



PHASE II LIMITED SUBSURFACE INVESTIGATION

**MIDWAY MOTEL
(BROWNFIELD SITE #4140806)
2007 NORTH MAIN STREET
CLOVERDALE, INDIANA**

CARDNO ATC PROJECT NO. 170IFA0001

BROWNFIELD SITE # #4140806

July 22, 2015

Prepared For:

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Re: Phase II Limited Subsurface Investigation
Midway Motel (Brownfield Site #4140806)
2007 North Main Street
Cloverdale, Indiana
Brownfield Site #4140806
Cardno ATC Project No.: 170IFA0001

Dear Ms. Robertson Habeck:

Cardno ATC is pleased to provide the Indiana Brownfields Program with this report documenting a Phase II Limited Subsurface Investigation (LSI) that was conducted at the Former Midway Motel, located at 2007 North Main Street in Cloverdale, Indiana. The work performed, findings and conclusions of the LSI are provided in this submittal. The work and all documents prepared during this LSI were funded through the Small Business Liability Relief and Brownfields Revitalization Act, U.S. EPA CERCLA Section 128(a) State Response Program Cooperative Agreement #RP-00E14607-0 Indiana Brownfields Program.

We appreciate the opportunity to be of service to you on this project. Please contact either of the undersigned if you have any questions or comments.

Sincerely,



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Enc: Phase II Limited Subsurface Investigation

Table of Contents

1.0	Introduction	1
1.1	Background Information	1
1.2	Phase II Limited Subsurface Investigation	1
2	Site Characteristics	3
2.1	Site Description	3
2.2	Hydrogeologic Setting	3
3	Work Performed	4
3.1	Drilling Activities	4
3.2	Soil Investigation	4
3.3	Groundwater Investigation	5
4	Findings	7
4.1	Hydrogeology and Soil Screening Results	7
4.2	Soil Analytical Results	7
4.2.1	Metals	8
4.2.2	PCBs	8
4.2.3	VOCs	8
4.2.4	SVOCs	8
4.3	Groundwater Analytical Results	8
4.3.1	Metals	9
4.3.2	VOCs	9
4.3.3	SVOCs	9
5	Conclusions	10
6	Qualifications	11

Tables

Table 1 -	Soil Boring Survey Locations & Temporary Well Gauging Data
Table 2 -	Soil Analytical Results Summary
Table 3 -	Comparison of XRF and Laboratory Results
Table 4 -	Groundwater Analytical Results Summary

Figures

Figure 1 -	Site Vicinity Map
Figure 2 -	Site Plan
Figure 3 -	Potentiometric Surface Map

Appendices

Appendix A -	Soil Boring Logs & Field Screening Results
Appendix B -	Groundwater Sampling Logs
Appendix C -	Soil and Groundwater Laboratory Analytical Reports

1.0 Introduction

Cardno ATC was retained by the Indiana Brownfields Program (the Program) to perform a Phase II Limited Subsurface Investigation (LSI) at the Former Midway Motel, located at 2007 North Main Street in Cloverdale, Indiana, herein referred to as (“the site”). A Vicinity Map depicting the site location is included as **Figure 1** and a site plan is included as **Figure 2**.

1.1 Background Information

The site consists of an approximate four acre plot of land with two dilapidated buildings. The former Midway Motel sits on the north end of the site with a former restaurant located to the south. The land between the two buildings is covered with a mixture of grass and gravel with a concrete parking area on the north side of the restaurant.

A September 30, 2014 Phase I Environmental Site Assessment, completed by American Environmental Corporation identified the following *recognized environmental conditions* (RECs) at the site:

- The property has been used for vehicle maintenance that was conducted on bare ground.
- Several areas at the site are littered with oil containers, paint cans and truck tires.

In addition to the two RECs identified above, the Phase I also identified a *historical recognized environmental condition* (HREC) that involved a release of unknown materials associated with the Indiana State Police dismantling of a former methamphetamine laboratory that was being operated at the site. Cardno ATC’s review of available files maintained by the Indiana State Police indicate the methamphetamine laboratory was located primarily in a horse trailer, with solvents being stored in Room #5 and acid in a metal shed outside Room #5.

Interviews of persons with knowledge of the historic operations at the site indicate automotive repair was performed in the gravel/grass covered areas between the two abandoned buildings. Fluids from the vehicles were routinely discharged to the ground surface along with miscellaneous automotive parts and debris. Additionally, the area of heavy vegetation along the west property boundary is suspected to be an area where a damaged sewer line is discharging wastewater to the surface. The increased surface moisture has resulted in the vegetative growth in this area.

The work and all documents prepared during this investigation were completed in accordance with the May 22, 2015 *Sampling and Analysis Plan, Revision 1* and the May 21, 2015 *Quality Assurance Project Plan, Revision 1*, which was approved by the US EPA on May 29, 2015. The procedures, findings, and conclusions of the Phase II LSI are discussed in the following sections. Following characterization and remedial action, if applicable, the Site will be redeveloped for commercial purposes.

1.2 Phase II Limited Subsurface Investigation

Between May 27 and June 3, 2015 Cardno ATC completed a Phase II LSI to further evaluate RECs identified in the September 30, 2014 Phase I Environmental Site Assessment, completed by American

Environmental Corporation. The Phase II LSI included the collection of 127 soil sample intervals from 22 soil borings advanced to depths ranging from 5 to 36 feet below ground surface (ft-bgs). Eleven of the soil borings were completed as temporary monitoring wells. Forty-four soil samples and eleven groundwater samples were retained for laboratory analysis to characterize the soil and groundwater quality beneath the site.

Based on the findings of the Phase II LSI, the subsurface soil consists primarily of brown, moist, silty clay to depths ranging from 5 to 36 ft-bgs. The silty clay was underlain by sandstone bedrock. Groundwater was observed in the temporary monitoring wells at depths ranging between 2 and 10 ft-bgs.

The results of the analyses performed on soil samples collected during the Phase II LSI indicate only one constituent of concern (CoC), arsenic, was present at concentrations exceeding the Indiana Department of Environmental Management's Remediation Closure Guide Residential Screening Levels (IDEM RCG RSL). The concentration of arsenic detected in the samples screened using the XRF and the samples analyzed by the laboratory are likely within the range of natural background concentrations and do not represent a release to the subsurface environment. If it is necessary to determine if the arsenic concentrations are representative of the natural background concentration, additional soil samples collected from an area unaffected by historical operations may be warranted.

The analysis of the groundwater samples did not indicate the presence of any CoCs at concentrations exceeding the IDEM RCG Tap Residential Screening Level (TRSL).

With the understanding that the intended future use of the site is to be as commercial and/or industrial land, the results of the Phase II LSI do not indicate an unacceptable risk to human health or the environment.

2 Site Characteristics

2.1 Site Description

The site is an approximate four acre plot of land along the east side of U.S 231, just north of Interstate 70 in Cloverdale, Putnam County, Indiana. The site is located in a mixed commercial and residential area on the northeast side of Cloverdale, and bounded by the Retired Military Garden & Gifts to the west (across U.S. 231) and Cloverdale AG Center to the north. The Indiana Department of Transportation, Cloverdale Sub District 615 bounds the site to the east and a cellular tower is located immediately to the south. No other buildings, structures or businesses reside in the area.

The former Midway Motel building sits on the north end of the site and a former restaurant is located to the south. The land between the two buildings is covered with a mixture of grass and gravel with a concrete parking area on the north side of the restaurant. A gravel covered parking area is located immediately north of the former motel building and a concrete pad is present immediately south of the former motel. A localized area of heavy vegetation along the west property boundary is suspected to be an area where a damaged sewer line is discharging wastewater to the surface. The increased soil moisture has resulted in the vegetative growth in this area.

A Vicinity Map is provided as **Figure 1**, and a Site Plan is provided as **Figure 2**.

2.2 Hydrogeologic Setting

The Cloverdale, Indiana Quadrangle Topographic Map (USGS, 1986) indicates the ground surface has an elevation of approximately 904 ft above mean sea level (MSL). The topography of the site, which is located on McCoy Hill, is generally flat with steep slopes along the south and west property boundaries. Surface drainage on the site appears to be towards constructed drains along U.S. 231, located along the western site boundary and drain towards Ferguson Branch, which is located approximately 2,600 feet southwest of the property.

The U.S. Department of Agriculture Soil Survey of Putnam County classifies the soil at the site as Iva silt loam complex. The Iva silt loam complex consists of nearly level, deep, and somewhat poorly drained soil and is on broad ridgetops of the uplands. Mississippian age, Blue River Group (limestone) and Pennsylvanian age Raccoon Creek Group (shale and sandstone) forms the bedrock below the site. The surface of the bedrock has an elevation of approximately 830 ft above MSL and dips to the southwest in the study area.

3 Work Performed

3.1 Drilling Activities

Prior to the start of the field activities, underground utilities were marked by the Indiana Underground Plant Protection Service. Cardno ATC reviewed the location of marked underground utilities and moved soil boring locations as necessary to avoid potentially contacting underground utilities. Additionally, a property-specific health and safety plan was prepared and reviewed with all field personnel before commencing with the field activities.

The drilling activities included the advancement of 22 soil borings (GP-1 through GP-22) to depths ranging from 5 to 36 feet below ground surface (ft-bgs). Each boring was initially advanced using a stainless steel hand auger to a maximum depth of approximately 4 ft-bgs to minimize the potential hazards associated with buried utilities. The soil borings were then advanced further and soil samples collected continuously in four foot intervals to the desired depth using a track mounted 8040DT Geoprobe® drill rig equipped with 5-foot long, nominal 2-inch diameter Macro core® samplers. The Macro-core samplers were equipped with new plastic internal liners prior to collection of each sample.

3.2 Soil Investigation

The soil samples were collected in plastic liners that were retrieved at the ground surface. When the Geoprobe® sample liners were opened, the Cardno ATC geologist immediately collected a sub-sample from each 2 ft interval for potential laboratory analysis using Terra Core Samplers (US EPA Method 5035A (Indiana Modified)) and laboratory-supplied 4 ounce jars. A second sub-sample (field aliquot) was placed into sealable plastic bags to be analyzed in the field using a photo-ionization detector (PID), which measures total photo-ionizable vapors (TPVs); and a Thermo Scientific Niton XRF analyzer capable of quantifying concentrations of numerous metals.

A Cardno ATC geologist classified each soil sample in accordance with the Unified Soil Classification System (USCS), and visually inspected each soil sample in the field for physical evidence of environmental impact such as staining, odors, free product, etc. Soil boring logs documenting the soil classification and field screening results are provided in **Appendix A**.

Two soil samples were retained for laboratory analysis from each of the soil borings. The samples retained for analysis included the surface interval (0 to 2.0 ft) and the subsurface sample interval exhibiting the greatest potential for being impaired (i.e., highest TPV and/or XRF reading, staining, odors, etc.). If no evidence of impact was observed in the subsurface soil, the sample selected for laboratory analysis was the deepest soil sample interval collected from above the water table.

The soil samples retained for laboratory analysis were analyzed for the following parameters:

- Volatile organic compounds (VOCs), using US EPA SW-846 Methods 8260,
- Semi-volatile organic compounds (SVOCs), using US EPA SW-846 Method 8270
- Polychlorinated biphenyls (PCBs) using US EPA SW-846 Method 8082

- To confirm the results of the XRF field analysis, Cardno ATC submitted 10 percent of the sample intervals (127 sample intervals resulted in 13 soil samples being retained and analyzed) for the Resource Conservation and Recovery Act (RCRA) metals using US EPA Method 6010B/7471.

Because the field screening data collected using the XRF is to be utilized for definitive level site characterization of the metal concentrations in the soil, ten percent of the samples screened using the XRF were retained for laboratory confirmation analysis based on the recorded lead or arsenic concentrations. Because lead was detected by the XRF in only three samples, and all the recorded lead concentrations in all three samples was less than the IDEM RCG SLs, Cardno ATC used the XRF recorded arsenic concentrations to determine which samples were retained for laboratory confirmation analysis as described below:

- Eight of the samples (10%) that screened at concentrations less than 70% of the IDEM RCG Screening Level for Residential Direct Contact for arsenic (less than 6.6 mg/kg) to confirm that concentrations are in fact, below the site action levels.
- Five of the samples (10%) that screened at concentrations exceeding the IDEM RCG Screening Level for Residential Direct Contact for arsenic (greater than 9.4 mg/kg) to confirm that concentrations are, in fact, greater than the site action levels.

Please note that the scope included the analysis of ten percent of the samples that screen at concentrations of between 70% and 100% of the IDEM RCG Screening Level for Residential Direct Contact for arsenic (between 6.6 mg/kg and 9.4 mg/kg); however, none of the field aliquot samples exhibited arsenic concentrations within this range.

3.3 Groundwater Investigation

After completion of soil boring and soil sampling activities, a temporary monitoring well was installed in eleven of the soil borings (GP-1, GP-2, GP-3, GP-5, GP-6, GP-10, GP-13, GP-15, GP-18, GP-20 and GP-22). The temporary monitoring wells were constructed of 1 inch diameter PVC casing and ten feet of 1-inch diameter, 0.010-inch slotted well screen. As feasible, a sand pack filter was placed around the well screen and a minimum 2 ft thick bentonite seal was placed above the sand pack zone.

Prior to groundwater sampling, the depth to water was measured in each well and recorded on groundwater sampling logs. The sampling logs are included in **Appendix B**. Groundwater samples were collected using a low flow/low stress sampling methodology as described in the IDEM Technical Memorandum *Micro-Purge Sampling for Monitoring Wells*, dated January 8, 2003. Due to very poor groundwater recharge during the sampling activities all of the temporary monitoring wells, with the exception of GP-2, exhibited significant drawdown. Therefore, Cardno ATC collected the water samples from those temporary wells using a disposable bailer after the wells had recharged after being purged dry. The water samples were placed in appropriate sample containers, labeled with a unique identification, placed in a cooler and transported to Pace Analytical laboratory using the appropriate chain-of-custody controls.

The eleven groundwater samples were analyzed for the following parameters:

- VOCs, using US EPA SW-846 Methods 8260,
- SVOCs, using US EPA SW-846 Method 8270/8270SIM

- RCRA Metals using US EPA Method 6010B/7470

The location and elevation of each temporary monitoring well was surveyed relative to the Indiana State Plane East, NAVD 88 Coordinate System. The easting and northing coordinates and elevation of each monitoring well is provided in **Table 1**. After the water level within each well was gauged and samples were collected, a licensed water-well driller properly abandoned each temporary well.

4 Findings

4.1 Hydrogeology and Soil Screening Results

The subsurface soil consisted primarily of brown, moist, silty clay (USCS Classification – CL) beneath the ground cover (topsoil, gravel, asphalt) to depths ranging from 5 to 36 ft-bgs. The silty clay was underlain by sandstone bedrock, which was encountered in soil borings GP-18 (15 ft-bgs), GP-20 (14 ft-bgs) and GP-22 (10 ft-bgs).

The depth at which groundwater was observed in the temporary monitoring wells ranged between 2 and 10 ft-bgs. The measured depth-to-water and calculated potentiometric surface elevation at each temporary monitoring well are provided on **Table 2** and **Figure 3**. Based on the depth to groundwater measurements recorded prior to the collection of the groundwater samples, the apparent groundwater flow direction is toward the southwest.

The field screening results recorded TPV readings between 0.0 ppm and 1,113 ppm (GP-16(0-2)). The samples exhibiting elevated PID reading from each soil boring were retained for laboratory analysis. The XRF field screening evaluated each sample interval for the following elements: sulphur, potassium, calcium, scandium, titanium, vanadium, chromium, manganese, iron, cobalt, nickel, copper, zinc, arsenic, selenium, rubidium, strontium, zirconium, molybdenum, tungsten, silver, mercury, lead, thorium and uranium. The results of the XRF field screening analysis are summarized **Appendix A**.

4.2 Soil Analytical Results

The soil samples were analyzed within the established holding times using U.S. EPA-approved Methods as described in the EPA publication, Test Methods for Evaluation of Solid Wastes, Physical/Chemical Methods (SW-846, 3rd Edition, Update III). The Method Detection Limits (MDLs) and Estimated Quantification Limits (EQLs) were low enough to determine if the reported CoC concentrations, if any, are in excess of the IDEM's Remediation Closure Guide (RCG) Screening Levels. Quality Assurance/Quality Control (QA/QC) was performed in accordance with the RCG, and in accordance with the full data package criteria

The soil analytical results were compared to the RCG screening levels (SLs-updated March 2015):

- Direct Contact – residential (IDEM RCG RSL),
- Migration to Groundwater – residential (IDEM MTG RSL)
- Direct Contact – commercial/industrial (IDEM RCG CISL),
- Direct Contact – excavation (IDEM RCG ESL).

The results of the laboratory analyses and the comparison to the above-referenced IDEM RCG SLs are summarized in **Table 3**, and are included on **Figure 4**. A copy of the laboratory certificate of analysis is provided in **Appendix C**.

4.2.1 **Metals**

One hundred and twenty-seven discrete soil samples were analyzed in the field for metals using a Thermo-Scientific Niton XRF analyzer. The thirteen soil samples retained for laboratory confirmation analysis included eight samples (GP-1(0-2), GP-2(0-2), GP-6(4-6), GP-10(0-2), GP-18(4-6), GP-19(0-2), GP-21(0-2) and GP-22(0-2)) that the XRF did not detect arsenic concentrations above the lower quantification limit, which was generally between 8 parts per million (ppm) and 13 ppm. The remaining five soil samples retained for laboratory confirmation analysis included GP-3(0-2), GP-6(0-2), GP-13(4-6), GP-16(0-2) and GP-17(0-2), which the XRF recorded arsenic concentrations between 11 ppm and 14 ppm.

The results of the laboratory confirmation analysis for metals indicate only arsenic was detected in one or more soil samples at a concentration exceeding the IDEM RCG screening level for residential land. All thirteen soil samples exhibited quantifiable arsenic concentrations, which ranged between 4.9 mg/kg and 9.8 mg/kg. Two of the samples, GP-10(0-2) (9.8 mg/kg) and GP-21(0-2) (9.7 mg/kg) exhibited arsenic concentrations that exceeded the IDEM RCG RSL of 9.4 mg/kg. No samples screened or analyzed by the laboratory exhibited a metal concentration exceeding the IDEM RCG CISL.

As summarized in **Table 4**, the comparison of the XRF screening results to the laboratory confirmation results did not indicate a correlation coefficient sufficient to allow the study to rely on the XRF screening data for definitive level site characterization. The low correlation coefficient is likely the results of the large number of samples where arsenic was not detected by the XRF and the laboratory analysis reported concentrations of arsenic below the lower quantification limit value of the XRF.

4.2.2 **PCBs**

Forty-four discrete soil samples were retained for laboratory analysis for PCBs. The results of the analysis did not indicate the presence of PCBs at concentrations above the laboratory reporting limits.

4.2.3 **VOCs**

Forty-four discrete soil samples were retained for laboratory analysis for VOCs. The results of the analysis did not indicate the presence of VOCs at concentrations above the laboratory reporting limits.

4.2.4 **SVOCs**

Forty-four discrete soil samples were retained for laboratory analysis for SVOCs. The results of the analysis did not indicate the presence of SVOCs at concentrations above the laboratory reporting limits.

4.3 **Groundwater Analytical Results**

The groundwater samples were analyzed within the established holding times using U.S. EPA-approved Methods as described in the EPA publication, Test Methods for Evaluation of Solid Wastes, Physical/Chemical Methods (SW-846, 3rd Edition, Update III). The MDLs and EQLs were low enough to determine if the reported CoC concentrations, if any, are in excess of the IDEM's RCG Screening Levels. QA/QC was performed in accordance with the RCG, and in accordance with the full data package criteria. The groundwater analytical results were compared to three IDEM RCG screening levels:

- Tap – residential (IDEM RCG TRSL),

- Vapor exposure – residential (VE RSL), and
- Vapor exposure – commercial/industrial (VE CISL).

The groundwater analytical results and comparison to the IDEM RCG SLs are summarized in **Table 5**. A copy of the laboratory certificate of analysis is provided in **Appendix C**.

4.3.1 **Metals**

Eleven groundwater samples were analyzed for the eight RCRA Metals. Only barium was detected in the groundwater at concentrations greater than the laboratory reporting limits. No metals were detected at concentrations exceeding the IDEM RCG TRSL.

4.3.2 **VOCs**

All eleven groundwater samples were analyzed for VOCs; however, no VOCs were detected at concentrations above the laboratory reporting limit.

4.3.3 **SVOCs**

All eleven groundwater samples were analyzed for SVOCs; however, no SVOCs were detected at concentrations above the laboratory reporting limit.

5 Conclusions

Cardno ATC conducted a Phase II LSI at the site to further evaluate RECs identified in the September 30, 2014 Phase I Environmental Site Assessment, completed by American Environmental Corporation. The Phase II LSI included the collection of 127 soil sample intervals from 22 soil borings advanced to depths ranging from 5 to 36 ft-bgs. Eleven of the soil borings were completed as temporary monitoring wells. Forty-four soil samples and eleven groundwater samples were retained for laboratory analysis to characterize the soil and groundwater quality beneath the site.

Based on the findings of the Phase II LSI, the subsurface soil consists primarily of brown, moist, silty clay to depths ranging from 5 to 36 ft-bgs. The silty clay was underlain by sandstone bedrock. Groundwater was observed in the temporary monitoring wells at depths ranging between 2 and 10 ft-bgs.

The results of the analyses performed on soil samples collected during the Phase II LSI indicate only one CoC, arsenic, was present at concentrations exceeding the IDEM RCG RSL. Specifically, samples GP-10(0-2) (9.8 mg/kg) and GP-21(0-2) (9.7 mg/kg) exhibited arsenic concentrations that exceeded the IDEM RCG RSL of 9.4 mg/kg. The concentration of arsenic detected in the samples screened using the XRF and the samples analyzed by the laboratory are likely within the range of natural background concentrations and do not represent a release to the subsurface environment. If it is necessary to determine if the arsenic concentrations are representative of the natural background concentration, additional soil samples collected from an area unaffected by historical operations may be warranted.

The analysis of the groundwater samples did not indicate the presence of any CoCs at concentrations exceeding the IDEM RCG TRSL.

With the understanding that the intended future use of the site is to be as commercial and/or industrial land, the results of the Phase II LSI do not indicate an unacceptable risk to human health or the environment.

6 Qualifications

The work performed in conjunction with this assessment, and the data developed, are intended as a description of available information at the dates and locations given. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type, or at a location not investigated, nor against future operations or conditions.

The present study included the collection of soil and groundwater samples collected from the twenty-two soil borings and eleven temporary monitoring wells advanced at the site. The conclusions drawn from this investigation are considered reliable; however, there may exist localized variations in subsurface conditions that have not been completely defined at this time.