ENVIRONMENTAL MANAGEMENT PLAN

1030 JAY STREET
ROCHESTER, NEW YORK

Prepared for:	City of Rochester 30 Church Street Rochester, New York 14614
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Project No.:	2918S-02 (BAP02)
Date:	December 2002

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APPENDICES

1.0 INTRODUCTION

This site-specific Environmental Management Plan (EMP) has been developed for the property located at 1030 Jay Street, City of Rochester, County of Monroe, New York (Site). The general location of the Site is depicted on Figure 1 (Project Locus Map) included in Appendix A. This EMP should be implemented when work performed at the Site may disturb fill material or soil that is potentially contaminated. Further details regarding the EMP are provided below.

1.1 Statement of Purpose

The purpose of this EMP is to address the handling of: (1) fill materials containing elevated concentrations of heavy metals that are documented to be associated with layers and chunks of suspect dried paint or other materials (e.g., ash); and 2) soil or fill material potentially containing petroleum and/or volatile organic compound (VOC) contamination.

Specifically, this EMP addresses how to identify, characterize, handle, and dispose or re-use these media during construction and post-development activities. This EMP establishes goals, procedures, and appropriate response actions to be used by on-site personnel should contaminated material be encountered and disturbed.

1.2 Site Description

The Site consists of an approximate 1.23-acre parcel of land owned by the City of Rochester (refer to Figure 2 included in Appendix A). The City of Rochester foreclosed on the Site and demolished the building that was formerly located on this property.

Under current redevelopment plans, it is understood that portions of the 1030 Jay Street parcel will be redeveloped with a slab-on-grade building and asphalt-paved parking lot(s).

2.0 SUMMARY OF ENVIRONMENTAL CONDITIONS

A Phase I Environmental Site Assessment and a Phase II Environmental Site Assessment dated February 23, 2001 were previously performed on the Site and the findings of these studies are further described herein.

2.1 Phase I Environmental Site Assessment

Historical information included in the Phase I Environmental Site Assessment report indicates that the Site was used by industrial businesses that included: Traders Box and Lumber Company; Kennedy McCandless Corp.; The Nursery Crafters; F.E. Reed Glass Corp.; and Rochester Novelty Works, Inc.

The Phase I Environmental Site Assessment report indicated that a waste oil spill occurred at this Site and some soil removal was conducted. However, information was not available that documented the cleanup was successful at fully remediating this spill. Also, information indicates that a former "tool" room and painting operations were present at the Site.

The Phase I Environmental Site Assessment identified between 50 and 100 unregistered vehicles and two tractor trailers on the Site. Evidence of surficial soil staining and oily material in a catch basin were noted at the Site at the time of the Phase I ESA site visit.

2.2 Phase II Environmental Site Assessment

The Phase II Environmental Site Assessment was performed to evaluate the identified areas of potential concern at the Site. Physical testing locations are depicted on Figure 2 included in Appendix A. The scope of work included:

- Dye testing some facility drains
- Excavating test pits at exterior locations
- Advancing soil borings at interior locations
- Analyzing soil, fill and sediment samples

The dye testing confirmed that the drains tested were connected to the municipal sewer system located in Jay Street.

During the subsurface studies, fill material was encountered from the ground surface to depths up to approximately 4 feet. Test pits conducted in the historical waste oil spill area encountered no evidence of waste oil contamination (e.g., no petroleum sheen, odors, or staining). Suspect dried paint material was observed at some test pit locations between depths of about 0.0 and 2.0 feet below the ground surface.

Samples of soil, sediment and fill were tested for one or more of the following lists of analytical laboratory parameters:

- Total RCRA metals
- VOCs
- Semi-volatile organic compounds (SVOCs)
- TCLP metals
- Cyanide
- Polychlorinated biphenyls (PCBs)

VOCs apparently attributable to the suspect dried paint material were detected in some samples, but at concentrations below NYSDEC TAGM 4046 recommended soil cleanup objectives.

SVOCs apparently attributable to the suspect dried paint material, were detected in one sample, but at concentrations below NYSDEC TAGM 4046 recommended soil cleanup objectives.

PCBs were not detected above reported analytical laboratory detection limits in the samples that were tested.

The RCRA metals analytical laboratory testing indicated that some samples of the surficial fill material contained elevated concentrations of heavy metals (e.g., arsenic, barium, chromium, and lead) at concentrations above NYSDEC TAGM 4046 recommended soil cleanup objectives and/or typical background ranges.

Cyanide was detected in a fill sample at a concentration of 28 mg/kg. The NYSDEC has not established a recommended soil cleanup objective for cyanide.

The TCLP extracts of one fill sample from test pit TP-8 that contained a layer of suspect dried paint, and a discrete sample of suspect dried paint material from TP-8, were determined to contain lead at concentrations (i.e., 7.3 mg/l and 5.72 mg/l, respectively) above the characteristic hazardous waste criteria of 5.0 mg/l. As such, if the fill material in proximity to TP-8 or the suspect dried paint material are disturbed, the material has the potential to be considered a characteristic hazardous waste for lead.

Analysis of a sediment sample from a storm drain indicated it was non-hazardous for full TCLP parameters, ignitability, corrosivity and reactivity. In addition, PCBs were not detected in the storm drain sediment sample. However, the results of a paint filter test suggest that the storm drain sediments would have to be treated to remove liquids if they are to be removed and disposed at a landfill.

3.0 ENVIRONMENTAL MANAGEMENT PLAN

This EMP assumes that the Site will be re-developed with a slab-on-grade building and asphalt-paved parking lot(s). However, this EMP also addresses other Site re-development activities (e.g., construction of new buildings, etc.).

This EMP provides options regarding the disposal and/or re-use of 1) fill material potentially containing elevated concentrations of heavy metals; and 2) soil or fill material potentially containing petroleum or other VOC contamination. This EMP also provides a protocol for preventing fugitive emissions during disturbance of these materials, and reducing future impacts associated with these materials. Procedures to be implemented in order to manage these materials in accordance with applicable regulations if they are encountered and/or disturbed during re-development activities are also discussed herein. The procedures presented are intended to: 1) reduce potential exposure to construction workers and nearby residents during re-development; and 2)reduce potential exposure to Site workers, Site occupants, and nearby workers and residents during future operation and/or occupation of the Site. The Summary Flow Chart included in Appendix B provides recommended handling and disposal options for materials covered by this EMP.

As part of this EMP, the City of Rochester, or current Site owner, must be notified at least two business days prior to performing any Site activities that have the potential to disturb contaminated material.

3.1 Potentially-Contaminated Materials

This section describes the types of contaminated media documented at the Site and provides information on the identification, handling, analytical laboratory testing, and disposal or re-use of these materials.

If fill material is not going to be excavated, then it does not require handling or analytical laboratory testing. An example is when clean select fill (e.g., crusher run, #2 stone, etc.) is brought on-site and placed over existing fill for construction of a parking lot with "sheet flow" stormwater drainage (i.e., excavation into the fill for drainage structures/piping is not required).

3.1.1 In-Field Identification

Fill Material

Based on the test pits and soil borings that have been performed at the Site to date, surficial fill material will likely be encountered from the ground surface to depths ranging between 2 and 4 feet below the ground surface. The average depth of fill is approximately 3 feet. The fill material outside the footprint of the former on-site building typically consists of a heterogeneous mixture of soil, asphalt, concrete, cinders, slag and ash. The fill material inside the footprint of the former on-site building generally consists of black sand and gravel with some concrete.

A thin layer, or chunks, of suspect dried paint material may be observed in the surficial fill material. The suspect dried paint material was primarily observed in test pits located on the northern portion of the Site. However, fill material at a test pit on the central western portion of the Site and a test pit at the center of the Site were also observed to contain some chunks of suspect dried paint material. The previously observed suspect dried paint material at the Site appeared white, yellow, gray or blue-gray in color. [Note: The fill material should be above the top of the groundwater table.]

Indigenous Soils

Native soils, consisting of sands and clay with some silts are present beneath the surficial fill material. Equipment refusal, indicative of bedrock or a layer of cobbles, was realized at depths ranging between 3.5 feet and 12.5 feet below the ground surface during previous subsurface studies.

Petroleum/VOC Contaminated Soil or Fill Material

Based on the suspect paint encountered in fill material and on the use of the Site for storage of unregistered vehicles, etc., it is possible that localized areas of fill material or soil may be contaminated with petroleum products, other VOCs or other automotive-related liquids (e.g., ethylene glycol or antifreeze). Impacted soil or fill may exhibit petroleum or unusual odors, staining, or pockets of free liquid. In addition, evidence of total VOC vapors may be detected when ambient air space above the material is screened using a photoionization detector (PID) and/or flame ionization detector (FID).

3.1.2 Handling

When surficial fill material is excavated or moved, the fill material must be segregated from other materials (e.g., native soils), and be placed on, and covered with, plastic sheeting that is at least 10 millimeters thick. Prior to re-use or off-site disposal, representative samples of the fill material must be collected and analyzed as described in Section 3.1.3.

If fill material that differs from that identified above is encountered, it must be removed, segregated from other material, and placed on, and covered with, plastic sheeting. The unknown fill material's location, appearance, and quantity (if possible) will be documented. The City of Rochester (or current Site owner) will be notified regarding the unknown fill material. The unknown fill must be addressed (e.g., characterized, disposed of off-site, etc.) in accordance with applicable regulations within 60 days, unless otherwise authorized by regulatory agencies.

Materials that are excavated or disturbed and appear to be contaminated by petroleum-related compounds or other VOCs (e.g., based on visual and olfactory assessment, PID/FID readings, etc.) must be removed, segregated from non-contaminated media, and be placed on, and covered with, plastic sheeting that is at least 10 millimeters thick. The contaminated material's location, appearance, and quantity (if possible) should be documented. The City of Rochester (or current Site owner) must be notified regarding the contamination. If contaminated material is to be staged on-site, any disposal, treatment, etc. will be conducted within 60 days, unless otherwise authorized by regulatory agencies.

3.1.3 Analytical Laboratory Testing

Analytical laboratory testing will be required on fill material and/or contaminated soil that is excavated, moved or disturbed. Based on the previous environmental studies performed at the Site, the recommended analytical laboratory testing requirements for these materials are provided below and also summarized on Table 1 in Appendix D.

Fill Material

As shown on Table 1, samples of excavated/staged/disturbed surficial fill material may require analysis at a New York State Department of Health (NYSDOH) ELAP-certified analytical laboratory for:

- TCLP metals
- Total RCRA metals
- Cyanide

If the fill material is to be disposed off-site at a landfill facility, additional testing parameters may be required to obtain disposal approvals. The specific disposal facility must be contacted to determine if there are any additional testing requirements.

Petroleum or VOC Contaminated Soil or Fill Material

As shown on Table 1, samples of excavated/staged/disturbed material contaminated with petroleum-related compounds or other VOCs (e.g., attributable to paint, etc.) may require testing for one or more of the following sets of parameters:

- USEPA target compound list (TCL) and NYSDEC STARS-list VOCs
- USEPA TCL semi-volatile organic compounds (SVOCs)
- Total RCRA metals
- TCLP metals
- Cyanide

The actual test parameters must be approved by the City of Rochester (or current Site owner), and these parameters may also be dependant upon the field observations, PID/FID readings measured, and potential testing requirements of a NYSDEC-approved disposal facility (i.e., landfill). The specific disposal facility must be contacted to determine if there are any additional testing requirements.

3.1.4 Disposal and Re-Use Criteria

This section of the EMP provides a mechanism for determining proper off-site disposal or re-use of materials (e.g., soil, fill material) from the Site. Off-site disposal or re-use requirements are generally based on comparing analytical laboratory test results to the following regulatory criteria:

- The TCLP extraction test results for soil or fill material samples must be compared to toxicity characteristic MCLs listed in 6 NYCRR Part 371.3(d) (copy included in Appendix C, also refer to Table 2 included in Appendix D).

- Total concentrations of VOCs, SVOCs and heavy metals in soil or fill material must be compared to recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 as amended by the NYSDEC's Tables dated August 22, 2001 for gasoline and fuel oil contaminated soils (copy included in Appendix C, also refer to Table 2 included in Appendix D).
- Total concentrations of petroleum-related VOCs and SVOCs in soil or fill material must be compared to petroleum soil guidance values listed in the August 1992 NYSDEC STARS Memo #1 (copy included in Appendix C, also refer to Table 2 included in Appendix D).
- There is no regulatory guidance document for cyanide. If total cyanide is detected in soil or fill that has been excavated/staged/disturbed, further work to evaluate the form of cyanide should be conducted and regulatory agencies should be consulted for their input in relation to proper disposal or re-use of cyanide-containing materials.

As indicated in 6 NYCRR Part 360-1.15 (b)(8), non-hazardous soil, ceases to be solid waste when it is excavated as part of a construction project (e.g., re-development project), other than a department-approved or undertaken inactive hazardous waste disposal site remediation program, and the material is used as backfill for the same excavation or excavations containing similar contaminants at the same site. A copy of 6 NYCRR Part 360-1.15 is included in Appendix C. As such, non-hazardous soil/fill at the Site that is excavated during re-development, is not a solid waste if re-used on-site in areas where similar material already exists. However, criteria for re-use established in this EMP must be achieved.

Off-Site Treatment or Disposal

If fill material is to be taken off-site, it must be disposed of in accordance with applicable regulations. Waste disposal criteria are provided below:

1. Soil or fill material requires treatment and/or disposal at an approved facility (e.g., landfill) as a characteristic hazardous waste when:
   - Fill material that is observed to contain a distinct layer of suspect dried paint (i.e., as observed during previous studies on the northeast corner of the Site)
   - VOCs, SVOCs or metals in samples exceed one or more of the toxicity characteristic MCLs listed in 6 NYCRR Part 371.3(d).
2. Soil or fill material requires treatment and/or disposal at an approved facility (e.g., landfill) as a non-hazardous waste (e.g., industrial waste or solid waste) when:
   - VOCs, SVOCs or total metals exceed recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046.
   - VOCs or SVOCs exceed petroleum soil guidance values listed in the August 1992 NYSDEC STARS Memo #1.
   - VOCs, SVOCs and total metals are below toxicity characteristic MCLs.

   [Note: Also, includes the sediments in exterior catch basin that were previously tested].

3. Fill material requires disposal at an approved landfill as a solid waste or as construction and demolition (C&D) debris (if not comprised primarily of soil) when:

   - VOCs, SVOCs or total metals are below recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046.
   - VOCs and SVOCs are below petroleum soil guidance values listed in the August 1992 NYSDEC STARS Memo #1.
   - VOCs, SVOCs and total metals are below toxicity characteristic MCLs.
   - The fill contains materials that define it as a solid waste in 6 NYCRR Part 360-1.15 (i.e., fill does not meet the criteria for being beneficially used).

Off-Site Re-Use

NA

1. Soil is not considered a waste and can be re-used off-site when:

   - VOCs, SVOCs or total metals are below recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046.
   - VOCs and SVOCs are below petroleum soil guidance values listed in the August 1992 NYSDEC STARS Memo #1.
   - VOCs, SVOCs and total metals are below toxicity characteristic MCLs.

2. Certain types of fill material (e.g., reworked soil with little or no brick, concrete, etc,) may be re-used off-site at certain types of commercial or industrial properties upon receipt of approval from appropriate regulatory agencies when:

   - VOCs, SVOCs or total metals are below recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046.
   - VOCs and SVOCs are below petroleum soil guidance values listed in the August 1992 NYSDEC STARS Memo #1.
   - VOCs, SVOCs and total metals are below toxicity characteristic MCLs.
   - The fill contains materials that cease to be a solid waste when beneficially used in accordance with 6 NYCRR Part 360-1.15.

On-Site Re-Use

Prior to re-using soil or fill on-site, its effect on geotechnical requirements associated with the redevelopment plans for the Site should be evaluated. On-site re-use of soil or fill at the Site falls into two categories:

1. Unrestricted on-site re-use of soil or fill when:

   - VOCs, SVOCs or total metals are below recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046.
   - VOCs and SVOCs are below petroleum soil guidance values listed in the August 1992 NYSDEC STARS Memo #1.

- VOCs and SVOCs and total metals are below toxicity characteristic MCLs.
- The fill contains materials that cease to be a solid waste when beneficially used in accordance with 6 NYCRR Part 360-1.15 (e.g., the material is used as backfill for the same excavation or excavations containing similar contaminants at the same site).

2. Restricted on-site re-use of soil or fill when:

   - VOCs and SVOCs are below recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046.
   - Total metals exceed recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046.
   - VOCs or SVOCs exceed petroleum soil guidance values listed in the August 1992 NYSDEC STARS Memo #1.
   - VOCs, SVOCs and total metals are below toxicity characteristic MCLs.
   - The fill contains materials that cease to be a solid waste when beneficially used in accordance with 6 NYCRR Part 360-1.15 (e.g., the material is used as backfill for the same excavation or excavations containing similar contaminants at the same site).

Acceptable uses of the fill material or soil that has restricted re-use includes backfill under parking lots, grading, architectural berms, etc. Fill material or soil with restrictions that is re-used on-site must be covered with a minimum one-foot layer of clean soil or impervious material (e.g., asphalt pavement) and can not be re-used on-site in planters, landscaping beds or in areas that may be used as gardens. This type of fill material or soil can not be re-used below the groundwater table or between 0 and 1 foot below the ground surface of the final planned grade unless covered with an impervious material (e.g., asphalt pavement).

3.1.5 Off-Site Transportation of Site Materials

Transporters of regulated non-hazardous waste or regulated hazardous waste must have the appropriate NYSDEC permits, etc. The disposal facility (e.g., landfill) for fill material or contaminated soil must be approved by the NYSDEC. This includes contaminated material that may be defined as hazardous waste and non-hazardous waste.

3.2 Air Monitoring

During activities that have the potential to disturb contaminated media (e.g., soil and fill), air monitoring must be conducted. This includes during re-development activities and post-development activities as they arise (e.g., building expansions, repairs to buried utilities, etc.). The type of air monitoring performed will depend on the type of activity and its location on the Site.

3.2.1 Particulate Monitoring

During activities that disturb fill material that is confirmed or suspected to contain elevated heavy metals, air monitoring for particulates using a real-time aerosol monitor (RTAM) must be implemented. This will ensure that respiratory protection is adequate to protect Site workers, occupants and the nearby community against potential contaminants in the fill, and to ensure that the potential contaminants are not migrating off-site through the air. The particulate monitoring measurements will be compared to action levels specified in NYSDEC TAGM 4031 (copy included in Appendix C) and also identified in the May 2002 Health and Safety Plan (HASP) for the Site. If the action level is exceeded (i.e., 150 ug/m^3 over an integrated period not to exceed 15 minutes), or if visible dust is encountered, then work shall be discontinued until corrective actions are implemented and subsequent readings indicate particulate levels are within the acceptable range. The party conducting the air monitoring will have the authority to halt the disturbance of fill material until appropriate actions are taken. Corrective actions may include dust suppression, change in the way work is performed, upgrade of personal protective equipment, etc. Readings must be recorded with an indication of the work area, wind direction/speed and monitoring location and available for review.

3.2.2 VOC Monitoring

Since some areas of fill material at the Site contain suspect paint material, the Site has been used for the storage of unregistered vehicles, and surficial soil staining has been observed at the Site, it is possible that contamination comprised of petroleum products, other VOCs, or other automotive products (e.g., ethylene glycol, etc.) may be encountered during re-development activities. As such, air monitoring should also include monitoring for VOCs using a real-time PID and/or FID meter during activities that disturb fill material or soil at or near the ground surface. This will ensure that respiratory protection is adequate to protect Site workers against these potential contaminants, and to ensure that the potential contaminants are not migrating off-site.

The air monitoring measurements will be compared to the corrective action levels that are specified in the HASP, which is attached in Appendix E of this EMP. If action levels are exceeded, then work shall be discontinued until corrective actions are implemented and subsequent readings indicate VOC concentrations are within the acceptable range. The party conducting the air monitoring will have the authority to halt the disturbance of contaminated media (e.g., excavation activities, grading activities, etc.) until appropriate actions are taken. Corrective actions may include change in the way work is performed, upgrade of personal protective equipment, etc. Readings must be recorded with an indication of the work area, wind direction/speed and monitoring location and available for review.

3.3 Dust Suppression

If dust suppression is required during site activities, the following techniques may be implemented: applying water to haul roads or grading surfaces; wetting equipment and excavation faces; spraying water on buckets during excavation and dumping; covering materials that are being hauled; restricting equipment speeds; covering excavated areas and exposed areas of fill material or other impacted media, etc. Dust suppression techniques will be utilized until air monitoring indicates that particulate levels are within an acceptable range.

3.4 Site Controls

If contaminated media of unknown type is encountered, a fence will be placed around its location in order to restrict access and exposure. Depending on the material encountered covering with "clean" backfill may be required to restrict access. Fencing will also be placed around excavations into contaminated materials that are to be left open over night, the weekend, or for any other extended periods of time.

3.5 Management of Potential Future Disturbances

Workers involved with future on-site work (i.e., placing/repairing plantings, new installation/repair of buried utilities, etc.) that have the potential to disturb contaminated media should be made aware of the potential exposure hazards. The property manager, occupying entity, and/or the owner of the Site will be responsible for notifying future on-site workers of potential exposure hazards. These parties will be in possession of this EMP and the associated HASP. These documents contain information on the type and location of contaminants at the Site, and address how to handle, treat, transport and dispose of impacted materials in a manner that precludes exposure. Precautions should be implemented to minimize disturbance of soil or fill that result in air-borne release of particulates. Areas where work has been completed should be repaired (e.g., clean soil/fill re-applied, paved, etc.).

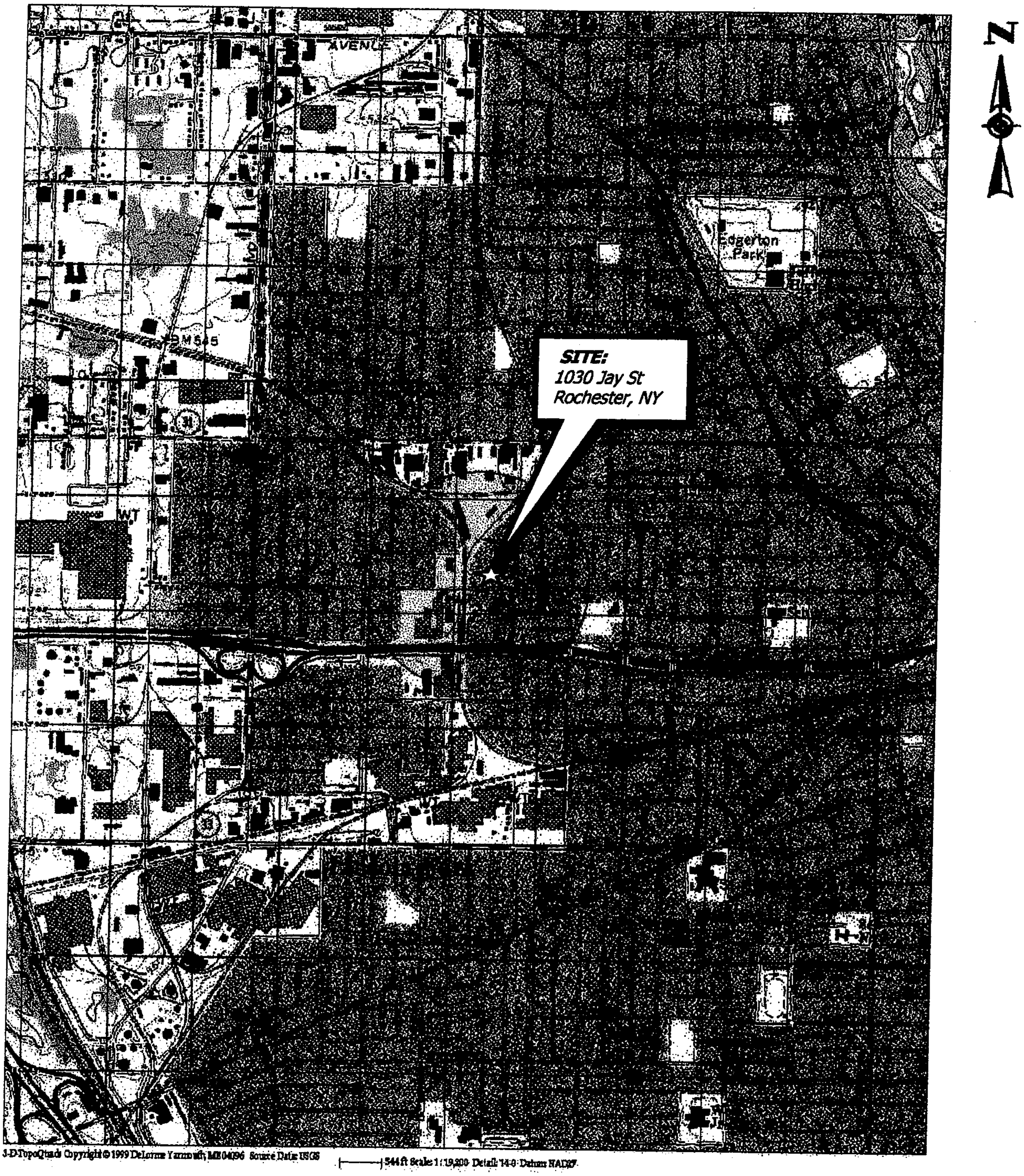
4.0 HEALTH AND SAFETY PLAN

A site-specific health and safety plan (HASP) for the Site is included in Appendix E. This HASP outlines the policies and procedures necessary to protect workers and the public from potential environmental hazards posed during redevelopment activities, maintenance activities, or other activities at the Site that have the potential to disturb fill material or soil that has the potential to contain contaminants.

Contractors, subcontractors, and their employees involved with activities at the site that have the potential to disturb potentially-contaminated fill materials or soil will be required to read and follow the procedures identified in the HASP.

APPENDIX A

Figures

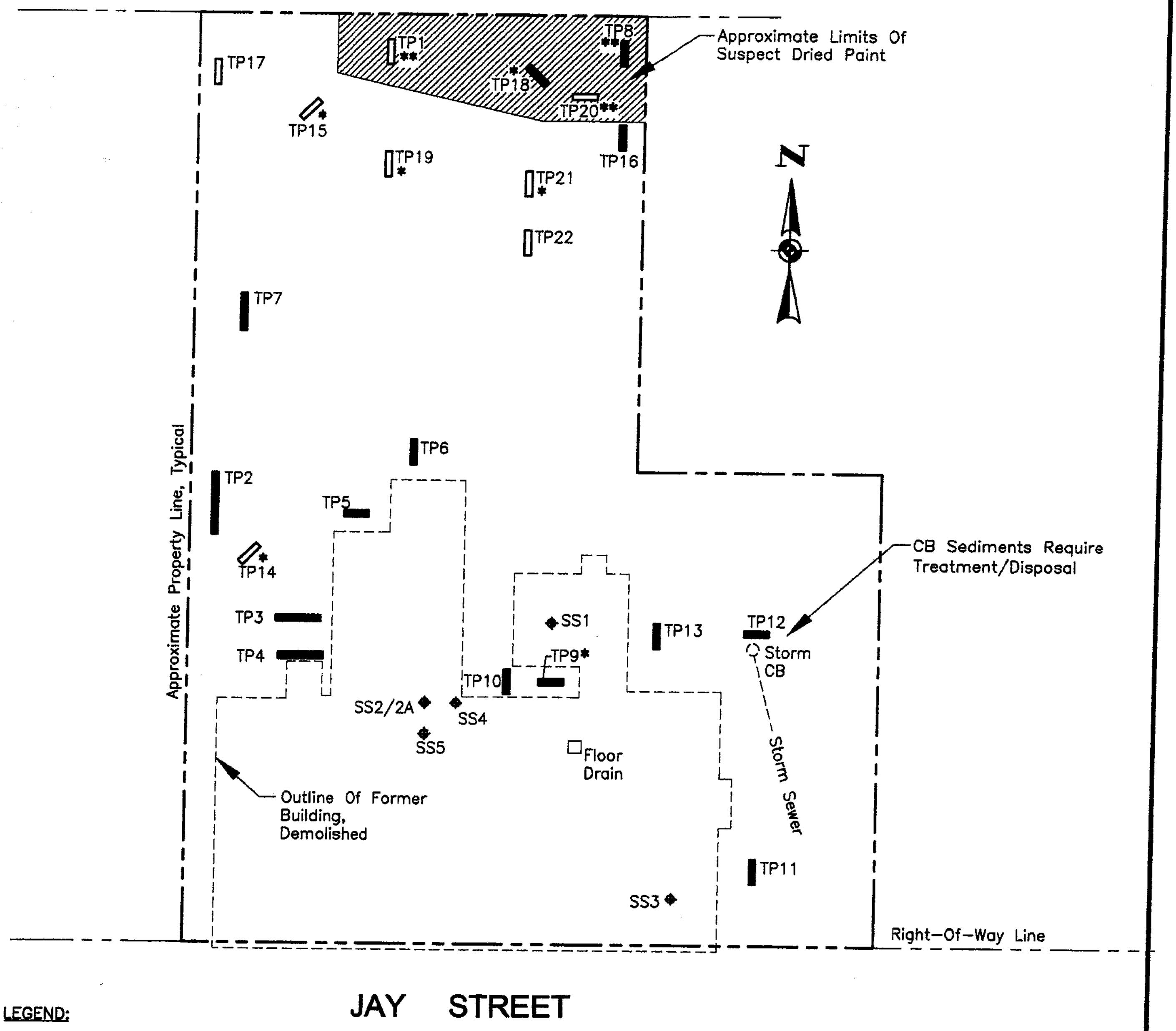


3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS

544 ft Scale 1:19,200 Detail: 14-0 Datum: NAD27

Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad map Rochester West (NY) 1995. Site Lat/Long: N43d-09.57' – W77d-38.92'

DATE **05-09-2002**	**day**	PROJECT TITLE **1030 JAY STREET** **ROCHESTER, NY**	PROJECT NO. **2918S-02**
DRAWN BY **Tww**	DAY ENVIRONMENTAL, INC. ENVIRONMENTAL CONSULTANTS ROCHESTER, NEW YORK 14614-1008	**ENVIRONMENTAL MANAGEMENT PLAN**	**FIGURE 1**
SCALE **1" = 2000'**		DRAWING TITLE **PROJECT LOCUS MAP**	



LEGEND:

TP5 ▭	Test pit with label (No samples tested)
◆ SS5	Soil boring with label
▬ ◆	Sample exceeded NYSDEC recommended soil cleanup objective (RSCO)
▬ ◆	Sample below NYSDEC RSCO
*	Indicates that sample contains chunks of suspect dried paint
**	Indicates that sample contains layer of suspect dried paint

NOTES:

1. Drawing prepared from a drawing by Sear-Brown Associates entitled "Soil Boring And Test Pit Locations" dated 2001. Location of features are approximate.

DATE
06-24-2002
DRAWN BY
Tww
SCALE
1" = 50' +/-

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008

PROJECT TITLE
1030 JAY STREET
ROCHESTER, NY
ENVIRONMENTAL MANAGEMENT PLAN
DRAWING TITLE
Soil Boring and
Test Pit Location Plan

PROJECT NO.
2918S-02
FIGURE 2

Ref1: JayStBas wg Ref2: Ref3:
Time Printed: Mon June 24 10:12 2002 Filename: Phase2\2918\2918-1.dwg

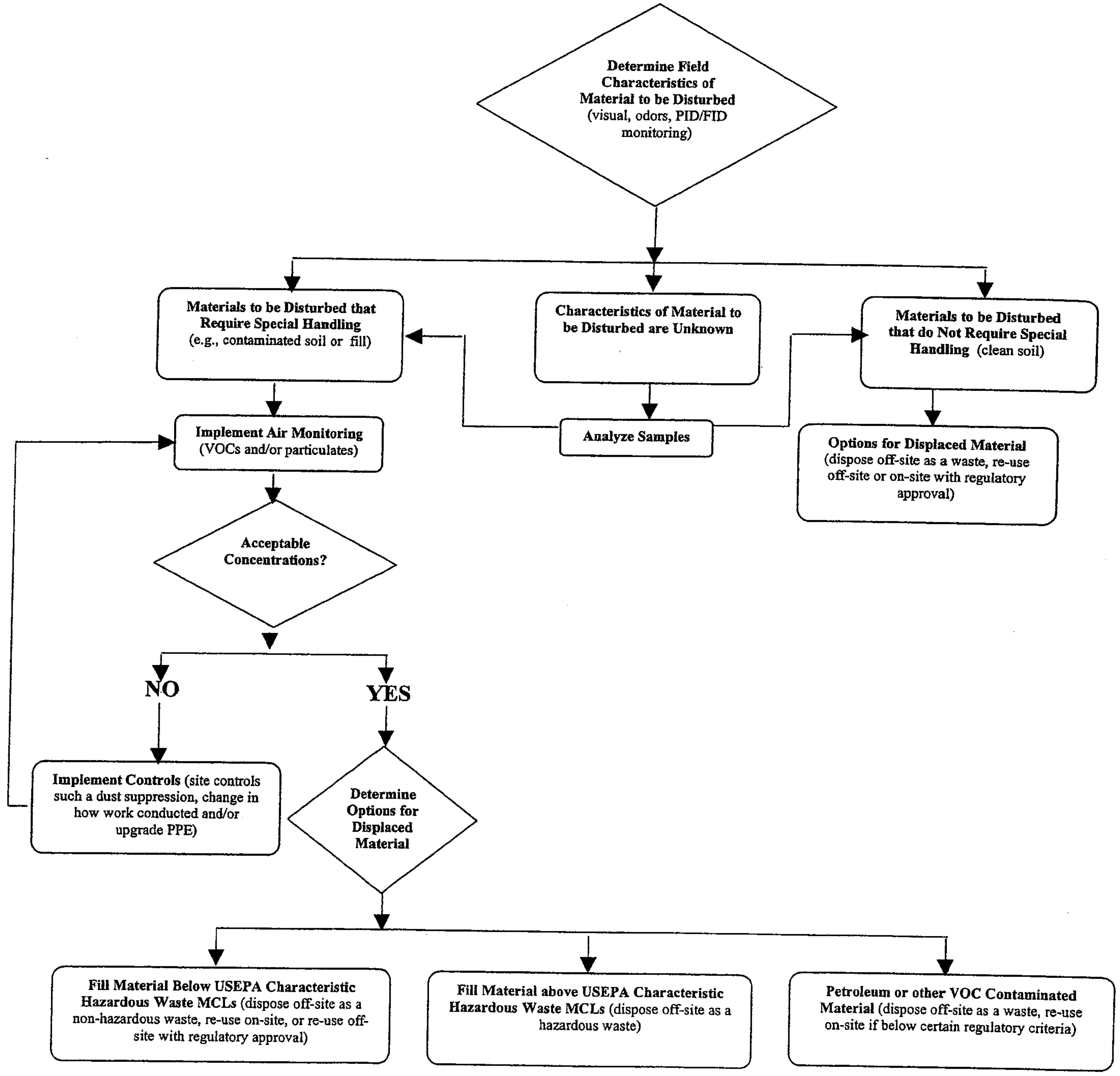
APPENDIX B

Summary Flow Chart for EMP

SUMMARY FLOW CHART

ENVIRONMENTAL MANAGEMENT PLAN

1030 JAY STREET
ROCHESTER, NEW YORK



APPENDIX C

Regulatory Guidance Documents

is a secondary process, the materials must be managed such that there is no placement on the land.

(ii) The following materials are solid wastes, even if the recycling involves use, reuse, or return to the process as described in clause (i)('a') through (i)('c') of this paragraph:

('a') materials used in a manner constituting disposal, or used to produce products that are applied to the land; or

('b') materials burned for energy recovery, used to produce a fuel, or contained in fuels; or

('c') materials accumulated speculatively; or

('d') materials listed in subparagraphs (5)(i) and (5)(ii) of this subdivision.

(7) Parties who raise a claim that a certain material is not a solid or hazardous waste, or is exempt or conditionally exempt from regulation, based on the intent to reclaim, recycle or reuse, must notify the Department, in writing, before utilizing the exemption or exclusion. Such notification shall give the names and locations of the generating and receiving facilities, if different, identify all exemptions or exclusions that the party is claiming, and describe the activity or activities which are believed to qualify for such exemptions or exclusions. Respondents in actions to enforce regulations, implementing Article 27, who raise a claim that a certain material is not a solid or hazardous waste, or is exempt or conditionally exempt from regulation, when intended for reclamation, recycling, or reuse, must demonstrate:

(i) for on-site reclamation, recycling, or reuse, that the party meets the terms of the exclusion or exemption; or

(ii) for off-site reclamation, recycling, or reuse:

('a') that there is a known market or disposition for the material; and

('b') that the owner or operator of the receiving facility has the necessary equipment and capacity to process the entire volume of material offered; and

('c') through appropriate documentation, such as contracts, that the receiving party will reclaim, recycle, use, or reuse the material in such a manner as to qualify it for the exemption or exclusion.

TABLE 1

	Use Constituting Disposal (1)	Energy Recovery/ Fuel (2)	Reclamation (3)	Speculative Accumulation (4)
Spent materials	(*)	(*)	(*)	(*)
Sludges listed in 371.4(b) and (c)	(*)	(*)	(*)	(*)
Sludges exhibiting a characteristic of hazardous waste	(*)	(*)	-	(*)
By-products listed in 371.4(b) and (c)	(*)	(*)	(*)	(*)
By-products exhibiting a characteristic of hazardous waste	(*)	(*)	-	(*)
Commercial chemical products listed in 371.4(d)	(*)	(*)	-	-
Scrap Metal other than excluded scrap metal (see 371.1(a)(9)	(*)	(*)	(*)	(*)

Note: the terms "spent materials," "sludges," "by-products," and "scrap metal" and "processed scrap metal" are defined in subdivision 371.1(a) of this section.

* 6 NYCRR Part 371.3(d) *

(d) Definition of hazardous waste.

(1) A solid waste, as defined in subdivision (c) of this section, is a hazardous waste if:

(i) It is not excluded from regulation as a hazardous waste under paragraph (e)(2) of this section; and

(ii) It meets any of the following criteria:

('a') It exhibits any of the characteristics of hazardous waste identified in section 371.3 of this Part. However, any mixture of a waste from the extraction, beneficiation, and processing of ores and minerals excluded under 371.1(e)(2)(vi) of this Part and any other solid waste exhibiting a characteristic of hazardous waste under section 371.3 of this Part is a hazardous waste only if it exhibits a characteristic that would not have been exhibited by the excluded waste alone if such mixture had not occurred or if it continues to exhibit any of the characteristics exhibited by the non-excluded wastes prior to mixture. Further, for the purposes of applying the Toxicity Characteristic to such mixtures, the mixture is also a hazardous waste if it exceeds the maximum concentration for any contaminant listed in Table 1 to subdivision 371.3(e) that would not have been exceeded by the excluded waste alone if the mixture had not occurred or if it continues to exceed the maximum concentration for any contaminant exceeded by the nonexempt waste prior to mixture.

('b') It is listed in section 371.4 of this Part and has not been excluded from the lists in section 371.4 under the provisions of subdivisions 370.3(a) and (c) of this Title.

('c') It is a mixture of a solid waste and a hazardous waste that is listed in section 371.4 solely because it exhibits one or more of the characteristics of hazardous waste identified in section 371.3, unless the resultant mixture no longer exhibits any characteristic of hazardous waste identified in section 371.3, or unless the solid waste is excluded from regulation under 371.1(e)(2)(vi) and the resultant mixture no longer exhibits any characteristic of hazardous waste identified in section 371.3 for which the hazardous waste listed in section 371.4 was listed. (However, nonwastewater mixtures are still subject to the requirements of Part 376 of this Title, even if they no longer exhibit a characteristic at the point of land disposal).

(Note: Mixing may be a form of treatment and require a Part 373 permit.)

('d') It is a mixture of solid waste and one or more hazardous wastes listed in section 371.4 and has not been excluded from this paragraph by petition under section 370.3(a) and (c) of this Title. However, if the generator can demonstrate that the mixture consists of wastewater and it is a surface water point source or pretreatment facility discharge in compliance with ECL Article 17 (including wastewater at facilities which have eliminated the discharge of wastewater), then the following mixtures of solid wastes and hazardous wastes listed in section 371.4 are not hazardous wastes (except by application of clause (1)(ii)('a') or ('b') of this subdivision):

('1') one or more of the following spent solvents listed in section 371.4(b)--carbon tetrachloride, tetrachloroethylene, trichloroethylene--provided that the maximum total weekly usage of these solvents (other than the amounts that can be demonstrated not to be discharged to wastewater) divided by the average weekly flow of wastewater into the headworks of the facility's wastewater treatment or pretreatment system does not exceed 1 mg/l; or

('2') one or more of the following spent solvents listed in section 371.4(b)--methylene chloride, 1,1,1-trichloroethane, chlorobenzene, o-dichlorobenzene, cresols, cresylic acid, nitrobenzene, toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, spent chlorofluorocarbon solvents--provided that the maximum total weekly usage of these solvents (other than the amounts that can be demonstrated not be discharged to wastewater) divided by the average weekly flow of wastewater into the headworks of the facility's wastewater treatment or pretreatment system does not exceed 25 mg/l; or

('3') one of the following wastes listed in section 371.4(c) of this Part, provided that the wastes are discharged to the refinery oil recovery sewer before primary oil/water/solids separation -- heat exchanger bundle cleaning sludge from the petroleum refining industry (EPA Hazardous Waste No. K050), crude oil storage tank sediment from petroleum refining operations (EPA Hazardous Waste No. K169), clarified slurry oil tank sediment and/or in-line filter/separation solids from petroleum refining operations (EPA Hazardous Waste No. K170), spent hydrotreating catalyst (EPA Hazardous Waste No. K171), and spent hydrorefining catalyst (EPA Hazardous Waste No. K172); or

('4') a discarded commercial chemical product, or chemical intermediate listed in section 371.4(d) arising from "de minimis" losses of these materials from manufacturing operations in which these materials are used as raw materials or are produced in the manufacturing process. For purposes of this subparagraph, "de minimis" means unintentional and minor losses of hazardous materials which occur unavoidably as a result of normal manufacturing processes. "De minimis" losses include those from normal material handling operations (e.g. spills from the unloading or transfer of materials from bins or other containers, leaks from pipes, valves or other devices used to transfer materials); minor leaks of process equipment, storage tanks or containers; leaks from well-maintained pump packings and seals; sample purgings; relief device discharges; discharges from safety showers and rinsing and cleaning of personal safety equipment; and rinsate from empty containers or from containers that are rendered empty by that rinsing; or

('5') wastewater resulting from laboratory operations containing any toxic (T) wastes listed in section 371.4, provided that the annualized average flow of laboratory wastewater does not exceed one percent of total wastewater flow into the headworks of the facility's wastewater treatment or pretreatment system, or provided the wastes' combined annualized average concentration does not exceed one mg/l in the headworks of the facility's wastewater treatment or pretreatment facility. The annualized average flow means the total flow registered for the calendar year divided by the number of operating days of the laboratory. The combined annualized average concentration means the weight of the combination of wastes divided by the annualized average flow. Toxic (T) wastes used in laboratories that are demonstrated not to be discharged to wastewater are not to be included in this calculation; or

('6') One or more of the following wastes listed in subdivision 371.4(c) of this Part-wastewaters from the production of carbamates and carbamoyl oximes (EPA Hazardous Waste No. K157)-Provided that the maximum weekly usage of formaldehyde, methyl chloride, methylene chloride, and triethylamine (including all amounts that can not be demonstrated to be reacted in the process, destroyed through treatment, or is recovered, i.e., what is discharged or volatilized) divided by the average weekly flow of process wastewater prior to any dilutions into the headworks of the facility's wastewater treatment system does not exceed a total of 5 mg/l; or

('7') Wastewaters derived from the treatment of one or more of the following wastes listed in subdivision 371.4(c) of this Part-organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes (EPA Hazardous Waste No. K156).-Provided, that the maximum concentration of formaldehyde, methyl chloride, methylene chloride, and triethylamine prior to any dilutions into the headworks of the facility's wastewater treatment system does not exceed a total of 5 milligrams per liter.

('e') Rebuttable presumption for used oil. Used oil containing more than 1000 ppm total halogens is presumed to be a hazardous waste because it has been mixed with halogenated hazardous waste listed in section 371.4. Persons may rebut this presumption by demonstrating that the used oil does not contain hazardous waste (for example, by using an analytical method from SW-846, Third Edition, to show that the used oil does not contain significant concentrations of halogenated hazardous constituents listed in appendix 23). EPA Publication SW-846, Third Edition, is available from the Government Printing Office, Superintendent of Documents, PO Box 371954, Pittsburgh, PA 15250-7954, 202-783-3238 (document number 955-001-00000-1).

('1') The rebuttable presumption does not apply to metalworking oils/fluids containing chlorinated paraffins, if they are processed, through a tolling agreement, to reclaim metalworking oils/fluids. The presumption does apply to metalworking oils/fluids if such oils/fluids are recycled in any other manner, or disposed.

('2') The rebuttable presumption does not apply to used oils contaminated with chlorofluorocarbons (CFCs) removed from refrigeration units where the CFCs are destined for reclamation. The rebuttable presumption does apply to used oils contaminated with CFCs that have been mixed with used oil from sources other than refrigeration units.

(2) A solid waste which is not excluded from regulation under subparagraph (1)(i) of this subdivision becomes a hazardous waste when any of the following events occur:

(i) In the case of a waste listed in section 371.4, when the waste first meets the listing description therein.

(ii) In the case of a mixture of solid waste and one or more listed hazardous wastes, when a hazardous waste listed in section 371.4 is first added to the solid waste.

(iii) In the case of any other waste (including a waste mixture), when the waste exhibits any of the characteristics identified in section 371.3.

(3) Unless and until it meets the criteria of paragraph (4) of this subdivision.

(i) A hazardous waste will remain a hazardous waste.

(ii) ('a') Any solid waste generated from the treatment, storage, or disposal of a hazardous waste, including any sludge, spill residue, ash, emission control dust, or leachate (but not including precipitation run-off), is a hazardous waste. (However, materials that are reclaimed from solid waste and used beneficially are not solid wastes and hence are not hazardous waste under this provision unless the reclaimed material is burned for energy recovery or used in a manner constituting disposal).

('b') The following solid wastes are not hazardous even though they are generated from the treatment, storage, or disposal of a hazardous waste, unless they exhibit one or more of the characteristics of hazardous waste:

('1') Waste pickle liquor sludge generated by lime stabilization of spent pickle liquor from the iron and steel industry (SIC codes 331 and 332).

('2') Waste from burning any of the materials exempted from regulation by clauses 371.1(g)(1)(iii)('c') and ('d').

('3') ('i') Nonwastewater residues, such as slag, resulting from high temperature metals recovery (HTMR) processing of K061, K062 or F006 waste, in units identified as rotary kilns, flame reactors, electric furnaces, plasma arc furnaces, slag reactors, rotary hearth furnace/electric furnace combinations or industrial furnaces (as defined in the definition for "Industrial furnace" in subdivision 370.2(b) of this Title), that are disposed in solid waste management facilities, provided that these residues meet the generic exclusion levels identified in the tables in this subparagraph for all constituents, and exhibit no characteristics of hazardous waste. Testing requirements must be incorporated in a facility's waste analysis plan or a generator's self-implementing waste analysis plan; at a minimum, composite samples of residues must be collected and analyzed quarterly and/or when the process or operation generating the waste changes. Persons claiming this exclusion in an enforcement action will have the burden of proving by clear and convincing evidence that the material meets all of the exclusion requirements.

Constituent	Maximum for any single composite sample – TCLP (mg/l)
Generic exclusion levels for K061 and K062 nonwastewater HTMR residues	
Antimony	0.10
Arsenic	0.50
Barium	7.6
Beryllium	0.010
Cadmium	0.050
Chromium (total)	0.33
Lead	0.15
Mercury	0.009
Nickel	1.0

Selenium	0.16
Silver	0.30
Thallium	0.020
Zinc	70
Generic exclusion levels for F006 nonwastewater HTMR residues	
Antimony	0.10
Arsenic	0.50
Barium	7.6
Beryllium	0.010
Cadmium	0.050
Chromium (total)	0.33
Cyanide (total) (mg/kg)	1.8
Lead	0.15
Mercury	0.009
Nickel	1.0
Selenium	0.16
Silver	0.30
Thallium	0.020
Zinc	70

('ii') A one-time notification and certification must be placed in the facility's files and sent to the Department for K061, K062 or F006 HTMR residues that meet the generic exclusion levels for all constituents, and do not exhibit any characteristics that are sent to solid waste management facilities. The notification and certification that is placed in the generator's or treater's files must be updated if the process or operation generating the waste changes and/or if the solid waste management facility receiving the waste changes. However, the generator or treater need only notify the Department on an annual basis if such changes occur. Such notification and certification should be sent to the Department no later than the end of the calendar year. The notification must include the following information: The name and address of the solid waste management facility receiving the waste shipments; the EPA Hazardous Waste Number(s) and treatability group(s) at the initial point of generation; and, the treatment standards applicable to the waste at the initial point of generation. The certification must be signed by an authorized representative and must state as follows: "I certify under penalty of law that the generic exclusion levels for all constituents have been met without impermissible dilution and that no characteristic of hazardous waste is exhibited. I am aware that there are significant penalties for submitting a false certification, including the possibility of fine and imprisonment."

('4') Biological treatment sludge from the treatment of one of the following wastes listed in subdivision 371.4(c) of this Part-organic waste (including heavy ends, still bottoms, light ends, spent solvents, filtrates, and decantates) from the production of carbamates and carbamoyl oximes (EPA Hazardous Waste No. K156), and wastewaters from the production of carbamates and carbamoyl oximes (EPA Hazardous Waste No. K157).

('5') Catalyst inert support media separated from one of the following wastes listed in section 371.4(c) of this Part - Spent hydrotreating catalyst (EPA Hazardous Waste No. K171), and Spent hydrorefining catalyst (EPA Hazardous Waste No. K172).

(4) Any solid waste described in paragraph (3) of this subdivision is not a hazardous waste if it meets the following criteria:

(i) In the case of any solid waste, it does not exhibit any of the characteristics of a hazardous waste identified in section 371.3. (However, wastes that exhibit a characteristic at the point of generation may still be subject to the requirements of Part 376, even if they no longer exhibit a characteristic at the point of land disposal.)

(ii) In the case of a waste which is a waste listed under section 371.4, contains a waste listed under section 371.4 or is derived from a waste listed under section 371.4, it also has been excluded from paragraph (3) of this subdivision under subdivisions 370.3(a) and (c) of this Title. Subdivision 370.3(c) provides for the petitioning for exclusion of a listed waste produced at a particular facility.

(5) Notwithstanding paragraphs (1) through (4) of this subdivision and provided the debris as defined in Part 376 of this Title does not exhibit a characteristic identified at section 371.3 of this Part, the following materials are not subject to regulation under Parts 370 through 374 or 376 of this Title:

(i) Hazardous debris as defined in Part 376 of this Title that has been treated using one of the required extraction or destruction technologies specified in Table 1 of subdivision 376.4(g) of this Title; persons claiming this exclusion in an enforcement action will have the burden of proving by clear and convincing evidence that the material meets all of the exclusion requirements; or

(ii) Debris as defined in Part 376 of this Title that the commissioner, considering the extent of contamination, has determined is no longer contaminated with hazardous waste.

(e) Exclusions.

(1) Materials which are not solid wastes. The following materials are not solid wastes for the purpose of this Part:

(i) ('a') domestic sewage; and

('b') any mixture of domestic sewage and other wastes that passes through a sewer system to a publicly-owned treatment works for treatment. "Domestic sewage" means untreated sanitary wastes that pass through a sewer system;

Section 360-1.15 Beneficial use.

(a) Applicability.

(1) This section applies to materials that, before being beneficially used (as determined by the department), were solid waste. This section does not apply to solid wastes subject to regulation under Subpart 360-4 of this Part, except in the manner identified in subdivision 360-1.15(b) of this Part.

(2) Beneficial use determinations granted by the department before the effective date of this section shall remain in effect, subject to all conditions contained therein, unless specifically addressed by subsequent department action.

(b) Solid waste cessation. The following items are not considered solid waste for the purposes of this Part when used as described in this subdivision:

(1) materials identified in subparagraphs 371.1(e)(1)(vi)-(viii) of this Title that cease to be solid waste under the conditions identified in those subparagraphs;

(2) compost and other distribution and marketing (D&M) products that satisfy the applicable requirements under Subpart 360-5 of this Part;

(3) unadulterated wood, wood chips, or bark from land clearing, logging operations, utility line clearing and maintenance operations, pulp and paper production, and wood products manufacturing, when these materials are placed in commerce for service as mulch, landscaping, animal bedding, erosion control, wood fuel production, and bulking agent at a compost facility operated in compliance with Subpart 360-5 of this Part;

(4) uncontaminated newspaper or newsprint when used as animal bedding;

(5) uncontaminated glass when used as a substitute for conventional aggregate in asphalt or subgrade applications;

(6) tire chips when used as an aggregate for road base materials or asphalt pavements in accordance with New York State Department of Transportation standard specifications, or whole tires or tire chips when used for energy recovery;

(7) uncontaminated soil which has been excavated as part of a construction project, and which is being used as a fill material, in place of soil native to the site of disposition;

(8) nonhazardous, contaminated soil which has been excavated as part of a construction project, other than a department-approved or undertaken inactive hazardous waste disposal site remediation program, and which is used as backfill for the same excavation or excavations containing similar contaminants at the same site. Excess materials on these projects are subject to the requirements of this Part. (Note: use of in-place and stockpiled soil from a site being converted to a realty subdivision, as defined by the Public Health Law (10 NYCRR 72), must be approved by the local health department.);

(9) nonhazardous petroleum contaminated soil which has been decontaminated to the satisfaction of the department and is being used in a manner acceptable to the department;

(10) solid wastes which are approved in advance, in writing, by the department for use as daily cover material or other landfill liner or final cover system components pursuant to the provisions of subdivision 360-2.13(w) of this Part when these materials are received at the landfill;

(11) recognizable, uncontaminated concrete and concrete products, asphalt pavement, brick, glass, soil and rock placed in commerce for service as a substitute for conventional aggregate;

(12) nonhazardous petroleum contaminated soil when incorporated into asphalt pavement products by a producer authorized by the department;

(13) unadulterated wood combustion bottom ash, fly ash, or combined ash when used as a soil amendment or fertilizer, provided the application rate of the wood ash is limited to the nutrient need of the crop grown on the land on which the wood ash will be applied and does not exceed 16 dry tons per acre per year;

(14) coal combustion bottom ash placed in commerce to serve as a component in the manufacture of roofing shingles or asphalt products; or as a traction agent on roadways, parking lots and other driving surfaces;

(15) coal combustion fly ash or gas scrubbing by-products placed in commerce to serve as an ingredient to produce light weight block, light weight aggregate, low strength backfill material, manufactured gypsum or manufactured calcium chloride; and

(16) coal combustion fly ash or coal combustion bottom ash placed in commerce to serve as a cement or aggregate substitute in concrete or concrete products; as raw feed in the manufacture of cement; or placed in commerce to serve as structural fill within building foundations when placed above the seasonal high groundwater table.

(c) Special reporting requirements. No later than 60 days after the first day of January following each year of operation, the generator of coal combustion ash must submit a report to the department that identifies the respective quantities of coal combustion bottom ash, fly ash, and gas scrubbing by-products it generated during the calendar year to which it pertains and, with respect to coal combustion bottom ash, how much was sent to a manufacturer of roofing shingles or asphalt products, how much was used as a traction agent on roadways, parking lots, and other driving surfaces, how much was sent to a manufacturer of cement, concrete or concrete products, and how much was used as structural fill; and, with respect to coal combustion fly ash and to gas scrubbing by-products, how much was used to produce light weight block, light weight aggregate, low strength backfill material (flowable fill), manufactured gypsum or manufactured calcium chloride.

(d) Case-specific beneficial use determinations.

(1) The generator or proposed user of a solid waste may petition the department, in writing, for a determination that the solid waste under review in the petition may be beneficially used in a manufacturing process to make a product or as an effective substitute for a commercial product. Unless otherwise directed by the department, the department may not consider any such petition unless it provides the following:

(i) a description of the solid waste under review and its proposed use;

(ii) chemical and physical characteristics of the solid waste under review and of each type of proposed product;

(iii) a demonstration that there is a known or reasonably probable market for the intended use of the solid waste under review and of all proposed products by providing one or more of the following:

(*a*) a contract to purchase the proposed product or to have the solid waste under review used in the manner proposed;

(*b*) a description of how the proposed product will be used;

(*c*) a demonstration that the proposed product complies with industry standards and specifications for that product; or

(*d*) other documentation that a market for the proposed product or use exists; and

(iv) a demonstration that the management of the solid waste under review will not adversely affect human health and safety, the environment, and natural resources by providing:

(*a*) a solid waste control plan that describes the following:

(*1*) the source of the solid waste under review, including contractual arrangements with the supplier;

(*2*) procedures for periodic testing of the solid waste under review and the proposed product to ensure that the proposed product's composition has not changed significantly;

(*3*) the disposition of any solid waste which may result from the manufacture of the product into which the solid waste under review is intended to be incorporated;

(*4*) a description of the type of storage (e.g., tank or pile) and the maximum anticipated inventory of the solid waste under review (not to exceed 90 days) before being used;

(*5*) procedures for run-on and run-off control of the storage areas for the solid waste under review; and

(*6*) a program and implementation schedule of best management practices designed to minimize uncontrolled dispersion of the solid waste under review before and during all aspects of its storage as inventory and/or during beneficial use; and (*b*) a contingency plan that contains the information and is prepared in accordance with subdivision 360-1.9(h) of this Part.

(2) The department will determine in writing, on a case-by-case basis, whether the proposal constitutes a beneficial use based on a showing that all of the following criteria have been met:

(i) the essential nature of the proposed use of the material constitutes a reuse rather than disposal;

(ii) the proposal is consistent with the solid waste management policy contained in section 27-0106 of the ECL;

(iii) the material under review must be intended to function or serve as an effective substitute for an analogous raw material or fuel. When used as a fuel, the material must meet the requirements of paragraph 360-3.1(c)(4) of this Part and the facility combusting the material must comply with the registration requirements in subdivision 360-3.1(c) of this Part, if appropriate;

(iv) for a material which is proposed for incorporation into a manufacturing process, the material must not be required to be decontaminated or otherwise specially handled or processed before such incorporation, in order to minimize loss of material or to provide adequate protection, as needed, of public health, safety or welfare, the environment or natural resources;

(v) whether a market is existing or is reasonably certain to be developed for the proposed use of the material under review or the product into which the solid waste under review is proposed to be incorporated; and

(vi) other criteria as the department shall determine in its discretion to be appropriate.

(3) The department will either approve the petition, disapprove it, or allow the proposed use of the solid waste under review subject to such conditions as the department may impose. When granting a beneficial use determination, the department shall determine, on a case-by-case basis, the precise point at which the solid waste under review ceases to be solid waste. Unless otherwise determined for the particular solid waste under review, that point occurs when it is used in a manufacturing process to make a product or used as an effective substitute for a commercial product or used as a fuel for energy recovery. As part of its petition, the petitioner may request that such point occur elsewhere. In such a request, the petitioner must include a demonstration that there is little potential for improper disposal of the material or little potential for the handling, transportation, or storage of the solid waste under review to have an adverse impact upon the public health, safety or welfare, the environment or natural resources.

(4) The department may revoke any determination made under this subdivision if it finds that one or more of the matters serving as the basis for the department's determination was incorrect or is no longer valid or the department finds that there has been a violation of any condition that the department attached to such determination.

New York State Department of Environmental Conservation

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4046

DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

TO: Regional Haz. Waste Remediation Engineers, Bureau Directors, and Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM: DETERMINATION OF SOIL CLEANUP OBJECTIVES AND CLEANUP LEVELS

DATE: JAN 24, 1994

Michael J. O'Toole, Jr. (signed)

Appendix A - Recommended Soil Cleanup Objectives | Appendix B - Total Organic Carbon (TOC)
- Table 1 - Volatile Organic Contaminants
- Table 2 - Semi-Volatile Organic Contaminants
- Table 3 - Organic Pesticides / Herbicides and PCBs
- Table 4 - Heavy Metals

The cleanup goal of the Department is to restore inactive hazardous waste sites to predisposal conditions, to the extent feasible and authorized by law. However, it is recognized that restoration to predisposal conditions will not always be feasible.

1. INTRODUCTION:

This TAGM provides a basis and procedure to determine soil cleanup levels at individual Federal Superfund, State Superfund, 1986 EQBA Title 3 and Responsible Party (RP) sites, when the Director of the DHWR determines that cleanup of a site to predisposal conditions is not possible or feasible.

The process starts with development of soil cleanup objectives by the Technology Section for the contaminants identified by the Project Managers. The Technology Section uses the procedure described in this TAGM to develop soil cleanup objectives. Attainment ofthese generic soil cleanup objectives will, at a minimum, eliminate all significant threats to human health and/or the environment posed by the inactive hazardous waste site. Project Managers should use these cleanup objectives in selecting alternatives in the Feasibility Study (FS). Based on the proposed selected remedial technology (outcome of FS), final site specific soil cleanup levels are established in the Record of Decision (ROD) for these sites.

It should be noted that even after soil cleanup levels are established in the ROD, these levels may prove to be unattainable when remedial construction begins. In that event, alternative remedial actions or institutional controls may be necessary to protect the environment.

2. BASIS FOR SOIL CLEANUP OBJECTIVES:

The following alternative bases are used to determine soil cleanup objectives:

a. Human health based levels that correspond to excess lifetime cancer risks of one in a million for Class A[1] and B[2] carcinogens, or one in 100,000 for Class C[3] carcinogens. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

b. Human health based levels for systemic toxicants, calculated from Reference Doses (RfDs). RfDs are an estimate of the daily exposure an individual (including sensitive individuals) can experience without appreciable risk of health effects during a lifetime. An average scenario of exposure in which children ages one to six (who exhibit the greatest tendency to ingest soil) is assumed. An intake rate of 0.2 gram/day for a five-year exposure period for a 16-kg child is assumed. These levels are contained in USEPA's Health Effects Assessment Summary Tables (HEASTs) which are compiled and updated quarterly by the NYSDEC's Division of Hazardous Substances Regulation;

c. Environmental concentrations which are protective of groundwater/drinking water quality; based on promulgated or proposed New York State Standards;

d. Background values for contaminants; and

e. Detection limits.

A recommendation on the appropriate cleanup objective is based on the criterion that produces the most stringent cleanup level using criteria a, b, and c for organic chemicals, and criteria a, b, and d for heavy metals. If criteria a and/or b are below criterion d for a contaminant, its background value should be used as the cleanup objective. However, cleanup objectives developed using this approach must be, at a minimum, above the method detection limit (MDL) and it is preferable to have the soil cleanup objectives above the Contract Required Quantitation Limit (CRQL) as defined by NYSDEC. If the cleanup objective of a compound is "non-detectable", it should mean that it is not detected at the MDL. Efforts should be made to obtain the best MDL detection possible when selecting a laboratory and analytical protocol.

3. DETERMINATION OF SOIL CLEANUP GOALS FOR ORGANICS IN SOIL FOR PROTECTION OF WATER QUALITY

The water/soil partitioning theory is used to determine soil cleanup objectives which would be protective of groundwater/drinking water quality for its best use. This theory is conservative in nature and assumes that contaminated soil and groundwater are in direct contact. This theory is based upon the ability of organic matter in soil to adsorb organic chemicals. The approach predicts the maximum amount of contamination that may remain in soil so that leachate from the contaminated soil will not violate groundwater and/or drinking water standards.

This approach is not used for heavy metals, which do not partition appreciably into soil organic matter. For heavy metals, eastern USA or New York State soil background values may be used as soil cleanup objectives. A list of values that have been tabulated is attached. Soil background data near the site, if available, is preferable and should be used as the cleanup objective for such metals. Background samples should be free from the influences of this site and any other source of contaminants. Ideal background samples may be obtained from uncontaminated upgradient and upwind locations.

Protection of water quality from contaminated soil is a two-part problem. The first is predicting the amount of contamination that will leave the contaminated media as leachate. The second part of the problem is to determine how much of that contamination will actually contribute to a violation of groundwater standards upon reaching and dispersing into groundwater. Some of the contamination which initially leaches out of soil will be absorbed by other soil before it reaches groundwater. Some portion will be reduced through natural attenuation or other mechanism.

PART A: PARTITION THEORY MODEL

There are many test and theoretical models which are used to predict leachate quality given a known value of soil contamination. The Water-Soil Equilibrium Partition Theory is used as a basis to determine soil standard or contamination limit for protection of water quality by most of the models currently in use. It is based on the ability of organic carbon in soil to adsorb contamination. Using a water quality value which may not be exceeded in leachate and the partition coefficient method, the equilibrium concentration (Cs) will be expressed in the same units as the water standards. The following expression is used:

Allowable Soil Concentration $Cs = f \times Koc \times Cw$ . . . . (1)

Where: f = fraction of organic carbon of the natural soil medium.

Koc = partition coefficient between water and soil media. Koc can be estimated by the following equation:

$$\log Koc = 3.64 - 0.55 \log S$$

S = water solubility in ppm
Cw = appropriate water quality value from TOGS 1.1.1

Most Koc and S values are listed in the Exhibit A-1 of the USEPA Superfund Public Health Evaluation Manual (EPA/540/1-86/060). The Koc values listed in this manual should be used for the purpose. If the Koc value for a contaminant is not listed, it should be estimated using the above mentioned equation.

PART B: PROCEDURE FOR DETERMINATION OF SOIL CLEANUP OBJECTIVES

When the contaminated soil is in the unsaturated zone above the water table, many mechanisms are at work that prevent all of the contamination that would leave the contaminated soil from impacting groundwater. These mechanisms occur during transport and may work simultaneously. They include the following: (1) volatility, (2) sorption and desorption, (3) leaching and diffusion, (4) transformation and degradation, and (5) change in concentration of contaminants after reaching and/or mixing with the groundwater surface. To account for these mechanisms, a correction factor of 100 is used to establish soil cleanup objectives. This value of 100 for the correction is consistent with the logic used by EPA in its Dilution Attenuation Factor (DAF) approach for EP Toxicity and TCLP. (Federal Register/Vol. 55, No. 61, March 29, 1990/Pages 11826-27). Soil cleanup objectives are calculated by multiplying the allowable soil concentration by the correction factor. If the contaminated soil is very close (<3' - 5') to the groundwater table or in the groundwater, extreme caution should be exercised when using the correction factor of 100 (one hundred) as this may not give conservative cleanup objectives. For such situations the Technology Section should be consulted for site-specific cleanup objectives.

Soil cleanup objectives are limited to the following maximum values. These values are consistent with the approach promulgated by the States of Washington and Michigan.

1. Total VOCs $\leq$ 10 ppm.
2. Total Semi VOCs $\leq$ 500 ppm.
3. Individual Semi VOCs $\leq$ 50 ppm.
4. Total Pesticides $\leq$ 10 ppm.

One concern regarding the semi-volatile compounds is that some of these compounds are so insoluble that their Cs values are fairly large. Experience (Draft TOGS on Petroleum Contaminated Soil Guidance) has shown that soil containing some of these insoluble substances at high concentrations can exhibit a distinct odor even though the substance will not leach from the soil. Hence any time a soil exhibits a discernible odor nuisance, it shall not be considered clean even if it has met the numerical criteria.

4. <u>DETERMINATION OF FINAL CLEANUP LEVELS:</u>

Recommended soil cleanup objectives should be utilized in the development of final cleanup levels through the Feasibility Study (FS) process. During the FS, various alternative remedial actions developed during the Remedial Investigation (RI) are initially screened and narrowed down to the list of potential alternative remedial actions that will be evaluated in detail. These alternative remedial actions are evaluated using the criteria discussed in TAGM 4030, Selection of Remedial Actions at Inactive Hazardous Waste Sites, revised May 15, 1990, and the preferred remedial action will be selected. After the detailed evaluation of the preferred remedial action, the final cleanup levels which can be actually achieved using the preferred remedial action must be established. Remedy selection, which will include final cleanup levels, is the subject of TAGM 4030.

Recommended soil cleanup objectives that have been calculated by the Technology Section are presented in Appendix A. These objectives are based on a soil organic carbon content of 1% (0.01) and should be adjusted for the actual organic carbon content if it is known. For determining soil organic carbon content, use attached USEPA method (Appendix B). Please contact the Technology Section, Bureau of Program Management for soil cleanup objectives not included in Appendix A.

TAGM 4046 Footnotes:

1. Class A are proved human carcinogens
2. Class B are probable human carcinogens
3. Class C are possible human carcinogens

APPENDIX A

TABLE 1

Recommended soil cleanup objectives (mg/kg or ppm)
Volatile Organic Contaminants

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin- ogens	Systemic Toxicants		
Acetone	2.2	50	0.0011	0.11	N/A	8,000	10	0.2
Benzene	83	0.7	0.0006	0.06	24	N/A	5	0.06
Benzoic Acid	54 *	50	0.027	2.7	N/A	300,000	5	2.7
2-Butanone	4.5 *	50	0.003	0.3	N/A	4,000	10	0.3
Carbon Disulfide	54 *	50	0.027	2.7	N/A	8,000	5	2.7
Carbon Tetrachloride	110 *	5	0.006	0.6	5.4	60	5	0.6
Chlorobenzene	330	5	0.017	1.7	N/A	2,000	5	1.7
Chloroethane	37 *	50	0.019	1.9	N/A	N/A	10	1.9
Chloroform	31	7	0.003	0.30	114	800	5	0.3
Dibromochloromethane	N/A	50	N/A	N/A	N/A	N/A	5	N/A
1,2-Dichlorobenzene	1,700	4.7	0.079	7.9	N/A	N/A	330	7.9
1,3-Dichlorobenzene	310 *	5	0.0155	1.55	N/A	N/A	330	1.6
1,4-Dichlorobenzene	1,700	5	0.085	8.5	N/A	N/A	330	8.5
1,1-Dichloroethane	30	5	0.002	0.2	N/A	N/A	5	0.2
1,2-Dichloroethane	14	5	0.001	0.1	7.7	N/A	5	0.1
1,1-Dichloroethene	65	5	0.004	0.4	12	700	5	0.4
1,2-Dichloroethene (trans)	59	5	0.003	0.3	N/A	2,000	5	0.3
1-3 dichloropropane	51	5	0.003	0.3	N/A	N/A	5	0.3
Ethylbenzene	1,100	5	0.055	5.5	N/A	8,000	5	5.5
113 Freon (1,1,2 Trichloro- 1,2,2 Trifluoroethane)	1,230 *	5	0.060	6.0	N/A	200,000	5	6.0
Methylene chloride	21	5	0.001	0.1	93	5,000	5	0.1
4-Methyl-2-Pentanone	19 *	50	0.01	1.0	N/A	N/A	10	1.0

TABLE 1 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin- ogens	Systemic Toxicants		
Tetrachloroethene	277	5	0.014	1.4	14	800	5	1.4
1,1,1-Trichloroethane	152	5	0.0076	0.76	N/A	7,000	5	0.8
1,1,2,2-Tetrachloroethane	118	5	0.006	0.6	35	N/A	5	0.6
1,2,3-trichloropropane	68	5	0.0034	0.34	N/A	80	5	0.4
1,2,4-trichlorobenzene	670 *	5	0.034	3.4	N/A	N/A	330	3.4
Toluene	300	5	0.015	1.5	N/A	20,000	5	1.5
Trichloroethene	126	5	0.007	0.70	64	N/A	5	0.7
Vinyl chloride	57	2	0.0012	0.12	N/A	N/A	10	0.2
Xylenes	240	5	0.012	1.2	N/A	200,000	--	1.2

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available

* Partition coefficient is calculated by using the following equation:
$\log Koc = -0.55 \log S + 3.64$, where S is solubility in water in ppm.
All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 2
Recommended soil cleanup objectives (mg/kg or ppm)
Semi-Volatile Organic Contaminants

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin- ogens	Systemic Toxicants		
Acenaphthene	4,600	20	0.9	90.0	N/A	5,000	330	50.0 ***
Acenaphthylene	2,056 *	20	0.41	41.0	N/A	N/A	330	41.0
Aniline	13.8	5	0.001	0.1	123	N/A	330	0.1
Anthracene	14,000	50	7.00	700.0	N/A	20,000	330	50.0 ***
Benzo(a)anthracene	1,380,000	0.002	0.03	3.0	0.224	N/A	330	0.224 or MDL
Benzo (a) pyrene	5,500,000	0.002 (ND)	0.110	11.0	0.0609	N/A	330	0.061 or MDL
Benzo (b) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
Benzo (g,h,i) perylene	1,600,000	5	8.0	800	N/A	N/A	330	50.0 ***
Benzo (k) fluoranthene	550,000	0.002	0.011	1.1	N/A	N/A	330	1.1
bis(2-ethylhexyl)phthalate	8,706 *	50	4.35	435.0	50	2,000	330	50.0 ***
Butylbenzylphthlate	2,430	50	1.215	122.0	N/A	20,000	330	50.0 ***
Chrysene	200,000	0.002	0.004	0.4	N/A	N/A	330	0.4
4- Chloroaniline	43 ****	5	0.0022	0.22	200	300	330	0.220 or MDL
4-Chloro-3-methylphenol	47	5	0.0024	0.24	N/A	N/A	330	0.240 or MDL
2-Chlorophenol	15 *	50	0.008	0.8	N/A	400	330	0.8

TABLE 2 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin-ogens	Systemic Toxicants		
Dibenzofuran	1,230 *	5	0.062	6.2	N/A	N/A	330	6.2
Dibenzo(a,h)anthracene	33,000,000	50	1,650	165,000	0.0143	N/A	330	0.014 or MDL
3,3'-Dichlorobenzidine	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2,4-Dichlorophenol	380	1	0.004	0.4	N/A	200	330	0.4
2,4-Dinitrophenol	38	5	0.002	0.2	N/A	200	1,600	0.200 or MDL
2,6 Dinitrotoluene	198*	5	0.01	1.0	1.03	N/A	330	1.0
Diethylphthlate	142	50	0.071	7.1	N/A	60,000	330	7.1
Dimethylphthlate	40	50	0.020	2.0	N/A	80,000	330	2.0
Di-n-butyl phthalate	162*	50	0.081	8.1	N/A	8,000	330	8.1
Di-n-octyl phthlate	2,346 *	50	1.2	120.0	N/A	2,000	330	50.0 ***
Fluoranthene	38,000	50	19	1900.0	N/A	3,000	330	50.0 ***
Fluorene	7,300	50	3.5	350.0	N/A	3,000	330	50.0 ***
Hexachlorobenzene	3,900	0.35	0.014	1.4	0.41	60	330	0.41
Indeno (1,2,3-cd)pyrene	1,600,000	0.002	0.032	3.2	N/A	N/A	330	3.2
Isophorone	88.31 *	50	0.044	4.40	1,707	20,000	330	4.40
2-methylnaphthalene	727 *	50	0.364	36.4	N/A	N/A	330	36.4
2-Methylphenol	15	5	0.001	0.1	N/A	N/A	330	0.100 or MDL
4-Methylphenol	17	50	0.009	0.9	N/A	4,000	330	0.9
Naphthalene	1,300	10	0.130	13.0	N/A	300	330	13.0
Nitrobenzene	36	5	0.002	0.2	N/A	40	330	0.200 or MDL

TABLE 2 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm) Carcin- ogens	Systemic Toxicants	CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
2-Nitroaniline	86	5	0.0043	0.43	N/A	N/A	1,600	0.430 or MDL
2-Nitrophenol	65	5	0.0033	0.33	N/A	N/A	330	0.330 or MDL
4-Nitrophenol	21	5	0.001	0.1	N/A	N/A	1,600	0.100 or MDL
3-Nitroaniline	93	5	0.005	0.5	N/A	N/A	1,600	0.500 or MDL
Pentachlorophenol	1,022	1	0.01	1.0	N/A	2,000	1,600	1.0 or MDL
Phenanthrene	4,365 *	50	2.20	220.0	N/A	N/A	330	50.0 ***
Phenol	27	1	0.0003	0.03	N/A	50,000	330	0.03 or MDL
Pyrene	13,295 *	50	6.65	665.0	N/A	2,000	330	50.0 ***
2,4,5-Trichlorophenol	89 *	1	0.001	0.1	N/A	8,000	330	0.1

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available
MDL is Method Detection Limit

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
Other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm., Total Semi- VOCs < 500ppm. and Individual Semi-VOCs < 50 ppm.

**** Koc is derived from the correlation Koc = 0.63 Kow (Determining Soil Response Action Levels...... EPA/540/2-89/057). Kow is obtained from the USEPA computer database 'MAIN'.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1%, and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 3
Recommended soil cleanup objectives (mg/kg or ppm)
Organic Pesticides / Herbicides and PCBs

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcinogens	Systemic Toxicants		
Aldrin	96,000	ND (<0.01)	0.005	0.5	0.041	2	8	0.041
alpha- BHC	3,800	ND (<0.05)	0.002	0.2	0.111	N/A	8	0.11
beta - BHC	3,800	ND (<0.05)	0.002	0.2	3.89	N/A	8	0.2
delta - BHC	6,600	ND (<0.05)	0.003	0.3	N/A	N/A	8	0.3
Chlordane	21,305 *	0.1	0.02	2.0	0.54	50	80	0.54
2,4-D	104 *	4.4	0.005	0.5	N/A	800	800	0.5
4,4'- DDD	770,000 *	ND (<0.01)	0.077	7.7	2.9	N/A	16	2.9
4,4'-DDE	440,000 *	ND (<0.01)	0.0440	4.4	2.1	N/A	16	2.1
4,4'-DDT	243,000 *	ND (<0.01)	0.025	2.5	2.1	40	16	2.1
Dibenzo-P-dioxins (PCDD) 2,3,7,8 TCDD	1709800	0.000035	0.0006	0.06	N/A	N/A	N/A	N/A
Dieldrin	10,700 *	ND (< 0.01)	0.0010	0.1	0.044	4	16	0.044
Endosulfan I	8,168 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan II	8,031 *	0.1	0.009	0.9	N/A	N/A	16	0.9
Endosulfan Sulfate	10,038 *	0.1	0.01	1.0	N/A	N/A	16	1.0
Endrin	9,157 *	ND (<0.01)	0.001	0.1	N/A	20	8	0.10

TABLE 3 (Continued)

Contaminant	Partition Coefficient, Koc	Groundwater Standards/ Criteria, Cw (ug/l or ppb)	a Allowable soil conc., Cs (ppm)	b ** Soil cleanup objectives to protect GW quality (ppm)	USEPA Health Based (ppm)		CRQL (ppb)	*** Rec. Soil Cleanup Objective (ppm)
					Carcin-ogens	Systemic Toxicants		
Endrin keytone	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
gamma - BHC (Lindane)	1,080	ND (<0.05)	0.0006	0.06	5.4	20	8	0.06
gamma - chlordane	140,000	0.1	0.14	14.0	0.54	5	80	0.54
Heptachlor	12,000	ND (<0.01)	0.0010	0.1	0.16	40	8	0.10
Heptachlor epoxide	220	ND (<0.01)	0.0002	0.02	0.077	0.8	8	0.02
Methoxychlor	25,637	35.0	9.0	900	N/A	400	80	***
Mitotane	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Parathion	760	1.5	0.012	1.2	N/A	500	8	1.2
PCBs	17,510 *	0.1	0.1	10.0	1.0	N/A	160	1.0 (Surface) 10 (sub-surf)
Polychlorinated dibenzo-furans (PCDF)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Silvex	2,600	0.26	0.007	0.7	N/A	600	330	0.7
2,4,5-T	53	35	0.019	1.9	N/A	200	330	1.9

a. Allowable Soil Concentration Cs = f x Cw x Koc
b. Soil cleanup objective = Cs x Correction Factor (CF)
N/A is not available

* Partition coefficient is calculated by using the following equation:
log Koc = -0.55 log S + 3.64, where S is solubility in water in ppm.
All other Koc values are experimental values.

** Correction Factor (CF) of 100 is used as per TAGM #4046

*** As per TAGM #4046, Total VOCs < 10 ppm.

Note: Soil cleanup objectives are developed for soil organic carbon content (f) of 1% (5% for PCBs as per PCB Guidance Document), and should be adjusted for the actual soil organic carbon content if it is known.

APPENDIX A

TABLE 4
Recommended soil cleanup objectives (mg/kg or ppm)
Heavy Metals

Contaminants	Protect Water Quality (ppm)	Eastern USA Background (ppm)	* CRDL (mg/kg or ppm)	***** Rec. Soil Cleanup Objective (ppm)
Aluminum	N/A	33,000	2.0	SB
Antimony	N/A	N/A	0.6	SB
Arsenic	N/A	3-12 **	0.1	7.5 or SB
Barium	N/A	15-600	2.0	300 or SB
Beryllium	N/A	0-1.75	0.05	0.16 (HEAST) or SB
Cadmium	N/A	0.1-1	0.05	1 or SB
Calcium	N/A	130 - 35,000 ***	50.0	SB
Chromium	N/A	1.5 - 40 **	0.1	10 or SB
Cobalt	N/A	2.5 - 60 **	0.5	30 or SB
Copper	N/A	1 - 50	0.25	25 or SB
Cyanide	N/A	N/A	0.1	***
Iron	N/A	2,000 - 550,000	1.0	2,000 or SB
Lead	N/A	****	0.03	SB ****
Magnesium	N/A	100 - 5,000	50.0	SB
Manganese	N/A	50 - 5,000	0.15	SB
Mercury	N/A	0.001 - 0.2	0.002	0.1
Nickel	N/A	0.5 -25	0.4	13 or SB
Potassium	N/A	8,500 - 43,000 **	50.0	SB
Selenium	N/A	0.1 - 3.9	0.05	2 or SB
Silver	N/A	N/A	0.1	SB
Sodium	N/A	6,000 - 8,000	50.0	SB
Thallium	N/A	N/A	0.1	SB
Vanadium	N/A	1-300	0.5	150 or SB
Zinc	N/A	9-50	0.2	20 or SB

Note: Some forms of metal salts such as Aluminum Phosphide, Calcium Cyanide, Potassium Cyanide, Copper cyanide, Silver cyanide, Sodium cyanide, Zinc phosphide, Thallium salts, Vanadium pentoxide and Chromium (VI) compounds are more toxic in nature. Please refer to the USEPA HEASTs database to find cleanup objectives if such metals are present in soil.

SB is site background
N/A is not available

* CRDL is contract required detection limit which is approx. 10 times the CRDL for water.

** New York State background

*** Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site-specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.

**** Background levels for lead vary widely. Average levels in undeveloped, rural areas may range from 4-61 ppm. Average background levels in metropolitan or suburban areas or near highways are much higher and typically range from 200-500 ppm.

***** Recommended soil cleanup objectives are average background concentrations as reported in a 1984 survey of reference material by E. Carol McGovern, NYSDEC.

APPENDIX B

TOTAL ORGANIC CARBON (TOC)

USE AND LIMITATIONS

Total organic carbon is a measure of the total amount of nonvolatile, volatile, partially volatile, and particulate organic compounds in a sample. Total organic carbon is independent of the oxidation state of the organic compounds and is not a measure of the organically bound and inorganic elements that can contribute to the biochemical and chemical oxygen demand tests.

Because inorganic carbon (e.g., carbonates, bicarbonates, free CO_2) will interfere with total organic carbon determinations, samples should be treated to remove inorganic carbon before being analyzed.

FIELD PROCEDURES

Collection

Samples can be collected in glass or plastic containers. A minimum sample size of 25 g is recommended. If unrepresentative material is to be removed from the sample, it should be removed in the field under the supervision of the chief scientist and noted on the field log sheet.

Processing

Samples should be stored frozen and can be held for up to 6 months under that condition. Excessive temperatures should not be used to thaw samples.

LABORATORY PROCEDURES

Analytical Procedures

- Equipment
  - Induction furnace
    e.g., Leco WR-12, Dohrmann DC-50, Coleman CH analyzer, Perkin Elmer 240 elemental analyzer, Carlo-Erba 1106
  - Analytical balance
    0.1 mg accuracy
  - Desiccator
  - Combustion boats
  - 10 percent hydrochloric acid (HCL)
  - Cupric oxide fines (or equivalent material)
  - Benzoic acid or other carbon source as a standard.

- Equipment preparation

  - Clean combustion boats by placing them in the induction furnace at 950° C. After being cleaned, combustion boats should not be touched with bare hands.
  - Cool boats to room temperature in a desiccator.
  - Weigh each boat to the nearest 0.1 mg.

- Sample preparation
  - Allow frozen samples to warm to room temperature.
  - Homogenize each sample mechanically, incorporating any overlying water.
  - Transfer a representative aliquot (5-10 g) to a clean container.

- Analytical procedures
  - Dry samples to constant weight at 70 ± 2°C. The drying temperature is relatively low to minimize loss of volatile organic compounds.
  - Cool dried samples to room temperature in a desiccator.
  - Grind sample using a mortar and pestle to break up aggregates.
  - Transfer a representative aliquot (0.2-0.5 g) to a clean, preweighed combustion boat.
  - Determine sample weight to the nearest 0.1 mg.
  - Add several drops of HCL to the dried sample to remove carbonates. Wait until the effervescing is completed and add more acid. Continue this process until the incremental addition of acid causes no further effervescence. Do not add too much acid at one time as this may cause loss of sample due to frothing. Exposure of small samples (i.e., 1-10 mg) having less than 50 percent carbonate to an HCL atmosphere for 24-48 h has been shown to be an effective means of removing carbonates (Hedges and Stern 1984). If this method is used for sample sizes greater than 10 mg, its effectiveness should be demonstrated by the user.
  - Dry the HCL-treated sample to constant weight at 70 ± 2° C.
  - Cool to room temperature in a desiccator.
  - Add previously ashed cupric oxide fines or equivalent material (e.g., alumina oxide) to the sample in the combustion boat.
  - Combust the sample in an induction furnace at a minimum temperature of 950 ± 10° C.

- Calculations
  - If an ascarite-filled tube is used to capture CO_2, the carbon content of the sample can be calculated as follows:

$$\text{Percent carbon} = \frac{A\ (0.2729)\ (100)}{B}$$

Where:

A = the weight (g) of CO_2 determined by weighing the ascarite tube before and after combustion
B = dry weight (g) of the unacidified sample in the combustion boat
0.2729 = the ratio of the molecular weight of carbon to the molecular weight of carbon dioxide

A silica gel trap should be placed before the ascarite tube to catch any moisture driven off during sample combustion. Additional silica gel should be placed at the exit end of the ascarite tube to trap any water that might be formed by reaction of the trapped CO_2 with the NaOH in the ascarite.

- If an elemental analyzer is used, the amount of CO_2 will be measured by a thermal conductivity detector. The instrument should be calibrated daily using an empty boat blank as the zero point and at least two standards. Standards should bracket the expected range of carbon concentrations in the samples.

QA/QC Procedures

It is critical that each sample be thoroughly homogenized in the laboratory before a subsample is taken for analysis. Laboratory homogenization should be conducted even if samples were homogenized in the field.

Dried samples should be cooled in a desiccator and held there until they are weighed. If a desiccator is not used, the sediment will accumulate ambient moisture and the sample weight will be overestimated. A color-indicating desiccant is recommended so that spent desiccant can be detected easily. Also, the seal on the desiccator should be checked periodically and, if necessary, the ground glass rims should be greased or the "O" rings should be replaced.

It is recommended that triplicate analyses be conducted on one of every 20 samples, or on one sample per batch if less than 20 samples are analyzed. A method blank should be analyzed at the same frequency as the triplicate analyses. The analytical balance should be inspected daily and calibrated at least once per week. The carbon analyzer should be calibrated daily with freshly prepared standards. A standard reference material should be analyzed at least once for each major survey.

DATA REPORTING REQUIREMENTS

Total organic carbon should be reported as a percentage of the dry weight of the unacidified sample to the nearest 0.1 unit. The laboratory should report the results of all samples (including QA replicates, method blanks, and standard reference measurements) and should note any problems that may have influenced sample quality. The laboratory should also provide a summary of the calibration procedure and results (e.g., range covered, regression equation, coefficient of determination).

Recommended Soil Cleanup Objectives for Gasoline Contaminated Soils

Contaminant	CAS Registry Number	Partition coefficient Koc	Recommeded EPA Method	Groundwater Standards/ Criteria C_w ug/l or ppb	Allowable Soil Concentration Cs^1 (ppm)	Soil Cleanup objectives to Protect GW Quality (ppm)*	USEPA Health Based (HEAST)		Detection Limit Solid (ppb)	Rec.soil Cleanup Objective (ppm)
							Carcinogens (ppm)	Systemic Toxicants (ppm)		
Benzene	71-43-2	83	8021/8260	0.7	0.0006	0.06	24	N/A	2	0.06 or MDL
Ethylbenzene	100-41-4	1,100	8021/8260	5	0.055	5.5	N/A	8,000	2	5.5
Toluene	108-88-3	300	8021/8260	5	0.015	1.5	N/A	20,000	2	1.5
Mixed Xylenes	N/A	240	8021/8260	5	0.012	1.2	N/A	200,000	2	1.2
Isopropylbenzene	98-82-8	454	8021/8260	5	0.023	2.3	N/A	3,100	1	2.3
n-Propylbenzene	103-65-1	741	8021/8260	5	0.037	3.7	N/A	N/A	1	3.7
p-Isopropyltoluene	99-87-6	2,114	8021/8260	5	0.11	11.0	N/A	N/A	1	10.0*
1,2,4 - Trimethylbenzene	95-63-6	2,590	8021/8260	5	0.13	13.0	N/A	N/A	1	10.0*
1,3,5 - Trimethylbenzene	108-67-8	661	8021/8260	5	0.033	3.3	N/A	N/A	1	3.3
n-Butyl-Benzene	104-51-8	2,455	8021/8260	5	0.12	12.0	N/A	N/A	1	10.0*
sec-Butyl-Benzene	135-98-8	2,200	8021/8260	5	0.11	11.0	N/A	N/A	1	10.0*
Tert-Butyl-Benzene	98-06-6	2,200	8021/8260	5	0.11	11.0	N/A	N/A	1	10.0*
Naphthalene	91-20-3	1,300	8021/8260	10	0.13	13.0	N/A	300	1	13.0
Methyl-Tert-Butyl-Ether (MTBE)**	1634-04-4	12	8021/8260**	10	0.0012	0.12	N/A	N/A	1	0.12

N/A - Not applicable

MDL - Method Detection Limit

1 - Allowable concentration with no Dilution Attenuation Factor - see TAGM 4046

*As per TAGM 4046 individual and the sum of VOCs not listed (Tentatively Identified Compounds(TICs))≤ 10 ppm

** Methyl t-butyl ether (MTBE) is not a target compound of Methods 8021 and 8260, but MTBE may be determined using these methods with appropriate quality assurance and quality control measures.

Note: Soil cleanup objectives are developed for soil organic content (*f*) of 1 %, and should be adjusted for the actual soil organic content if it is known.

Recommended Soil Cleanup Objectives for Fuel Oil Contaminated Soil

Contaminant	CAS Registry Number	Partition coefficient Koc	Recommended EPA Method	Groundwater Standards/ Criteria Cw ug/l or ppb.	Allowable Soil Concentration Cs[1] (ppm)	Soil Cleanup objectives to Protect GW Quality (ppm)	USEPA Health Based (HEAST) (ppm)		Detection Limit Solid (ppb)	Rec.soil Cleanup Objective (ppm)
							Carcinogens	Systemic Toxicants		
Benzene	71-43-2	83	8021/8260	0.7	0.0006	0.06	24	N/A	2	0.06 or MDL
Ethylbenzene	100-41-4	1,100	8021/8260	5	0.055	5.5	N/A	8,000	2	5.5
Toluene	108-88-3	300	8021/8260	5	0.015	1.5	N/A	20,000	2	1.5
Mixed Xylenes	N/A	240	8021/8260	5	0.012	1.2	N/A	200,000	2	1.2
Isopropylbenzene	98-82-8	454	8021/8260	5	0.023	2.3	N/A	3,100	1	2.3
n-Propylbenzene	103-65-1	741	8021/8260	5	0.037	3.7	N/A	N/A	1	3.7
p-Isopropyltoluene	99-87-6	2,114	8021/8260	5	0.11	11.0	N/A	N/A	1	10.0*
1,2,4 - Trimethylbenzene	95-63-6	2,590	8021/8260	5	0.13	13.0	N/A	N/A	1	10.0*
1,3,5 - Trimethylbenzene	108-67-8	661	8021/8260	5	0.033	3.3	N/A	N/A	1	10.0*
n-Butyl-Benzene	104-51-8	2,455	8021/8260	5	0.12	12.0	N/A	N/A	1	3.3
sec-Butyl-Benzene	135-98-8	2,200	8021/8260	5	0.11	11.0	N/A	N/A	1	10.0*
Tert-Butyl-Benzene	98-06-6	2,200	8021/8260	5	0.11	11.0	N/A	N/A	1	10.0*
Naphthalene	91-20-3	1,300	8021/8260/8270	10	0.13	13.0	N/A	300	1(330)	13.0
Anthracene	120-12-7	14,000	8270	50	7.00	700.0	N/A	20,000	330	50.0**
Acenaphthene	83-32-9	4,600	8270	20	0.92	92.0	N/A	5,000	330	50.0**
Acenaphthylene	208-96-8	2,056	8270	50	1.03	103.0	N/A	N/A	330	50.0**
Benz(a)anthracene	56-55-3	1,380,000	8270	0.002	0.028	2.8	0.224	N/A	330	0.224 or MDL
Benzo(b)fluoranthene	205-99-2	550,000	8270	0.002	0.011	1.1	0.220	N/A	330	0.220 or MDL
Benzo(k)fluoranthene	207-8-9	550,000	8270	0.002	0.011	1.1	0.220	N/A	330	0.220 or MDL
Benzo(g,h,i)perylene	191-24-2	1,600,000	8270	5	80.00	8,000.0	N/A	N/A	330	50.0**
Benzo(a)pyrene	50-32-8	5,500,000	8270	0.002	0.11	11.0	0.061	N/A	330	0.061 or MDL
Chrysene	218-01-9	200,000	8270	0.002	0.004	0.40	N/A	N/A	330	0.4
Dibenzo(a,h)anthracene	53-70-3	3,300,000	8270	50	1,650.00	165,000.0	0.0143	N/A	330	0.0143 or MDL
Fluoranthene	206-44-0	38,000	8270	50	19.00	1,900.0	N/A	3,000	330	50.0**
Fluorene	86-73-7	7,300	8270	50	3.65	365.0	N/A	3,000	330	50.0**
Indeno(1,2,3-cd)pyrene	193-39-5	1,600,000	8270	0.002	0.032	3.2	N/A	N/A	330	3.2
Phenanthrene	85-01-5	4,365	8270	50	2.18	218.0	N/A	N/A	330	50.0**
Pyrene	129-00-0	13,295	8270	50	6.65	665.0	N/A	2,000	330	50.0**

N/A- Not Applicable

MDL - Method Detection Limit

1 - Allowable concentration with no Dilution Attenuation Factor - see TAGM 4046

*As per TAGM 4046 individual and the sum of VOCs not listed (Tentatively Identified Compounds(TICs))≤ 10 ppm

**As per TAGM 4046 individual non-carcinogenic semivolatiles ≤ 50 ppm and total semivolatiles not listed (Tentatively Identified Compounds(TICs))≤ 500ppm

Note: Soil cleanup objectives are developed for soil organic carbon content (*f*) of 1%, and should be adjusted for the actual soil organic carbon if it is known.

New York State Department of Environmental Conservation

TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM #4031

FUGITIVE DUST SUPPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

TO: Regional Hazardous Waste Remediation Engrs., Bur. Directors & Section Chiefs

FROM: Michael J. O'Toole, Jr., Director, Division of Hazardous Waste Remediation

SUBJECT: DIVISION TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM -- FUGITIVE DUST SUPRESSION AND PARTICULATE MONITORING PROGRAM AT INACTIVE HAZARDOUS WASTE SITES

DATE: Oct 27, 1989

Michael J. O'Toole, Jr. (signed)

1. Introduction

Fugitive dust suppression, particulate monitoring, and subsequent action levels for such must be used and applied consistently during remedial activities at hazardous waste sites. This guidance provides a basis for developing and implementing a fugitive dust suppression and particulate monitoring program as an element of a hazardous waste site's health and safety program.

2. Background

Fugitive dust is particulate matter--a generic term for a broad class of chemically and physically diverse substances that exist as discrete particles, liquid droplets or solids, over a wide range of sizes--which becomes airborne and contributes to air quality as a nuisance and threat to human health and the environment.

On July 1, 1987, the United States Environmental Protection Agency (USEPA) revised the ambient air quality standard for particulates so as to reflect direct impact on human health by setting the standard for particulate matter less than ten microns in diameter (PM_{10}); this involves fugitive dust whether contaminated or not. Based upon an examination of air quality composition, respiratory tract deposition, and health effects, PM_{10} is considered conservative for the primary standard--that requisite to protect public health with an adequate margin of safety. The primary standards are 150 ug/m^3 over a 24-hour averaging time and 50 ug/m^3 over an annual averaging time. Both of these standards are to be averaged arithmetically.

There exists real-time monitoring equipment available to measure PM_{10} and capable of integrating over a period of six seconds to ten hours. Combined with an adequate fugitive dust suppression program, such equipment will aid in preventing the off-site migration of contaminated soil. It will also protect both on-site personnel from exposure to high levels of dust and the public around the site from any exposure to any dust. While specifically intended for the protection of on-site personnel as well as the public, this program is not meant to replace long-term monitoring which may be required given the contaminants inherent to the site and its air quality.

3. Guidance

A program for suppressing fugitive dust and monitoring particulate matter at hazardous waste sites can be developed without placing an undue burden on remedial activities while still being protective of health and environment. Since the responsibility for implementing this program ultimately will fall on the party performing the work, these procedures must be incorporated into appropriate work plans. The following fugitive dust suppression and particulate monitoring program will be employed at hazardous waste sites during construction and other activities which warrant its use:

1. Reasonable fugitive dust suppression techniques must be employed during all site activities which may generate fugitive dust.

2. Particulate monitoring must be employed during the handling of waste or contaminated soil or when activities on site may generate fugitive dust from exposed waste or contaminated soil. Such activities shall also include the excavation, grading, or placement of clean fill, and control measures therefore should be considered.

3. Particulate monitoring must be performed using real-time particulate monitors and shall monitor particulate matter less than ten microns (PM_{10}) with the following minimum performance standards:

   Object to be measured: Dust, Mists, Aerosols
   Size range: <0.1 to 10 microns
   Sensitivity: 0.001 mg/m^3
   Range: 0.001 to 10 mg/m^3
   Overall Accuracy: ±10% as compared to gravimetric analysis of stearic acid or reference dust

   Operating Conditions:
      Temperature: 0 to 40°C
      Humidity: 10 to 99% Relative Humidity

   Power: Battery operated with a minimum capacity of eight hours continuous operation

   Automatic alarms are suggested.

   Particulate levels will be monitored immediately downwind at the working site and integrated over a period not to exceed 15 minutes. Consequently, instrumentation shall require necessary averaging hardware to accomplish this task; the P-5 Digital Dust Indicator as manufactured by MDA Scientific, Inc. or similar is appropriate.

4. In order to ensure the validity of the fugitive dust measurements performed, there must be appropriate Quality Assurance/Quality Control (QA/QC). It is the responsibility of the entity operating the equipment to adequately supplement QA/QC Plans to include the following critical features: periodic instrument calibration, operator training, daily instrument performance (span) checks, and a record keeping plan.

5. The action level will be established at 150 ug/m^3 over the integrated period not to exceed 15 minutes. While conservative, this short-term interval will provide a real-time assessment of on-site air quality to assure both health and safety. If particulate levels are detected in excess of 150 ug/m^3, the upwind background level must be measured immediately using the same portable monitor. If the working site particulate measurement is greater than 100 ug/m^3 above the background level, additional dust suppression techniques must be implemented to reduce the generation of fugitive dust and corrective action taken to protect site personnel and reduce the potential for contaminant migration. Corrective measures may include increasing the level of personal protection for on-site personnel and implementing additional dust suppression techniques (see Paragraph 7). Should the action level of 150 ug/m^3 be exceeded, the Division of Air Resources must be notified in writing within five working days; the notification shall include a description of the control measures implemented to prevent further exceedences.

6. It must be recognized that the generation of dust from waste or contaminated soil that migrates off-site, has the potential for transporting contaminants off-site. There may be situations when dust is being generated and leaving the site and the monitoring equipment does not measure PM_{10} at or above the action level. Since this situation has the potential to migrate contaminants off-site, it is unacceptable. While it is not practical to quantify total suspended particulates on a real-time basis, it is appropriate to rely on visual observation. If dust is observed leaving the working site, additional dust suppression techniques must be employed. Activities that have a high dusting potential--such as solidification and treatment involving materials like kiln dust and lime--will require the need for special measures to be considered.

7. The following techniques have been shown to be effective for the controlling of the generation and migration of dust during construction activities:

    1. Applying water on haul roads.
    2. Wetting equipment and excavation faces.
    3. Spraying water on buckets during excavation and dumping.
    4. Hauling materials in properly tarped or watertight containers.
    5. Restricting vehicle speeds to 10 mph.
    6. Covering excavated areas and material after excavation activity ceases.
    7. Reducing the excavation size and/or number of excavations.

    Experience has shown that utilizing the above-mentioned dust suppression techniques, within reason as not to create excess water which would result in unacceptable wet conditions, the chance of exceeding the 150 ug/m^3 action level at hazardous waste site remediations is remote. Using atomizing sprays will prevent overly wet conditions, conserve water, and provide an effective means of suppressing the fugitive dust.

8. If the dust suppression techniques being utilized at the site do not lower particulates to an acceptable level (that is, below 150 ug/m^3 and no visible dust), work must be suspended until appropriate corrective measures are approved to remedy the situation. Also, the evaluation of weather conditions will be necessary for proper fugitive dust control--when extreme wind conditions make dust control ineffective, as a last resort remedial actions may need to be suspended.

There may be situations that require fugitive dust suppression and particulate monitoring requirements with action levels more stringent than those provided above. Under some circumstances, the contaminant concentration and/or toxicity may require appropriate toxics monitoring to protect site personnel and the public. Additional integrated sampling and chemical analysis of the dust may also be in order. This must be evaluated when a health and safety plan is developed and when appropriate suppression and monitoring requirements are established for protection of health and the environment.

New York State Department of Environmental Conservation

Spill Technology and Remediation Series (STARS) #1

PETROLEUM-CONTAMINATED SOIL GUIDANCE Policy
(Last Revised, August 1992)

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SECTION I
PURPOSE AND APPLICABILITY

The goal at each petroleum spill site is to remove the spilled petroleum product from the soil in the most efficient and safe manner in order that the soil may be returned to a reusable product. When complete removal is not possible, practical, or cost effective, the objective is to remediate the contaminated media to concentration levels which will protect groundwater, human health and the environment.

The Petroleum-Contaminated Soil Guidance Policy is intended to provide direction on the handling, disposal and/or reuse of non-hazardous petroleum-contaminated soils. The reuse or disposal options for excavated soils vary depending on the level of treatment provided consistent with protecting the public health and the environment. While this document does not establish standards, it is intended as guidance in determining whether soils have been contaminated to levels which require investigation and remediation.

This document also constitutes a determination of beneficial use by the Department, as defined in Solid Waste Regulation NYCRR Part 360. Petroleum-contaminated soil, if determined to satisfy the criteria herein, can be reused or disposed of as directed in this guidance. Therefore, soils which meet beneficial use conditions are no longer a solid waste in accordance with NYCRR Part 360-1.2(a)(4).

This guidance is intended for Regional Spill Investigators, Regional Solid Waste staff and responsible parties to assist them in determining the acceptability of remedial activities at a petroleum spill site or in determining the acceptability of a site assessment. It may be applied to both excavated and non-excavated material. The evaluation method and guidance values included in this guidance may be used to determine the limits of contamination, such as defining the extent of contamination in an excavation which contains contaminated material. Situations may exist where results of sampling analysis will require interpretations or subjective judgement, as with certain nuisance characteristics such as odors. These interpretations and judgements will be made solely by the DEC representative on site. There may be instances where the DEC will opt to digress from this guidance to establish cleanup goals reflecting site-specific circumstances at a particular petroleum spill site.

The guidance may also be used by responsible parties to develop corrective action plans which will achieve the criteria set forth in this document.

Robert G. Hampston	Norman H. Nosenchuck
Director	Director
Division of Construction Management	Division of Solid Waste

SECTION II

HAZARDOUS WASTE DETERMINATION

An initial determination[1] must be made on all excavated petroleum-contaminated soil as to whether or not it is a hazardous waste. The hazardous waste determination typically involves laboratory analysis to quantify contaminant concentrations in the waste material. The DEC and EPA regulations, however, allow the generator of the waste to use knowledge of the waste and/or laboratory analysis to make a hazardous waste determination. Petroleum-contaminated soils are generally stored on site while laboratory analysis results are obtained and evaluated. As long as the material is segregated from the environment by impervious material, such as polyethylene sheeting, the petroleum-contaminated soil may remain on site until appropriate laboratory results are available and interpreted.

A petroleum-contaminated soil is considered a characteristic hazardous waste when it exhibits any of the following characteristics: ignitability, corrosivity, reactivity, or toxicity, as defined in 6NYCRR Part 371, Section 371.3, or 40 CFR Section 261. Knowledge of soils contaminated with virgin petroleum products indicates that those waste materials do not demonstrate ignitability, corrosivity, or reactivity characteristics. Therefore, the only characteristic of concern for virgin petroleum-contaminated soil is toxicity. The Toxicity Characteristic (TC) Rule identifies benzene and lead as compounds which may cause petroleum-contaminated waste to be hazardous. Analysis of additional parameters may be necessary for petroleum-contaminated soil located at sites where other contaminants may be present. Refer to Appendix A for more specific information regarding the procedures for hazardous waste determination, and the TC Rule regulatory levels.

If the contaminated soil has been excavated and if the hazardous waste criteria apply, then the contaminated soil is classified as a hazardous waste. Excavated soil which is hazardous due to any non-petroleum component will be referred to the Division of Hazardous Waste Remediation, and the Division of Hazardous Substances Regulation to determine appropriate remedial actions.

If in-situ soil is contaminated by a petroleum product, and if the above hazardous waste criteria are met, the site will be remediated under the direction of the Bureau of Spill Prevention and Response to provide for protection of human health and environmental quality. In-situ soil, which violates any of the hazardous waste criteria due to any non-petroleum component, will be referred to the Division of Hazardous Waste Remediation, and the Division of Hazardous Substances Regulation to determine appropriate remedial actions.

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[1] In-situ or excavated soils which could contain contaminants other than petroleum products, by virtue of laboratory analysis, site history, visual observations, etc., will be sampled and analyzed by either the responsible party or by the Bureau of Spill Prevention and Response (BSPR). The Division of Hazardous Substances Regulation (DHSR) will provide assistance to BSPR staff (for state-funded projects) and responsible parties in making hazardous waste determinations for their generated waste.

SECTION III

SOIL CLEANUP GUIDELINES

There are four essential guidelines which must be satisfied in order for soil to be considered acceptably remediated or not sufficiently contaminated. These are: A) protection of the groundwater; B) protection of human health; C) protection of fish and wildlife and the environment in which they live; and D) protection against objectionable nuisance characteristics. Compliance with these guidelines is satisfied by analysis of soil samples for contaminant concentrations and leachability, and subsequent comparison of the sampling results to guidance values, values which have been determined to be acceptable by DEC.

Contaminant concentrations are determined using EPA standard Methods 8021 or 8270. Leachability is determined using a procedure known as the Toxicity Characteristic Leaching Procedure (TCLP). Satisfactory protection of groundwater is indicated by TCLP Extraction Guidance Values or by TCLP Alternative Guidance Values. Satisfactory protection of human health is indicated by Human Health Guidance Values. Satisfactory protection of water body sediment is indicated by Sediment Guidance Values. Finally, satisfactory protection against objectionable nuisance characteristics is indicated by the lack of odor and by each contaminant concentration being less than 10,000 ppb. Tables 1 and 2 in Section VIII list the contaminants of concern and their corresponding guidance values for acceptable soil concentrations for components of gasoline and fuel oil, respectively. Analysis of additional parameters may be necessary for petroleum-contaminated soil located at sites where other contaminants may be present.

The procedures used when evaluating soil samples to satisfy these guidelines are discussed further in this section.

A. Protection of Groundwater

The presence of a contaminant in the soil does not determine its potential for groundwater contamination. Soil particles can adsorb contaminants which will not be released through infiltration and groundwater recharge mechanisms. Therefore, it is the leachability of the soil which must be measured. To be protective of groundwater quality, the soil must not leach contaminants to the groundwater at concentrations which violate groundwater standards. The **Toxicity Characteristic Leaching Procedure (TCLP)** has been accepted by the Department[2] as a method of determining leachability of petroleum-contaminated soil.

The Toxicity Characteristic Leaching Procedure (TCLP) is an extraction process designed to address the leaching potential of organic and inorganic contaminants. It is used to simulate the actual site-specific leaching potential of individual contaminants present in the soil. In the extraction process, the soil sample is mixed with an acid solution and shaken for approximately eighteen hours. For non-volatile organic and inorganic

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[2] Accepted by NYSDEC Cleanup Standards Task Force.

compounds, the soil/acid solution is filtered to produce an extract liquid. For volatile organic compounds, the soil/acid solution is held in a Zero Headspace Extractor (ZHE), preventing the escape of volatile organics, and a liquid extract is squeezed out of the soil/acid solution. The extracted liquid is then analyzed to determine the concentration of the petroleum compounds in question. If the concentrations in the extract are less than or equal to the groundwater standards, then the soil may be considered environmentally acceptable for groundwater protection. Tables 1 and 2 in Appendix B identify the TCLP Extraction Guidance Values for the primary components of gasoline and fuel oil. The tabulated TCLP Extraction Guidance Values are equal to the NYSDEC groundwater standards or the NYSDOH drinking water standards, whichever is more stringent.

An alternative approach to the actual extraction process of the TCLP laboratory procedure which may be a cost-saving shortcut is to evaluate the concentration of the contaminant in the soil and mathematically determine if it will satisfy the leachate criteria. The TCLP laboratory procedure requires the soil sample to be diluted by a ratio of 20:1 when preparing the sample for the acidic extraction, and subsequent leachate analysis. Assuming that the entire mass of the contaminants present in the soil will leach out during the extraction process, the dilution factor of 20 can be applied to the actual soil contaminant concentration to give a maximum possible contaminant concentration obtainable in the leachate.

If a contaminant concentration in the soil is known, then the maximum possible contaminant concentration in the TCLP extract can be determined by the following equation:

$$\boxed{\begin{array}{l}\text{Contaminant}\\ \text{Concentration}\\ \text{in Soil}\\ \text{(ug/kg or ppb)}\end{array}} \div 20 = \boxed{\begin{array}{l}\text{Maximum Possible}\\ \text{Contaminant}\\ \text{Concentration}\\ \text{in Extract}\\ \text{Liquid (ug/l or ppb)}\end{array}}$$

If the maximum possible contaminant concentration in the extract liquid, as determined by the above equation, is less than or equal to the contaminant's TCLP Extraction Guidance Value, then the contaminant satisfies the groundwater quality protection criterion. If the calculated maximum possible contaminant concentration in the extract liquid is greater than the TCLP Extraction Guidance Value, then no conclusion can be drawn and groundwater quality protection must be confirmed by actually performing the TCLP extraction for that contaminant.

<u>Example:</u>

If the total concentration of Toluene in the soil as determined by Method 8021 is 100 ug/kg or 100 ppb for Sample A and 140 ug/kg or 140 ppb for

Sample B, and the groundwater standard is 5 ppb then:

Sample A is: 100 ug/kg ÷ 20 = 5 ug/l = 5 ppb
Sample B is: 140 ug/kg ÷ 20 = 7 ug/l > 5 ppb

Sample A is considered to have satisfied groundwater protection by the TCLP extraction test for Toluene at 5 ppb. In Sample B, the calculated extract value is greater than 5 ug/l, therefore, no conclusion can be drawn from the calculation, and an actual TCLP extraction test must be performed.

To simplify this alternative approach, TCLP Alternative Guidance Values, which are equal to 20 times the TCLP Extraction Guidance Values, have been included in Tables 1 and 2. Therefore, if a contaminant's soil concentration is known, it can simply be compared to the TCLP Alternative Guidance Values.

The above methodology can also be used to make the hazardous waste determination, with the soil or sediment concentration compared to the respective hazardous waste limit for the leachate. A considerable decrease in analytical costs may be realized if the above equation is used to evaluate contaminant concentration acceptability.

In summary, if the contaminant concentrations in the soil are less than or equal to the TCLP Alternative Guidance Values, or if the contaminant concentrations in the soil extract are less than or equal to the TCLP Extraction Guidance Values, then the soil is considered environmentally acceptable for groundwater quality protection.

B. Protection of Human Health

Protection of human health is an essential requirement of both treatment and reuse of petroleum-contaminated soil. EPA has published health-based standards for many contaminants in soil. The standards are contained in the Health Effects Assessment Summary Table (HEAST REPORT). These standards were derived from methodologies based on soil ingestion values for carcinogens and systemic toxicants.

The appropriate health-based soil Guidance Values are listed in Tables 1 and 2 for the primary components of gasoline and fuel oil.

If the contaminant concentrations in the soil are less than or equal to the Human Health Guidance Values, then the soil is considered safe for human health concerns.

C. Protection of Fish and Wildlife

Protection of fish and wildlife must be satisfied when dealing with contaminated sediment. Some Sediment Guidance Values for protection of aquatic life and animals which consume aquatic life, have been developed and are noted in Tables 1 and 2. Where sediments are contaminated, these Guidance Values should be used. The appropriate natural resource division (eg. Marine, Fish & Wildlife, etc.) should be contacted for situations involving sediment contaminants which do not have tabulated Sediment Guidance Values. If a spill has occurred at a location that may be sensitive to wildlife (eg. wetlands), the Division of Fish and Wildlife should be consulted to determine whether the soil cleanup levels are adequate for natural resource protection.

If the contaminant concentrations in the sediment are less than or equal to the tabulated Sediment Guidance Values, then the sediment is considered environmentally acceptable for fish and wildlife concerns.

D. Protection Against Objectionable Nuisance Characteristics

Petroleum-contaminated soil must not exhibit objectionable nuisance characteristics to be eligible for some reuse options described later in this guidance and listed in Table 3.

1) <u>Petroleum-Type Odors</u>

The soil must not exhibit any discernible petroleum-type odors in order to be considered for the reuse options identified later in this guidance. Odor determinations for state-funded spill projects will be made by the Regional Spill Investigator. Odor determinations for responsible party (RP) sites are the responsibility of the RP. The Regional Spill Investigator may or may not be available to assess the odor criteria at all sites. When the Regional Spill Investigator is on-site, he/she may override the decision of the RP if, in the investigator's opinion, sufficient odors still persist. Determinations by DEC Spill Investigators do not relinquish a responsible party's responsibilities or liabilities under the law.

2) <u>Contaminant Concentrations</u>

The soil shall not contain any contaminant at a concentration above **10,000 ug/kg (10,000 ppb).** This maximum individual contaminant concentration should support the above odor determination, since some petroleum constituents will not leach at high concentrations but may exhibit odors.

If the soil does not exhibit petroleum-type odors <u>and</u> does not contain any individual contaminant at greater than 10,000 ppb, then the soil is considered acceptable for nuisance characteristics.

SECTION IV

GUIDANCE VALUES

A. Gasoline-Contaminated Soils

Table 1 lists the primary gasoline components of concern. The table identifies the compound names, the preferred EPA laboratory methods for determining contaminant concentration, the detection limits for a liquid matrix (water), the detection limits for a solid matrix (soil), the TCLP Extraction Guidance Values (C_w), the TCLP Alternative Guidance Values (C_a), the Human Health Guidance Values (C_h), and the Sediment Guidance Values (C_s).

Although EPA Method 8021 is preferred, other laboratory methods may be used with prior approval from the DEC Regional Spill Investigator. Other proposed methods should be evaluated on their ability to quantify the compounds of concern at acceptable detection levels.

The tabulated detection limits are the practical quantitation limits (PQLs). The PQL is the lowest level that can be measured within specified limits of precision during routine laboratory operations on most matrices. Efforts should be made to obtain the best detection possible when selecting a laboratory.

To demonstrate groundwater quality protection via the TCLP Extraction Method, the concentration of the hydrocarbon compound in the TCLP extract, as determined by EPA Method 8021 for a liquid matrix, must be less than or equal to the TCLP Extraction Guidance Value, C_w.

-or-

To demonstrate groundwater quality protection via the TCLP Alternative Method, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a solid matrix, must be less than or equal to the TCLP Alternative Guidance Value, C_a.

To demonstrate human health protection, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a solid matrix, must be less than or equal to the Human Health Guidance Value, C_h.

To demonstrate fish and wildlife protection, the concentration of the hydrocarbon compound in the soil, as determined by EPA Method 8021 for a solid matrix, must be less than or equal to the Sediment Guidance Value C_s. Meeting this requirement is only necessary when dealing with contaminated sediment.

To demonstrate nuisance protection, the soil must not exhibit petroleum-type odors, and must not contain any contaminant at greater than 10,000 ppb, as determined by EPA Method 8021 for a solid matrix.

When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard, as long as the reported laboratory detection limits are reasonably close to the listed PQLs.

B. Fuel Oil-Contaminated Soil

Table 2 lists the primary fuel oil components of concern. As with Table 1, Table 2 identifies compound names, preferred EPA laboratory methods, detection limits, and Guidance Values.

Although EPA Methods 8021 and 8270 are preferred for identifying compounds of concern for gasoline and fuel oil, other laboratory methods may be used with prior approval from the DEC Regional Spill Investigator. Other proposed methods should be evaluated on their ability to quantify the compounds of interest at acceptable detection levels.

Since there is no single laboratory method which will analyze for all of the volatile and semi-volatile compounds of concern, it is generally necessary to use more than one laboratory method for fuel oil analysis. Both volatile and semi-volatile compounds must be addressed initially, but a reduced list of analytes may be acceptable for subsequent sampling depending upon the initial results.

As with Table 1, the detection limits in Table 2 are PQLs. Efforts should be made to obtain the best detection possible when selecting a laboratory.

Experience has shown that soil containing some of the insoluble semi-volatile compounds at high concentrations can exhibit a distinct odor even though the substances will not leach from the soil. Therefore, the maximum individual contaminant concentration of 10,000 ppb is instituted to help address this problem. In addition, anytime a soil exhibits discernible petroleum odors, even if it has met the numerical criteria, it shall not be considered clean enough for some reuse options under 6NYCRR Part 360, as described later in this document.

Odor determination is subjective. Since there is no recognized odor measuring device, some discrepancies may arise between responsible parties and the DEC on this subject. In order to document odor determinations and to address the need for remediation due to odors, the following approaches may be considered: (1) direct the laboratory to identify and quantify all pollutants present in the soil and/or leachate samples instead of just the method's target compounds; and (2) establish site-specific conditions based on an evaluation of the characteristics of the site. The determination and evaluation of odors remains a subject requiring further research and policy development.

Some of the semi-volatiles are carcinogens, and subsequently have groundwater quality Guidance Values of 0.002 ppb. The TCLP Extraction Guidance Values are 0.002 ppb, and the TCLP Alternative Guidance Values are 0.04 ppb. The solid matrix detection limit does not approach this low value. Therefore, when these compounds are determined to be present, the TCLP Extraction Method and the Alternative Guidance Values must be satisfied to demonstrate groundwater quality protection for these particular contaminants. The following compounds listed in Table 2 are affected by this limitation: benzo(a)anthracene; benzo(b)fluoranthene; benzo(k)fluoranthene; benzo(a)pyrene; chrysene; benzo(ghi)perylene; and indeno(1,2,3-cd)pyrene.

Particular attention should be paid to the Human Health Guidance Values for fuel oil-contaminated soil. While the majority of the semi-volatiles have health Guidance Values considerably higher than the contaminant concentration generally encountered at spill sites, there are seven compounds listed in Table 2 which have Human Health Guidance Values lower than the detection limits. When any of these compounds (benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(a)pyrene and dibenz(a,h)anthracene) are present, the Human Health Guidance Value most likely will be the limiting factor for achieving acceptable cleanup levels.

To demonstrate groundwater quality protection via the TCLP Extraction Method, the concentrations of the hydrocarbon compounds in the TCLP extract, as determined by EPA Methods 8021 and 8270 Base/Neutral for a liquid matrix, must be less than or equal to the TCLP Extraction Guidance Value, C_w;

-or-

To demonstrate groundwater quality protection via the TCLP Alternative Method, the concentrations of the hydrocarbon compounds in the soil, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the TCLP Alternative Guidance Value, C_a. As described above, the TCLP Alternative Method is not a sufficient demonstration of groundwater protection for some contaminants.

To demonstrate human health protection, the concentrations of the hydrocarbon compounds in the soil, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the Human Health Guidance Value, C_h.

To demonstrate fish and wildlife protection, the concentrations of the hydrocarbon compounds in the soil, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix, must be less than or equal to the Sediment Guidance

Value, C_s. Meeting this requirement is only necessary when dealing with contaminated sediment.

To demonstrate nuisance protection, the soil must not exhibit petroleum-type odors, and must not contain any contaminant at greater than 10,000 ppb, as determined by EPA Methods 8021 and 8270 Base/Neutral for a solid matrix.

When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard, as long as the reported laboratory detection limits are reasonably close to the listed PQLs.

SECTION V

LABORATORY ANALYSIS

There are a variety of laboratory methods, established by the USEPA and the NYS Department of Health (DOH), which can be used to analyze petroleum-contaminated soils. The selection of appropriate laboratory methods depends on the compounds of concern, the detection limits for each compound, the nature of the samples to be analyzed, the capabilities of the laboratory, and the regulatory limits or Guidance Values to be achieved. The methods recommended and most often used for petroleum-contaminated soils are EPA Standard Methods 8021, 8270 (Base/Neutrals) and the TCLP extraction process. In every case, the NYSDEC will evaluate laboratory results from NYSDOH-approved laboratories only.

Each laboratory method identifies compounds which can be quantified with an acceptable degree of precision and accuracy. Many laboratory methods have petroleum compounds as target compounds, along with non-petroleum compounds. Method 8270, for example, identifies acid extractable hydrocarbons and base/neutral extractable hydrocarbons. The semi-volatile constituents of petroleum products are a sub-set of the base/neutral extractable compounds under Method 8270. Therefore, when requesting this analysis, base/neutrals only should be specified.

Some laboratories may be able to quantify non-target compounds of concern with particular methods. For example, there is no laboratory method which lists MTBE (methyl t-butyl ether) as a target compound; however, laboratories can include MTBE in their analysis using Method 8021. Therefore, when requesting this analysis, Method 8021 plus MTBE should be specified.

Each laboratory method establishes minimum concentrations of the target compounds which can be detected under ideal conditions using that particular procedure. These Method Detection Limits (MDLs) are rarely achievable under actual conditions in an analytical laboratory. Laboratories report their actual detection limits as Practical Quantitation Limits (PQLs). The PQLs for analysis on a liquid matrix are generally four times the MDLs. With a solid matrix, the PQLs will be affected by the quantity of contamination present, categorized as low, medium or high concentrations. Lower PQLs are generally possible with low level soil contamination. Laboratories must identify their PQLs when reporting analytical results.

Laboratories and methods to be utilized should be selected according to the best detection possible for the compounds of interest, and the regulatory or guidance levels needed to be achieved. For example, Table 2 indicates that naphthalene is a target compound for Method 8021 and Method 8270. Both of these methods can provide detection levels in a liquid matrix below the TCLP Extraction Guidance Value of 10 ppb. Therefore, either method could be used for analysis of a liquid matrix of naphthalene. However, for a solid matrix, Method 8021 is capable of providing much better detection of naphthalene than Method 8270. If the soil concentrations for naphthalene will be compared to the TCLP Alternative Guidance Value of 200 ppb, then Method 8021 should be used instead of Method 8270. If the soil concentrations for naphthalene will be compared only with the nuisance protection level of 10,000 ppb, or the Human Health Guidance Value of 300,000 ppb, then both Method 8021 and Method 8270 are capable of providing satisfactory detection levels for naphthalene.

Initial laboratory analysis should address the full range of compounds which may be present, considering the petroleum products involved. In consideration of prior laboratory results, potential contaminants may be eliminated from subsequent sampling analysis lists. As the contaminants are identified or eliminated, it may be appropriate to change laboratory methods during a project, to avoid unnecessary laboratory expenses. In addition, it may be appropriate to discuss analytical work with the laboratory in terms of the actual compounds of interest rather than method numbers and their defined target compounds. The final laboratory results for a project, however, should address the same full range of compounds as the initial sampling results, to confirm that the interim results did not overlook the appearance of other compounds. For example, gasoline-contaminated soil which is undergoing on-site bioremediation should be analyzed initially using Method 8021 plus MTBE. If only benzene, toluene, ethyl benzene and xylenes are detected, then Method 8020 could be used for interim sampling events. Upon completion of the bioremediation project, the soil should be analyzed using Method 8021 plus MTBE, to demonstrate the satisfaction of the Guidance Values applicable to the selected reuse option.

A detailed description of analytical protocols and procedures is available in the DEC Sampling Guidelines and Protocols manual.

SECTION VI

SAMPLING

Samples should be collected in such a manner so as to best characterize the extent of contamination of the soil in question. There is no specific number or type of samples which will apply to all situations and best engineering judgement will have to be used. The type of sample, grab or composite, will vary depending upon the constituent being identified. While grab samples come from one location, composites come from several locations and are joined to form one sample. When volatiles are in question, care must be taken when collecting composite samples to minimize the loss of volatiles during handling. In order to minimize handling of volatiles, several grab samples are preferred, with confirmatory composite samples. When sampling for semi-volatiles, several composite samples are preferred, with confirmatory grab samples.

The treatment process (if any) will also have a bearing as to how well a soil may be characterized. Low temperature thermal treatment units (e.g. rotary kiln dryers) process soil resulting in a more homogeneous mixture than would be obtained from a stationary pile. The following guidance is offered to assist the Regional Spill Investigator in determining the number and types of samples which should be requested for various treatment scenarios. More comprehensive samples may be required depending on the reuse or disposal alternative to be used.

The responsible party and the Regional Spill Investigator should agree on a sampling plan and review procedure before the samples are collected. All sample results submitted for regulatory compliance must be analyzed by New York State Department of Health approved laboratories.

A detailed description of soil sampling protocols and procedures is available in the DEC Sampling Guidelines and Protocols manual.

A. Tank Pit

If there is a question as to the extent of residual contamination, or if comprehensive documentation is necessary, a tank pit may be sampled for laboratory analysis.

A total of five samples should be taken from the excavation. One composite sample from each of the side walls at a distance approximately one third up from the bottom of the pit. Several samples should also be collected to form one composite sample from the bottom of the pit. Any remaining samples should be grab samples from areas with greater potential for contamination such as stained soils, adjacent to a corrosion hole, opposite a manway, or opposite a tank opening. All samples shall be taken no less than six inches below the exposed surface being sampled. Samples for compositing should be taken from random locations on the floor and walls of the tank pit.

B. Soil Pile

The number of samples required for an excavated pile will be related to the quantity of soil stockpiled. The table below can be used as a guide in determining the appropriate number of samples. If, in the opinion of the Regional Spill Investigator, additional samples are warranted, they should be requested.

Recommended Number of Soil Pile Samples

CONTAMINANT	SEMI-VOLATILES		VOLATILES	
SAMPLE TYPE	Grab	Composite	Grab	Composite
SOIL QUANTITY (yd^3)				
0-50	1	1	1	1
50-100	1	2	2	1
100-200	1	3	3	1
200-300	1	4	4	1
300-400	2	4	4	2
400-500	2	5	5	2
500-800	2	6	6	2
800-1000	2	7	7	2
>1000 - **Proposed Sampling plan shall be submitted for approval on site specific basis**				

Best engineering judgement is needed to determine the most appropriate sampling locations. The objective of the sampling is to characterize the extent of contamination of the pile. Consideration should be given to how the soil was stockpiled. Is the most contaminated soil toward the top? Are areas visibly contaminated? How high and how long is the pile? It may be preferable to divide the pile into manageable segments. Samples should be taken from within the pile. Surface soil should not be used as sampling material. Samples shall be collected in accordance with proper sample collection techniques. All samples must be collected in glass containers with air-tight sealable tops.

Using the above sampling table, considering the factors mentioned above, and applying best engineering judgement, an acceptable evaluation of the contaminant concentrations in the soil can be made.

C. Processed Soil

Processed soil is soil which undergoes physical handling during a treatment process. Examples of treatment processes are rotary kiln dryers (low temperature thermal treatment units) or soil washing units. Soil under these conditions are more homogeneously mixed; therefore, individual samples are more likely to characterize the entire lot. Since these processes are continuous in nature, the samples should be collected over a period of time similar to that described below:

1) A sample may be collected every twenty minutes for a period of two hours. The samples are then mixed to form one composite sample. This frequency will continue until all soils are processed. The twenty minute composite interval is a guideline which can be adjusted based on the amount of soil processed and the processing period. Testing protocols are specifically defined in the treatment unit's operating permit.

2) At least one grab sample should be taken for every two sets of composites.

3) A minimum of two samples (1 grab, 1 composite) should be taken for any treated soil batch.

D. Aboveground (Ex-Situ) Treatment

Typical aboveground treatment technologies are bioremediation and soil vapor extraction. Soil remediated under these conditions will be mixed (tilled) and spread evenly over a wide area. The soil will be spread to a uniform thickness, usually no higher than two feet, although depths may be higher for soil vapor extraction treatment. The shallow depth makes sample collection an easy process. The number of required samples can be based on the quantity of soil being treated (see above table). Depth of the sample can be anywhere from six inches to the bottom of the treatment layer. Care must be taken not to penetrate the liner material. The sampling locations and depths must be randomized.

E. Non-Excavated (In-Situ) Treatment

Treatment of non-excavated soil is similar to aboveground treatment in that the contamination is spread over a wide area. It differs, however, in that the depths of the contaminated zone are varied and usually extend much deeper. Once the volume of contaminated material is determined, the above table can be used to determine the number of required samples. The sampling locations and depths must be randomized.

SECTION VII

MANAGEMENT OF EXCAVATED (EX-SITU) CONTAMINATED SOILS

Once non-hazardous petroleum-contaminated soil is moved from its original state, it is by definition a solid industrial waste and must be managed in accordance with Part 360 and transported in accordance with Part 364 regulations. There are several alternatives available to properly handle this contaminated soil.

A. Soils Which Do Not Meet Guidance Values

Soils which do not meet the guidance values can be processed under a specific DEC Beneficial Use Determination (BUD), such as at an approved hot-mix asphalt batching plant or at a cold-mix asphalt plant, disposed of at a DEC authorized landfill, or treated on site.

1) Reuse Under Specific Beneficial Use Determinations

The DEC Division of Solid Waste has made Beneficial Use Determinations (BUD's) under 6 NYCRR Part 360, identifying recycling or re-use activities which are not subject to Part 360 regulations. The use of petroleum-contaminated soil in a manufacturing process to produce a marketable product may be eligible for BUD issuance. Each manufacturing process operator must maintain compliance with the specific requirements of the issued BUD. Hot-mix and cold-mix asphalt manufacturing are two examples of processes which have received BUD's, and other processes may be approved by the Division of Solid Waste in the future.

a. Reuse at an Approved Asphalt Batching Plant

Several asphalt plants have been authorized to accept non-hazardous contaminated soil, for use as aggregate, provided the plant is in compliance with any other DEC regulations which may apply to the facility. For example, the use of petroleum-contaminated soil may require a modification of the facility's air emission permit.

b. Production of Cold-Mix Asphalt

A Beneficial Use Determination (BUD) has been issued to the process which combines liquid asphalt emulsion with the contaminated soil to produce a cold-mix asphalt. Approval to process petroleum-contaminated soil to produce a cold-mix asphalt is issued by the Spill Response Program. The applicant must satisfy specific testing requirements prior to receiving approval to process. Each BUD identifies allowable uses for the manufactured cold-mix asphalt and any qualifying conditions and post-treatment testing protocols.

These asphalt products, if being stockpiled or transported for disposal rather than reuse, no longer meet the requirements for these BUDs and are subject to all applicable regulatory provisions of 6NYCRR Parts 360 and 364.

PCS containing asphalt products, which are left in a stockpile and are not being beneficially used, remain a solid waste until such use is accomplished. These materials shall be removed from the stockpile for beneficial use in accordance with their beneficial use approval requirements, or disposal if necessary, as rapidly as possible.

2) Disposal at an Authorized Landfill

A DEC-authorized landfill is one which either has an operating permit or is under a consent order. While this is not the preferred method of dealing with contaminated soil, it may be the most economical or, due to site constraints, the only alternative. Additional restrictions may be required by the landfill operators prior to accepting materials at their facilities.

3) Treatment On Site

Non-hazardous petroleum-contaminated soil may be treated on the site of generation without a DEC Part 360 Permit. Depending on the treatment technologies being utilized, other DEC permits may be required for air emissions and water discharges.The soil treatment processes may involve excavation of soils, securely stockpiling the soils until treatment is initiated, aboveground treatment of the soils, and/or placement of soils back into an excavation for treatment. The Regional Spill Investigator should require a remedial plan, signed by the responsible party, prior to the placement of contaminated soils into an excavation for treatment.

If the soil is to be placed back in an excavation for treatment, and if the excavation is determined to be uncontaminated, the excavation must be prepared and lined in such a manner to protect it against contamination from the soil which will be treated. However, if the excavation is contaminated it shall be the decision of the Regional Spill Investigator as to whether a liner is necessary.

All excavated soil shall be placed on an impervious material (eg: polyethylene sheeting) with the sides banked so as to control and contain run-off. During periods when no treatment is on-going, the surface of the pile(s) must also be covered with an impervious material.

The site may have to be evaluated for its impact to the ambient air. Cross media contamination shall be minimized and aesthetic or nuisance issues shall be addressed. If space on the site is limited, or if the protection of the public health is in jeopardy, then on-site treatment will not be allowed and soil must be removed to a permitted location for treatment or disposal.

There are several methods of on-site soil treatment. Typical among these are soil venting, bioremediation, soil washing and low temperature thermal treatment. All treatment should be evaluated based on its ability to achieve the desired result in the most economical and efficient manner.

B. Soils Which Meet Guidance Values

The reuse options available for de-contaminated soil depends upon which particular Guidance Values are satisfied by the soil. Table 3 identifies the reuse options and the Guidance Values which must be met to use each reuse option.

As described earlier, the DEC Division of Solid Waste (DSW) has issued a Generic Beneficial Use Determination (BUD) which exempts petroleum-contaminated soils, which have been successfully incorporated into an asphalt product by a Bureau of Spill Prevention and Response (BSPR) approved producer and which will be utilized in a bonified paving project.

In addition, the DSW has determined that soils which satisfy the appropriate Guidance Values and which will be reused as highway sub-base material, fill for the original excavation, fill elsewhere on the site of generation, or fill off-site at pre-approved locations, are being beneficially used and are exempt from the provisions of 6NYCRR Part 360. These soils are also exempt from 6NYCRR Part 364 since they no longer meet the Part 364 definition of "solid waste".

The reuse options are not listed as a hierarchy; however, off-site reuse is generally less desirable. The Regional Spill Supervisor or his/her designee will review all appropriate soil sampling data to determine if the criteria has been met for the requested reuse option. Upon request from the responsible party, the evaluation of the submitted data shall be documented with a statement from the Regional Spill Supervisor that the soil does or does not meet the criteria for the desired reuse option. **The DEC and its designee assume no liability when evaluating data for a responsible party with regard to the reuse or disposal of the soil in question.** The generator of the soil has the ultimate responsibility for the accurate and precise characterization, and the safe and proper reuse or disposal of the material. In addition, soil which is being reused off site shall not be allowed to be transported prior to the receipt of the laboratory reports confirming that the soil has satisfied the appropriate Guidance Values of this guidance document. **The responsible party shall maintain all field data, laboratory results, and final disposition records for three years.**

The possible reuse options are presented below. Additional uses of decontaminated petroleum-contaminated soil may be identified in a Part 360 Permit or BUD for a specific facility.

1) Reuse as a Construction Material

Soil which satisfies the Guidance Values for groundwater protection, human health protection and nuisance characteristics can be reused as construction material. Construction material can include hot asphalt, cold-mix asphalt, concrete, roadway sub-base, etc. Final destination of the soil shall be identified prior to removal from the site.

2) Returned to the Original Excavation

Soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics, can be placed back in the hole from which it was excavated.

3) Placed Elsewhere on Site

Soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics, can be placed anywhere within the confines of the contiguously-owned property from which it originated.

4) Reuse Off-Site at a Pre-Approved Location

The Regional Spill Engineer and Regional Solid Waste Engineer may approve a request for an off-site reuse location for remediated soil which satisfies the Guidance Values for groundwater protection, human health protection, and nuisance characteristics. Sites which may be considered for this option are industrial sites, authorized construction and demolition debris landfills, petroleum storage facilities, authorized landfills, or other locations where public access is limited. Written approval must be received from the property owner(s) prior to exercising this reuse option. The responsible party may submit such a request to the Regional Spill Engineer who will coordinate with the Regional Solid Waste Engineer to approve or disapprove the request.

C. Rock Debris

Rock debris, for purposes of this policy, is defined as those rocks which are four (4) inches or greater in diameter. They shall be cleaned of any packed-on petroleum-contaminated soil. These rocks are not treated as a solid waste and can be disposed of as construction and demolition debris.

If rock debris cannot be separated from the petroleum-contaminated soil, it shall be handled as a solid waste in accordance with NYCRR Part 360 and/or Part 364 requirements.

SECTION VIII

MANAGEMENT OF NON-EXCAVATED (IN-SITU) CONTAMINATED SOIL

In-situ contaminated soil may pose a threat to the groundwater, human health and the environment. These sites must be evaluated to determine the extent of contamination and the appropriate investigative or remedial actions necessary. The soil may be treated in-situ and evaluated by the same guidelines as excavated soil, while taking into account site-specific considerations and conditions.

Additional guidance will be developed to establish procedures for evaluating the potential impacts of non-excavated (in-situ) contaminated soils. Issues which should be considered when evaluating in-situ contaminated soil are environmental sensitivity of the site, level of residual contamination, soil characteristics, depth to groundwater, present and potential land use. A proper sampling plan will be necessary to determine the number, quantity and depth of samples to properly characterize the site.

SECTION IX

REFERENCES

NYS Department of Environmental Conservation, Cleanup Standards Task Force, DRAFT Cleanup Policy and Guidelines, October 1991.

NYS Department of Environmental Conservation, Division of Hazardous Substances Regulation, 6NYCRR Part 364, Waste Transporter Permits, January 12, 1990.

NYS Department of Environmental Conservation, Division of Hazardous Substances Regulation, 6NYCRR Part 371 Identification and Listing of Hazardous Wastes, December 25, 1988.

NYS Department of Environmental Conservation, Division of Solid Waste, 6NYCRR Part 360 Solid Waste Management Facilities, May 28, 1991.

NYS Department of Environmental Conservation, Division of Water, Sampling Guidelines and Protocols, March 1991.

NYS Department of Environmental Conservation, Division of Water, Spill Response Guidance Manual, January 1990.

NYS Department of Environmental Conservation, Division of Water, Technical and Operation Guidance Series (1.1.1), Ambient Water Quality Standards and Guidance Values, November 15, 1991.

US Environmental Protection Agency, 40 CFR Part 261 Identification and Listing of Hazardous Wastes, June 29, 1990.

US Environmental Protection Agency, Health Effects Assessment Summary Table, April 4, 1991.

APPENDIX A

HAZARDOUS WASTE DETERMINATION AND REGULATORY LEVELS

In accordance with DEC and EPA regulations, the generator of a waste material must determine if the material is a hazardous waste or a non-hazardous waste. The generator can make this determination using knowledge of the waste and/or laboratory analyses.

A waste material can be a hazardous waste due to its origin, its listed waste content, or its characteristics.

Soil contaminated with virgin petroleum products is a hazardous waste if it exhibits a characteristic of a hazardous waste, namely, ignitability, corrosivity, reactivity, and toxicity. The hazardous waste characteristics, defined in 6NYCRR Part 371, Section 371.3, and 40 CFR Section 261, are described below.

A. **Ignitability**:

A solid waste exhibits the characteristic of ignitability if a representative sample of the waste has any of the following properties:

1) Is not a liquid and is capable under standard temperature and pressure, of causing fire through friction, absorption of moisture or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard.

2) It is a liquid, other than an aqueous solution containing less than 24 percent ethyl alcohol by volume, and has a flash point less than 60 C (140 F).

3) It is an ignitable compressed gas.

4) It is an oxidizer.

In accordance with guidance from the DEC Division of Hazardous Substances Regulation and based on knowledge of the waste, soils contaminated with virgin petroleum products do not exhibit the above properties and do not have to be tested for the ignitability characteristic.

B. **Corrosivity**:

A solid waste exhibits the characteristic of corrosivity if a representative sample of the waste has either of the following properties:

1) It is aqueous and has pH less than or equal to 2 or greater than or equal to 12.5.

2) It is a liquid and corrodes steel at a rate greater than 6.35 mm (0.250 inch) per year at a test temperature of 55 C (130 F).

Based on knowledge of the waste, soils contaminated with virgin petroleum products do not exhibit the above properties, and do not have to be tested for the corrosivity characteristic.

C. **Reactivity**:

A solid waste exhibits the characteristic of reactivity if a representative sample of the waste has any of the following properties:

1) It is normally unstable and readily undergoes violent change without detonating.

2) It reacts violently with water.

3) It forms potentially explosive mixtures with water.

4) When mixed with water, it generates toxic gases, vapors or fumes in a quantity sufficient to present a danger to human health or the environment.

5) It is a cyanide or sulfide bearing waste which, when exposed to pH conditions between 2 and 12.5, can generate toxic gases, vapors or fumes in quantity sufficient to present a danger to human health or the environment.

6) It is capable of detonation or explosive reaction if it is subjected to a strong initiating source or if heated under confinement.

7) It is readily capable of detonation or explosive decomposition or reaction at standard temperature and pressure.

8) It is a forbidden explosive, a Class A explosive or a Class B explosive.

Based on knowledge of the waste, soils contaminated with virgin petroleum products do not exhibit the above properties, and do not have to be tested for the reactivity characteristic.

D. **Toxicity**:

If the Toxicity Characteristic Leaching Procedure (TCLP) extract from a representative sample of the waste contain any of the contaminants identified in the attached listing of Hazardous Waste Regulatory levels at concentrations equal to or greater than the values listed, it is a hazardous waste.

With respect to petroleum-contaminated soil, the primary compound of concern is benzene. If the benzene concentration in a TCLP extract is equal to or greater than 500 ppb, the contaminated material is a characteristic hazardous waste. For gasoline contaminated soil, toxicity for lead must also be evaluated.

The regulatory level of benzene in the soil is determined by analyzing the soil using the TCLP extraction method and determining the concentration in the extract.

A second method of determination is to identify the total concentration of the contaminant in the soil. If the total concentration is less than the regulatory level, then the leachate level could not possibly exceed the standard. This approach would save laboratory costs because the TCLP would not have to be run. If the total concentration in the soil exceeds the regulatory level required in the extract, no conclusion can be drawn from these results and a complete TCLP must be run.

Additional Information on Toxicity Characteristics

On March 29, 1990, the U.S. Environmental Protection Agency established the Toxicity Characteristic (TC) Rule. The TC Rule expands the list of contaminants by which a waste can be classified as hazardous due to toxicity, and it replaces the Extraction Procedure Toxicity (EP Tox) with the Toxicity Characteristic Leaching Procedure (TCLP). The TC Rule's specified contaminant list includes the same 14 metals and pesticides as the original toxicity list, plus 25 additional organic chemicals. Each of the 39 listed contaminants has the potential for rendering a particular material a characteristic hazardous waste due to toxicity. Since benzene is one of the 25 organic compounds added to the toxicity list, and since benzene is commonly found in petroleum products, it is possible that petroleum-contaminated soil may classify as a hazardous waste. Limited relief from these hazardous waste regulations is currently available because the TC Rule has specifically deferred petroleum-contaminated soil, groundwater, and debris generated from underground storage tank (UST) releases, until the impact of the regulation is further evaluated.

UST sites are essentially those sites which have underground storage tanks containing transportation fuels, such as gasoline, jet fuel, aviation gas, and diesel fuel. (See 40 CFR Section 280.12 for a more complete definition). The TC Rule does not apply to petroleum-contaminated media produced by a leak from an UST, including associated underground piping. However, DEC regulations state that the materials contaminated by transportation fuels can be hazardous wastes if they exhibit other hazardous waste characteristics, such as toxicity due to lead.

The TC Rule, as published on March 29, 1990, became effective on September 25, 1990, for large-quantity generators, and March 29, 1991, for small quantity generators. Large quantity generators are defined as those parties who generate 2,200 pounds or more of hazardous waste in any month. Small quantity generators are those parties who generate between 220 and 2,200 pounds of hazardous waste in any month. Until the DEC adopts the TC Rule, waste generators must comply with both the EPA and DEC waste regulations. Refer to the specific regulations of interest for more information.

HAZARDOUS WASTE REGULATORY LEVELS FOR TOXICITY CHARACTERISTIC

CONSTITUENT	REGULATORY LEVEL (mg/L)
Arsenic	5.0
Barium	100.0
Benzene	0.5*
Cadmium	1.0
Carbon tetrachloride	0.5*
Chlordane	0.03*
Chlorobenzene	100.0*
Chloroform	6.0*
Chromium	5.0
o-Cresol	200.0*
m-Cresol	200.0*
Cresol (TOTAL)	200.0*
2,4-D	10.0
1,4-Dichlorobenzene	7.5*
1,2-Dichloroethane	0.5*
1,1-Dichloroethylene	0.7*
2,4-Dinitrotoluene	0.13*
Endrin	0.02
Heptachlor (and its epoxide)	0.008*
Hexachlorobenzene	0.13*
Hexachloro-1,3butadiene	0.5*
Hexachloroethane	3.0*
Lead	5.0
Lindane	0.4

HAZARDOUS WASTE REGULATORY LEVELS FOR TOXICITY CHARACTERISTIC (Cont'd)

CONSTITUENT	REGULATORY LEVEL (mg/L)
Mercury	0.2
Methoxychlor	10.0
Methyl ethyl ketone	200.0*
Nitrobenzene	2.0*
Pentachlorophenol	100.0*
Pyridine	5.0*
Selenium	1.0
Silver	5.0
Tetrachloroethylene	0.7*
Toxaphene	0.5
Trichloroethylene	0.5*
2,4,5-Trichlorophenol	400.0*
2,4,6-Trichlorophenol	2.0*
2,4,5-TP (Silvex)	1.0
Vinyl chloride	0.2*

* New Toxicity Characteristics Effective 9/25/90

APPENDIX B

GUIDANCE VALUES AND REUSE OPTIONS

TABLE 1
Guidance Values For Gasoline Contaminated Soil*

Compound	EPA Method	Detection Limit(1) (ppb)		TCLP Extraction Guidance Value(2) C_w (ppb)	TCLP Alternative Guidance Value C_a (ppb)	Human Health Guidance Value C_h (ppb)	Sediment Guidance Value C_s (ppb)
		Liquid	Solid				
Benzene	8021 (8020)	1	2	0.7	14	2.4 x 10^4	
Ethylbenzene	8021 (8020)	1	2	5	100	8.0 x 10^6	
Toluene	8021 (8020)	1	2	5	100	2.0 x 10^7	
o-Xylene	8021 (8020)	2	2	5	100	2.0 x 10^8	
m-Xylene	8021 (8020)	2	2	5	100	2.0 x 10^8	
p-Xylene	8021 (8020)	2	2	5	100	***	
Mixed Xylenes	8021 (8020)	2	2	5	100	2.0 x 10^8	
Isopropylbenzene	8021	1	1	5	100	***	
n-Propylbenzene	8021	1	1	5	100	***	
p-Isopropyltoluene	8021	1	1	5	100	***	
1,2,4-Trimethylbenzene	8021	1	1	5	100	***	
1,3,5-Trimethylbenzene	8021	1	1	5	100	***	
n-Butylbenzene	8021	1	1	5	100	***	
sec-Butylbenzene	8021	1	1	5	100	***	
Naphthalene	8021	1	1	10	200	3.0 x 10^5	
Methyl t-butyl ether (MTBE)(3)	8021 (8020)	1	1	50	1,000	***	

***Nuisance Characteristics Guidance:**

No petroleum-type odors.

No individual contaminant in soil at greater than 10,000 ppb.

(1) The listed Detection Limits are Practical Quantitation Limits (PQLs). The Method Detection Limit (MDL) is the best possible detection. Laboratories report the Practical Quantitation Limit (PQL), which is generally 4 times the MDL. Efforts should be made to obtain the best detection possible when selecting a laboratory. When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard.

(2) The TCLP Extraction Guidance Values are equal to the NYSDEC groundwater quality standards or Guidance Values, or the NYSDOH drinking water quality standards or Guidance Values, whichever is more stringent.

(3) Methyl t-butyl ether (MTBE) is not a target compound of Methods 8021 and 8020, but MTBE may be determined using these methods with appropriate quality assurance and quality control measures.

*** No Guidance Value identified in EPA HEAST Report.

TABLE 2
Guidance Values for Fuel Oil Contaminated Soil*

Compound	**EPA Method**	**Detection Limit**[(1)] (ppb)		**TCLP Extraction Guidance Value**[(2)] C_w (ppb)	**TCLP Alternative Guidance Value** C_a (ppb)	**Human Health Guidance Value** C_h (ppb)	**Sediment Guidance Value** C_s (ppb)	
		Liquid	Solid				Fresh	Marine
Benzene	8021 (8020)	1	2	0.7	14	2.4×10^4		
Ethylbenzene	8021 (8020)	1	2	5	100	8.0×10^6		
Toluene	8021 (8020)	1	2	5	100	2.0×10^7		
o-Xylene	8021 (8020)	2	2	5	100	2.0×10^8		
m-Xylene	8021 (8020)	2	2	5	100	2.0×10^8		
p-Xylene	8021 (8020)	2	2	5	100	***		
Mixed Xylenes	8021 (8020)	2	2	5	100	2.0×10^8		
Isopropylbenzene	8021	1	1	5	100	***		
n-Propylbenzene	8021	1	1	5	100	***		
p-Isopropyltoluene	8021	1	1	5	100	***		
1,2,4-Trimethylbenzene	8021	1	1	5	100	***		
1,3,5-Trimethylbenzene	8021	1	1	5	100	***		
n-Butylbenzene	8021	1	1	5	100	***		
sec-Butylbenzene	8021	1	1	5	100	***		
t-Butyl benzene	8021	1	1	5	100	***		
Naphthalene[(3)]	8021 (8270)	1 (6)	1 (330)	10	200	3.0×10^5		
Anthracene	8270	8	330	50	1,000	2.0×10^7		
Fluorene	8270	8	330	50	1,000	3.0×10^6		
Phenanthrene	8270	22	330	50	1,000	***		
Pyrene	8270	8	330	50	1,000	2.0×10^6		
Acenaphthene	8270	8	330	20	400	5.0×10^6		
Benzo(a)anthracene	8270	31	330	.002	.04[(4)]	220	33	18
Fluoranthene	8270	9	330	50	1,000	3.0×10^6		

(CONTINUED ON THE NEXT PAGE)

TABLE 2 (Cont'd)
Guidance Values for Fuel Oil Contaminated Soil*

Compound	**EPA Method**	**Detection Limit (ppb)**		**TCLP Extraction Guidance Value(3) C_w (ppb)**	**TCLP Alternative Guidance Value C_a (ppb)**	**Human Health Guidance Value C_h (ppb)**	**Sediment Guidance Value C_s (ppb)**	
		Liquid	Solid				Fresh	Marine
Benzo(b)fluoranthene	8270	19	330	.002	.04(4)	220	33	18
Benzo(k)fluoranthene	8270	10	330	.002	.04(4)	220	33	18
Chrysene	8270	10	330	.002	.04(4)	***	33	18
Benzo(a)pyrene	8270	10	330	.002	.04(4)	61	33	18
Benzo(g,h,i)perylene	8270	10	330	.002	.04(4)	***		
Indeno(1,2,3-cd)pyrene	8270	10	330	.002	.04(4)	***		
Dibenz(a,h)anthracene	8270	10	330	50	1,000	14		

*** Nuisance Characteristics Guidance:**
No Petroleum-type odors.
No individual contaminant in soil at greater than 10,000 ppb.

(1) The listed Detection Limits are Practical Quantitation Limits (PQL's). The Method Detection Limit (MDL) is the best possible detection. Laboratories report the Practical Quantitation Limit (PQL), which is generally 4 times the MDL. Efforts should be made to obtain the best detection possible when selecting a laboratory. When the Guidance Value or standard is below the detection limit, achieving the detection limit will be considered acceptable for meeting the Guidance Value or standard.

(2) The TCLP Extraction Guidance Values are equal to the NYSDEC groundwater quality standards or Guidance Values, or the NYSDOH drinking water quality standards or Guidance Values, whichever is more stringent.

(3) For naphthalene analysis in a liquid matrix, both Method 8021 and Method 8270 can provide satisfactory levels for comparison to the C_w of 10 ppb.

For naphthalene analysis in a solid matrix, Method 8021 is preferred over Method 8270 for comparison to the C_a of 200 ppb. If the C_a Guidance Value is not being used in the soil evaluation, then both Method 8021 and 8270 can provide satisfactory detection levels for comparison to the C_h of 3.0×10^5, and nuisance characteristic of 10,000 ppb.

(4) Due to the high detection limit for a solid matrix, the TCLP Extraction Method must be used to demonstrate groundwater quality protection for these compounds.

*** No Guidance Value identified in EPA HEAST Report.

TABLE 3
Soil Reuse Options

Reuse Option	Minimum Criteria To Be Met[1]		
	Protection of Groundwater	**Protection of Human Health**	**Protection Against Nuisance Characteristics**
Asphalt[2] or Concrete Manufacturing			
Cold-Mix Asphalt[2]			
Construction Material	X	X	X
Fill for Original Excavation	X	X	X
Fill Elsewhere On-Site	X	X	X
Off-Site at Pre-Approved Location	X	X	X

(1) In addition, the criteria for protection of fish and wildlife must be met when sediments are the waste materials being handled, and when these soils or sediments are being disposed in surface waters, marine waters, or wetland areas.

(2) The soils must satisfy the criteria established under the particular BUD issuance.

APPENDIX D

Tables

TABLE 1

RECOMMENDED ANALYTICAL PROGRAM

1030 JAY STREET
ROCHESTER, NEW YORK

TYPE OF MATERIAL	ANALYTICAL PARAMETERS						
	TCL and STARS VOCs EPA Method 8260 and/or STARS VOCs EPA Method 8021	STARS MEMO #1 SVOCs EPA Method 8270	Cyanide EPA Method 9012	Total RCRA Metals	TCLP VOCs and/or Metals	pH, Reactivity, Ignitability	No Testing Recommended
Soil/fill with suspect petroleum-related constituents and/or other VOCs (e.g., paint)	X	X	X	X	X(2)		
Fill suspected of containing heavy metals			X	X	X(3)		
Unanticipated contamination of unknown type	X	X	X	X	X(2)	X(1)	
C&D fill							X(4)
solid waste							X(4)

Footnotes:

(1) Ignitability and corrosivity for liquid wastes only.

(2) Required if previous testing results indicate total VOCs and/or total metals are anticipated to exceed TCLP regulatory levels, or is required by disposal facility.

(3) Required if previous test results indicate that total metals exceed TAGM #4046 cleanup objectives or above typical background ranges for naturally occurring metals, or if required by disposal facility.

(4) In accordance with Part 360, treat as uncontaminated unless suspected and proven otherwise via analytical testing. Disposal facilities may require some analytical testing.

TABLE 2

RE-USE OBJECTIVES

1030 JAY STREET
ROCHESTER, NEW YORK

TYPE OF SOIL/FILL MATERIAL ANALYZED	STARS MEMO #1 Soil Guidance Values for VOCs and SVOCs (1)	NYSDEC TAGM #4046 Soil Cleanup Objectives for VOCs and SVOCS (2)	NYSDEC TAGM #4046 Soil Cleanup Objectives and/or background ranges for Metals (2)	NYSDEC 6 NYCRR Part 371.3(d) toxicity characteristic MCLs	NYSDEC 6NYCRR Part 360 Solid Waste Criteria
Petroleum constituents in soil/fill	X	X		X	X
Heavy metals and non-petroleum constituents in soil/fill		X	X	X	X

Notes: If petroleum impacted material is proposed for re-use on-site or off-site, compare to:

- Toxicity characteristic MCLs listed in 6 NYCRR Part 371.3(d)
- Petroleum soil guidance values as referenced in the August 1992 NYSDEC STARS Memo #1
- Recommended soil cleanup objectives listed in the January 24, 1994 NYSDEC TAGM 4046 as amended by the NYSDEC's Tables dated August 22, 2001 for gasoline and fuel oil contaminated soils
- Solid Waste Criteria listed in 6 NYCRR Part 360

If non-petroleum impacted material (e.g., impacted with heavy metals, non-petroleum VOCs, etc.) is proposed for re-use on-site or off-site, compare to:

- Toxicity characteristic MCLs listed in 6 NYCRR Part 371.3(d);
- Recommended soil cleanup objectives and/or background ranges as referenced in the January 24, 1994 NYSDEC TAGM 4046 as amended as amended by the NYSDEC's Tables dated August 22, 2001 for gasoline and fuel oil contaminated soils.
- Solid Waste Criteria listed in 6 NYCRR Part 360

APPENDIX E

Health and Safety Plan

HEALTH AND SAFETY PLAN

1030 JAY STREET
ROCHESTER, NEW YORK

Prepared by: Day Environmental, Inc.
40 Commercial Street
Rochester, New York 14614

Approved by: Davis E. Frederiksen, CIH
Certification #3388

Project No.: 2918S-02

Date: July 2002

TABLE OF CONTENTS

ATTACHMENTS

Attachment A	Figures Figure 1 - Route to Emergency Service Figure 2 (Site Plan with Previous Physical Test Locations)
Attachment B	Tables 1 - 5 Summarizing Previously Detected Analytes and Compounds

1.0 INTRODUCTION

This Health and Safety Plan (HASP) outlines the policies and procedures necessary to protect workers and the public from potential environmental hazards posed during redevelopment activities and maintenance activities at the subject property (Site) addressed as 1030 Jay Street, Rochester, New York (refer to Figure 1 included in Attachment A). The Site consists of an approximately 1.23-acre parcel of land owned by the City of Rochester (refer to Figure 2 included in Attachment A). The City of Rochester foreclosed on the Site and demolished the building that was located on this property. As outlined in this HASP, Site activities shall be conducted in a manner to minimize the probability of injury, accident, or incident occurrence.

Although the HASP focuses on the specific work activities planned for this Site, it must remain flexible because of the nature of this work. Conditions may change and unforeseen situations can arise that require deviations from the original HASP.

1.1 Site History/Overview

The Site is currently vacant. An approximate 17,000 square foot building was recently demolished by the City of Rochester. Numerous unregistered vehicles have been stored on this Site. The City of Rochester is the current owner of the Site.

Historical information included in a Phase I Environmental Site Assessment report indicated that the Site had been used by industrial businesses that included: Traders Box and Lumber Company; Kennedy McCandless Corp.; The Nursery Crafters; F.E. Reed Glass Corp.; and Rochester Novelty Works, Inc.

The Phase I Environmental Site Assessment report indicated that a waste oil spill occurred at this Site and some soil removal was conducted. However, information was not available that documented the cleanup was successful at fully remediating this spill. Also, information indicates that a former "tool" room and painting operations were present at the Site.

The Phase I Environmental Site Assessment identified between 50 and 100 unregistered vehicles and two tractor trailers on the Site. Evidence of surficial soil staining and oily material in a catch basin were noted at the Site.

The Phase II Environmental Site Assessment was performed to evaluate the identified areas of potential concern at the Site. Physical testing locations are depicted on Figure 2 included in Attachment A. The scope of work included:

- Dye testing some facility drains
- Excavating test pits at exterior locations
- Advancing soil borings at interior locations
- Analyzing soil, fill and sediment samples

The dye testing confirmed that the drains tested were connected to the municipal sewer system located in Jay Street.

During the test pitting and soil boring work, surficial fill material was encountered from the ground surface to depths up to approximately 4 feet. Test pits conducted in the historical waste oil spill area encountered no evidence of waste oil contamination (e.g., no petroleum sheen, odors, or staining). Suspect dried paint material was observed at some test pit locations.

Samples of soil, sediment and fill were tested for one or more of the following lists of analytical laboratory parameters:

- Total RCRA metals
- VOCs
- Semi-volatile organic compounds (SVOCs)
- TCLP metals
- Cyanide
- Polychlorinated biphenyls (PCBs)

Tables 1 - 5 included in Attachment 2 summarize the type of contaminants and their detected concentrations. The analytical laboratory test results are also summarized below:

- VOCs apparently attributable to the suspect dried paint material were detected in some samples, but at concentrations below NYSDEC TAGM 4046 recommended soil cleanup objectives.

- SVOCs apparently attributable to the suspect dried paint material, were detected in one sample, but at concentrations below NYSDEC TAGM 4046 recommended soil cleanup objectives.

- PCBs were not detected above reported analytical laboratory detection limits in the samples that were tested.

- The RCRA metals analytical laboratory testing indicated that some samples of the surficial fill material contained elevated concentrations of heavy metals (e.g., arsenic, barium, chromium, and lead) at concentrations above NYSDEC TAGM 4046 recommended soil cleanup objectives and/or typical background ranges.

- Cyanide was detected in a fill sample at a concentration of 28 mg/kg. The NYSDEC has not established a recommended soil cleanup objective for cyanide.

- One fill sample from test pit TP-8 and a sample of suspect dried paint material from TP-8 were determined to contain lead at concentrations (i.e., 7.3 mg/l and 5.72 mg/l, respectively) above the characteristic hazardous waste criteria of 5.0 mg/l. As such, if the fill material in proximity to TP-8 or the suspect dried paint material are disturbed, the material has the potential to be considered a characteristic hazardous waste for lead.

- Analysis of a sediment sample from a storm drain indicated it was non-hazardous for full TCLP parameters, ignitability, corrosivity and reactivity. In addition, PCBs were not detected in the storm drain sediment sample. However, the results of a paint filter test suggested that the storm drain sediments would have to be treated to remove liquids if they are to be removed and disposed at a landfill.

1.2 Planned Activities Covered by HASP

The City of Rochester currently plans to lease portions of the parcel for the construction and use of asphalt-paved parking lot(s) and possibly commercial buildings. This HASP is to be implemented during activities that are associated with performing construction activities and maintenance activities at the Site. These activities include:

- Construction of open asphalt-paved parking lot(s) or building(s).
- Site grading activities parcel.
- Removing fill materials containing a layer of suspect dried paint.
- Miscellaneous or other on-site work as may arise that involves disturbance of potentially contaminated soil or fill.

This HASP can be modified to cover other site activities (e.g., subsurface utility repairs, etc.) when appropriate. The owner of the property, Site lessees, their contractors, and other site workers will be responsible for the development and/or implementation of health and safety provisions associated with normal construction activities or site activities.

2.0 KEY PERSONNEL AND MANAGEMENT

The Project Manager (PM), Certified Industrial Hygienist (CIH) and Site Safety Officer (SSO) are responsible for formulating and enforcing health and safety requirements, and implementing the HASP.

2.1 Certified Industrial Hygienist

The CIH or designated health and safety specialist is responsible for the contents of the HASP and ensures that the HASP complies with federal, state and local health and safety requirements. If necessary, the CIH can modify the HASP to adjust for on-site changes that affect safety. The CIH will coordinate with the SSO on modifications to the HASP and will be available for consultation when required. The CIH will not necessarily be on site during the field or construction activities.

2.2 Project Manager

The PM has the overall responsibility for the project and to assure that the goals of the construction project are attained in a manner consistent with the HASP requirements. The PM will coordinate with the SSO to ensure that the project goals are completed in a manner consistent with the HASP.

2.3 Site Safety Officer

The SSO has responsibility for administering the HASP relative to site activities, and will be in the field full-time while site activities are in progress. The SSO's operational responsibilities will be monitoring, including personal and environmental monitoring, ensuring personal protective equipment maintenance, and assignment of protection levels. The SSO will be the main contact in any on-site emergency situation. The SSO will direct field activities involved with safety and be responsible for stopping work when unacceptable health or safety risks exist. The SSO is responsible for ensuring that on-site personnel understand and comply with safety requirements.

2.4 Employee Safety Responsibility

Each employee is responsible for personal safety as well as the safety of others in the area. The employee will use the equipment provided in a safe and responsible manner as directed by the SSO.

2.5 OSHA Records

Required records are to be maintained at the offices of the parties (e.g., consultants, contractors, owner, etc.) that utilize this HASP.

3.0 SAFETY RESPONSIBILITY

Contractors, consultants, state or local agencies, or other parties, and their employees, involved with this project will be responsible for their own safety while on-site. Their employees will be required to understand the information contained in this HASP, and must follow the recommendations that are made in this document.

4.0 JOB HAZARD ANALYSIS

This HASP discusses some of the anticipated hazards for this Site. The hazards listed below deal specifically with those hazards associated with the management of the contaminated material (e.g., soil, fill, etc.).

4.1 Chemical Hazards

Chemical substances can enter the unprotected body by inhalation, skin absorption, ingestion, or through a puncture wound (injection). A contaminant can cause damage to the point of contact or can act systemically, causing a toxic effect at a part of the body distant from the point of initial contact.

A list of selected site-specific volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), and metals that have been detected at the Site are presented in the table included in this section of the HASP. This list also presents the permissible exposure limits (PELs) and levels that are considered immediately dangerous to life and health (IDLH).

- The VOCs and SVOCs detected at the Site are most likely attributable to the past storage of unregistered vehicles at the Site, or the layer or chunks of suspect dried paint that was observed in fill materials on portions of the Site.
- The metals detected may be attributable to naturally occurring concentrations in soil, the past storage of unregistered vehicles at the Site, or the layer or chunks of suspect dried paint that was observed in fill materials on portions of the Site.

In addition to the VOCs, SVOCs, and metals listed in the table, cyanide was detected in one soil sample from the Site.

The potential routes of exposure for these analytes and chemicals include inhalation, ingestion, skin absorption and skin/eye contact. The potential for exposure through any one of these routes will depend on the activity conducted. The more likely routes of exposure for the activities that are performed at the Site include inhalation and skin contact.

If other chemicals are encountered during construction activities or maintenance activities, this HASP may need to be modified to include those chemicals.

Table Listing Constituents Previously Detected at the Site and Applicable Health Exposure Criteria

CONSTITUENT	OSHA PEL	IDLH
p-Isoppropyltoluene	NA	NA
Trichloroethene	25 ppm *	1,000 ppm
Fluoranthene	0.1 mg/m^{3}* $^{(1)}$	80 mg/m$^{3(1)}$
Pyrene	0.1 mg/m^{3}* $^{(1)}$	80 mg/m$^{3(1)}$
Arsenic	0.01 mg/m^{3}	5 mg/m^{3}
Barium	0.5 mg/m^{3}	50 mg/m^{3}
Cadmium	0.005 mg/m^{3}	9 mg/m^{3}
Chromium	1 mg/m^{3}	250 mg/m^{3}
Lead	0.05 mg/m^{3}	100 mg/m^{3}
Mercury	0.1 mg/m^{3}	10 mg/m^{3}
Selenium	0.2 mg/m^{3}	1 mg/m^{3}
Silver	0.01 mg/m^{3}	10 mg/m^{3}
Cyanide	5 mg/m^{3}	25 mg/m^{3}

Notes:
PEL = OSHA Permissible Exposure Limit (TWA for 8-hour day)
* = PEL replaced with NIOSH Recommended Exposure Limit (REL - TWA for 8-hour day)
NA = Not Available
IDLH = Immediate Dangerous to Life or Health Concentration
(1) = As coal tar pitch

4.2 Physical Hazards

There are physical hazards associated with this project, which might compound the chemical hazards. Hazard identification, training, adherence to the planned construction and maintenance measures, and careful housekeeping can prevent many problems or accidents arising from physical hazards. Potential physical hazards associated with this project and suggested preventative measures include:

- Slip/Trip/Fall Hazards - Some areas may have wet surfaces that will greatly increase the possibility of inadvertent slips. Caution must be exercised when using steps and stairs due to slippery surfaces in conjunction with the fall hazard. Good housekeeping practices are essential to minimize the trip hazards.

- Small Quantity Flammable Liquids - Small quantities of flammable liquids will be stored in "safety" cans and labeled according to contents.

- Electrical Hazards - Electrical devices and equipment shall be de-energized prior to working near them. All extension cords will be kept out of water, protected from crushing, and inspected regularly to ensure structural integrity. Temporary electrical circuits will be protected with ground fault circuit interrupters. Only qualified electricians are authorized to work on electrical circuits. Heavy equipment (e.g., backhoe, drill rig) shall not be operated within 10 feet of high voltage lines, unless proper protection from the high voltage lines is provided by the appropriate utility company.

- Noise - Work around large equipment often creates excessive noise. The effects of noise can include:

  - Workers being startled, annoyed, or distracted.
  - Physical damage to the ear resulting in pain, or temporary and/or permanent hearing loss.
  - Communication interference that may increase potential hazards due to the inability to warn of danger and proper safety precautions to be taken.

  Proper hearing protection will be worn as deemed necessary. In general, feasible administrative or engineering controls shall be utilized when on-site personnel are subjected to noise exceeding an 8-hour time weighted average sound level of 90 d(B)A (decibels on the A-weighted scale). In addition, whenever employee noise exposures equal or exceed an 8-hour, time weighted average sound level of 85 d(B)A, employers shall administer a continuing, effective hearing conservation program as described in OSHA Regulation 29 CFR Part 1910.95.

  Heavy Equipment - Each morning before start-up, heavy equipment will be inspected to ensure safety equipment and devices are operational and ready for immediate use.

  Subsurface and Overhead Hazards - Before any excavation activity, efforts will be made to determine whether underground utilities and potential overhead hazards will be encountered. Underground utility clearance must be obtained prior to subsurface work.

4.3 Environmental Hazards

Environmental factors such as weather, wild animals, insects, and irritant plants can pose a hazard when performing outdoor tasks. The SSO shall make every reasonable effort to alleviate these hazards should they arise.

4.3.1 Heat Stress

The combination of warm ambient temperature and protective clothing increases the potential for heat stress. In particular:

- Heat rash
- Heat cramps

- Heat exhaustion
- Heat stroke

Site workers will be encouraged to increase consumption of water or electrolyte-containing beverages such as Gatorade when the potential for heat stress exists. In addition, workers are encouraged to take rests whenever they feel any adverse effects that may be heat-related. The frequency of breaks may need to be increased upon worker recommendation to the SSO.

4.3.2 Exposure to Cold

With outdoor work in the winter months, the potential exists for hypothermia and frostbite.

Protective clothing greatly reduces the possibility of hypothermia in workers. However, personnel will be instructed to wear warm clothing and to stop work to obtain more clothing if they become too cold. Employees will also be advised to change into dry clothes if their clothing becomes wet from perspiration or from exposure to precipitation.

5.0 SITE CONTROLS

To prevent migration of contamination caused through tracking by personnel or equipment, work areas, and personal protective equipment staging/decontamination areas will be specified prior to beginning operations.

5.1 Site Zones

In the area where contaminated material present the potential for worker exposure (work zone), personnel entering the area must wear the mandated level of protection for the area. A "transition zone" shall be established where personnel can begin personal and equipment decontamination procedures. This can reduce potential off-site migration of impacted media. Contaminated equipment or clothing will not be allowed outside the transition zone (e.g., on clean portions of the Site) unless properly containerized for disposal. Operational support facilities will be located outside the transition zone (i.e., in a "support zone"), and normal work clothing and support equipment are appropriate in this area. If possible, the support zone should be located upwind of construction activities and maintenance activities.

5.2 General

The following items will be requirements to protect the health and safety of workers during implementation of construction activities and maintenance activities that disturb contaminated material.

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of contamination shall not occur in the work zone and/or transition zone during disturbance of contaminated material.
- Personnel admitted in the work zone shall be properly trained in health and safety techniques and equipment usage.
- No personnel shall be admitted in the work zone without the proper safety equipment.
- Proper decontamination procedures shall be followed before leaving the Site.

6.0 PROTECTIVE EQUIPMENT

This section addresses the various levels of PPE that are, or may be, required at this job site. Personnel entering the work zone and transition zone shall be trained in the use of the anticipated PPE to be utilized.

6.1 Anticipated Protection Levels

TASK	PROTECTION LEVEL	COMMENTS/MODIFICATIONS
Site mobilization	D	
Site prep	D	
Extrusive work (e.g., surveying, etc.)	D	
Intrusive work (e.g., fill disturbance/removal, etc.)	C/Modified D/D	Based on air monitoring and SSO discretion
Support zone	D	
Site breakdown and demobilization	D	

If visible dust is observed during construction activities or maintenance activities when fill material is being disturbed, then dust suppression will be implemented.

It is anticipated that work conducted as part of this project will be performed in Level D or modified Level D PPE. If conditions are encountered that require higher levels of PPE (e.g., Level C, B, or A), the work will immediately be stopped. The appropriate government agencies (e.g., NYSDEC, NYSDOH, etc.) will be notified, and the proper health and safety measures will be implemented (e.g., develop and implement engineering controls, upgrade in PPE, etc.).

6.2 Protection Level Descriptions

This section lists the minimum requirements for each protection level. Modifications to these requirements can be made upon approval of the SSO. If Level A, Level B, and/or Level C PPE is required, Site personnel that enter the work zone and/or transition zone must be properly trained and certified in the use of those levels of PPE.

6.2.1 Level D

Level D consists of the following:

- Safety glasses
- Hard hat when working with heavy equipment
- Steel-toed work boots
- Protective gloves during sampling or handling of potentially contaminated media
- Work clothing as prescribed by weather

6.2.2 Modified Level D

Modified Level D consists of the following:

- Safety glasses with side shields
- Hard hat
- Steel-toed work boots
- Work gloves
- Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and PVC acid gear will be required when workers have a potential to be exposed to impacted liquids or impacted particulates].

6.2.3 Level C

Level C consists of the following:

- Air-purifying respirator with appropriate cartridges for organic vapors and particulates (i.e., dusts, fumes and mists).
- Outer protective wear, such as Tyvek coverall [Tyveks (Sarans) and PVC acid gear will be required when workers have a potential to be exposed to impacted liquids or particulates].
- Hard hat
- Steel-toed work boots
- Nitrile, neoprene, or PVC overboots, if appropriate
- Nitrile, neoprene, or PVC gloves, if appropriate
- Face shield (when projectiles or splashes pose a hazard)

6.2.4 Level B

Level B protection consists of the items required for Level C protection with the exception that an air-supplied respirator is used in place of the air-purifying respirator. Level B PPE is not anticipated to be required during this project. If the need for level B PPE becomes evident, Site activities will be ceased until Site conditions are further evaluated, and any necessary modifications to the HASP have been approved by the Project Manager, CIH or SSO. Subsequently, the appropriate safety measures (including Level B PPE) must be implemented prior to commencing site activities.

6.2.5 Level A

Level A protection consists of the items required for Level B protection with the addition of a fully-encapsulating, vapor-proof suit capable of maintaining positive pressure. Level A PPE is not anticipated to be required during this project. If the need for level A PPE becomes evident, Site activities will be ceased until Site conditions are further evaluated, and any necessary modifications to the HASP have been approved by the Project Manager, CIH or SSO. Subsequently, the appropriate safety measures (including Level A PPE) must be implemented prior to commencing site activities.

6.3 Respiratory Protection

Any respirator used will meet the requirements of OSHA 29 CFR 1910.134. Both the respirator and cartridges specified shall be fit-tested prior to use in accordance with OSHA regulations (29 CFR 1910). Air purifying respirators shall not be worn if contaminant levels exceed designated use concentrations. The workers will wear respirators with approval for: organic vapors <1,000 parts per million (ppm); and dusts, fumes and mists with a TWA <0.05 $mg/m^{3.}$

No personnel who have facial hair, which interferes with the respirator's sealing surface, will be permitted to wear a respirator and will not be permitted to work in areas requiring respirator use.

Only workers who have been certified by a physician as being physically capable of respirator usage shall be issued a respirator. Personnel unable to pass a respiratory fit test or without medical clearance for respirator use will not be permitted to enter or work in areas on-site that require respirator protection.

7.0 DECONTAMINATION PROCEDURES

This section describes the procedures necessary to ensure that both personnel and equipment are free from contamination when they leave the work Site.

7.1 Personnel Decontamination

Personnel involved with construction activities and maintenance activities that involve disturbing contaminated material will follow the decontamination procedures described herein to ensure that material which workers may have contacted in the work zone and/or transition zone does not result in personal exposure and is not spread to clean areas of the Site. This sequence describes the general decontamination procedure. The specific stages can vary depending on the Site, the task, and the protection level, etc.

1. Leave work zone and go to transition zone
2. Remove soil/debris from boots and gloves
3. Remove boots
4. Remove gloves
5. Remove Tyvek suit and discard, if applicable
6. Remove and wash respirator, if applicable
7. Go to support zone

7.2 Equipment Decontamination

Contaminated equipment shall be decontaminated in the transition zone before leaving the Site. Decontamination procedures can vary depending upon the contaminant involved, but may include sweeping, wiping, scraping, hosing, or steam cleaning the exterior of the equipment. Personnel performing this task will wear the proper PPE.

7.3 Disposal

Disposable clothing will be treated as contaminated waste and be disposed of properly. Liquids (e.g., decontamination water, excavation waters, etc.) generated by construction activities and maintenance activities will be disposed of in accordance with applicable regulations.

8.0 AIR MONITORING

Air monitoring will be conducted in order to determine airborne particulate and contamination levels. This ensures that respiratory protection is adequate to protect personnel against the chemicals that may be encountered and that chemical contaminants are not migrating off-site. Additional air monitoring may be conducted at the discretion of the SSO.

The following chart describes the direct reading instrumentation that will be utilized and appropriate action levels.

Monitoring Device	Action level	Response/Level of PPE
PID Volatile Organic Compound Meter	$\leq$ 5 ppm in breathing zone, sustained 5 minutes	Level D
	6-25 ppm in breathing zone, sustained 5 minutes	Level C
	26-250 ppm in breathing zone, sustained 5 minutes	Level B, Stop work, evaluate the use of engineering controls
	>250 ppm in breathing zone	Level A, Stop work, evaluate the use of engineering controls
RTAM Particulate Meter	< 150 ug/m^3 over an integrated period not to exceed 15 minutes	Continue working
	> 150 ug/m^3	Cease work, implement dust suppression, change in way work performed, etc. If levels can not be brought below 150 ug/m^3, then upgrade PPE to Level C

8.1 Particulate Monitoring

During implementation of construction activities and maintenance activities where contaminated materials may be disturbed, air monitoring will include real-time monitoring for particulates using a RTAM at the perimeter of the work zone in accordance with the 1989 NYSDEC Technical and Administrative Guidance Memorandum (TAGM) #4031, entitled "Fugitive Dust Suppression and Particulate Monitoring Program at Inactive Hazardous Waste Sites. The TAGM uses an action level of 150 ug/m^3 (0.15 mg/m^3) over an integrated period not to exceed 15 minutes. If the action level is exceeded, or if visible dust is encountered, then work shall be discontinued until corrective actions are implemented. Corrective actions may include dust suppression, change in the way work is performed, upgrade of personal protective equipment, etc. Readings will be recorded and be available for review.

8.2 Volatile Organic Compound Monitoring

During implementation of construction activities and maintenance activities where contaminated materials may be disturbed, a PID will be used to monitor total volatile organic content of the ambient air. The PID will prove useful as a direct reading instrument to aid in determining if current respiratory protection is adequate or needs to be upgraded. The SSO will take measurements before operations begin in an area to determine the amount of VOCs naturally occurring in the air. This is referred to as a background level. Levels of VOCs will periodically be measured in the air at active work sites, and at the transition zone when levels are detected above background in the work zone.

8.3 Community Air Monitoring Plan

This Community Air Monitoring Plan (CAMP) includes real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when activities are in progress at the Site that have the potential to release VOCs or dust. This CAMP is based on the NYSDOH's Generic CAMP dated June 20, 2000. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of Site activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air. Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Continuous monitoring will be conducted during ground intrusive activities. Ground intrusive activities include, but are not limited to, soil/fill excavation and handling, trenching, etc.

8.3.1 VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the work zone) on a continuous basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.
- If total organic vapor levels at the downwind perimeter of the work zone persist at levels

in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source or vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the work zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less (but in no case less than 20 feet), is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

The 15-minute readings must be recorded and be available for NYSDEC and NYSDOH personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

8.3.2 Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored continuously at the upwind and downwind perimeters of the work zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

Readings must be recorded and be available for NYSDEC and NYSDOH personnel to review.

9.0 EMERGENCY RESPONSE

To provide first-line assistance to field personnel in the case of illness or injury, the following items will be made immediately available on the Site:

- First-aid kit
- Portable emergency eye wash
- Supply of clean water

9.1 Emergency Telephone Numbers

The following telephone numbers are listed in case there is an emergency at the Site:

Fire/Police Department:	911
Poison Control Center:	275-3232
NYSDEC Spills	226-2466
NYSDOH (David Napier)	423-8071
City of Rochester (Joseph Biondolillo)	428-6649
MCDOH (Joseph Albert)	274-6904
Nearest Hospital:	Strong Memorial Hospital 601 Elmwood Avenue Rochester, New York
Hospital Phone Numbers:	(585) 275-4551 (Emergency) (585) 275-2100 (General)
Directions to the Hospital (refer to map in Attachment A):	Turn right onto Jay Street; travel west approximately 0.65 mile and turn left onto Mt. Read Boulevard; travel south approximately 0.15 miles and turn right onto on-ramp for I-490 west; travel west on I-490 approximately 0.6 miles and exit left onto I-390 South; travel south on I-390 approximately 3.5 miles and exit onto Route 383 (Scottsville Road); turn left on Scottsville Road and travel northeast approximately 0.6 mile and turn right onto Elmwood Avenue; travel east approximately 0.8 mile and turn right into the hospital. Follow signs to emergency medical services (EMS).

9.2 Evacuation

Although unlikely, it is possible that a site emergency could require evacuating all personnel from the site. If required, the SSO will give the appropriate signal for site evacuation (i.e., hand signals, alarms, etc.).

All personnel shall exit the site and shall congregate in an area designated by the SSO prior to the start of work. The SSO shall ensure that all personnel are accounted for. If someone is missing, the SSO will alert emergency personnel. The appropriate government agencies will be notified as soon as possible regarding the evacuation, and any necessary measures that may be required to mitigate the reason for the evacuation.

9.3 Medical Emergency

In the event of a medical emergency involving illness or injury to one of the on-site personnel, the site should be shut-down and immediately secured. The appropriate government agencies should be notified immediately. The area in which the injury or illness occurred should not be entered until the cause of the illness or injury is known. The nature of injury or illness should be assessed. If the victim appears to be critically injured, administer first aid and/or CPR as needed. Instantaneous real-time air monitoring should be done in accordance with air monitoring outlined in Section 8.0 of this HASP.

9.4 Contamination Emergency

It is unlikely that a contamination emergency will occur; however, if such an emergency does occur, the site should be shut-down and immediately secured. If an emergency rescue is needed, notify, Police, Fire Department and EMS Units immediately. Advise them of the situation and request an expedient response. The appropriate government agencies should be notified immediately. The area in which the contamination occurred should not be entered until the arrival of trained personnel who are properly equipped with the appropriate PPE and monitoring instrumentation. (See also Section 8.0 of this HASP).

9.5 Fire Emergency

In the event of a fire on-site, the site should be shut-down and immediately secured. The area in which the fire occurred should not be entered until the cause can be determined. All non-essential site personnel should be evacuated from the site to a safe, secure area. Notify the Fire Department immediately. Advise the Fire Department of the situation and the identify of any hazardous material involved. The appropriate government agencies should be notified as soon as possible.

The four classes of fire along with their constituents are as follows:

Class A:	Wood, cloth, paper, rubber, many plastics, and ordinary combustible materials.
Class B:	Flammable liquids, gases and greases.
Class C:	Energized electrical equipment.
Class D:	Combustible metals such as magnesium, titanium, sodium, potassium.

Small fires on-site may be actively extinguished; however, extreme care should be taken while in this operation. All approaches to the fire should be done from the upwind side if possible. Distance from on-site personnel to the fire should be close enough to ensure proper application of the extinguishing material, but far enough away to ensure that the personnel are safe. The proper extinguisher should be utilized for the Class(s) of fire present on the site. If possible, the fuel source should be cut off or separated from the fire. Care must be taken when performing operations involving the shut-off values and manifolds, if present.

Examples of proper extinguishing agent as follows:

Class A:	Water Water with 1% AFFF Foam (Wet Water) Water with 6% AFFF or Fluorprotein Foam ABC Dry Chemical
Class B:	ABC Dry Chemical Purple K Carbon Dioxide Water with 6% AFFF Foam
Class C:	ABC Dry Chemical Carbon Dioxide
Class D:	Metal-X Dry Powder

No attempt should be made against large fires. These should be handled by the Fire Department.

9.6 Spill or Air Release

In the event of a spill or air release of a hazardous material on-site, the Site should be shut-down and immediately secured. The area in which the spill or release occurred should not be entered until the cause can be determined and site safety can be evaluated. All non-essential site personnel should be evacuated from the Site to a safe, secure area. The appropriate government agencies should be notified as soon as possible. The spilled or released material should be immediately identified and appropriate containment measures should be implemented, if possible. Real-time air monitoring should be implemented as outlined in Section 8.0 of this HASP. If the material is unknown, Level B protection is mandatory. Samples of the material should be acquired to facilitate identification of the material.

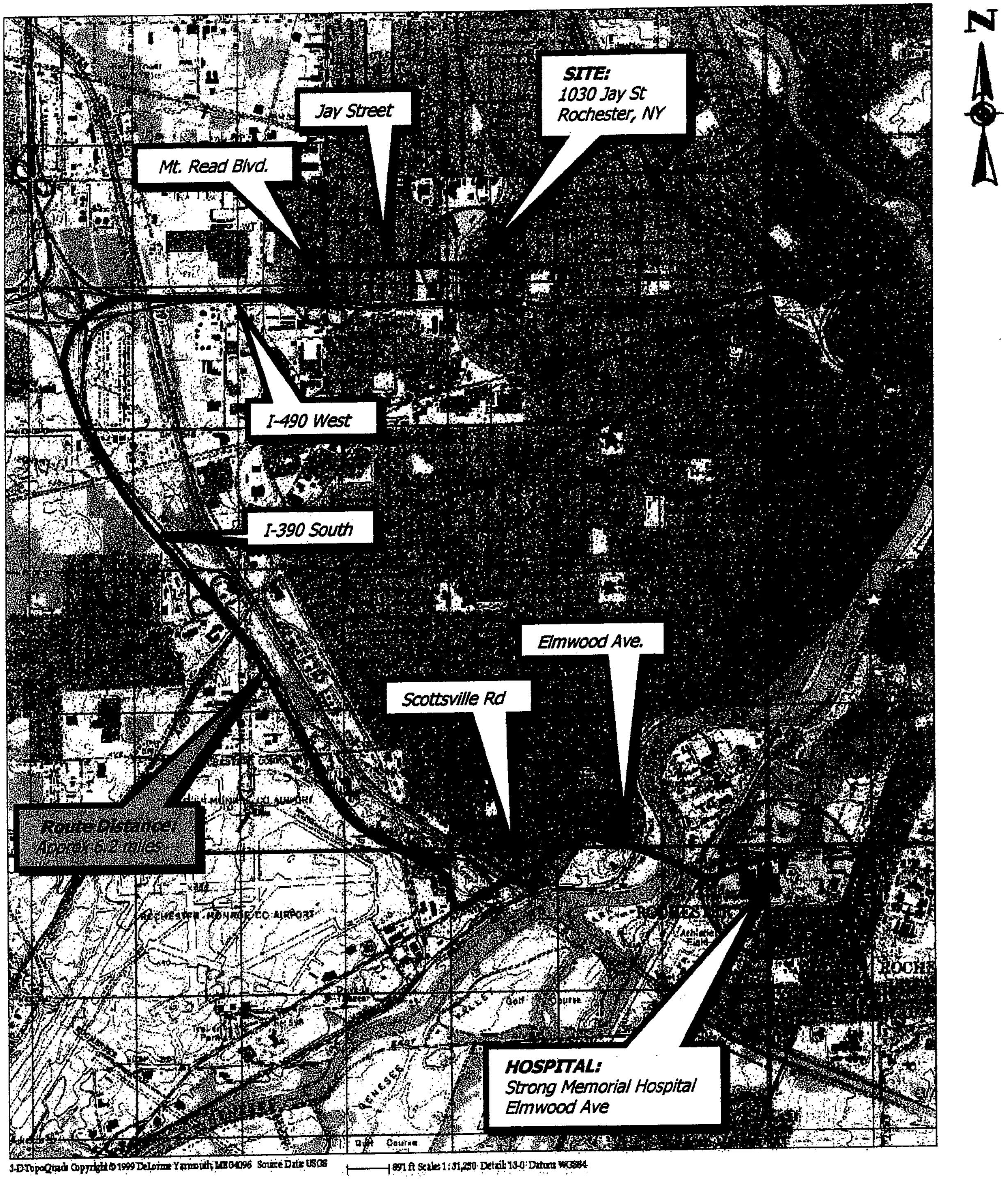
9.7 Locating Containerized Waste or Buried Tanks

In the event that containerized waste (e.g., drums) or buried tanks are located during construction activities and maintenance activities, the site should be shut-down and immediately secured. The area in which containerized wastes and/or tanks are discovered should not be entered until site safety can be evaluated. All non-essential site personnel should be evacuated from the site to a safe, secure area. The appropriate government agencies should be notified as soon as possible. The SSO shall monitor the area as outlined in Section 8.0 of this HASP.

Prior to any handling, containers and/or tanks will be visually assessed by the SSO to gain as much information as possible about their contents. As a precautionary measure, personnel shall assume that unlabelled containers contain hazardous materials until their contents are characterized. If the material is unknown, Level B protection is mandatory. To the extent possible based upon the nature of the containers encountered, actions may be taken to stabilize the area and prevent migration (e.g., placement of berms, etc.). Subsequent to initial visual assessment and any required stabilization, an environmental contractor will sample, test, remove, and dispose of any containers, tanks, and their contents.

ATTACHMENT A

Figures



3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 891 ft Scale: 1 : 31,250 Detail: 13-0 Datum: WGS84

Drawing Produced From: 3-D TopoQuads, DeLorme Map Co., referencing USGS quad maps Rochester West (NY) 1995, W Henrietta (NY) 1995, and Pittsford (NY) 1995.

DATE
05-15-2002

DRAWN BY
Tww

SCALE
As Noted

day

DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008

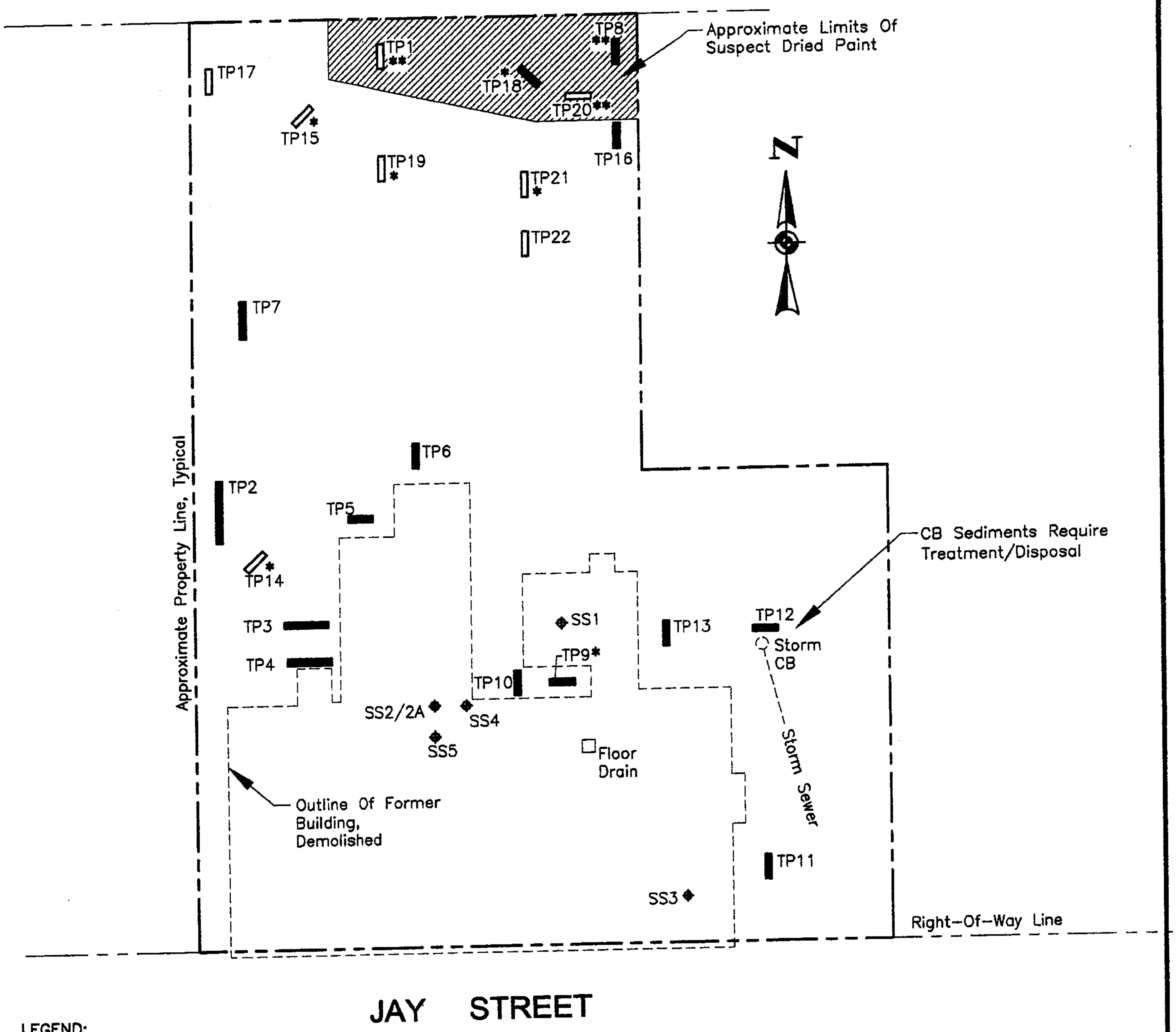
PROJECT TITLE
1030 JAY STREET
ROCHESTER, NY

HEALTH AND SAFETY PLAN

DRAWING TITLE
ROUTE FOR EMERGENCY SERVICE

PROJECT NO.
2918S-02

FIGURE 1



LEGEND:

TP5 ▭	Test pit with label (No samples tested)
⌖ SS5	Soil boring with label
▬ ◆	Sample exceeded NYSDEC recommended soil cleanup objective (RSCO)
▬ ◆	Sample below NYSDEC RSCO
*	Indicates that sample contains chunks of suspect dried paint
**	Indicates that sample contains layer of suspect dried paint

NOTES:

1. Drawing prepared from a drawing by Sear-Brown Associates entitled "Soil Boring And Test Pit Locations" dated 2001. Location of features are approximate.

DATE
06-24-2002

DRAWN BY
Tww

SCALE
1" = 50' +/-

day
DAY ENVIRONMENTAL, INC.
ENVIRONMENTAL CONSULTANTS
ROCHESTER, NEW YORK 14614-1008

PROJECT TITLE
1030 JAY STREET
ROCHESTER, NY

ENVIRONMENTAL MANAGEMENT PLAN

DRAWING TITLE
Soil Boring and
Test Pit Location Plan

PROJECT NO.
2918S-02

FIGURE 2

Ref1: JayStBase-1.d... Ref2: Ref3:
Time Printed: Mon June 24 10:12 2002 Filename: Phase2\2918\2918-1.dwg

ATTACHMENT B

Tables 1-5 Summarizing Previously Detected Analytes and Compounds

TABLE 1
SOIL AND SUSPECT PAINT MATERIAL SAMPLE SUMMARY

1030 Jay Street
Rochester, New York

Sample	Location and Depth	Date Sampled	Matrix	VOCs EPA 8260	SVBNs EPA 8270	PCBs EPA 8082	Metals SW846 & EPA 6010 (1)	Total Cyanide EPA 9012	TCLP Metals
SS-1 (0'-2')	SS-1 (0'-2' BGS)	10/3/00	Soil	X	X	X	X	X	
SS-2 (1.5'-2')	SS-2 (1.5'-2' BGS)	10/3/00	Soil	X	X	X	X	X	X(2)
SS-3 (10'-12.5')	SS-3 (10'-12.5" BGS)	10/3/00	Soil	X	X	X	X	X	
TP-3 (2'-4')	TP-3 (2'-4' BGS)	10/3/00	Soil	X	X	X	X	X	
TP-3 (4'-6')	TP-3 (4'-6' BGS)	10/3/00	Soil	X	X	X	X	X	
TP-8 (0'-2')	TP-8 (0'-2' BGS)	10/3/00	Soil	X	X	X	X	X	X(2)
TP-8 (2'-4')	TP-8 (2'-4' BGS)	10/4/00	Soil	X	X	X	X	X	
TP-12 (1.5'-5')	TP-12 (1.5'-5' BGS)	10/4/00	Soil	X	X	X	X	X	
Suspect Paint Material	TP-8 (0.5'-1' BGS)	10/4/00	Paint	X	X	X	X	X	X

Notes:
BGS = below ground surface
VOCs = volatile organic compounds
SVBNs = semi-volatile organic (base-neutral) compounds
PCBs = Polychlorinated biphenyls
1. All metals analyzed by SW846 EPA 6010 except for Mercury which was analyzed by SW846 EPA 7471 Method.
2. Laboratory analysis included only arsenic, barium, cadmium, chromium, and lead.
TCLP = Toxicity Characteristic Leaching Procedure

TABLE 1 (CONTINUED)
SOIL AND SUSPECT PAINT MATERIAL SAMPLE SUMMARY

1030 Jay Street
Rochester, New York

Sample	Location and Depth	Date Sampled	Matrix	Metals SW846 & EPA 6010 (1)	Total Cyanide EPA 9012
TP-2 (0'-2')	TP-2 (0'-2' BGS)	10/3/00(3)	Soil	X(2)	
TP-4 (0'-3.5')	TP-4 (0'-3.5' BGS)	10/3/00(3)	Soil	X(2)	
TP-5 (0'-2')	TP-5 (0'-2' BGS)	10/3/00(3)	Soil	X(2)	
TP-6 (0'-1.5')	TP-6 (0'-1.5' BGS)	10/3/00(3)	Soil	X(2)	
TP-7 (0'-3')	TP-7 (0'-3' BGS)	10/3/00(3)	Soil	X(2)	
TP-9 (0'-3.5')	TP-9 (0'-3.5' BGS)	10/4/00(3)	Soil	X(2)	
TP-10 (0'-2')	TP-10 (0'-2')	10/4/00(3)	Soil	X(2)	
TP-11 (0'-2')	TP-11 (0'-2')	10/4/00(3)	Soil	X(2)	
TP-12 (0'-1.5')	TP-12 (0'-1.5')	10/4/00(3)	Soil	X(2)	
TP-13 (0'-2')	TP-13 (0'-2')	10/4/00(3)	Soil	X(2)	
SS-2A(3'-4')	Adjacent to SS-2 (3'-4')	12/14/00	Soil	X(2)	
Composite SS-4 (0.5'-2.5') & SS-5 (0'-2')	SS-4 (0.5-2.5) and SS-5 (0.0'-2')	12/14/00	Soil	X(2)	
Composite TP-16 (0'-2') & TP-18 (0.5'-2.5')	TP-16 (0'-2') and TP-18 (0.5'-2.5')	12/14/00	Soil	X(2)	X

Notes:

BGS = below ground surface
VOCs = volatile organic compounds
SVBNs = semi-volatile organic (base-neutral) compounds
PCBs = Polychlorinated biphenyls

1. All metals analyzed by SW846 EPA 6010 except for Mercury which was analyzed by SW846 EPA 7471 Method.
2. Laboratory analysis included only arsenic, barium, cadmium, chromium, and lead.
3. "Supplemental" soil sample - submitted for analysis on 10/30/00

TCLP = Toxicity Characteristic Leaching Procedure

TABLE 2
SUMMARY OF DETECTED COMPOUNDS IN INITIAL SOIL AND SUSPECT PAINT MATERIAL SAMPLES

1030 Jay Street
Rochester, New York

Sample Location	SS-1	SS-2	SS-3	TP-3	TP-3	TP-8	TP-8	TP-12	Paint	RECOMMENDED SOIL CLEANUP OBJECTIVE(2)	EASTERN USA BACKGROUND RANGE(2)
Depth of Sample	0'-2'	1.5'-2'	10'-12.5'	2'-4'	4'-6'	0'-2'	2'-4'	1.5'-5'			
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Suspect Material		
Date Sampled	10/3/00	10/3/00	10/3/00	10/3/00	10/3/00	10/4/00	10/4/00	10/4/00	10/4/00		
EPA 8260 TCL VOCs (ug/kg)											
p-Isopropyltoluene	ND<8.15	ND<10.7	ND<10.7	ND<10.0	ND<9.22	14.6	ND<9.02	ND<10.0	107	NS	NA
Trichloroethene	ND<8.15	ND<10.7	ND<10.7	ND<10.0	ND<9.22	496	ND<9.02	ND<10.0	327	700	NA
EPA 8270 TCL SVBNs (ug/kg)											
Fluoranthene	ND<366	ND<40,084 (1)	ND<375	ND<380	ND<354	4,490	ND<366	ND<360	ND<42,792 (1)	50,000	NA
Pyrene	ND<366	ND<40,084 (1)	ND<375	ND<380	ND<354	4,195	ND<366	ND<360	ND<42,792 (1)	50,000	NA
RCRA Metals											
SW846/EPA 6010 (mg/kg) (3)											
Arsenic	5.67	7.48	2.49	2.25	1.87	**22.9**	3.35	1.84	1.22	7.5 or SB	3 - 12
Barium	215	**624**	18.4	57.6	19.9	**3582**	298	17.0	96.1	300 or SB	15 - 600
Cadmium	0.604	**28.5**	ND<0.356	ND<0.485	ND<0.469	**14.2**	ND<0.569	ND<0.467	6.49	1, 10(5)	0.1 - 1
Chromium	12.5	34.4	5.97	8.29	6.30	**204**	6.95	6.01	**672**	10, 50(5)	1.5 - 40
Lead	50.2	**2160**	4.13	10.5	5.22	**3595**	21.9	5.23	**4700**	SB	200 - 500 (urban)
Mercury	0.131	0.188	ND<0.0614	ND<0.0862	ND<0.0914	ND<0.111	ND<0.0839	ND<0.0803	ND<0.077	0.1	0.001 - 0.2
Selenium	0.647	1.52	0.864	ND<0.485	ND<0.469	1.58	ND<0.569	ND<0.467	**6.21**	2 or SB	0.1 - 3.9
Silver	1.34	1.50	1.21	ND<0.971	ND<0.937	1.93	ND<1.14	ND<0.934	ND<0.952	SB	NA
Total Cyanide EPA 9012 (mg/kg)	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	28	ND<1.0	ND<1.0	ND<1.0	NA (4)	NA

References/Notes:

1. Elevated detection limit due to matrix effects of sample.
2. NYSDEC. January 24, 1994. Determination of Soil Cleanup Objectives and Cleanup Levels, Division of Hazardous Waste Remediation, Technical and Administrative Guidance Memorandum, HWR 94-4046 (Revised).
3. Mercury analyzed for by SW846 7471 Method, all other metals by SW846 6010.
4. Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.
5. Proposed revision to DEC soil cleanup objective.

No PCBs were reported at concentrations above detection limits
BOLD = reported concentration is above the DEC Recommended Soil Cleanup Objective for organic compounds
BOLD = reported concentration is above the existing or proposed DEC Recommended Soil Cleanup Objective **and** the Eastern USA Background range for metals
NA = Not Available
ND = Not Detected
NS = No Standard or Guidance Value
SB = Site Background
ug/kg = micrograms per kilogram which is equivalent to parts per billion
mg/kg = milligrams per kilogram which is equivalent to parts per million

TABLE 3
SUMMARY OF DETECTED METALS IN SUPPLEMENTAL OCTOBER 2000 SOIL SAMPLES

1030 Jay Street
Rochester, New York

Sample Location	TP-2	TP-4	TP-5	TP-6	TP-7	TP-9	TP-10	TP-11	TP-12	TP-13	RECOMMENDED SOIL CLEANUP OBJECTIVE$^{(1)}$	EASTERN USA BACKGROUND RANGE$^{(1)}$
Depth of Sample	1-2'	0-3.5'	0-2'	0-1.5'	0-3'	0-3.5'	0-2'	0-2'	0-1.5'	0'-2'		
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil		
Date Sampled	10/3/00	10/3/00	10/3/00	10/3/00	10/4/00	10/4/00	10/4/00	10/4/00	10/4/00	10/4/00		
TAL Metals												
SW846/EPA 6010 (mg/kg)												
Arsenic	7.58	**13.2**	**50.8**	**12.8**	1.97	3.48	3.62	3.17	1.28	4.21	7.5 or SB	3 - 12
Barium	**7530**	42.6	**7300**	**1240**	68.9	**3420**	76.3	117	87.8	184	300 or SB	15 - 600
Cadmium	1.84	3.06	5.50	0.922	<0.524	0.724	<0.492	<0.521	<0.463	0.861	1, 10$^{(2)}$	0.1 - 1
Chromium	15.8	**52.9**	30.8	11.3	8.45	10.4	4.84	7.42	12.2	10.7	10, 50$^{(2)}$	1.5 - 40
Lead	249	30.0	**598**	125	8.54	68.6	11.6	12.3	7.04	27.4	SB	200 - 500 (urban)

References/Notes:

1. NYSDEC. January 24, 1994. Determination of Soil Cleanup Objectives and Cleanup Levels, Division of Hazardous Waste Remediation, Technical and Administrative Guidance Memorandum, HWR 94-4046 (Revised).
2. Proposed revision to DEC soil cleanup objective.

BOLD = reported concentration is above the existing or proposed DEC Recommended Soil Cleanup Objective and the Eastern USA Background range

SB = Site Background

mg/kg = milligrams per kilogram which is equivalent to parts per million

TABLE 4
SUMMARY OF DETECTED METALS IN DECEMBER 2000 SOIL SAMPLES

1030 Jay Street
Rochester, New York

Sample Location	**SS-2A**	**SS-4, SS-5**	**TP-16, TP-18**	**RECOMMENDED SOIL CLEANUP OBJECTIVE(1)**	**EASTERN USA BACKGROUND RANGE(1)**
Depth of Sample	(3'-4')	(0.5'-2.5'), (0'-2')	(0'-2')		
Matrix	Soil	Soil	Soil		
Date Sampled	12/14/00	12/14/00	12/14/00		
Metals (mg/kg)					
Arsenic	1.60	2.83	**<u>18.6</u>**	7.5 or SB	3 - 12
Barium	25.9	30.7	**<u>7300</u>**	300 or SB	15 - 600
Cadmium	<0.569	<0.505	7.10	1, 10(4)	0.1 - 1
Chromium	5.35	7.69	41.8	10, 50(4)	1.5 - 40
Lead	4.90	6.98	423	SB	200 - 500 (urban)
Total Cyanide EPA 9012 (mg/kg)	NT	NT	ND<1.0	NS(3)	NS

References/Notes:

1. NYSDEC. January 24, 1994. Determination of Soil Cleanup Objectives and Cleanup Levels, Division of Hazardous Waste Remediation, Technical and Administrative Guidance Memorandum, HWR 94-4046 (Revised).
2. Metals analysis by SW846 6010. Cyanide analysis by USEPA 9012.
3. Some forms of Cyanide are complex and very stable while other forms are pH dependent and hence are very unstable. Site specific form(s) of Cyanide should be taken into consideration when establishing soil cleanup objective.
4. Proposed revision to DEC soil cleanup objective.

BOLD = reported concentration is above the DEC Recommended Soil Cleanup Objective and the Eastern USA Background range
NT = Not Tested
ND = Not Detected
NS = No Standard or Guidance Value
SB = Site Background
mg/kg = milligrams per kilogram which is equivalent to parts per million

TABLE 5
SUMMARY OF TCLP METALS IN SOIL AND SUSPECT PAINT MATERIAL SAMPLES

1030 Jay Street
Rochester, New York

Sample **Matrix** **Date Sampled**	**SS-2 (1.5'-2')** Soil 10/3/00	**TP-8 (0'-2')** Soil 10/4/00	**Paint** Suspect Material 10/4/00	**EPA TCLP Hazardous Waste Regulatory Levels (mg/l)**
TCLP Metals **EPA 6010 (mg/l)**				
Arsenic	<0.025	<0.025	<0.100	5.0
Barium	0.550	4.60	22.2	100.0
Cadmium	0.045	0.090	<0.025	1.0
Chromium	<0.025	<0.025	0.227	5.0
Lead	0.095	**7.3**	**5.72**	5.0
Mercury	NT	NT	<0.0020	0.2
Selenium	NT	NT	<0.100	1.0
Silver	NT	NT	<0.050	5.0

References/Notes:

EPA = United States Environmental Protection Agency
TCLP = Toxicity Characteristic Leaching Procedure
BOLD = reported concentration is above applicable regulatory level
NT = Not Tested
mg/l = milligrams per liter which is equivalent to parts per million