LEACHATE LOADING AND HAULING

HEALTH AND SAFETY

ORIENTATION POLICY MANUAL

February 2008
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The role of the Essex-Windsor Solid Waste Authority is to provide waste disposal and waste diversion services to the City of Windsor and County of Essex.

Site staff may be exposed to various types of health and safety hazards during their daily work activities. These hazards are present due to the nature of the work and include the risk of injury while working with and around heavy equipment, high volumes of traffic, confined spaces or potentially hazardous materials received at the site.

Landfill gas is generated as a result of the anaerobic decomposition of the landfilled solid waste. Toxic hydrogen sulphide (H₂S) gas and explosive methane (CH₄) gas are components of landfill gas which are generated as the waste decomposes. Landfill gas may migrate underground and accumulate in buildings or excavations far away from the actual landfill site. Hazardous atmospheric conditions may exist in the manholes on the site and may exist in excavations and other enclosed areas. Landfill gas is dangerous in confined spaces.

NOTE: A confined space, as defined by the Occupational Health and Safety Act, Regulation 1, means a space in which, because of its construction, location, contents or work activity therein, the accumulation of a hazardous gas, vapour, dust or fume or the creation of an oxygen-deficient atmosphere may occur. Confined spaces are also limited in respect of access or egress and are not normally intended for human occupancy.

Workers may be exposed to potential health and safety risks while working in some areas of the landfill site. These risks evolve from the potential presence of hazards which are:

- toxic
- combustible
- physical
- biological
To mitigate these risks, special attention and procedures must be executed to protect the workers from the following types of work activities:

- handling biological agents
- working with physical agents, such as noise, rotating equipment, heavy equipment, rough terrain and high voltages
- working in confined spaces
- working on elevated work platforms
- working in harsh climatic conditions, such as, sun exposure and extreme temperature exposure, dust exposure, vectors and insects
- working with hazardous materials and chemicals
- encountering explosive atmospheres
- working with high traffic volume in congested areas.

Part II Roles and Responsibilities in the Workplace

It is a joint responsibility of both the employer and the workers to create and maintain a safe and healthy workplace. This joint responsibility was recognised in law in Ontario in 1978 with the passing of the *Occupational Health and Safety Act*. The Essex-Windsor Solid Waste Authority’s Management Philosophy is consistent with the Act in that the Authority wants to promote the INTERNAL RESPONSIBILITY SYSTEM. The Internal Responsibility System is a workplace where workers and management resolve health and safety matters internally. The Joint Health and Safety Committee is one of the instruments through which this is done. The following describes the roles and responsibilities of the various parties of the workplace.

Joint Health and Safety Committees

A central theme of the *Occupational Health and Safety Act* is the requirement for everyone in a workplace to share the responsibility for health and safety. A Joint Occupational Health and Safety Committee is the mechanism legislated in the Act for maintaining this co-operative effort. A committee is an advisory body, comprising of union and management members, expected to stimulate a co-operative awareness of safety issues. A list of names of members is posted on the Health and Safety Board in the lunchroom.
Duties of Employer – Section 26 of the Occupational Health and Safety Act

Two important responsibilities of the employer under section 26 of the Act are to provide information, instruction and supervision to a worker to protect the health and safety of the worker, and to take every precaution reasonable in the circumstances for the protection of the worker. The employer has put in place worker awareness and training initiatives for this Division. Additional duties of the employer can be referenced under Section 26.

Duties of a Supervisor – Section 27 of the Occupational Health and Safety Act

Under the Occupational Health and Safety Act, a supervisor’s health and safety responsibilities are to ensure:

- workers carry out work in a safe and responsible manner
- workers wear the required safety equipment
- workers receive information on all workplace hazards
- safe work practices are in place and used when work is done
- the health and safety of all workers under their supervision

Duties of a Worker – Section 28 of the Occupational Health and Safety Act

The Occupational Health and Safety Act details a worker’s responsibilities. A worker must:

- comply with the Act and its regulations governing work procedures
- wear the required protective equipment provided by the employer
- neither remove or make ineffective any protective device(s)
- not engage in pranks or inappropriate conduct
- report to a supervisor any hazards or legal contravention observed.

The Rights of Workers

The Occupational Health and Safety Act is designed to protect workers’ health and safety in the workplace. The act is based on three fundamental concepts:

- the right of workers to participate
- the right of workers to know
➢ the right of workers to refuse

Safety regulations are issued under the *Occupational Health and Safety Act*. A copy of the Act and Regulations is located on the Health and Safety Board in the lunchroom or can be obtained from your supervisor.

**Accident/Incident Reporting**

An accident/incident investigation involves the examination of an undesired event that resulted, or could have resulted, in physical harm to people or damage to property. The reasons to perform an investigation are to determine the facts and circumstances related to the event, determine the causes and develop remedial actions to control future loss, not to find fault.

The Workers’ Compensation Act requires that a report must be filed within 3 days of learning of an occupational injury or disease that disables a worker or requires health care. This report must be completed with your supervisor and signed by your supervisor.

An Accidental Injury Report must be sent immediately to the Personnel Department when the employee requires medical attention from a medical practitioner. This accident is considered a Lost Time Accident when the employee is unable to report to work for the next scheduled shift.

An Accidental Injury Report must also be sent to the main office for record keeping purposes when any other type of incident or accident occurs.

All incidents include equipment damage, fire, breach of security, spills and a near miss. All accidents include first aid, medical aid, lost time accidents (LTA’s) and critical injury.

**Work Refusal**

Section 43 of the *Occupational Health and Safety Act* refers specifically to work refusals. A worker may refuse to do work or to do particular work if he or she has reason to believe that:

➢ equipment, machines, devices or things when used or operated may endanger the worker or workers or is in non-compliance with the Act or regulations

➢ the physical condition of the workplace is likely to endanger the worker

The worker shall promptly report the circumstances of the refusal to his or her employer or supervisor and remain near his or her workstation until an investigation has been completed.
Emergency Response Procedures

The Essex-Windsor Solid Waste Authority – Waste Disposal Division has an emergency response chart that contains reference information and simple procedures to follow in the event of an emergency. All employees should be familiar with this document, and review the procedures occasionally. Any inconsistencies that may require changes should be reported to a supervisor. This chart is posted in readily visible locations in all buildings.

Building Evacuation

In the event of an emergency or sounding of a fire alarm or gas alarm, all employees must evacuate the buildings. No one shall re-enter the building until the alarm has been cleared by the Fire Department or a supervisor and declared safe to enter.

All Essex-Windsor Solid Waste Authority – Waste Disposal Division employees shall be introduced to the fire alarm and the gas alarm. The gas alarm is activated by elevated levels of methane gas being present in the workplace atmosphere. Procedures Nos. WD-027 (Fire) and WD-028 (High Level Gas Alarm) in the EWSWA Waste Disposal Division Procedures Manual provides information on how to react to gas and fire alarms at the site.

WHMIS Regulation 834

Workplace Hazardous Material Information System commonly known as WHMIS, is a system that protects employers and employees in the workplace by giving them vital information about hazardous material. An important component of the WHMIS Regulation is the requirement to make available all material safety data sheets to all workers. The material safety data sheets station is located in the lunchroom of the Maintenance Building.

First Aid Boxes

In compliance with Regulation 1101, section 1-(1), all first aid stations shall be the responsibility of a worker who works in the immediate vicinity of the first aid station and who is qualified in first aid to the standards of this regulation. The new or transferred employee shall be shown the location of the first aid stations in her/his work area. A list of the qualified first aiders for each first aid box is posted adjacent to the box.

Personal Hygiene

Section 134.(a),(b), of Regulation 516/92 for Industrial Establishments states that a worker who is exposed to a substance that is poisonous by ingestion, or that may contaminate the skin, shall be provided with shower rooms and lockers for work and street clothes. These
facilities are located at the Regional Site in the Maintenance Building. There is a no smoking policy in all of the buildings and vehicles on the site.

*Work Procedures for Hazardous Work Activities*

Site specific work procedures have been developed for hazardous work activities on the site. Your Supervisor must go over the work procedures that pertain to your responsibilities with you.
Policy Statement

The Landfill and Transfer Station Safety Rules are intended to protect the safety of all persons using the Landfill Site and Transfer Station and Landfill and Transfer Station workers.

Policy

All persons present on the Landfill Site and Transfer Station must obey the rules. Any person who fails to obey these rules will be given a verbal warning, and any further violation of the rules may subject the offender to immediate expulsion from the Landfill Site and Transfer Station for a minimum of one full working day. Any person expelled from the Sites will not be allowed to return until they have expressed an intent to obey the rules. The Landfill and Transfer Station Safety Rules will be enforced by any authorised employee of the Authority.

Safety Rules

1. Wastes requiring special handling shall be disposed of as outlined according to the procedures outlined in this Policy WD-024.

2. Loads must arrive fully covered by tarpaulins or acceptable alternatives to ensure load is secured.

3. Vehicle must come to a complete stop before being driven onto weighscale.

4. Directions of Authority personnel on duty must be obeyed.

5. Only designated entrance and exit routes may be used.

6. All speed limits and signs posted on the Sites must be obeyed.

7. Safety shoes must be worn in designated areas.

8. Unloading is permitted only in authorized designated areas.
9. Tarpaulins and turnbuckles must be removed/released only in unloading area.
10. All unloading doors are to be secured with chains or acceptable alternatives.

11. Scavenging is prohibited (MOE Regulation 347)

12. Smoking in the unloading area is prohibited.

13. Loose material must be removed from truck boxes before the vehicle leaves the unloading area.

14. All doors must be closed and secured before departure from the unloading area.

15. Unsafe vehicles are not allowed on the Sites.

16. Yield right-of-way to Landfill and Transfer Station equipment and personnel at all times.

17. No person under the age of sixteen is allowed to exit vehicle on Landfill and Transfer Station property.

18. All drivers are to exercise extreme caution while backing up.

19. Drivers must set the parking brake (maxis) before leaving the drivers’ seat at any time.

20. No loitering in the tipping area or tarp area.

**THE AUTHORITY DOES NOT ASSUME RESPONSIBILITY FOR ANY INJURY TO PERSONS OR DAMAGE TO VEHICLES**
Policy Statement

The following policy is to apply to the proper use and maintenance of ladders at the Regional Landfill, Transfer Station No. 2 and Landfill No. 3:

Policy

This policy is established to ensure the safe use of ladders by all landfill personnel.

1. **Portable Ladder**
   a) Ladder should be:
      - Held, tied or otherwise secured before use;
      - Set up on good footing;
      - Free of obstructions, slippery substances or other hazards at its base;
      - Set up with its base 1 metre out for every 3 to 4 metres up.
   b) The user should:
      - Maintain 3-point contact with the ladder;
      - Keep centre of gravity between the side rails;
      - Face ladder while climbing up or down;
      - Check ladder is in good working condition before use.
c) The user must:
   - Use a fall-arrest system when any ladder is to be set up next to an unprotected edge where a fall of 3 metres (10 feet) or more could occur.

2. Stepladder
   a) Ladder should be:
      - Fully open and spreaders pushed down and locked;
      - Set up on good footing;
      - Free of obstructions, slippery substances or other hazards at its base.
   
   b) The user should:
      - Maintain 3-point contact with the ladder;
      - Keep centre of gravity between the side rails;
      - Face ladder while climbing up or down;
      - Check ladder is in good working condition before use.

   c) The user must:
      - Use a fall-arrest system when any ladder is to be set up next to an unprotected edge where a fall of 3 metres (10 feet) or more could occur.
3. **Fixed Ladder**
   
a) Ladder must be:
   
   - Equipped with a safety cage or other means of fall protection if higher than 3 metres (10 feet);

b) The user should:
   
   - Maintain 3-point contact with the ladder;
   - Keep centre of gravity between the side rails;
   - Face ladder while climbing up or down;
   - Check ladder is in good working condition before use.
Policy Statement

The following policy is to apply to any fire at Essex-Windsor Solid Waste Authority facilities.

There are six major areas where fire may occur. These are:

1. Buildings: including the Maintenance Shop, Scale House, Leachate Spray Irrigation Garages, Greenhouse and Transfer Station;
2. Main Disposal Area
3. Closed Sections of Landfills
4. Bufferlands
5. Compost Pad
6. Appurtenances: such as Leachate Pumping Stations and Gas Flares

The Maintenance Shop, Transfer Stations and Scale House are the only buildings which are normally occupied during operating hours.

Policy

Fire Buildings

1. When a fire is identified in any EWSWA building, all staff must evacuate the building immediately via the nearest exit.
2. If closed doors are encountered on the way to an exit, feel the doorknob for heat before opening the door. Do not open the door if the knob is hot and proceed to an alternative exit.

3. Where applicable and safe to do so, washrooms, storage rooms, etc. shall be checked by the Site Supervisor to ensure that everyone is evacuated.

4. When a fire is identified in any of the buildings, the Site Supervisor shall telephone the Fire Department at 9-1-1 immediately from the nearest safe location.

5. The Site Supervisor shall assign a staff member to meet the Fire Department at the front gate and direct the Fire Department to the location of the fire.

Small Fires

If a small fire does not present a hazard to the occupants, an attempt may be made to extinguish the fire with a portable fire extinguisher. Employees are to:

1. Make sure the door is at their back if an attempt is made to extinguish a fire.

2. Direct the nozzle of the fire extinguisher to the base of the fire with a side to side motion.

3. Leave the area immediately. The door to the area should be closed to confine and contain the fire in the event that the small fire cannot be extinguished.

4. Call the Fire Department at 9-1-1 or from a safe location if the fire has not been put out and report:
   - The status and the location of the fire
   - The type of fire (i.e. chemical, fuel)
### SUBJECT:
FIRE

### POLICY NO:
WD - 027

### EFFECTIVE DATE:
April 1, 2003

### REPLACES ISSUE OF:
July 1999

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<th>PREPARED BY:</th>
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<th>PAGE 3 OF 5</th>
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<tr>
<td>EWSWA Staff</td>
<td>EWSWA</td>
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- whether an ambulance is required.

5. Call a supervisor from a safe location regardless of whether the fire has been put out or not.

### Main Disposal Site

1. Call the supervisor immediately regardless of whether the fire has been extinguished or not.

2. Extinguish fire using a chemical fire extinguisher located in the compactor, F.E.L. and bulldozer or by smothering the fire with dirt if fire does not present a hazard to staff.

3. Personal protection equipment must be worn at all times including, but not limited to, a hard hat, safety glasses, gloves, safety boots and radio.

### Closed Portions of the Landfill Site

1. Leave the capped portion of the Landfill

2. Immediately call the Fire Department at 9-1-1 from a safe location and report:
   - the location of the fire
   - the type of fire (methane gas leak)
   - whether an ambulance is required

3. Call your supervisor from a safe location.
4. Management staff and the fire department will assess what the next course of action should be.

Bufferlands

1) If the fire does not present a hazard, an attempt may be made to extinguish the fire with the water truck or dirt.
   a) At all times, the employee must remain upwind of fire
   b) Maintain an exit to their back
   c) Maintain a minimum of 50 feet between them and the fire
   d) Personal protection equipment must be worn at all times including, but not limited to, a hard hat, safety glasses, gloves, safety boots and radio.

2) Call a supervisor from a safe location.

Compost Pad

1) If the fire does not present a hazard, an attempt may be made to extinguish the fire with the water cannon on the water truck or dirt. At all times, the employee shall:
   a) Remain up wind of the fire
   b) Maintain an exit to their back
   c) Maintain a minimum distance of 50 feet between them and the fire.
   d) Personal protection equipment must be worn at all times including, but not limited to, a hard hat, safety glasses, gloves, safety boots and radio.
Reporting

The Site Supervisor shall complete an Accident/Incident Report and file.
Policy Statement

Landfill gas may migrate through native soils, trenches, excavations, etc. and accumulate in buildings around the landfill site. Landfill gas can be explosive.

The following buildings are equipped with methane gas detectors, which will detect the presence of landfill gas:

- Regional Maintenance Building
- Regional Scale House
- Regional Green House
- Regional Leachate Spray Irrigation Building
- Transfer Station No. 2 Scale House
- Transfer Station No. 2

Policy

The following steps must be followed if a gas alarm is sounded while inside the building:

1. Evacuate the building immediately.
2. Remain at least 20 m away from the building.
3. Do not turn on or off any electrical equipment or lights upon leaving.
4. Notify your Supervisor.
5. Ventilate the building only if it is safe to do so.
6. Do not re-enter the building until your Supervisor says it is safe to do so.
7. Call the Fire Department at 9-1-1 if there is any possibility of gas being present in the building. Do not re-enter the building until the Fire Department or your supervisor says it is safe to do so.

The following steps must be followed if a gas alarm is sounded or the warning beacon is flashing (indicating a methane gas level of >40% LEL) when no one is in the building:

1. **Do not open the door.**

2. Ensure that there is no source of flame or spark within 20 m of the building (including vehicles).

3. Ensure that staff and vehicles remain 20 m from the building.

4. Notify your Supervisor.

5. Do not go into the building until your Supervisor says that it is safe to do so.
Policy Statement

The following procedures are intended to minimize the impact of spills on staff and the environment.

Policy

Three types of spills have been defined for EWSWA sites. These are:

- **Type A** – a minor spill that can be contained locally with absorbent material or a spill kit. This type of spill has not entered a waterway or sewer.
- **Type B** – A spill that has the potential to enter a waterway (i.e., ditch or pond) or create a potential environmental impact. A Type B spill must be reported to the Site Supervisor.
- **Type C** – A major spill that would require the evacuation of a building or area and the assistance of outside agencies (i.e. Emergency Measures Unit, Fire Department). A Type C spill must be reported to the MOE.

Action:

Type A Spill

1. Contain spill with absorbent material or an appropriate spill kit. Absorbent material is kept in all work areas.
2. Use the appropriate protective equipment such as: rubber protective gloves, safety goggles and respirator.
3. Surround spill with Sorball®. Shovel the material towards the center of the spill using more Sorball® if required to absorb the spill.
4. Clean up the used absorbent with a broom and shovel. Place used absorbent in a container and label the contents. Seal the container.

5. Contact your Supervisor to arrange for proper disposal.

6. If a Type A spill occurs during normal working hours, notify your supervisor.

Type B Spill

1. Call your supervisor immediately.

2. Call the MOE Spill Hot Line at 1-800-268-6060 if the supervisor is unavailable and report:
   - Type of material spilled
   - Quantity
   - How the spill is being contained

3. Try to contain the spill with absorbent material, spill containment snakes or clay dikes.

4. Cover or dike catch basins to try to prevent the spill from escaping.

5. Direct flow away from surface water bodies.

6. Excavate contaminated soils or materials and dispose of appropriately. Contact your Supervisor for assistance.
Type C Spill

1. Call your supervisor, who will call the MOE Spill Hot Line at 1-800-268-6060 and report the type of spill, quantity and how the spill is being contained.

2. Call the MOE Spill Hot line at 1-800-268-6060 if the supervisor or senior staff members are unavailable and report:
   - Type of material spilled
   - Quantity
   - How the spill is being contained.

3. Call the Fire Department at 9-1-1.

4. Do not try to control the spill.

5. Leave the building or area immediately.

6. Remain in an area that is safe.

**Reporting**

The Site Supervisor shall complete an Accident/Incident Investigation Report and file.
Policy Statement

Work adjacent to open access holes for the leachate collection system can expose employees to a range of possible hazards which could lead to injury, illness or other serious consequences. The presence of dangerous gases, vapours or fumes, the existence of oxygen-deficient atmosphere and exposure to explosive environments are situations that may occur and which might cause accidents if the proper procedures are not followed.

Under no circumstances are EWSWA staff to enter any leachate collection access hole.

Policy

Staff may be exposed to hazards within a 3 metre radius of an open leachate collection access hole. Therefore, the following safe work practices must be followed:

1. Work up wind of the open leachate collection access hole if possible.
2. Cover access hole with the metal grate cover if working within one metre of an open leachate collection access hole.
3. Do not lean over the access hole if possible.
4. Park vehicles at least 3 metres away from an open leachate collection access hole.
5. Do not participate in activities that may generate sparks (e.g., metal against metal) or have an open flame within a 3 metre radius of an open leachate collection access hole.
6. Do not smoke within 3 metres of any leachate collection system access hole.
7. Any work done on access holes or pump stations must be done in a buddy system. This will eliminate possible isolation injury.

8. Worker “A” will go and lift or open lid on pump station or access hole while Worker “B” stands back three (3) metres (approximately 10 feet) and observes for incident.

9. Both workers will back off and let confined space vent for a minimum of five (5) minutes or until they feel comfortable working in the area. The venting will be done by natural airflow.

10. The workers will test the environment for combustible gas before working around the access hole.

11. At ABSOLUTELY NO TIME should an employee smoke or ignite a flammable item in or around any access hole or pump station.

**Note:** An employee may be asked or required to wear a respirator to perform any tasks around pump stations or access holes or may wear one in accordance with their rights under the Occupational Health and Safety Act and Regulations.

12. At ABSOLUTELY NO TIME should any worker enter the confined space.
CITY OF WINDSOR

HEALTH AND SAFETY POLICIES
May 25, 2004

Essex-Windsor Solid Waste Authority
360 Fairview Ave., West
Essex, Ontario N8M 1Y6

Re: Health and Safety at Pollution Control Facilities

As you are aware, your contracted firm unloads leachate at the Lou Romano Water Reclamation Plant (LRWRP) and the Little River Pollution Control Plant (LRPCP). Your workers are expected to perform their work in compliance with the Ontario Occupational Health and Safety Act and Regulations.

For example, the height of the vehicle is greater than 1.5 meters. Therefore, workers that access the hatch on the top of the truck must wear Fall Arrest Protective Equipment supplied by you, the Employer.

In addition, LRWRP utilizes chlorine for disinfection. Please advise your drivers of the potential hazards and applicable regulations.

Yours truly,

P. T. Bziuk, P.Eng.
Plant Manager - LRWRP

cc: Manager of Environmental Support Services
    Plant Manager - LRPCP
    City of Windsor • 350 City Hall Square West • Windsor, ON • N9A 6S1
    www.city.windsor.on.ca

Kill Woods, P.Eng.
Executive Director Pollution Control Services
Lou Romano Water Reclamation Plant
4155 Ojibway Parkway
Windsor, Ontario, N9C 4A5
(519) 253-7111, ext. 383 Fax (519) 253-0464
kwoods@city.windsor.on.ca
FIRE PROCEDURE

In case of fire:

1. Go to the nearest telephone and dial 911 on the outside line.

2. Give the exact location of the fire - name of street and number, size of fire, and your name.

If fire is in occupied dwelling:

1. Alert the occupants.

2. Dial 911 on an outside line.

3. Get all available help, return to the scene of the fire, do what you can to control it or to help evacuate occupants.

4. When the Fire Department arrives tell the senior officer what you know about the fire.

5. Stand by, ready to help if needed, but do not interfere with the work of the Fire Department.

6. Know the location of the various fire extinguishers in each plant or pump house location.

7. Know the type of fire for which each of these extinguishers is suited. Use only CO\textsubscript{2} or dry chemical extinguishers on or near electrical equipment.

8. When a fire occurs, see that an alarm is turned in by phone or fire alarm. Get the assistance of fellow employees to fight the fire with extinguishers.
CHLORINE

**Description:**

Under normal atmospheric conditions, chlorine is a greenish-yellow gas with a characteristic odour. It is two and a half times as heavy as air.

Gaseous chlorine is liquified by compression and refrigeration and shipped as liquid chlorine. At atmospheric pressure liquid chlorine will boil, cooling itself to minus 35 degrees Celsius. At room temperature liquid chlorine has a vapour pressure of 600 kilopascals or 85 pounds/square inch. When allowed to evaporate at atmospheric pressure, one volume of liquid chlorine will produce 460 volumes of chlorine gas.

**Formula:**

\[ \text{Cl}_2 \]

**Constants:**

Molecular weight 70.91, m.p. -101°C, b.p. -34.5°C

Density (liquid 1.47 at 0° vapour density: 2.49)

**Toxicology:**

The greenish-yellow gas has a suffocating odour and is dangerous to inhale. The Threshold Limit Value is one (1) ppm or 3 mg per m³ of air. Chlorine is extremely irritating to the mucous membranes of the eyes and respiratory tract. It combines with moisture to liberate nascent oxygen and form hydrochloric acid. Both these substances, if present in quantity, cause inflammation of the tissues with which they come in contact. If the lung tissues are attacked, pulmonary edema may result. A concentration of 3.5 ppm produces a detectable odour; 15 ppm causes immediate irritation of the throat. Concentration of 50 ppm is dangerous for even short exposures and 1,000 ppm may be fatal, even where the exposure is brief.

**Fire Hazard:**

Chlorine can react to cause fires or explosions upon contact with turpentine, ether, ammonia gas, illuminating gas, hydrocarbons, hydrogen and powdered metals. Chlorine is neither explosive nor flammable, but it will support combustion. For example, steel at a temperature of 483°F will ignite in the presence of chlorine and burn quite readily.

**Disaster Hazard:**

Dangerous; when heated it emits highly toxic fumes. Never heat cylinder as vapour pressure ranges from 39.4 lbs./sq. inch at 0° to 602.4 lbs. at 100°. Chlorine gas reacts with water or steam to provide toxic and corrosive fumes of hydrogen chloride. Never spray water on a container of chlorine; if necessary fog spray the gas cloud only.
**Chlorine (cont’d)**

**Aqua Ammonia:**

Aqua ammonia vapour is a good detector of chlorine, as it gives off a white cloud when in contact with chlorine. It should be used (as a double check) for chlorine in the air before work is begun in a chlorine room. This should be done because the least detectable amount of chlorine in the atmosphere is about three and half (3 ½) ppm. The maximum amount that can be inhaled for one hour without serious effects if four (4) ppm. A few breaths containing 1,000 ppm would be lethal.

**Chlorine Safety Equipment**

The following equipment is provided and available where chlorine is used:

<table>
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<tr>
<th>Location</th>
<th>Equipment</th>
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<tbody>
<tr>
<td>Lou Romano Water Reclamation Plant</td>
<td>Air Pack, (SCBA) Self Contained Breathing Apparatus (2)</td>
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<td>Eyewash Station (1)</td>
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<td>Shower (1)</td>
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<td>90 tonne tank car</td>
<td>Tank Car Repair Kit (1)</td>
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<td></td>
<td>First Aid Kit (1)</td>
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<tr>
<td></td>
<td>Automatic Chlorine Sensor and Alarm (1)</td>
</tr>
<tr>
<td></td>
<td>150 lb. Cylinder and 2 Masks</td>
</tr>
</tbody>
</table>
Chlorine Standard Safety Practices:

1. All persons using the gas protective equipment must be trained in its use and maintenance.

2. Do not start up or operate a chlorinator or evaporator unless adequate protective equipment (air pack/ respirator) is on hand in the chlorine room area.

3. A self-contained air pack must be worn when it is necessary to locate and stop small leaks in the piping or when making any repairs or adjustment to LEAKING equipment or if the concentration of the chlorine gas in the air is unknown.

4. A self-contained air breathing unit must not be used unless the air cylinder is fully charged. AIR CYLINDERS MUST BE COMPLETELY RECHARGED AFTER EACH USE.

5. Never apply water to a chlorine leak because of the added corrosive action created by the water and chlorine mixture.

6. When connecting/disconnecting tank cars, two persons must always be present; one person wearing a SCBA (Self Contained Breathing Apparatus).
CHLORINE ALARM PROCEDURES
LOU ROMANO WATER RECLAMATION PLANT

1. Anyone hearing a chlorine alarm and who is trained in the use of the SCBA (Self-Contained Breathing Apparatus) should proceed to the area of SCBA (Self Contained Breathing Apparatus) storage.

Persons arriving at the area of SCBA storage should put on the SCBA, and inspect the Chlorine Storage Room and Evaporator Room for any victims. If anyone is found they should be immediately removed from the danger zone.

2. The Laboratory staff upon hearing the alarm would designate one person to check wind direction and wait in the Control Room to direct personnel which exit to use. Remaining Laboratory staff - turn off make up air unit MCC1 green handle also air intake for handle MAU#1 and MAU#2 in Electrical Room…should follow 1. above.

Laboratory personnel would also call the Dewatering Building and Electrical Shop to inform those persons of the alarm and wind direction. Persons in the Dewatering Building should turn off make-up air units and remain on the operating floor of the Centrifuge Room. Persons in the Electrical Shop should proceed to a safe upwind location.

3. Anyone hearing a chlorine alarm who is NOT trained in the use of the SCBA (Self-Contained Breathing Apparatus) should proceed to the Main Control Room. In the event that no one from the Laboratory is present to direct personnel, then the flag should be checked and the most appropriate (upwind) exit should be used.

Following the above, the following procedure would then apply:

4. **Minor Leak** - No visible chlorine cloud

   The competent person with the air pack should re-enter the area to locate the source of the chlorine, once another person is standing by wearing a SCBA.

   **NOTE:** The exhaust fan should **NOT** be turned on until the leak has been isolated.
   (To turn it on, use switch in hallway by window).

5. Competent personnel responding to an alarm who find the air pack already gone should check through the window of the Chlorine Room to ensure everything is under control, and wait if necessary, to enter and isolate the leak when required.

   All other persons, having checked to ensure everything is under control, should report to the Control Room as noted in 3. above.

6. **Major Leak** - Visible Chlorine Cloud

   Once 1. is completed, the Chlorine Room and/or Evaporator Room and the Janitor/Workout Area Room should be sealed as much as possible.

   The responding person, or his designate shall immediately call the Fire Department (911) and inform them that a major chlorine leak has occurred, give the location of the leak, wind direction and any injuries.
7. **NO** entry will be made into the storage or chlorinator area until the Fire Department has arrived. (They have a full length protective suit which can be worn in a cloud of chlorine).

**NOTE:** The exhaust fan should **NOT** be turned on until the Fire Department have arrived and are set up to “fog” the resultant chlorine gas cloud. To subsequently turn it on, use switch in hallway by window.

Again, all non-essential personnel should at this time report to the Control Room for evacuation.

**Leaks Occurring on a One-Man Shift:**

- If alarm sounds Operator will proceed to hallway window. If there is no noticeable cloud of chlorine (yellow/green) a Supervisor and then a Mechanic must be called.
- The Operator will then leave the area to a safe upwind location and await the arrival of help.
- The Mechanic and Operator will determine the site of the leak and proceed as in Step 4.
- If the Operator determines it is a large leak (visible cloud), they will call 911 (City TAC) and proceed as in Step 6. The Operator will then proceed to the gate upwind of the leak and await the arrival of the Fire Department. A Supervisor must also be called and made aware of the situation.
- Under “**NO**” circumstances shall an Operator while by himself/herself on shift enter the Chlorine Evaporator Room while the alarm is sounding.
- If Alarm sounds, the LRWRP Chief Wastewater Operator must immediately contact the LRPCP Chief Wastewater Operator to advise of the alarm sounding and then proceed to the hallway window.

**Leaks Occurring on a Two-Man Shift:**

If the only persons present are the Chief Operator and Operator, then the following procedure should be adopted:

- If both persons are known to be outside the area then the leak should be isolated (assuming a minor leak) by one person **ONLY** when the other is standing by wearing a SCBA.
- If the leak is major, the procedure noted in 6. above should be followed, and a Supervisor notified.
- If Alarm sounds, the LRWRP Chief Wastewater Operator must immediately contact the LRPCP Chief Wastewater Operator to advise of the alarm sounding and then proceed to the hallway window.

**TREATMENT FOR INHALED POISONS:**

In case of inhaled poisons the First Aider should first remove the casualty from the poisonous atmosphere and carry him to fresh air. If the casualty is not breathing, artificial respiration should be started immediately and continued until hospital treatment can be given.

If the casualty starts breathing or was breathing when you found him, place in recovery position, treat for shock, then get help.

Anyone hearing a chlorine alarm will assure that any visitors to the plant are informed and directed to a safe place, i.e., contractors or visitors working in the back of the plant should be directed to the Dewatering Building Control Room, visitors in the office or laboratory directed to the Main Control Room and contractors anywhere else in the plant to the appropriate area.
CHLORINE - FIRST AID TREATMENT

Acute Toxicity

Chlorine acts as a severe corrosive, irritating or destroying the tissue that it contacts. Exposure to chlorine gas can irritate the eyes, respiratory system, and skin. In larger exposures, intense lacrimation, coughing, throat irritation, sneezing, salivation, and laboured breathing may occur. Following high exposures, nausea, vomiting, and general excitement of the victim, may also occur. This may be followed by pulmonary edema, and secondary lung infections. Exposures severe enough to produce pulmonary edema will invariably be accompanied by significant eye and upper respiratory symptoms. Liquid chlorine may cause very severe burns to the skin or eyes.

Immediate First Aid Procedures

1. Remove victim from further exposure (rescue personnel must use proper respiratory equipment).

2. Decontaminate skin (deluge shower) and remove contaminated clothes if exposure to liquid chlorine has occurred. **DO NOT** use chemical antidotes.

3. Flush eyes with copious amounts of water for 20-30 minutes if eye exposure has occurred. **DO NOT** use chemical antidotes.

4. Administer cardiopulmonary resuscitation or artificial respiration as needed.

5. Notify medical authorities and arrange for further evaluation.

Advice to Physicians

A. The treatment and prognosis of eye burns are similar to those produced by other acid or acid-like corrosives. Eye burns should be seen as soon as possible by an ophthalmologist. If an ophthalmologist is not immediately available:

   1. Wash the eyes with water.
   2. Apply sterile bandages **WITHOUT** any medication.
   3. Allay pain with systemic administration of analgesics.
   4. Have patient taken to ophthalmologist.

B. Skin burns should be treated the same as thermal burns.

C. Chlorine gas inhalation could cause some of the gas to enter the stomach, causing vomiting. If dry vomiting persists, a large amount of liquid antacid should be given to neutralize gas and stop vomiting so as not to rupture internal organs.
**Chlorine - First Aid Treatment (cont'd)**

D. Patients with serious inhalation exposures should be observed for a delayed reaction in the form of pulmonary edema. It has been suggested that immediate steroid therapy may offer some degree of prophylaxis against pulmonary edema. This has not been scientifically confirmed but may be indicated for severe exposures. Additional guidance on the treatment of chemically-induced pulmonary edema follows:

Revised July 1992

For further reference to chlorine procedures, refer to the following:

<table>
<thead>
<tr>
<th>NEW</th>
<th>OLD</th>
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</thead>
<tbody>
<tr>
<td>N/A Timing for Chlorination at West Windsor</td>
<td>LRWRP Procedures Book, Section 1</td>
</tr>
<tr>
<td>3.0 Chlorine Emergency Procedures</td>
<td>LRWRP Procedures Book, Section 5.1</td>
</tr>
<tr>
<td>13.4 Changing Tank Cars</td>
<td>LRWRP Procedures Book, Section 5.2</td>
</tr>
<tr>
<td>13.3 Safe Handling of Chlorine</td>
<td>LRWRP Procedures Book, Section 5.8</td>
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<td></td>
<td>MOEE Gas Chlorination Workshop</td>
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<tr>
<td>13.6 Chlorine Analyzer</td>
<td>LRWRP Procedures Book, Section 5.3</td>
</tr>
<tr>
<td>13.4 Start Up and Shut Down of Chlorination Equipment</td>
<td>LRWRP Procedures Book, Section 5.5</td>
</tr>
<tr>
<td>2.5.2 Chlorine Alarm</td>
<td>LRWRP Procedures Book, Section 5.11</td>
</tr>
<tr>
<td>13.3 General Information</td>
<td>LRWRP Procedures Book, Section 5.8</td>
</tr>
<tr>
<td>13.1 System Maintenance</td>
<td>Mechanical and Electrical Preventive Maintenance Information</td>
</tr>
<tr>
<td>(same) Major Tank Car Rupture or Major Leak</td>
<td>Emergency Procedures Manual</td>
</tr>
</tbody>
</table>
**Leachate**

Leachate is formed when water passes through the waste in the landfill cell. The precipitation can be from rain, melted snow or the waste itself. As the liquid moves through the landfill many organic and inorganic compounds, like heavy metals, are transported in the leachate. This moves to the base of the landfill cell and collects. Generally leachate has a high biochemical oxygen demand (BOD) and high concentrations of organic carbon, nitrogen, chloride, iron, manganese, and phenols. Many other chemicals may be present, including pesticides, solvents, and heavy metals.

You may come into contact with leachate while working around the leachate collection ponds or the leachate collection system manholes or while working around the Leachate Land Application (LLA) Systems.

🚫 **AVOID CONTACT WITH LEACHATE WHenever POSSIBLE. WEAR PPE's.**

⚠️ **Inorganic Compounds**

Lead from paints and mercury from lamps and thermometers may be present in the leachate. Acute exposure to lead may cause severe abdominal pain, diarrhea, vomiting cramps, drowsiness, coma and seizures among other symptoms. The symptoms of acute exposure to mercury may be diarrhea, dehydration, and renal failure among others.

Other inorganic compounds include cadmium compounds from paint and batteries and nickel from batteries and some ceramic colors. Symptoms of acute exposure include skin irritation on contact and diarrhea when ingested.

⚠️ **Organic Compounds**

Toluene and xylene, phenols and cresols used in glues and paints and benzene, a starting material in chemical manufacture may be present in the leachate. Acute exposure to toluene/xylene may cause euphoria, tremors, convulsions and coma. Exposure to phenols and cresols may cause diarrhea, vomiting, sweating shock and coma.
Pathogens
The ponds are frequented by birds and small animals any of which may introduce bacteria, fungi, and parasites, via their fecal material, into the leachate. Any of these may be hazardous to your health.

Avoid contact with leachate whenever possible. Wear PPE’s.

Personal Protective Equipment
When working in areas where leachate may come in contact with skin, eyes or clothing use protective gloves, goggles or face shield and/or plastic rain gear.
In case of accidental contact with leachate, wash the affected area with soap and water as soon as possible.
In case of accidental contact with the eyes, flush with water or eyewash solution.

If you have any questions or require any additional information regarding this Safetygram please contact any member of your Health and safety Committee.
Monitors

Monitors are situated around the landfill sites. These are used to monitor the levels of leachate, ground water and landfill gases in and around the waste cells. In many cases these wells are drilled directly into the waste cell and thus are a direct conduit for the escape of landfill gases – predominantly methane (CH₄) and carbon dioxide (CO₂) with some other trace gases.

**Avoid Inhaling Landfill Gases. This may result in serious injury or death.**

**No smoking within 10 metres of monitors, explosion and fire hazard.**

**Methane (CH₄)**

Methane is a colourless, odourless gas. Methane poses a serious suffocation hazard in confined spaces. Methane, in the presence of oxygen, is highly explosive and flammable. There shall be no smoking or the use of any equipment that may make a spark within 10 metres of the monitoring wells.

**Personal Protective Equipment**

Respirators may be used to reduce inhaling some landfill gases. However, the standard respirator is of no use in the situations of low oxygen levels normally associated with high methane levels. A separate air source is required in those instances.

If you have any questions or require any additional information regarding this Safetygram please contact any member of your Health and safety Committee.
Gas Flares

During the decomposition process of Municipal Solid Waste, landfill gases are produced - predominantly methane (CH₄) and carbon dioxide (CO₂). In an effort to reduce the harmful "greenhouse" effects of landfill gases, methane and other flammable gases are burnt off by flares situated around the Regional Landfill site.

The solar flares on the West Cell and Cell 1 North have collection pipes drilled directly into the waste cell. A candlestick flare, connected to a blower with a Variable Frequency Drive (VFD), is connected to a gas collection system installed in Cells 1 and 2 South.

🚫 AVOID INHALING LANDFILL GASES. THIS MAY RESULT IN SERIOUS INJURY OR DEATH.

🚫 NO SMOKING WITHIN 10 METRES OF FLARES, EXPLOSION AND FIRE HAZARD.

⚠ Methane (CH₄)

Methane is a colourless, odourless gas. Methane poses a serious suffocation hazard in confined spaces. Methane, in the presence of oxygen is highly explosive and flammable. There shall be no smoking or the use of any equipment that may make a spark within 10 metres of the flares.

⚠ Solar Flares

Solar flares maintain a flame by igniting the landfill gases with a solar powered sparkler assembly. The pressure of the landfill gases in the waste cell is enough to maintain a steady flow of methane to the flare head. However, even when a flare is burning there may still be an explosion hazard around the flare. Dry weather conditions may cause cracking in the ground around the collection pipe allowing landfill gases to escape.

These flares are located on the West Cell and on Cell 1 North.
Candlestick Flare

Unlike the Solar Flares, there is a vacuum created on the collection system, drawing the landfill gases out of the waste cells. However, even when a flare is burning there may still be an explosion hazard around the flare. Cracks in any of the seals in the collection pipes may allow gases to escape into the surrounding air.

This flare is located south of Cell 1 South with collection pipes laid out across the south slopes of Cells 1 and 2.

Avoid inhaling landfill gases. This may result in serious injury or death.

No smoking within 10 metres of flares, explosion and fire hazard.

Personal Protective Equipment

Respirators may be used to reduce inhaling some landfill gases. However, the standard respirator is of no use in the situations of low oxygen levels normally associated with high methane levels. A separate air source is required in these instances.

If you have any questions or require any additional information regarding this Safetygram please contact any member of your Health and safety Committee.