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TO: Qualified Underground Storage Tank Consultants (QCs) and Interested Parties

FROM: Paul D. Zuger, Acting Chief, Storage Tank Division

SUBJECT: Utilization of a Vacuum Truck for Corrective Action Activities at Leaking Underground Storage Tank Sites

There has been an increased utilization of vacuum trucks to remove petroleum free product from the surface of the groundwater and/or high dissolved contaminant concentrations in the groundwater via monitoring wells as a type of corrective action activity at Leaking Underground Storage Tank (LUST) sites. This practice has raised concerns over the effectiveness at some LUST site locations, and the cross media transfer of petroleum contaminants to the air due to emissions from the vacuum exhaust. This informational memorandum establishes the Storage Tank Division's guidance, and outlines Air Quality Division (AQD) rules governing the proper utilization of this method of free product removal as a corrective action activity.

Requirements Under Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as Amended

Section 21307, (2)(c)(i) states "Conduct free product removal in a manner that minimizes the spread of contamination into previously uncontaminated zones by using recovery and disposal techniques appropriate to the conditions at the site and in a manner that properly treats, discharges, or disposes of recovery by-products as required by law."

Section 21308a. (1)(b)(xviii)(E) and (F) describes the requirements of the 90-day Initial Assessment Report in relation to free product removal activities.

(E) "Whether any discharge will take place on-site or off-site during the recovery operation and where this discharge will be located."

(F) "The type of treatment applied to, and the effluent quality expected from, any discharge."

The provisions under Part 213 require these corrective action activities minimize the spread of contaminants into previously uncontaminated zones, and require reporting on type of treatment applied, and effluent quality from any discharge. The AQD, as described below, regulates the treatment and/or discharge of air emissions from the vacuum exhaust.

Requirements Under Rules 279 and 290 of the Air Pollution Control Rules promulgated under Article II, Chapter 1, Part 55, Air Pollution Control, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as Amended

In a March 31, 1997 AQD interoffice communication to AQD District Supervisors, Mr. Dennis Drake, AQD Chief, issued a permit exemption pursuant to Rule 279 for a Permit to Install which states:

“Any vacuum truck used at a remediation site as a remedial action method, provided that the usage does not exceed two consecutive days use and is not used more than once per month at a site.”

Rule 290 also provides for Permit to Install Exemptions with Limited Emissions. Gasoline vapors are considered by AQD as a carcinogen, the following section of this rule would apply as amended on June 13, 1997.

R 336.1290 (a)(ii)(C) For carcinogenic air contaminants with initial risk screening levels greater than or equal to 0.04 micrograms per cubic meter, the uncontrolled or controlled emissions shall not exceed 20 or 10 pounds per month, respectively.

R 336.1290 (c) Records of material use and calculations identifying the quality, nature, and quantity of the air contaminant emissions are maintained in sufficient detail to demonstrate that the emissions meet the emission limits outlined in this rule.

If the site exceeds the two consecutive days as allowed under Rule 279, and chooses to utilize Rule 290 for the calendar month, Rule 290 of the Air Pollution Control Rules requires the company to maintain sufficient record keeping that documents the actual emissions for the month. Documentation must be collected and maintained for the most recent two years pursuant to Rule 290.

The exemptions cited above are not to be used in combination per month per emission unit (i.e., utilize a Rule 279 exemption with no sampling of emission or record keeping and also within the same month utilize the Rule 290 exemption).

Minimum Sampling Procedure for Measuring Offgas Emissions During Fluid Recovery

The following procedure should be utilized when offgas treatment is not used:

Sampling Location: Exhaust of the vacuum truck

Information Collected: Concentration in ppm_v of exhaust gas and exhaust air velocity in ft./min. (If a photoionization detector (PID), or flame ionization detector (FID), or similar device is used, identify the molecular weight of the calibration gas.)

Sample Frequency: Collect samples at 15 minute intervals for the first hour, and then hourly thereafter.

This information is then used in a standard equation to develop the amount of volatile organic compounds emitted into the atmosphere. The equation used to obtain the emission rate in lbs./hour is as follows:

$$ER = \text{ppm}_v \times \frac{(MW)}{24.02} \times \text{SCMM} \times \text{Constant}$$

$$\text{SCFM} = \text{ACFM} \times \frac{460 + 70^{\circ}\text{F}}{460 + T^{\circ}\text{F}}$$

$$\text{SCMM} = \text{SCFM} \times 0.0283$$

where:

ER	=	Emission Rate in lbs./hr.
ppm _v	=	exhaust gas concentration
MW	=	molecular weight (calibration gas)
ACFM	=	actual cubic feet per minute [(ft./min.)(3.14)(0.0069)] for a 2 inch stack
SCMM	=	standard cubic meters minute
24.02	=	Ideal Gas Law Constant
460	=	conversion to absolute temperature
Constant	=	$1.323 \times 10^{-4} = [(60 \text{ min/hr}) (2.205 \text{ lbs./kg}) (\text{kg}/1000 \text{ g}) (\text{g}/1000 \text{ mg})]$

Typically propane is used as the calibration gas for a PID or FID. The molecular weight of propane is 44. If another calibration gas is used, the molecular weight of that gas should be used in the equation.

Offgas may be subject to treatment using a trailer mounted internal combustion engine prior to discharge into the atmosphere. The treated offgas generally is discharged at temperatures exceeding 1000 degrees Fahrenheit. As such, there are limited options regarding sampling procedures in a safe and technically feasible manner. Therefore, a similar procedure as above may be utilized, however the sample location is modified to a point prior to treatment. A treatment efficiency of 90 percent is then assumed, which based upon manufacturer's estimates is a conservative estimate. The 90 percent treatment efficiency is then applied to the standard equation to obtain a value representing the amount discharged to the atmosphere.

When sampling using this procedure for volatile organic compounds, it is assumed that the emission rate will be compared to the most restrictive criteria under Rule 290.

Records of calculations identifying the quality, nature, and quantity of the air contaminant emissions must be maintained in sufficient detail to demonstrate that the emissions meet the emission limits outlined in Rule 290. To assist with the record keeping requirements, Form EQP 3558, RULE 290 PERMIT TO INSTALL EXEMPTION: SOURCES WITH LIMITED EMISSIONS RECORD, is available on the Internet at <http://www.deq.state.mi.us/ead/pub/caap/airpermit/eqp3558.pdf>

The records are to be maintained on file for the most recent two-year period, and made available to the AQD upon request. The AQD encourages a five-year retention schedule to be consistent with the Federal Clean Air Act, and other provisions of the AQD Rules.

Verification of Effectiveness of Corrective Action Activities

Storage Tank Division Operational Memorandum No. 7 Identification, Reporting, and Recovery of Free Product at LUST Sites, generally outlines the requirements under Part 213 where free product has been identified.

Part 213 requires, as part of the corrective action plan (CAP), monitoring requirements which would also apply to the removal of free product utilizing a vacuum truck as a corrective action as illustrated in the following sections:

Section 21309a. (2)(c) "A monitoring plan if monitoring of environmental media or site activities or both is required to confirm the effectiveness and integrity of the remedy. The monitoring plan shall include all of the following:"

..."(ii) Environmental media to be monitored, including, but not limited to, soil, air, water or biota."

..."(ix) Contingency plan to address ineffective monitoring"

..."(xi) How the monitoring data will be used to demonstrate effectiveness of corrective action activities."

Section 21311a. (1)(c)(i) "On-site and off-site corrective action alternative including alternatives to remediate contaminated soil and groundwater for each cleanup type, including alternatives that permanently and significantly reduce the volume, toxicity, and mobility of the regulated substances."

Utilization of a vacuum truck for remediation shall follow these criteria, as would any other technology analyzed in the feasibility analysis.

Summary of Requirements and Recommended Guidance for the Utilization of a Vacuum Truck as a Corrective Action Activity at LUST Sites

REQUIREMENTS:

- Section 21307(2)(c) requires the removal of free product.
- The use of a vacuum truck to remove free product must be consistent with the provisions of Part 213 and Part 55. This would include:

Part 213:

- * Follow the reporting requirements in Operational Memorandum No. 7.
- * Justify the use of vacuum truck free product removal as an initial response action and/or final corrective action plan on a site-specific basis.
- * Monitor and verify the effectiveness of the free product removal activities at each LUST site.
- * Provide for corrective action alternative and contingencies.

Part 55

- * Either meet an exemption under Rule 279, limiting the usage to two consecutive days once per month at a site; or,
- * Meet an exemption under Rule 290, which limits the air emissions per month at a site; or,
- * Obtain a Permit to Install from the AQD for the site.

RECOMMENDATION:

- The Storage Tank Division recommends the use of air emission controls to abate volatile organic emissions on the vacuum exhaust of these vehicles during free product removal activities. Technology is widely available and relatively inexpensive to address air emissions by the use of incineration and/or carbon canisters to control vapor emissions.
- To the extent possible, corrective action activities where volatile air emissions would occur, should not be scheduled on Michigan Ozone Action Days.

Attachments:

1. 279 Exemption
2. Rule 290
3. Rule 290 Report Form

cc: STD Stakeholders
STD Mailing List
DEQ Division/Office Chiefs
STD Supervisors