

PERMIT # 2144

TECHNICAL SUPPORT AND POTENTIAL TO EMIT DOCUMENT

August 2006

I. GENERAL COMMENTS:

A. Company Information

1. Mission Linen Supply

2. Physical Address:

301 South Park Avenue
Tucson, AZ 85705

Mailing Address:

301 South Park Avenue
Tucson, AZ 85705

B. Background

This is a new permit for the operation of a multi-phase extraction system (MPE) at the Mission Linen Supply facility, (a former dry cleaning facility), located at 301 South Park Avenue, Tucson, AZ. The only background is that Mission Linen was originally operating a Soil Vapor Extraction unit (SVEU) with vapor-phase granular activated carbon (GAC) under a portable source permit, issued by the Arizona Department of Environmental Quality (ADEQ), to clean up VOC contamination from the former dry cleaning facility. The system now also includes a 500-lb bed of permanganate-impregnated zeolite beads as a polisher following the activated carbon adsorption vessels. The contamination is from tetrachloroethylene (PCE) spills in the former dry cleaning area. In addition, PCE and its degradation products, trichloroethylene (TCE), cis-1, 2-dichloroethene (cis-1,2-DCE), and vinyl chloride are known to be dissolved within diesel fuel, which lies atop the shallow aquifer at this location. The layer of diesel fuel which migrated onto the Mission Linen site from an upgradient source, contains up to 10% dissolved PCE at the location beneath the former dry cleaning area.

During SVEU operations, Mission Linen began to evaluate remedial methods to remove additional PCE from the subsurface to accelerate cleanup at the site. An MPE pilot test was conducted in September 2003 and the results of the pilot test indicated that MPE was a feasible method of removing the diesel fuel/ PCE mixture from the shallow aquifer. Materials to be treated by the MPE system are VOC contaminated diesel fuel, groundwater, and soil gas. Specific pollutants are identified in the previous paragraph.

URS Corporation (URS) is the consultant for Mission Linen and will be operating the equipment on their behalf.

C. Attainment Classification

The source is in an area that is in attainment for all pollutants.

II. SOURCE DESCRIPTION

A. Process Description

The MPE process will consist of the application of high vacuum within a series of wells to extract a mixture of diesel fuel, groundwater, and soil vapor from the subsurface. A number of new and existing wells (11 total) will be used for purposes of extracting these fluids. In the processing equipment, the liquid streams (diesel fuel and water) will be separated from the vapor stream. (Refer to Figure E-1 of the application for a process diagram).

Treatment of Gases

Extracted soil gas and fluids will be treated to remove VOCs and petroleum hydrocarbons through a series of three vapor-phase GAC vessels. Prior to treatment with the GAC, the vapor will pass through a series of filters to remove oil mist and dust, an air-to-air heat exchanger to cool the soil vapor stream, and a knockout vessel to collect condensate from the vapor stream. Following the GAC treatment, a vessel containing permanganate-impregnated zeolite beads will be used as a polisher to oxidize any vinyl chloride that may “roll through” the GAC. (Vinyl chloride may be displaced by PCE and TCE in the GAC). Treated soil gas will then be discharged to the atmosphere through a vent on the building roof (Exhaust stream #2 on Fig. E-1 of application).

Treatment of Liquid Stream

The extracted liquid stream will pass through an oil/ water separator where hydrocarbon liquids (predominantly diesel fuel) will be separated from water. The water will be routed to treatment in a series of sealed vessels consisting of an oil-adsorbing clay bed to remove hydrocarbons that may pass through the oil/ water separator and liquid-phase GAC to remove VOCs. Treated water will either be used in the laundry or routed to the wastewater treatment system for the facility. There will be no emission points in the water treatment portion of the process. The hydrocarbon liquid will be routed from the oil/ water separator to a product storage tank for temporary storage and eventual transportation off-site. There are vents on the oil/ water separator and product storage tank that will be routed to vapor-phase GAC for treatment (Exhaust stream #1 on Fig. E-1 of application).

B. Air Pollution Control Devices

Control devices used at the site are as follows:

Three 2000-lb GAC Units and a 500-lb Permanganate-Impregnated Zeolite Bead Unit

These will be used to treat the contaminated soil gas (exhaust stream #2) extracted using the MPE system. The maximum treated stream flow rate from the Total Fluid Recovery Vessel will be no greater than 150 scfm. The stream will pass through the three GAC units then enter the permanganate unit to remove any vinyl chloride. The vapor stream will then be discharged to the atmosphere via a 2-inch diameter, 25-foot stack located on top of the adjacent building.

One 200-lb vapor phase GAC Unit

The unit is rated at 200 scfm far greater than the actual flow, which is expected to be approximately 4 scfm. VOC constituents in exhaust stream #1 will be controlled by passing the vapor stream through the vapor phase carbon unit and vented to the atmosphere via a 2-inch diameter stack, 20 feet tall, located adjacent to the carbon drum. Flow of air through the unit will only be generated as the separator and/ or product tanks fill and vapor is forced through the vent, or as a result of changes in barometric pressure. The vapor phase carbon unit will have a 90% control efficiency of VOCs.

III. REGULATORY HISTORY

As this is a new source to PDEQ, there is no regulatory history associated with it. Mission Linen has stated in its application that the source will stay in compliance with all regulations and requirements during the operation of the MPE.

A. Testing & Inspections

New source, no inspections have been done. URS has been in the process of conducting feasibility studies for use of the MPE system.

B. Excess Emissions N/A, new source.

IV. EMISSIONS ESTIMATES

Based on several assumptions material balance was used to estimate the concentrations of VOC & HAP species in the hydrocarbon liquids. Refer to Section 2.2 of the 01/28/2005 application for a listing of assumptions. PDEQ has checked and verified URS' PTE calculations. Results of these calculations are summarized in the tables below. The potential maximum VOC, HAPs emissions are based on the maximum concentrations measured from the wells for PCE, TCE, cis-1,2-DCE and vinyl chloride (based on Miller Brooks September 2003 monitoring report and Draft Remedial Investigation report) and air stream pilot test data collected during MPE testing for ethylbenzene, xylenes and volatile fuel hydrocarbons. The emissions were based on the maximum concentrations and a maximum extraction flow rate of 4248 liters per minute (L_{air}/min) for design airflow through the soil gas treatment units. Refer to Section 2.2 (pages 2-3 to 2-7) of the 01/28/2005 application for potential to emit (PTE) calculations.

Emission Tables

Emissions of VOC & HAPs without controls are shown in the tables below. Information can also be found in Tables 2 & 3 of the 01/28/2005 application.

Table 1.¹
Summary of Estimated HAP and VOC emissions from Product Tank & Oil Water Separator
Mission Linen Soil Remediation System - Exhaust Stream #1

Description	PCE	TCE	DCE	VOCs	Diesel	Total HAPs	Total VOCs
Product Tank (lbs/ yr) ²	4.18	2.75	0.18	4.59	4.85	7.11	16.55
Oil-Water Separator (lbs/ yr) ²	0.29	0.24	0.02	0.57	0.29	0.55	1.41
Uncontrolled Emissions (lbs/yr)	4.47	2.99	0.20	5.16	5.14	7.66	17.96
Uncontrolled Emissions (tons/yr)	0.0022	0.0015	0.0001	0.0026	0.0026	0.0038	0.009
Controlled Emissions (lbs/ yr)	0.45	0.30	0.02	0.52	0.52	0.77	1.80
Controlled Emissions (tons/ yr)	0.0002	0.0002	0.00	0.0003	0.0003	0.0004	0.001

¹ For a more detailed table, refer to Table 2 in the 01/28/2005 application.

² Emissions from vessels, upstream of controls based on results from TANKS 4.09 for pure species, and prorated for liquid weight fraction. Gasoline was used as surrogate to represent VOCs in the recovered product. The recovered hydrocarbon liquid does not contain gasoline.

**Table 2.
Estimated HAP and VOC emissions from Exhaust Stream #2
Mission Linen Soil Remediation System.**

Description	PCE	TCE	DCE	Vinyl Chloride	Ethyl Benzene	Xylenes	VOCs	Total HAPs	Total VOCs
Vapor conc. (ppmv) ¹	4700	1200	39	6	0.95	1.7	990	N/A	N/A
Uncontrolled Emissions (tons/yr) ²	79.7	16.1	0.39	0.038	0.0103	0.018	11.6	96.26	107.86
Controlled Emissions (tons/ yr) ³	0.532	0.182	0.35	0.004	0.0093	0.0166	1.04	1.09	2.13

¹ Vapor concentrations are assumed 80% of the mass extracted in the product.

² Operating schedule is based on full-time operation, 90% of the year (7,884 hr/yr).

³ Based on proposed emission limits from ISC3 modeling for PCE, TCE, Vinyl Chloride and 90% removal efficiency for VOCs.

Table 3. Total Estimated HAP and VOC emissions from Exhaust Streams 1 & 2

Description	PCE	TCE	DCE	Vinyl Chloride	Ethyl Benzene	Xylenes	VOCs	Total HAPs	Total VOCs
Uncontrolled Emissions (tons/yr) ²	79.70	16.10	0.39	0.038	0.0103	0.018	11.6	96.26	107.86
Controlled Emissions (tons/ yr) ³	0.532	0.182	0.35	0.004	0.0093	0.0166	1.04	1.09	2.13

As shown in the uncontrolled emissions numbers in Table 3 above, Mission Linen meets the permitting thresholds for requiring a permit. After using the MPE and applying pollution controls, emissions are reduced to 1.09 for HAPs and 2.13 for VOCs. The use of the pollution controls will be taken as a synthetic minor limitation.

V. OPERATING PLAN

Vapor Phase Carbon Drum

A handheld photoionization detector (PID) will be used to monitor the influent and effluent side of the 200-lbvapor-phase GAC once each week during system operation. When effluent concentrations are within 5% of influent concentration, the GAC unit will be replaced. This operating plan is for Exhaust Stream #1.

2000-lb GAC unit and permanganate-impregnated Units

Influent, effluent, and intermediate sampling points between 2000-lb carbon vessels will be monitored on a weekly basis using a hand-held PID. The influent sampling point will be prior to the initial GAC vessel and the effluent point

will be after the discharge from the vessel containing the permanganate-impregnated beads and prior to the point at which the treated air stream is discharged to the atmosphere.

Field measurement of VOC concentration will be used to determine GAC “breakthrough” which in this case is defined as the point at which the effluent concentration on the initial GAC bed and the influent concentration to that vessel are within 10% of each other. If breakthrough in the initial GAC bed is detected, the GAC within that vessel will be scheduled for replacement and the remaining GAC vessels will be moved forward in the series (i.e., the secondary vessel becomes the initial vessel and the tertiary vessel becomes the secondary vessel). The vessel with the new GAC will be placed as the tertiary vessel.

To ensure compliance with permit conditions, influent and effluent grab samples from the vapor abatement system will be collected on a daily basis for the first five days of continuous operation, twice weekly for the following two weeks of operation, weekly, for the following four weeks of operation and monthly thereafter. The samples will be submitted to a laboratory for analysis of VOCs using EPA’s Compendium Method TO-15.

Based on the potential to emit the source’s class is a Class III synthetic minor stationary source for HAPs and VOCs.

VI. APPLICABLE REQUIREMENTS

NSPS No NSPS rules apply to the source.

NESHAP No NESHAP rules apply.

SIP The following SIP rules apply: SIP rules 321, 343 & 344.

PCC The following PCC rules apply: 17.12.185, 17.16.010, 17.16.030, 17.16.040, 17.16.050, & 17.16.430

VII. PERMIT CONTENTS

A. Emission Limits/ Standards:

Multi Phase Extraction System (MPE)

17.16.430.A.1.a	PM Standard
17.16.040.A, 17.16.130.B.3 & SIP Rule 321	Opacity Standard
17.16.050.D & SIP Rule 343	Visibility Limiting Standard
17.16.430.D & SIP Rule 344	Odor Limiting Standard
17.16.430.G	Processing of VOCs
17.16.430.G	Use of abatement equipment
17.16.430.G	Flow through Limit
17.12.190.B	No direct discharge into the atmosphere

Fuel Limitation

Change of fuels with appropriate revision.

Operational Limitation

17.12.190.B & 17.16.430.G	Conditions for Granular Activated Carbon and permanganate-impregnated beads use
17.12.190.B & 17.16.430.G	Conditions for Vapor Phase Carbon use

B. Monitoring:

Multi Phase Extraction System (MPE) 17.12.185.A.3

PM monitoring not required unless requested by the Control Officer.
Opacity & Odor monitoring (See operational limitations)

Fuel Limitation 17.12.185.A.3

None

Operational Limitations

Monitoring of gas concentrations in GAC & PIZB 17.12.185.A.3
Grab-sample schedule from vapor abatement system 17.12.185.A.3
Observe exhaust stacks for evidence of visible emissions 17.12.185.A.3
Monitoring of gas concentrations in VPC 17.12.185.A.3
Weekly performance checks of equipment 17.12.185.A.3

C. Recordkeeping Requirements

Multi Phase Extraction System (MPE)

Recordkeeping of gas concentrations 17.12.185.A.4
Record results of opacity observations 17.12.185.A.4
Record results of performance observations 17.12.185.A.4
Display contact information at the site of the MPE 17.12.185.A.4
Location of Records 17.12.185.A.4

D. Reporting Requirements:

All Operations

Submittal of initial MPE test report required by permit 17.12.185.A.5
Submittal of other reports when requested by the Control Officer 17.12.185.A.5
Submit MPE O & M plan within 60 days of permit issuance 17.12.030 & 17.12.185.A.3.d.
Emissions Inventory reporting 17.12.320

E. Testing Requirements:

Testing upon Control Officer's request 17.20.010.B
Calibration tests for PID 17.20.010.B
Compliance with Particulate Matter Standard 17.20.010.B
Compliance with Opacity Standard 17.12.185.A.3
Testing before startup 17.12.185.A.3

F. Alternate Operating Scenarios:

The applicant has not requested any alternate operating scenarios. The increase in extraction wells discussed in the permit application would not be an alternate operating scenario. It would be addressed as a facility change without a permit revision.

G. Miscellaneous Comments: None

VIII. IMPACTS TO AMBIENT AIR QUALITY Not a major source and so no studies are required.

IX. CONTROL TECHNOLOGY DETERMINATION

No control technologies needed to be determined. This is simply an MPE system used for soil/ liquid vapor extraction.

X. PREVIOUS PERMIT CONDITIONS None since this is a new source

FINAL TSD