UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

REGION III

STATEMENT OF BASIS FOR PROPOSED REMEDY

PENNZOIL-QUAKER STATE COMPANY - PLANT 2

OIL CITY, PENNSYLVANIA

PAD 004 329 835

I. Introduction

The United States Environmental Protection Agency (EPA) has prepared this Statement of Basis (SB) to solicit public comment on its proposed remedy for Plant 2 of the former Pennzoil-Quaker State Company (PQS) Rouseville Refinery located at 191 State Route 8, Oil City, PA 16373 (Facility). The former PQS refinery consisted of Plant 1 and 2 bisected by both State Route 8 and Oil Creek. This SB applies to the portion of the Facility known as Plant 2. Plant 2 is now owned by Shell Oil Company (Shell), who acquired the former refinery in 2002.

EPA's proposed remedy consists of compliance with and maintenance of institutional controls (ICs) and operation and maintenance of engineering controls (ECs) that are already in-place. This SB highlights key information relied upon by EPA in making its proposed remedy.

The former Pennzoil-Quaker State Plant 2 refinery is subject to EPA's Corrective Action Program under the Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act (RCRA) of 1976, and the Hazardous and Solid Waste Amendments (HSWA) of 1984, 42 U.S.C. §§ 6901 et seq. (Corrective Action Program). The Corrective Action Program is designed to ensure that certain facilities subject to RCRA have investigated and cleaned up any releases of hazardous waste and hazardous constituents that have occurred at their property. The Commonwealth of Pennsylvania (Commonwealth) is not authorized for the Corrective Action Program under Section 3006 of RCRA. Therefore, EPA retains primary authority in the Commonwealth for the Corrective Action Program.

The Administrative Record (AR) for the Facility contains all documents, including data and quality assurance information, on which EPA's proposed remedy is based. An index to the Administrative Record is included at the end of this SB. See *Section IX, Public Participation*, for information on how you may review the AR.

II. Facility Background

The Facility is located at 191 State Route 8 in Cornplanter Township, Oil City, Pennsylvania. The Facility is bound by railroad tracks and a steep bedrock outcrop to the west, vacant land owned by Merisol Antioxidants to the north, Oil Creek to the east, and a self-serve fueling station and used-automobile dealership to the south. State Route 8 bisects the Facility, roughly paralleling Oil Creek. Plant 2 occupies approximately 23 acres. A location map and a Facility layout are attached, hereto as Figures 1 and 2, respectively.

The Facility began as a petroleum refinery in the late 1800s and operated for more than a century. It is located along the banks of Oil Creek, so named because of the natural oil seeps known since pre-Colonial times. The first drilling for oil in the United States occurred just north of the Facility in Titusville, PA. The surrounding area is steeped in a rich history of oil production. For hundreds of years, people had known about oil seeps in western Pennsylvania. In fact, there is evidence that Native Americans had been harvesting the oil by digging small pits around active seeps and lining them with wood.

This area was the leading oil-producing region in the United States through 1904. During that time, there was a rush of prospectors who dug oil production wells everywhere and abandoned these wells improperly. This history has made Facility investigations complex and difficult, as these former production areas continue to release crude oil to the environment.

PQS operated the Plant 2 as the Rouseville Refinery until calendar year 2000 when refinery operations ceased. Plant 2 was acquired by Shell on October 1, 2002 during the acquisition of Pennzoil-Quaker State. The refinery was decommissioned between 2001 and 2004. During that time, all buildings, including storage tanks and refinery operational equipment were demolished except for Building #76 (office), the groundwater treatment building, and several small buildings utilized for storage. The remaining property at the Facility is vacant. A location map (figure 1) and a Facility layout (figure 2) are attached.

III. Summary of Environmental History

A. Background

EPA issued a Corrective Action Permit on September 28, 1990 requiring PQS to investigate the Plant 2 property for releases to the environment.

In 1990, the Pennsylvania Department of Environmental Resources (PADER), which was subsequently renamed the Pennsylvania Department of Environmental Protection (PADEP), Bureau of Water Quality entered into a Consent Order with PQS to investigate and cleanup petroleum releases (often referred to as "separate phase liquids" or "SPL") at the Facility. From 1990 to 2000, PQS's investigation and interim cleanup activities were primarily governed by this PA Consent Order. EPA and PADEP agreed to defer to the PA Consent Order as the controlling framework for the investigation of Plant 2, in order to avoid duplication of effort on the Agencies' part and confusion on PQS's part.

In 2000, PQS initiated a comprehensive site characterization of Plant 2 in accordance with the requirements of the Storage Tank Act and the Land Recycling and Environmental Remediation Standards Act (Act 2), 35 P.S. § 6026.101. Shell continued characterization and remediation activities pursuant to these Acts after acquiring PQS in 2002. In July 2004, EPA informed Shell that the Permit would be terminated and that corrective action activities would continue to be addressed through Act 2 subject to EPA's approval.

B. Interim Measures

PQS performed a variety of Interim Measures at the Facility starting in 1986. These measures included installation of a total fluids recovery system (a pump & treat system), remote skimming, passive skimming, vacuum enhanced skimming, hand bailing, well socks, enhanced fluid recovery, and targeted soil and SPL excavation. Each measure is fully documented in the following reports found in the AR:

- Site Characterization Report (TolTest, March 11, 2003)

- Site Characterization Report/Remedial Investigation Report (URS April 2009)
- Human Health Risk Assessment (RBR November 2009 and April 2010)
- Site Characterization Report/Remedial Investigation Report - Addendum (URS December 18, 2009)
- Remedial Action Plan (URS February 12, 2010)
- Final Report (URS July 29, 2010)
- Supplementary Site Information for ROD (URS April 29, 2011)
- Quarterly Interim Remedial Action Progress Reports (1980 through 2011)

In addition to these activities, PQS personnel routinely inspected the bank along Oil Creek for any petroleum seeps into the creek.

Site characterization included multiple phases and was conducted between 2003 and 2009. The findings of the investigations can be found in the April 2009 Site Characterization Report/Remedial Investigation Report (SCR/RIR) located in the AR.

Based on diminished recovery rates, the total fluids recovery system was shut down on January 13, 2009. Shell proposed, and EPA agreed, that SPL has been recovered to the maximum extent practicable by the total fluids recover system; therefore, the system will remain shut down.

C. Risk Assessments

In April 2005, the Facility submitted a Notice of Intent to Remediate to PADEP pursuant to Act 2. A combination of the Act 2 Statewide Health Standards (SHS) and Site Specific Standards (SSSs) were chosen as the cleanup goals to be achieved.

Shell submitted a human health risk assessment (HHRA) for the Site in November 2009 to EPA and PADEP. Shell then submitted an updated HHRA on April 5, 2010 to EPA and PADEP.

The following assumptions on future use were used to develop the updated HHRA:

- The PQS property will be restricted to non-residential uses;
- The future use of groundwater for any (potable or non-potable) purpose will be prohibited.
- An existing public water system supplies drinking water in the area. Groundwater use is prohibited by local ordinances and/or other institutional controls.
- Soil vapor sampling is required in the area of any proposed future building or building expansion prior to construction if the proposed location is different from areas already sampled. Vapor barriers or other ECs will be required for new buildings, based on these sample results.

The updated HHRA evaluated exposures to current or future outdoor worker, construction/ excavation worker, indoor worker, and recreational visitor (potential receptors) from all media from constituents of interest identified. Exposures and cleanup levels were based on comparison

of the most recent analytical results to EPA industrial regional screening levels (IRSLs), PADEP medium specific concentrations (MSCs) for vapor intrusion, and PADEP Water Quality Criteria (WQC) for surface water. PADEP approved the updated HHRA on June 16, 2010.

EPA has reviewed the human health risk assessment and the resulting cleanup levels. EPA has determined that the risk assessment was conducted in accordance with EPA guidance and that the cleanup levels are protective of human health and the environment for non-residential land use. Appendix A contains a summary of the sampling results, the appropriate screening levels, and the resulting calculated cleanup levels.

Shell also completed an ecological screening risk assessment (ERA) for the Facility to evaluate the potential for adverse ecological impacts. A macroinvertebrate survey was conducted to determine impacts related to Oil Creek surface water or sediments. Based on the ERA and the survey results, there are no unacceptable ecological risks. PADEP approved the ERA on December 30, 2009. EPA has reviewed the ecological risk assessment and agrees with its conclusions. EPA is proposing that no further action is needed to address ecological risks.

D. Final Report

In July 2010, Shell submitted an Act 2 Final Report, which summarized site characterization and risk assessment information, described the completion of remedial activities, and demonstrated attainment of the cleanup goals.

The Final Report also details Shell's excavation program aimed at removing additional SPL and soil from select areas and backfilling with clean fill. A total of 7,770-cubic yards or 11,655-tons of soil were excavated from four areas. Additionally, a total of approximately 50-gallons of SPL were recovered from former refinery piping during the soil excavation program. The success of this excavation program is demonstrated in the monitoring results. The most recent apparent SPL thickness map from July 19, 2010 shows the SPL thickness measurements have been reduced from 8.0 feet to 0.67 feet localized in one well. Therefore, there are no longer recoverable quantities of SPL in the soil.

Shell also proposed a post-remediation care plan. The post-remediation care plan contains the engineering and institutional controls described below. It includes an annual inspection and maintenance schedule that focuses on verifying the integrity of the concrete retaining wall and maintenance of a phytoremediation barrier. The concrete retaining wall is a physical barrier that prevents any residual SPL remaining at the site from entering Oil Creek. The phytoremediation barrier is a combination of poplar and willow trees that depress groundwater levels to prevent dissolved phase contaminants from entering Oil Creek. The phytoremediation barrier will be inspected on an annual basis to document the tree survival rate. Inspections will be performed during the third quarter of each year with the findings of the inspections reported by October 15 of each year. If the survivability of the phytoremediation barrier drops below 70 percent, replacement trees will be planted at the Facility.

IV. Corrective Action Objectives

EPA's Corrective Action Objectives for the Facility are the following:

1. Soils

EPA has determined that the cleanup standards calculated for soils are protective of human health and the environment for individual contaminants at this Facility provided that the Facility is not used for residential purposes. Therefore, EPA's Corrective Action Objective for the Facility soils is long term control of residential exposure to soils by requiring the compliance with and maintenance of land use restrictions at the Facility.

2. Groundwater

EPA's *Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action* (2004) contains the guidance EPA uses to establish cleanup levels for groundwater at RCRA facilities. EPA expects final remedies to return "usable" groundwater to its maximum beneficial use within a timeframe that is reasonable given the particular circumstances of the project. For projects where aquifers are either currently used for water supply or have the potential to be used for water supply, EPA will use the National Primary Drinking Water Standard Maximum Contaminant Levels promulgated at 40 C.F.R. Part 141.

For the Facility, the shallow aquifer is not suitable for drinking purposes and such a use is prohibited by both a municipal ordinance and the post-remediation care plan. Therefore, EPA has determined that maximum beneficial use of the shallow groundwater is recharge flow to Oil Creek. Under this remedy, EPA is establishing the cleanup levels listed in Appendix A to protect Oil Creek from groundwater discharging from the property.

EPA has determined that the cleanup standards calculated for groundwater are protective of human health and the environment for individual contaminants at this Facility provided that consumptive uses of groundwater are prohibited. As such, EPA's Corrective Action Objective for Facility groundwater is to control exposure to the hazardous constituents remaining in the groundwater by requiring the compliance with and maintenance of groundwater use restrictions at the Facility.

3. Separate Phase Liquids (SPL)

EPA's Corrective Action Objective for SPL and residual petroleum constituents is to eliminate the sources and prevent migration of SPL to surface water. EPA has determined that Shell has removed contaminated soils to the maximum extent practicable. Shell has prevented SPL migration to Oil Creek through the construction and maintenance of the retaining wall and the planting of the phytoremediation barrier.

4. Vapors

EPA's Corrective Action Objective for the Facility vapors is to control exposure to this hazard

by requiring the compliance with and maintenance of land use restrictions at the Facility.

5. Surface Water and Sediment

EPA has determined that the cleanup standards calculated for surface water and sediment are protective of human health and the environment for individual contaminants at this Facility. The potential exists for residual SPL migration to Oil Creek. Therefore, EPA's Corrective Action Objective for surface water and sediments is to control migration to Oil Creek with a combination of engineering and institutional controls.

V. Proposed Remedy

EPA is proposing the compliance with and maintenance of engineering and institutional controls. EPA's proposed remedy is based upon the work completed under PA's consent order, Storage Tank Act, and Act 2. EPA agrees that a combination of engineering and institutional controls will serve to protect human health and the environment based upon the cleanup standards calculated for the Facility.

Engineering Controls

EPA has determined that the existing concrete retaining walls are protective of human health and the environment by controlling migration of contaminants through environmental media at this Facility. EPA's Corrective Action Objective for the Facility concrete retaining wall is requiring the compliance with and maintenance of institutional controls established at the Facility as described directly below.

Institutional Controls

Because some contaminants remain in the soil and groundwater at the Facility, EPA's proposed remedy requires the compliance with and maintenance of the following land and groundwater use restrictions.

- The Property shall be used for non-residential purposes only.

- No person shall withdraw or make use of any groundwater underneath the Property for any purpose.

- The existing groundwater treatment building will either be demolished during Site decommissioning activities or will remain if (i) additional sampling and/or vapor intrusion modeling is submitted demonstrating that the occupation of the groundwater treatment building will not result in an unacceptable vapor intrusion risk; or (ii) engineering measures (such as forced ventilation) or other approved actions are implemented to limit or prevent unacceptable vapor intrusion into the groundwater treatment building.

- No person shall construct or expand any building within the property, unless (i) additional sampling and/or vapor intrusion modeling is submitted showing that the occupation of such buildings will not result in an unacceptable vapor intrusion risk; or (ii) engineering measures (such as vapor barriers or venting systems) or other approved actions are implemented to limit or prevent unacceptable vapor intrusion into occupied areas.

- No person shall disturb the soil and subsurface underlying any portion of the Facility where concentrations of constituents exceed the cleanup standards and/or where SPL may exist without putting in place such protections to protect the health and safety of the workers and the general public, as applicable. Furthermore, any excavated soils or other materials shall be handled and managed in accordance with an approved Work Plan.

- The integrity of the concrete retaining walls along Oil Creek will be maintained intact or an alternate replacement barrier will be installed until such time as measureable SPL is no longer present or it is demonstrated that the remaining SPL does not pose an adverse risk to Oil Creek without the retaining walls in place. As long as the outer retaining wall is required to protect Oil Creek from possible SPL impact, the Owner will perform annual inspection of the condition of this outer wall and report the findings. As a part of these annual inspections, the adjacent portion of Oil Creek will be inspected for potential petroleum sheens.

VI. Evaluation of EPA's Proposed Remedy

This section provides a description of the criteria EPA used to evaluate the proposed remedy consistent with EPA guidance. The criteria are applied in two phases. In the first phase, EPA evaluates three remedy threshold criteria as general goals. In the second phase, for those remedies which meet the threshold criteria, EPA then evaluates seven balancing criteria to determine which proposed remedy alternative provides the best relative combination of attributes.

A. Threshold Criteria

1. Protect Human Health and the Environment

During operational activities and early in the environmental history, protective measures to protect human health and the environment focused on preventing SPL from migrating into Oil Creek through the use of a total fluids recovery system. Following closure and decommission of the Facility, removal of SPL continued until SPL was removed to the maximum extent practicable.

On November 15, 2010, Shell recorded an environmental covenant which imposes land and groundwater use restrictions and conditions regarding the use of the Facility property and groundwater. Under the covenant, Facility property may only be used for non-residential purposes and groundwater beneath the property may not be used for any purpose. These

conditions are enforceable and provide long–term assurance that the exposure assumptions used in developing EPA's proposed remedy are not changed without approval.

2. Achieve Media Cleanup Objectives

The Facility has achieved the calculated cleanup standards for soils, groundwater, sediments, and surface water. These standards meet EPA risk guidelines for human health and the environment at the Facility. EPA's proposed remedy requires compliance with the implementation and maintenance of institutional controls to ensure that Facility property is not used for residential purposes and groundwater beneath Facility property is not used for any purpose.

3. Remediating the Source of Releases

In all proposed decisions, EPA seeks to eliminate or reduce further releases of hazardous wastes or hazardous constituents that may pose a threat to human health and the environment. As described in the Summary of Environmental History section above, the Facility has remediated the sources of releases. There are no remaining large, discrete sources of waste from which constituents would be released to the environment. Therefore, EPA has determined that this criterion has been met.

B. Balancing/Evaluation Criteria

1. Long-Term Effectiveness

The proposed use of institutional controls will maintain protection of human health and the environment over time by controlling exposure to the hazardous constituents remaining at the Facility. EPA's proposed remedy requires the compliance with and maintenance of land use and groundwater use restrictions at the Facility. The land use and groundwater use restrictions have already been implemented through an environmental covenant recorded in the chain of title of the deed for the Facility property. The environmental covenant runs with the land and as such will be enforceable against future land owners.

2. Reduction of Toxicity, Mobility, or Volume of the Hazardous Constituents

The reduction of toxicity and volume of hazardous constituents at the Facility has already been achieved by decommissioning the Facility structures and soil excavation. The reduction of mobility of hazardous constituents at the Facility has been, and will continue to be, achieved by the concrete retaining wall utilized as an engineering control to prevent migration of contaminants through environmental media at this Facility to Oil Creek**.** Additionally, the reduction of mobility will be assisted by the phytoremediation barrier.

3. Short-Term Effectiveness

EPA's proposed remedy does not involve any additional activities, such as construction or excavation that would pose short-term risks to workers, residents, and the environment. In addition, the land use and groundwater use restrictions have already been implemented through an environmental covenant recorded in the chain of title of the deed for the Facility property.

4. Implementability

EPA's proposed remedy is readily implementable. An environmental covenant has already been recorded and the engineering and institutional controls are in place. Therefore, EPA does not anticipate any regulatory constraints in implementing its proposed remedy.

5. Cost

An environmental covenant has already been recorded in the chain of title of the deed to the Facility property. Therefore, there should be no additional costs associated with the proposed remedy.

6. Community Acceptance

EPA will evaluate Community acceptance of the proposed remedy during the public comment period and will be described in the Final Decision and Response to Comments (FDRTC).

7. State/Support Agency Acceptance

Environmental cleanup at this Facility has been overseen by PADEP as part of Pennsylvania's RCRA grant each year since 1993. PADEP approved the Act 2 Final Report for remedial activities on November 3, 2010. EPA will evaluate further State acceptance based on any comments received from PADEP during the public comment period and will be described in the FDRTC.

VII. Environmental Indicators

EPA sets national goals to measure progress toward meeting the nation's major environmental goals. For Corrective Action, EPA evaluates two key environmental indicators for each facility: (1) current human exposures under control and (2) migration of contaminated groundwater under control. The EPA has determined that the Facility met these indicators on April 19, 1996.

VIII. Financial Assurance

EPA has evaluated whether financial assurance for corrective action is necessary to implement EPA's proposed remedy at the Facility. Given that EPA's proposed remedy does require maintaining the integrity of the concrete retaining walls along Oil Creek or installing an alternate replacement barrier, EPA is proposing that financial assurance be required. Financial Assurance documentation to satisfy this requirement was submitted and is currently under review by both PADEP and EPA.

IX. Public Participation

Before EPA makes a final decision on its proposal for the Facility, the public may participate in the remedy selection process by reviewing this SB and documents contained in the Administrative Record (AR) for the Facility. The AR contains all information considered by EPA in reaching this proposed remedy. It is available for public review during normal business hours at:

U.S. EPA Region III
1650 Arch Street
Philadelphia, PA 19103
Contact: Mr. Kevin Bilash (3LC30)
Phone: (215) 814-2796
Fax: (215) 814 - 3113
Email: bilash.kevin@epa.gov

Interested parties are encouraged to review the AR and comment on EPA's proposed remedy. The public comment period will last thirty (30) calendar days from the date that notice is published in a local newspaper. You may submit comments by mail, fax, or e-mail to Mr. Kevin Bilash. EPA will hold a public meeting to discuss this proposed remedy upon request. Requests for a public meeting should be made to Mr. Kevin Bilash.

EPA will respond to all relevant comments received during the comment period. If EPA determines that new information warrant a modification to the proposed remedy, EPA will modify the proposed remedy or select other alternatives based on such new information and/or public comments. EPA will announce its final decision and explain the rationale for any changes in a document entitled the Final Decision and Response to Comments. All persons who comment on this proposed remedy will receive a copy of the FDRTC. Others may obtain a copy by contacting Mr. Kevin Bilash at the address listed above.

Date: _____

Abraham Ferdas, Director
Land and Chemicals Division
US EPA, Region III

Figure 1 – Location Map
Figure 2 – Facility Layout

Index to Administrative Record

Site Characterization Report, prepared by TolTest, March 11, 2003

Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action, United States Environmental Protection Agency, Solid Waste and Emergency Response (5303W), EPA530-R-04-030, April 2004

Pennzoil-Quaker State Company Site Characterization Report/Remedial Investigation Report, Former Rouseville Refinery – Plant 2, prepared by URS Corporation, April 2009

Human Health Risk Assessment for the Former Pennzoil Quaker State Plant 2, prepared by Risk-Based Remedies Consulting, Inc., November 2009 and April 2010

Pennzoil-Quaker State Company Site Characterization Report/Remedial Investigation Report – Addendum, prepared by URS Corporation, December 18, 2009

Updated HHRA approval letter, prepared by PADEP, June 16, 2010

Remedial Action Plan, Former PQS Refinery Plant #2, prepared by URS Corporation, February 12, 2010

Final Report, Former PQS Refinery Plant II, prepared by URS Corporation, July 29, 2010

Supplementary Site Information for ROD, Former Pennzoil-Quaker State Refinery Plant #2, prepared by URS Corporation, April 29, 2011

Quarterly Interim Remedial Action Progress Reports, prepared by various consulting companies, 1980 through 2011

Attachment A

Table a: Soil SSS's compared to EPA RSLs and Facility highest and average concentrations

Table b: Groundwater SSS's compared to EPA RSLs and Facility highest and average concentrations

Table c: Sediment SSS's compared to EPA Soil RSLs and Facility highest and average concentrations

Table d: Surface water SSS's compared to PADEP WQCs and Facility highest and average concentrations

Table e: Derived Indoor Air SSS's compared to EPA Target Indoor Air Concentration

Table f: Derived Ambient Air SSS's compared to EPA RSLs

Table a:

Soil (mg/kg)				
Constituent Sample	Highest	Average	EPA RSL	SSS
Volatile Organics				
1,1,2,2-tetrachloroethane	3.2	NA	2.8	3.2
1,2,3-trichloropropane	1.8	NA	0.095	1.8
1,2,4-trimethylbenzene (TMB)	1670	70.4	260	146
benzene	1600	28.9	5.4	66.3
ethylbenzene	1100	41.4	27	83.2
Naphthalene	400	16.9	18	39
Toluene	6500	123	4500	312
Xylenes, total	8900	427	2700	972
Semi-Volatile Organics				
2-methylnaphthalene	770	13.5	410	28.1
benz(a)anthracene	120	1.03	2.1	3.01
benzo(a)pyrene	110	0.92	0.21	2.75
benzo(b)fluoranthene	98	1.03	2.1	2.8
benzo(k)fluoranthene	42	0.42	21	1.52
Dibenz(a,h)anthracene	9.9	0.22	0.21	0.31
Indeno(1,2,3-cd)pyrene	57	0.63	2.1	1.66
Inorganics				
Antimony	112	7.22	410	8.51
arsenic	266	22.3	1.6	25.3
chromium	2880	30.3	5.6	51.8
Cobalt	43.3	9.35	300	10.14
iron	519000	43598	720000	49108
lead	2980	79.5	800	79.5
Mercury	15.4	0.26	3.4	0.59
vanadium	82.1	20.7	5200	22.3

Table b:

Groundwater (ug/L)				
Constituent Sample	Highest	Average	EPA RSL	SSS
Volatile Organics				
1,2,3-trichloropropane	11.5	6.03	0.00072	6.1
1,2,4-trimethylbenzene (TMB)	11000	751	1.5	1220
1,2-dichloroethane	59	2.30	0.15	3.79
1,3,5-TMB	6650	272	37	585
2-hexanone	124	4.79	4.7	5.98
4-isopropyltoluene	119	3.12	68	4.45
benzene	62000	4286	0.41	6730
cumene	353	25.6	68	30.1
ethylbenzene	4280	353	1.5	668
Methylene chloride	250	214	4.8	214
Methyl-tert-butyl-ether	1900	50.4	12	75.1
Naphthalene	1300	136	0.14	176
n-propylbenzene	870	76.1	130	115
styrene	3430	17.1	160	124
Toluene	25000	956	230	2272
Xylenes, total	25700	1694	20	4418
Semi-Volatile Organics				
2,4-dimethylphenol	82	6.9	73	9.14
2-methylnaphthalene	14000	375	15	980
3&4-methylphenol	200	6.92	18	9.52
Acenaphthene	230	9.25	220	18.5
benz(a)anthracene	643	8.15	0.029	14.5
benzo(a)pyrene	1260	11.2	0.0029	43.1
benzo(b)fluoranthene	88	4.88	0.029	5.93
Benzo(g,h,i)perylene	399	7.03	110	11.2
benzo(k)fluoranthene	594	14.3	0.29	38.9
Bis(2-ethylhexyl)phthalate	7190	134	4.8	439
Chrysene	2250	18.6	2.9	74.2
Dibenzo(a,h)anthracene	174	4.19	0.0029	6.52
Dibenzofuran	32	5.17	3.7	32
Di-n-octyl phthalate	20	3.14	4.8	3.36
Fluoranthene	582	10.3	150	21.7
Fluorene	280	11	150	15.3
Indeno(1,2,3-cd)pyrene	157	3.42	0.029	5.21
Naphthalene	4200	115	0.14	240
pentachlorophenol	4	N/A	0.56	4
Phenanthrene	5140	86.9	1100	225

Pyrene	2730	46.9	110	163
Dissolved Inorganics				
Antimony	332	32.4	1.5	40.1
arsenic	460	22.9	0.045	37.9
Barium	2500	413	730	546
Cobalt	26.6	4.14	1.1	4.7
iron	83400	8241	2600	17157
lead	104	2.7	15	2.7
Manganese	12800	1164	88	2284
Mercury	0.99	0.12	0.057	0.14
Selenium	61	2.38	18	2.94
vanadium	8.7	2.94	0.26	3.3
Zinc	2000	101	1100	144
Miscellaneous				
Cyanide	159	38.1	73	66.8

Table c:

Sediment (ug/L)				
Constituent Sample	Highest	Average	EPA RSL	SSS
Volatile Organics				
benzene	1.4	0.49	1.1	0.6
Semi-Volatile Organics				
benz(a)anthracene	3	0.4	0.15	0.72
benzo(a)pyrene	2.1	0.34	0.015	0.57
benzo(b)fluoranthene	3	0.39	0.15	0.72
Dibenz(a,h)anthracene	0.34	NA	0.015	0.34
Indeno(1,2,3-cd)pyrene	1.4	0.24	0.15	0.39

Table d:

Surface Water (ug/L)				
Constituent Sample	Highest	Average	PADEP WQC	SSS
Volatile Organics				
benzene	4	1.8	1.2	3.16
Semi-Volatile Organics				
benz(a)anthracene	0.013	0.013	0.0044	0.013
benzo(a)pyrene	0.028	NA	0.0044	0.028
benzo(b)fluoranthene	0.019	NA	0.0044	0.019
benzo(k)fluoranthene	0.2	NA	0.0044	0.2
chrysene	0.014	0.014	0.0044	0.014
Dibenz(a,h)anthracene	0.028	NA	0.0044	0.028

Table e:

Indoor Air (mg/m³)		
Constituent Sample	EPA Target Indoor Air Concentration	Derived SSS based on PADEP Soil Gas EPC
Volatile Organics		
2,2,4-trimethylpentane	NA	7.06E-01
Cyclohexane	NA	1.08
hexane	2.0E-01	1.73E-01
Toluene	4.0 E-01	1.64E-01

Table f:

Ambient Air (mg/m³)		
Constituent Sample	EPA RSL	Derived SSS based on Groundwater EPC
Volatile Organics		
1,2,3-trichloropropane	1.3E-03	1.12E-07
1,2,4-trimethylbenzene (TMB)	3.1E-02	3.28E-04
1,2-dichloroethane	4.7E-04	3.43E-07
1,3,5-TMB	NA	1.41E-04
2-hexanone	1.3E-01	4.61E-08
4-isopropyltoluene	NA	3.05E-06
benzene	1.6E-03	2.99E-03
cumene	1.8	2.06E-05
ethylbenzene	4.9E-03	3.03E-04
Methylene chloride	1.2	4.72E-05
Methyl-tert-butyl-ether	4.7E-02	4.77E-06
Naphthalene	3.6E-04	1.45E-05
n-propylbenzene	4.4	5.52E-05
styrene	4.4	1.83E-05
Toluene	22	1.09E-03
Xylenes, total	4.4E-01	1.84E-03
Semi-Volatile Organics		
2-methylnaphthalene	NA	1.23E-05
Acenaphthene	NA	7.57E-08
Dibenzofuran	NA	2.60E-08
Fluorene	NA	4.44E-07
Pyrene	NA	1.46E-07