SITE HEALTH AND SAFETY PLAN

for the

NORMAN LANDFILL

TOXIC SUBSTANCES

HYDROLOGY PROGRAM

U.S. Geological Survey

Oklahoma District

Table of Contents

FIGURES

TABLES

1.0 INTRODUCTION

This section of the Norman Landfill Health and Safety Plan (HASP) document defines general applicability and general responsibilities with respect to compliance with Health and Safety programs.

1.1 Scope and Applicability of the Site Health and Safety Plan

The purpose of this Norman Landfill Health and Safety Plan is to define the requirements and designate protocols to be followed at the Norman Landfill during investigation activities. Applicability extends to all employees of the U.S. Geological Survey.

All personnel on site shall be informed of the site emergency response procedures and any potential fire, explosion, health, or safety hazards of the operation. This HASP describes those hazards in section 3.3 and defines protective measures planned for the site.

This plan must be reviewed by all personnel prior to entering an exclusion zone or contamination reduction zone. During development of this plan consideration was given to current safety standards as defined by EPA/OSHA/NIOSH, health effects and standards for known contaminants, and procedures designed to account for the potential for exposure to unknown substances. Specifically, the following reference sources have been consulted:

- OSHA 29 CFR 1910.120 and EPA 40 CFR 311

1.2 Visitors

All visitors entering a contamination reduction zone or exclusion zone at the Norman landfill will be required to read this HASP. Visitors will also be expected to provide their own protective equipment. In the event that a visitor does not adhere to the provisions of the HASP, he/she will be requested to leave the work area. All nonconformance incidents will be recorded in the site log.

2.0 KEY PERSONNEL/IDENTIFICATION OF HEALTH AND SAFETY

2.1 Key Personnel

The following personnel and organizations are critical to the planned activities at the Site. The organizational structure will be reviewed and updated periodically by the site supervisor.

Scott Christenson

2.2 Site Specific Health and Safety Personnel

The Site Health and Safety Officer (HSO) has responsibility for ensuring that the provisions of this HASP are adequate and implemented in the field. Changing field conditions may require decisions to be made concerning adequate protection programs. Therefore, it is vital that personnel assigned as HSO be experienced and meet the additional training requirements specified by OSHA in 29 CFR 1910.120 (see Section 4.0 of this HASP). The HSO is also responsible for conducting site inspections on a regular basis in order to ensure the effectiveness

of this plan. The HSO at the site is Scott Christenson.

2.3 Organizational Responsibility

The U.S. Geological Survey is conducting scientific research into the physical, chemical, and microbiological processes at the Norman Landfill. This research will be conducted in compliance with all applicable laws and statutes.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSIS

3.1 Historical Overview of Site

This HASP defines the hazards and methods to protect personnel from those hazards as identified in previous site work or background information.

The site is a closed municipal landfill, owned by the City of Norman, Oklahoma (contact person is Jim Berry, Directory of Public Works), and is located in the alluvium of the Canadian River, close to the geographic center of the state. The landfill occupies approximately 12 hectares just outside the corporate boundary of the City of Norman. In 1983, the landfill was within 70 meters of the river, but the river changed course during a flood in 1987. Currently, the landfill is about 500 meters from the river. The landfill began receiving waste in 1922. Solid wastes were deposited on the ground surface, and no restrictions were placed on the type of material accepted. In 1960, the city began dumping waste in trenches approximately 3 meters deep, dug by a gravel company to obtain sand. The trenches filled with water because of the shallow water table at the landfill. From 1960 to 1972, municipal garbage trucks dumped solid waste into piles at one end of a trench. Bulldozers then pushed the waste into the trench, which contained 1.5 to 2.5 meters of water. The waste later was covered with 15 centimeters of sand. In 1972 new solid-waste legislation in the State of Oklahoma required that waste be deposited at least 0.6 meters above the water table and covered at least weekly. This mode of operation was used until 1985, when the landfill was covered with a clay cap and closed permanently. In 1982, the landfill was estimated to have received about 188 tons of municipal waste per day for 6 days each week. Undoubtedly, the landfill received a significant amount of hazardous waste because no restrictions were placed on the type of material dumped in the landfill. This waste site was in operation before liners or other pollution-abatement measures were required. Ground water down gradient from the landfill has low levels of dissolved oxygen and measurable concentrations of hydrogen sulfide and methane.

The work site for the Norman Landfill includes the east and west cells, which are clay-capped cells that are prominent topographic features, as well as that part of the Canadian River alluvium through which leachate is migrating. Because the part of the alluvium affected by leachate has not been clearly defined at the present time (May 1996), the work site is considered to be the area shown in figure 1

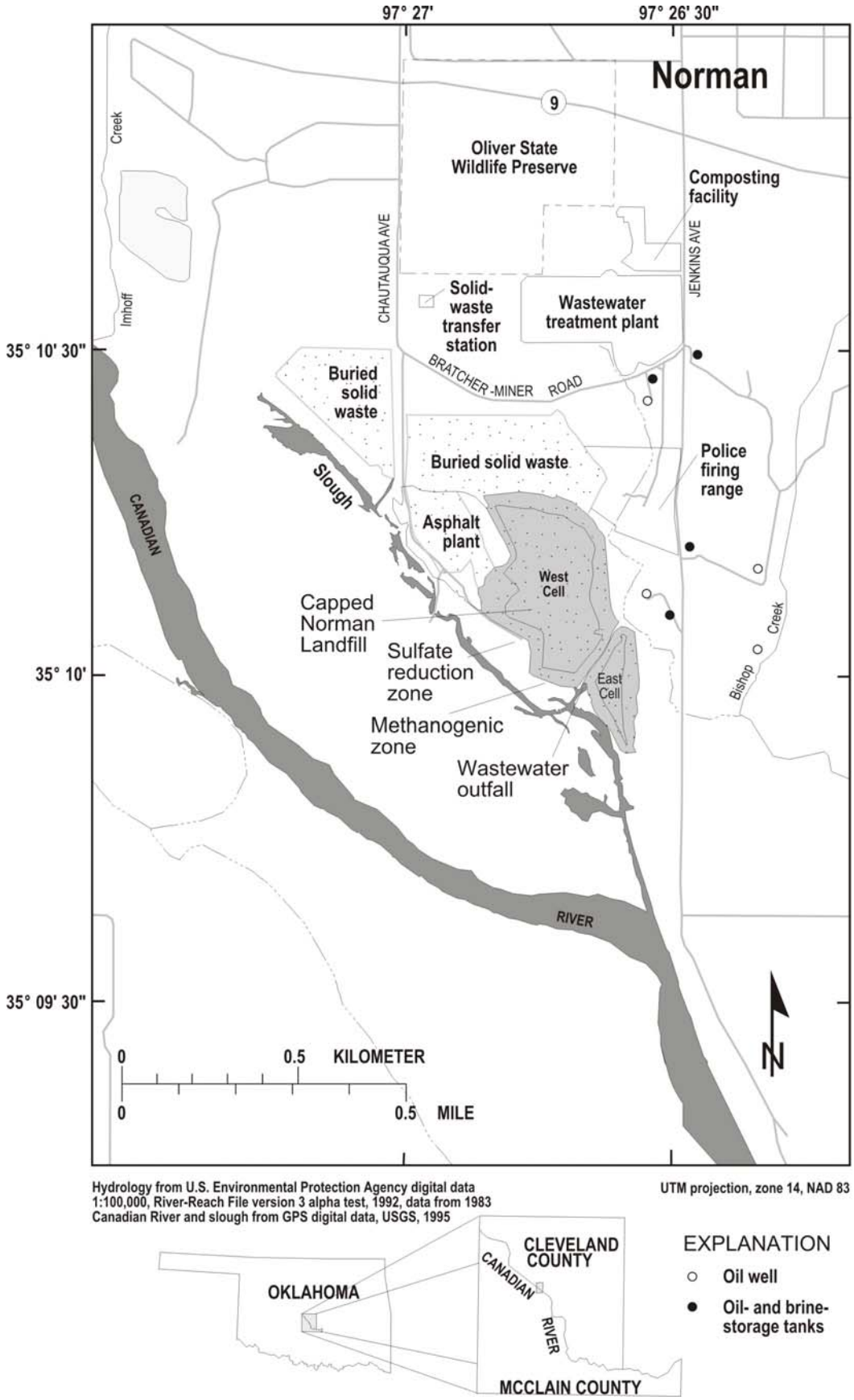

Figure 1. Map of the Norman Landfill study area.

. Additional work for background information is sometimes performed outside the area shown in figure 1 but this work is not considered to be hazardous.

For a thorough overview of historical information concerning the site see the following documents:

Adrian, Neal, Mangaokar, Anup, Phanapadipong, Phaichun, and Wainaina, Steven, 1990, Design of a ground water monitoring well system, Norman municipal landfill: Unpublished student paper, University of Oklahoma, Norman.

Dixon, Kelly, 1992, Preliminary assessment of the Norman landfill, Oklahoma State Department of Health.

Dunlap, W.J, Shew, D.C., Robertson, J.M., and Toussaint, C.R., 1976, Organic pollutants contributed to groundwater by a landfill: *in* Proceedings, Research Symposium on gas and leachate from landfills, Rutgers University - Cooks College, New Brunswick, New Jersey, March 24-26, 1975, p. 96-110, U.S. Environmental Protection Agency 600/9-76-004.

Robertson, J.M, Toussaint, C.R., and Jorque, M.A., 1974, Organic compounds entering ground water from a landfill: U.S. Environmental Protection Agency Environmental Protection Technology Series, EPA 660/2-74-077, p. 47.

3.2 Task by Task Risk Analysis

The evaluation of hazards is based upon the knowledge of site background presented in Section 3.1, and anticipated risks posed by the specific operation. The following subsections describe each task/operation in terms of the specific hazards associated with it. In addition, the protective measures to be implemented during completion of those operations are also identified.

The primary objectives of the Norman Landfill investigation are to conduct research into the physical, chemical, and microbiological processes that occur in the landfill, the leachate plume, and the interaction of the leachate plume with the surrounding ground and surface water. In order to conduct this research, numerous tasks must be undertaken. Section 3.3 provides a summary of task analysis and chemical hazards for each task at the Norman Landfill.

3.3 Task Hazard Descriptions

3.3.1 Site Walk Through:

General hazards associated with site walk-throughs, site surveys, and sampling grid layout include the following:

- Exposure to irritant and toxic plants such as poison ivy and sticker bushes may cause allergic reactions to personnel.
- Surfaces covered with heavy vegetation and undergrowth create a tripping hazard.
- Back strain due to carrying equipment, tools, and instruments.
- Native wildlife such as rodents, ticks, and snakes present the possibility of insect bites and associated diseases such as Lyme disease.

- Driving vehicles on uneven or unsafe surfaces can result in accidents such as overturned vehicles or flat tires.
- Heat stress/cold stress exposure.

HAZARD PREVENTION

- Wear long-sleeved clothing and slacks to minimize contact with irritant and toxic plants and to protect against insect bites. Appropriate first aid for individuals' known allergic reactions.
- Be alert and observe terrain while walking to minimize slips and falls. Steel-toed boots provide additional support and stability.
- Use proper lifting techniques to prevent back strain.
- Avoid wildlife when possible. In case of an animal bite, perform first aid and capture the animal, if possible, for rabies testing. Perform a tick check after leaving a wooded or vegetated area.
- Ensure all maintenance is performed on vehicles before going to the field. A site surveillance on foot might be required to choose clear driving paths.
- Implement heat stress management techniques such as shifting work hours, fluid intake, and monitoring employees, especially high risk workers.

3.3.2 Subsurface Soil sampling:

For the purposes of this hazard identification section, surface soil sampling will be considered any soil sampling completed by hand using a trowel, split spoon, shovel, auger, or other type of hand-held tool.

Hazards generally associated with soil and tailings/spoils sampling include:

- Contact with contaminants.
- Back strain and muscle fatigue due to lifting, shoveling, and augering techniques.
- Contact with or inhalation of solvents used for cleaning equipment.

HAZARD PREVENTION

- Latex, vinyl, or rubber gloves are worn when handling samples.
- When removing equipment from the ground or any time when an individual may be splashed with leachate, modified level D personal protective equipment is worn.
- To minimize exposure to chemical contaminants, a thorough review of suspected contaminants should be completed and implementation of an adequate protection program.
- Proper lifting (pre-lift weight assessment, use of legs, multiple personnel) techniques will prevent back strain. Use slow easy motions when shoveling, augering, and digging to decrease muscle strain.
- Material Safety Data Sheets for all decon solutions are available at the Oklahoma District office.
- First aid equipment should be available based on MSDS requirements.

3.3.3 Soil Borings:

Hazards generally associated with drilling operations include the following:

- Exposure to vapors of volatile organics.
- Absorbtion of toxic chemicals from landfill leachate.
- Noise levels exceeding the OSHA PEL of 90 dBA are both a hazard and a hinderance to communication.
- Fumes (carbon monoxide) from the drill rig.
- Overhead utility wires, i.e., electrical and telephone, can be hazardous when the drill rig boom is in the upright position.
- Underground pipelines and utility lines can be ruptured or damaged during active drilling operations
- Moving parts, i.e. augers, on the drill rig may catch clothing. Free or falling parts from the cat head may cause head injury.
- Moving the drill rig over uneven terrain may cause the vehicle to roll over or get stuck in a rut or mud. Be aware of hazards associated with moving heavy machinery and other associated injury.
- High pressure hydraulic lines and air lines used on drill rigs are hazardous when they are in ill repair or incorrectly assembled.

HAZARD PREVENTION

- Latex, vinyl, or rubber gloves are worn when handling samples.
- When removing equipment from the ground or any time when an individual may be splashed with leachate, modified level D personal protective equipment is worn.
- Review the contaminants suspected to be on site and perform air monitoring as required.
- Shut down drill rig and/or divert exhaust fumes.
- All chains, lines, cables should be inspected daily for weak spots, frays, etc.
- Ear muffs and ear plugs effectively reduce noise levels.
- Hard hats should be worn at all times when working around a drill rig. Secure loose clothing. Check boom prior to approaching drill rig.
- To avoid contact with any overhead lines, the drill rig boom should be lowered prior to moving the rig. Overhead utilities should be considered “live” until determined otherwise.
- The rig mast should not be erected within 10 feet of an overhead electrical line until the line is de-energized, grounded, or shielded and an electrician has certified that arcing cannot occur.
- Minimum working distances around “live” overhead power lines are:

Minimum working voltage range ((phase to phase) kilovolt)) and clear hot stick distance

2.1 to 15	2 ft. 0 in.
15.1 to 35	2 ft. 4 in.

35.1 to 46	2 ft. 6 in.
46.1 to 72.5	3 ft. 0 in.
72.6 to 121	3 ft. 0 in.
138 to 145	3 ft. 6 in.
161 to 169	3 ft. 8 in.
230 to 242	5 ft. 0 in.
345 to 362	7 ft. 0 in.1
500 to 552	11 ft. 0 in.1
700 to 765	15 ft. 0 in.1

- A thorough underground utilities search should be conducted before the commencement of a drilling project. The utility locator service is Call Okie (1-800-533-6543).
- All high pressure lines should be checked prior to and during use.
- Attached to this report is an appendix covering drilling safety.

3.3.4 Well Installation:

Hazards generally associated with drilling operations include the following:

- Exposure to vapors of volatile organics.
- Absorbtion of toxic chemicals from landfill leachate.
- Noise levels exceeding the OSHA PEL of 90 dBA are both a hazard and a hinderance to communication.
- Fumes (carbon monoxide) from the drill rig.
- Overhead utility wires, i.e., electrical and telephone, can be hazardous when the drill rig boom is in the upright position.
- Underground pipelines and utility lines can be ruptured or damaged during active drilling operations
- Moving parts, i.e. augers, on the drill rig may catch clothing. Free or falling parts from the cat head may cause head injury.
- Moving the drill rig over uneven terrain may cause the vehicle to roll over or get stuck in a rut or mud. Be aware of hazards associated with moving heavy machinery and other associated injury.
- High pressure hydraulic lines and air lines used on drill rigs are hazardous when they are in ill repair or incorrectly assembled.

HAZARD PREVENTION

- To minimize exposure to volatiles when drilling, a monitoring instrument (Drager 4-gas analyzer, monitoring hydrogen sulfide, lower explosive limit, oxygen, and broad-band toxics sensor) should be placed near the opening to monitor organic levels. The breathing zone should also be monitored. The action levels on the instruments should be chosen before site work begins.
- Latex, vinyl, or rubber gloves are worn when handling samples.
- When removing equipment from the ground or any time when an individual may be

splashed with leachate, modified level D personal protective equipment is worn.

- Review the contaminants suspected to be on-site and perform air monitoring as required. Shut down drill rig and/or divert exhaust fumes.
- All chains, lines, cables should be inspected daily for weak spots, frays, etc.
- Ear muffs and ear plugs effectively reduce noise levels.
- Hard hats should be worn at all times when working around a drill rig. Secure loose clothing. Check boom prior to approaching drill rig.
- To avoid contact with any overhead lines, the drill rig boom should be lowered prior to moving the rig. Overhead utilities should be considered "live" until determined otherwise.
- The rig mast should not be erected within 10 feet of an overhead electrical line until the line is de-energized, grounded, or shielded and an electrician has certified that arcing cannot occur.
- Minimum working distances around "live" overhead power lines are:

Minimum working voltage range ((phase to phase) kilovolt)) and clear hot stick distance

2.1 to 15	2 ft. 0 in.
15.1 to 35	2 ft. 4 in.
35.1 to 46	2 ft. 6 in.
46.1 to 72.5	3 ft. 0 in.
72.6 to 121	3 ft. 0 in.
138 to 145	3 ft. 6 in.
161 to 169	3 ft. 8 in.
230 to 242	5 ft. 0 in.
345 to 362	7 ft. 0 in.1
500 to 552	11 ft. 0 in.1
700 to 765	15 ft. 0 in.1

- A thorough underground utilities search should be conducted before the commencement of a drilling project. The utility locator service is Call Okie (1-800-533-6543).
- All high pressure lines should be checked prior to and during use.
- Attached to this report is an appendix covering drilling safety.

3.3.5 Ground-Water Sampling:

Hazards generally encountered during ground-water sampling include the following:

- Exposure to vapors of volatile organics when the well head is initially opened.
- Absorbtion of toxic chemicals from landfill leachate.
- Back strain due to lifting bailers or pumps from down-well depths and moving equipment (generators) to well locations.
- Slipping on wet or muddy surfaces.
- Electrical hazards associated with use of electrical equipment around water or wet surfaces.

- Possible water splashing in eyes during sampling.

HAZARD PREVENTION

- To minimize exposure to volatiles when the well head is initially opened, a monitoring instrument (Drager 4-gas analyzer, monitoring hydrogen sulfide, lower explosive limit, oxygen, and broad-band toxics sensor) should be placed near the opening to monitor organic levels. The breathing zone should also be monitored. The action levels on the instruments should be chosen before site work begins, and should be outlined in the safety plan.
- To prevent contact with leachate-contaminated ground water, gloves are worn by all personnel.
- Back strain can be prevented by employing proper lifting and bailing techniques. Heavy equipment, such as pumps and generators, should by only lifted with the legs, preferably using two or three personnel.
- Slipping on wet surfaces can be prevented by placing all purged water in drums for removal. Also, if the area is wet wear boots with good treads and be alert of where personnel are walking to decrease the chance of slipping.
- Ground fault interrupter should be used in the absence of properly grounded circuitry or when pumps are used around wet conditions.
- Electrical extension cords should be protected or guarded from damage (i.e., cuts from other machinery) and be maintained in good condition.
- Eye protection should be worn as appropriate to prevent water splashing into eyes.

3.3.6 Soil Gas Sampling:

For the purposes of this hazard identification section, surface soil sampling will be considered any soil sampling completed by hand using a trowel, split spoon, shovel, auger, or other type of hand-held tool. Hazards generally associated with soil and tailings/spoils sampling include:

- Contact with or inhalation of contaminants in sampling media.
- Back strain and muscle fatigue due to lifting, shoveling, and augering techniques.
- Contact with or inhalation of decontamination solutions.

HAZARD PREVENTION

- Latex, vinyl, or rubber gloves are worn when handling samples.
- When removing equipment from the ground or any time when an individual may be splashed with leachate, modified level D personal protective equipment is worn.
- Proper lifting (pre-lift weight assessment, use of legs, multiple personnel) techniques will prevent back strain. Use slow easy motions when shoveling, augering, and digging to decrease muscle strain.
- Material Safety Data Sheets for all decon solutions should be included with each Site Health and Safety Plan.
- First aid equipment should be available based on MSDS requirements.

3.3.7 Aquifer Tests:

Hazards generally encountered during aquifer testing sampling include the following:

- Exposure to vapors of volatile organics when the well head is initially opened.
- Back strain due to lifting bailers or pumps from down-well depths and moving equipment (generators) to well locations.
- Slipping on wet, muddy surfaces.
- Electrical hazards associated with use of electrical equipment around water or wet surfaces.
- Possible water splashing in eyes during sampling.

HAZARD PREVENTION

- To minimize exposure to volatiles when the well head is initially opened, a monitoring instrument (Drager 4-gas analyzer, monitoring hydrogen sulfide, lower explosive limit, oxygen, and broad-band toxics sensor) should be placed near the opening to monitor organic levels. The breathing zone should also be monitored. The action levels on the instruments should be chosen before site work begins, and should be outlined in the safety plan. To prevent contact with contaminated groundwater, or product material, provide adequate protective equipment.
- Latex, vinyl, or rubber gloves are worn when handling samples.
- When removing equipment from the ground or any time when an individual may be splashed with leachate, modified level D personal protective equipment is worn.
- Back strain can be prevented by employing proper lifting and bailing techniques. Heavy equipment, such as pumps and generators, should by only lifted with the legs, preferably using two or three personnel.
- Slipping on wet surfaces can be prevented by wearing rubber boots with good treads and be alert of where personnel are walking to decrease the chance of slipping.
- Ground fault interrupter should be used in the absence of properly grounded circuitry or when pumps are used around wet conditions.
- Electrical extension cords should be protected or guarded from damage (i.e., cuts from other machinery) and be maintained in good condition.
- Eye protection should be worn as appropriate to prevent water splashing into eyes.

3.4 Physical and Chemical Hazards

In April of 1995, temporary wells were drilled and ground water-samples were collected at the Norman Landfill in areas believed to contain the most contaminated ground water, based on what was known of the site hydrogeology and some initial surface geophysics. The intent of this drilling and sampling was to identify the level of hazard associated with working at this landfill. The samples were sent to Quanterra, a laboratory that is equipped to handle hazardous wastes. The samples were analyzed a an extensive suite of constituents considered to be contaminants. A list of target compounds identified in ground-water samples is shown in table 1. A list of tentatively identified organic compounds in these same samples is shown in table 2.

All of these chemicals were detected at such low concentrations that they do not constitute a fire or respiratory hazard. Monitoring gasses emitted from drill holes using the Drager 4-gas analyzer has shown no evidence of breathing hazard from landfill leachate, at least after the leachate has flowed from under the clay cap of the landfill.

Table 1.—Target compounds identified in ground-water samples from the Norman Landfill in April, 1995.

SITE ID	DATE	TIME	VOCS TARGETED COMPOUNDS ug/l	VOCS TIC ug/l	SEMIVOLATILES TARGETED COMPOUNDS ug/l	SEMIVOLATILES TIC ug/l	CHLORINATED PEST. AND PCB's ug/l	ORGANOPHOSPHATE PESTICIDES ug/l	CHLORINATED HERBICIDES ug/l	METALS mg/l	INORGANICS mg/l	METHOD BLANKS ug/l
351000097250001 Reston Blank-1-M	03/08/95	1000	Methylene Cl 8100/250	ND	ND	2 TID's 6.0&7.0	ND	ND	ND	ND	ND	1,2-Dibromo-3Chloro-propane 1.7/10 Methylene Cl 1/5 Methyl methacrylate 1.2/20
351000097250001 Reston Blank-2-M	03/08/95	1450	Methylene Cl 520/25	ND	ND	2 TID's 12&7.6	ND	ND	ND	Pb .0077/.005	ND	Same as Above
351003097264601 Field Blank SSB1	04/13/95	1600	Methylene Cl 3200/100	ND	ND	1 TID@6.1	ND	ND	ND	FE .052/.04 ZN .024/.02	ND	a,a-dimethylphenethyl amine 1.1/10
351003097264601 SS WEST INTERMEDIATE	04/14/95	1300	ND	ND	ND	20 TID's 4.6-35	ND	ND	ND	BA 10.6/.01 CO .012/.01 FE 16.9/.04	Cl 1030/10 NO3 1.3/1.0	a,a-dimethylphenethyl amine 1.1/10
351003097264602 SS WEST SHALLOW	04/15/95	1000	Benzene 5.0/5.0 Chlorobenzene 23.0/5.0	ND	ND	20 TID's 4.6-100	ND	Diazinon 1/.25 EthylParathion. 0.47/0.25 ND's on second col. (prefered)	ND	As .0077/.005 Ba 3.5/.01 Co .012/.01 Fe 9.3/.04	Cl 642/5 NO3 1.1/1.0 SO4 90.4/1.0	2-Butanone 2.2/10 Methylene Cl 2.0/5.0 Fe .049/.04 Sn 0.16/.1
351003097264603 SS WEST DEEP	04/15/95	1500	ND	ND	ND	17 TID's 4.1-81	ND	ND	ND	Ba 4.8/.01 Co .018/.01 Fe 7.5/0.04	Cl 689/5.0 NO3 0.96/.5 SO4 3.6/0.5	Same as Above
350959097264301 SS EAST INTERMEDIATE	04/16/95	1200	ND	ND	ND	14 TID's 4.6-44	ND	ND	ND	As 0.017/.005 Ba 0.86/0.01 Fe 18.9/0.04	Cl 569/5.0 NO3 0.76/0.5 SO4 56.1/0.5	Same as Above
350959097264302 SS EAST SHALLOW	04/16/95	1600	ND	ND	ND	20 TID's 8.4-40	4,4'-DDT .16/.10 ND on second col. (prefered) g-BHC(lindane) 0.28/0.05 (on second col.)	Diazinon 1.3/.25 ND on second col. (prefered)	ND	Ba 5.6/0.01 Co 0.019/0.01 Fe 16.9/0.04	Cl 941/5.0 NO3 1.5/1.0 SO4 18.1/1.0	Same as Above
350959097264302 Field Blank SS EAST B	04/17/95	1200	Methylene Cl 250/10	ND	ND	1 TID 8.5	ND	ND	ND	ND	ND	Same as Above
350959097264303 SS EAST DEEP	04/18/95	1100	ND	ND	ND	20 TID's 5.0-75.0	d-BHC 0.081/0.05 ND on second col. (prefered)	ND	ND	Ba 3.8/0.01 Fe 9.9/0.04	Cl 498/5.0 NO3 0.87/0.5 SO4 11.3/0.5	Fe .043/.04

351000097264501 04/19/95 1200 SS CENTRAL INTERMEDIATE	ND	ND	ND	20 TID's 4.5-76	ND	ND	ND	Ba 6.9/0.01 Fe 9.9/0.04	Cl 763/5.0 SO4 7.8/1.0	ND

Table 2.—Tentatively identified organic compounds from ground-water samples from the Norman Landfill in April, 1995

VOLATILE ORGANIC COMPOUNDS	CONCENTRATION ug/l
Benzene	5
Chlorobenzene	23

TARGETED PESTICIDE COMPOUNDS (All of these hits were later refuted on a second column)	CONCENTRATION ug/l
Diazinon	1.0
Ethylparathion	0.47
4,4- DDT	0.16
gamma-BHC(lindane)	0.28
delta-BHC	0.081

TENTATIVELY IDENTFIED SEMI-VOLATILE COMPOUNDS(TIC's)	Occurances	min.	max.	avg.	CONCENTRATION ug/l
1,3- Oxathiolane	1				6.4
Siloxane	12	5	40	12.3	
2-bromo-Hexane	1				8.3
nitro-Methane	1				13
Oxygenated Hydrocarbons	45	4.1	100	15	
3,3'-oxybis-2-Butanol	1				9.6
1-(2 methoxy-1-methylethoxy)-2-Propanol	6	4.6	17	8.6	
1-methyl-5-trideutero Methyltetrazole	1				6.8
Propaline Glycol	1				5.2
1-Amino-4-methylpiperazine	1				4.6
1,3,3-Trimethoxybutane	1				5.2
2,3,4,6-Tetramethyl-4-pyrone	1				6.7
2-ethoxy-1-Propanol	1				11
Diethyltoluamid	6	9.2	30	17	
6-chloro-1H- Purine	1				8.3
N-ethyl-4-methyl Benzenesulfonamid	5	6.6	21	12	
1,8-Diaza-2,9-diketocyclotetradecane	1				35
Octadecanoic acid,butyl ester	1				21
Nitrogen compound	5	10	81	33	
Cyanogen chloride	6	6.8	36	17	
3-Methylaniline	1				7.2
2-methyl-3-Buten--2-ol	1				6.8
5-Isopropyl-2,4-dioxo-1,2,3,4-tetrahydropyrimid	3	10	16	13	
N,N-4-trimethyl Benzenesulfonamid	2				20
2(3H)-Benzothiazolone	1				7.3
2,2-dimethylethenyl ester, Pentanoic acid	2				7.2
1,1'-oxybis[2-ethoxy] Ethane	1				4.6
2-(2-ethoxyethoxy)Ethanol	5	4.6	23	16	
4-acetyl-Morpholine	3	16	21	19	
Sterol	1				5.5
1-hydroxymethyl-5,5- di.....					
2,4-Imidazolidinedione	1				6.3
6-methyl-2-(1-methylethyl)-4-(1H) Pyrimidinone	1				14
p-tert-butyl Benzoic acid	1				24
1,1'-oxybis-2-Propanol	1				16
Cyclic Hydrocarbons	3	5.7	8.9	7.6	
1-ethoxy-1-methoxy Ethane	1				9.3
4-propoxy-Phenol	1				5.4
Aromatic hydrocarbon	1				12
1,1'-(1-methyl-1,2-ethanediyl) bis..... 2-Propanol	2				26
2-(2-methoxy-1-methyl ethoxy) 1-Propanol	1				6.4

4.0 PERSONNEL TRAINING REQUIREMENTS

Consistent with OSHA's 29 CFR 1910.120 regulation covering Hazardous Waste Operations and Emergency Response, all site personnel are required to be trained in accordance with the standard. At a minimum all personnel are required to be trained to recognize the hazards on-site, the provisions of this HASP, and the responsible personnel.

4.1 Preassignment and Annual Refresher Training

Prior to arrival on site, all personnel must meet the requirements of preassignment training, consistent with OSHA 29 CFR 1910.120 paragraph (e)(3). The employer should be able to provide a document certifying that each general site worker has received 40 hours of instruction off the site, and 24 hours of training for any workers who are on site only occasionally for a specific task. If an individual employee has work experience and/or training that is equivalent to that provided in the initial training, an employer may waive the 40-hour training so long as that equivalent experience is documented or certified. All personnel must also receive 8 hours of refresher training annually.

4.2 Site Supervisors Training

Consistent with OSHA 29 CFR 1910.120 paragraph (e)(8), individuals designated as site supervisors require an additional 8 hours of training. The following individuals are identified as site supervisors:

Name: Scott Christenson

4.3 Training and Briefing Topics

The following items will be discussed by a qualified individual at the site pre-entry briefing(s) or periodic site briefings.

Chemical hazards, Table 3.1
Emergency response plan, Sec. 10.0;
[29 CFR 1910.120(l)] Medical surveillance requirements
Overhead and underground utilities
Personnel protective equipment, Sec. 5.0
Physical hazards, Table 3.2
Respiratory protection, Sec. 5.8
Site characterization and analysis, Sec. 3.0
Symptoms of overexposure to hazards
Training requirements, Sec. 4.0;

5.0 PERSONAL PROTECTIVE EQUIPMENT TO BE USED

This section describes the general requirements of the EPA designated Levels of Protection (A-D), and the specific levels of protection required for each task at the Site.

5.1 Levels of Protection

Personnel wear protective equipment when response activities involve known or suspected atmospheric contamination vapors, gases, or particulates may be generated by site activities, or when direct contact with skin-affecting substances may occur. Full facepiece respirators protect lungs, gastrointestinal tract, and eyes against airborne toxicant. Chemical-resistant clothing protects the skin from contact with skin-destructive and absorbable chemicals. The specific levels of protection and necessary components for each have been divided into four categories according to the degrees of protection afforded:

Level A: Should be worn when the highest level of respiratory, skin, and eye protection is needed.

Level B: Should be worn when the highest level of respiratory protection is needed, but a lesser level of skin protection. Level B is the primary level of choice when encountering unknown environments.

Level C: Should be worn when the criteria for using air-purifying respirators are met, and a lesser level of skin protection is needed.

Level D: Should be worn only as a work uniform and not in any area with respiratory or skin hazards. It provides minimal protection against chemical hazards.

Modifications of these levels are permitted, and routinely employed during site work activities to maximize efficiency. For example, Level C respiratory protection and Level D skin protection may be required for a given task. Likewise the type of chemical protective ensemble (i.e., material, format) will depend upon contaminants and degrees of contact.

The Level of Protection selected is based upon the following:

- Type and measured concentration of the chemical substance in the ambient atmosphere and its toxicity.
- Potential for exposure to substances in air, liquids, or other direct contact with material due to work being done.
- Knowledge of chemicals on-site along with properties such as toxicity, route of exposure, and contaminant matrix. In situations where the type of chemical, concentration, and possibilities of contact are not known, the appropriate Level of Protection must be selected based on professional experience and judgment until the hazards can be better identified.

5.2 Level A Personnel Protective Equipment:

Level A personnel protective equipment will not be used at the Norman Landfill. Tasks requiring this level of protection will not be performed.

5.3 Level B Personnel Protective Equipment:

- Supplied-air respirator (MSHA/NIOSH approved). Respirators may be positive pressure-demand, self-contained breathing apparatus (SCBA), or positive pressure-demand, airline respirator (with escape bottle for IDLH or potential for IDLH atmosphere)
- Chemical-resistant clothing (disposable chemical-resistant, one-piece suits, with hoods and foot protection)
- Work clothing
- Gloves, chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Hard hat, if working near heavy equipment

5.4 Level C Personnel Protective Equipment:

- Air-purifying respirator, full-face, cartridge-equipped (MSHA/NIOSH approved)
- Chemical-resistant clothing (disposable chemical-resistant, one-piece suits, with hoods and foot protection)
- Work clothing
- Gloves, chemical-resistant
- Boots (outer), chemical-resistant, steel toe and shank
- Hard hat, if working near heavy equipment
- Escape mask

5.5 Modified Level D Personnel Protective Equipment:

- Chemical-resistant clothing (disposable chemical-resistant, one-piece suits, with hoods and foot protection)
- Gloves, chemical resistant
- Work clothing
- Boots/shoes, leather or chemical-resistant, steel toe and shank
- Safety glasses
- Hard hat with face shield

5.5.1 Level D Personnel Protective Equipment:

- Gloves, chemical resistant
- Work clothing
- Boots/shoes, leather or chemical-resistant, steel toe and shank

- Safety glasses
- Hard hat

5.6 Reassessment of Protection Program

The Level of Protection provided by PPE selection shall be upgraded or downgraded based upon a change in site conditions or findings of investigations. When a significant change occurs, the hazards should be reassessed. Some indicators of the need for reassessment are:

- Commencement of a new work phase, such as the start of drum sampling or work that begins on a different portion of the site.
- Change in job tasks during a work phase.
- Change of season/weather.
- When temperature extremes or individual medical considerations limit the effectiveness of PPE.
- Contaminants other than those previously identified are encountered.
- Change in ambient levels of contaminants.
- Change in work scope which effects the degree of contact with contaminants.

5.7 Work Mission Duration

Before the workers actually begin work in their PPE ensembles the anticipated duration of the work mission should be established. Several factors limit mission length, including:

- Air supply consumption (SCBA use).
- Suit/Ensemble permeation and penetration rates for chemicals.
- Ambient temperature and weather conditions (heat stress cold stress).
- Capacity of personnel to work in PPE.

5.9 SOP for Respiratory Protection Devices

The following subsections define standard operating procedures for air purifying respirators and self-contained breathing apparatus.

5.9.4 Cleaning and Disinfecting Self Contained Breathing Apparatus

Cleaning procedures for Self Contained Breathing Apparatus (SCBA) facepieces apply to the Drager escape-pack SCBA. The backpiece is cleaned with cleaning solution and a brush. Following cleaning, the facepiece is combined with the regulator and an operational check is performed.

5.9.5 SCBA Inspection & Checkout

Inspection prior to major field activities:

1. Check cylinder label for current hydrostatic test date.

2. Inspect cylinder for large dents or gouges.

3. Inspect cylinder gauge for damage.

4. Complete routine inspection.

5. Fill out the appropriate records with results and recommendations.

Routine Inspection: Perform immediately prior to donning or after cleaning.

1. Before proceeding, check that the:

- High-pressure hose connector is tight on cylinder fitting.
- By-pass valve is closed.
- Mainline valve is closed.
- Regulator outlet is not covered or obstructed.

2. Backpack and harness assembly:

- Visually inspect straps for wear, damage, and completeness.
- Check wear and function of belt.
- Check backplate and cylinder holder for damage.

3. Cylinder and high pressure hose assembly:

- Check cylinder to assure that it is firmly attached to backplate.
- Open cylinder valve; listen or feel for leakage around packing and hose connection.
- Check high pressure hose for damage or leaks.

4. Regulator:

- Cover regulator outlet with palm of hand.
- Open mainline valve.
- Note stoppage of air flow after positive pressure builds.
- Close mainline valve.
- Remove hand from regulator outlet.
- Open by-pass valve slowly to assure proper function.
- Close by-pass valve.
- Open mainline valve.
- Note pressure reading on regulator gauge.
- Close cylinder valve while keeping hand over regulator outlet.
- Slowly remove hand from outlet and allow air to flow.
- Note pressure when low-pressure warning alarm sounds; it should be between 550-650 psi.
- Remove hand from regulator outlet.

- Close mainline valve.
- Check regulator for leaks by blowing air into regulator for 5-10 seconds. Draw air from outlet for 5-10 seconds. If a positive pressure or vacuum cannot be maintained there is a leak. DO NOT USE SCBA.

5. Facepiece and corrugated breathing hose:

- Inspect hand harness and facepiece for damage, serrations, and deteriorated rubber.
- Inspect lens for damage and proper seal in facepiece. Inspect exhalation valve for damage and dirt build-up.
- Stretch breathing hose and carefully inspect for holes and deterioration.
- Inspect connector for damage and presence of washer.
- Perform negative pressure test with facepiece donned.

6. Storage:

- Refill cylinder to 2216 psi.
- Close cylinder valve.
- Tightly connect high pressure hose to cylinder.
- Bleed pressure from high pressure hose by opening mainline valve.
- Close by-pass valve.
- Close mainline valve.
- Fully extend all straps.
- Store facepiece in a clean plastic bag for protection.

5.10 SOP for Personal Protective

5.10.1 Inspection

Proper inspection of PPE features several sequences of inspection depending upon specific articles of PPE and it's frequency of use. The different levels of inspection are as follows:

Inspection and operational testing of equipment received from the factory or distributor.
Inspection of equipment as it is issued to workers.
Inspection after use or training and prior to maintenance.
Periodic inspection of stored equipment.
Periodic inspection when a question arises concerning the appropriateness of the selected equipment, or when problems with similar equipment arise.

The primary inspection of PPE in use for activities at the Site will occur prior to immediate use and will be conducted by the user. This ensures that the specific device or article has been checked- out by the user that the user is familiar with its use.

Table 5.1 Sample PPE Inspection Checklists

CLOTHING

Before use:

- Determine that the clothing material is correct for the specified task at hand.
- Visually inspect for:
    - imperfect seams
    - non-uniform coatings
    - tears
    - malfunctioning closures
- Hold up to light and check for pinholes.
- Flex product:
    - observe for cracks
    - observe for other signs of shelf deterioration
- If the product has been used previously, inspect inside and out for signs of chemical attack:
    - discoloration
    - swelling
    - stiffness

During the work task:

- Evidence of chemical attack such as discoloration, swelling, stiffening, and softening. Keep in mind, however, that chemical permeation can occur without any visible effects.
- Closure failure.
- Tears.
- Punctures.
- Seam Discontinuities.

GLOVES

Before use:

- Visually inspect for:
    - imperfect seams
    - tears
    - non-uniform coating
    - pressurize glove with air; listen for pin-hole leaks.

5.11 Specific Levels of Protection Planned for the Site

Level B personnel protective equipment was used during the initial ground-water sampling at the Norman Landfill, when the level of hazard for working at this site were not known. The level of hazard in working at background sites and where leachate has mixed with ground water

appears to be minimal, based on the results of chemical analyses (tables 1 and 2). Level B may be appropriate for drilling through the clay cap of the landfill, but there are no plans to drill through the landfill cap at the present time (September, 1996).

The types of contaminants found in the dilute leachate (leachate mixed with ground water at the work sites) at the Norman landfill and their concentrations (tables 1 and 2), plus the monitoring that has been done with the Drager 4-gas analyzer, indicate no respiratory hazard in working at the Norman Landfill. The types of contaminants found in the dilute leachate at the Norman landfill and their concentrations are also not caustic, and good protection is afforded by chemically resistant gloves and coated Tyvek suits.

The following levels of protection will be utilized during activities at the Norman Landfill:

- Modified Level D when it is possible to come in contact with leachate contaminated ground water.
- Level D when it is not possible to come in contact with leachate contaminated ground water.

Table 5.2 presents the level of protection planned for the completion of individual task assignments and the specific components of each protective ensemble.

TABLE 5.2

SPECIFIC LEVELS OF PROTECTION PLANNED FOR THE TASK ASSIGNMENTS AT THE SITE

Site walk through - (Level D)

Subsurface soil sampling

Over leachate plume (Modified Level D)
Not over leachate plume (Level D)

Well installation

Over leachate plume (Modified Level D)
Not over leachate plume (Level D)

Ground-water sampling

Over leachate plume (Level D)
Not over leachate plume (Level D)

Soil gas sampling

Over leachate plume (Level D)
Not over leachate plume (Level D)

Aquifer tests

Over leachate plume (Level D)
Not over leachate plume (Level D)

Temporary well removal

Over leachate plume (Modified Level D)
Not over leachate plume (Level D)

6.0 MEDICAL SURVEILLANCE REQUIREMENTS

Medical monitoring programs are designed to track the physical condition of employees on a regular basis as well as survey pre-employment or baseline conditions prior to potential exposures The medical surveillance program is a part of each employers Health and Safety program.

6.1 Baseline or Preassignment Monitoring

Prior to being assigned to a hazardous or a potentially hazardous activity involving exposure to toxic materials employee must receive a preassignment or baseline physical. The contents of the physical is to be determined by the employers medical consultant. As suggested by NIOSH/OSHA/ USCG/EPA's Occupational Safety & Health Guidance Manual for Hazardous Waste Site Activities, the minimum medical monitoring requirements for work at the Site is as follows:

- Complete medical and work histories.
- Physical examination.
- Pulmonary function tests (FVC and FEV1).
- Chest X-ray (every 2 years).
- EKG.
- Eye examination and visual acuity.
- Audiometry.
- Urinalysis.
- Blood chemistry and heavy metals toxicology.

The preassignment physical should categorize employees as fit-for-duty and able to wear respiratory protection.

6.2 Periodic Monitoring

In addition to a baseline physical, all employees require a periodic physical within the last 12 months unless the advising physician believes a shorter interval is appropriate. The employers medical consultant should prescribe an adequate medical which fulfills OSHA 29 CFR 1910.120 requirements. The preassignment medical outlined above may be applicable.

6.3 Site Specific Medical Monitoring

For activities at the Site, the following specific tests will be required prior to individuals entering an Exclusion Zone or Contamination Reduction Zone.

6.4 Exposure/Injury/Medical Support

As a follow-up to an injury or possible exposure above established exposure limits, all employees are entitled to and encouraged to seek medical attention and physical testing. Depending upon the type of exposure, it is critical to perform follow-up testing within 24-48 hours. It will be up to the employers medical consultant to advise the type of test required to accurately monitor for exposure effects.

6.5 Exit Physical

At termination of employment or reassignment to an activity or location which does not represent a risk of exposure to hazardous substances, an employee shall require an exit physical. If his/her last physical was within the last 6 months, the advising medical consultant has the right to determine adequacy and necessity of exit exam.

7.0 FREQUENCY AND TYPES OF AIR MONITORING/SAMPLING

This section explains the general concepts of an air monitoring program and specifies the surveillance activities that will take place during project completion at the Site. The purpose of air monitoring is to identify and quantify airborne contaminants in order to verify and determine the level of worker protection needed. Initial screening for identification is often qualitative, i.e., the contaminant, or the class to which it belongs, is demonstrated to be present but the determination of its concentration (quantification) must await subsequent testing. Two principal approaches are available for identifying and/or quantifying airborne contaminants:

- The on-site use of direct-reading instruments.
- Laboratory analysis of air samples obtained by gas sampling bag, collection media (i.e., filter, sorbent), and/or wet-contaminant collection methods.

7.1 Direct-Reading Monitoring Instruments

Unlike air sampling devices, which are used to collect samples for subsequent analysis in a laboratory, direct-reading instruments provide information at the time of sampling, enabling rapid decision-making. Data obtained from the real-time monitors are used to assure proper selection of personnel protection equipment, engineering controls, and work practices. Overall, the instruments provide the user the capability to determine if site personnel are being exposed to

concentrations which exceed exposure limits or action levels for specific hazardous materials.

Of significant importance, especially during initial entries, is the potential for IDLH conditions or oxygen deficient atmospheres. Real-time monitors can be useful in identifying any IDLH conditions, toxic levels of airborne contaminants, flammable atmospheres, or radioactive hazards. Periodic monitoring of conditions is critical, especially if exposures may have increased since initial monitoring or if new site activities have commenced.

7.2 Specific Contaminants to be Monitored at the Site

The following checklist provides a summary of the contaminants to be monitored for and frequency/schedule of monitoring. The air sampling checklist will serve as a site monitoring plan.

7.2.1 Site Air Monitoring and Sampling Program

A. Air Monitoring Instruments

The Oklahoma District has purchased a Drager 4-gas monitor that measures combustible gas, hydrogen sulfide, oxygen, and a broad-band toxic gas sensor.

Combustible Gas Indicator (CGI)

Frequency: Continuous monitoring
Locations: Upwind and downwind of site activities

Hydrogen sulfide sensor

Frequency: Continuous monitoring
Locations: Upwind and downwind of site activities

Oxygen Meter

Frequency: Continuous monitoring
Locations: Upwind and downwind of site activities

Broad-band toxic-gas sensor

Frequency: Continuous monitoring
Locations: Upwind and downwind of site activities

B. Action Levels

Explosive atmosphere:

Action Level	Action
<10% LEL	Continue investigation.
10%-25% LEL	Continue on-site monitoring with extreme caution as higher levels are encountered.
>25% LEL	Explosion hazard. Withdraw from area immediately.

Oxygen:

Action Level	Action
<19.5%	Monitor wearing self-contained breathing apparatus. NOTE: Combustible gas readings are not valid in atmospheres with <19.5% oxygen.
19.5%-25%	Continue investigation with caution. Deviation from normal level may be due to presence of other substances.
>25%	Fire hazard potential. Discontinue investigation. Consult a fire safety specialist.

Organic gases and vapors:

Action Level	Action
Depends on contaminant	Consult standard reference manuals for air concentration/toxicity data. Action level depends on PEL/REL/TLV. Action Level is 1/2 the current standard. See Table 3.1.

C. Reporting Format

- Field notebook

8.0 SITE CONTROL MEASURES

The following section defines measures and procedures for maintaining site control. Site control is an essential component in the implementation of the site health and safety program.

8.1 Buddy System

During all Level B, C, and modified Level D activities or when some conditions present a risk to personnel, the implementation of a buddy system is mandatory. A buddy system requires at least two people who work as a team; each looking out for each other. For example, Level B operations generally require three people. Table 8.1 lists those tasks which require a buddy system and any additional site control requirements.

8.2 Site Communications Plan

Successful communications between field teams and contact with personnel in the support zone is essential. The following communications systems will be available during activities at the Site.

- Hand Signals

Signal	Definition
Hands clutching throat	Out of air/cannot breath
Hands on top of head	Need assistance
Thumbs up	OK/I am all right/I understand
Thumbs down	No/negative

Arms waving upright	Send backup support
Grip partners wrist	Exit area immediately

8.3 Work Zone Definition

The three general work zones established at the Site are the Exclusion Zone, Contamination Reduction Zone, and Support Zone.

The Exclusion Zone is defined as the area where contamination is either known or likely to be present, or because of activity, will provide a potential to cause harm to personnel. Entry into the Exclusion Zone requires the use of personnel protective equipment.

The Contamination Reduction Zone is the area where personnel conduct personal and equipment decontamination. It is essentially a buffer zone between contaminated areas and clean areas. Activities to be conducted in this zone will require personal protection as defined in the decontamination plan.

The Support Zone is situated in clean areas where the chance to encounter hazardous materials or conditions is minimal. Personal protective equipment is therefore not required.

8.4 Nearest Medical Assistance

Figure 8.2 provides a map of the route to the nearest medical facility which can provide emergency care for individuals who may experience an injury or exposure on site. The route to the hospital should be verified by the HSO, and should be familiar to all site personnel. The following individuals on site have current certification in CPR and/or first aid:

- Scott Christenson

8.5 Safe Work Practices

Table 8.2 provides a list of standing orders for the Exclusion Zone.

Table 8.3 provides a list of standing orders for the Contamination Reduction Zone.

8.6 Emergency Alarm Procedures

The warning signals described in section 10.4 “Evacuation Routes and Procedures,” will be deployed in the event of an emergency. Communication signals will also be used according to section 8.2.

TABLE 8.1. PERSONNEL REQUIREMENTS

Task	Control Measures
Subsurface soil sampling	Buddy System
Soil borings	Buddy System
Well installation	Buddy System
Ground-water sampling	Buddy system

Soil gas sampling	Buddy System
Aquifer tests	Buddy System

FIGURE 8.2 MAP DEPICTING ROUTE TO NEAREST MEDICAL FACILITIES (near here)

TABLE 8.2 STANDING ORDERS FOR EXCLUSION ZONE

- No smoking, eating, or drinking in this zone.
- No horse play.
- No matches or lighters in this zone.
- Check-in on entrance to this zone.
- Check-out on exit from this zone.
- Implement the communications system.
- Line of sight must be in position.
- Wear the appropriate level of protection as defined in the Safety Plan.

TABLE 8.3 STANDING ORDERS FOR CONTAMINATION REDUCTION ZONE

- No smoking, eating, or drinking in this zone.
- No horse play.
- No matches or lighters in this zone.
- Wear the appropriate level of protection.

9.0 DECONTAMINATION PLAN

Table 5.2 lists the tasks and specific levels of protection required for each task. Consistent with the levels of protection required, the decontamination figure provides a step by step representation of the personnel decontamination process for either level A, B, or C. These procedures should be modified to suit site conditions and protective ensembles in use.

9.1 Standard Operating Procedures

Decontamination involves the orderly controlled removal of contaminants. Standard decontamination sequences are presented in the decontamination figure. All site personnel should minimize contact with contaminants in order to minimize the need for extensive decon.

9.2 Levels of Decontamination Protection Required for Personnel

The levels of protection required for personnel assisting with decontamination will be Level C. The Site Safety Officer is responsible for monitoring decontamination procedures and determining their effectiveness.

9.3 Equipment Decontamination

Instructions for decontaminating equipment outside the scope of this document and are described elsewhere.

9.4 Disposition of Decontamination Wastes

All equipment and solvents used for decontamination shall be decontaminated or disposed of properly. Commercial laundries or cleaning establishments that decontaminate protective clothing or equipment shall be informed of the potentially harmful effects of exposures.

LEVEL B DECONTAMINATION STEPS

- Step 1 Segregated equipment drop
- Step 2 Boot cover and glove wash
- Step 3 Boot cover and glove rinse
- Step 4 Tape removal - outer glove and boot
- Step 5 Boot cover removal
- Step 6 Outer glove removal
- Step 7 Suit/safety boot wash
- Step 8 Suit/SCBA/boot/glove rinse
- Step 9 Safety boot removal
- Step 10 SCBA backpack removal
- Step 11 Splash suit removal
- Step 12 Inner glove wash
- Step 13 Inner glove rinse

- Step 14 Face piece removal
- Step 15 Inner glove removal
- Step 16 Inner clothing removal
- Step 17 Field wash
- Step 18 Redress

FIGURE 9.3. LEVEL C DECONTAMINATION STEPS

- Step 1 Segregated equipment drop
- Step 2 Boot cover and glove wash
- Step 3 Boot cover and glove rinse
- Step 4 Tape removal
- Step 5 Boot cover removal
- Step 6 Outer glove removal
- Step 7 Suit/safety boot wash
- Step 8 Suit/safety boot rinse
- Step 9 Safety boot removal
- Step 10 Splash suit removal
- Step 11 Inner glove wash
- Step 12 Inner glove rinse
- Step 13 Face piece removal
- Step 14 Inner glove removal
- Step 15 Inner clothing removal
- Step 16 Field wash
- Step 17 Redress

FIGURE 9.4. LEVEL D DECONTAMINATION STEPS

- Step 1 Remove outer garments (i.e., coveralls)
- Step 2 Remove gloves
- Step 3 Wash hands and face

10.0 EMERGENCY RESPONSE/CONTINGENCY PLAN

This section describes contingencies and emergency planning procedures to be implemented at the Site. This plan is compatible with local, state and federal disaster and emergency management plans as appropriate.

10.1 Pre-Emergency Planning

During the site briefings held periodically/daily, all employees will be trained in and reminded

of provisions of the emergency response plan, communication systems, and evacuation routes. Table 10.1 identifies the hazardous conditions associated with specific site activities. The plan will be reviewed and revised if necessary, on a regular basis by the HSO. This will ensure that the plan is adequate and consistent with prevailing site conditions.

10.2 Personnel Roles and Lines of Authority

The Site Supervisor has primary responsibility for responding to and correcting emergency situations. This includes taking appropriate measure to ensure the safety of site personnel and the public. Possible actions may involve evacuation of personnel from the site area, and evacuation of adjacent residents. He/she is additionally responsible for ensuring that corrective measures have been implemented, appropriate authorities notified, and follow-up reports completed. The HSO may be called upon to act on the behalf of the site supervisor, and will direct responses to any medical emergency. The individual contractor organizations are responsible for assisting the project manager in his/her mission within the parameters of their scope of work.

The Site Supervisor and HSO is Scott Christenson.

10.3 Emergency Recognition/Prevention

Table 3.1 provides a listing of chemical and physical hazards on-site. Additional hazards as a direct result of site activities are listed in Table 10.1 as are prevention and control techniques/mechanisms. Personnel will be familiar with techniques of hazard recognition from preassignment training and site specific briefings. The HSO is responsible for ensuring that prevention devices or equipment is available to personnel.

10.4 Evacuation Routes/Procedures

In the event of an emergency which necessitates an evacuation of the site, the following alarm procedures will be implemented:

Evacuation alarm notification should be made verbally by the Site Supervisor supplemented by sounding three long blasts from a vehicle horn. All personnel should evacuate upwind of any activities. Rendezvous at the office of the Norman Asphalt Company in case of an emergency, so that all personnel can be accounted for.

Personnel will be expected to proceed to the closest exit with your buddy, and mobilize to the safe distance area associated with the evacuation route. Personnel will remain at that area until the re-entry alarm is sounded or an authorized individual provides further instructions.

TABLE 10.1 EMERGENCY RECOGNITION/CONTROL MEASURES

HAZARD	PREVENTION/CONTROL
Fire/Explosion	Fire Extinguisher Alarm System Fire Inspections

Figure 10.1 provides a map depicting evacuation routes for the site and immediate area. Also indicated are muster areas and safe distances in the event of a major incident.

10.7 Emergency Contact/Notification System

The following list provides names and telephone numbers for emergency contact personnel. In the event of a medical emergency, personnel will take direction from the HSO and notify the appropriate emergency organization. In the event of a fire or spill, the site supervisor will notify the appropriate local, state, and federal agencies.

Organization	Contact/Telephone
Ambulance:	911
Police:	Norman Police Dept.: 911
Fire:	Norman Fire Dept.: 911
State Police:	OK Highway Patrol: 425-2373
Hospital:	Norman Regional: 360-8430
Poison Control Center	271-5454
EPA Emergency Response Team	908-321-6660
National Response Center	800-424-8802
Center for Disease Control	404-488-4100
Chemtrec	800-424-9300
Oklahoma District Office	405-843-7570
Scott Christenson (residence)	405-330-2795
James Greer (residence)	405-360-2148
Jim Berry, Director of Public Works, City of Norman	405-366-5453

This list of phone numbers is to be posted in the trailer on site.

10.8 Emergency Medical Treatment Procedures

Any person who becomes ill or injured in the exclusion zone must be decontaminated to the maximum extent possible. If the injury or illness is minor, full decontamination should be completed and first aid administered prior to transport. If the patient's condition is serious, at least partial decontamination should be completed (i.e., complete disrobing of the victim and redressing in clean coveralls or wrapping in a blanket.) First aid should be administered while awaiting an ambulance or paramedics. All injuries and illnesses must immediately be reported to the project manager.

Any person being transported to a clinic or hospital for treatment should take with them information on the chemical(s) they have been exposed to at the site. This information is included in Table 3.1.

Any vehicle used to transport contaminated personnel will be treated and cleaned as necessary.

10.9 Fire or Explosion

In the event of a fire or explosion, the local fire department should be summoned immediately. Upon their arrival, the project manager or designated alternate will advise the fire commander of the location, nature, and identification of the hazardous materials on site.

If it is safe to do so, site personnel may:

- Use fire fighting equipment available on site to control or extinguish the fire; and,
- Remove or isolate flammable or other hazardous materials which may contribute to the fire.

10.10 Spill or Leaks

In the event of a spill or a leak, site personnel will:

- Inform their supervisor immediately;
- Locate the source of the spillage and stop the flow if it can be done safely; and,
- Begin containment and recovery of the spilled materials.

10.11 Emergency Equipment/Facilities

Figure 10.2 provides a map of the site and identifies the location of the following emergency equipment:

- First aid kit
- Fire extinguisher
- Mobile telephone
- Eye wash

12.0 SPILL CONTAINMENT PROGRAM

The procedures defined in this section comprise the spill containment program in place for activities at the Site.

- All drums and containers used during the clean-up shall meet the appropriate DOT, OSHA, and EPA regulators for the waste that they will contain.
- Drums and containers shall be inspected and their integrity assured prior to being moved. Drums or containers that cannot be inspected before being moved because of storage conditions, shall be positioned in an accessible location and inspected prior to further handling.
- Operations on site will be organized so as to minimize the amount of drum or container movement.
- Employees involved in the drum or container operations shall be warned of the hazards associated with the containers.
- Where spills, leaks, or ruptures may occur, adequate quantities of spill containment equip-

ment (absorbent, pillows, etc.) will be stationed in the immediate area. The spill containment program must be sufficient to contain and isolate the entire volume of hazardous substances being transferred.

- Drums or containers that cannot be moved without failure, shall be emptied into a sound container.
- Fire extinguishing equipment meeting 29 CFR part 1910. subpart 1 shall be on hand and ready for use to control fires.

13.0 HAZARD COMMUNICATION

In order to comply with 29 CFR 1910.1200, Hazard Communication, the following written Hazard Communication Program has been established. All employees will be briefed on this program, and have a written copy for review.

A. CONTAINER LABELING

All containers received on site will be inspected to ensure the following: (1) all containers will be clearly labeled as to the contents; (2) the appropriate hazard warnings will be noted; and (3) the name and address of the manufacturer will be listed.

All secondary containers will be labeled with either an extra copy of the original manufacturer's label or with generic labels which have a block for identify and blocks for the hazard warning.

B. MATERIAL SAFETY DATA SHEETS (MSDSs)

Copies of MSDSs for all hazardous chemicals known or suspected on site will be maintained in the work area. MSDSs will be available to all employees for review during each work shift.

C. EMPLOYEE TRAINING AND INFORMATION

Prior to starting work, each employee will attend a health and safety orientation and will receive information and training on the following: (1) an overview of the requirements contained in the Hazard Communication Standard, 29 CFR 1910.1200; (2) chemicals present in their workplace operations; (3) location and availability of a written hazard program; (4) physical and health effects of the hazardous chemicals; (5) methods and observation techniques used to determine the presence or release of hazardous chemicals; (6) how to lessen or prevent exposure to these hazardous chemicals through usage of control/work practices and personal protective equipment; (7) emergency procedures to follow if they are exposed to these chemicals; (8) how to read labels and review MSDSs to obtain appropriate hazard information; (9) location of MSDS file and location of hazardous chemical list.

14.0 RECORD KEEPING

Records relating to health and safety issues at the Norman Landfill are stored at the following locations:

MEDICAL RECORDS

DFOH Federal Health Unit
215 Dean A. Mcgee
Oklahoma City, OK 73102
(405) 231-5309

HAZWOPER TRAINING CERTIFICATIONS

Oklahoma District Office
202 NW 66th Street (Building 7)
Oklahoma City, OK 73116
(405) 843-7570

Copies of these certifications are brought to the site during major field efforts.

The location of these records is to be posted in the trailer at the site.