

|   |                                      |  |                                 |                 |             |
|---|--------------------------------------|--|---------------------------------|-----------------|-------------|
| <br><b>Carleton</b><br>UNIVERSITY<br>Department of<br>Physical Plant | <i>Standard Operating Procedure</i>  |  | <i>Issued</i>                   | <i>Reviewed</i> | <i>Page</i> |
|   | <b>Natural Gas Leak<br/>Response</b> |  | <b>SOP<br/>001</b>              |                 |             |
|   |                                      |  | <i>Approved by:</i><br>D. Boyce |                 |             |
|   |                                      |  | Aug 15/08                       |                 | 1/2         |

## 1 Purpose

The purpose of this procedure is to ensure that Department of Physical Plant personnel safely and effectively respond to reports of natural gas leaks.

## 2 Scope

This procedure applies to all Physical Plant personnel who respond to reports of natural gas leaks.

## 3 Introduction

### 3.1 Properties of Natural Gas

- Colourless
- Odourless – however, to increase detectability, a mercaptan odourant is added at the local distribution station, which gives natural gas its characteristic “rotten egg” smell.
- Non-toxic
- Lighter than air (vapour density between 0.59 and 0.72).
- Combustible

### 3.2 Hazards of Natural Gas

#### 3.2.1 Explosive Hazard

Natural gas is composed primarily of the hydrocarbons methane, ethane and propane, which can become highly explosive when combined with air and an ignition source. The Lower Explosive Limit (LEL) for natural gas is 3.9% - 4.5% while the Upper Explosive Limit (UEL) is 14.5% - 15%.

#### 3.2.2 Oxygen Displacement Hazard

While natural gas is not toxic, at high concentrations it will displace oxygen, which could lead to asphyxiation.

#### 3.2.3 Migration Hazard

Since natural gas is lighter than air, it has the potential to create an explosive or oxygen displacement hazard a great distance away from the source of the leak. Indoors, natural gas can migrate upwards in a building through a service chase or wall cavity. Outdoors, natural gas leaking from an underground pipe typically permeates the ground and rises harmlessly into the air. However, if the ground is frozen or covered with impermeable concrete or pavement, the gas will begin to migrate laterally until it finds a channel to follow. This channel could be a sewer line, conduit or even the loosely compacted trench in which the gas line itself is buried. If the channel leads into a confined space such as a vault or basement, natural gas concentrations could rise high enough to create an explosive or asphyxiation hazard.

## 4 Buildings with Natural Gas Service

The following buildings are serviced by the campus natural gas distribution system:

|                          |                                     |
|--------------------------|-------------------------------------|
| 1 Tory Building          | 23 St. Patrick’s Building           |
| 7 University Center      | 24 Social Science Research Building |
| 8 Gymnasium              | 28 Child Care Centre                |
| 9 Athletics Building     | 30 Leeds House                      |
| 10 Mackenzie Building    | 34 Prescott Residence               |
| 11 Maintenance Building  | 35 Field House                      |
| 12 Steacie Building      | 36 Alumni Hall & Sports Center      |
| 13 Herzberg Building     | 40 Tennis Centre                    |
| 19 Residence Commons     | Maintenance Landscaping Building    |
| 22 Architecture Building |                                     |

## 5 Procedures

The Carleton University emergency procedure “*When in Doubt – Get Out!*” directs building occupants to leave a building immediately if they feel their health is in danger from contaminants, fumes, odours or dusts. In addition,

|   |                                      |  |                    |                 |             |
|---|--------------------------------------|--|--------------------|-----------------|-------------|
| <br><b>Carleton</b><br>UNIVERSITY<br>Department of<br>Physical Plant | <i>Standard Operating Procedure</i>  |  | <i>Issued</i>      | <i>Reviewed</i> | <i>Page</i> |
|   | <b>Natural Gas Leak<br/>Response</b> |  | <b>SOP<br/>001</b> |                 |             |
|   |                                      |  | Aug 15/08          |                 | 2/2         |
| <i>Approved by:</i>   |                                      |  |                    |                 |             |
| D. Boyce  |                                      |  |                    |                 |             |

the procedure instructs the occupants to call the Department of University Safety at 4444 and states that University Safety will evacuate the building if necessary.

The Carleton University “*Building Evacuation Procedure*” indicates that staff in the Department of University Safety will receive the first calls about a problem and will call in additional resources such as the fire department or police services.

Given these existing university procedures, the Department of Physical Plant will respond to reported natural gas leaks as follows:

## 6 Buildings with Natural Gas Service

### 6.1.1 Call University Safety

Call University Safety at 4444 to relay all pertinent information about the leak. University Safety will initiate emergency procedures as required.

### 6.1.2 Call Enbridge

Call the Enbridge Gas Distribution emergency number at 1-866-763-5427 immediately and report details of the leak.

## 7 Buildings without Natural Gas Service

### Dispatch a Plumber

Dispatch a plumber immediately to investigate the source of the odour. If the plumber believes the odour is not caused by sewer gas but is caused by natural gas migrating into the area, then follow the response detailed above for buildings serviced with natural gas. If the plumber does not locate a source of sewer gas but the odour persists, then initiate an Indoor Air Quality Complaint Report and dispatch the appropriate Physical Plant personnel to investigate.

|                 |                            |             |                 |                            |             |
|-----------------|----------------------------|-------------|-----------------|----------------------------|-------------|
| <b>Operator</b> | <i>Name (please print)</i> | <i>Date</i> | <b>Reviewer</b> | <i>Name (please print)</i> | <i>Date</i> |
|                 | <i>Signature</i>           |             |                 | <i>Signature</i>           |             |