ILLINOIS EPA RCRA CORRECTIVE ACTION CERTIFICATION

This certification must accompany any document submitted to Illinois EPA in accordance with the corrective action requirements set forth in a facility's RCRA permit. The original and two copies of all documents submitted must be provided.

1.0 FACILITY IDENTIFICATION

Name: WRB Refining LLC - Wood River Refinery

County: Madison

Street Address: 900 South Central Ave.

Site No. (IEPA): 1191150002

City: Roxana, IL 62084

Site No. (USEPA): ILD 080 012 305

2.0 OWNER INFORMATION

Name: Not Applicable

Mailing Address:

3.0 OPERATOR INFORMATION

Equilon Enterprises LLC d/b/a Shell Oil Products US

17 Junction Drive, PMB #399

Glen Carbon, IL 62034

Contact Name:

Kevin Dyer

Contact Title:

Principal Program Manager

Phone No.:

618-288-7237

4.0 TYPE OF SUBMISSION (check applicable item and provide requested information, as applicable)

☐ RFI Phase I Workplan/Report
☐ RFI Phase II Workplan/Report
☐ CMP Report; Phase ____
☒ Other (describe):
Soil Vapor Extraction Pilot Test Work Plan
Date of Submittal December 30, 2010

IEPA Permit Log No. ____
Date of Last IEPA Letter on Project 11/15/10
Log No. of Last IEPA Letter on Project B-43R-CA-2
Does this submittal include groundwater information: ☐ Yes ☒ No

5.0 DESCRIPTION OF SUBMITTAL: (briefly describe what is being submitted and its purpose)

Work plan for soil vapor extraction pilot test, in response to November 15, 2010 letter from IEPA.

6.0 DOCUMENTS SUBMITTED (identify all documents in submittal, including cover letter; give dates of all documents)

Cover letter , RCRA Corrective Action Certification and Pilot Test Work Plan, dated December 30, 2010.

7.0 CERTIFICATION STATEMENT - ***(This statement is part of the overall certification being provided by the owner/operator, professional and laboratory in Items 7.1, 7.2 and 7.3 below).*** The activities described in the subject submittals have been carried out in accordance with procedures approved by Illinois EPA. I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

7.1 **OWNER/OPERATOR CERTIFICATION** (Must be completed for all submittals. Certification and signature requirements are set forth in 35 IAC 702.126.) All submittals pertaining to the corrective action requirements set forth in a RCRA Permit must be signed by the person designated below (or by a duly authorized representative of that person):

1. For a Corporation, by a principal executive officer of at least the level of vice-president.
2. For a Partnership or Sole Proprietorship, by a general partner or the proprietor, respectively.
3. For a Governmental Entity, by either a principal executive officer or a ranking elected official.

A person is a duly authorized representative only if:

1. the authorization is made in writing by a person described above; and
2. the written authorization is provided with this submittal (a copy of a previously submitted authorization can be used).

Owner Signature: _____ _____ (Date)

Title: _____

Operator Signature: Kevin E Olzen 12/22/10 (Date)

Title: Principal Program Manager

7.2 **PROFESSIONAL CERTIFICATION** *(if necessary)* - Work carried out in this submittal or the regulations may also be subject to other laws governing professional services, such as the Illinois Professional Land Surveyor Act of 1989, the Professional Engineering Practice Act of 1989, the Professional Geologist Licensing Act, and the Structural Engineering Licensing Act of 1989. No one is relieved from compliance with these laws and the regulations adopted pursuant to these laws. All work that falls within the scope and definitions of these laws must be performed in compliance with them. The Illinois EPA may refer any discovered violation of these laws to the appropriate regulating authority.

Professional's Signature: Robert B Billman 12/30/10 Date

Professional's Name: Robert B. Billman

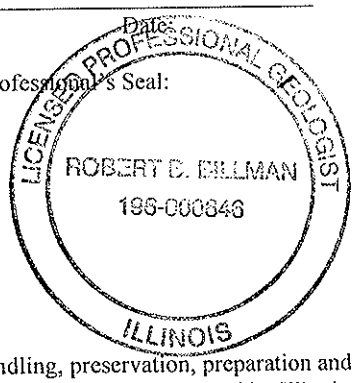
Professional's Address: URS Corporation

1001 Highlands Plaza Drive West

St. Louis, MO 63110

Professional's Phone No.: 314-743-4108

Professional's Seal:



7.3 **LABORATORY CERTIFICATION** *(if necessary)* - The sample collection, handling, preservation, preparation and analysis efforts for which this laboratory was responsible were carried out in accordance with procedures approved by Illinois EPA.

Name of Laboratory _____

_____
Signature of Laboratory Responsible Officer Date

Mailing Address of Laboratory

_____

_____

_____

_____
Name and Title of Laboratory Responsible Officer

URS

December 30, 2010

Mr. Steven F. Nightingale, P.E.
Manager, Permit Section
Illinois Environmental Protection Agency
Bureau of Land
1021 North Grand Avenue East
Springfield, Illinois 62794

Subject: **Soil Vapor Extraction Pilot Test Work Plan**
Roxana, Illinois
119115002 – Madison County
Equilon Enterprises LLC d/b/a Shell Oil Products US
Log No. B-43-CA-16 and 18

Dear Mr. Nightingale:

On behalf of Shell Oil Products US, URS Corporation is submitting the enclosed pilot test work plan for your review. This plan was developed in response to Condition 19 of the Agency's letter dated November 15, 2010.

If you have any questions during your review, please contact Kevin Dyer, SOPUS project manager, at kevin.dyer@shell.com (618/288-7237), or me at bob_billman@urscorp.com (314/743-4108).

Sincerely,

Robert B. Billman
Senior Project Manager

Enclosures: RCRA Corrective Action Certification and Work Plan (original plus 2 copies)

Cc: Kevin Dyer, SOPUS
Marty Reynolds, Village of Roxana
Eric Petersen, ConocoPhillips

1001 Highland Plaza Drive West, Suite 300
St. Louis, MO 63110
Phone: 314.429.0100
Fax: 314.429.0462

WORK PLAN

SOIL VAPOR EXTRACTION PILOT TEST

ROXANA, ILLINOIS

Prepared for

Shell Oil Products US
17 Junction Drive
PMB #399
Glen Carbon, IL 62034

December 2010

URS Corporation
1001 Highlands Plaza Drive West, Suite 300
St. Louis, MO 63110
314.429.0100
Project #21562593

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SECTIONONE Introduction

Shell Oil Products US (SOPUS) has been conducting subsurface investigations in the Village of Roxana in the area generally bounded by Illinois Route 111 and the west property boundary (aka west fenceline) of the WRB Refining LLC Wood River Refinery (WRR) (**Figure 1**).

In September of 2010, SOPUS submitted a Vapor Intrusion Investigation Work Plan, in which the installation of soil vapor extraction (SVE) system was proposed (SOPUS, 2010). The Illinois Environmental Protection Agency (IEPA) approved the work plan in a letter to SOPUS dated November 15, 2010 (IEPA, 2010). In particular, comment number 19 required submittal of a pilot test work plan. This work plan was developed to be responsive to that comment and presents the procedures for the SVE pilot test. The SVE system will be the primary remedial technology, and other remedial technologies (such as recovery of Light Non-Aqueous Phase Liquid (LNAPL) through a skimming system, or air sparging) may be incorporated as applicable to enhance the effectiveness of the SVE system.

SECTION TWO Conceptual Site Model

The conceptual site model (CSM) for this site has been developed based on the current understanding of the geology, groundwater flow, interaction with the Mississippi River/WRR pumping centers, and release history. This information was originally presented in the Vapor Intrusion Investigation Work Plan and is being summarized here as background.

The Village of Roxana (Village) is located approximately 1.5 miles east of the Mississippi River within the American Bottoms floodplain. The surface topography across the floodplain generally slopes downward to the west-southwest, with a total drop in elevation of approximately 15 feet across the area. The floodplain deposits regionally consist of recent alluvial (i.e., river) deposits overlying Pleistocene (i.e., Ice Age) glacial outwash. The recent alluvial deposits consist of a complex, heterogeneous sequence of sands, silts, and clays. The underlying glacial outwash deposits consist of more uniform sands and gravels that extend to bedrock. The depth to bedrock in the area typically exceeds 100 feet.

More specific to the site area, the subsurface conditions underlying the site generally consist of two primary strata, a layer of silty clay that is up to nine feet thick across the site underlain by sands. There are occasional interbedded silt or clay layers within the sand, but these do not appear to be laterally (or vertically) extensive.

The glacial outwash deposits (i.e., sands) underlying the area are the primary source for water production (e.g., industrial and municipal supply) and this water bearing zone is known as the American Bottoms Aquifer. The water table for the aquifer generally begins at a depth of approximately 25 to 40 feet bgs (approximately elevation 403 to 406). Groundwater is hydraulically connected with water in the Mississippi River, however, given the large distance from the river and nearby high-volume groundwater pumping (e.g., WRR, BP, etc), the observed water level fluctuations due to river rise take longer to occur and the magnitude of the fluctuations are muted in comparison to observations made at locations further west. The groundwater elevations have been significantly higher since late 2008 and are currently at or near all time highs.

Prior to development in the area, the natural movement of groundwater through the glacial outwash material was toward the west (toward the Mississippi River). Since development in the area, groundwater pumping has altered the groundwater flow along the west fenceline such that it now flows to the east toward the nearby pumping centers at the WRR.

Another critical aspect of the CSM is the location of the source material relative to the Village of Roxana. There are two main sources/areas, which have distinct areas of the village that they may potentially affect:

1. The WRR immediately east of the Village, and
2. The 1986 benzene release adjacent to the southern portion of the Village,

Releases of petroleum products at the WRR have resulted in a dissolved phase groundwater plume along the west fenceline and extending beneath the eastern edge of the Village. In addition, the edge of a LNAPL plume has been observed in certain areas within the confines of the WRR. The primary LNAPL plume is located further east in the WRR. The effects of groundwater pumping at the WRR as required by SOPUS' RCRA Part B Permit for the site act to contain (and eventually capture and recover) LNAPL and dissolved phase impacts.

The 1986 benzene release occurred from a pipeline on the northwest corner of the intersection of Rand Avenue and Highway 111, near a commercial/industrial area immediately across the highway from the Roxana Public Works Yard. The groundwater flow direction, as a result of pumping the existing groundwater extraction wells as required by the RCRA Part B Permit, has caused any groundwater benzene impact to migrate toward the refinery pumping centers and is now primarily located near the Roxana Public Works Yard.

Petroleum vapors (if any) in the eastern portion of the Village, would most likely be primarily associated with the LNAPL beneath the WRR, and to a lesser extent, the dissolved phase impact beneath the eastern edge of the Village. Any vapors in the southern edge of the Village would most likely be associated with the benzene release.

Figure 2 presents a schematic diagram of this CSM.

SECTION THREE Conceptual Remedial Approach

This section presents the overall remedial approach for the petroleum impact along the west fenceline of the refinery, of which SVE is the primary remedial technology. Section 4 of the plan presents the scope of work for the SVE pilot test.

The objectives for a full-scale remedial system are to reduce the source material concentrations along the west fenceline of the WRR to address the source of vapors. Addressing this source material via SVE will remediate vapors (if any) from the remaining LNAPL and groundwater, and enhance natural degradation. As required by the Part B permit, an inward groundwater hydraulic gradient is maintained at the WRR and therefore, impacted groundwater or LNAPL in the vicinity of the western fence line will continue to flow toward the groundwater/LNAPL extraction system.

Source remediation will also be conducted in the area of the Public Works Yard. Initially, the system will focus on SVE to recover any vapors associated with soil and groundwater impact. As appropriate, air sparging wells may also be installed in this area to enhance the SVE vapor remediation. As the air sparging system operates, the SVE system will be used to continue pulling any vapors from the vadose zone and will remove any vapor if generated as a result of the operation of the air sparging system.

Based upon these remedial objectives, we have developed the following overview of the Conceptual Design of the remedial systems.

West Fenceline

- Based on the typical depth to groundwater (30 to 40 feet), the SVE-influenced area will be approximately 100 feet across, in an east-west direction (≈three times the depth to groundwater).

- An SVE system will be installed with one or more north-south trending rows of extraction wells. The wells will be placed such that the radius of influence for adjacent wells overlaps. The assumed radius of influence for the system, based on similar nearby systems, is 60 feet. However, the radius of influence is one of the data gaps that will be filled by the pilot test and may be adjusted. Once the radius of influence is determined, the appropriate well spacing will be assigned and the wells will be placed accordingly.

- The SVE extraction wells will be screened over as much of the unsaturated zone and impacted material as possible. Therefore, the base of the screen will be set at a depth at or near the water table under normal water level conditions and will extend to a depth that addresses the impacted material but does not pull soil vapor from unimpacted zones and/or cause short-circuiting through the underground utilities. The longer screen length will allow for vapor recovery from the entire affected area.

- A skimmer system will be installed in each well (along the west fenceline) in which the tranmissivity indicates that there is sufficient LNAPL to support such a system. The system will operate until a predetermined LNAPL transmissivity is reached.

Public Works Yard

- An additional SVE well network will be installed in the Public Works Yard. The radius of influence will be determined during the subject pilot test that will determine the ROI for both the west fenceline and the Public Works Yard.

- An SVE treatment compound (for both the extraction wells along the fenceline and in the Public Works Yard) consisting of the vacuum blower(s)/pump(s) and the treatment system such as a catalytic or thermal oxidizer will be constructed on the Public Works Yard if access is obtained from the Village of Roxana.

- If necessary to further remediate vapors, an air sparging system may be installed in this area to enhance the remediation effectiveness of the SVE system. The SVE extraction wells would be used to recover any additional vapor generated by the air sparging system and will continue to remediate any remaining impact.

The SVE system is conceptually shown on **Figure 3**.

SECTION FOUR Scope of Work

As presented in the conceptual design above, the primary remedial technology for LNAPL is an SVE system designed to remove the volatile organic constituents from the residual LNAPL in the soil pore spaces on the WRR property near the west fenceline. The effectiveness of the SVE system technology is not being tested during this pilot test due to the success of a similar system in similar geologic conditions in the nearby Village of Hartford. Therefore, this test will focus on filling data gaps necessary to complete the system design. The data required includes system operation data (such as air flow, mass removal rates, and radius of influence) and mass distribution data (such as extent of LNAPL and nature of the LNAPL (residual LNAPL vs. recoverable LNAPL)). There are two separate scopes of work:

1. SVE extraction to determine the radius of influence (well spacing), extraction rates and pressures for blower design, and vapor concentrations for treatment system design.

2. Data gap investigation to better define the extent of impact in proximity to the west fenceline. These two scopes of work are described in the sections below.

4.1 SOIL VAPOR EXTRACTION (SVE) PILOT TEST

There are two distinctly different areas of impact at the site. The first is the area along the west fenceline of the WRR which contains petroleum hydrocarbon impact associated with refining activities. The other is an area in the southern portion of the Village associated with a benzene pipeline release in 1986. The intent of the conceptual design is to install the SVE system in both areas, however, the nature of the impact is different (benzene vs. petroleum hydrocarbons) and the impacted media are slightly different (groundwater and soil impact in the benzene release area and LNAPL, soil and groundwater impact along the west fenceline), therefore, a pilot test will be conducted on one extraction well within each of these areas.

Extraction Wells and Vapor Monitoring Points

The test well along the west fenceline will be installed in a safe and accessible location in the area that has historically had observed LNAPL. The test well in the area of the benzene release will be installed in the Roxana Public Works Yard due to the relatively higher groundwater concentrations.

The extraction wells will be installed using a hollow-stem auger or sonic drill rig. They will be 4-inch diameter PVC with a granular filter pack that will extend to approximately 2-feet above

the top of the screen. A three foot thick bentonite chip seal will be installed immediately above the sand pack and the remaining annular space will be filled with a cement bentonite grout. The filter pack will be installed in one foot lifts and surged to allow for settlement and the bentonite seal will be installed in one foot lifts with each lift being hydrated. The intent is to screen the extraction wells over as much of the unsaturated zone and impacted material as possible. Therefore, the base of the screen will be set at a depth at or near the water table under normal water level conditions and will extend to a depth that addresses the impacted material but does not pull soil vapor from unimpacted zones and/or cause short-circuiting through the underground utilities buried shallow to the surface. Based on this approach, a 20 to 30-foot screen interval is assumed for this work plan and the actual screen interval will be determined following the completion of the data gap investigation.

Vapor monitoring points will be installed at distances of 30, 60, and 90 feet from each extraction well. Three vapor monitoring points will be installed at each location with one at the top of the sand unit, one at or near the bottom of the extraction well screen, and one in the middle of the vadose zone. The proposed location of the extraction wells and vapor monitoring points are provided on **Figure 4** and shown schematically on **Figure 5**.

The vapor monitoring ports at each VMP location will be installed together in a hollow-stem auger or Geoprobe® boring. Each vapor monitoring port will consist of a 0.5-inch outer diameter by 6-inch long Geoprobe® Systems stainless steel screen connected to a 0.125-inch diameter stainless steel or teflon riser tubing extending to the ground surface. A sand pack will be placed in the annular space from approximately six inches below to six inches above each stainless steel screen. Granular bentonite seals will be placed between individual vapor monitoring port screen/sand pack intervals. The remaining annular space will be filled with cement bentonite grout to the ground surface and completed at the surface with a flush-mounted protective cover.

Air Flow Estimation

The starting air flow for the pilot test was estimated based on the following information. A radius of influence of 60 feet is assumed based on experience with the SVE system in the Village of Hartford. A pore volume of 33,930 ft^3 was estimated assuming a 20-foot screen interval with a 60-foot radius of influence and a vapor filled porosity of 15 percent (0.15). It is believed that removal of two pore volumes per day is sufficient to recover hydrocarbon mass. Based on these assumptions and the objective to remove two pore volumes per day, an extraction rate of ±50

ft^3/min is desired. To achieve this, an airflow rate of 50 cubic feet per minute (cfm) is required. Therefore, we propose to run tests at 50, 75, and 90 cfm to determine the most efficient operating range that will meet our objectives, for the full scale system. These calculations are presented in **Appendix A.**

SVE Pilot Test Equipment

Test equipment used during the pilot test will be rented from a qualified vendor and include the following.

- Internal combustion engine (ICE) system or equivalent capable of approximately 100 cfm, 100-inches water column, and vapor treatment. This unit needs a silencer/muffler due to the nearby residential neighborhood. Sufficient fuel (soil vapor and supplemental fuel as needed) should be available to avoid shutdowns during testing.

- Treatment system having an inlet temperature gauge and flow meter (between knockout and blower) with sample port on discharge.

- Knockout tank with demister.

- Inlet and outlet relief valves.

- Miscellaneous ancillary equipment including but not limited to health and safety monitoring equipment, water level meters, air sampling and monitoring equipment, and flow meters.

SVE Pilot Test Procedures

Prior to running the pilot test, the VOC concentrations at the extraction well will be determined and recorded. Tedlar bag samples will be collected to determine VOC concentrations. The ICE system will be connected to the extraction well and the test will begin by running the unit at approximately 50 cfm. The vapor temperature and pressure will be routinely monitored at the extraction well and each VMP. Readings will be recorded at approximately 2, 5, 10, and 15 minutes and every 15 minutes until the readings from the extraction well stabilize (within 5 percent of previous for three consecutive readings). The readings will be documented on the Pilot Test Vapor Reading form provided as **Appendix B**. The readings are expected to stabilize within the first two to three hours. If they do not stabilize within three hours, the readings will

be collected once an hour until they stabilize (or a maximum of ten hours). Either manual or automatic data collection will be used depending on the specific system that is used. Once stable, the readings will be collected once an hour for the remainder of that work day and then shut down overnight to allow the subsurface conditions to equilibrate prior to the next test. Prior to shutting down the system, an additional Tedlar bag will be collected from the extraction well to determine VOC concentrations.

The system will be tested at approximately 75 and 90 cfm following the same procedures.

Following the tests at these three air flow rates, the system will operate at the airflow rate deemed most likely to be used during full scale operation for approximately three days to assess sustainability. The extraction well and VMPs will be monitored twice a day during this period. In addition, one summa canister will be collected from the intake to the ICE during this period and analyzed for VOCs via USEPA method TO-15.

It is likely that water will be recovered during the pilot tests either as liquid water or condensation. Recovered water will be removed from the vapor stream in the knockout tank and pumped to either 55-gallon drums or a small poly tank. The water will be sampled and disposed of appropriately based on the results of the analytical testing.

4.2 DATA GAP INVESTIGATION

Prior to the pilot test, a soil and LNAPL investigation will be conducted along the west fenceline to determine the extent of soil impact. The investigation will consist of the collection and analysis of soil samples that will be correlated with the existing CPT/ROST and soil sampling data along the west fenceline to provide a better understanding of the distribution of petroleum hydrocarbon impact. The data obtained during this investigation will be used to help determine the appropriate extraction well screen interval, along the west fenceline and the applicability of other remedial technologies to enhance the remedial effort of the SVE system.

Approximately seven soil borings will be continuously sampled and inspected via visual observations and headspace screening, for evidence of impact. Up to three samples will be collected from each soil boring (one at the top of the sand unit, one at or near the bottom of the extraction well screen, and one in the middle of the vadose zone). The sample interval showing the highest degree of impact within each of these based on the screening will be submitted to the laboratory for analysis. If there is no evidence of impact within one of these zones, then no

sample will be collected. The samples submitted to the laboratory will be analyzed for BTEX and total petroleum hydrocarbons (TPH) via USEPA Methods 8260 and 8015, respectively. Personnel conducting the sampling will wear clean disposable protective gloves. Laboratory supplied sample containers will be labeled with a sample ID, site name, sampler initials, sample date and time, sample preservative, and the parameters to be analyzed. After sample collection, the samples will be logged on a chain-of-custody (COC) form, packaged to prevent damage during shipment, and cooled to 4°C. The samples will then be delivered, under the proper COC documentation, to the appropriate laboratory via overnight delivery or courier service.

The data from the field activities will be collected in accordance with the procedures described in this Pilot Test work plan. Quality assurance samples in the form of duplicates, trip blanks, and matrix spike and matrix spike duplicates (MS/MSD) will be collected. Duplicates of selected samples will be collected and analyzed from 10 percent of the sample locations to check for sampling and analytical reproducibility. MS and MSD samples will be collected and analyzed from 5 percent of the sample locations to evaluate the effect of the sample matrix on the accuracy of the analysis. A trip blank will be collected and included in each cooler containing samples for VOC analysis. A minimum of one trip blank set for every 10 investigative samples will be collected. The trip blank will consist of two 40-mL VOA vials prepared by the laboratory, transported to the field, labeled and shipped with the other samples to the laboratory. The trip blanks will not be opened in the field. Equipment blanks will also be collected and analyzed from 10 percent of the sample locations if non-dedicated or non-expendable equipment are used.

4.3 GENERAL IMPLEMENTATION ACTIVITIES

Activities associated with pilot testing will be conducted as described in this plan, and in accordance with procedures previously used for Roxana/West Fenceline investigations, and URS Standard Operating Procedures (SOPs)/guidelines and SOPUS guidelines.

Health and Safety during the pilot tests and investigation activities will be governed by the *Roxana/Route 111 Investigation and Rand Avenue Remediation Health and Safety Plan* (HASP) dated December 2010 prepared by URS (URS, 2010A) according to Occupational Safety and Health Administration Hazardous Waste Operations and Emergency Response (OSHA HAZWOPER) rules (29 CFR 1910.120 (b)(1)) as well as the SOPUS Contractor Health, Safety and Environment (HSE) Program Document dated December 2005 (SOPUS, 2005) and the

ConocoPhillips Environmental and Geotechnical Work 2010 Health and Safety Plan dated March 2010 (URS, 2010B).

SECTION FIVE Investigation Derived Waste

Investigative derived waste (IDW) including soil cuttings, PPE, and expendable materials will be collected and disposed of properly. Expendable materials (e.g., disposable sampling equipment, such as gloves and tubing) having a low probability of contamination will be collected in trash bags and disposed of as municipal waste. Impacted expendable materials and soil cuttings will be collected and placed in labeled and sealed 55-gallon drums or directly into roll-offs for future disposal. Solids generated from borings outside the WRR will be collected and staged at the Public Works Yard. Solids generated from inside the WRR will be managed by current site owner representatives on behalf of SOPUS. Liquids will be containerized, profiled and disposed. Prior to disposal, the soil cuttings and purge water may be sampled for waste characterization as part of the disposal profile process.

SECTION SIX Scheduling and Reporting

Completion of the pilot test requires SOPUS to acquire an air permit through IEPA, and SOPUS submitted the permit application on December 27, 2010. A copy of the application is provided in **Appendix C**. It is anticipated that it will take approximately two or three months for IEPA to issue the air permit after submission of the application.

Upon IEPA's approval of this work plan, SOPUS will begin the data gap investigation and installation of the SVE extraction wells and monitoring points. Once the air permit is finalized SOPUS will mobilize the vacuum/vapor treatment equipment. It is anticipated that the pilot test will last one to two weeks at each location.

The information derived from the pilot test will be incorporated into the final design of the SVE system. It is not anticipated that a formal report will be developed following the completion of the pilot test.

SECTION SEVEN Cost Estimate

In accordance with Section V.F.1 of the Part B Permit, a detailed cost estimate, to implement the pilot test described in this work plan is presented below.

ACTIVITY	COST
SVE Pilot Test	
Installation	**$ 48,000**
URS Labor	$ 13,500
Mobilization/Demobilization	$ 1,000
Equipment (PID, FID, etc.)	$ 2,500
Supplies (PPE, decontamination, etc.)	$ 2,000
Drilling Contractor	$ 29,000
Operation	**$ 99,500**
URS Labor	$ 47,000
Mobilization/Demobilization	$ 2,000
Equipment (PID, FID, manometer, etc.)	$ 16,000
Supplies (PPE, decontamination, tubing, etc.)	$ 5,000
ProAct Services Corporation	$ 29,000
Laboratory	$ 500
SVE Pilot Test (Total)	**$ 147,500**
Data Gap Investigation	
URS Labor	$ 7,000
Mobilization/Demobilization	$ 500
Equipment (PID, FID, etc.)	$ 1,500
Supplies (PPE, decontamination, etc.)	$ 1,000
Drilling Contractor	$ 10,000
Laboratory	$ 2,000
Data Gap Investigation (Total)	**$ 22,000**
GRAND TOTAL	**$ 169,500**

SECTION EIGHT References

Illinois Environmental Protection Agency (IEPA). November 15, 2010. Letter of work plan approval with conditions. Sent to URS Corporation.

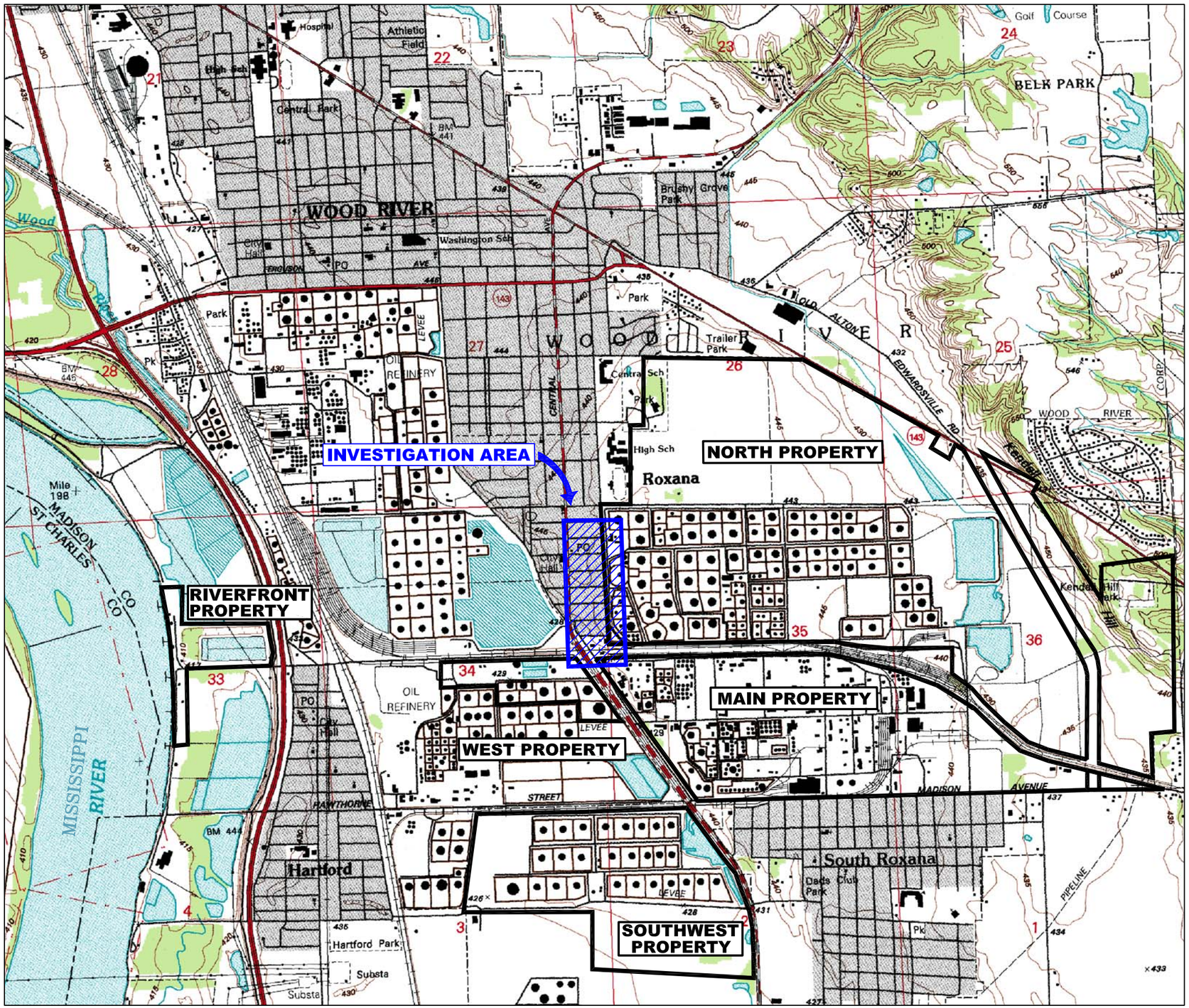
Shell Oil Products US. September 20, 2010. *Vapor Intrusion Investigation Work Plan.* Prepared by URS Corporation.

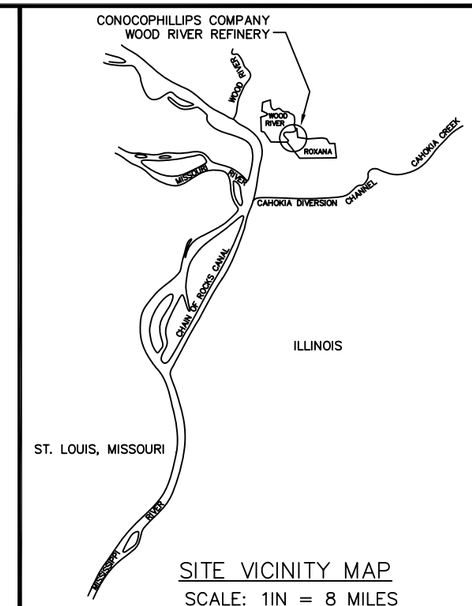
Shell Oil Products US. November 2010. *3rd Quarter 2010 - Soil Vapor Monitoring Report, Roxana Illinois.* Prepared by URS Corporation.

URS Corporation. 2010A. *Roxana /Route 111 Investigation and Rand Avenue Remediation Health and Safety Plan.* Prepared for Shell Oil Products US, December 2010.

URS Corporation. 2010B. *Environmental and Geotechnical Work 2010 Health and Safety Plan.* Prepared for ConocoPhillips, March 2010.

Figures





SITE VICINITY MAP
SCALE: 1IN = 8 MILES

LEGEND

- WOOD RIVER REFINERY PROPERTY BOUNDARY
- INVESTIGATION AREA

SOURCE: MAP TAKEN FROM ELECTRONIC USGS DIGITAL RASTER GRAPHIC 7.5 MINUTE TOPOGRAPHIC MAP OF WOOD RIVER, ILL–MO REVISED 1994.

CONTOUR INTERVAL = 5 FT

0 2000

SCALE FEET

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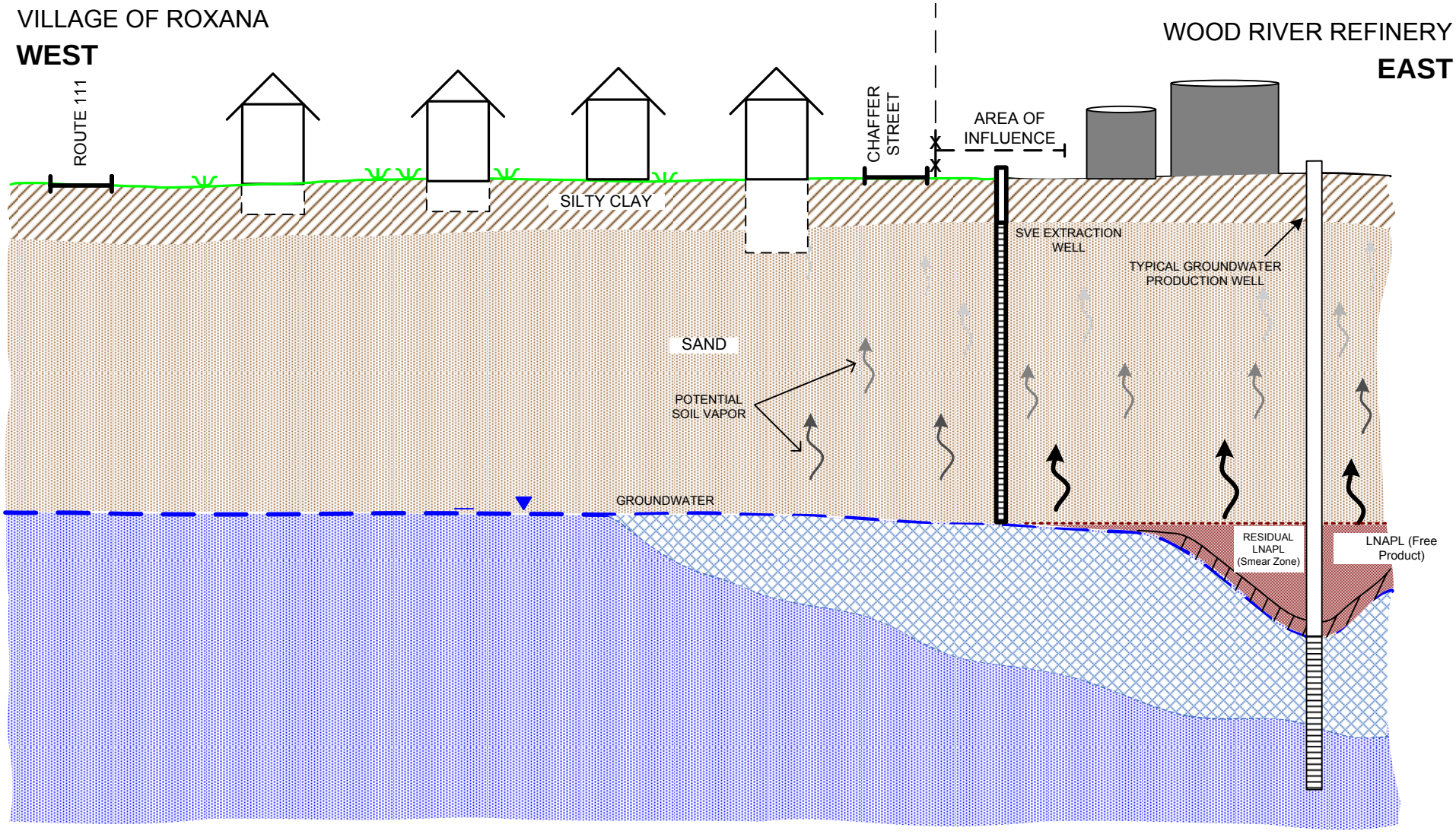
SHELL OIL PRODUCTS US ROXANA, ILLINOIS	PROJECT NO. 21562291
URS	
DRN. BY: djd (12/16/10) DSGN. BY: djd CHKD. BY: wmp	Site Location Map
	FIG. NO. 1

File: P:\ENVIRONMENTAL\SHELL OIL PRODUCT US\B–ROXANA–ROUTE 111\21562XXX–ROXANA INVESTIGATION & ASSESSMENT\REMEDIATION PILOT TEST WORK PLAN\FIGURES\FIGURE 1 SITE LOCATION MAP.DWG Last edited: 12/30/10 ● 11:08 a.m. ● WCC–ST.LOUIS



NOTES:

NOT TO SCALE

SHELL OIL PRODUCTS US ROXANA, ILLINOIS		PROJECT NO. 21562593
URS		
DRN. BY: mpm 12/13/10 DSGN. BY: sjs CHKD. BY: b3	Conceptual Site Model Schematic	FIG. NO. 2

File: P:\ENVIRONMENTAL\SHELL OIL PRODUCT US\B-ROXANA-ROUTE 111\2156XXXX_ROXANA INVESTIGATION & ASSESSMENT\REMEDIATION PILOT TEST WORK PLAN\FIGURES\FIGURE 3 CONCEPTUAL LAYOUT OF THE SVE SYSTEM.DWG Last edited: DEC. 30, 10 @ 12:41 p.m. by: david_deguire

LEGEND

- VAPOR MONITORING POINT LOCATION
- SVE EXTRACTION WELL
- SVE HEADER LINE
- TREATMENT ZONE
- SVE TREATMENT COMPOUND
- INFLUENCE RADIUS OF SVE WELL
- WRR PROPERTY BOUNDARY

SECOND ST
THIRD ST
FOURTH ST
FIFTH ST
SIXTH ST
SEVENTH ST
EIGHTH
VILLAGE
(S. CENTRAL AVE) HIGHWAY 111
CHAFFER ST
RAND AVENUE
1986 APPROXIMATE BENZENE RELEASE SITE
WEST PROPERTY
WOOD RIVER REFINERY

VMP-1
VMP-2
VMP-3
VMP-4
VMP-5
VMP-6
VMP-7
VMP-8
VMP-9
VMP-10
VMP-11
VMP-12
VMP-13
VMP-14
VMP-15
VMP-16

SVE HEADER LINE
SVE HEADER LINE
SVE TREATMENT COMPOUND

R-77
R-71
R-78
R-79
R-81
A-28
A-33
A-27

INWARD GROUNDWATER GRADIENT

Ø 200
SCALE FEET
N

SHELL OIL PRODUCTS US ROXANA, ILLINOIS	PROJECT NO. 21562291
URS	
DRN. BY: djd (12/16/10) DSGN. BY: ss CHKD. BY: ss	Conceptual Layout of the SVE System
	FIG. NO. 3

File: P:\ENVIRONMENTAL\SHELL OIL PRODUCT US\B-ROXANA-ROUTE 111\2156XXXX_ROXANA INVESTIGATION & ASSESSMENT\REMEDIATION PILOT TEST WORK PLAN\FIGURES\FIGURE 4 PROPOSED PILOT TEST SVE EXTRACTION WELL AND VAPOR MONITORING POINT LOCATION.DWG Last edited: DEC. 30, 10 @ 12:35 p.m. by: david_deguire

LEGEND

PROPOSED EXTRACTION WELL LOCATION

PROPOSED VAPOR MONITORING POINT LOCATION

VAPOR MONITORING POINT LOCATION

TREATMENT ZONE

SECOND ST

THIRD ST

FOURTH ST

FIFTH ST

SIXTH ST

SEVENTH ST

EIGHTH ST

VILLAGE

(S. CENTRAL AVE) HIGHWAY 111

CHAFFER ST

RAND AVENUE

1986 APPROXIMATE BENZENE RELEASE SITE

PUBLIC WORKS YARD

WOOD RIVER REFINERY

WEST PROPERTY

VMP-1

VMP-2

VMP-3

VMP-4

VMP-5

VMP-6

VMP-7

VMP-8

VMP-9

VMP-10

VMP-11

VMP-12

VMP-13

VMP-14

VMP-15

VMP-16

R-71

R-77

R-78

R-79

R-81

A-28

A-33

A-27

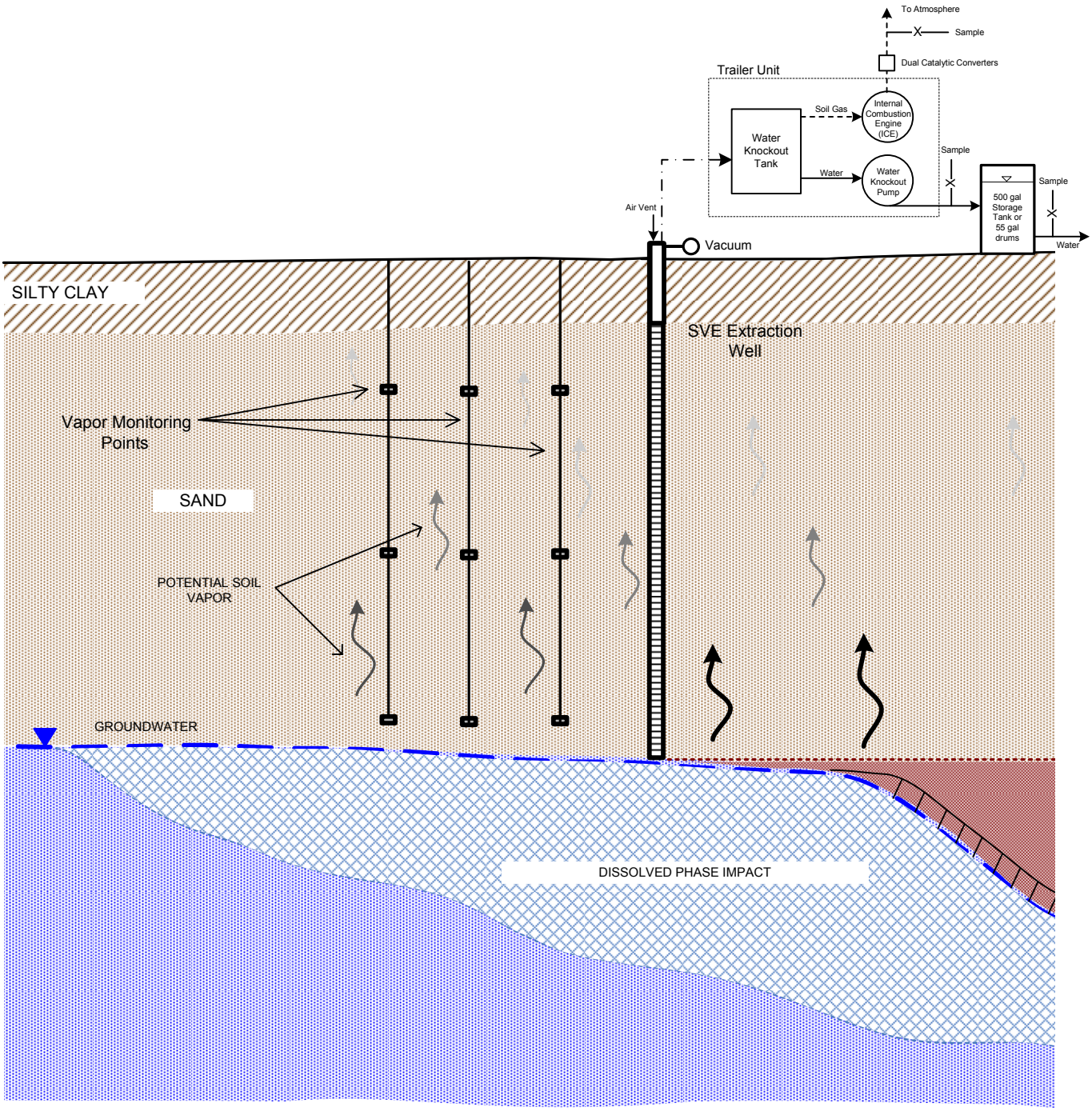
INWARD GROUNDWATER GRADIENT

Ø 200

SCALE FEET

N

SHELL OIL PRODUCTS US ROXANA, ILLINOIS		PROJECT NO. 21562291
URS		
DRN. BY: djd (12/16/10) DSGN. BY:ss CHKD. BY:ss	Proposed Pilot Test SVE Extraction Well and Vapor Monitoring Point Location	FIG. NO. 4



NOTES:

NOT TO SCALE

SHELL OIL PRODUCTS US ROXANA, ILLINOIS		PROJECT NO. 21562593
URS		
DRN. BY: mpm 12/13/10 DSGN. BY: sjs CHKD. BY: b3	Conceptual Pilot Test Schematic Cross Section	FIG. NO. 5

APPENDIX A SVE System Calculations Sheet

Assume 4-inch PVC well between VMP-3 and VMP-4 (Pilot Test 1) and similar well in area around VMP-13 at Roxana Public Works for Pilot Test 2. Wells have 10-slot, 20-foot screen from 25 to 45-feet below ground surface.

ESTIMATE EXTRACTION RATE - PILOT TESTS 1 & 2

$VaporFilledPorosity := 0.15 \quad WellSpacing := 120ft \quad ScreenedInterval := 20ft \quad MinDay := 1440min$

- VaporFilledPorosity (Φ, 0.15) is representative of sands with water and LNAPL in the pore space...along with vapor.
- Well Spacing (2r, 120-feet) is design width with assumed Radius of Influence (ROI) of 60 feet. ROI is distance where approximate 1-inch (or greater) water column (negative pressure or suction pressure) can be measured.
- Screened interval (h, 20-feet) assumes bottom of screen in close proximity to lowest annual static water elevation (45-feet below ground surface) with top of screen 25-feet below ground surface.
- Pore volume is estimated by $\pi r^2 h\Phi$ (π x 60^2 x 20 x 0.15)

Estimate extraction rate required to remove 2 pore volumes/day.

$$PoreVolume := \pi \cdot \left(\frac{WellSpacing}{2} \right)^2 \cdot ScreenedInterval \cdot VaporFilledPorosity$$

$$PoreVolume = 3.393 \times 10^4 \, ft^3$$

To Remove 2 PoreVolumes/Day the extraction rate is:

$$VolFlowRate := \frac{PoreVolume \cdot 2}{MinDay}$$

$$VolFlowRate = 47 \frac{ft^3}{min}$$

$$VolFlowRate = 1.3 \frac{m^3}{min}$$

At 47 cfm two pore volumes, as defined, would be extracted.

ESTIMATE INITIAL VOC CONCENTRATION (Use Table E-1, 3rd Quarter 2010 Report)

Pilot Test #1 - around VMP-4

VMP-3 (31.5-feet bgs): Total VOCs = 2,783 mg/m^3. This should be considered a maximum concentration for VMP-3 since non-detects were considered concentrations at the stated detection limit. For example, for Acetone - <72 mg/m^3 = 72 mg/m^3. Cyclohexane appears to be the most prominent contaminent by mass. For example, at VMP-3, the cyclohexane result was 1,100 mg/m^3.

VMP-4 (23.5-feet bgs): Total VOCs = 4,937 mg/m^3.

VMP-5 (31-feet bgs): Total VOCs = 2,827 mg/m^3

$$\text{AvgVOCs} := \frac{2783 + 4937 + 2827}{3}\,\frac{\text{mg}}{\text{m}^3}$$

$$\text{AvgVOCs} = 3516\,\frac{\text{mg}}{\text{m}^3}$$

AvgVOCs is assumed average concentration around 30-feet bgs (smear zone). This should, again, be considered a maximum along the fence line since this area appears to be the most heavily impacted area based on Table E-1 results.

3,516 mg/m^3 is 1021 ppmv based on MW of cyclohexane (Air Toxics website).

$$\text{VOCMassFlowRate} := \text{VolFlowRate}\cdot\text{AvgVOCs}$$

$$\text{VOCMassFlowRate} = 6.755\,\frac{\text{kg}}{\text{day}}$$

$$\text{VOCMassFlowRate} = 15\,\frac{\text{lb}}{\text{day}}$$

Pilot Test #2

In the Roxana Public Works Yard benzene represents the bulk of contaminant mass; therefore, only benzene concentrations are used to estimate vapor strength.

VMP-11 (29-feet bgs): Total benzene = 31,000 mg/m^3. This value is from 11/2009, Figure 6. Per Table E-1, in September 2010 the benzene result was 120 mg/m^3 at 29-feet; there was no result for 38-feet bgs.

VMP-12 (39-feet bgs): Total Benzene = 26,000 mg/m^3 at 39-feet. Again, from Figure 6. Per Table E-1, in September 2010 the benzene result was 14,000 at 25-feet; there was no result at 39-feet.

VMP-13 (29.5-feet bgs): Total Benzene = 90,000 mg/m^3, Figure 6. Per Table E-1, in September 2010 the benzene result was 5,800 at 21.5-feet; there was no result for 29.5-feet bgs.

VMP-14 (29-feet bgs): Total Benzene = 79,000 mg/m^3 at 29-feet, Figure 6. Per Table E-1, in September 2010 the benzene result was 37,000 at 20-feet bgs.

$$\text{AvgBenzene} := \frac{31000 + 26000 + 90000 + 79000}{4}\ \frac{\text{mg}}{\text{m}^3}$$

$$\text{AvgBenzene} = 56500\ \frac{\text{mg}}{\text{m}^3}$$

AvgBenzene is assumed average concentration around 30-feet bgs (smear zone). This is for benzene only; however, it is the most prominent COC by mass.

56,500 mg/m^3 is 17,686 ppmv based MW of benzene.

$$\text{BenzeneMassFlowRate} := \text{VolFlowRate} \cdot \text{AvgBenzene}$$

$$\text{BenzeneMassFlowRate} = 108.567\ \frac{\text{kg}}{\text{day}}$$

$$\text{BenzeneMassFlowRate} = 239\ \frac{\text{lb}}{\text{day}}$$

This is an initial mass flow rate. Once this resident mass is removed, the mass flow rate should decrease.

APPENDIX B

Pilot Test Vapor Monitoring Form

PILOT TEST VAPOR READING FORM
ROXANA, ILLINOIS

Time	SVE Test Well:				OB#1	OB#2	OB#3	
(min.)	Temp (°F)	Airflow (cfm)	Pressure (inches of water)	Vapor Conc. (ppmv)	Pressure (inches of water)	Pressure (inches of water)	Pressure (inches of water)	Comments
0								
2								
5								
10								
15								
30								
45								
60								
75								
90								
105								
120								
135								
150								
165								
180								
240								
300								
360								
420								
480								

APPENDIX C Pilot Test Air Permit Application

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL -- PERMIT SECTION
P.O. BOX 19506
SPRINGFIELD, ILLINOIS 62794-9506

FEE DETERMINATION FOR CONSTRUCTION PERMIT APPLICATION

FOR AGENCY USE ONLY	
ID NUMBER:	
PERMIT #:	
COMPLETE ☐ INCOMPLETE ☐	DATE COMPLETE:
CHECK #:	ACCOUNT NAME:

THIS FORM IS TO BE USED BY ALL SOURCES TO SUPPLY FEE INFORMATION THAT MUST ACCOMPANY ALL CONSTRUCTION PERMIT APPLICATIONS. ***THIS APPLICATION MUST INCLUDE PAYMENT IN FULL TO BE DEEMED COMPLETE.*** MAKE CHECK OR MONEY ORDER PAYABLE TO THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY. SEND TO THE ADDRESS ABOVE. DO NOT SEND CASH. REFER TO INSTRUCTIONS (197-INST) FOR ASSISTANCE.

SOURCE INFORMATION

1) SOURCE NAME: Soil Vapor Extraction Treatment System

2) PROJECT NAME: Roxana Site	3) SOURCE ID NO. (IF APPLICABLE):
4) CONTACT NAME: Kevin E. Dyer	5) CONTACT PHONE NUMBER: (618) 288-7237

FEE DETERMINATION

6) FILL IN THE FOLLOWING THREE BOXES AS DETERMINED IN SECTIONS 1 THROUGH 4 BELOW:

$ 500	+	$ 500	=	$ 1,000
SECTION 1 SUBTOTAL		SECTION 2, 3 OR 4 SUBTOTAL		GRAND TOTAL

SECTION 1: STATUS OF SOURCE / PURPOSE OF SUBMITTAL

7) YOUR APPLICATION WILL FALL UNDER ONLY ONE OF THE FOLLOWING SIX CATEGORIES DESCRIBED BELOW. CHECK THE BOX THAT APPLIES, ENTER THE CORRESPONDING FEE IN THE BOX TO THE RIGHT AND COPY THIS FEE INTO THE SECTION 1 SUBTOTAL BOX ABOVE. PROCEED TO APPLICABLE SECTIONS.

FOR PURPOSES OF THIS FORM:

- ***MAJOR SOURCE*** IS A SOURCE THAT IS REQUIRED TO OBTAIN A CAAPP PERMIT.
- ***SYNTHETIC MINOR* SOURCE** IS A SOURCE THAT HAS TAKEN LIMITS ON POTENTIAL TO EMIT IN A PERMIT TO AVOID CAAPP PERMIT REQUIREMENTS (E.G., FESOP).
- ***NON-MAJOR* SOURCE** IS A SOURCE THAT IS NOT A MAJOR OR SYNTHETIC MINOR SOURCE.

☐ EXISTING SOURCE WITHOUT STATUS CHANGE OR WITH STATUS CHANGE FROM SYNTHETIC MINOR TO MAJOR SOURCE OR VICE VERSA. ENTER $0 AND PROCEED TO SECTION 2.	
☐ EXISTING NON-MAJOR SOURCE THAT WILL BECOME SYNTHETIC MINOR OR MAJOR SOURCE. ENTER $5,000 AND PROCEED TO SECTION 4.	
☐ EXISTING MAJOR OR SYNTHETIC MINOR SOURCE THAT WILL BECOME NON-MAJOR SOURCE. ENTER $4,000 AND PROCEED TO SECTION 3.	$ 500 SECTION 1 SUBTOTAL
☐ NEW MAJOR OR SYNTHETIC MINOR SOURCE. ENTER $5,000 AND PROCEED TO SECTION 4.	
☒ NEW NON-MAJOR SOURCE. ENTER $500 AND PROCEED TO SECTION 3.	
☐ AGENCY ERROR. IF THIS IS A TIMELY REQUEST TO CORRECT AN ISSUED PERMIT THAT INVOLVES ONLY AN AGENCY ERROR AND IF THE REQUEST IS RECEIVED WITHIN THE DEADLINE FOR A PERMIT APPEAL TO THE POLLUTION CONTROL BOARD, THEN ENTER $0. SKIP SECTIONS 2, 3 AND 4. PROCEED DIRECTLY TO SECTION 5.	

SECTION 2: SPECIAL CASE FILING FEE

8) FILING FEE. IF THE APPLICATION ONLY ADDRESSES ONE OR MORE OF THE FOLLOWING, CHECK THE APPROPRIATE BOXES, ENTER $500 IN THE SECOND BOX UNDER FEE DETERMINATION ABOVE, SKIP SECTIONS 3 AND 4 AND PROCEED DIRECTLY TO SECTION 5. OTHERWISE, PROCEED TO SECTION 3 OR 4, AS APPROPRIATE.

- ☐ ADDITION OR REPLACEMENT OF CONTROL DEVICES ON PERMITTED UNITS
- ☐ PILOT PROJECTS/TRIAL BURNS BY A PERMITTED UNIT
- ☐ APPLICATIONS ONLY INVOLVING INSIGNIFICANT ACTIVITIES UNDER 35 IAC 201.210 (MAJOR SOURCES ONLY)
- ☐ LAND REMEDIATION PROJECTS
- ☐ REVISIONS RELATED TO METHODOLOGY OR TIMING FOR EMISSION TESTING
- ☐ MINOR ADMINISTRATIVE-TYPE CHANGE TO A PERMIT

THIS AGENCY IS AUTHORIZED TO REQUIRE AND YOU MUST DISCLOSE THIS INFORMATION UNDER 415 ILCS 5/39. FAILURE TO DO SO COULD RESULT IN THE APPLICATION BEING DENIED AND PENALTIES UNDER 415 ILCS 5 ET SEQ. IT IS NOT NECESSARY TO USE THIS FORM IN PROVIDING THIS INFORMATION. THIS FORM HAS BEEN APPROVED BY THE FORMS MANAGEMENT CENTER.

APPLICATION PAGE _____

Printed on Recycled Paper
197-FEE

SECTION 3: FEES FOR CURRENT OR PROJECTED NON-MAJOR SOURCES

9) IF THIS APPLICATION CONSISTS OF A SINGLE NEW EMISSION UNIT OR NO MORE THAN TWO MODIFIED EMISSION UNITS, ENTER $500.	9)	500
10) IF THIS APPLICATION CONSISTS OF MORE THAN ONE NEW EMISSION UNIT OR MORE THAN TWO MODIFIED UNITS, ENTER $1,000.	10)	
11) IF THIS APPLICATION CONSISTS OF A NEW SOURCE OR EMISSION UNIT SUBJECT TO SECTION 39.2 OF THE ACT (I.E., LOCAL SITING REVIEW); A COMMERCIAL INCINERATOR OR A MUNICIPAL WASTE, HAZARDOUS WASTE, OR WASTE TIRE INCINERATOR; A COMMERCIAL POWER GENERATOR; OR AN EMISSION UNIT DESIGNATED AS A COMPLEX SOURCE BY AGENCY RULEMAKING, ENTER $15,000.	11)	
12) IF A PUBLIC HEARING IS HELD (SEE INSTRUCTIONS), ENTER $10,000.	12)	
13) SECTION 3 SUBTOTAL (ADD LINES 9 THROUGH 12) TO BE ENTERED ON PAGE 1.	13)	500

SECTION 4: FEES FOR CURRENT OR PROJECTED MAJOR OR SYNTHETIC MINOR SOURCES

Application Contains Modified Emission Units Only	14) FOR THE FIRST MODIFIED EMISSION UNIT, ENTER $2,000.	14)	
	15) NUMBER OF ADDITIONAL MODIFIED EMISSION UNITS = _____ X $1,000.	15)	
	16) LINE 14 PLUS LINE 15, OR $5,000, WHICHEVER IS LESS.		16)
Application Contains New And/Or Modified Emission Units	17) FOR THE FIRST NEW EMISSION UNIT, ENTER $4,000.	17)	
	18) NUMBER OF ADDITIONAL NEW AND/OR MODIFIED EMISSION UNITS = _____ X $1,000.	18)	
	19) LINE 17 PLUS LINE 18, OR $10,000, WHICHEVER IS LESS.		19)
Application Contains Netting Exercise	20) NUMBER OF INDIVIDUAL POLLUTANTS THAT RELY ON A NETTING EXERCISE OR CONTEMPORANEOUS EMISSIONS DECREASE TO AVOID APPLICATION OF PSD OR NONATTAINMENT NSR = _____ X $3,000.		20)
Additional Supplemental Fees	21) IF THE NEW SOURCE OR EMISSION UNIT IS SUBJECT TO SECTION 39.2 OF THE ACT (I.E., SITING); A COMMERCIAL INCINERATOR OR OTHER MUNICIPAL WASTE, HAZARDOUS WASTE, OR WASTE TIRE INCINERATOR; A COMMERCIAL POWER GENERATOR; OR ONE OR MORE OTHER EMISSION UNITS DESIGNATED AS A COMPLEX SOURCE BY AGENCY RULEMAKING, ENTER $25,000.		21)
	22) IF THE SOURCE IS A NEW MAJOR SOURCE SUBJECT TO PSD, ENTER $12,000.		22)
	23) IF THE PROJECT IS A MAJOR MODIFICATION SUBJECT TO PSD, ENTER $6,000.		23)
	24) IF THIS IS A NEW MAJOR SOURCE SUBJECT TO NONATTAINMENT (NAA) NSR, ENTER $20,000.		24)
	25) IF THIS IS A MAJOR MODIFICATION SUBJECT TO NAA NSR, ENTER $12,000.		25)
	26) IF APPLICATION INVOLVES A DETERMINATION OF CLEAN UNIT STATUS AND THEREFORE IS NOT SUBJECT TO BACT OR LAER, ENTER $5,000 PER UNIT FOR WHICH A DETERMINATION IS REQUESTED OR OTHERWISE REQUIRED. _____ X $5,000.		26)
	27) IF APPLICATION INVOLVES A DETERMINATION OF MACT FOR A POLLUTANT AND THE PROJECT IS NOT SUBJECT TO BACT OR LAER FOR THE RELATED POLLUTANT UNDER PSD OR NSR (E.G., VOM FOR ORGANIC HAP), ENTER $5,000 PER UNIT FOR WHICH A DETERMINATION IS REQUESTED OR OTHERWISE REQUIRED. _____ X $5,000.		27)
	28) IF A PUBLIC HEARING IS HELD (SEE INSTRUCTIONS), ENTER $10,000.		28)
29) SECTION 4 SUBTOTAL (ADD LINES 16 AND LINES 19 THROUGH 28) TO BE ENTERED ON PAGE 1.			29)

SECTION 5: CERTIFICATION

NOTE: APPLICATIONS WITHOUT A SIGNED CERTIFICATION WILL BE DEEMED INCOMPLETE.

30) I CERTIFY UNDER PENALTY OF LAW THAT, BASED ON INFORMATION AND BELIEF FORMED AFTER REASONABLE INQUIRY, THE INFORMATION CONTAINED IN THIS FEE APPLICATION FORM IS TRUE, ACCURATE AND COMPLETE.

BY: _____
SIGNATURE

Principal Project Manager
TITLE OF SIGNATORY

Kevin E. Dyer
TYPED OR PRINTED NAME OF SIGNATORY

12 / 22 / 10
DATE

APPLICATION PAGE _____

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197-FEE

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
PERMIT SECTION
P. O. BOX 19506
SPRINGFIELD, ILLINOIS 62794-9506

This Agency is authorized to require and you must disclose this information under 415 ILCS 5/39. Failure to do so could result in the application being denied and penalties under 415 ILCS 5 et seq. It is not necessary to use this form in providing this information. This form has been approved by the forms management center.

APPLICATION FOR PERMIT (A)

☐ CONSTRUCT ☐ OPERATE

NAME OF EQUIPMENT TO BE CONSTRUCTED OR OPERATED _____ (B)

FOR AGENCY USE ONLY

I.D. NO. _____

PERMIT NO. _____

DATE _____

NOTE: THIS APPLICATION FORM IS ONLY FOR SOURCES NOT REQUIRED TO OBTAIN A FESOP OR CAAPP PERMIT PURSUANT SECTION 39.5 OF THE ILLINOIS ENVIRONMENTAL PROTECTION ACT.

1a. NAME OF OWNER: Shell Oil Products US		2a. NAME OF OPERATOR: URS Corporation	
1b. STREET ADDRESS OF OWNER: 17 Junction Dr., PMB 399		2b. STREET ADDRESS OF OPERATOR: 1001 Highlands Plaza Dr. West, Suite 300	
1c. CITY OF OWNER: Glenn Carbon		2c. CITY OF OPERATOR: St. Louis	
1d. STATE OF OWNER: IL	1e. ZIP CODE: 62034	2d. STATE OF OPERATOR: MO	2e. ZIP CODE: 63110

3a. NAME OF CORPORATE DIVISION OR PLANT: Not Applicable		3b. STREET ADDRESS OF EMISSION SOURCE: corner of Chaffer St. and 8th St.		
3c. CITY OF EMISSION SOURCE: Roxana	3d. LOCATED WITHIN CITY LIMITS: ☒ YES ☐ NO	3e. TOWNSHIP: Woodriver	3f. COUNTY: Madison	3g. ZIP CODE: 62048

4. ALL CORRESPONDENCE TO: (TITLE AND/OR NAME OF INDIVIDUAL) Kevin E. Dyer	5. YOUR DESIGNATION FOR THIS APPLICATION: (C) Roxana Site
6. ADDRESS FOR CORRESPONDENCE: (CHECK ONLY ONE) ☒ OWNER ☐ OPERATOR ☐ EMISSION SOURCE	7. WHO IS THE PERMIT APPLICANT? ☒ OWNER ☐ OPERATOR

8. THE UNDERSIGNED HEREBY MAKES APPLICATION FOR A PERMIT AND CERTIFIES THAT THE STATEMENTS CONTAINED HEREIN ARE TRUE AND CORRECT, AND FURTHER CERTIFIES THAT ALL PREVIOUSLY SUBMITTED INFORMATION REFERENCED IN THIS APPLICATION REMAINS TRUE, CORRECT AND CURRENT. BY AFFIXING HIS/HER SIGNATURE HERETO THE UNDERSIGNED FURTHER CERTIFIES THAT HE/SHE IS AUTHORIZED TO EXECUTE THIS APPLICATION.

AUTHORIZED SIGNATURE(S): (D)

BY _____ 12/22/10 BY _____ _____

SIGNATURE DATE SIGNATURE DATE

Kevin E. Dyer

TYPED OR PRINTED NAME OF SIGNER TYPED OR PRINTED NAME OF SIGNER

Principal Program Manager

TITLE OF SIGNER TITLE OF SIGNER

(A) THIS FORM IS TO PROVIDE THE ILLINOIS EPA WITH GENERAL INFORMATION ABOUT THE EQUIPMENT TO BE CONSTRUCTED OR OPERATED. THIS FORM MAY BE USED TO REQUEST A CONSTRUCTION PERMIT, AN OPERATING PERMIT, OR A JOINT CONSTRUCTION AND OPERATING PERMIT.

(B) ENTER THE GENERIC NAME OF THE EQUIPMENT TO BE CONSTRUCTED OR OPERATED. THIS NAME WILL APPEAR ON THE PERMIT WHICH MAY BE ISSUED PURSUANT TO THIS APPLICATION. THIS FORM MUST BE ACCOMPANIED BY OTHER APPLICABLE FORMS AND INFORMATION.

(C) PROVIDE A DESIGNATION IN ITEM 5 ABOVE WHICH YOU WOULD LIKE THE ILLINOIS EPA TO USE FOR IDENTIFICATION OF YOUR EQUIPMENT. YOUR DESIGNATION WILL BE REFERENCED IN CORRESPONDENCE FROM THIS AGENCY RELATIVE TO THIS APPLICATION. YOUR DESIGNATION MUST NOT EXCEED TEN (10) CHARACTERS. *(OPTIONAL)*

(D) THIS APPLICATION MUST BE SIGNED IN ACCORDANCE WITH 35 ILL. ADM. CODE 201.154 OR 201.159 WHICH STATES: "ALL APPLICATIONS AND SUPPLEMENTS THERETO SHALL BE SIGNED BY THE OWNER AND OPERATOR OF THE EMISSION SOURCE OR AIR POLLUTION CONTROL EQUIPMENT, OR THEIR AUTHORIZED AGENT, AND SHALL BE ACCOMPANIED BY EVIDENCE OF AUTHORITY TO SIGN THE APPLICATION."

IF THE OWNER OR OPERATOR IS A CORPORATION, SUCH CORPORATION MUST HAVE ON FILE WITH THE ILLINOIS EPA A CERTIFIED COPY OF A RESOLUTION OF THE CORPORATION'S BOARD OF DIRECTORS AUTHORIZING THE PERSONS SIGNING THIS APPLICATION TO CAUSE OR ALLOW THE CONSTRUCTION OR OPERATION OF THE EQUIPMENT TO BE COVERED BY THE PERMIT.

BILLING INFORMATION		10. CONTACT PERSON FOR APPLICATION: Heather Breitenbach	
9a. COMPANY NAME: Same as owner		11. CONTACT PERSON'S TELEPHONE NUMBER: (314) 429-0100	
9b. STREET ADDRESS:		12. CONTACT PERSON'S FACSIMILE NUMBER: (314) 429-0462	
9c. CITY:		13. FEDERAL EMPLOYER IDENTIFICATION NUMBER (FEIN): 522074528	
9d. STATE:	9f. BILLING CONTACT PERSON:	14. PRIMARY STANDARD INDUSTRIAL CLASSIFICATION (SIC) CATEGORY: Refined Petroleum Pipeline	
9e. ZIP CODE:	9g. CONTACT TELEPHONE NO.:	15. PRIMARY SIC NUMBER: 4613	16. TAXPAYER IDENTIFICATION NUMBER (TIN): 52-2074528

17. DOES THIS APPLICATION CONTAIN FORM 197-FEE, "CONSTRUCTION PERMIT APPLICATION FEE DETERMINATION?"
☒ YES ☐ NO

18. DOES THE APPLICATION CONTAIN A PLOT PLAN/MAP?
☒ YES ☐ NO
IF THE PLOT PLAN/MAP HAS PREVIOUSLY BEEN SUBMITTED, SPECIFY:
I. D. NO.: APPLICATION NUMBER
IS THE APPROXIMATE SIZE OF APPLICANT'S PREMISES LESS THAN 1 ACRE?
☒ YES ☐ NO IF "NO", SPECIFY _____ ACRES

19. DOES THE APPLICATION CONTAIN A PROCESS FLOW DIAGRAM(S) THAT ACCURATELY AND CLEARLY REPRESENTS CURRENT PRACTICE? ☒ YES ☐ NO

20. IS THE EMISSION UNIT COVERED BY THIS APPLICATION ALREADY CONSTRUCTED? ☐ YES ☒ NO
IF "YES", PROVIDE THE DATE CONSTRUCTION WAS COMPLETED:

21. IF THIS APPLICATION INCORPORATES BY REFERENCE A PREVIOUSLY GRANTED PERMIT(S), HAS FORM APC-210, "DATA AND INFORMATION-INCORPORATION BY REFERENCE" BEEN SUBMITTED? ☐ YES ☐ NO

APPLICATION FOR OPERATING PERMIT ONLY

22. DOES THE STARTUP OF AN EMISSION UNIT COVERED BY THIS APPLICATION PRODUCE AIR CONTAMINANT EMISSIONS IN EXCESS OF APPLICABLE STANDARDS?
☐ YES ☒ NO
IF "YES", HAS FORM APC-203, "OPERATION DURING STARTUP" BEEN COMPLETED FOR THIS UNIT?
☐ YES ☐ NO

23. DOES THIS APPLICATION REQUEST PERMISSION TO OPERATE AN EMISSION UNIT DURING MALFUNCTIONS OR BREAKDOWNS?
☐ YES ☒ NO
IF "YES", HAS FORM APC-204, "OPERATION DURING MALFUNCTION AND BREAKDOWN" BEEN COMPLETED FOR THIS UNIT?
☐ YES ☐ NO

24. IS AN EMISSION UNIT COVERED BY THIS APPLICATION SUBJECT TO A FUTURE COMPLIANCE DATE?
☐ YES ☒ NO
IF "YES", HAS FORM APC-202, "COMPLIANCE PROGRAM & PROJECT COMPLETION SCHEDULE" BEEN COMPLETED FOR THIS UNIT?
☐ YES ☐ NO

25. DOES THE SOURCE COVERED BY THIS APPLICATION REQUIRE AN EPISODE ACTION PLAN (REFER TO GUIDELINES FOR EPISODE ACTION PLANS)?
☐ YES ☒ NO

26. LIST AND IDENTIFY ALL FORMS, EXHIBITS, AND OTHER INFORMATION SUBMITTED AS PART OF THIS APPLICATION. INCLUDE THE PAGE NUMBERS OF EACH ITEM (ATTACH ADDITIONAL SHEETS IF NECESSARY):

197-FEE	Pages 1-2		
APC Form 200	Pages 3-4		
APC Form 220	Pages 5-7		
APC Form 260	Pages 8-13		
Exhibit 260-1	Page 14		
ProAct cut sheet	Page15		
Figure 1	Page 16		
Figure 2	Page 17		

TOTAL NUMBER OF PAGES 17

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
1021 NORTH GRAND AVENUE, EAST
SPRINGFIELD, ILLINOIS 62702

* DATA AND INFORMATION PROCESS EMISSION SOURCE	

* THIS INFORMATION FORM IS TO BE COMPLETED FOR AN EMISSION SOURCE OTHER THAN A FUEL COMBUSTION EMISSION SOURCE OR AN INCINERATOR. A FUEL COMBUSTION EMISSION SOURCE IS A FURNACE, BOILER, OR SIMILAR EQUIPMENT USED PRIMARILY FOR PRODUCING HEAT OR POWER BY INDIRECT HEAT TRANSFER. AN INCINERATOR IS AN APPARATUS IN WHICH REFUSE IS BURNED.

1. NAME OF PLANT OWNER: Shell Oil Products US	2. NAME OF CORPORATE DIVISION OR PLANT (IF DIFFERENT FROM OWNER):
3. STREET ADDRESS OF EMISSION SOURCE: corner of Chaffer St. & 8th St.	4. CITY OF EMISSION SOURCE: Roxana

GENERAL INFORMATION		
5. NAME OF PROCESS: Soil Vapor Extraction System	6. NAME OF EMISSION SOURCE EQUIPMENT: Internal Combustion Engine	
7. EMISSION SOURCE EQUIPMENT MANUFACTURER: Proact Services Corporation	8. MODEL NUMBER: ICE 100	9. SERIAL NUMBER:
10. FLOW DIAGRAM DESIGNATION(S) OF EMISSION SOURCE: Internal Combustion Engine Exhaust		
11. IDENTITY(S) OF ANY SIMILAR SOURCE(S) AT THE PLANT OR PREMISES NOT COVERED BY THE FORM (IF THE SOURCE IS COVERED BY ANOTHER APPLICATION, IDENTIFY THE APPLICATION):		
12. AVERAGE OPERATING TIME OF EMISSION SOURCE: 16 HRS/DAY 5 DAYS/WK 8 WKS/YR	13. MAXIMUM OPERATING TIME OF EMISSION SOURCE: 24 HRS/DAY 5 DAYS/WK 8 WKS/YR	
14. PERCENT OF ANNUAL THROUGHPUT: DEC-FEB 0 % MAR-MAY 100 % JUN-AUG 0 % SEPT-NOV 0 %		

INSTRUCTIONS
1. COMPLETE THE ABOVE IDENTIFICATION AND GENERAL INFORMATION SECTION. 2. COMPLETE THE RAW MATERIAL, PRODUCT, WASTE MATERIAL, AND FUEL USAGE SECTIONS FOR THE PARTICULAR SOURCE EQUIPMENT. COMPOSITIONS OF MATERIALS MUST BE SUFFICIENTLY DETAILED TO ALLOW DETERMINATION OF THE NATURE AND QUANTITY OF POTENTIAL EMISSIONS. IN PARTICULAR, THE COMPOSITION OF PAINTS, INKS, ETC., AND ANY SOLVENTS MUST BE FULLY DETAILED. 3. EMISSION AND EXHAUST POINT INFORMATION MUST BE COMPLETED, UNLESS EMISSIONS ARE EXHAUSTED THROUGH AIR POLLUTION CONTROL EQUIPMENT. 4. OPERATION TIME AND CERTAIN OTHER ITEMS REQUIRE BOTH AVERAGE AND MAXIMUM VALUES 5. FOR GENERAL INFORMATION REFER TO "GENERAL INSTRUCTIONS FOR PERMIT APPLICATIONS," APC-201.

DEFINITIONS
AVERAGE - THE VALUE THAT SUMMARIZES OR REPRESENTS THE GENERAL CONDITION OF THE EMISSION SOURCE, OR THE GENERAL STATE OF PRODUCTION OF THE EMISSION SOURCE. SPECIFICALLY: AVERAGE OPERATING TIME - ACTUAL TOTAL HOURS OF OPERATION FOR THE PRECEDING TWELVE MONTH PERIOD. AVERAGE RATE - ACTUAL TOTAL QUANTITY OF "MATERIAL" FOR THE PRECEDING TWELVE MONTH PERIOD, DIVIDED BY THE AVERAGE OPERATING TIME. AVERAGE OPERATION - OPERATION TYPICAL OF THE PRECEDING TWELVE MONTH PERIOD, AS REPRESENTED BY AVERAGE OPERATING TIME AND AVERAGE RATES. MAXIMUM - THE GREATEST VALUE ATTAINABLE OR ATTAINED FOR THE EMISSION SOURCE, OR THE PERIOD OF GREATEST OR UTMOST PRODUCTION OF THE EMISSION SOURCE. SPECIFICALLY: MAXIMUM OPERATING TIME - GREATEST EXPECTED TOTAL HOURS OF OPERATIONS FOR ANY TWELVE MONTH PERIOD. MAXIMUM RATE - GREATEST QUANTITY OF "MATERIAL" EXPECTED PER ANY ONE HOUR OF OPERATION. MAXIMUM OPERATION - GREATEST EXPECTED OPERATION, AS REPRESENTED BY MAXIMUM OPERATING TIME AND MAXIMUM RATES.

This Agency is authorized to require this information under Illinois Revised Statutes, 1979, Chapter 111 1/2, Section 1039. Disclosure of this information is required under that Section. Failure to do so may prevent this form from being processed and could result in your application being denied. This form has been approved by the Forms Management Center.

RAW MATERIAL INFORMATION		
NAME OF RAW MATERIAL	AVERAGE RATE PER IDENTICAL SOURCE	MAXIMUM RATE PER IDENTICAL SOURCE
20a. Contaminated soil vapor at 50, 75, 90 cfm	b. LB/HR	c. LB/HR
21a.	b. LB/HR	c. LB/HR
22a.	b. LB/HR	c. LB/HR
23a.	b. LB/HR	c. LB/HR
24a.	b. LB/HR	c. LB/HR

PRODUCT INFORMATION		
NAME OF PRODUCT	AVERAGE RATE PER IDENTICAL SOURCE	MAXIMUM RATE PER IDENTICAL SOURCE
30a. Treated soil vapor	b. LB/HR	c. LB/HR
31a.	b. LB/HR	c. LB/HR
32a.	b. LB/HR	c. LB/HR
33a.	b. LB/HR	c. LB/HR
34a.	b. LB/HR	c. LB/HR

WASTE MATERIAL INFORMATION		
NAME OF WASTE MATERIAL	AVERAGE RATE PER IDENTICAL SOURCE	MAXIMUM RATE PER IDENTICAL SOURCE
40a. None	b. LB/HR	c. LB/HR
41a.	b. LB/HR	c. LB/HR
42a.	b. LB/HR	c. LB/HR
43a.	b. LB/HR	c. LB/HR
44a.	b. LB/HR	c. LB/HR

*FUEL USAGE INFORMATION		
FUEL USED	TYPE	HEAT CONTENT
50a. NATURAL GAS ☐	b. ----------	c. 1000 BTU/SCF
OTHER GAS ☐		BTU/SCF
OIL ☐		BTU/GAL
COAL ☐		BTU/LB
OTHER ☐		BTU/LB
d. AVERAGE FIRING RATE PER IDENTICAL SOURCE: BTU/HR	e. MAXIMUM FIRING RATE PER IDENTICAL SOURCE: BTU/HR	

*THIS SECTION IS TO BE COMPLETED FOR ANY FUEL USED DIRECTLY IN THE PROCESS EMISSION SOURCE, E. G. GAS IN A DRYER, OR COAL IN A MELT FURNACE.

*EMISSION INFORMATION

51. NUMBER OF IDENTICAL SOURCES (DESCRIBE AS REQUIRED):

AVERAGE OPERATION

CONTAMINANT	CONCENTRATION OR EMISSION RATE PER IDENTICAL SOURCE		METHOD USED TO DETERMINE CONCENTRATION OR EMISSION RATE
PARTICULATE MATTER	52a. GR/SCF	b. LB/HR	c.
CARBON MONOXIDE	53a. PPM (VOL)	b. LB/HR	c.
NITROGEN OXIDES	54a. PPM (VOL)	b. LB/HR	c.
ORGANIC MATERIAL	55a. PPM (VOL)	b. LB/HR	c.
SULFUR DIOXIDE	56a. PPM (VOL)	b. LB/HR	c.
**OTHER (SPECIFY)	57a. PPM (VOL)	b. 0.42 LB/HR	c. HAPS (see APC form 260)

MAXIMUM OPERATION

CONTAMINANT	CONCENTRATION OR EMISSION RATE PER IDENTICAL SOURCE		METHOD USED TO DETERMINE CONCENTRATION OR EMISSION RATE
PARTICULATE MATTER	58a. GR/SCF	b. LB/HR	c.
CARBON MONOXIDE	59a. PPM (VOL)	b. LB/HR	c.
NITROGEN OXIDES	60a. PPM (VOL)	b. LB/HR	c.
ORGANIC MATERIAL	61a. PPM (VOL)	b. LB/HR	c.
SULFUR DIOXIDE	62a. PPM (VOL)	b. LB/HR	c.
**OTHER (SPECIFY)	63a. PPM (VOL)	b. 0.76 LB/HR	c. HAPS (see APC form 260)

*ITEMS 52 THROUGH 63 NEED NOT BE COMPLETED IF EMISSIONS ARE EXHAUSTED THROUGH AIR POLLUTION CONTROL EQUIPMENT.
**"OTHER" CONTAMINANT SHOULD BE USED FOR AN AIR CONTAMINANT NOT SPECIFICALLY NAMED ABOVE. POSSIBLE OTHER CONTAMINANTS ARE ASBESTOS, BERYLLIUM, MERCURY, VINYL CHLORIDE, LEAD, ETC.

***EXHAUST POINT INFORMATION

64. FLOW DIAGRAM DESIGNATION(S) OF EXHAUST POINT:
Internal Combustion Engine Exhaust

65. DESCRIPTION OF EXHAUST POINT (LOCATION IN RELATION TO BUILDINGS, DIRECTION, HOODING, ETC.):
2" galvanized steel air stack from top of enclosure

66. EXIT HEIGHT ABOVE GRADE: 14ft.	67. EXIT DIAMETER: 2in.
68. GREATEST HEIGHT OF NEARBY BUILDINGS: N/A	69. EXIT DISTANCE FROM NEAREST PLANT BOUNDARY: <100ft.
AVERAGE OPERATION	MAXIMUM OPERATION
70. EXIT GAS TEMPERATURE: 770 °F	72. EXIT GAS TEMPERATURE: 770 °F
71. GAS FLOW RATE THROUGH EACH EXIT: 80 ACFM	73. GAS FLOW RATE THROUGH EACH EXIT: 80 ACFM

***THIS SECTION SHOULD NOT BE COMPLETED IF EMISSIONS ARE EXHAUSTED THROUGH AIR POLLUTION CONTROL EQUIPMENT.

STATE OF ILLINOIS
ENVIRONMENTAL PROTECTION AGENCY
DIVISION OF AIR POLLUTION CONTROL
1021 NORTH GRAND AVENUE, EAST
SPRINGFIELD, ILLINOIS 62702

* DATA AND INFORMATION AIR POLLUTION CONTROL EQUIPMENT	

* THIS INFORMATION FORM IS TO BE COMPLETED FOR AN EMISSION SOURCE OTHER THAN A FUEL COMBUSTION EMISSION SOURCE OR AN INCINERATOR. A FUEL COMBUSTION EMISSION SOURCE IS A FURNACE, BOILER, OR SIMILAR EQUIPMENT USED PRIMARILY FOR PRODUCING HEAT OR POWER BY INDIRECT HEAT TRANSFER. AN INCINERATOR IS AN APPARATUS IN WHICH REFUSE IS BURNED.

1. NAME OF OWNER: Shell Oil Products US	2. NAME OF CORPORATE DIVISION OR PLANT (IF DIFFERENT FROM OWNER):
3. STREET ADDRESS OF CONTROL EQUIPMENT: corner of Chaffer St. and 8th St.	4. CITY OF CONTROL EQUIPMENT Roxana
5. NAME OF CONTROL EQUIPMENT OR CONTROL SYSTEM: Soil Vapor Extraction/Treatment System with Internal Combustion Engine	

INSTRUCTIONS

1. COMPLETE THE ABOVE IDENTIFICATION SECTION.
2. COMPLETE THE APPROPRIATE SECTION FOR THE UNIT OF CONTROL EQUIPMENT, OR THE APPROPRIATE SECTIONS FOR THE CONTROL SYSTEM. BE CERTAIN THAT THE ARRANGEMENT OF VARIOUS UNITS IN A CONTROL SYSTEM IS MADE CLEAR IN THE PROCESS FLOW DIAGRAM.
3. COMPLETE PAGE 6 OF THIS FORM, EMISSION INFORMATION AND EXHAUST POINT INFORMATION.
4. EFFICIENCY VALUES SHOULD BE SUPPORTED WITH A DETAILED EXPLANATION OF THE METHOD OF CALCULATION, THE MANNER OF ESTIMATION, OR THE SOURCE OF INFORMATION. REFERENCE TO THIS FORM ANY RELEVANT INFORMATION OR EXPLANATION INCLUDED IN THIS PERMIT APPLICATION.
5. EFFICIENCY VALUES AND CERTAIN OTHER ITEMS OF INFORMATION ARE TO BE GIVEN FOR AVERAGE AND MAXIMUM OPERATION OR THE SOURCE EQUIPMENT. FOR EXAMPLE, "MAXIMUM EFFICIENCY" IS THE EFFICIENCY OF THE CONTROL EQUIPMENT WHEN THE SOURCE IS AT MAXIMUM OPERATION, AND "AVERAGE FLOW RATE" IS THE FLOW RATE INTO HE CONTROL EQUIPMENT WHEN THE SOURCE IS AT AVERAGE OPERATION.
6. FOR GENERAL INFORMATION REFER TO "GENERAL INSTRUCTIONS FOR PERMIT APPLICATIONS," APC-201.

DEFINITIONS

AVERAGE - THE VALUE THAT SUMMARIZES OR REPRESENTS THE GENERAL CONDITION OF THE EMISSION SOURCE, OR THE GENERAL STATE OF PRODUCTION OF THE EMISSION SOURCE. SPECIFICALLY:
AVERAGE OPERATION - OPERATION TYPICAL OF THE PRECEDING TWELVE MONTH PERIOD, AS REPRESENTED BY AVERAGE OPERATING TIME AND AVERAGE RATES.

MAXIMUM - THE GREATEST VALUE ATTAINABLE OR ATTAINED FOR THE EMISSION SOURCE, OR THE PERIOD OF GREATEST OR UTMOST PRODUCTION OF THE EMISSION SOURCE. SPECIFICALLY:
MAXIMUM OPERATION - GREATEST EXPECTED OPERATION, AS REPRESENTED BY MAXIMUM OPERATING TIME AND MAXIMUM RATES.

This Agency is authorized to require this information under Illinois Revised Statutes, 1979, Chapter 111 1/2, Section 1039. Disclosure of this information is required under that Section. Failure to do so may prevent this form from being processed and could result in your application being denied. This form has been approved by the Forms Management Center.

ADSORPTION UNIT	
1. FLOW DIAGRAM DESIGNATION(S) OF ADSORPTION UNIT:	
2. MANUFACTURER:	3. MODEL NAME AND NUMBER:
4. ADSORBENT: ☐ ACTIVATED CHARCOAL: TYPE _____ ☐ OTHER: SPECIFY _____	
5. ADSORBATE(S):	
6. NUMBER OF BEDS PER UNIT:	7. WEIGHT OF ABSORBENT PER BED: LB
8. DIMENSIONS OF BED: THICKNESS _____ IN, SURFACE AREA _____ SQUARE IN	
9. INLET GAS TEMPERATURE: °F	9. PRESSURE DROP ACROSS UNIT: INCH H_2O GAUGE
11. TYPE OF REGENERATION: ☐ REPLACEMENT ☐ STEAM ☐ OTHER: SPECIFY _____	
12. METHOD OF REGENERATION: ☐ ALTERNATE USE OF _____ ENTIRE UNITS ☐ ALTERNATE USE OF _____ BEDS IN A SINGLE UNIT ☐ SOURCE SHUT DOWN ☐ OTHER: DESCRIBE	
AVERAGE OPERATION OF SOURCE	MAXIMUM OPERATION OF SOURCE
13. TIME ON LINE BEFORE REGENERATION: MIN/BED	15. TIME ON LINE BEFORE REGENERATION: MIN/BED
14. EFFICIENCY OF ABSORBER (SEE INSTRUCTION 4): %	16. EFFICIENCY OF ABSORBER (SEE INSTRUCTION 4): %

AFTERBURNER	
1. FLOW DIAGRAM DESIGNATION(S) OF AFTERBURNER:	
2. MANUFACTURER:	3. MODEL NAME AND NUMBER:
4. COMBUSTION CHAMBER DIMENSIONS: LENGTH _____ IN, CROSS-SECTIONAL AREA _____ SQUARE IN	
5. INLET GAS TEMPERATURE: °F	7. FUEL: ☐ GAS ☐ OIL: SULFUR _____ WT%
6. OPERATING TEMPERATURE OF COMBUSTION CHAMBER: °F	8. BURNERS PER AFTERBURNER: _____ @ _____ BTU/HR EACH
9. CATALYST USED: ☐ NO ☐ YES: DESCRIBE CATALYST _____	
10. HEAT EXCHANGER USED: ☐ NO ☐ YES: DESCRIBE HEAT EXCHANGER _____	
AVERAGE OPERATION OF SOURCE	MAXIMUM OPERATION OF SOURCE
11. GAS FLOW RATE: SCFM	13. GAS FLOW RATE: SCFM
12. EFFICIENCY OF AFTERBURNER (SEE INSTRUCTION 4): %	14. EFFICIENCY OF AFTERBURNER (SEE INSTRUCTION 4): %

CYCLONE

1. FLOW DIAGRAM DESIGNATION(S) OF CYCLONE:

2. MANUFACTURER:

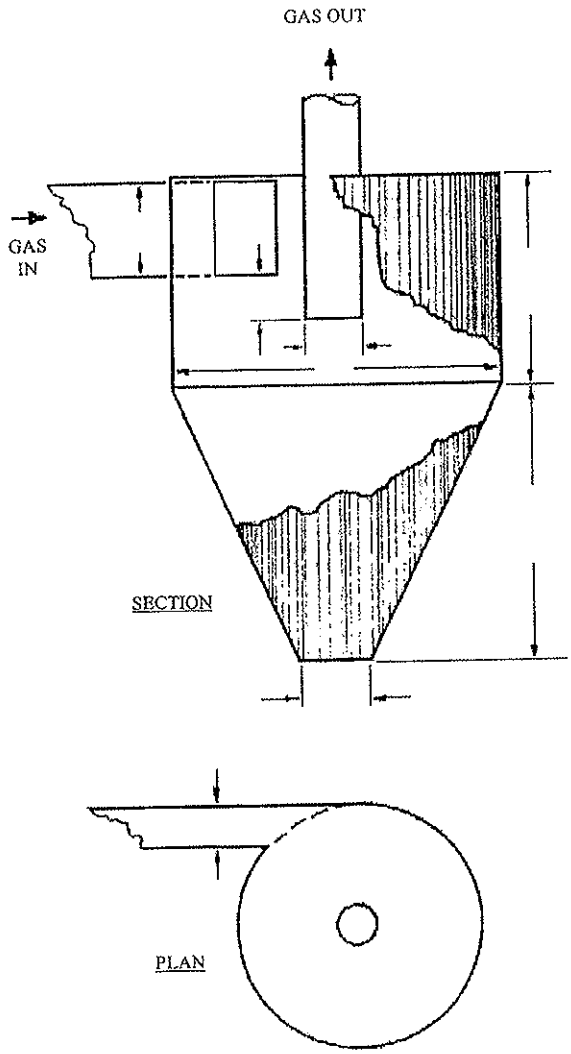
3. MODEL:

4. TYPE OF CYCLONE:
☐ SIMPLE ☐ MULTIPLE

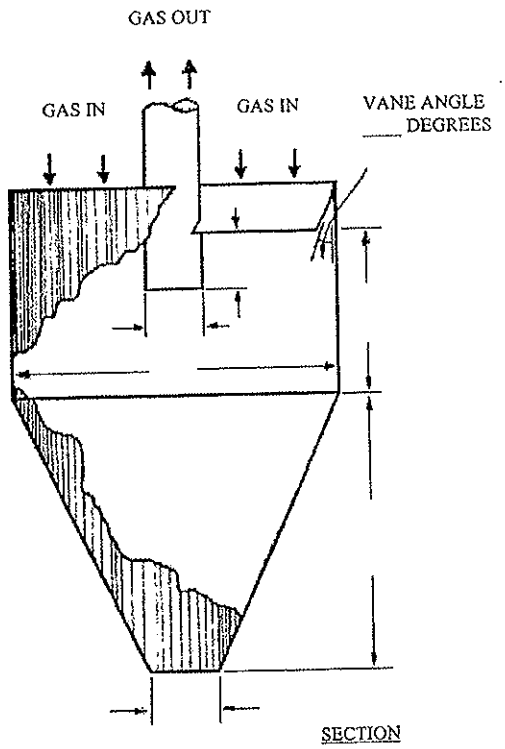
5. NUMBER OF CYCLONES IN EACH MULTIPLE CYCLONE:

6. DIMENSION THE APPROPRIATE SKETCH (IN INCHES) OR PROVIDE A DRAWING WITH EQUIVALENT INFORMATION:

TANGENTIAL INLET CYCLONE



AXIAL INLET CYCLONE
(INDIVIDUAL CYCLONE OF MULTIPLE CYCLONE)



NOT TO SCALE

AVERAGE OPERATION OF SOURCE	MAXIMUM OPERATION OF SOURCE
7. GAS FLOW RATE: SCFM	9. GAS FLOW RATE: SCFM
8. EFFICIENCY OF CYCLONE (SEE INSTRUCTION 4): %	10. EFFICIENCY OF CYCLONE (SEE INSTRUCTION 4): %

CONDENSER		
1. FLOW DIAGRAM DESIGNATION(S) OF CONDENSER:		
2. MANUFACTURER:	3. MODEL NAME AND NUMBER:	4. HEAT EXCHANGE AREA: FT^2

AVERAGE OPERATION OF SOURCE		MAXIMUM OPERATION OF SOURCE	
5. COOLANT FLOW RATE PER CONDENSER: WATER _____ GPM AIR _____ SCFM OTHER: TYPE _____, FLOW RATE _____		10. COOLANT FLOW RATE PER CONDENSER: WATER _____ GPM AIR _____ SCFM OTHER: TYPE _____, FLOW RATE _____	
6. GAS FLOW RATE: SCFM		11. GAS FLOW RATE: SCFM	
7. COOLANT TEMPERATURE: INLET____°F OUTLET____°F	8. GAS TEMPERATURE: INLET____°F OUTLET____°F	12. COOLANT TEMPERATURE: INLET____°F OUTLET____°F	13. GAS TEMPERATURE: INLET____°F OUTLET____°F
9. EFFICIENCY OF CONDENSER (SEE INSTRUCTION 4): %		14. EFFICIENCY OF CONDENSER (SEE INSTRUCTION 4): %	

*ELECTRICAL PRECIPITATOR	
1. FLOW DIAGRAM DESIGNATION(S) OF ELECTRICAL PRECIPITATOR:	
2. MANUFACTURER:	3. MODEL NAME AND NUMBER:
4. COLLECTING ELECTRODE AREA PER CONTROL DEVICE: FT^2	

AVERAGE OPERATION OF SOURCE	MAXIMUM OPERATION OF SOURCE
5. GAS FLOW RATE: SCFM	7. GAS FLOW RATE: SCFM
6. EFFICIENCY OF ELECTRICAL PRECIPITATOR(SEE INSTRUCTION 4): %	8. EFFICIENCY OF ELECTRICAL PRECIPITATOR(SEE INSTRUCTION 4): %
SUBMIT THE MANUFACTURER'S SPECIFICATIONS FOR THE ELECTRICAL PRECIPITATOR. REFERENCE THE INFORMATION TO THIS FORM.	

*ELECTRICAL PRECIPITATORS VARY GREATLY IN THEIR DESIGN AND IN THEIR COMPLEXITY. THE ITEMS IN THIS SECTION PROVIDE A MINIMUM AMOUNT OF INFORMATION. THE APPLICANT MUST, HOWEVER, SUBMIT WITH THIS APPLICATION THE MANUFACTURER'S SPECIFICATIONS, INCLUDING ANY DRAWINGS, TECHNICAL DOCUMENTS, ETC. IF THE INFORMATION PROVIDED BY THE MANUFACTURER'S SPECIFICATIONS IS INSUFFICIENT FOR FULL AND ACCURATE ANALYSIS, THE AGENCY WILL REQUEST SPECIFIC ADDITIONAL INFORMATION.

FILTER UNIT	
1. FLOW DIAGRAM DESIGNATION(S) OF FILTER UNIT:	
2. MANUFACTURER:	3. MODEL NAME AND NUMBER:
4. FILTERING MATERIAL:	5. FILTERING AREA: FT^2
6. CLEANING METHOD: ☐ SHAKER ☐ REVERSE AIR ☐ PULSE AIR ☐ PULSE JET ☐ OTHER: SPECIFY _____	
7. GAS COOLING METHOD: ☐ DUCT WORK: LENGTH _____ FT., DIAM _____ IN. ☐ BLEED-IN AIR ☐ WATER SPRAY ☐ OTHER: SPECIFY _____	

AVERAGE OPERATION OF SOURCE	MAXIMUM OPERATION OF SOURCE
8. GAS FLOW RATE (FROM SOURCE): SCFM	12. GAS FLOW RATE (FROM SOURCE): SCFM
9. GAS COOLING FLOW RATE: BLEED-IN AIR _____ SCFM, WATER SPRAY _____ GPM	13. GAS COOLING FLOW RATE: BLEED-IN AIR _____ SCFM, WATER SPRAY _____ GPM
10. INLET GAS CONDITION: TEMPERATURE _____ °F DEWPOINT _____ °F	14. INLET GAS CONDITION: TEMPERATURE _____ °F DEWPOINT _____ °F
11. EFFICIENCY OF FILTER UNIT (SEE INSTRUCTION 4): %	15. EFFICIENCY OF FILTER UNIT (SEE INSTRUCTION 4): %

SCRUBBER

1. FLOW DIAGRAM DESIGNATION(S) OF SCRUBBER:

2. MANUFACTURER:

3. MODEL NAME AND NUMBER:

4. TYPE OF SCRUBBER:
   - ☐ HIGH ENERGY: GAS STEAM PRESSURE DROP _____ INCH H_2O
   - ☐ PACKED: PACKING TYPE _____, PACKING SIZE _____, PACKING HEIGHT _____ IN.
   - ☐ SPRAY: NUMBER OF NOZZLES _____, NOZZLE PRESSURE _____ PSIG
   - ☐ OTHER: SPECIFY _____ ATTACH DESCRIPTION AND SKETCH WITH DIMENSIONS

5. TYPE OF FLOW:
   ☐ COCURRENT ☐ COUNTERCURRENT ☐ CROSSFLOW

6. SCRUBBER GEOMETRY:
   LENGTH IN DIRECTION OF GAS FLOW _____ IN., CROSS-SECTIONAL AREA _____ SQUARE IN.

7. CHEMICAL COMPOSITION OF SCRUBBANT:

AVERAGE OPERATION OF SOURCE	MAXIMUM OPERATION OF SOURCE
8. SCRUBBANT FLOW RATE: GPM	12. SCRUBBANT FLOW RATE: GPM
9. GAS FLOW RATE: SCFM	13. GAS FLOW RATE: SCFM
10. INLET GAS TEMPERATURE: °F	14. INLET GAS TEMPERATURE: °F
11. EFFICIENCY OF SCRUBBER (SEE INSTRUCTION 4): _____ % PARTICULATE _____ % GASEOUS	15. EFFICIENCY OF SCRUBBER (SEE INSTRUCTION 4): _____ % PARTICULATE _____ % GASEOUS

OTHER TYPE OF CONTROL EQUIPMENT

1. FLOW DIAGRAM DESIGNATION(S) OF "OTHER TYPE" OF CONTROL EQUIPMENT:

2. GENERIC NAME OF "OTHER" EQUIPMENT:

3. MANUFACTURER:

4. MODEL NAME AND NUMBER:

5. DESCRIPTION AND SKETCH, WITH DIMENSIONS AND FLOW RATES, OF "OTHER" EQUIPMENT:

AVERAGE OPERATION OF SOURCE	MAXIMUM OPERATION OF SOURCE
6. FLOW RATES: _____ GPM 50 SCFM	8. FLOW RATES: _____ GPM 90 SCFM
7. EFFICIENCY OF "OTHER" EQUIPMENT (SEE INSTRUCTION 4): 96-99 %	9. EFFICIENCY OF "OTHER" EQUIPMENT (SEE INSTRUCTION 4): 96-99 %

EMISSION INFORMATION

1. NUMBER OF IDENTICAL CONTROL UNITS OR CONTROL SYSTEMS (DESCRIBE AS REQUIRED):

AVERAGE OPERATION

CONTAMINANT	CONCENTRATION OR EMISSION RATE PER IDENTICAL CONTROL UNITS OR CONTROL SYSTEM		METHOD USED TO DETERMINE CONCENTRATION OR EMISSION RATE
PARTICULATE MATTER	2a. GR/SCF	b. LB/HR	c.
CARBON MONOXIDE	3a. PPM (VOL)	b. LB/HR	c.
NITROGEN OXIDES	4a. PPM (VOL)	b. LB/HR	c.
ORGANIC MATERIAL	5a. PPM (VOL)	b. LB/HR	c.
SULFUR DIOXIDE	6a. PPM (VOL)	b. LB/HR	c.
**OTHER (SPECIFY)	7a. PPM (VOL)	b. 0.42 LB/HR	c. HAPS (see Exhibit 260-1)

MAXIMUM OPERATION

CONTAMINANT	CONCENTRATION OR EMISSION RATE PER IDENTICAL CONTROL UNITS OR CONTROL SYSTEM		METHOD USED TO DETERMINE CONCENTRATION OR EMISSION RATE
PARTICULATE MATTER	8a. GR/SCF	b. LB/HR	c.
CARBON MONOXIDE	9a. PPM (VOL)	b. LB/HR	c.
NITROGEN OXIDES	10a. PPM (VOL)	b. LB/HR	c.
ORGANIC MATERIAL	11a. PPM (VOL)	b. LB/HR	c.
SULFUR DIOXIDE	12a. PPM (VOL)	b. LB/HR	c.
**OTHER (SPECIFY)	13a. PPM (VOL)	b. 0.76 LB/HR	c. HAPS (see Exhibit 260-1)

***"OTHER" CONTAMINANT SHOULD BE USED FOR AN AIR CONTAMINANT NOT SPECIFICALLY NAMED ABOVE. POSSIBLE OTHER CONTAMINANTS ARE ASBESTOS, BERYLLIUM, MERCURY, VINYL CHLORIDE, LEAD, ETC.

EXHAUST POINT INFORMATION

1. FLOW DIAGRAM DESIGNATION(S) OF EXHAUST POINT: Internal Combustion Engine Exhaust

2. DESCRIPTION OF EXHAUST POINT (LOCATION IN RELATION TO BUILDINGS, DIRECTION, HOODING, ETC.):
2" galvanized steel air stack from top of enclosure

3. EXIT HEIGHT ABOVE GRADE: 14ft.	4. EXIT DIAMETER: 2in.
5. GREATEST HEIGHT OF NEARBY BUILDINGS: N/A	6. EXIT DISTANCE FROM NEAREST PLANT BOUNDARY: <100ft.
AVERAGE OPERATION	**MAXIMUM OPERATION**
7. EXIT GAS TEMPERATURE: 770 °F	9. EXIT GAS TEMPERATURE: 770 °F
8. GAS FLOW RATE THROUGH EACH EXIT: 80 ACFM	10. GAS FLOW RATE THROUGH EACH EXIT: 80 ACFM

Exhibit 260-1
SVE Pilot Test System Description and Emission Calculations

Shell Oil Products US will be conducting a pilot test at the Roxana site as shown in Figure 1. Two extraction wells will be used to extract soil vapor using an extraction/treatment system consisting of an internal combustion engine (ICE), a knockout tank, and water pump and storage as shown in Figure 1 and the attached cut sheet. The motor for the ICE will be used to develop the vacuum pressure necessary to extract and convey the soil vapor to a knockout tank, where the soil vapor and condensate water will be separated. The vapors will be conveyed by vacuum to the ICE unit for destruction of hydrocarbon constituents. The condensate water will be conveyed by a water pump to a holding tank for subsequent transport and treatment/discharge.

The pilot test will be conducted on up to two extraction wells; one near VMP-4 and the other near VMP-13 at the POTW, as shown on Figure 2. For the purposes of this application and the mass removal calculations, it has been assumed that the pilot test will be completed on both wells. Each extraction well will be operated at different vapor flow rates for several weeks and will be subject to the data collected and field discretion during the pilot test. During operation of each extraction well, the ICE will extract vapor at three test rates: 50, 75, and 90 cubic feet per minute (cfm). At 50 cfm approximately two pore volumes will be removed per day from the subsurface.

An ICE unit will be used throughout each pilot test to combust volatiles in the extracted vapor. The engine's hydrocarbon destruction efficiency is estimated at 96 percent. The maximum rated hydrocarbon loading to the engine is 250 pounds per day. Based on the anticipated destruction efficiency and the maximum loading rate, the maximum controlled hydrocarbon mass emission rate is 0.76 pounds per hour (lb/hr) as shown in Table 1 below.

Table 1: Calculation of HAPS Emissions

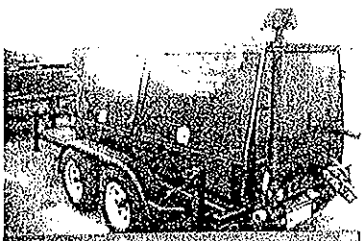
Avg HAPS (mg/m^3)	Volume flow rate (cfm)	HAPS mass flow rate (kg/day)	HAPS mass flow rate (lb/day)	Efficiency	emission rate (lb/day)	emission rate (lb/hr)
56500	50	115.21	254.02	0.96	10.16	0.423
56500	75	172.81	381.03	0.96	15.24	0.635
56500	90	207.37	457.23	0.96	18.29	0.762

ProAct Services Corporation

8 Cylinder

Internal Combustion Engine (ICE)
Propane or Natural Gas

Environmental Treatment Specialists



General Specifications:	100 SCFM @20" Hg Air treatment by engine 8 SCFM @100 PSI (option) 3 GPM auto water dump system (option)
Trailer:	6ft wide x 24 ft long x 6 ft height 7,500 pound double axle wheel trailer
Main Equipment:	4.6 Liter 8 cylinder Ford engine Flame Arrestor 2-catalytic converters Knock out tank w/ particulate filter Air compressor (option) Auto water dump system (option) Vacuum & Pressure gauges, sample ports
Trailer Specifications:	System is mounted and enclosed in a custom trailer
Control Panel:	PLC (Phoenix 1,000 Controller) On/Off switch all components Low oil, High temp shut down Well valve control system Interlock connections
Inlet Hose Connection:	1 - Male camlock 2" inlet fittings (10 ft hose w/system)
Outlet Hose Connection:	2" air stack from top of enclosure (14 ft. high)
Power Requirements:	Propane or Natural Gas connection

ProAct Services Corporation

Corp Office: 231-843-2711
Gulf Coast: 210-862-6467
or 713-202-6351
Midwest Office: 231-342-1116
East Coast Office: 203-262-1200

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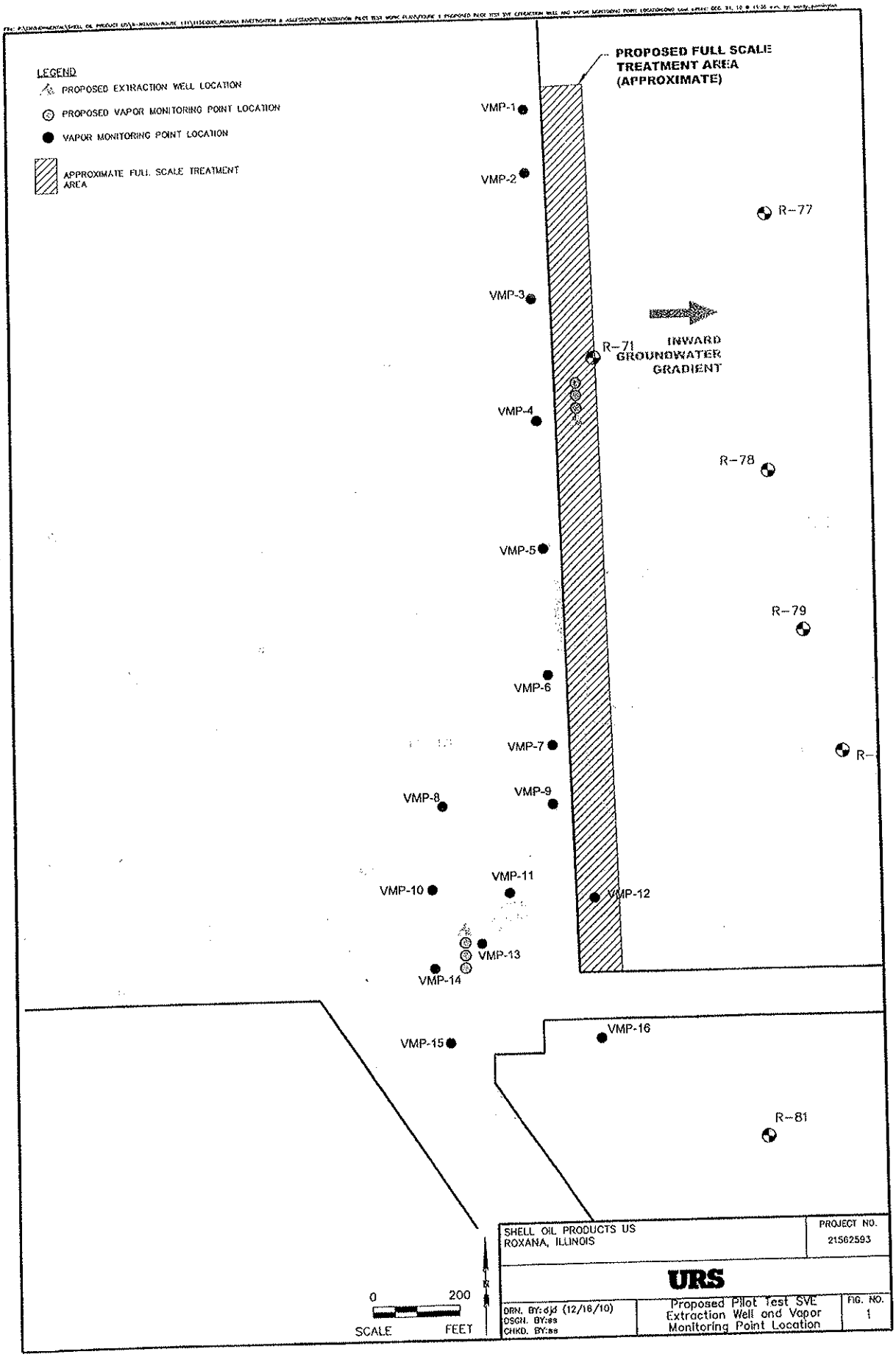
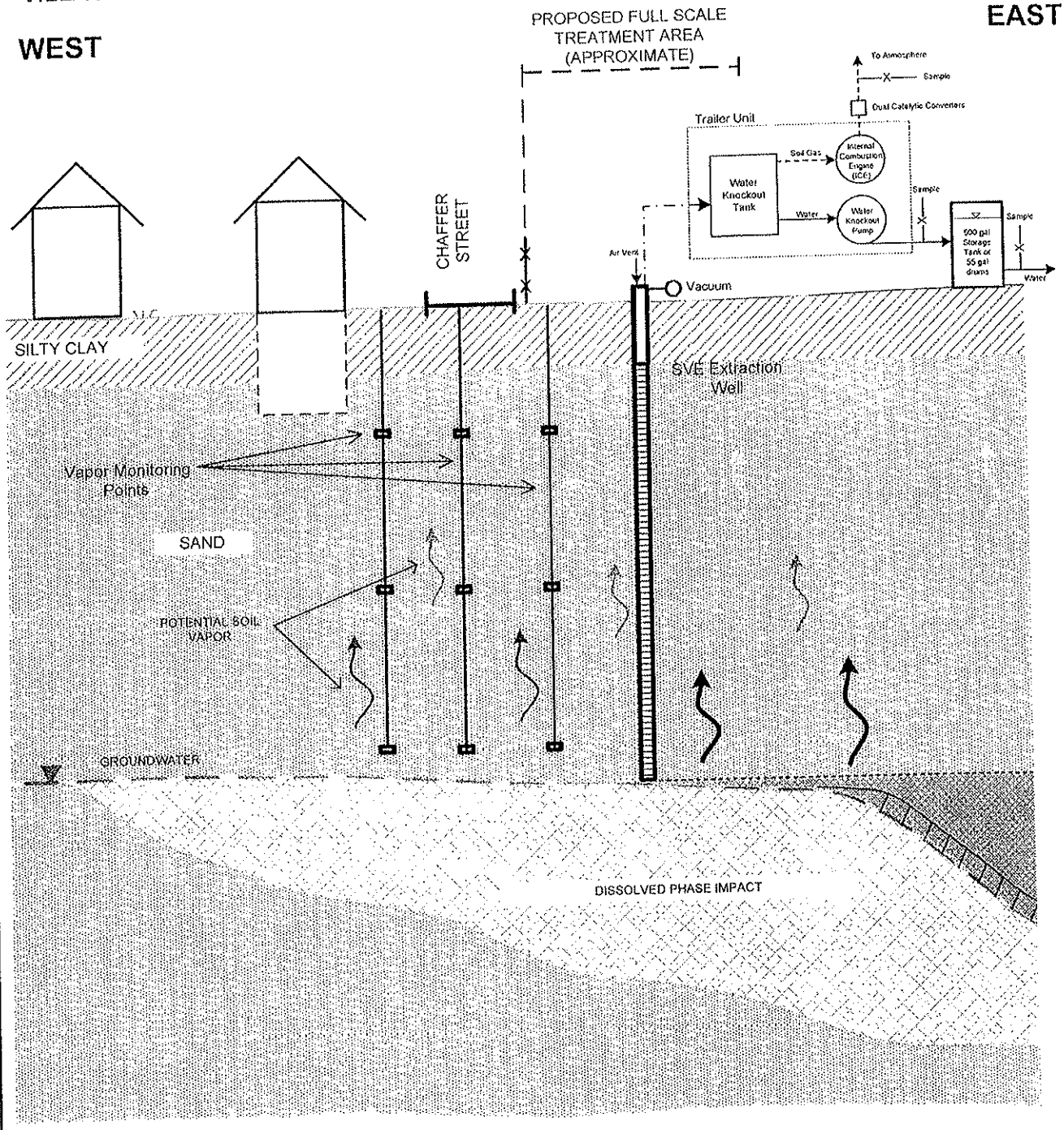

LEGEND
PROPOSED EXTRACTION WELL LOCATION
PROPOSED VAPOR MONITORING POINT LOCATION
VAPOR MONITORING POINT LOCATION
APPROXIMATE FULL SCALE TREATMENT AREA
PROPOSED FULL SCALE TREATMENT AREA (APPROXIMATE)
VMP-1
VMP-2
VMP-3
VMP-4
VMP-5
VMP-6
VMP-7
VMP-8
VMP-9
VMP-10
VMP-11
VMP-12
VMP-13
VMP-14
VMP-15
VMP-16
R-71
R-77
R-78
R-79
R-81
INWARD GROUNDWATER GRADIENT
0
200
SCALE
FEET
SHELL OIL PRODUCTS US
ROXANA, ILLINOIS
PROJECT NO.
21562593
URS
DRN. BY:djd (12/16/10)
DSGN. BY:ss
CHKD. BY:ss
Proposed Pilot Test SVE Extraction Well and Vapor Monitoring Point Location
FIG. NO.
1

VILLAGE OF ROXANA

WOOD RIVER REFINERY

WEST

EAST



NOTES:

NOT TO SCALE

SHELL OIL PRODUCTS US ROXANA, ILLINOIS	PROJECT NO. 21562593
URS	
DRN. BY: mpm 12/21/10 DSGN. BY: sjs CHKD. BY: b3	Conceptual Pilot Test Schematic Cross Section
	FIG. NO. 2

P:\Environmental\Shell Oil Product US\B-Roxana-Route 111\2156\XXXX_Roxana Investigation & Assessment\Remediation Pilot Test Work Plan\Figures\Fig 2 Conceptual Pilot Test Schematic Cross Section.vsd Last edit: 12/21/2010 11:38:09 AM