

PHASE II INVESTIGATION  
CMC HEARTLAND PARTNERS SITE  
EAST 28<sup>TH</sup> STREET AND STATE HIGHWAY 55  
MINNEAPOLIS, MINNESOTA

DECEMBER 18, 1995

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## **1.0 INTRODUCTION**

Peer Environmental & Engineering Resources, Inc. (PEER) was retained by CMC Heartland Partners (CMC) to perform a Phase II soil and ground water investigation of the CMC Lite Yard Site (site). The site is located at the northwest intersection of East 28<sup>th</sup> Street and State Highway 55 (Hiawatha Avenue), Hennepin County, Minneapolis, Minnesota.

The purpose of the investigation was to address several environmental issues identified by a Phase I Environmental Site Assessment recently completed by a prospective buyer of the site. The issues include:

1. Potential soil and ground water impacts from 14 former aboveground storage tanks (ASTs) which presumably contained petroleum products. These ASTs were located in the south-central portion of the site, northeast of the identified Rollins Oil Company petroleum release site.
2. Potential soil and ground water impacts associated with a former "oil warehouse" identified on the eastern portion of the site in the 1912 Sanborn Fire Insurance Map.
3. Potential soil and ground water impacts associated with a former pesticide manufacturing business (Reade Manufacturing) apparently located in a building on the south-central portion of the site. This building was located west of the identified pesticide release that has been investigated by Nova Environmental Services (NOVA) and Geraghty & Miller.

## **2.0 BACKGROUND**

### **2.1 SITE DESCRIPTION**

The site is approximately 7.7 acres in size. The general site location is shown on Figure 1. The site includes the addresses 2000 to 2100 East 28<sup>th</sup> Street. The site coordinates are as follows: SE1/4, NW1/4, SW1/4, Section 36, Township 29 North, Range 24 West, 44° 57' 9" North Latitude, 93° 14' 35" West Longitude.

Current site features are shown on Figure 2. One vacant building exists in the southwestern portion of the site (2000 East 28<sup>th</sup> Street). This building was previously occupied by the Rollins Oil Company. The remainder of the site is currently undeveloped. The majority of open space at the site is used by the current tenant, Bituminous Roadways, for storage of crushed bituminous, aggregate materials, and mulch. Numerous large stockpiles (several 100's of feet long, 10's of feet wide, and 10-20 feet high) of these materials are present at the site.

A soil berm approximately 5 feet high by 10 feet wide borders the eastern and southern edges of the site along Highway 55 and East 28<sup>th</sup> Street. The western edge of the site is bordered by active railroad tracks.

## 2.2 PREVIOUS INVESTIGATIONS

Various environmental investigations have been completed at the site, including: a Phase I Environmental Site Assessment, a petroleum release investigation, a subsurface investigation for the proposed reconstruction of Highway 55, and a pesticide release investigation. A listing of the available environmental reports is provided in Section 7.0. The following is a summary of the findings of the key investigations.

### *Phase I Environmental Site Assessment*

A Phase I of the site was recently completed for a prospective buyer by Twin City Engineering (TCE). The results are presented in a draft report dated December 4, 1995. The Phase I included review of historical data (i.e., aerial photographs, Sanborn Fire Insurance Maps, and Polk City Directories), review of topographic and geologic information, review of available environmental reports, interviews, a government records search, a site reconnaissance, and preparation of a report regarding recognized environmental conditions at the site.

The Phase I indicates the site was previously occupied by a railyard. Historical research identified the following primary issues related to past land use:

1. Fourteen former ASTs which presumably contained fuel oil, diesel fuel, and gasoline. These ASTs were located in the south-central portion of the site. Sanborn maps and historical aerial photographs indicate the ASTs existed at various times between 1912 and the early 1970's. The ASTs had estimated capacities of 10,000 to 25,000 gallons.

2. A former "oil warehouse" located on the eastern portion of the site. The oil warehouse is shown on the 1912 Sanborn Fire Insurance Map. This structure apparently was removed sometime prior to 1938. Petroleum based oils or lubricants were presumably stored in the structure.
3. A former pesticide manufacturing business (Reade Manufacturing) which was located in a the south-central portion of the site at 2100 East 28<sup>th</sup> Street. A listing in the 1940 Polk City Directory indicates the nature of the business as "grasshopper poison manufacturers". The business apparently existed between 1940 and the early 1960's.

Figure 3 shows the approximate locations of the former ASTs, the oil warehouse, and the pesticide manufacturing business, based on the available historical information. Phase II Investigation was recommended to address these issues.

The Phase I report also summarizes the status of the previously identified petroleum release at Rollins Oil Company (2000 East 28<sup>th</sup> Street), and the pesticide release previously identified on the southeastern portion of the site. Available reports on these releases are discussed in the following text.

#### *Rollins Oil Company Petroleum Release.*

A petroleum release (MPCA Site ID# LEAK00001583) was reported in 1989 at the Rollins Oil Company located on the southwest and south-central portion of the site (see Figure 2). Rollins operated five ASTs between 1943 and 1986; four 25,000 gallon fuel oil tanks and one 17,000 gallon gasoline tank. The release involved both gasoline and fuel oil and was presumably due to tank leakage and fueling operations.

A remedial investigation and supplemental investigation activities were completed by DPRA for Rollins Oil Company. The results of the remedial investigation are summarized in a report dated January, 1992. Investigation activities have included completion of five soil borings installation of six monitoring wells (MW-6, MW-8, MW-9, MW-10, and MW-11), PID soil screening, and soil and ground water analytical testing.

Approximately 10,000 cubic yards of petroleum contaminated soil was identified. Free phase petroleum product was identified in one monitoring well (MW-6), in addition to dissolved phased ground water contamination.

The locations of the Rollins investigation activities are shown on Figure 3. The monitoring wells currently exist at the site. Monitoring well MW-9 is located immediately adjacent to the former ASTs which have been evaluated by this investigation.

A corrective action design (CAD) for product recovery and soil venting was prepared, but was never implemented. The MPCA has currently agreed to annual ground water quality monitoring and passive product recovery as the only required actions in response to the petroleum release.

#### *Pesticide Release Investigation*

A pesticide release was reported at the site in December, 1994. The release was discovered during completion of an investigation for the City of Minneapolis and the Minnesota Department of Transportation (MnDOT) along Highway 55 (Hiawatha Avenue). The investigation was performed by NOVA. The results are presented in a report dated January 17, 1995.

The purpose of the investigation was to evaluate potential impacts associated with past land use activities at the site. The investigation was targeted on the eastern portion of the site, along Hiawatha Avenue, in the proposed MnDOT right-of-way. The locations of completed investigation activities are shown on Figure 3. A map showing the proposed right-of-way and easements for the site is presented in Appendix A.

The NOVA investigation included completion of six soil borings (B-1 through B-6), PID soil screening, and analytical testing of soil samples for diesel range organics (DRO), RCRA metals, polynuclear aromatics hydrocarbons (PAHs), polychlorinated biphenyls (PCBs) and organochlorine pesticides (by EPA Method 8080).

Low concentrations (0.0069 to 0.055 milligrams per kilogram - mg/kg) of several pesticides were detected in the 3 to 5 foot soil sample from one boring (B-1). The pesticides included: gamma-BHC (Lindane), Dieldrin, alpha-Endosulfan, and Heptachlor. NOVA recommended a remedial investigation be completed per Minnesota Department of Agricultural (MDA) guidelines to address the pesticide release.

The source of the pesticide impacts in B-1 was believed to be from a former pesticide manufacturing business which was thought to have been located in the southeast corner of the site. However, as indicated by the Phase I, the pesticide manufacturing business was apparently located in the south-central portion of the site at 2100 East 28<sup>th</sup> Street.

Geraghty & Miller, Inc. implemented a remedial investigation to fully assess the magnitude and extent of the pesticide release, and to determine if remediation was required. The results are presented in a report dated November 1995. The locations of investigation activities completed by Geraghty & Miller are shown on Figure 3.

The investigation included six sampling probes (GP-1 through GP-6), analytical testing of pesticides and arsenic in soil, pesticides in ground water, and completion of a contamination impacts survey.

The investigation identified seven pesticide compounds at low concentrations (0.0035 to 0.034 mg/kg) in soil samples from the 0 to 2 feet depth interval in the vicinity of the NOVA boring B-1. The pesticides identified included: Heptachlor, Aldrin, Heptachlor Epoxide, p,p-DDE, Endosulfan II, p,p-DDT, and Methoxychlor. Arsenic was detected in soil samples from various depth intervals at concentrations of 1.0 to 160 mg/kg. No pesticides were detected in ground water.

Based on the results of the investigation, no further action was recommended in response to the pesticide release. File closure regarding the release is pending from the MDA.

### **3.0 INVESTIGATION ACTIVITIES**

#### **3.1 GENERAL**

Field investigation activities performed by PEER included: completion of shallow and deep soil borings, advancement of soil and ground water sampling probes, and collection and analytical testing of soil and ground water samples. All field investigation activities were completed between December 11-13, 1995. Drilling services were provided by Aqua-Plus, Inc. of Elk River, Minnesota. Sampling probe services were provided by Precision Environmental of Minneapolis, Minnesota.

Investigation methods and procedures are presented in Appendix B. Additional information regarding sampling probe completion methods is included in Appendix C. Soil boring and sampling probe logs are included in Appendix D.

#### **3.2 FORMER AST AREA**

##### *Shallow Soil Borings*

Fourteen shallow soil borings (B-1 through B-14) were completed. Each boring was located at the base of a former AST (see Figure 4). The purpose of the shallow borings was to detect potential releases from the former ASTs.



The borings were completed to depths of 5 feet using a truck-mounted rig equipped with hollow stem augers. Split barrel soil samples were collected from the each boring at the 0 to 2 foot and 3 to 5 foot depth intervals and screened for organic vapors using a photoionization detector (PID). Selected soil samples were submitted for analytical testing.

#### *Deep Soil Borings*

Five deep soil borings (DB-1 through DB-5) were completed (see Figure 4). The purpose of the deep borings was to evaluate general subsurface conditions for the entire AST area.

The borings were completed to depths of 30 feet. Split barrel soil samples were collected at 5 foot depth intervals from the borings and screened for organic vapors using a PID. Selected soil samples were submitted for analytical testing.

#### *Ground Water Probes*

An assessment of ground water quality was performed using a truck-mounted Geoprobe<sup>®</sup> rig. Five ground water sampling probes (W-1 through W-5) were completed at the locations indicated on Figure 5.

The probes were advanced to the depth of ground water (approximately 28 feet). Ground water samples were collected from probes W-2, W-3, W-4 and W-5 for on-site laboratory analysis. A ground water sample could not be collected from probe W-1, since low temperatures caused the water to freeze within the sampling device before collection. A ground water sample was subsequently collected from boring DB-2, which was advanced adjacent to probe location W-1. This sample was identified as W-1 and was analyzed on-site. The sample was obtained from the borehole using a disposable polyethylene bailer.

### 3.3 FORMER OIL WAREHOUSE

Shallow boring B-15 (completed to 5 feet) and deep boring DB-6 (completed to 30 feet) were completed in the vicinity of the former oil warehouse building (see Figure 4). The purpose of the borings was to evaluate general subsurface conditions for this area.

Split barrel soil samples were collected at selected intervals from the borings and screened for organic vapors using a photoionization detector (PID). Selected soil samples were submitted for analytical testing.

### 3.4 FORMER PESTICIDE MANUFACTURING BUILDING

Soil and ground water was evaluated in the vicinity of the former pesticide manufacturing building using a truck-mounted Geoprobe<sup>®</sup> rig. Three soil and ground water sampling probes (GP-1 through GP-3) were completed (see Figures 4 and 5). The probes were advanced to depths ranging from 27 to 30 feet.

Soil samples were collected from the probes at approximately 5 foot intervals and screened for organic vapors using a PID. Selected soil samples were submitted for analytical testing. Ground water samples were also collected from each probe and submitted for analytical testing.

### 3.5 ANALYTICAL TESTING

A summary of all samples submitted for analytical testing is provided in Table 1. The following sections outline the specific analytical methods used.

#### 3.5.1 Former AST Area

##### *Soil Boring Samples*

The samples were submitted to Horizon Laboratories, Inc. (Horizon) of St. Paul, Minnesota. The samples were analyzed for the following parameters:

Parameter/Compound	Laboratory	Method
Diesel range organics (DRO)	Horizon	WDNR Method
Gasoline range organics (GRO)	Horizon	WDNR Method
Petroleum volatile organic compounds (PVOCs)*	Horizon	EPA 8020
Total Lead	Horizon	EPA 6010
* PVOCs include benzene, ethyl benzene, toluene, xylenes, 1,3,5-trimethylbenzene, 1,2,4-trimethylbenzene, and methyl tert-butyl ether.		

### *Probe Water Samples*

Probe water samples W-1 through W-5, and GP-3 were analyzed on-site by Precision Environmental. The samples were analyzed for the following parameters:

- DRO (by modified WDNR Method)
- GRO (by modified WDNR Method)
- Benzene, ethyl benzene, toluene and xylenes (by modified EPA 8020).

Probe samples W-4 (duplicate sample) and GP-2 were submitted to Horizon Laboratories for analysis of GRO, DRO and PVOCs.

### 3.5.2 Oil Warehouse Building

Soil samples were submitted to both Pace Analytical Services, Inc. (PACE) of Minneapolis, Minnesota and Horizon Laboratories, Inc. The samples were analyzed for the following parameters:

Parameter/Compound	Laboratory	Method
DRO	Horizon	WDNR Method
VOCs	Horizon	MDH 465D
PCBs	PACE	EPA 8080
8 RCRA Metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver)	PACE	Various EPA Methods

### 3.5.3 Former Pesticide Manufacturing Building

Soil and ground water samples were submitted to PACE. Soil samples were analyzed for organochlorine pesticides (EPA Method 8080) and total arsenic (EPA Method 6010). Ground water samples were analyzed for organochlorine pesticides only.

## 4.0 RESULTS

### 4.1 HYDROGEOLOGY

#### 4.1.1 Geologic Setting

##### *Regional*

The ground surface elevation of the site is approximately 840 feet National Geodetic Vertical Datum (NGVD). Published references indicate surface soils consist of sandy glacial river terrace deposits which are underlain by clayey till.

The unconsolidated deposits are approximately 40 to 60 feet thick, and are underlain by limestone and shale bedrock of the Platteville and Glenwood Formations.

##### *Site*

Soil borings and sampling probes completed as part of this and previous investigations encountered fine to coarse grained sand with gravel. The sand is underlain at depths of 18 to 30 feet by layers of clay and clayey sand at various locations. Several feet of silty sand fill was encountered overlying the sand deposits in a number of the borings.

#### 4.1.2 Ground Water

Published references indicate ground water occurs at a depth of 20 feet. Regional ground water flow in the vicinity of the site is variable, but presumably is eastward towards the Mississippi River.

Previous water level measurements from August 1995 by DPRA of the existing monitoring wells indicated ground water occurs at depths of 24 to 28 feet, and ground water flow is generally to the north. Flow has previously varied from northwest to northeast. Ground water was encountered in the soil borings and sampling probes completed for this investigation between depths of approximately 25 to 30 feet.

## 4.2 FORMER AST AREA

PID screening results from the soil borings are summarized in Table 2 and on the respective boring logs. Soil analytical results are summarized in Table 3. The laboratory analytical reports and chain-of-custody forms are included in Appendix E.

Ground water analytical results are summarized in Table 4. A summary of the analytical results are included in Appendix C.

## 4.3 FORMER OIL WAREHOUSE

PID screening results are summarized in Table 2, and on the respective boring logs. Soil analytical testing results summarized in Table 5. Table 5 also includes the typical range in concentration of metals occurring in natural soils. The laboratory analytical reports and chain-of-custody forms are included in Appendix E.

## 4.4 FORMER PESTICIDE MANUFACTURING BUILDING

PID screening results are summarized in Table 6, and on the respective sampling probe logs. Soil analytical testing results are summarized in Table 7. The laboratory analytical report and chain-of-custody forms are included in Appendix E.

## 5.0 DISCUSSION

### 5.1 FORMER AST AREA

#### *Soil Impacts*

The PID screening and analytical testing results for the shallow soil borings indicate the presence of petroleum impacted soil below the former ASTs at locations B-4, B-7, B-12 and B-13 (see Figure 6). At these locations, GRO or DRO concentrations were detected above the MPCA action level for soil of 50 milligrams per kilogram (mg/kg). Although elevated PID readings and low DRO concentrations were detected at other shallow boring locations, the data as a whole suggests that petroleum impacts at the other former AST locations are either minor or not present.

The analytical results for the impacted soil are consistent with a degraded diesel fuel or gasoline source (see Table 3). This is indicated by the presence of heavier ended compounds such as xylenes and trimethylbenzene, and a general lack of lighter compounds such as benzene and toluene. In degraded fuels, the lighter compounds tend to volatilize and biodegrade causing them to decrease in concentration over time.

Elevated lead concentrations (i.e., 420 to 3,300 mg/kg) were detected in the soil samples collected from borings B-12 and B-13. Petroleum constituents were detected in these same samples suggesting the lead is petroleum related (e.g., leaded gasoline).

The horizontal extent of the identified petroleum impacted soil appears to be generally limited (see Figure 6). Specifically, the areas with identified petroleum impacted soil (i.e. locations B-4, B-7, B-12 and B-13) are all located within 20 feet of deep soil borings DB-1 through DB-5. If the impacted soil were laterally extensive, evidence of soil impacts (e.g. high PID readings, odors, staining) would be expected to be detected in these borings at relatively shallow depths (i.e. from ground surface to 20 feet). In summary, no such evidence of soil impacts was detected in the deep borings.

No buildings or significant underground utilities were identified in the immediate vicinity of the identified soil impacts from the former ASTs. A vapor risk assessment was completed for the adjacent Rollins Oil Co. petroleum release site. The results are summarized in the RI/CAD report dated January, 1992. The results of the vapor risk assessment indicated that the petroleum release at the Rollins site posed a low risk of vapor impacts to nearby utilities and structures.

#### *Ground Water Impacts*

Petroleum impacted ground water has been identified in ground water probes W-1, W-3, W-4, W-5, GP-2 and GP-3. Ground water impacts were not detected in probe W-2. Recent analytical results for the adjacent Rollins petroleum release site have been evaluated. The DRO results from the Rollins monitoring wells (i.e., 5/15/95 sampling event) and the ground water probes on the CMC property are shown on Figure 6. The results show that DRO is present at varying concentrations across the site, but are generally higher in the Rollins monitoring wells. DRO appears to decrease with distance to the north/northeast as indicated by the results for MW-6 (free product detected), MW-9 (610 ug/L) and W-5 (50 ug/L). The direction of ground water flow at the Rollins site has been interpreted by others to be northward.

The primary source of the ground water impacts detected in the vicinity of the former ASTs appears to be the adjacent Rollins site. However, the data also suggests that the identified soil impacts from the former ASTs on the northern portion of the CMC property (by probes W-3, W-4 and W-5) also have contributed to the ground water impacts. In general, the ground water impacts identified in the vicinity of the former ASTs appear relatively minor. With the exception of benzene in probe GP-3, all of the constituents were detected below Minnesota Department of Health - Health Risk Limits (HRLs) for the respective compounds. Benzene was detected in GP-3 at a concentration of 20 ug/L. The HRL for benzene is 10 ug/L.

A ground water receptor survey was completed for the adjacent Rollins site and summarized in the RI/CAD report dated January, 1992. No immediate downgradient receptors of contaminated ground water were identified.

## 5.2 FORMER OIL WAREHOUSE

Two soil borings were advanced in the former oil warehouse area; one 5 foot boring (B-15) and one 30 foot boring completed to the depth of the water table (DB-6). The 3-5 foot sample from B-15 and 8-10 foot sample from DB-6 were submitted for analytical testing. Since the specific type of oil product stored in the warehouse was unknown, the samples were analyzed for a wide range of parameters, including: VOCs, DRO, PCBs and RCRA metals.

Low PID readings were detected in soil samples from both borings. However, no evidence of contamination, including odors, staining or elevated PID readings was observed during boring completion or soil sampling activities.

No VOCs, DRO or PCBs were detected above laboratory detection limits in the two samples analyzed. Several metals were detected at low to moderate concentrations in the samples, including: barium, chromium, lead and mercury. The concentrations of metals were within the typical range expected for natural soils.

### 5.3 FORMER PESTICIDE MANUFACTURING BUILDING

#### *General*

Three sampling probes (GP-1, GP-2 and GP-3) were advanced in the vicinity of the former pesticide manufacturing building. Soil samples from the 2 to 7 foot, 8 to 10 foot and 18 to 20 foot depth intervals from each probe were submitted for analytical testing. In addition, ground water samples were collected from each probe.

The soil samples submitted for analytical testing were selected based on the following factors:

- All three probes were completed on the edge of the berm, at an elevation approximately 2 feet above the ground surface. In addition, it is anticipated that the 0 to 5 foot interval below ground surface was disturbed to remove the building's footings during demolition of the former pesticide manufacturing building. Thus, the shallow samples are representative of the former ground surface, and the 8 - 10 foot samples are representative of the first undisturbed soil horizon below the former building.
- The 18 - 20 foot sample was selected to assist in identifying the vertical extent of any impacts.

Shallow soil samples from the probes interval are currently being analyzed. The results will be submitted as an addendum.

#### *PID Screening Results*

Low PID reading were detected at the depth of the water table in all three probes, and at shallower depths in GP-3. The PID readings are presumably related to petroleum impacts from the Rollins release and operations of the former ASTs.

#### *Soil and Ground Water Impacts*

No organochlorine pesticides were detected at or above the laboratory detection limits in the 8 - 10 foot and 18 - 20 foot soil samples, or ground water samples.



Arsenic was detected at 120 mg/kg in one of the soil samples (GP-3, 8-10'). This concentration is somewhat above the typical range of 1 - 50 mg/kg occurring in natural soils, and is consistent with concentrations detected in site soils during the Geraghty & Miller investigation. Arsenic was not detected in any of the other soil samples at or above the laboratory detection limit.

## 6.0 CONCLUSIONS AND RECOMMENDATIONS

### *Former AST Area*

- Petroleum impacted soil was detected in the vicinity of the former ASTs at locations B-4, B-7, B-12 and B-13. A petroleum release was subsequently reported to the MPCA on December 13, 1995. *Leak 9035*
- Elevated lead was detected in shallow soil samples B-12 (3-5') and B-13 (0-2'). The lead is presumably associated with previous storage of leaded gasoline. The lead concentrations detected were above 400 mg/kg (a typical the MPCA cleanup standard).
- The deep soil boring results suggest the horizontal extent of petroleum impacted soil is generally limited to the immediate vicinity of the former ASTs.
- Petroleum impacted ground water was detected in the vicinity of the former ASTs. The source of the impacts appears to be the adjacent Rollins Oil Co. petroleum release site, with contributions from the former ASTs. In general, the ground water impacts detected in the vicinity of the former ASTs are relatively minor.
- Based upon previous investigation, potential for vapor impacts to building structures and underground utilities appears low. In addition, no immediate downgradient receptors of contaminated ground water have previously been identified.
- Additional investigation or corrective actions in the vicinity of the former ASTs does not appear warranted. It is recommended that the MPCA consider site closure at this time.
- Current site use and proposed future use of the site is for storage and handling of crushed bituminous, aggregate materials, and mulch. Should site activities disturb shallow soils with elevated lead and/or petroleum impacts, the soil may require special handling and treatment.

### *Former Oil Warehouse*

- Based on the results of this investigation, no evidence of a significant petroleum or hazardous substance release was detected in the vicinity of the former oil warehouse

#### *Former Oil Warehouse*

- Based on the results of this investigation, no evidence of a significant petroleum or hazardous substance release was detected in the vicinity of the former oil warehouse area. No further investigation of this issue appears warranted.

#### *Former Pesticide Manufacturing Building*

- Based on the results of this investigation, no evidence of a significant pesticide release to soil or ground water was identified in the vicinity of the former pesticide manufacturing building area. Shallow soil samples are currently being analyzed. Final conclusions regarding potential pesticide impacts to soil will be provided upon review of the shallow data.
- The previously identified pesticide release in the southeast portion of the site appears to have been related to some type of surficial spill or past application of pesticides along the former railroad tracks which existed in that area. The impacts do not appear to have been associated with the former pesticide manufacturing building.

## 7.0 REFERENCES

#### *Geologic References*

- Geologic Atlas, Hennepin County, Minnesota, 1989, Minnesota Geological Survey, County Atlas Series, Atlas C-4.
- Geologic and Hydrologic Aspects of Tunneling in the Twin Cities Area, Minnesota, 1979, U.S. Geological Survey, Miscellaneous Investigations Series, Map I-1157.

#### *Pesticide Release*

- Drilling Investigation Report, CMC Heartland Partners Site, Trunk Highway 55 and 28<sup>th</sup> Street, Minneapolis, Minnesota, January 17, 1995, prepared by Nova Environmental Services, Inc.
- Remedial Investigation Report, CMC Heartland Partners, Lite Yard Site, 28<sup>th</sup> Street and Highway 55, Minneapolis, Minnesota, Minnesota Department of Agricultural Site ID#: 95-0100, November, 1995, prepared by Geraghty & Miller, Inc.

*Rollins Oil Company Release*

- Remedial Investigation/Corrective Action Design Plan, MPCA Leak #1583, Rollins Oil Company, 2000 East 28<sup>th</sup> Street, Minneapolis, Minnesota, January, 1992, prepared by DPRA Incorporated.
- Project Update Report, MPCA Leak #1583, Rollins Oil Company, 2000 East 28<sup>th</sup> Street, Minneapolis, Minnesota, January, 1994, prepared by DRPA Incorporated.
- Project Update Report, MPCA Leak #1583, Rollins Oil Company, 2000 East 28<sup>th</sup> Street, Minneapolis, Minnesota, September, 1994, prepared by DPRA Incorporated.
- Update Report, MPCA Leak #1583, Rollins Oil Company, 2000 East 28<sup>th</sup> Street, Minneapolis, Minnesota, January, 1995, prepared by DPRA Incorporated.
- Progress Report, MPCA Leak #1583, Rollins Oil Company, 2000 East 28<sup>th</sup> Street, Minneapolis, Minnesota, June, 1995, prepared by DPRA Incorporated.
- Update Report, MPCA Leak #1583, Rollins Oil Company, 2000 East 28<sup>th</sup> Street, Minneapolis, Minnesota, September, 1995, prepared by DPRA Incorporated.

*General*

- Phase I Environmental Site Assessment, CMC Heartland Property, Northwest Corner of Hiawatha Avenue and East 28<sup>th</sup> Street, Minneapolis, Minnesota, "draft" dated December 4, 1995, prepared by Twin City Engineering.

TABLE 1

## SAMPLES SUBMITTED FOR ANALYTICAL TESTING

Sample Number	Matrix	Date Collected	VOC's	GRO/PVOC	DRO	Pesticides	PCBs	Total Lead	Total Arsenic <sup>(2)</sup>	8 RCRA Metals
GP-1 (5-7')	Soil	12/11/95				X			X	
GP-1 (8-10')	Soil	12/11/95				X			X	
GP-1 (18-20')	Soil	12/11/95				X			X	
GP-1 (28-30')	Soil	12/11/95		X	X					
GP-1	Water	12/11/95				X				
GP-2 (2-4')	Soil	12/11/95				X			X	
GP-2 (8-10')	Soil	12/11/95				X			X	
GP-2 (18-20')	Soil	12/11/95				X			X	
GP-2	Water	12/11/95		X	X	X				
GP-3 (2-4')	Soil	12/11/95				X			X	
GP-3 (8-10')	Soil	12/12/95				X			X	
GP-3 (18-20')	Soil	12/12/95				X			X	
GP-3	Water	12/12/95				X				
GP-3	Water	12/12/95		X <sup>(1)</sup>	X <sup>(1)</sup>					
GP-3A	Water	12/12/95				X				
B-1 (0-2')	Soil	12/12/95		X	X			X		
B-4 (0-2')	Soil	12/12/95		X	X			X		
B-6 (3-5')	Soil	12/13/95		X	X			X		
B-7 (0-2')	Soil	12/13/95		X	X			X		
B-9 (3-5')	Soil	12/12/95		X	X			X		
B-11 (3-5')	Soil	12/13/95		X	X			X		
B-12 (3-5')	Soil	12/13/95		X	X			X		
B-13 (0-2')	Soil	12/13/95		X	X			X		
B-14 (3-5')	Soil	12/13/95		X	X			X		
B-15 (3-5')	Soil	12/13/95	X		X		X			X
DB-1 (3-5')	Soil	12/12/95		X	X			X		
DB-3 (28-30')	Soil	12/13/95		X	X			X		
DB-5 (28-30')	Soil	12/13/95		X	X			X		
DB-6 (8-10')	Soil	12/13/95	X		X		X			X
W-1/DB-2	Water	12/12/95		X <sup>(1)</sup>	X <sup>(1)</sup>					
W-2	Water	12/12/95		X <sup>(1)</sup>	X <sup>(1)</sup>					
W-3	Water	12/12/95		X <sup>(1)</sup>	X <sup>(1)</sup>					
W-4	Water	12/12/95		X <sup>(1)</sup>	X <sup>(1)</sup>					
W-5	Water	12/12/95		X <sup>(1)</sup>	X <sup>(1)</sup>					
EB-1	Water	12/12/95				X				
FB-1	Water	12/12/95	X		X					

## NOTES:

<sup>(1)</sup> = Analytical testing performed on-site by Precision Environmental.<sup>(2)</sup> = Analytical testing provided by Pace Analytical Services, Inc.

**TABLE 2  
PID SCREENING RESULTS - SOIL BORINGS**

Depth	B-1	B-2	B-3	B-4	B-5	B-6	B-7	B-8	B-9	B-10	B-11	B-12	B-13	B-14	B-15	DB-1	DB-2	DB-3	DB-4	DB-5	DB-6
0-2'	3.5	3.0	0.9	121x	5.7	6.6	4.1	0.9	0.4	1.0	0.5	39	72x	1.7	0.4	NS	NS	NS	NS	NS	NS
3-5'	0.0	0.6	0.2	3.3	2.2	2.8	2.1	1.1	0.1	0.6	2.4	43*	1.0	59	13	0.7	0.3	7.5	0.4	0.0	1.0
8-10'												↓		↓		0.6	0.0	0.0	0.0	0.0	0.0
13-15'																0.3	0.0	0.0	0.0	0.0	0.0
18-20'																0.2	0.0	0.7	0.0	0.0	4.0
23-25'																0.8	36.6*	3.0	0.0	10	8.0
28-30'																0.0	1.5	3.0*	0.7	60*	1.0

NOTES:

NS = No sample collected from specified interval.  
 PID readings obtained using Photoionization detector (PID) equipped with a 10.6 eV lamp.  
 Bold line indicated termination depth of boring. Shaded portions indicate depths below the termination depth.

**TABLE 3  
SOIL ANALYTICAL RESULTS - FORMER AST AREA**

Sample ID	MTBE	Benzene	Toluene	Ethyl Benzene	Total Xylenes	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene	GRO	DRO	Total Lead
B-1 (0-2')	ND (0.65)	ND (0.12)	ND (0.068)	ND (0.082)	ND (0.34)	ND (0.12)	ND (0.15)	ND (1.0)	ND (1.1)	5.1
B-4 (0-2')	ND (6.5)	ND (1.2)	ND (0.68)	1.9	ND (3.4)	5.2	8.8	740	1,500	200
B-6 (3-5')	ND (0.8)	ND (0.07)	ND (0.065)	ND (0.075)	ND (0.18)	ND (0.075)	ND (0.10)	ND (0.70)	1.1	32
B-7 (0-2')	ND (0.8)	ND (0.07)	0.13	0.083	0.34	0.18	0.24	9.0	130	230
B-9 (3-5')	ND (0.65)	ND (0.12)	ND (0.068)	ND (0.082)	ND (0.34)	ND (0.12)	ND (0.15)	ND (1.0)	2.6	11
B-11 (3-5')	ND (0.80)	ND (0.07)	ND (0.065)	ND (0.075)	ND (0.18)	ND (0.075)	ND (0.10)	ND (0.7)	ND (0.9)	5.3
B-12 (3-5')	ND (8)	ND (0.7)	ND (0.65)	ND (0.75)	4.7	3.6	5.9	480	9,300	420
B-13 (0-2')	ND (0.8)	ND (0.07)	ND (0.065)	ND (0.075)	0.20	0.20	0.22	34	3,000	3,300
B-14 (3-5')	ND (0.8)	ND (0.07)	ND (0.065)	ND (0.075)	ND (0.18)	ND (0.075)	ND (0.10)	ND (0.70)	ND (0.9)	18
DB-1 (3-5')	ND (0.65)	ND (0.12)	ND (0.068)	ND (0.082)	ND (0.34)	ND (0.12)	ND (0.15)	ND (1.0)	1.4	4.3
DB-2 (23-25')	ND (6.5)	ND (1.2)	ND (0.68)	ND (0.82)	ND (3.4)	5.4	2.6	530	580	3.8
DB-3 (28-30')	ND (8)	ND (0.7)	ND (0.65)	ND (0.75)	2.1	1.1	1.3	120	83	190
DB-5 (28-30')	ND (0.8)	ND (0.07)	ND (0.065)	ND (0.075)	ND (0.18)	ND (0.075)	ND (0.10)	ND (0.7)	1.4	17
GP-1 (28-30')	ND (0.65)	ND (0.12)	ND (0.068)	ND (0.082)	ND (0.34)	ND (0.12)	ND (0.15)	ND (1.0)	ND (1.1)	NA
PQL	0.65	0.12	0.068	0.082	0.34	0.12	0.15	1.0	1.1	---

**NOTES:**

All values reported in mg/Kg (ppm).  
 NA = Not analyzed for this parameter.  
 ND ( ) = Parameter not detected above method detection limit indicated in parenthesis.  
 GRO = Gasoline Range Organics.  
 DRO = Diesel Range Organics.  
 PQL = Practical Quantitation Limit.

**TABLE 4  
GROUND WATER ANALYTICAL RESULTS - FORMER AST AREA**

Sample ID	MTBE	Benzene	Toluene	Ethyl benzene	Xylenes	GRO	DRO	1,3,5-Trimethylbenzene	1,2,4-Trimethylbenzene
W-1	NA	ND (1.0)	7	ND (2.0)	ND (5.0)	20	60	NA	NA
W-2	NA	ND (1.0)	ND (1.0)	ND (2.0)	ND (5.0)	ND (10)	ND (10)	NA	NA
W-3	NA	3.0	8.0	3.0	21	150	40	NA	NA
W-4	NA	ND (1.0)	ND (1.0)	ND (2.0)	ND (5.0)	ND (10)	ND (10)	NA	NA
W-4*	ND (6.4)	ND (0.7)	ND (0.65)	ND (0.75)	6.8	70	ND (460)	ND (0.8)	ND (1.0)
W-5	NA	4.0	8.0	3.0	21	250	50	NA	NA
GP-2	ND (6.4)	ND (0.7)	ND (0.65)	ND (0.75)	ND (1.8)	ND (7.0)	260	ND (0.75)	ND (1.0)
GP-3	NA	20	50	100	400	7,000	6,000	NA	NA
FB	ND (6.4)	ND (0.7)	ND (0.65)	ND (0.75)	ND (1.8)	ND (50)	ND (65)	ND (0.8)	ND (1.0)
HRL	NE	10	1,000	700	10,000	NE	NE	NE	NE

**NOTES:**

\*Ground water analysis conducted off-site by Horizon Laboratories. All other samples analyzed on-site by Precision Environmental.  
 All units in ug/L unless noted.  
 ND = Not detected at or above detection limit in parenthesis.  
 NA = Not analyzed for parameter.  
 NE = Not established.  
 HRL = Health Risk Limits.

**TABLE 5  
SOIL ANALYTICAL RESULTS - FORMER OIL WAREHOUSE**

Parameter	B-15 (3-5')	DB-6 (8-10')	Typical Range**
PCBs by EPA 8080	ND (0.033)	ND (0.033)	----
Mercury	0.05	ND (0.02)	0.01 - 0.8
Barium	88	53	1,000 - 4,000
Chromium	23	11	5 - 3,000
Lead	8.6	ND (4.0)	2 - 200
DRO	ND (0.9)	ND (0.9)	---
VOCs by 465D	ND*	ND*	---

**NOTES:**

All units in mg/kg soil analysis conducted by Horizon Laboratory unless noted.

ND ( ) = Not detected at or above method detection limits in parenthesis.

\* = For all parameters on MDH 465D List.

\*\* = Common range of metal in natural soils, Pollution Control Engineer's Handbook, 1992, p101.



**TABLE 6**  
**PID SCREENING RESULTS - GEOPROBE BORINGS**

Depth Interval (feet)	GP-1	GP-2	GP-3
3-5'	NS	0.0	0.0
5-7'	0.0	NA	0.1
8-10'	0.0	0.0	0.4
13-15'	0.0	0.0	0.1
18-20'	0.0	0.0	0.4
23-25'	0.0	0.8	0.7
28-30'	0.4	NS	NS

**NOTES:**

NS = No sample collected from specified interval.

PID readings obtained using Photoionization detector (PID) equipped with a 10.6 eV lamp.

Bold line indicated termination depth of boring. Shaded portions indicate depths below the termination depth.

**TABLE 7  
SOIL AND GROUND WATER ANALYTICAL RESULTS - FORMER PESTICIDE MANUFACTURING BUILDING**

Parameter	Units	GP-1		GP-2		GP-3	
		8-10'	18-20'	8-10'	18-20'	8-10'	18-20'
Total Arsenic	mg/kg or mg/L	ND (8.0)	NA	ND (8.0)	NA	120	NA
Organochlorine Pesticides	ug/kg or ug/L	ND*	ND*	ND*	ND*	ND*	ND*

**NOTES:**

NA = Not analyzed.

ND = Not detected at or above method detection limit indicated in parenthesis.

\* = All organochlorine pesticide compounds were not detected. Method detection limits for the pesticide individual compounds vary.

mg/kg = milligrams/kilogram.

ug/L = micrograms/liter.

ug/kg = micrograms/kilogram.



SCALE IN MILES



0 0.5 1.0

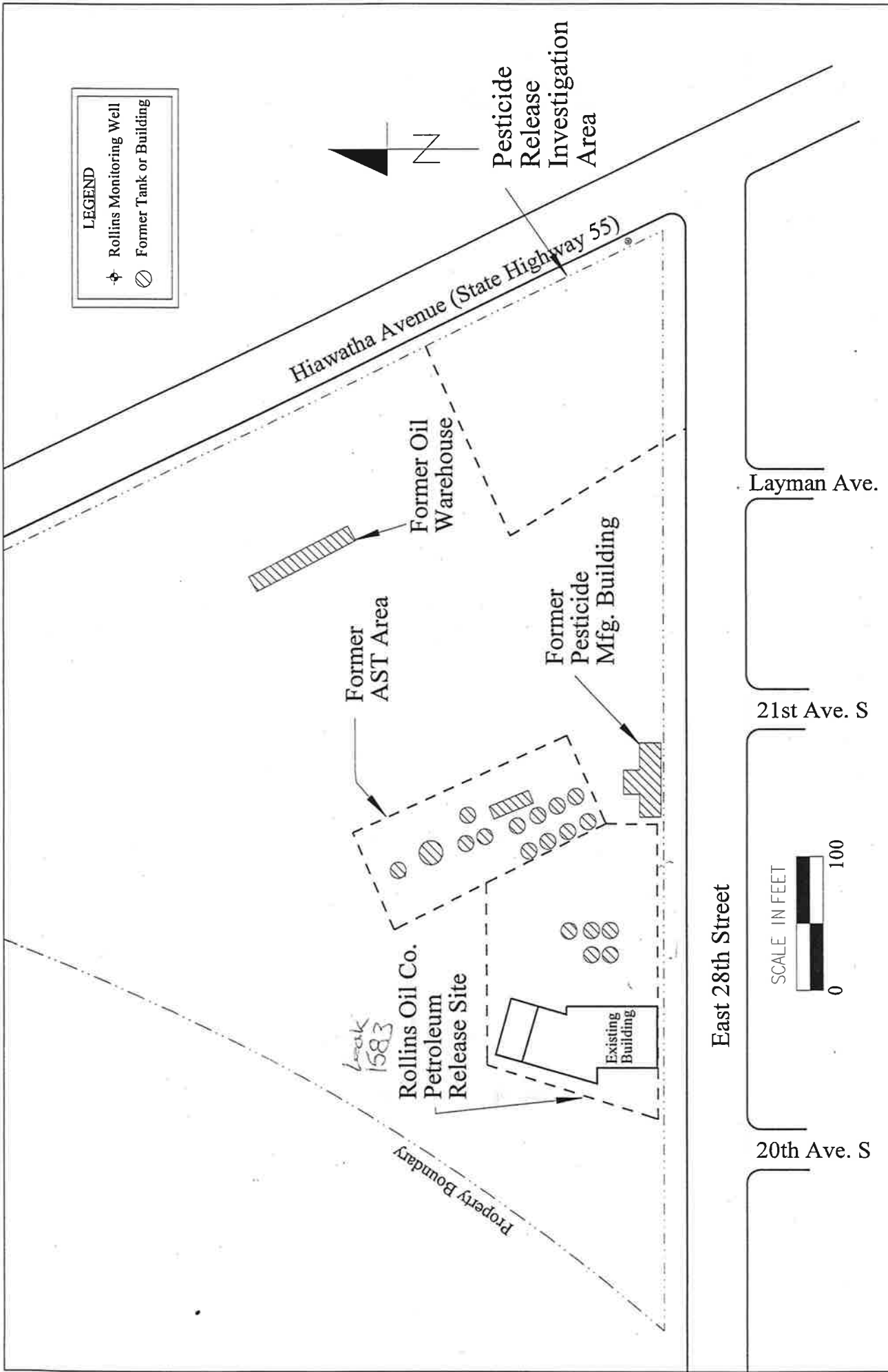
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 Engineering Resources, Inc.  
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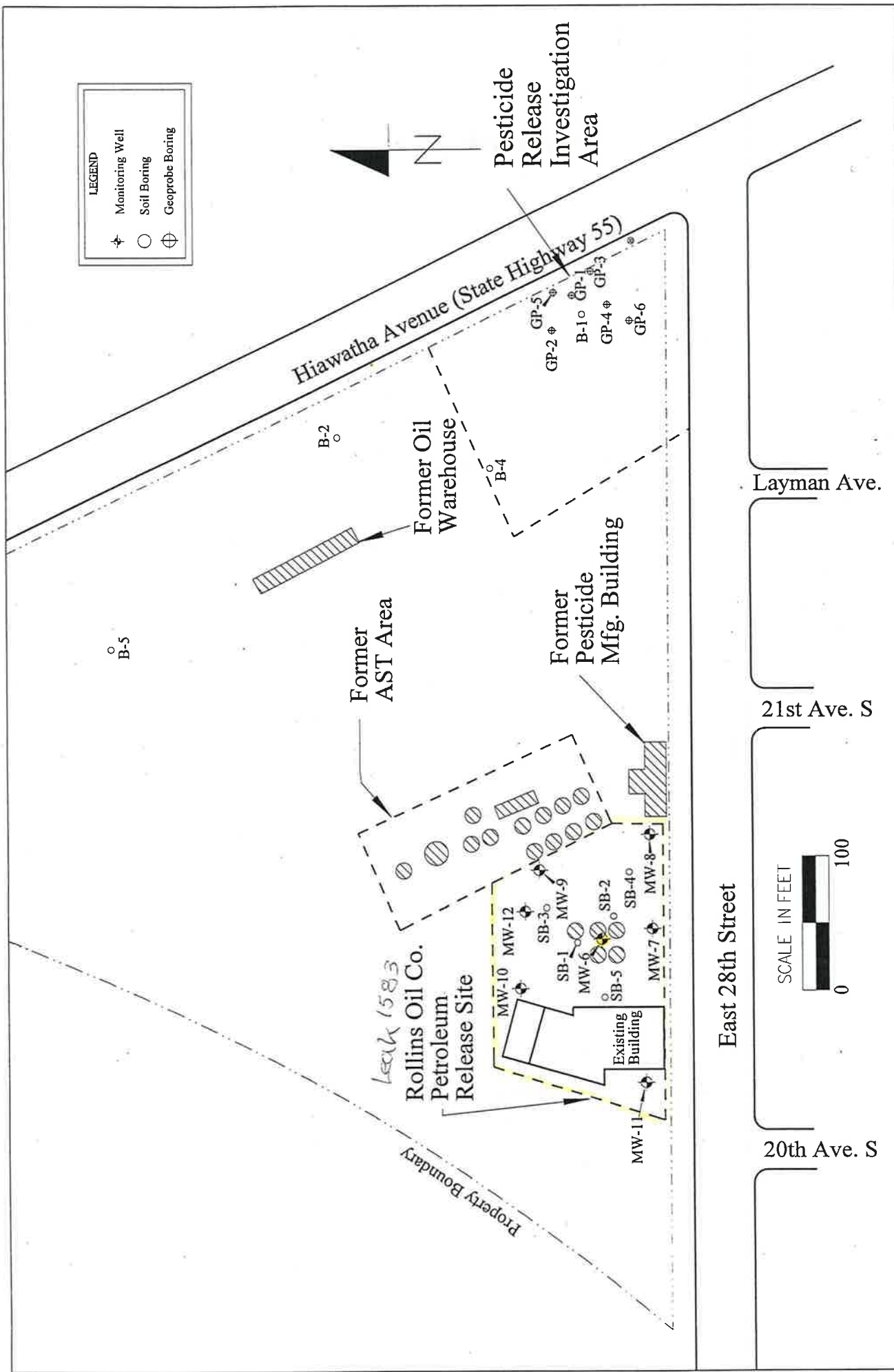
Site Location Map  
 CMC Heartland Partners Property  
 East 28th Street and State Highway 55  
 Minneapolis, Minnesota

December 95



Current and Historical Site Features  
 CMC Heartland Partners Property  
 East 28th Street and State Highway 55  
 Minneapolis, Minnesota

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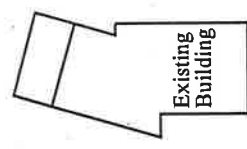
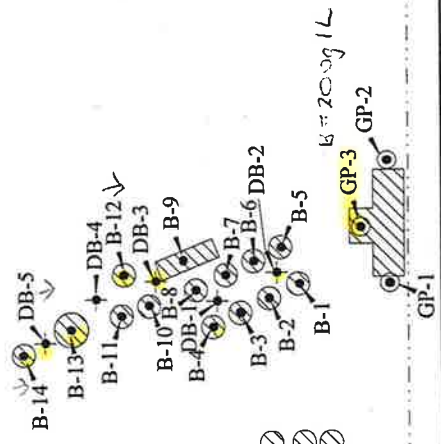
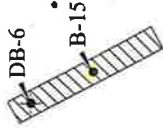
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**LEGEND**

- 5' Soil Boring
- ⊕ 30' Soil Boring
- ⊙ Geoprobe
- ⊕ Monitoring Well
- ⊘ Former Tank or Building



Hiawatha Avenue (State Highway 55)



Property Boundary

Layman Ave.

21st Ave. S

East 28th Street

20th Ave. S



Dec. 95

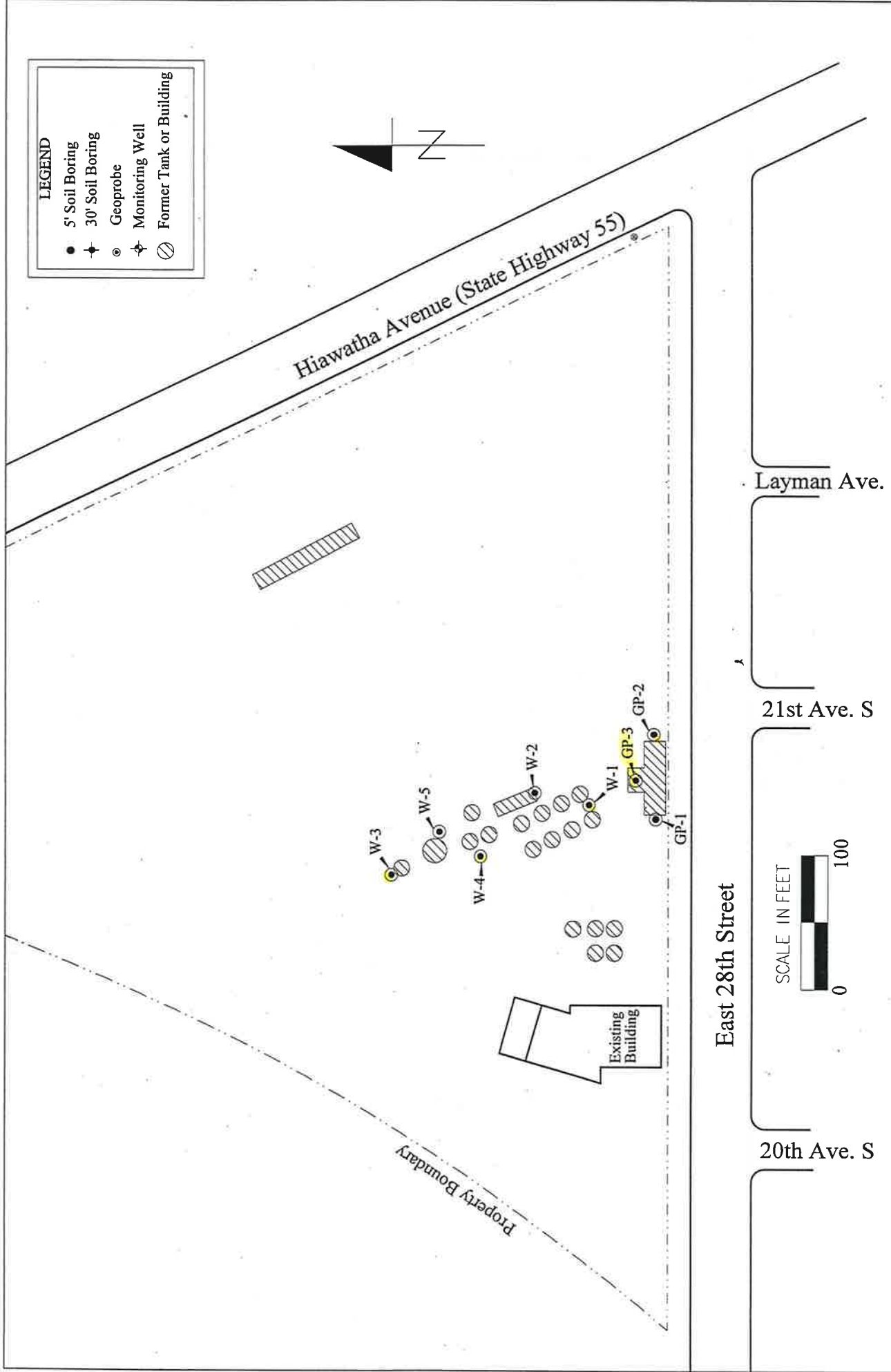
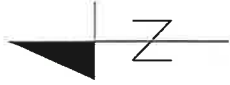
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Soil Investigation Activities  
 CMC Heartland Partners Property  
 East 28th Street and State Highway 55  
 Minneapolis, Minnesota

Peer Environmental &  
 Engineering Resources, Inc.  
 Minneapolis, Minnesota

**LEGEND**

- 5' Soil Boring
- ⊕ 30' Soil Boring
- ⊙ Geoprobe
- ⊕ Monitoring Well
- ⊘ Former Tank or Building



Dec. 95

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Ground Water Investigation Activities  
 CMC Heartland Partners Property  
 East 28th Street and State Highway 55  
 Minneapolis, Minnesota

Peer Environmental &  
 Engineering Resources, Inc.  
 Minneapolis, Minnesota

**LEGEND**

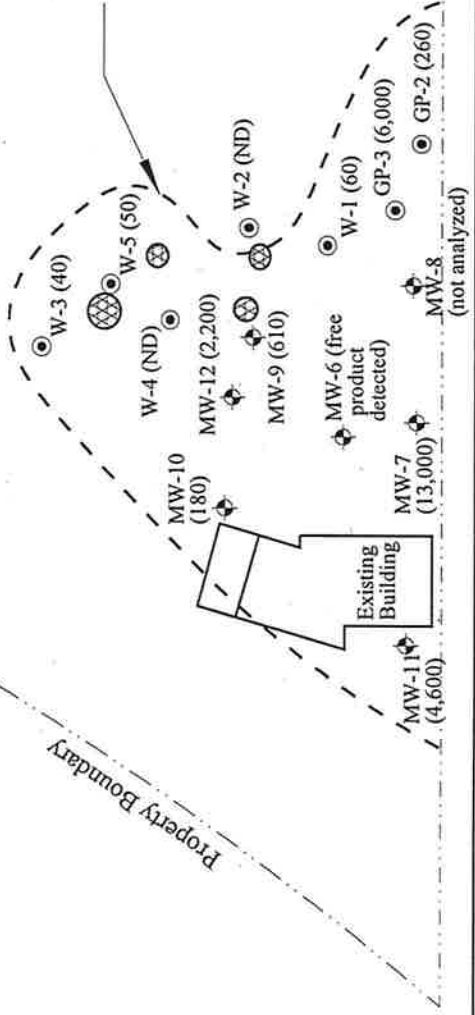
- ◆ Monitoring Well
- Geoprobe
- ⊗ Identified areas with petroleum impacted soil
- (40) DRO Concentration in ug/L



**Note:**  
 DRO results for monitoring wells from May 5, 1995 sampling event conducted by Rollins Oil Co.

Hiawatha Avenue (State Highway 55)

Approximate Area of Petroleum Impacted Ground Water



Layman Ave.

21st Ave. S

East 28th Street



20th Ave. S

**Peer Environmental & Engineering Resources, Inc.**  
 Minneapolis, Minnesota

**Areas With Identified Soil and Ground Water Impacts**  
 CMC Heartland Partners Property  
 East 28th Street and State Highway 55  
 Minneapolis, Minnesota

Dec. 95

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