
Appendix J

**Minnesota Pollution
Control Agency Leaking
Underground Storage
Tank List**

Land Application of Petroleum Contaminated Soil
July 14, 1988

I. Background Information

The following list outlines the minimum information which should be provided to the Minnesota Pollution Control Agency (MPCA) prior to approval of a proposed site for land application of petroleum contaminated soil.

- A. Disposal site location and site location map
- B. Landowner's name, address and telephone number
- C. Documentation of approval or notification (providing a reasonable time for response) of the appropriate local officials (county, city, or township)
- D. Topographic and soil survey maps with the proposed spreading site outlined and a map scale presented
- E. Volume of soil to be landspread
- F. Projected date of spreading
- G. Site and soil characteristics (see below)
- H. Proposed land application procedures (see below)
- I. Proposed sampling, tillage and reporting schedule (see below)
- J. Any previous history of waste disposal activities at the proposed site

II. Site and Soil Characteristics

The following list outlines the recommended site and soil characteristics which should be used to evaluate the suitability of a site for land application of petroleum contaminated soil.

- A. Site slope: four percent maximum.
- B. Minimum distance to surface water: 100 feet.
- C. Distances to roads, buildings and other features: site specific, in general as outlined in Minn. Rule pt. 7040.1805 Sewage Sludge Management.
- D. Minimum depth to seasonal high water table, tile lines, or bedrock: five feet for most soils, ten feet for uniform sandy soils.
- E. Soil characteristics:
 - 1. pH: minimum pH of 6.5, neutral or slightly alkaline desirable.
 - 2. Nutrients: optimum carbon:nitrogen:phosphorus: sulfur (C:N:P:S) ratio of 50:2:1:1 is desired. Nutrient testing may be necessary for coarse grained soils.
 - 3. In general, well cultivated and fertilized fields are desirable.
 - 4. Optimum soil moisture content is 50-70 percent of the soil water holding capacity.

F. Maximum application

- Approximately:
1. 800 yards³/acre at six inch spreading thickness
 2. 530 yards³/acre at four inch spreading thickness
 3. 270 yards³/acre at two inch spreading thickness
 4. 135 yards³/acre at one inch spreading thickness

(One yard³ = 27 feet³; one acre = 43,560 feet²)

G. Soil borings may be required to evaluate the proposed land application site.

III. Procedures

The following list outlines recommended procedures for land application of petroleum contaminated soil.

- A. Addition of lime may be necessary to raise the pH to 6.5 or greater.
- B. The land spreading season is the growing season in Minnesota from approximately May 15 to October 15.
- C. Contaminated soils should not be applied greater than six inches deep.
- D. The method of spreading contaminated soil (dozer, grader, spreader, etc.) should be identified and is a potential problem area.
- E. Macro-nutrient (fertilizer) should be added as necessary to maintain an optimum C:N:P:S ratio of 50:22:11:5.
- F. Spread soils should be incorporated (mixed) with the upper four to six inches of native soil immediately (within 48 hours) after application.
- G. Soil should be disked no less than monthly during the growing season.
- H. Approval is for single application of contaminated soil to a site. Multiple applications of contaminated soil to the same site may require a separate disposal facility permit.
- I. The petroleum loading rate should not exceed approximately two percent (20,000 mg/kg) petroleum hydrocarbons as fuel oil or gasoline in the soil to be disposed of. This corresponds to approximately 100 barrels (4,200 gallons) per acre for soil spread six inches thick contaminated with a relatively heavy oil.

IV. Monitoring Requirements

The following list outlines recommended soil sampling and analysis (monitoring) requirements for land application of petroleum contaminated soil.

A. The number of composite soil samples should be balanced on the following table:

Table Two
Volume of Soil Number of Samples

0 to 200 yards ²	0 - 1
200 to 500 yards ³	2
500 to 1000 yards ³	3
1000 to 2000 yards ³	4

- B. Soil samples should be analyzed for benzene, ethyl benzene, toluene, xylenes, total hydrocarbons and fuel oil or gasoline (lead for leaded gasoline) required concentration and pH (of native soil prior to application and mixed soils thereafter) and other analyses may be necessary, depending upon the product involved.
- C. Soil samples should be obtained prior to land application and quarterly thereafter, except for the winter quarters. The purposes of sampling are to confirm that degradation is occurring and to evaluate initial loading rates. The duration of sampling will be specified by ORCA staff on a site specific basis. However, it is anticipated that the initial plus two follow-up quarterly sampling events should be adequate if significant degradation is occurring.
- D. Sampling of ground water or surface waters may be necessary on a site specific basis.

The following information is for informational purposes only.

The following information is for informational purposes only. It is not intended to be used as a basis for any legal action.