# APPLICATION FOR FEDERALLY ENFORCEABLE STATE OPERATING PERMIT
# SOIL VAPOR EXTRACTION (SVE) SYSTEM WITH REGENERATIVE THERMAL OXIDIZER (RTO)

## Roxana Illinois
## Source ID 119090AAO
## Permit Application Number 11060036

*Prepared for*
Shell Oil Products U.S.

March 2012

*Prepared by*

URS Corporation
1001 Highlands Plaza Drive West
St. Louis, MO 63110
(314) 429-0100
Project #21562735

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Shell Oil Products US (SOPUS) installed a soil vapor extraction system at the Roxana Site in 2011 as shown in **Figure 1** (Source ID 119090AAO/Permit Application Number 11060036). The system uses a 15 horsepower (hp) blower/motor to pull vacuum from extraction wells located in the Village of Roxana and at the WRB Refining LP Wood River Refinery located in Roxana, Illinois to extract soil vapor. The system is equipped with two 240-gallon knockout tanks, a regenerative thermal oxidizer (RTO) unit, two water pumps, and two 629-gallon storage tanks, as shown in **Figure 2.**

The blower will develop the vacuum necessary to extract and convey the soil vapor to the two knockout tanks, where the soil vapor and condensate/water will be separated. The vapor will then be conveyed by vacuum to the RTO unit for destruction of hydrocarbon constituents. The hydrocarbon destruction efficiency range for the RTO is between 96 - 99 percent. The condensate/water is conveyed by water pumps to holding tanks for subsequent transport and treatment/discharge. The holding tanks for the condensate/water consist of two stainless steel above-ground storage tanks (AST). The tanks are approximately four feet in diameter and six feet in length with a maximum capacity of 629 gallons. The tanks will be kept under ambient conditions and will not be pressurized. Each tank is equipped with a two-inch diameter vent that vents to the atmosphere.

The SVE with RTO has been designed to automatically shut down in the event of system malfunctions. If the RTO malfunctions, the vacuum will be cut off and the entire system will shut down.

**Hazardous Air Pollutant (HAP) and other Volatile Organic Matter (VOM) Emissions**

Based on flow and constituent data collected during the start-up and shake-down period conducted in January and February 2012 the maximum potential hazardous air pollutants (HAPs) emission rate is calculated at 9.40E-01 tons per year (tons/yr) (**Table 1**). The maximum combined emission rate for all other volatile organic matter (VOM) is calculated at 2.06 tons/yr (**Table 2**). Other criteria pollutant emissions (those associated with combustion) will be less than major source thresholds. **Table 3** provides the potential criteria pollutant emissions. Condensate/water has not been generated during the operation of the SVE System; however, there is a potential that condensate/water containing VOM can accumulate in the storage tanks from SVE operations. Groundwater data collected from the Roxana Interim Groundwater Program were utilized to calculate potential emissions from the two 629-gallon storage tanks.

The estimated potential emissions from the condensate/water tanks is calculated at 6.12E-04 tons/yr (**Table 4**). Combined emissions estimates from the SVE system (RTO and condensate/water storage tanks) for VOM are included in **Table 5**.

**Requested Permit Conditions**

SOPUS respectfully requests that the operating permit for the SVE system contain the following conditions.

- Annual VOM emissions shall not exceed 24.9 tons per year.
- Annual emissions of any one HAP shall not exceed 7.9 tons per year.
- Annual total HAP emissions shall not exceed 19.9 tons per year.

These requested limits are intended to allow for the installation of additional extraction wells, if needed. If additional extraction wells are added, the HAP and VOM inlet mass to the RTO may increase. The requested limits would allow for that possibility without triggering the thresholds that would require special IEPA processing of the permit application.

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) | FOR AGENCY USE ONLY |
|---|---|
| ☐ CONSTRUCT ☒ OPERATE | I.D. NO. |
| | PERMIT NO. |
| NAME OF EQUIPMENT TO BE CONSTRUCTED OR OPERATED: Soil Vapor Extraction Treatment System (B) | 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: Glen 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: WRB Refinery Near Intersection of Chaffer & 8th St. | | |
| 3c. CITY OF EMISSION SOURCE: Roxana | 3d. LOCATED WITHIN CITY LIMITS: ☒ YES ☐ NO | 3e. TOWNSHIP: Wood River | 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 SIGNATURE | 3/30/12 DATE | BY SIGNATURE | 3/30/12 DATE |
| Kevin E. Dyer<br>TYPED OR PRINTED NAME OF SIGNER | | Robert E. Mooshegian<br>TYPED OR PRINTED NAME OF SIGNER | |
| Principal Program Manager<br>TITLE OF SIGNER | | Senior Project Manager<br>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: Jennifer Mumper | |
|---|---|---|---|
| 9a. COMPANY NAME: Same as owner | | 11. CONTACT PERSON'S TELEPHONE NUMBER: (314) 743-4178 | |
| 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):



TOTAL NUMBER OF PAGES 32

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



| * DATA AND INFORMATION<br><br>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: | 2. NAME OF CORPORATE DIVISION OR PLANT (IF DIFFERENT FROM OWNER): |
|---|---|
| Shell Oil Products US | |
| 3. STREET ADDRESS OF EMISSION SOURCE: | 4. CITY OF EMISSION SOURCE: |
| WRB Refinery Near Intersection of Chaffer & 8th St. | Roxana |

| GENERAL INFORMATION | | |
|---|---|---|
| 5. NAME OF PROCESS: Soil Vapor Extraction System | 6. NAME OF EMISSION SOURCE EQUIPMENT: Regenerative Thermal Oxidizer | |
| 7. EMISSION SOURCE EQUIPMENT MANUFACTURER: Anguil Environmental Services, Inc. | 8. MODEL NUMBER: RTO 100 | 9. SERIAL NUMBER: 15736 |
| 10. FLOW DIAGRAM DESIGNATION(S) OF EMISSION SOURCE: Regenerative Thermal Oxidizer | | |
| 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: 24 HRS/DAY 7 DAYS/WK 52 WKS/YR | 13. MAXIMUM OPERATING TIME OF EMISSION SOURCE: 24 HRS/DAY 7 DAYS/WK 52 WKS/YR | |
| 14. PERCENT OF ANNUAL THROUGHPUT: DEC-FEB 25 % MAR-MAY 25 % JUN-AUG 25 % SEPT-NOV 25 % | | |

| 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:<br>AVERAGE OPERATING TIME - ACTUAL TOTAL HOURS OF OPERATION FOR THE PRECEDING TWELVE MONTH PERIOD.<br>AVERAGE RATE - ACTUAL TOTAL QUANTITY OF "MATERIAL" FOR THE PRECEDING TWELVE MONTH PERIOD, DIVIDED BY THE AVERAGE OPERATING TIME.<br>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:<br>MAXIMUM OPERATING TIME - GREATEST EXPECTED TOTAL HOURS OF OPERATIONS FOR ANY TWELVE MONTH PERIOD.<br>MAXIMUM RATE - GREATEST QUANTITY OF "MATERIAL" EXPECTED PER ANY ONE HOUR OF OPERATION.<br>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 2500 scfm | 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. (see APC form 260) |
| CARBON MONOXIDE | 53a. PPM (VOL) | b. LB/HR | c. (see APC form 260) |
| NITROGEN OXIDES | 54a. PPM (VOL) | b. LB/HR | c. (see APC form 260) |
| ORGANIC MATERIAL | 55a. PPM (VOL) | b. LB/HR | c. (see APC form 260) |
| SULFUR DIOXIDE | 56a. PPM (VOL) | b. LB/HR | c. (see APC form 260) |
| **OTHER (SPECIFY) | 57a. PPM (VOL) | b. 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. (see APC form 260) |
| CARBON MONOXIDE | 59a. PPM (VOL) | b. LB/HR | c. (see APC form 260) |
| NITROGEN OXIDES | 60a. PPM (VOL) | b. LB/HR | c. (see APC form 260) |
| ORGANIC MATERIAL | 61a. PPM (VOL) | b. LB/HR | c. (see APC form 260) |
| SULFUR DIOXIDE | 62a. PPM (VOL) | b. LB/HR | c. (see APC form 260) |
| **OTHER (SPECIFY) | 63a. PPM (VOL) | b. 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:
Regenerative Thermal Oxidizer

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

| | |
|---|---|
| 66. EXIT HEIGHT ABOVE GRADE: 30.5 ft. | 67. EXIT DIAMETER: 30 in. |
| 68. GREATEST HEIGHT OF NEARBY BUILDINGS: 8 ft. | 69. EXIT DISTANCE FROM NEAREST PLANT BOUNDARY: <100ft. |
| AVERAGE OPERATION | MAXIMUM OPERATION |
| 70. EXIT GAS TEMPERATURE: 200 °F | 72. EXIT GAS TEMPERATURE: 200 °F |
| 71. GAS FLOW RATE THROUGH EACH EXIT: 10000 ACFM | 73. GAS FLOW RATE THROUGH EACH EXIT: 10000 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<br><br>PROCESS EMISSION SOURCE | |
|---|---|

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

| GENERAL INFORMATION | | |
|---|---|---|
| 5. NAME OF PROCESS: Soil Vapor Extraction System | 6. NAME OF EMISSION SOURCE EQUIPMENT: Storage Tank | |
| 7. EMISSION SOURCE EQUIPMENT MANUFACTURER: The Tank Shop Inc. | 8. MODEL NUMBER: TTS Series 500G | 9. SERIAL NUMBER: D-621036 / D-621035 |
| 10. FLOW DIAGRAM DESIGNATION(S) OF EMISSION SOURCE: 629 Gal. Water Storage Tank | | |
| 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: 24 HRS/DAY 7 DAYS/WK 52 WKS/YR | 13. MAXIMUM OPERATING TIME OF EMISSION SOURCE: 24 HRS/DAY 7 DAYS/WK 52 WKS/YR | |
| 14. PERCENT OF ANNUAL THROUGHPUT: DEC-FEB 25 % MAR-MAY 25 % JUN-AUG 25 % SEPT-NOV 25 % | | |

| INSTRUCTIONS |
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| 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 |
|---|
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| MAXIMUM - THE GREATEST VALUE ATTAINABLE OR ATTAINED FOR THE EMISSION SOURCE, OR THE PERIOD OF GREATEST OR UTMOST PRODUCTION OF THE EMISSION SOURCE. SPECIFICALLY:<br>MAXIMUM OPERATING TIME - GREATEST EXPECTED TOTAL HOURS OF OPERATIONS FOR ANY TWELVE MONTH PERIOD.<br>MAXIMUM RATE - GREATEST QUANTITY OF "MATERIAL" EXPECTED PER ANY ONE HOUR OF OPERATION.<br>MAXIMUM OPERATION - GREATEST EXPECTED OPERATION, AS REPRESENTED BY MAXIMUM OPERATING TIME AND MAXIMUM RATES. |

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| RAW MATERIAL INFORMATION | | |
|---|---|---|
| NAME OF RAW MATERIAL | AVERAGE RATE PER IDENTICAL SOURCE | MAXIMUM RATE PER IDENTICAL SOURCE |
| 20a. Condensate from soil vapor extraction | 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. | 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. Condensate from soil vapor extraction | 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. 6.99E-8 LB/HR | c. HAPS (see Table 4) |
| 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. 6.99E-8 LB/HR | c. HAPS (see Table 4) |

*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: Water Storage Tank | |
| 65. DESCRIPTION OF EXHAUST POINT (LOCATION IN RELATION TO BUILDINGS, DIRECTION, HOODING, ETC.): | |
| 66. EXIT HEIGHT ABOVE GRADE: 13 ft. | 67. EXIT DIAMETER: 2 in. |
| 68. GREATEST HEIGHT OF NEARBY BUILDINGS: 8 ft. | 69. EXIT DISTANCE FROM NEAREST PLANT BOUNDARY: <100ft. |
| AVERAGE OPERATION | MAXIMUM OPERATION |
| 70. EXIT GAS TEMPERATURE: Ambient °F | 72. EXIT GAS TEMPERATURE: Ambient °F |
| 71. GAS FLOW RATE THROUGH EACH EXIT: Ambient ACFM | 73. GAS FLOW RATE THROUGH EACH EXIT: Ambient ACFM |

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

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

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



| PROCESS EMISSION SOURCE ADDENDUM<br>TANK | FOR AGENCY USE ONLY |
|---|---|

| | |
|---|---|
| 1. NAME OF OWNER: Shell Oil Products US | 2. NAME OF CORPORATE DIVISION OR PLANT (IF DIFFERENT FROM OWNER): Not Applicable |
| 3. STREET ADDRESS OF EMISSION SOURCE: WRB Refinery Near Intersection of Chaffer and 8th St. | 4. CITY OF EMISSION SOURCE: Roxana |

**TANK INFORMATION**

| | |
|---|---|
| 5. NAME OF TANK MANUFACTURER: The Tank Shop Inc. | 6. DESIGNATION OF TANK: Storage Tank |
| 7. SERIAL NUMBER: D-621036 / D-621035 | 8. CAPACITY: 629 gallons |
| 9. TANK USE: Water/condensate storage tank | 10. NUMBER OF SAME CAPACITY TANKS STORING THE SAME MATERIAL: 2 |

| | | | |
|---|---|---|---|
| 11. TANK SHAPE: ☐ HORIZONTAL | ☒ CYLINDRICAL | ☐ SPHERICAL | ☐ OTHER (SPECIFY)____ |

| | | |
|---|---|---|
| 12. TANK DIAMETER: 4.2 FT | 13. TANK HEIGHT: 4.2 FT | 14. TANK LENGTH: 6 FT |

| | |
|---|---|
| 15. STATUS: ☐ EXISTING ☐ ALTERATION | 16. TANK TYPE: ☐ PRESSURE ☒ FIXED ROOF ☐ OTHER (SPECIFY)____ ☐ FLOATING ROOF |
| 17. SEAL: ☐ SINGLE ☐ DOUBLE ☒ OTHER (SPECIFY)____ | 18. AVERAGE DISTANCE FROM TOP OF TANK SHELL TO LIQUID: FT |
| 19. SHELL TYPE: ☐ RIVETED ☒ WELDED ☐ OTHER (SPECIFY)____ | 20. PAINT COLOR: blue |

**VENT VALVE DATA**

| TYPE OF VENT | NUMBER OF VENTS | PRESSURE SETTING | DISCHARGE VENTED TO (ATMOSPHERE, FLARE, ETC.) |
|---|---|---|---|
| 21. COMBINATION | a. ____ | b. ____ | c. ____ |
| 22. PRESSURE | a. ____ | b. ____ | c. ____ |
| 23. VACUM | a. ____ | b. ____ | c. ____ |
| 24. OPEN | a. 1 | b. ambient | c. atmosphere |

| MATERIAL TO BE STORED | | |
|---|---|---|
| 25. MATERIAL: Condensate from soil vapor extraction system | 26. DENSITY: 62.3 LB/FT³ | 27. VAPOR PRESSURE AT 70 °F: 0.363 PSIA |
| | | |
| | | |

| STORAGE CONFITIONS | | | |
|---|---|---|---|
| 28. STORAGE TEMPERATURE: MINIMUM amb. °F MAXIMUM amb. °F | | 29. TANK TURN OVER PER YEAR: 27,375 | ☐ BBLS/ ☒ GALS/ |
| 30. MAXIMUM FILLING RATE: | ☐ BBLS/DAY ☐ GALS/DAY | 31. AVERAGE THROUGHPUT: 75 | ☐ BBLS/DAY ☒ GALS/DAY |
| 32. PRESSURE EQUALIZERS USED? ☐ YES ☒ NO | | 33. PERMANENT SUBMERGED LOADING PIPE USED? ☐ YES | ☒ NO |
| 34. VAPOR LOSS CONTROL DEVICE? ☐ YES ☒ NO | IF VAPOR LOSS CONTROL DEVICE IS USED, COMPLETE "DATA & INFORMATION –AIR POLLUTION CONTROL EQUIPMENT," (FORM APC-260, AS PART OF THIS APPLICATION | | |

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



| * DATA AND INFORMATION<br><br>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): Not Applicable |
|---|---|
| 3. STREET ADDRESS OF CONTROL EQUIPMENT: WRB Refinery Near Intersection of Chaffer and 8th St. | 4. CITY OF CONTROL EQUIPMENT Roxana |
| 5. NAME OF CONTROL EQUIPMENT OR CONTROL SYSTEM: Soil Vapor Extraction System with Regenerative Thermal Oxidizer | |

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:<br>☐ 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:<br>THICKNESS _____ IN, SURFACE AREA _____ SQUARE IN | |
| 9. INLET GAS TEMPERATURE: °F | 9. PRESSURE DROP ACROSS UNIT: INCH $H_2O$ GAUGE |
| 11. TYPE OF REGENERATION:<br>☐ REPLACEMENT ☐ STEAM ☐ OTHER: SPECIFY _____ | |
| 12. METHOD OF REGENERATION:<br>☐ ALTERNATE USE OF _____ ENTIRE UNITS ☐ ALTERNATE USE OF _____ BEDS IN A SINGLE UNIT<br>☐ 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: Regenerative Thermal Oxidizer | |
| 2. MANUFACTURER: Anguil Environmental Systems | 3. MODEL NAME AND NUMBER: RTO-100 |
| 4. COMBUSTION CHAMBER DIMENSIONS:<br>LENGTH 282 IN, CROSS-SECTIONAL AREA 1,960 SQUARE IN | |
| 5. INLET GAS TEMPERATURE: ambient °F | 7. FUEL:<br>☒ GAS ☐ OIL: SULFUR _____ WT% |
| 6. OPERATING TEMPERATURE OF COMBUSTION CHAMBER: 1550-1800 °F | 8. BURNERS PER AFTERBURNER: 1 @ 2.8 MM BTU/HR EACH |
| 9. CATALYST USED:<br>☒ NO ☐ YES: DESCRIBE CATALYST _____ | |
| 10. HEAT EXCHANGER USED:<br>☐ NO ☒ YES: DESCRIBE HEAT EXCHANGER Ceramic Bed | |
| AVERAGE OPERATION OF SOURCE | MAXIMUM OPERATION OF SOURCE |
| 11. GAS FLOW RATE: 10000 SCFM | 13. GAS FLOW RATE: 10000 SCFM |
| 12. EFFICIENCY OF AFTERBURNER (SEE INSTRUCTION 4): 96-99 % | 14. EFFICIENCY OF AFTERBURNER (SEE INSTRUCTION 4): 96-99 % |

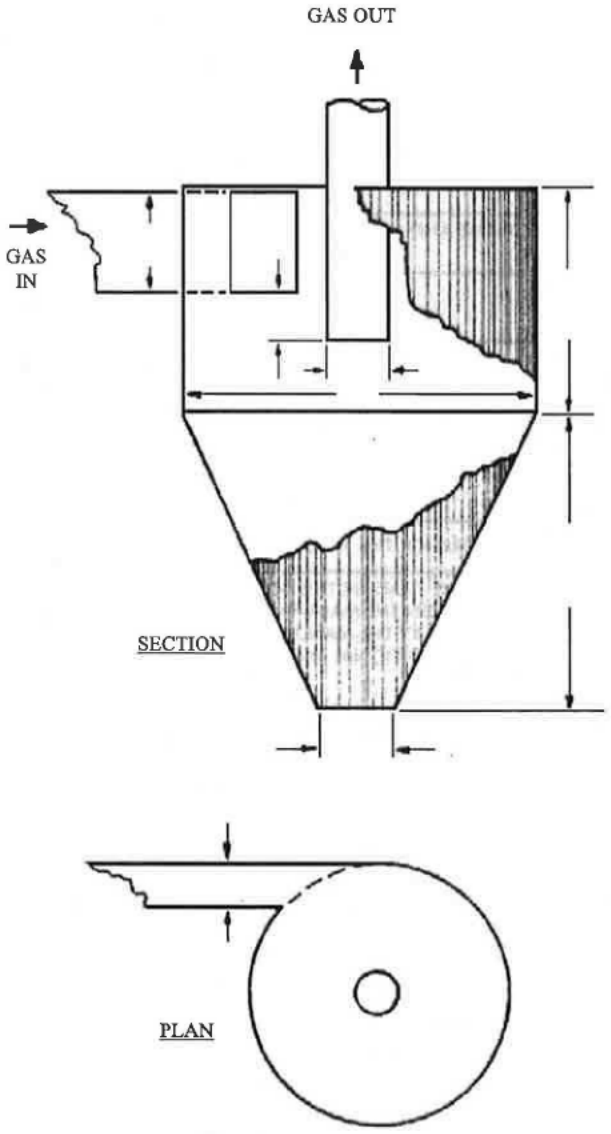
## CYCLONE

1. FLOW DIAGRAM DESIGNATION(S) OF CYCLONE:

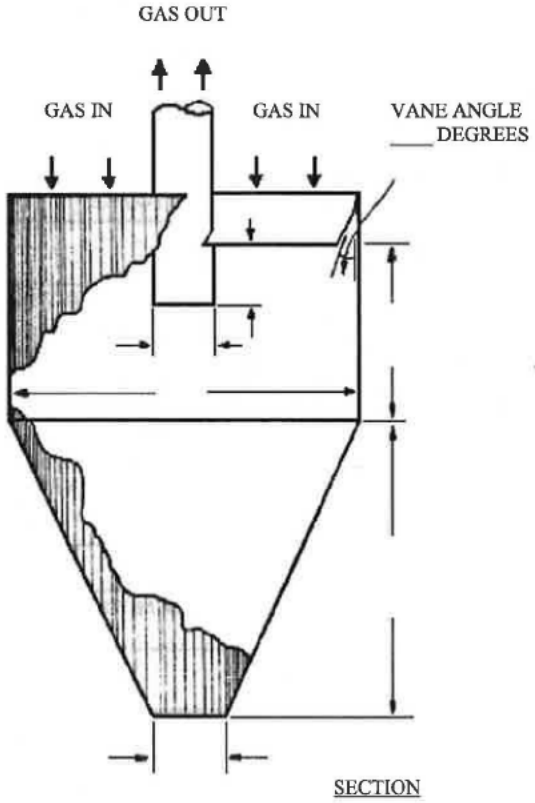
| 2. MANUFACTURER: | 3. MODEL: |
|---|---|
| 4. TYPE OF CYCLONE: ☐ SIMPLE ☐ MULTIPLE | 5. NUMBER OF CYCLONES IN EACH MULTIPLE CYCLONE: |

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:<br>WATER _____ GPM AIR _____ SCFM<br>OTHER: TYPE _____, FLOW RATE _____ | | 10. COOLANT FLOW RATE PER CONDENSER:<br>WATER _____ GPM AIR _____ SCFM<br>OTHER: TYPE _____, FLOW RATE _____ | |
| 6. GAS FLOW RATE: SCFM | | 11. GAS FLOW RATE: SCFM | |
| 7. COOLANT TEMPERATURE:<br>INLET____°F OUTLET____°F | 8. GAS TEMPERATURE:<br>INLET____°F OUTLET____°F | 12. COOLANT TEMPERATURE:<br>INLET____°F OUTLET____°F | 13. GAS TEMPERATURE:<br>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:<br>☐ SHAKER ☐ REVERSE AIR ☐ PULSE AIR ☐ PULSE JET ☐ OTHER: SPECIFY _____ | |
| 7. GAS COOLING METHOD: ☐ DUCT WORK: LENGTH _____ FT., DIAM _____ IN.<br>☐ 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:<br>BLEED-IN AIR _____ SCFM, WATER SPRAY _____ GPM | 13. GAS COOLING FLOW RATE:<br>BLEED-IN AIR _____ SCFM, WATER SPRAY _____ GPM |
| 10. INLET GAS CONDITION:<br>TEMPERATURE _____ °F DEWPOINT _____ °F | 14. INLET GAS CONDITION:<br>TEMPERATURE _____ °F DEWPOINT _____ °F |
| 11. EFFICIENCY OF FILTER UNIT (SEE INSTRUCTION 4): % | 15. EFFICIENCY OF FILTER UNIT (SEE INSTRUCTION 4): % |

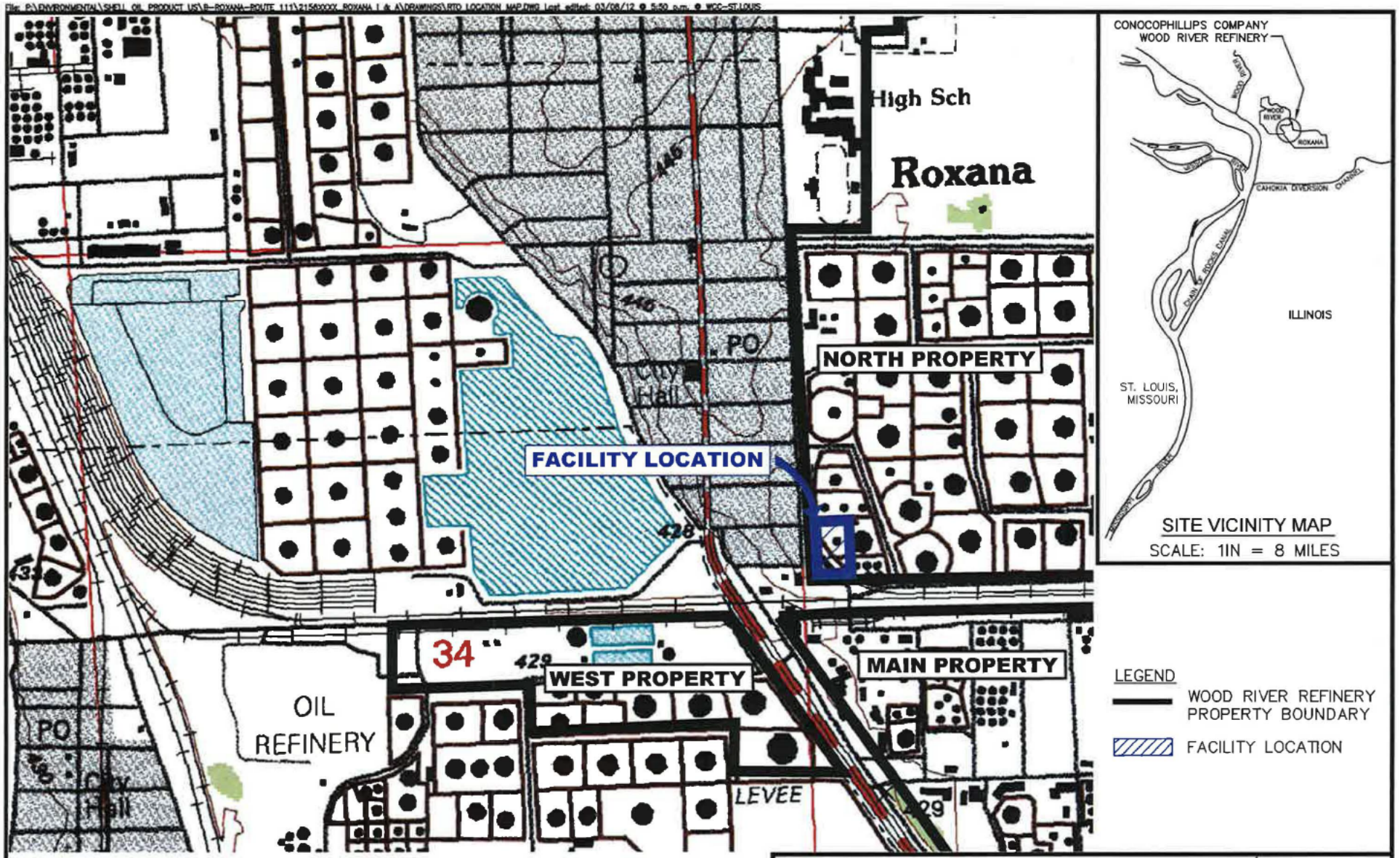
| SCRUBBER | |
|---|---|
| 1. FLOW DIAGRAM DESIGNATION(S) OF SCRUBBER: | |
| 2. MANUFACTURER: | 3. MODEL NAME AND NUMBER: |
| 4. TYPE OF SCRUBBER:<br>☐ HIGH ENERGY: GAS STEAM PRESSURE DROP _____ INCH $H_2O$<br>☐ PACKED: PACKING TYPE _____, PACKING SIZE _____, PACKING HEIGHT _____ IN.<br>☐ SPRAY: NUMBER OF NOZZLES _____, NOZZLE PRESSURE _____ PSIG<br>☐ OTHER: SPECIFY _____ ATTACH DESCRIPTION AND SKETCH WITH DIMENSIONS | |
| 5. TYPE OF FLOW:<br>☐ COCURRENT ☐ COUNTERCURRENT ☐ CROSSFLOW | |
| 6. SCRUBBER GEOMETRY:<br>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):<br>_____ % PARTICULATE _____ % GASEOUS | 15. EFFICIENCY OF SCRUBBER (SEE INSTRUCTION 4):<br>_____ % 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 _____ SCFM | | 8. FLOW RATES: _____ GPM _____ SCFM |
| 7. EFFICIENCY OF "OTHER" EQUIPMENT (SEE INSTRUCTION 4): % | | 9. EFFICIENCY OF "OTHER" EQUIPMENT (SEE INSTRUCTION 4): % |

| 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. (see Table 3) |
| CARBON MONOXIDE | 3a. PPM (VOL) | b. LB/HR | | c. (see Table 3) |
| NITROGEN OXIDES | 4a. PPM (VOL) | b. LB/HR | | c. (see Table 3) |
| ORGANIC MATERIAL | 5a. PPM (VOL) | b. LB/HR | | c. (see Table 2) |
| SULFUR DIOXIDE | 6a. PPM (VOL) | b. LB/HR | | c. (see Table 3) |
| **OTHER (SPECIFY) | 7a. PPM (VOL) | b. LB/HR | | c. HAPS (see Table 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. (see Table 3) |
| CARBON MONOXIDE | 9a. PPM (VOL) | b. LB/HR | | c. (see Table 3) |
| NITROGEN OXIDES | 10a. PPM (VOL) | b. LB/HR | | c. (see Table 3) |
| ORGANIC MATERIAL | 11a. PPM (VOL) | b. LB/HR | | c. (see Table 2) |
| SULFUR DIOXIDE | 12a. PPM (VOL) | b. LB/HR | | c. (see Table 3) |
| **OTHER (SPECIFY) | 13a. PPM (VOL) | b. LB/HR | | c. HAPS (see Table 1) |

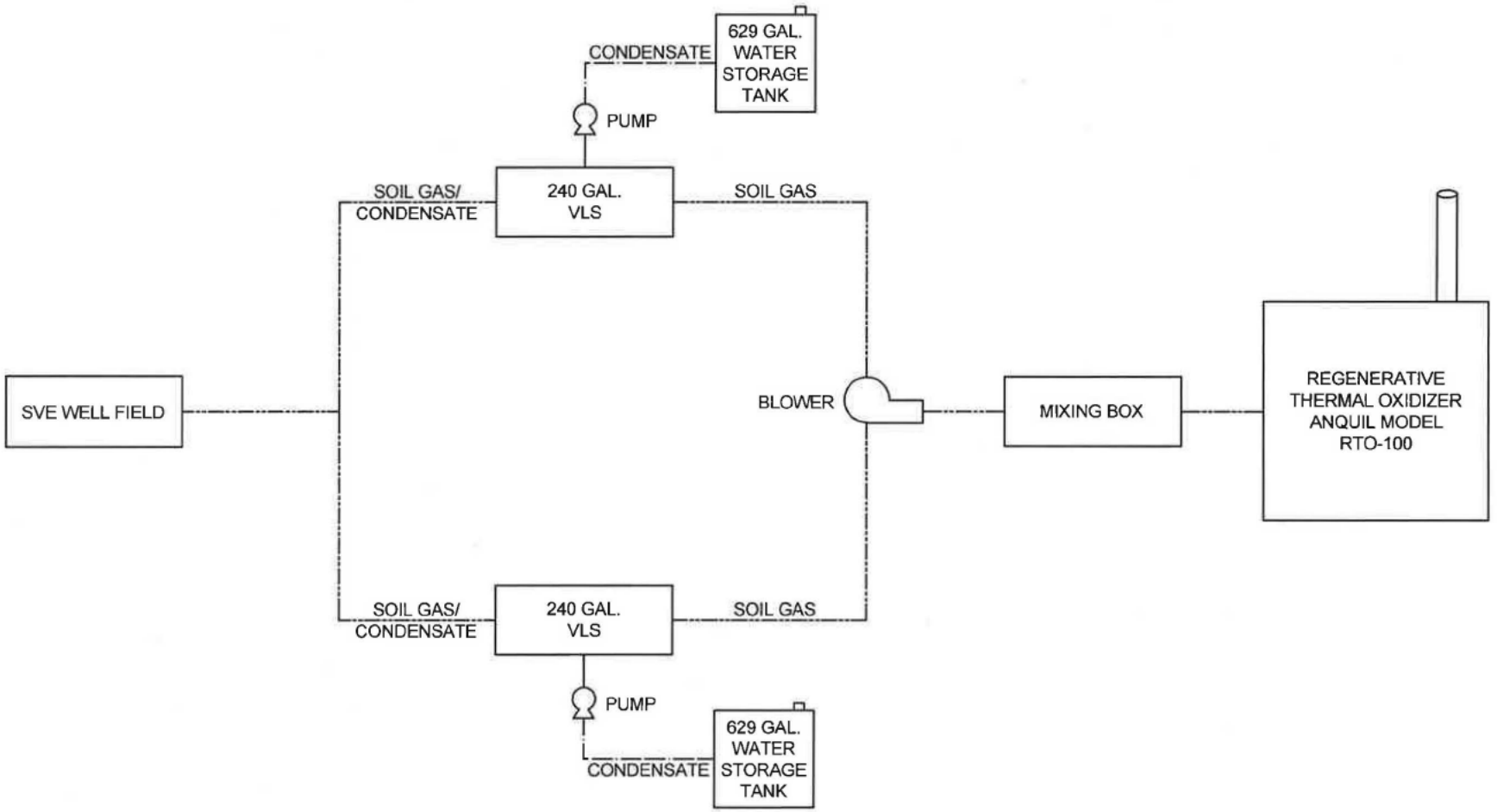
**"OTHER" CONTAMINANT SHOULD BE USED FOR AN AIR CONTAMINANT NOT SPECIFICALLY NAMED ABOVE. POSSIBLE OTHER CONTAMINANTS ARE ASBESTOS, BERYLLIUM, MERCURY, VINYL CHLORIDE, LEAD, ETC.

| EXHAUST POINT INFORMATION | |
|---|---|
| 1. FLOW DIAGRAM DESIGNATION(S) OF EXHAUST POINT: Regenerative Thermal Oxidizer Exhaust | |
| 2. DESCRIPTION OF EXHAUST POINT (LOCATION IN RELATION TO BUILDINGS, DIRECTION, HOODING, ETC.): 30" carbon steel / aluminized steel air stack from top of enclosure | |
| 3. EXIT HEIGHT ABOVE GRADE: 30.5 ft. | 4. EXIT DIAMETER: 30 in. |
| 5. GREATEST HEIGHT OF NEARBY BUILDINGS: 8 ft. | 6. EXIT DISTANCE FROM NEAREST PLANT BOUNDARY: <100ft. |
| AVERAGE OPERATION | MAXIMUM OPERATION |
| 7. EXIT GAS TEMPERATURE: 200 °F | 9. EXIT GAS TEMPERATURE: 200 °F |
| 8. GAS FLOW RATE THROUGH EACH EXIT: 10000 ACFM | 10. GAS FLOW RATE THROUGH EACH EXIT: 10000 ACFM |




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

| | |
|---|---|
| SHELL OIL PRODUCTS US<br>SOIL VAPOR MONITORING PROGRAM<br>ROXANA, ILLINOIS | PROJECT NO.<br>21562735 |
| URS | |
| DRN. BY: djd March 2012<br>DSGN. BY: jrm<br>CHKD. BY: | Facility Location Map — FIG. NO. 1 |




| | |
|---|---|
| SHELL OIL PRODUCTS US<br>ROXANA, ILLINOIS | PROJECT NO.<br>21562735 |
| URS | |
| DRN. BY:chs March 2012<br>DSGN. BY:jrm<br>CHKD. BY:sjs | SVE Process Diagram — FIG. NO. 2 |

**Table 1**
**RTO HAPs Emissions**

| Month | tons/month | | | | | | | | | | | | | | | | Calculated Monthly Total HAPs Emissions | Annual Expected Total HAPs Emissions |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Benzene | Ethylbenzene | Toluene | o-xylene | m,p-xylene | Carbon Disulfide | Methylene Chloride | Hexane | 2-Butanone | 2,2,4-Trimethylpentane | 1,2-Dichloroethane | Trichloroethene | 1,2-Dibromoethane (EDB) | Cumene | 1,4-Dichlorobenzene | 1,2,4-Trichlorobenzen | tons/ month | tons/year |
| Jan-12 | 1.71E-04 | 3.43E-05 | 1.51E-04 | 1.61E-05 | 6.75E-05 | 1.81E-04 | 7.46E-05 | 3.02E-03 | 4.03E-05 | 1.71E-03 | 0.00E+00 | 0.00E+00 | 1.61E-05 | 0.00E+00 | 2.42E-05 | 5.44E-05 | 5.57E-03 | 6.68E-02 |
| Feb-12 | 4.47E-03 | 5.36E-04 | 1.79E-03 | 2.55E-04 | 1.08E-03 | 1.02E-02 | 9.00E-04 | 3.50E-02 | 5.38E-04 | 2.07E-02 | 1.53E-05 | 2.21E-05 | 4.58E-04 | 2.02E-05 | 3.54E-04 | 1.56E-03 | 7.79E-02 | 9.40E-01 |

Assumptions:

| **Month** | **Exhaust Flow Rate** | **CF[1]** | **CF[2]** | **CF[3]** | **Hours Operated** | **CF[4]** | **CF[5]** |
|---|---|---|---|---|---|---|---|
| | (scfm) | lb/lb - Mole | min/ hour | $ft^3$/lb -Mole | hrs/ month | lbs/ ton | hours/ month |
| Jan-12 | 10,000 | 100 | 60 | 3.87E+08 | 13 | 2000 | 730 |
| Feb-12 | 10,000 | 100 | 60 | 3.87E+08 | 730 | 2000 | 730 |

Notes:

1. The construction permit required additional analysis during startup and shakedown, which happened primarily in February.
2. The February emissions values are based on an average of samples collected between February 1st and February 9th.

CF Conversion Factor

[1] Value obtained from Permit Condition 3.a.

[2] 60 mins/hr

[3] Value obtained from Permit Condition 3.a.

[4] 2000 lbs/ton

[5] 730 hours/month

## Table 2
## RTO Other Volatile Organic Matter (VOM) Emissions

| Month | Other VOM Total | Calculated Monthly Total Other VOM Emissions | Calculated Monthly Total Other VOM Emissions | Annual Expected Total Other VOM Emissions |
|---|---|---|---|---|
| | tons/month | tons/month | lbs/ hour[5] | tons/year |
| 12-Jan | 1.70E-01 | 1.70E-01 | 4.65E-01 | 2.04E+00 |
| 12-Feb | 2.07E-02 | 2.07E-02 | 5.66E-02 | 2.06E+00 |

| Month | Exhaust Flow Rate | CF[1] | CF[2] | CF[3] | Hours Operated | CF[4] | CF[5] |
|---|---|---|---|---|---|---|---|
| | (scfm) | lb/lb -Mole | min/ hour | $ft^3$/lb -Mole | hrs/ month | lbs/ ton | hrs/month |
| Jan-12 | 10,000 | 100 | 60 | 3.87E+08 | 13 | 2000 | 730 |
| Feb-12 | 10,000 | 100 | 60 | 3.87E+08 | 730 | 2000 | 730 |

Notes:

1. The current operation FESOP required additional analysis during startup and shakedown, which happened primarily in February.
2. The February emissions values are based on an average of samples collected between February 1st and February 9th.

CF Conversion Factor

[1] Value obtained from Permit Condition 3.a.

[2] 60 mins/hr

[3] Value obtained from Permit Condition 3.a.

[4] 2000 lbs/ton

[5] 13 hours/month (January 2012), 730 hours/month (February 2012)

**Table 3**
**Potential RTO Criteria Pollutant Emissions**

| Maximum Design Rate (MMBtu/hr) | Maximum Fuel Throughput | Units | $SO_2$ Emission Factor (lb/MMBtu) | NOx Emission Factor (lb/MMBtu) | CO Emission Factor (lb/MMBtu) | PM Emission Factor (lb/MMBtu) | Potential $SO_2$ Emission Rate (TPY) | Potential NOx Emission Rate (TPY) | Potential CO Emission Rate (TPY) | Potential PM Emission Rate (TPY) |
|---|---|---|---|---|---|---|---|---|---|---|
| 3.0 | 3000 | SCF/hr | 6.00E-01 | 1.00E-01 | 7.45E-03 | 8.24E-02 | 7.50E-03 | 1.25E+00 | 1.01E-01 | 9.46E-02 |

Notes:
Emission factor from AP-42 External Combution Sources, 1.4 Natrual Gas Combustion (per manufacturer's recommendation)

**Table 4**

**Soil Vapor Extraction System Calculated Storage Tank Emissions**

| Pollutant | Concentration mg/L | Total Pounds/Year | Total Pounds/Hour |
|---|---|---|---|
| Benzene | 1860 | 1.90E-04 | 2.17E-08 |
| Ethylbenzene | 10 | 1.02E-06 | 1.16E-10 |
| Toluene | 10 | 1.02E-06 | 1.16E-10 |
| Xylenes (Total) | 10 | 1.02E-06 | 1.16E-10 |
| n-Butylbenzene | 50 | 5.10E-06 | 5.82E-10 |
| sec-Butylbenzene | 50 | 5.10E-06 | 5.82E-10 |
| tert-Butylbenzene | 50 | 5.10E-06 | 5.82E-10 |
| Carbon disulfide | 50 | 5.10E-06 | 5.82E-10 |
| Carbon tetrachloride | 10 | 1.02E-06 | 1.16E-10 |
| Chlorobenzene | 10 | 1.02E-06 | 1.16E-10 |
| Chloroethane | 20 | 2.04E-06 | 2.33E-10 |
| Chloroform | 10 | 1.02E-06 | 1.16E-10 |
| Chloromethane | 20 | 2.04E-06 | 2.33E-10 |
| Cymene (p-Isopropyltoluene) | 50 | 5.10E-06 | 5.82E-10 |
| 1,4-Dioxane | 250 | 2.55E-05 | 2.91E-09 |
| Ethyl methacrylate | 50 | 5.10E-06 | 5.82E-10 |
| Hexachlorobutadiene | 50 | 5.10E-06 | 5.82E-10 |
| 2-Hexanone (Methyl N-Butyl Ketone) | 50 | 5.10E-06 | 5.82E-10 |
| Isopropylbenzene (Cumene) | 50 | 5.10E-06 | 5.82E-10 |
| Methyl tert-Butyl Ether (MTBE) | 10 | 1.02E-06 | 1.16E-10 |
| Naphthalene | 0.271 | 2.76E-08 | 3.16E-12 |
| n-Propylbenzene | 50 | 5.10E-06 | 5.82E-10 |
| 1,2,3-Trichlorobenzene | 50 | 5.10E-06 | 5.82E-10 |
| 1,2,4-Trichlorobenzene | 50 | 5.10E-06 | 5.82E-10 |
| 1,1,2-Trichloroethane | 10 | 1.02E-06 | 1.16E-10 |
| 1,2,4-Trimethylbenzene | 50 | 5.10E-06 | 5.82E-10 |
| 1,3,5-Trimethylbenzene | 50 | 5.10E-06 | 5.82E-10 |
| Vinyl acetate | 50 | 5.10E-06 | 5.82E-10 |
| Total PAHS | 0.15 | 1.53E-08 | 1.75E-12 |
| Total HAPS from 629-gallon Storage Tanks: | | 5.10E-04 | 5.82E-08 |
| Other VOM Total from 629-gallon Storage Tanks: | | 1.02E-04 | 1.16E-08 |
| Total HAPS + VOM from 629-gallon Storage Tanks: | | 6.12E-04 | 6.99E-08 |
| Total PAHs from 629-gallon Storage Tanks: | | 3.06E-08 | 3.49E-12 |
| Total Emissions from 629-gallon Storage Tanks: | | 6.12E-04 | 6.99E-08 |

**Table 5**
**Potential Emissions Totals**

| | tons/year | lbs/hour |
|---|---|---|
| Total RTO HAPS: | 9.40E-01 | 1.07E-04 |
| Total RTO VOM: | 2.06E+00 | 2.35E-04 |
| **Total RTO HAPs and VOM:** | **3.00E+00** | **3.42E-04** |
| Total HAPS from 629-gallon Storage Tanks: | 5.10E-04 | 5.82E-08 |
| Other VOM Total from 629-gallon Storage Tanks: | 1.02E-04 | 1.16E-08 |
| Total HAPS + VOM from 629-gallon Storage Tanks: | 6.12E-04 | 6.99E-08 |
| Total PAHs from 629-gallon Storage Tanks: | 3.06E-08 | 3.49E-12 |
| Total Emissions from 629-gallon Storage Tanks: | 6.12E-04 | 6.99E-08 |
| **Combined Emissions (VOM & HAPs) Total from RTO and Storage Tanks:** | **3.00E+00** | **3.43E-04** |

Exhibit 1
Soil Vapor Extraction System Process Description

## Exhibit 1
## Soil Vapor Extraction System Process Description

SOPUS completed installation of a full-scale soil vapor extraction system at the Roxana Site in January 2012 (**Figure 1**). The system consists of the following:

- Network of soil vapor extraction wells and SVE piping;
- Fifteen horsepower blower/motor (blower) that provides the vacuum to extract the soil vapor;
- Two, 240-gallon vapor liquid separators (VLSs);
- Two, 629-gallon above ground groundwater/condensate tanks and;
- A 10,000 SCFM regenerative thermal oxidizer (RTO) (**Figure 2**).

A steel shipping container, referred to as a conex, has been adapted to house the two VLSs, the vapor extraction blower, and the RTO control system. The conex and RTO are located adjacent to each other on property owned by the WRB Refining, LP, Wood River Refinery (**Figure 1**).

The blower provides the vacuum pressure necessary to extract and convey the soil vapor to one of two vapor liquid separators. The vapors are conveyed by vacuum to the RTO unit for destruction of hydrocarbon constituents. Condensate water, if generated, is conveyed by pumps to one of two stainless steel above ground storage tanks for subsequent transport and disposal. The tanks are approximately four feet in diameter and six feet in length with a maximum holding capacity of 629 gallons. The tanks will be kept under ambient conditions and will not be pressurized. Each storage tank is equipped with a two-inch diameter vent.

Based on flow data and constituent data collected during the start-up and shake-down period conducted in January and February 2012, the maximum potential hazardous air pollutants (HAPs) emission rate is calculated at 9.40E-01 tons per year (tons/yr) (**Table 1**). The maximum combined emission rate for all other volatile organic matter (VOM) is calculated at 2.06 tons/yr (**Table 2**). Other criteria pollutant emissions (those associated with combustion) will be less than major source thresholds. **Table 3** provides the potential criteria pollutant emissions. Condensate/water has not been generated during the operation of the SVE System; however, there is potential that condensate/water containing VOM can accumulate in the storage tanks from SVE operations. Groundwater data collected from the Roxana Interim Groundwater Program were utilized to calculate potential emissions from the two 629-gallon storage tanks. The estimated potential emissions from the water/condensate tanks is calculated at 6.12E-04 tons/yr (**Table 4**). Combined emissions estimates from the SVE system (RTO and condensate/water storage tanks) for VOM are included in **Table 5**.