Landmark Environmental LLC

Environmental Contingency Plan

219 and 223 First Avenue S.W.
Rochester, Minnesota 55902

Prepared for
City of Rochester

June 2007

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219 and 223 First Avenue S.W.
Rochester, Minnesota

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Action Summary—Emergency Reference

Refer to this action summary in the event of an emergency.

Action Summary for Excavation and Demolition

If underground storage tanks ("USTs"), unlabeled chemical containers, visible or olfactory evidence of contaminated soil (such as discoloration, presence of oils or tars, chemical odors, vapors, unlabeled chemical containers, potential asbestos-containing material ["ACM"], or discernable concentrations of debris or non-native fill material such as ash, glass, or slag), other than the environmental conditions previously identified at property located at 219 and 223 First Avenue, S.W., Rochester, Minnesota ("the Property"), are observed during excavation or other earthwork activities related to the redevelopment project, the following actions will be taken:

1. STOP WORK IMMEDIATELY, SECURE WORKER SAFETY, AND SECURE THE AREA.

2. Contact Landmark Environmental, LLC ("Landmark") for further instruction.

   Landmark Staff: Jason Skramstad (952-887-9601 ext 205) or Eric Gabrielsen (952-240-8935 [cell])

3. Refer to the appropriate sections of this Environmental Contingency Plan ("ECP").

Action Summary for Screening, Sampling, and Excavation of Contaminated Soil

Unless otherwise directed or approved by the MPCA, complete the following:

1. Follow field-screening procedures described in the following standard operation procedures ("SOPs") and record observations.

2. If evidence of **petroleum-contaminated soils** is observed, refer to **Appendix A** of this ECP for sampling and excavation action levels and sampling instructions. If the action levels in Appendix A should differ from the cleanup goals established in the Voluntary Response Action Plan ("VRAP") for this Property; use the cleanup goals established in the VRAP.

3. If evidence of **ACM** is observed, refer to **Appendix B** of this ECP.

4. For evidence of releases of **hazardous substances,** use the following action levels for determining when to collect laboratory samples:

Field Screening Action Level	**Required Sample Analysis**
10 parts per million ("ppm") non-methane headspace or greater	Volatile Organic Compounds ("VOCs") 8260 (preserved with methanol).
Visual indications of contamination (ash, tar, cinders, glass, etc.), dark discoloration or	RCRA metals, Polynuclear Aromatic Hydrocarbons ("PAHs") Method 8270;

staining	and/or Polychlorinated Biphenyls ("PCBs").
Potential ACM	Refer to Appendix B—licensed asbestos inspector to perform sampling!
USTs or unlabeled chemical containers	Sampling parameters will be determined in consultation with MPCA, depending on type or characteristics of the chemicals in the UST or chemical containers.

At a minimum, **one soil sample will be collected from each excavation area or type of material** exhibiting potential contamination based on field screening results (showing the greatest impacts). The SOPs for soil screening and sample collection will be followed as described in this ECP. Groundwater may be encountered during deeper excavations. If groundwater is encountered or if runoff from precipitation events collects in contaminated soil excavation areas, the section in this ECP that describes the procedures to address water discharges will be followed.

If analytical results indicate presence of contamination above the cleanup goals as proposed in the VRAP, the excavated contaminated **soil/fill material will be stockpiled, covered, and managed** in accordance with procedures described in this ECP and in accordance with the excavation and stockpiling procedures and sampling guidelines published by the MPCA and included in **Appendix A (for petroleum), Appendix B (for ACM) and as discussed in this ECP for hazardous substances**.

SOP For Field Screening Soil Samples

Field screening techniques for soils are as follows: (1) Visual Examination; (2) Odor; and (3) Headspace Organic Vapor Screening. The results of these three screening procedures will be used to screen soil samples for possible contamination.

Visual Examination

Visual examination of the soil sample will include noting any discoloration of the soil or visible oiliness or tar.

Odor

The sampler will note chemical odor only if noticed incidentally while handling the soil sample. Samplers will not unduly expose themselves to sample odors. Chemical odor will be described as light, moderate, or strong, and will be appropriately described by type, if evident.

Headspace Organic Vapor Screening

The headspace organic vapor screening method will be used in the field to screen soils suspected to contain volatile organic compounds. The screening method is intended to be used in conjunction with other real-time observations.

The following equipment is required to conduct headspace organic vapor screening: photoionization detector ("PID") (with 11.7 eV bulb) or flame ionization detector; clean gallon-size plastic zip-lock bags or clean pint or quart-size glass jars with lids and aluminum foil; and a log book or record sheet, and the appropriate personal protective equipment necessary for collection and handling of soil samples as described in the Site Safety Plan ("SSP"). The meter shall be calibrated daily or more frequently if suspect data is obtained. Manufacturer's guidelines will be followed for operation and calibration.

The following procedure will be used for conducting headspace organic vapor screening:

1. Soil samples collected from a split-barrel sampler will be collected immediately after opening the split-barrel. If the sample is collected from an excavation wall, soil pile, or backhoe bucket, it will be collected from a freshly exposed surface.

2. Half fill a clean glass jar or plastic bag with the sample to be analyzed using a stainless steel spoon or gloved hand. Quickly zip the bag or cover the open top of the jar with a sheet of aluminum foil and the lid to seal the jar. If commercially available canning jars are used, seal the foil using the ring provided, omitting the lid.

3. Agitate the jar or bag for 15 seconds. If the soil is cohesive, try to not allow the soil to form a ball.

4. Allow headspace development for approximately 5-10 minutes. The sample should be kept in a shaded area out of direct sunlight. Ambient temperature during headspace development should be recorded. When ambient temperatures are below 50°F, headspace development should be conducted inside a heated vehicle or building.

5. Agitate the jar or bag for an additional 15 seconds. If the soil is cohesive, try to not allow the soil to form a ball.

6. Record ambient background readings from the instrument and also background readings inside a clean plastic bag, if using plastic bags.

7. Remove the jar lid to expose the aluminum foil seal or open a corner of the bag. Quickly insert the probe into the bag or puncture the foil seal with the sampling probe to a point about one-half of the headspace depth. Exercise care to avoid uptake of water droplets or soil particles.

8. Record the highest meter response. The maximum response will likely occur between zero to five seconds. Maximum headspace concentration will be the difference between the maximum recorded concentration and the background reading.

9. When using a flame ionization detector, it may be necessary to correct for methane. In this case, take a reading first with carbon filter, then without. This will require two duplicate jar samples. The second reading less the first is the headspace adjusted for methane. Adjusted readings less than zero are considered zero. Methane correction is not necessary if a PID is used.

SOP For Soil Sample Collection

A variety of samplers (split-barrel, split-barrel with brass liners, piston sampler, backhoe, or shovel) may be used to retrieve soil from sampling locations. Depending on the analysis to be conducted on the soil sample, the soil sample will either be sealed within the sampler (e.g., collecting volatile samples) or the soil sample will be transferred to laboratory-supplied containers. The equipment required to transfer the soil from the sampler to the laboratory-supplied sample containers includes: stainless steel spoons or scoops and the appropriate personal protective equipment necessary for collection and handling of soil samples as described in the SSP.

All soil sampling equipment will be carefully cleaned before and during soil sampling. All sampling tools including split-barrels, stainless steel spoons and scoops will be cleaned before use and between samples in the following manner: (1) clean with tap water and TSP, using a brush if necessary to remove particulate matter and films; (2) rinse three times with tap water; and (3) rinse three times with deionized water. To prevent sample cross-contamination, the sampler will discard the outer pair of sample gloves and put on a new pair between each sample event.

Collecting Volatile and Semivolatile Organic Samples

The following procedure applies to the collection of hand-excavated soil samples:

1. Dig to the desired sampling interval, exposing fresh soil surface to sample.

2. Collect a large sample on a shovel or in a bucket auger and bring it to the surface or collect the sample directly from the fresh soil surface.

3. Using a stainless-steel spoon or gloved hand, pack the soil into 2 oz. sample jars, leaving no headspace. Samples for volatile organic compounds should be preserved with methanol.

4. Wipe the jar lip and screw threads to remove soil and provide a good sealing surface, and immediately screw on the lid.

5. Cool the sample to approximately 4°C immediately after collection.

Collecting Metals and Cyanide Samples

1. The metals and cyanide soil samples will be collected from hand samples or core barrel samples and placed into a laboratory-supplied, 8-ounce, wide-mouth glass jar.

2. The sample containers will be filled to at least three-quarters full using a stainless steel spoon or scoop.

3. Cool the sample to approximately 4° C immediately after collection.

Sample Storage

Immediately after samples are collected, they will be placed in a cooler containing ice or ice packs. Samples will be kept cold (approximately 4° C) until receipt at the laboratory, where they are to be stored in a refrigerated area. All samples will be kept secured to prevent tampering. If sample coolers are left in a vehicle or field office for temporary storage, the area will be locked and secured.

Introduction

This Environmental Contingency Plan ("ECP") was prepared by Landmark Environmental, LLC ("Landmark") on behalf of the City of Rochester ("the City") and the Economic Development Authority for the City ("the EDA") for the property located at 219 and 223 First Avenue Southwest in Rochester, Minnesota (the "Property") in preparation for redevelopment. The location of the Property is shown on Figure 1. The ECP is being submitted to the Minnesota Pollution Control Agency ("MPCA") Voluntary Investigation and Cleanup ("VIC") Program for review and approval. Additional copies of the ECP will be available to submit to the MPCA Petroleum Brownfields Program, in the event petroleum impacted soil/fill material or containers of petroleum compounds are encountered during redevelopment. Copies of the prior environmental investigation and response action ("RA") implementation reports and the Voluntary Response Action Plan ("VRAP") related to the redevelopment plans have been submitted to the MPCA VIC Program for review and approval. Previous investigation reports summarizing soil and groundwater conditions at the Property are listed below.

A portion of the Property (the 219 Parcel) is currently owned by the City and the remaining portion (the 223 Parcel) in the process of being acquired. The Property currently includes no buildings, except for a small groundwater remediation shed. The City intends to construct a commercial/office building with a partial, one-level basement.

The City and the HRA requests that the MPCA VIC Program review and approve this ECP. Redevelopment activities are expected to begin in August 2007. ***Therefore, the City and the HRA requests that the MPCA provide approval of the RAP or a modified version, no later than July 30, 2007.*** Upon completion of the RAs, a RA Implementation Report will be prepared and submitted to the MPCA VIC Program for review and approval, at which time the City and the HRA will request that the MPCA VIC Program issue a Certificate of Completion.

Background

The 219 Parcel is currently owned by the City. The City acquired the Property from Rochester DC LLC, a Delaware limited liability company, on May 31, 2007. The 223 Parcel is currently owned by the Mayo Clinic Rochester, a Minnesota non-profit corporation. Both parcels comprise the Property and are currently used as surface parking lots.

219 1st Avenue Parcel

The 219 Parcel consists of 14,300 square feet of land that historically supported two dry cleaning facilities; historical structures were demolished prior to the construction of the current parking lot. The historical activities likely involved the use of hazardous substances, including the common dry cleaning solvent tetrachoroethylene ("PCE"). The 219 Parcel is enrolled in the MPCA VIC Program as VP#12560. Based on previous environmental investigations, RAs have been conducted to address reported releases of PCE at the Property on this parcel since 2000. The RAs currently include operation of a dual phase extraction ("DPE") system.

The general Property vicinity has been developed since prior to 1884 for residential/commercial use. A number of the commercial operations located in the vicinity of the Property involved the use of hazardous substances or petroleum compounds and were the sites of leaking underground storage tanks and documented releases of VOCs.

The DPE system was installed and operated by DPRA, Inc. ("DPRA") in the past on behalf of the former Property owner of the 219 Parcel. Details of the DPE system construction and operation are included in the *Implementation* Report*, Dual Phase Extraction System Installation and Start-up, Former Dry Cleaners, 219 First Avenue SW, Rochester, Minnesota* ("DPRA Report"), dated July 2006. In addition, the DPRA Report summarizes the results of four soil gas samples, labeled SG-1 through SG-4, that were collected around the perimeter of the 219 Parcel on November 9, 2005. PCE was reported in each soil-gas sample. SG-2 was collected from a boring located north of the 219 Parcel and PCE was reported at 2.2 micrograms per cubic meter ("ug/m^3"), which is below the MPCA VIC Program Industrial-Commercial Intrusion Screening Values ("I/CISVs") of 14 ug/m^3. PCE concentrations in SG-1, SG-3 and SG-4 ranged from 480 ug/m^3 to 520 ug/m^3. No other VOCs were reported above the I/CISVs.

Based on the results of the DPE system operation and the soil gas sample results, the DPRA Report recommended that "permanent soil gas points (should be installed) adjacent to the surrounding buildings to monitor soil gas concentrations in these areas". In addition, the DPRA Report recommended that a soil gas sample should be collected from each monitoring point for analysis of VOCs by U.S. Environmental Protection Agency ("EPA") Method TO-15.

Based on the review of the DPRA Report, the MPCA VIC Program requested that DPRA submit a Work Plan to conduct the installation of vapor points and collect additional soil-gas samples. DPRA submitted the *Status Update and Work Plan, Former Dry Cleaners, 219 First Avenue Southwest, Rochester, Minnesota* ("DPRA Work Plan"), to the MPCA VIC Program on December 4, 2006. The DPRA Work Plan recommended the installation of six soil gas points at locations around the perimeter of the Property. DPRA recommended two rounds of soil gas sampling, immediately after the installation of the soil gas points and then six months after the first sampling event.

223 1st Avenue SW Parcel

The 223 Parcel consists of approximately 4,300 square feet of land that historically was used as a stable and later as a hotel and then as the Lawler Movie Theatre; historical structures were demolished prior to the construction of the current surface parking lot. As stated, the general Property vicinity has been developed since prior to 1884 for residential/commercial use. These historical activities likely did not involve the use of significant quantities of hazardous substances or petroleum products. DPRA collected a soil gas sample (SG-1) on the south side of 223 Parcel in November 2005. The concentration of PCE in this sample was reported at 520 ug/m^3.

219 and 223 1st Avenue Southwest – January 2007 Phase II Environmental Investigation

Following the preparation of a Phase I Environmental Site Assessment ("ESA") in December 2006, Landmark conducted a Supplemental Phase II Environmental Investigation ("Supplemental Investigation"). The results of the Supplemental Investigation are presented in a report dated January 2007. Based on the results of the January 2007 Supplemental Investigation, soil and fill material was encountered throughout the Property to depths ranging from 10 to 15 feet bgs. Bedrock was encountered in the six geotechnical borings at depths ranging from 13 to 17 feet bgs.

The soil/fill material on the 219 Parcel consists of poorly graded sand that has been placed above a concrete slab at approximately 10 feet bgs. No construction debris or demolition debris was encountered in the six borings located on the 219 Parcel. All RCRA metals and detected PAHs were reported below the MPCA residential soil reference values ("RSRVs") in soil samples collected on the 219 Parcel.

Soil and fill material on the 223 Parcel is more varied and contained construction demolition debris. In the eastern portion of the 223 Parcel, sandy silt and clay with gravel was encountered. In the central and western portions of the 223 Parcel, demolition debris consisting of concrete, bricks, movie theater seats, and wood was mixed with sand, silt and gravel from 10 to 15 feet bgs. Arsenic was reported above the RSRV of 5.0 mg/kg in soil sample GB-3/2-4 (10.2 mg/kg) and GB-5/4.5-6.5 (8.1 mg/kg), which were collected on the 223 Parcel. In sample LGP-4/0-2, which was also collected on the 223 Parcel, the BaP equivalent was calculated at 12.7 mg/kg, which is above the RSRV of 2.0 mg/kg as well as the commercial/industrial soil reference values ("C/ISRV") of 3.0 mg/kg. This result was confirmed in sample DUP-3, where the BaP equivalent was calculated at 10.4 mg/kg.

VOC impacts to groundwater on the 219 Parcel were confirmed during the Supplemental Investigation in the groundwater sample collected at GB-4. Additionally, VOC impacts to groundwater were identified during the Supplemental Investigation on the 223 Parcel in samples collected at GB-3 and GB-5.

The Supplemental Investigation included soil gas sampling. Benzene and 1,2,4-trimethylbenzene concentrations reported in the soil gas samples likely represent background levels. VOC concentrations were reported above the C/ISVs at four locations including chloroform (at LSG-1) and PCE (at LSG-2, LSG-5 and LSG-6).

Figure 1 shows the Property location. Figure 2 shows the Property layout with the proposed structures. As depicted on Figure 2 and the design and construction drawings included in the VRAP, all of the Property will be included in the future redevelopment activities discussed in the VRAP.

Site Responsibilities and Coordination

Field personnel designated as responsible for implementing the VRAP and ECP will be safety-trained for hazardous waste operations according to the requirements of 29 CFR 1910.120. These individuals also will be operating under appropriate SSPs. A SSP for the general contractor, for Landmark staff, and for the excavation/demolition contractor will be submitted under separate cover. This ECP, as well as all site-specific SSPs for all parties, will be kept onsite at a central location during all excavation and construction activities.

The local fire and police department will be provided a copy of all the SSPs and will be briefed as necessary on the hazards that could be encountered while responding to an emergency at the Property. The designated hospital also will be contacted and briefed to confirm that they are equipped to deal with emergencies arising from development activities. Emergency contacts are provided in the SSPs.

Site responsibilities and contacts are as follows:

Responsibility		Contact Name	Contact Numbers
Property Owner (at time of implementation)			
City of Rochester		Doug Knott	507-328-2003
General Construction, Excavation and Demolition Contractor			
Office Address:	Project Manager	TBD	
	On-Site Superintendent		
Environmental Consultant			
Office Address: Landmark Environmental, LLC 2042 West 98th Street Bloomington, MN 55431	Project Manager	Jason Skramstad	952-887-9601 (ext. 205)
	Field Managers	Eric Gabrielsen or Jerry Mullin	952-240-8935 (cell) 952-702-8335 (cell)
	Safety Officer	Sherry Van Duyn	952-887-9601 (ext. 209)
Regulatory Agency			
Office Address: Minnesota Pollution Control Agency, VIC Program 520 Lafayette Road St. Paul, MN 55155	Project Manager	Ed Olson	651-296-8111
	Project Tech. Analyst	Allan Timm	651-296-6300
	Duty Officer		651-649-5451

Proposed Activities

This section describes proposed activities for redevelopment and VRAP implementation.

Redevelopment Plan

The City and the EDA plan to construct a commercial building with a partial basement, and underground utilities. The City and the EDA also plan on building a tunnel on the adjacent property which connects to the partial basement located on the Property. The locations of these structures are shown in Appendix A of the VRAP.

There are no buildings to be demolished prior to redevelopment. The small remediation building located on the Property will be removed prior to redevelopment activities. Excavation activities will include the removal of the asphalt parking surface and buried foundations from former buildings. Soil/fill material and buried debris and construction material will be encountered during the excavation activities and will be addressed in accordance with the MPCA-approved VRAP and ECP, as discussed in more detail later. Based on the preliminary redevelopment drawings, excavation will generally not extend below a depth of 12 to 14 feet beneath the ground surface except for a limited area needed to accommodate the installation of an elevator pit. The VRAP included existing and proposed contour elevations, storm water sewer locations, proposed grading plans and the technical specifications the vapor barrier/venting system. Details of the new DPE system design will be included in a design submittal to the MPCA within 30 days.

Chemicals of Concern and Cleanup Goals

Based on available environmental investigation data and the proposed use of the Property, the chemicals of concern ("COCs") include PCE, PAHs and arsenic.

Soils not disturbed by the redevelopment will be left in place. However, contaminated soil and/or groundwater encountered during redevelopment will be managed according to MPCA guidelines and as specified in the VRAP. The following proposed cleanup goals are consistent with goals approved by the MPCA for commercial redevelopment projects where minimal institutional controls are required to be implemented:

- Soils excavated that cannot be reused, but may be able to be reused on another property will meet unrestricted use cleanup goals established by the MPCA. Soils will be sampled for the COCs at a frequency of 1 sample per 500 cubic yards for off-site reuse. Deleterious soils, soils with debris or cinders will not be used on another property and will be properly disposed in a Subtitle D permitted landfill.

- Analytical data indicate that PCE-impacted groundwater is present under the Property at a depth of approximately 14 feet bgs. Groundwater reportedly flows in a southwest direction across the Property. Active groundwater remediation is being proposed. Groundwater could be encountered during construction activities. If dewatering is necessary, the water will be properly disposed as discussed in the VRAP. In addition, the groundwater and the saturated soils at and just below the water table are a source of organic vapors. As a result, a vapor barrier and passive venting system will be installed under the entire proposed building.

- Based upon the Supplemental Investigation Report, the COCs in the soil/fill material at the 223 Parcel include PAHs and arsenic. This soil/fill material also contains buried debris and

building materials. The soil/fill material under the entire 223 Parcel will be excavated and transported off-site to a Subtitle D landfill. Figure 2 depicts the redevelopment plan and the identified soil/fill material excavation locations. Once excavation limits for the redevelopment have been reached, no further excavation is proposed to be completed. A one-foot layer of clean soil (concentrations less than the Residential SRVs and less than 10 ppm headspace) will remain or be placed immediately under the proposed building.

- Field screening and confirmation sampling will be conducted during the implementation of the RAs. Field screening and, as necessary, contingency sampling will be conducted during redevelopment in accordance with the ECP.

Response Action Plan

The proposed RAs generally consist of the following elements and are described in more detail in the VRAP:

- Decommission the current remediation system and seal any wells prior to redevelopment.

- The excavation area of the soil/fill material on 223 Parcel is shown on Figure 2. The soil/fill material will be generally excavated to a depth of 12 to 14 feet below the final grade, based on the redevelopment plans. All of the soil/fill material excavated from the 223 Parcel will be transported off-site to a permitted Subtitle D landfill. Final sidewall and floor verification samples for the 223 Parcel excavation area will be collected following excavation in accordance with applicable MPCA guidelines.

- Design and install a new DPE system to address the chlorinated VOCs detected in groundwater.

- Design and install a vapor barrier and a venting system under the entire proposed building to address any potential vapor intrusion into the proposed building. A vapor barrier will also be installed around the tunnel located on the adjacent property which will connect to the partial basement located on the property.

The excavation area related to the 219 Parcel is shown in Figure 2. The soil/fill material from the southern portion of this parcel will be generally excavated to a depth of 12 to 14 feet below the final grade, based on the redevelopment plans. The northern portion of this parcel will not be excavated as part of the redevelopment. The excavated soil/fill material will be field-screened during excavation in accordance with applicable MPCA guidelines. If no there are no indications of contamination, soil/fill material will be placed under the proposed parking ramp to be located directly south of the Property. If the field screening results, indicate the presence of unexpected contamination or buried debris or building materials, the contaminated soil/fill material and the buried debris or building materials will be segregated and transported off-site to a Subtitle D landfill following proper characterization to meet landfill disposal requirements. Final sidewall and floor verification samples for the 219 Parcel excavation area will continue to the Property line on the east and west sides and to the end of the basement on the north side

Standard dust control and excavation dewatering procedures (if necessary) will be implemented during redevelopment and RA activities.

Contingency Procedures

Unexpected environmental conditions potentially consist of encountering one or more of the following during redevelopment and implementation of the VRAP: USTs; buried demolition debris containing potential ACM; water wells; recovered groundwater; and other hazardous materials or contaminated soils (e.g., potential releases to soils beneath existing buildings, buried chemical containers). Procedures for addressing each potential condition are discussed below.

General Procedures

MPCA has the following notification, demolition oversight, and environmental oversight requirements with regard to the activities covered by this ECP.

Notification Requirements

In the event that any suspected hazardous substances or unexpected environmental issues are encountered during redevelopment activities, work in the area shall cease and the work area shall be secured. The contractor shall contact Landmark immediately, if Landmark is not present on site. Representatives of Landmark (or other environmental consultant) and/or the contractor shall then contact MPCA staff within 72 hours, in order to determine or confirm appropriate actions. Identified releases shall also be reported to the Duty Officer within 24 hours.

Ongoing Environmental Oversight Requirements

For the duration of excavation activities related to redevelopment, a representative of Landmark shall be present onsite to observe and record soil/fill material conditions. Samples from the excavations will be obtained for field screening and/or analytical as described in the VRAP. For each inspection, excavation and soil sample locations, as well as field screening results, will be recorded on a site inspection log. These logs will be kept for subsequent submittal to the MPCA VIC Program.

Underground Storage Tanks

In the event an UST is encountered during earthwork, removal of the UST and excavation of petroleum-contaminated soils, including field screening, soil sampling, and storage/disposal of contaminated soil, will be conducted in accordance with MPCA, Petroleum Remediation Program Fact Sheet #3-1 and the MPCA, Petroleum Brownfields Program, Development Response Action Plan Guidance Document both in Appendix A or if hazardous substance contaminated soil MPCA, VIC Program Guidance Document #10, Site Safety and Contingency Plans will be followed.

Action levels/cleanup goals are in Appendix A or, if different, in the VRAP; if action levels in the VRAP are different than those in Appendix A, the action levels in the VRAP will be used.

Pre-Excavation Preparation

The contractor will confirm that the UST (if identified) is isolated from all supply and/or drain piping and that all utilities have been adequately located and marked. To the maximum extent practicable, the contractor will remove and containerize residual UST contents prior to tank excavation. All residual UST contents shall be handled in accordance with MPCA and Occupational Safety and

Health Administration ("OSHA") requirements. This includes, but is not limited to, use of appropriate Department of Transportation ("DOT"), OSHA, and EPA drums and containers, use of appropriate fluid transfer devices, use of suitable absorbent materials, use of appropriate blast shields, and use of non-sparking material handling equipment and hand tools. All laborers handling residual petroleum or hazardous waste products shall be properly trained and in compliance with contractor's SSP.

Tank Excavation

Any UST will be excavated and removed in a manner that minimizes the potential for incidental spillage of residual tank contents during UST removal. Pending cleaning, scrapping, and/or loading of the UST for transportation off-site, all UST components will be placed on impermeable sheeting to prevent incidental soil contamination at the Property.

In the event that field screening discloses evidence of a petroleum release from the UST, contaminated soil will be placed onto a reinforced polyethylene liner. Contaminated soil will be excavated following the guidance in the MPCA, Petroleum Remediation Program Fact Sheet #3-01 in Appendix A. Contaminated soil shall be covered with reinforced polyethylene liner to prevent water from coming in contact with the soil.

Transportation and Disposal

Excavated wastes will be transported in strict compliance with all DOT and local, state, and federal guidelines. All wastes will be disposed of at appropriately licensed facilities; the end disposition of materials will be documented.

Buried Demolition Debris

In the event buried demolition debris with potential ACM is encountered during earthwork, an Asbestos Hazard Emergency Response Act certified and Minnesota Department of Health ("MDH") licensed inspector will be present to guide further excavation and sampling efforts. Subsequent excavation and abatement work will be conducted in accordance with the MPCA guidelines in Appendix B.

Water Wells

In the event water wells are encountered at the Property during redevelopment activities, the demolition/excavation contractor will hire a licensed water well driller to seal the well in accordance with Minnesota Rules Section 4725.3850 Sealing Well and Boring of the Minnesota Rules Chapter 4725 Department of Health, including measuring the length of the well to be sealed, making reasonable efforts (with MDH guidance, if necessary) to remove any obstructions from the well, making proper notifications to the MDH, requesting MDH recommendations on proceeding, ripping or perforating casing if required, and providing responsibility for well abandonment in accordance with Section 4725.3875 Responsibility for Sealing, of the Minnesota Rules Chapter 4725 Department of Health. Any well casing will be removed to a depth of six feet below ground surface to eliminate any obstacles to future development. In addition, well protection (i.e., protective posts or surface mount) will be removed.

Recovered Excavation Water

Excavations may encounter groundwater. In the event excavations must be dewatered during redevelopment activities, the demolition/excavation contractor will contain waters, as necessary,

prior to testing, treatment and disposal, acquire permits necessary for discharge to an approved facility (sanitary sewer, storm sewer, or other facility), and treat recovered water as necessary to meet discharge requirements.

Hazardous Materials or Contaminated Soils

Hazardous materials and/or additional soils containing hazardous substances may be encountered during earthwork activities associated with development work. If, based upon visual or olfactory evidence, such materials are encountered during earthwork activities at the Property, excavation of the impacted area will temporarily cease until MPCA and Landmark are notified. Specific requirements for the demolition/excavation contractor as they relate to contaminated soil excavation will include the following: temporary erosion controls; run-on and runoff controls; air emission controls; decontamination facilities; notification procedures; temporary contaminated soil stockpile areas; excavation and staging; and contaminated soil disposal. General requirements are described below.

A Landmark representative will be present during excavation of the materials to screen and classify materials (based on appearance, odor, organic vapor headspace measurements) and collect analytical samples of soil and/or potentially hazardous materials. A contaminated materials staging area ("CMSA") will be constructed by placing a minimum 8-mil-thick plastic sheet on the ground and constructing a 6-inch-high soil berm around the perimeter. The plastic will extend beyond the perimeter berm to prevent runoff from and run-on to the CMSA. A minimum 10-mil-thick plastic cover will be placed over the CMSA stockpile. The cover will extend beyond the perimeter soil berm and will be secured and maintained.

If drums or other hazardous items are encountered, they will be individually removed and their condition assessed. If the excavated drums/hazardous substances are not in good condition (e.g., severe rusting, structural defects, leaking, etc.) or if un-containerized hazardous substances are encountered, the materials will be transferred to a new drum or overpack that is in satisfactory condition. These containers will meet the appropriate requirements of DOT, OSHA, and EPA regulations for the associated materials.

Intact drums and repacked materials will be transported to the storage area and placed in roll-off boxes. If appropriate, liquid wastes may be bulk-stored in tanks. The roll-off box will be lined to contain leaks, spills, or accumulated precipitation. The roll-off box will be of sufficient capacity to contain 10 percent of the volume of the drums, or the volume of the largest container, whichever is greater. The roll-off box will be covered to prevent collection of precipitation.

After contaminated soil (as determined by field screening tests), drums, and hazardous substances have been excavated from the impacted area; the excavation will be extended in shallow lifts for an additional 1-foot (unless groundwater is encountered). Additional soil from this "over-excavation" will be transported to the storage area and stockpiled separately from the contaminated soil.

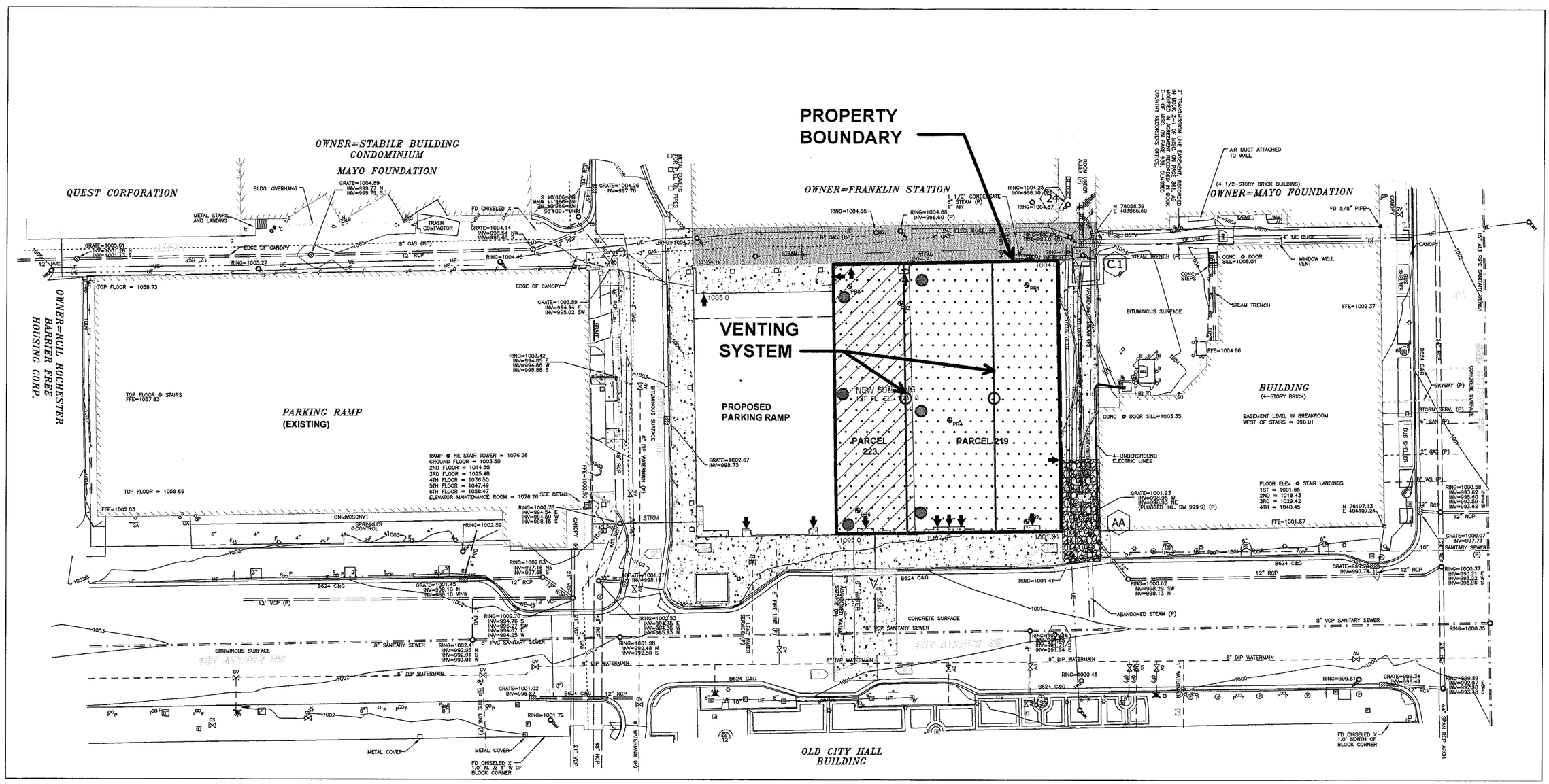
Soil/fill material samples from the excavation floor, sidewalls and stockpiles will be collected. Soil/fill material samples will be analyzed for the appropriate parameters designated by the Landmark representative in accordance with the ECP and VRAP. Stockpiled contaminated and/or clean soil, and any containerized materials will be properly disposed once analytical results are available. Following completion of the "over excavation," the excavation contractor will continue earthwork activities.

Reporting

Landmark will inform MPCA staff of project status and site oversight observations via e-mail on a regular basis or as unexpected conditions arise during redevelopment activities.

Documentation and records for demolition environmental oversight, ongoing environmental oversight, VRAP implementation, and ECP implementation will be reported to MPCA in the RA Implementation Report described in the VRAP.

Figures



Basemap from HGA, May 17, 2007

NOTES:

1. Vapor barrier and passive venting systems will be installed beneath the entire proposed building to address any potential vapor intrusion into the proposed building
2. Soil/fill material from Parcel 223 will be generally excavated to a depth of 12 to 14 feet below the final grade, based on the redevelopment plan. All of the soil/fill material excavated from the 223 Parcel will be transported off-site to a permitted Subtitle D landfill.
3. Prior to redevelopment, the current dual phase extraction system will be decomissioned and all associated wells will be will be sealed.
4. A new dual phase extraction system will be installed beneath the proposed building to address the chlorinated VOCs detected in the subsurface.

SCALE (feet)

0 50

N

LEGEND

- Vapor Barrier Location
- Parcel 223
- Proposed Dual Phase Extraction Well Location

Rev	Date	By	Description
X	XX-XX-XX	XXX	XXX

LANDMARK ENVIRONMENTAL, LLC
2042 W 98th Street
Bloomington, MN 55431

FIGURE 2
RESPONSE ACTION PLAN MAP

219 AND 223 FIRST AVENUE S.W.
ROCHESTER, MINNESOTA

Landmark Project Number: CRC		
Drawn: JDS	Checked:	Designed:
Scale: 1:50	Date: 06-15-2007	Revision: 00
Drawing Number: DWG NUMBER	Sheet 1 Of	Sheets 1

Appendices

Appendix A

Petroleum Remediation Program
Minnesota Pollution Control Agency
http://www.pca.state.mn.us/programs/lust_p.html

Excavation of Petroleum Contaminated Soil

Guidance Document 3-01

Excavation of petroleum contaminated soil may be necessary at some petroleum release sites. Excavation removes contaminated soil that poses environmental or health threats. Excavation may also be necessary when storage tanks are installed or removed or when construction occurs in zones where contamination is present. However, at most sites, petroleum contaminated soil is left in place to degrade over time where risks to potential receptors is determined to be low. This document provides guidance on determining when excavation of petroleum contaminated soil is necessary as a corrective action, sampling requirements, and other related information.

Emergency conditions. If there are vapor impacts, drinking water impacts, the release was a recent spill, or there is a potential unstable condition, immediately contact the State Duty Officer at **651-649-5451 or 1-800-422-0798**.

Reporting requirements. Detection of any amount of contamination in soil or ground water must be reported to the State Duty Officer at **651-649-5451 or 1-800-422-0798** (even if contamination is below the action levels shown below).

How to use this document.
Section I. provides general guidance for excavation of petroleum contaminated soil, whether or not underground storage tanks (USTs) or above ground storage tanks (ASTs) have been installed or removed.

Section II. provides specific guidance for management of petroleum contaminated soil during the installation or removal of USTs or ASTs.

Section III. provides guidance when excavating petroleum contaminated soil as a corrective action.

I. GENERAL EXCAVATION REQUIREMENTS

A. Excavation prior to an LSI.

Except for site specific situations, contaminated soil should remain in place until a Limited Site Investigation (LSI) has been completed. The identification of risk receptors and the definition of the extent and magnitude of contamination will determine if excavation is appropriate for a site.

Excavation prior to the completion of an LSI is considered a corrective action if any of the following circumstances exist:

1. All contaminated soil (above action levels using Table 1) can be excavated to a maximum of 150 cubic yards of soil providing that ground water is not impacted or likely to become impacted (obtain prior MPCA approval if you wish to excavate more than 150 cubic yards of soil). See Section B. below for more details.
2. Petroleum saturated soil is present. Use the "petroleum sheen test" described in Section C below.
3. A recent release has occurred. Quick removal of contamination can prevent the expansion of the contamination plume. Obtain MPCA prior approval before proceeding.
4. Obvious high risk situation or release has occurred in a hydrogeologically sensitive area such as a karst area or a Drinking Water Supply Management Area (DWSMA). Contact the MPCA for site specific guidance. Refer to MPCA Guidance Document 1-01 for more information.
5. Excavation is necessary to facilitate UST or AST installations (see Section II below)

Use the Table 1 below for field excavation criteria.

TABLE 1

Fuel Type in Soil	Field Screening Level
Gasoline and aviation gasoline	Above 40 parts per million (ppm)
Diesel fuel, fuel oil, used or waste oils, jet fuel, kerosene	Visual evidence of contamination, or field screening above 10 ppm.

B. When is an LSI required?

An LSI is generally necessary at sites where contamination cannot be addressed by the excavation of less than 150 cubic yards of soil, contaminated soil is in contact with ground water, or ground water contamination is suspected. When an LSI is necessary, the contaminated soil is usually returned to the excavation basin, unless prior MPCA approval has been obtained.

An LSI is necessary if any of the following situations exist:

1. Soil contamination above the field screening levels (Table 1) remains, **or** if soil contaminant concentrations (collected from the base or sidewalls, or soils returned to the excavation) exceed the conditions listed in Table 2.

TABLE 2

Soil Type	**Perform LSI if:**
Sand/gravel	a. soil above field screening level in Table 1 remains, or b. water table is within 25 feet of the surface and soil analytical result is greater than 1 mg/kg GRO/DRO, * or c. soil analytical result greater than 50 mg/kg GRO/DRO remains.
silt/clay	d. soil above field screening level in Table 1 remains; or e. soil analytical result greater than 100 mg/kg GRO/DRO remains.

* A soil boring is necessary at sites with sandy or silty sand soil (Unified Soil Classification System/American Society for Testing Materials) and where the water table is within 25 feet of the ground surface. The purpose of this boring is to determine whether or not an LSI is necessary. Advance a soil boring directly through each suspected source area (e.g., former tank locations, pump islands, product transfer areas), in the following situations:

- Contamination in soil from the suspected source area excavation is between 1 & 50 mg/kg GRO/DRO; or
- Visual or other evidence of contamination remains in the suspected source area.

Analyze soil samples in accordance with Guidance Document 4-04 *Soil Sample Collection and Analysis Procedures*. If the boring(s) encounters contaminated ground water, an LSI is necessary.

If the boring encounters old contamination that does not intersect the water table and the ground water sample is not contaminated, an LSI may not be necessary.

2. Ground water is present in the excavation and has been in contact with either petroleum product or petroleum contaminated soil.
3. Contamination intercepts a seasonally high water table (indicated by mottling on the excavation sidewalls) or bedrock.
4. Other impacts are known or suspected (such as discharge of contaminated water to surface waters or utilities, vapor impacts to buildings or utilities, etc.).

MPCA staff may allow exceptions to these situations on a site-specific basis. See Guidance Document 1-01 *Petroleum Remediation Program General Policy* and Guidance Document 4-01 *Soil and Ground Water Assessments Performed during Site Investigations* for additional information.

C. Product saturated soil.

In most situations, petroleum saturated soil must be removed. Contact the MPCA for prior written approval to remove and properly manage the petroleum saturated soil. Use a "petroleum sheen test" to determine if the soil is petroleum saturated.

Petroleum Sheen Test:

a. Place a small quantity of petroleum contaminated soil in a jar or on a large spoon.
b. Add enough water to break apart and submerge the soil particles.
c. If droplets of product or rainbow sheen are present on the water surface, soil is considered saturated with petroleum.

D. Field screening during excavations

All soil samples collected for field screening must be labeled so as to designate type of sample, location of sample, and depth of sample (see below). All excavation soil sample locations must be shown on a map of the excavation.

Use a properly calibrated field instrument to screen excavated soils in accordance with Guidance Document 4-04 *Soil Sample Collection and Analysis Procedures*. As excavation proceeds, collect and field screen soil samples frequently enough to verify the need for soil removal (at least one soil vapor analysis for each 10 cubic yards of soil removed). Label these soil samples with the prefix "R", for "removed" along with the sample depth, and carefully note the sample locations on a scaled map. The field technician should carefully document successive soil vapor readings vertically below the source of release, indicating the location and depth of each sample on a map of the excavation. *Example*: R-1(2'), R-1(4'), R-1 (6'), R-2(4'), etc. Note: R-1 samples are from the same location but successively deeper).

After excavation is complete, screen soil samples from the bottom and sidewalls of the excavation, along removed pipe runs, and beneath removed dispensers. Collect and label sidewall and bottom samples for field screening as discussed in the next section.

E. Sampling requirements following soil removal

When excavation is complete but before returning any soil to the excavation, collect soil samples for laboratory analysis to document the contamination remaining in place. Also, in order to document the contamination removed, stockpile soils samples must be collected (see Part F, below). All soil samples collected for laboratory analysis must be labeled so as to designate type of sample, location of sample, and depth of sample (see below). All soil sample locations must be shown on a map of the excavation. Collect and analyze soil samples following procedures described in Guidance Document 4-04 *Soil Sample Collection and Analysis Procedures*, according to the following schedule:

1. Sidewall samples. Remove at least one foot of exposed soil prior to collecting the sample to ensure the collection of a representative sample. Collect up to 4 sidewall samples (i.e. one from each side) to document the levels of contamination remaining in place. The sidewall samples should be collected at the depth interval where the highest level of contamination was detected in the removed soil (i.e., "R" samples), typically near the bottom of the excavation. Label all sidewall samples with the prefix "S" for "sidewall", location number, and sample depth (e.g., S1(6'), S2(8'), S3(5'), etc.) and carefully note the sample locations on a map of the excavation.

2. Bottom samples. Remove at least one foot of exposed soil prior to collecting the sample to ensure the collection of a representative sample. Collect samples from the bottom of the excavation (i.e., floor of the excavation) at a rate of 1 bottom sample per 100 ft^2 of bottom area, and beneath removed dispensers unless the excavation is being completed to remove USTs, in which case, see Table 4 below. Label all bottom samples with the prefix "B", for "bottom", sample location number, and sample depth (e.g., B-1(7'), B-2(14'), B-3(10'), etc.).

Note: Follow-up laboratory sampling to document remaining contamination is *not* generally required after removing surface soil contamination as a corrective action (See Section III, Excavation as Corrective Action).

F. Storage and Treatment of petroleum contaminated soil

Store excavated contaminated soil on an impermeable surface, covered with plastic. Anchor the plastic covering in place with clean soil or other suitable material. Remember to obtain local government and MPCA staff approval prior to moving contaminated soil for off-site storage. Storage at land treatment sites must be in accordance with Minn. R. ch. 7037. Improper storage of contaminated soil may result in additional releases to the environment, and a corresponding reduction in your reimbursement.

Procedures for proper treatment of petroleum contaminated soil are discussed in Guidance Documents 3-03 *Land Treatment of Petroleum Contaminated Soil*, 3-10 *Thermal Treatment of Petroleum Contaminated Soil*, 3-13 *Composting of Petroleum Contaminated Soil*, and Emergency Response Guidance Document 4-04 *Thin Spreading Small Quantities of Petroleum Contaminated Soil.*

1. If less than 10 cubic yards of contaminated soil is removed for treatment, soil samples will normally not be necessary if the soil will be land treated (unless the soil is a potential hazardous waste).
2. Sampling the contaminated soil stockpiles. Collect and analyze soil samples (grab samples) from representative portions of the excavated soil pile, using the methods described in Guidance Document 4-04 *Soil Sample Collection and Analysis Procedures.* Label these samples with the prefix "P" for "Pile" and location number (e.g., P-1, P-2, etc.).

G. Karst Conditions

Refer to Guidance Document 4-09 to determine if your site is located in a karst region of the state and for guidance specific to karst terrains.

H. Excavation Worksheet

Complete Guidance Document 3-02 *General Excavation Report Worksheet* in all cases where petroleum contamination is encountered during an excavation completed prior to the site investigation [LSI or full Remedial Investigation(RI)], even if no soil is removed for off site treatment. If a site investigation is not being performed, promptly submit the *General Excavation Report Worksheet* for MPCA review. If a site investigation is being completed, include the *General Excavation Report Worksheet* as an appendix of Guidance Document 4-06

Investigation Report Form. The reporting deadline is 10 months from the date you receive the MPCA "Petroleum Storage Tank Release Investigation and Corrective Action" letter. MPCA staff may establish a shorter deadline for high priority sites.

I. Endangering structures.
Do not allow excavations to endanger structures, including buildings, roads, utility lines, etc. Excavations must comply with Occupational Safety and Health Administration (OSHA) standards.

J. Soil Excavated During Development
Petroleum contaminated soil which is excavated during construction or other development activities must be treated and disposed of in accordance with MPCA guidelines (See F. above). Soil excavated for the sole purpose of development (including the proper management of that soil) is not eligible for Petrofund reimbursement under Stat. 115C. Contact the MPCA's Petroleum Brownfields Program for assistance in development at petroleum release sites.

If you plan to excavate a site that was previously closed and soil contamination remains, refer to Guidance Document 3-16 *Assessment of Petroleum Contamination at Closed Sites When There is No New Release.*

II. EXCAVATION DURING TANK REMOVALS OR INSTALLATIONS

A. Planning Ahead
It is in your best interest to obtain at least two bids on the work before you hire a contractor. By doing this, you will have met the Petrofund bidding requirement should contaminated soil be encountered. Bid forms are available from the Department of Commerce (call 651/297-1119 or 1-800-638-0418). **Note that regulated USTs must be removed by an MPCA-Certified Contractor.**

Prior to tank removal, plan ahead for storage of contaminated soil during site work, and treatment of contaminated soil (see Guidance Documents 3-03 *Land Treatment of Petroleum Contaminated Soil*, 3-10 *Thermal Treatment of Petroleum Contaminated Soil,* and 3-13 *Composting of Petroleum Contaminated Soil*). Remember to obtain local government and MPCA staff approval prior to moving contaminated soil for off-site storage.

Arrange for an environmental consultant with an appropriate field instrument to screen and collect soil samples for laboratory analysis during excavation (see Guidance Document 4-04 *Soil Sample Collection and Analysis Procedures*).

B. Installation or removal of underground storage tanks (USTs)
Refer to Attachment A below for a flow chart on managing petroleum contaminated soil during UST removals or installations.

1. Excavation when new tank systems are being installed. If the site is not a closed petroleum leak site, remove and separate contaminated soil above the field screening levels from those

below the screening levels (Table 1), up to the volume allowed by Tables 3A and 3B. Screen soils from around the tanks, removed piping and dispensers. If excavation removed all contamination above the field screening levels listed in Table 1 and ground water is not likely to be impacted, collect analytical sidewall and bottom samples from the tank basin, piping and dispenser areas. **NOTE**: If the project site is a closed leak site, refer to Guidance Document 3-16 *Assessment of Petroleum Contamination at Closed Sites When There is No New Release.*

If test pits indicate the volume of contaminated soil exceeds 150 cubic yards, an LSI is necessary. Additional soil removal beyond the volume allowed for the tank install is not necessary at this phase of work.

TABLE 3

TABLE 3A		TABLE 3B	
NEW TANK SIZE (gal)	FOR EACH TANK TO BE INSTALLED ADD (yds)	OLD TANK SIZE (gal)	FOR EACH TANK TO BE REMOVED SUBTRACT (yds)
550	30	550	3
1,000	40	1,000	5
2,000	70	2,000	10
3,000	90	3,000	15
4,000	110	4,000	20
5,000	130	5,000	25
6,000	140	6,000	30
8,000	170	8,000	40
10,000	210	10,000	50
12,000	240	12,000	60
15,000	260	15,000	75
20,000	320	20,000	100
25,000	400	25,000	125

Note: For new pipe trenching allow one-third (0.33) cubic yard for every one (1) linear foot of contaminated trench.

EXAMPLE 1: Two 10,000 gallon tanks are to be installed in the old tank basin, where one 4,000 gallon tank and one 6,000 gallon tank will be removed.
(210 + 210) - (20 + 30) = 370
Up to 370 cubic yards of contaminated soil may be removed.

EXAMPLE 2: Two 10,000 gallon tanks are to be installed in the old tank basin, where one 4,000 gallon tank and one 6,000 gallon tank will be removed. Test Pits indicate the removal of an additional 130 cubic yards of petroleum contaminated soil would remove all the soil contamination above the soil screening levels in Table 6.1.
(210 + 210) - (20 + 30) + 130 = 500

Up to 500 cubic yards of contaminated soil may be removed.

2. Excavation of soil at sites where USTs are removed but new tank installation will not occur.
If the project site is a closed petroleum leak site, refer to Guidance Document 3-16 *Assessment of Petroleum Contamination at Closed Sites When There is No New Release.* Initiate test pits in the area of maximum contamination. If the test pits indicate any of the following conditions: a.) more than 150 cubic yards of contaminated soil remains; b.) contamination extends beyond the reach of the backhoe; or c.) soil contamination is in contact with the ground water, an LSI will be required, and soil removal is not required as a corrective action at this phase of work. For additional information concerning when an LSI will be required, refer to section refer to I.B.

3. Sampling requirements at UST sites.

TABLE 4

One tank, any size, in individual tank basin	two samples; one from directly below each end of the tank
More than one tank, less than 10,000 gallons, in a single tank basin	one sample directly below the center of each tank
More than one tank, 10,000 gallons or larger, in a single tank basin	two samples from below each tank; one from directly below each end of the tank
Leaking lines	one sample from below each suspected point of release, or every 20 feet
Dispensers	one sample from below each dispenser which is removed
Any additional samples needed to adequately characterize the excavation.	

C. Excavation when upgrading, installing or removing above ground storage tanks (ASTs).
Excavation requirements at AST sites are similar to those required at UST sites. The main difference is that surface soil contamination at AST sites often occur at loading and transfer areas, valve locations, piping runs, and from tank releases. Surface soil contamination can pose a risk to surface water, ground water, and to humans through direct exposure and requires corrective action. Except for site specific situations, contaminated soil should remain in place until an LSI has been completed. Refer to Section I. A. above for exceptions.

This guidance pertains only to AST systems with total capacity of less than 1 million gallons. Facilities with capacities over 1 million gallons are regulated with site specific permits.

For additional guidance, refer to Guidance Document 4-17 *Frequently Asked Questions (FAQs) about Investigation and Remediation of Above Ground Storage Tank Facilities.*

1. Excavation when installing or upgrading AST systems.
If contaminated soil must be displaced to install or upgrade AST systems, soil must be disposed of in accordance with MPCA regulations.

If contaminated soil (exceeding action levels shown on Table 1 above) must be removed to complete an AST upgrade or to install a new AST system, you may remove up to two (2) feet of contaminated soil in the following areas:

a. below the footprint of the new AST containment berm
b. below pipes, dispenser areas, or loading and transfer areas

If the contaminated soil encountered during your AST installation or upgrading work appears to pose a human or environmental threat and installation of a new AST system will make these soils inaccessible, removal may be appropriate prior to the completion of an LSI. Obtain prior written approval by the MPCA.

If surface contamination exists in other areas of the site, removal or other corrective actions will probably be necessary but should wait until an LSI has been conducted. Soil removal prior an LSI may be approved if excavating up to 150 cubic yards completely addresses the release and eliminates the need for further an investigation at the site.

2. Excavation of soil at AST sites at the time of decommissioning.
Refer to Section I to determine if excavation alone will adequately address the release, or if an LSI will be required.

D. Sampling requirements during AST upgrades or decommission:

1. **Upgrades:** During a tank facility upgrade when there is no visible contamination, verification samples are not required but highly recommended. See table below for sampling guidance.

   If removing or moving a tank to a different location on your tank facility as part of your upgrade **sampling is required**, see Table 5 below for sampling requirements.

   Sampling is required if a petroleum release has occurred or visible contamination is present at the tank facility. All contamination/releases must be reported immediately to the duty officer at 1-800-422-0798. If you are working with a remediation program, you should also call the project manager for assistance. See MN Statute 7151.8400 for additional guidance. See table below for sampling requirements.

2. **Decommissioning:** AST owners and operators must take verification samples when permanently decommissioning a tank(s) and the tank appurtenances to determine if contamination is present, per Minnesota Rules Chapter 7151.8400. See table below for sampling requirements.

   All contamination/releases must be reported immediately to the duty officer at 1-800-422-0798. If you are working with a remediation program, you should also call the project manager for assistance. See MN Statute 7151.8400 for additional guidance.

3. AST Sampling Requirements:

TABLE 5

Tank Size and Type	Number of Samples	Sample Location
Vertical tank less than or equal to 12' diameter	1 sample	2 feet below the tank
Vertical tank greater than 12' diameter	Divide tank diameter by 12' and round up to nearest whole number. **(see example)**	2 feet below the tank
Horizontal tank 10,000 gallons or less	1 sample	2 feet below the center of tank
Horizontal tank greater than 10,000 gallons	2 samples	2 feet below each end of the tank
Transfer Area(s)	1 sample in each area if there is more than one transfer area	2 feet below the loading rack
Piping or Areas of Visible Contamination	Take soil headspace samples 2 feet under the following areas: pipe fittings, joints and any other area where contamination is present or likely to be present. Submit soil samples with a headspace reading greater than zero for laboratory analyses.	
Collect any additional samples that may be needed to adequately characterize the excavation(s).		
Example: 27 foot diameter tank: 27/12 = 2.25. Round up 2.25 to nearest whole number equals 3. 3 soil samples are required.		
Soil Analytical Requirements		
For samples collected from areas with visible or known contamination:	• Refer to Guidance Document 4-04 *Soil Sample Collection and Analysis Procedures* for the required analyses.	
For verification samples collected from areas with no visible contamination:	Perform the following analyses based on tank content and/or sample location: • Gasoline tank samples must be analyzed for GRO (Gasoline Range Organics) and BTEX (benzene, toluene, ethyl benzene and xylenes). • Other petroleum tank samples must be analyzed for DRO (Diesel Rang organics). • Transfer area samples must be analyzed for GRO, DRO and BTEX unless gasoline was never stored at the facility, then only DRO is required.	

III. EXCAVATION AS CORRECTIVE ACTION

At most sites, contaminated soil is left to degrade in place. However soil excavation is occasionally appropriate as part of the corrective action (e.g., addressing actual or potential impacts to drinking water, surface waters, vapor impacts, or dermal contact). Excavation is also used as a method to remove product saturated soil. Excavation as a corrective action is typically conducted after a site investigation (LSI or full RI) has been completed and Guidance Document 4-06 has been submitted. When soil is excavated as a corrective action after the Site Investigation phase, complete Guidance Document 3-02a *Corrective Action Excavation Report Worksheet.*

1. **Excavation to address free product**. Excavation is sometime used to address free product in ground water when the product is trapped in the pore spaces of tight sediments. Use the "Petroleum Sheen Test" above to determine if the sediments are considered "saturated".

2. **Excavation of surface contaminated soil.** Surface contaminated soil can pose an unacceptable risk because of the potential for dermal contact and for contaminated runoff to surface waters. Corrective action is necessary at sites where surface contamination exists.

   If excavation is chosen as the corrective action option, contamination from the surface to a depth of two feet should be removed in any of the following cases:

   a) soil is visibly contaminated, or
   b) field headspace screening with a photoionization device (PID) indicate levels above 10 parts per million (ppm), or
   c) saturated soil exists (as determined using the "petroleum sheen test" described above).

   Post-excavation soil sampling is not generally required to document contamination remaining in place after surface soil contamination removal because the extent and magnitude of contamination should have already been defined during the Site Investigation. The area excavated should be backfilled with clean fill. Other options may be considered based on recommendations made in the Investigation Report Form or Corrective Action Design Report. Please note that soil sampling of the stockpile will likely be required prior to soil treatment approval.

   At an active AST facility, site-specific cleanup criteria may be approved if adequate operational controls are in place to manage the risks.

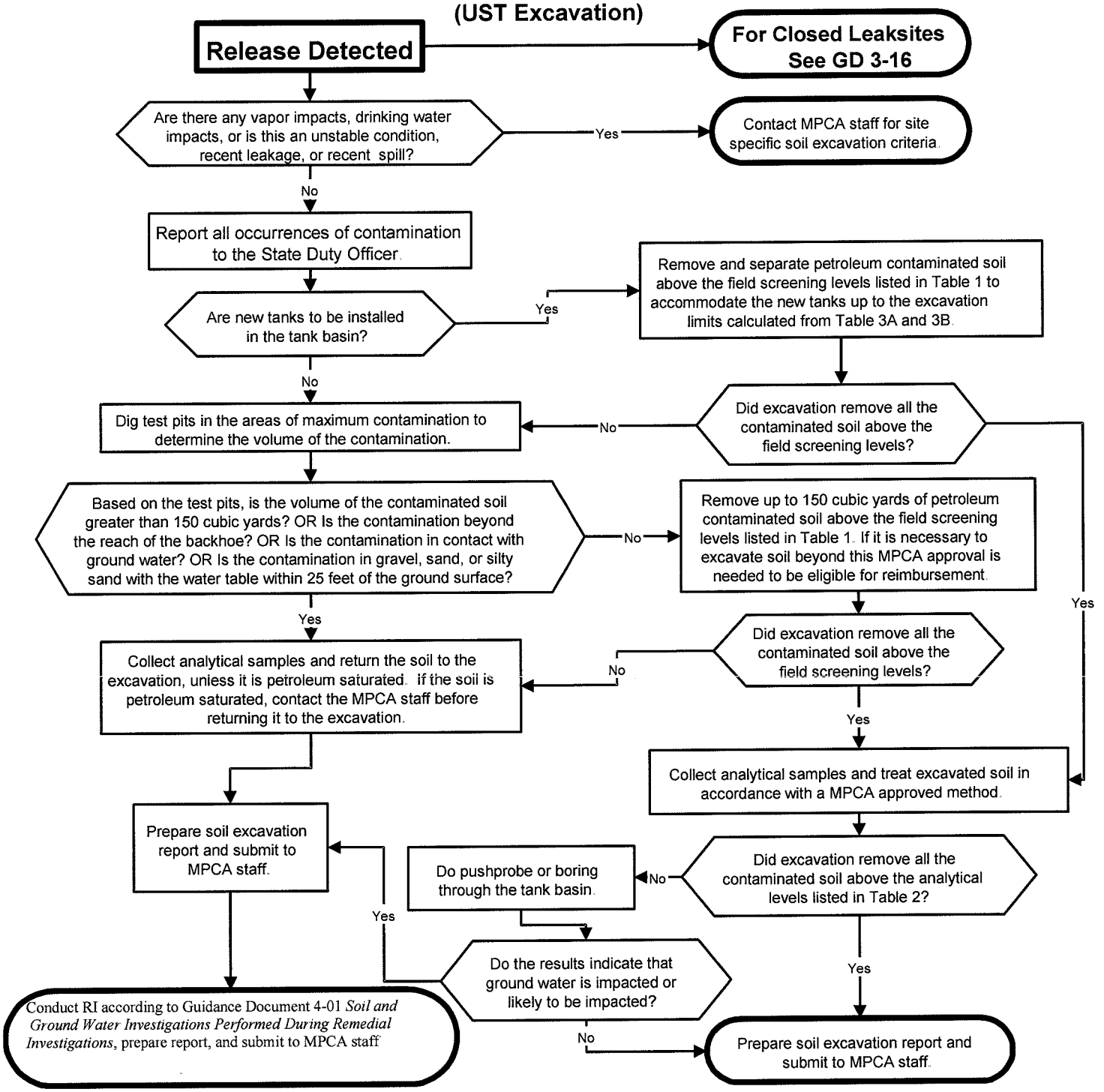
3. **Excavation to address other risk factors.** Excavation of contaminated soil is sometimes used to address risks such as vapors to building or utilities, or as a means of addressing surface water impacts or drinking water impacts. Excavation criteria, such as screening

levels or volume of soil removed will be site specific, and should be addressed in the Corrective Action Design Report.

Web Pages and Phone Numbers

MPCA staff	http://www.pca.state.mn.us/pca/staff/index.cfm
MPCA toll free	**1-800-657-3864**
Petroleum Remediation Program web page	http://www.pca.state.mn.us/programs/lust_p.html
MPCA Info. Request	http://www.pca.state.mn.us/about/inforequest.html
MPCA VIC program	http://www.pca.state.mn.us/cleanup/vic.html
MPCA Petroleum Brownfields Program	http://www.pca.state.mn.us/programs/vpic_p.html
PetroFund Web Page	http://www.state.mn.us/cgi-bin/portal/mn/jsp/content.do?id=-536881377&agency=Commerce
PetroFund Phone	**651-297-1119**, or **1-800-638-0418**
State Duty Officer	**651-649-5451 or 1-800-422-0798**

Attachment A
(UST Excavation)



Petroleum Remediation Program
Minnesota Pollution Control Agency
http://www.pca.state.mn.us/programs/lust_p.html

Petroleum Brownfields Program
Development Response Action Plans

Guidance Document 5-03

This document describes the process of Development Response Action Plan (DRAP) review and approval by the Minnesota Pollution Control Agency's (MPCA's) Petroleum Brownfields Program. A DRAP is a plan for managing petroleum contaminated soil and/or water during construction activities at properties under development. Property owners, purchasers and developers of property where contaminated soil and/or water might be encountered must determine the extent of contamination and its potential effects on the future usage of the property, and propose plans to mitigate these effects (called "response actions").

DRAPs should be approved by the MPCA prior to beginning construction or development work at the property. The construction or development should also be completed according to the plan approved or as modified by the MPCA. Failing to (a) obtain DRAP approval from the MPCA and/or (b) complete the construction or development accordingly, may violate Minnesota's environmental protection laws.

I. The Process

A. Enrollment: In order to obtain DRAP approval, an applicant must enroll in the Petroleum Brownfields Program by filling out a *Petroleum Brownfields Application* (Guidance Document 5-04). Other services provided by the Petroleum Brownfields Program are described in Guidance Document 5-02 *Petroleum Brownfields Program.*

B. Consultant: An applicant to the Petroleum Brownfields Program will need to hire an environmental consultant who is qualified to prepare a DRAP and oversee the approved response actions.

C. Site Investigation: A complete Site Investigation (described in Section II) is required at every site prior to DRAP approval.

D. DRAP Report: After a Site Investigation is completed, a DRAP Report should be submitted to the Petroleum Brownfields Program. The DRAP Report must contain the information described in Section IV below. The response actions proposed in the DRAP will depend upon site specific conditions, including but not limited to, the levels of contamination, the depth of contamination, and the planned construction at the site. Response actions are discussed in Section III.

E. Review: The Petroleum Brownfields staff assigned to the site will generally review the DRAP within 30 days and provide a response (approval, approval with modifications, or rejection of the DRAP). Since review times may vary depending upon staff workload, if MPCA technical review of a DRAP is necessary for a grant application, the MPCA strongly recommends the DRAP Report be submitted a minimum of 45 days prior to application deadlines. Any DRAP Report submitted less than 45 days in advance will not be guaranteed a review and response in time to meet those deadlines.

F. Implementation: The implementation of the response actions may proceed following written approval of the DRAP Report. The MPCA understands that some projects may encounter petroleum contamination that could not have been foreseen. Should the property owner/developer know that temporary work stops are not an option during construction, the property owner/developer could, prior to beginning construction work, enroll in the Petroleum Brownfields Program and submit for MPCA review and approval a Construction Contingency Plan that describes proposed response actions for unforeseen petroleum contamination. If the applicant proceeds with the response actions prior to MPCA approval, the applicant may not be eligible for certain assurances and may need to conduct additional or more extensive response actions.

II. Site Investigation

Prior to beginning the DRAP approval process, a complete Site Investigation that adequately defines the extent and magnitude of the release, must be completed at the site. The Petroleum Brownfields Program utilizes the same guidance documents (Guidance Document 1-01 *Petroleum Remediation Program General Policy* and other applicable documents) for conducting site investigations as the Petroleum Remediation Program.

The level of additional investigation required at sites undergoing future development will vary depending on the site's past and current use, and level of any prior investigations that may have occurred at the site. Some of the more common scenarios and required levels of investigation are discussed below, however, the applicant may need to discuss with the Petroleum Brownfields staff, what level of additional investigation will be needed.

Scenario 1: A complete Site Investigation was conducted several years ago after all tanks and sources were removed from the property. The investigation led to file closure in the Petroleum Remediation Program and the site was subsequently used as a parking lot. In this scenario, the property developer's consultant would review the Site Investigation Report in the MPCA's closed site file. They would also complete a Phase I Environmental Site Assessment (Phase I) at the property to verify there are not additional or more recent potential sources of contamination.

Scenario 2: A leaking petroleum tank Site Investigation occurred several years ago, but the tanks were not removed or were replaced with new tanks, and the site continued in operation as a gas station. The original investigation led to closure of the leaking petroleum tank site file. In this scenario, the developer's consultant must, at a minimum, conduct a Phase I and Phase II at the property. If an additional release was discovered during this work, they would need to report it to the State Duty Officer and another full Site Investigation would likely be necessary.

Scenario 3: Current leaking petroleum tank site where a complete Site Investigation has not yet occurred. In this scenario, a complete Site Investigation and a Phase I would be required. The Site Investigation and review of the Site Investigation Report could occur under the oversight of the Petroleum Remediation Program, or the site could be enrolled in the Petroleum Brownfields Program for expedited review of the Site Investigation Report.

Scenario 4: Site has had petroleum release(s), unrelated to a tank. A Phase I and a Site Investigation defining the extent and magnitude of the release(s) would be required. The Site Investigation must be conducted in accordance with Petroleum Remediation Program guidance documents.

III. Response Actions

Please note that the general guidelines described in this section are provided to assist you in preparing your DRAP. Because every site presents unique conditions and circumstances, developers/property owners should **not** proceed with implementing these guidelines at their sites without first receiving DRAP approval.

The development of petroleum contaminated properties requires the implementation of certain response actions necessary to protect human health and the environment. Response actions that may be required include excavation of petroleum contaminated soil, the use of vapor barriers and vent systems, and/or other engineering controls. Whether petroleum contaminated soil may be re-used onsite, or must be disposed of offsite, depends on the type of development planned for your property. Field screening and confirmation sampling, conducted by a trained professional environmental consultant and following MPCA guidelines, are required at all petroleum contaminated sites.

A. Residential/Recreational Site Development-

In most cases, excavation of petroleum contaminated soil (PCS) within property boundaries will be required at residential and recreational developments. Table 1 below lists additional response action requirements if complete excavation is not possible or feasible. A DRAP for residential developments will most likely require a plan for off-site soil disposal/treatment.

B. Commercial/Industrial Site Development-

MPCA staff will generally approve development plans if contaminated soil remains on-site at less than 10 parts per million (ppm) on a Photo Ionization Detector (PID). Additional response actions requirements are listed in Table 1 below. With MPCA approval, PCS may be re-used on-site at many commercial and industrial development sites.

Table 1

Risk Scenario	**Response Action Requirement**
Site Buildings/Structures	Vapor barrier required if any measurable contamination remains onsite.
Site Buildings/Structures	PCS > 50 ppm (PID) will require Vent System or additional soil removal.
Utility Trench	PCS Removal to < 10 ppm (PID); > 10 ppm (PID) requires a vapor barrier in utility trench
Green space	0-4' - Clean soils

Note: The presence of contaminated ground water at the site may also necessitate response actions. Discuss with Petroleum Brownfields staff.

Soil Reuse at Commercial and Industrial Developments

For many commercial or industrial property developments, time and cost saving measures such as reusing contaminated soils on-site as controlled fill, can be approved by Petroleum Brownfields Program staff. Table 2 below gives general guidance for on-site petroleum contaminated soil re-use options at commercial and industrial sites.

Table 2

Soil Re-use Method	Maximum Re-Use Contamination Level
Landscape Berms	< 100 ppm (PID) mixed 50/50 with clean fill, with 2 feet of clean cover soils and vegetation
Thin spread Under Newly Constructed Roadways or Parking Surfaces	< 200 ppm (PID)

Note: Contaminated soil re-use is not permitted at residential sites.

Off-Site Soil Treatment/Disposal

Any petroleum contaminated soil removed from the site must be treated or disposed of in a method approved by the MPCA. Options are thermal treatment, land treatment, composting and soil disposal at permitted landfills. Guidance for off-site soil treatment is listed in the Petroleum Remediation Program Guidance Document 3-03 *Land Treatment of Petroleum Contaminated Soil*, 3-10 *Thermal Treatment of Petroleum Contaminated Soil* and 3-13 *Composting of Petroleum Contaminated Soil.*

IV. Development Response Action Plan (DRAP) Report

The DRAP Report describes in detail the actions the developer intends to take to address and mitigate the effects of petroleum contaminated soil, surface water and/or ground water at or from the property.

DRAP Report Contents: Detailed below are the necessary components of a DRAP Report. A DRAP Report which does not include these elements will cause delays in review time by the Petroleum Brownfields Program staff. For assistance in determining whether a Phase I, Phase II and/or Site Investigation are necessary, refer back to Section II or discuss with Petroleum Brownfields staff.

A. *Introduction*, including:
- MPCA Site ID #;
- Property name and address; and
- A brief description of the proposed development.

B. *Summary of Phase I*, including:
- Brief description of the current and historical use of the property;
- Brief description of the recognized environmental conditions (i.e., sources of contamination/potential contamination);
- Brief description of the surrounding properties and surrounding areas of recognized environmental conditions;

- Site location map; and
- Site map showing: property boundaries, structures and features, and areas of recognized environmental conditions.

C. *Summary of Phase II*, if completed, including:
- Discussion of the scope and results of the investigation;
- Site map showing: property boundaries, structures and features, areas of recognized environmental conditions and sampling/boring locations;
- Isoconcentration map(s); and
- Table containing boring analytical results and sample depths.

D. *Summary of Site Investigation Report or Excavation Report*, if completed, including:
- Discussion of the scope and results of the investigation;
- Site map showing: property boundaries, structures and features, areas of recognized environmental conditions, excavation limits and sampling/boring locations;
- Isoconcentration map(s); and
- Table with boring analytical results and sample depths.

E. *Proposed Development Response Actions*, including:
- Map showing proposed structures/improvements, current source areas and proposed excavation areas (including: foundations, utilities, landscaping, vapor barriers and venting systems);
- Grading plan (map) showing proposed location and placement of contaminated soil to be re-used onsite (commercial/industrial sites only);
- Detailed written proposal for re-using, treating and/or disposing of any excavated contaminated soil. This proposal should include: plans for field and laboratory sampling, plans for segregating soil based on levels of contamination, onsite re-use options and plans (commercial/industrial sites only), estimated volumes, and treatment/disposal facilities and locations;
- Detailed written proposal for installing any vapor barriers, vent systems or other engineered controls. This proposal should include: detailed description of the system and how it will serve to protect human health, location, and any other details necessary to present the proposal; and
- A monitoring plan describing:
    - Type(s) and method(s) of monitoring that will take place during the response actions. Description of screening/sampling methods and equipment, including sampling locations, sampling frequency and analytical parameters;
    - Confirmation sampling: estimated number and locations, and description of methods and procedures; and
    - Follow-up monitoring: detailed description of the operation and maintenance of the monitoring system; description of the monitoring methods, procedures and equipment; description of the monitoring locations and analytical parameters.

F. *Contingency Plan* (note: significant changes to the DRAP not covered by the Contingency Plan require prior approval by the MPCA):
- Steps that will be taken if monitoring limits are exceeded or unexpected conditions, wastes or contaminated media are encountered and
- A list of MPCA, county and city staff that will be contacted in the event the contingency plans need to be carried out, or there is unexpected public interest or concern about site activities.

G. *Appendices*
- Copy of entire Phase I Report;
- Copy of entire Phase II Report, if completed; and
- Copy of Site Investigation Report and/or Excavation Report, if completed;
- Site-specific Safety Plan covering potential impacts to onsite workers and people on adjacent or nearby properties during the response action tasks. The Safety Plan will *not* be specifically reviewed for approval by MPCA staff but must be included in the DRAP Report.

V. DRAP Implementation Report

Following the completion of the response actions at the site, a DRAP Implementation Report must be prepared and submitted to the Petroleum Brownfields staff. This report should be submitted within six months of the date of the DRAP Approval Letter. If the development has not been completed by that time, a status report updating the Petroleum Brownfields staff is required. In most cases where properties require long-term monitoring, the site will be referred to the Petroleum Remediation Program for continued management. Upon MPCA approval of the DRAP Implementation Report, a DRAP Completion letter will be issued. If the implemented response actions resulted in a petroleum tank release site being eligible for closure in accordance with Petroleum Remediation Program guidelines, a Petroleum Tank Release Site File Closure Letter will also be issued.

DRAP Implementation Report Contents: Detailed below are the necessary components of a DRAP Implementation Report.

A. *Introduction*, including:
- MPCA Site ID#;
- Property name and address;
- Brief summary of the scope and goals of the response actions; and
- Brief summary of any systems (vapor barrier, vent system, etc.) installed.

B. *Discussion*, including:
- Detailed description of, and rationale for, any modifications to the approved response actions made during implementation of the DRAP and
- Locations and levels of contamination remaining.

C. *Conclusions/Recommendations*, including:
- Statement about whether the DRAP tasks were completed;
- Recommendation (in accordance with Petroleum Remediation Program policy) to either close the MPCA site file, or conduct additional monitoring or remediation;
- Recommendations for permanently sealing monitoring and water wells; and
- Recommendations for post-remedial monitoring.

D. *Figures*, including:
- Map documenting source area(s) and the extent of excavation(s);
- Map indicating the area of influence of vent systems;
- Map showing all confirmation data indicating the sampling locations and detected parameters with concentrations; and
- Map indicating location(s) of on-site re-use areas.

E. *Tables*:
- Soil screening data including: location, depth, background level, concentration;
- Soil confirmation data including: location, depth, parameter, concentration;
- Ground water analytical data (if applicable) including: location, depth, parameter, concentration;
- Surface water analytical data (if applicable) including: location, parameter, concentration; and
- Air monitoring data (if applicable) including: location, background level, concentration.

F. *Appendices*:
- Manifests for soil disposal;
- Boring logs;
- Well logs and construction forms;
- Minnesota Department of Health well logs and abandonment forms; and
- Analytical reports.

VII. Definitions

- ***Investigation Report***: The Petroleum Remediation Program's Guidance Document 4-06 *Investigation Report Form.*
- ***Petroleum Remediation Program:*** The MPCA program that oversees investigations and cleanups at petroleum tank release sites.
- ***Phase I:*** A review of the history of a site's ownership, physical features and potential sources of contamination, as well the past and present operations conducted at the property. Also, the report summarizing the findings of the review.
- ***Phase II:*** On-site investigation conducted to determine if potential contaminant sources are causing an actual release of contaminants to soil, surface water and/or ground water. Also, the report summarizing the findings of the investigation.
- ***Response Actions:*** Actions taken during property development to address and mitigate the impacts of petroleum contaminated soil, ground water and surface water on human health.
- ***Site Investigation:*** For purposes of this document, this is a Limited Site Investigation or Remedial Investigation conducted in accordance with the Petroleum Remediation Program's Guidance Document 1-01 *Petroleum Remediation Program General Policy* and other applicable guidance documents.
- ***Thin Spread:*** For purposes of this document, this is the spreading of contaminated soil on the ground at a maximum thickness of two inches.
- ***Vapor Barrier:*** A material with a high resistance to vapor movement, used to control condensation or prevent migration of moisture. Can be used to prevent the migration of vapor through walls and floors into buildings.
- ***Vent System:*** A continuous open passageway to the outside atmosphere for the purpose of removing vapors and gases from structures.

Appendix B

Minnesota Pollution Control Agency Voluntary Investigation and Cleanup

Guidance Document #9

Voluntary Investigation and Cleanup Program Guidance for Investigating and Remediating Asbestos Containing Waste Materials

1.0 Purpose and Introduction

This guidance document summarizes MPCA Voluntary Investigation and Cleanup (VIC) Program requirements associated with investigation and remediation of sites with buried asbestos containing waste materials. Asbestos containing materials are a common waste product encountered at former dumps and within fill at VIC Sites and must be handled in accordance with the appropriate federal and state regulations. The scope of VIC Projects includes threatened or known releases to the environment under the Minnesota Environmental Release and Liability Act (MERLA), and includes releases or threatened releases of buried asbestos containing materials. This guidance is designed to supplement the MPCA VIC Fact Sheet "Asbestos Containing Waste Materials at VIC Sites," the MPCA's Superfund Section's Risk Based Site Evaluation Guidance, other MPCA VIC Guidance Documents pertaining to site investigations and remediation, and the guidance provided through the MPCA's Asbestos Compliance Program (Asbestos Program). This guidance emphasizes the VIC Program's and the Asbestos Program's coordinated role in ensuring that the appropriate regulations are followed, public health and safety are protected, and long term environmental risks are properly managed. Asbestos abatement from buildings and building demolition activities are not within the scope of VIC projects and the MPCA Asbestos Program staff should be contacted for questions related to these activities (see contact information at the end of this document).

2.0 Asbestos Occurrence and Hazards

2.1 Types and Uses of Asbestos Containing Material

Asbestos is a common hazardous substance encountered at abandoned dumps and in fill material. The term "dump" refers broadly to buried mixed municipal waste, refuse and demolition wastes. Abandoned dumps will be discussed in more detail in the soon to be revised VIC Guidance Document #19. Asbestos is a naturally occurring substance comprised of separable fibers and occurs in two different forms as part of two mineral groups– serpentine and amphibole. The U.S. Environmental Protection Agency (EPA) and the Occupational Safety and Health Administration (OSHA) recognize six asbestos minerals: chrysotile (the type of serpentine mineral with long and flexible fibers); and five amphibole minerals (with relatively short brittle fibers), which are actinolite, tremolite, anthophyllite, crocidolite, and amosite asbestos.

Asbestos has been used extensively in industry due to its durability, ability to be woven, and heat resistant properties. The term "Asbestos Containing Material" (ACM) refers to materials that contain at least 1% asbestos. ACM may be found in a variety of building materials including: floor and ceiling tile, floor tile mastic, pipe insulation, adhesives, gaskets, roofing materials, friction products (automobile parts, i.e. in clutches, brakes and transmissions), asbestos cement products (i.e. transite), corrugated ACM paper (referred to sometimes as "air cell"), duct wrap,

and vermiculite (used in insulation and as a soil amendment). Thermal System Insulation (TSI) includes the broad class of friable ACM products applied to pipes, fittings, boilers, tanks, ducts or other structural components to prevent heat loss or gain (sometimes referred to as "mag"). Transite is the name for ACM cement boards and pipes and is typically gray, dense, and easily broken. Chrysotile makes up 90% to 95% of all asbestos used in building materials in the U.S, although the percentage of amphibole asbestos minerals may be high in some ACM. Frequently used definitions pertaining to ACM include the following:

Asbestos Containing Waste Material (ACWM) – generally refers to ACM that is no longer in use but rather occurs as waste products and typically is encountered in subsurface fill at remediation Sites. Buried ACM is more typically referred to as ACWM.

Category I Nonfriable ACM – includes asbestos-containing packing, gaskets, resilient floor covering, and asphalt roofing products containing more than 1 percent asbestos that cannot be crumbled to powder by hand pressure. Category I ACM is considered pliable rather than brittle, breaks by tearing rather than fracturing, and does not easily release asbestos fibers upon breaking.

Category II Nonfriable ACM – refers to any material, excluding Category I nonfriable ACM, containing more than 1 percent asbestos that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. Transite is an example of Category II ACM. Category II ACM is not pliable, breaks by fracturing rather than tearing, and does release some asbestos fibers upon breaking.

Friable ACM – refers to ACM that, when dry, can be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable materials may become friable during grinding, cutting, burning, crushing, and similar operations, including some types of building demolition which may generate and release asbestos fibers.

Nonfriable Asbestos Containing Material – refers to ACM that, when dry, cannot be crumbled, pulverized, or reduced to powder by hand pressure. Nonfriable asbestos may be either Category I or Category II ACM.

Regulated Asbestos-Containing Material (RACM) – refers to (a) Friable ACM, (b) Category I ACM that has become friable, (c) Category I ACM that will be or has been subjected to sanding, grinding, cutting, or abrading, or (d) Category II ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or facility renovation.

2.2 Health Risks Associated With Asbestos

The health risks associated with asbestos result from the inhalation of microscopic asbestos fibers that become airborne due to the disturbance of ACM. Asbestos is a recognized human carcinogen and its exposure can lead to lung cancer and mesothelioma, which is cancer of the pleural membrane of the lung. No known safe level of exposure to asbestos fibers is known.

Asbestosis is a disease caused by scarring of the lung tissue due to inhalation of asbestos fibers. Although less common, medical evidence suggests that ingesting asbestos may result in cancers of the esophagus, larynx, oral cavity, stomach, colon and kidney.

2.3 Asbestos Air Standards

Due to the ability of asbestos fibers to be transported easily in air, fibers are found in ambient air at concentrations ranging from 0.00001 to 0.0001 fibers per milliliter (fiber/mL). OSHA has set a time weighted average (TWA) permissible exposure limit for working conditions at 0.1 fibers per cubic centimeter (f/cc or f/mL) averaged over a 30 minute period. The Minnesota Department of Health (MDH) has set the Clean Indoor Air Standard for Minnesota at 0.01 f/cc. Although these standards apply to working conditions, they may be also be used as a guide in the evaluation of asbestos air emissions during air monitoring at remediation sites. Neither the MPCA nor the U.S. EPA has, however, specified an acceptable exposure or ambient air standard for asbestos.

2.4 Asbestos Detection Methods

The most accurate method to detect asbestos and estimate concentrations that may become airborne typically combines the use of polarizing light microscopy (PLM), electron microscopy, and energy dispersive X-ray analysis. PLM also is the recommended detection method specified in the federal regulations for abandoned waste sites (see Section 3). Although transmission electron microscopy (TEM) is extensively used in research to identify smaller concentrations of asbestos fibers, it is not currently in widespread use or required for use in soil and air sampling at remediation sites.

2.5 Buried Asbestos Containing Materials

Asbestos Containing Waste Material (ACWM) is waste ACM that has been removed from buildings and is commonly encountered within demolition materials buried as part of former abandoned dumps or within fill. Abandoned dumps may be identified as part of routine Phase I Investigations, although in many cases buried ACWM is associated with smaller undocumented dumping areas or granular fill containing ACWM rather than large former municipal dumps. Many properties in urban areas were constructed and graded several decades ago using imported fill from undocumented sources. Such fill may contain varying amounts of debris and ACWM.

Demolition debris and other solid waste encountered in dumps or fill are also considered as solid waste that has been improperly disposed of, whether ACWM is present or not. Voluntary parties and their consultants need to investigate such sites carefully, following both VIC and Asbestos Program requirements, to avoid exacerbating site hazards and regulatory enforcement.

3.0 Regulatory Background

3.1 Federal NESHAP Standard

A property on which the disturbance and excavation of ACWM takes place is strictly regulated through National Emission Standards for Hazardous Air Pollutants (NESHAP), as codified in Title 40 Code of Federal Regulations Part 61. NESHAP was established in accordance with Section 112 of the Clean Air Act, which required the U.S. EPA to develop and enforce regulations to protect the general public from exposure to airborne contaminants that are known to be hazardous to human health. These regulations were first developed in 1973 and subsequently, have been amended several times.

The purpose of NESHAP is to protect the public health by minimizing the release of asbestos when facilities that contain ACM are demolished or renovated. The MPCA considers a property that has buried ACWM incorporated as part fill or debris as an Inactive Waste Disposal Site under NESHAP. Disturbance or excavation of buried ACWM at Inactive Waste Disposal Sites is considered a renovation under NESHAP. In addition, historically approved disposal sites that have not accepted ACWM within the past year and unpermitted dumps containing ACM are considered an Inactive Waste Disposal Site.

The Federal NESHAP standards are adopted by reference into Minnesota Rules in Minnesota Rules, part 7011.9920. The MPCA Asbestos Program is the delegated authority in Minnesota to enforce federal NESHAP regulations. The method specified in NESHAP for asbestos detection (Appendix E, subpart E, 40 CFR part 763, section 1) is PLM.

3.2 Regulated Nature of ACWM

All buried ACWM at VIC Sites is considered by the MPCA to be Regulated Asbestos Containing Material (RACM). RACM includes ACM that may have been used within buildings as non-friable Category I or Category II ACM but has now been incorporated into waste or fill and buried. Whether asbestos was friable or nonfriable, waste ACM may have been crumbled, abraded, pulverized, or powdered by the original demolition activities or through the act of dumping or burial. Once ACWM is identified within debris, all ACM and impacted demolition debris or solid waste materials are regarded as RACM and regulated by the NESHAP.

NESHAP requires that if RACM is removed from an Inactive Waste Disposal Site, the removal must be conducted by a licensed asbestos abatement contractor using an MPCA-approved Emissions Control Plan. The MPCA Asbestos Program must review and approve, in advance, any Emission Control Plans prepared to fulfill NESHAP requirements for proposed activities at VIC Sites. Further guidance related to the Emission Control Plan requirement is provided in Sections 4 and 5 in this document.

3.3 Other Applicable Regulations Pertaining to ACWM

Asbestos work is regulated by several state programs to ensure that the public is protected. Asbestos associated with subsurface soils through past disposal or filling is considered to be a

hazardous substance under the Minnesota Environmental Response and Liability Act (MERLA). Proper management and handling of ACWM during site work is required in order to remain eligible for MPCA VIC Program assurances under MERLA.

The MPCA Asbestos Program has prepared the "Asbestos Guidance on Excavation Projects," dated July 1999, which must be followed if a site contains RACM and is considered to be an Inactive Waste Disposal Site under the NESHAP. Prior to a renovation or demolition, all buildings must be evaluated by an asbestos inspector certified by the Minnesota Department of Health (MDH) under the Asbestos Hazardous Emergency Response Act (AHERA). Parties are required to submit the completed "Notification of Intent To Perform A Demolition" form to the MPCA Asbestos Program staff a minimum of 10 working days prior to conducting a building demolition. Asbestos monitoring and sampling conducted at sites regulated under the NESHAP must be conducted by an MDH/AHERA-certified asbestos inspector (Asbestos Inspector). Remedial excavation or reconsolidation activities of suspect ACWM must be conducted by a MDH/AHERA-licensed asbestos contractor (Asbestos Contractor).

The Asbestos Unit of the Division of Environmental Health at the MDH specifies work practices to identify and manage asbestos, and to safely remove, encapsulate, or enclose asbestos-containing materials. MDH is responsible for the licensing of asbestos contractors and the certification of asbestos workers, site supervisors, inspectors, management planners, and project designers to ensure that properly trained personnel perform asbestos work or management. The "Notifications of Asbestos Air Monitoring" within structures must be provided to the MDH Asbestos Unit at least 5 calendar days prior to beginning a project. The "Notification of Asbestos Related Work" must be provided to both the MDH and the Asbestos Coordinator of the MPCA within 10 working days of the beginning of work.

County and city environmental departments may have additional regulations or ordinances pertaining to asbestos or solid waste. Parties conducting response actions are responsible for contacting the appropriate county and city representatives before initiating a remediation project involving asbestos or solid waste to determine whether additional requirements exist.

The Minnesota Department of Labor and Industry is responsible for administering the federal OSHA requirements to protect workers from asbestos exposure. The OSHA Construction Standard for Asbestos is 29 CFR 1926.1101.

U.S. EPA's Worker Protection Rule, 40 CFR 763, Subpart G, extended the OSHA standard to state and local employees who perform asbestos work and who are not covered by the OSHA Asbestos Standards, or by a state OSHA plan. The OSHA Standard is incorporated by reference. People who plan to renovate or remove asbestos from a building of a certain size, or who plan to demolish any building, are required to notify the appropriate federal, state and local agencies, and to follow all federal, state, and local requirements for removal and disposal of RACM.

4.0 Investigating VIC Sites With Suspected ACWM

4.1 Phase I Investigations

A Phase I Investigation is required for most sites for which technical assistance is sought and is an explicit requirement if the voluntary party is pursuing a No Action Determination or a Certificate of Completion. The purpose of a Phase I Investigation is to determine, whether, based upon a physical site survey and research of available historical documents and environmental databases, the site may have been the subject of a release or threatened release of a hazardous substance, pollutant, or contaminant. The Phase I Investigation also determines the types of additional inquiry that should be included in the Phase II Investigation Work Plan. The Voluntary Party is requested to refer to VIC Guidance Document #8, for guidance on preparation of Phase I Investigations.

Particularly useful resources for accessing the potential of ACWM at properties include: aerial photographs that may identify past dumping activities; evidence of historic areas of lower topography which may have been filled; areas of higher topography that may contain excess fill; city directories describing past businesses; insurance maps documenting past building and property details; documentation of past on-site building demolition; facility inspection reports; and interviews with former employees. The historical practice of demolishing buildings and burying most of the materials in-place is one of the most common sources of buried ACWM. Old utility lines made of transite or wrapped with asbestos material may be indicated on old city records, building plans or fire insurance maps. Records of buried dumps or fill material on a property also are common indications that asbestos may be present.

4.2 Phase II Investigations

Properties where buried ACWM is suspected should undergo a thorough Phase II Investigation to determine the nature, type and distribution of the ACWM present in the subsurface, and whether the ACWM will be disturbed or left on-site. Phase II Investigations should be conducted in accordance with an MPCA approved Phase II Investigation Work Plan. The MPCA VIC Program staff will consider all properties that contain fill with debris or refuse, even at low percentages, to have the potential for ACWM to be encountered or present in the subsurface. For such suspect properties, a Phase II Investigation should be designed and conducted to determine the amount, type and distribution of the debris at the site and the presence of pollutants, contaminants or hazardous substances, including ACWM. To appropriately evaluate debris and ACWM, test pits or test trenches should be conducted rather than or in addition to the use of soil borings to delineate the lateral and vertical extent of fill impacted by debris (including ACWM). The number of test pits/trenches required will vary depending on the aerial extent of the fill, the thickness, and the heterogeneity of the type of debris and distribution of ACWM. It is important that a sufficient number of exploratory test pits/trenches and sampling be conducted to characterize and document the variety and distribution of waste through the aerial and vertical extent of the fill.

The Phase II Investigation Work Plan should take into account the nature of the proposed property use or redevelopment plans, and the remedial objectives and closure requirements. If the involved parties do not desire to use institutional controls to manage residual contamination on-site, then the investigation must be designed to ensure that the full extent of the on-site waste is determined and fully characterized. The location of proposed green spaces, paving areas, building footprints, and the type of access future workers and the public will have to the site represent information that better describes potential exposure scenarios, which, if known, can assist in focusing the Phase II Investigation.

If ACWM is suspected at a site but has not yet been confirmed and soils are proposed to be disturbed and temporarily excavated through the use of test pits, test trenches, or surface grading activities, an Asbestos Inspector must be involved in the project to inspect the site wastes for the presence of ACWM. If suspect ACWM is identified, the Asbestos Inspector must collect samples of the waste or suspect soils to confirm the presence, the type and the amount of asbestos present in the materials. The MPCA VIC staff also may require representative samples of soil or debris associated with suspect ACWM to be collected and analyzed. Soil associated with identified or suspect ACWM must also be treated as if it contains ACWM, and the Asbestos Inspector should evaluate such soils visually. If friable asbestos has been identified, the Asbestos Inspector should also collect and analyze soil samples.

A Phase II Investigation Work Plan must include a Contingency Plan, if test pits, test trenches or other exploratory excavations are proposed and the potential to encounter ACWM exists. In general, the greater the likelihood of encountering ACWM during an investigation, the more likely the MPCA VIC Program shall require that an Emissions Control Plan be submitted and approved in advance as part of the Phase II Investigation Work Plan (see Section 5.2). In the event ACWM is encountered during investigatory excavation activities and no appropriate contingencies have been approved in advance by the MPCA, excavation activities should cease and the MPCA VIC Project and Asbestos Program staff should be contacted as soon as possible to determine the appropriate waste management procedures. Once ACWM is confirmed, the property and all subsequent excavation activities are regulated under NESHAP as an Inactive Waste Disposal Site and must follow the appropriate regulations.

Soil and debris temporarily excavated from test trenches and pits may be stockpiled and covered adjacent to the excavation during Phase II Investigations if conducted in accordance with an approved work plan and the oversight of an environmental consultant and an Asbestos Inspector. Response actions involving excavation of soil and debris for off-site disposal or on-site reconfiguration, however, may be conducted only under the direction of an Asbestos Contractor.

Exploratory excavations conducted during Phase II Investigations without a certified Asbestos Contractor should: a) be approved in advanced by the MPCA; b) be conducted only if appropriate wetting procedures are proposed and implemented; c) replace and cover all excavated wastes back in the excavation during the same working day; and d) ensure all temporary stockpiles are placed on and are covered with plastic during the excavation activities. If wastes excavated are of limited volume, localized and can be easily disposed, the MPCA VIC or Asbestos Program staff may require that an Asbestos Contractor be involved and that the wastes not be replaced in the excavation, but be properly disposed.

5.0 Requirements for Excavation or Disturbance of ACWM

5.1 Excavation Requirements based on the NESHAP

The Asbestos Program at the MPCA has prepared the "Asbestos Guidance on Excavation Projects" (NESHAP Guidance) to summarize the requirements which must be followed when ACWM is excavated at Inactive Waste Disposal Sites. The Asbestos and VIC Program strongly encourage the party to utilize qualified environmental consultants and technicians to ensure that appropriate regulations are followed and hazardous emissions are prevented during site investigation and remediation activities.

The VIC Program strongly encourages environmental consultants to closely coordinate with the Asbestos Program staff to ensure that the NESHAP is appropriately followed. A summary of these requirements is briefly outlined below:

- A "Notification of Asbestos Related Work" (Notice) must be completed and submitted to the Asbestos Program within 10 working days of initiating the project. The advance notice may be waived, if RACM unexpectedly is encountered during an excavation in progress.
- An Emission Control Plan (ECP) must be prepared and submitted to the Asbestos Program for review and approval pursuant to 40 CFR 61.145. The minimum requirements for an ECP are summarized in Section 6.0.
- The area of proposed asbestos excavation must be secured and clearly marked by asbestos warning signs that are visible at all entrances and exits to the area.
- RACM must be adequately wetted to minimize emissions during excavations and loaded into trucks or containers lined and covered by polyethylene. If excess water is generated due to the required wetting of the soil, ensure that wastes transported off-site to the landfill do not contain any free liquids. The shipments must be properly manifested and must contain a waste generator label and warning signs.
- Stockpiling of ACWM impacted soils should be done on-site and within the zone of contamination.
- If ACWM is present at the surface, trucks/excavation equipment must be decontaminated prior to leaving the zone of contamination or clean granular fill must be placed over the area.
- Off-site disposal of RACM is only allowed at approved landfills that are permitted by the MPCA to accept RACM as part of their Solid Waste Management Plan.
- The excavated area of the site must be visually inspected by an Asbestos Inspector. Inspection frequency, though at the discretion of the Inspector, should be sufficiently frequent to thoroughly inspect the excavation area and the materials excavated.

An Asbestos Contractor should be retained and be present for on-site coordination of all excavation activities where ACWM is known to exist or is suspect. If excavation activities are being conducted through use of an MPCA approved Contingency Plan the Asbestos Contractor may not be required to be on-site during excavation activities at locations where Phase II

Investigation results indicate that ACWM is not present. The Asbestos Contractor, must, however, be on call to respond to observations of an on-site Asbestos Inspector.

Excavating ACWM without the use of an approved ECP, contrary to an approved ECP, or without oversight from an Asbestos Contractor may be considered to be a significant violation of NESHAP and MPCA requirements and may lead to enforcement actions and the levying of fines.

5.2 Emissions Control Plan Requirements

An ECP must be prepared and approved by the MPCA Asbestos Program staff before RACM can be excavated from an Inactive Waste Disposal Site. The regulated party may provide this ECP directly to the Asbestos Program staff for review or may coordinate this review through the VIC Project staff. Approved ECPs utilized at a VIC Project form an integral component of the project's work plan or response action plan.

Many ECPs have very similar formats and content, however, each ECP will require site specific project details. Every ECP must, at a minimum, include the following:

Project and Site Description
Include a detailed description of the project with the name of project, the address, a site location map, an estimate of the amount of RACM present at the site and the amount of RACM to be excavated. The site map should have an accurate scale and include a location map of the area impacted by RACM and the area proposed to be excavated or disturbed. The project description should briefly describe the nature of the project (emergency response action, redevelopment proposed, utility work, etc.) and the proposed schedule, including the proposed start date. Indicate in this section when the "Notification of Asbestos-Related Work" was or will be submitted to the MPCA Asbestos Compliance Program staff. General site information should describe the slope of the site surface, the site's lateral proximity to surface water, the vertical depth to ground water, and a description of on-site and surrounding land use and potential receptors.

Description of the Waste/RACM
Provide a narrative description of the type of RACM and other waste to be encountered, including representative test pit/trench or soil boring logs. Include information regarding any other known or suspected contamination associated with the waste/RACM and/or other risk factors (i.e. volatile vapors, methane gas, heavy metals, etc.) and how these issues are being addressed as part of the project.

Project Contacts Information
List names, contact information, and responsibilities for the site owner, the site project manager, the licensed asbestos inspectors and contractors, and the disposal facility involved in the project. Also, provide a list of regulatory contacts (i.e. VIC staff, Asbestos Program staff, as well as city, county, and MDH staff, if applicable) associated with the site.

Site Security
Describe the required signs that will be used to demarcate the area contaminated by RACM. Discuss how site security will be established, so that access to the site will be restricted to authorized personnel during excavation activities and when RACM is potentially accessible or exposed.

Emission Control Procedures
Provide a detailed description of the type of emission control procedures to be utilized during all phases of the work or when site conditions may generate emissions. Such conditions include the following: a) RACM is exposed at the surface; b) digging of test pits or test trenches; c) active excavation activities or site grading of soils containing RACM; d) loading of RACM into containers or trucks; and e) removal of RACM from trucks for disposal at a permitted landfill. This section must include the wetting practices that will be used to minimize emissions.

Excavation/Removal Activities
Discuss the portion of the site, upon which excavation or removal activities will take place. Describe the methods and type of equipment to be used during excavation and loading activities and how such equipment will be decontaminated. Trucks and equipment must be decontaminated prior to leaving the zone of contamination.

Air Monitoring
Describe the type of air monitoring proposed for the project and list the personnel conducting this work.

Containerization/Transport
Describe the type of containers to be used for storage and for transport of RACM off-site to an approved disposal facility. The ECP should describe the type of signs the transport trucks shall display during loading/unloading of the RACM. In addition, the container must be lined with plastic and covered during transport.

Description of Residual RACM/Waste
Provide detailed information regarding the type, amount and location of any and all RACM proposed to be left on-site, any vertical buffers proposed, and the type of institutional controls (such as restrictive covenants or an affidavit) proposed to document and/or restrict access to this material.

Transport/Disposal Information
Provide the name, address and contact information for the transportation contractor and the landfill or other disposal facility accepting the RACM and the type of manifests utilized during the transport.

Other Project Specific Details
The requirements provided above are not meant to be exhaustive, but should form the core component of every ECP. Other information, that should be provided, if pertinent, includes identified community concerns, other known site hazards, or any other factors that the Asbestos Program or VIC staff should be aware of prior to initiation of the project.

5.3 Perimeter Air Monitoring Requirements

Air monitoring of ambient air along the perimeter of sites or work areas may be required, if the project activities have the potential for generating fugitive dust containing asbestos fibers. Such activities may include Phase II Investigations involving the digging of test pits, site grading activities, and excavation of suspect ACWM as part of response actions. The use of a properly designed ECP should minimize or prevent the emission of asbestos fibers from excavation projects dealing with ACWM. Depending on the volume of materials disturbed or the nature of the waste, the MPCA may require perimeter air monitoring for asbestos, which would consist of collecting potential fibers on a filter and analyzing the fibers with PLM. In such cases, air monitoring plans will be a required component of the RAP.

6.0 Cleanup Requirements for Sites with ACWM

A Response Action Plan (RAP) must be prepared and submitted to the MPCA for review and approval prior to conducting ACWM excavation activities that involve off-site disposal or on-site reconsolidation or reburial of ACWM waste. A RAP is a detailed report specifying remedial objectives, how the objectives will be achieved, and remedial design specifications. The detailed elements of the remedial design may be submitted separate from a more conceptual RAP; however, an approved RAP is required prior to initiating remedial actions at VIC Sites.

If a RAP is required and implemented, a RAP Implementation Report or documentation report must be submitted and approved in order for the VIC Program to issue either a No Action Determination or a Certificate of Completion. Refer to VIC Guidance Document #18 for future guidance pertaining to preparation of a RAP and a RAP Implementation Report. If ACWM excavation and disturbance is a component of the remedial actions, the approved ECP will be considered a component of the RAP and should be appended to the RAP. A Focused Feasibility Study (FFS) should be completed as an interim step, prior to developing a RAP, particularly at complex sites or when several potentially acceptable remedial options are available.

Contingency Plans are required as a component of the RAP, if site redevelopment or excavation activities have the potential to encounter ACWM. The Contingency Plan should clearly indicate under what conditions the ECP is to be utilized. The ECP will address emission control requirements; however, the RAP must describe measures that will be taken to segregate, stockpile and properly characterize suspect materials that may contain asbestos, other contaminated soil, suspect debris or other hazardous materials. Compliance with a Contingency Plan should allow construction to continue while suspect materials are characterized.

6.1 Overview of Cleanup Alternatives

The best alternative for remediation of an abandoned dump, when financially and technically feasible, is to dig up the dump or refuse materials and dispose of the waste in a permitted landfill. Due to the expense and potential risks of excavating large volumes of impacted refuse, risk-based site closures that involve leaving ACWM on-site may be more practicable. Generally there are two types of cleanups that are conducted at properties with ACWM: a) complete removal of the asbestos materials with disposal at an approved landfill; and b) risk-based closure in which

residual ACWM is left on-site in the subsurface and long term management and risks are largely addressed through the combined use of engineering controls, institutional controls, and a Contingency Plan. For Sites with smaller volumes of localized ACWM whose lateral and vertical extent can be determined a complete removal may be the preferred option. For such removal actions the Asbestos Inspector should inspect the excavation and collect soil samples for analysis to document that no asbestos fibers remain in the soil.

6.2 Risk-Based Closures at Sites Containing ACWM

It may not be practicable for all ACWM to be excavated and removed from all sites, especially at sites containing large volumes of waste or on which ACWM is very deeply buried. The VIC Program may allow some or all ACWM to remain on-site if appropriate vertical separation distances and institutional controls are utilized. Residual ACWM waste remaining at a site must be managed in a manner consistent with the "Guidance on Incorporation of Planned Property Use into Site Decisions" (Property Use Guidance), which forms part of the MPCA's Risk Based Site Evaluation (RBSE) Manual. The two principal requirements are the use of institutional controls and the appropriate use of vertical separation distances between the surface soils and the buried waste. Other considerations that are discussed below are recommendations on the physical segregation of wastes, mechanical sorting of debris that may contain ACWM, reconfiguring and reuse of wastes, and long term maintenance requirements at sites where ACWM is suspect.

Institutional Controls
Minnesota Statute, § 115B.02, subd. 9a defines institutional controls as legally enforceable restrictions, conditions, or controls on the use of real property, ground water, or surface water located at or adjacent to a facility where response actions are taken. Institutional Controls include real property notification, affidavits, contractual agreements (including consent orders), easements, and environmental restrictive covenants.

The MPCA allows the use of institutional controls, in addition to treatment, containment, or removal of contaminants, as part of an overall site remedy. Institutional controls are intended to ensure that the response (cleanup) actions remain protective of public health and the environment. Institutional Controls document the presence of contamination at a particular parcel and provide notice through recording in official property records so that interested parties become aware of residual contamination and any accompanying property use conditions and restrictions. Institutional Controls may also include easements to ensure access to property for purposes such as maintaining response actions or long-term monitoring.

MPCA continues to prefer measures that reduce the need for use restrictions and long-term monitoring/maintenance activities. General guidance on the application of the institutional controls that are within MPCA's authority to require or seek is summarized in "Guidance on Incorporation of Planned Property Use Into Site Decisions" (Property Use Document) which is a component of the MPCA's Risk Based Site Evaluation Manual.

An acceptable site remedy, which incorporates long term management of buried ACWM, requires the use of institutional controls – either a Declaration of Restrictions and Covenants (Restrictive Covenant) or a Real Property Affidavit (Deed Notice). The type of institutional control required will depend upon the proposed land use and the volume, characteristics, and depth of burial of the

ACWM. If the remedial objectives at a site require unrestricted future use of the property (e.g. residential use) then long term management of buried ACWM will not be considered an acceptable remedy.

Vertical Separation Requirement
ACWM waste or impacted fill remaining on-site as part of remedial design must be buried an appropriate depth beneath the surface. This burial depth, or vertical separation distance, will depend upon the proposed land use for the site and on whether the waste materials are buried beneath an engineering control or not. An engineering control is a relatively impervious structure that is utilized as a component of a RAP to assist in restricting direct access to subsurface soils and reducing the potential for erosion of the cover. Common engineering controls include pavement, sidewalks, building footprints, and engineered caps. The soil within this vertical separation must not pose an unacceptable human health risk as determined by the RBSE Manual. The burial of ACWM waste allows the potential risks to be decreased to acceptable levels by an appropriate depth of burial and use of institutional controls and engineering controls. Minimum vertical separation distances considered appropriate for industrial and restricted commercial properties with little or no slope are as follows:

Beneath Green Space	4-feet
Beneath Paving and Sidewalks	2- to 4-feet
Beneath Building Floors	1- to 2-feet

The above vertical separation distances correspond to the approximate vertical intervals of the "accessible zone" as described in the Property Use Document. The accessible zone is considered the interval that is considered most likely to be accessed in the future. A range in distances is provided because what represents the "accessible zone" may vary between sites. If the ACWM is buried deep enough to be considered a remotely accessible depth (see Property Use Guidance), a Deed Notice and not a Restrictive Covenant possibly may be used as the institutional control.

Clean cover used for vertical separation in green space areas without any impervious engineered surfaces ideally should be well vegetated only by shallow rooting plants (i.e. grasses, shrubs). Exceptions to this recommendation may be considered, if the ACWM is buried deeper than four feet below the surface.

Reconfiguring Waste
The reconfiguration or reconsolidation of solid wastes and debris is sometimes appropriate as a remedial strategy in order to reduce the aerial footprint of waste or, under certain conditions, to relocate wastes to other portions of a site. If the wastes being reconfigured include potential ACWM, the activities will require the use of an Asbestos Contractor and an approved ECP and RAP. The MPCA VIC and Asbestos Programs may allow the reconfiguration of solid waste, if it takes place within the existing footprint of the buried on-site waste or debris, meets the appropriate vertical separation distance, includes placement of a Restrictive Covenant on the property deed, and does not violate other municipal or county requirements. Placement of solid waste outside the existing footprint of a dump is not an acceptable reconsolidation solution and is considered a violation of the Minnesota solid waste rules and may result in enforcement actions. As is the case with all solid wastes, no reconsolidation of ACWM is allowed within five feet of the water table or near surface water.

Reuse and Screening of Site Waste Materials or Fill
On-site fill contaminated with ACWM cannot be reutilized as controlled fill except under very limited conditions and only with the advance approval of the MPCA. It is never appropriate to use such fill or any fill with solid waste as off-site controlled fill. Solid waste within fill can be mechanically sorted and separated by use of a bar screen. The resulting waste-free fill may be usable as controlled engineered fill on-site or for limited off-site uses, such as road aggregate.

The mechanical screening of fill with debris is allowed under certain conditions as a means of reducing the volume of debris requiring off-site disposal at a landfill. If mechanical screening is conducted, it is recommended that a bar screen with a maximum one-inch opening be used. Solid waste and fill that does not pass through the screen must be handled or disposed of properly. Mechanical screening of fill containing ACWM is not acceptable, as no practicable means of controlling asbestos emissions exists in this case. Therefore, it is very important that fill be well characterized before any mechanical screening is attempted. In such cases, a Contingency Plan and ECP containing directives for ceasing screening activities if ACWM is identified in this material must be utilized during such screening activities.

If no ACWM is found during the mechanical screening of fill and debris, the screened granular fill may be left on-site, although it will need to be buried with appropriate vertical separation distances. The need for institutional controls to restrict or document such screened fill material will be evaluated by the MPCA VIC staff on a site by site basis.

Long Term O&M Requirements
Long term operation and maintenance requirements may not be necessary if the use of a Restrictive Covenant appropriately restricts access to subsurface wastes. However, if engineering controls are used to restrict or minimize access, operation and maintenance (O&M) of the engineering controls may be required (e.g. the maintenance of paving surfaces, building floors, vegetated surfaces, or engineered caps). Contingency Plans that serve as work plans in the event of site redevelopment activities or site disturbance in the future are sometimes appropriate and may be considered a type of long term O&M. In such cases, these plans are considered to be part of an ongoing response action and may require the use of a voluntary response action agreement in order for VIC assurances to be issued.

7.0 References and Resources

MPCA's Asbestos Program Web Site:
http://www.pca.state.mn.us/programs/asbestos_p.html

MPCA's Risk Based Site Evaluation Manual
http://www.pca.state.mn.us/cleanup/riskbasedoc.html

MPCA VIC Program Web Site:
http://www.pca.state.mn.us/cleanup/vic.html

MDH's Asbestos Program Web Site:
http://www.dehs.umn.edu/ihsd/asbestos/

- Asbestos Program Publications:
  - Guidance for the Removal, Transport, and Disposal of Category I Asbestos-Containing Materials," MPCA Air Quality/Asbestos Program/#4.04/December 2000;
  - "Asbestos Guidance on Excavation Projects," Air Quality/Asbestos Program/#4.03/July 1999;
- Asbestos Program/Asbestos Hotline: 651-297-8685
- MN Department of Health: 651-215-0900