INITIAL SITE CHARACTERIZATION REPORT

PADEP #02-0683
Kwik Fill Station S-124
106 State Street
Sunbury, Pennsylvania

Prepared for:

UNITED REFINING COMPANY OF PENNSYLVANIA
P.O. Box 599
Warren, Pennsylvania

Prepared by:

Groundwater & Environmental Services, Inc.
220 Executive Drive, Suite 500
Cranberry Township, Pennsylvania

Thomas Rebar
Geologist

Mark E. Skrobacz, P.G.
Site Operations Manager

August 1998

TABLE OF CONTENTS

INITIAL SITE CHARACTERIZATION REPORT

PADEP #02-0683
Kwik Fill Station S-124
106 State Street
Sunbury, Pennsylvania

1.0 INTRODUCTION

Groundwater & Environmental Services, Inc. (GES) was contracted by United Refining Company of Pennsylvania (UPA) to perform an initial Site Characterization (SC) at a gasoline retail facility located in Sunbury, Pennsylvania (Kwik Fill S-124). The purpose of the SC was to assess potential subsurface hydrocarbon impacts in soil and groundwater. The initial SC was performed after a petroleum release was confirmed when an underground storage tank (UST) failed a tank tightness test on 25 November 1997. UST closure activities were completed in May 1998.

The following sections present site background information and land use descriptions of adjoining properties. Subsequent sections describe the investigative methods and results. The report concludes with a technical summary of site conditions.

2.0 SITE LOCATION AND SETTING

The site is located at 106 State Street, Sunbury, Pennsylvania (Figure 1, Generalized Site Plan). The property is an active Kwik-Fill retail gasoline facility located in the Pennsylvania Department of Environmental Protection (PADEP) northcentral regional office. Mr. Thomas Yannacone is the regional PADEP contact person.

In addition to the three 10,000-gallon gasoline USTs, site features include a pump island, and a single story convenience store (Figure 1, Generalized Site Plan). The site is located within the Shamokin Creek floodplain, approximately two miles northeast of the confluence formed with the Susquehanna River.

Adjacent properties include a railroad to the north, the City of Sunbury Water Treatment Plant to the northeast, residences and commercial establishments to the west and south. The nearest surface water consists of various ponds and tributaries situated within the floodplain of Shamokin Creek (Figure 2, Surrounding Properties Plan).

3.0 BACKGROUND

3.1 Underground Storage Tank Closure

GES monitored the UST closure activities performed by Perry Petroleum Equipment Company during 27 May through 2 June 1998. Closure activities included the removal of three 10,000-gallon

gasoline USTs. A total of nine soil samples were collected from beneath each tank (three samples per tank) for laboratory analysis. Laboratory analyses included parameters set forth under PADEP UST closure document for unleaded gasoline. All soil sample results were below laboratory detection limits and below PADEP Act 2 statewide health standards.

PADEP was notified of a petroleum release on 28 June 1998. A UST closure report is pending. As a result of the petroleum impacts, approximately 845 tons of soil was excavated and transported by Clean Rock Industries Inc. in June 1998 to their Hagerstown, Maryland facility for disposal/recycling.

4.0 CURRENT FINDINGS

GES performed an initial SC that included a survey of potential sensitive receptors, installation of five soil borings, four monitor wells, soil and groundwater sampling and analyses, and a monitor well casing survey. The methodologies used and results of these activities are discussed below.

4.1 Potential Sensitive Receptors Survey

Several residences with basements are located immediately south of the site across State Street from the facility (Figure 2). Miscellaneous utility lines (i.e., water, sewage) exist beneath and adjacent to the site.

The nearest surface water is Little Shamokin Creek, located approximately 300 feet to the north of the site. The main channel of Shamokin Creek is located approximately 700 feet to the west of the site and flows south toward the Susquehanna River.

The site and general area receive potable water supplies from the City of Sunbury Water Department. Their water source is the Susquehanna River, with intakes located approximately 1.5 miles west and northwest of the site. No private or public potable water supply wells are known to be located within 2,000 feet of the site.

4.2 Geology

Bedrock in the general area is mapped as the Hamilton Group, which is comprised of the Marcellus and overlying Mahantango Formations. In general, these rocks consist of siltstone, fine-grained sandstone and dark, fissile shale. Maximum thickness of the Hamilton Group is approximately 2,200 feet.

4.3 Hydrogeology

Available subsurface water supplies at the site and surrounding area consist of that stored in the pore space of the underlying sediments and secondary openings within the consolidated sedimentary bedrock. Primarily, groundwater in the study area is sustained by flow fractures of the sedimentary bedrock and recharged directly by water from streams and surface water infiltration.

4.4 Soil Borings and Sampling

An on site assessment of potential subsurface petroleum impacts was performed by advancing five soil borings and converting four borings into monitor wells.

4.4.1 Soil Borings

On 7 May 1998, five soil borings were installed by BL Myers, Inc. using air rotary drilling techniques with an 8-inch diameter tri-cone drill bit (Figure 3, Soil Boring/Monitor Well Location Plan). Soil borings MW-1, MW-2, MW-3, MW-4, and SB-1were drilled to 19, 20, 20, 14, and 15 feet below ground surface (bgs), respectively. During drilling, soil samples were collected from the drill cuttings in all borings for general lithologic description and screened for volatile organic vapors using a photoionization detector (PID).

Soils consisted of fill material (e.g. slag and gravel) across the site at an average depth of approximately eight feet bgs. Shale bedrock was encountered beneath the fill material to the limit of each boring.

PID readings ranged from 3 ppm in SB-1 to 1400 ppm in MW-2. The Drilling Logs summarize all soil boring information and included as Attachment A.

All drill cuttings were stockpiled on site and covered with clean plastic sheeting, sampled, and transported off site for disposal/recycling at Clean Rock, Hagerstown, Maryland.

4.4.2 Soil Sampling

One soil sample in each boring was collected for laboratory analysis. All samples were immediately placed on ice in laboratory supplied containers to maintain a temperature of 4° C. Each sample was wrapped with bubble packing to prevent breakage and shipped overnight via Federal Express to Lancaster Laboratories, Inc. (Lancaster) of Lancaster, Pennsylvania for benzene, toluene, ethylbenzene, xylenes, (BTEX), methyl tert-butyl ether (MTBE), napthalene, and cumene via EPA Method 8260B analyses. As required, sample integrity was maintained by a Chain of Custody (COC) form to provide a closed loop from the time the samples were collected in the field until they arrived at the laboratory. A copy of the COC is included with the laboratory report as Attachment B.

4.4.3 Soil Analytical Results

The analytical results are summarized in Table 1. One soil sample was collected from each soil boring for laboratory analysis. BTEX concentrations ranged from 340 µg/kg in SB-1 (8 feet bgs) to 43,900 µg/kg in MW-2 (5 feet bgs). MTBE concentrations ranged from non detect [ND (210, 220, or 240 µg/kg)] and below detection limits [BDL (<210 µg/kg)] in all samples. Naphthalene concentrations ranged from BDL (210 µg/kg) in MW-3 (5 feet bgs), MW-4 (6 feet bgs), and SB-1 (8 feet bgs) to 1,400 µg/kg in MW-2 (5 feet bgs). Cumene was detected above laboratory detection limits (210 µg/kg) in one sample: MW-2 (5 feet bgs) at 220 µg/kg.

4.5 Monitor Well Construction

Four soil borings were converted into monitor wells [(MW-1, MW-2, MW-3 and MW-4 (Figure 3)]. Each well was constructed with threaded 2-inch schedule 40 polyvinyl chloride (PVC) casing and 0.010-inch continuous slotted well screen. The well annulus outside the screened interval in each well was backfilled with a gravel pack to a minimum of one foot above the top of the well screen. A minimum 1-foot hydrated bentonite seal was placed above the sand pack. The wells were completed with locking caps and protected with 8-inch diameter, flush mounted, bolt down manhole covers in concrete pads. Well construction details are illustrated on the attached Drilling Logs.

4.5.1 Monitor Well Development

Each monitor well was developed to remove fine-grained materials that may have entered during construction. All development water was treated with liquid-phase granular activated carbon (GAC) and discharged on site.

4.5.2 Monitor Well Top of Casing Survey

On 7 May 1998, all wells were surveyed to determine their relative top of casing elevation using rod and level techniques. This was accomplished by assigning an arbitrary benchmark elevation of 100.00 feet to a permanent site feature. The benchmark was used as a backsight and the instrument height was subtracted from the rod readings from each elevation. The top of casing elevations are included on Table 2.

4.6 Groundwater Sampling

4.6.1 Monitor Well Gauging

On 24 June 1998, liquid level readings were measured in each well using an electronic oil/water interface probe accurate to the nearest 0.01 foot. The depths to groundwater ranged from 9.47 feet in MW-1 to 11.07 feet in MW-4. Based on the 24 June 1998 liquid level data, the groundwater flow direction is to the southwest at a gradient of 0.017 feet/feet (Figure 4, Groundwater Monitoring Map).

4.6.2 Monitor Well Purging

Before collecting groundwater samples, three well volumes of the standing water column were removed from each well using dedicated disposable polyethylene bailers. The purged water was treated with liquid-phase GAC and discharged on site.

4.6.3 Monitor Well Sampling

Groundwater samples were collected on 24 June 1998 from all on site monitor wells. (MW-1, MW-2, MW-3, and MW-4). Samples from each well were collected and submitted for BTEX, MTBE, napthalene, and cumene (8260B) analyses. Each sample was collected in pre-preserved (hydrochloric acid) 40 milliliter VOA vials and immediately placed in a shipping cooler with ice to maintain a temperature of 4° C. Each sample was wrapped with bubble packing to prevent breakage and shipped overnight to Mountain Research, Inc. laboratory via United Parcel Services. As discussed in Section 4.4.2, sample integrity was maintained during shipment using a COC form and seal. A copy of the COC is included with the laboratory report (Attachment C).

4.6.4 Groundwater Analytical Results

Four water samples were submitted for laboratory analysis. BTEX was detected from 2,477 µg/l in MW-4 to 27,700 µg/l in MW-2. MTBE concentrations ranged from 2.3 µg/l in MW-3 to 2,000 µg/l in MW-1. Naphthalene ranged from 26 µg/l in MW-4 to 770 µg/l in MW-3. Cumene was detected from 12 µg/l in MW-4 to 170 µg/l in MW-3. The analytical results are depicted on Figure 4 and summarized in Table 2.

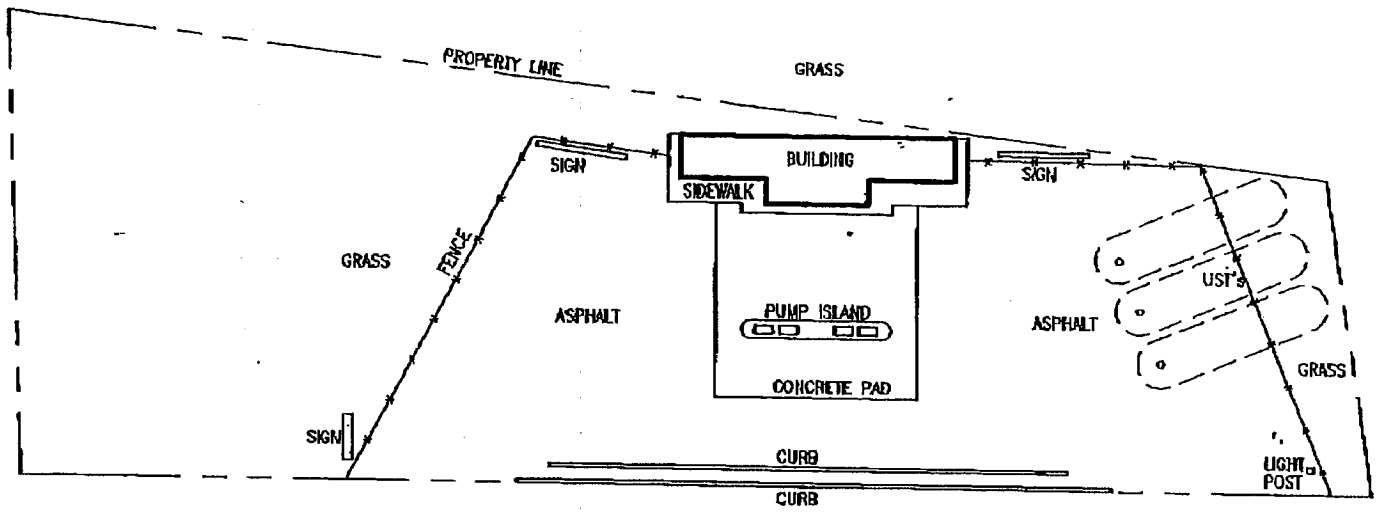
5.0 CONCLUSIONS

The SC was performed to assess the potential degree and extent of on site petroleum impacts in soil and groundwater. The scope of work included installing five soil borings, constructing four monitor wells, soil and groundwater sampling and analysis, a monitor well TOC survey, and performing a sensitive receptor survey. The findings are summarized below:

- No potable wells were identified within a 2,000-foot radius of the site.
- The nearest surface water body is Little Shamokin Creek located approximately 300 feet to the north.
- Potential migration pathways include sanitary and storm sewers, and on site gas, electric, and water lines.
- Based on the soil analytical results obtained during UST closure activities, the source of petroleum impacts to groundwater has been removed. All sample concentrations were below laboratory detection limits and Act 2 statewide health standards. The final UST closure report submittal is pending.
- Liquid level measurements obtained from five on site monitor wells on 6 May 1998 indicate the depth to groundwater ranges from 9.47 to 11.07 below top of casing and the flow direction is to the southwest at a gradient of 0.017 feet/feet.
- Soil analytical results indicated one sample exceeded PADEP Act 2 statewide health standards. Benzene in soil sample MW-2 (5 feet bgs) was detected at 6,500 ug/kg.
- Groundwater analytical results indicated all samples exceeded PADEP Act 2 statewide health standards for BTEX and naphthalene. Cumene exceeded standards in MW-2 and MW-3, and MTBE concentrations exceeded standards in MW-1, MW-2, and MW-4.
- Based on the groundwater analytical results, subsurface groundwater impacts have not been delineated. Therefore, additional groundwater monitoring, delineation, and site characterization activities (i.e., slug test) are recommended.

FIGURES

GES GROUNDWATER & ENVIRONMENTAL SERVICES, INC.



GENERALIZED SITE PLAN

UNITED OIL REFINING – KWIK FILL #S-124
106 STATE STREET
SUNBURY, PENNSYLVANIA

NORTH

DWG:
REV: 8-3-98
BY: GEL

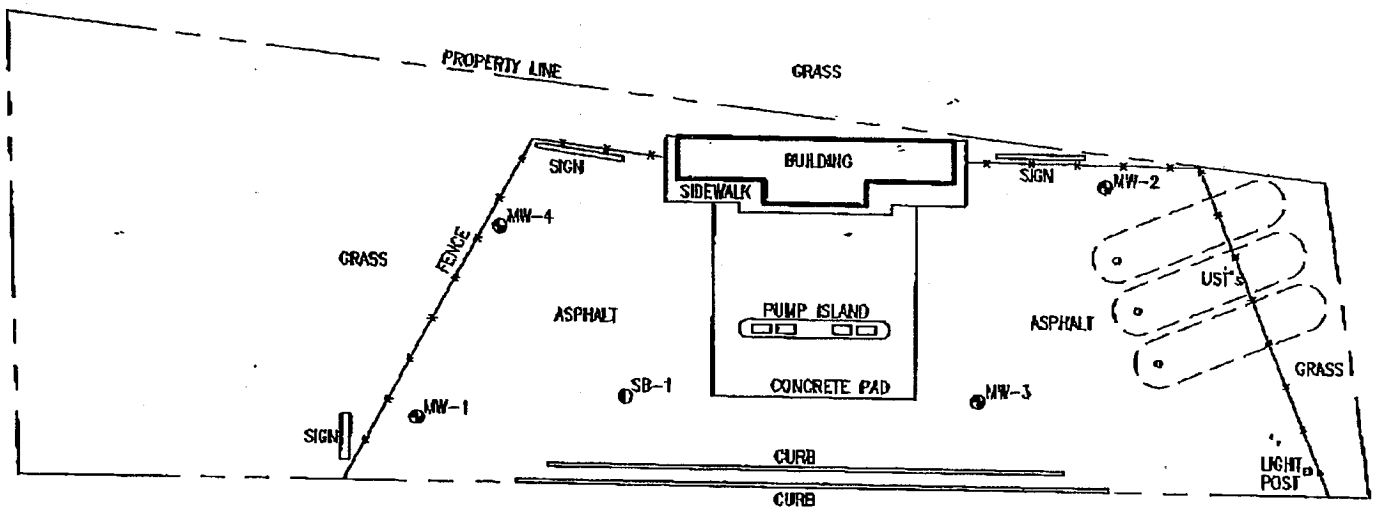
CK: BP | APPV: MS

SCALE IN FEET
0 40

FIGURE 1

\United Refining\Sunbury 106 State St.dft.plan

GES GROUNDWATER & ENVIRONMENTAL SERVICES, INC.



STATE STREET (ROUTE 61)

LEGEND

- MONITORING WELL
- SOIL BORING

SOIL BORING/MONITORING WELL LOCATION PLAN

UNITED OIL REFINING – KWIK FILL #S-124
106 STATE STREET
SUNBURY, PENNSYLVANIA

NORTH

DRG:
REV: 8-2-96
BY: GPL

CK: BP | APPV: MS

SCALE IN FEET
0 40

FIGURE 3

\Unified Refining\Sunbury 106 State St. site.dgn

TABLE 1

SOIL ANALYTICAL RESULTS

United Refining Company (Kwik Fill #S-124)
106 State Street
Sunbury, Pennsylvania

08 May 98

Sample ID	Depth (feet)	Benzene (µg/kg)	Toluene (µg/kg)	Ethylbenzene (µg/kg)	Xylenes* (µg/kg)	BTEX (µg/kg)	MTBE (µg/kg)	Napthalene (µg/kg)	Cumene (µg/kg)
MW-1	8	<210	<210	<210	340	340	ND(210)	290	ND(210)
MW-2	5	6,500	16,000	3,400	18,000	43,900	ND(220)	1,400	220
MW-3	5	<210	760	<210	1,300	2,060	ND(210)	<210	ND(210)
MW-4	6	<240	740	<240	1,400	2,140	ND(240)	ND(240)	ND(240)
SB-1	8	<210	330	<210	780	1,110	<210	ND(210)	ND(210)

*	total for m-xylene, o-xylene, p-xylene
BTEX	benzene, toluene, ethylbenzene, xylenes
MTBE	methyl tert-butyl ether
µg/kg	micrograms/kilogram
mg/kg	milligrams/kilogram
ND	none detected (parameter detection level)

TABLE 2

GROUNDWATER GAUGING AND QUALITY DATA

United Refining Company (Kwik Fill #S-124)
106 State Street
Sunbury, Pennsylvania

Well ID	Sample Date	TOC Elevation (ft)	GW Depth (ft)	GW Elevation (ft)	Product Depth (ft)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Xylenes* (µg/l)	BTEX (µg/l)	MTBE (µg/l)	Napthalene (µg/l)	Cumene (µg/l)
MW-1	06/24/98	100.00	9.47 9.58	90.53	--	3,000	1,700	310	1,000	6,010	2,000	100	15
MW-2	06/24/98	103.48	10.41 DT 10.99	93.07 10.71	--	11,000	10,000	2,400	4,300	27,700	870	670	120
MW-3	06/24/98	103.70	10.98 11.71	92.72 11.45	--	340	5,400	2,200	4,200	12,140	2	770	170
MW-4	06/24/98	102.44	11.07 11.35	91.37	--	1,600	87	230	560	2,477	550	26	12
PADEP ACT II GROUNDWATER QUALITY STANDARDS (<2500 TDS)													
						5 µg/L	1,000 µg/L	700 µg/L	10,000 µg/L	N/A	20 µg/L	20 µg/L	25 µg/L

* total for m-xylene, o-xylene, p-xylene
TOC top of well casing
GW groundwater
BTEX benzene, toluene, ethylbenzene, xylenes
MTBE methyl tert-butyl ether
(29) total depth of well from grade (rounded to the nearest foot)
µg/l micrograms/liter
ND (1) none detected (parameter detection limit)

GROUNDWATER & ENVIRONMENTAL SERVICES, INC.
DRILLING LOG

Project	Kwik Fill SW124	Owner	United Refining Corporation - PA		
Location	Sunbury, PA	Permit No.	NA		
Boring Number	SB-1	Total Depth	15 Feet	Diameter	8-Inch
Casing Elevation	NA	Water Level: Initial	NA	Static	15 Feet
Screen Dia.	NA	Length	NA	Slot Size	NA
Casing Dia.	NA	Length	NA	Type	NA
Drilling Method	Air Rotary	Sample Method	From cuttings		
Completion Details	Backfilled with bentonite chips				
Driller	B.L. Meyers	Log By	B. Peterka	Date	07-May-98

SEE ATTACHED FIGURE

Depth (feet)	Sample No.	Well Const.	OVM (ppm)	Blow Count	Recovery (inches)	Lithology	Notes
0						Asphalt Surface with gravel base	
			3	NA		Miscellaneous FILL material; consisting of slag, gravel, and shale pieces	
5							
			33	NA		Gray, weathered SHALE	
	SB-1, 8' *		1400	NA	NA		
10							
			8	NA			
15						Dark gray SHALE	
20						Limit of boring to 15 feet bgs *Sample submitted for laboratory analysis	
25							
30							