REMEDIATION WORK PLAN

CITY OF SOUTH BEND
DEPARTMENT OF COMMUNITY AND ECONOMIC DEVELOPMENT
SOUTH BEND, INDIANA

FORMER OLIVER PLOW WORKS
VRP #6001202
South Bend, Indiana

Envirocorp Project No. 80D2468

May 2002

Prepared And Submitted By:

ENVIROCORP, INC.
South Bend, Indiana

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1.0 EXECUTIVE SUMMARY

The Former Oliver Plow Works site was recently obtained by the South Bend Redevelopment Commission as a classic brownfields site. The site is located in the middle of South Bend, was vacated in 1984, and is currently populated with buildings that are not suited to current commercial or industrial use. The intent of the commission is to repair any property damage that had occurred and provide for the reuse of the site.

The potential source for the impacted soils at the site is the former operation of the Oliver Plow Works and/or White Farm, which occurred before the property was obtained by the South Bend Redevelopment Commission. See Figure 1 for a map of the area surrounding the site.

The site has not been found to contain any significant concentration of chemicals of concern (COC). The proposed cleanup criteria for the site is to Tier II Non-Residential levels for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Resource Conservation Recovery Act (RCRA) metals, and polychlorinated biphenyls (PCBs) as listed in Section 3. The potential exposure pathways include skin contact with surficial and subsurface soils, ingestion of soils and groundwater, and inhalation of vapors or particulate matter. It is proposed that the confirmation sampling event be conducted at this site in lieu of any additional investigation.

2.0 INTRODUCTION

2.1 Site Background

2.1.1 Site Location and History

A. Facility Name and Address

Former Oliver Plow Works (Former White Farm and Allied Products)
533 South Chapin Street
South Bend, Indiana

See Figure 1 for Area Map

B. Facility Description

The site currently contains 29 buildings and several smaller buildings and ancillary structures. The only buildings currently occupied are the first floors of Buildings 29 and 29A, used by Jamil Packaging Corporation for warehouse space. Building 1 was most recently used by the City of South Bend for welfare services. The buildings and the subsurface utilities, excluding the former power house and foundry building, are scheduled for demolition prior to the confirmation sampling event.

C. Site Map

Please note that all structures, foundations, and subsurface features, except for the two buildings indicated on the map, are slated for demolition and removal from the site before the confirmation sampling event. See Figure 2 for the site map prior to demolition, and Figure 3 for the site map after demolition.

D. Brief Summary of Site History/Activities Leading up to Work Plan

Three previous environmental investigations have been conducted on the subject property. In August 1988, Roy F. Weston, Inc. (Weston) conducted an "Environmental Liabilities Assessment" of the site for Allied Products Inc.; South Bend, Indiana. The 1988 assessment noted three underground storage tanks (USTs) on the southwest portion of the site, and hazardous waste storage on the northeast portion of the site. A proposal for sampling of the soils and groundwater was also presented in this document.

Weston later conducted a "Phase II Environmental Liabilities Assessment" and another "Environmental Liabilities Assessment" of the site for Allied Products in January 1990. Information from these two documents indicate each of the USTs noted in the 1988 report had been removed with no soil sampling and all of the hazardous waste noted in 1988 had been removed. The soil samples obtained by Weston from the former UST area on the southwest portion of the site were noted to have a number of chlorinated compounds and elevated levels of total petroleum hydrocarbons (TPH). Low levels of chlorinated compounds were noted in the former tank pit north of Building 21B.

In August 1992, Chemical Waste Management, Inc., (ENRAC Division) conducted a PCB removal operation on the transformer pad located south of Building 30, the power plant. All transformers were drained of PCB-containing fluids. Approximately 264.53 tons of soil was removed at the time due to PCB contamination.

Envirocorp performed a Phase I "due diligence" investigation of the site for the City of South Bend in 1998. A number of "Recognized Environmental Conditions" (RECs) were noted during this investigation, including the former UST areas, potential hazardous waste storage areas, and areas with stained soils.

A Phase II Site Assessment was performed by Envirocorp in the fall of 1999, to address the RECs noted in the Phase I. This investigation also included an asbestos survey of the buildings at the site, as well as, the installation of 41direct push soil borings, a trenching investigation of near surface soils in areas identified by an anonymous former employee of Oliver Plow as locations of illegal dumping of waste paints and solvents, the analysis of select soil samples for volatile organic compounds (VOCs), polynuclear aromatics (PNAs), RCRA metals (silver, arsenic, barium, cadmium, chromium, lead, mercury, and selenium), and PCBs, and sampling analysis of the groundwater for RCRA metals, VOCs, and PNAs.

E. One Mile Radius Map

See Figure 1

2.1.2 Site Documentation

A. Previous Reports

"Environmental Liabilities Assessment for the White Farm Equipment Facility, South Bend, Indiana", August 1988, Roy F. Weston, Inc.

"Phase II Environmental Liabilities Assessment for the White Farm Equipment Facility, South Bend, Indiana", January 1990, Roy F. Weston, Inc.

"Environmental Liabilities Assessment for the White Farm Equipment Facility, South Bend, Indiana", January 1990, Roy F. Weston, Inc.

"Project Summary of Allied Products, South Bend, IN Facility", late 1992, Chemical Waste Management Inc., ENRAC Division.

"Phase I Environmental Site Assessment, Oliver Plow Works", September, 1997, Envirocorp Services & Technology, Inc.

"Phase II Site Assessment, Former Oliver Plow Works," December, 1999, Envirocorp, Inc.

B. Available Data and/or Other Documentation

None available except as noted above.

2.2 Summary of Site Investigation Activities

The site was subjected to investigation activities in the early 1990s and the late 1990s. The investigations, detailed in Section 2.2.1(d), demonstrated that the COCs at the site were not present at levels that would preclude the issuance of a covenant not-to-sue. The latest investigation was focused upon clarifying the nature of the Recognized Environmental Conditions noted in the Phase I. A copy of this report (without analytical report) is included in Attachment A.

2.2.1 Sources and Extent of Contamination

A. Discussions of Potential Sources

The potential source for the impacted soils at the site is the former operation of the Oliver Plow Works and/or White Farm. The impact to the site occurred before the property was obtained by the South Bend Redevelopment Commission, and the intent of the commission is to repair any property damage that had occurred and provide for the reuse of the site.

B. Description of Contaminants of Concern and Concentration Levels

The COCs at this site include VOCs, SVOCs, RCRA metals, and PCBs. The most current determination of the concentrations of the COCs, detailed in Tables 1 and 2, did not exceed the Tier II non-residential cleanup goals in any samples obtained in the Phase II investigation, with the exception of benzo(a)pyrene in a surficial sample at location T-3 and lead from sample at two feet from the boring for MW-8.

C. Contaminant Characteristics

The following information was obtained from the Risk Assessment Information Service web site hosted by Oak Ridge National Laboratory.

1) BENZO(a) PYRENE

Prepared by: Rosemarie A. Faust, Ph.D., Chemical Hazard Evaluation Group, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, Oak Ridge, Tennessee. December 1994.

Benzo[*a*]pyrene is a polycyclic aromatic hydrocarbon (PAH) that can be derived from coal tar. Benzo[*a*]pyrene occurs ubiquitously in products of incomplete combustion of fossil fuels and has been identified in ambient air, surface water, drinking water, waste water, and char-broiled foods (IARC, 1983). Benzo[*a*]pyrene is primarily released to the air and removed from the atmosphere by photochemical oxidation and dry deposition to land or water. Biodegradation is the most important transformation process in soil or sediment (ATSDR, 1990).

Benzo[*a*]pyrene is readily absorbed following inhalation, oral, and dermal routes of administration (ATSDR, 1990). Following inhalation exposure, benzo[*a*]pyrene is rapidly distributed to several tissues in rats (Sun et al., 1982; Weyand and Bevan, 1986). The metabolism of benzo[*a*]pyrene is complex and includes the formation of a proposed ultimate carcinogen, benzo[*a*]pyrene 7,8 diol-9,10-epoxide (IARC, 1983). The major route of excretion is hepatobiliary followed by elimination in the feces (Environmental Protection Agency [EPA], 1991).

No data are available on the systemic (non-carcinogenic) effects of benzo[*a*]pyrene in humans. In mice, genetic differences appear to influence the toxicity of benzo[*a*]pyrene. Subchronic dietary administration of 120 mg/kg benzo[*a*]pyrene for up to 180 days resulted in decreased survival due to hematopoietic effects (bone narrow depression) in a "nonresponsive" strain of mice (i.e., a strain whose cytochrome P-450 mediated enzyme activity is not induced as a consequence of PAH exposure). No adverse effects were noted in "responsive" mice (i.e., a strain capable of inducing increased cytochrome P-450 mediated enzyme activity as a consequence of PAH exposure) (Robinson et al., 1975). Immunosuppression has been reported in mice administered daily intraperitoneal injections of 40 or 160 mg/kg of benzo[*a*]pyrene for 2 weeks, with more pronounced effects apparent in "nonresponsive" mice (Blanton et al., 1986; White et al., 1985). In utero exposure to benzo[*a*]pyrene has produced adverse developmental/reproductive effects in mice. Dietary administration of doses as low as 10 mg/kg during gestation caused reduced fertility and reproductive capacity in offspring (Mackenzie and Angevine, 1981), and treatment by gavage with 120 mg/kg/day during gestation caused stillbirths, resorptions, and malformations (Legraverend et al., 1984). Similar effects have been reported in intraperitoneal injection studies (ATSDR, 1990). Neither a reference dose (RfD) nor a reference concentration (RfC) has been derived for benzo[*a*]pyrene.

Numerous epidemiologic studies have shown a clear association between exposure to various mixtures of PAHs containing benzo[*a*]pyrene (e.g., coke oven emissions, roofing tar emissions, and cigarette smoke) and increased risk of lung cancer and other tumors. However, each of the mixtures also contained other potentially carcinogenic PAHs; therefore, it is not possible to evaluate the contribution of benzo[*a*]pyrene to the carcinogenicity of these mixtures (IARC, 1983; EPA, 1991). An extensive data base is available for the carcinogenicity of benzo[*a*]pyrene in experimental animals. Dietary administration of benzo[*a*]pyrene has produced papillomas and carcinomas of the forestomach in mice (Neal and Rigdon, 1967), and treatment by gavage has produced mammary tumors in rats (McCormick et al., 1981) and pulmonary adenomas in mice (Wattenberg and Leong, 1970). Exposure by inhalation and intratracheal instillation has resulted in benign and malignant tumors of the respiratory and upper digestive tracts of hamsters (Ketkar et al., 1978; Thyssen et al., 1981). Numerous topical application studies have shown that benzo[*a*]pyrene induces skin tumors in several species, although mice appear to be the most sensitive species. Benzo[*a*]pyrene is a complete carcinogen and also an initiator of skin tumors (IARC, 1973; EPA, 1991). Benzo[*a*]pyrene has also been reported to induce tumors in animals when administered by other routes, such as intravenous, intraperitoneal, subcutaneous, intrapulmonary, and transplacental.

2) LEAD

December 1994

Prepared by Kowetha A. Davidson, Ph.D., Chemical Hazard Evaluation and Communication Program, Biomedical and Environmental Information Analysis Section, Health Sciences Research Division, Oak Ridge, Tennessee.

Lead occurs naturally as a sulfide in galena. It is a soft, bluish-white, silvery gray, malleable metal with a melting point of 327.5C. Elemental lead reacts with hot boiling acids and is attacked by pure water. The solubility of lead salts in water varies from insoluble to soluble depending on the type of salt (IARC, 1980; Goyer, 1988; Budavari et al., 1989).

Lead is a natural element that is persistent in water and soil. Most of the lead in environmental media is of anthropogenic sources. The mean concentration is 3.9 ug/L in surface water and 0.005 ug/L in sea water. River sediments contain about 20,000 ug/g and coastal sediments about 100,000 ug/g. Soil content varies with the location, ranging up to 30 ug/g in rural areas, 3000 ug/g in urban areas, and 20,000 ug/g near point sources. Human exposure occurs primarily through diet, air, drinking water, and ingestion of dirt and paint chips (EPA, 1989; ATSDR, 1993).

The efficiency of lead absorption depends on the route of exposure, age, and nutritional status. Adult humans absorb about 10-15% of ingested lead, whereas children may absorb up to 50%, depending on whether lead is in the diet, dirt, or paint chips. More than 90% of lead particles deposited in the respiratory tract are absorbed into systemic circulation. Inorganic lead is not efficiently absorbed through the skin; consequently, this route does not contribute considerably to the total body lead burden (EPA, 1986a).

Lead absorbed into the body is distributed to three major compartments: blood, soft tissue, and bone. The largest compartment is the bone, which contains about 95% of the total body lead burden in adults and about 73% in children. The half-life of bone lead is more than 20 years. The concentration of blood lead changes rapidly with exposure, and its half-life of only 25-28 days is considerably shorter than that of bone lead. Blood lead is in equilibrium with lead in bone and soft tissue. The soft tissues that take up lead are liver, kidneys, brain, and muscle. Lead is not metabolized in the body, but it may be conjugated with glutathione and excreted primarily in the urine (EPA, 1986a,c; ATSDR, 1993). Exposure to lead is evidenced by elevated blood lead levels.

The systemic toxic effects of lead in humans have been well-documented by the EPA (EPA, 1986a-e, 1989a, 1990) and ATSDR (1993), who extensively reviewed and evaluated data reported in the literature up to 1991. The evidence shows that lead is a multitargeted toxicant, causing effects in the gastrointestinal tract, hematopoietic system, cardiovascular system, central and peripheral nervous systems, kidneys, immune system, and reproductive system. Overt symptoms of subencephalopathic central nervous system (CNS) effects and peripheral nerve damage occur at blood lead levels of 40-60 ug/dL, and nonovert symptoms, such as peripheral nerve dysfunction, occur at levels of 30-50 ug/dL in adults; no clear threshold is evident. Cognitive and neuropsychological deficits are not usually the focus of studies in adults, but there is some evidence of neuropsychological impairment (Ehle and McKee, 1990) and cognitive deficits in lead workers with blood levels of 41-80 ug/dL (Stollery et al., 1993).

Although similar effects occur in adults and children, children are more sensitive to lead exposure than are adults. Irreversible brain damage occurs at blood lead levels greater than or equal to 100 ug/dL in adults and at 80-100 ug/dL in children; death can occur at the same blood levels in children. Children who survive these high levels of exposure suffer permanent severe mental retardation.

As discussed previously, neuropsychological impairment and cognitive (IQ) deficits are sensitive indicators of lead exposure; both neuropsychological impairment and IQ deficits have been the subject of cross-sectional and longitudinal studies in children. One of the early studies reported IQ score deficits of four points at blood lead levels of 30-50 ug/dL and one to two points at levels of 15-30 ug/dL among 75 black children of low socioeconomic status (Schroeder and Hawk, 1986).

Very detailed longitudinal studies have been conducted on children (starting at the time of birth) living in Port Pirie, Australia (Vimpani et al., 1985, 1989; McMichael et al., 1988; Wigg et al., 1988; Baghurst et al., 1992a,b), Cincinnati, Ohio (Dietrich et al., 1986, 1991, 1992, 1993), and Boston, Massachusetts (Bellinger et al., 1984, 1987, 1990, 1992; Stiles and Bellinger 1993). Various measures of cognitive performance have been assessed in these children. Studies of the Port Pirie children up to 7 years of age revealed IQ deficits in 2-year-old children of 1.6 points for each 10-ug/dL increase in blood lead, deficits of 7.2 points in 4-year-old children, and deficits of 4.4 to 5.3 points in 7-year-old children as blood lead increased from 10-30 ug/dL. No significant neurobehavioral deficits were noted for children, 5 years or younger, who lived in the Cincinnati, Ohio, area. In 6.5-year-old children, performance IQ was reduced by 7 points in children whose lifetime blood level exceeded 20 ug/dL.

Children living in the Boston, Massachusetts, area have been studied up to the age of 10 years. Cognitive performance scores were negatively correlated with blood lead in the younger children in the high lead group (greater than or equal to 10 ug/dL), and improvements were noted in some children at 57 months as their blood lead levels became lower. However, measures of IQ and academic performance in 10-year-old children showed a 5.8-point deficit in IQ and an 8.9-point deficit in academic performance as blood lead increased by 10 ug/dL within the range of 1-25 ug/dL. Because of the large database on subclinical neurotoxic effects of lead in children, only a few of the studies have been included. However, EPA (EPA, 1986a, 1990) concluded there is no clear threshold for neurotoxic effects of lead in children.

In adults, the cardiovascular system is a very sensitive target for lead. Hypertension (elevated blood pressure) is linked to lead exposure in occupationally exposed subjects and in the general population. Three large population-based studies have been conducted to study the relationship between blood lead levels and high blood pressure. The British Regional Heart Study (BRHS) (Popcock et al., 1984), the NHANES II study (Harlan et al., 1985; Pirkle et al., 1985; Landis and Flegal, 1988; Schwartz, 1990; EPA, 1990), and Welsh Heart Programme (Ellwood et al., 1988a,b) comprise the major studies for the general population. The BRHS study showed that systolic pressure greater than 160 mm Hg and diastolic pressure greater than 100 mm Hg were associated with blood lead levels greater than 37 ug/dL (Popcock et al., 1984). An analysis of 9933 subjects in the NHANES study showed positive correlations between blood pressure and blood lead among 12-74-year-old males but not females (Harlan et al., 1985; Landis and Flegal et al., 1988), 40-59-year-old white males with blood levels ranging from 7-34 ug/dL (Pirkle et al., 1985), and males and females greater than 20 years old (Schwartz, 1991). In addition, left ventricular hypertrophy was also positively associated with blood lead (Schwartz, 1991). The Welsh study did not show an association among men and women with blood lead of 12.4 and 9.6 ug/dL, respectively (Ellwood et al., 1988a,b). Other smaller studies showed both positive and negative results. The EPA (EPA, 1990) concluded that increased blood pressure is positively correlated with blood lead levels in middle-aged men, possibly at concentrations as low as 7 ug/dL. In addition, the EPA estimated that systolic pressure is increased by 1.5-3.0 mm Hg in males and 1.0-2.0 mm Hg in females for every doubling of blood lead concentration.

The hematopoietic system is a target for lead as evidenced by frank anemia occurring at blood lead levels of 80 ug/dL in adults and 70 ug/dL in children. The anemia is due primarily to reduced heme synthesis, which is observed in adults having blood levels of 50 ug/dL and in children having blood levels of 40 ug/dL. Reduced heme synthesis is caused by inhibition of key enzymes involved in the synthesis of heme. Inhibition of erythrocyte -aminolevulinic acid dehydrase (ALAD) activity (catalyzes formation of porphobilinogen from -aminolevulinic acid) has been detected in adults and children having blood levels of less than 10 ug/dL. ALAD activity is the most sensitive measure of lead exposure, but erythrocyte zinc protoporphyrin is the most reliable indicator of lead exposure because it is a measure of the toxicologically active fraction of bone lead. The activity of another erythrocyte enzyme, pyrimidine-5-nucleotidase, is also inhibited by lead exposure. Inhibition has been observed at levels below 5 ug/dL; no clear threshold is evident.

Other organs or systems affected by exposure to lead are the kidneys, immune system, reproductive system, gastrointestinal tract, and liver. These effects usually occur at high blood levels, or the blood levels at which they occur have not been sufficiently documented.

The EPA has not developed an RfD for lead because it appears that lead is a nonthreshold toxicant, and it is not appropriate to develop RfDs for these types of toxicants. Instead the EPA has developed the Integrated Exposure Uptake Biokenetic Model to estimate the percentage of the population of children up to 6 years of age with blood lead levels above a critical value, 10 ug/dL. The model determines the contribution of lead intake from multimedia sources (diet, soil and dirt, air, and drinking water) on the concentration of lead in the blood. Site-specific concentrations of lead in various media are used when available; otherwise default values are assumed. The EPA has established a screening level of 400 ppm (ug/g) for lead in soil (EPA, 1994a).

Inorganic lead and lead compounds have been evaluated for carcinogenicity by the EPA (EPA, 1989, 1993). The data from human studies are inadequate for evaluating the potential carcinogenicity of lead. Data from animal studies, however, are sufficient based on numerous studies showing that lead induces renal tumors in experimental animals. A few studies have shown evidence for induction of tumors at other sites (cerebral gliomas; testicular, adrenal, prostate, pituitary, and thyroid tumors). A slope factor was not derived for inorganic lead or lead compounds.

D. Horizontal and Vertical Extent of Contamination

There were no areas found to be impacted above the non-residential cleanup goals at this site. The COCs appear to be located in the upper 10 feet at the site. There was no indication, except in the southwest corner, of any migration of COCs below this depth. See Figure 4 and 5 for a cross sectional view of the horizontal extent of impact from COCs.

E. Table of Analysis Results

The analysis results for the most recent investigation are included in Attachment A

2.2.2 Ecological Assessment Results

We have elected to include the full ecological desktop assessment documentation required for the Phase II Investigation.

A. Identification of Potentially Affected Species

This site is located in the middle of South Bend. It has been developed since the middle 1850s. The site is surrounded by dense residential and commercial properties. No evidence of any potentially affected species were noted at the site.

B. Identification of Aquatic Life Present

No aquatic life was noted on the site or bordering the site.

C. Contamination Pathways to Surface Water

The surface water at the site had flowed from the west to east. It is directed into a collection system that emptied into a collection basin located on the northeastern portion of the site or into the city storm sewer. The basin was sealed from the subsurface and was used as a reservoir for fire protection purposes.

D. Potential Exposures to Aquatic Life

No potential exposure to aquatic life exists at this site due to the lack of surface water bodies near the site.

E. Identification of Wildlife and Vegetation Found in the Vicinity

This site is located in the middle of a dense industrial/residential area in South Bend. No open areas, other than a city park, are located near this site. The site itself will be cleared of all buildings, with the exception of two historic structures, in the next six months.

F. Potential Wildlife/Vegetation Exposure Pathways

Little to no potential exposure to wildlife or vegetation exists at this site due to the lack of suitable habitat near to the site.

G. Discussion of Potential/Observed Effects of Contamination on Vegetative or Wildlife Populations.

Not applicable.

H. Identification of Environmentally Sensitive Areas

No environmentally sensitive areas exist on the site.

I. Flow and Drainage Patterns

The flow of surface water at the site is from the west to east. Surface flow either is captured by storm drains, flows to the on-site cistern, or stays on the site and migrates to the groundwater via infiltration.

J. Identification of Potential Stresses to Wetlands and Flood Plains

There was no potential stresses to wetlands or flood plains noted at the site.

K. Potential Exposure Routes to Environmentally Sensitive Areas

No potential exposure routes were noted to exist.

L. Map depicting Locations of Flood Plains and Wetlands

See Figure 6.

2.2.3 Baseline Hydrogeological Assessment Results

We have elected to include the hydrogeological assessment documentation required for the Phase II Investigation

A. Presentation of Geologic Information Obtained During the Literature Search

No information, other than that described in Section B, was obtained during the literature search.

B. Presentation of Geologic Information Obtained from Review of Available Public Documents

The site is located in the Saint Joseph Aquifer System and Tributary Valleys, as identified by the Indiana Department of Natural Resources (IDNR) publication titled "Water Resource Availability in the St. Joseph River Basin, Indiana" 1987, which is part of the Saint Joseph River Basin Sole Source Aquifer. This aquifer system is composed of fine to medium sands with interspersed zones of coarse sands and gravel. Clay and till units are known to exist in the area of the site at an elevation of approximately 635 feet above mean sea level. The site is located near the boundary of the Saint Joseph River Basin and the Kankakee River Basin.

The most recent investigation of the area by the United States Geological Survey (USGS) is detailed in the Water Resource Investigations Report (WRIR) 95-4225 "Hydrogeology and Simulated Ground-Water Flow Through the Unconsolidated Aquifers of Northeastern St. Joseph County, Indiana"(1996), WRIR #95-4041, "Use of Surface and Borehole Geophysics to Delineate the Glacial Drift Stratigraphy of Northeastern St. Joseph County, Indiana" (1996), and WRIR #95-4092 "Ground-Water Quality in Northeastern St. Joseph County, Indiana" (1996). The three reports are part of an effort to describe the result of an investigation of groundwater resources in Northeastern Saint Joseph County, including a numerical simulation (model) of the groundwater system. Particle tracking from areas upgradient of the site indicate that the groundwater flow is to the northeast and the Saint Joseph River is a permanent hydrogeologic boundary in the area. These reports indicate a confining unit exists between the two aquifers beneath the site, with a thickness of approximately 25 feet.

Review of the well water logs at the IDNR revealed three wells that appear to be located on the site. One of these logs contains a lithological description of the unconsolidated formation at the site, indicating that a 30 foot thick layer of clay is present at 45 feet below grade (bg) to 75 feet bg. This log also indicates that the bedrock, a blue shale, is present at 137 feet bg.

C. Depth to Bedrock and Description of Lithology

The depth to bedrock beneath the site is approximately 135 to 150 feet. The bedrock consists of a Ellsworth Shale located within the Michigan Basin at approximately 550 feet above mean sea level.

D. Identification of Regional Aquifer(s)

The site is located in the Saint Joseph Aquifer System as identified by the IDNR. It is located above the Saint Joseph River Sole Source Aquifer.

E. Location of Surface Water Bodies, Floodways, and Drainage

The nearest surface water body is the Saint Joseph River, approximately 4,800 feet northeast of the site. The site does not have any off-site conveyance of stormwater, except through the city combined storm/sanitary sewer.

F. Description of Structural Features such as Jointing, Faulting, and Folding

Not applicable.

G. Summary of Site Specific Data

The site was generally found to consist of well sorted, fine to medium sands interbedded with fine to medium sand and gravel. The soils at and below the water table were found to consist of fine to coarse sand with traces of fine to medium gravel. A thin silty sand to sandy silt layer was encountered on the south side of the site at approximately 6 to 8 feet bg. Groundwater was noted at a depth of 19 to 24 feet bg. See figures 4 and 5 for a cross sectional representation of the geology at the site.

3.0 CLEANUP CRITERIA SELECTION

The proposed cleanup criteria presented in this section is related to surface and subsurface soils over the entire site (Figure 3). The groundwater under the site will be addressed by the City of South Bend in a regional manner in the next phase of the redevelopment of the Studebaker Corridor.

A. Proposed Cleanup Criteria

TABLE 1
Covenant Not-to-Sue Parameters and Tier II Non-Residential Cleanup Goals
Surface Soils

Contaminant	Surface Soil	Contaminant	Surface Soil
naphthalene	10,000.00	2-methylphenol	10,000.00
acenaphthene	10,000.00	4-methylphenol	10,000.00
fluorene	10,000.00	2-chlorophenol	10,000.00
anthracene	10,000.00	2,4-dichlorophenol	6,120.00
fluoranthene	10,000.00	2,4,5-trichlorophenol	10,000.00
pyrene	10,000.00	2,4,6-trichlorophenol	1,922.89
benzo(a)anthracene	76.45	pentachlorophenol	483.33
chrysene	7,945.21	2,4-dinitrophenol	4,080.00
benzo(b)fluoranthene	79.45	bis(2-ethylhexyl)phthalate	4,142.86
benzo(k)fluoranthene	794.52	butylbenzylphthalate	10,000.00
benzo(a)pyrene	7.94	di-n-butylphthalate	10,000.00
indeno(1,2,3-cd)pyrene	79.45	diethylphthalate	10,000.00
dibenzo(a,h)anthracene	7.95	dimethylphthalate	10,000.00
3,3'-dichlorobenzidine	128.89	di-n-octyl-phthalate	10,000.00
n-nitroso-di-n-propylamine	8.29	benzene	16.63
bis(2-chloroisopropyl)ether	93.12	toluene	1,000.00
4-chloroaniline	8,160.00	ethylbenzene	1,000.00
2-chloronaphthalene	10,000.00	xylenes	1,000.00
2,4-dinitrotoluene	4,080.00	vinyl chloride	0.02
hexachloroethane	408.00	chloroethane	1,000.00
isophorone	10,000.00	1,1-dichloroethene	0.15
benzyl alcohol	10,000.00	1,1-dichloroethane	973.47
bis(2-chloroethyl)ether	4.06	1,2-dichloroethene (cis)	1,000.00
nitrobenzene	1,020.00	1,2-dichloroethane	5.27
1,2-dichlorobenzene	10,000.00	trichloroethene	24.97
1,4-dichlorobenzene	10,000.00	1,1,1-trichloroethane	1,000.00
1,2,4-trichlorobenzene	10,000.00	1,1,2-trichloroethane	22.74
hexachlorobenzene	6.87	tetrachloroethene	101.23
hexachlorocyclopentadiene	2.02	1,1,2,2-tetrachloroethane	75.91
n-nitrosodiphenylamine	10,000.00	chloroform	5.28
benzoic acid	10,000.00	acetone	1,000.00
2-nitroaniline	42.90	4-methyl-2-pentanone	1,000.00
phenol	10,000.00	methyl ethyl ketone	1,000.00
lead	400.00	arsenic	612.00
cadmium	1,020.00	barium	10,000.00
silver	10,000.00	mercury	122.40
chromium VI	10,000.00	selenium	10,000.00
		PCBs	7.53

All values in parts per million

TABLE 2
Covenant Not-to-Sue Parameters and Tier II Non-Residential Cleanup Goals
Subsurface Soils

Contaminant	Subsurface Soil	Contaminant	Subsurface Soil
naphthalene	10,000	2-methylphenol	375.93
acenaphthene	10,000	4-methylphenol	427.24
fluorene	10,000	2-chlorophenol	11.63
anthracene	10,000	2,4-dichlorophenol	15.12
fluoranthene	10,000	2,4,5-trichlorophenol	5,507.44
pyrene	10,000	2,4,6-trichlorophenol	30.65
benzo(a)anthracene	103.88	pentachlorophenol	24.95
chrysene	10,000	2,4-dinitrophenol	7.37
benzo(b)fluoranthene	354.98	bis(2-ethylhexyl)phthalate	1,406.25
benzo(k)fluoranthene	3,759.12	butylbenzylphthalate	10,000
benzo(a)pyrene	69.85	di-n-butylphthalate	6,188.56
indeno(1,2,3-cd)pyrene	629.17	diethylphthalate	10,000
dibenzo(a,h)anthracene	69.86	dimethylphthalate	10,000
3,3'-dichlorobenzidine	12.86	di-n-octyl-phthalate	10,000
n-nitroso-di-n-propylamine	0.66	benzene	4.77
bis(2-chloroisopropyl)ether	1.32	toluene	1,000
4-chloroaniline	1,117.69	ethylbenzene	1,000
2-chloronaphthalene	10,000	xylenes	1,000
2,4-dinitrotoluene	39.07	vinyl chloride	0.13
hexachloroethane	3.31	chloroethane	1,000
isophorone	256.03	1,1-dichloroethene	0.08
benzyl alcohol	4,356.75	1,1-dichloroethane	1,000
bis(2-chloroethyl)ether	0.66	1,2-dichloroethene (cis)	102.49
nitrobenzene	1.73	1,2-dichloroethane	0.37
1,2-dichlorobenzene	10,000	trichloroethene	25.73
1,4-dichlorobenzene	34.67	1,1,1-trichloroethane	1,000
1,2,4-trichlorobenzene	1,405.37	1,1,2-trichloroethane	1.05
hexachlorobenzene	101.56	tetrachloroethene	8.01
hexachlorocyclopentadiene	2.89	1,1,2,2-tetrachloroethane	0.21
n-nitrosodiphenylamine	567.8	chloroform	20.33
benzoic acid	10,000	acetone	136.29
2-nitroaniline	3.3	4-methyl-2-pentanone	407.48
phenol	658.78	methyl ethyl ketone	146.24
lead	1,000	arsenic	438
cadmium	730	barium	10,000.00
silver	7,300.00	mercury	87.6
chromium VI	10,000.00	selenium	7,300.00
		PCBs	4.23

All values in parts per million

pjm/rwp-2468.rpt

4.0 STATEMENT OF WORK

4.1 Objectives of Remedial Action

A. Discussion of the Rationale of why Remediation will not be Conducted

The site has no major documented historic contamination problems, except for PCBs successfully remediated in the former transformer area near the boiler room in 1992. The Phase II Investigation conducted in 1999 was directed at the RECs identified in the Phase I Investigation performed in 1998. The Phase II investigation indicated that no gross contamination was present at the site and the site was not adversely impacting the groundwater.

4.2 Confirmation Sampling Plan

The confirmation sampling plan is presented in Attachment B. This plan includes site specific Data, Quality Objectives, and the Conceptual Site Model of the site to assist in identifying the types of COCs to be investigated within individual areas on the site. The conceptual site model divides the site into 12 different sections based upon potential COCs that may exist in the soils.

The confirmation sampling plan is based upon the use of the ranked set sampling (RSS) technique. This technique uses an indicator parameter to minimize the number of samples that need to be submitted to a fixed laboratory. The application of this technique will reduce the number of samples analyzed by 75%. The indicator parameters include lead, total petroleum hydrocarbons, and PCBs. These parameters will be measured using field methods at the site. Please see Attachment B for a more detailed discussion and references.

4.3 Site Safety Plan

The site specific Site Safety Plan (SSP), located in Attachment C, has been prepared in accordance with all applicable Occupational Safety and Health Administration (OSHA) regulations and Envirocorp's Corporate Safety Plan.

4.4 Quality Assurance Project Plan

The Quality Assurance Project Plan (QAPP), located in Attachment D, has been prepared in accordance to the Voluntary Remediation Program Guidance Manual, 1996.

5.0 COMMUNITY RELATIONS

5.1 Identity of Adjacent Property Owners

See Attachment E

5.2 Known and/or Registered Neighborhood Organizations

Westside Partnership Center
617 S. Pulaski
South Bend, IN 46619
Phone: 235-5800
Fax: 235-5801
Coordinator: Lisa Barocio, Chair: Cindy Deleon

Near Westside Partnership Center
205 Sadie
South Bend, IN 46628
Phone: 245-6116
Fax: 245-6115
Chair: Ray Thompson

Near Westside Neighborhood Organization
716 W. Colfax
South Bend, IN 46601
President: Noreen Deane-Moran
Tel.: 232-2795

Rum Village Partnership Center
1031 W. Dubail
South Bend, IN 46613
Phone: 245-6118
Fax: 245-6120
Coordinator: Patti Huettl

Rum Village Neighborhood Association
President: Shirley Fulton
Phone: 245-6118
Fax: 245-6120

5.3 Sensitive Institutions within 2 miles

See Attachment F

5.4 Sample Written Notice to be Sent to Individuals Identified in 5.1, 5.2, and 5.3

See Appendix G

5.5 Names and Mailing Addresses of all affected Local Governmental Units within 1 Mile of Site

City of South Bend
Mayor Steven Luecke
227 West Jefferson Blvd
South Bend, Indiana 46601

Saint Joseph County
Commissioner Office
City/County Building
South Bend, Indiana 46601

5.6 Name and Mailing Address of Newspaper for Notice of Public Comment Period

South Bend Tribune
255 West Colfax
South Bend, Indiana 46601

5.7 Name and Address of Local Repository for Remediation Work Plan

Saint Joseph County Public Library
304 South Main Street
South Bend, Indiana 46601

6.0 FUTURE USE OF SITE

A. Statement of future use of site

The anticipated future use of the site is a commercial/industrial center.

7.0 SCHEDULE

We anticipate beginning the confirmation sampling within one month of approval of the RWP or completion of the demolition at the site, whichever is later. The Confirmation Sampling Event is expected to take three to five weeks, and completion of the Remediation Completion Report is expected to take two to four months, after the sampling is complete.

8.0 COST ESTIMATE

The cost estimate for this project assumes that no remediation will be required and all costs will be incurred in the completion sampling plan. We estimate that the completion sampling and the remediation completion report will cost approximately $XXX,XXX.

City of South Bend
Former Oliver Plow Redevelopment Project
Voluntary Remediation

This notice is being provided to inform you of the presence of a site in your neighborhood that has been accepted into the Indiana Department of Environmental Managements' (IDEM) Voluntary Remediation Program. This notice is a requirement of a Community Relations Plan which has been developed by the City of South Bend and is a component of the Remediation Work Plan that is available for review at the depository listed below. The Community Relations Plan includes provisions for notifying all neighboring property owners and occupants, neighborhood organizations and other local entities. In addition, the Community Relations Plan may require the applicant to post an informational sign at the subject property. For additional information about the Community Relations Plan, please review the documents in the repository or contact Ms. Ruth Williams, the IDEM Project Manager at 1-317-234-0973 or 1-800-451-6027.

The site has been investigated over the past 10 years and the widespread presence of chemicals above the applicable limits has not been noted. The City of South Bend is planning to conduct sampling of the surface and subsurface soils to confirm that the site meets or exceeds all of the standards set by the State of Indiana.

A public comment period will be opened by IDEM for comment on DATE to DATE. IDEM will accept written comments on the Remediation Work Plan during this time. This plan is located at the Saint Joseph Public Library; 304 South Main Street; South Bend, Indiana.

Any written comments should be addressed to:

Ms. Ruth Williams, Project Manager
IDEM - Voluntary Remediation Program
100 North Senate Avenue Room 1101
Post Office Box 6015
Indianapolis, Indiana 46206-6015