|  |  |
| --- | --- |
| Minnesota Pollution Control Agency (MPCA), 520 Lafayette Road North, St. Paul, MN 55155-4194 | Request to land treatpetroleum-contaminated soilPetroleum Remediation ProgramGuidance document 3-05Doc Type: Environmental Development/Guidance |

Instructions:This form is to be submitted to the Minnesota Pollution Control Agency (MPCA) after specific soil contamination information is known and a land treatment site has been selected. This form may be submitted at the same time as the [Application for petroleum-contaminated soil land treatment site](https://www.pca.state.mn.us/sites/default/files/c-prp3-04.doc). Petroleum-contaminated soil (PCS) may be spread upon approval of this form.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Land treatment site ID: | PRE |       | Leak site or other site ID: | LS00 |       |

1. Background

|  |
| --- |
| **Land treatment site owner** |
| Individual or corporate name: |       |
| Mailing address: |       |
| City: |       | State: |    | Zip code: |       |
| Email address: |       | Phone number: |       |

|  |
| --- |
| **Land treatment site operator** |
| Individual or corporate name: |       |
| Mailing address: |       |
| City: |       | State: |    | Zip code: |       |
| Email address: |       | Phone number: |       |

|  |
| --- |
| **Responsible party information for soil batch** |
| Individual or corporate name: |       |
| Mailing address: |       |
| City: |       | State: |    | Zip code: |       |
| Email address: |       | Phone number: |       |

|  |
| --- |
| **Person completing application** |
| Individual or corporate name: |       |
| Mailing address: |       |
| City: |       | State: |    | Zip code: |       |
| Email address: |       | Phone number: |       |

|  |
| --- |
| **Location of land treatment site** |
| Legal description: |       | ¼ of |       | ¼ of Section: |       | Township: |       | N | Range: |       | W |
| Township name: |       | County: |       |

|  |
| --- |
| **Soil batch description(s)** |
| List all the PCS that has been spread or has already been approved for spreading at this land treatment site. The location of each application must be represented on [Section VIII: Figure 1](#VIIIFigures). |
| **Leak site number(s)** | **Total cubic yards (c/y) spread** | **Date applied (mm/dd/yyyy)** |
|       |       |       |
|       |       |       |
|       |       |       |

|  |  |  |
| --- | --- | --- |
| Total soil volume already spread or already approved for spreading: |       | c/y |
| Soil volume of proposed batch to be spread: |       | c/y |
| Projected date of soil spreading (mm/dd/yyyy): |       |  |

1. Soil storage information

|  |
| --- |
| Soil may be stockpiled at the land treatment site prior to approval of the request form, in accordance with [Treatment and disposal of petroleum-contaminated soil](https://www.pca.state.mn.us/sites/default/files/c-prp3-03.pdf), Section I.**Double click checkboxes to select *Checked* and then select *OK*.** |
| Location of proposed batch: |
| [ ]  Leak site property | [ ]  Land treatment site | [ ]  Not yet excavated | [ ]  Other, specify: |  |
| Date soil excavated (stockpiled): |       | (mm/dd/yyyy) |
| Type of run-off controls, if applicable: |       |

1. Petroleum-contaminated soil sampling results

|  |
| --- |
| PCS must be collected and analyzed in accordance with MPCA guidance document [Soil sample collection and analysis procedures](https://www.pca.state.mn.us/sites/default/files/c-prp4-04.pdf). Soil samples may be collected from an excavated soil stockpile or from subsurface soil borings conducted in locations which are representative of soil contaminated by the release, see [Section VIII: Figure 2](#VIIIFigures). Attach copies of the laboratory reports as [Section IX: Appendix A](#IX).**Double click checkboxes to select *Checked* and then select *OK*.** |
| Type(s) of petroleum product released: |
| [ ]  Gasoline, unleaded | [ ]  Diesel | [ ]  Unused mineral oil or spirits | [ ]  Jet fuel |
| [ ]  Gasoline, leaded | [ ]  Fuel oil | [ ]  Used oil (motor oil, hydraulic fluid, mineral oil) | [ ]  Aviation gas |
| [ ]  Ethanol-blended fuel | [ ]  Kerosene | [ ]  Unused hydraulic fluid & motor oil | [ ]  Unknown/other |

|  |
| --- |
| Parameters sampled for: |
| [ ]  Volatile organic compounds (VOCs) | [ ]  Gasoline range organics (GRO) | [ ]  Lead | [ ]  Polychlorinated biphenyls (PCBs) |
| [ ]  Petroleum VOCs (PVOCs) | [ ]  Diesel range organics (DRO) | [ ]  Resource Conservation and Recovery Act (RCRA) metals | [ ]  Polycyclic aromatic hydrocarbons (PAHs) |

| **Sample ID** | **Sample date** | **GRO** | **DRO** | **Benzene** | **Toluene** | **Ethyl-benzene** | **Xylenes** | **Lead** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|       |       |       |       |       |       |       |       |       |
|       |       |       |       |       |       |       |       |       |
|       |       |       |       |       |       |       |       |       |
|       |       |       |       |       |       |       |       |       |
|       |       |       |       |       |       |       |       |       |
|       |       |       |       |       |       |       |       |       |

Report results in milligram per kilogram (mg/kg). Use less than symbols to show the report level.

If additional compounds are detected, modify this table and/or attach an additional table as [Section IX: Appendix B.](#IX)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Average GRO: |       | mg/kg | Average DRO: |       | mg/kg |

To assist in determining soil spreading thickness in the next section, determine the average sample result for GRO and/or DRO. If both GRO and DRO have been sampled, use the highest average to calculate the proposed spreading thickness and area of land required in the following section.

1. Soil spreading information

|  |  |
| --- | --- |
| Step 1: | To calculate the proposed spreading thickness and area of land required, obtain the following information from the land treatment site approval letter. |

|  |  |  |
| --- | --- | --- |
| **Organic matter (%)** | **Soil permeability** | **Treatment zone depth** |
|       |       |       |

|  |  |
| --- | --- |
| Step 2: | Use the above three values and follow the tables below to determine the allowable GRO mg/kg or allowable DRO mg/kg: |

**Table 1: Gasoline-contaminated soil**

|  |  |
| --- | --- |
|  | Average GRO (mg/kg) |
| Minimum organic matter (percentage) | Permeability(inches per hour) | Minimum thickness of suitable soil within treatment zone (feet) |
| 2 | 3 | 4 |
| 2% to 3.9% | less than 6 | N/A | N/A | 1,000 |
|  | less than 0.6 | N/A | 1,000 | 2,500 |
| 4% or greater | less than 6 | N/A | 1,000 | 2,500 |
|  | less than 0.6 | 1,000 | 2,500 | 5,000 |

**Table 2: Contaminated soil characterized as fuel oil/diesel**

|  |  |
| --- | --- |
|   | Average GRO (mg/kg) |
| Minimum organic matter (percentage) | Permeability(inches per hour) | Minimum thickness of suitable soil within treatment zone (feet) |
| 2 | 3 | 4 |
| 2% to 3.9% | less than 6 | N/A | N/A | 2,000 |
|  | less than 0.6 | N/A | 2,000 | 5,000 |
| 4% or greater | less than 6 | N/A | 2,000 | 5,000 |
|  | less than 0.6 | 2,000 | 5,000 | 10,000 |

**Example**

|  |  |  |
| --- | --- | --- |
| **Organic Matter %** | **Soil Permeability**  | **Treatment Zone Depth** |
| 2% | < 0.6 | 3 feet |

**Allowable DRO for these site characteristics:**

|  |  |
| --- | --- |
|  | Average GRO (mg/kg) |
| Minimum organic matter (percentage) | Permeability(inches per hour) | Minimum thickness of suitable soil within treatment zone (feet) |
| 2 | 3 | 4 |
| 2% to 3.9% | less than 6 | N/A | N/A | 2,000 |
|  | less than 0.6 | N/A | **2,000** | 5,000 |
| 4% or greater | less than 6 | N/A | 2,000 | 5,000 |
|  | less than 0.6 | 2,000 | 5,000 | 10,000 |

**Allowable DRO concentration for these site characteristics = 2,000 mg/kg**

|  |  |
| --- | --- |
| Step 3: | Take the allowable GRO or DRO mg/kg value and the average GRO or DRO value from [Section III](#III) to calculate the acceptable spreading thickness: |

$$\frac{4\*\left[allowable GRO/DRO, mg/kg\right]}{average GRO/DRO in batch of soil,mg/kg}=Acceptable spreading thickness, inches$$

**Example**

Allowable DRO = 2,000 mg/kg Average DRO in soil batch = 1,200 mg/kg

4 x 2,000 / 1,200 = 6.67 inches spreading thickness

\*Spreading thicknesses above 4 inches are considered 4 inches. For this example, the spreading thickness is considered 4 inches rather than 6.67 inches.

|  |  |
| --- | --- |
| Step 4: | Once the acceptable spreading thickness is calculated, use the formula below to determine the acres required. |

$$\left[Soil volume, cubic yards\right]\*\left(\frac{0.00744}{spreading thickeness, inches}\right)= Acres required$$

**Example**

Soil volume = 600 c/y Spreading thickness = 4 inches 600 x (0.00744/4) = 1.12 acres

|  |  |  |
| --- | --- | --- |
| Proposed spreading thickness (inches): |       |  |
| Area of land to be used (acres): |       |  |

1. Determination of nutrient addition

|  |
| --- |
| If the petroleum loading level exceeds an average DRO/GRO concentration of 2,000 mg/kg spread at a thickness of four inches, or an equivalent petroleum loading level at a thinner spreading thickness, evaluate the native soil to determine if nutrient addition is required. |
| **Double click checkboxes to select *Checked* and then select *OK*.** |

1. **Nitrogen**

$\left[\left(average DRO/GRO in batch of soil, ppm\right)\*\left(spreading thickness, inches\right)\right]\*0.0128] -[organic matter, percent\*50]-Nitrogen rate reduction=pounds of nitrogen per acre (lbs/ac)$

| Condition | Nitrogen rate reduction (pounds of N per acre) |
| --- | --- |
| Previous year’s crop, alfalfa | 100 |
| Previous year’s crop, soybeans | 40 |
| Previous year’s crop, clover or other legume |
| Nitrogen applied within the last year | 1/3 of a pound for each pound of N applied |
| None, or non-nitrogen fixing crop (ex. corn) | No rate reduction |

Calculate the nitrogen need:

|  |  |  |  |
| --- | --- | --- | --- |
| **Average GRO/DRO concentration (mg/kg)** | **Spreading thickness (inches)** | **Organic matter (%)\*** | **Nitrogen rate reduction** |
|       |       |       |       |

**\***Percents in calculation should be in decimal form (4% = 0.04)

[(      parts per million [ppm]) \* (      inches) \* 0.0128] - [      \* 50] –       Nitrogen rate reduction =

      pounds of nitrogen per acre (lbs/ac) required per year

If the nitrogen application rate as is less than 25 pounds of nitrogen per acre, nitrogen need not be applied.

Is nitrogen addition needed for soil batch application? [ ]  Yes [ ]  No

If yes, how many pounds per acre?

**Example 1**

The previous year’s crop at the land treatment site was alfalfa.

Average DRO in soil batch = 1,200 mg/kg Spreading thickness = 4 inches Organic matter = 2%

[(1,200 x 4) x 0.0128] – (0.02 x 50) – 100 = -39.56 pounds of nitrogen per acre per year

Since the nitrogen application rate is less than 25 lbs/ac, then nitrogen need not be applied.

**Example 2**

No crop was grown previously.

Average DRO in soil batch = 1,200 mg/kg Spreading thickness = 4 inches Organic matter = 2%

[(1,200 x 4) x 0.0128] – (0.02 x 50) – 0 = 61.44 pounds of nitrogen per acre per year

Since the nitrogen application rate is greater than 25 lbs/ac, then nitrogen must be applied at that rate.

1. **Phosphorus**

$$\left[\left(average GRO/DRO in batch of soil, ppm\right)\*\left(spreading thickness, inches\right)\*0.0027\right]-\left[phosphorus concentration, ppm\*2\right]=pounds of phosphorus per acre required $$

Use the phosphorus results of the last soil analysis, if the land treatment site has been tested within the last three years. If not, use a value of 5 ppm in the calculation. Attach results of phosphorus analysis as [Section IX: Appendix C](#IX).

Calculate the phosphorus need:

|  |  |  |
| --- | --- | --- |
| **Average GRO/DRO concentration (ppm)** | **Spreading thickness (in)** | **Extractable phosphorus concentration** |
|       |       |       or 5 ppm |

[(      ppm) \* (      inches) \* 0.0027] - [      ppm \* 2] =       pounds of phosphorus per acre required

If the phosphorus application rate is less than 25 pounds of phosphorus per acre, then phosphorus need not be applied.

Is phosphorus addition needed for soil batch application? [ ]  Yes [ ]  No

If yes, how many pounds per acre?

**Example**

There are no phosphorus soil analysis results from within the last three years.

Average DRO in soil batch = 1,200 mg/kg Spreading thickness = 4 inches Organic matter = 2%

[(1,200 x 4) x 0.0027] – (5 x 2) = 2.96 pounds of phosphorus per acre per year

Since the phosphorus application rate is less than 10 lbs/ac, then phosphorus need not be applied.

1. **Maximum nutrient application rates**

If the site conditions require the addition of nitrogen and/or phosphorus, do not exceed any of the maximum values below within a one-year time period:

| Condition | Maximum nitrogen application rate per year (pounds per acre) | Maximum phosphorus application rate per year (pounds per acre) |
| --- | --- | --- |
| Land treatment plot cropped after spreading | 200 | 120 |
| Land treatment plot not cropped after spreading | 100 | 60 |

An exemption to the maximum fertilizer rates may be granted if the owner or operator submits documentation which indicates that lack of nutrients may be limiting petroleum biodegradation.

1. **Frequency & methods of nutrient application**

Nutrient application is only required in the first year following soil batch application. It is not required in subsequent years. Acceptable nutrient sources for application include compost, manure, other organic fertilizers, or inorganic fertilizers.

If fertilizer is to be applied to the land treatment site for the purpose of biodegradation of added PCS, it must be broadcast to assure as uniform an application as possible. Fertilizers may be applied in a single application or in smaller, multiple applications. Fertilizers must be incorporated into the native soil within ten days of application.

1. Local government notification information

|  |
| --- |
| Notifications and approvals were secured during completion of [Application for petroleum-contaminated soil land treatment site](https://www.pca.state.mn.us/sites/default/files/c-prp3-04.doc) for the land treatment site. Review the completed application or land treatment site approval letter to determine if local units of government require individual soil batch review.**Double click checkboxes to select *Checked* and then select *OK*.** |
| Do local units of government require individual batch reviews? [ ]  Yes [ ]  No |
| If yes, provide written evidence that the county or township has been notified of the proposed batch application and it was approved as [Section IX: Appendix D](#IX). |

1. Acknowledgment of operational requirements

|  |
| --- |
| Confirm full understanding of the following:**Double click checkboxes to select *Checked* and then select *OK*.** |
| [ ]  | Dates and climatic conditions for soil spreading: Only spread PCS when the surface soil is not frozen, is free of snow and ponded water, and is otherwise capable of being tilled. Spreading cannot occur after November 1st or before April 1st. |
| [ ]  | Petroleum loading limitations: Spreading thickness cannot exceed 4 inches (or 540 cubic yards per acre; each inch of spreading thickness corresponds to 135 cubic yards of soil per acre if spread 4 inches thick). |
| [ ]  | Prohibition of mixing or repeated use: Do not combine or spread PCS originating from separate releases on the same plot. Plots within an approved land treatment site previously used for land treatment of PCS may **not** receive repeat applications of PCS. Individual plots within an approved site must be separated by a minimum of 2 feet to prevent mixing of separate batches of spread soil. |
| [ ]  | Maintenance of border marking: Border markings established at the land treatment site must remain in place during spreading of the contaminated soil and until all follow-up monitoring requirements are fulfilled. |
| [ ]  | Removal of large rocks and debris: Remove rocks and debris larger than 4 inches in diameter from PCS prior to incorporation into the native soil. Debris includes pieces of plastic, bricks, metal, wood, etc. |
| [ ]  | Spreading and incorporation of petroleum contaminated soil: Spread PCS uniformly. Incorporate PCS into the upper 4 to 6 inches of native soil as soon as feasible but no later than 48 hours after spreading. In order to minimize soil moisture loss and volatile loss of the petroleum contaminants, initial incorporation must be conducted only to the degree that most soil clods are broken up and PCS and native soil mixing occurs. For most land treatment applications, one or two passes with a tillage implement will result in adequate incorporation during a single tillage cycle. |
| [ ]  | Tillage: Unless the plot has been seeded to a crop, tillage of the soil following the initial incorporation must be done in monthly cycles, excluding the period from November 1 to April 1, until all soil monitoring samples are less than 100 mg/kg GRO and/or DRO or until a minimum of four tillage cycles have been done, whichever is first. Tillage of the soil must be delayed until the soil moisture is increased if the soil lacks moisture such that tillage would cause wind erosion or decreased microbial activity. |
| [ ]  | Cropping: Following the initial incorporation of PCS into the native soil, the plot may be seeded to a crop. No root crops or crops for direct human consumption may be grown during the period of time when soil monitoring is performed. |

1. Figures

|  |
| --- |
| All figures must include a north arrow, scale, and legend. Approximate scales are not acceptable. Attach all required figures in the following order. Indicate figures included in this report by marking the check box.**Double click checkboxes to select *Checked* and then select *OK*.** |
| [ ]  | Figure 1: Site map (scale: 1 inch = 50 feet) including: |
|  | 1. Proposed plot for this batch of soil (label dimensions in feet).
2. All other plots previously used for land treatment (indicate leak number).
3. Location of setbacks identified on [Application for petroleum-contaminated soil land treatment site](https://www.pca.state.mn.us/sites/default/files/c-prp3-04.doc).
 |
| [ ]  | Figure 2: If applicable, figure of the leak site with the soil boring locations, depths, and soil analytical data if the soil batch analytical data obtained from leak site soil boring data rather than stockpile sampling at the land treatment site. |

1. Appendices

|  |
| --- |
| Attach all required or applicable appendices in the following order. Indicate appendices included in this report by marking the check box. All reproduced data must be legible.**Double click checkboxes to select *Checked* and then select *OK*.** |
| [ ]  | *Appendix A* | Copies of laboratory reports and chain of custody forms. |
| [ ]  | *Appendix B* | PCS sampling results table |
| [ ]  | *Appendix C* | Native soil nutrient test results for phosphorus. |
| [ ]  | *Appendix D* | Written evidence of county or township approval of the proposed soil batch application. |

1. Applicant signature

|  |
| --- |
| By signing below you take responsibility for complying with all requirements of Minn. R. ch. 7037 “Petroleum Contaminated Soil Management” and will be subject to the contents and practices herein. The MPCA reserves the right to inspect your land treatment plot at any time and enforce through available means if it has been determined that the site was not suitable for land treatment of petroleum contaminated soil and/or if proper land application procedures have not been followed. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Signature: |       |  | Signature: |       |
|  | *(This document has been electronically signed.)* |  |  | *(This document has been electronically signed.)* |
| Title: | Land treatment site owner |  | Title: | Land treatment site operator |
| Date (mm/dd/yyyy): |       |  | Date (mm/dd/yyyy): |       |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Signature: |       |  | Signature: |       |
|  | *(This document has been electronically signed.)* |  |  | *(This document has been electronically signed.)* |
| Title: | Responsible party for soil batch |  | Title: | Individual completing application |
| Date (mm/dd/yyyy): |       |  | Date (mm/dd/yyyy): |       |

1. Local officials

A copy of this form must be sent to the appropriate local government officials for the location of the land treatment site before or at the same time that it is submitted to the MPCA.

**County official**

|  |  |
| --- | --- |
| Individual name: |       |
| Title: |       |
| Mailing address: |       |
| City: |       | State: |       | Zip code: |       |
| Email: |       | Phone: |       |

**City, Township or Tribal government official**

|  |  |
| --- | --- |
| Individual name: |       |
| Title: |       |
| Mailing address: |       |
| City: |       | State: |       | Zip code: |       |
| Email: |       | Phone: |       |

1. Submission of form

Submit the completed form and all attachments to the Petroleum Remediation Program via MN.SoilTreatment.MPCA@state.mn.us.