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OPERATIONS CENTER 9 Monroe Street • Troy, NY 12181
Tel: 518-266-0542 Fax: 518-266-1296

COPY

SUBSURFACE INVESTIGATION REPORT

Site Location:

City of Troy: Former Sperry Warehouse Site
King Street
City of Troy
Rensselaer County, New York
Spill No: 98-15284

Prepared For:

King Fuels, Inc.
King Road
Troy, New York 12081

Prepared By:

North American Environmental, Inc.
9 Monroe Street
Troy, New York 12180
(518) 226-0542

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**City of Troy: Former Sperry Warehouse Site
King Street
Troy, New York**

TABLE OF CONTENTS

	<u>Page</u>
1.0 Introduction	3
2.0 Objectives	3
3.0 Site Description	3
4.0 Scope of Work	4
4.1 Soil Borings	4
4.2 Soil Sample Collection	5
4.3 Monitoring Well Installation and Construction	5
4.4 Groundwater Sampling	6
5.0 Results of Investigation	6
5.1 Regional Geology/Hydrology	6
5.2 Site Geology/Hydrology	7
5.3 Field Screening Results	8
5.4 Soil Analytical Results	9
5.5 Groundwater Analytical Results	10
6.0 Conclusions	10

TABLES

Table 1 - Soil Sample Analytical Results: March 25-30, 1999

Table 2 - Metals in Soil Samples: Analytical Results: March 25-30, 1999

Table 3 - Water Sample Analytical Results: March 25-30, 1999

FIGURES

Figure 1 Site Location Map

Figure 2 Site Plan with Well & Boring Locations

APPENDICES

Appendix A Soil Borings

Appendix B Laboratory Analytical Results

1.0 INTRODUCTION

Between March 25 and 30, 1999, North American Environmental Services (NAES), Inc, under contract to King Fuels, Inc, performed a subsurface investigation to assess the soil and groundwater quality at the City of Troy property located along the east side of King Street for the purposes of a property transaction. The location of the site is shown in Figure 1. A site plan, showing the approximate location of the buildings, roads, and borings/monitoring wells is enclosed as Figure 2.

2.0 OBJECTIVES

The objectives of the site investigation were the following:

- to characterize the soil beneath the site;
- to determine if there is any petroleum contamination in the soil;
- to determine if there is any petroleum contamination in the groundwater;
- and, if so, to define and characterize it within the limits of the scope of this investigation.

3.0 SITE DESCRIPTION

The site, which is located on the east side of King Street, south of Main Street, is a large relatively level plot of land with two buildings. Various companies have used the buildings over the years including an iron works, a package carrier company, a storage company, and a wood working company. The land around the buildings is unkept lawn or field with some brush and small trees, outside storage areas, or parking and access ways. The area along the Wynantskill Creek, which borders the southern portion of the property is forested. Water and sewage is provided to the property by the City of Troy.

4.0 SCOPE OF WORK

The objectives of the site investigation were the following:

- Installation of seven soil borings around the property;
- Soil sample collection every five feet using a split spoon sampler. Between the split spoon sampling, soil samples were collected from the drill cuttings;
- Field screening of soil samples collected during drilling to assess the level of petroleum contamination in the soil;
- Installation of wells at contaminated boring locations at the approval of the City of Troy;
- Collection of water samples from each boring location;
- Submission of soil and water samples to the laboratory for analysis
- Preparation of report summarizing the methods used, the data collected, and the results and conclusions.

4.1 SOIL BORINGS

The subsurface investigation was started on March 25 and completed on March 30, 1999. Seven test borings were drilled at the site utilizing a trailer mounted RAM hollow stem auger drill rig. Soil samples were collected every five feet by augering to a discreet depth, withdrawing the plug from the interior of the augers and inserting a hollow, two foot long split spoon sampler within the augers. The split spoon was driven into the undisturbed soil beneath the lead auger using a 140 pound hammer falling a vertical distance of 30 inches. The split spoon was withdrawn and opened and each soil sample was measured and characterized. Part of each sample was deposited into a resealable plastic bag half full for field screening. The rest of the sample filled glass jars for later possible submission to the laboratory for analysis.

4.2 SOIL SAMPLE COLLECTION

The soil exhibiting the highest PID readings from each boring was selected for laboratory analysis. In addition, if elevated levels of VOCs were recorded in the soil, a sample of the soil beneath the "hot" sample was also collected to document the depth of the contamination. Since all of the PID readings of the soil collected from B-4, B-5, and B-6 were less than 3.5 ppm, only one sample was collected from each of these three borings.

Each of the soil samples were collected in clean, 8-ounce Teflon sealed jars and put on ice until submitted under chain-of-custody to SciLab of Albany, located at 15 Century Hill Drive in Latham, New York. Soil samples were analyzed for VOCs using EPA Method 8021, semi-volatile organic compounds (SVOCs), and eight RCRA metals according to the New York State "STARS Memo" #1 guidelines. The laboratory report of the analytical results is enclosed in Appendix B.

4.3 MONITORING WELL INSTALLATION AND CONSTRUCTION

The soil borings were installed to 17 to 20 feet below grade. Monitoring wells were constructed in six of the seven borings. No monitoring well was installed in B-5 because there was no indication of contamination in the soil or groundwater at the time of the drilling, and a well had been installed by others just southwest of the location of B-5.

The lower ten to 15 feet of each well was constructed of 0.01" machine slotted Schedule 40 PVC well screen. The top portion of each well was constructed with threaded solid

Schedule 40 PVC well riser. The annular space between the borehole wall and the well was backfilled with No. 0 sand as the augers were withdrawn from the borehole. The sand filter was installed to approximately one foot above the top of the well screen, and then sealed with approximately one to two feet of bentonite. The remainder of the borehole was backfilled with clean, native backfill. The well was completed with a standpipe grouted in place to protect the PVC pipe extending above grade. After construction of the wells, they were developed using a manual surge and bail technique with a dedicated bailer until visual clarity was attained. The development was performed to remove excess sediment from the well and to insure adequate hydraulic conductivity between the newly installed well and the native formation.

4.4 GROUNDWATER SAMPLING

Using standard sampling techniques, a groundwater sample was collected for analyses from each of the borings after purging each well of three to five well volumes. The groundwater samples were collected in three, 40 ml. Teflon capped vials, preserved with HCl, and stored on ice until transported to SciLab of Albany. The groundwater samples were analyzed for VOCs using EPA Methods 8021 and 8270.

5.0 RESULTS OF INVESTIGATION

5.1 REGIONAL GEOLOGY/HYDROLOGY

According to the "Roadside Geology of New York" (Van Diver, 1985), the bedrock in the vicinity of Troy consists of Paleozoic sedimentary rocks, primarily shales, siltstones and sandstones. No bedrock was encountered during the drilling at the site.

The nearest surface water is the Wynantskill Creek, which borders the southern boundary of the property, and the Hudson River to which it discharges, which is approximately 600 feet east of the site.

5.2 SITE GEOLOGY/HYDROLOGY

Based on the information gathered during the subsurface investigation, the site is covered by a black gravel fill with cinders, chunks of iron ores, cobbles, slag, cinders, wood fragments, foundry sand, pieces of fire bricks and red bricks, ashes, and some silt. Composition varies slightly around the site. A heavy creosote odor was found in the fill at MW-7. A fuel oil odor was observed at the MW-1 location. Brown or gray clay was found at depths of between 14 and 17 feet at the site, with the exception of the clay found at a depth of ten feet at MW-1 and no clay found within the first twenty feet at MW-4.

Groundwater was reported at depths of between ten and 12 feet below grade throughout most of the site during drilling, with the exception of the groundwater found in the boring at MW-3 at 5.5 feet below grade and in the boring at MW-2 at seven feet below grade. It is assumed that groundwater is moving toward and with the river resulting in a southwesterly flow. The westerly flowing Wynantskill Creek effects the groundwater movement along the south boundary of the site, where it is located.

5.3 FIELD SCREENING RESULTS

During the subsurface investigation, after the characteristics of each soil sample collected were recorded, a portion of each recovered soil sample was deposited into resealable bags. Vapors from the soil were allowed to collect in the headspace of the bag. The probe of a 10.2 eV photoionization detector (PID) calibrated to a 100 ppm hydrocarbon standard was inserted into the headspace vapors within the bag, and the PID was used to screen the soil samples for total volatile organic compounds (VOCs).

The results of the headspace analysis performed in the field indicated that PID readings of soil vapors from the soil samples collected from soil borings indicated on the map as MW- 4, B-5, and MW-6 were all less than 4 ppm.

Elevated PID readings (>5 ppm) were reported in the remaining borings as follows:

<u>Boring No:</u>	<u>Depth</u>	<u>PID Reading</u>
MW-1	10-12'	88 ppm
	15-17'	14.6 ppm
	17-20'	27 ppm
MW-2	0-17'	15 - 26 ppm (26 ppm at 10-12')
MW-3	0-17'	14 - 113 ppm (113 ppm at 10-12')
MW-7	0-17'	0.9 - 48.8 ppm (48.8 ppm at 15-17'); below 5 ppm at 5-10', 12-15', & 17-20')

The results of the soil characterization and the headspace analysis are recorded on the soil boring logs, which are enclosed in Appendix A.

5.4 SOIL ANALYTICAL RESULTS

Analytical results indicated that no petroleum compounds were detected above the laboratory method detection levels in the soil samples collected from B-2 at depths of 10-17 feet below grade, B-3 at depths of 16-17 feet below grade, B-4 at depths of 10-15 feet below grade, B-5 at depth of 10-15 feet below grade, or from B-6 at depths of 15-17 feet below grade.

Several petroleum compounds were detected above their respective New York State "STARS Memo #1" guidance values in the soil samples collected from B-1 at depths of 10-20 feet below grade, B-3 at depths of 7-10 feet below grade and from B-7 at depths of 15-18 feet below grade. Lighter volatiles (benzene, toluene, ethylbenzene, and xylenes or BTEX) were reported in the soil samples collected from B-7 from 15-18 feet below grade. Heavier volatiles (isopropylbenzene to naphthalene) were reported in the soil samples collected from B-1 from 10 -12 feet below grade, from B-3 from 7-10 feet below grade, and at B-7 from 15-17 feet below grade. Semi-volatiles were reported in the soil from B-1 at 17-20 feet below grade, and from B-7 at 15 to 18 feet below grade.

In addition, the soil samples submitted were tested for the eight RCRA metals. The results indicated possible elevated levels of chromium at each boring location. Elevated arsenic levels were reported at all locations except B-1 at a depth of 10 -12 feet below grade; and at B-5 at a depth of 15-17 feet below grade. Possible elevated levels of cadmium were reported at B-4 at a depth of 10 to 15 feet below grade.

The laboratory results of the soil sample analyses are summarized in Tables 1 and 2. The laboratory report is enclosed in Appendix B.

5.5 GROUNDWATER ANALYTICAL RESULTS

Groundwater samples were collected from each of the seven borings and analyzed for VOCs and MtBE using EPA Methods 8021 and 8270. Analytical results indicated that none of the petroleum compounds tested for were detected above the Ambient Groundwater Quality Guideline Values in the groundwater samples collected from monitoring wells MW-1, MW-2, MW-3, and MW-6. Slightly elevated levels of benzene, above the guidance value of 0.7 ppb, were reported in the groundwater collected from MW-4 (0.8 ppb) and B-5 (5 ppb). Elevated levels of several petroleum hydrocarbons were reported in the groundwater collected from MW-7. The laboratory results of the groundwater sample analyses are summarized in Table 3. The laboratory report is enclosed in Appendix B.

6.0 CONCLUSIONS

Based upon the data collected during the field work and results of the analyses, North American Environmental Services, Inc. has drawn the following conclusions.

- 1) Groundwater flow is assumed to be to the south, and west, toward and with the Hudson River. The Wynantskill Creek effects the groundwater movement on the site along the southern boundary, where it is located. It also is assumed to effect groundwater movement to the south and west. The depth to groundwater at the site was generally found to be ten to 12 feet below grade during the drilling, with the exception of MW-2, where it was reported at seven feet below grade and at MW-3, where groundwater was reported at 5.5 feet below grade.

- 2) Soil at the site is a black gravel fill with cinders, chunks of iron ores, cobbles, slag, cinders, wood fragments, foundry sand, pieces of fire bricks and red bricks, ashes, and some silt. Composition varies slightly around the site. Brown or gray clay was found at depths of between 14 and 17 feet at the site, with the exception of the clay found at a depth of ten feet at MW-1 and no clay found within the first twenty feet at MW-4.
- 3) Several petroleum compounds were detected above their respective New York State "STARS Memo #1" guidance values in the soil samples collected from B-1 at depths of 10-20', B-3 at depths of 7-10' and from B-7 at depths of 15-18'. Soil collected from B-1 and B-7 was contaminated to depths of 20 and 18 feet respectively. Soil collected from B-3 was contaminated to a depth of between 10 and 16 feet below grade. At a depth of 16 feet, the soil was not contaminated with petroleum hydrocarbons at B-3.
- 4) Possible elevated levels of arsenic and chromium were reported in the majority of the soil collected at the site. Cadmium was also reported at slightly elevated levels (2 ppm) in the soil collected from B-4.
- 5) Slightly elevated levels of benzene, above the guidance value of 0.7 ppb, were reported in the groundwater collected from MW-4 (0.8 ppb) and B-5 (5 ppb). Elevated levels of several petroleum hydrocarbons were reported in the groundwater collected from MW-7.