ALABAMA COOPERATIVE Extension SYSTEM

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Decontamination Of Soil By Aeration

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Historically, soil from Underground Storage Tank (UST) contamination incidents has been primarily decontaminated by some sort of aeration of the soil. This aeration can be natural (by spreading and drying) or by forced air ventilation with pipes, fans, etc. In either case, the petroleum contamination is merely transferred from soil to atmosphere by volatilization.

Another method of devolatilizing soil is by heating, usually in a rotary dryer, such as those used by asphalt plants. Since the temperature realized in these dryers is usually 400 degrees F or less, the petroleum vapors are not oxidized, but are emitted to the atmosphere. Only by adding a downstream afterburner capable of high temperature and residence time can these vapors be properly oxidized.

Other methods of decontamination, such as disposal in a hazardous waste landfill or bioremediation, which have little or no potential for vapor emissions, are not within the purview of the Air Division. Use of these methods is subject to the approval of the Land Division and the UST section of ADEM.

The Air Division has consulted with ADEM's UST Section to develop the following guidelines for the purpose of minimizing vapor emissions during soil remediation. This guidance applies to projects in all areas of the State except Jefferson County and within the city limits of Huntsville. The Jefferson County Health Department Air Pollution Control Program or the City of Huntsville Department of Natural Resources should be contacted to determine requirements in that county or city.

A contaminated site that has the potential to emit more than 2,000 lbs of volatile organic compounds (VOC) will be expected to utilize a method that minimizes emissions. The Air Division has issued Air Permits to several portable thermal dryers which incorporate appropriate vapor and dust control equipment. These dryers, along with other types of remediation techniques, such as forced aeration or soil venting with vapor control equipment, will be the presumptive devolatilization methods for this size and type of project. All projects must receive prior approval from the Air Division and the UST Section of ADEM before any method is utilized.

To determine whether a site has the potential to emit more than 2,000 lbs of VOCs, the following method shall be used. For sites at which the contaminated soil has been excavated, five grab samples shall be composite to one sample for each 20 cubic yards of soil, and a Total Petroleum Hydrocarbon (TPH) test shall be conducted to determine the concentration of contaminate in the soil. For sites at which the contaminated soil remains in the ground (in-situ), a TPH test shall be conducted at soil borings representing a specific quantity of soil to determine the concentration of contaminate in the soil. The formula below shall be used to calculate potential VOC emissions from that estimated quantity of soil for both excavated and in-situ sites. The resulting emissions from each specific quantity of soil shall be added to calculate potential VOC emissions.

a x b x .002 = c

a = concentration of TPH in sample (ppm)

b = quantity of soil represented by sample (cyds)

c = potential VOC emissions (lbs)

Example

Sample 1 shows a TPH concentration of 500 ppm and represents 20 cyds.
Sample 2 shows a TPH concentration of 300 ppm and represents 20 cyds.
Sample 3 shows a TPH concentration of 1000 ppm and represents 20 cyds.

a ppm x b cyds x .002 = c lbs VOC emissions

Sample 1: 500 ppm x 20 cyds x .002 = 20 lbs VOC emissions

Sample 2: 300 ppm x 20 cyds x .002 = 12 lbs VOC emissions

Sample 3: 1000 ppm x 20 cyds x.002 = 40 lbs VOC emissions

Total Potential Emissions: 72 lbs VOC emissions

Because this is less than the limit of 2000 lbs., it would not be required that a remediation method which minimizes air emissions be utilized.

Please call the Anna Jalbert of the Air Division at (334) 271-7861 in Montgomery if you have any questions or comments concerning these guidelines.

Table 1. Total Potential Voc Emissions Calculations

a ppm x b cyds x .002 = c lbs
VOC emissions

Sample 1 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 2 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 3 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 4 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 5 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 6 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 7 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 8 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 9 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 10 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 11 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 12 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 13 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 14 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 15 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 16 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 17 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 18 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 19 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 20 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 21 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 22 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 23 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 24 _____ppm x _____cyds x .002 = _____lbs VOC emissions
Sample 25 _____ppm x _____cyds x .002 = _____lbs VOC emissions

TOTAL POTENTIAL EMISSIONS _____ lbs VOC emissions

NOTE - If more samples are taken than indicated above, please attach additional pages as necessary. These calculations must be completed and submitted with the ADEM UST Closure Assessment Report form, also included in this handbook. Both forms may be copied for public use.

ALABAMA COOPERATIVE Extension SYSTEM

ANR-740

For more information, call your county Extension office. Look in your telephone directory under your county's name to find the number.

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UPS, 1992, ANR-740

(PLEASE TYPE OR USE BLACK INK)

ADEM UST CLOSURE

SITE ASSESSMENT REPORT

(Use a separate form for a group of tanks in each tank pit)

Facility I.D. No.: _____ Date of this Report: _____

Facility County: _____ UST Owner: _____

Facility Name: _____ Address: _____

Location: _____ _____

_____ Contact: _____

Address: _____ _____

_____ Contact Telephone No.: _____

Name of Contractor and/or Consulting Engineer used to close tanks: _____

_____

Name of Laboratory used: _____

_____

PRIOR TO BEGINNING CLOSURE, THE CONTRACTOR SHOULD BECOME FAMILIAR WITH ALL CLOSURE PROCEDURES IN API BULLETIN 1604, "REMOVAL AND DISPOSAL OF USED UNDERGROUND PETROLEUM STORAGE TANKS."

Number of Tanks Closed: _____

Closure Date: _____

Tank Identification #	Tank 1	Tank 2	Tank 3	Tank 4	Tank 5
Tank Size					
Tank Capacity					
Tank Age					
Substance Stored					

1. Tank Closure By Removal

a. Attach a site map showing the general location of the facility.

b. Attach plan and sectional views of the excavation and include the following:

1. All appropriate excavation dimensions,
2. All soil sample locations using an appropriate method of identification,
3. Location of areas of visible contamination,
4. Former location of tank(s), including depth, with tank Identification Number.

c. Is the groundwater more than 5 feet below the bottom of the excavation? YES _____ NO _____

If not, provide the depth from the ground surface to the groundwater table: _____ ft.

d. Was there a notable product odor found in the excavation? YES _____ NO _____

e. Was there water in the excavation? YES _____ NO If yes, how was it handled?

_____

_____

f. Was free product found in the excavation? YES _____ NO _____ If yes, how was it handled?

_____

_____

g. Were visible holes noted in the tank(s)? YES _____ NO _____ If yes, please indicate which tank(s) by the Identification Number: _____. Also, describe the location(s) and provide general description as to the size and number of holes for above noted tanks, (Example: 3 sq. ft. of pinholes or 3 ft. diameter hole): _____

_____

_____

_____

_____

h. Describe the soil type and thickness of all soil layers encountered in the excavation: _____

_____

_____

_____

i. Was the excavation backfilled? YES _____ NO _____

If yes, provide the date: _____

2. Tank Closure Without Removal

a. Attach a site map showing the general location of the facility.

b. Attach plan and sectional views of the site and include the following:

1. Location of the tank(s) including depth,
2. Location of tank(s) with respect to other tanks, if applicable,
3. Soil boring locations and depth at which soil samples were taken.

c. Is the groundwater more than 5 feet below the bottom of the tank? YES _____ NO _____

If not, provide the depth from the ground surface to the groundwater table: _____ ft.

d. Was there a notable product odor found in the bore holes? YES _____ NO _____

e. Was there free product found in the bore holes? YES _____ NO _____ If yes, how was it handled?

_____

_____

_____

f. Describe the soil type and thickness of all soil layers encountered in the bore holes, or provide a boring log:

_____

_____

_____

g. Specify the inert solid material used to fill the tank(s): _____

h. Provide the date the tank(s) were filled: _____

i. Were the bore holes properly sealed? YES _____ NO _____

If yes, provide the date: _____

3. Product Line Closure

a. The product lines were _____ REMOVED _____ CAPPED. If the product line was longer than 10 feet, attach plan and sectional views of the excavation or lines and include the following:

1. Length and depth of excavation or piping,
2. All soil sample locations and depths,
3. Location of areas of visible contamination.

b. Was there a notable product odor found in the excavation or bore holes? YES _____ NO _____

c. Were visible holes noted in the lines? YES _____ NO _____

If yes, please indicate the location and provide a general description as to the size and number of holes.

_____

_____

_____

_____

4. Groundwater Sampling (If required by attached closure guidelines)

a. Indicate the following on the plan and sectional views required by Section la or 2.a above:

1. The location and depth of the 1 up-gradient and 3 down-gradient borings or monitoring wells. (Monitoring wells are not required but may be desirable in certain situations.)

2. The most probable direction of groundwater flow. State basis for determining direction: _____

_____

_____

b. Was a monitoring well used? YES _____ NO _____ If yes, attach a typical detail of the wells.

5. Laboratory Data

a. Attach a chain of custody record for each sample which includes at least the following:

1. Sample identification number,
2. Date and time sample was taken,
3. Person taking sample,
4. Type of sample (soil or water),
5. Type of sample container,
6. Method of preservation,
7. Date and time sample was relinquished,
8. Person relinquishing sample,
9. Date and time sample was received by lab,
10. Person receiving sample at lab.

b. Attach the required laboratory data which includes at least the following:

1. A sample identification method which can be cross referenced with the soil sample locations indicated on the plan and sectional views required by Section la or 2a above,
2. The sample analysis results with appropriate units,
3. The method used to analyze each sample,
4. The date and time the sample was analyzed,
5. The person analyzing each sample.

6. Excavated Soil

ALL EXCAVATED SOIL REQUIRES ANALYSIS PRIOR TO DISPOSAL. TANK CLOSURE SAMPLES FROM THE EXACTION MAY NOT BE REPRESENTATIVE OF THE LEVEL OF CONTAMINATION IN THE EXCAVATED SOIL.

a. If tank was closed by removal, provide an estimate of the volume of soil removed:
_____ cubic ft.

b. Indicate method of soil disposal to be used:
1. Return to the excavation pit
2. Spread in a thin layer on site
3. Disposal in a landfill

c. If soil was disposed of, indicate the final destination and, if applicable, attach copies of invoices or receipts:

_____

_____

THIS FORM SHOULD BE COMPLETED AND RETURNED, ALONG WITH ANY OTHER PERTINENT INFORMATION, TO THE FOLLOWING ADDRESS:

The Alabama Department of Environmental Management
Groundwater Branch
1400 Coliseum Boulevard
P.O. Box 301463
Montgomery, AL 36130-1463
(334) 271-7995 or (334) 271-7830

Name of Engineer or Geologist Completing Form: _____

Date: _____

Company: _____

Telephone Number: _____

Signature of Tank Owner: _____ Date: _____

API BULLETINS 1604 AND 2015 ARE AVAILABLE FROM ADEM UPON REQUEST

_____

For ADEM Use:

Reviewed by: _____ Date: _____

Comments:

_____
_____
_____
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