately 55 to 60 feet bgs). VOC concentrations at these depths generally were in the single digit part per million range, although total VOC concentrations above 10 mg/kg were noted in soil samples collected from the 30 to 40 feet bgs depth interval immediately west of the previously excavated area. VOC concentrations above 0.1 mg/kg at depth extend to the northwest of SWMU 5.

ICMs are warranted in the SWMU 5 area to minimize the potential migration of VOCs from the soils in this area. There are isolated areas of source material (i.e., free product) that can be effectively addressed with certain stabilization technologies such as in-situ chemical oxidation (ISCO) and SVE that are relatively easily implemented. Additionally, because vapor-phase VOC contamination is present in and may migrate

through permeable sands and gravels in the SWMU 5 area, the local Site characteristics are amenable to implementation of the same stabilization technologies mentioned above to minimize the migration of VOCs in soil and groundwater.

2.4.4 SWMU 11/AOC 2

. PCE and TCE were the VOCs most commonly detected in SWMU 11/AOC 2 soil samples. PCE was detected primarily in soil samples collected inside the main building in the area of the former vapor degreaser. PCE detections in the range of 1 mg/kg to 50 mg/kg occurred in the vicinity of the former degreaser, with isolated higher detections present. Free product was observed in one soil sample collected from the 22 to 24 feet bgs depth interval at boring B-1117. There are separate upper and lower sand and gravel units present in this area. These units are separated by a continuous, low permeability silt layer at 20 to 25 feet bgs. Free product, if present in sufficient quantity, may migrate vertically through the upper sand and gravel unit and accumulate along the top of the silt layer.

TCE detections were common along the eastern side of the main building up to the eastern property boundary. The source of the TCE is unclear, but drums containing TCE were reportedly managed historically in this area. TCE was reportedly used in the vapor degreaser (prior to switching to PCE).

ICMs are warranted in the SWMU 11/AOC 2 area to minimize the potential migration of VOCs from soils in this area. There is an isolated area of source material (i.e., free product) that can be effectively addressed with certain stabilization technologies such as ISCO and SVE that are relatively easily implemented. Additionally, because vapor-phase VOC contamination is present within and may migrate through permeable sands and gravels, the local Site characteristics are amenable to implementation of the same stabilization technologies to minimize the migration of VOCs.

3.0 PREMOBILIZATION ACTIVITIES

3.1 HEALTH AND SAFETY PLAN

CRA has prepared a Site-Specific Health and Safety plan for this project. This plan covers all remediation activities and all personnel involved with remediation activities at the Site will be briefed on the plan and will adhere to it at all times.

3.2 UTILITY CLEARANCE

The estimated location of all underground installations will be determined before ICM intrusive field activities commence. The Indiana Underground Plant Protective Organization will be contacted and a locate request for any underground public utilities will be submitted at least 2 business days prior to the start of work. The Site owners will also be contacted prior to project startup, to locate underground private utilities and installations. Ground-penetrating radar or other equipment may be used to confirm that the treatment area is clear of buried utilities.

4.0 ISCO IMPLEMENTATION

4.1 PILOT STUDY RESULTS

4.1.1 LABORATORY STUDY RESULTS

A laboratory study was performed to evaluate application of ISCO to specific areas of the Site. The primary objectives of the laboratory study were to gather the data necessary to determine:

i) the effectiveness of ISCO for treatment of the VOCs in representative soil and groundwater samples from the Site;

ii) the most effective oxidant for treatment of Site soils; and

iii) the effective concentration/dosage of oxidant required to complete treatment as expeditiously as possible.

ISCO is a cost-effective method for treating source material, is relatively easy to implement, and is effective on chlorinated ethenes. In an oxidation reaction, the oxidizing agent breaks the carbon bonds in chlorinated compounds and converts them into non-hazardous or less-toxic compounds, primarily carbon dioxide, water, and chloride.

The oxidizing agents commonly used in ISCO include:

- potassium permanganate ($KMnO_4$);
- Fenton's reagent (a solution of hydrogen peroxide and ferrous sulfate);
- ozone; and
- sodium persulfate ($Na_2S_2O_8$).

The natural oxidant demand (NOD) is a critical factor in the evaluation of ISCO treatment in determining the dosages of oxidant that are required to effectively oxidize the contaminants present (referred to as stoichiometric demand) as well as the competing reactions. The competing reactions are typically caused by the presence of natural organic materials such as humates and fulvates, as well as reduced metal species. The consumption of oxidants by these non-target compounds is defined as the NOD. In order to determine the optimum oxidant dosage, treatability studies to determine the NOD of the Site soil were conducted.

A series of microcosm tests were conducted to assess the effectiveness of selected chemical oxidizing agents for treatment of VOCs in the soils and to determine the optimum concentration range of the chemical oxidizing agents' solution to be used for implementation. The results of the pilot study demonstrated that chemical oxidation treatment of the soil was effective. Treatment with $KMnO_4$ reduced Site-related contaminant concentrations by between 90 percent and 95 percent. Therefore, chemical oxidation treatment would be effective for its intended use at the Site.

Potassium permanganate ($KMnO_4$ or permanganate) is the oxidizer that has been chosen for use at the Site. $KMnO_4$ is a commonly used oxidant that is readily available in large quantities and is cost effective. This compound is relatively safe and easy to handle when normal health and safety procedures are followed. $KMnO_4$ is effective when delivered in an aqueous solution, and reacts throughout a wide range of pH conditions. Besides carbon dioxide and water, the reactions yield primarily manganese dioxide and chloride. The $KMnO_4$ treatment would be focused on the most contaminated soil where free product could be present to reduce the initial concentrations and eliminate source material in a short time frame.

CRA generated a report entitled "*Chemical Oxidation Treatability Study*"*(CRA, 2006)* and submitted it to the United States Environmental Protection Agency (USEPA) for review on October 12, 2006. The USEPA approved the report on November 2, 2006.

4.1.2 FIELD INJECTION TEST

In addition to the laboratory pilot study, a field injection test was performed to determine the effective radius of influence for chemical injections. The field test was performed on November 21, 2006 using a direct-push technology (DPT) drilling rig and approximately 5 percent $KMnO_4$ solution. The $KMnO_4$ stains the soil a distinct purple color that is easily visible. The DPT rig advanced a single boring at a location along the eastern edge of SWMU 5. One hundred and fifty gallons of $KMnO_4$ solution was pumped into the subsurface through the DPT rods into the target zone. Following injection, a series of borings were advanced around the injection point at 2.5, 5 and 10 feet from the injection point to visually identify $KMnO_4$ in the subsurface and determine the effective injection radius.

The results of the injection test indicated that the effective radius of oxidant dispersal was limited to approximately 5 feet. This is likely due to the presence of very permeable sand and gravel in the subsurface. Based on the very close injection point spacing, ISCO would not be a cost effective technology to treat large areas of vadose zone soils because

the use of ISCO requires thorough distribution of oxidants within the soil matrix in the affected area. The oxidant must come into contact with the contaminant in order to initiate the chemical reaction necessary to break down the contaminant. ISCO will only be effective when applied in a very targeted manner at the Site.

4.2 ISCO IMPLEMENTATION

The objective of implementing ISCO is to rapidly reduce VOC concentrations in the areas where the greatest concentrations were observed and, in doing so, minimize any ongoing and/or potential releases. ISCO treatment will be supplemented by SVE as described in Section 5.

ISCO injections will be performed in SWMU 5 in the area around borings B-512, B-517, B-518, B-524, and at SWMU 11 in and around the area of boring B-1117 at specific depth intervals where free product was indicated to be present by visual observation and photoionization detector (PID) readings exceeding 1,500 parts per million (benzene equivalents) were observed. The following summarizes the SWMU locations, borehole locations, depth intervals, maximum PID readings, and observations of boreholes that will be the target depth interval for ISCO injections.

SWMU	*Identifier*	*Depth Int. (ft bgs)*	*PID*	*Observations*
5	B-512	15-20	1,516	Black staining, strong solvent odor
5	B-517	15-20	3,650	Black staining, strong solvent odor, trace product
5	B-518	16-20	3,426	Free product, strong odor at 19 feet
5	B-524	18-24	4,620	Strong solvent odor, potential liquid free product
11	B-1117	18-26	>9,999	Strong solvent odor, potential free product at 22 feet

The stratigraphic logs for the targeted locations noted in the preceding table are provided in Appendix A. It is noted that in SWMU 5, observations of highly elevated PID readings and potential presence of free product occur between approximately 15 and 20 feet bgs at the interface between a sand unit and an underlying lower permeability silt unit. These borehole locations and depth intervals are the target zone for ISCO in SWMU 5.

The SWMU 5 ISCO deployment areas are depicted on Figure 4.1. In SWMU 11/AOC 2 injections will be performed in the area around boring B-1117 at depth intervals where

free product was observed. The conceptual SWMU 11 ISCO deployment area is depicted on Figure 4.2.

The objective of the ISCO injections is to target the known areas of potential free product to reduce the potential for migration of this material and to quickly reduce the concentrations of VOCs in these target zones. The recommended dose to achieve this objective is approximately 15 grams (g) $KMnO_4$ per kilogram (kg) of soil. In SWMU 5, based on the treatment areas, the thickness of the treatment zones, the anticipated number of injection points, and a radius of influence of 5 feet, it is estimated that approximately 3,500 pounds of $KMnO_4$ will be required per injection event. In SWMU 11, it is estimated that approximately 800 pounds of $KMnO_4$ will be required per injection event. Injections will be delivered in three bimonthly injection events. In total, approximately 13,000 pounds of $KMnO_4$ will be delivered to the target zones in both former SWMUs.

The key to effective remediation using ISCO is to deliver the highest concentration of oxidant practical directly to the zone of highest VOC impact and disperse the oxidant thoroughly in the impacted zone. The most effective method for delivery of the oxidant to the target area is through the use of DPT drilling rigs (i.e., Geoprobe™, or similar). Prior to injection, the dry permanganate will be mixed to an approximately 3 percent solution in a 500-gallon poly tank. The mixing of the permanganate solution will be performed in proximity to the injection area. The 5-gallon pails of dry permanganate will be added to the water in the poly tank and will be stirred thoroughly using high pressure water from the injection pump. Secondary containment will be provided for the mixing tank during mixing/injection activities.

The permanganate solution will be continuously injected into the soil column by pumping through the drill stem and a specialized injector tip at a minimum pressure of 50 psi. The individual injection points will be spaced at 10-foot intervals as shown in Figures 4.1 and 4.2. Three injections of 3 percent $KMnO_4$ solution will be conducted in the target treatment areas to achieve the VOC reduction objective. The drilling locations will be shifted horizontally approximately 5 feet during each bimonthly injection event to ensure the target area is treated.

5.0 SVE INTERIM CORRECTIVE MEASURES

5.1 OBJECTIVE

The objectives of the SVE Interim Corrective Measures are to reduce VOC concentrations in soil in the source areas and reduce migration of VOCs. In order to achieve these objectives, the SVE extraction wells installed in each of the three source areas will be screened in both the permeable zone immediately above the bedrock and in the permeable zones above the confining silt layers. The intent is to create a vacuum that will volatilize and extract the VOCs thereby reducing the VOC concentrations in the soil and minimizing the potential migration of the VOCs in soil vapor and leaching to groundwater.

5.2 AIR REGULATORY REQUIREMENTS

5.2.1 AIR PERMITTING

Based on soil analytical data from the Phase IIB RFI and soil mass estimates for SWMUs 1 and 2, SWMU 5, and SWMU 11, the estimated total maximum mass of VOCs present in the subsurface in these three areas is 5.5 tons. The estimated maximum total mass of a single hazardous air pollutant (HAP) in these three areas is 4.7 tons of TCE. Further, the estimated total mass of combined HAPs is 7.1 tons. Conservatively assuming that the SVE systems are 100 percent efficient at removing the HAPs during the first year of operation, the Site would be exempt from Indiana registration and permitting requirements pursuant 326 IAC 2 because VOC and single HAP potential emissions would be below 10 tons per year and combined HAPs potential emission would be below 25 tons per year. Potential emission calculations are provided in Appendix B.

5.2.2 VOC CONTROL

The general VOC reduction requirements in 326 IAC 8-1-6 indicate that if an emissions unit (i.e. one SVE system) has potential emissions of 25 tons per year or more, then VOC emissions must be reduced by best available control technology (BACT). Conservatively assuming that the SVE systems are 100 percent efficient and all contamination is removed during the first year, the estimated total mass of VOCs is 5.5 tons, which is well below the applicability threshold.

Although air permitting and VOC emission controls are not required by regulations, to control potential odors the discharge from the SWMU 5 and SWMU 11/AOC 2, SVE systems initially will be routed through activated carbon treatment units at system startup. Typically, the highest concentration of VOCs in soil vapor occurs during the early phase of SVE system operation. As the SVE systems proposed for SWMU 5 and SWMU 11/AOC 2 are located relatively close to residential properties, the discharge from the SVE systems will be routed through activated carbon treatment units at system startup. Although there is no threat to the residents from operation of the SVE system, the activated carbon will be installed to mitigate potential odor problems. It is anticipated that the carbon treatment units will be decommissioned within the first three months of system operation.

5.3 DESIGN OF THE SVE INTERIM CORRECTIVE MEASURES

5.3.1 SVE PILOT TEST

CRA completed an SVE pilot test at the Site during the week of September 25, 2006. The objective of the pilot test was to determine a radius of influence of SVE extraction wells. The radius of influence for a SVE system is defined as the maximum distance from the extraction well at which a minimum vacuum of 0.1 inches of water column can be established in the treatment zone. A single extraction well and vacuum monitoring piezometers were installed in the SWMU 1 unit, SWMU 5 shallow unit, SWMU 5 deep unit, SWMU 11/AOC 2 shallow unit and SWMU 11/AOC 2 deep unit. A portable SVE system was connected to each of the extraction wells and the vacuum response at the piezometers associated with each well was recorded to determine the individual radius of influence for each unit. The design and implementation of the pilot study are documented in Appendix C.

Based on the results of the SVE pilot tests, the effective radius of influence at the three SVE pilot test locations is summarized below. The shallow zone represents soil above approximately 30 feet bgs and the deep zone represents soil between approximately 30 and 60 feet bgs.

	Radius of Influence (feet)	
Treatment Area	***Shallow Zone***	***Deep Zone***
SWMUs 1 and 2	25	N/A[1]
SWMU 5	25	45
SWMU 11/AOC 2	25	45

Two vapor samples were collected from each extraction well during the pilot study. Those ten samples were submitted for VOC analysis. The primary VOCs of concern in the target areas are PCE, TCE and cDCE. Elevated levels of these VOCs were recorded in the vapor effluent samples obtained in each of the target areas. The highest concentrations of the primary VOCs recorded in each area are summarized below:

- SWMU 5: PCE-660,000 parts per billion (ppbv), TCE-7,500,000 ppbv, cDCE 2,000,000 ppbv;
- SWMU 11: PCE-7,000,000 ppbv, TCE-74,000 ppbv, cDCE-12,000 ppbv; and
- SWMU 1/SWMU 2: PCE-1,100,000 ppbv, TCE-120,000 ppbv, cDCE-4,600 ppbv.

The extraction well spacing and system component requirements are determined based on the information from the pilot study. These are discussed in the following sections.

5.3.2 SWMU 1 AND 2 SVE WELL AND HEADER ARRAY

The SVE system will be installed in the SWMU 1 and 2 area following completion of the excavation ICM program submitted under separate cover to USEPA. Based on data from the SVE pilot test, the radius of influence for the SVE extraction wells in this area is approximately 25 feet. Extraction wells to be installed in this area are shown in Figures 5.1 and 5.2.

The thickness of the overburden is relatively thin in the SWMU 1 and 2 area. Additionally, the depth to water is relatively shallow and variable due to topography in this area. As shown on Table 5.1, the depth to groundwater in the SWMU 1 and 2 area ranges from approximately 30 feet at monitoring well OB-16 to approximately 13 feet at monitoring well OB-21. In general, the ground surface elevations are highest to the east and south of SWMU 1 and 2 and lowest to the west and north. Therefore, to prevent the uptake of groundwater in the SVE extraction wells, it will be necessary to vary the

[1] Bedrock and groundwater are less than 30 feet deep in the SWMU 1 and 2 area. Therefore, the deep zone will not be treated with SVE.

screened intervals to maintain a minimum appropriate freeboard between the bottoms of the extraction wells and the top of the water table.

The monitoring wells within or closest to the target treatment area include OB-17, OB-19, and OB-21. The maximum groundwater elevation observed at these three wells during the period from October 2003 and May 2006 was 608.59 feet at OB-17. Therefore, the bottoms of the SVE extraction wells installed will be targeted to an elevation of approximately 610 feet. In order to maintain a minimum of 3 feet between the top of the screened interval and the ground surface to provide an adequate seal and prevent vacuum loss, it will be necessary to vary the lengths of the extraction well screens. 10-foot well screens will be used at locations in areas where overburden thickness results in a minimum of 3 feet between the top of the screen and the ground surface, otherwise, a 5-foot or 7-foot long screen will be installed as appropriate.

The extraction wells will be connected to a PVC header pipe that will be attached to a 50 hp (minimum) regenerative blower that will provide the necessary vacuum to the system. The system will be designed to operate at 6 inches of mercury column of vacuum and the design flow rate for each well will be 75 standard cubic feet per minute (scfm), resulting in a system flow rate of approximately 2,400 scfm.

The SWMU 1 and 2 area is located away from any residential areas and is surrounded by agricultural land or idle industrial property. Therefore, no off-gas treatment of the vapor effluent will be installed to control odors.

The vapor system blowers and controls may be located inside Building 6. The layout of the SWMU 1 and 2 SVE array (SVE #3) is shown on Figures 5.1 and 5.2. Alternatively, the blower system may be installed into a trailer and delivered to the Site as a free standing unit.

5.3.3 SWMU 5 AND SWMU 11/AOC 2 SVE WELL AND HEADER ARRAYS

In the SWMU 5 and SWMU 11/AOC 2 areas, the thickness of unconsolidated sediment above the water table ranges from approximately 45 to 60 feet. A low permeability silt layer at a depth of approximately 20 to 25 ft bgs separates the upper and lower sand units. The extent of VOC impacts to soil vary within the upper sand unit and the lower sand unit. Additionally, the effective radius of influence varies significantly between the upper and lower sand units, indicating that the lower sand unit has greater effective permeability. Additionally, the SVE pilot test results indicate that vacuum applied to

one unit does not appreciably affect the other unit. Therefore, separate extraction well arrays will be installed in the shallow and deep sand units in the SWMU 5 and SWMU 11/AOC 2 areas.

The wells in the upper sand unit will be screened from approximately 15 to 25 feet bgs. There is no concern about groundwater intrusion in the shallow extraction wells because groundwater levels range from approximately 45 to 60 feet bgs in this area. Based on data from the SVE Pilot Test, the radius of influence for the SVE extraction wells in the upper sand unit is approximately 25 feet.

The SVE extraction wells in the deep sand unit will be constructed to prevent groundwater intrusion into the screened intervals. Table 5.2 summarizes the groundwater elevations recorded during the period from October 2003 through May 2006 for monitoring wells within and in close proximity to the proposed treatment areas in SWMU 5 and SWMU 11/AOC 2. The shallowest groundwater elevation recorded during this period was approximately 609 feet at monitoring well OB-11. The bottom of the extraction wells will therefore be set no lower than an elevation of 612 feet to prevent groundwater intrusion. The deep vapor extraction wells will be equipped with 15 foot screens.

Based on data from the SVE Pilot Test, the radius of influence for the extraction wells in the deep sand unit is approximately 45 feet. The proposed layout of the SWMU 5 and SWMU 11 SVE systems (SVE #1 and SVE #2) are shown on Figures 5.3 through 5.6.

The SWMU 5 shallow and deep vapor extraction wells will be connected to a header pipe, which will be attached to a 100 hp (minimum) regenerative blower that will provide the necessary vacuum to the system. The system will be designed to operate at 12 inches of mercury column of vacuum. The design flow rates for each shallow extraction well and each deep extraction well will be 50 scfm and 100 scfm, respectively, resulting in a total system flow rate of approximately 4,750 scfm. This system may be configured with multiple blowers due to the significant total system requirements.

The SWMU 11/AOC 2 shallow and deep vapor extraction wells will be connected to a header pipe, which will be attached to a 50 hp (minimum) regenerative blower that will provide the necessary vacuum to the system. The system will be designed to operate at 6 inches of mercury column of vacuum. The design flow rates for each shallow extraction well and each deep extraction well will be 50 scfm and 100 scfm, respectively, resulting in a total system flow rate of approximately 1,400 scfm. Due to physical access constraints, it may not be possible to install all of the proposed SVE extraction wells

inside the main plant building. However, as many locations as possible will be installed within the main building as conditions permit.

5.4 SVE SYSTEM INSTALLATION

The SVE extraction wells will be installed with a hollow stem auger drill rig. Prior to drilling the wells, a land surveyor will mark the locations and determine the ground surface elevations at each proposed well location. This will permit proper placement of the wells and the screened intervals. The SVE extraction wells for both the upper and lower sand units will be constructed of 2-inch ID Schedule 40 PVC pipe. The shallow sand unit wells will have 10-foot long factory cut screens with 0.010-inch slots and the deep sand unit wells will have 5, 7 or 15-foot long factory cut screens with 0.010-inch slots. Shallow and deep vapor extraction wells will be installed in separate boreholes to minimize the potential for cross contamination between these units. Each well will be equipped with a shutoff valve so that individual wells can be blanked off from the SVE system. Each well will also be equipped with a port that will allow attachment of a portable vacuum gauge that will allow a technician to measure the individual vacuum at each extraction well. The header pipes will be placed into trenches with minimum depths of 30 inches bgs to protect the pipes from freezing. Typical SVE well detail is provided in Figure 5.7.

Both the north (SWMUs 1 and 2) and south (SWMU 5 and SWMU 11/AOC 2) SVE blower and treatment systems may be installed inside Site buildings. Prior to the delivery of the SVE equipment to the Site, CRA personnel will inspect the buildings chosen to house the equipment. The purpose of this inspection will be to determine if the buildings require upgrades to their electrical systems in order to power the SVE equipment.

The electrical service requirements for the SVE systems are as follows:

- SVE #1 – 480V, 3 phase, 124 A;
- SVE #2 – 480V, 3 phase, 67 A; and
- SVE #3 – 480V, 3 phase, 67 A.

In the event that the existing electrical service at the Site is inadequate, a qualified electrical contractor will be hired to run new lines to the Site and install the necessary equipment to provide the required service. New electric meters will be installed at the Site to track the power usage and cost for operation of the SVE systems. CRA personnel

will also determine whether equipment pads will be required. Electrical connections will be made by a qualified licensed electrician. All meter boxes, control boxes, fuse boxes, and control switches will be equipped with lockout function to prevent the systems from being accidentally energized during maintenance and inspection.

Alternatively, the blower and treatment systems may be installed into trailers and delivered to the Site as free standing units.

5.5 SVE SYSTEM DESIGN AND STARTUP

Each of the three SVE systems will consist of the following equipment:

- appropriately sized blower(s);
- moisture separator;
- condensate storage tank(s);
- condensate transfer pump;
- carbon filter units; and
- control unit.

A typical SVE system schematic drawing is presented on Figure 5.8.

Following system installation, a startup period will be required to optimize system operation. The operating parameters include system vacuum, blower speeds, flow rates, flow balancing, carbon loading, rate of condensate removal, and hours of operation. The operating parameters will be set to optimize system operations and to ensure that the required minimum vacuum is established at each extraction well. The system control units will monitor the systems and will be programmed to shut down the systems if they are not operating within the range set for each parameter.

5.6 SVE SYSTEM MONITORING

Soil vapor samples will be collected from each of the five soil zones addressed by the three proposed SVE systems (SWMU 1 and 2, SWMU 5 shallow, SWMU 5 deep, SWMU 11/AOC 2 shallow, and SWMU 11/AOC 2 deep) on a bimonthly basis (i.e., in months 1, 3, and 5 of operation) during the first 6 months of operation to track vapor concentration trends. The vapor samples will be collected in laboratory-supplied Summa canisters and the vapor samples will be analyzed for VOCs using U.S. EPA

Method TO-14A. Following the initial 6 months of operation, soil vapor samples will be collected quarterly to track soil vapor concentration trends and assess the progress of the remediation.

5.7 SVE SYSTEM INSTALLATION REPORT

Once the system installation and startup period are completed, CRA will generate an installation report that will include the following:

- a description of all installed system components;
- a description of all construction activities, including well installation, header system construction and system components installation;
- the startup procedures; and
- as-built drawings showing the locations of all wells, the layout of the header systems and the schematics for each of the SVE systems.

5.8 SVE SYSTEM OPERATION AND MAINTENANCE MANUAL

CRA will generate a Site specific Operation and Maintenance (O&M) manual for the SVE systems. The O&M manual will contain the following:

- a description of each system;
- the operating parameters for each system;
- the procedure for monitoring the systems;
- the procedure for disposal of condensate;
- the procedure for replacing the carbon in the filters;
- the procedure and schedule for vapor sampling;
- the procedure and schedule for inspecting the systems; and
- the maintenance requirements and maintenance schedule for the systems.

5.9 CONFIRMATORY SAMPLING

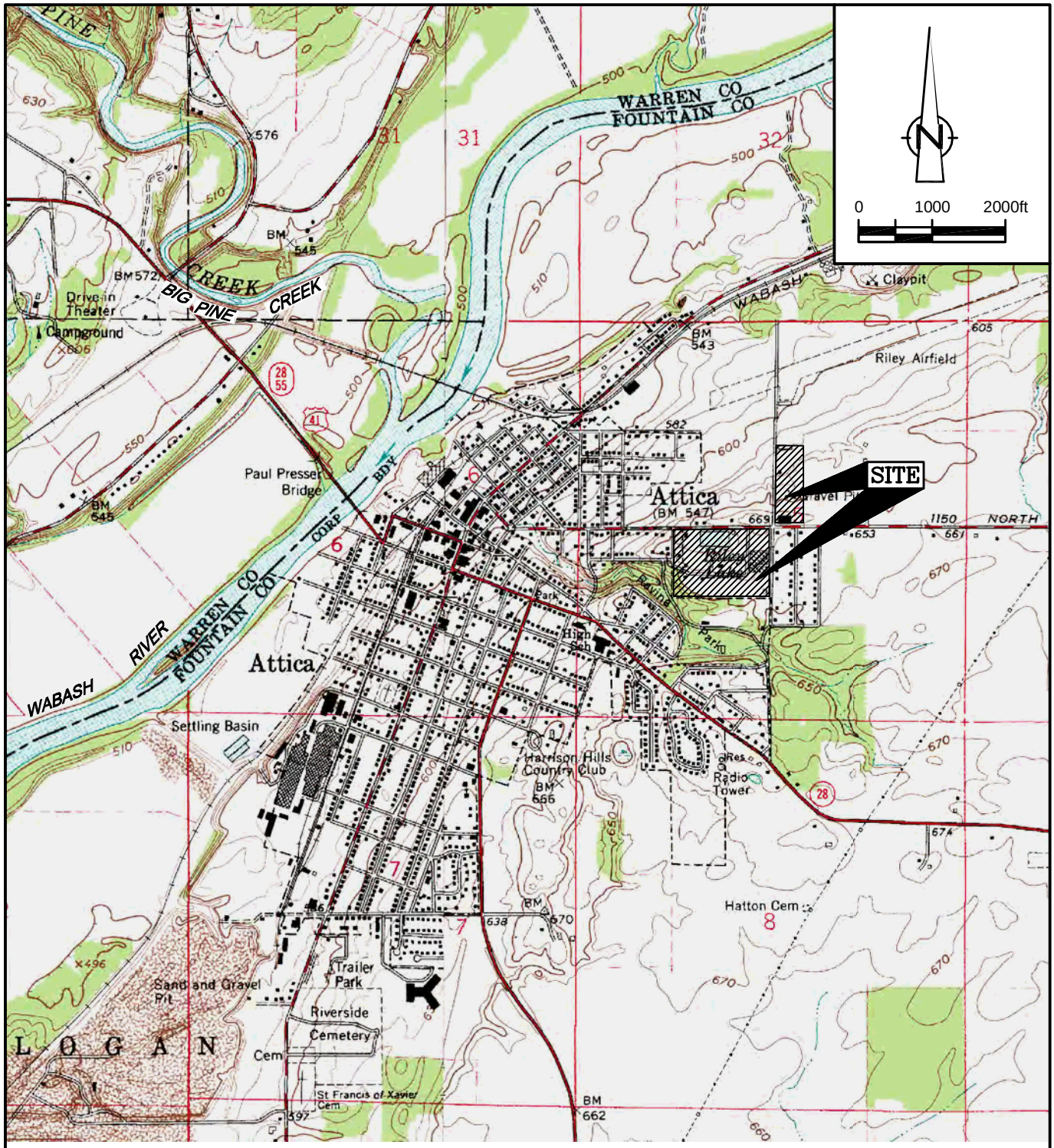
The effluent vapor data will be monitored over time to track the level of VOC removal from each SVE system. Additionally, the extraction wells will be fitted with ports that will allow monitoring of VOC vapor concentrations using a portable meter (such as a

photoionization detector) or collection of an effluent air sample for laboratory analysis. These systems will be monitored periodically and the SVE system will be adjusted using valves to direct the airflow to the locations requiring the most treatment.

Once operations are observed to have hit an asymptote where VOC removal rates have been reduced to a stable level, confirmatory soil sampling will be performed to assess the progress of cleanup. The soil sampling procedures and analytical protocols to be used will be similar to those used during the Phase IIB RFI. A confirmatory soil sampling plan will be developed and submitted for U.S. EPA approval prior to performing the confirmatory sampling. At a minimum, the confirmatory sampling plan will include the proposed soil sampling locations, methods for selection of sample depth intervals, soil sampling procedures, laboratory analytical protocols, and data management procedures.

6.0 SCHEDULE

The proposed schedule for implementation of the ISCO and SVE ICMs proposed herein is provided in Figure 6.1. Regular SVE monitoring data will be submitted to the U.S. EPA with the monthly report submittals.



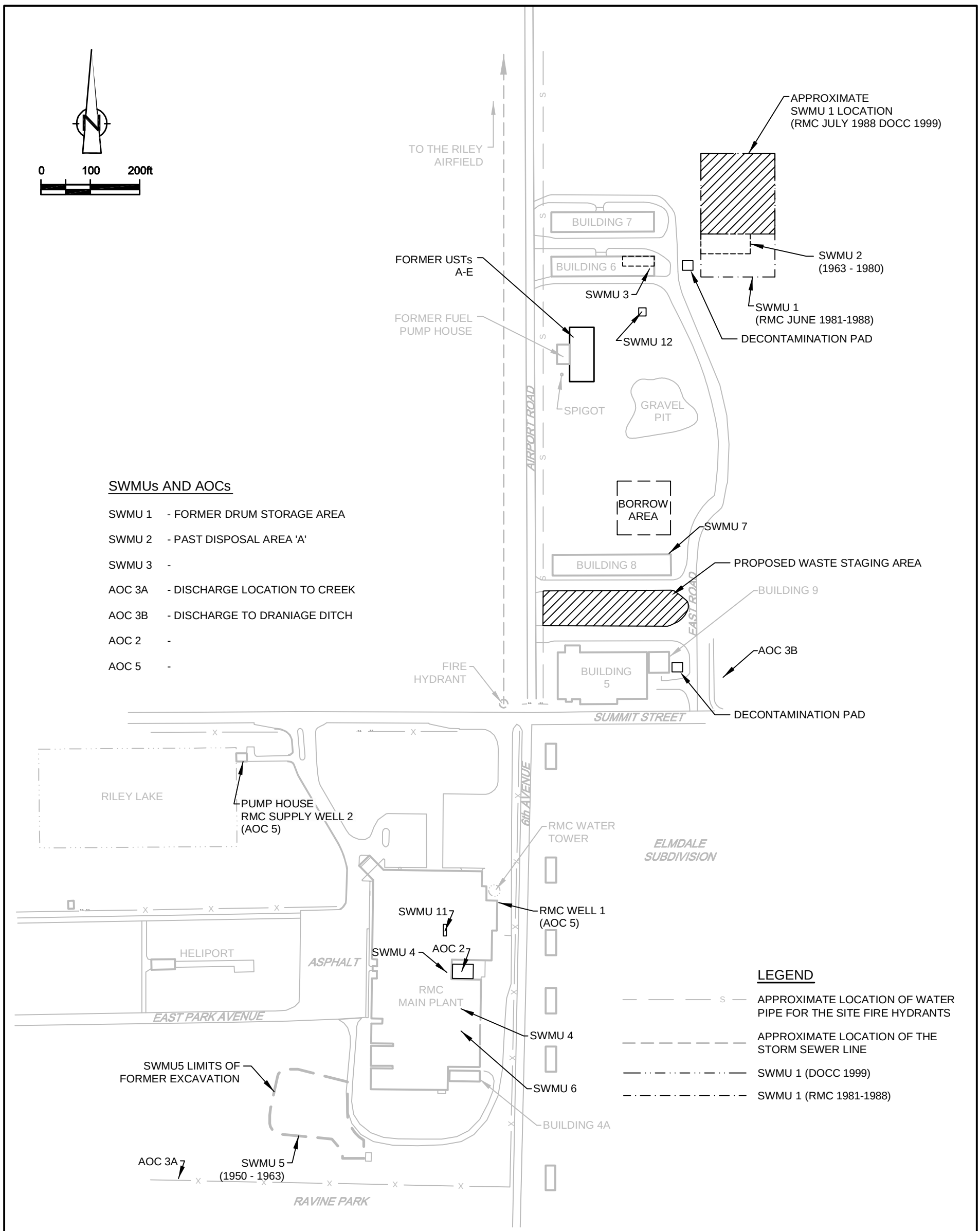
SOURCE: ATTICA AND WILLIAMSPORT, INDIANA
U.S.G.S. TOPOGRAPIC MAPS

INDIANA

figure 1.1

SITE LOCATION
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA020 JAN 30/2007



SWMUs AND AOCs

SWMU 1 - FORMER DRUM STORAGE AREA

SWMU 2 - PAST DISPOSAL AREA 'A'

SWMU 3 -

AOC 3A - DISCHARGE LOCATION TO CREEK

AOC 3B - DISCHARGE TO DRANIAGE DITCH

AOC 2 -

AOC 5 -

NOTE:

SWMU 1 APPEARS TO HAVE VARIED IN SIZE FROM THE EXTENTS SHOWN IN RMC DRAWINGS (1981 TO 1988) TO THE DOCC REPORT (1999)

figure 1.2

SITE PLAN WITH SWMUs AND AOCs
RADIO MATERIALS CORPORATION
Attica, Indiana

SOURCE: PHASE I RFI (2000)

19190-00(016)GN-WA021 JAN 30/2007

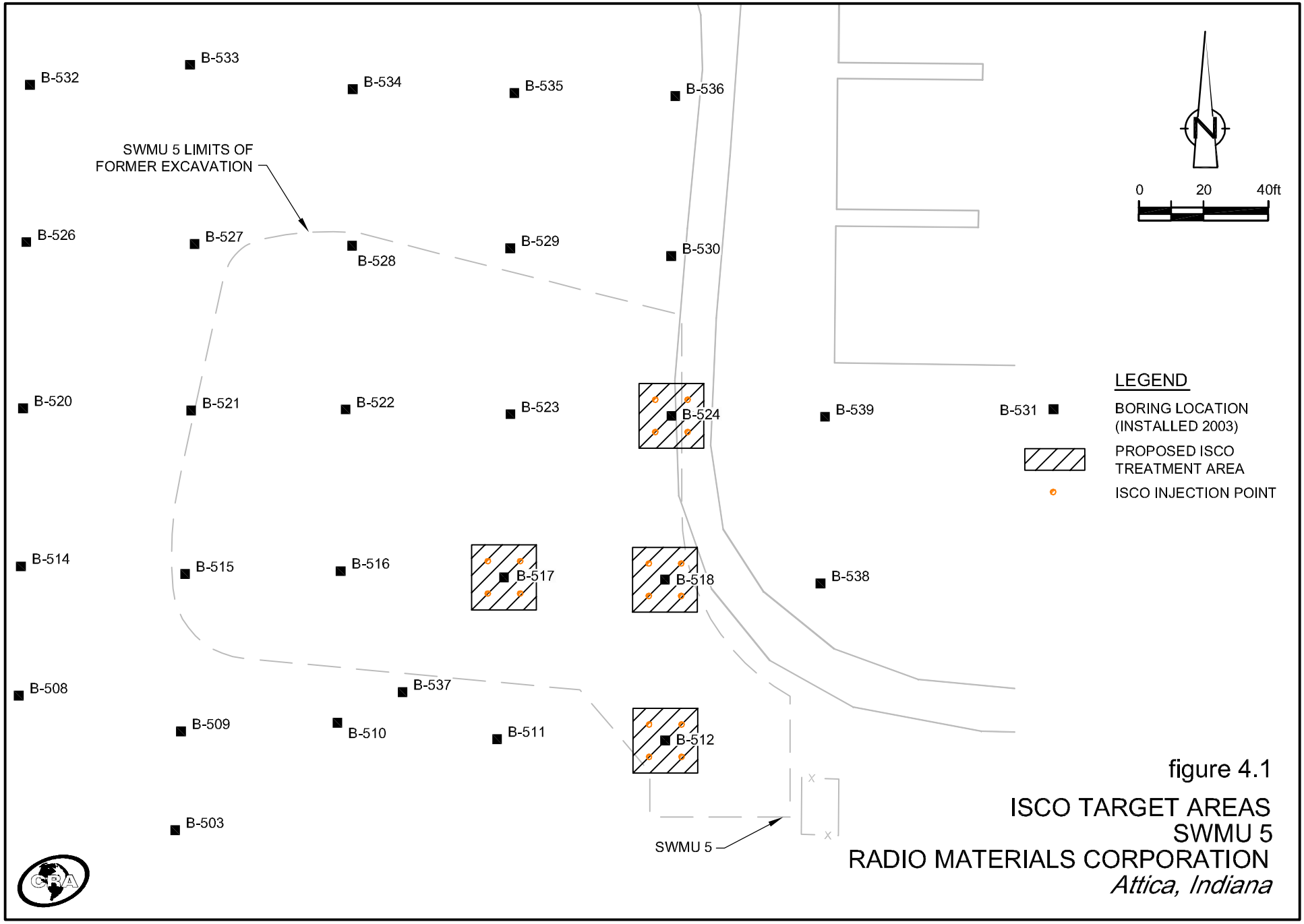


figure 4.1

ISCO TARGET AREAS
SWMU 5
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA013 MAR 01/2007

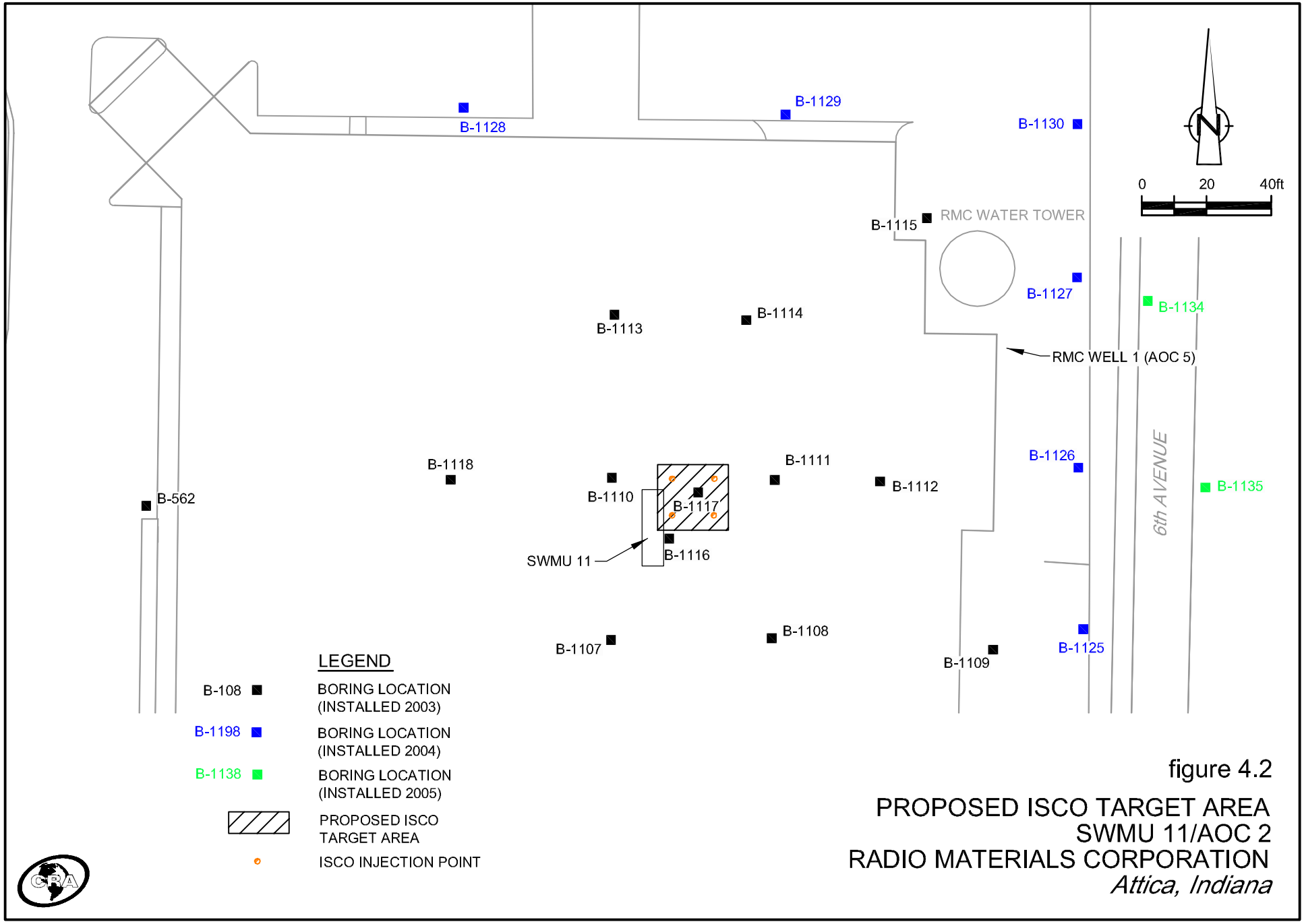


figure 4.2

PROPOSED ISCO TARGET AREA
SWMU 11/AOC 2
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA019 JAN 31/2007

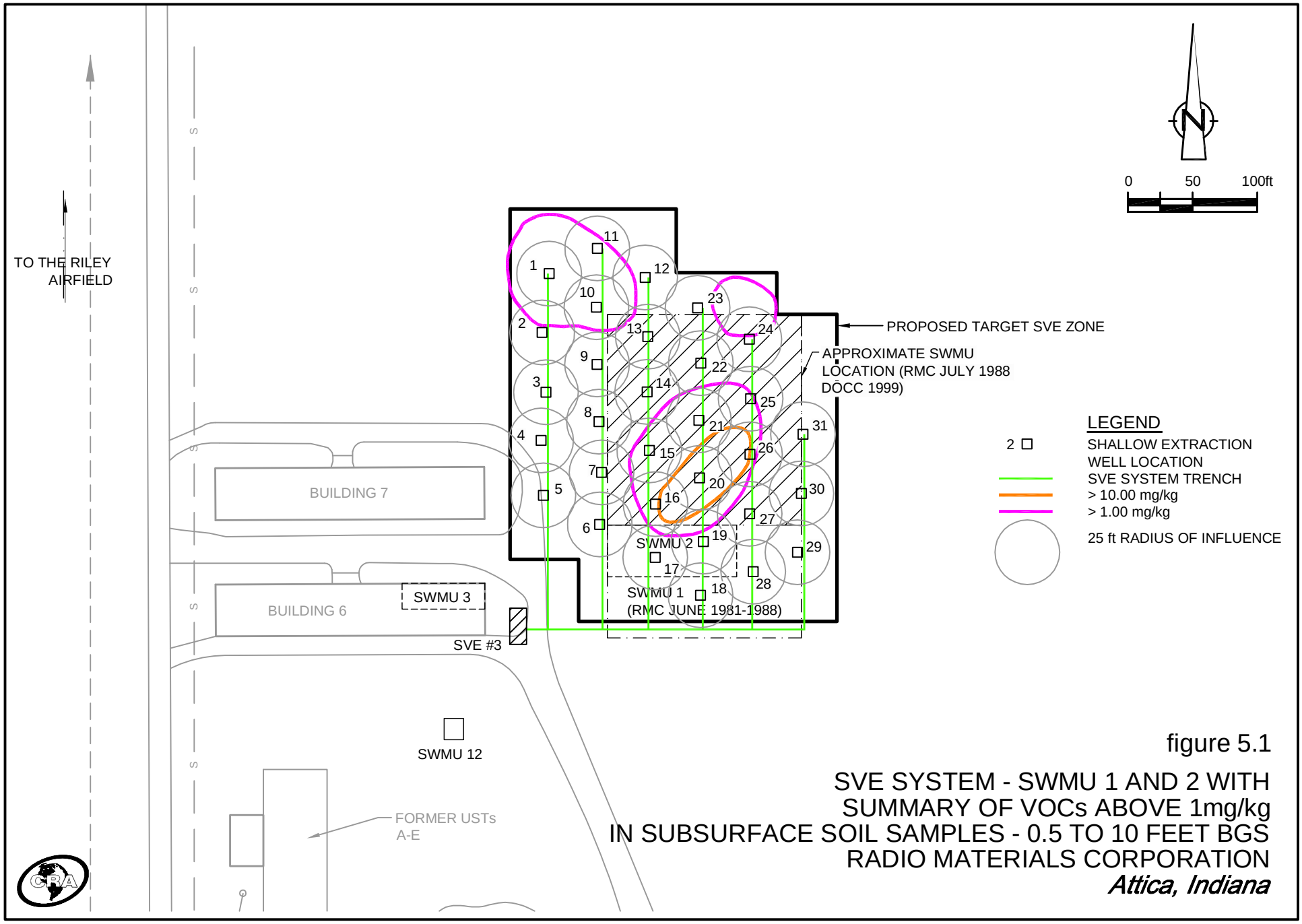


figure 5.1

SVE SYSTEM - SWMU 1 AND 2 WITH SUMMARY OF VOCs ABOVE 1mg/kg IN SUBSURFACE SOIL SAMPLES - 0.5 TO 10 FEET BGS
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA005 JAN 31/2007

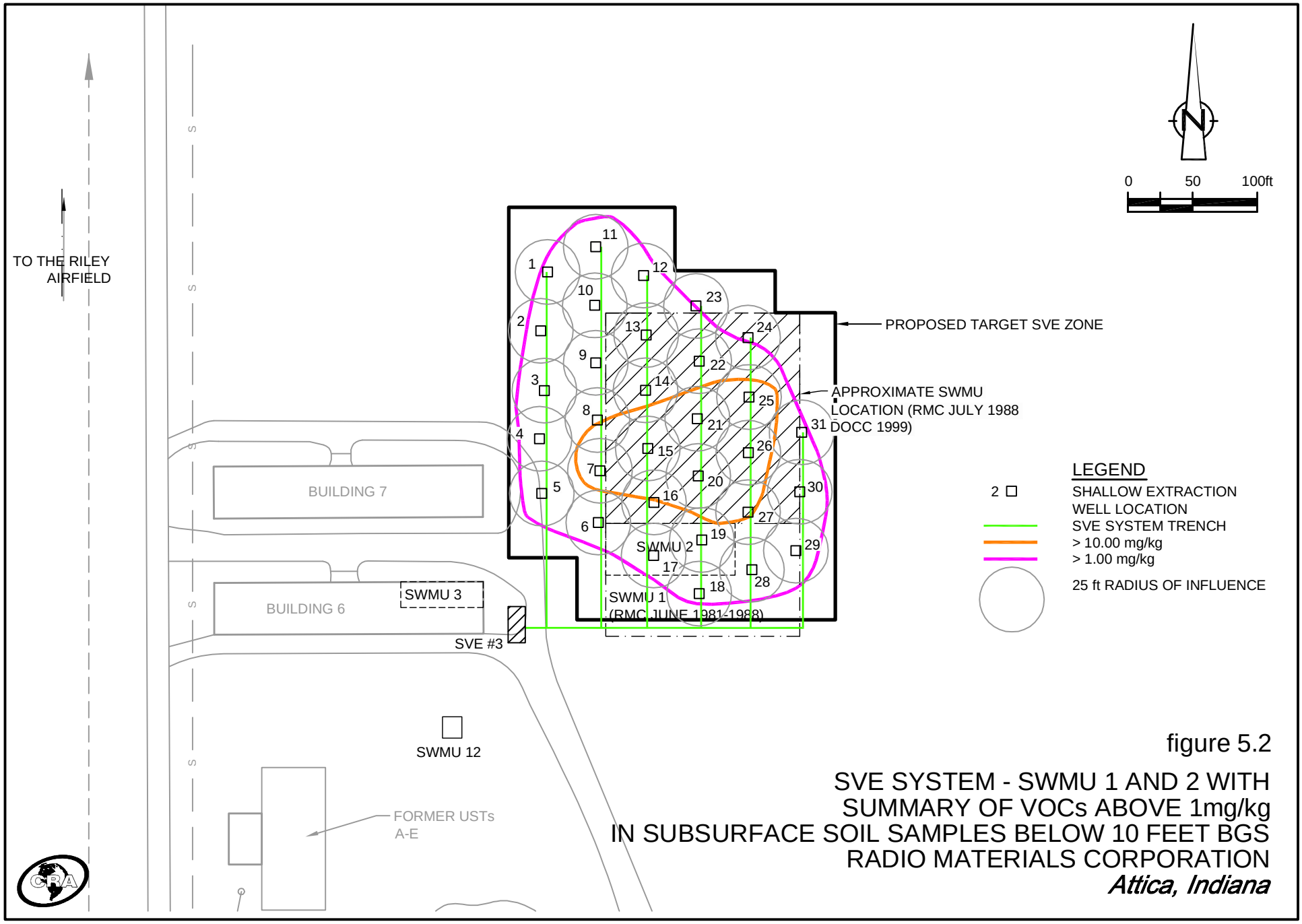


figure 5.2

SVE SYSTEM - SWMU 1 AND 2 WITH SUMMARY OF VOCs ABOVE 1mg/kg IN SUBSURFACE SOIL SAMPLES BELOW 10 FEET BGS

RADIO MATERIALS CORPORATION

Attica, Indiana

19190-00(016)GN-WA006 JAN 31/2007

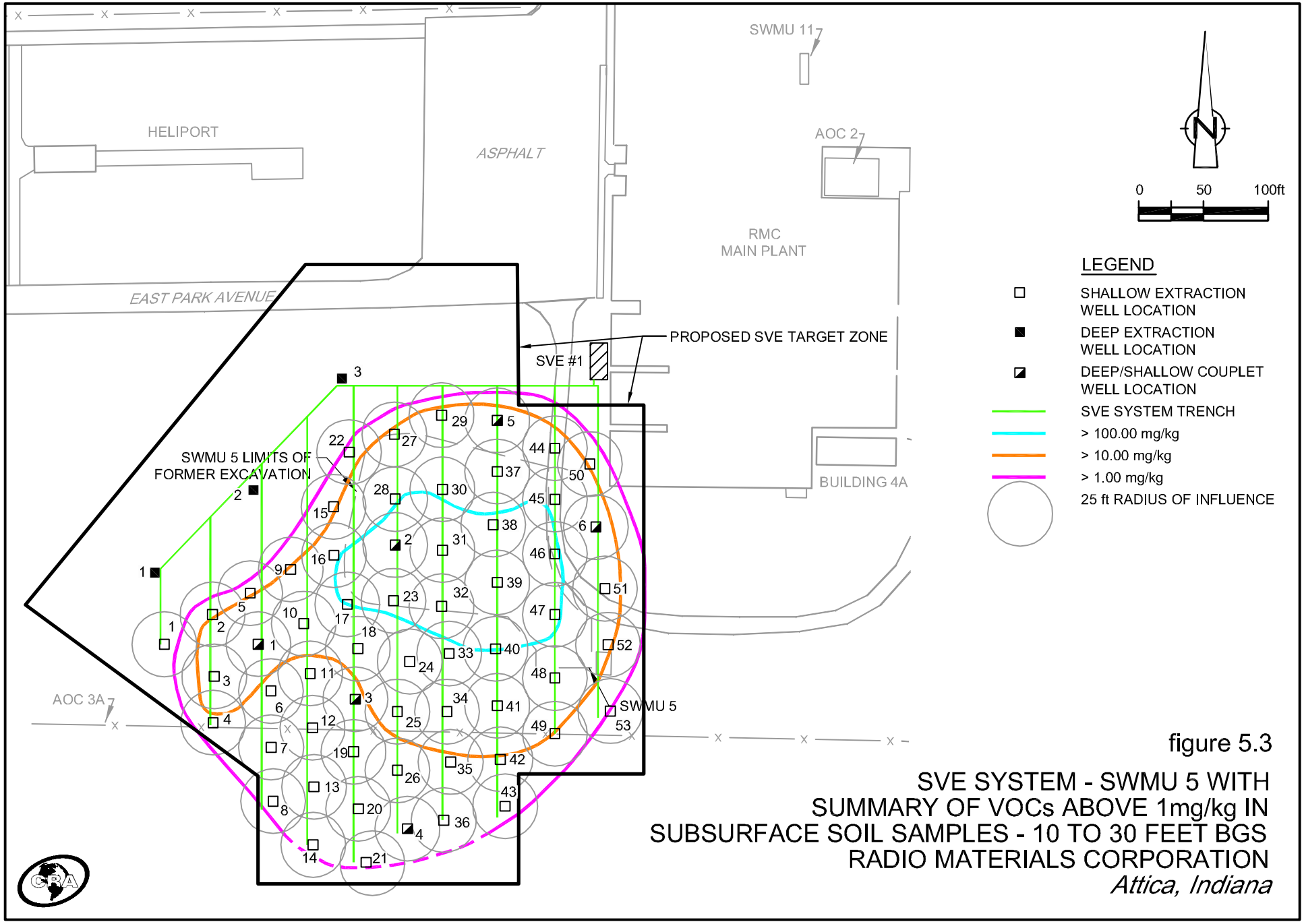


figure 5.3

SVE SYSTEM - SWMU 5 WITH
SUMMARY OF VOCs ABOVE 1mg/kg IN
SUBSURFACE SOIL SAMPLES - 10 TO 30 FEET BGS
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA008 FEB 07/2007

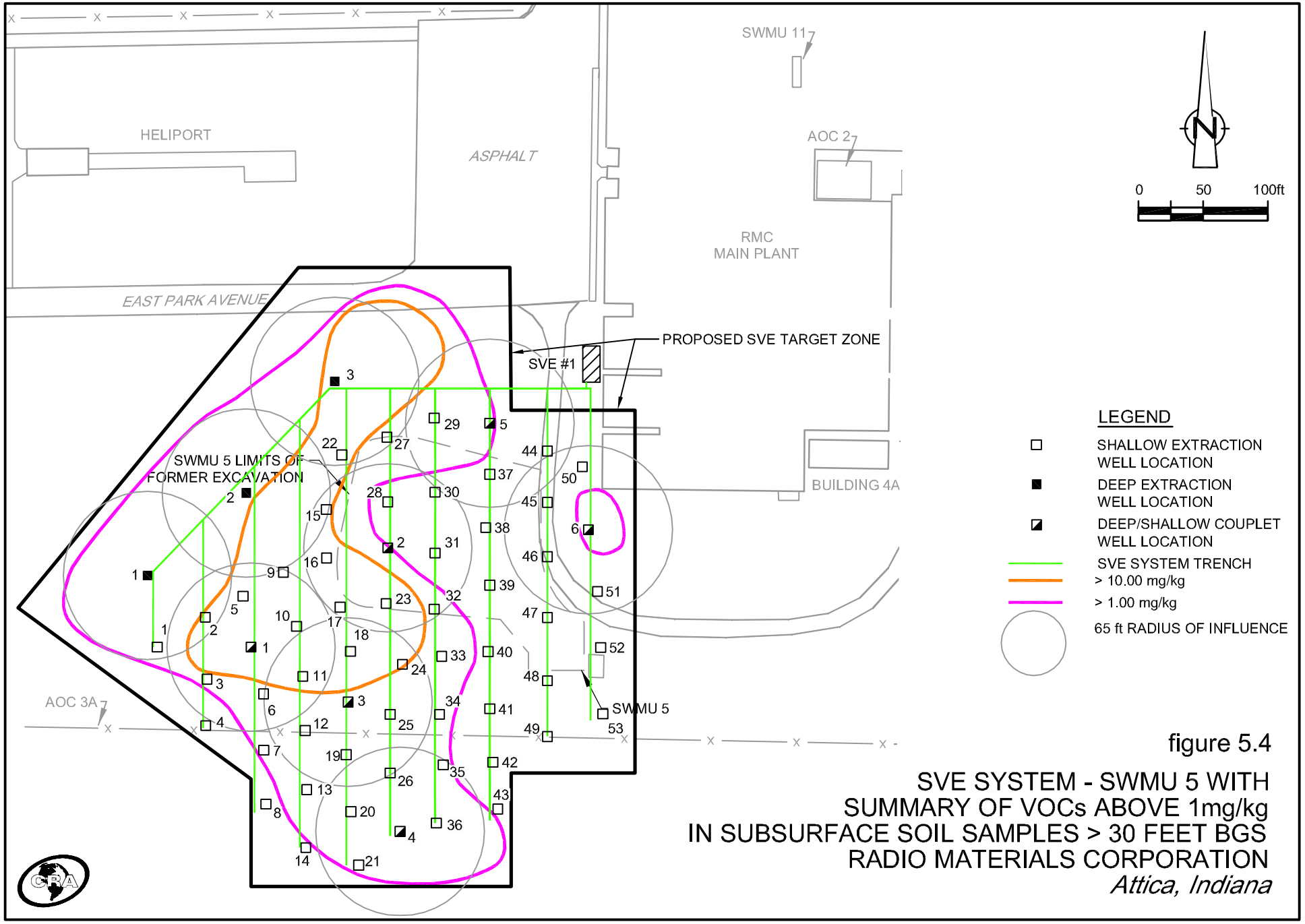


figure 5.4

SVE SYSTEM - SWMU 5 WITH
SUMMARY OF VOCs ABOVE 1mg/kg
IN SUBSURFACE SOIL SAMPLES > 30 FEET BGS
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA009 FEB 09/2007

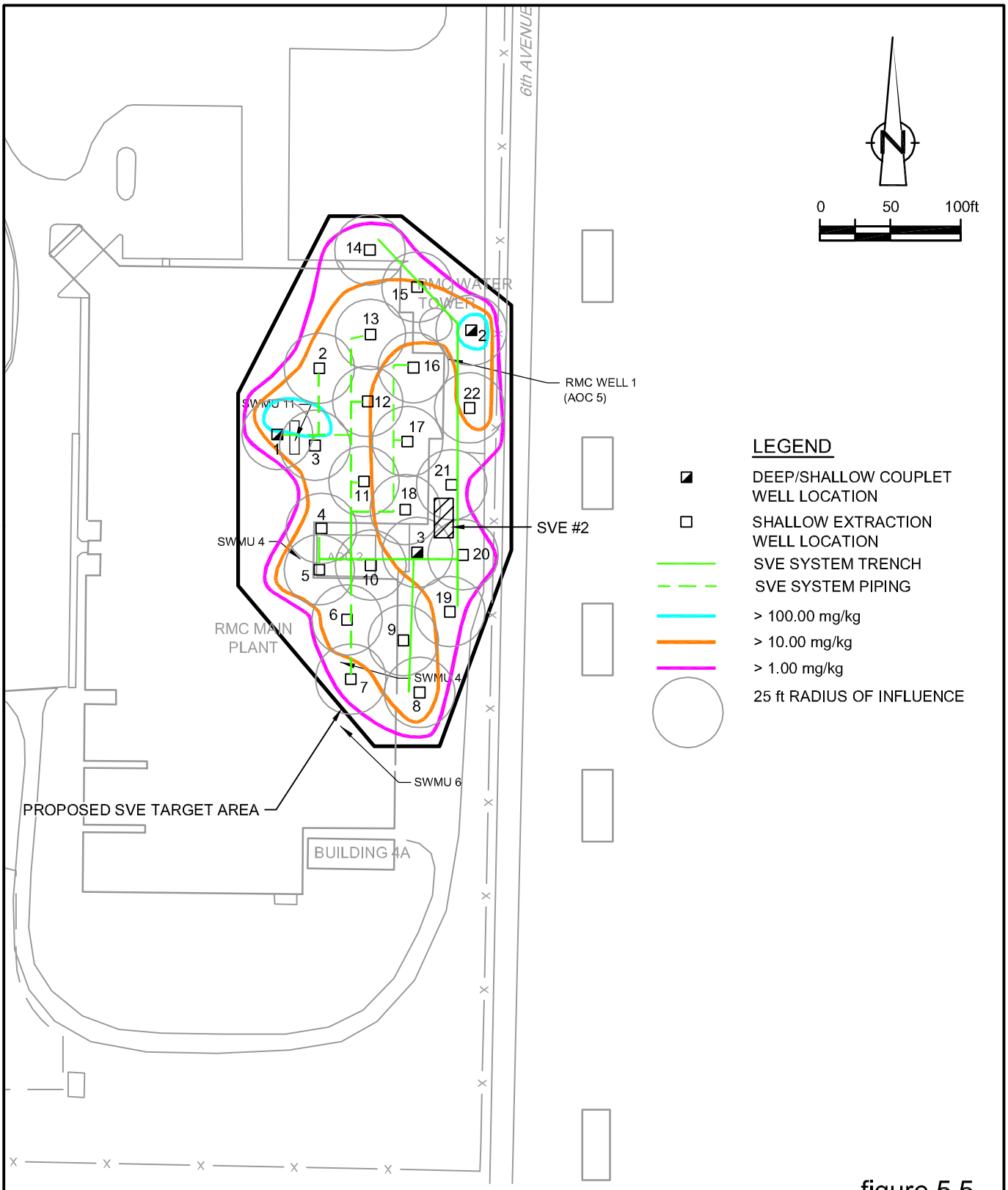


figure 5.5

SVE SYSTEM - SWMU 11/AOC 2 WITH
SUMMARY OF VOCs ABOVE 1 mg/kg
IN SUBSURFACE SOIL SAMPLES - 10 TO 30 FEET BGS
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA011 APR 12/2007

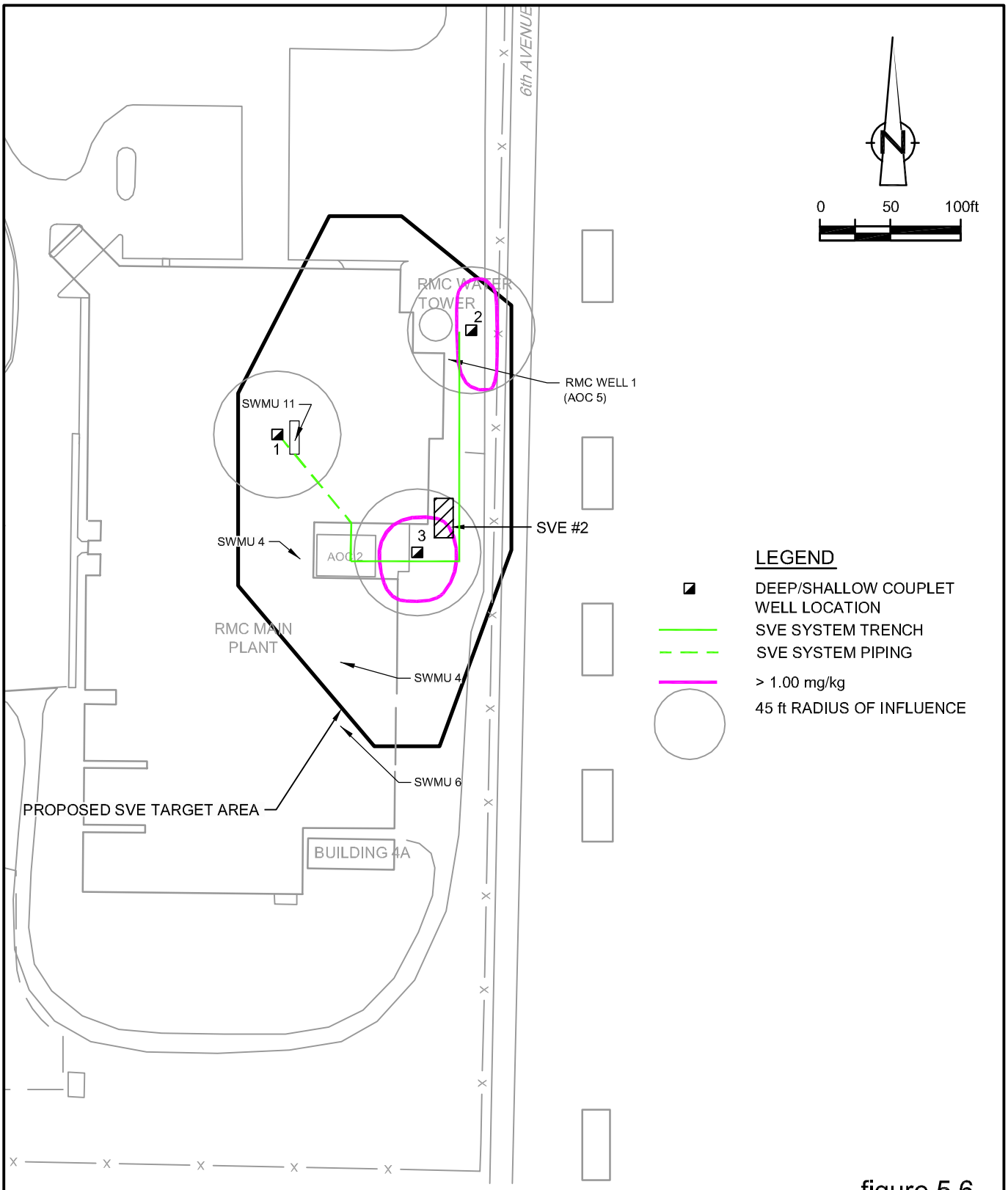
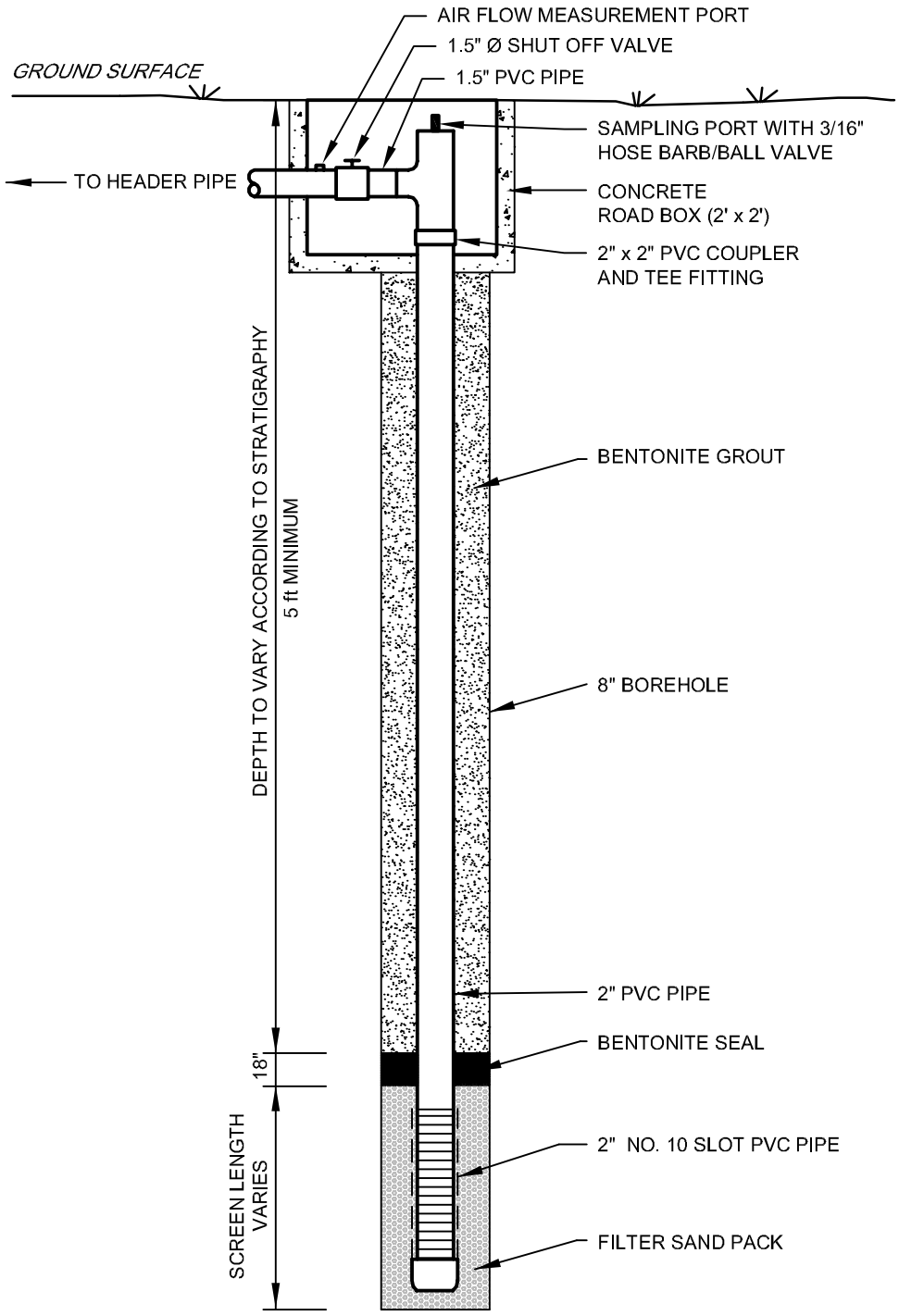


figure 5.6

SVE SYSTEM - SWMU 11/AOC 2 WITH
SUMMARY OF VOCs ABOVE 1 mg/kg
IN SUBSURFACE SOIL SAMPLES > 30 FEET BGS
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA012 APR 12/2007



NOTE: WELL DEPTHS TO BE VERIFIED IN THE FIELD BASED ON LOCAL SOIL CONDITIONS

figure 5.7

TYPICAL SOIL VAPOR EXTRACTION WELL DETAIL
RADIO MATERIALS CORPORATION
Attica, Indiana

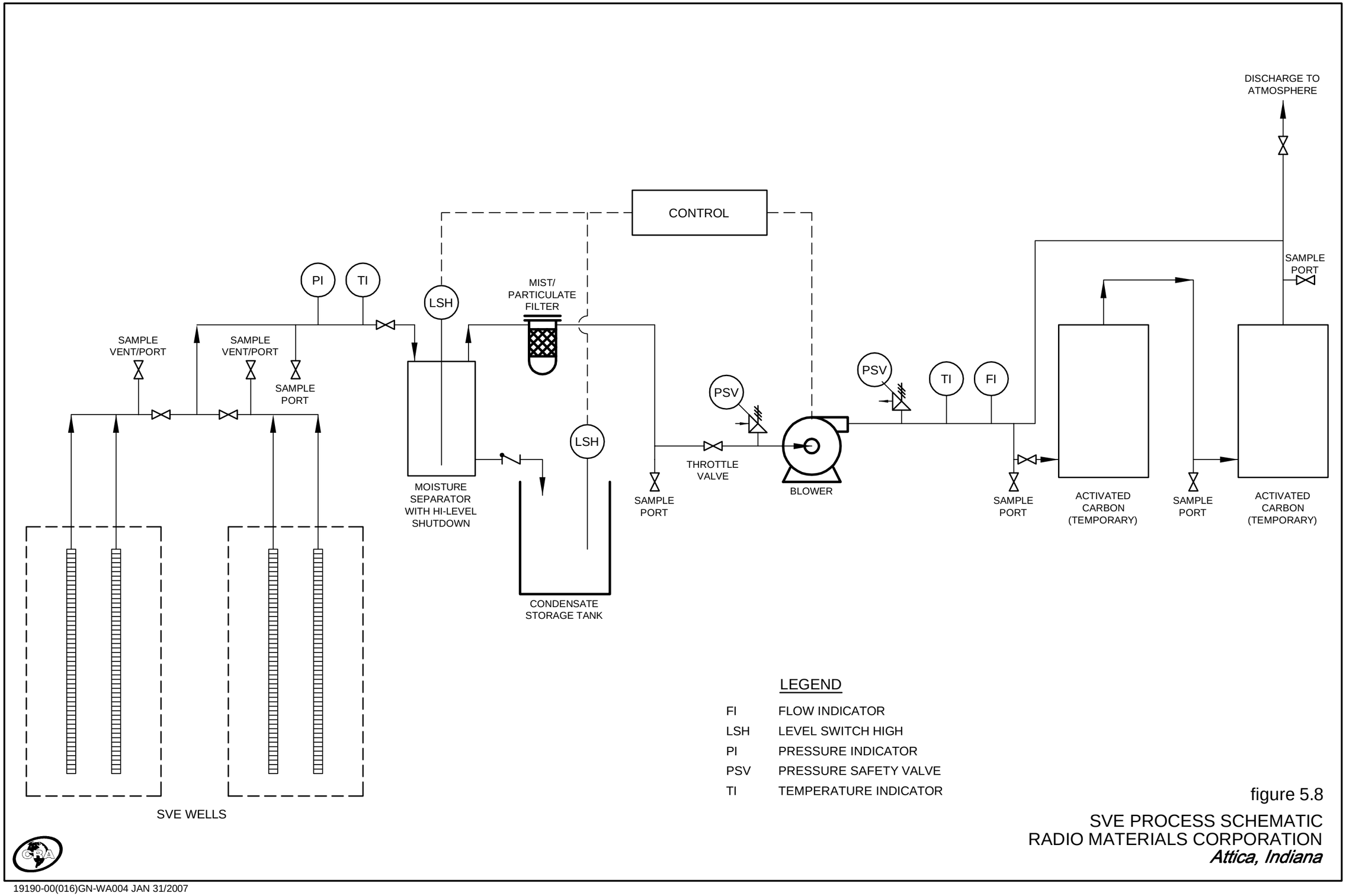


figure 5.8

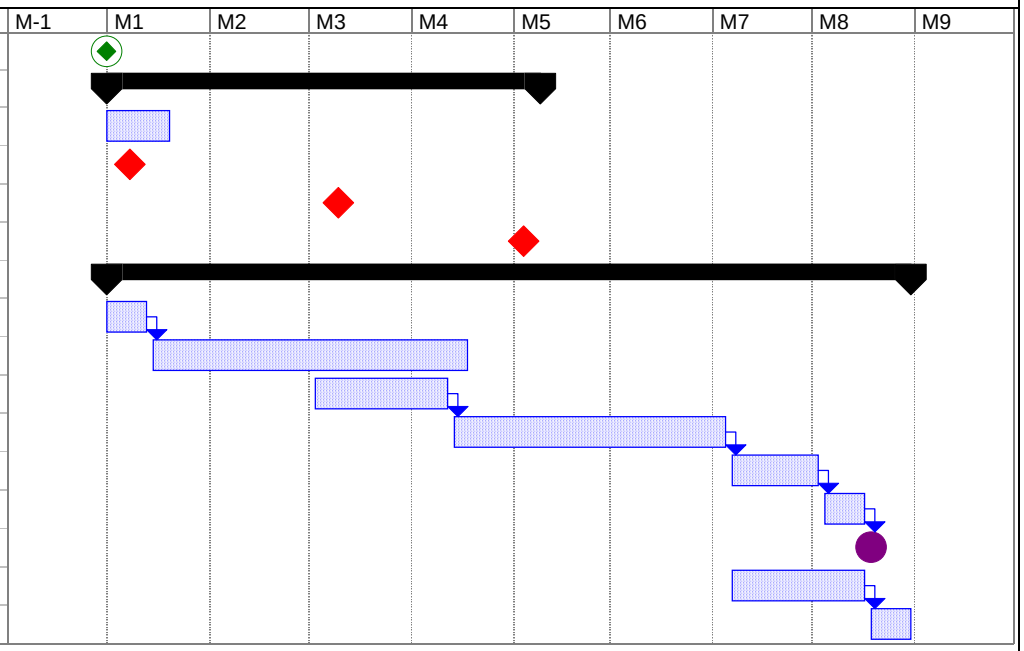
SVE PROCESS SCHEMATIC
RADIO MATERIALS CORPORATION
Attica, Indiana

19190-00(016)GN-WA004 JAN 31/2007

FIGURE 6.1

PROJECT SCHEDULE
RADIO MATERIALS CORPORATOIN
ATTICA, INDIANA

ID	Task Name	Duration
1	**U.S. EPA Approval**	**1 day**
2	**ISCO INJECTIONS**	**96 days**
3	Contractor Procurement/Mobilization	3 wks
4	Perform First Bimonthly Injection	1 wk
5	Perform Second Bimonthly Injection	1 wk
6	Perform Third Bimonthly Injection	1 wk
7	**SVE SYSTEM**	**176 days**
8	Drilling Contractor Procurement	2 wks
9	Install Extraction Wells	70 days
10	SVE Contractor Procurement	30 days
11	Equipment Procurement	60 days
12	Piping/Equipment/Electrical Installation	20 days
13	System Start-up/Optimization	10 days
14	Inspections/Monitoring (ongoing)	1 day
15	Prepare Installation Report	30 days
16	Prepare OM&M Manual	10 days



Project: 019190 (16)
Date: 4/12/07

U.S. EPA Approval
Summary
Task
Bimonthly Injections
Inspections/Monitoring

TABLE 5.1

SUMMARY OF GROUNDWATER ELEVATION DATA
SWMU 1 AND 2 AREA OVERBURDEN WELLS
RADIO MATERIALS CORPORATION
ATTICA, INDIANA

RFI-IIB Well No.	TOC[1] Elevation[2]	Ground Surface Elevation	October 14, 2003		October 20, 2003		November 24, 2003		December 19, 2003		January 28, 2004		February 18, 2004		March 31, 2004	
			Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation
OB-16	637.31	634.86	28.52	608.79	28.62	608.69	28.65	608.66	28.62	608.69	28.21	609.10	28.53	608.78	28.84	608.47
OB-17	631.04	628.35	22.93	608.11	23.01	608.03	23.05	607.99	23.03	608.01	22.69	608.35	22.92	608.12	23.21	607.83
OB-19	621.49	618.50	16.79	604.70	16.82	604.67	16.65	604.84	16.69	604.80	16.74	604.75	16.82	604.67	17.03	604.46
OB-21	619.65	620.04	13.10	606.55	13.29	606.36	13.89	605.76	13.61	606.04	12.58	607.07	13.06	606.59	13.19	606.46
OB-22	623.53	623.82	16.59	606.94	16.66	606.87	16.88	606.65	16.98	606.55	16.20	607.33	16.55	606.98	16.78	606.75
OB-23	623.59	623.84	16.58	607.01	16.98	606.61	17.29	606.30	17.03	606.56	16.48	607.11	16.85	606.74	17.04	606.55
OB-24	623.22	623.63	17.45	605.77	17.55	605.67	17.68	605.54	17.63	605.59	17.04	606.18	17.40	605.82	17.56	605.66

Notes:
[1] TOC - top of casing
[2] TOC elevations are referenced to the Indiana West State Plane Coordinates NAVD88, NAD83
[3] Depth to water is provided in feet below the well TOC
[4] Not Installed

TABLE 5.1

SUMMARY OF GROUNDWATER ELEVATION DATA
SWMU 1 AND 2 AREA OVERBURDEN WELLS
RADIO MATERIALS CORPORATION
ATTICA, INDIANA

RFI-IIB Well No.	TOC[1] Elevation[2]	Ground Surface Elevation	November 30, 2004		January 25, 2005		July 27, 2005		November 7, 2005		February 6, 2006		April 24, 2006		May 24, 2006	
			Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water3	Water Elevation	Depth to Water3	Water Elevation	Depth to Water3	Water Elevation	Depth to Water3	Water Elevation
OB-16	637.31	634.86	29.60	607.71	27.92	609.39	29.07	608.24	29.60	607.71	29.68	607.63	28.72	608.59	28.61	608.70
OB-17	631.04	628.35	23.74	607.30	22.45	608.59	23.32	607.72	23.77	607.27	23.82	607.22	23.03	608.01	23.00	608.04
OB-19	621.49	618.50	17.02	604.47	16.65	604.84	16.89	604.60	17.13	604.36	17.13	604.36	16.83	604.66	16.81	604.68
OB-21	619.65	620.04	13.95	605.70	12.42	607.23	13.75	605.90	14.35	605.30	14.36	605.29	13.49	606.16	13.30	606.35
OB-22	623.53	623.82	18.40	605.13	16.04	607.49	17.14	606.39	17.70	605.83	17.73	605.80	16.72	606.81	DRY	DRY
OB-23	623.59	623.84	17.83	605.76	16.28	607.31	17.50	606.09	18.10	605.49	18.14	605.45	17.09	606.50	19.64	603.95
OB-24	623.22	623.63	18.31	604.91	16.57	606.65	17.98	605.24	18.30	604.92	18.36	604.86	17.95	605.27	DRY	DRY

Notes:
[1] TOC - top of casing
[2] TOC elevations are referenced to the I
Coordinates NAVD88, NAD83
[3] Depth to water is provided in feet bel
[4] Not Installed

TABLE 5.2

SUMMARY OF GROUNDWATER ELEVATION DATA
SWMU 5 AND SWMU 11/AOC 2 AREAS
RADIO MATERIALS CORPORATION
ATTICA, INDIANA

RFI-IIB Well No.	TOC[1] Elevation[2]	Ground Surface Elevation	October 14, 2003		October 20, 2003		November 24, 2003		December 19, 2003		January 28, 2004		February 18, 2004		March 31, 2004	
			Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation
Overburden Wells/Piezometers																
OB-02	659.03	659.32	51.22	607.81	51.30	607.73	52.31	606.72	51.87	607.16	50.52	608.51	50.98	608.05	51.44	607.59
OB-03	661.93	662.26	55.51	606.42	55.61	606.32	56.05	605.88	55.82	606.11	54.85	607.08	55.24	606.69	55.82	606.11
OB-04	664.40	662.03	57.02	607.38	57.11	607.29	57.50	606.90	57.33	607.07	56.41	607.99	56.81	607.59	57.30	607.10
OB-05	660.40	660.69	54.33	606.07	54.43	605.97	54.54	605.86	54.50	605.90	53.78	606.62	54.12	606.28	54.64	605.76
OB-06	653.82	654.65	46.37	607.45	46.47	607.35	46.73	607.09	46.62	607.20	45.97	607.85	45.91	607.91	46.68	607.14
OB-07	656.14	656.42	50.05	606.09	49.38	606.76	49.61	606.53	49.69	606.45	48.57	607.57	48.76	607.38	49.59	606.55
OB-08	662.24	662.47	57.16	605.08	57.27	604.97	57.76	604.48	57.55	604.69	56.41	605.83	56.83	605.41	57.37	604.87
OB-11	660.13	660.28	51.78	608.35	51.87	608.26	52.25	607.88	52.06	608.07	51.19	608.94	51.63	608.50	52.14	607.99
OB-12	664.47	664.69	59.22	605.25	59.36	605.11	59.89	604.58	59.60	604.87	58.25	606.22	58.72	605.75	59.31	605.16
PZ-04	657.75	655.34	53.63	604.12	53.74	604.01	54.07	603.68	53.91	603.84	52.85	604.90	53.32	604.43	53.47	604.28

Notes:
[1] TOC - top of casing
[2] TOC elevations are referenced to the Indiana West State Plane Coordinates NAVD88, NAD83
[3] Depth to water is provided in feet below the well TOC
[4] Not Installed

TABLE 5.2

SUMMARY OF GROUNDWATER ELEVATION DATA
SWMU 5 AND SWMU 11/AOC 2 AREAS
RADIO MATERIALS CORPORATION
ATTICA, INDIANA

RFI-IIB Well No.	TOC[1] Elevation[2]	Ground Surface Elevation	November 30, 2004		January 25, 2005		July 27, 2005		November 7, 2005		February 6, 2006		April 24, 2006		May 24, 2006	
			Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water	Water Elevation	Depth to Water3	Water Elevation	Depth to Water3	Water Elevation	Depth to Water3	Water Elevation	Depth to Water3	Water Elevation
Overburden Wells/Piezometers																
OB-02	659.03	659.32	52.35	606.68	55.19	603.84	51.88	607.15	52.48	606.55	52.40	606.63	51.44	607.59	51.19	607.84
OB-03	661.93	662.26	56.80	605.13	55.30	606.63	56.24	605.69	56.80	605.13	56.77	605.16	56.04	605.89	55.22	606.71
OB-04	664.40	662.03	55.17	609.23	56.72	607.68	57.64	606.76	58.17	606.23	58.14	606.26	57.35	607.05	57.02	607.38
OB-05	660.40	660.69	55.59	604.81	54.12	606.28	55.00	605.40	55.62	604.78	55.66	604.74	54.85	605.55	54.55	605.85
OB-06	653.82	654.65	47.30	606.52	46.56	607.26	46.81	607.01	47.16	606.66	47.39	606.43	46.56	607.26	46.24	607.58
OB-07	656.14	656.42	48.86	607.28	48.65	607.49	48.13	608.01	51.90	604.24	49.99	606.15	50.22	605.92	50.18	605.96
OB-08	662.24	662.47	58.98	603.26	57.06	605.18	58.09	604.15	59.13	603.11	59.39	602.85	58.30	603.94	57.81	604.43
OB-11	660.13	660.28	52.92	607.21	51.61	608.52	52.47	607.66	53.08	607.05	53.03	607.10	52.18	607.95	51.89	608.24
OB-12	664.47	664.69	61.14	603.33	59.20	605.27	60.39	604.08	61.43	603.04	61.73	602.74	60.67	603.80	60.08	604.39
PZ-04	657.75	655.34	55.21	602.54	53.25	604.50	54.45	603.30	55.46	602.29	55.57	602.18	54.52	603.23	54.02	603.73

Notes:
[1] TOC - top of casing
[2] TOC elevations are referenced to the I
Coordinates NAVD88, NAD83
[3] Depth to water is provided in feet bel
[4] Not Installed

APPENDIX A

STRATIGRAPHIC LOGS

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Radio Materials Corporation
PROJECT NUMBER: 019190
CLIENT:
LOCATION: Attica, Indiana
DRILLING CONTRACTOR: Mid-America Drilling Services, Inc.

HOLE DESIGNATION: B-512
DATE COMPLETED: August 15, 2003
DRILLING METHOD: Geoprobe
FIELD PERSONNEL: M. Groves

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL
	GROUND SURFACE	658.7
	TOPSOIL, with grass and roots	658.4
2	ML SILT, trace sand and gravel, firm, low plasticity, brown, moist	
4		
6	- becomes soft at 6.7ft BGS	
8	- becomes firm at 8.7ft BGS	
10	- with sand and gravel at 9.3ft BGS	
12		
14		
16	SP SAND, trace gravel, compact, medium grained, poorly graded, brown, moist	643.1
18	- becomes wet, black staining, slight solvent odor at 18.1ft BGS	640.2
20	ML SILT, trace sand and gravel, firm, low plasticity, brownish gray, moist, strong solvent odor	638.7
22	- refusal at 20.0ft BGS	
	END OF BOREHOLE @ 20.0ft BGS	
24		
26		
28		
30		
32		
34		
36		
38		
40		
42		
44		
46		
48		

BOREHOLE: Backfilled with Bentonite Pellets

SAMPLE NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
1	P/S	2.0		0
2	P/S	2.0		0
3	P/S	2.0		0
4	P/S	2.0		0
5	P/S	2.0		0
6	P/S	2.0		0
7	P/S	2.0		0
8	P/S	2.0		18.1
9	P/S			78.5
10	P/S			1516

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Radio Materials Corporation
PROJECT NUMBER: 019190
CLIENT:
LOCATION: Attica, Indiana
DRILLING CONTRACTOR: Mid-America Drilling Services, Inc.

HOLE DESIGNATION: B-517
DATE COMPLETED: August 19, 2003
DRILLING METHOD: Geoprobe
FIELD PERSONNEL: M. Groves

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL
	GROUND SURFACE	658.6
	TOPSOIL, with grass and roots	658.4
2	ML SILT, trace sand and gravel, firm, low plasticity, brown, slightly moist	
4	SP SAND, trace gravel, compact, medium grained, poorly graded, brown, slightly moist	655.5
6		
8	- becomes medium to coarse grained at 6.8ft BGS	
10	- becomes moist at 10.1ft BGS	
12		
14		644.5
16	ML SILT, trace sand and gravel, firm, low plasticity, brown, grayish brown, moist, trace black staining	
18		
20	- with sand, black staining, strong solvent odor, trace product at 18.9ft BGS - trace sand, no black staining at 19.5ft BGS - potential free product at 20.0ft BGS	638.6
22	END OF BOREHOLE @ 20.0ft BGS	
24		
26		
28		
30		
32		
34		
36		
38		
40		
42		
44		
46		
48		

BOREHOLE: Backfilled with Bentonite Pellets

SAMPLE NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
1	P/S	2.0		9.4
2	P/S	1.3		47.1
3	P/S	2.0		19.1
4	P/S	1.2		24.1
5	P/S	2.0		3.6
6	P/S	1.1		1.8
7	P/S	2.0		3.2
8	P/S	1.5		186
9	P/S	2.0		2874
10	P/S	1.0		3650

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Radio Materials Corporation
PROJECT NUMBER: 019190
CLIENT:
LOCATION: Attica, Indiana
DRILLING CONTRACTOR: Mid-America Drilling Services, Inc.

HOLE DESIGNATION: B-518
DATE COMPLETED: August 19, 2003
DRILLING METHOD: Geoprobe
FIELD PERSONNEL: M. Groves

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL
	GROUND SURFACE	659.4
	TOPSOIL, with grass and roots	659.2
2	ML SILT, trace sand and gravel, firm, low plasticity, brown, slightly moist	
4		
6	- becomes moist at 5.0ft BGS	
	SP SAND, trace gravel, compact, medium grained, poorly graded, brown, slightly moist	652.9
8	- becomes dense at 7.5ft BGS	
10	- with gravel at 9.0ft BGS	
12		
14	- becomes moist at 13.8ft BGS	
	- trace gravel at 14.8ft BGS	
16		
18	- becomes very moist, slight odor at 17.5ft BGS	
	- turns grayish brown, free product, strong odor at 19.0ft BGS	
20		639.9
	ML SILT, trace sand, firm, low plasticity, brown, moist, strong solvent odor	639.4
22	- potential free product at 20.0ft BGS	
24	END OF BOREHOLE @ 20.0ft BGS	
26		
28		
30		
32		
34		
36		
38		
40		
42		
44		
46		
48		

BOREHOLE: Backfilled with Bentonite Pellets

SAMPLE NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
1	P/S	2.0		0
2	P/S	1.6		0
3	P/S	2.0		24.4
4	P/S	2.0		39.8
5	P/S	2.0		10.4
6	P/S	1.4		23.8
7	P/S	2.0		32.4
8	P/S	1.2		44.3
9	P/S	2.0		68.3
10	P/S	1.0		3426

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Radio Materials Corporation
PROJECT NUMBER: 019190
CLIENT:
LOCATION: Attica, Indiana
DRILLING CONTRACTOR: Mid-America Drilling Services, Inc.

HOLE DESIGNATION: B-524
DATE COMPLETED: August 15, 2003
DRILLING METHOD: Geoprobe
FIELD PERSONNEL: M. Groves

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL
	GROUND SURFACE	660.4
	TOPSOIL, with grass and roots	660.3
	FILL, sand and gravel road base aggregate	658.6
2	ML SILT, with sand, trace gravel, stiff, low plasticity, brown, slightly moist	
4	- trace sand, becomes moist at 2.6ft BGS	
6	- becomes very stiff at 5.5ft BGS	
8		
10		650.0
12	SP SAND, with gravel, very dense, medium grained, poorly graded, brown, slightly moist	
	- slight solvent odor at 11.3ft BGS	
14	- no odor at 12.0ft BGS	
	- medium to coarse grained at 13.0ft BGS	
16	- no gravel, fine to medium grained at 15.3ft BGS	
18	- trace gravel, medium grained at 18.0ft BGS	
20	ML SILT, trace sand and gravel, firm, low plasticity, brown, moist	641.3
		640.1
22	SP SAND, trace gravel, medium grained, poorly graded, brown, wet, strong solvent odor, potential liquid free product present	638.6
24	ML SILT, trace sand, soft, low plasticity, brownish gray, moist, strong odor	636.4
26	END OF BOREHOLE @ 24.0ft BGS	
28		
30		
32		
34		
36		
38		
40		
42		
44		
46		
48		

BOREHOLE: Backfilled with Bentonite Pellets

SAMPLE NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
1	P/S	2.0		5.0
2	P/S	2.0		5.5
3	P/S	2.0		4.2
4	P/S	2.0		21.1
5	P/S	2.0		6.3
6	P/S	2.0		19.9
7	P/S	2.0		8.9
8	P/S	0.9		7.8
9	P/S	2.0		7.8
10	P/S	1.4		9.4
11	P/S	2.0		3882
12	P/S	2.0		4620

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ◯

STRATIGRAPHIC AND INSTRUMENTATION LOG (OVERBURDEN)

PROJECT NAME: Radio Materials Corporation
PROJECT NUMBER: 019190
CLIENT:
LOCATION: Attica, Indiana
DRILLING CONTRACTOR: Mid-America Drilling Services, Inc.

HOLE DESIGNATION: B-1117
DATE COMPLETED: September 23, 2003
DRILLING METHOD: Geoprobe
FIELD PERSONNEL: M. Groves

DEPTH ft BGS	STRATIGRAPHIC DESCRIPTION & REMARKS	ELEV. ft AMSL
	GROUND SURFACE	664.7
	CONCRETE	664.2
	FILL, sand and gravel	663.6
2	ML SILT, sand, trace gravel, firm, low plasticity, brown, slightly moist	
4	- trace sand, moist at 4.0ft BGS	
	- soft at 4.9ft BGS	
6	- firm at 6.3ft BGS	
8	- with sand and gravel at 7.3ft BGS	
10	- trace gravel, soft at 9.3ft BGS	
	- trace sand, very moist at 10.3ft BGS	
12		
14		
16		
18	- turns grayish brown at 17.5ft BGS	
20		
22	- strong solvent odor at 21.5ft BGS	
	- potential free product at 22.0ft BGS	
24		
26	END OF BOREHOLE @ 25.5ft BGS	639.2
28		
30		
32		
34		
36		
38		
40		
42		
44		
46		
48		

BOREHOLE: Backfilled with Bentonite Pellets

SAMPLE NUMBER	INTERVAL	REC (ft)	'N' VALUE	PID (ppm)
1	P/S	2.0		3.8
2	P/S	2.0		2.9
3	P/S	0.0		4.5
4	P/S	1.0		4.5
5	P/S	2.0		6.8
6	P/S	2.0		212.0
7	P/S	2.0		241.0
8	P/S	2.0		48.6
9	P/S	1.0		43.2
10	P/S	1.0		43.2
11	P/S	2.0		45.6
12	P/S	2.0		51.7
13	P/S	2.0		>9.999
14	P/S	2.0		>9.999
15	P/S	1.0		1104

NOTES: MEASURING POINT ELEVATIONS MAY CHANGE; REFER TO CURRENT ELEVATION TABLE

CHEMICAL ANALYSIS ( )

APPENDIX B

POTENTIAL EMISSION CALCULATIONS FROM SOIL DATA

Appendix B
Potential Emission Calculations from Soil Data

SWMU Zone	Depth of Zone (ft)	Area of > 1.00 mg/kg Zone (ft^2)	Soil Volume (ft^3)	Soil Mass (kg)	Avg PCE Concentration (mg/kg)	Avg TCE Concentration (mg/kg)	Avg VOC Concentration (mg/kg)	Area of > 10.00 mg/kg Zone (ft^2)	Soil Volume (ft^3)	Soil Mass (kg)	Avg PCE Concentration (mg/kg)	Avg TCE Concentration (mg/kg)	Avg VOC Concentration (mg/kg)	Area of > 100.00 mg/kg Zone (ft^2)	Soil Volume (ft^3)	Soil Mass (kg)	Avg PCE Concentration (mg/kg)	Avg TCE Concentration (mg/kg)	Avg VOC Concentration (mg/kg)
SWMU 1/2 (0.5 to 10 ft bgs)	9.5	16,057	152,545	7,688,132	2.197	0.160	0.160	2,935	27,881	1,405,197	126.668	9.241	9.556						
SWMU 1/2 (10 to 16 ft bgs)	6	37,145	222,872	11,232,562	3.775	0.122	0.123	12,255	73,532	3,705,955	36.625	1.534	1.585						
SWMU 5 (0 to 10 ft bgs)	10	16,605	166,045	8,368,535	0.890	2.600	2.617	5,400	53,996	2,721,348	24.067	12.000	14.807						
SWMU 5 (10 to 30 ft bgs)	20	35,805	716,099	36,090,783	0.050	1.760	1.815	41,692	833,844	42,025,023	2.384	18.929	21.670	15,797	315,941	15,923,163	8.149	116.113	132.712
SWMU 5 (30 to 55 ft bgs)	25	60,610	1,515,247	76,367,161	0.464	1.643	1.695	28,615	715,378	36,054,430	0.898	4.839	11.484						
SWMU 11 (0 to 10 ft bgs)	10	8,305	83,052	4,185,731	0.001	6.570	9.330	1,665	16,646	838,960	27.000	0.017	0.023						
SWMU 11 (10 to 30 ft bgs)	20	22,473	449,456	22,652,198	0.373	6.420	7.130	21,759	435,174	21,932,417	12.421	25.265	27.787	1,421	28,423	1,432,496	817.900	315.067	315.243
SWMU 11 (30 to 55 ft bgs)	25	10,349	258,731	13,039,802	1.404	2.236	2.356												

	Potential Emissions (tpy)			
SWMU Zone	PCE	TCE	VOCs	Combined HAPs
SWMU 1/2 (0.5 to 10 ft bgs)	0.2	0.0	0.0	0.2
SWMU 1/2 (10 to 16 ft bgs)	0.2	0.0	0.0	0.2
SWMU 5 (0 to 10 ft bgs)	0.1	0.1	0.1	0.1
SWMU 5 (10 to 30 ft bgs)	0.1	3.0	3.4	3.1
SWMU 5 (30 to 55 ft bgs)	0.1	0.3	0.6	0.4
SWMU 11 (0 to 10 ft bgs)	0.0	0.0	0.0	0.1
SWMU 11 (10 to 30 ft bgs)	1.6	1.3	1.3	2.9
SWMU 11 (30 to 55 ft bgs)	0.0	0.0	0.0	0.1
Total	2.3	4.7	5.5	7.1
Exemption Levels	< 10	< 10	< 10	< 25

APPENDIX C

SVE PILOT STUDY REPORT

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(Following Report)

FIGURE C.1 SVE PILOT STUDY LOCATIONS

1.0 INTRODUCTION

1.1 BACKGROUND

Conestoga-Rovers & Associates (CRA) completed a Phase IIB Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) in compliance with the U.S. Environmental Protection Agency (U.S. EPA) Region 5 RCRA 3008(h) Consent Order No. IND 005 477 021. The Consent Order was issued to Radio Materials Corporation (RMC) and applies to the RMC manufacturing facility located in Attica, Indiana (Site). The Radio Materials Corporation (RMC) facility, U.S. EPA identification number IND005477021 (Site) is located in west-central Indiana at 1095 East Summit Street in the eastern portion of the City of Attica, in Fountain County, Section 5, Township 21 North, Range 7 West.

Based on the findings of the Phase IIB RFI, CRA developed an Interim Corrective Measures (ICMs) Work Plan. ICMs are defined by the U.S. EPA as measures to control or abate threats to human health and/or the environment from releases and/or to prevent or minimize the further spread of contamination while long-term remedies are pursued.[1]

The ICM Work Plan identified the areas of the Site that would be amenable to ICMs, the stabilization technologies selected and the rationale for selection, and the activities required to investigate the technologies and obtain the data and information required to design and implement the stabilization technologies. Soil vapor extraction (SVE) was identified as a stabilization technology that would be potentially applicable to several areas of the Site.

SVE applies a vacuum to unsaturated soils to volatilize VOCs that are adsorbed to the soil matrix. The vacuum is applied through the use of a vacuum extraction blower connected to vacuum extraction wells via above or below grade piping. VOCs are removed from the air stream via treatment methods or discharged to the atmosphere pending regulatory approval. This technology takes advantage of the volatile characteristics of certain contaminants for their removal in permeable soils.

[1] RCRA Corrective Action Plan (Final), OSWER Directive 9902.3-2A, Office of Waste Programs Enforcement, Office of Solid Waste, May 1994

1.2 PURPOSE

The purpose of this report is to describe the work completed during the Soil Vapor Extraction Pilot Study conducted at the Site. The SVE Pilot Study was conducted in accordance with the document entitled *Interim Corrective Measures Work Plan, Radio Materials Corporation, Attica, Indiana* (CRA 2006). The SVE Pilot Study was conducted to evaluate the potential effectiveness of SVE in several areas of the Site that may be amenable to implementation of this technology and to obtain data necessary to design a complete SVE system for the Site.

2.0 SVE PILOT STUDY

2.1 OBJECTIVE

The objective of the SVE Pilot Study was to determine if an adequate vacuum could be induced in the subsurface soils in the areas of the Site selected for SVE implementation. USEPA technical guidance indicates that a vacuum of 0.1 inches water column ("H_2O) is required to induced vapor movement in the subsurface soil. The SVE Pilot Study was designed to determine if this vacuum could be achieved in the Site soils and also to determine the approximate distance from the extraction point at which the required vacuum is achievable. This information is necessary in the design phase of the ICM implementation to determine the proper spacing of the extraction points. An additional objective of the SVE Pilot Study was to collect samples of the subsurface vapors from the selected areas of the Site. These samples would be submitted to a laboratory for chemical analysis. This analysis is necessary to determine what, if any, treatment is required for the discharge from the SVE system.

The following subsections detail the design of the pilot study and the activities conducted during the pilot study.

2.2 DESIGN OF SVE PILOT STUDY

2.2.1 SVE TEST ARRAY

The SVE pilot study was designed to determine the radius of influence of the extraction wells and the potential mass removal of VOCs in SWMUs 1 and 2, SWMU 5, and SWMU 11/AOC 2. The SVE pilot study arrays would be installed in each of the above-mentioned areas to determine the radius from the extraction point at which the vacuum required to obtain VOC removal is achievable. The pilot study was designed as described below.

An SVE test array would be installed at SWMUs 1 and 2, SWMU 5, and SWMU 11/AOC 2. Each SVE test array would consist of a soil vapor extraction well and three soil vacuum monitoring points. The vapor extraction wells would be constructed of 4-inch inside diameter Schedule 40 PVC riser and 0.010 slot screen with flush-mounted protective covers set in concrete pads.

The thickness of the unconsolidated soil above the water table in the SWMU 1 and 2 area ranges from approximately 15 to 20 feet. As such, one vapor extraction well would be

installed in this area and screened from approximately 5 to 10 feet bgs. A series of three 1-inch ID PVC vacuum monitoring points would be installed at distances of approximately 5 feet, 10 feet, and 20 feet outward from the extraction well and screened from approximately 5 to 10 feet bgs to complete the test array.

In the areas of SWMU 5 and SWMU 11/AOC 2, the thickness of unconsolidated sediment above the water table ranges from approximately 50 to 60 feet. Moreover, thicker sand units are present below a depth of approximately 30 feet bgs. As such, to obtain the design criteria for the upper and lower depth intervals, the SVE test arrays in these areas would consist of two vapor extractions wells and six soil vacuum monitoring probes. One vapor extraction well would be screened from approximately 10 to 20 feet bgs and one vapor extraction well would be screened from approximately 35 to 50 feet bgs in each of these arrays.

A series of six 2-inch ID PVC vacuum monitoring points would be installed at distances of 5 feet, 10 feet, and 20 feet outward from the shallow extraction wells and 5 feet, 20 feet, and 40 feet outward from the deep extraction wells. Three of the monitoring ports would be screened from a depth of approximately 10 to 20 feet bgs to evaluate the radius of influence in the shallow soils and the remaining three monitoring ports would be screened from a depth of approximately 40 to 50 feet bgs to evaluate the radius of influence in the deeper material. A step test would be conducted at each location by varying the vacuum applied to the well in order to determine the most effective operating conditions.

Soil vapor samples would be collected from each extraction well using SUMMA canisters. The vapor samples were to be analyzed for total VOCs. This information will be used in determining the requirements for off-gas treatment system for the SVE network.

2.2.2 SVE FIELD TEST

The SVE pilot test would be performed by attaching a regenerative blower to the extraction well in the array in order to apply a vacuum to the well. Vacuum gauges would be attached to each of the vacuum monitoring points, and the vacuum pressure at each well would be monitored as the pilot test progressed. The blower will be started and the power will be increased until a vacuum is achieved in the extraction well. The initial target vacuum at the extraction well will depend on the response at the vacuum monitoring points. The vacuum pressure at the wellhead and the effluent airflow from the blower will be measured. The effluent air would be treated with a carbon filtration

unit. When the vacuum pressure stabilized at each well (a minimum of 15 minutes), the blower pressure would be increased and the process repeated. Each test would be conducted for approximately 22 hours. The vacuum pressures at each vapor monitoring point would be recorded and will be used to determine a radius of influence for each extraction well at the various operating parameters. A SUMMA canister would be used to collect a vapor sample at the midpoint and end of the test. The process would then be repeated on the other extraction well in the system.

An engineering evaluation will be conducted using the results of the SVE pilot study to determine the applicability of SVE as a Site remedy or control measure, and to determine initial operational requirements. The results of the vacuum response and the analytical results from the vapor sampling will be presented in a SVE pilot study report.

2.2.3 INSTALLATION OF SVE ARRAYS

The SVE arrays were installed by Boart Longyear Drilling of Indianapolis, Indiana, during the week of September 18-22, 2006. The arrays were designated SVE 1, SVE 2, and SVE 3. The following paragraphs describe the installation of each of these arrays.

2.2.4 SVE 1

The SVE 1 array was installed in the SWMU 5 area. This array consisted of a shallow extraction well with three vacuum monitoring points and a deep extraction well with three monitoring points.

The shallow extraction well (SVE 1S) was installed to a depth of 20 feet bgs. This well consisted of a 4-inch inside diameter (ID) PVC casing with a 10-foot screen. This well was screened from 10 – 20 feet bgs. Three vacuum monitoring wells were installed at distances of 5, 10, and 20 feet from SVE 1S. These wells were installed to a depth of 20 feet bgs. These wells consisted of 2-inch ID PVC casings with 10-foot screens. Each of these three wells was screened from 10 – 20 feet bgs.

The deep extraction well (SVE 1D) was installed to a depth of 47 feet bgs. This well consisted of a 4-inch inside diameter (ID) PVC casing with a 15-foot screen. This well was screened from 32 – 47 feet bgs. Three vacuum monitoring wells were installed at distances of 5, 20, and 40 feet from SVE 1D. These wells were installed to a depth of 47 feet bgs. These wells consisted of 2-inch ID PVC casings with 10-foot screens. Each of these three wells was screened from 37 – 47 feet bgs.

2.2.5 SVE 2

The SVE 2 array was installed inside the building in the SWMU 11/AOC 2 area. This array consisted of a shallow extraction well with three vacuum monitoring points and a deep extraction well with three monitoring points.

The shallow extraction well (SVE 2S) was installed to a depth of 20 feet bgs. This well consisted of a 4-inch inside diameter (ID) PVC casing with a 10-foot screen. This well was screened from 10 – 20 feet bgs. Three vacuum monitoring wells were installed at distances of 5, 10, and 20 feet from SVE 2S. These wells were installed to a depth of 20 feet bgs. These wells consisted of 2-inch ID PVC casings with 10-foot screens. Each of these three wells was screened from 10 – 20 feet bgs.

The deep extraction well (SVE 2D) was installed to a depth of 50 feet bgs. This well consisted of a 4-inch inside diameter (ID) PVC casing with a 15-foot screen. This well was screened from 35 – 50 feet bgs. Three vacuum monitoring wells were installed at distances of 5, 20, and 40 feet from SVE 2D. These wells were installed to a depth of 45 feet bgs. These wells consisted of 2-inch ID PVC casings with 10-foot screens. Each of these three wells was screened from 35 – 45 feet bgs.

2.2.6 SVE 3

The SVE 3 array was installed in the SWMU 1/SWMU 2 area. This array consisted of a shallow extraction well with three vacuum monitoring points. There was no deep extraction well at this location because bedrock is approximately 12-15 feet bgs.

The shallow extraction well (SVE 3) was installed to a depth of 10 feet bgs. This well consisted of a 4-inch inside diameter (ID) PVC casing with a 5-foot screen. This well was screened from 5 – 10 feet bgs. Three vacuum monitoring wells were installed at distances of 5, 10, and 20 feet from SVE 3. These wells were installed to a depth of 10 feet bgs. These wells consisted of 2-inch ID PVC casings with 5-foot screens. Each of these three wells was screened from 5 – 10 feet bgs.

The approximate locations of the SVE arrays are shown on Figure C.1.

2.3 SVE PILOT STUDY PROCEDURE

The SVE pilot study was conducted by Specialty Earth Sciences of New Albany, Indiana (SES). SES conducted the pilot study during the week of September 25, 2006. The same test procedure was applied at all five extraction wells. The test procedure consisted of the following:

- A well head assembly was attached to the top of the extraction well. This assembly consisted of a 4-inch ID rigid T shaped PVC pipe. One arm of the T was attached to the well top. A vacuum gauge and sampling port were installed in the base of the T.
- A 4-inch ID flexible hose was connected to the base of the wee head assembly and run to the inlet of the blower. The outlet from the blower was connected to a carbon filtration unit. The off gas from the carbon unit was discharged to the atmosphere.
- Vacuum gauges were attached to the vacuum monitoring wells associated with the extraction well.
- The blower was started at low speed and the speed was gradually increased until a vacuum measurement of approximately 0.10 "H_2O was observed at the closest vacuum monitoring well. The blower was run at this speed for 15 minutes. The blower speed was then increased and run for 15 minutes. This process was repeated until a point was reached where an increase in the blower speed did not generate an increase in the vacuum at the monitoring wells. Once the point of equilibrium was reached, the blower was run at a steady speed for the duration of the 24-hour test. After each increase in blower speed, the attending technician recorded the vacuum at the extraction well head and the three monitoring wells, the air velocity at the extraction well, the air velocity at the exhaust pipe, the air temperature at the exhaust pipe and the pressure at the exhaust pipe.
- A Summa canister was used to take a sample of the air from the sampling port at the extraction well head. Two discrete samples were taken during the 24-hour test. One sample was taken at 4 hours and the other was taken at 24 hours. The samples were submitted to Microbac Laboratories of Indianapolis, In for VOC analysis.

Upon completion of the 24-hour test, the well head assembly was disconnected from the extraction well and moved to another array. The SVE arrays were tested in the following order: SVE 1S, SVE 1D, SVE 3, SVE 2S, and SVE 2D.

2.4 SVE PILOT STUDY RESPONSE RESULTS

The SVE Pilot Study results for each array are discussed in the following paragraphs.

2.4.1 SVE 1S

At blower startup, an immediate vacuum was observed in the vacuum monitoring well located 5 feet from the extraction well. The target vacuum for effective SVE is 0.10 "H_2O. The initial vacuum at the 5-foot well was 0.88 "H_2O. There was no observable vacuum at the 10-foot well and limited vacuum (0.02 "H_2O) at the 20-foot well.

The blower speed was increased until a vacuum of 12 "H_2O was established at the extraction well. This resulted in vacuums of 1.70 "H_2O at 5 feet, 0.02 "H_2O at 10 feet, and 0.01 "H_2O at 20 feet. The blower speed was gradually increased until a vacuum of 85 "H_2O was recorded at the extraction well. This resulted in vacuums of 15 "H_2O at 5 feet, 0.18 "H_2O at 10 feet, and 0.06 i"H_2O at 20 feet.

The blower speed was increased again until a vacuum of 136 "H_2O was established at the extraction well. This resulted in a vacuum increase at 5 feet (to 20 "H_2O), however the vacuum at 10 and 20 feet decreased (to 0.05 and 0.03 "H_2O, respectively).

2.4.2 SVE 1D

At blower startup, an immediate vacuum was observed in the vacuum monitoring wells located at 5, 20, and 40 feet from the extraction well. The target vacuum for effective SVE is 0.10 "H_2O. The initial observed vacuums were 0.11 "H_2O at the 5-foot well, 0.08 "H_2O at the 20-foot well, and 0.05 "H_2O at the 40-foot well. There was no observable vacuum at the extraction well. This would indicate that the subsurface structure is highly permeable and offers little resistance to airflow.

The blower speed was increased until a vacuum of 2 "H_2O was established at the extraction well. This resulted in vacuums of 0.60 "H_2O at 5 feet, 0.40 "H_2O at 20 feet, and 0.32 "H_2O at 40 feet. The blower speed was gradually increased until a vacuum of 4 "H_2O was recorded at the extraction well. This resulted in vacuums of 0.80 "H_2O at 5 feet, 0.53 "H_2O at 20 feet, and 0.32 "H_2O at 40 feet. Once the extraction well vacuum reached 4 "H_2O, the blower was operated at a constant speed for the duration of the test. The blower maintained the extraction well vacuum of 4 "H_2O for approximately 17 hours. The vacuums at the three monitoring wells showed a fluctuation of less than 10% over this period.

2.4.3 SVE 2S

At blower startup, an immediate vacuum was observed in the vacuum monitoring wells located at 5, 10, and 20 feet from the extraction well. The target vacuum for effective SVE is 0.10 "H_2O. The initial observed vacuums were 0.25 "H_2O at the 5-foot well, 0.15"H_2O at the 10-foot well, and 0.06 "H_2O at the 20-foot well. The initial vacuum at the extraction well was 18 "H_2O.

The blower speed was gradually increased until a maximum vacuum of 109 "H_2O was recorded at the extraction well. This resulted in vacuums of 4.90 "H_2O at 5 feet, 2.70 "H_2O at 10 feet and 1.25 "H_2O at 20 feet. The maximum extraction well vacuum was achieved 10 hours into the test. Once the extraction well vacuum reached 109 "H_2O, the blower was operated at a constant speed for the duration of the test. The extraction well vacuum dropped from 109 to 82 "H_2O during the remainder of the test. The vacuums at the three monitoring wells, however, showed a fluctuation of less than 10% over this period.

2.4.4 SVE 2D

At blower startup, an immediate vacuum was observed in the vacuum monitoring wells located at 5, 20, and 40 feet from the extraction well. The target vacuum for effective SVE is 0.10 "H_2O. The initial observed vacuums were 0.10 "H_2O at the 5-foot well, 0.08 "H_2O at the 20-foot well, and 0.07 "H_2O at the 40-foot well. There was no observable vacuum at the extraction well. This would indicate that the subsurface structure is highly permeable and offers little resistance to airflow.

The blower speed was increased until a vacuum of 2 "H_2O was established at the extraction well. This resulted in vacuums of 0.37 "H_2O at 5 feet, 0.32 "H_2O at 20 feet, and 0.30 "H_2O at 40 feet. The blower speed was gradually increased until a vacuum of 4 "H_2O was recorded at the extraction well. This resulted in vacuums of 0.67 "H_2O at 5 feet, 0.54 "H_2O at 20 feet, and 0.49 "H_2O at 40 feet. Once the extraction well vacuum reached 4 "H_2O, the blower was operated at a constant speed for the duration of the test. The blower maintained the extraction well vacuum of 4 "H_2O for approximately 22 hours. The vacuums at the three monitoring wells showed a fluctuation of less than 15% over this period.

2.4.5 SVE 3

At blower startup, an immediate vacuum was observed in the vacuum monitoring wells located at 5 feet and 20 feet from the extraction well. The target vacuum for effective SVE is 0.10 "H_2O. The initial vacuum at the 5-foot well was 0.15 "H_2O and the initial vacuum at the 20-foot well was 0.06 "H_2O. There was no observable vacuum at the 10-foot well. The initial vacuum at the extraction well was 4 "H_2O.

The blower speed was gradually increased until a vacuum of 23 "H_2O was established at the extraction well. This resulted in vacuums of 0.76 "H_2O at 5 feet, 0.03 "H_2O at 10 feet, and 0.26 "H_2O at 20 feet. Once the extraction well vacuum reached 23 "H_2O, the blower was operated at a constant speed for the duration of the test. The blower maintained the extraction well vacuum of 23 "H_2O for approximately 18 hours. The vacuums at the three monitoring wells showed a fluctuation of less than 10% over this period.

Overall, the responses observed during the pilot study indicated that the areas targeted for SVE should be amenable to the technology. Furthermore, the observed vacuum responses indicate that the radius of influence for the shallow and deep extraction wells is sufficient to make the overall SVE system a cost effective alternative for addressing the VOC contamination in the targeted areas.

The response data sheets for the SVE pilot test are presented in Attachment A.

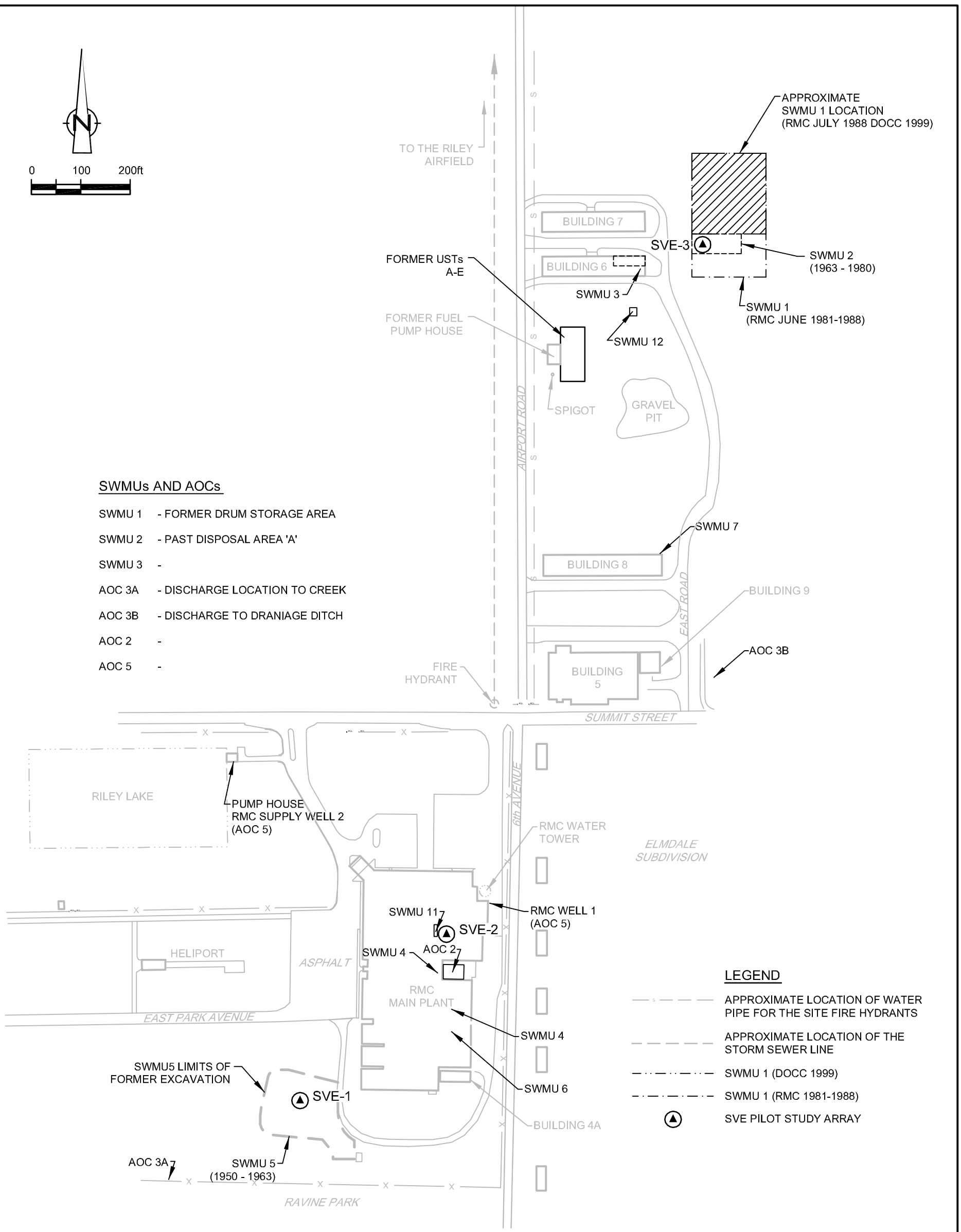
2.5 SVE PILOT STUDY ANALYTICAL RESULTS

Two vapor samples were collected from each extraction well during the pilot study. These ten samples were submitted to Microbac Laboratories for VOC analysis. The primary contaminants of concern (COCs) in the target areas are PCE, TCE and cDCE. High levels of one or more of these contaminants were recorded in each of the target areas. The highest concentrations of the primary COCs recorded in each area were:

- SWMU 5: PCE-660,000 parts per billion(ppb), TCE-7,500,000 ppb, cDCE 2,000,000 ppb;
- SWMU 11: PCE-7,000,000 ppb, TCE-74,000 ppb, cDCE-12,000 ppb; and
- SWMU 1/SWMU 2: PCE-1,100,000 ppb, TCE-120,000 ppb, cDCE-4,600 ppb.

The elevated VOC concentrations in the soil vapors indicate that offgas treatment will probably be required for the SVE system. The analytical report from Microbac is presented in Attachment B.

The type of treatment, extraction well spacing and system component requirements will be determined during the system design phase of the ICM implementation.



SWMUs AND AOCs

SWMU 1 - FORMER DRUM STORAGE AREA

SWMU 2 - PAST DISPOSAL AREA 'A'

SWMU 3 -

AOC 3A - DISCHARGE LOCATION TO CREEK

AOC 3B - DISCHARGE TO DRANIAGE DITCH

AOC 2 -

AOC 5 -

NOTE:

SWMU 1 APPEARS TO HAVE VARIED IN SIZE FROM THE EXTENTS SHOWN IN RMC DRAWINGS (1981 TO 1988) TO THE DOCC REPORT (1999)

figure C.1

SVE PILOT STUDY LOCATIONS
RADIO MATERIALS CORPORATION
Attica, Indiana

SOURCE: PHASE I RFI (2000)

19190-00(016)GN-WA015 JAN 29/2007

ATTACHMENT A

RESPONSE DATA SHEETS FOR THE SVE PILOT TEST

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-29-06 + 9-30-06

Weather : Clear 42
Start Time: 6:50a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE#2D** Vacuum (inches H2O	**MW-5D** Distance: 5'4" Vacuum (inch H2O)	**MW-20D** Distance: 19'0" Vacuum (inch H2O)	**MW-40D** Distance: 36'9" Vacuum (inch H2O)	**MW-5S** Distance:5'0" Vacuum (inch H2O)
6:50	0	0	0.0	/	0	0	0.00	0.00	0.00	0.00
6:55	0:05	600	6.0	/60	1100	0	0.10	0.08	0.07	0.00
7:10	0:20	600	6.0	/60	1100	0	0.16	0.13	0.13	
7:25	0:35	600	6.0	/58	1100	0	0.18	0.15	0.15	0.00
7:40	0:50			/		0	0.19	0.15	0.15	
7:45	0:55	1400	20.0	/58	1600	2"	0.37	0.32	0.30	0.00
8:00	1:10			/60	1600	2"	0.45	0.38	0.36	
8:15	1:25	1400	20.0	/60	1600	2"	0.46	0.40	0.37	
8:30	1:40	1450		/		2"	0.45	0.38	0.35	
8:35	1:45	2000	2.0psi	/68	3600	3"	0.55	0.44	0.39	0.00
8:50	2:00			/		3"	0.62	0.50	0.43	
9:05	2:15	2000		/		3"	0.70	0.57	0.52	
9:20	2:30	2000	2.0psi	/70	4000	3"	0.66	0.55	0.50	
9:35	2:45			/		3"	0.63	0.52	0.47	0.00
9:40	2:50	2300	2.0psi	/78	3300	4"	0.67	0.54	0.49	
9:55	3:05			/		4"	0.76	0.61	0.58	
10:20	3:30	2300		/80		4"	0.75	0.60	0.56	
10:35	3:45			/		4"	0.74	0.59	0.54	
10:45	3:55	2300	2.0psi	/80	3300	4"	0.72	0.58	0.52	0.00
11:00	4:10	2300		/80		4"	0.70	0.56	0.50	
11:30	4:40	2300	2.0psi	/82	3300	4"	0.60	0.46	0.39	
12:30	5:40			/82		4"	0.64	0.50	0.43	
13:30	6:40	2300	2.0psi	/84	3200	4"	0.60	0.47	0.39	
14:30	7:40			/84		4"	0.60	0.48	0.40	
15:30	8:40	2300	2.0psi	/84	3200	4"	0.60	0.48	0.40	
16:30	9:40			/84		4"	0.67	0.53	0.47	
17:30	10:40	2300	2.0psi	/82	3200	4"	0.65	0.52	0.45	

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-29-06 + 9-30-06

Weather : Clear 42
Start Time: 6:50 a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE#2D** Vacuum (inch H2O)	**MW-5D** Distance: 5'4" Vacuum (inch H2O)	**MW-20D** Distance: 19'0" Vacuum (inch H2O)	**MW-40D** Distance: 36'9" Vacuum (inch H2O)	**MW-5S** Distance:5'0" Vacuum (inch H2O)
18:30	11:40	2300	2.0psi	/84	3150	4"	0.76	0.62	0.56	
19:30	12:40	2300	2.0psi	/84	3150	4"	0.80	0.65	0.61	
20:30	13:40			/84		4"	0.74	0.59	0.55	
21:30	14:40			/84		4"	0.68	0.54	0.48	
22:30	15:40			/84		4"	0.64	0.50	0.43	
23:30	16:40			/84		4"	0.60	0.47	0.41	
0:30	17:40			/84		4"	0.60	0.46	0.40	
1:30	18:40	2300	2.0psi	/84	3150	4"	0.60	0.46	0.42	
2:30	19:40			/84		4"	0.65	0.51	0.46	
3:45	20:55			/84		4"	0.66	0.52	0.47	
4:30	21:40			/84		4"	0.68	0.53	0.49	
5:30	22:40	2300	2.0psi	/84	3150	4"	0.66	0.52	0.47	
6:05	23:15	Stop Test								

Air Exhaust Sample Data (Summa Cannister)				
Sample ID	Sample Time (hr:min)			Date/ Time
	Start	Stop	Total	
SVE#2DA				9/29, 10:50a.m.
SVE#2DB				9/30, 6:00a.m.

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-28-06 + 9-29-06

Weather : Clear 60
Start Time: 8:40a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE#2S** Vacuum (inches H2O	**MW-5S** Distance: 5'4" Vacuum (inch H2O)	**MW-10S** Distance: 11'4" Vacuum (inch H2O)	**MW-20S** Distance: 21'3" Vacuum (inch H2O)	**MW-5D** Distance:5'0" Vacuum (inch H2O)
8:40	0:00	450		/50		18"	0.25	0.15	0.06	
8:55	0:15	350		/52		18"	0.24	0.14	0.06	
9:10	0:30	350		/52		18"	0.24	0.14	0.06	
9:15	0:35	1000	6.0	/64		50"	0.45	0.33	0.18	
9:30	1:05	1050	6.0	/72		48"	0.69	0.39	0.22	
9:45	1:20	1050	6.0	/72		48"	0.70	0.40	0.22	
10:00	1:35	950	6.0	/78		47"	0.71	0.40	0.23	
10:15	1:50	950	6.0	/78		47"	0.70	0.40	0.23	0.05
10:20	1:55	1250	9.0	/90		72"	1.30	0.72	0.37	0.05
10:40	add water	1300	9.0	/100		79"	1.95	1.05	0.54	
11:00	2:35	1300	9.0	/104		75"	1.95	1.05	0.56	0.04
11:15	2:50	1300	9.0	/104		74"	1.95	1.02	0.52	0.02
11:30	3:05	1300	9.0	/104		74"	1.95	1.04	0.54	0.02
11:35	3:10	1400	16.0	/118	1900	7"Hg	2.20	1.50	0.74	0.00
11:50	3:25	1400	16.0	/120	1900	7"Hg	2.80	1.60	0.76	0.00
12:05	3:40	1500	16.0	/122	2200	7"Hg	2.90	1.65	0.79	
12:20	3:55	1500	16.0	/122	2200	7"Hg	2.90	1.65	0.80	
12:35	4:10	1700	18.0	/132	2100	8"Hg	3.30	1.90	0.90	
12:55	4:30	1800	18.0	/134	2200	8"Hg	3.60	1.95	0.95	
13:15	4:50	1800	18.0	/136	2200	8"Hg	3.70	2.00	0.97	
13:45	5:20	1800	18.0	/136	2200	8"Hg	3.80	2.10	0.98	
14:45	6:20	1750	18.0	/136	2200	8"Hg	3.90	2.10	0.99	0.00
15:45	7:20	1750	19.0	/132	2000	7"Hg	4.00	2.20	1.03	
16:45	8:20	1750	19.0	/132	1800	7"Hg	4.20	2.30	1.09	
17:45	9:20	1750	19.0	/132	1750	7"Hg	4.30	2.30	1.10	0.04
18:45	10:20	1875	19.0	/132	1750	8"Hg	4.90	2.70	1.25	0.02

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-28-06 + 9-29-06

Weather : Clear 60
Start Time: 8:40a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE#2S** Vacuum (inch Hg)	**MW-5S** Distance: 5'4" Vacuum (inch H2O)	**MW-10S** Distance: 11'4" Vacuum (inch H2O)	**MW-20S** Distance: 21'3" Vacuum (inch H2O)	Distance:5'0" Vacuum (inch H2O)
19:45	11:20	1800	19.0	/132	1750	7"Hg	4.80	2.60	1.20	0.02
20:45	12:20	1800	19.0	/126	1750	7"Hg	4.80	2.63	1.20	0.02
21:45	13:20	1900	19.0	/124	1750	7"Hg	4.80	2.60	1.20	0.02
22:45	14:20	1950		/122		7"Hg	4.90	2.70	1.25	0.02
23:45	15:20	2000		/122		7"Hg	4.90	2.70	1.25	0.00
0:45	16:20	2000		/121		7"Hg	5.00	2.80	1.25	0.00
1:45	17:20	2000		/120		7"Hg	5.10	2.80	1.30	0.00
2:45	18:20	1800		/119		7"Hg	5.20	2.80	1.30	0.03
3:45	19:20	2000		/118		7"Hg	5.20	2.80	1.30	0.03
4:45	20:20	2050		/118		6"Hg	5.30	2.90	1.35	0.00
5:45	21:20	2000	19.0	/118	1750	6"Hg	5.30	2.90	1.35	0.00
6:05	21:40	Stop Test		/						
				/						
				/						
				/						
				/						
				/						
				/						

Air Exhaust Sample Data (Summa Cannister)				
Sample ID	Sample Time (hr:min)			Date/ Time
	Start	Stop	Total	
SVE#2SA				9/28, 12:25p.m.
SVE#2SB				9/29, 6:00a.m.

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-27-06 + 9-28-06

Weather : Clear 60
Start Time: 8:15a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE#3** Vacuum (inches H2O	**MW-5** Distance: 5'6" Vacuum (inch H2O)	**MW-10** Distance: 9'5" Vacuum (inch H2O)	**MW-20** Distance: 19'2" Vacuum (inch H2O)	Distance: Vacuum (inch H2O)
8:05	0:00	0	0.0		0	0	0.00	0.00	0.00	
8:15	0:10	600	6.0	/50	600	4"	0.15	0.00	0.06	
** Add Bentonite and Hydrate to seal off short circuiting well.										
8:45	0:30	600	6.0	/54	600	4"	0.20	0.00	0.06	
9:00	0:45	600	6.0	/56	600	4"	0.20	0.00	0.06	
9:05	0:50	1050	12.5	/60	1000	8"	0.31	0.01	0.10	
9:15	1:00	1050	12.5	/62	1000	8"	0.31	0.01	0.10	
9:30	1:15			/		8"	0.31	0.01	0.10	
9:35	1:20	1300	18.0		1100	12"	0.40	0.01	0.14	
9:50	1:35	1300	18.0	/68	1100	12"	0.40	0.01	0.14	
10:05	1:50	1300	18.0	/68	1100	12"	0.41	0.01	0.14	
10:10	1:55	1650	26.5	/76	2000	16"	0.52	0.01	0.17	
10:25	2:10	1650	26.5	/76	2000	16"	0.53	0.01	0.17	
11:00	2:45	1650	26.5	/80	2000	16"	0.53	0.01	0.18	
11:05	2:50	2050	2.0psi	/90	3000	20"	0.68	0.02	0.22	
11:20	3:05	2050	2.0psi	/90	3000	20"	0.68	0.02	0.23	
11:35	3:20	2050	2.0psi	/90	3000	20"	0.67	0.02	0.23	
11:50	3:35	2050		/90	3000	20"	0.68	0.02	0.23	
12:05	3:50	2000	2.0psi	/92	3000	20"	0.68	0.02	0.23	
12:10	3:55	2400	2.0psi	/97	3600	23"	0.76	0.03	0.26	
12:25	4:10	2400	2.0psi	/100	3600	23"	0.78	0.03	0.26	
12:40	4:25			/100		23"	0.79	0.02	0.27	
13:10	4:55			/105		23"	0.79	0.02	0.26	
14:10	5:55			/100		23"	0.76	0.02	0.25	
15:10	6:55			/100		23"	0.75	0.02	0.25	
16:10	7:55			/100		23"	0.75	0.02	0.25	
17:10	8:55	2400	2.0psi	/100	3600	23"	0.75	0.02	0.25	

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-27-06 + 9-28-06

Weather : Clear 60
Start Time: 8:15a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE#3**	**MW-5**	**MW-10**	**MW-20**	
							Distance: 5'6"	Distance: 9'5"	Distance: 19'2"	Distance:
						Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)
18:00	9:45	2400	2.0psi	/100	3600	23"	0.74	0.02	0.24	
19:00	10:45			/98		23"	0.73	0.03	0.24	
20:00	11:45			/98		23"	0.72	0.03	0.24	
21:00	12:45			/96		23"	0.72	0.02	0.23	
22:00	13:45			/94		23"	0.71	0.03	0.23	
23:00	14:45			/94		23"	0.72	0.03	0.23	
0:00	15:45			/94		23"	0.72	0.03	0.23	
1:00	16:45			/94		23"	0.71	0.02	0.23	
2:00	17:45			/94		23"	0.71	0.02	0.23	
3:00	18:45			/93		23"	0.71	0.02	0.23	
4:00	19:45			/92		22"	0.71	0.03	0.23	
5:00	20:45			/92		22"	0.71	0.02	0.23	
6:00	21:45	2400	2.0psi	/92	3600	22"	0.71	0.02	0.23	
6:20	22:05	Stop Test								

Air Exhaust Sample Data (Summa Cannister)				
Sample ID	Sample Time (hr:min)			Date/ Time
	Start	Stop	Total	
SVE#3A				9/27, 12:15a.m.
SVE#3B				9/28, 6:15a.m.

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-26-06 + 9-27-06

Weather : Clear 50
Start Time: 7:30 a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	SVE#1D	MW-5D	MW-20D	MW-40D	
							Distance: 5'8"	Distance: 20'2"	Distance: 39'3"	Distance:
						Vacuum (inches H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)
7:30	0:00	0	0.0	/49	0	0	0.00	0.00	0.00	
7:35	0:05	400	5.0	/60	400	0	0.11	0.08	0.05	
7:40	0:10	400	5.5	/60	400	0	0.14	0.09	0.06	
7:45	0:15	550	8.5	/60	800	0	0.18	0.13	0.09	
8:00	0:30	750	12.5	/56	900	0	0.25	0.18	0.12	
8:15	0:45			/			0.30	0.22	0.16	
8:30	1:00	1250	16.5	/56	950	0	0.35	0.25	0.18	
8:45	1:15	1200	16.5	/56	950	0	0.38	0.27	0.20	
9:00	1:30			/		0	0.39	0.29	0.22	
9:05	1:35	1100	20.0	/58	1100	0	0.41	0.29	0.22	
9:45	2:15	1100	20.0	/60	1300	0	0.42	0.30	0.23	
10:00	2:30	1200	24.0	/62	1500	0	0.47	0.33	0.25	
10:30	3:00	1200	24.0	/62	1500	0	0.48	0.33	0.26	
11:00	3:30	1450		/68		2"	0.57	0.38	0.30	
11:15	3:45	1500		/70		2"	0.60	0.40	0.32	
11:30	4:00	1600		/70		2"	0.61	0.41	0.33	
11:45	4:15	1600		/70		2"	0.60	0.39	0.32	
12:00	4:30	1600		/72		2"	0.58	0.39	0.32	
12:05	4:35	2000	4.0psi	/78	2800	3"	0.67	0.45	0.36	
12:25	5:00	2100	3.0psi	/80	2800	3"	0.72	0.49	0.39	
12:40	5:15	2100	3.0psi	/80	2800	3"	0.70	0.45	0.36	
13:05	5:40	2100	2.5psi	/82	2800	3"	0.69	0.43	0.35	
13:10	5:45	2300	2.5psi	/88	3000	4"	0.78	0.49	0.40	
13:25	6:00	2300		/88	3000	4"	0.79	0.51	0.42	
13:40	6:10	2300	2.5psi	/88	3000	4"	0.78	0.49	0.39	
14:00	6:30	2300	2.0psi	/88	2800	4"	0.76	0.48	0.39	
15:00	7:30	2300	2.0psi	/88	2800	4"	0.78	0.49	0.39	

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-26-06 + 9-27-06

Weather : Clear 70
Start Time: 7:30 a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE#1D** Vacuum (inch H2O)	**MW-5D** Distance: 5'8" Vacuum (inch H2O)	**MW-20D** Distance: 20'2" Vacuum (inch H2O)	**MW-40D** Distance: 39'3" Vacuum (inch H2O)	Distance: Vacuum (inch H2O)
16:00	8:30	2300	2.5psi	/88	2800	4"	0.80	0.51	0.42	
17:00	9:30	2300	2.5psi	/88	2800	4"	0.79	0.51	0.41	
18:00	10:30			/86		4"	0.80	0.53	0.42	
19:00	11:30			/85		4"	0.80	0.55	0.42	
20:00	12:30			/84		4"	0.82	0.58	0.44	
21:00	13:30			/82		4"	0.83	0.60	0.46	
22:00	14:30			/82		4"	0.81	0.58	0.43	
23:00	15:30			/80		4"	0.80	0.55	0.42	
0:00	16:30			/80		4"	0.79	0.54	0.41	
1:00	17:30			/79		4"	0.77	0.52	0.40	
2:00	18:30			/80		4"	0.77	0.52	0.40	
3:00	19:30			/80		4"	0.77	0.52	0.39	
4:00	20:30			/80		4"	0.74	0.50	0.38	
5:00	21:30			/79		4"	0.77	0.52	0.40	
6:00	22:30	2300	2.5psi	/79	2800	4"	0.79	0.54	0.40	
6:20	22:50	Stop Test								

Air Exhaust Sample Data (Summa Cannister)				
Sample ID	Sample Time (hr:min)			Date/ Time
	Start	Stop	Total	
SVE#1DA				9/26, 11:30a.m.
SVE#1DB				9/27, 6:15a.m.

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-25-06 + 9-26-06

Weather : Sunny 75
Start Time: 8:30 a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

Pilot Test Data						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Press. (inch H20)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE# 1S**	**MW-5S**	**MW-10S**	**MW-20S**	
							Distance: 5'10"	Distance: 10'7"	Distance: 22'0"	Distance:
						Vacuum (inches H2O	Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)
8:30	0:00			/			0.00	0.00	0.00	
8:32	0:02	300	3.0	/48	300	6"	0.88	0.00	0.02	
8:47	0:17	250	4.0	/		6"	1.00	0.00	0.00	
8:50	0:20	350	4.0	/50	400	12"	1.70	0.02	0.01	
9:05	0:35	425	5.0	/58	400	19"	2.80	0.04	0.02	
9:20	0:50			/		19"	3.00	0.04	0.02	
9:25	0:55	500	7.0	/65	600	30"	4.40	0.08	0.03	
9:40	1:10	500	7.0	/70	600	30"	5.00	0.08	0.03	
9:45	1:15	700	10.0	/76		41"	6.80	0.10	0.04	
10:00	1:30			/		42"	7.30	0.11	0.04	
10:05	1:35	875	11.5	/86		55"	8.70	0.13	0.04	
10:20	1:50	875	11.5	/88		55"	9.50	0.14	0.04	
10:25	1:55	950	15.0	/100		69"	12.00	0.16	0.05	
10:55	2:25	1000	15.0	/102	700	69"	12.00	0.16	0.06	
11:00	2:30	1125	17.0	/108		76"	13.00	0.17	0.06	
12:00	3:30	1100	16.5	/112		77"	13.50	0.17	0.06	
13:00	4:30	1100	16.5	/115		76"	13.50	0.17	0.07	
13:55	5:25	1100	16.5	/115		76"	13.50	0.16	0.06	
14:00	5:30	1250	18.5	/120	900	85"	15.00	0.17	0.07	
15:00	6:30	1400	18.0	/120	1300	85"	15.00	0.18	0.06	
16:00	7:30	1400	18.0	/124	1550	85"	15.00	0.18	0.06	
17:00	8:30	1450	18.0	/124	1550	86"	14.50	0.17	0.06	
17:30 ****	9:00	1000		/150		10"Hg	20.00	0.05	0.03	
17:45	9:15	1125		/152		10"Hg	20.00	0.04	0.03	
18:00	9:30	1100		/162		10"Hg	17.50	0.03	0.03	

**** Hydrated Bentonite Seal in SVE#1S, Well Seal was found to be short circuiting to atmosphere.
Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

SOIL VAPOR EXTRACTION PILOT TEST
DATA SHEET

Client: CRA
Site Name: Attica P.S.
Project Number: 10435-06-016
Test Date: 9-25-06 + 9-26-06

Weather : Sunny 75
Start Time: 8:30 a.m.
Relative Humidity:

Site Personnel: JHS
JFS
Project Manager: JAS

						Extraction Well	Monitored Pilot Test Wells			
Actual Time (hr:min)	Elapsed Time (hr:min)	Air Velocity (fpm) Thermal Anem.	Exhaust Pressure (inch H2O)	PID (ppm^{V}) / Exhaust Temp (deg. F)	Air Velocity (fpm @ static) Pitot Tube	**SVE#1S**	**MW-5S**	**MW-10S**	**MW-20S**	
							Distance: 5'10"	Distance: 10'7"	Distance: 22'0"	Distance:
						Vacuum (inch Hg)	Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)	Vacuum (inch H2O)
18:25	9:55	1100		/162		10"Hg	17.00	0.03	0.02	
19:00	10:30	1300		/162		9" Hg	17.50	0.03	0.03	
19:30	11:00	1300		/164		9"Hg	17.50	0.03	0.03	
20:00	11:30			/164		9"Hg	17.50	0.03	0.03	
20:30	12:00			/162		8"Hg	17.50	0.02	0.03	
21:00	12:30			/162		8"Hg	17.00	0.03	0.03	
22:00	13:30			/158		8"Hg	17.00	0.02	0.03	
23:00	14:30			/158		8"Hg	17.00	0.02	0.03	
0:00	15:30			/158		8"Hg	17.00	0.02	0.03	
1:00	16:30			/158		8"Hg	17.00	0.02	0.03	
2:00	17:30			/158		7"Hg	17.00	0.02	0.03	
3:00	18:30			/158		7"Hg	17.00	0.02	0.03	
4:00	19:30			/156		7"Hg	17.00	0.02	0.03	
5:00	20:30			/156		7"Hg	17.00	0.02	0.03	
6:00	21:30			/154		7"Hg	17.00	0.02	0.03	
6:30	22:00	1300		/154		7"Hg	17.00	0.02	0.03	
Stop Test										

Air Exhaust Sample Data (Summa Cannister)				
Sample ID	Sample Time (hr:min)			Date/ Time
	Start	Stop	Total	
SVE#1SA				9/25, 12:30p.m.
SVE#1SB				9/26, 6:00a.m.

Note: Thermal anemometer readings were taken from 4" ID pipe inlet.
Note: Pitot tube readings were taken from 3" ID outlet pipe.

ATTACHMENT B

ANALYTICAL REPORT FROM MICROBAC

October 18, 2006

Jason Swearingen
Specialty Earth Sciences, LLC
10435 Lambs Ridge Road
Elizabeth, IN 47117

Work Order No.: ME0610148

RE: TO-15

Dear Jason Swearingen:

Microbac Laboratories, Inc. received 10 samples on 10/4/2006 10:00:00 AM for the analyses presented in the following report.

The enclosed results were obtained from and are applicable to the sample(s) as received at the laboratory. All sample results are reported on an "as received" basis unless otherwise noted. This report includes the numbered pages as well as the Cooler Inspection Report and Chain of Custody form(s).

All data included in this report have been reviewed and meet the applicable project specific and certification specific requirements, unless otherwise noted. A qualifications page is included in this report and lists the programs under which Microbac maintains certification.

This report shall not be reproduced except in full, without the written approval of Microbac Laboratories.

We appreciate the opportunity to service your analytical needs. If you have any questions, please feel free to contact us.

Sincerely,
Microbac Laboratories, Inc.

Deborah Griffiths
Senior Project Manager

Enclosures

WORK ORDER SAMPLE SUMMARY

Date: *Wednesday, October 18, 2006*

CLIENT: Specialty Earth Sciences, LLC
Project: TO-15
Lab Order: ME0610148

Lab Sample ID	Client Sample ID	Tag Number	Collection Date	Date Received
ME0610148-01A	SVE #1 SA		9/25/2006 12:30:00 PM	10/4/2006
ME0610148-02A	SVE #1 SB		9/26/2006 6:00:00 AM	10/4/2006
ME0610148-03A	SVE #1 DA		9/26/2006 11:30:00 AM	10/4/2006
ME0610148-04A	SVE #1 DB		9/27/2006 6:15:00 AM	10/4/2006
ME0610148-05A	SVE #3 A		9/27/2006 12:15:00 AM	10/4/2006
ME0610148-06A	SVE #3 B		9/28/2006 6:15:00 AM	10/4/2006
ME0610148-07A	SVE #2 SA		9/28/2006 12:25:00 PM	10/4/2006
ME0610148-08A	SVE #2 SB		9/29/2006 6:00:00 AM	10/4/2006
ME0610148-09A	SVE #2 DA		9/29/2006 10:50:00 AM	10/4/2006
ME0610148-10A	SVE #3 DB		9/30/2006 6:00:00 AM	10/4/2006

CASE NARRATIVE

Date: *Wednesday, October 18, 2006*

Client: Specialty Earth Sciences, LLC
Project: TO-15
Lab Order: ME0610148

TO-15 Analysis was performed by Air Toxics in Folsom, CA

2-Propanol in samples SVE #2 SA and SVE #2 SB was not detected; however, the continuing calibration verification (CCV) for this compound was biased low.

ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #1 SA	*Work Order / ID:*	ME0610148-01
Sample Description:		*Collection Date:*	09/25/06 12:30
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	***ND***	7200		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	***ND***	9100		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	***ND***	7200		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	***ND***	5400		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	***8000***	5300		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	***ND***	6500		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	***ND***	10000		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	***ND***	8000		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	***ND***	5400		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	***ND***	6100		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	***ND***	6500		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	***ND***	8000		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	***ND***	8000		uG/m3	1	10/09/06 00:00
2-Propanol	A	***ND***	3300		uG/m3	1	10/09/06 00:00
Benzene	A	***ND***	4200		uG/m3	1	10/09/06 00:00
Bromomethane	A	***ND***	5200		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	***ND***	8400		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	***ND***	6100		uG/m3	1	10/09/06 00:00
Chloroethane	A	***ND***	3500		uG/m3	1	10/09/06 00:00
Chloroform	A	***ND***	6500		uG/m3	1	10/09/06 00:00
Chloromethane	A	***ND***	2700		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	***920000***	5300		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	***ND***	5800		uG/m3	1	10/09/06 00:00
Freon-11	A	***ND***	7500		uG/m3	1	10/09/06 00:00
Freon-113	A	***ND***	10000		uG/m3	1	10/09/06 00:00
Freon-114	A	***ND***	9300		uG/m3	1	10/09/06 00:00
Freon-12	A	***ND***	6600		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	***ND***	5800		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	***ND***	4800		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	***ND***	4600		uG/m3	1	10/09/06 00:00
o-Xylene	A	***ND***	5800		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	***100000***	9000		uG/m3	1	10/09/06 00:00
Toluene	A	***58000***	5000		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	***7400***	5300		uG/m3	1	10/09/06 00:00
Trichloroethene	A	***4200000***	7100		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	***110000***	3400		uG/m3	1	10/09/06 00:00

ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #1 SB	*Work Order / ID:*	ME0610148-02
Sample Description:		*Collection Date:*	09/26/06 06:00
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	***ND***	8900		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	***ND***	11000		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	***ND***	8900		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	***ND***	6600		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	***15000***	6500		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	***ND***	8100		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	***ND***	13000		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	***ND***	9900		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	***ND***	6600		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	***ND***	7600		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	***ND***	8100		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	***ND***	9900		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	***ND***	9900		uG/m3	1	10/09/06 00:00
2-Propanol	A	***ND***	4000		uG/m3	1	10/09/06 00:00
Benzene	A	***ND***	5200		uG/m3	1	10/09/06 00:00
Bromomethane	A	***ND***	6400		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	***ND***	10000		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	***ND***	7600		uG/m3	1	10/09/06 00:00
Chloroethane	A	***ND***	4300		uG/m3	1	10/09/06 00:00
Chloroform	A	***ND***	8000		uG/m3	1	10/09/06 00:00
Chloromethane	A	***ND***	3400		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	***2000000***	6500		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	***7100***	5800		uG/m3	1	10/09/06 00:00
Freon-11	A	***ND***	9200		uG/m3	1	10/09/06 00:00
Freon-113	A	***ND***	12000		uG/m3	1	10/09/06 00:00
Freon-114	A	***ND***	11000		uG/m3	1	10/09/06 00:00
Freon-12	A	***ND***	8100		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	***ND***	7100		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	***5900***	4800		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	***ND***	5700		uG/m3	1	10/09/06 00:00
o-Xylene	A	***ND***	7100		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	***200000***	11000		uG/m3	1	10/09/06 00:00
Toluene	A	***99000***	6200		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	***16000***	6500		uG/m3	1	10/09/06 00:00
Trichloroethene	A	***5500000***	8800		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	***120000***	4200		uG/m3	1	10/09/06 00:00

ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #1 DA	*Work Order / ID:*	ME0610148-03
Sample Description:		*Collection Date:*	09/26/06 11:30
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	***ND***	4800		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	***ND***	6000		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	***ND***	4800		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	***ND***	3600		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	***5800***	3500		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	***ND***	4300		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	***ND***	6800		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	***ND***	5300		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	***ND***	3600		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	***ND***	4100		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	***ND***	4300		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	***ND***	5300		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	***ND***	5300		uG/m3	1	10/09/06 00:00
2-Propanol	A	***ND***	2200		uG/m3	1	10/09/06 00:00
Benzene	A	***ND***	2800		uG/m3	1	10/09/06 00:00
Bromomethane	A	***ND***	3400		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	***ND***	5500		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	***ND***	4000		uG/m3	1	10/09/06 00:00
Chloroethane	A	***ND***	2300		uG/m3	1	10/09/06 00:00
Chloroform	A	***ND***	4300		uG/m3	1	10/09/06 00:00
Chloromethane	A	***ND***	1800		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	***1600000***	3500		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	***ND***	3800		uG/m3	1	10/09/06 00:00
Freon-11	A	***ND***	4900		uG/m3	1	10/09/06 00:00
Freon-113	A	***ND***	6700		uG/m3	1	10/09/06 00:00
Freon-114	A	***ND***	6200		uG/m3	1	10/09/06 00:00
Freon-12	A	***ND***	4400		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	***ND***	3800		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	***ND***	3200		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	***ND***	3000		uG/m3	1	10/09/06 00:00
o-Xylene	A	***ND***	3800		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	***330000***	6000		uG/m3	1	10/09/06 00:00
Toluene	A	***ND***	3300		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	***5100***	3500		uG/m3	1	10/09/06 00:00
Trichloroethene	A	***3600000***	4700		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	***12000***	2200		uG/m3	1	10/09/06 00:00

ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #1 DB	*Work Order / ID:*	ME0610148-04
Sample Description:		*Collection Date:*	09/27/06 06:15
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	ND	10000		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	ND	12000		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	ND	10000		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	ND	7400		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	ND	7300		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	ND	9000		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	ND	14000		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	ND	11000		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	ND	7400		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	ND	8500		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	ND	9000		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	ND	11000		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	ND	11000		uG/m3	1	10/09/06 00:00
2-Propanol	A	ND	4500		uG/m3	1	10/09/06 00:00
Benzene	A	ND	5900		uG/m3	1	10/09/06 00:00
Bromomethane	A	ND	7100		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	ND	12000		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	ND	8400		uG/m3	1	10/09/06 00:00
Chloroethane	A	ND	4800		uG/m3	1	10/09/06 00:00
Chloroform	A	ND	9000		uG/m3	1	10/09/06 00:00
Chloromethane	A	ND	3800		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	1900000	7300		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	ND	8000		uG/m3	1	10/09/06 00:00
Freon-11	A	ND	10000		uG/m3	1	10/09/06 00:00
Freon-113	A	ND	14000		uG/m3	1	10/09/06 00:00
Freon-114	A	ND	13000		uG/m3	1	10/09/06 00:00
Freon-12	A	ND	9100		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	ND	8000		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	ND	6600		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	ND	6400		uG/m3	1	10/09/06 00:00
o-Xylene	A	ND	8000		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	660000	12000		uG/m3	1	10/09/06 00:00
Toluene	A	8000	6900		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	ND	7300		uG/m3	1	10/09/06 00:00
Trichloroethene	A	7500000	9900		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	14000	4700		uG/m3	1	10/09/06 00:00

ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #3 A	*Work Order / ID:*	ME0610148-05
Sample Description:		*Collection Date:*	09/27/06 00:15
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	ND	1100		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	ND	1400		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	ND	1100		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	ND	850		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	ND	830		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	ND	1000		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	ND	1600		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	ND	1200		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	ND	840		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	ND	960		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	ND	1000		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	ND	1200		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	ND	1200		uG/m3	1	10/09/06 00:00
2-Propanol	A	ND	510		uG/m3	1	10/09/06 00:00
Benzene	A	ND	670		uG/m3	1	10/09/06 00:00
Bromomethane	A	ND	810		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	ND	1300		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	ND	960		uG/m3	1	10/09/06 00:00
Chloroethane	A	ND	550		uG/m3	1	10/09/06 00:00
Chloroform	A	ND	1000		uG/m3	1	10/09/06 00:00
Chloromethane	A	ND	430		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	320	830		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	ND	910		uG/m3	1	10/09/06 00:00
Freon-11	A	ND	1200		uG/m3	1	10/09/06 00:00
Freon-113	A	ND	1600		uG/m3	1	10/09/06 00:00
Freon-114	A	ND	1500		uG/m3	1	10/09/06 00:00
Freon-12	A	ND	1000		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	ND	910		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	ND	750		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	ND	730		uG/m3	1	10/09/06 00:00
o-Xylene	A	ND	910		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	1100000	1400		uG/m3	1	10/09/06 00:00
Toluene	A	ND	790		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	ND	830		uG/m3	1	10/09/06 00:00
Trichloroethene	A	110000	1100		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	ND	530		uG/m3	1	10/09/06 00:00

ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #3 B	*Work Order / ID:*	ME0610148-06
Sample Description:		*Collection Date:*	09/28/06 06:15
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	***ND***	720		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	***ND***	910		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	***ND***	720		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	***ND***	540		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	***ND***	520		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	***ND***	650		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	***ND***	1000		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	***ND***	800		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	***ND***	540		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	***ND***	610		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	***ND***	650		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	***ND***	800		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	***ND***	800		uG/m3	1	10/09/06 00:00
2-Propanol	A	***ND***	320		uG/m3	1	10/09/06 00:00
Benzene	A	***ND***	420		uG/m3	1	10/09/06 00:00
Bromomethane	A	***ND***	510		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	***ND***	830		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	***ND***	610		uG/m3	1	10/09/06 00:00
Chloroethane	A	***ND***	350		uG/m3	1	10/09/06 00:00
Chloroform	A	***ND***	650		uG/m3	1	10/09/06 00:00
Chloromethane	A	***ND***	270		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	***4600***	520		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	***ND***	580		uG/m3	1	10/09/06 00:00
Freon-11	A	***ND***	740		uG/m3	1	10/09/06 00:00
Freon-113	A	***ND***	1000		uG/m3	1	10/09/06 00:00
Freon-114	A	***ND***	930		uG/m3	1	10/09/06 00:00
Freon-12	A	***ND***	660		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	***ND***	580		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	***ND***	480		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	***ND***	460		uG/m3	1	10/09/06 00:00
o-Xylene	A	***ND***	580		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	***670000***	900		uG/m3	1	10/09/06 00:00
Toluene	A	***ND***	500		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	***ND***	520		uG/m3	1	10/09/06 00:00
Trichloroethene	A	***120000***	710		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	***ND***	340		uG/m3	1	10/09/06 00:00

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ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #2 SA	*Work Order / ID:*	ME0610148-07
Sample Description:		*Collection Date:*	09/28/06 12:25
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	***ND***	9300		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	***ND***	12000		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	***ND***	9300		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	***ND***	6900		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	***ND***	6800		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	***ND***	8400		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	***ND***	13000		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	***ND***	10000		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	***ND***	6900		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	***ND***	7900		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	***ND***	8400		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	***ND***	10000		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	***ND***	10000		uG/m3	1	10/09/06 00:00
2-Propanol	A	***ND***	2.00		uG/m3	1	10/09/06 00:00
Benzene	A	***ND***	5400		uG/m3	1	10/09/06 00:00
Bromomethane	A	***ND***	6600		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	***ND***	11000		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	***ND***	7800		uG/m3	1	10/09/06 00:00
Chloroethane	A	***ND***	4500		uG/m3	1	10/09/06 00:00
Chloroform	A	***ND***	8300		uG/m3	1	10/09/06 00:00
Chloromethane	A	***ND***	3500		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	***ND***	6800		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	***ND***	7400		uG/m3	1	10/09/06 00:00
Freon-11	A	***ND***	9600		uG/m3	1	10/09/06 00:00
Freon-113	A	***ND***	13000		uG/m3	1	10/09/06 00:00
Freon-114	A	***ND***	12000		uG/m3	1	10/09/06 00:00
Freon-12	A	***ND***	8400		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	***ND***	7400		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	***ND***	6100		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	***ND***	5900		uG/m3	1	10/09/06 00:00
o-Xylene	A	***ND***	7400		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	***7000000***	12000		uG/m3	1	10/09/06 00:00
Toluene	A	***ND***	6400		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	***ND***	6800		uG/m3	1	10/09/06 00:00
Trichloroethene	A	***26000***	9200		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	***ND***	4400		uG/m3	1	10/09/06 00:00

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ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #2 SB	*Work Order / ID:*	ME0610148-08
Sample Description:		*Collection Date:*	09/29/06 06:00
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	***ND***	6400		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	***ND***	8000		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	***ND***	6400		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	***ND***	4700		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	***ND***	4600		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	***ND***	5800		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	***ND***	9000		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	***ND***	7000		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	***ND***	4700		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	***ND***	5400		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	***ND***	5800		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	***ND***	7000		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	***ND***	7000		uG/m3	1	10/09/06 00:00
2-Propanol	A	***ND***	2900		uG/m3	1	10/09/06 00:00
Benzene	A	***ND***	3700		uG/m3	1	10/09/06 00:00
Bromomethane	A	***ND***	4500		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	***ND***	7400		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	***ND***	5400		uG/m3	1	10/09/06 00:00
Chloroethane	A	***ND***	3100		uG/m3	1	10/09/06 00:00
Chloroform	A	***ND***	5700		uG/m3	1	10/09/06 00:00
Chloromethane	A	***ND***	2400		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	***ND***	4600		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	***ND***	5100		uG/m3	1	10/09/06 00:00
Freon-11	A	***ND***	6600		uG/m3	1	10/09/06 00:00
Freon-113	A	***ND***	9000		uG/m3	1	10/09/06 00:00
Freon-114	A	***ND***	8200		uG/m3	1	10/09/06 00:00
Freon-12	A	***ND***	5800		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	***ND***	5100		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	***ND***	4200		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	***ND***	4100		uG/m3	1	10/09/06 00:00
o-Xylene	A	***ND***	5100		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	***5800000***	7900		uG/m3	1	10/09/06 00:00
Toluene	A	***ND***	4400		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	***ND***	4600		uG/m3	1	10/09/06 00:00
Trichloroethene	A	***33000***	6300		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	***ND***	3000		uG/m3	1	10/09/06 00:00

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ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #2 DA	*Work Order / ID:*	ME0610148-09
Sample Description:		*Collection Date:*	09/29/06 10:50
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	***ND***	3500		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	***ND***	4400		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	***ND***	3500		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	***ND***	2600		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	***ND***	2500		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	***ND***	3100		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	***ND***	4900		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	***ND***	3800		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	***ND***	2600		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	***ND***	3000		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	***ND***	3100		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	***ND***	3800		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	***ND***	3800		uG/m3	1	10/09/06 00:00
2-Propanol	A	***ND***	1600		uG/m3	1	10/09/06 00:00
Benzene	A	***ND***	2000		uG/m3	1	10/09/06 00:00
Bromomethane	A	***ND***	2500		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	***ND***	4000		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	***ND***	2900		uG/m3	1	10/09/06 00:00
Chloroethane	A	***ND***	1700		uG/m3	1	10/09/06 00:00
Chloroform	A	***ND***	3100		uG/m3	1	10/09/06 00:00
Chloromethane	A	***ND***	1300		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	***8300***	2500		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	***ND***	2800		uG/m3	1	10/09/06 00:00
Freon-11	A	***ND***	3600		uG/m3	1	10/09/06 00:00
Freon-113	A	***ND***	4900		uG/m3	1	10/09/06 00:00
Freon-114	A	***ND***	4500		uG/m3	1	10/09/06 00:00
Freon-12	A	***ND***	3200		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	***ND***	2800		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	***ND***	2300		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	***ND***	2200		uG/m3	1	10/09/06 00:00
o-Xylene	A	***ND***	2800		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	***3600000***	4300		uG/m3	1	10/09/06 00:00
Toluene	A	***ND***	2400		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	***ND***	2500		uG/m3	1	10/09/06 00:00
Trichloroethene	A	***72000***	3400		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	***ND***	1600		uG/m3	1	10/09/06 00:00

ANALYTICAL RESULTS

Date: *Wednesday, October 18, 2006*

Client:	Specialty Earth Sciences, LLC		
Client Project:	TO-15		
Client Sample ID:	SVE #3 DB	*Work Order / ID:*	ME0610148-10
Sample Description:		*Collection Date:*	09/30/06 06:00
Sample Matrix:	Air	*Date Received:*	10/04/06 10:00

VOLATILE ORGANIC COMPOUNDS Method: **TO-15 MOD** Prep Date/Time: **10/04/06 16:30** Analyst: **SUB**

Analyses	ST	Result	RL	Qual	Units	DF	Analyzed
1,1,1-Trichloroethane	A	***ND***	1900		uG/m3	1	10/09/06 00:00
1,1,2,2-Tetrachloroethane	A	***ND***	2400		uG/m3	1	10/09/06 00:00
1,1,2-Trichloroethane	A	***ND***	1900		uG/m3	1	10/09/06 00:00
1,1-Dichloroethane	A	***ND***	1400		uG/m3	1	10/09/06 00:00
1,1-Dichloroethene	A	***ND***	2500		uG/m3	1	10/09/06 00:00
1,2,4-Trimethylbenzene	A	***ND***	1700		uG/m3	1	10/09/06 00:00
1,2-Dibromoethane	A	***ND***	2700		uG/m3	1	10/09/06 00:00
1,2-Dichlorobenzene	A	***ND***	2100		uG/m3	1	10/09/06 00:00
1,2-Dichloroethane	A	***ND***	1400		uG/m3	1	10/09/06 00:00
1,2-Dichloropropane	A	***ND***	1600		uG/m3	1	10/09/06 00:00
1,3,5-Trimethylbenzene	A	***ND***	1700		uG/m3	1	10/09/06 00:00
1,3-Dichlorobenzene	A	***ND***	2100		uG/m3	1	10/09/06 00:00
1,4-Dichlorobenzene	A	***ND***	2100		uG/m3	1	10/09/06 00:00
2-Propanol	A	***ND***	860		uG/m3	1	10/09/06 00:00
Benzene	A	***ND***	1100		uG/m3	1	10/09/06 00:00
Bromomethane	A	***ND***	1400		uG/m3	1	10/09/06 00:00
Carbon Tetrachloride	A	***ND***	2200		uG/m3	1	10/09/06 00:00
Chlorobenzene	A	***ND***	1600		uG/m3	1	10/09/06 00:00
Chloroethane	A	***ND***	920		uG/m3	1	10/09/06 00:00
Chloroform	A	***ND***	1700		uG/m3	1	10/09/06 00:00
Chloromethane	A	***ND***	720		uG/m3	1	10/09/06 00:00
cis-1,2-Dichloroethene	A	***12000***	1400		uG/m3	1	10/09/06 00:00
Ethylbenzene	A	***ND***	1500		uG/m3	1	10/09/06 00:00
Freon-11	A	***ND***	2000		uG/m3	1	10/09/06 00:00
Freon-113	A	***ND***	2700		uG/m3	1	10/09/06 00:00
Freon-114	A	***ND***	2400		uG/m3	1	10/09/06 00:00
Freon-12	A	***ND***	1700		uG/m3	1	10/09/06 00:00
m,p-Xylene	A	***ND***	1500		uG/m3	1	10/09/06 00:00
Methyl-t-butyl ether	A	***ND***	1200		uG/m3	1	10/09/06 00:00
Methylene Chloride	A	***ND***	1200		uG/m3	1	10/09/06 00:00
o-Xylene	A	***ND***	1500		uG/m3	1	10/09/06 00:00
Tetrachloroethene	A	***1600000***	2400		uG/m3	1	10/09/06 00:00
Toluene	A	***ND***	1300		uG/m3	1	10/09/06 00:00
trans-1,2-Dichloroethene	A	***ND***	1400		uG/m3	1	10/09/06 00:00
Trichloroethene	A	***74000***	1900		uG/m3	1	10/09/06 00:00
Vinyl Chloride	A	***ND***	890		uG/m3	1	10/09/06 00:00

FLAGS, FOOTNOTES AND ABBREVIATIONS (as needed)

NA	=	Not Analyzed	N/A	=	Not Applicable			
mg/L	=	Milligrams per Liter (ppm)	ug/L	=	Micrograms per Liter (ppb)	cfu	=	Colony Forming Unit
mg/Kg	=	Milligrams per Kilogram (ppm)	ug/Kg	=	Micrograms per Kilogram (ppb)	ng/L	=	Nanograms per Liter (ppt)

U	=	Undetected
J	=	Analyte concentration detected between RL and MDL (Metals / Organics)
B	=	Detected in the associated Method Blank at a concentration above the routine PQL/RL
b	=	Detected in the associated Method Blank at a concentration above the Method Detection Limit but less than the routine PQL/RL
D	=	Surrogate recoveries are not calculated due to sample dilution
ND	=	Not Detected at the Reporting Limit (or the Method Detection Limit, if listed)
E	=	Value above quantitation range
H	=	Analyte was prepared and/or analyzed outside of the analytical method holding time
I	=	Matrix Interference
R	=	RPD outside accepted recovery limits
S	=	Spike recovery outside recovery limits
Surr	=	Surrogate

DF = Dilution Factor RL = Reporting Limit ST = Sample Type MDL = Method Detection Limit

SAMPLE TYPES

A	=	Analyte
I	=	Internal Standard
S	=	Surrogate
T	=	Tentatively Identified Compound (TIC, concentration estimated)

QC SAMPLE IDENTIFICATIONS

MBLK	=	Method Blank	ICSA	=	Interference Check Standard "A"	OPR	=	Ongoing Precision and Recovery Standard
DUP	=	Method Duplicate	ICSAB	=	Interference Check Standard "AB"			
LCS	=	Laboratory Control Sample	LCSD	=	Laboratory Control Sample Duplicate			
MS	=	Matrix Spike	MSD	=	Matrix Spike Duplicate			
ICB	=	Initial Calibration Blank	CCB	=	Continuing Calibration Blank			
ICV	=	Initial Calibration Verification	CCV	=	Continuing Calibration Verification			
PDS	=	Post Digestion Spike	SD	=	Serial Dilution			

CERTIFICATIONS

Below is a list of certifications maintained by the Microbac Merrillville Laboratory. All data included in this report has been reviewed for and meets all project specific and quality control requirements of the applicable accreditation, unless otherwise noted. Complete lists of individual analytes pursuant to each certification below are available upon request.

- Illinois EPA for the analysis wastewater and solid waste in accordance with the requirements of the National Environmental Laboratory Accreditation Program [NELAP] (accreditation #100435)
- Illinois Department of Public Health for the microbiological analysis of drinking water (registry #175458)
- Indiana DEM approved support laboratory for solid waste and wastewater analyses
- Indiana SDH for the chemical analysis of drinking water (lab #C-45-02)
- Indiana SDH for the microbiological analysis of drinking water (lab #M-45-08)
- Kentucky EPPC for the analysis of samples applicable to the Underground Storage Tank program (lab #0061)
- North Carolina DENR for the environmental analysis for NPDES effluent, surface water, groundwater, and pretreatment regulations (certificate #597)
- Wisconsin DNR for the chemical analysis of wastewater and solid waste (lab #998036710)

MICROBAC LOCATIONS

Corporate	-	Wexford, PA	**Camp Hill Division**	-	Camp Hill, PA
Pittsburgh Division	-	Warrendale, PA	**Knoxville Division**	-	Maryville, TN
Erie Division	-	Erie, PA / Wilkes-Barre, PA	**Venice Division**	-	Venice, FL / Fort Myers, FL
New Castle Division	-	New Castle, PA	**South Carolina Division**	-	New Ellenton, SC
Kentucky Testing Division	-	Louisville, KY / Evansville, IN	**Fayetteville Division**	-	Fayetteville, NC
Massachusetts Division	-	Marlboro, MA	**Southern Testing Division**	-	Wilson, NC
Gascoyne Division	-	Baltimore, MD	**Hauser Division**	-	Boulder, CO
Corona Division	-	Corona, CA	**Friend Laboratory**	-	Waverly, NY
South Jersey Division	-	Turnersville, NJ			

COOLER INSPECTION

Date: Wednesday, October 18, 2006

Client Name SPECIALTY EARTH SCIENC

Date / Time Received: 10/4/2006 10:00:00 AM

Work Order Number ME0610148

Received by: DP

Checklist completed by DP | 10/4/2006 4:47:44 PM

Reviewed by DG | 10/5/2006 3:35:49 PM

Carrier name: UPS

After-Hour Arrival?	Yes ☐	No ☑	
Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shippping container/cooler?	Yes ☐	No ☐	Not Present ☑
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody included sufficient client identification?	Yes ☑	No ☐	
Chain of custody included sufficient sample collector information?	Yes ☑	No ☐	
Chain of custody included a sample description?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Chain of custody identified the appropriate matrix?	Yes ☑	No ☐	
Chain of custody included date of collection?	Yes ☑	No ☐	
Chain of custody included time of collection?	Yes ☑	No ☐	
Chain of custody identified the appropriate number of containers?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Chain of custody identified the appropriate preservatives?	Yes ☑	No ☐	
Samples properly preserved?	Yes ☑	No ☐	

If No, adjusted by? _____ Date/Time _____

Chain of custody included the requested analyses?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Samples received on ice?	Yes ☐	No ☑

Container/Temp Blank temperature Temp: ℃

VOA vials have zero headspace? No VOA vials submitted ☑ Yes ☐ No ☐

ANY "NO" EVALUATION (excluding After-Hour Receipt) REQUIRES CLIENT NOTIFICATION.

General Comments:Samples were received and shipped directly from Indy to a contract lab. They were not received in Merrillville.

Sample ID	Client Sample ID	Comments
ME0610148-01A	SVE #1 SA	
ME0610148-02A	SVE #1 SB	
ME0610148-03A	SVE #1 DA	
ME0610148-04A	SVE #1 DB	
ME0610148-05A	SVE #3 A	
ME0610148-06A	SVE #3 B	
ME0610148-07A	SVE #2 SA	
ME0610148-08A	SVE #2 SB	
ME0610148-09A	SVE #2 DA	
ME0610148-10A	SVE #3 DB	

ME06 10148 SPECIALTY EARTH SCIENC 10/18/2006
Attica P.S. / Attica, IN
Jason Swearingen
DG

Microbac

Samples Submitted to:
[ ] 250 West 84th Drive, Merrillville, IN 46410, Tel: 219-769-8378, Fax: 219-769-1664
[ ] 5713 West 85th Street, Indianapolis, IN 46278, Tel: 317-872-1375, Fax: 317-872-1379

Chain of Custody Record

Number 70927

Instructions on back

Client Name: Specialty Earth Sciences
Address: 10435 Lambs Ridge Rd.
City, State, Zip: Elizabeth, IN 47117
Contact: Jason Swearingen
Telephone #: 812-969-3480

Project: Attica P.S.
Location: Attica, IN
PO #:
Compliance Monitoring? [ ] Yes(1) [ ] No
(1)Agency/Program

Turnaround Time:
[✓] Routine (~~7 working days~~) 10-12 business days
[ ] RUSH* (notify lab) 8 10/4/06
(needed by)

Report Type:
[ ] Results Only
[✓] Level II
[ ] Level III
[ ] Level III CLP-like
[ ] Level IV
[ ] Level IV CLP-like
[ ] EDD

Sampled by (PRINT): Joe Schmitt
Sampler Signature: Joe Schmitt
Sampler Phone #: 317-346-4050
Send Report via: [ ] Mail [ ] Telephone [ ] Fax (fax #) [ ] e-mail (address) jswearin@seesciences.com

* Matrix Types: Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)
** Preservative Types: (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

Client Sample ID	Matrix*	Grab	Composite	Filtered	Date Collected	Time Collected	No. of Containers	Requested Analyses → Preservative Types **	TO-15								For Lab Use Only 061014 8
SUE #1SA					9-25-06	12:30p.m.	1	None	✓								01-A
SUE #1SB					9-26-06	6:00a.m.	1		✓								02-A
SUE #1DA					9-26-06	11:30a.m.	1		✓								03-A
SUE #1DB					9-27-06	6:15a.m.	1		✓								04-A
SUE #3A					9-27-06	12:15a.m.	1		✓								05-A
SUE #3B					9-28-06	6:15a.m.	1		✓								06-A
SUE #2SA					9-28-06	12:25p.m.	1		✓								07-A
SUE #2SB					9-29-06	6:00a.m.	1		✓								08-A
SUE #2DA					9-29-06	10:50a.m.	1		✓								09-A
SUE #2DB					9-30-06	6:00a.m.	1		✓								10-A

Possible Hazard Identification: [ ] Hazardous [✓] Non-Hazardous [ ] Radioactive
Sample Disposition: [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments

Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
[signature]	Oct 4, 2006 8:00 a.m.	[signature]	10/4/06 0800
		Received for Lab By (signature): [signature]	10-4-06

Sample temperature upon receipt in degrees C =

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Samples Submitted to:
[ ] 250 West 84th Drive, Merrillville, IN 46410, Tel: 219-769-8378, Fax: 219-769-1664
[X] 5713 West 85th Street, Indianapolis, IN 46278, Tel: 317-872-1375, Fax: 317-872-1379

Chain of Custody Record

Number 70821

Instructions on back Sub Chain

Client Name Microbac Laboratories	**Project** Athich P.S. (SES)	**Turnaround Time**	**Report Type**
Address 5713 W. 85th St.	**Location**	[X] Routine (~~7 working days~~) 10 working days	[ ] Results Only [X] Level II
City, State, Zip Indianapolis, IN 46278	**PO #**	[ ] RUSH* (notify lab)	[ ] Level III [ ] Level III CLP-like
Contact Danielle Griffiths	Compliance Monitoring? [ ] Yes(1) [ ] No	_____ (needed by)	[ ] Level IV [ ] Level IV CLP-like
Telephone # 317-872-1375	(1)Agency/Program		[ ] EDD

Sampled by (PRINT) Client **Sampler Signature** _____ **Sampler Phone #** _____

Send Report via [ ] Mail [ ] Telephone [ ] Fax (fax #) _____ [ ] e-mail (address) dariffiths@microbac.com

* **Matrix Types:** Soil/Solid (S), Sludge, Oil, Wipe, Drinking Water (DW), Groundwater (GW), Surface Water (SW), Waste Water (WW), Other (specify)

** **Preservative Types:** (1) HNO3, (2) H2SO4, (3) HCl, (4) NaOH, (5) Zinc Acetate, (6) Methanol, (7) Sodium Bisulfate, (8) Sodium Thiosulfate, (9) Hexane, (U) Unpreserved

Client Sample ID	Matrix*	Grab	Composite	Filtered	Date Collected	Time Collected	No. of Containers	Requested Analyses → Preservative Types ** ↓	TO-15								For Lab Use Only 06/10146
SVE #1 SA	A	X			9/25/06	1230	1	U	X								01-A
SVE #1 SB					9/26/06	0600											02-A
SVE #1 DA					↓	1130											03-A
SVE #1 DB					9/27/06	0615											04-A
SVE #3A					↓	1215											05-A
SVE #3B					9/28/06	0615											06-A
SVE #2SA					↓	1225											07-A
SVE #2SB					9/29/06	0600											08-A
SVE #2DA					↓	1050											09-A
SVE #2DB	↓	↓			9/30/06	0600	↓	↓	↓								10-A

Possible Hazard Identification [ ] Hazardous [ ] Non-Hazardous [ ] Radioactive **Sample Disposition** [ ] Dispose as appropriate [ ] Return [ ] Archive

Comments	Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
STD EDD NEEDED. Quote # 0609790	[signature]	10/4/06 0900		
TO-15 Direct Inject @ $125/sample	Relinquished By (signature)	Date/Time	Received By (signature)	Date/Time
1L Summa Rented @ $20/can				
	Relinquished By (signature)	Date/Time	Received for Lab By (signature)	Date/Time
Sample temperature upon receipt in degrees C =			[signature]	10-4-06

rev. 11/04/04

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