WASTE EXCAVATION AND HANDLING PLAN
TASK 1B/1D

- SAMPLING AND ANALYSIS PLAN
- QUALITY ASSURANCE PROJECT PLAN
- HEALTH AND SAFETY PLAN
- SPILL CONTROL PLAN
- EROSION CONTROL PLAN
- DATA MANAGEMENT PLAN
- AIR MONITORING PLAN

Metamora Landfill Site
Lapeer County, Michigan

OCTOBER 1991
REF. NO. 3298 (16)

CONESTOGA-ROVERS & ASSOCIATES

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1.0 INTRODUCTION

1.1 GENERAL

This report presents the Waste Excavation and Handling Plan (WEHP) for the drummed waste and soils to be excavated, handled, staged, stored or incinerated at the Metamora Landfill Site (Site). The Site is located approximately 4,000 feet east of the Village of Metamora in Lapeer County, Michigan. The Site location is presented on Figures 1.1 and 1.2. A Site plan is presented on Figure 1.3. An aerial photograph of the Site depicting existing conditions as of May 1991, is presented as Plan 1 in the Incineration Work Plan (IWP). A topographic map and Site plan are respectively presented as Plans 2 and 3 in the IWP.

This WEHP has been developed pursuant to the requirements of the Consent Decree in the matter of United States of America (USA) vs. BASF-Inmont et al. A Scope of Work (SOW) for the Remedial Design/Remedial Action (RD/RA) at the Site is incorporated into the Consent Decree by reference. The SOW outlines the methods to design and implement the individual remedy components of the Site-wide remedy. The tasks required to implement the SOW are summarized in Table 1.1.

The major components of the remedy for the Site, as outlined in the SOW, include the following activities:

1) Installation of Site security fence;
2) Institutional controls;

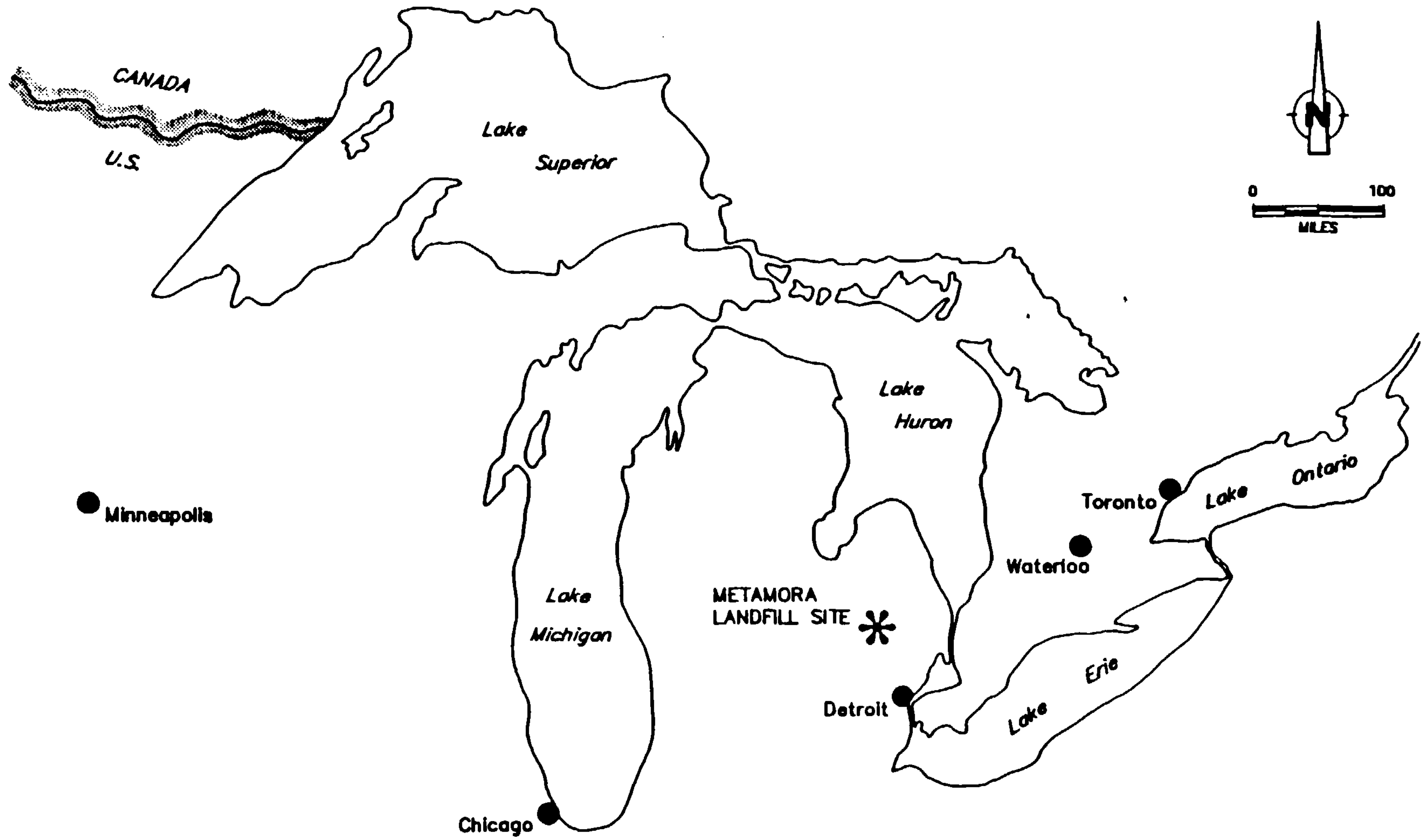

figure 1.1
SITE LOCATION
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

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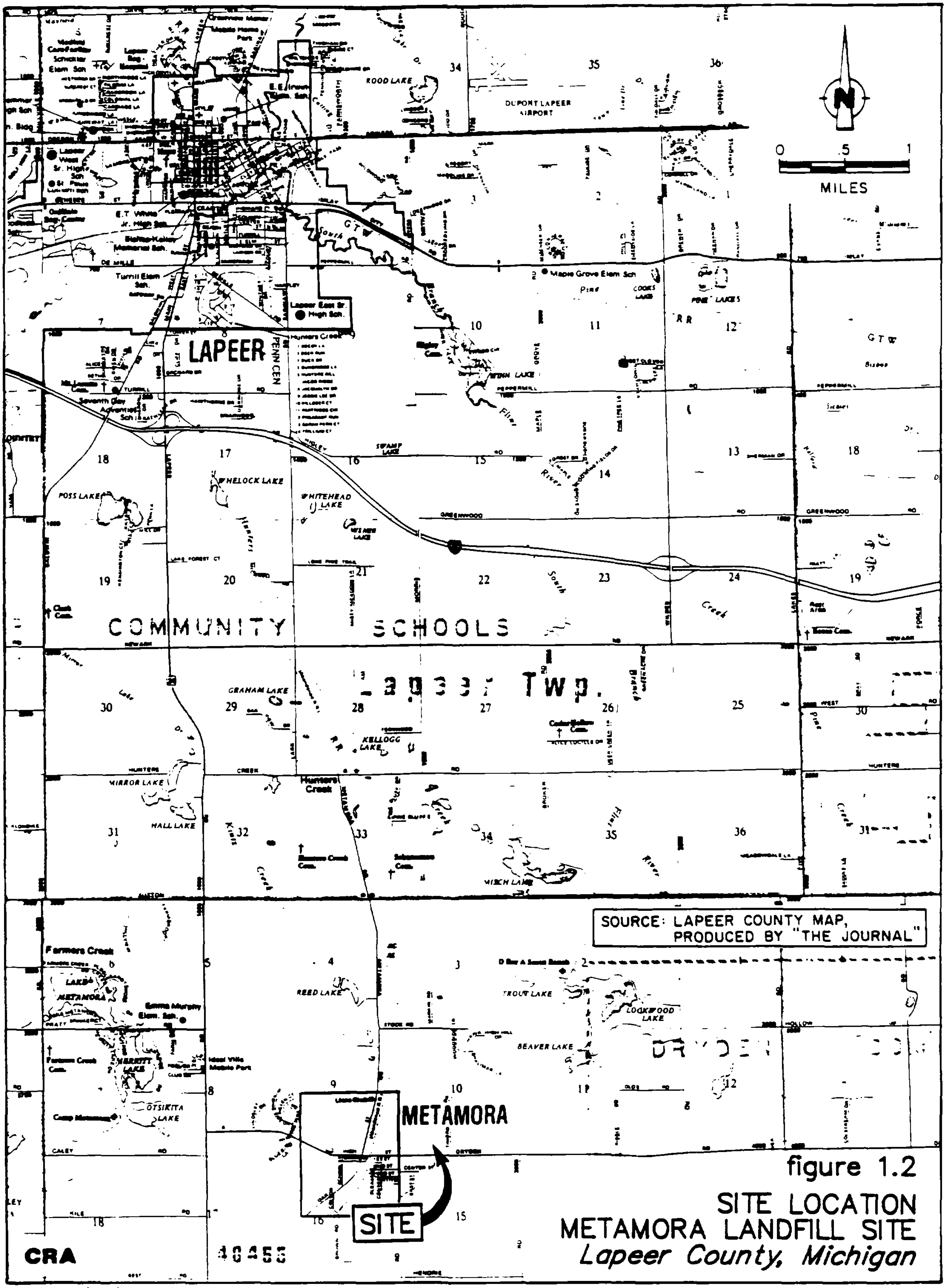

figure 1.2
SITE LOCATION
METAMORA LANDFILL SITE
Lapeer County, Michigan

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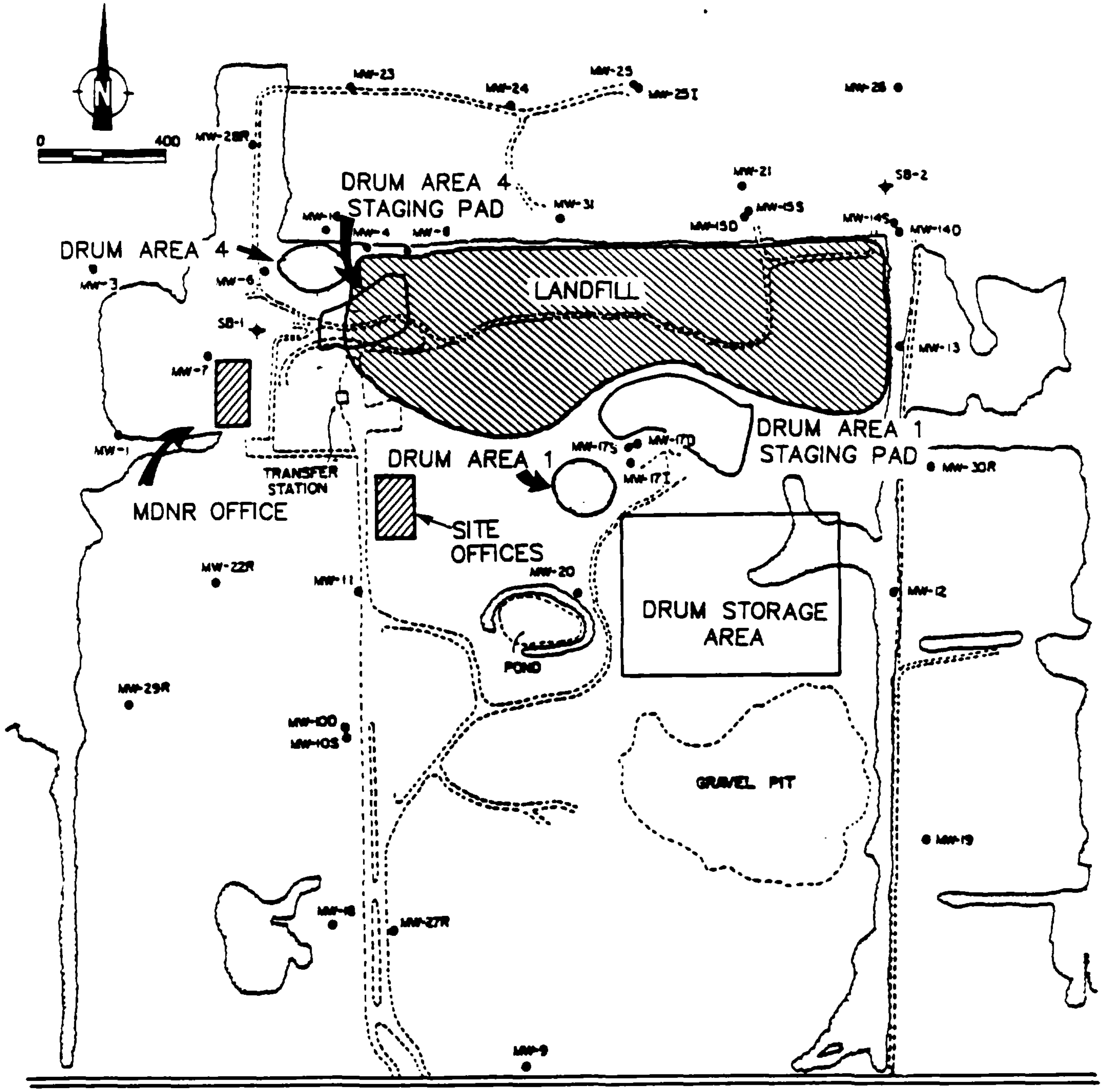

NOTE: EXISTING CONDITIONS,
DECEMBER 1990

figure 1.3

SITE PLAN
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

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TABLE 1.1

SCOPE OF WORK SUMMARY
METAMORA LANDFILL SITE RD/RA
LAPEER COUNTY, MICHIGAN

TASK 1: SOLID WASTE REMEDIATION PLANS

A. Incineration Work Plan
B. Waste Excavation and Handling Plan
C. Soil Characterization Work Plan
D. Data Management Plan

TASK 2: RD/RÅ WORK PLAN/PROJECT PLANS

A. Description and Qualification of Personnel
B. Interim Groundwater Monitoring Plan
C. Pre-Design Hydrogeologic Investigation
D. Health and Safety Plan
E. Quality Assurance Project Plan
F. Monitoring/Sampling plan, addressing groundwater, air and effluent sampling
G. Project Schedule for Completion of Tasks

TASK 3: REMEDIAL DESIGN

A. Design Plans and Specifications
B. Operation and Maintenance Plan
C. Cost Estimate
D. Project Schedule
E. Construction Quality Assurance Objectives
F. Health and Safety Plan
G. Design Phases
H. Additional Studies
I. Community Relations Support

TASK 4: REMEDIAL ACTION CONSTRUCTION

A. Responsibility and Authority
B. Construction Quality Assurance Personnel Qualifications
C. Inspection Activities
D. Sampling Requirements
E. Documentation

TASK 5: REPORTS

A. Progress
B. Draft
C. Final

3) Access and easement;

4) Excavation of buried drums and associated soils in Drum Area 1;

5) Incineration of waste and selected soil;

6) Installation and Implementation of a Groundwater Monitoring Program;

7) Installation and Operation of a Groundwater Extraction and Treatment System;

8) Construction of a Landfill Cover; and

9) Residual Soil Treatment and Disposal.

As part of Task 1B of the SOW (Solid Waste Remediation Plans), a Waste Excavation and Handling Plan (WEHP) is required.

The WEHP developed by Chemical Waste Management (MDNR's contractor for the Operable Unit Number 1 (OU1) RA) and approved by MDNR has been amended and refined by Conestoga-Rovers & Associates (CRA) on behalf of the Metamora Landfill Site Settling Defendants (MLSSD). The amended WEHP (and associated Project Plans) presented herein, incorporates specific requirements negotiated within the final Consent Decree between U.S. EPA and the MLSSD in addition to procedural changes in the excavation and handling of containerized waste which will ensure the protection of on-Site personnel and the environment.

This amended WEHP describes the steps to be taken by the MLSSD to excavate, sample and characterize all remaining containerized waste at the Site. As part of this description, additional plans developed by Chemical Waste Management, as part of their WEHP, and approved by

MDNR, have been amended. These plans have been incorporated into the amended WEHP and include:

i) Sampling and Analysis Plan (SAP):
ii) Quality Assurance Project Plan (QAPP);
iii) Health and Safety Plan (HASP);
iv) Spill Control Plan (SCP);
v) Erosion Control Plan (ECP);
vi) Data Management Plan (DMP); and
vii) Air Monitoring Plan (AMP).

The amended WEHP and attached plans shall be incorporated into the final project specifications which will be developed as part of the detailed design. The on-Site incineration and excavation contractor will be required to follow this amended WEHP during performance of the Site work.

The selection of the on-Site incineration and excavation contractor will be made in conformance with accepted private sector procurement procedures as described in the Incineration Work Plan (IWP).

1.2 SITE BACKGROUND

The Site is situated on a 160-acre parcel of land located approximately 4,000 feet east of the Village of Metamora in Lapeer County, Michigan. The landfill encompasses an area of approximately 25 acres within the 160 acre Site (see Figure 1.3). The Site is situated on a local topographic high which is comprised of extensive sand and gravel deposits.

A number of environmental investigations have been completed at the Site. The Site was added to the National Priorities List (NPL) on October 15, 1984. U.S. EPA subsequently issued a Phased Feasibility Study (PFS) in August 1986; and a Record of Decision (ROD) in September 1986 calling for the excavation and off-Site incineration of buried drummed wastes and interstitial soils from Drum Areas 1 and 4. Incineration of buried drums and soils located in the two drum disposal areas was termed the Operable Unit Number 1 (OU1) Remedial Action (RA).

In 1988, MDNR contracted with Chemical Waste Management, Inc. (CWM) to conduct the drum excavation, handling, transport and off-Site incineration of all excavated waste materials as part of the OU1 RA. CWM began excavation in 1989. As of December 1990, a total of approximately 25,000 drums had been excavated. A total of 15,000 drums were disposed at an off-Site incineration facility and 10,000 remain on Site on the Storage Pad. Drum excavation activities were discontinued by MDNR in December 1990.

The Consent Decree and SOW require the MLSSD to complete the drum excavation work initiated by CWM/MDNR and to incinerate all excavated containerized waste. This WEHP describes the tasks which the MLSSD will re-initiate to complete the drum excavation, sampling and characterization of the containerized waste.

1.3 WEHP ORGANIZATION

This WEHP is presented in the following sections:

Section 2	General Project Information
Section 3	Drum and Soil Handling
Section 4	Non-Incinerable Waste
Section 5	Staging and Storage Pad Removal
Section 6	Demobilization
Section 7	Schedule

This WEHP also includes the following Project Plans which are presented as Appendices.

Appendix A	Sampling and Analysis Plan (SAP)
Appendix B	Quality Assurance Project Plan (QAPP)
Appendix C	Health and Safety Plan (HASP)
Appendix D	Spill Control Plan (SCP)
Appendix E	Erosion Control Plan (ECP)
Appendix F	Data Management Plan (DMP)
Appendix G	Air Monitoring Plan (AMP)

The purpose of this WEHP is to describe the procedures for waste excavation and handling. The procedures shall follow a step-by-step process beginning from the point when the overburden has been removed through until the excavation is ready to be backfilled. This WEHP is intended to provide the approach to successfully complete Site excavation activities.

Additional emergency response procedures and Site security activities are respectively presented as Appendices A and B of the IWP.

The WEHP and associated Project Plan presented herein, in conjunction with the IWP, serve as the basis of the Source Removal and Disposal Program project specifications.

SECTION 2

2.0 GENERAL PROJECT INFORMATION

2.1 PROJECT COORDINATOR

MLSSD will retain an Engineering Consultant (Engineer) as Project Coordinator to provide overall project management and field oversight services during the implementation of the drum excavation, sampling, consolidation and incineration program. The Engineer will provide technical support and will oversee all construction activities associated with this project. The Engineer will provide additional field support personnel as required to oversee the required activities.

2.2 RESPONSE CONTRACTOR

Prior to the initiation of work at the Site, MLSSD will notify U.S. EPA of the names of the Response Contractor(s) (Contractor(s)). The Contractor(s) will implement the construction activities presented in this and associated Work Plans. The Contractor(s) will be responsible for completing the work on schedule and in accordance with the Contract Specifications which will be issued by MLSSD. The Contractor(s) will coordinate the field activities of their personnel and those of the subcontractors.

The Contractor(s) will be responsible for engaging analytical laboratories to provide analytical support services associated with the project. Selected analytical laboratories, which will be approved by

MLSSD, will perform waste compatibility testing, and analysis of consolidated waste samples for waste disposal characterization purposes as required.

2.3 SAMPLING AND ANALYSIS

All sampling and analysis of drummed waste and soil will be completed in accordance with the Sampling and Analysis Plan (SAP) presented in Appendix A and the Quality Assurance Project Plan (QAPP) presented in Appendix B.

2.4 HEALTH AND SAFETY

All personnel assigned to work tasks in the Exclusion Zone shall be properly oriented with all applicable plans, including the Health and Safety Plan (HASP) which is presented in Appendix C. All personnel shall strictly adhere to the HASP when performing work on Site. The incineration and excavation contractor shall be responsible for implementing and maintaining the HASP.

The Exclusion Zone for Drum Area 1 shall be established on Site and at a minimum will include the excavation area, staging area, and vehicle decontamination facility. The Exclusion Zone shall be surrounded by a temporary snow fence. The exact location of the snow fence shall be determined by the Engineer's Health and Safety Officer (HSO) in consultation with the Contractor's HSO. The final fence location will be discussed with the U.S. EPA representative for concurrence.

Additional emergency response procedures are presented as Appendix A of the IWP.

2.5 EQUIPMENT

All personnel working within the Exclusion Zone shall wear Level "B" protective equipment and will properly decontaminate when leaving the Exclusion Zone. The HASP presented in Appendix C provides a detailed description of the use and maintenance of all health and safety equipment and the decontamination procedures.

It is expected that the Contractor shall utilize a minimum of six (6) pieces of heavy equipment in the Exclusion Zone (either at the excavation or storage area). The Contractor shall be required to identify the equipment scheduled to be used during the drum excavation and handling program prior to mobilizing to the Site. The equipment to be used by the Contractor will be of a quality and quantity to ensure the safe, successful and timely completion of the project. This equipment includes:

1. Track backhoe with drum handling attachment capable of full rotation;
2. A track backhoe with a 1 1/2-cubic yard bucket (approximate) with no bucket teeth exposed and equipped with a drum sling;

3. A rubber-tired front-end loader with a standard loading bucket, forklift attachment and a drum handling attachment;
4. A pneumatic brass ram for remote piercing of drums;
5. An off-road dump truck (15 to 20-ton capacity); and
6. A flat bed truck.

The above may be substituted by other equivalent equipment capable of achieving the same task.

All equipment will be thoroughly decontaminated before exiting the Exclusion Zone. Decontamination shall, at a minimum, require that equipment is cleaned with a high-pressure power washer and shall include the use of brushes, brooms, and shovels as necessary at the decontamination facility.

2.6 SPILL CONTROL

All spills will be handled in accordance with the Spill Control Plan presented in Appendix D.

2.7 EROSION CONTROL

Erosion will be controlled in accordance with the Erosion Control Plan presented in Appendix E.

2.8 DATA MANAGEMENT

Data generated during the Source Removal and Disposal Program may include, but not be limited to the following:

1. drum inspection information;
2. photographs;
3. video tapes;
4. physical evidence of PRP information;
5. waste compatibility data;
6. waste characterization data;
7. excavation logs;
8. visitor logs; and
9. electronic data bases.

Whenever suspected PRP evidentiary information is identified during the excavation, the U.S. EPA field representative will be immediately notified. The evidence will be inspected as outlined in the Data management Plan (DMP) and subsequently removed to a secure area by U.S. EPA.

Additional data management procedures and protocols will be conducted in accordance with the Data Management Plan presented in Appendix F.

2.9 AIR MONITORING

Air monitoring shall be conducted in accordance with the Air Monitoring Plan (AMP) presented in Appendix G.

2.10 PERMITTING REQUIREMENTS

The Contractor will be required to identify and obtain permits to conduct all activities that require permitting (e.g. road improvements at Site entrance).

2.11 SITE PREPARATION

2.11.1 General

Site preparation will include all activities necessary to prepare the Site prior to commencing excavation, sampling, consolidation and incineration operations. The Contractor will provide office and support facilities, staging facilities, decontamination facilities and a perimeter fence, as required. All aspects of this project will be completed adjacent to the existing drum storage area and Drum Area 1 to minimize waste handling.

Aspects of the Site preparation requirements may be redundant as they already exist on Site. The determination as to the requirement to complete the construction of additional on-Site support facilities will be finalized through discussions between U.S. EPA and MLSSD.

2.11.2 Personnel Support and Hygiene Facilities

At the commencement of Site work the Contractor will initially mobilize all personnel support and hygiene facilities as specified in the Contract Specifications. Facilities to be established on Site will include:

i) personnel hygiene facility/emergency medical facility;
ii) Contractor's office trailer;
iii) Engineer's office trailer;
iv) office trailer for the use of the U.S. EPA/U.S. ACE; and
v) tank(s) for wastewater containment.

2.11.3 Construction Utilities

Construction utilities will be routed to the personnel support area from available utilities located on Site. Utilities to be supplied to the support area will include electrical power and telephone. Application will be made to the appropriate utility authorities prior to constructing the connecting lines. Construction standards will be in accordance with the requirements of the local utility authorities and all applicable utility and electrical codes.

SECTION 3

3.0 DRUM AND SOIL HANDLING

The purpose of this section is to provide the protocols and procedures to be utilized to excavate and handle buried drums located in Drum Area 1. A plan of Drum Area 1, including the area in which excavation of additional drums is to be completed, is presented on Figure 3.1.

Projected waste quantities[1] are summarized as follows:

A. Currently Staged/Stored Waste

- 11,000 drums
- 4,000 tons of soil

B. To be Excavated

- 3,000 to 6,000 drums
- 1,000 to 4,000 tons of soil

Excavation will not commence until incineration of existing stored waste has been started. Prior to commencing the excavation, the existing cap material over the Drum Disposal area will be stripped and stockpiled adjacent to the Drum Disposal area. The stockpiled material will be used as backfill upon completion of the drum excavation program. All soils which remain in Drum Area 1 (including the existing cap material) at the conclusion of drum excavation activities shall be addressed in accordance with the Soil Characterization Work Plan (SCWP).

1 The waste quantities identified are based upon representations made by MDNR and CWM personnel.

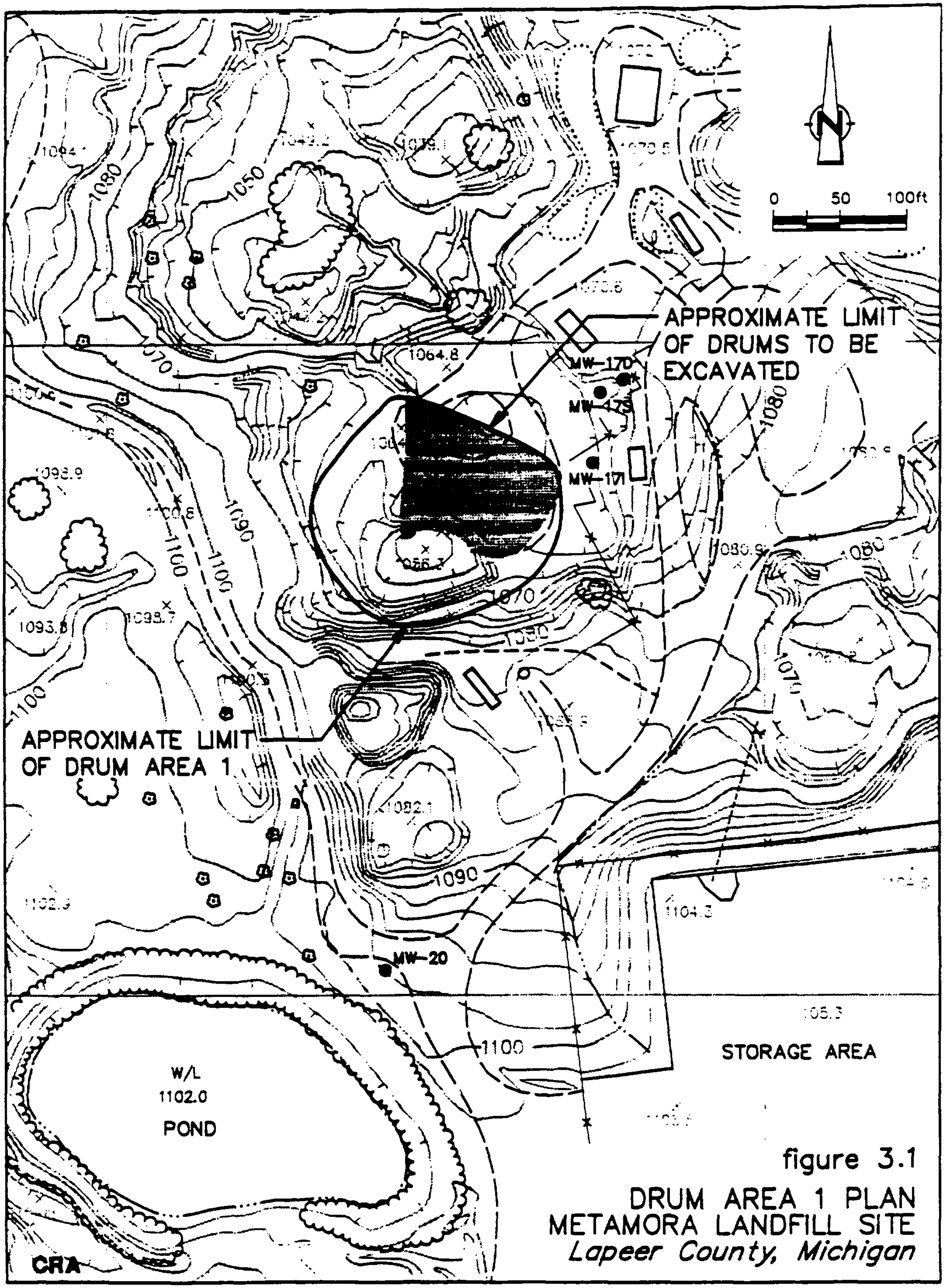

figure 3.1

DRUM AREA 1 PLAN
METAMORA LANDFILL SITE
Lapeer County, Michigan

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Excavation of Drum Area 1 will extend vertically until the native soil is encountered. As the drum area is excavated any drums which are encountered and any chemically saturated soil and/or debris immediately associated with the drums will be removed. Excavation will continue until the completion of drum removal activities. Soils which are associated with Drum Area 1, which remain in place at the completion of the drum excavation activities, will be addressed as described in the Soil Characterization Work Plan (SCWP).

It should be noted that soils which are identified to be chemically saturated and/or contain PCBs in excess of 500 ppm will be excavated for immediate incineration. Soils which contain less than 500 ppm PCBs and/or are not chemically saturated will be addressed as outlined in the SCWP. The quantity of soils meeting the stated descriptions is presently unknown.

When containerized waste is encountered the protocols contained within the Occupational Safety and Health Administration (OSHA) Standards as presented in the Federal Register, Vol. 54, No. 42, Monday, March 6, 1989, Part-1910 - Hazardous Waste Operations and Emergency Response; Final Rule 1910-120(j) and this section will apply. The protocols presented below for point of excavation handling will ensure that leakage and spillage of containerized waste encountered in the excavation is minimized.

When the native soil is reached, the excavated surface will be visually inspected for exposed buried drums. Where drums are visible, the drums and any visibly contaminated soils (chemically saturated) and/or debris immediately associated with the drums will be removed. If drums are not visible, then the vertical extent of the excavation will be considered complete. The completion of excavation activities shall be decided upon with the concurrence of the U.S. EPA field representative.

3.1 EQUIPMENT

a) Safety Equipment

During the handling of drums or containers, safety apparel and equipment as specified in the HASP (Appendix C), will be worn or used at all times. In particular, self contained air respiratory devices (Level B) will be worn at all times.

b) Handling Equipment

All handling, moving and transport of drums or containers will be effected with mechanical equipment whenever possible, unless it is for the installation of slings. Movement or handling by personnel may be required in the event that mechanical means cannot be properly or safely employed due to potential drum or container breakage or leakage.

All handling and transport equipment will be equipped with Class ABC fire extinguishers, and self contained full air respiratory systems if deemed necessary by the Site Safety Officer (SSO). All equipment used

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WASTE EXCAVATION AND HANDLING PLAN
TASK 1B/1D

- SAMPLING AND ANALYSIS PLAN
- QUALITY ASSURANCE PROJECT PLAN
- HEALTH AND SAFETY PLAN
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- DATA MANAGEMENT PLAN
- AIR MONITORING PLAN

Metamora Landfill Site
Lapeer County, Michigan

for the handling and transport of drums or containers will be regularly maintained. In particular, the ignition, manifold and exhaust components will be maintained to prevent backfiring or generation of sparks within the exhaust gases.

Prior to removal from the Site, equipment will be decontaminated within the equipment decontamination facility. This facility is described in Section 4.2.4 of the Incineration Waste Plan (IWP).

c) Control of VOC Emissions

VOC emission controls (such as a carbon adsorption hood) shall be utilized during drum excavation activities if the air monitoring data indicates appreciable increases in VOC levels over background conditions.

3.2 DRUM AND CONTAINER HANDLING

3.2.1 Drum and Container Excavation

a) Working Groups

During the excavation of the waste, a team of personnel specifically trained in the handling of containerized waste will be designated to perform this task. The team will be located in the Exclusion Zone (see HASP, Appendix C). The team may carry out other tasks but will be immediately available if a container is encountered. This team will contain no fewer than two people. During the handling of containerized waste, visual contact will be maintained between members of the working team at all times. All team members will be able to communicate with ease between themselves.

b) Point-of-Excavation Handling

As containerized waste is encountered, and prior to physically handling a drum or container, a preliminary classification check list will be completed. This list will include a screening of the container with an HNU or OVA, a geigercounter and an explosimeter (LEL). As well, a visual description will be made of the drum or container contents, if discernable, and the condition of the drum or container as it appears in the excavation including evidence of any pertinent labels or warnings. If, during this inspection, an open or leaking drum or container is identified to contain liquids, the liquids will be pumped, poured or bailed into a repack drum prior to removing the drum or container from the excavation (to the extent possible). If an open drum or container is identified to contain solids, the drum or container will be carefully removed from the excavation. If the container is neither opened nor leaking, the container will be carefully removed from the excavation and examined for structural integrity. All containers will be overpacked prior to removal to the staging pad. The potential for transferring structural sound and intact drums directly to the staging pad without overpacking will be reviewed once the excavation of drums has been re-initiated. PRP evidence will be recovered and/or recorded as described in the DMP (see Appendix F).

c) Spill Prevention and Response

The handling and transport of drummed or containerized waste will be, at all times, conducted in a controlled and safe manner which will minimize damage to the containerized materials. Repack and overpack units and absorbents (corn cob or oil dry) will be provided at the excavation area and staging pads and at strategic locations along any transport path for use in the event of leakage or spillage.

All spills will be handled in accordance with the Spill Control Plan presented in Appendix D.

3.2.2 Drum Logging

All containers removed from the excavation shall be accurately described in a log. This drum log will include all drums encountered including empty drums. Drums will be initially logged and numbered at the excavation face. The numbering system shall be consistent with the numbering sequence already established on Site. Technicians overpacking or otherwise containing drums shall begin logging information for each drum on a field excavation data sheet (see Figure 3.2). The information gathered by the technicians will be transferred to the field sampling data sheet (see Figure 3.3). Container fragments encountered,

FIELD EXCAVATION DATA SHEET

METAMORA LANDFILL

DRUM FIELD OBSERVATIONS

Drum No. __________ Temperature: __________

Drum Size: (Please circle) 5 15 30 55 85 gallon

Type: Steel ( ) Plastic ( ) Other ( )

Lid: Open Head ( ) Closed Head ( )

Condition: Good ( ) Bad ( ) Description: __________________________

HNu : ________ Explosimeter: _________ Gieger: _________

Labels: Description ____

____

____

Comments:

____

____

Field Observer: ___________________________ Date: _________________

Time: _________________

figure 3.2

FIELD EXCAVATION DATA SHEET

METAMORA LANDFILL SITE

Lapeer County, Michigan

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<u>FIELD SAMPLING DATA SHEET</u>

METAMORA LANDFILL
DRUM FIELD OBSERVATIONS

Sample No. __________ Temperature: __________

Drum Size: (Please circle) 5 15 30 55 85 gallon

Type: Steel ( ) Plastic ( ) Other ( )

Lid: Open Head ( ) Closed Head ( )

Condition: Good ( ) Bad ( ) Description: ______________________________

HNu : _________ Explosimeter: __________ Gieger: __________

Liquid/Solid Ratio: __________________

Percent (%) Full: 25% ( ) 50% ( ) 75% ( ) 100% ( )

If Liquid: Pumpable ( ) Not Pumpable ( )

If Solid: Easily Emptied ( ) Not Easily Emptied ( )

Comments:

____

____

Field Observer: ______________________________ Date: ___________________

Time: __________

figure 3.3
FIELD SAMPLING DATA SHEET
METAMORA LANDFILL SITE
Lapeer County, Michigan

including any contents, which constitute less than approximately 50 percent of the container volume shall be stockpiled with the bulk solid material designated for on-Site incineration.

During the initial inspection at the excavation, any customized containers, suspicious looking drums, drums labeled as containing hazardous materials (explosives, etc.) and drums under pressure will be clearly marked for special handling. Drums encountered of this nature shall be segregated from other drums within the drum staging pad.

3.2.3 Repack/Overpack of Waste/Drum

Immediately following the initial visual drum inspection the drum will be overpacked with the qualification explained Section 3.2.1(b).

Containers which show signs of pressure build up, poor structural integrity, leakage or damage will be immediately overpacked.

Whenever possible all overpacking will be done remotely by the heavy equipment.

3.2.4 Transportation to Staging/Analytical Area

All drummed waste once removed from the excavation and secured shall be delivered to the Staging Area by a front-end loader (or equivalent) pending waste sampling and characterization. All lids will be securely sealed and fastened prior to transportation.

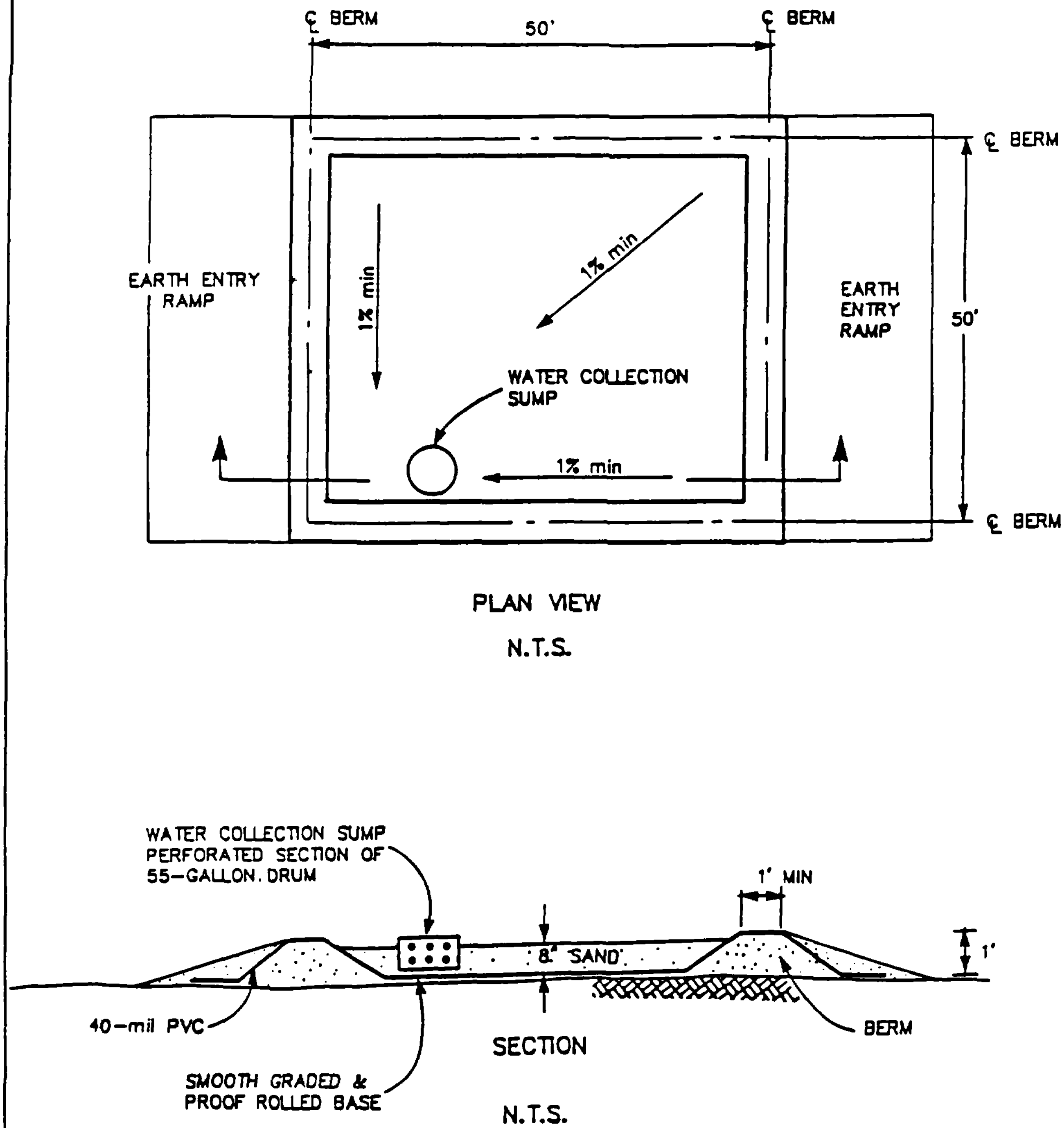
3.2.5 Staging and Sampling Area

The final location on the Staging Area shall be determined in the field by the Engineer's representative and the Contractor after consultation with the U.S. EPA.

The staging pad will be constructed as illustrated on Figure 3.4, and consist of a 40-mil HDPE liner covered with 8 inches of sand (Section 4.2.4 of the IWP). Alternatively, asphalt may be used. The pad will be sloped to a sump to collect any liquids which accumulate within the staging pad area. Accumulated liquids will be pumped to storage tanks pending disposal. All drums in the staging area will be placed in double line straight rows for ease of handling, access and emergency response. Drums containing solids and liquids will be stored separately.

All containerized waste will be staged within the Staging Area while the container contents are sampled and characterized for consolidation and disposal purposes. All sampling will be conducted within the Staging Area before transferring these containers to the Drum Storage Area pending final incineration.

The staging pad will remain on Site at the completion of the Drum Area 1 activities for possible utilization during other remedial



NOTE: EXACT DIMENSIONS TO BE DETERMINED AS THE PROJECT PROCEEDS TO CONSTRUCTION

figure 3.4

TYPICAL STAGING PAD
METAMORA LANDFILL SITE
Lapeer County, Michigan

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activities. Ultimately, the staging pad will be excavated (if required) and utilized as fill for the landfill cap.

3.2.5.1 Drum Entry

The drums and overpacks will be opened on the staging pad. All drums will be grounded prior to sampling. If the bung can be removed, the sampling of contained liquids will be safely accomplished by glass thief. Following sampling, the glass thief will be broken and discarded within the drum. Drums that show no signs of extreme pressure can be opened using a non-sparking wrench, allowing any gas pressure to escape. Drums exhibiting signs of extreme pressure or that cannot be manually opened shall be opened remotely to minimize any danger. All personnel will stay a safe distance away from this activity. A pneumatic ram can be outfitted with a non-sparking brass piercing point to open the drum from a distance. Absorbent material, either ground corn cob or oil-dry, will be available to contain any spillage from drum opening. All openings will be plugged after the sampling operations.

3.2.5.2 Sampling Procedures

The following procedures will be adhered to during sampling of drummed liquid waste. Detailed descriptions of the sampling procedures and protocols are presented in Appendices A and B (SAP/QAPP).

1. Remove cover from sample container.

2. Insert glass tubing almost to the bottom of the drum or until a solid layer is encountered. If more than one phase of material is identified in liquid or solid drums, each phase will be sampled for compatibility testing and waste characterization as appropriate. If no phasing is apparent, then the sample will be collected from at least 12 inches down from the top of the drummed waste.

3. Allow the waste in the drum to reach its natural level in the tube.

4. Cap the top of the sampling tube with a double-gloved thumb or stopper, ensuring liquids do not come into contact with the sampler's thumb or the stopper.

5. Carefully remove the capped tube from the drum and insert the uncapped end in the sample container. Do not spill liquid on outside of bottle.

6. Release the thumb or stopper and allow the glass thief to drain completely and fill the sample container. Repeat the above steps until sufficient volume has been collected for analysis.

7. Remove tube from the sample container, break in two pieces and place the tube in the drum.

8. Cap the sample container tightly and place prelabeled sample container in a carrier.

9. Replace the bung or place plastic over the drum.

10. Transport the sample to the on-Site laboratory for analysis.

Approximately 500 mL of sample should be collected for liquid matrices. The exact volume, however, will be determined by the on- or off-Site laboratory and the specific analyses which are required.

Sampling of drummed solids or sludges will in general conform to the preceding procedures with the following exceptions:

1. Sample collection will be accomplished using a stainless steel trowel, spoon or trier. All sampling equipment will be cleaned between subsequent drums using the cleaning protocols described in the QAPP presented in Appendix B.

2. A representative sample will be collected from a depth of at least 12 inches from the top of the drum contents upper surface.

3. The sample collected will be a composite of a minimum of four 25 gram samples collected through the drum cross-section.

The exact mass of sample which is to be collected will be determined by the on- or off-Site laboratory and the specific analyses which are required.

3.2.6 Final Staging of Drums

. After visual inspection and sampling of the drum contents, drums will be segregated visually into two classes, solid or liquid. The drums will then be moved to the portion of the staging pad reserved for final staging prior to removal to the storage area. Drums will be staged in an upright position. All staged drums shall be placed in straight double rows for ease of access and for emergency handling.

3.2.7 Storage

Upon completion of drum sampling and waste characterization, drums will be transferred from the Staging Area to the Storage Area on a flatbed truck. Any drum containing materials identified to be potentially dangerous by itself shall be segregated from the other drums within the Storage Area. Drums containing compatible materials shall be staged together. Drums of incompatible waste shall be segregated in the Storage Area at a distance which will ensure that waste will not mix if spilled or leaked. All drums shall be placed in straight double rows per compatibility group with accessible aisles for ease of work and in the event of an emergency.

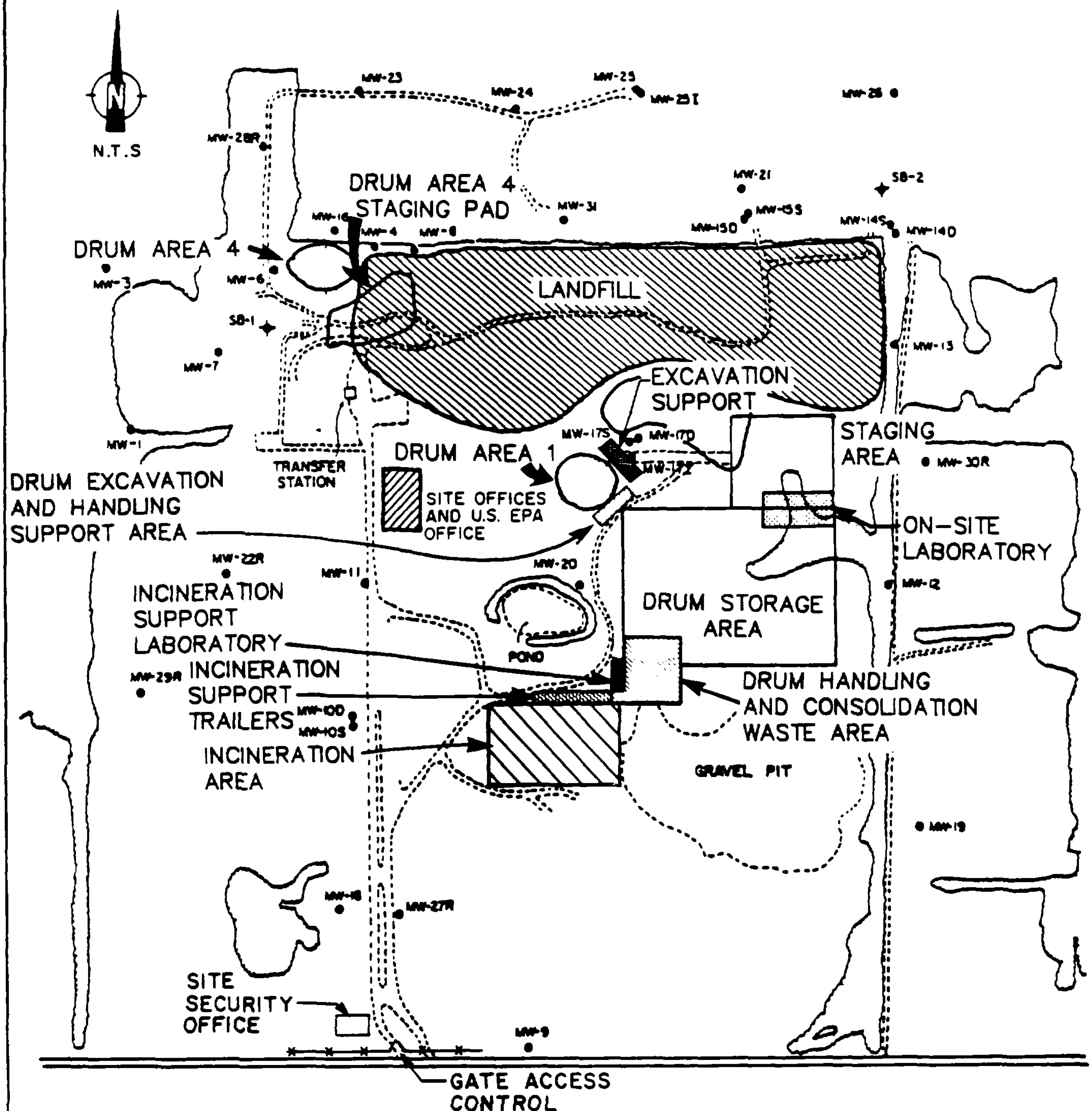
3.2.8 Waste Consolidation

Drummed waste in the Storage Area will be delivered to the consolidation area for bulking of compatible materials prior to incineration. All drummed wastes will be consolidated according to the chemical compatibility data and the waste feed requirements for the on Site incinerator. The incineration and excavation contractor will develop a consolidation and compatibility scheme depending upon the operational parameters of the incinerator. Following consolidation, all waste will be segregated into four primary waste classes: solid waste,liquid waste, sludge waste, and shredded drums. Soils are discussed separately in Section 3.3.

All waste consolidation activities will be performed within the Drum Handling and Consolidation Waste Area which will be comprised of a building with a minimum of three sides. The suggested Site layout for the Source Removal and Disposal Program showing the location of all the waste staging and storage areas is conceptually illustrated on Figure 3.5. The final Site layout shall be determined in consultation with U.S. EPA.

3.2.8.1 Solid Drummed Waste Consolidation

Based on the chemical compatibility testing (see Section 3.4), solid waste will be emptied from the drum and consolidated with compatible waste materials. The material will be consolidated in containers providing separation from incompatible materials and to ensure that any liquids that may leach from the consolidated material can be contained.



SOURCE: E. C. JORDAN, 1986

NOTES: 1) SUGGESTED SITE LAYOUT

2) TO BE UPDATED AS NEW SURVEYS BECOME AVAILABLE, IN CONSULTATION WITH U.S. EPA

figure 3.5

SOURCE REMOVAL AND DISPOSAL PROGRAM SITE LAYOUT
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298-27/06/91-16-0

Materials containing less than 50 ppm PCBs shall be stored separately at the waste consolidation area. If the amount of free liquid is appreciable (a discretionary judgment on-Site), the liquid should be removed from the drum by a decanting pump prior to removing the solids. The collected liquid will be handled as a liquid waste. Solid materials will be stored at the waste consolidation area in stockpiles separated such that contact between incompatible waste is avoided. Empty drums will be shredded and processed separately.

3.2.8.2 Liquid Waste Consolidation

Liquids will be consolidated, based on the chemical compatibility results, into enclosed storage tanks.

Liquid wastes of sufficient BTU value may be utilized as a supplemental fuel source for the on-Site incinerator.

At a minimum, PCB contaminated liquids shall be segregated for disposal in the incinerator (greater than 50 ppm).

Wastewater, including decontamination water, shall be collected in either steel or plastic tanks located at appropriate locations on-Site. Final disposition of the wastewater shall be based upon the characterization of the wastewater.

Wastewater will be treated in either an on-Site treatment facility (i.e. which may be associated with the on-Site incinerator) or transported off Site for disposal at a U.S. EPA approved facility. If treated on Site, the water may be incinerated or discharged to the on-Site siltation pond. The actual treatment/disposal option to be employed for Site-generated wastewater streams will be contractor specific and subject to the approval of U.S. EPA.

3.2.8.3 Sludge Waste Consolidation

Sludges will remain in the drums or overpacks until incineration. Sludges will be removed from the drums for preparation of the waste feed stream. Sludges will be placed in a contained and lined area. Empty drums will be taken to the drum shredder.

3.2.8.4 Shredded Drums

Empty drum carcasses that are severely chemically contaminated will be shredded and stockpiled for processing through the incineration unit. These drums will be processed separately so that the metals may be sent to a metal reclamation facility or to a landfill as necessary following incineration.

3.2.9 On-Site Incineration

Upon completion of all waste sampling, characterization and consolidation all waste streams will be fed to the on-Site incinerator in accordance with the Incineration Work Plan (IWP) and the Contractor's approved operating plans.

3.3 SOIL HANDLING

All soils associated with Drum Area 1 which are not incinerated pursuant to the Incineration Work Plan (IWP) shall be addressed as outlined in the Soil Characterization Work Plan (SCWP).

3.3.1 Soil Excavation and Characterization

The existing cap material (which is on the order of one to three feet thick) in Drum Area 1 will be stripped and stockpiled (as required) in an area immediately adjacent to Drum Area 1 where the soil will not become contaminated. A plan of Drum Area 1 was presented as Figure 3.1.

Interstitial soil, except chemically saturated soil, will be separated from the drummed and/or containerized waste and placed in a stockpile at the base of the excavation. A layer of visqueen will be placed beneath the stockpile to separate the native soils from the excavated soils. As the soil is excavated it will be scanned with a HNU or equivalent organic vapor monitor. Field PCB screening will also be conducted to provide initial identification of soil with a PCB content greater than 500 ppm.

Chemically saturated soil will initially be placed in a lined roll-off box for transportation to the on-Site incineration facility or the storage pad (as per Section 3.2.7).

Soils which are not chemically saturated will be stockpiled and will be characterized in accordance to the Soil Characterization Work Plan. PCB screening tests will assist in segregating soils that have greater than 500 ppm PCBs. These segregated piles will be tested in the on-Site laboratory for PCB content.

Non-incinerable debris will be separated and placed in a lined roll-off box for disposal to an off-Site or on-Site disposal facility, as discussed in Section 4.0.

Air monitoring shall be conducted during the soil excavation activities consistent with the AMP (see Appendix G).

3.3.2 Soil Storage

All soil stockpiles will be placed on a layer of visqueen in an area which is protected from storm water run-off damage. The stockpiles will be covered to prevent wind and rain erosion.

All soil contained in roll-off boxes or in stockpiles will be kept covered during all storm events, and all extended periods of work stoppages.

3.4 DRUMMED WASTE SEGREGATION AND COMPATIBILITY TESTING

The following subsections present conceptualized methods to complete drum waste compatibility testing and consolidation. The actual derivative of the process outlined below will be determined by the specific contractor retained for the project.

3.4.1 Segregation of Drummed Wastes Into Waste Classes

Drummed wastes will be segregated according to waste classes prior to consolidation and any subsequent waste characterization for incineration. The waste classes determined by the testing detailed in this section will permit an assessment of material incompatibilities and chemical characteristics which need to be further addressed for disposal purposes. Segregated materials which are determined to have the same compatibility characteristics as determined by the waste class determined in this section will be subjected to the compatibility testing described in the following section (Section 3.4.2) prior to consolidation for disposal.

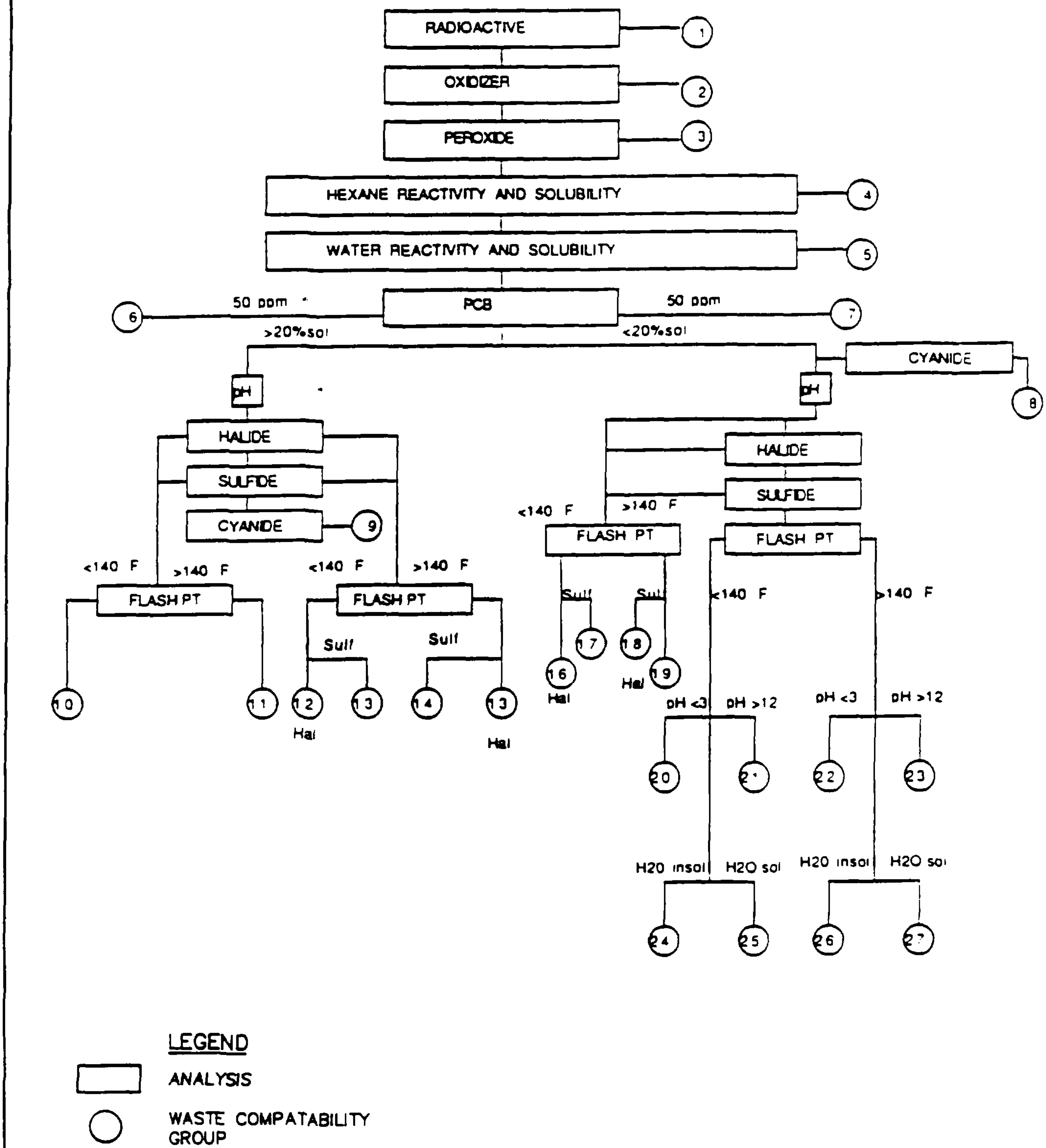
The determination of waste classes will be conducted either at an off-Site laboratory or on-Site laboratory using samples collected in the field following the protocols outlined in Section 6.2.3. U.S. EPA will be notified of MLSSD's final decision as to whether an on-Site or off-Site laboratory (or combination) will be used. The final determination on which type of laboratory facility will be used will be made upon review and evaluation of Contractor's bids by MLSSD.

No more than five milliliters (mL) of waste is needed to conduct the waste characteristics tests. This volume will be collected as a split sample in the laboratory from the total volume collected. The remaining sample volume will be kept for compatibility and waste characterization testing and analysis.

A waste compatibility segregation scheme devised by Wadsworth Alert Laboratories is presented on Figure 3.6 and summarized in Table 3.1.

3.4.1.1 <u>General Testing</u>

a. Visual Classification - All waste will be visually classified as to state (liquid or solid), color, viscosity and other identifying features. Soil, debris and sludges which pass the Paint Filter Test will be segregated out and placed with dry wastes for disposal. Materials not identified to be any of the above will undergo the waste characteristics testing described below.



NOTE: FOR DEMONSTRATION PURPOSES ONLY

figure 3.6

WADSWORTH LABORATORIES WASTE COMPATABILITY SCHEME
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298-25/06/91-16-0

TABLE 3.1

WASTE COMPATIBILITY GROUPS
WADSWORTH LABORATORIES' COMPATIBILITY SCHEME

1.	Radioactive Waste	RAD
2.	Oxidizer	OXID
3.	Peroxide	PEROX
4.	Organic Reactive	ORGRCT
5.	Water Reactive	H2ORCT
6.	Solid PCB	PCBSOL
7.	Liquid PCB	PCBLIQ
8.	Aqueous Cyanide	AQCYN
9.	Solid Cyanide	SOLCYN
10.	Flammable, Non-Halogenated, Non-Sulfide, Solid	FSOL
11.	Non-Flammable, Non-Halogenated, Non-Sulfide, Solid	NFSOL
12.	Flammable, Halogenated, Solid	FHALSOL
13.	Flammable, Sulfide, Solid	FSULSOL
14.	Non-Flammable, Sulfide, Solid	NFSULSOL
15.	Non-Flammable, Halogenated Solid	NFHALSOL
16.	Flammable, Halogentated, Liquid	FHALLIQ
17.	Flammable, Sulfide, Liquid	FSULLIQ
18.	Non-Flammable, Sulfide, Liquid	NFSULLIQ
19.	Non-Flammable, Halogenated, Liquid	NFHALLIQ
20.	Flammable Acid	FACID
21.	Flammable Base	FBASE
22.	Non-Flammable Acid	NFACID
23.	Non-Flammable Base	NFBASE
24.	Flammable Organic	FORG
25.	Flammable Aqueous	FAQ
26.	Non-Flammable Organic	NFORG
27.	Non-Flammable Aqueous	NFAQ

Note:

For demonstrative purposes only.

b. Phase Determination - Phase determination will be implemented to assess whether the waste is a liquid, solid, or heterogeneous mixture. This determination may sometimes be difficult for very viscous liquids or resins, but it is not crucial because the same characterization tests are performed on both solids and liquids.

3.4.1.2 <u>General Liquid Testing</u>

a. Flame Ignitability Test - The first test to be conducted will be an open flame ignitability test. A bunsen burner will be lit and adjusted to a small blue flame for this test. A fire extinguisher will be on hand when conducting this characterization test. The flame ignitability test may be conducted on several samples simultaneously. Two to five milliliter samples will be placed in disposable heat resistant containers. The containers are then placed in a large sand box or water bath and the lit bunsen burner is slowly passed over the unidentified waste. If a flame is observed, then the waste is classified as flammable. A non-flammable classification will be assigned to the waste if the bunsen burner has been passed over the sample three to four times without a flame being observed. The test is qualitative and is not meant to be precise. The lighting, depth of the container, ventilation in the container and degree of contact between the flame and liquid will all affect the test result. (This procedure was taken from the paper, "Compatibility Field Testing Procedures for Unidentified Hazardous Waste" by Rodney D. Turpin, U.S. EPA, Edison, New Jersey, presented at the National Conference on Management of Uncontrolled Hazardous Waste Sites, Washington DC, October 1981.)

b. Water solubility and reactivity - Determination of whether the waste is soluble, insoluble, or reactive with water will be performed by placing several drops of the waste in a 40 mL vial containing three to five mL of distilled water. Should reactions of the waste with the water be observed such as gas generation, heat generation, combustion, etc., the waste will be categorized as water reactive and isolated from other waste materials. There is often some heat of solution or color change when a waste is mixed with water, but a waste which exhibits these mild reactions will not be considered a water-reactive waste.

A waste which is not readily miscible with water is organic in nature and its characteristics will be determined further by Organic Liquid Testing. Some organic solvents such as acetone and alcohols are miscible with water, but the mixing reaction is usually easily detectable. If the waste forms an immiscible layer at the bottom of the vial, the waste may be either a halogenated organic liquid, or a dense petroleum hydrocarbon.

An aqueous waste will form a single phase in the vial. Water-soluble wastes may be either inorganic liquids or non-polar soluble organics and will be further characterized by Inorganic Liquid Testing as presented below.

3.4.1.3 <u>Inorganic Liquid Testing</u>

a. The presence of soluble volatile organics in the waste will be checked by testing the headspace of the waste with an organic vapor monitor (PID instrument i.e. HNU). Alternatively, a FID instrument (e.g. Foxboro OVA) will be used with a combustible gas meter to determine net organic vapors. Samples which are determined to contain volatile organics in excess of 0.2 meter units will be reclassified as organic liquid and subjected to the testing in Section 3.4.1.4.

b. The presence of soluble organics which are not volatile will be checked by testing the waste for total organic carbon (TOC). TOC will be determined using EPA Method 9060 contained in SW-846 "Test Methods for Evaluating Solid Waste" Third Edition. Samples found to contain a TOC content greater than 1 percent will be reclassified as organic liquid and subjected to the testing in Section 3.4.1.4.

c. Inorganic Oxidizers - Testing for inorganic oxidizers will be done by placing a drop of the waste on a strip of potassium iodide (KI)/starch paper. A purple stain indicates the presence of an oxidizer. The color change occurs at 12.5 parts per million (ppm) of total inorganic oxidizers and peroxides. The stain must appear within two minutes for the waste to be categorized as an inorganic oxidizer. If two minutes have elapsed and no stain has appeared, the result of the test will be considered negative. If the waste is dark and stains the KI/starch paper dark because of its color, the edges of the spot will be checked closely for the purple color. Very strong acids or bases may also stain the paper brown. Should this happen, a strip of the KI/starch paper will be moistened with buffer solution and the test will be repeated. (The composition of the buffer solution and all other solutions are listed in Section 3.4.1.6.) A portion of the sample will also be diluted with the buffer solution, if necessary.

d. Peroxides - Peroxides in the aqueous solution will be detected with peroxide test paper (such as EM Quant Peroxide-Test strips). The pH of one mL of the sample will be adjusted to between pH 2-12 with NaOH or H_2SO_4 solutions, if necessary. The reagent portion of a strip will be immersed into the sample for five seconds. A blue stain must appear within two minutes for the waste to be categorized as containing peroxides. If two minutes have elapsed and no stain has appeared, the result of the test will be considered negative. The test is sensitive to a few parts per million, and the relative darkness of the blue stain indicates the relative concentration of the peroxides.

e. pH and Subsequent Reactivity Screening - The pH of the waste will be determined with pH paper. Samples with a pH less than or equal to three will be classified as acidic, and samples with a pH greater than three will be classified as neutral or base. The detection limit for pH is one pH unit. The samples will be further tested as follows:

i) Nitric or Perchloric Acid Testing - The acidic wastes ($pH<3$) will be tested for nitric (HNO_3) or perchloric acid ($HC10_4$) with a sulfuric acid/diphenylamine test. Two milliliters of the sample will be pipetted into a vial and 0.5 mL of the diphenylamine solution will be added, followed by an equal amount of H_2SO_4 solution. A deep purple color will indicate the presence of nitrate or chlorate ions.

ii) Sulfide and Cyanide Testing - The basic liquids (pH >7) will be tested for the presence of sulfide or cyanide ions. To test for sulfide, a drop of the sample will be placed on a strip of lead acetate paper which has been previously moistened with the buffer solution. A black stain indicates the presence of sulfide. If the sulfide test is positive, the sulfide will be removed before the following cyanide test is conducted. This will be accomplished by adding cadmium nitrate to a small amount of the sample and swirling until all of the sulfide has precipitated. Since cadmium nitrate will lower the pH of the sample, a buffer of NaOH will be added as required to avoid the loss of hydrogen cyanide gas.

High chloride ion concentrations may interfere with the cyanide ion detector tube test. Therefore, the waste will be diluted by adding 8 mL of distilled water to a 0.5 mL sample to minimize effects from interfering ions while retaining sensitivity to less than 100 ppm cyanide. After diluting the sample, the top of a cyanide ion detector tube (e.g. Matheson-Kitigawa) will be scored and broken and set in the sample with the red dot up. The liquid will be allowed to rise into the column by capillary action and any color change in the tube will be noted. A deep blue color will indicate the presence of the cyanide ion.

An alternate method for detecting sulfide- or cyanide-containing wastes consists of pumping a known volume of gas through hydrogen sulfide and hydrogen cyanide detector tubes. One or two drops of sulfuric acid solution are added to an equal amount of sample in a vial and the vapor space above the mixture is immediately tested for H_2S and HCN. If both tests are negative, several more drops of sample and acid solution are added and the test is repeated. The detector tubes may be reused several times if the tests continue negative. Due to the high toxicity of H_2S and HCN, precautions will be taken to avoid breathing any gases which may evolve from the sample. The detection limit for cyanide using a Draeger tube is 2 to 15 milligrams per cubic meter (mg/m^3) or equivalent to 6 to 45 mg of material in a sample, and for sulfide is one to 200 ppm or equivalent to 1.3 to 250 mg of material in a sample.

3.4.1.4 Organic Liquid Testing

a. The headspace above the sample will be tested for volatile organics with an organic vapor monitor (PID instrument, i.e. HNU). Alternatively, a FID instrument (i.e., Foxboro OVA) will be used with a combustible gas meter to determine organic vapors. Headspace readings will be noted for informational purposes.

b. Beilstein's Test - The second flame test is Beilstein's copper wire halogen test. A small coil will be bent in the end of a length of copper wire and held over the peak of the flame until any green flame disappears. Do not allow the wire to melt in the flame. Allow the wire to cool, then dip it in a small amount of the waste and hold it in the edge of the flame again. A green flame indicates the presence of a halogen (chloride, bromine, fluorine, iodine). If the test is to be repeated, the wire must be thoroughly cooled before dipping the coil back into the liquid. The detection limit for the Beilstein's test is 0.1 percent. Very volatile liquids may have a tendency to evaporate in the flame before decomposition can occur, thus causing a negative result. Several compounds have also been found to cause a green flame (e.g. organic acids, copper cyanide, urea, and quinaline and pyridine derivatives).

c. The possible presence of organic oxidizers will be checked for by placing a drop of the waste on a strip of KI/starch paper. A purple stain will indicate the presence of an oxidizer.

d. Organic peroxides will be tested for with the peroxide test paper. After immersing the reagent portion of the strip in the sample for five seconds, the strip will be moistened by breathing several times on the reagent pad. Peroxides will be indicated by a blue stain, as in the inorganic liquid test.

e. A pH determination will be made after mixing 2 mL of the sample with 2 mL of distilled water. Determination of the pH of the water phase will be made with pH test paper.

3.4.1.5 Solids Testing

a. Color, texture, and approximate density of the waste and any other sample-specific preliminary information will be recorded.

b. An open flame ignitability test will be performed on a BB-sized portion of the waste and all observations recorded.

c. Reactivity: Another BB-sized portion of the sample will be added to a vial containing 10 mL of distilled water.

Reactions will be observed. If no violent reaction is observed, an additional amount of sample equivalent to about one cubic centimeter (cc) will be added to the water. The vial will be swirled to thoroughly mix the waste with the water.

d. The pH of the mixture will be determined. The oxidizer, peroxide, sulfide, and cyanide tests may be conducted on the waste/water mixture as in Inorganic Liquids Testing, above.

3.4.1.6 Preparation of Solutions for Tests

a. Buffer Solution: Dissolve 24.3 g $NaC_2H_3O_2 \bullet 3H_2O$ (sodium acetate trihydrate) or 14.6 g anhydrous $NaC_2H_3O_2$ in 40 mL distilled water.

Add 48 mL concentrated acetic acid and bring solution to 100 mL with distilled water.

b. Diphenylamine Solution: 1.0 g of diphenylamine in 50 mL methanol.

c. Sulfuric Acid: Four parts concentrated H_2SO_4 to one part water.

d. Sodium Hydroxide Solution: 0.1N sodium hydroxide solution (4.0 grams anhydrous NaOH in one liter of distilled water).

3.4.1.7 <u>PCB Screening</u>

All drummed waste determined to fall under the same waste classification will be screened for PCB contamination prior to compatibility testing. A ten sample composite will be prepared by collecting a split sample in the laboratory from the total volume collected. The composite sample will be screened for PCBs using SW-846 Method 8080. Should the composite sampling yield PCBs at a concentration greater than 5 ppm, two five drum composites samples will be screened for PCBs. If this second level of screening yields PCBs at a concentration greater than 10 ppm, individual samples from which the five composite sample was prepared, will be screened for PCBs.

3.4.2 Compatibility Testing and Consolidation

Drummed waste materials which are to be consolidated prior to disposal will be subjected to compatibility testing. The mixing of incompatible materials will be minimized by consolidating primarily materials which were determined to belong to the same waste class following the procedures in Section 3.4.1. The mixing of materials from the same waste class will prevent incompatible reactions from occurring. Where waste materials from different waste classes are considered for consolidation, the information obtained from the tests will be used in conjunction with the compatibility information contained in the U.S. EPA document "A Method For Determining the Compatibility of Hazardous Wastes", EPA-600/2-80-076, dated April 1980 for assessing the potential for incompatible reactions.

Compatibility testing for the purpose of consolidation will be performed using small quantities of the materials proposed for consolidation. Compatibility testing will typically be conducted for binary combinations by adding one component to the other and monitoring for resultant physical reactions that occur. The materials will be classified as incompatible when reaction consequences include any of the following[(1)]:

i) heat generated by chemical reaction;

ii) fire produced by extremely exothermic reactions;

(1) USEPA, "A Method for Determining the Compatibility of Hazardous Wastes", EPA-600/2-80-076, April 1980.

iii) generation of innocuous gases (i.e. N_2, CO_2, etc.) which can cause pressurization of closed containers potentially resulting in container rupture;

iv) generation of toxic gases (i.e. HCN, H_2S, etc.);

v) generation of flammable gases (i.e. H_2, C_2H_2, etc.);

vi) explosion due to extremely vigorous reactions or reactions producing sufficient heat to detonate unstable reactions or reaction products;

vii) violent polymerization resulting in the generation of extreme heat and sometimes toxic/flammable gases; and

viii) solubilization of toxic substances.

Compatibility testing of ternary combinations will not be attempted unless two of the materials have already been binary tested and the resulting compatible product is used for testing.

3.5 WASTE CONSOLIDATION

The waste compatibility data base will be used to determine which waste materials may be bulked on Site. The drum handling and consolidation operation will take place on Site in the area identified on Figure 3.5. Drum containers containing compatible wastes will be bulked at a bulking operation at which drums are crushed and the bulked wastes will be loaded into appropriate containers (i.e. 20 c.y. roll off boxes).

Dependant upon the quantities of waste to be bulked there may be one ore more bulking operations established to expedite the bulking of wastes into compatible groups. Bulked wastes will be stored pending waste characterization for incineration.

4.0 NON-INCINERABLE WASTE

All non-incinerable material shall be segregated and shall include empty drum carcasses, crushed drums, large rocks, concrete, metal, etc. This material shall be bulked into roll-off boxes (as required) for disposal on Site. This material shall be disposed of in a excavated pit located along the bottom of the slope of the southern side of the existing landfill. The location and disposal of this material will be subject to the approval of the U.S. EPA field representation.

All non-incinerable drums shall be crushed and/or shredded using a drum crusher. The drum crusher will be designed to provide total containment during crushing activities. The drum shredder shall be capable of handling more than one drum. Drums defined as empty by 40 CFR 261.7 and drums which are empty as a result of repackaging operations shall be crushed and/or shredded.

4.1 OVERPACK DRUMS

The overpack drums existing on Site shall be recycled for use during the excavation. Overpack drums existing in good physical condition at the end of the project shall be recovered and/or recycled for off-Site use.

SECTION 5

5.0 STAGING AND STORAGE PAD REMOVAL

Upon completion of excavation activities, the staging and storage area shall be dismantled using heavy excavation equipment. The staging and storage pad material shall be bulked into stockpiles for landfilling on Site. If heavy staining has occurred within the Staging Area the sand cover shall be sampled to determine the final disposal method (as per the Soil Characterization Work Plan).

SECTION 6

6.0 DEMOBILIZATION

Following excavation and incineration of all waste material, equipment will be demobilized from the Site. All equipment will be decontaminated prior to leaving the Site. The concrete pads and storage pad will be dismantled and placed as fill for the landfill capping program. The last item to be demobilized will be the on-Site incinerator.

The Site will be left in a clean and orderly fashion.

SECTION 7

7.0 SCHEDULE

The schedule to conduct the Source Removal and Disposal Program is outlined in Section 13 of the IWP and the RD/RA Work Plan.

The schedule presented in the RD/RA Work Plan provides an overall schedule for all RD/RA activities to be conducted pursuant to the SOW.

A

APPENDIX A

SAMPLING AND ANALYSIS PLAN

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LIST OF FIGURES

A.1 DRUM SAMPLING

A.1.1 DRUM SAMPLING HEALTH AND SAFETY GUIDELINES

Extreme hazards exist in the handling of drums containing unknown materials. Therefore drums will be opened as per 29 CFR §1910.120 (j).

Equipment needed to open drums should, whenever possible, be non-sparking (brass) and include, but not be limited to the following:

A.1.1.1 Drum Opening Equipment

- 2 bung wrenches (one straight and one bent)
- Medium and large screwdriver set
- Breaker bar
- 1/2-inch drive ratchet
- 1/2-inch drive speed handle
- 15/16-inch deep socket
- 12-inch crescent wrench
- Vice grip pliers
- Rubber mallet
- Pneumatic brass ram for remote drum piercing

A.1.1.2 Sampling Personal Protective Equipment

When drums are being opened and sampled, Level B personal protective equipment will be worn and will consist of the following:

- Open circuit positive pressure Self Contained Breathing Apparatus (SCBA) or Type C hoseline pressure/demand respirator with escape unit, with full face mask
- Two-piece, hooded, chemically resistant suit
- Chemical resistant inner gloves
- Chemical protective outer gloves
- Chemically protective outer boots with steel toe and shank
- Two-way radio communications (intrinsically safe)
- Hard hat
- Face Shield

A.1.1.3 Drum Opening Precautions

Drums will be moved with heavy equipment so that the drum is kept at a safe distance and shielded from personnel. Drums will be observed prior to opening to look for clues to the condition or contents of the drum. Observations include, but are not limited to:

- Is the drum under pressure or distended?
- Is the drum corroded?
- What material is the drum constructed of (steel, plastic, etc.)?

- Are there any markings or labels on the drum?

Any indications that manual opening of a drum might be dangerous to the handler will require opening by remote means. Otherwise, the drum will be opened by removing the lid or bung. Caution will always be taken to open slowly to allow release of pressure. Once the drum is successfully opened, the sampling personnel will obtain the sample and record observations. All direct contact with drum contents will be made with disposable sampling tools.

After the sample is taken, the drum lid or bung will be put on and the overpack lid replaced to prevent volatile emissions and rainwater infiltration.

A portable geigercounter will be used to screen any new drums placed in the staging area and prior to sampling the drum. An explosimeter (O_2/LEL meter) will also be used to monitor the staging area during sampling event. An HNU will be used to monitor volatiles during the drum opening, sampling and staging activities.

A.1.2 FIELD DATA COLLECTION

Sampling personnel will collect as much useful data about each drum as is possible. This data shall be collected in order to make drum handling and disposal decisions. Additionally, individual drum samples may be collected on an as required basis to aid in identifying additional PRPs.

The sample analysis requirements will be determined on an as required basis. The sampler will bring a Field Sampling Data Sheet (see Figure A.1) into the field for the sampling event. This data sheet will be in addition to the Field Excavation Data Sheet (see Figure A.2) generated when the drum is excavated and sent to the staging area. Data to be recorded on these sheets will include, but not be limited to the following:

Drum Observation Data

- Drum number
- Drum size (gallons)
- Drum material (steel, plastic, other)
- Drum lid (open head, close head, bung)
- Drum condition (good, bad) and Description
- Meter Readings
- Contents liquid/solid/sludge ratio
- Percent full
- If liquid, ease of pumping
- If solid, ease of emptying
- Label information
- Other comments
- Initials of observer
- Date of sampling
- Approximate ambient temperature
- Area of origin

FIELD SAMPLING DATA SHEET

METAMORA LANDFILL
DRUM FIELD OBSERVATIONS

Sample No. __________ Temperature: __________

Drum Size: (Please circle) 5 15 30 55 85 gallon

Type: Steel ( ) Plastic ( ) Other ( )

Lid: Open Head ( ) Closed Head ( )

Condition: Good ( ) Bad ( ) Description: ____________________

HNu : __________ Explosimeter: __________ Gieger: __________

Liquid/Solid Ratio: ______________

Percent (%) Full: 25% ( ) 50% ( ) 75% ( ) 100% ( )

If Liquid: Pumpable ( ) Not Pumpable ( )

If Solid: Easily Emptied ( ) Not Easily Emptied ( )

Comments:

____

____

Field Observer: ____________________ Date: ______________

Time: __________

figure A.1
FIELD SAMPLING DATA SHEET
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-7/9/91-16-TPG

FIELD EXCAVATION DATA SHEET

METAMORA LANDFILL
DRUM FIELD OBSERVATIONS

Drum No. __________ Temperature: __________

Drum Size: (Please circle) 5 15 30 55 85 gallon

Type: Steel ( ) Plastic ( ) Other ( )

Lid: Open Head ( ) Closed Head ( )

Condition: Good ( ) Bad ( ) Description: ____________________

HNu : __________ Explosimeter: __________ Gieger: __________

Labels: Description ____

____

____

Comments:

____

____

Field Observer: ______________________ Date: ______________

Time: ______________

figure A.2
FIELD EXCAVATION DATA SHEET
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-7/9/91-16-TPG

When the sample has been taken and the lid tightly replaced, the sample container will be thoroughly wiped off. A copy of the Field Sampling Data Sheet is then secured to the container with a rubber band. The containers are then returned to the sample box in numerical order. Not only can the sample be identified by the number written directly on the jar, but also by the attached data sheet.

A.1.3 GUIDELINE FOR OBTAINING REPRESENTATIVE SAMPLE

A sample will be collected from each drum which is representative of the complete drum contents. To accomplish acquisition of a representative sample, various sampling devices may be used and include, but are not limited to the following:

Drum Sampling Tools

- Disposable plastic coliwasa
- Disposable plastic trier
- Hammer and chisel
- Soil auger
- Dipper
- Glass thief
- Trowel, spoon or trier

Disposable tools are preferable because they eliminate the need for tool decontamination. Samplers will take care not to cause cross-contamination between samples. This will be accomplished by frequent outer glove changing, use of sterile disposable sampling tools, decontamination of non-disposable sampling tools and leaving each sample container(s) open for a minimum amount of time. Care should be taken to avoid touching the inside of the jar or lid and to always lay the lid upside down while it is removed.

Sampling shall be conducted in accordance with accepted scientific principles.

A.1.4 DRUM SAMPLE TRACKING GUIDELINES

Each drum will be assigned a unique five (5) digit number (e.g. MD-00001) for control purposes. A paint stick capable of withstanding weather will be used to mark the overpack or drum in three places.

The sample container is marked with the prefix of MD (Metamora Drum) and the corresponding five (5) digit number (MD-00001, MD-00002, etc.). The number will be written with a permanent black marker on both the lid and the jar. The Field Sampling Data Sheets will be completed and a copy is affixed to the jar with a rubberband. The sample will then be returned to the sample jar box in numerical order.

When the sampling event is complete, the sampling personnel will bring the sample to the Contaminant Reduction Zone and proceed to doff their personal protective equipment (PPE).

A Chain of Custody form (see Figure A.3) is filled out by the sampler. The form is then signed and filed when the samples are relinquished to laboratory personnel.

The chemist who receives the samples from the sampler will be responsible for entering drum numbers and the field observation data into the Drum Log section of the Sample Receiving Log (see Figure A.4).

CRA
CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name):

CHAIN OF CUSTODY RECORD

PROJECT Nº:

PROJECT NAME:

SAMPLER'S SIGNATURE ______________________ (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	SAMPLE LOCATION	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
				TOTAL NUMBER OF CONTAINERS			

ANTICIPATED CHEMICAL HAZARDS:

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
1 ______ (SIGN)		2 ______ (SIGN)
RELINQUISHED BY: 2 ______ (SIGN)	DATE/TIME	RECEIVED BY: 3 ______ (SIGN)
RELINQUISHED BY: 3 ______ (SIGN)	DATE/TIME	RECEIVED BY: 4 ______ (SIGN)
RELINQUISHED BY: 4 ______ (SIGN)	DATE/TIME	RECEIVED BY: 5 ______ (SIGN)
RELINQUISHED BY: 5 ______ (SIGN)	DATE/TIME	RECEIVED BY: 6 ______ (SIGN)
RELINQUISHED BY: 6 ______ (SIGN)	DATE/TIME	RECEIVED BY: 7 ______ (SIGN)

METHOD OF SHIPMENT:	SHIPPED BY:	RECEIVED FOR LABORATORY BY: (SIGN) ______	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN) ______	DATE/TIME

WHITE — CRA OFFICE COPY
YELLOW — RECEIVING LABORATORY COPY
PINK — CRA LABORATORY COPY
GOLDEN ROD — SHIPPERS

figure A.3

SAMPLE CHAIN-OF-CUSTODY
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-25/06/91-16-0

SAMPLE RECEIVING LOG

Sample Number	PCB Con.	Composited With Numbers	Date Sampled	Sampler Initials	No. of Yards	Comments
MS-001	<LOQ	MS-002 MS-003 MS-004 MS-005	6-2-91	TPG	200 yd3	
MS-002	<LOQ	MS-001 MS-003 MS-004 MS-005	6-2-91	TPG	200 yd3	
MS-003	<LOQ	MS-001 MS-002 MS-004 MS-005	6-2-91	TPG	200 yd3	

figure A.4
SAMPLE RECEIVING LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-6/27/91-16-TPG

A.2 DRUM ANALYSIS

A.2.1 FINGERPRINTING DRUM SAMPLES

The fingerprinting methods outlined below are the screening procedures for the basic physical properties of hazardous waste which will be used for all waste samples collected. The sampling analyses are discussed in the QAPP (see Appendix B).

These methods will be used by the analyst to characterize samples into compatible waste streams. The samples will be characterized using one of the classes and will be marked with the following abbreviations on the sample container as well as in the Fingerprint Log (see Figure A.5).

Fingerprint Classes

- IS	Inert Solid
- IL	Inert Liquid
- FS	Flammable Solid
- FL	Flammable Liquid
- AS	Acid Solid
- AL	Acid Liquid
- BS	Basic Solid
- BL	Basic Liquid
- CNS	Cyanide Solid
- CNL	Cyanide Liquid
- SS	Sulfide Solid
- SL	Sulfide Liquid
- WR	Water Reactive

FINGERPRINT LOG

Date	Sample Number	Fingerprint Class	Physical Description	%L/ %S	Rad	Flash	H2O	pH	CN-	S-	Comments	Initials
6-28-91	MD0001	IS	blk tar-like	0/100	—	>200	insol	N/A	-	-		TPG
6-28-91	MD0002	FL	brn/clr	100/0	—	<70/>200	insol/so	NA/7	-	-		TPG
6-28-91	MD0003	CNS	wht powder	0/100	—	>200	insol	12	+	-		TPG
6-28-91	MD0004	BL	blue	100/0	—	>200	sol	12	-	-		TPG
6-28-91	MS0001	IS	brn	0/100	—	>200	partly sol	8	-	-		TPG
6-28-91	MS0002	IS	yell	100/0	—	>200	sol	12	-	-		TPG

figure A.5
FINGERPRINT LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-6/27/91-16-TPG

A.2.2 COMPOSITING DRUM SAMPLES FOR LABORATORY ANALYSIS (if required)

Composite drum samples may be required to determine the RCRA/TSCA characteristics (i.e. less than or greater than 50 ppm PCBs) for incineration. The exact requirements for RCRA/TSCA characterization shall be defined through the Trial Burn process.

Compatible drum samples will be composited into groups of ten and entered into a Drum Composite Log (see Figure A.6). The composite sample will be prepared by putting equal portions of each of the ten (10) drum samples into a quart jar. The composite jar will be labeled and transferred to either the on- or off-Site laboratory for RCRA or TSCA characterization analysis (if required). Each composite sample shall be numbered with a unique three (3) digit number with a prefix of MDC, Metamora Drum Composite (MDC-001, MDC-002, etc.). A Chain of Custody will be filled out and one copy will accompany the samples and the other copy will be kept in an on-Site file.

Samples for VOC analysis (if required) will not be composited.

DRUM COMPOSITE LOG

Date Submitted to Lab	Date Analysis Received	Drum Composite Number	Individual Sample No.	Fingerprint Class	PCB Conc.	Comments	Initials
6-28-91	6-30-91	MDC-001	MD-0001	IS	< 4 ppm		TPG
		MDC-002	MD-0002	IS	< 4 ppm		TPG
		MDC-003	MD-0003	IS	< 4 ppm		TPG
6-28-91	6-30-91	MDC-004	MD-0004	IS	< 4 ppm		TPG

figure A.6
DRUM COMPOSITE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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A.2.3 TRACKING SAMPLES AND ANALYSIS

Waste samples which require characterization for TSCA incineration requirements may be composited (into groups of ten) for analysis. The date of sample submittal and the date of analysis receipt will be recorded in the Drum Composite Log. When the analysis is received, the Drum Composite Log will be completed. If the PCB concentration of the composite sample.is greater than 5 ppm, then the drum samples shall be recomposited into composite samples representing five drums and re-analyzed. The purpose of this sampling (if required) is to determine which drummed waste has PCB concentrations in excess of 50 ppm and thus must be treated as a TSCA waste material for incineration purposes.

Upon final characterization (both compatibility and RCRA RCRA/TSCA analysis), drum repackaging will be initiated and the Drum Repackaging and Storage Log will be filled out (see Figure A.7).

All drums will be examined for physical evidence of PRP identity. Drums which exhibit physical PRP information shall be photographed in-place prior to removal of the evidence. Drums which display physical PRP evidence may be chemically sampled for PRP identification purposes. Appropriate notations shall be recorded on Figures A.1 and A.2 to note the presence of PRP information. PRP information shall be managed as presented in the DMP (see Appendix F).

DRUM REPACKAGE AND STORAGE LOG

Date Stored	Drum Sample Number	No. of Drums In Comp.	Roll-Off Or Repack Number	Net Weight	From Area and Storage Location
6-28-91	MDC-001	MD0001	Roll off 5	37000 lb	4/A-4
		MD0005			
		MD0006			
		MD0007			
		MD0009			
		MD0012			
		MD0015			
6-28-91	MDC-001	MD0020	Roll off 5	37000 lb	4/A-4

figure A.7
DRUM REPACKAGE AND STORAGE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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A.3 SOIL SAMPLING

A.3.1 SOIL SAMPLING, HEALTH AND SAFETY GUIDELINES

Potential hazards exist when sampling contaminated soils. The soil piles to be sampled will be in the staging area. Real-time work face air monitoring will be conducted in this area during all sampling activities (see Air Monitoring Plan in Appendix G). While sampling, Level B respiratory protection will be used. If vapor levels do not exceed the action levels defined in the Air Monitoring Plan, Level C PPE will be used during each soil sampling event.

Level B soil sampling PPE shall at a minimum include (if required):

- Open circuit positive pressure SCBA or Type "C" hoseline pressure/demand respirator with escape unit
- Chemical resistant suit
- Chemical resistant inner gloves
- Chemical protective outer gloves
- Chemically protective outer boots with steel toe and shank
- Two-way radio communication (intrinsically safe)
- Hard hat

All direct contact with contaminated soil will be made with disposable precleaned sampling tools or decontaminated reusable tools.

A.3.2 GUIDELINES FOR OBTAINING REPRESENTATIVE SAMPLES

Soil samples will be collected to represent the soil stockpiles as accurately as possible. A stainless steel soil auger will be utilized to obtain vertical cross-sections of the pile. Up to seven grab samples (one at top, three at the halfway point and three at base) will be collected and placed in a precleaned stainless steel bowl. A sample for VOC analysis (if required) will be immediately placed into the appropriate sample containers prior to compositing of the remaining soil. The remaining soil will be thoroughly homogenized within the stainless steel bowl. A one-quart sample will be prepared from this composite and will be labeled so as to identify the pile from which it came. Additional details regarding soil sampling protocols and procedures are presented in the Soil Characterization Work Plan (under separate cover).

The sampler will take care to prevent cross-contamination between samples. This will be accomplished by frequent outer glove changing, use of precleaned disposable sampling tools, decontamination of non-disposable sampling tools, leaving sample container(s) open for a minimum amount of time and avoiding contact with the inside of the sample jar/lid.

Decontamination of Non-Disposable Sampling Tools:

1. Any gross contamination will be wiped off the implement with a brush.

2. The implement will be washed using laboratory grade non-phosphate detergent followed by a deionized water rinse.
3. The implements will be set out to air dry on a clean surface in a contaminant-free area.
4. When implements are dry, they will be placed in a fresh plastic bag or wrapped in aluminum foil.

A.3.3 SOIL SAMPLE TRACKING GUIDELINES

A soil sample tracking system will be followed to accurately and efficiently cross-reference the soil stockpiles, sample and characterization results.

A.3.3.1 Soil Sampling Procedure

1. The Engineer's representative will direct contractor personnel which soils to stockpile on the staging pad. The soil will be aggregated in piles of approximately 200 cubic yard. Soils with greater than 500 ppm PCBs will be stockpiled separate from soil with less than 500 ppm PCBs.

2. Each stockpile will be given a unique three digit number with a prefix of MS (Metamora soil) and will be marked with a numbered stake.

3. Each stockpile will be sampled with a steel auger by compositing up to seven random two-foot vertical cross-sectional grab samples (one at top, three at mid-point, and three at base).

4. A sample for VOC analysis (if required) will be collected directly into the appropriate containers prior to compositing the remaining soil.

5. The remaining soil will be thoroughly homogenized in a precleaned stainless steel bowl.

6. The homogenized sample will be placed in a one-quart sample bottle which will be labeled with the unique three-digit number and a sketch of the location of the sampled piles on the staging pad will be made.

7. When the sampling event is complete, the sampling personnel will bring the sample to the Contaminant Reduction Zone and proceed to doff their personal protective equipment.

8. The Chain of Custody form will be filled out by the sampler . The completed Chain of Custody form will be signed by the laboratory and filed.

9. The chemist who receives the samples from the sampler will be responsible for entering the soil sample number and field location data into the Soil Log section of the Sample Receiving Log.

A.4 SOIL ANALYSIS

All soil samples collected in accordance with the methods described in Section A.3 shall be analyzed following the protocols and procedures outlined in the QAPP (see Appendix B).

A.4.1 FINGERPRINTING AND SOIL SAMPLES AND PCB ANALYSIS

The following fingerprint classes will be used to characterize the soil samples into compatible soil classes:

Soil Fingerprint Classes

- IS	Inert Solid
- FS	Flammable Solid
- AS	Acid Solid
- BS	Basic Solid
- CNS	Cyanide Solid
- SS	Sulfide Solid

PCB analysis for RCRA/TSCA characterization will be completed on composite samples collected from five soil stock piles (i.e. 1000 yd^3). Prior to removing the soil from the excavation face, soil samples will be subjected to a PCB screening test to determine if the soil should be moved to the staging area. To the extent possible (i.e. soil containing less than 500 ppm PCBs), soil will remain in the excavation area (i.e. Drum Area 1) to be characterized for disposal pursuant to the Soil Characterization Work Plan (SCWP).

After the sample has been analyzed, the chromatograph will be interpreted and the PCB concentration determined. The analyst will then fill out the "PCB Conc" column on the Soil Receiving Log (see Figure A.8).

A.4.2 COMPOSITING SOIL SAMPLES FOR ANALYSIS

The composite sample will be prepared by segregating equal portions of each of the five samples into a one-quart jar. The composite jar will be labeled and numbered with a unique three (3) digit number [with a prefix of MSC, Metamora Soil Composite (MSC-001, MSC-002, ETC.)] (see Soil Composite Log, Figure A.9).

The composite sample will then be packaged for shipment to the on- or off-Site laboratory for RCRA/TSCA characterization analysis (i.e. to determine if the soil contains less or greater than 50 ppm PCBs). The sample may require further splitting to determine the PCB concentration on each pile if a result of greater than 10 ppm PCBs is obtained on the five stockpile composites. Other analyses that may be requested are outlined in the Soil Characterization Work Plan. A Chain of Custody form is filled out. One (1) copy accompanies the samples, the other is kept in an on-Site file.

GC RUN LOG

Date	Auto Sample Number	Sample Number	Weight	Dilution	Arochlor	PCB Conc.	Comments	Initials
6-2-91	1	MS-001	10.0 g	1:10	1242	<LOQ		TPG
6-2-91	2	MS-002	10.0 g	1:10	1242	<LOQ		TPG
[illegible]	3	MS-003	10.0 g	1:10	1242	<LOQ		TPG

figure A.8
GC RUN LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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SOIL COMPOSITE LOG

Date Submitted	Date Received	Soil Composite Number	Individual 200yd3 Sample No.	Fingerprint Class	PCB Conc.	Comments	Initals
5-12-91	5-13-91	MSC-001	MS-001	IS	BDC		TPG
5-12-91	5-13-91	MSC-002	MS-002	IS	BDC		TPG
5-12-91	5-13-91	MSC-003	MS-003	IS	BDC		TPG

figure A.9
SOIL COMPOSITE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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3298-6/27/91-16-91

A.4.3 TRACKING SOIL SAMPLE AND ANALYSIS

The date of sample submittal and the date of receipt will be recorded in the Soil Composite Log. When the laboratory report is received, the Contractor's Waste Profile Sheet will be completed.

Soil repackaging (if required) can be initiated at this time and the Soil Repackaging and Storage Log filled out (Figure A.10).

SOIL REPACKAGING AND STORAGE LOG

Date Stored	Soil Comp. Sample Number	Number of soil sample 200yd3	Roll-Off Or Repack Number	Net Weight	Location
6-28-91	MSC-001	MS-001	Roll off 2	34000 lb	4/A-5
		MS-002			
		003			
	MSC-001	004	Roll off 2	34000 lb	
	MSC-002	005	Roll off 2	34000 lb	
		006			
		007			
6-28-91	MSC-002	008	Roll off 2	34000 lb	4/A-5

figure A.10
SOIL REPACKAGING AND STORAGE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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3298-7/9/91-16-TPG

A.5 WATER SAMPLING

A.5.1 GUIDELINES FOR OBTAINING REPRESENTATIVE SAMPLES

When the Contractor's wastewater tank becomes full a representative sample of the wastewater will be collected to evaluate disposal options. In the event that layers occur within the tank, a composite sample will be collected from the bottom, middle and top of the tank. The wastewater sample will be collected by using a bacon bomb sampler. After each sample is taken, the stainless steel sampler will be decontaminated to prevent cross-contamination.

Water samples shall be collected in accordance with sound scientific principles. The water samples shall be analyzed in accordance with the methods specified in the QAPP (see Appendix B).

Decontamination of Bacon Bomb

1. Initially the sampler will be washed with laboratory grade non-phosphate detergent followed by a deionized water rinse.
2. The sampler will then be set out to air dry on clean towels in a contaminant-free area.

A.5.3 WATER SAMPLE TRACKING GUIDELINES

All wastewater samples will be tracked using a Water Sample Log and Water Transfer Log (Figures A.11 and A.12).

A.5.4 WATER ANALYSIS

All analysis for wastewater collected from the decontamination area and staging area sumps will be completed at an approved contract laboratory (either on or off Site). The analytes that will be quantified will be those required by the disposal facility for approval. When the analysis is complete, the results will be submitted to the disposal facility. Wastewater will only be shipped off Site to U.S. EPA approved facilities.

WATER SAMPLE LOG

Date Submitted	Date Received	Sample Number	Tank Number	Comments	Initials
6-23-91	6-28-91	MW-001	Area4 Frac Tank	Batch 1	TPG
6-24-91	6-28-91	MW-002	Area 4 Frac Tank	Batch 2	TPG
6-25-91	6-30-91	MW-003	Lab Waste Tank	Batch1	TPG

figure A.11
WATER SAMPLE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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3298-6/27/91-16-TPG

WATER TRANSFER LOG

Date Transfer	Sample Number	Transferred From (Tank #)	Transferred To	Disposal Facility	Initials
7-12-90	MW-001	Area 4 Frac Tank Batch 1	Tanker 701		TPG
7-12-90	MW-002	Area 4 Frac Tank Batch 2	Tanker 401		TPG
7-12-90	MW-003	Lab Waste Tank Batch 1	Tanker 404		TPG

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figure A.12
WATER TRANSFER LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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APPENDIX B

SAMPLING AND ANALYTICAL
QUALITY ASSURANCE PROJECT PLAN

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- FIELD SAMPLING DATA SHEET
- CHAIN OF CUSTODY
- SAMPLE RECEIVING LOG
- FINGERPRINT LOG
- DRUM COMPOSITE LOG
- DRUM REPACKAGE AND STORAGE LOG
- SOIL PCB PREPARATION LOG
- SOIL REPACKAGING AND STORAGE LOG
- WATER SAMPLE LOG
- WATER TRANSFER LOG
- INSTRUMENT CALIBRATION LOG
- GC RUN LOG
- SOIL COMPOSITE LOG

B.1 PROJECT DESCRIPTION

B.1.1 INTRODUCTION

This section includes the project organization/ responsibilities and the procedures/requirements for the sampling and analytical testing to be completed by the Remedial Action (RA) contractor during the Metamora Landfill Source Removal and Disposal Program.

This Quality Assurance Project Plan (QAPP) has been prepared exclusively for the U.S. EPA for specific application during the Metamora Landfill Source Removal and Disposal Program in accordance with generally accepted engineering practices and approved analytical methodology.

B.1.2 PURPOSE

The purpose of this QAPP is to provide the Contractor and its subcontractor (as appropriate) with a plan to assure that the sampling and analytical testing program for the Metamora Landfill Source Removal and Disposal Program provides reliable data of necessary quality.

A detailed Site specific QAPP shall be incorporated into the selected Contractors operational plans for the Site.

B.1.3 SCOPE OF QAPP

The requirements of this QAPP apply to the RA Contractor and its subcontractors (as appropriate) for the Metamora Landfill Source Removal and Disposal Program.

The content and format of the QAPP is based on "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" (QAMS-005/80) prepared by the U.S. EPA Office of Research and Development.

The QAPP provides guidance in the following areas:

- The responsibilities of the various staff functions in the project organization;
- The validation of field determinations and analytical results through preventive maintenance, calibration and analytical protocols;
- The identification and control of samples through sample tracking systems and chain-of-custody protocols;
- Recording and retaining documentation of the quality of samples, applied processes, equipment and results;
- Validation of data and documentation of their use in calculations; and
- The accuracy, appropriateness and consistency of calculations and evaluations.

B.1.4 PROJECT SUMMARY

This section summarizes the activities that will be completed as part of the Metamora Landfill Source Removal and Disposal Program. This information has been summarized from the Waste Excavation and Handling Plan (WEHP) and the Incineration Work Plan (IWP).

B.1.4.1 Project Objectives

The objective of the Metamora Landfill Source Removal Program is to complete the remediation at the Site as described in the SOW for the Site.

Completion of this objective involves the following Site activities:

- mobilize an on-Site incinerator;
- construct necessary facilities for the operation of the incinerator and completion of all on-Site activities;
- excavate drummed waste and chemically saturated soils;
- stage, characterize and incinerate/dispose of soils;
- stage and characterize drummed waste for consolidation and on-Site incineration;
- consolidate and/or process waste for on-Site incineration;
- on-Site incineration;

- maintain compliance with ARARs;
- ensure ash meets performance criteria;
- treatment and/or disposal of incinerator ash;
- landfill incinerator ash; and
- dismantle and demobilize from the Site.

B.1.4.2 Sampling Plan Summary

Sampling and testing for the Source Removal and Disposal Program will be for the purpose of characterizing the wastes for consolidation and incineration. Additionally, air samples will be collected and tested to monitor air quality.

Sampling activities are described in the SAP and the Air Monitoring Plan (AMP) and are summarized as follows:

- Real time monitoring will be completed in the excavation area using a total hydrocarbon monitor (e.g. PID/OVA) explosimeter (see AMP, Appendix G).
- Air monitoring will be routinely conducted at excavation perimeter utilizing a PID or OVA (see AMP, Appendix G).
- Time weighted average air sampling will be done at the Site perimeter using adsorption tubes (consistent with the AMP, Appendix G).
- Excavated wastes contained in drums and waste saturated soils will be staged and sampled.

- Contaminated water from the excavation and staging areas will be collected and sampled.
- Ash from the incinerator will be stockpiled and sampled.

B.1.4.3 Outputs

· The following is a list of the Contractor's plans and submittals to be completed for this Source Removal Program:

- Regulatory permits (as required);
- Health and Safety Plan;
- Certification of health and safety training for Site personnel;
- Evidence of participation in a medical monitoring program for Site personnel;
- Project schedules;
- Trial Burn Plan;
- Compliance Monitoring Plan;
- Ash Monitoring Plan;
- Operation and Maintenance Plan;
- Construction Quality Control Plan (CQCP); and
- Project record documents (manifests, drum logs, field summaries, etc.).

B.1.4.4 Project Schedule

The Metamora Source Removal and Disposal Program schedule is presented in Section 13 of the IWP. The IWP proposed the following schedule of project activities:

1. Submittal of Contractor's work plans, followed by U.S. EPA approval.

2. Mobilization including: Site preparation, utility installation, road improvements, earthwork required for the temporary staging facility, set-up of on-Site incineration facility, establishment of on-Site offices, and laboratories.

3. Construction of temporary staging area, concrete incinerator pad, buildings as required, and concrete decontamination pads.

4. Installation, shake down and trial burn of incinerator.

5. Startup incineration of stored drummed waste.

6. Renewed excavation of drums in Area 1, including sampling, characterizing, repackaging, and moving repacked material to a staging and storage areas.

7. Excavation of staging-area components for utilization as fill.

8. Consolidation of liquids and soils based on compatibility testing.

9. Decontamination of Site equipment/facilities.

10. Demobilization.

11. Closure of the temporary storage facility.

12. Closure of on-Site incineration facility.

B.2 PROJECT ORGANIZATION AND RESPONSIBILITIES

Figure B.1 presents the organizational structure for this project. The Contractor will be required to present the organizational structure for contractor specific QA/QC procedures. The Project Coordinator (Engineer) will oversee the project and will use information provided by the Quality Assurance Team (QAT) and the Contractor to determine whether work is in compliance with the contract specifications and the Quality Assurance/Quality Control (QA/QC) requirements. The Engineer may also retain outside services (i.e., licensed land surveyor, testing laboratories, etc.) as necessary to assist the QAT. Additionally, the Engineer will serve as the intermediary between the QAT and the Contractor's Quality Control Systems Manager (QCSM) for enforcement of project plans.

The QAT is responsible for the ongoing monitoring of project activities to help ensure conformance to the QAPP and contract specifications and to evaluate the effectiveness of the QAPP's requirements. The team has access to all personnel and subcontractors, as necessary, to resolve quality assurance problems.

The QAT will be comprised of: The Quality Assurance Officer (QAO), and the QA support staff [i.e., QA Health and Safety Officer, Field Manager (FM), Field Technicians]. The number of QA representatives on Site will vary depending upon QA activity needs. The responsibilities of each member of the QAT during various phases of this project are discussed in the work plan. Some of the duties of the QAT are summarized as follows:

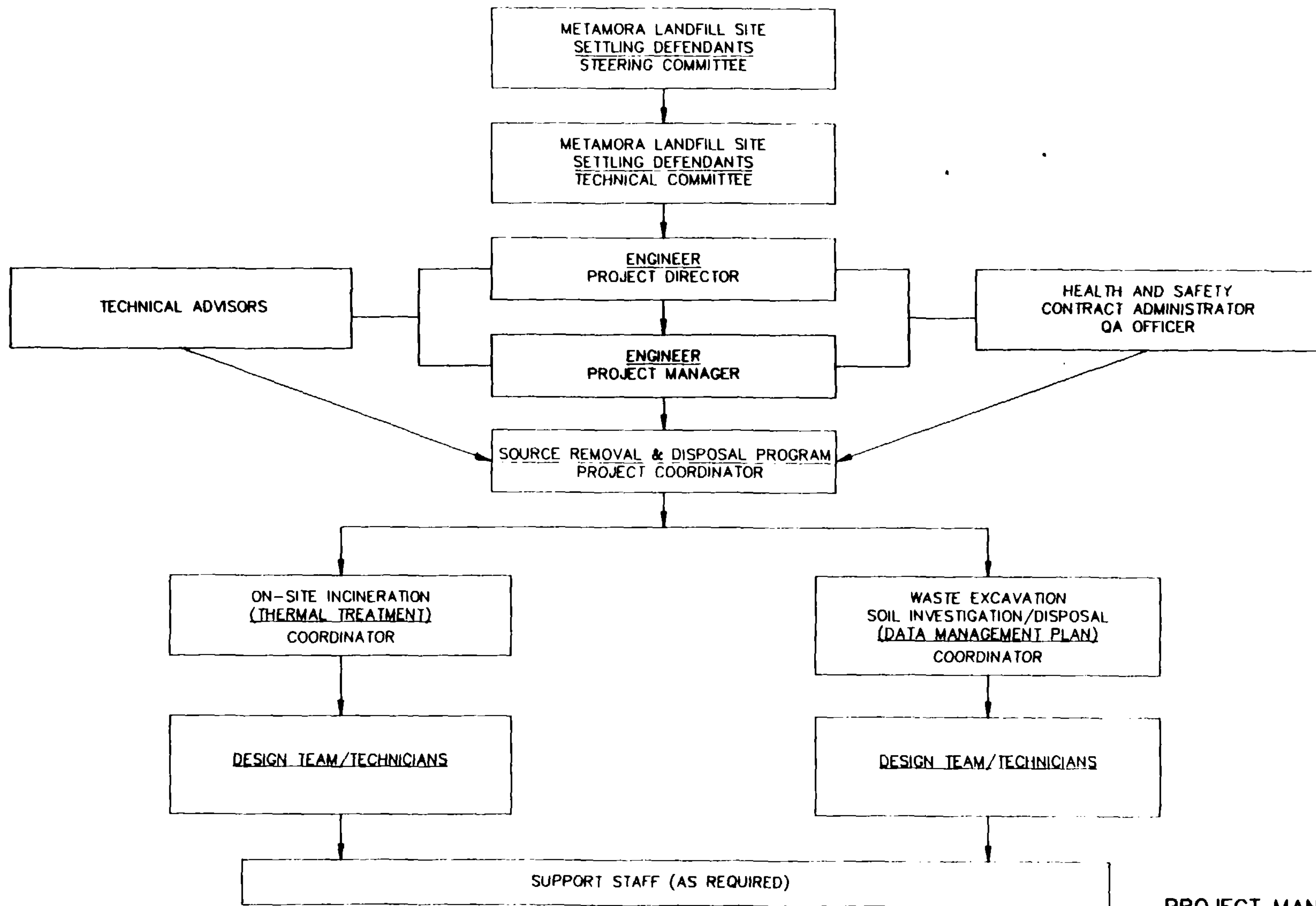

figure B.1

PROJECT MANAGEMENT
RD/RA PROJECT TEAM
METAMORA LANDFILL SITE
Lapeer County, Michigan

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- Monitor the correction of quality problems, and alert other task leaders where similar problems might occur;
- Observe and make appropriate tests to check the Contractor or Subcontractor's work;
- Participate in QA audits;
- Recommend changes, as appropriate, to the QAPP to monitor construction/remediation activities as work progresses; and
- Review proposed additions and changes to this QAPP.

In addition to the above, the QAC's duties will include:

- Implementing this QAPP;
- Review of test data;
- Providing QA reports to the QAT on the results of audits and the need for preventative or corrective actions;
- Providing the Engineer with recommendations for preventative and corrective actions; and
- Summarizing the quality of data obtained from the Contractor or Subcontractor.

As specified in the contract specifications, the Contractor shall have a QCSM within their organization at the work Site, who shall be responsible for overall management of the Quality Control (QC) program and have the authority to act in all QC matters for the RA contractor. Some of the QCSM's responsibilities are summarized below:

- Ensures that construction activities comply with the contract specifications and the CQCP;
- Coordinates and schedules all QC testing and audits;
- Implements procedures and timetables for bringing nonconforming work into compliance with contract requirements;
- Designates the QC staff and responsibilities and authorities of each person;
- Reviews and corrects, as needed, all Contractor's submittals prior to forwarding submittals to the Engineer;
- Certifies that all submittals are in compliance with the contract requirements; and
- Documents the quality and progress of all on-Site work.

The Contractor is responsible to retain or supply a laboratory either on or off Site (or combination) which is capable of completing all analytical support (dependent upon the Contractor's available support services and cost effectiveness considerations). An addendum to this QAPP shall be issued by the Contractor specifying the laboratory's qualifications and personnel.

The QCSM will have a staff to conduct all QC activities. The QC staff will include the Site Safety Officer (SSO) responsible for air monitoring and the health and safety of the on-Site personnel. The size of the QC staff will vary depending on work phase needs. The duties and responsibilities of this staff are specified in the HASP, SAP and the CQCP.

U.S. EPA Responsibilities

The U.S. EPA Region V Remedial Project Manager (RPM) (or representative) will be responsible for executing and directing all technical and administrative aspects of this project.

B.3 QUALITY ASSURANCE OBJECTIVES

B.3.1 GENERAL

The objective of the QAPP is to provide guidelines for maintaining the integrity of analytical results. In addition, the documentation of the collection and custody of the samples must be complete and traceable. To this end, samples from the project will be collected and analyzed according to the approved methodology. This section presents the goals for representativeness, precision, accuracy, completeness and comparability of the data generated.

The Data Quality Objectives (DQOs) for this project will be consistent with the Guidance Document entitled "Data Quality Objectives for Remedial Response Activities" (EPA/540/G-87/003; March 1987) and sound engineering practice.

B.3.2 REPRESENTATIVENESS

Samples will be collected and tested so that results are representative of the media (e.g., air, soil/waste, water, etc.) and the conditions being measured. Sampling protocols have been developed so that samples collected are representative of the media. Sample handling protocols (e.g., storage and transportation) developed through the Contractor's laboratory will be followed to protect the integrity of the samples.

Documentation will establish that protocols have been followed and sample identification and integrity have been maintained.

B.3.3 PRECISION

Precision is the most commonly used criterion for measuring the quality of an analytical method. It can be defined as the quantity that is a measure for the dispersion of results when the analytical procedure is repeated on one sample. This dispersion may arise from a variety of sources, but the scatter of the results will be around the expected actual value of the results if no consistent bias exists. This scatter can be described as a normal distribution. The statistic used to monitor precision is relative percent difference (RPD).

$$RPD = \left| \frac{[A-B] \times 200}{A + B} \right|$$

A = Measurement on sample

B = Duplicate measurement on sample

Acceptable RPD ranges for this project are presented in Table B.1.

TABLE B.1

QUALITY ASSURANCE OBJECTIVES
ACCURACY AND PRECISION

Parameter	*Accuracy (Fortification) % Recovery*	*Precision (Duplication) RPD (water/solid)*
Physical Appearance	N/A	N/A
Water Miscibility/Reactivity	N/A	N/A
pH (Meter)	N/A	+/- 0.1 Unit
pH (Screen)	N/A	N/A
Cyanide (Screen)	+/-	N/A
Sulfide (Screen)	+/-	+/-
Phenol (Screen)	+/-	+/-
Flash Point (Screen)	+/-	+/-
Radiation (Screen)	+/-	+/-
Oxidizer (Screen)	+/-	+/-
Total Solids	80/120	0-20
Viscosity	N/A	0-20
Specific Gravity	N/A	0-20
Choride (Total)	75-125	0-20/35
Bromide (Total)	75-125	0-20/35
Sulfur (Total)	75-125	0-20/35
Heating Value	80/120	0-20
Water Content	80/120	0-20
Cyanide (Total/Free)	75-125	0-20/35
Phenol (Total)	75-125	0-20/35
Sulfide (Total)	75-125	0-20/35
Fluoride (Total)	75-125	0-20/35
Acidity	75-125	0-20/35
Alkalinity	75-125	0-20/35
Metals (ICAP)	75-125	0-20/35
Arsenic (AAGF)	75-125	0-20/35
Mercury (AACV)	75-125	0-20/35
TCLP Metals	75-125	0-20/35
Solvent (Screen)	Method Specific	Method Specific
Polychlorinated Biphenyls (PCBs)	Method Specific	Method Specific
Volatile Organic Compounds (VOC)	Method Specific	Method Specific

B.3.4 ACCURACY

An accurate measurement implies one that conforms with the truth, free of bias. Although accuracy cannot be quantified, it is possible to measure properties that are related to the concept of accuracy. Percent recovery of a matrix spike is used to assess the accuracy of the method in the sample matrix tested:

$$\text{Percent Recovery} = \frac{(SS - US) \times 100}{S}$$

where:

SS	=	Amount measured in spiked sample
US	=	Amount measured in unspiked sample
S	=	Amount of spike added to sample

Acceptable percent recovery ranges for this project are presented in Table B.1

B.3.5 COMPLETENESS

Completeness is a measure of the amount of valid data obtained compared to the amount that was specified to be obtained under normal conditions. The amount of valid data specified is a function of the measurements required to accomplish project objectives. The total number of samples or measurements to be obtained has not been determined because the sampling requirements will not be apparent until field work is re-initiated. Thus, the extent of completeness must be reviewed on a relative basis for sample collection activities. Completeness is expected on the order of 75 percent.

B.3.6 COMPARABILITY

Comparability reflects both internal consistency of measurements made at the Site and reporting of results in units consistent with other organizations reporting similar data. Each value reported for a specific measurement should be similar to other values within the same data set and within other related data sets.

Comparability of data and measuring procedures must also be consistent. Thus, instruments must operate within their calibrated range and analytical methodologies must produce comparable results. Measurements compared to similar measurements which appear as "outliers" will be re-evaluated. Additionally, appropriate standard units for each measurement system will be utilized.

B.3.7 GENERAL QUALITY ASSURANCE OBJECTIVES

The overall quality assurance objectives for the Metamora Landfill Source Removal and Disposal Program are:

- to generate traceable, documented and consistent field and analytical data;
- to collect sufficient field samples to evaluate representativeness; and
- to analyze sufficient internal laboratory blanks, reference standards and matrix spike samples to allow an evaluation of analytical precision and accuracy.

B.4 SAMPLING PROCEDURES

B.4.1 GENERAL

The sampling procedures discussed in this section are summarized from the Sampling and Analysis Plan (SAP), Waste Excavation and Handling Plan (WEHP) and Air Monitoring Plans (AMP) for the Metamora Landfill Source Removal Program as amended.

An objective of this sampling and analytical testing program is to collect and test representative samples of the wastes so that the wastes can be categorized and consolidated for disposal in the on-Site incineration facility.

B.4.2 PREPARATION OF SAMPLE CONTAINERS

Air Samples

Time weighted average samples will be collected in accordance with U.S. EPA Method TO-1. Alternatively, U.S. EPA Method TO-14 may be utilized.

Waste Samples

The sample containers used for collection of waste samples (i.e. sludges, soils, water, etc.) will be new and clean (i.e. I-Chem

Series 300 or equivalent). Sample containers will not require cleaning (organic and metals preparation) as per the U.S. EPA-CLP program as the action levels for the compatibility testing that will be utilized for the waste materials are in the part per million range.

B.4.3 AIR SAMPLING

Air sampling will be completed in compliance with the Air Monitoring Plan prepared for the Site. This plan includes real-time air monitoring in the work area and at the Site perimeter using a total hydrocarbon monitor sensitive to 1.0 ppm, such as the Foxboro Organic Vapor Analyzer or the HNU Photoionizer, and an explosimeter. The PID/OVA and explosimeter will be utilized within the excavation as described in the AMP (see Appendix G). The PID/OVA will also routinely be utilized to determine organic vapor levels at the excavation perimeter. Additionally, time weighted average air samples will be collected at stations around the Site perimeter using U.S. EPA Method TO-1 "Method for the Determination of Volatile Organic Compounds in Ambient Air using Tenax Adsorption and Gas Chromatography/Mass Spectrometry (GC/MS)" which is presented in the Air Monitoring Plan. Real-time instrumentation for monitoring dust may also be used periodically if deemed necessary by the Site Safety Officer (SSO).

Time weighted average air samples, collected as described above, will be analyzed by a laboratory approved by the Engineer and U.S. EPA. Samples will be shipped the same day, if possible, using overnight services, or transported directly to the laboratory, if possible. The analytical data will be available from the laboratory for the examination of both the Engineer, the QAT and the U.S. EPA within forty-eight (48) hours from receipt of the samples at the laboratory.

To ensure that unpredictable sampling errors are controlled, data quality is verified and that monitoring data is defensible, the following measures will be implemented when using U.S. EPA Method TO-1:

1. Field blanks will be submitted for analysis with each sample set.
2. One duplicate sample will be submitted with each set.
3. Blind blanks will be submitted at a rate of once per week.
4. One spiked tenax tube per shipment of blank tenax cartridges.

Air monitoring instrumentation will be calibrated according to the manufacturers specifications and in accordance with Section B.6.0. Copies of the operational manuals for the HNU photoionization and the MSA explosimeter shall be available for use on Site.

B.4.4 WASTE SAMPLING

Based upon previous excavations, it is anticipated that the following four types of wastes will be generated during the Source Removal and Disposal Program:

- Containerized (Drummed) Wastes (i.e. sludges, liquids and solids);

- Contaminated Soils;
- Contaminated Water; and
- Non-Incinerable Wastes (debris, construction materials, etc.).

The procedures that will be utilized for sampling these media are summarized in this section. More detailed sampling procedures are discussed in the SAP (Appendix A) for this project.

B.4.4.1 Containerized Waste

Sampling

Drum sampling will follow the precautionary procedures and health and safety guidelines presented in the SAP and HASP for this project.

Once the drum has been properly opened, observations will be made of the drum and its contents. The following information will be recorded on the Field Excavation Data Sheet and the Field Sampling Data Sheet. The field observation data sheet presented in Attachment B.1 presents the following information:

- Drum number
- Drum capacity (gallons)
- Drum material (steel, plastic, other)
- Drum lid (open head, close head)

- Drum condition (good, bad)
- Contents liquid/solid ratio
- Percent full
- If liquid, ease of pumping
- If solid, ease of emptying
- Other comments
- Initials of observer
- Date of sampling

Once the above data has been recorded, a sample of the drum's contents will be collected. This sample will be collected so as to represent the contents of the drum. For example, if the drum contains ten percent (10%) solid, twenty percent (20%) non-aqueous liquid and seventy percent (70%) aqueous liquid, the sample should contain equivalent percentages of these various phases.

Sampling devices used to collect the sample may include, but are not limited to, the following:

- Disposable plastic coliwasa;
- Disposable plastic trier;
- Hammer and chisel (for solids attached to the drum);
- Soil auger;
- Dipper; and
- Glass thief.

Sample collection using the above implements will be done in accordance with the manufacturer's specifications. Care will be taken not to cross-contaminate between samples by using sterile disposable sampling tools (i.e. coliwasa and trier) which will be discarded after each use. Additionally, non-disposable sampling tools (i.e. soil auger, chisel and dipper) will be decontaminated between each sample collection.

. During sample collection, sample containers will be left open for a minimum amount of time. Additionally, when the lid is removed, care will be taken to avoid touching the inside of the lid and to lay the lid upside down when it is removed.

Sample Tracking

Following sampling, each drum will be assigned a unique five digit number (e.g., 00001, 00002, etc.) for control purposes. A paint stick, capable of withstanding weather, will be used to mark the overpack or drum in three places.

The sample container will be marked with the prefix MD (Metamora Drum) and the corresponding five digit number (e.g., MD-0000l, MD-00002, etc.). The sample number will be written with a permanent black marker on both the lid and the jar. The Field Sampling Data Sheet will be completed and affixed to the sample jar with a rubber band. The sample jar will be returned to the sample jar box in numerical order. When the sampling event is complete, the samples will be transported to the on-Site laboratory for initial screening. A chain-of-custody (see Attachment B.1) will be filled out by the sampler when the samples are relinquished to the on-Site laboratory personnel in accordance with Section B.5.0.

Fingerprinting

Upon receipt of the samples at the on-Site laboratory, the analyst will enter the drum numbers and the field observation data into the Drum Log Section of the Sample Receiving Log (see Attachment B.1). The analyst will then complete the "finger-printing" analysis of the samples for initial characterization of the wastes. The fingerprinting methods are summarized in Table B.2. The following fingerprint classes will be used to characterize the samples.

- IS Inert Solid
- IL Inert Liquid

- FS Flammable Solid
- FL Flammable Liquid

- AS Acid Solid
- AL Acid Liquid

- BS Basic Solid
- BL Basic Liquid

- CNS Cyanide Solid
- CNL Cyanide Liquid

- SS Sulfide Solid
- SL Sulfide Liquid

- WR Water Reactive

The above appropriate abbreviations will be marked on the sample container and on the Fingerprint Log (see Attachment B.1).

TABLE B.2

FINGERPRINTING ON SITE

	Method Code	*Method*
Physical Appearance	2	D4979-89
Radioactive Screen	4	
Flash Point Screen	2	D4982-89
Water Miscibility	2	D4843-88
pH Screen	2	D4980-89
Cyanide Screen	2	D5049-90
Sulfide Screen	2	D4978-89

SOIL PCB ON SITE

PCB	1	8080

ADDITIONAL COMPOUNDS

BTU	2	D240
Chloride (Total)	3	325
Bromide (Total)	3	320
Sulfide (Total)	3	376
% Ash	2	D482-80
% H20	2	E203
Specific Gravity	2	C854, D1298, D5057-90
Viscosity	2	D2196—81
Metals (Ag, Ba, Cd, Cr, Cu, Fe, Hg, Pb, Zn, Na, K)	1	6010
Arsenic	1	7060
Selenium	1	7740

1. SW-846 1987, Third Edition
2. ASTM Annual Book of Standards, 1990
3. Methods for Chemical Analysis of Water and Wastes, (EPA-600/4-79-020 revised March 1983)
4. Geiger counter - use standards to confirm calibration

Compositing of Drum Samples

The drums samples will be composited by fingerprint class in groups of 10 and entered into a Drum Composite Log (see Attachment B.1). The composite sample will be collected by placing equal portions of each of the 10 drum samples into a quart jar. The composite jar will be labeled and numbered with a unique three (3) digit number with a prefix of MDC, Metamora Drum Composite (e.g., MDC-001, MDC-002, etc.).

The composite sample will then be delivered to the on-Site laboratory facility. A chain-of-custody will again be filled out in accordance with Section B.5. One copy accompanies the samples and the other copy is kept in an on-Site file.

In the Drum Composite Log, the date of sample submittal and the date of analysis receipt will be recorded. When samples are received at the on-Site laboratory, the Drum Composite Log will be referenced and completed. If the PCB concentration for a composite sample is above 5 ppm, then the drum samples from which it came will be recomposited in groups of five and resubmitted to the laboratory. A flow chart for drum characterization is presented on Figure B.2. When final PCB concentrations are established, the complete disposal analysis will be requested and completed.

When the laboratory report is received it will be utilized to determine consolidation and incineration requirements. Drum

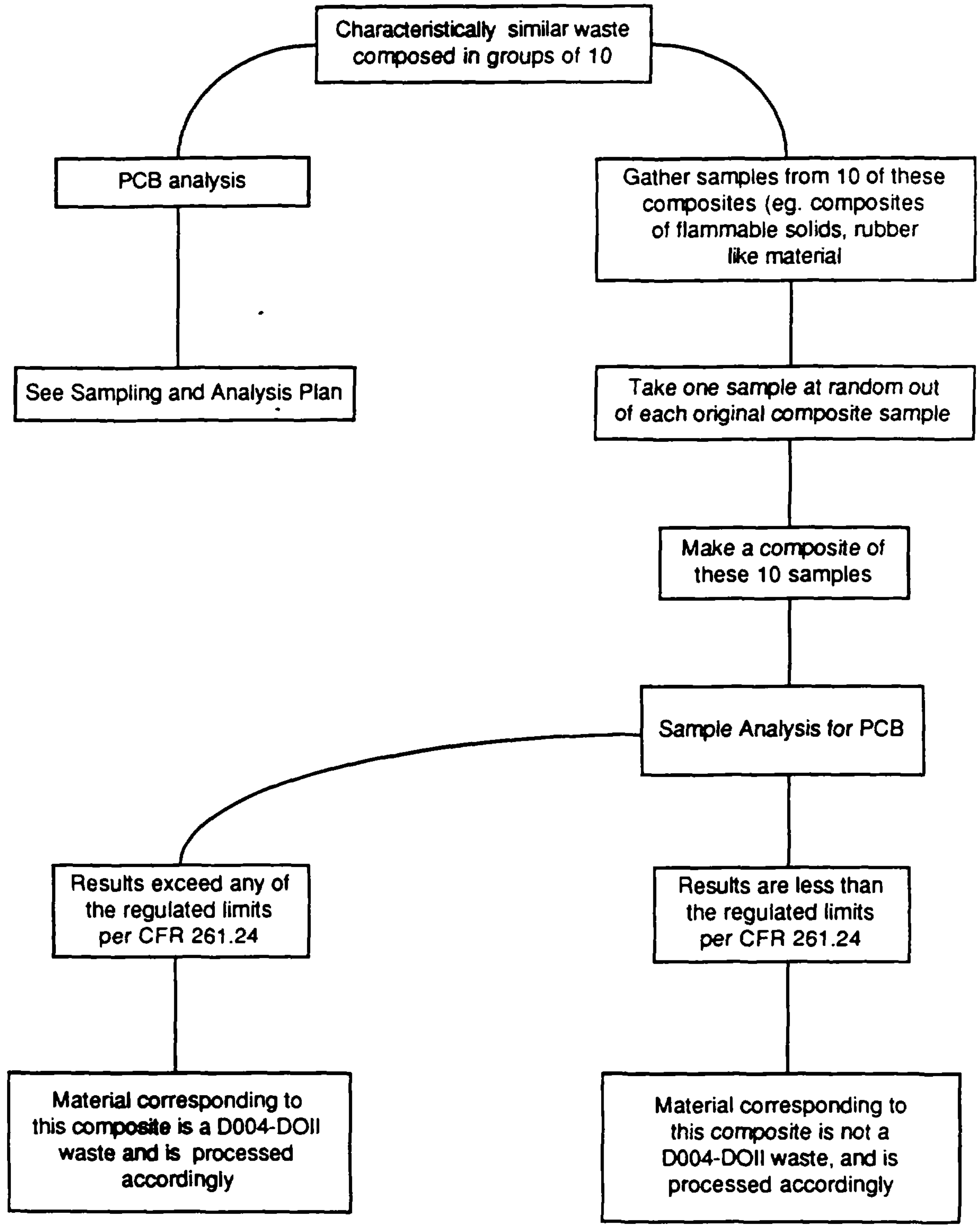

figure B.2

DRUM CHARACTERIZATION FLOW CHART
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298-6/27/91-16-TPG

repackaging will then be initiated and the Drum Repackaging and Storage Log filled out (see Attachment B.1).

B.4.4.2 Contaminated Soils

Sampling

All soil will be handled in accordance with the Soil Characterization Work Plan (SCWP). In summary, grossly contaminated soils (visually contaminated containing mobile non-aqueous phase chemicals) will be incinerated on Site. Soils which appear to be clean (i.e. not visually contaminated with liquid waste) will be staged and characterized according to the SCWP.

The intent of the soil sample collection will be to obtain a representative sample of the soil pile being evaluated. To accomplish this objective, a stainless steel soil auger will be used to obtain vertical cross-sections of the pile. Seven grabs will be collected, one from the top, three from height and three from the bottom and placed into a bucket lined with a clean and new garbage bag liner. Samples for VOC analysis will not be composited. The remaining soil will then be composited (mixed) together. A soil composite log will be maintained as presented in Attachment B.1. A one-quart sample will be collected from the composite material and the sample jar labeled as to identify the soil pile from which it came. As discussed in Section B.4.4.1, sampling personnel will take care not to cross-contaminate between samples.

The decontamination of non-disposable sampling tools will be as follows:

1. Gross contamination will be wiped off the sampling tool with a brush.
2. The sampling tools will be washed in two succeeding basins of water with laboratory grade non-phosphate detergent.
3. The sampling tools will be rinsed in a final basin of deionized water.
4. The sampling tools will be set out to dry on clean towels in a contaminant-free area.
5. When the sampling tools are dry, they will be placed in a clean and new garbage bag or wrapped in aluminum foil.

Additional details regarding soil sampling and equipment decontamination is provided in the SAP (see Appendix A).

Staging and Tracking

The Engineer's on-Site representative will designate which soils are to be considered waste, based on visual observations, degree of chemical saturation and field PCB screen testing. The contaminated soils will be piled on the staging pad or placed in a roll-off box should the soils be saturated with non-aqueous phase liquids. The size of each pile will be a function of the incineration facility requirements and operational considerations (staging area size); however, it is anticipated that each soil pile will be approximately 200 cubic yards (yd^3). Each stockpile will be given a unique three (3) digit number (i.e. 001, 002, etc.) with a prefix of MS

(Metamora Soil) and will be marked with a numbered stake. Once a sample has been collected from the soil pile it will be labeled with the corresponding pile number. Additionally, a sketch of the staging pad showing the location of the soil pile from which the sample was collected will be made and kept with the sample documentation. The Contractor will also maintain a photographic record of the soil pile staging activities (as per the DMP, Appendix F). The chain-of-custody form will be filled out and sample custody procedures will be followed in accordance with Section B.5. The samples will be transported to the on-Site laboratory for fingerprinting following completion of the sampling event.

B.4.4.3 Contaminated Water

Sampling

Potentially contaminated water collected in the sump pits (i.e. decontamination pad, staging pad) and as surface run-off from contaminated areas will be stored in an on-Site tanks(s) or tank truck. Safety guidelines discussed in the SAP and the HASP will be followed during sampling of the tank. The tank will be sampled using a stainless steel "Bacon Bomb" sampler once the tank is at or near capacity. Sampling will be done in accordance with the manufacturer's specifications. The sampling equipment will be decontaminated between collection of samples using the following procedure:

1. The sampling equipment will be washed in two (2) succeeding basins of water with laboratory grade non-phosphate detergent.
2. The sampling equipment will then be rinsed in a final basin of deionized water.
3. The sampling equipment will then be set out to dry on clean towels in a contaminant-free area.

· In the event that layers occur within the tank, sample portions will be obtained from the bottom, middle and top.

Sample Tracking

The Water `Sample Log and the Water Transfer Log (see Attachment B.1) will be completed following collection of the sample. The sample container will be marked with the prefix MW (Metamora water) and a unique three digit number (e.g., MW-001, MW-002, etc.). Additionally, a chain-of-custody form will be completed prior to transport to the on-Site analytical laboratory.

B.4.4.4 Non-Incinerable Wastes

Non-incinerable wastes include metal drum debris, crushed drums, large rocks and contaminated construction materials (crushed stone, concrete fragments, etc.). Non-incinerable wastes will not be sampled. These wastes will be bulked into roll-off boxes for future on-Site landfilling.

However, any crushed drums that are grossly contaminated or contain wastes with greater than 50 ppm PCBs will be shredded and incinerated.

B.4.5 RINSATE/TRIP BLANK/FIELD BLANK SAMPLE COLLECTION

Collection of trip blanks and field blanks is not part of the compatibility testing requirements and thus, will not be collected during this project. The various laboratory quality control blanks that will be analyzed during this project are included in Section B.8.

Rinsate samples shall be collected daily during sampling activities to verify decontamination procedures.

B.4.6 SAMPLING PACKAGING

The sample label on each sample container will be covered with a 3-inch wide clear type. Only high quality metal coolers will be used to ship samples to the on-Site laboratory or, if required, to off-Site laboratory(ies). Styrofoam coolers, boxes or foam lined fabric coolers are not acceptable.

Styrofoam packing beads will be placed in the cooler bottom. Containers will be arranged upright so they do not touch each other. The coolers will not be overpacked, conforming with the weight limit requirements of the air shipper. More styrofoam packing beads will be added to cover bagged bottles. Frozen ice packs will be placed in ziplock bags and put around samples, but will not come in direct contact with the sample containers. Additional styrofoam beads will be added to fill the cooler. The cooler drain will be taped shut with fiber strapping tape. The original chain-of-custody form will be put in a ziplock bag and taped to the underside of the cooler lid with fiber strapping tape.

· The lid of the cooler will be securely sealed. At least two custody seals (numbers recorded on the custody form) will be placed on the cooler over the cooler latch(es) and at the back of the cooler. The seal will be signed and dated by the person sealing the cooler. Three inches (wide) of clear tape will cover the seals.

Since glass bottles may be contained in the cooler, "Fragile" labels will be put on top of the cooler. The shipping label with laboratory address and contact person will be put on top of the cooler, and covered with 3-inch clear tape.

Sample delivery to off-Site laboratory (if required) will be made by a reputable carrier to ensure sample arrival at the laboratory. Upon receipt of the coolers, the date, the time of arrival and signature of the sample custodian will be placed on the chain-of-custody. The sample custodian will then break and record the seal condition, inventory the samples, sign the custody form, and inform the QCSM of any discrepancies between bottle, labels, tags and custody documentation.

B.4.7 DOCUMENTATION OF SAMPLING ACTIVITIES

Documentation of sampling activities and handling will be completed through the use of the following forms and logs developed for this project:

- Field Excavation Data Sheet
- Field Sampling Data Sheet
- Chain-of-Custody Record
- Sample Receiving Log
- Fingerprint Log
- Drum Composite Log
- Drum Repackage and Storage Log
- Soil Composite Log
- Sample Receiving Log
- Soil PCB Prep Log
- Soil Repackaging and Storage Log
- Water Sample Log
- Water Transfer Log
- GC Run Log
- Instrument Calibration Log
- Photographic Log

Examples of these forms are included in Attachment B.1.

B.5 SAMPLE CUSTODY

The objective of sample custody is to assure the sample integrity from the time the sample is taken by field personnel throughout the entire analytical scheme including retention and disposal.

All custody records (sample label, chain-of-custody, etc.) shall be originated by field personnel and will accompany the sample container at the time it is collected. The sample record will contain the following information:

-- Sample I.D.;
-- Date and time taken;
-- Source of the sample (include sample type and name);
-- Analysis required (if applicable) and
-- Name of person collecting the sample.

The chain-of-custody form will be prepared identical to the labels and tags secured on the sample jars. Chain-of-custody forms will be completed in duplicate using carbon paper (if required). The original custody form will be placed in a ziplock bag and taped to the inside lid of the shipping cooler and the duplicate will be maintained for the project files. The shipping cooler will be secured with strapping tape and signed custody seals will be placed across the cooler opening to ensure sample integrity during shipment.

The information on the custody form (date, time, sampler(s), analyses etc.) will match the information on the sample tag and adhesive label. Indicated will be (when multiple bottles are present for a sample) the number of bottles present (i.e. 1 of 2, 2 of 2). Indelible waterproof ink should be used on labels and tags. "Magic" markers will not be used on or near volatile vial labels or tags, to avoid contamination. Sample labels will be covered with 3-inch wide clear adhesive tape to help eliminate label soak-off. Tags will be attached securely to bottles.

. When transferring the possession of samples, the transferee will sign and record the date the transfer took place. Once the samples are received at the laboratory, the laboratory will assume responsibility for the integrity and security of the samples. The following custody procedures will be maintained by the Contractor's laboratory:

1. The laboratory will be securely locked 24 hours/day and entrance to the laboratory by the front door will be monitored using a sign-in book. Only authorized people may gain entrance to the laboratory by the front door and then they must be supervised by laboratory personnel.

2. Sample Data Control personnel will receive the samples, provide a laboratory identification number for each sample bottle on the chain-of-custody record and log the sample in the sample data/control computer system with all the necessary information related to sample identity.

3. Log-in personnel will check samples to assure that the samples are properly coordinated with the log book information, chain-of-custody records, and all other pertinent information.

4. Persons designated by the laboratory supervisor will be responsible for securing the samples in the appropriate active sample retention area.

5. Authorized laboratory personnel will obtain the samples from the designated storage area. The analysts will be responsible for returning all samples to the designed active sample retention area upon completion of analyses.

6. All samples will be held for a period of 90 days after all the results have been reported unless otherwise requested. All hazardous samples will then be disposed of in a Lab Pack and incinerated.

7. When samples are transferred from the laboratory to any other destination, the appropriate custody protocol will be used.

B.6 CALIBRATION PROCEDURES AND FREQUENCY

B.6.1 GENERAL

Analytical laboratory instruments and field instruments used to generate analytical determinations will be periodically inspected and calibrated with National Institute of Standards and Technology (NIST) traceable standards. Documentation of such calibration and maintenance will be kept in bound notebooks. If equipment has been out of service for two weeks or longer, the equipment will be recalibrated immediately prior to use and then at the manufacturer's prescribed frequencies to ensure acceptable continual calibration while in use. Specific calibration procedures vary with the analyte measured and are contained in the instruments manufacturer's specifications.

B.6.2 FIELD INSTRUMENTS

Field measurements along with proper documentation are important parts of the monitoring program. Before the actual trip to the field, equipment must be checked for possible malfunctions and cleaned. Additionally, field meters must be calibrated daily to ensure proper working order and to render integrity to the measured values. Air flow pumps for the air monitoring shall be calibrated as required by the appropriate methods. Calibration procedures provided in the manufacturer's specifications are to be followed.

The Contractor is responsible for maintaining log sheets for all field meters. These log sheets should contain the same information as those for permanent laboratory instruments (serial number, name and model of meter, year purchased, etc.). These sheets should also contain QC results and calibration notes for each day the equipment is used. An example of a typical instrument calibration log is included as Attachment B.1.

. Tape measures used to locate sampling locations will be compared against a known non-field use standard tape measure to ensure that the scale has not been stretched or altered during field use. The time, date and results of these comparisons will be included on the Contractor's equipment log.

B.6.3 ANALYTICAL LABORATORY INSTRUMENTS

Laboratory analysts responsible for the daily operation of the equipment must also verify that the calibration is still verifiable by the independent certifiable standards traceable to NIST. The value of the our format QC standard sample must lie within the statistically determined confidence interval supplied with the sample in order for the equipment to be considered to be in calibration. Potential calibration and frequency procedures for each parameter are listed in Table B.3. The exact calibration and frequency procedures will be specified by the Contractor in the QAPP addendum.

TABLE B.3

CALIBRATION MATERIALS AND FREQUENCY

Parameter	*Calibration Material (1)*	*Frequency*
Physical Appearance	N/A	N/A
Water Miscibility/Reactivity	N/A	N/A
pH (Meter)	pH 4,7,10 Std Buffers	Daily or Each Sample Set
pH (Screen)	pH 4,7,10 Std Buffers	Daily or Each Sample Set
Load Bearing Capacity	N/A	N/A
Cyanide (Screen)	50 ppm CN Solution	Daily or Each Sample Set
Sulfide (Screen)	50 ppm S Solution	Daily or Each Sample Set
Phenol (Screen)	100 ppm Phenol Solution	Daily or Each Sample Set
Flash Point (Screen)	N/A	N/A
Radiation (Screen)	1 nCi Cs 137	Daily or Each Sample Set
Paint Filter Test	N/A	N/A
Oxidizer (Screen)	3% H_2O_2 Solution	Daily or Each Sample Set
Total Solids	Pumice Stone	Daily or Each Sample Set
Viscosity	50 & 500 cps Stds	Daily or Each Sample Set
Specific Gravity	D.I. Water	Daily or Each Sample Set
Chloride (Total)	5 ppm Cl Solution	Daily or Each Sample Set
Bromide (Total)	5 ppm Br Solution	Daily or Each Sample Set
Sulfur (Total)	15 ppm SO_4 Solution	Daily or Each Sample Set
Heating Value	Benzoic Acid	Daily or Each Sample Set
Water Content	5% H_2O in Acetone Standard	Daily or Each Sample Set
Cyanide (Total/Free)	____ ppm CN Solution	Daily or Each Sample Set
Phenol (Total)	Aluminum Oxide	Daily or Each Sample Set
Sulfide (Total)	133 ppm S	Daily or Each Sample Set
Fluoride (Total)	1 ppm F	Daily or Each Sample Set
Acidity	pH 4, 7, 10 Std Buffers	Daily or Each Sample Set
Alkalinity	pH 4, 7, 10 Std Buffers	Daily or Each Sample Set
Metals (ICAP)	10 ppm Metal Ion Standard Solutions	Daily or Each Sample Set
Arsenic (AAGF)	0.3 ppm As Standard Solution	Daily or Each Sample Set
Selenium (AAGF)	0.3 ppm Se Standard Solution	Daily or Each Sample Set
Mercury (AACV)	0.5, 1.0, 2.5, 5.6, Standards	Daily or Each Sample Set
Solvent (Screen)	1,1,1,-Trichloroethane	Daily or Each Sample Set
	Methylisobutyl Ketone	Daily or Each Sample Set
	p-xylene	Daily or Each Sample Set
Polychlorinated Biphenyls	15 ppm Aroclor 1242 Standard Solution	Daily or Each Sample Set
Volatile Organics	Internal Standards:	
	Bromochloromethane	Daily or Each Sample Set
	1-Bromo-1-chloropropane	Daily or Each Sample Set
	1,1-Dichlorobutane	Daily or Each Sample Set
	M6 Autotune Standard:	
	20 ng Bromofluorobenzene Std. Soln.	Daily or Each Sample Set

Note:

(1) For demonstrative purposes. The selected laboratory shall determine the actual calibration materials.

If calibration verification fails, the equipment will be removed from service and the laboratory manager notified. If a prolonged period of downtime is anticipated, the Engineer, the QAC and the QCSM will be notified to avoid invalidation of sample results due to exceeding holding times. Reanalysis of samples analyzed on defective equipment may be requested by the Engineer once the equipment has been shown to be operating properly and recalibrated.

B.7 ANALYTICAL PROCEDURES

B.7.1 SELECTION OF PARAMETERS

Laboratory analyses will be done on air, contaminated water, soil and waste samples. The selection of analytical test parameters for the water, soil and waste is based upon the compatibility requirements of the Contractor's disposal facilities receiving waste materials during the course of the Source Removal and Disposal Program.

The anticipated compatibility tests for the disposal facility are summarized in Tables B.4 through B.6.

Air samples collected during the air monitoring program will be tested for the parameters identified in Table B.7. A more detailed discussion of the air analyses is presented in the Air Monitoring Plan (Appendix G) for the Site.

B.7.2 SELECTION OF PROCEDURES

The anticipated procedures for the analysis of all samples by the Contractor will be in accordance with one of the following four publications:

- "Test Methods for Evaluating Solid Waste", SW-846, 3rd Edition, Revision I, December 1987.

TABLE B.4

LIQUID/DRUM WASTE/SLUDGES

Parameter	*Method Code*	*Method Reference*
Physical Appearance	3	D4979-89
Water Miscibility/Reactivity	3	D4843-88
pH (Meter)	1	9040
pH (Screen)	3	D4980-89
Cyanide (Screen)	3	D5049-90
Sulfide (Screen)	3	D4978-89
Flash Point (Screen)	3	D4982-89
Flash Point (Closed Cup)	1	1010, 1020
Radiation (Screen)	5	
Total Solids	2	209G
Viscosity	3	D2196-81
Specific Gravity	3	C854, D1298, D5057-90
Chloride (Total)	4	325
Bromide (Total)	4	320
Sulfide (Total)	4	376
Ash %	3	D482-80
Heating Value	3	D240
Water Content	3	E203
Cyanide (Total/Free)	1	9010
Fluoride (Total)	3	S4327
Metal (ICAP)	1	6010
Arsenic (AAGF)	1	7060
Selenium (AAGF)	1	7740
Mercury (AACV)	1	7470
Pesticides/PCBs	1	8080
Volatile Organics	1	8240
Phenols/Base Neutrals	1	8270

Notes:

(1) SW-846, December 1987, 3rd Edition, Revision I
(2) Standard Methods for Examination of Water and Waste Water, 16th Edition, 1985
(3) ASTM Annual Book of Standards (Part II, 1990)
(4) Methods for Chemical Analysis of Water and Wastes (EPA-600/4-79-020, revised March 1983)
(5) Geiger counter - use standards to confirm calibration

TABLE B.5

CONTAMINATED SOIL AND DRUM SOLIDS/NON PCB

Parameter	*Method Code*	*Method Reference*
Physical Appearance	2	D4874-90
Water Miscibility/Reactivity	2	D3987-85
pH (Meter)	1	9040
pH (Screen)	2	D4980-89
Cyanide (Screen)	2	D5049-90
Sulfide (Screen)	2	D4978-89
Flash Point (Screen)	2	D4982-89
Flash Point (Closed Cup)	1	1010, 1020
Radiation (Screen)	3	
Paint Filter Test	1	9095
Oxidizer (Screen)	2	D4981-89
Cyanide (Total/Free)	1	9010
Sulfide (Total)	1	9030
Metals TCLP	1	1311/7000 Series
Pesticides/PCBs	1	8080
Volatile Organics	1	8240
Phenols/Base Neutrals	1	8270

Notes:

(1) SW-846 December 1987, 3rd Edition, Revision I
(2) ASTM Annual Book of Standards (Part II, 1990)
(3) Geiger counter - use standards to confirm calibration

TABLE B.6

WASTE WATER

Parameter	*Method Code*	*Method Reference*
Physical Appearance	3	D4979-89
Water Miscibility/Reactivity	3	D4843-88
pH (Meter)	1	9040
pH (Screen)	3	D4980-89
Cyanide (Screen)	3	D5049-90
Sulfide (Screen)	3	D4978-89
Phenolics	4	420 Series
Flash Point (Screen)	3	D4981-89
Flash Point (Closed Cup)	1	1010, 1020
Radiation (Screen)	5	
Total Solids	2	209G
Ash %	3	D3174
Oil and Grease (if pH 10)	1	9071
Fluoride	2	413B, 413E
Nitrate	1	9200
Ammonia	2	417D
Acidity	2	402
Alkalinity	2	403
Metals TCLP	1	1311/7000 Series
TOC	1	9060
Solvent (Screen - ppm level)	6	

Notes:

(1) SW-846, December 1987, 3rd Edition, Revision I
(2) Standard Methods for Examination of Water and Waste Water, 16th Edition, 1985
(3) ASTM Annual Book of Standards (Part II, 1990)
(4) 420 Series (EPA 600/4-79-020, revised March 1983)
(5) Geiger counter - use standards to confirm calibration
(6) HNU or headspace GC

TABLE B.7

AIR SAMPLING CANDIDATE TEST PARAMETERS (1)

Parameter (2)
1,2-Dichloroethane
Benzene
Tetrachloroethene
Trichloroethene

Notes:

(1) Refer to AMP presented in Appendix G. The parameter list may be amended dependent upon a review of the historical data base and actual field conditions encountered.

(2) The parameters identified were selected as representative of the various types of volatile organic componds which have been identified on Site.

- "Standard Methods for Examination of Water and Waste Water", 16th Edition, 1985
- "Annual Book of ASTM Standards", (Part II, 1990)
- "Methods for Chemical Analysis of Water and Wastes", (EPA600/4-79-020, revised March 1983)

The method numbers corresponding to the laboratory analyses to be completed during this project are presented in Tables B.4 through B.6.

If updated versions of these methods are available during the course of the project the newer methods will be used (if required).

B.8 INTERNAL QUALITY CONTROL

B.8.1 QUALITY CONTROL PROGRAM

Quality control procedures will be used for laboratory and field activities. The following paragraphs discuss the quality control program that the Contractor will implement during the Metamora Landfill - Source Removal and Disposal Program. Laboratories that may be employed by the Contractor must demonstrate quality control practices at least as stringent as the program discussed below.

The quality control program is based on "Handbook for Analytical Quality Control in Water and Wastewater Laboratories," U.S. EPA, March 1979. "Good Laboratory Practices" which encompass sampling, sample handling, housekeeping, and safety are maintained at all laboratories. The following practices will be implemented at all laboratories involved in this project:

A. Instrument Performance Parameters

All instrumentation must be evaluated through the use of an instrument check standard and calibration blank before standardization can be initiated. Divergence from acceptable benchmark criteria requires correction before analyses can be performed. Blank and instrument check standard results are recorded in a bound instrument log book which will also contain evaluation parameters, benchmark criteria and maintenance records.

B. Contamination Evaluation

Reagent blanks must be prepared with each batch of samples and analyzed to insure that sample contamination has not occurred. If blank analyses do not fall within acceptable limits, modification of reagents or modification of the analytical method will be implemented.

C. Duplicate Analysis

A sample must be analyzed in duplicate for each ten samples being analyzed for a particular parameter. A blind duplicate sample from each sample matrix being tested will be submitted to the laboratory on a weekly basis. Results of these duplicate analyses will be reviewed weekly and reported to the QCSM.

D. Quality Control Check Sample

A quality control solution or sample material should be analyzed at least every day to show that accuracy is being maintained.

E. Fortification of Samples

Fortifications are employed to monitor recoveries and maintain extraction and/or concentration techniques at acceptable levels. This procedure provides information about the effect of the sample matrix on the analyte in question. A ratio of one fortification for each ten samples analyzed will be maintained.

F. Reference Materials

Standard Reference Materials from the NBS will be obtained and analyzed according to normal laboratory methodology to indicate accuracy of the methods. These materials will be analyzed at least quarterly but, preferably more frequently.

G. Round Robin Analyses (if multiple laboratories are utilized)

All laboratories will participate in Round Robin sample analyses. These samples will be submitted by the QCSM and will be for the analysis of "normal" parameters. Results will be reported to the QCSM. Digressions from the norms established by the majority of laboratories participating will be investigated and corrected by the QCSM.

H. Reference Laboratory Evaluation

At least one sample per month for each parameter being analyzed must be sent to a designated and approved laboratory for parallel analysis. The split sample will be selected homogeneous samples only. A report of the results must be sent to the QCSM.

The following information should be included with the sample report:

- Waste Name

- Sample ID Number
- Analysis Requested
- Lab Results

I. <u>Reports</u>

All laboratories must report the following information to the QCSM on a monthly basis.

1. Number of Samples Analyzed
2. Number and Results of Duplicates
3. Number and Results of Fortifications
4. Instruments Used
5. Frequency of Occurrence for Quality Control Check Sample Within Acceptable Limits
6. Mean and Standard Deviation of Analyte in Question

All laboratories must report intralab and Round Robin results as they occur and reference material analysis at least quarterly. All laboratory reports will include a standard deliverables package.

J. <u>Contract Laboratories</u>

Laboratories subcontracted by the Contractor must submit a written copy of the laboratory's Quality Control Procedures to the Engineer prior to approval. A quality assurance inspection will be conducted by a designated compliance officer to insure that proper records and documents are present and maintained. All laboratories used by the Contractor are subject to inspection and audit of all procedures while under contract to the Contractor by the QCSM. Laboratories are required to adopt and implement all of the quality control practices listed above as they are applicable to sample type and volume. A quarterly review of the laboratory will be conducted to assure that quality control of data is being maintained. The QAO shall review and comment on the laboratory QACP.

Frequency of the aforementioned Quality Control practices is outlined in Table B.8.

B.8.2 QUALITY REVIEW OF PLANS AND PROJECT SUMMARIES

The Contractor will prepare several plans and submittals (i.e. project summaries, field reports, logs, etc.) for the Engineer before and during this project, as described in Section B.1.6.5. In addition to the review that will be completed by the Engineer and U.S. EPA prior to approval of these plans and submittals, the Contractor will conduct a quality review as discussed below.

Quality reviews will be continuous during the preparation of the Contractor's submittals; however, the review process will be divided into phases, usually occurring at the completion of a specific draft document. At each phase, the review will include an assessment of: client goals, contractual commitments, timing, technical merit, assignment of personnel, budget, project problem resolution, documentation and

TABLE B.8

QUALITY CONTROL PROCEDURES
FREQUENCY OF PRACTICES

Parameter	*QA Checks*	*Lab Blanks*	*Duplications*	*Fortifications*	*Std. Ref. Materials*	*Blind Duplicates*	*Std. Lab. Evaluation*
Physical Appearance	N/A	N/A	N/A	N/A	N/A	C	C
Water Miscibility/Reactivity	N/A	N/A	N/A	N/A	N/A	C	C
pH (Meter)	A	A	B	N/A	D	C	C
pH (Screen)	A	A	B	N/A	D	C	C
Load Bearing Capacity	N/A	N/A	B	N/A	N/A	C	C
Cyanide (Screen)	A	A	B	B	D	C	C
Sulfide (Screen)	A	A	B	B	D	C	C
Phenol (Screen)	A	A	B	B	D	C	C
Flash Point (Screen)	N/A	N/A	B	N/A	D	C	C
Radiation (Screen)	A-	N/A	B	N/A	N/A	C	C
Paint Filter Test	N/A	N/A	N/A	N/A	N/A	C	C
Oxidizer (Screen)	A	A	B	N/A	D	C	C
Total Solids	A	A	B	B	D	C	C
Viscosity	A	A	B	N/A	D	C	C
Specific Gravity	A	A	B	N/A	D	C	C
Chloride (Total)	A	A	B	B	D	C	C
Bromide (Total)	A	A	B	B	D	C	C
Sulfur (Total)	A	A	B	B	D	C	C
Heating Value	A	A	B	B	D	C	C
Water Content	A	A	B	B	D	C	C
Cyanide (Total/Free)	A	A	B	B	D	C	C
Phenol (Total)	A	A	B	B	D	C	C
Sulfide (Total)	A	A	B	B	D	C	C
Fluoride (Total)	A	A	B	B	D	C	C
Acidity	A	A	B	B	D	C	C
Alkalinity	A	A	B	B	D	C	C
Metals (ICAP)	A	A	B	B	D	C	C
Arsenic (AAGF)	A	A	B	B	D	C	C
Selenium (AAGF)	A	A	B	B	D	C	C
Mercury (AACV)	A	A	B	B	D	C	C
Solvent (Screen)	A	A	B	B	D	C	C
Polychlorinated Biphenyls	A	A	B	B	D	C	C
Volatile Organics	A	A	B	B	D	C	C

Notes:

A = Daily or once per set
B = 10% Based on number of samples
C = Monthly
D = Quarterly

consistency with the Contractor's company policy. The review will include an identification of problem areas, communication to implement solutions and follow-up.

Quality control during preparation of plans and submittals will include peer review of conclusions drawn from the available information. The comparability objective discussed in Section B.3.6 is of importance when data are derived from several sources. Documentation of data will be done through data verification/tracking checklists to monitor the consistency in the data selection process. This process allows the data to be traced to their source and provides a review of the data as they are developed. The Contractor will be responsible for utilization of this process and compliance will be monitored by the QCSM.

B.9 DATA REDUCTION, VALIDATION AND REPORTING

B.9.1 DATA REDUCTION

Data reduction is the process of converting measurement system outputs to an expression of the parameter which is consistent with the objectives discussed in Section B.3.6. Calculations made during data reduction by the Contractor will follow U.S. EPA approved analytical methods.

B.9.2 DATA VALIDATION

Validation of measurements is a process of reviewing data to assure that data are adequate for their intended use. Data validation will include the following activities, at a minimum:

- Monitoring and auditing measurement system calibration and calibration verification records;
- Monitoring and auditing quality control activities;
- Reviewing data for technical credibility (raw data and calibration data will be checked for approximately 10 percent of the samples);
- Screening data sets for outliers;
- Auditing sample data records and chain-of-custody; and
- Checking intermediate calculations.

Data validation activities will be documented by the Contractor (and reviewed by the QAO) and records kept of any necessary corrective or remedial action. Laboratory reports of data will be edited by comparing with original calculations. Data tabulations will be edited by comparing with the laboratory reports. The data will be screened to monitor consistency with the quality assurance objectives discussed in Section B.3.0.

. Results of laboratory audits completed by U.S. EPA and other regulatory agencies will assist in validating the data reported. In addition, system audits of laboratory procedures and data management will be conducted by the QAT. Results reported for each sample will be verified to assure proper identification by comparing the original sample collection log sheets with chain-of-custody forms and laboratory log books, when possible.

B.9.3 DATA REPORTING

Final results on samples will be reported on a Waste Analysis Report (WAR). The WAR is reviewed, signed and dated by the Manager of Analytical Chemistry. The WAR is then copied, filed numerically (according to unique sequential sample number) for future reference and kept on file for a minimum period of five years, unless otherwise specified. Final reports, after review, are released to the sample submitter.

B.10 AUDITS

B.10.1 GENERAL

QA audits will be conducted to document that the data generated is of acceptable quality and that subsequent calculations, interpretations, data reduction and other project outputs are checked and validated. QA audits will be conducted prior to and on an ongoing basis throughout the project by the QAO. Field laboratory QA audits will be conducted quarterly during the completion of field analyses. This section summarizes the various aspects of these audits.

B.10.2 SYSTEMS AUDIT

Systems audits include the evaluation of the following areas:

- organization and personnel;
- analytical methodology;
- sampling and sample handling procedures; and
- data handling.

The above project systems will be audited for compliance with the technical specifications and the project plans.

B.10.3 PERFORMANCE AUDITS

Performance audits are for the evaluation of analytical and data generation systems for compliance with this QAPP and other U.S. EPA approved project plans.

Prior to full scale production of the Contractor's on-Site or off-Site laboratories a laboratory audit will be conducted by the Engineer or Engineer's representative.

B.10.4 PROJECT AUDIT

Project audits review the aspects of systems and performance audits at one point in time during the project. The project audit typically occurs at least once during a short-term project and more frequently during long-term projects. These audits are unscheduled.

B.10.5 AUDIT REPORT

Written QA audit reports will include the following:

- an assessment of project team status in each of the project areas;
- areas requiring improvement or problems to be corrected; and
- a timetable for required corrective actions.

A follow-up review will be completed to monitor the progress of the corrective action, the results of which will also be reported.

B.11 PREVENTIVE MAINTENANCE

Scheduled service for laboratory analytical equipment is accomplished by manufacturer's representatives under service contracts or by the laboratory manager, under the manufacturer's direction. A record of such service is recorded in a bound instrument log book along with the next due date for maintenance. Critical spare parts, GC septa, and columns will be kept on hand to avoid down time and costly repairs caused by substituting out-of-date or faulty parts.

Field instruments will be checked and calibrated daily before use. Batteries will be recharged daily as appropriate. Spare parts will be kept in the field trailer on Site. The QCSM is responsible for ensuring the upkeep of the field instruments.

B.12 DATA ASSESSMENT

The purpose of data assessment is to assure that the data generated are accurate and consistent with the project objectives. Data quality will be assessed based upon the precision, accuracy, completeness, comparability and consistency of the data generated during this project. This assessment is discussed in the following paragraphs.

Data assessment will be accomplished by the QCSM prior to submittal to the QAT. The QCSM will review analytical results for compliance with the QC criteria described in this QAPP (see Section 5.0). Additionally, the QCSM will monitor sampling activities to assure that the sample collection and handling procedures are in accordance with the Sampling and Analysis Plan before submittal to the QAT and the Engineer.

Recommendations for improved quality control will be reviewed and implemented by the QCSM, if appropriate. In the event that data gaps are identified, the QCSM may recommend collection of additional raw data to achieve project objectives.

B.13 CORRECTIVE ACTION

B.13.1 GENERAL

The need for corrective action may be identified by system or performance audits or b standard QC procedures. The essential steps in the corrective action system will be:

- Checking and predetermined limits for data acceptability beyond which corrective action is required;
- Identifying the defining problems;
- Assigning responsibility for investigating the problem;
- Investigating and determining the cause of the problem;
- Determination of a corrective action to eliminate the problem (this may include reanalyses or resampling and analyses);
- Assigning and accepting responsibility for implementing the corrective action;
- Implementing the corrective action and evaluating the effectiveness;
- Verifying that the corrective action has eliminated the problem;
- Documenting the corrective action taken; and
- Reports to U.S. EPA (as required).

For each measurement system, the QA officer will be responsible for initiating the corrective action and the laboratory supervisor will be responsible for implementing the corrective action.

Immediate and long-term corrective action is discussed in the following subsections.

B.13.2 IMMEDIATE CORRECTION ACTIONS

Immediate corrective action is applicable to spontaneous, non- recurring problems (e.g. instrument malfunctions). The individual who detects or suspects nonconformance to the established QA/QC criteria for equipment, instruments, data, methods, etc. will notify the QCSM. The QCSM will then investigate the extent of the problem and take necessary corrective steps. If a large quantity of data is affected, the QCSM will prepare a memorandum to the Engineer. The Engineer, the QAC and the QCSM will collectively decide how to proceed. The QCSM will implement the agreed upon corrective action, document the solution and notify the Engineer, in memorandum form, that the corrective action has been taken.

B.13.3 LONG-TERM CORRECTIVE ACTIONS

Long-term corrective actions address recurring problems with data or procedures that are identified during the project. These problems may be identified by the QCSM and his/her staff during the following activities:

- Monitoring of field activities;
- Performance audits;

- System audits;
- Laboratory/field comparison studies; and
- QA program audits.

If recurring problems are identified during these activities the QCSM will follow the procedure outlined previously for immediate corrective actions.

If recurring problems escape the notice of the QCSM and are identified by the QAT, the QAT will initiate corrective action as follows:

1. The QAC will provide written notification to the Engineer who in turn will inform the QCSM of non-compliance with the foregoing requirements.
2. The QCSM, after receipt of such notice, should immediately take appropriate corrective action.
3. The QCSM will document the solutions and notify the Engineer.

B.14 REPORTS TO MANAGEMENT

QA summary reports are to be prepared on a monthly basis by the QCSM to inform the QAT and the Engineer of the QA program status. The summary reports will include, at a minimum:

- assessment of measurement data representativeness, accuracy, precision, completeness, and comparability;
- results of performance audits and/or systems audits;
- significant QA problems and recommended solutions; and
- status of solutions to any problems previously identified.

The above information shall be presented in a factual, concise and complete manner. Supporting information will be appended to the report.

ATTACHMENT B.1

PROJECT LOGS

FIELD EXCAVATION DATA SHEET

METAMORA LANDFILL

DRUM FIELD OBSERVATIONS

Drum No. __________ Temperature: __________

Drum Size: (Please circle) 5 15 30 55 85 gallon

Type: Steel ( ) Plastic ( ) Other ( )

Lid: Open Head ( ) Closed Head ( )

Condition: Good ( ) Bad ( ) Description: ____________________

HNu : __________ Explosimeter: __________ Gieger: __________

Labels: Description ______________________________

____

____

Comments:

____

____

Field Observer: ____________________ Date: ______________

Time: ______________

FIELD EXCAVATION DATA SHEET
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-7/9/91-16-TPG

FIELD SAMPLING DATA SHEET

METAMORA LANDFILL

DRUM FIELD OBSERVATIONS

Sample No. __________ Temperature: __________

Drum Size: (Please circle) 5 15 30 55 85 gallon

Type: Steel ( ) Plastic ( ) Other ( )

Lid: Open Head ( ) Closed Head ( )

Condition: Good ( ) Bad ( ) Description: ____________________________

HNu : ________ Explosimeter: _________ Gieger: _________

Liquid/Solid Ratio: __________________

Percent (%) Full: 25% ( ) 50% ( ) 75% ( ) 100% ( )

If Liquid: Pumpable ( ) Not Pumpable ( )

If Solid: Easily Emptied ( ) Not Easily Emptied ( )

Comments:

____

____

Field Observer: ______________________________ Date: __________________

Time: _________

FIELD SAMPLING DATA SHEET
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-7/9/91-16-TPG

CRA
CONESTOGA-ROVERS & ASSOCIATES
651 Colby Drive, Waterloo, Ontario Canada N2V 1C2

SHIPPED TO (Laboratory name):

CHAIN OF CUSTODY RECORD

PROJECT Nº:

PROJECT NAME:

SAMPLER'S SIGNATURE ______________________ (SIGN)

SEQ. Nº	SAMPLE Nº	DATE	TIME	SAMPLE LOCATION	SAMPLE TYPE	Nº OF CONTAINERS	REMARKS
				TOTAL NUMBER OF CONTAINERS			

ANTICIPATED CHEMICAL HAZARDS:

RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
1 ______ (SIGN)		2 ______ (SIGN)
RELINQUISHED BY: 2 ______ (SIGN)	DATE/TIME	RECEIVED BY: 3 ______ (SIGN)
RELINQUISHED BY: 3 ______ (SIGN)	DATE/TIME	RECEIVED BY: 4 ______ (SIGN)
RELINQUISHED BY: 4 ______ (SIGN)	DATE/TIME	RECEIVED BY: 5 ______ (SIGN)
RELINQUISHED BY: 5 ______ (SIGN)	DATE/TIME	RECEIVED BY: 6 ______ (SIGN)
RELINQUISHED BY: 6 ______ (SIGN)	DATE/TIME	RECEIVED BY: 7 ______ (SIGN)

METHOD OF SHIPMENT:	SHIPPED BY:	RECEIVED FOR LABORATORY BY: (SIGN) ______	DATE/TIME
CONDITION OF SEAL UPON RECEIPT: GENERAL CONDITION OF COOLER:		COOLER OPENED BY: (SIGN) ______	DATE/TIME

WHITE – *CRA OFFICE COPY*
YELLOW – RECEIVING LABORATORY COPY
PINK – CRA LABORATORY COPY
GOLDEN ROD – SHIPPERS

SAMPLE CHAIN–OF–CUSTODY
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-25/06/91-16-0

SAMPLE RECEIVING LOG

Sample Number	PCB Con.	Composited With Numbers	Date Sampled	Sampler Initials	No. of Yards	Comments
MS-001	<LOQ	MS-002 MS-003 - MS-004 MS-005	6-2-91	TPG	200 yd3	
MS-002	<LOQ	MS-001 MS-003 MS-004 MS-005	6-2-91	TPG	200 yd3	
MS-003	<LOQ	MS-001 MS-002 MS-004 MS-005	6-2-91	TPG	200 yd3	

SAMPLE RECEIVING LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-6/27/91-16-TPG

FINGERPRINT LOG

Date	Sample Number	Fingerprint Class	Physical Description	%L/ %S	Rad	Flash	H2O	pH	CN-	S-	Comments	Initials
6-28-91	MD0001	IS	blk tar-like	0/100	—	>200	insol	N/A	-	-		TPG
6-28-91	MD0002	FL	brn/clr	100/0	—	<70/>200	insol/so	NA/7	-	-		TPG
6-28-91	MD0003	CNS	wht powder	0/100	—	>200	insol	12	+	-		TPG
6-28-91	MD0004	BL	blue	100/0	—	>200	sol	12	-	-		TPG
6-28-91	MS0001	IS	brn	0/100	—	>200	partly sol	8	-	-		TPG
6-28-91	MS0002	IS	yell	100/0	—	>200	sol	12	-	-		TPG

FINGERPRINT LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-6/27/91-16-TPG

DRUM COMPOSITE LOG

Date Submitted to Lab	Date Analysis Received	Drum Composite Number	Individual Sample No.	Fingerprint Class	PCB Conc.	Comments	Initials
6-28-91	6-30-91	MDC-001	MD-0001	IS	< 4 ppm		TPG
		MDC-002	MD-0002	IS	< 4 ppm		TPG
		MDC-003	MD-0003	IS	< 4 ppm		TPG
6-28-91	6-30-91	MDC-004	MD-0004	IS	< 4 ppm		TPG

DRUM COMPOSITE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298-6/27/91-16-TPG

DRUM REPACKAGE AND STORAGE LOG

Date Stored	Drum Sample Number	No. of Drums In Comp.	Roll-Off Or Repack Number	Net Weight	From Area and Storage Location
6-28-91	MDC-001	MD0001	Roll off 5	37000 lb	4/A-4
		MD0005			
		MD0006			
		MD0007			
		MD0009			
		MD0012			
		MD0015			
6-28-91	MDC-001	MD0020	Roll off 5	37000 lb	4/A-4

DRUM REPACKAGE AND STORAGE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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3298-7/9/91-16-TPG

SOIL PCB PREP LOG

Date	Soil Sample Number	Sample Weight	Soxlet Number	Time Start	Time End	Comments	Initials
6-2-91	MS-001	10.0 g	1	14:00	08:00		TPG
6-2-91	MS-002	10.0 g	2	14:15	09:00		TPG
6-2-91	MS-003	10.0 g	3	14:30	09:00		TPG

SOIL PCB PREP LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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SOIL REPACKAGING AND STORAGE LOG

Date Stored	Soil Comp. Sample Number	Number of soil sample 200yd3	Roll-Off Or Repack Number	Net Weight	Location
6-28-91	MSC-001	MS-001	Roll off 2	34000 lb	4/A-5
		MS-002			
		003			
	MSC-001	004	Roll off 2	34000 lb	
	MSC-002	005	Roll off 2	34000 lb	
		006			
		007			
6-28-91	MSC-002	008	Roll off 2	34000 lb	4/A-5

SOIL REPACKAGING AND STORAGE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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3298-7/9/91-16-TPG

WATER SAMPLE LOG

Date Submitted	Date Received	Sample Number	Tank Number	Comments	Initials
6-23-91	6-28-91	MW-001	Area4 Frac Tank	Batch 1	TPG
6-24-91	6-28-91	MW-002	Area 4 Frac Tank	Batch 2	TPG
6-25-91	6-30-91	MW-003	Lab Waste Tank	Batch1	TPG

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WATER SAMPLE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-6/27/91-16-TPG

WATER TRANSFER LOG

Date Transfer	Sample Number	Transferred From (Tank #)	Transferred To	Disposal Facility	Initials
7-12-90	MW-001	Area 4 Frac Tank Batch 1	Tanker 701		TPG
7-12-90	MW-002	Area 4 Frac Tank Batch 2	Tanker 401		TPG
7-12-90	MW-003	Lab Waste Tank Batch 1	Tanker 404		TPG

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WATER TRANSFER LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-6/26/91-16-TPG

INSTRUMENT CALIBRATION LOG

INSTRUMENT: ______________________________

Date Calibrated	Known Standard	Actual Instrument Reading	Adjustments Made	Calibrated By	Comments

COMMENTS: ______________________________

____

____

____

INSTRUMENT CALIBRATION LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

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3298-6/27/91-16-TPG

GC RUN LOG

Date	Auto Sample Number	Sample Number	Weight	Dilution	Arochlor	PCB Conc.	Comments	Initials
6-2-91	1	MS-001	10.0 g	1:10	1242	<LOQ		TPG
6-2-91	2	MS-002	10.0 g	1:10	1242	<LOQ		TPG
6-2-91	3	MS-003	10.0 g	1:10	1242	<LOQ		TPG

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GC RUN LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298-6/27/91-16-91

SOIL COMPOSITE LOG

Date Submitted	Date Received	Soil Composite Number	Individual 200yd3 Sample No.	Fingerprint Class	PCB Conc.	Comments	Initals
5-12-91	5-13-91	MSC-001	MS-001	IS	BDC		TPG
5-12-91	5-13-91	MSC-002	MS-002	IS	BDC		TPG
5-12-91	5-13-91	MSC-003	MS-003	IS	BDC		TPG

SOIL COMPOSITE LOG
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298-6/27/91-16-91

C

APPENDIX C

HEALTH AND SAFETY PLAN

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LIST OF FIGURES

C.1 INTRODUCTION

The Health and Safety Plan (HASP) has been prepared to present the protocols and procedures which shall be followed to ensure the protection of all Site personnel during RA activities (as per 29 CFR 1910.120).

The Contractor selected to complete the Source Removal and Disposal Program shall adhere to the procedures presented in this HASP at a minimum. Additionally, the selected Contractor shall evaluate the chemical compounds which were historically encountered during drum removal activities. The Contractor shall select compounds which are most likely to cause occupational exposure hazards. For each of the identified chemicals the Contractor shall provide a summary of the associated occupational exposure standards and related toxicological information.

This HASP is presented as the following sections:

C.2	Site Hazards
C.3	Planning and Organization
C.4	Training
C.5	Medical Monitoring
C.6	Personnel Protective Clothing
C.7	Site Control
C.8	Decontamination
C.9	Waste Handling Procedures
C.10	Site Emergency Contingencies

All activities will be conducted in accordance with the Federal Register, Vol 54, No. 244, March 6, 1989, Occupational Safety and Health Administration, 29 CFR 1910, Hazardous Waste Operations and Emergency Response, Final Rule.

A Site Specific Health and Safety Plan must be submitted by the Contractor for the review and approval of MLSSD and U.S. EPA.

Before work proceeds on Site, all personnel will attend a briefing. The briefing will cover all aspects of the HASP. Personnel will then be required to sign a statement that they have read and understand the HASP.

Additional emergency response procedures and Site security activities are presented in the IWP as the following Appendices:

Appendix A	Emergency Response/Contingency Plan; and
Appendix B	Site Security Plan.

C.2 SITE HAZARDS

C.2.1 HIGH HAZARD POTENTIAL

Soil and Drum Excavation:

A large track mounted excavator equipped with a bucket or claw grips will be utilized to remove contaminated soils and buried drums. Excavation areas have been located by past investigations and may contain soils contaminated with various chemicals and drummed wastes. Caution will be taken during excavation while uncovering buried drums and to prevent spillage into the surrounding soils.

Other hazards associated with deep excavations will be addressed as per OSHA 29 CFR Subpart P 1926.650.653. On occasion, personnel may be required to enter the excavation. In excavations greater than four feet in depth, the Contractor's Confined Space Entry Procedures will be followed.

Drum Handling and Sampling:

Extreme hazards exist in handling closed drums containing unknown materials. When possible, drums will be moved with heavy equipment so that the drum is kept at a distance and shielded from personnel. If necessary, drums will be immediately overpacked to insure safety.

Drum opening and sampling will require extreme caution. Time will be taken to observe each drum prior to opening to look for clues to the condition or contents of the drum. Some possible observations might be:

- Is the drum under pressure or distended?
- Is the drum corroded?
- What material is the drum constructed of (steel, plastic, etc.)?
- Are there any markings or labels on the drum?

Drums exhibiting dangerous signs may require opening by remote means.

When possible, drums will be opened by removing the lid or bung. Caution will be taken to slowly open the drum to allow release of pressure (see SAP in Appendix A).

Drums shall be opened as per 29 CFR 1910.120(j), (g), the WEHP and the associated Project Plans. In general, Level B protective equipment shall be utilized.

C.2.2 MEDIUM HAZARD POTENTIAL

Transporting and Loading Soils

Caution will be taken during transport of soils from the excavation and while loading the contaminated soil into trucks and/or roll-off boxes. The soil will be transported and loaded so particulates released to the air are minimized. Watering of waste piles may be required to reduce the generation of dust.

Air Monitoring:

The hazards associated with monitoring the air for contaminants are related to the close proximity of the instruments and air monitoring technicians to the construction activities and chemical hazards. Caution will be taken to avoid construction and chemical hazards while obtaining air monitoring data. Air monitoring procedures are outlined in the Air Monitoring Plan (AMP) presented as Appendix G.

Backfilling Excavations:

Physical hazards associated with backfilling and entering deep excavations exist. OSHA Regulations regarding excavation will be followed as found in 29 CFR Subpart P 1926.650-653.

C3 PLANNING AND ORGANIZATION

The Contractor's Site Safety Officer (SSO) is responsible for field technical coordination of the HASP. Specific duties include establishing Site exclusion work zones, and contamination reduction zones; conducting periodic safety inspections, establishing emergency egress points, assembly areas, and first-aid stations; and implementing the Site Emergency Plan. The SSO also provides supervision of the air monitoring personnel.

The Air Monitoring Technician (AMT) is responsible for perimeter and personnel air monitoring. The AMT must be able to maintain, use and calibrate all on-Site air monitoring instrumentation. In the absence of the SSO, the AMT will assume the duties and responsibilities of the SSO.

C3.1 SITE SAFETY UPDATES

The HASP will be revised as necessary from the following information sources. This information will be transmitted to all on-Site personnel through safety meetings.

Weather Conditions

Weather conditions will be recorded using a wind and speed/direction instrument. Ambient temperature will be recorded using thermometers. This information will be used to determine the direction and speed in the event of an accidental release. It will also be used to determine cold and heat stress conditions. Wind socks will be located across the excavation area to provide personnel with visual confirmation of wind direction.

Air Monitoring Data

Air monitoring will be used to help determine the location of various work zones, Personal Protection Equipment (PPE) levels, downwind hazards and any exposure to personnel (see AMP in Appendix G).

Daily Site Inspections

Daily Site walks will be conducted to observe for the compliance to the HASP. Unsafe work practices will be stopped and discussed during the next daily safety meeting. Tools and equipment will be checked to ensure that worn out or damaged equipment is replaced or repaired. The storage of waste containers will be checked for proper segregation and integrity. Any observed leaks or spills will be handled immediately.

Daily Safety Log

A daily safety log is used to keep track of the daily activities on Site and could include:

1) Daily safety meeting subjects,
2) Training conducted,
3) Drills conducted,

4) Safety equipment ordered,

5) Air monitoring concerns,

6) PPE upgrading, and

7) Safety violations.

The Safety log will be maintained on Site to provide an account of daily safety practices and concerns.

C.3.2 SITE OPERATING PROCEDURES

Before operations can begin on Site, an Exclusion Zone (EZ) must be defined. This zone is to be considered contaminated and unprotected personnel are not authorized inside. A snow fence will be erected to ensure that unauthorized personnel do not enter into this area.

The Contamination Reduction Zone (CRZ) is used to ensure that contaminant migration is controlled. Personnel entering the EZ must first enter the CRZ (which contains a decontamination line) and be inspected for proper PPE apparel. Personnel exiting the EZ must proceed through the CRZ (i.e. decontamination line) to further reduce the spread of contamination. When personnel have proceeded through the CRZ, they must then go directly to the shower trailer. All personnel who have had direct contact with hazardous materials must shower at the on-Site hygiene facilities.

The Support Zone is the clean area. All trailers (office, breaks, laboratory, etc.) will be in this area. Office and break trailers are the only authorized smoking areas.

It is expected that there will be several Exclusion Zones, including the excavation face, staging and sampling area, storage area, bulking area and incinerator area.

C.4 TRAINING

C.4.1 INITIAL TRAINING

All employees must be certified to work on a hazardous waste Site by meeting the training requirements of 29 CFR Part 1910.120. New employees will be trained prior to assignment at the Site. As well, all project employees must attend an approved orientation and basic safety program before their assignment to the RA project.

This shall be a combination of formal classroom instruction, demonstration, and practical exercises in the following subject areas.

Hazard Awareness

Describing the chemical, physical, biological and radiological hazards that may be encountered in the workplace.

Employee Rights and Responsibilities

Describing safety operating philosophy, employee information sources, and material safety data sheets.

Safe Work Practices

Describing the purpose for the application of work zones, contamination control and decontamination procedures.

Personal Protective Equipment

. Instruction in the selection, use, maintenance, and limitations of the equipment; demonstration of proper use; and practice drills.

Emergency Preparedness

Describing the employee's Site specific duties during emergency conditions.

Training Evaluation

A written examination of all material concerns in the training course.

C.4.2 REFRESHER TRAINING

Regular refresher training in basic hazard awareness shall be provided to employees at least annually.

C.4.3 SPECIAL TRAINING

Many standards promulgated by OSHA explicitly require the employer to train employees in specific health and safety aspects of their jobs.

Some OSHA standards require employers to limit certain job assignments to employees who are "certified", "competent", or "qualified", meaning that they have had special previous training. Examples of job assignments that require special training include, but are not limited to:

- welding, cutting and other hot work;
- confined space entry;
- forklift truck operation;
- hazardous materials handling (e.g. PCBs);
- first-aid and CPR;
- fire fighting; and
- compressed gas and compressed air equipment use.

C.4.4 SITE SAFETY OFFICER TRAINING

The Site Safety Officer (SSO) shall be properly trained and must have a minimum of two years of work experience in areas of hazardous chemical handling and disposal.

C.4.5 EMPLOYEE NOTIFICATION/INFORMATION

The SSO shall provide employees proper information and notification including air sampling results and material safety data sheet information.

C.4.6 TRAINING CERTIFICATION

Written certification of training will be provided for all employees before they will be allowed to work on Site. Each employee's file will contain medical monitoring and respiratory protection certification, as discussed in Section C.5.

C.5 MEDICAL

C.5.1 MEDICAL SURVEILLANCE

Examination Requirements

All Site personnel, including any subcontractors, shall have successfully completed a pre-placement or periodic/update medical examination prior to their assignment to the project (as required by 29 CFR 1910.120). The evaluation shall include, at a minimum:

- A review of medical, personal, family and occupational histories;

- A full physical examination;

- Physical examination and clinical evaluation of the employee's ability to:
  - a) wear respiratory protective devices and protective apparel;
  - b) to tolerate strenuous work and heat stress conditions; and
  - c) to work with hazardous materials.

- Clinical tests:
  - PA chest x-ray;
  - Pulmonary function (FEV 1.0) and (FVC) including resting EKG;
  - Audiometry (approved booth);
  - CBC with differential, hematocrit;
  - Blood chemistry (SMAC 23 test survey);
  - Urinalysis (including mercury);

- Vision screening; and
- Any other tests deemed appropriate by the examining physician.

C.5.2 EMERGENCY MEDICAL TREATMENT

Emergency medical treatment is integrated into the overall emergency contingency plan. The provisions for emergency medical treatment include:

a) Training in first-aid and CPR for key project personnel;

b) Appropriate first-aid and CPR supplies and equipment;

c) Specific written medical emergency decontamination procedures, including written instructions for ambulance crews and hospital personnel as appropriate;

d) Conspicuously posted notices giving the names, phone numbers, addresses, and procedures for contacting the on-call physician, ambulance, medical facility, emergency fire and police services, and poison control hotlines (emergency telephone numbers are provided in Section C.10);

e) Appropriate maps and directions to emergency medical facilities (see Figure C.1 and C.2);

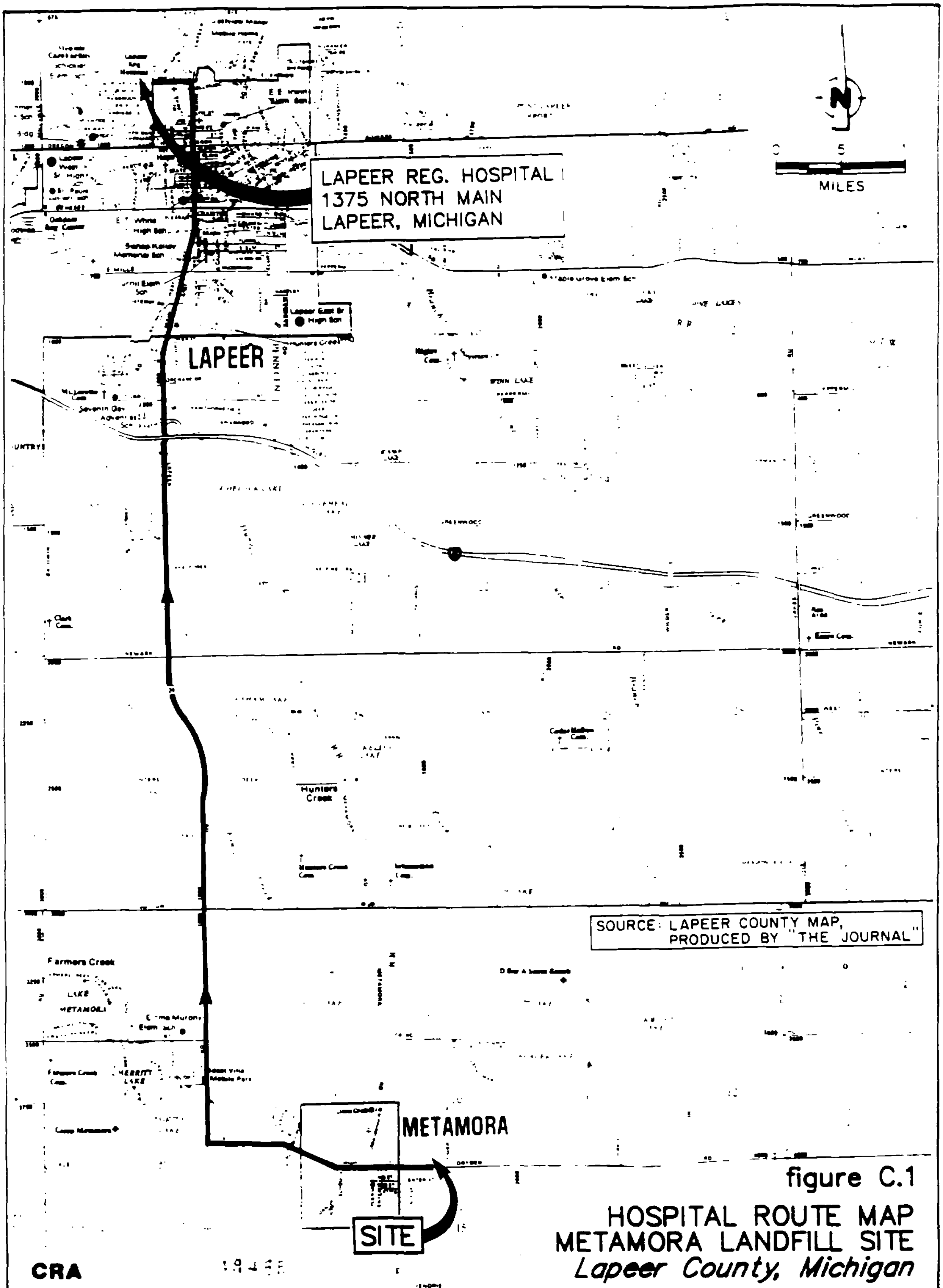

figure C.1

HOSPITAL ROUTE MAP
METAMORA LANDFILL SITE
Lapeer County, Michigan

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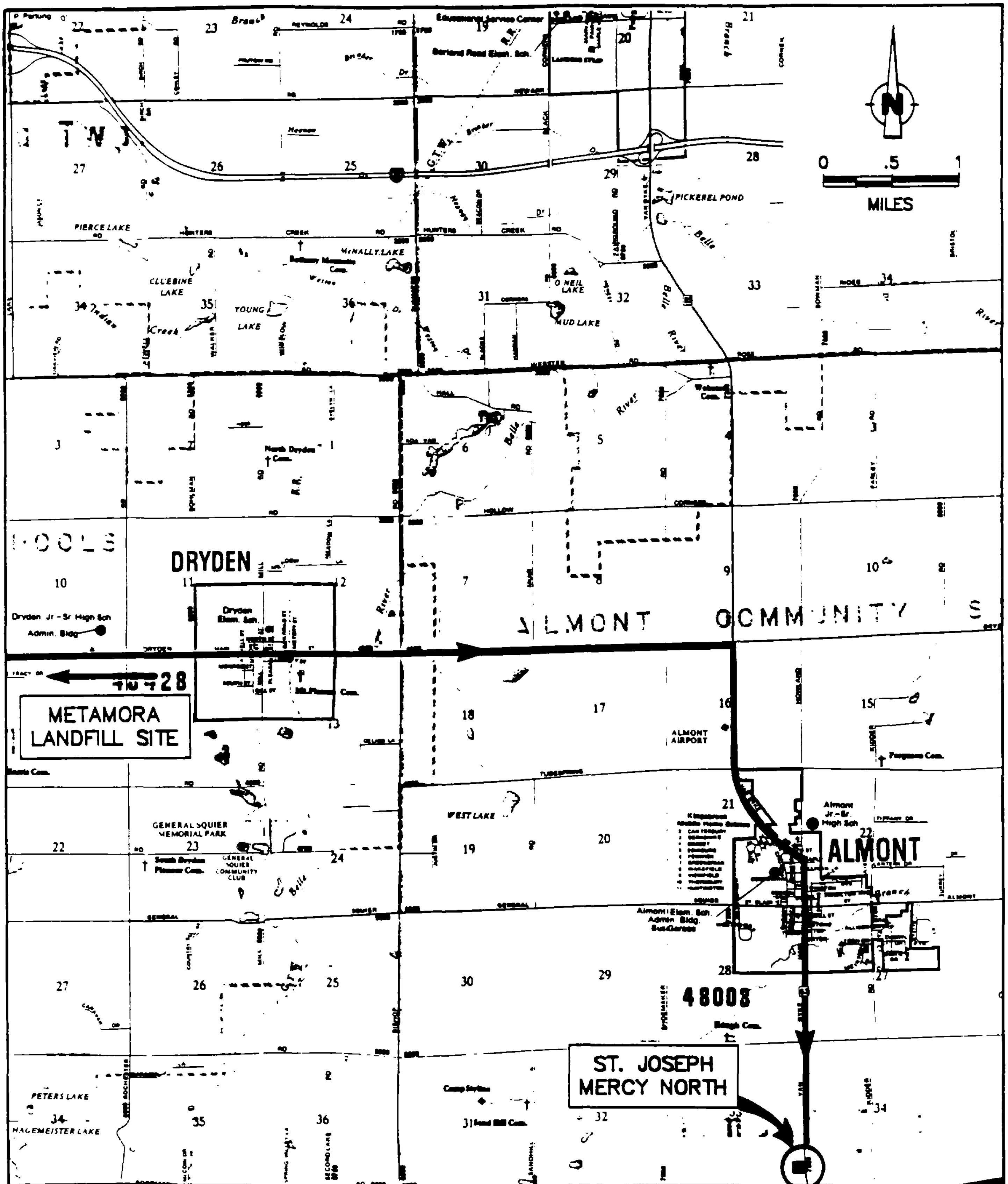

SOURCE: LAPEER COUNTY MAP
PRODUCED BY "THE JOURNAL"

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figure C.2
HOSPITAL ROUTE MAP
METAMORA LANDFILL SITE
Lapeer County, Michigan

3298–1/10/91–16–0

f) Periodic review with Site personnel of the emergency medical treatment procedures; and

g) Prompt and accurate reporting of all accidents and incidents consistent with established procedures.

1. Lapeer County General Hospital
   - exit right from Site on Dryden Road
   - travel 2 miles west on Dryden Road
   - turn right on M-24 to Lapeer
   - travel 8 miles north on M-24 through Lapeer
   - Lapeer County General Hospital @ 1375 North Main Street (M-24) on left.

2. St. Joseph Mercy North
   - exit left from Site on Dryden Road
   - travel 11 miles east on Dryden Road
   - turn right on VanDyke to Almont
   - travel 4.5 miles south on VanDyke through Almont
   - St. Joseph Mercy North @ 80650 VanDyke

Each of these routes will be tested prior to initiating Site activities. The route will be tested routinely during the project to determine if there are construction zones requiring detours.

C.6 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Selection of appropriate PPE will be based on the contaminant type(s) concentration(s) and routes of exposure. Selection of appropriate protection levels will consider all potential exposures to provide adequate worker protection.

. The major objectives of the PPE programs are to select equipment appropriate to and approved for the hazards; to ensure that the devices are introduced to users with a clear and complete explanation of their protection value and method of proper use; and, to assign supervisory responsibility ensuring proper use and continued maintenance of the d 'ices.

C.6.1 LEVELS OF PROTECTION AND EQUIPMENT REQUIREMENTS

The Contractor shall provide uniforms to its field employees to be worn on Site. These uniforms are to be worn under the appropriate disposable chemically resistant suits. At the end of the work shift the uniforms are removed and washed on Site. The employee then takes a shower in the decontamination trailer and leaves the Site wearing personal street clothes. Extra uniforms will be available on Site during the day in the event that a disposable chemically resistant suit tears and the uniform is contaminated. In this situation the employee will be required to doff his or her PPE and proceed to the personnel decontamination trailer for a shower and a change of uniform.

Appropriate personnel protection shall be worn according to predetermined material exposure levels. The required safety equipment and clothing must be available on Site before work is to begin. Protective equipment and criteria is provided below for Levels B and C.

Level B Conditions

Level B indicates that the highest degree of respiratory protection is required, but Site materials do not present a danger to small unprotected areas of the skin. The criteria for Level B include:

- Atmospheres are "immediately dangerous to life and health" (IDLH)
- Oxygen deficient atmosphere
- Exposure of unprotected parts of body is unlikely
- >5 ppm total organic vapors (unknowns) as read by a Photo Ionization Detector (PID)

Level B Equipment

- Open circuit positive pressure Self Contained Breathing Apparatus (SCBA) or Type C hoseline pressure/demand respirator with escape unit
- Two piece, hooded, chemically resistant suit
- Chemical resistant inner gloves
- Chemical protective outer gloves
- Chemically protective inner and outer boots
- Safety boots with steel toe and shank

- Two-way radio communications (intrinsically safe)
- Hard hat
- *Face shield*

Level C Conditions

Level C indicates that required respiratory and body protection is less than Level A and B. Criteria for Level C is as follows:

- Level C can only be worn if air born contaminants can be identified, so that proper warning properties and cartridges can be assured. This is also providing that the oxygen levels are not less than 19.5 percent.
- Exposure of unprotected parts of the body is unlikely.

Level C Equipment

- Air purifying respirator (MSHA/NIOSH approved) (full face respirator will be required on exclusion zone)
- Chemical resistant clothing
- Overalls and long-sleeved jacket or coveralls
- Two-piece hooded, chemically resistant splash suit
- Chemically protective outer gloves
- Hard hat
- Face shield
- Chemically protective outer boots with inner safety boots with steel toe and shank

C.7 SITE CONTROL

Site Control will be maintained through a series of boundary areas, checkpoints, and physical security. The purpose of Site Control is to delineate contaminated areas from non-contaminated areas, to prevent possible spread of contamination, minimize on-Site personnel from contamination, protect and prevent unauthorized personnel from entry into the contaminated area and/or the general area.

A Site plan shall be posted depicting the following areas:

a) Topography
b) Prevailing winds direction
c) Drainage
d) Buildings
e) Containers
f) Stockpile holding area
g) Roads
h) Nearest inhabited area
i) Houses
3) Towns, etc.

(See Plan 3 of IWP)

SITE WORK ZONES

The possibility of exposure or translocation of contaminants are reduced or eliminated in a number of ways, including:

- Setting up security or physical barriers to exclude unnecessary personnel from the general area.
- Minimizing the number of personnel and equipment on Site consistent with effective operations.
- Establishing work zones within the Site.
- Establishing control points to regulate access to work zones.
- Conducting Operations in a manner to reduce the exposure of personnel and equipment.
- Minimizing the airborne dispersion of contaminant(s).
- Implementing appropriate decontamination procedures.

FIELD OPERATIONS WORK AREAS

Work areas (zones) will be established based on anticipated contamination. Within these zones prescribed operations will occur utilizing appropriate PPE. Movement between areas will be controlled at checkpoints. The planned zones are discussed below:

i) Exclusion Zone

The Exclusion Zone is the innermost area of three (3) concentric rings and is considered contaminated, dirty or "hot". An entry checkpoint will be established at the periphery of the Exclusion Zone to control the flow of personnel and equipment between contiguous zones and to ascertain that the procedures established to enter and exit the zones are followed. Subsequent to initial entry and as cleaning proceeds, the boundary will be readjusted based on observations and/or measurements. The boundary will be physically secure and posted.

ii) <u>Contamination Reduction Zone</u>

Between the Exclusion Zone and the Support Zone is the Contamination Reduction Zone (CRZ). The purpose of this zone is to provide an area to prevent or reduce the transfer of contaminants which may have been picked up by personnel or equipment returning from the Exclusion Zone. All personnel and equipment decontamination occurs in this area.

The boundary between the Support Zone and the CRZ is the contamination control line. This boundary separates the possibly contaminated area from the Support Zone. Entry into the CRZ from the Support Zone will be through an access control point.

Personnel entering this station will be wearing the prescribed PPE for activities in the CRZ. Exiting the CRZ to the Support Zone mandates the removal of any suspected, or known, contaminated PPE and/or compliance with the decontamination procedures. At the boundary between the CRZ and the Exclusion Zone is the "hotline" and access control station. Entrance into the Exclusion Zone requires the wearing of the prescribed PPE.

iii) Support Zone

The Support Zone is the outermost of the three (3) rings and is considered a non-contaminated or clean area. It contains the Command Post and/or Field Headquarters trailer for field operations and other elements necessary to support Site activities. Normal street work clothes are the appropriate apparel within this zone. The Support Zone will also contain parking facilities and a materials receiving area.

SITE SECURITY

Site security will be used to:

- Prevent exposure of unauthorized personnel;
- Avoid the increased hazard from vandals or persons seeking to abandon other waste on Site; and
- Avoid interference with safe working procedures.

Duty Hours

- Security maintained during working hours at entrance to Site by a security company.

- All personnel must sign in and out at the entrance to the Support Zone.

- All personnel must have proof of training, respiratory fit test, and a certificate of medical fitness to enter the CRZ.

- Personnel who are new to the Site will be briefed on the Site as to the emergency procedures they are expected to follow in the event of an accident. This DOES NOT include vendors dropping off supplies or subcontractors (i.e. electrical, phone, etc.).

- The perimeter of the Exclusion Zone will be a constructed barrier. The barrier will have warning signs placed every 50 yards along its length and width.

<u>After-Duty Hours</u>

No one is allowed on Site after hours except the following individuals:

- Project Manager;
- Project Coordinator; and
- Members of Contractor's work crew.

All personnel will sign in and out at all times.

After-hours phone numbers for U.S. EPA, the Engineer, the Contractor, and other emergency personnel will be posted in the Security Trailer and on bulletin boards in office trailer and break trailers.

The security force will be briefed on the Site and their responsibilities in the event of unauthorized intrusion or an accident/incident.

Additional Site security information is provided in the Site Security Plan presented as Appendix B of the IWP.

COMMUNICATIONS

The following methods of communication shall be utilized on Site.

A. Internal (Radio intrinsically safe)

Radios will be used for normal communications between the office trailers, the laboratory and field crews. All Site personnel will be alerted in the event of an accident/incident. Hand and arm signals will be used in the event radios fail. Hand and arm signals are described in the SSHASP. All communications shall be in accordance with 29 CFR 1910.120 (j)(5)(iv).

B. BUDDY SYSTEM

- Provide assistance to partner
- Observe partner
- Checks partners PPE
- Notifies support personnel for assistance in case of emergency

C. EXTERNAL (TELEPHONE)

The external telephone (or cellular telephone) will be used to communicate to off-Site agencies (fire department, police department, U.S. EPA). Emergency telephone numbers are identified in Section C.10.

C.8 DECONTAMINATION PROCEDURES

As part of the system to prevent or reduce the physical transfer of contaminants by people and/or equipment on Site, safety procedures will be instituted for decontaminating anything leaving the Exclusion Zone and CRZ. These procedures include the decontamination of personnel, protective equipment, monitoring equipment, clean-up equipment, etc. Unless otherwise demonstrated, everything leaving the Exclusion Zone should be considered contaminated and appropriate methods established for decontamination. In general, decontamination at the Site consists of rinsing equipment, personnel, etc., with detergent/water solution. If contaminants are known, then a specific detergent and/or solvent can be used to decontaminate. The spent solution, contaminated clothing, brushes, sponges, containers, stands, etc., used in the decontamination process will, until shown otherwise, be considered contaminated and must be properly disposed. Disposal will involve placing all contaminated articles in DOT specified drums, affixing proper labels and disposed as a hazardous

C.8.1 PERSONNEL DECONTAMINATION

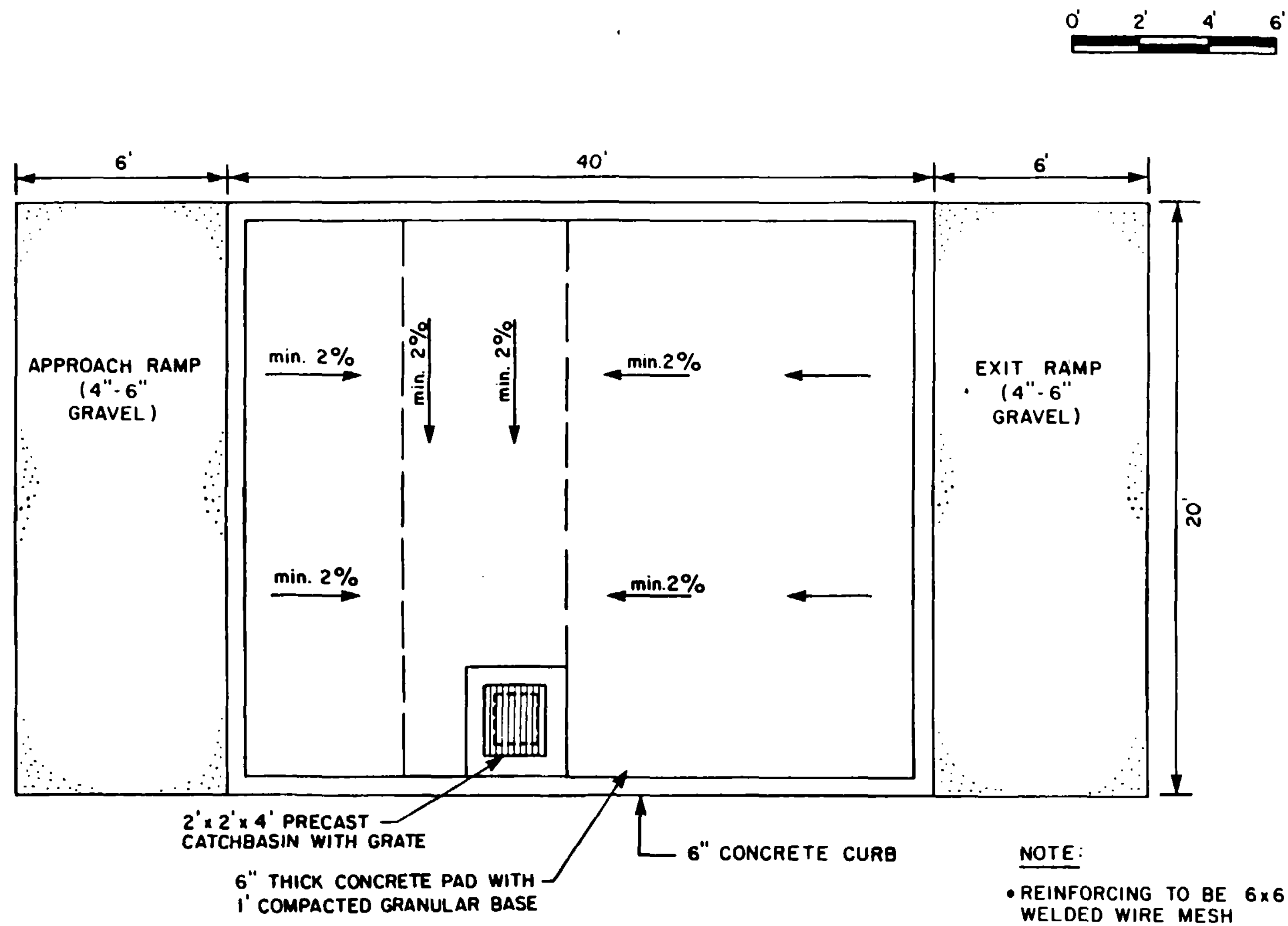
The Contractor will mobilize personnel decontamination trailers (PDTs) to the Site (as required) for personnel decontamination. The PDT is a self-contained unit which contains facilities for showering and changing. Once on Site, the PDT forms the control for the worker access to the Exclusion Zone. In order to enter the Exclusion Zone, all personnel and visitors will be required to proceed through the PDT to don the appropriate level of PPE.

At the end of a shift and whenever leaving the Exclusion Zone, all personnel will be required to remove protective equipment and discard disposable garments and equipment in drums for disposal as hazardous waste. Reusable equipment will be pressure washed and will remain in the CRZ. All wash water generated from this process will be containerized for proper handling and disposal. All personnel will shower and change into clean clothes before leaving the PDT.

C.8.2 HEAVY EQUIPMENT AND VEHICLE DECONTAMINATION

An area adjacent to the CRZ will be constructed to decontaminate heavy equipment and vehicles exiting the Exclusion Zone.

This area will be large enough for the heaviest equipment on Site. The area will be constructed of impermeable surface sloped to a sump area. Water or decontamination solution collected here will be pumped to a holding tank. Heavy dirt and mud will be scraped off before the heavy equipment or vehicles enter the decontamination pad. As heavy equipment or vehicles enter the decontamination pad, track and tires should be sprayed as they move into the pad. A detail of the decontamination pad is shown on Figure C.3.



NOTE:

- REINFORCING TO BE 6x6x6 WELDED WIRE MESH
- FINAL DIMENSIONS TO BE DETERMINED

figure C.3

PLAN VIEW OF DECONTAMINATION FACILITY
METAMORA LANDFILL SITE
Lapeer County, Michigan

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The outside and top to bottom of heavy equipment and vehicles will be decontaminated before the inside. Personnel operating on the decontamination pad must be aware of possible electrical hazards while spraying water or decontamination solution. Batteries should be disconnected or covered to prevent electrical shock (if required). Personnel should also stay to the upwind side when decontaminating equipment and stay out of the overspray.

C.9 WASTE HANDLING

Accidents may occur during handling of drums and other hazardous waste containers. Hazards include detonations, fires, explosions, vapor generation, and physical injury resulting from moving heavy containers by hand and working around stacked drums, heavy equipment and deteriorated drums. While these hazards are always present, proper work practices such as minimizing handling and using equipment and procedures that isolate workers from hazardous substances can minimize the risks to Site personnel.

C.9.1 GENERAL SAFE WORK PRACTICES

The following provides a summary of safe work practices:

1. Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand to mouth transfer and ingestion of material is prohibited in any area where the possibility of contamination exists.

2. Hands must be thoroughly washed upon leaving a contaminated or suspected contaminated area before eating, drinking, smoking, or conducting any other activities.

3. Employees shall be required to shower at the end of the work shift whenever decontamination procedures for outer garments are in effect.

4. Legible and understandable precautionary labels shall be prominently affixed to containers of materials, mixtures, scrap, wastes, debris, and contaminated clothing.

5. Contaminated protective equipment shall not be removed from the regulated area until it has been cleaned or properly packaged and labeled for disposal.

6. Removal of materials from protective clothing or equipment by blowing, shaking, or any other means which may disperse materials into the air is prohibited.

7. Portable or fixed emergency shower/eyewash stations shall be strategically located throughout the regulated area.

8. A deluge shower or hose and nozzle shall be available in the CRZ to wash down heavily contaminated personnel before doffing protective clothing.

9. Personnel will be cautioned to inform each other of subjective symptoms of chemical exposure such as headaches, dizziness, nausea and irritation of the respiratory tract, eyes, or skin.

10. No excessive facial hair which interferes with a satisfactory fit of the mask-to-face seal, will be allowed on personnel required to wear respiratory protective equipment.

11. Adverse climatic conditions, heat and cold, are important considerations in planning and conducting Site operations. The effects of ambient temperature can cause physical discomfort, loss of efficiency, personal injury, and increased accident probability. In particular, heat stress due to protective clothing decreasing body ventilation is an important factor. One or more of the following recommendations will help reduce heat stress. Their applicability is dependent on evaluating the climatic conditions specific to the operations.

    a. Provide plenty of liquids to replace loss of body fluids. Employees should replace water and salts lost from sweating. Use either a 0.1% salt water solution, more heavily salted foods or commercial mixes such as Gatorade or other electrolyte products. The commercial mixes may be preferable for employees on low sodium diets.

    b. Establish a work schedule that will provide sufficient rest periods for cooling down. This may require shifts of workers when wearing suits and SCBA.

    c. Cooling devices, such as vortex coolers and cool vests, may be worn under suits.

d. Establish work regimes consistent with the American Conference of Government and Industrial Hygienists (ACGIH) Guidelines.

e. Provide employee monitoring consistent with the OSHA guidelines.

f. Cold stress control measures will be prescribed and implemented (as necessary).

C.9.2 DRUM INSPECTION

As drums are uncovered from the excavation, the drum inspection crew will visually inspect the containers to gain as much information as possible about their contents. The inspection crew will look for the following clues:

- Symbols, words or other marks which may indicate contents as the following:
  - radioactive
  - explosive
  - corrosive
  - toxic
  - flammable
  - lab pack

- *Signs of deterioration* caused by corrosion, rust, and leaks.

- Drums that may be swelling or bulging due to pressure.

C.9.2.1 Type of Drum

The configuration of the drum head may give a clue as to possible contents of the drums. 17H drums have a whole lid that is removable and also identified by the large ring and bolt used to close the drum. This type of drum is designed to contain solids.

17E drums are tight-head drums. The lid is not designed to be removed. Normally, this drum will have bungs in the top. This drum is designed to contain liquids.

Personnel will be cautioned that although the words, symbols, type of drum may give clues as to drum contents, these clues are not certain and actual. Contents could be completely different than what is indicated.

C.9.3 HANDLING

The initial handling of drums will be accomplished by using heavy equipment equipped with drum grabbers or drum slings to remove the drum from the excavation. The equipment will then lower the drum into an overpack.

Drums that are leaking will be overpacked as soon as they are pulled from the excavation. Open drums will be closed by placing new lids, bungs or plastic covers over the opening. If this does not seem feasible, the drums will be overpacked in place.

Drums which are deteriorated, rusted through or very weak will be overpacked in place.

The overpacked drum will then be moved by forklift equipped with drum grabber or drums will be placed on a pallet.

In the drum storage area, drum carts will be used to move drums short distances. Manual drum handling will be kept at a minimum. Before drums are moved to the initial staging area, they will be swept by a radiation detection instrument. If no radiation is detected the drum will be moved to the initial staging area. If the drum does contain radioactive material it will be isolated and then be handled by a company which specializes in radioactive materials.

C.9.4 OPENING CONTAINERS

Most drums can be opened by hand using a bung wrench or an air operated bung wrench. In cases where the bungs cannot be opened with a bung wrench, a backhoe (or equivalent) with a non-sparking piercer will be used to open the drums. This method will also be used to open pressurized drums or suspected pressurized drums. Picks and chisels will not be used to open drums.

Extreme caution will be used to open exotic metal drums (stainless steel, aluminum, nickel). A minimum number of personnel will be involved in this type of operation. These drums will be opened last. All other drums will be removed from the area to reduce the danger should the exotic metal drums cause a fire or explosion. All openings will be completed remotely. Some plastic drums may have to be opened by using an air operated drill. This may be the only method to be used to gain access inside the drum. If after opening a drum and the drum contains smaller containers, this drum will be considered a lab pack. The smaller containers will not be opened except by specially trained personnel.

After drums have been opened and sampled, the drums will be closed by one of the following methods:

- Bungs will be replaced.
- If bungs cannot be replaced, plastic caps will be taped on to the top of the drum or drums will be overpacked.

C.9.5 SAMPLING

Once the drums have been opened by the above procedures, drums will be staged to be sampled. Sampling will be completed by using methods stated in the SAP and the QAPP.

C.9.6 STAGING.

As drums are removed from the excavation they will be initially staged by type of drum and size. Drums will then be moved to an opening area. The drums will be opened, sampled, resealed and moved to the holding area to await sampling results. All drums must be sealed or overpacked. Drums will be segregated by class of content based on the results of the fingerprint analysis. Drums will be stored in rows two drums wide with ten feet between rows. Fork trucks and drum carts must be able to operate in this area without causing damage to drums.

C.9.7 BULKING AREA

The final step in drum handling will be the drum bulking area. Drums will be bulked using a pump or other appropriate means.

C.9.7.1 VacTruck and Pump Components:

- Hose connection must be compatible with materials being bulked.
- Hose connection will be secured to prevent accidental opening and causing a spill.
- When bulking flammable materials, the pumps or other appropriate means will be bonded and grounded.

C.9.8 INCINERATOR FEED STOCK AREAS

Incinerator feed stock areas shall be constructed and operated in a manner to minimize gaseous and particulate releases of waste materials. Remedial options may include the use of a ventilation hood or equivalent.

C.10 SITE EMERGENCY CONTINGENCIES

C.10.1 SITE EMERGENCY WARNING SYSTEM

Several warning systems may be utilized depending on the work Site conditions or emergency involved:

- Verbal communications
- Verbal communications assisted with a bull horn
- Radio communications
- Vehicle horns
- Portable hand-held compressed gas horns

Verbal instructions with or without assistance are used to deal with specific incidents.

Radio communications are used on Site to give instructions and directions. Emergency radio communications are prefixed as such and have priority over operations communications.

Horn signals are used to signify an emergency warning. Repeated short blasts are used on Site or from off Site to signify evacuation of all personnel from the Site to the CRZ or support zone where further instructions will be given after a head count is taken.

C.10.2 EMERGENCY EQUIPMENT

The following equipment shall be available at the work Site depending on the nature of the remedial activities to be performed:

- Fire extinguishers - dry chemical
- First-aid kits (including chemical burn kit)
- Emergency oxygen kit
- Emergency shower kit (pressurized)
- PDT (personnel decontamination trailer)
- Fire blankets
- Litters
- Portable two-way radio equipment
- Hand-held compressed gas horns
- Bull horns
- Appropriate spill cleanup supplies and equipment (see Spill Control Plan)

C.10.3 EMERGENCY PROCEDURES

In case of an emergency or hazardous situation, the team member that observes this condition shall immediately give the alarm.

1. Upon hearing the alarm, all non-emergency communications will cease and the member giving the alarm will proceed to give the Project Manager all pertinent information.
2. Actions to be taken will be dictated by the emergency.

3. Power equipment will be shut down and operators will stand by for instructions.
4. Injured personnel will be transported to the Personnel Decontamination Trailer (PDT)
5. Contractor's Command Post (CP) will be notified immediately.
6. In case of a fire, explosion or hazard alarm, individuals will proceed immediately to assigned pre-located safe sites.
7. Upon arrival at the safe sites, a complete head count will be given to Project Manager and individuals will stay at the safe site until the area is secured.

Emergency phone numbers are:

Agency/Facility	*Phone*	*Contact*
Police	(313) 664-1801	Lapeer Co. Sherriff
Fire	(313) 664-1801	Lapeer Co. Fire Dept.
Ambulance	(313) 664-1801	Lapeer Co. Ambulance Service
Hospital	(313) 664-8511	Lapeer Reg. Hospital
Emergency Coordinator	(313) 667-0366	John Biscoe
U.S. EPA	(312) 886-6337	Linda Nachowicz
U.S. EPA	(312) 353-2318	Emergency Response

The following provides a summary of local organizations and information sources which may be utilized during emergency response activities:

1. <u>Ambulance:</u> Lapeer County Ambulance Service
106 Calhoun Street
Lapeer, Michigan 48446
Telephone (313) 664-1801 Emergency only
(313) 664-2927 Business

2.	Police and Fire:	Lapeer County Sheriffs Department 2408 W. Genesee Street Lapeer, Michigan 48446 Telephone (313) 664-1801 (Emergency)
		Michigan State Police Lapeer Post Telephone (313) 664-2905
3.	Lapeer Fire Department	2300 West Genesee Street Lapeer, Michigan 48446 Telephone (313) 664-2111 Dispatch (313) 664-1801 (Emergency)
	Metamora Fire Department	Metamora Township Hall 730 West Dryden Road Metamora, Michigan Fire Chief (home) (313) 678-2908 Fire Chief (work) (313) 678-2577 Dispatched through Lapeer Fire Department @ (313) 664-1801
4.	Local Hospitals:	Lapeer County General Hospital 1375 North Main Street Lapeer, Michigan 48846 Telephone (313) 664-8511
		St. Joseph Mercy North 80650 Van Dyke Almont, Michigan 48003 Telephone (313) 798-8551
5.	Lapeer County Emergency Coordinator	John Biscoe Telephone (313) 667-0366 1-800- 572-1655
6.	Poison Control Information	Southeast Regional Poison Center Children's Hospital 3901 Beaubien Detroit, Michigan 48003 Telephone (313) 257-9111 1-800-572-1655

		Hurley Poison Center 1 Hurley Plaza Flint, Michigan 48503 Telephone (313) 257-9111
7.	Lapeer County Health Department	Ray Gaynier, Director Environmental Health Division Lapeer, Michigan 48446 Telephone (313) 667-0392
8.	U.S. EPA	Linda Nachowicz Telephone (312) 886-6337 Emergency Response Telephone (312) 353-2318 (Emergency)
9.	MDNR	Emergency Number Telephone 1-800-292-4706 1-800-292-0248 (24 hour)
10.	Chemtrec	Spill Response Information Telephone 1-800-424-9300 (24 hour)
11.	*Poison Control*	Telephone 313-257-9111 1-800-572-1655
12.	National Response Center	Telephone 800-424-8802 (24 hour)

C.10.4 PERSONAL INJURY

If an injury occurs due to an accident or exposure to a hazardous substance, the Contractor's CP will be immediately notified by radio. The SSO will be given all appropriate information concerning the nature and cause of the injury so that treatment preparations can be initiated. The injured person will be transported to the hotline where appropriate first-aid treatment can begin. The Project Manager will be informed and will investigate the cause of the injury and make any necessary changes in work procedures.

Additional emergency response procedures are presented in the Emergency Response/Contingency Plan presented as Appendix A of the IWP.

C.10.5 AMBIENT MONITORING CONTINGENCIES

When ambient monitoring on the downwind edge of the Site indicates higher than background levels of any contaminant, the SSO and Contractor's Project Manager (PM) will immediately determine the cause, make changes to work practices or procedures, and if necessary, make changes in Site layout (i.e., change the location of CP, CRZ, or Exclusion Zone). Additionally, the SSO or PM will warn unprotected personnel to evacuate or don protective equipment or shut down all activities (if required). The SSO or PM will also determine the necessity (in consultation with the U.S. EPA on-Site representative) to contact local authorities to effect off-Site evacuation (if required).

D

APPENDIX D

SPILL CONTROL PLAN

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LIST OF ATTACHMENTS

D.1 <u>SPILL CONTROL</u>

All waste materials spilled in areas which are not contained and are uncontaminated will be classified as a spill. The on-Site Engineer will be notified <u>immediately</u> of all waste spills.

Concurrent to the cleanup activities, the Site Safety Officer (SSO), on-Site chemist and Project Manager should evaluate the magnitude of the spillage and determine if the degree of resultant hazard warrants work stoppage. The Project Manager should be informed of the situation as soon as possible.

The SSO must first determine the extent of the problem. The SSO determines the nature of the fingerprint analysis which may be necessary. If the SSO decides that Site evacuation is required, the SSO will implement the Work Site Evacuation System. If necessary, he makes arrangements to obtain special equipment to contain and clean up the spill. The SSO is also responsible for contacting federal, state and local authorities when necessary. The Spill Response Coordinator (SRC) determines the potential for fire associated with the spill.

Once these basic determinations have been made, the SRC directs the spill response. Personnel should wear protective clothing and equipment for the particular chemical hazards involved.

Spill response equipment and personnel trained in spill response must be present on Site and operational in case of a spill. A contingency plan must be developed to react to potential spills. The plan should be approved by the Project Manager and distributed to the appropriate personnel.

Equipment available on Site for spill response will include at a minimum:

- oil dry, clean fill or corn cob;
- 55-gallon drums;
- shovels, heavy equipment, i.e. loader, backhoe;
- pumps;
- decontamination facilities; and
- overpacks.

These materials shall be strategically located near the excavation area, staging area, bulking area, storage area and incineration area. Additional materials will be maintained on a pallet to allow an immediate response to potential spill conditions should thus develop.

D.1.1 SPILL CONTROL-LIQUIDS

In general, a liquid spill is contained by surrounding the spill with berms of absorbent material. In the event of a large spill, earth berms may be constructed around the spill. The spill must be prevented from entering surface water or sewer drainage systems. The goal of containment is to minimize contamination.

All spilled liquids will be solidified with an appropriate absorbent as soon as possible (i.e. after the spill is completely contained). The resulting solidified waste will be transferred into drums. The on-Site Engineer representative will designate appropriate handling for the drummed material.

Should the spill drain into a waterway, the liquid should be treated, vacuumed by a tank truck or dammed to prevent further contamination. The surrounding area must be treated for contamination after spill containment.

Immediate measures will be taken to control and contain all spills. The following actions will be taken:

1. Keep unnecessary people away, isolate hazardous areas, and deny entry.
2. Do not allow anyone to touch spilled material.
3. Stay upwind and keep out of low areas.
4. Keep combustibles away from the spilled material.
5. Use water spray to reduce vapors, as needed.
6. Other actions, as needed.

In the event of an area becoming contaminated as a result of a spill, clean soil will be placed over this area to eliminate further contact contamination. The on-Site Engineer will then be consulted to determine if any further cleanup of the area is required.

D.1.2 SPILL CONTROL - GASES

In the event of a gas leak from a cylinder, personnel should immediately utilize self-contained breathing air. The area will be cleared or the room sealed off to prevent gas from escaping to other parts of building (the building ventilation system may be left on or off depending upon the location of personnel and the surrounding community). Outside windows are opened in order to ventilate the room.

The SRC directs personnel to attempt to seal the leak using various tools in the Spill Response Kit. The cylinder is placed into an available fume hood, then the cylinder should be safety-shuttled outside to an isolated area or treated, if possible. Care must be taken to avoid breaking the valve or the gas container.

In the event of a large scale gas release, the Site Safety Officer (SSO), and Project Manager (PM) should be contacted immediately. All personnel in the vicinity must immediately don SCBAs. The nature of the gas should be determined and a decision to evacuate the Site may be made. Risk to nearby communities should also be assessed at this stage. Techniques to neutralize the gas should be assessed and implemented as soon as possible.

The SSO and PM shall determine the necessity to contact local authorities (in consultation with the U.S. EPA representative) to effect off-Site evacuation, if required.

D.1.3 SPILL CONTROL SOLIDS

In the event of a solid spill, the material should be appropriately moved into an overpack or other suitable container and labeled. The contaminated area surrounding the spill must either be treated or excavated until complete decontamination is achieved. The spread of contaminated dust should be prevented by covering or wetting the material, depending upon the size of the spill. Contact should be avoided with the material and proper safety precautions followed.

All contaminated materials will be contained and placed in the appropriate staging areas and properly disposed as soon as possible.

D.1.4 SPILL CONTROL SPILLAGE INCIDENT REPORTING

Upon completion of the cleanup, the SSO should complete an incident report if the spill is considered reportable by project standards. The report should include a description of the spill (i.e. what spilled, why, etc.), size of the spill, action taken (including equipment and methods used), local entities contacted, and personnel involved. The report should be signed by the SSO and reviewed and signed by the on-Site Engineer.

Copies of the report should be distributed according to project requirements. A file of incident reports should be maintained on Site.

All spills will be noted in a daily log. For spills determined to be significant by the Engineer or by law, a spill report shall be prepared. Examples of a Waste Spill Report and a Spillage Identification are provided in Attachment D.1.

ATTACHMENT D.1

REPORT #1

WASTE SPILL REPORT

Project: ________________________________

Date: ____________________ Time: ________

Location of Spill: ____

____

Description of Spill: ____

____

Action Taken: ____

____

Personnel Involved: ____

____

Spill Reported To:

____

AUTHORIZATIONS:

____________________________ ____________________________

Spill Response Coordinator U.S. EPA Representative

____________________________ ____________________________

Project Manager Other Authorized Signature

REPORT #2

SPILLAGE INDENTIFICATION REPORT

Reported By: ____________ Date: ______ Project: ___________

____

____

____

Spillage Content:

____

____

____

Equipment Needed:

____

____

____

Site Evacuation: [ ] YES [ ] NO

Fire Hazard: [ ] YES [ ] NO

Additional Comments: ____

____

____

Spill Response Coordinator: ____

Project Manager: ____

E

APPENDIX E

EROSION CONTROL PLAN

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E.1 EROSION CONTROL PLAN

E.1.1 INTRODUCTION

The purpose of the Erosion Control Plan (ECP) is to describe the measures necessary to provide for drainage to control erosion during remediation activities. Current drainage patterns already occurring shall be utilized to direct run-off water flow from rain and snow. This ECP may require revision depending on changes in the topography during the course of the project. The Engineer's on-Site representative will be notified of any condition that will alter this plan and the Contractor will receive approval on any revision.

It is assumed that the procedures described below have already been implemented during the initial phase of the project. They will be verified and carried through on the existing and any planned layout during the remainder of the project. The Contractor will be required to ensure that erosion control measures are implemented which are consistent with all local and state requirements.

E.1.2 EROSION CONTROL

A. Storage Pad

The drum storage pad constructed by CWM currently diverts a stormwater runoff to the north side of the pad. The culverts and drainage ditches constructed as part of the storage pad stormwater management system shall be routinely inspected and maintained. Maintenance may include:

1. excavation of ditches,
2. cleanout of ditches,
3. construction of berms,
4. grading,
5. placement of topsoil, and
6. grass seeding.

B. <u>Drum Area 1</u>

Stormwater management practices shall be employed in the Drum Area 1 vicinity on an as required basis. These practices will include:

1. constructing ditches or berms,
2. grading,
3. placement of hay bales or siltation fencing, and
4. construction of culverts.

The stormwater management system shall be routinely inspected and maintained.

C. Side Slopes

Excavation work performed in Drum Area 1 will require that side slopes with a minimum 1:1 ratio be maintained to prevent erosion. A flatter slope will be maintained if deemed necessary by the Engineer's representative and the Contractor's Project Manager.

The minimum slope also ensures that the excavation side slopes will not present a cave-in problem for personnel in the excavation areas.

D. Temporary Control

If the Engineer's representative determines temporary erosion and pollution control are required, hay bales shall be stacked or silt fences erected in the designated location. Hay bales will be rectangular-shaped. The hay bales will also be free from noxious weed seeds. Alternatively, landscape fabrics and/or soil stabilization materials may be utilized.

E. Maintenance

All roads, pads and ditches shall be maintained periodically as required to promote drainage and prevent erosion.

F. Documentation

Erosion control measures and routine inspections will be documented in the daily work reports. In the event of any problems arising, deviations will be made to the satisfaction of the on-Site Engineer. Follow-up inspections concerning these changes will be documented in the daily work reports.

F

APPENDIX F

DATA MANAGEMENT PLAN

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LIST OF FIGURES

F.1 INTRODUCTION

The Data Management Plan (DMP) presents procedures and protocols to track the progress, retention and/or storage of data collected during the excavation and incineration of waste materials.

F.1.1 SUMMARY

Data will be obtained from several sources during the course of Site remedial activities. The data provided by each source will be validated and compiled by the Engineer and if necessary the Contractor prior to its presentation to MLSSD and United States Environmental Protection Agency (U.S. EPA). The Engineer will present interpreted data in formal reports where the data is used to support conclusions and recommendations.

All documents used for and generated during the remediation will be stored and maintained in a unique project file. These project files will be maintained by the Engineer.

A duplicate file (or portions of the primary file) will be maintained on Site.

The DMP presented herein will identify procedures and protocols to be employed for managing all information, reports and correspondence associated with the RA to be conducted at the Site. The DMP is thus concerned with two separate tasks which are:

1. data management, and
2. document control.

The data management task consists of procedures used to handle and safeguard all data generated by field and laboratory programs. Document control consists of implementing procedures to physically track all documents associated with the RA. Both objectives are expanded upon in the following sections.

The Contractor retained by the MLSSD shall be required to implement data management procedures consistent with the methods identified in this DMP.

F.2 DATA REQUIREMENTS

Data requirements necessary to complete the RA are defined in the SOW.

The SOW identifies specific RA tasks which have been defined in the Incineration Work Plan (IWP) and Waste Excavation and Handling Plan (WEHP). Data acquisition activities may include, but not be limited to:

1) excavation log;
2) PRP physical evidence;
3) photographs;
4) video tapes;
5) sample collection;
6) waste compatibility data;
7) waste characterization data;
8) compliance monitoring data;
9) surveying information; and
10) computerized drafting.

F.3 DATA SOURCES

In general, data sources corresponding to a particular data requirement are identified in the WEHP and IWP. Data sources will include, U.S. EPA, MDNR, Lapeer County, Drilling Subcontractors, Subcontractor Laboratories, and additional data generated, gathered or collected by CRA. Figure F.3.1 summarizes the data sources which will be used during the course of the RA.

Data sources are subdivided into two major groups:

1. External Data Sources, and
2. Internal Data Sources.

The External data sources include groups such as regulatory authorities. The internal data sources include the Engineer and the Engineer's subcontractors.

Data collection from each individual source will be validated by the Engineer prior to its utilization (as required).

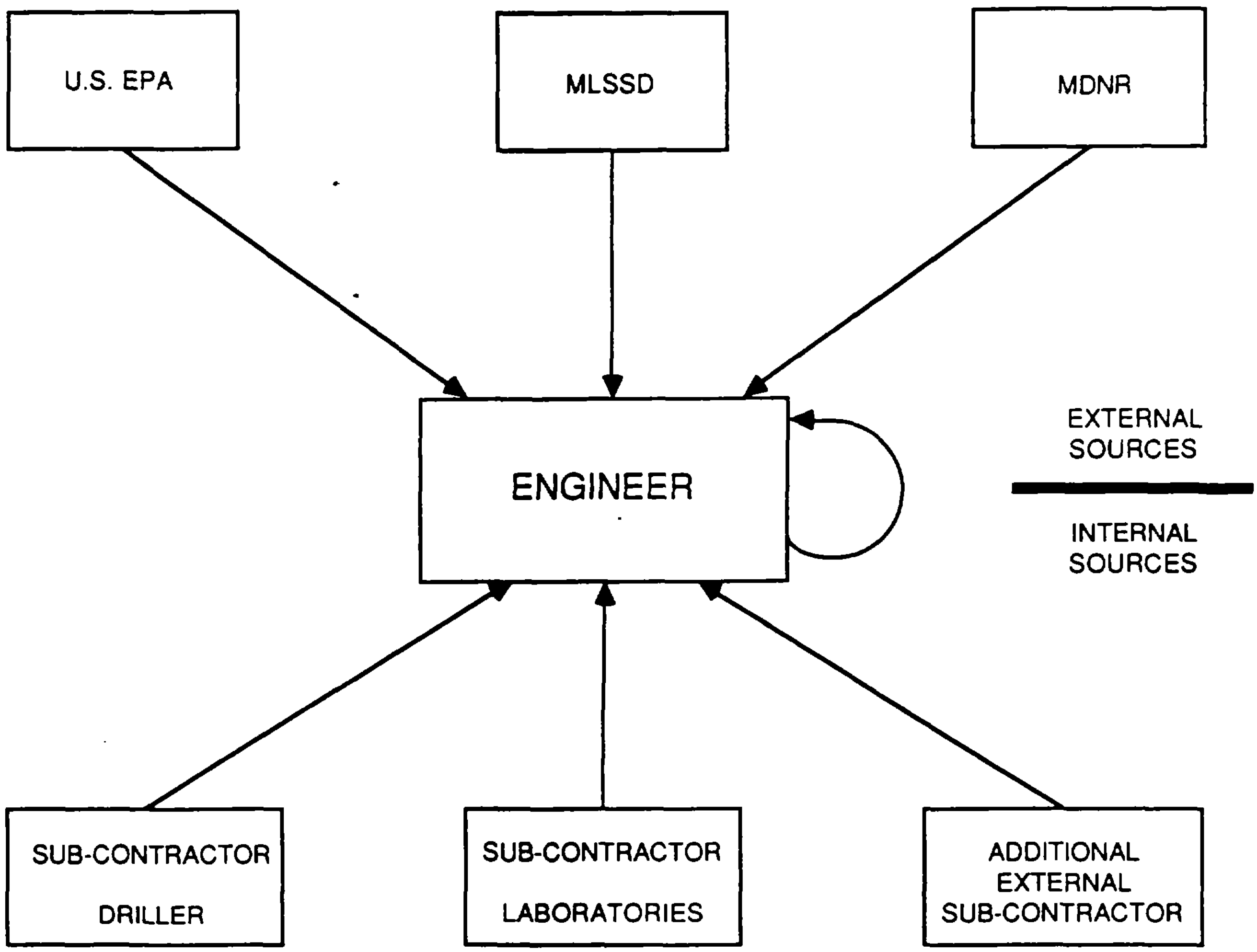


figure F.3.1

DATA SOURCES FLOW DIAGRAM
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298-7/9/91-16-TPG

F.4 DATA MANAGEMENT

Data generated from the field and analytical programs (internal data sources) will aid in forming the basis upon which decisions regarding the RA are formulated. The data management section of the DMP presents procedures and protocols relating to recording, retrieving and storing of all the field and laboratory data generated. For ease of discussion, the field and laboratory data can be categorized as follows:

1. field data,
2. laboratory analytical data and quality assurance/quality control (QA/QC) data.

These categories of data, and security procedures, will be discussed in the following sections.

F.4.1 MANAGEMENT OF FIELD DATA

Accurate and comprehensive recording of field operations will be achieved through the use of field logbooks, Field Data Sheets, cameras, tape recording devices and computers. Field data will include completing an excavation face log and collecting PRP evidentiary information.

F.4.1.1 Field Logbooks

The field logbook and Field Data Sheets are the primary means of recording Site-related information. A bound field logbook is used to record all pertinent Site data such as the following:

1. general field observations;
2. field measurements and observations;
3. sample locations and corresponding sample numbers;
4. relevant comments pertaining to the samples collected;
5. weather conditions;
6. a listing of all personnel involved in Site-related activities; and
7. an accurate log of all telephone conversations and Site meetings and visitors.

The field books generated will be numbered consecutively and maintained in a secure file room where they are not subject to potential damage.

F.4.1.2 Still Photographs

Still photographs provide a means of visually recording Site conditions and operations. Still photographs will be taken of any PRP physical evidence prior to the removal of the evidence to a secure location. Still photographs will be taken of all excavated drums on an as required basis.

To ensure quick and accurate retrieval, all photographs obtained during Site work will be properly documented, catalogued and stored. Documentation shall consist of the following:

1. identification of Site and project;
2. identification of the area and/or activity photographed;
3. date and time of photograph;
4. photographer's name;
5. weather conditions; and
6. project number.

Cataloguing of photographs shall be done in a manner that ensures ease of accessibility. Storage of the photographs shall be in a location where they are not subject to damage. Copies of photographs taken for evidentiary purposes shall be maintained in a separate and secure location.

F.4.1.3 Audio Cassette Recordings

On occasion, conditions may exist which will prevent the use of field logbooks. At such times only, an audio cassette tape recorder shall be used. Information recorded on the cassette will be transcribed, filed and may be used to supplement the field logbook.

F.4.1.4 Computer Diskettes

At this time, it is envisaged that all analytical and field survey data will be compiled on 5 1/2-inch or 3 1/2-inch floppy diskettes, hard or tape drives, or CD Roms. In all cases where Site data is stored on diskettes, a backup copy of each computer diskette will be maintained. Each computer diskette will be catalogued and stored with other project diskettes. Daily backup disk will be stored separately from primary files. There will be a single database system accessible by modem from read only or write and read users.

F.4.1.5 Evidentiary Information

All PRP evidentiary information will be photographed in-place as encountered. After pertinent information is transcribed into the field log book by MLSSD's excavation face representative the physical evidence will be removed, packaged and transferred to a secure location provided by U.S. EPA. The U.S. EPA field representative shall be notified whenever any suspected PRP information is identified.

F.4.2 MANAGEMENT OF LABORATORY ANALYTICAL DATA

Chain-of-Custody protocols will be used to transport and track the samples during the analytical program. Copies of the generated Chain-of-Custody forms will be maintained by both the laboratory and CRA.

The laboratory will be requested to provide the data on a computer diskette in addition to the hard copy print. The computer diskette provided by the laboratory will be numbered, catalogued and stored as discussed in Section 4.1.4. Data flow will be from the laboratory to CRA at the primary level. CRA will then validate the data as discussed in the QAPP and distribute the data to the appropriate parties.

The laboratory will maintain the integrity of their database through their own internal security procedures.

F.4.3 DATA SECURITY

The integrity and confidentiality of the data generated during the RA will be maintained by controlling access to the data. Only personnel actively involved in the project will be permitted access to the data. It will be the responsibility of these same personnel to ensure that the original documents are not misfiled or damaged.

F.5 DATA VALIDATION

Data presented by the laboratory will be subjected to a QA/QC validation procedure as described in the QAPP. This process will identify data which requires qualification prior to utilization.

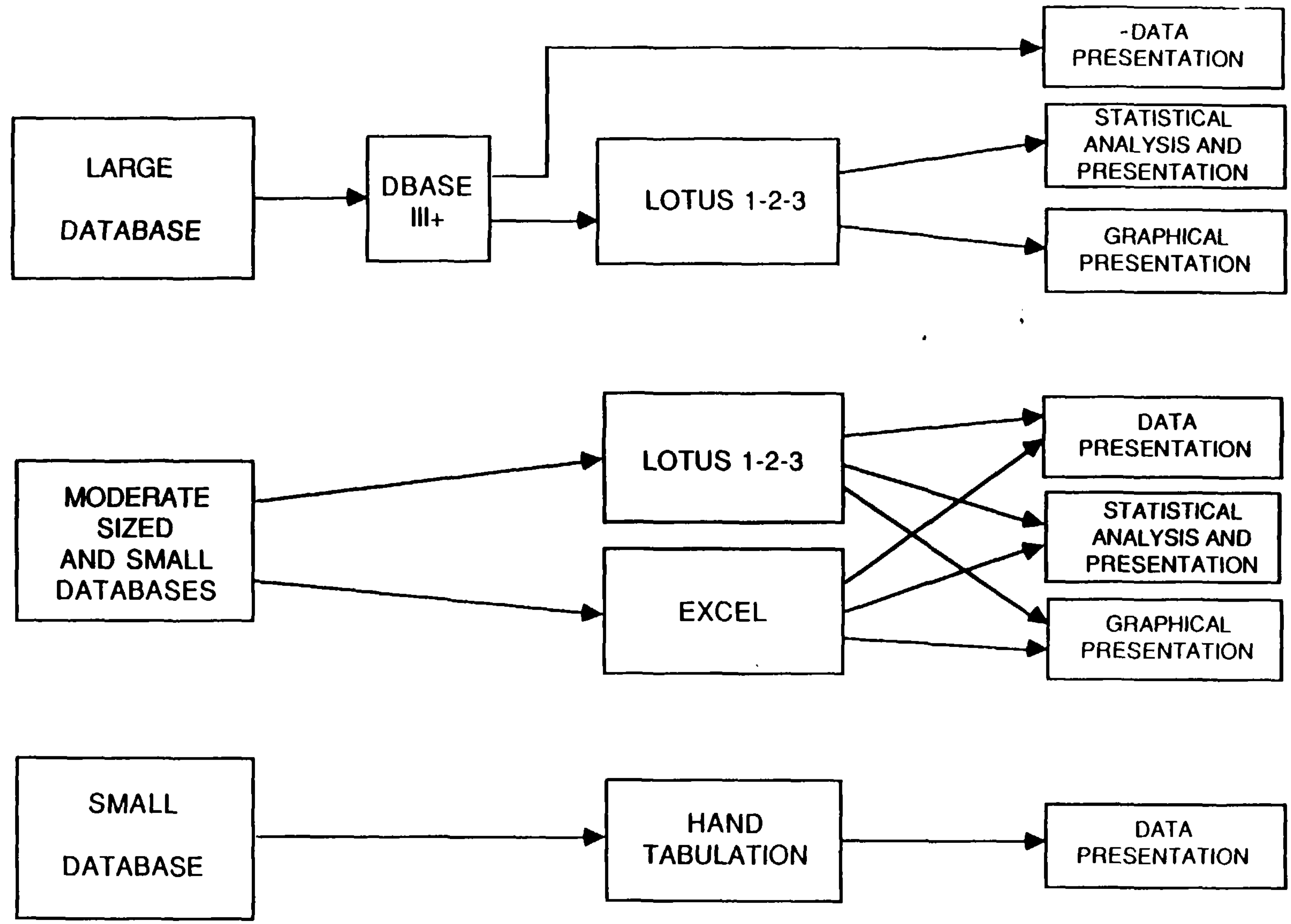
Raw data received by CRA will be subjected to a project data validation process. The initial step in data validation will be to determine whether the new data fits the current understanding of existing data. If the data fits it will be either accepted or subjected to additional data validation procedures. If the data does not fit the existing understanding of previously validated data, CRA will endeavor to determine whether the new data is incorrect.

Once data has been validated for use, the data will be compiled by the Contractor. Data which is deemed to be invalid will be itemized with the reason(s) for invalidity. Invalid data will not be used to interpret the characteristics of the Site.

F.6 DATA COMPILATION

Database compilation will be accomplished by the Contractor in a manner which effectively and efficiently supports the project. To the extent possible, the selected Contractor will utilize U.S. EPA's existing data base and drum tracking software to complete the project. The database management system shall be developed to expedite database manipulation and the decision making process (as required.)

A simplified example of data base handling procedures is presented on Figure F.6.1.



Note: For demonstrative purposes only.

figure F.6.1

DATA COMPILATION FLOW DIAGRAM
METAMORA LANDFILL SITE
Lapeer County, Michigan

CRA

3298-7/9/91-16-TPG

F.7 DATA INTERPRETATION

After compilation, the Engineer and the Contractor will interpret the new data, in conjunction with the existing database. The interpretation of the data will be based on sound engineering and scientific principles.

F.8 DATA PRESENTATION

Data will be presented (to U.S. EPA/MDNR) on a monthly basis (as required) during the course of the RA. Data presented in the monthly progress reports will be validated but may not be interpreted by the Engineer. Where appropriate, the Engineer will provide a minimal interpretation of the data presented in the monthly progress reports.

The Engineer will present the data, in a validated and interpreted form of a report. This document will be the culmination of the data flow within this project. All data presented in the report will be validated, compiled and interpreted by the Engineer. All invalid data will be presented as invalid with the reasons for the invalidity of the data.

The report will be presented to U.S. EPA at the conclusion of the RA.

F.9 DOCUMENT CONTROL

Documents used for and generated during the RA will be stored and maintained in a unique project file. A master project file will be maintained by the Engineer at their office. Subsets of the file will be maintained on Site as required. Access to the documents will be restricted to personnel actively engaged in the project and procedures will be implemented to track the documents.

The documents to be covered by the document control procedures can be categorized as follows:

1. background information files;
2. primary data documents; and
3. project documents generated during the course of the project.

Each of these three categories of documents will be included in the document control system.

The background information files for the RA consist of the following:

1. reports from previous Site investigation programs;
2. background information files from U.S. EPA/MDNR;
3. background information collected by the Engineer; and
4. miscellaneous correspondence.

Primary data documents for the RA may consist of the following:

1. field logbooks;
2. analytical reports;
3. Chain-of-Custody forms;
4. regulatory agency correspondence;
5. Site-related correspondence from U.S. EPA/MDNR;
6. personnel medical records;
7. logs of meetings and telephone conversations;
8. quality assurance/quality control data;
9. inventory of samples collected;
10. Site plans and data diskettes; and
11. survey notes.

Project documents include the monthly reports and all reports generated during the RA.

APPENDIX G

AIR MONITORING PLAN

TABLE OF CONTENTS

LIST OF TABLES

G.1 PROGRAM ADMINISTRATION

The Air Monitoring Plan (AMP) presented herein was developed based upon the Chemical Waste Management AMP submitted to and approved by MDNR during the OU1 RA. This revised AMP has been refined in accordance with the Consent Decree (and SOW) and sound engineering practice.

The daily supervision of the AMP will be the responsibility of the Contractor's Site Safety Officer (SSO).

G.2 GENERAL STRATEGY

In order to ensure the protection of Site personnel, the surrounding community and the environment, the following five types of air monitoring will be performed (as necessary):

1. Work Area Monitoring;
2. Exclusion Zone Perimeter Monitoring;
3. Site Property Line Monitoring;
4. Meteorological Monitoring; and
5. Personnel Monitoring.

The air monitoring program will be generally concerned with volatile organic compound emissions from the excavation. Decisions regarding air monitoring for particulate and/or PCBs shall be made by the HSO during RA implementation.

G.3 WORK AREA MONITORING

A. SAMPLING LOCATIONS

Monitoring for total volatile organics compounds (VOCs) will be performed immediately adjacent to the waste excavation, equipment decontamination areas and staging areas.

Area monitoring will be performed using a fixed station at the breathing zone height. This station will be located at a downwind position that is as close as possible to the work area without causing interference to actual RA activities. Sampling will be performed by Air Monitoring Technicians, as necessary, to ensure that any vapor emissions are detected as soon as possible.

Special attention will be given to wind-shielded locations in the excavation area to ensure that any accumulation of airborne contaminants and/or explosive vapors is detected.

B. SAMPLING METHOD

Sampling will be performed using the following instrumentation:

1. Total VOC monitor sensitive to 1.0 ppm, such as the Foxboro Organic Vapor Analyzer (OVA) or the HNU Photoionizer (PID).

2. Explosion Meter

Real-time instrumentation for monitoring total dust may also be used periodically if deemed necessary by the SSO.

All instrumentation will be calibrated according to the manufacturers specifications.

C. SAMPLING FREQUENCY

Real-time monitoring in the waste excavation area will be performed daily prior to the start of work, using both the explosion meter and the total VOC instrument. Monitoring will continue throughout active excavation periods until activity involving hazardous material has ceased.

Real-time monitoring will be conducted in the equipment decontamination and staging area as deemed necessary to assess the release of VOC during associated activities.

Sampling for airborne contaminants will be performed during excavation and waste staging activities. Daily work will not begin until all required air monitoring instrumentation is in place and operating.

Action Level	Response
Organic Vapors 5 ppm to 50 ppm for 15 minutes	Contact Site Safety Officer, determine source of emissions and take corrective actions, if required.

Organic Vapors over 50 ppm for 15 minutes	Stop work, take corrective action, perform continuous monitoring at the Site perimeter to assess potential for migration of vapors off Site. Notify U.S. EPA on-Site representative.

D. ACTION LEVELS/NOTIFICATION

The following Site action levels and response actions for Site operations will be used:

Action Level	Response
10% LEL	Contact SSO, investigate cause while remedial activities continue.
20% LEL	Stop work, remove personnel, institute corrective actions as needed to control emissions. Work may resume when levels return to 10% LEL for 15 minutes.

G.4 EXCLUSION ZONE PERIMETER MONITORING

Ambient air monitoring for total VOC at the exclusion zone perimeter will be performed using real-time instrumentation sampling methods during excavation activities.

A. REAL-TIME SAMPLING LOCATIONS

Ambient air will be monitored for total VOC at eight specific stations located along the perimeter of the Exclusion Zone. The eight locations will be chosen so as to encircle the exclusion zone as indicated on a Site map. Exact locations will be determined in the field.

B. SAMPLING METHOD

Sampling for total VOC will be performed using a real-time total VOC monitor such as the Foxboro OVA or HNU PID.

C. SAMPLING DOCUMENTATION

Real-time measurements both along the exclusion zone perimeter and in the active work area will be recorded in a permanent log.

D. ACTION LEVELS/NOTIFICATION

If a total VOC reading at the exclusion zone perimeter line is more than 10.0 ppm above the most recent upwind reading, additional upwind readings will be taken to confirm the situation. If it is verified that emissions are due to remedial activity, the U.S. EPA repersentative will be notified immediately. Measurements will then be taken. If concentrations at the Site property line exceed 1 ppm for a 15 minute period remedial action will cease and the U.S. EPA representative will be contacted.

E. SAMPLING FREQUENCY

Real-time sampling will be performed every three hours at the exclusion zone perimeter stations during active excavation and/or staging operations.

If actual field operations indicate that sampling of all eight exclusion zone perimeter locations every three hours is not practical or necessary, adjustments to the sampling frequency and/or locations may be proposed to the U.S. EPA representative for review and approval.

G.5 SITE PROPERTY LINE MONITORING

A. SAMPLING METHOD

Sampling for the VOC parameters specified on Table G.1 will be performed using U.S. EPA Method TO-1 during excavation activities.

Based on the wind conditions at the start of each day, four air monitoring stations will be located at various locations along the Site boundary as follows:

1. Upwind from the excavation/staging area;
2. Downwind from the excavation area;
3. Downwind from the staging area; and
4. At the property line of the nearest downwind community resident.

The SSO will be responsible for the daily selection of property line station locations.

B. SAMPLING FREQUENCY

During the first four weeks of the incineration and excavation activities, the sample sets will be collected daily and analyzed in accordance with U.S. EPA Method T-01. Following completion of the first two weeks of excavation activities, all Site air data, consisting of real-time HNU/OVA readings and compound-specific air sample results, and the nature of the RA activities to be performed in the following periods of time,

TABLE G.1

PROPERTY LINE AIR MONITORING

Compound	*Analytical Method*
benzene	T-01
trichloroethene	T-01
tetrachloroethene	T-01
1,2-dichloroethane	T-01

will be evaluated.

Following this review and evaluation, and after consultation with U.S. EPA, the frequency of analysis of the sample sets may be reduced if approved by U.S. EPA. The proposal to U.S. EPA to reduce the frequency of property line air sampling shall include the rationale for the reduced sampling frequency and a contingency plan for increasing the frequency as deemed warranted based upon Site RA activities.

C. SAMPLE ANALYSIS

Perimeter samples, collected as described above, will be analyzed by a laboratory approved by U.S. EPA. Samples will be shipped the same day, if possible, using overnight mail services, or transported directly to the laboratory, if possible. The analytical data will be made available verbally from the laboratory for evaluation by the Engineer, the Contractor and U.S. EPA within 48 to 72 hours from receipt of the samples at the laboratory (if possible).

D. QUALITY CONTROL

To ensure that unpredictable sampling errors are controlled and that the data are accurate and precise, the following measures will be implemented:

1. Blind field blanks will be submitted for analysis with each sample set.
2. Duplicate samples will be submitted at a rate of once per day.

3. Spiked tenax tubes will be routinely analyzed.

E. ACTION LEVELS/NOTIFICATION

If the analytical results indicate higher airborne contaminant concentrations at the downwind stations than upwind stations, the Contractor and Engineer will investigate mitigation methods and work practices available to determine if emissions from the Site can be reduced.

The data generated from the property line sampling shall be submitted to U.S. EPA for review.

F. DATA REPORTING

The results of the real-time work area and perimeter monitoring will be transmitted to U.S. EPA in a timely fashion. The U.S. EPA will immediately be given verbal notification of any operational problems, or detected concentrations of airborne contaminants in excess of background.

G. SAMPLE DOCUMENTATION

A summary of all air monitoring, along with the appropriate written documentation, will be kept on file at the Site.

G.6 METEOROLOGICAL MONITORING

Meteorological monitoring will be performed during excavation and staging activities. The following data will be monitored and recorded:

1. Wind speed;
2. Wind direction;
3. Temperature; and
4. General weather conditions.

In addition, at least four wind socks (if required) will be positioned such that the wind direction can be determined from all appropriate areas of the Site.

Meteorological monitoring shall be completed in accordance with U.S. EPA standard methods in conformance with accepted scientific principles.

Meteorological data will be used to determine Site perimeter air monitoring stations.

G.7 PERSONNEL MONITORING

The risk of exposure of Site personnel to airborne contaminants during different work activities is based upon the personal protective equipment requirements for specific project tasks.

It is expected that the results of work area real-time monitoring and perimeter monitoring, as well as the analytical results of the waste material, will provide adequate information to characterize the airborne levels of hazardous substances.

Knowledge of the personal protective equipment requirements for specific project tasks, as well as monitoring and waste sampling should allow for an assessment of Site personnel exposures.