HEALTH AND SAFETY PLAN
IMMEDIATE RESPONSE ACTION

Rasmussen Dump Site
Livingston County, Michigan
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1.0 INTRODUCTION

1.1 GENERAL

The Rasmussen Dump Site is a former municipal and industrial disposal site located in Green Oak Township, Livingston County, Michigan. Pursuant to an Administrative Order by Consent Under Section 106(a) of CERCLA (106 Order) issued to a group of Potentially Responsible Parties (PRPs), waste materials from three identified areas of buried wastes will be removed under an Immediate Response Action. The response areas, referred to as the Industrial Wastes Area (IW Area), Northeast Buried Drum Area (NEBD Area), and the Surface Drum Area are shown on Figure 1.

Materials investigated in the IW and NEBD areas were found to contain high levels of assumed to be organic site-derived constituents. Drums and containers are known to be buried in both of these response areas also. Materials contained within the Surface Drum Area consist of municipal wastes and potential buried drums. The work to be conducted under the Immediate Response Action will involve the handling of these wastes. In addition, the surface soils on the top of the landfill over portions of the areas where work will be conducted have been identified to contain detectable levels of PCBs. Thus, workers may be subject to contact and inhalation hazards associated with the work. The Health and Safety Plan presented herein will be implemented during field construction to provide
for a safe and minimal risk working environment for on-Site personnel. It also provides for emergency response procedures and corrective procedures based on the results of Site perimeter air monitoring.

It is anticipated that during the site response action the total number of Site personnel employed on the Site at any one time will vary from 10 to 20, depending on the phase of work. All Site personnel will receive training specific to this Health and Safety Plan before entering the Site and while on Site will be required to comply with the provisions of this Health and Safety Plan as applicable to their specific Site duties. Written verification of the training will be maintained on Site.

1.2 MANAGEMENT AND IMPLEMENTATION

The PRPs have retained the firm of Conestoga-Rovers & Associates (CRA) to provide overall project coordination services and field oversight services during the implementation of the response program. The PRPs' Project Coordinator will provide managerial oversight regarding the Health and Safety Program and will be represented on Site by a designated Field Engineer (Engineer).

The Contractor is responsible for engaging an analytical laboratory to provide analytical support services associated with the response program. The laboratory's primary responsibility within the Health and
Safety Program will be to perform the analysis of all air samples required during this program. The Contractor's selected laboratory will be identified to the PRPs and must receive the approval of the PRPs prior to commencing work on this project.

The implementation and enforcement of the Health and Safety Plan on a daily basis will be the responsibility of the response contractor (Contractor) who will be selected by the PRPs through a competitive bidding process. The Contractor will be required to retain the services of a Certified Industrial Hygienist (CIH) to develop and oversee this Health and Safety Plan during all on-Site activities. A Site Safety Officer will report to the CIH and will be responsible for the management of the Health and Safety Plan on a daily basis.

The Site Safety Officer will report all air monitoring data and other health and safety related information to the Engineer. Similarly, the laboratory will report analytical data to the Engineer. The Engineer will be responsible for distributing the required information to the United States Environmental Protection Agency, Region V (USEPA) and the Michigan Department of Natural Resources (MDNR).

If the Contractor seeks revisions to the Health and Safety Plan, approval must be obtained first from the PRPs' Project Coordinator and the Engineer. If the Project Coordinator and the Engineer determine that the revisions are appropriate for Site conditions then the Project Coordinator will
submit the proposed revision to the USEPA. No revisions will be approved unless approval is received from the Project Coordinator and USEPA in consultation with the MDNR. If the revision is approved then the revision form presented in Appendix I will be completed and signed by each designated person.
2.0 **BASIS**

The Occupational Safety and Health Administration (OSHA) Standards and Regulations contained in Title 29, Code of Federal Regulations, Parts 1910 and 1926 (29 CFR 1910 and 1926) including the amended sections in 29 CFR 1910.120, "Interim final Rule on Hazardous Waste Operations and Emergency Response" and current TLVs as provided by the American Conference of Governmental Industrial Hygienists (ACGIH) provide the basis for the safety and health program. Some of the specifications within this Health and Safety Plan are in addition to OSHA regulations and reflect the positions of the United States Environmental Protection Agency (USEPA), the National Institute for Occupational Safety and Health (NIOSH), and the United States Coast Guard (USCG) regarding procedures required to ensure safe operations at abandoned hazardous waste disposal sites.

The safety and health of the public and on-Site personnel and the protection of the environment will take precedence over cost and schedule considerations for all project work. If emergency shut down of operations is necessary, cost and schedule impacts will be considered only after the cause of the problem is resolved and work is resumed. The Engineer and the Contractor's Site Safety Officer will be responsible for decisions regarding when work will be stopped for health or safety reasons and when it will be restarted.
3.0 **CERTIFIED INDUSTRIAL HYGIENIST AND SITE SAFETY OFFICER**

The Contractor will provide an Industrial Hygienist who is American Board of Industrial Hygienists (ABIH) certified in comprehensive practice. The certified industrial hygienist (CIH) will have a sound working knowledge of State and Federal occupational safety and health regulations. In addition the Contractor will provide a designated Site Safety Officer who is an Industrial Hygiene Technician with qualifications in occupational health. The Site Safety Officer will be on Site on a full-time basis and will report directly to the CIH who will be responsible for implementing the Health and Safety Plan on an on-call basis. The qualifications of the CIH and Site Safety Officer will be provided to the PRPs during the remedial action bidding procedures.

The CIH will:

a) Be responsible for the initial training sessions for all on-Site personnel with regard to this safety plan and other safety requirements to be observed during construction, including:

i) potential hazards,

ii) personal hygiene principles,

iii) personnel protective equipment,

iv) respiratory protection equipment usage and fit testing, and

v) emergency procedures dealing with fire and medical situations:
b) Be responsible for implementation of the health and safety plan at the initial period of excavation of the IW, NEBD and Surface Drum Areas;

c) Review and modify the Site safety plan, in consultation with the PRPs' Project Coordinator and the USEPA On-Scene Coordinator, as more information becomes available concerning the hazardous materials involved, review all monitoring reports and respirator inspection logs, provide the initial qualitative respirator fit test, and prepare sample hazardous substance information forms for known hazardous materials at the Site.

d) Oversee the Site Safety Officer's activities. The CIH will be in regular periodic contact with the Site Safety Officer. It is anticipated that the CIH will visit the Site at least monthly and in emergency situations following the preconstruction training of all on-Site personnel. The CIH will maintain an appropriate level of contact with the Site Safety Officer to ensure that the Health and Safety Plan is properly implemented.

The Site Safety Officer will:

a) Be responsible for daily enforcement and monitoring of the health and safety plan;
b) Be responsible for assisting the CIH in the pre-construction training of all on-Site personnel with regard to this safety plan and other safety requirements to be observed during construction, including:

i) potential hazards,

ii) personal hygiene principles,

iii) personnel protective equipment,

iv) respiratory protection equipment usage and fit testing, and

v) emergency procedures dealing with fire and medical situations;

c) Be responsible for alerting the Engineer prior to the Contractor starting any particularly hazardous work;

d) Be responsible for the maintenance of separation of Exclusion Zone and Support Zone areas as described hereafter;

e) Maintenance of the emergency contingency plan; and

f) Conduct all on-Site air monitoring.

Both the CIH and the Site Safety Officer will be certified in first aid and cardiopulmonary resuscitation.
4.0 CONTRACTOR SAFETY PLAN

4.1 GENERAL

During all active site work at the Rasmussen Dump Site, the Contractor will implement and maintain a Contractor Safety Plan to ensure safe, accident free completion of the Site work. As a minimum the Contractor will implement the safety standards presented in US Army Corps of Engineers, Safety and Health Requirements Manual, EM-385-1, April 1981, revised October 1984. The Contractor will submit a written Safety Plan to the PRPs' Project Coordinator for approval prior to initiating on-Site activities.

The Contractor's designated Project Superintendent will be directly responsible for enforcing the Safety Plan for Contractor and Subcontractor personnel and will report directly to the Engineer any unsafe Site activities that may occur. The following sections highlight required components of this plan.

4.2 ACCIDENT PREVENTION PLAN

The Contractor will develop a comprehensive accident prevention program which follows the requirements listed in 29 CFR 1926. Some of the more important features which the program will include are:
1) Statement of company policy.
2) Delegation of responsibility.
3) A self inspection guide.
4) Weekly safety meetings.
5) Outline of topics suitable for safety meetings.
6) Fire prevention program.
7) Posting requirements.
8) Assured equipment grounding conductor program.
9) Policy for violation of safety rules.
10) Accident investigation.
11) General safety rules for employees.

The hazards that may be encountered by personnel with the exception of possible employee exposure to the listed contaminants and heat stress due to the wearing of protective equipment are common to any construction site. Some of these hazards would include:

1) Electrical - (1926.400) 
2) Motorized equipment - (1926.600-604)
3) Fire protection and prevention - (1926.150-152)

Measures to address the other hazards expected to be encountered, i.e. personal protection, first aid, and emergency procedures, are discussed more fully in other sections of this plan.
The Contractor will be responsible for the administration of the accident prevention program. The CIH will be responsible for the implementation and overview of the program while the Site Safety Officer will manage the program on a daily basis. The Site Safety Officer will determine whether any of the safety rules are being violated, advise the employee on the proper procedure, initiate any disciplinary action which may be required, conduct the daily safety inspections, investigate all accidents, and make recommendations that will correct all unsafe conditions.

All subcontractors will be required to follow the Contractor's accident prevention program. Subcontractor personnel will be trained in the content and procedures associated with the program. The Site Safety Officer will be responsible to determine subcontractor compliance with this program.

There will be weekly safety meetings conducted by the Site Safety Officer. The topics will be developed in conjunction with the CIH. All on-Site personnel will be required to attend the safety meetings. A log will be kept of the attendees and subjects covered.

Basic fire prevention measures will be followed. A fire alarm plan is included as a separate section within this plan (Section 5).
The Site will be kept in a neat and orderly fashion. Noncontaminated refuse will be disposed of on a regular basis.

All equipment will be inspected daily by the operator prior to operation. Motorized equipment will be checked to see that brake and steering mechanisms are in working order and that all alarm systems and safety guards are operational. Electrical equipment will be checked to determine whether it is properly grounded and that there are no frayed cords or other obvious defects.

There will be a person on Site at all times trained and certified in first aid and cardiopulmonary resuscitation. There will also be an industrial first aid kit located in the Site office. All injuries and/or illnesses will be reported to the Site Safety Officer who will then decide on the proper course of treatment (i.e. routine first aid or emergency medical treatment). The emergency medical treatment facility and the route to be followed to get there is discussed in Section 12.0 of this plan.

Sanitation will be provided in accordance with the personnel decontamination procedures outlined in Sections 16.0 and 17.0 of this plan.

All accidents will be reported to the Site Safety Officer who will then investigate the accident and take corrective procedures to prevent its reoccurrence. An accident investigation form has been developed to aid
the Site Safety Officer in his investigation. A copy of this form is included in Appendix II. All accidents will be reported to the Engineer and the CIH. In addition, specific forms available from the Michigan Department of Public Health for reporting accidents will be available and posted in the office trailers. The Site Safety Officer shall complete these forms in addition to the form included in Appendix II.

The Site Safety Officer will make a daily safety inspection of the Site and note any work practices which violate the Safety rules. Checklists have been developed for this inspection. All safety hazards and violations of safety rules will be immediately corrected. Applicable forms and checklists have been included in Appendix III. Copies of completed checklists will be maintained on Site.
5.0 FIRE ALARM PLAN

The basic outline of the fire alarm program is as follows:

1) The alarm system will be activated when any on-Site personnel notices the presence of a fire. Initial warnings will be sent out to all personnel carrying a radio, who will then be responsible for notifying their respective crews (a crew will include a minimum of two people).

2) As soon as the initial alarm to on-Site personnel is completed and evacuation is under way, outside assistance will be immediately requested if deemed necessary by the Safety Officer. Phone numbers of emergency response teams will be available at each on-Site phone.

3) Personnel not intrinsically involved in on-Site emergency response procedures will evacuate to an area upwind of the fire as determined in Section 12.1. If the fire can be treated with fire extinguishers, the designated fire fighting personnel closest to the fire will obtain a fire extinguisher and attempt to extinguish the fire. This will be attempted only if there is minimum risk to the personnel involved.
6.0 MEDICAL SURVEILLANCE

In accordance with requirements detailed in 29 CFR 1910.134, and 29 CFR 1910.120, all Site personnel who will be required to work in the Exclusion Zones will receive medical surveillance by a licensed occupational physician or physician's group. Prior to commencing Site work the Contractor will designate a physician for performing the medical surveillance. The Contractor will submit to the PRPs' Project Coordinator a letter from the physician stating his qualifications and that he is aware of the work being completed at the Rasmussen Dump Site under the Immediate Response Action.

Personnel medical records will be maintained by either the consulting physician or by the Contractor's medical or personnel officer. If the records are kept by the Contractor, they will be filed in locked file cabinets with access limited to the Contractor's designated officer. The project Site office will have a record of which tests were performed as part of the medical surveillance program and a copy of the consulting physician's statement regarding the tests and the employee's suitability for work. Personnel medical records and the results of the tests performed on each person will not be maintained at the project Site office. The physician's statement will be provided to the PRPs' Project Coordinator prior to commencing excavation of the waste disposal areas. The medical records will be available to the employee or his designated representative upon written request, as outlined in OSHA Regulation 1910.20.
Personnel involved in work with waste materials during
the duration of the project must be taking part in the Contractor's medical
surveillance program prior to working on Site. All on-Site Contractor
personnel who will be required to work in the Exclusion Zones will have
been provided a medical exam within one year prior to commencing work on
Site. The medical exam will include as a minimum the following:

a) Medical/Occupational Questionnaire including work history
b) Full Physical Examination
c) Vitals (height, weight, blood pressure, pulse)
d) Screening Audiometric Test with Otoscopic Exam for Wax and
   Perforated Ear Drums
e) Visual Acuity Measurement, including Color Perception
f) Pulmonary Function Test [Spirometry - Forced Vital Capacity (FVC)
   and Forced Expiratory Volume (FEV)-1.0 second]
g) EKG
h) Blood Chemistry Profile*
i) Complete Blood Count for Differential and Platelet PCB Evaluation,
   including WCB, RBC, HGB, Hematocrit

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* Minimum Blood Chemistry Profile: Serum Cholinesterase, Calcium, Phosphorus, Glucose, Uric
   acid, Blood Urea Nitrogen (BUN), Creatine, Albumin, Globulin, SGPT transaminase (SGOT), SGOT
   transaminase (SGOT), Lactic Dehydrogenase (LDH), Albumin/Globulin ratio, Alkaline
   phosphatase, Total protein, Total and direct bilirubin, G-Glutamyl transpeptidase (GGTP),
   Sodium, Potassium, Chloride, Magnesium, Iron, Creatinine/BUN ratio, Cholesterol,
   Methemoglobin and Serum Lead.
j) Urinalysis**

k) Physician's certification of approval for respirator wearing and fitness for work.

l) tetanus shot

m) stress test for employees >35 years old or at the discretion of the physician.

It will be the Contractor's designated physician's responsibility to determine if additional data will be required.

The Contractor will be responsible to ensure that the necessary medical examinations are conducted on all on-Site Contractor personnel who will be expected to work in the Exclusion Zones prior to commencing work which requires respiratory protection. The Contractor will provide the medical certificates of approval to the PRPs' Project Coordinator and will ensure that personnel not obtaining such certificates will not enter or work in the Exclusion Zones. Non-Contractor personnel required to enter or work in the Exclusion Zones will provide proof of medical surveillance prior to their entry into the Contaminant Reduction Zones or Exclusion Zones.

Interim medical surveillance will be completed as required, such as when an individual exhibits poor health or high stress.

** Urinalysis: Albumin, Glucose, Bilirubin, Acetone, Occult blood, pH, Specific gravity, Microscopic review, and analyses for heavy metals.
responses due to on-Site activity or when accidental exposure to elevated concentrations of contaminants occur.

Additional surveillance examinations will be performed if a worker has completed 400 cumulative hours in level B protection or a worker suffers acute exposure to any toxic or hazardous material.

Medical surveillance for personnel who will only occasionally enter the Contaminant Reduction Zones or Exclusion Zones (i.e. surveyors, secretaries, etc.) will be established in accordance with 29 CFR 1910.120. As stated, medical surveillance will be required for those personnel "who are or may be exposed to hazardous substances or health hazards at or above the established permissible exposure limits for those substances, without regard to the use of respirators, for 30 days or more a year", or "who wear a respirator for 30 days or more a year". Medical surveillance for these personnel will be established on an individual basis.
7.0 **TRAINING**

The Contractor will provide and require that all personnel assigned to or entering the Site complete training or refresher sessions. Training and refresher sessions will ensure that all personnel are capable of and familiar with the use of safety, health, respiratory and protective equipment and with the safety and security procedures required for this Site. Training will meet the requirements of 29 CFR 1910.120.

The Contractor’s CIH will provide and conduct a training program on Site for all Site personnel prior to commencing work within the Exclusion Zones. This training program will address as a minimum the following topics:

a) Potential hazards,
b) Biology, chemistry and physics of hazardous materials,
c) Rights and responsibilities of workers under OSHA and additional legislation of the State of Michigan,
d) Standard safety operating procedures,
e) Types of monitoring equipment to be used,
f) Site Safety Plan,
g) Internal and External Communications,
h) Medical surveillance program,
i) Personal protective clothing and equipment,
j) Respiratory equipment including training and qualitative fit-testing for half and full facepiece respirators and use of self contained breathing apparatus.

k) Air monitoring program,

l) Decontamination procedures,

m) Evacuation, first aid and emergency procedures dealing with fire and medical situations,

n) Work zones established at the Site,

o) Safe work practices associated with employee's work assignment, including dust control measures, hazardous materials recognition, and use of buddy system,

p) Basic operational safety, emphasizing hazards expected on Site, and

q) Prohibitions (inside Exclusion and Contaminant Reduction Zones), including:

(i) Glasses or facial hair, such as beards and long sideburns, which interfere with respirator fit

(ii) Contact lenses

(iii) Eating, drinking, smoking, chewing in the Exclusion or Contaminant Reduction Zones,

(iv) Personal articles, e.g. watches, rings, etc, and

(v) Working when ill.

All personnel assigned to the Site will receive safety and health training, and upon completion of training will be recorded on
Training Acknowledgement Logs which will be submitted to the Engineer. The Training Acknowledgement Logs will include provisions for the following information.

a) Employee or visitor's name.

b) Verification of topics covered, including:
   (i) Materials used,
   (ii) Equipment demonstration,
   (iii) Hands-on equipment practice for each employee,
   (iv) Prohibitions covered,
   (v) Buddy-System Explanation, and
   (vi) Standard Operating Procedures.

c) Date and Signature.

A sample of a Training Acknowledgement Log is included in Appendix IV.

There will be weekly safety training sessions conducted by the Site Safety Officer. The purposes of this training are to reinforce the proper procedures, to correct any deficiencies noted in the safety and health program, and to prepare the workers for any change in the health and safety program due to changes in the operations or unanticipated problems. Documentation of this training will be submitted to the Engineer. Documentation will include the topic(s) covered and a signed list of attendees.
The Site Safety Officer will be responsible for ensuring that personnel that do not successfully complete the required training are not permitted to enter the Exclusion and Contaminant Reduction Zones.

7.1 VISITOR SAFETY TRAINING PROGRAM

All visitors who enter the Contaminant Reduction Zones or Exclusion Zones will be required to undergo a maximum one hour training program conducted by the Site Safety Officer. This training will be provided if the training does not prevent the Safety Officer from performing his/her designated duties consequently causing a delay in Site work. If the Site Safety Officer is not available to perform the training, visitors will not be allowed to enter the Exclusion Zones until the necessary training can be performed. The training will consist of:

1) Hazards present at the Site.
2) Effects of these hazards.
3) Progress of work and the relationship of the present work in regard to the type of hazards that may be encountered.
4) Emergency signals and procedures.
5) Type and limitations of personal protective equipment in use.
6) Proper use of protective equipment.
7) General safety rules and policies in effect at the Site.
8) Completion of a Training Acknowledgement Log.

If a visitor does not, for any reason, obtain the required training, he/she will not be permitted into these work zones.
8.0 RESPIRATOR PROGRAM

All on-Site personnel will receive training in the use of, and be fit tested for both half- and full-facepiece respirators. All on-Site personnel working within the Exclusion Zones will also receive training in supplied air breathing apparatus.

Levels of respiratory protection have been chosen to be consistent with the Site specific potential airborne hazards associated with the Site characterization data presented in Appendix V. The selection of appropriate protection is based upon the potential airborne presence of compounds with the lowest recommended threshold limit value, their concentration levels in on-Site media, and upon the type of work activity being conducted. The two types of activity requiring the use of respiratory protection include waste excavation and associated activities, and drum handling activities. Table 8.1 summarizes compounds identified on Site and available respiratory criteria.

Prior to commencing waste excavation work and regularly during the active excavation in either the IW, NEBD or Surface Drum Areas, both the Contaminant Reduction Zones and the Exclusion Zones will be monitored with an organic vapor photoionizer (e.g. HNu) to determine the level of respiratory protection required. Since all of the potential volatile organic constituents identified at the Site with the exception of dichlorofluoromethane, dichlorodifluoromethane and several less volatile
## TABLE 8.1
IDENTIFIED CHEMICAL COMPOUNDS AND RESPIRATORY CRITERIA

<table>
<thead>
<tr>
<th>Compound</th>
<th>TWA (ppm)</th>
<th>TWA (mg/m³)</th>
<th>STEL (ppm)</th>
<th>STEL (mg/m³)</th>
<th>IDLH (ppm)</th>
<th>IDLH (mg/m³)</th>
<th>AREA WHERE CHEMICAL COMPOUND DETECTED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IW Area</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Soil</td>
</tr>
<tr>
<td>Volatile Organics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>acetone</td>
<td>750</td>
<td>1,780</td>
<td>1,000</td>
<td>2,375</td>
<td>20,000</td>
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<tr>
<td>2-butanone</td>
<td>200</td>
<td>590</td>
<td>300</td>
<td>885</td>
<td>3,000</td>
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<td>X</td>
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<tr>
<td>2-hexanone</td>
<td>5</td>
<td>20</td>
<td>--</td>
<td>--</td>
<td>5,000</td>
<td></td>
<td>X</td>
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<tr>
<td>4-methyl-2-pentanone</td>
<td>50</td>
<td>205</td>
<td>75</td>
<td>300</td>
<td>3,000</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>benzene(6)</td>
<td>1/10</td>
<td>9/50</td>
<td>--</td>
<td>--</td>
<td>2,000</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>toluene</td>
<td>100</td>
<td>375</td>
<td>150</td>
<td>560</td>
<td>2,000</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ethyl benzene</td>
<td>100</td>
<td>435</td>
<td>125</td>
<td>545</td>
<td>2,000</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>total xylenes</td>
<td>100</td>
<td>435</td>
<td>150</td>
<td>655</td>
<td>10,000</td>
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<td>X</td>
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<tr>
<td>styrene</td>
<td>50</td>
<td>215</td>
<td>100</td>
<td>425</td>
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<tr>
<td>1,1,1-trichloroethane</td>
<td>350</td>
<td>1,900</td>
<td>450</td>
<td>2,450</td>
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<td></td>
<td>X</td>
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<tr>
<td>1,1-dichloroethane</td>
<td>200</td>
<td>810</td>
<td>250</td>
<td>1,010</td>
<td>4,000</td>
<td></td>
<td>X</td>
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<tr>
<td>tetrachloroethene</td>
<td>50</td>
<td>335</td>
<td>200</td>
<td>1,340</td>
<td>500</td>
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<tr>
<td>trichloroethene</td>
<td>50</td>
<td>270</td>
<td>200</td>
<td>1,080</td>
<td>1,000</td>
<td></td>
<td>X</td>
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<tr>
<td>chloroform</td>
<td>10</td>
<td>50</td>
<td>--</td>
<td>--</td>
<td>1,000</td>
<td></td>
<td>X</td>
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<tr>
<td>methylene chloride</td>
<td>100</td>
<td>350</td>
<td>500</td>
<td>1,740</td>
<td>5,000</td>
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<tr>
<td>carbon disulfide</td>
<td>10</td>
<td>30</td>
<td>--</td>
<td>--</td>
<td>500</td>
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<td>X</td>
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<tr>
<td>chlorobenzene</td>
<td>75</td>
<td>350</td>
<td>--</td>
<td>--</td>
<td>2,400</td>
<td></td>
<td>X</td>
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<tr>
<td>dichlorofluoromethane</td>
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<td></td>
<td>X</td>
</tr>
<tr>
<td>dichlorodifluoromethane</td>
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<td>--</td>
<td>--</td>
<td>--</td>
<td></td>
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</table>
### TABLE 8.1
IDENTIFIED CHEMICAL COMPOUNDS AND RESPIRATORY CRITERIA

<table>
<thead>
<tr>
<th>Compound</th>
<th>TWA (ppm)</th>
<th>TWA (mg/m³)</th>
<th>STEL (ppm)</th>
<th>STEL (mg/m³)</th>
<th>IDLH (ppm)</th>
<th>IDLH (mg/m³)</th>
<th>AREA WHERE CHEMICAL COMPOUND DETECTED(1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base/Neutral Organics</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>IW Area</td>
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<tr>
<td>bis(2-ethylhexyl)phthalate</td>
<td>--</td>
<td>5</td>
<td>--</td>
<td>10</td>
<td>--</td>
<td>5</td>
<td>X</td>
</tr>
<tr>
<td>di-n-butyl phthalate</td>
<td>--</td>
<td>5</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>5</td>
<td>X</td>
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<tr>
<td>naphthalene</td>
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<td>50</td>
<td>15</td>
<td>75</td>
<td>500</td>
<td>75</td>
<td>X</td>
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<tr>
<td>2-methylnaphthalene</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>butyl benzyl phthalate</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>di-n-octyl phthalate</td>
<td>--</td>
<td>--</td>
<td>--</td>
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<td>--</td>
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<tr>
<td>fluorene</td>
<td>--</td>
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<td>--</td>
<td>--</td>
<td>--</td>
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<tr>
<td>isophorone</td>
<td>5</td>
<td>25</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>800</td>
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<tr>
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<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
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<tr>
<td>phenol</td>
<td>5</td>
<td>19</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>acenaphthylene</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
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<tr>
<td>aniline</td>
<td>2</td>
<td>10</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>100</td>
</tr>
<tr>
<td>benzo(a)anthracene</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
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<tr>
<td>benzo(a)pyrene</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>benzo(b) fluoranthene</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>benzo(k) fluoranthene</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>fluoranthene</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>n-nitrosodiphenylamine</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>pentachlorophenol</td>
<td>0</td>
<td>0.5</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
<tr>
<td>pyrene</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>X</td>
</tr>
</tbody>
</table>
## TABLE 8.1
IDENTIFIED CHEMICAL COMPOUNDS AND RESPIRATORY CRITERIA

<table>
<thead>
<tr>
<th>Compound</th>
<th>TWA (2)(3)</th>
<th>STEL (2)(4)</th>
<th>IDLH (5)</th>
<th>AREA WHERE CHEMICAL COMPOUND DETECTED (1)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(ppm)</td>
<td>(mg/m^3)</td>
<td>(ppm)</td>
<td>(mg/m^3)</td>
</tr>
<tr>
<td></td>
<td>Soil</td>
<td>Waste</td>
<td>Soil</td>
<td>Waste</td>
</tr>
<tr>
<td></td>
<td>IW Area</td>
<td>NEBD Area</td>
<td>Surface Drum Area</td>
<td></td>
</tr>
<tr>
<td>Pesticides/PCBs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-4'-DDT</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>arochlor-1248</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>arochlor-1254</td>
<td>--</td>
<td>0.5</td>
<td>1.0</td>
<td>5mg/m^3 X</td>
</tr>
<tr>
<td>arochlor-1260</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

**Notes:**

(1) Based on MDNR RI.
(2) Data from "Threshold Limit Values and Biological Exposure Indices for 1987-1988", ACGIH.
(3) TWA - 8 hr time weighted average.
(4) STEL - 15-min time weighted average.
(5) IDLH (Immediately Dangerous to Life or Health) values from "NIOSH Pocket Guide to Chemical Hazards" National Institute for Occupational Safety and Health, September 1985.
(6) OSHA PEL dependent on type of work operation and exposure levels. Higher PEL permitted where exposure to benzene is from liquid mixtures containing less than 0.1% benzene by volume or vapors from such liquids after September 12, 1989. Refer to 29 CFR 1910.1028.
base/neutral organic compounds have eight-hour time weighted average (TWA) threshold limit values (TLVs), it is not be necessary to have personnel working in the Exclusion Zones continuously use pressure demand self-contained breathing apparatus (SCBA). If air monitoring indicated a need for SCBA, personnel in the Exclusion Zones would have the necessary time to don the SCBA which would be available within the immediate area of active work locations. Operators will be required to don the appropriate respiratory equipment when containerized materials are encountered and/or ruptured by the excavating machinery. The donned respiratory equipment may not be removed until approval is given by the Safety Officer based on the real time air monitoring.

In the absence of additional air monitoring information, the following action levels, as determined by monitoring with an OVA or an OVA in conjunction with the HNu, will determine the level of respiratory protection for waste excavation activities:

<table>
<thead>
<tr>
<th>Total Organic Vapor Concentration Above Background (ppm)</th>
<th>Level of Respiratory Protection Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>Respiratory Protection not required but shall be immediately available</td>
</tr>
<tr>
<td>5 - 50</td>
<td>Full facepiece air purifying respirator (APR)</td>
</tr>
<tr>
<td>&gt;50</td>
<td>Supplied air system</td>
</tr>
</tbody>
</table>
Excavation personnel who will be at the immediate point-of-excavation during initiation of excavation at each of the waste disposal areas will be required to wear an APR until the Site Safety Officer determines that the APR may be removed.

Excavation and waste characterization and compatibility sampling personnel who are required to handle drums/containers of unknown content will be using supplied air until the contents and associated respiratory hazards, if any, are known. Subsequent handling of characterized containerized materials will be performed under the appropriate level of respiratory protection to be determined by the Site Safety Officer based on the characterization data in consultation with the Engineer, the USEPA OSC and MDNR. The handling of overpacked/repacked waste containers during on Site transportation and at the staging cell (container closed) will require the use of APRs.

Total organic vapor readings will be obtained with an HNu PI 101 with a 10.2 or 11.7 eV probe. Appendix VI presents the operating procedures for the HNu meter.

During excavation of the waste disposal areas, an OVA or an OVA in conjunction with an HNu will be used to monitor total organic vapor readings in and around the excavation zone. Monitoring will be continuous during initiation of excavation of each waste disposal area and when drums/containers are encountered. Monitoring need not be
continuous if drums/containers are not encountered, but will be at a regular frequency determined by the Site Safety Officer in consultation with the Engineer, USEPA OSC, and MDNR.

Cartridges to be used in the full facepiece air purifying respirators will be made by the same manufacturer as the facepieces in accordance with OSHA regulations. All air purifying respirators will be provided with combination organic vapor, acid gases and high efficiency particulate cartridges.

Personal and perimeter air monitoring data will be collected as outlined in the air monitoring plan. Data generated by this sampling will also be used to modify on-Site activities or to determine if the level of respiratory protection may require adjustment.

The Site Safety Officer will be responsible for implementing, maintaining and enforcing the respirator program.

On-Site personnel unable to pass a respirator fit test will not enter or work in the Exclusion Zones or Contaminant Reduction Zones when hazardous wastes are exposed to the atmosphere.

Respiratory protection will be upgraded to a supplied air system if oxygen levels fall below 19.5 percent, if levels of toxic vapors are determined to be present at concentrations which present Immediate Danger
to Life and Health (IDLH) conditions or if personnel must work in confined spaces.

The guidelines for the respirator program to be implemented at the Rasmussen Dump Site are contained within Appendix VII.
9.0 WORK AREAS

The Contractor will clearly lay out and identify work areas in the field and will limit equipment, operations and personnel in the areas as defined below prior to initiation of excavation operations in the waste disposal areas. Figure 1 illustrates the Work Zones for the Site.

a) Exclusion Zone (see Figure 1) - This will include all areas in which soils/wastes designated for off-site disposal are to be excavated, staged or handled, and surface areas adjacent to these areas which may be affected during these operations.

The Exclusion Zone will include all working areas located within the existing Site fence with the exception of the areas designated as the Contaminant Reduction Zone and Support Zone.

On-Site transport routes will be controlled by stakes and flagging. Egress from the Exclusion Zone will be controlled by surrounding the Contaminant Reduction Zone with stakes, flagging and warning signs.

Access to the Exclusion Zone will be restricted to personnel who are wearing the proper personal protective equipment, have received the required medical examination, and have undergone the safety and health training. Eating, drinking, or smoking is prohibited in these areas. A log of entry to and exit from the Exclusion Zone will be
maintained for the purposes of stress monitoring and determining exposure times.

b) Contaminant Reduction Zone (see Figure 1) - This zone will occur at the interface of the Exclusion Zone and the Support Zone and will provide for the transfer of construction materials and equipment, the decontamination of off-Site transport vehicles prior to entering the Support Zone, the decontamination of personnel and clothing prior to entering the Support Zone and for the physical segregation of the Support Zone from the Exclusion Zones.

Access to the Contaminant Reduction Zone will be restricted to personnel who are wearing the proper personal protective equipment, have undergone the medical examination, and have participated in the training program. Eating, drinking, or smoking is prohibited in this area.

c) Support Zone (see Figure 1) - This area includes the central office area and support facilities located immediately within the Site perimeter fencing. The Support Zone will be clearly delineated and procedures will be implemented to prevent active or passive contamination from other work zones. The function of the Support Zone includes:

i) An entry area for personnel, material and equipment to the Exclusion Zone;
ii) An exit area for decontaminated personnel, materials and equipment from the Exclusion Zone;

iii) The housing of Site special services; and

iv) A storage area for clean safety and work equipment.
10.0 COMMUNICATIONS

The Contractor will provide telephone communication for the Site. Emergency numbers including police, fire, ambulance, hospital, poison control center and appropriate regulatory agencies will be prominently posted near each phone.

In addition, key personnel will be equipped with radio communication. Radio communication will be provided to the following Site personnel:

i) the Engineer,
ii) Site Superintendent
iii) Site Safety Officer,
iv) Security Personnel, and
v) each crew (a crew will include a minimum of two people) foreman.

Additional personnel will be provided with radio communication as deemed appropriate by the Contractor’s Site Superintendent and Site Safety Officer.
11.0 **EMERGENCY AND FIRST AID EQUIPMENT**

The safety equipment listed below will be located and maintained within the Contaminant Reduction Zone or within the Exclusion Zones at appropriate locations as directed by the Site Safety Officer. The placement of the equipment will be at the discretion of the Site Safety Officer and will be located close to areas where drums are being handled at the point-of-extraction.

a) portable emergency eye wash and shower;

b) two twenty pound ABC type dry chemical fire extinguishers;

c) two Self Contained Breathing Apparatus (SCBA) units, with a minimum of two spare tanks;

d) approved industrial First-Aid Kit for a minimum of 25 personnel, complete with buffer solutions for treating acid and caustic burns;

e) stretcher; and

f) blankets.
12.0 EMERGENCY RESPONSE PLAN

12.1 ON-SITE CONTINGENCY PLAN

In the event of injury to on-Site personnel or contact with hazardous materials, the Site Safety Officer will ensure that the following protocol will be followed:

i) in the event of an injury or chemical exposure, notify the Site Safety Officer who shall notify the Engineer and the Contractor's Project Manager;

ii) contact the designated medical center and describe the injury (prior to mobilizing to the Site, the Contractor will submit the name and telephone number of the designated medical center to the Engineer),

iii) decontaminate personnel and administer appropriate first aid; and,

iv) transport personnel to the designated medical facility along a predefined route (prior to mobilizing to Site, the Contractor will submit the designated route to the Engineer).

Fire fighting equipment (extinguishers) will be maintained in strategic locations within the Site to combat localized fires. The locations will be marked by an appropriate and highly visible sign. The
Contractor shall ensure that designated personnel will be available whom are trained in fire fighting procedures and whom will be equipped with self contained breathing apparatus when involved in fighting fires involving chemical substances which require the use of such respiratory equipment.

In the event of significant release of toxic or hazardous vapors from any container or excavation, the source of such vapors will be immediately backfilled or covered with fill. Equipment operators will utilize self contained breathing apparatus during such operations. Alternate plans of contaminant removal will be developed by the Contractor and submitted to the Engineer prior to recommencing work in the area.

In the event that an accident or some other incident such as an explosion or an exposure to toxic chemical levels occurs during the course of the project, the Site Safety Officer shall notify the Engineer immediately and undertake corrective actions. The Site Safety Officer shall sound the fire alarm should conditions warrant evacuation of the area of the incident. The Site Safety Officer shall provide a written report, within 24 hours, to the Engineer and CIH. The report will include the following items:

a) Name, organization, telephone number, and location of the contractor,
b) Name and title of the person(s) reporting the incident,
c) Date and time of accident/incident,
d) Location of accident/incident giving pertinent details,
e) Brief summary of accident/incident giving pertinent details including type of operation ongoing at time of accident,
f) Cause of accident/incident, if known,
g) Casualties (fatalities, disabling injuries),
h) Details of any existing chemical hazard of contamination,
i) Estimated property damage, if applicable,
j) Nature of damage and effect on contract schedule,
k) Action taken by the Contractor to ensure safety and security, and
l) Other damage or injuries sustained (public or private).

Following Site mobilization and prior to excavating waste areas, the Site Safety Officer will establish designated meeting places for personnel in the event that on-Site work zone evacuation is required. The Site Safety Officer will select these locations such that they are upwind of work zones based on wind directional monitoring.

12.2 OFF-SITE CONTINGENCY PLAN

Prior to commencing work involving the excavation, handling and disposal of potentially contaminated material, the Contractor will coordinate the development of an off-Site emergency contingency plan. This plan is intended to provide immediate response to a serious Site occurrence such as explosion, fire or migration of significant quantities of toxic or hazardous material from the Site into adjacent public areas.
Coordination meetings will be held with appropriate authorities including the State, Engineer, Fire, Hospital, State and City Police, State Department of Transportation, Civil Defense officials and the Livingston County Emergency Coordinator. The meetings will identify the Emergency Response Coordinator through whom all information and coordination will occur in the event of an incident. Plans will be developed, or existing plans incorporated into the master plan, for

i) evacuation of adjacent areas,
ii) fire fighting procedures,
iii) transport of injured personnel to medical facilities,
iv) priority transportation routes, and
v) coordination and/or modification of highway operations.

12.3 EMERGENCY MEDICAL FACILITIES, ROUTES AND PHONE NUMBERS

The Contractor will designate, upon mobilization to the Site, an emergency medical facility for non-chemical and chemical accidents respectively. Staff at the designated facilities will be advised of the potential medical emergencies that might arise. A map indicating the shortest route to these medical facilities and a list of emergency phone numbers will be presented at the initial training session and will be attached to the Health and Safety Plan. In addition, a copy of the map showing the route to the
emergency medical facilities will be posted in the office trailers and an extra copy will be available for use by a driver if required.
13.0 PERSONAL SAFETY AND RELATED EQUIPMENT

The Contractor will ensure that all on-Site personnel are equipped with the proper personal safety equipment and protective clothing appropriate for the hazardous material being handled and the nature of work being completed. The Contractor will ensure that all safety equipment and protective clothing is kept clean and well-maintained. The personal protective equipment required for various work activities are summarized on Table 13.1 and described in the following sections. Respiratory protection will be in accordance with Section 8.0.

13.1 NON-HAZARDOUS WORK ACTIVITIES

Safety equipment and apparel required for non-hazardous work activities consists of the following standard issue, Level D, work wear:

a) hardhats,
b) safety shoes or boots,
c) eye protection if applicable,
d) hearing protection if applicable,
e) workgloves,
f) coveralls and outerwear, and
g) safety harnesses and other equipment, as required.
# TABLE 13.1

## SUMMARY OF PERSONAL PROTECTIVE EQUIPMENT

<table>
<thead>
<tr>
<th>Work Activity</th>
<th>Total Organic Vapor Concentration Above Background (ppm)</th>
<th>Personal Protective Equipment Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Site Preparation Activities</td>
<td>N/A</td>
<td>Level D</td>
</tr>
<tr>
<td>2) Non-Hazardous Work Activities (no dermal or inhalation exposure to waste materials)</td>
<td>N/A</td>
<td>Level D</td>
</tr>
<tr>
<td>3) General Exclusion Zone Activities (excluding handling/sampling of waste containers)</td>
<td>0-5, 5-50, &gt;50</td>
<td>Level C; APR immediately available but not donned, Level C; APR donned, Level B; APR upgraded to SCBA or other supplied air</td>
</tr>
<tr>
<td>4) Excavation and Backfilling (excluding handling/sampling of waste containers)</td>
<td>N/A; during initiation of excavation in each area for workers at immediate point-of-excavation</td>
<td>Level C; APR donned</td>
</tr>
<tr>
<td>5) Handling/Sampling of Waste Containers (during excavation, overpacking/repacking, sampling)</td>
<td>N/A</td>
<td>Level B; SCBA or other supplied air</td>
</tr>
<tr>
<td>6) Handling of Overpacked/Repacked Waste Containers (transport to and handling at staging pads; container closed)</td>
<td>N/A</td>
<td>Level C; APR donned</td>
</tr>
<tr>
<td>7) Handling of Characterized Waste Containers</td>
<td>N/A</td>
<td>To be determined by Site Safety Officer in consultation with Engineer, EPA OSC, MDNR.</td>
</tr>
<tr>
<td>8) Off-Site Transport Drivers</td>
<td>N/A</td>
<td>APR available in cab</td>
</tr>
</tbody>
</table>
Non-hazardous work activities are defined as those activities which would result in neither dermal nor inhalation exposure of workers to Site substances. The primary hazard to workers are those associated with heavy construction activities i.e. moving machinery.

Non-hazardous work activities include the following work tasks:

a) all Site preparation activities conducted outside of the Site fence which are required prior to initiating excavation of the waste disposal areas,

b) construction of the equipment decontamination facility for the NEBD Area, and

c) construction of the equipment decontamination facility and staging pad for the IW area.

13.2 GENERAL EXCLUSION ZONE ACTIVITIES

The hazards presented to workers conducting general exclusion zone activities (excluding the handling/sampling of waste containers) will include potential inhalation and dermal contact with Site substances in addition to general construction related hazards. There will also be a cut and puncture hazard should metallic debris be encountered. The use of respiratory protection will also increase the potential for slip and trip type accidents to occur.
Safety equipment and apparel as required for general work and excavation work within the Exclusion Zones upon initiating excavation of the waste disposal areas will be generally completed at Level C protection, which will consist of Level D wear supplemented by the following:

a) Disposable outerwear including, Saranex coveralls, and nitrile gloves,
b) Rubber overshoes or overboots,
c) Full-facepiece respirator with cartridges suitable for organic vapors, acid gas and particulates, (self-contained breathing apparatus or other supplied air system will be immediately available and donned as necessary based on real-time air monitoring to conduct response actions in a safe manner); and,
d) Eyepiece inserts for those personnel that require the use of glasses.

If the real-time air monitoring indicates the need, respiratory protection will be upgraded to SCBA or other supplied air. Level B will consist of the Level C equipment except that the respiratory protection will be upgraded.

Additional protective equipment usage guidelines to be implemented include:

a) Contact lenses will not be permitted.
b) All disposable or reusable gloves worn on the Site will be nitrile gloves or cotton gloves (for operators) with latex gloves worn underneath. All reusable gloves will be checked daily for punctures or tearing prior to donning.

c) During periods of respirator usage in contaminated areas, respirator filters will be changed daily or upon breakthrough, whichever occurs first.

d) Footwear used on Site will be work shoes or boots, and will be covered by rubber overshoes when entering or working in the Exclusion Zones or Contaminant Reduction Zones.

e) On-Site personnel unable to pass a respirator fit test will not enter or work in the Exclusion Zones or Contaminant Reduction Zones.

f) All on-Site personnel will wear an approved hardhat. The Safety Officer will determine when the hard hat protection requirement may be waived.

g) All personal protective equipment worn on Site will be decontaminated at the end of each work day. The Site Safety Officer will be responsible for ensuring individuals decontaminate personal protective equipment before reuse.
h) Duct tape will be used to ensure that disposable coveralls and gloves are tightly secured with the outerwear outside of the gloves when personnel are working within contaminated zones.

The initiation of excavation activities in the waste disposal areas will be conducted under Level C with continuous air monitoring. Based on the monitoring results, the Site Safety Officer will evaluate the appropriateness of the level of protection and consult with the Engineer should modifications to the level of protection be deemed necessary. Off-Site transport drivers will only be required to have available the respiratory protection component of the Level C gear as they will not be permitted out of their vehicles when in the Exclusion and Contaminant Reduction Zones.

13.3 HANDLING/SAMPLING OF WASTE CONTAINERS

Personnel involved in the handling/sampling of waste containers will be subject to potential inhalation and dermal hazards from Site chemicals.

The handling of waste containers of unknown content during excavation, overpacking/repacking and sampling will be conducted under Level B. Subsequent handling once the contents and associated respiratory hazards, if any, are known will be performed under the
appropriate level of respiratory protection to be determined by the Site Safety Officer in consultation with the Engineer, USEPA OSC, and MDNR. The handling of overpacked/repacked waste containers during transport to and at the staging pads will be conducted under Level C.

All personnel involved in the handling or sampling of waste containers of unknown content will conform to the following additional personal protective equipment requirements:

i) Chemical resistant rain gear will be worn over tyvek coveralls and standard work clothing. The zipper of the outerwear will also be taped,

ii) Chemical resistant (neoprene) overboots will be worn over standard safety footwear with the outerwear taped to the outside of the overboots,

iii) Surgical latex inner gloves will be worn and the outerwear will be taped to the outside of the gloves, and

iv) A nitrile outerglove will be worn over the latex gloves and taped to the outerwear.
14.0 PROCEDURES FOR DONNING AND DOFFING OF PROTECTIVE CLOTHING AND EQUIPMENT

Donning:

1) All equipment to be personally inspected by wearer.

2) Adjust hard hat for proper fit.

3) Standing or sitting, step into legs of suit; ensure proper placement of legs and feet within suit, then gather suit around the waist.

4) Put on boots; tape leg cuff of suit over the tops of the boots using duct tape.

5) Don respirator and adjust it; perform positive and negative pressure fit tests. Procedures are outlined in the respirator program.

6) Put sleeves of suit over arms.

7) Put on inner gloves.

8) Put on hard hat.

9) Secure the suit by closing all fasteners. Tape over fasteners if protective flap is not already provided.
10) Put on outer gloves; tape cuff of sleeve to tops of gloves.

11) Have an assistant check to determine if all equipment is secure and functioning normally and that there are no other problems.

**Doffing:**

1) Wearer of equipment will first be decontaminated. Boots will be washed off in a boot wash with a soapy water solution.

2) Remove any extraneous or disposable clothing, boots, outer gloves, hard hat, and tape.

3) Remove arms, one at a time, from suit. Be careful not to have any contact between the outer surface of the suit and the wearer’s body. Keep the inner gloves on.

4) Sitting, remove both legs from suit.

5) Remove inner gloves by rolling them off the hand, inside out.

6) Remove respirator, throw away cartridges and wash in disinfecting solution. Suspend respirator to dry. (Completed only at end of work day.)
7) Remove inner clothing, and thoroughly wash the body. (Completed only at end of work day.)
15.0 **HEAT STRESS/COLD STRESS**

15.1 **HEAT STRESS**

Heat stress is one of the most common hazards encountered at a Site, and there are a number of factors which have an effect in determining the amount of heat stress experienced by an individual worker. These factors include environmental conditions, type of clothing worn, workload, and individual characteristics. Since heat stress is a common hazard and has the potential to become a serious illness, the Contractor will develop a program to protect its employees which meets the following requirements.

All employees will be trained in the following:

1) Individual factors which influence an individual's susceptibility to heat.

2) Environmental characteristics such as temperature, humidity, wind speed, and cloud cover.

3) Body response to heat.

4) Effect of personal protective equipment and workload.
5) The various types of heat disorders and their associated symptoms.

6) Heat stress program - acclimatization, monitoring, work/rest regimen, and fluid intake (balanced electrolytic fluids).

Training for the heat stress program will be conducted at the time of the initial training.

Monitoring will be initiated when the ambient air temperature reaches 70°F. The monitoring frequency will depend upon the temperature and the type of protective clothing worn. As the temperature increases, the monitoring will become more frequent. Also, if an employee is wearing impermeable protective clothing, the frequency of monitoring will increase. For example at 72.5°F (adjusted temperature)¹ and wearing an impermeable suit, an employee will be monitored after every 120 minutes of work. If the temperature increases to 87.5°F (adjusted temperature), the workers will be monitored after every 60 minutes of work.

The monitoring will include:

1) heart rate,
2) body temperature (oral), and
3) body water loss (if practicable).

¹ Adjusted Temperature = Air temperature + 13% \frac{sunshine}{100}
The heart rate will be determined for 30 seconds as soon as practicable during the rest period. If this heart rate exceeds 110 beats per minute, the next work cycle will be shortened by one third.

The oral temperature will also be taken at the end of the work period. If the oral temperature exceeds 99.6°F, then the next work cycle will be shortened by one third.

If the heat stress conditions become severe, then the Site Safety Officer or CIH will recommend that body water loss be determined. The employee will be weighed, and the total body water loss will be kept below 1.5 percent body weight loss in a work day.

The length of the work cycle will depend upon the monitoring cycle. The length of the rest cycle depends upon the physical monitoring results. The initial rest period will be 15 minutes (minimum) in duration. During this time period the body will usually return to its homeostatic condition. If the body does not return to homeostasis during the 15 minute rest period, then the rest period will be increased to ensure that a homeostatic condition is reached.
15.2 COLD STRESS

If work is performed during cold months at the Rasmussen Dump Site, workers may be exposed to cold stress during the response program. The Contractor will provide appropriate cold weather clothing and heated shelter for all workers and will monitor for cold stress. Workers who are exposed to temperatures below -10°F with wind speeds less than 5 mph will be medically certified as suitable for such exposure. All workers certified for exposure will adhere to the work warm-up schedule as specified in the current ACGIH standards as outlined in the booklet entitled "Threshold Limit Values and Biological Exposure Indices". A copy of the ACGIH standard will be available on Site for reference if it is anticipated that implementation of the work warm-up schedule will be required.

All workers who may be subjected to cold stress will receive training during the initial Site training session in the following:

1) Environmental characteristics such as temperature, humidity, wind speed, and cloud cover.

2) Body response to cold.

3) The various types of cold stress and their associated symptoms.

4) Cold stress program.
16.0 **PERSONAL HYGIENE PROTOCOLS**

The Contractor will be responsible for, and ensure that all Contractor personnel performing or supervising response actions within the Exclusion Zones, or exposed or subject to exposure to vapors, liquids, or solids containing Site constituents, observe and adhere to the personal hygiene-related provisions of this section. On-Site personnel found to be disregarding the personal hygiene-related provisions of this plan will, at the request of the Engineer or Site Safety Officer, be barred from the Site.

The Contractor will ensure that the following equipment/facilities are available for the personal hygiene of all on-Site personnel.

a) Suitable disposable outerwear (Saranex suits, inner and outer gloves, and respirator cartridges), gloves, footwear, and respiratory protection on a daily basis for the use of on-Site personnel,

b) Contained storage and disposal for used disposable outerwear,

c) Personnel hygiene facility complete with change area, showers, toilets and washbasins with contained storage for all wash waters,

d) Lunch area, and
e) A smoking area.

The Contractor will also enforce the following regulations for personnel working within the Exclusion Zones:

a) On-Site personnel will wear disposable outerwear and gloves at all times whenever entering or working in the Exclusion Zones or Contaminant Reduction Zones.

b) Used disposable outerwear will not be reused if deemed to be unsuitable to provide the necessary protection, and when removed, will be placed inside disposable containers provided for that purpose.

c) Smoking will be prohibited except in a designated smoking area.

d) Eating and drinking will be prohibited except in the designated lunch or break area.

e) Disposable outerwear will be removed prior to entering the lunch area, and prior to cleansing hands, face, neck, and other exposed areas.

f) On-Site personnel will thoroughly cleanse their hands and other exposed areas before entering the smoking or lunch area.
g) All personnel working in the Exclusion Zones or Contaminant Reduction Zones will shower and change to street clothes prior to leaving the Site.

h) All work clothing will be laundered on Site on a daily basis and will not be allowed to be taken off-Site by personnel.
17.0 EQUIPMENT AND PERSONNEL DECONTAMINATION

17.1 PROCEDURES TO MINIMIZE THE NEED FOR EQUIPMENT AND PERSONNEL DECONTAMINATION

Procedures will be implemented to reduce the amount of contact with excavated waste material of both personnel and equipment. These procedures are:

1. Proper work practices that would lead to minimal direct contact with waste material.

2. Plastic sheeting will be used where practicable to cover the equipment or instruments.

3. Use of disposable equipment and clothing as much as practicable.

4. Equipment will be decontaminated in the Contaminant Reduction Zone prior to leaving the Site or being taken into the Support Zone.

17.2 PERSONNEL DECONTAMINATION

Any Site personnel entering and working within the Exclusion Zone will be required to follow the personnel decontamination procedures presented below.
Personnel decontamination will consist of:

1. **Contaminant Reduction Zone** - boot and glove wash with detergent, tape removal, and outer glove removal; removal of boots, gloves, disposable suit, respirator, hard hat, and inner gloves. Personnel decontamination will be conducted at the entrance to the hygiene trailer away from the equipment decontamination pad. Decontamination will be performed inside the hygiene trailer or under a temporary shelter under cold weather conditions. Protective clothing which is discarded will be collected and disposed of with the waste material.

2. **Support Zone** - shower and redress area.

All personnel will have removed their protective clothing prior to entering the hygiene trailer. Personnel will wash their hands and face in the hygiene trailer before entering the lunch and break areas to eat, drink or smoke. At the end of their work shift, personnel will shower and redress in the hygiene trailer prior to leaving Site.
17.3 **EQUIPMENT DECONTAMINATION**

All equipment used within the Exclusion Zones and which comes in contact with material potentially containing the designated Site constituents will be decontaminated at the on-Site equipment decontamination facilities. Decontamination in the Contaminant Reduction Zone will consist of a high pressure wash with detergent for equipment leaving Site. Small tools which are difficult to decontaminate will be disposed of with the waste material. Vehicles leaving waste excavation areas will undergo interim decontamination at the tire decontamination stations located on Figure 1 and as described in the Work Plan.
18.0 **AIR MONITORING**

18.1 **GENERAL**

During the progress of active response actions, the Contractor will complete real-time air monitoring for on-Site air quality. Real-time air monitoring will be conducted for explosive gases, oxygen levels, and total volatile organic vapors. In addition to the real-time air monitoring, the Engineer will execute a compound-specific perimeter air monitoring program which will be correlated to the real-time monitoring program. The Contractor's Site Safety Officer will review all of the air data collected during the course of the project on an ongoing basis and in consultation with the PRPs Project Coordinator, USEPA's On-Scene Coordinator and MDNR's Project Coordinator, will modify those work practices as necessary.

18.2 **REAL-TIME AIR MONITORING**

Prior to implementing the Health and Safety Plan the Engineer will designate six (6) air monitoring locations which are distributed around the Exclusion Zone perimeter. These pre-specified locations will be used as part of the real-time air monitoring program during implementation of the work at the Site. The approximate position of these Exclusion Zone perimeter locations are shown on Figure 1.
Real-time air monitoring at these locations will be conducted using an HNu/OVA which has been appropriately calibrated. HNu/OVA readings will be taken by the Contractor once per hour at each of the six pre-specified Exclusion Zone perimeter locations shown on Figure 1.

If actual field operations reveal that hourly sampling of all six Exclusion Zone perimeter locations is not practical or necessary, adjustments may be made after consultation between the PRPs Project Coordinator, USEPA's On-Scene Coordinator, MDNR's Project Coordinator and approval by the Agencies. Any such modification shall be memorialized in writing.

If, during the real-time monitoring, an unexplained HNu/OVA reading of greater than 10 ppm above background ("background" shall mean the readings obtained at an upwind location which is not being impacted by Site activities) is sustained for a duration of thirty seconds at a downwind Exclusion Zone perimeter monitoring location, the Contractor shall review and modify work procedures at the Site to minimize the potential of air emission levels greater than 10 ppm above background at the Exclusion Zone perimeter and shall take an HNu/OVA measurement at the most appropriate pre-determined Site perimeter (i.e. property boundary) downwind location (see Section 18.3). The Contractor shall notify the Engineer, USEPA and MDNR representatives of any readings greater than 10 ppm above background recorded at the Exclusion Zone perimeter.
If HNu/OVA readings taken by the Contractor or by
USEPA/MDNR at the appropriate downwind Site perimeter location reflect
an unexplained level of 1 ppm above background sustained for a period of
thirty seconds, the Contractor shall review and modify work procedures in
order to minimize the potential of air emission levels of greater than 10 ppm
above background at the Exclusion Zone perimeter and of greater than 1 ppm
above background at the Site perimeter, respectively. The Contractor shall
notify the Engineer, USEPA and MDNR representatives of any readings
greater than 1 ppm above background recorded at the Site perimeter.

The real-time air monitoring program at the Exclusion
Zone perimeter is in addition to the real-time monitoring required for
worker protection described in Section 8.0.

18.3 COMPOUND-SPECIFIC AIR SAMPLING

In addition to the real-time air monitoring conducted as
described in Section 18.2, the Engineer will designate eight (8) air monitoring
locations which are distributed around the Site perimeter. These pre-
specified locations will be used as part of the air monitoring program during
implementation of the work at the Site. The approximate position of these
Site perimeter locations is shown on Figure 2. In addition, the Engineer will
designate an air monitoring location in the direction of the nearest residence.
Air samples will be collected for compound-specific analysis at two pre-established Site perimeter locations and at the residence station. The compounds to be analyzed and the analytical methods used include the following:

<table>
<thead>
<tr>
<th>Compound</th>
<th>Analytical Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzene</td>
<td>TO-1</td>
</tr>
<tr>
<td>Chloroform</td>
<td>TO-1</td>
</tr>
<tr>
<td>Methylene Chloride</td>
<td>TO-1</td>
</tr>
<tr>
<td>Trichloroethylene</td>
<td>TO-1</td>
</tr>
<tr>
<td>Tetrachloroethylene</td>
<td>TO-1</td>
</tr>
<tr>
<td>Polychlorinated Biphenyls (PCBs)</td>
<td>TO-10</td>
</tr>
</tbody>
</table>

(particulate and gaseous phase)

At each compound-specific monitoring location two Dupont pumps or equivalent, calibrated before and after each use with a primary standard, will be set at a flow rate calculated as described in Appendices VIII and IX for Method TO-1 and TO-10, respectively. The air sample for the volatile organics will be collected on two Tenax cartridges connected in series (primary with backup) for a daily period encompassing working hours. At the end of this sampling period the samples will be submitted by the Engineer to the laboratory for analysis.

The ambient air samples collected for PCB specific analysis will be representative of a daily period encompassing working hours. A
personal sampling pump will be used at each of the three compound-specific monitoring locations. Each of the pumps will be designated for collection of both particulate PCB and for the collection of PCB in the gaseous phase (TO-10).

Particulate PCB samples will be collected on a glass fiber prefilter mounted in front of the polyurethane foam sorbent used to collect gaseous phase PCBs. This collection procedure will ensure that the particulate and gaseous phase PCBs are collected using the same sample volume. At the close of a sampling period, the particulate sample will be collected with the gaseous phase sample and sealed for shipment to the analytical laboratory.

A polyurethane foam (PUF) sorbent will be used to collect the vapor or gaseous phase PCB sample. The PUF will be packed into a cylinder by the laboratory. The tube will be opened just prior to initiating sampling and attached in-line with a pump. A flow rate of 0.05 L/min will be used in order to eliminate or reduce the possibility of breakthrough on the sample tube. At the close of a sampling period, the total time will be noted and the sample tube will be removed and capped securely with plastic caps on both ends. These samples will be refrigerated until shipment and during shipment in order to reduce the possibility of loss of sample through volatilization.
Samples will be shipped via overnight courier to the designated laboratory under chain-of-custody.

Daily samples for compound-specific analysis will be collected at three locations: one upwind perimeter station, one downwind perimeter station, and one station in the direction of the nearest residence. These samples shall constitute a "sample set".

The results of all analyses of sample sets which are required to be analyzed will be reported orally within 48 to 72 hours of the end of the sampling period to USEPA's On-Scene Coordinator and to MDNR's Project Coordinator.

During the first two weeks of active excavation and handling of the excavated material, the sample sets will be collected daily and analyzed in accordance with the analytical methods presented in Appendices VIII and IX. Following completion of the first two weeks of the active excavation and handling of the excavated material, all Site air data, consisting of real-time HNu/OVA readings and compound-specific air sample results, and the nature of the work to be performed in subsequent phases of the project, will be evaluated. Following this review, and after consultation between the PRPs Project Coordinator, USEPA's On-Scene Coordinator, and MDNR's Project Coordinator, the frequency of analysis of the sample sets may be reduced if approved by the Agencies. If the frequency of analysis of the sample sets is reduced, the initial reduction will be to a
frequency of analysis of three sample sets per week. Any such modification shall be memorialized in writing.

18.4 **WIND DIRECTIONAL MONITORING**

The Contractor will furnish and maintain a minimum of three wind socks, with additional wind socks as necessary at each active working area to determine the direction of any potential emissions migrating from Site. The Contractor will notify the Engineer of directional changes within one hour after the change is first observed and after the directional change has stabilized for 30 minutes to allow resetting of perimeter sample locations if required.

18.5 **ANALYSIS CALIBRATION AND DATA REPORTING**

Analysis calibration will be performed by a laboratory selected by the PRPs and approved by the Agencies as described in the analytical methods presented in Appendices VIII and IX. Calibrations of all monitoring equipment will be completed on a daily basis. Calibration of the personal pumps will be completed with a primary standard.

The Engineer will be immediately advised when results indicate:
- required modifications to existing Site protocols,
- excessive exposure to employees.
- possibility of excessive contamination having occurred in off-Site regions.

Results will be reported verbally to the Engineer within 48 to 72 hours of collection of the sample if required. Written data sheets detailing monitoring results will be presented to the Engineer the following day. The air monitoring report forms will include the following information:

i) Site Location/Date
ii) Work Process/Operation Name
iii) Sampling Method Used
iv) Instrument Calibration Record at Sample Location
v) Temperature, Pressure, Humidity at Sample Location
vi) Area Sampling Location Diagram
vii) Personal Samples
   - Name of Workers
   - Location of Workers
viii) Area Sample Description/Location
ix) Sampling Data
    - Pump I.D.
    - Flow Rate
    - Sample Filter/Tube Number
    - Pump On/Off (time)
- Volume Air Collected (liters)
- Lab Sample Number

x) Analysis Results \((\text{mg/m}^3, \text{ppm})\)

xi) Field Notes
- Description of Operations and Complaints/Symptoms
- Chemicals/Materials/Equipment in Use
- Engineering/Administration Controls in Effect
- Personal Protective Equipment in Use
- Sampling Observations/Comments

xii) Sample Submission
- Name of Worker, Location
- Name of Chemist/Industrial Hygienist
- Instrument Identification No:
- Chain of Custody
- Sealing of Samples

Data sheets for on-Site inspections, calibrations, monitoring and analytical results are included in Appendix X.
19.0 **CONTAMINANT MIGRATION CONTROL**

All vehicles and equipment used in the Exclusion Zone will undergo decontamination procedures in the Contaminant Reduction Zone prior to leaving the Site. The Contractor's Site Safety Officer will certify that each piece of equipment has been decontaminated prior to removal from Site.

Decontamination will consist of the thorough cleaning of equipment with a high pressure hot water cleaner, and will be performed at the equipment decontamination facility constructed within the Contaminant Reduction Zone.

Personnel engaged in vehicle decontamination will wear protective equipment including disposable clothing and respiratory protection.

Additional vehicle/equipment decontamination will be conducted as described in Section 17.3.
20.0 **PARTICULATE EMISSION CONTROL**

During all response activities, the Contractor will implement and enforce a dust control program to minimize the generation and off-Site migration of fugitive particulate emissions.

All roadways, designated work areas and other sources of dust generation will be controlled by application of water and/or calcium chloride as determined necessary by the Engineer in consultation with the Safety Officer.
21.0 **POSTED REGULATIONS**

The Contractor will post "No Smoking" signs at the gated entrances into the fenced area and on the perimeter of the Exclusion Zone in addition to signs which state "Warning, Hazardous Work Area, Do Not Enter Unless Authorized". In addition, a notice directing visitors to the Site Office will be posted at the gated entrances.

Safety regulations and safety reminders will be posted at conspicuous locations throughout the Site.
22.0 **SAFETY MEETINGS**

The Site Safety Officer will conduct weekly safety meetings which will be mandatory for all Site personnel. The meetings will provide refresher courses for existing equipment and protocols, and will examine new Site conditions as they are encountered.

Additional safety meetings will be held on an as required basis.

Should any unforeseen or Site peculiar safety related factor, hazard, or condition become evident during the performance of work at this Site, the Contractor will bring such to the attention of the Engineer in writing as quickly as possible. In the interim, the Contractor will take prudent action to establish and maintain safe working conditions and to safeguard employees, the public, and the environment.

No visitors or personnel will be allowed to enter the Exclusion Zones or Contaminant Reduction Zones unless they have the prior approval of the Site Safety Officer and the Engineer.
23.0 **HEALTH AND SAFETY LOGS**

The Contractor will maintain daily safety inspection logs and weekly reports on Site as part of the Health and Safety Program. All daily and weekly logs will be signed by the Site Safety Officer. Contents of these reports will be as follows:

i) **Daily Safety Inspection Logs**

These logs will record the following information:

- Date
- Areas inspected
- Employees in designated areas
- Equipment being utilized by employees named
- Protective equipment being worn by employees named
- Air monitoring data reported

ii) **Weekly Reports**

These reports will record the following information:

- Summary Sheet covering range of work activities completed or in progress
- Copies of daily logs
- Copies of analytical and air monitoring results
- Any incidents of:
  - Safety violations
  - Misuse of protective equipment
  - Disregard of buddy system
  - Violation of eating, smoking, and chewing in prohibited areas
  - Instances of job-related injuries and illness (an accident report shall be required)
  - Copies of Medical Certificates for on-Site employees and waivers for visitors

iii) **Final Health and Safety Report**

At the completion of all Site work the Contractor will submit a final report which will include:

- Final physical/medical and decontamination certification
- Summary of monitoring completed on the job to include personnel, air, decontamination, treated water and other applicable monitoring
- Procedures and techniques used to decontaminate:
  - Equipment and vehicles
  - Personnel
  - Personnel hygiene facility
- Signed and dated by the Project Superintendent and the CIH
24.0 **EMERGENCY HAND SIGNALS**

In order to maintain a standard form of communication in the field while wearing protective personnel equipment, the following hand signals will be used:

- **Hand gripping throat:** Out of air, can't breathe!
- **Grip partner's wrist or place both hands around waist:** Leave area immediately, no debate!
- **Hands on top of head:** Need assistance.
- **Thumbs up:** OK, I'm all right, I understand.
- **Thumbs down:** No, negative.
APPENDIX IV

TRAINING ACKNOWLEDGEMENT FORM
TRAINING ACKNOWLEDGEMENT FORM

NAME: ____________________________________________

ADDRESS: _________________________________________

SOCIAL SECURITY: _________________________________

EMPLOYER: _______________________________________

I have completed and understand the applicable training program, for work to be carried out during the Immediate Response Action at the Rasmussen Dump Site, including the following topics:

a. Work Rules and Safety Requirements,
b. Personal Protection Equipment,
c. Potentially Hazardous Chemicals,
d. Emergency Equipment,
e. Reporting Injuries and Illnesses,
f. Emergency Procedures,
g. Job Assignments,
h. Personal hygiene,
i. Medical Tests,
j. Motor Tests, and
k. Standard Operating Procedures.

I further confirm that a respirator qualitative fit test was performed and that I have been issued a respirator of the same type.

By signing this form, I relieve the Rasmussen Site Participating Respondents Committee (PRC) and its members and their officers, employees and agents of the liability of consequences related to potential hazards associated with site entry and work.

Site Person

Signature: ___________________________ Date: ___________

I certify that this Site Person has received adequate safety training and instruction and that this person is proficient in the use of protective clothing and equipment and knowledgeable in all aspects of this Health and Safety Plan.

Safety Officer

Signature: ___________________________ Date: ___________