

Brownfield Program Response Action Plans

Petroleum Brownfield and Voluntary Investigation and Cleanup Programs

This document provides guidance on developing a Response Action Plan (RAP) for properties enrolled in the Minnesota Pollution Control Agency's (MPCA) Brownfield Program. The Brownfield program consists of two integrated programs, the Petroleum Brownfield Program, which handles petroleum contamination under the Petroleum Tank Release Cleanup Act (Minn. Stat. 115C), and the Voluntary Investigation and Cleanup (VIC) Program, which handles hazardous substance contamination under Minnesota's Environmental Response and Liability Act (Minn. Stat. 115B). For a general description of Brownfield program services and the types of liability assurance letters offered, see the Brownfield Program Services guidance document on the MPCA's Brownfield webpage. An application for enrollment into the MPCA's Brownfield program can be accessed from that location.

I. Overview

State law requires that all persons properly manage contaminated soil and water they uncover or disturb, even if they are not the party responsible for the contamination. Improper management of contaminated soil or water can expose a landowner or developer to environmental liability and administrative penalties and/or fines. In addition, response actions may be necessary at a brownfield site to manage risk to human health or the environment posed by potential exposure to contaminants or to mitigate risk to groundwater or surface water.

To ensure these issues are properly addressed, a party can seek Brownfield program approval of a RAP and/or a Construction Contingency Plan (CCP). Collectively, these two documents cover the range of planned or potential response actions that may be necessary at a brownfield site. A RAP is designed to remediate and/or manage contaminated media known to be present based on-site sampling data, while a CCP is prepared to manage previously unidentified environmental issues that may be encountered during response actions or other site activities. A CCP may be a stand-alone document or it may be a component of a RAP.

Response actions proposed in a RAP fall into two general categories:

1. **Risk-based response actions** to remediate source areas at a site and mitigate potential risk to human health or the environment caused by contaminated soil, groundwater, surface water, or soil vapor.
2. **Construction-related response actions** to properly manage contaminated soil that does not pose a risk at the site, given the existing conditions and planned property use, but needs to be removed solely for construction or geotechnical purposes.

Successful implementation of a RAP or CCP and subsequent submittal of an implementation report may lead to an implementation report approval letter, which provides MPCA confirmation that the reported cleanup and/or management of contaminated media was appropriate and in accordance with MPCA requirements. In addition, the VIC Program may issue a No Action/No Further Action Determination or a Certificate of Completion for hazardous substance contamination, provided if all requirements for those assurances have been met, and/or the Petroleum Brownfield Program may issue a no further action determination of the petroleum release site.

Note that response actions and/or other site improvements related to redevelopment of the property are not eligible for Petrofund reimbursement.

II. Site investigation and risk evaluation

Before submitting a RAP or CCP for MPCA Brownfield program review, a current Phase I Environmental Site Assessment (ESA) must be prepared, and a site investigation must be conducted to define the extent and magnitude of contamination. The MPCA's review of the Phase I ESA and site investigation report(s) may lead to comments or identify gaps in information that need to be addressed before MPCA review and approval of a RAP or CCP. A risk evaluation must be completed to define any risks to human health and the environment posed by the contamination. The risk evaluation must take into account current receptors as well as risk exposure pathways that may be created due to a planned change in land use. For a site enrolled in the MPCA's Brownfield program, the risk evaluation is included in the site investigation report through an evaluation of the cumulative set of data collected at the site with respect to potential exposure pathways for the current and planned property use.

The Petroleum Brownfield Program requires sites to be addressed in accordance with Petroleum Remediation Program (PRP) guidance documents. For a site in the Petroleum Brownfield Program, a Limited Site Investigation (LSI) or a Remedial Investigation (RI) is usually required. In some circumstances, a Phase II investigation may satisfy the LSI/RI requirement. Because PRP guidance contains specific requirements for defining the extent and magnitude of contamination and conducting risk evaluations, work plan review and approval is not required by the Petroleum Brownfield Program. For more information, see Guidance Document 1-01 [Petroleum Remediation Program General Policy](#) and other applicable documents.

For hazardous substances, pollutants, or contaminants under the oversight of the VIC Program, various guidance documents on the MPCA's Cleanup Guidance webpage offer guidance for conducting site investigations and evaluating risk. Because of the wide range of contaminants and potential sources of contamination associated with VIC sites, and due to the nature of the various VIC liability assurance letters, the VIC Program encourages voluntary parties to submit Phase II investigation work plans for MPCA review and approval before they conduct fieldwork. Feedback and approval from the VIC Program on the proposed scope of work can result in an investigation more specifically tailored to the desired assurance letter and VIC Program requirements. Proceeding with fieldwork without VIC work plan approval may result in the need for an additional mobilization to obtain data that was not collected under the original scope of work. Per Minn. Stat. § 115B.175 subd. 3(b), the VIC Program cannot approve a RAP unless the nature and extent of the release have been adequately identified and evaluated in the site's investigation reports.

When applicable, the risk-based screening values listed below and associated guidance is used to evaluate risk to human health and the environment at MPCA brownfield sites. Each of these tools has a specific application, as outlined in MPCA guidance, and is intended to be used as an integrated piece of the overall site investigation and risk evaluation.

- **Soil Reference Values (SRVs)** for evaluating potential human health risks associated with exposure to contaminated soil
- **Soil Leaching Values (SLVs)** for evaluating potential risk to groundwater due to leaching of soil contaminants
- **Intrusion Screening Values (ISVs)** for evaluating potential risk associated with vapor intrusion
- **Health Risk Limits (HRLs)** for evaluating potential risk posed by consumption of contaminated groundwater

In addition, there may be site-specific concerns, such as methane or buried asbestos-containing debris that have contaminant-specific approaches for investigation and risk management. More detailed information on these wastes, and guidance on the application of SRVs, SLVs and ISVs, can be found on the MPCA's Cleanup Guidance webpage. A list of current HRLs can be found on the Minnesota Department of Health's website.

III. Review and approval of response action plans

Brownfield program staff will generally review a RAP/CCP and provide a response (approval, request for additional information, or rejection of the document) within 30 business days. A voluntary party seeking RAP approval for a Contamination Cleanup Grant application must submit a complete RAP to the MPCA at least 45 business days before the grant application due date. Late RAPs will not be treated as a priority and are not guaranteed a review before the grant application deadline.

Per Minn. Stat. § 115B.175 subd. 4, non-responsible parties conducting response actions for a release of hazardous substances in accordance with an MPCA approved RAP do not associate themselves with the release as a result of performance of those response actions. Minn. Stat. § 115B.03 subd. 10 provides similar liability protection to contractors for implementation of response actions or site development activities, provided that the contractor performs those actions in accordance with an MPCA-approved plan. If liability protection under these statutes is desired, or if a party is seeking Brownfield program assurances, the RAP and/or CCP must be approved by the MPCA before implementing response actions or beginning construction/redevelopment work at the property.

IV. Risk exposure pathways and response actions

The need for response actions at a brownfield site will depend on the concentration of contaminants, the depth and extent of contamination, and the planned property use. Because every brownfield site reflects a unique combination of hydrogeologic conditions, environmental contamination, and potential exposure pathways, the information presented below should be considered general guidance. It is through risk evaluation and the subsequent preparation of a RAP, if necessary, that the site-specific circumstances are weighed and a reasoned course of action chosen.

- A. **Soil-human health pathway:** Excavation of contaminated soil to achieve appropriate cleanup goals and construction of engineering controls, such as caps or vertical buffers, are common risk-based response actions to prevent exposure to contaminated soil. Note that an exceedance of an SRV does not necessarily warrant a risk-based response action. The need for a risk-based response action depends on the collective body of information, the representativeness of the data, and a reasonable evaluation of risk exposure pathways. For additional information on assessing the soil-human health pathway, see the SRV guidance and applicable PRP guidance documents on the MPCA's Cleanup Guidance webpage.

Evaluation of the soil-human health pathway has a direct bearing on soil reuse decisions for soil excavated at brownfield sites. Whether contaminated soil may be reused on - or off-site depends on the type and concentrations of contaminants and the planned property use. The following table summarizes options for soil reuse at sites enrolled in the MPCA's Brownfield program.

Table 1. Potential reuse options for excavated soil

Contamination level	Potential reuse option	Criteria/additional information
Unregulated fill	Reuse on-site or off-site at discretion of contractor	See Best Management Practices for the Off-Site Reuse of Unregulated Fill on the MPCA's Cleanup Guidance webpage.
Regulated fill	Reuse on-site in accordance with MPCA-approved RAP or off-site in accordance with Regulated Fill policy	See Off-site Use of Regulated Fill Policy on the MPCA's Cleanup Guidance webpage. If soil is impacted by VOCs and/or PID > 10 ppm, avoid reuse near building foundations or as backfill in utility trench.
Exceeds regulated fill criteria	On-site management in accordance with MPCA-approved RAP	Soil treatment may be necessary prior to on-site management.
Petroleum-impacted < 100 ppm (PID)	On-site landscape berm	Mix 50/50 with clean fill, with two-foot cover of unregulated fill and vegetative cover.
Petroleum-impacted < 200 ppm (PID)	Thin-spread on-site under road or pavement.	Maximum thickness of four inches
Petroleum-impacted > 200 ppm (PID)	None	Needs landfill disposal or treatment at MPCA-approved facility.

B. Soil leaching pathway: Volatile organic compounds (VOCs) pose the greatest risk to groundwater due to their mobility in the environment. If VOCs or other leachable contaminants of concern are present in soil, and groundwater data is not available, SLVs are one tool that can be used to evaluate the potential risk to groundwater posed by the leaching of contaminants. In most cases, the assessment of whether the soil leaching pathway is a concern will be conducted through the evaluation of groundwater data. For additional information on assessing the soil leaching pathway, see the SLV guidance and applicable PRP guidance documents on the MPCA's Cleanup Guidance webpage.

Because a development's stormwater management system can affect the soil leaching pathway, the location and design of the stormwater management system should take into account the nature and distribution of contamination at the site. The Brownfield program does not approve stormwater design plans. However, the RAP should include applicable stormwater design information, such as the type of stormwater management system planned for the site and its location relative to contaminated soil and/or groundwater, so any potential effect on contaminant mobilization can be evaluated. If stormwater best management practices such as infiltration are planned in the vicinity of contaminated soil or groundwater, the following options should be considered:

- Move the stormwater design feature to a site location that is not anticipated to mobilize contaminants
- Model the subsurface hydrologic setting to demonstrate that existing or residual contamination will not be adversely affected by the stormwater design feature
- Remove soil contamination so as to accommodate infiltration practices
- Consider a non-infiltration stormwater management system

The RAP should describe how the above considerations were or will be integrated into the site development plan. If information about the stormwater management system is not available when the RAP is prepared, a follow up submittal (correspondence or RAP Addendum, as appropriate) is required once the stormwater management system design has been completed.

- C. **Vapor intrusion pathway:** If the investigation and risk assessment at a brownfield site points to a potential risk for vapor intrusion, the RAP should include response actions for the vapor intrusion pathway. Depending on the site-specific situation, this may include source remediation plus installation of a vapor mitigation system in an existing or planned building. The need for a risk-based response action for soil vapor will depend on the collective body of information, the representativeness of the data, and a reasonable evaluation of risk exposure pathways. For detailed information on assessing the vapor intrusion pathway and mitigating vapor intrusion risk in existing or planned buildings, see *Best Management Practices for Vapor Investigation Mitigation Decisions* under the MPCA's Vapor Intrusion Guidance webpage.

If general site information suggests that a vapor intrusion risk is possible or likely, proactive measures may be appropriate before, or in lieu of, a full soil gas investigation. Be aware, however, that a soil gas investigation may be necessary to obtain certain Brownfield program assurances and/or grant funds for installation of a vapor mitigation system. Questions regarding the latter should be directed to the appropriate granting agency.

- D. **Groundwater pathway:** Most brownfield redevelopment projects do not create pathways of exposure to contaminated groundwater; thus, groundwater response actions are not typically required for site redevelopment. However, it may be necessary to address contaminated groundwater if a party desires regulatory closure or certain liability assurances for the groundwater contamination. Actions in this case could range from monitored natural attenuation to more active remedies designed to contain and treat a contaminant plume. If groundwater contamination poses a potential risk to a receptor, and a voluntary party does not wish to pursue closure or a groundwater liability assurance, Brownfield program staff will refer the groundwater contamination to the appropriate MPCA regulatory program.

If contaminated groundwater will or may be encountered during construction activities, such as dewatering, the RAP or CCP should reference the need to obtain a permit from the appropriate authority for the management and disposal of impacted groundwater.

- E. **Notice of environmental conditions or restrictions:** When contaminants remain at a property that could pose a future risk to human health or the environment, there is a need to provide notice of the environmental conditions to future property owners and the public. Depending on the site conditions, the notification may be satisfied by providing access to reports maintained in MPCA files and/or on-line data search tools such as *What's in My Neighborhood?* If the property is subject to extensive contamination by a release of a hazardous substance and/or petroleum contaminant, a more formal notification is appropriate. In this case, the Brownfield program will require an *Affidavit Concerning Real Property Contaminated with Hazardous Substances and/or Petroleum Contaminant* to be filed on the property record. In some cases, there is an additional need to restrict property use and/or activities that could result in exposure to a hazardous substance and/or a petroleum contaminant or to document affirmative obligations, such as maintenance of engineering controls or long-term monitoring requirements. Under these circumstances, the Brownfield program will require an *Environmental Covenant and Easement* to be filed on the property record. Before filing either the affidavit or environmental covenant on the property record, the content must be reviewed and approved by MPCA staff. The Brownfield program will not approve the RAP Implementation Report or issue final assurances for a site until the affidavit or environmental covenant (if required) has been recorded.

V. Components of a Response Action Plan

A RAP describes in detail the actions a party intends to take to remediate and/or manage contamination at a brownfield site. Background information on site history, environmental conditions, and the planned property use is required to present the context and rationale for the proposed response actions. Attachment A provides a menu of items that are common to many RAPs. Including in the RAP all items that are relevant for a particular site will enable Brownfield program staff to review the document in a more efficient and timely manner.

The general outline in Attachment A is not meant to be an inclusive checklist or required format. Other RAP elements not listed may be appropriate on a site-specific basis. Similarly, some items may not be pertinent for a particular brownfield site. The outline in Attachment A should be used as a reference when preparing a RAP. Contact Brownfield program staff if in doubt about the applicability of any particular item. If pertinent items are missing from the RAP, Brownfield program staff will not be able to complete review of the document until such information is received. If pertinent information regarding planned response actions is not yet available, the response actions is considered conceptual and submittal of a RAP is premature.

Attachment A

Components of a Response Action Plan

Introduction

- Site location and description
- MPCA site name and project number(s)
- Brief description of the proposed development
- Letters/assurances desired from the Petroleum Brownfield and/or VIC programs
- Identification, project responsibilities, and contact information for contractors and MPCA staff

RAP scope and objectives

- Overview of RAP objectives
- Proposed cleanup goals

Summary of past investigations

Phase I ESA

- Historical and current use of the property
- Recognized environmental conditions at the property
- Summary of historical investigations and responses
- Surrounding land use and off-site environmental issues that may affect the property
- Physical features and regional hydrogeologic conditions

Summary of Phase II/Site Investigation

- Scope and results of the investigation(s) that have been completed at the property

Site conceptual model

- Geology and hydrogeology
- Nature and extent of contamination (e.g. debris fill, impacted soil, other media as appropriate)
- Comparison of contaminants of concern to risk-based screening values
- Potential receptors and exposure pathways
- Identification of unacceptable risks for which response actions are proposed

Proposed response actions

Soil response actions

- Estimated total volume of soil to be excavated during site activities
- Proposed soil excavations (location, rationale, contaminant(s) of concern, estimated volume)
- Environmental oversight and field screening procedures
- On-site soil management and handling methods
- Waste characterization procedures (sampling frequency, analytical methods, etc.)
- Soil stabilization or other on-site waste treatment procedures
- Disposition of excavated soil, including estimated volumes and criteria for on-site and off-site reuse, treatment and/or landfill disposal
- Identification of off-site treatment/disposal facilities (if known) for contaminated media
- Need for hazardous waste determination to support landfill disposal of soil
- Confirmation samples (number/frequency, parameters, analytical methods, sampling procedures, etc.)
- MDH-certified laboratory to be used for sample analysis

Engineering controls

- Soil buffers in greenspace areas and below pavement/building (thickness, criteria)
- Use of pavement or building as "cap"
- Use of vapor barrier in utility trenches

Engineered remedial systems

- Description and proposed design of engineered remedial systems (e.g., soil vapor extraction, building vapor mitigation, groundwater containment/treatment, engineered soil cap, etc.). Brownfield program staff does not review/approve the full engineering design for a remedial system; however, enough information about the system must be provided in the RAP to allow an evaluation of the scope and effectiveness of the proposed system.
- Need for pilot testing, air emissions testing, etc.
- Need for future submittal of Operation and Maintenance Plan

Short-term monitoring/temporary engineering controls

- Perimeter monitoring and nuisance management (e.g. dust, noise, odor)
- Need for stormwater controls, including Construction Site Stormwater Pollution Prevention Plan
- Site security
- Reference to Health and Safety Plan

Long-term monitoring

Institutional controls

- Real Property Notification/Affidavit
- Environmental covenant

Necessary permits, variances, access agreements

Anticipated project schedule

- Implementation of response actions and construction activities
- Submittal of Response Action Implementation Report

Construction Contingency Plan

- Types of unexpected environmental conditions that might be encountered (e.g. buried debris, suspected asbestos containing waste materials, contaminated media, stained soil, odors, underground storage tanks, unsealed wells, etc.)
- Actions to follow if unexpected conditions, wastes, or contaminated media are encountered
- Specialized personnel that may be required, such as a licensed asbestos inspector, licensed well contractor, etc.

Figures

Site figures may be combined, as appropriate, provided that the requested information is clearly conveyed.

- Site location map (USGS topographic map, 7.5-minute, 1:24,000-scale).
- Site map showing property boundary and surrounding properties (with uses labeled).
- Detailed site map showing property boundaries, existing structures and features, and current/historical potential sources of contamination.
- Detailed site map, as above, showing location of all borings, test pits, wells, other sampling points.
- Detailed site map(s), as above, showing sample results for contaminants of concern (by media).
- Geologic cross section(s) of property showing locations of borings, test pits/trenches, monitoring wells, and key site features, such as buildings, basements, utilities, etc.
- Potentiometric map(s) showing groundwater flow direction.
- Site redevelopment plan showing proposed structures, utilities, stormwater management system, pavement, and greenspace areas.
- Site redevelopment plan, as above, including sample results for contaminants of concern.
- Site map(s) showing the proposed location of soil excavations and/or other proposed response actions, relative to sample results for the contaminants of concern.
- Supporting design for any engineered remedial system.
- Grading plan and/or cut-and-fill map. If contaminated soil is to be reused on site, show the proposed location for soil placement, relative to planned structures, utilities, pavement, and greenspace.

Tables

- Comprehensive summary of field screening results (e.g., PID, XRF).
- Comprehensive summary of analytical data, by media, compared to risk-based screening values. Include date of sample collection and sample depth, as appropriate.
 - **Soil** data (mg/kg), with hazardous substances compared to residential and industrial SRVs and SLVs
 - **Groundwater** data (ug/l), compared to HRLs and other applicable standards
 - **Surface water** data, compared to applicable surface water standards
 - **Soil gas** data (ug/m³), compared to ISVs, 10xISVs, and 100xISVs for the planned property use
 - **Indoor air** data (ug/m³), compared to ISVs for the planned property use
- Comprehensive summary of static water level elevations from monitoring wells/piezometers.
- Monitoring well construction information, with well ID, unique numbers, date installed, total depth, casing/screen material, and elevation of ground surface, top of casing and screened interval.

Appendices

- Standard Operating Procedures
- Soil boring/test pit/well construction logs from Phase II/Site Investigation
- Laboratory analytical reports, including QA/QC data and chromatograms, as appropriate (if document contains new investigation results)