

GEOTECHNICAL NOV 13 2001

**PRELIMINARY SITE ASSESSMENT
MILLER MART #4
ROUTE 34 AND US HIGHWAY 158, BOX 284
CAMDEN COUNTY, NORTH CAROLINA
STATE PROJECT NO. 8.T020401 (R-2414B)**

GEOTECHNICAL NOV 13 2001

**Prepared for:
NCDOT Geotechnical Unit
PO Box 25201
Raleigh, North Carolina 27611-5201**

**Prepared by:
Solutions Industrial & Environmental Services, Inc.
3722 Benson Drive
Raleigh, North Carolina 27609**

Solutions Project No. 0870.01A3.NDOT



Christie Zawacki
Christie Zawacki, P.E.
Environmental Engineer

Gary M. Birk
Gary M. Birk, P.E.
Senior Engineer

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1.0 INTRODUCTION

The NCDOT is planning improvements to U.S. Highway 158 in Camden County which will require acquiring property for new highway construction. On September 26, 2001, Solutions Industrial & Environmental Services, Inc. (Solutions-IES) submitted proposal NC01892P to the NCDOT for conducting preliminary site assessments (PSAs) on seven parcels of land sited within the planned construction area along U.S. Highway 158 in Camden, North Carolina. This report summarizes the results of file review and field activities conducted for one of the parcels, Miller Mart #4, located at Route 34 and U.S. Highway 158, Camden County, Camden, NC.

2.0 BACKGROUND

The Miller Mart #4 site is located at the intersection of Route 34 and U.S. Highway 158 in Camden, NC (Figure 1). Based upon our file review at the NCDENR Washington Regional Office (WaRO), previous investigation activities have not been conducted at the site. Solutions-IES conducted an assessment to evaluate the subsurface conditions within the portion of the property that NCDOT intends to acquire.

As shown on Figure 2, the site is located on the east side of U.S. Highway 158 in Camden, NC. According to drawings provided by the NCDOT, the property is owned by Wallace Cahoon. The site is currently a convenience store and Exxon gasoline station. Three gasoline USTs greater than 3500 gallons in size are located on the property. The UST Facility ID for the site is 0-026793, and the UST permit number is 2001019270. The UST permit was posted inside the store on the day of the site visit and indicated an expiration date of December 2001. The permit also identified Miller Oil as the UST owner.

3.0 FIELD ACTIVITIES

Field activities consisted of collecting and analyzing soil and groundwater samples from areas within the proposed highway expansion area at the site. The field activities were conducted by Solutions-IES on October 10 and 12, 2001. Photographs were taken to document site conditions during the assessment activities. The site photographs are included in Appendix A.

Prior to beginning subsurface sampling, Solutions-IES personnel spoke with the store manager to notify him of the proposed sampling activities. Solutions-IES also contacted Carolina No-Cuts to identify utilities on the subject property.

After clearing the utilities on the property, Solutions-IES collected subsurface samples using a Geoprobe®. Samples were collected at five boring locations, identified as GP-1D through GP-5D. The locations of the Geoprobe® borings are indicated on Figure 2.

The Geoprobe® borings were advanced to a total depth of 2.4 m (8 feet) below ground surface (bgs), which was below the groundwater table. Continuous soil cores were collected from each boring using a Macro® Sampler. Upon removal from the ground, the cores were cut into 2-foot lengths. Soil from each 2-foot interval was further split into two identical portions. Each portion was placed in a separate resealable plastic bag. One bag was placed on ice for possible laboratory analysis, while the other bag was sealed and placed at ambient temperature for field screening with an organic vapor analyzer (OVA).

The soil samples were examined for soil type and the presence or absence of petroleum staining or odor. After a period of approximately 20 minutes, which allowed for the accumulation of volatile organic compounds (VOCs) in the headspace of the bags, each sealed bag left at ambient temperature was scanned with the OVA. A background reading was taken with the OVA prior to measuring VOC concentrations in the bags. The readings of the VOC concentrations in the headspace were then entered on the boring log along with a soil description and any indications of petroleum staining or odor (Appendix B). The results of the OVA field screenings are summarized on Table 1.

Based on field observations and OVA readings, Solutions-IES submitted five soil samples from selected boring locations and depths for laboratory analysis. In general, the split samples, which had been stored on ice in the cooler, with corresponding elevated OVA readings were selected for submittal to Prism Laboratories, Inc. in Charlotte, NC. Soil samples were not submitted for laboratory analysis from boring locations where there were no field-observable indications of petroleum hydrocarbons (i.e., staining, odor, or OVA readings substantially above background). The samples submitted to the laboratory were analyzed for total petroleum hydrocarbons (TPH) as both gasoline-range organics (GRO) and diesel-range organics (DRO) using EPA SW-846 methods 5030 and 3550, respectively.

Solutions-IES also collected a groundwater sample (GW-1D) from the Geoprobe boring location that indicated the highest OVA readings, GP-5D. The groundwater sample was collected in 40-mL VOA

vials for volatile organic compound (VOC) analysis via EPA Method 8260B plus isopropyl ether (IPE) and methyl *tert*-butyl ether (MTBE).

Following completion of the soil and groundwater sampling activities, the Geoprobe borings were abandoned by completely filling each boring with soil and sand. Borings completed in paved areas were finished at the surface to match pre-existing conditions.

4.0 LABORATORY RESULTS

The analytical laboratory results for the soil and groundwater samples are summarized in Tables 2 and 3, respectively. Copies of the laboratory reports are provided in Appendix C.

TPH-DRO compounds were detected at concentrations above the laboratory method detection limits in only two soil samples. The soil samples collected from boring GP-1D at a depth of 0.6 to 1.2 m bgs and from boring GP-5D at a depth of 1.2 to 1.8 m bgs indicated concentrations of 13 mg/kg and 12 mg/kg, respectively. TPH-GRO compounds were not detected above the laboratory method detection limits in any of the soil samples submitted for analysis. Neither TPH-DRO nor TPH-GRO concentrations exceed the action levels for soil as identified in the NCDENR, Groundwater Section *Guidelines for the Investigation and Remediation of Soil and Groundwater* (NCDENR, July 2000). However, the TPH-DRO concentrations exceed the UST closure level of 10 mg/kg.¹

The groundwater sample (GW-1D) collected from boring GP-5D indicated concentrations of benzene, ethylbenzene, IPE, MTBE, naphthalene, toluene, 1,2,4-trimethylbenzene and total xylenes above the 15A NCAC 2L .0202 groundwater standards (NC 2L standards). 1,3,5-Trimethylbenzene was also detected at a concentration of 270 µg/L; however, this concentration is below the 2L standard of 350 µg/L. Phase-separated hydrocarbons were not observed on the groundwater surface.

5.0 DISCUSSION

Subsurface assessment activities conducted at the Miller Mart #4 site revealed that soil and shallow groundwater (~ 1.8 m bgs) in the area between the fueling island and existing U.S. Highway 158 have been impacted by a release of petroleum hydrocarbons. This area is within the proposed highway expansion area. This apparent release is previously unreported and no prior environmental assessments

¹ NCDENR, Division of Waste Management, UST Section *Guidelines for Tank Closure*, December 2000.

are on file in the WaRO. The source of the release (i.e., fuel pumps, underground piping or underground storage tanks) is undetermined.

Within the assessment area, field observations (i.e. odor) and OVA measurements of soil samples suggested petroleum contamination in the unsaturated shallow soil. However, laboratory results from samples with elevated OVA readings confirmed only low concentrations of TPH-DRO compounds in the soil at two locations and no evidence of TPH-GRO in any samples. In contrast, the groundwater sample indicated concentrations of multiple VOC compounds above the NC 2L standards.

The current assessment was limited to evaluating the presence or absence of petroleum contamination in the area of proposed highway construction at the site. Based on field observations and laboratory data, Solutions-IES attempted to estimate the volume of soil that may be impacted at the site. Solutions-IES established a TPH threshold value of 10 mg/kg as a conservative indicator concentration of soil contamination that would likely have to be remediated with the understanding that:

- any detectable TPH concentrations are reportable;
- additional assessment activities may be required to define the nature and extent of the releases; and
- additional testing using Massachusetts Department of Environmental Protection (MADEP) Methods for the determination of Volatile and Extractable Petroleum Hydrocarbons (VPH and EPH) would be required to establish the Maximum Soil Contaminant Concentrations (MSCCs) for each of the hydrocarbon fractions²

Figure 3 shows our estimate of the lateral extent of soil impact within the proposed construction area. In general, the lateral extent was estimated as the midpoint between impacted and non-impacted boring locations. Using the limited data, Solutions-IES attempted to estimate the volume of affected soil in each area. The impacted area appears to be approximately 12 m by 11m within the proposed construction area. As a conservative estimate, Solutions-IES assumed that the soil was impacted from a depth of approximately 0.6 m bgs to the water table at 1.8 m, resulting in approximately 158 cubic meters (~207 cubic yards). Additional sampling would be required to better estimate the extent of petroleum impact at the site.

No effort to delineate the vertical or lateral extent of contamination in groundwater was proposed or conducted. Without additional monitoring points, the direction of groundwater flow could not be

² *Guidelines for Corrective Action, North Carolina Underground Storage Tank Section, Effective July 1, 2001*, State of North Carolina, Department of Environment and Natural Resources, DWM, UST Section, April 2001.

determined. However, based on the shallow topographic relief and apparent contamination toward U.S. Highway 158, it is inferred that groundwater is flowing to the west-northwest.

6.0 CONCLUSIONS AND RECOMMENDATIONS

This PSA was performed on behalf of the NCDOT for Miller Mart #4 located at the intersection of Route 34 and U.S. Highway 158, Camden County, NC. Based upon our file review, field observations at the time of our site visit, and laboratory results, we offer the following conclusions:

- Soils within the proposed highway expansion area appear to have been impacted by petroleum hydrocarbons in the vicinity of the fuel dispensers at the site. The laboratory results suggest that additional assessment or remedial action may be necessary. Based on the limited data, approximately 158 cubic meters appear to be impacted within the proposed highway expansion area. Additional sampling would be needed to better estimate the volume of affected soil.
- Shallow groundwater (~1.8 m bgs) near the fuel dispensers is impacted with benzene, ethylbenzene, IPE, MTBE, naphthalene, toluene, 1,2,4-trimethylbenzene, and total xylenes at concentrations above the NC 2L groundwater standards within the proposed highway expansion area. The horizontal and vertical extent of contamination was not defined by the scope of this assessment. However, it is inferred that shallow groundwater further west and northwest beyond the areas of this assessment and beneath NCDOT's proposed work area are also impacted. Remediation of the groundwater contamination may be required in the future.