Oak Ridges Moraine Conservation Plan

WELLHEAD PROTECTION – SITE MANAGEMENT AND CONTINGENCY PLANS

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DRAFT

Acknowledgements

This technical paper is one in a series of technical papers that provides guidance for implementing the water-related provisions of the Oak Ridges Moraine Conservation Plan. This technical paper was prepared for the Ministry of the Environment by MacViro Consultants Incorporated. Stephen Maude and Diane Blachford of the Ministry of the Environment coordinated the preparation of this series of technical papers.

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Site Management and Contingency Plans

1. PURPOSE AND OVERVIEW

This technical paper provides guidance for owners or operators within wellhead protection areas that carry on uses listed under Subsection 28(1) or 28(2) to prepare and maintain a site management and contingency plan per Subsection 28(4) of the Oak Ridges Moraine Conservation Plan (ORMCP). The overall objective is to reduce the generation and use of prohibited materials and the ultimate elimination of prohibited materials through a gradual phasing out period. The intent is to eliminate the likelihood of releases into the environment and specifically to prevent the travel of the contaminant to the capture zones of municipal wells.

The uses listed under Subsection 28(1) and 28(2) are prohibited within wellhead protection areas except for in facilities that were established or received permitting prior to November 15, 2001. The broad spectrum of contaminants related to these uses includes: petroleum fuels, petroleum solvents and chlorinated solvents, pesticides, herbicides, fungicides, construction equipment, inorganic fertilizers, road salt, severely toxic contaminants, hazardous waste or liquid industrial waste, and contaminants associated with waste disposal sites, organic soil conditioning sites, snow storage and disposal facilities, animal manure, animal agriculture, and the storage of agricultural equipment.

This technical paper provides guidance for developing a site management and contingency plan and assists in achieving compliance with existing legislation, regulations and best management practices.

2. REQUIREMENTS OF THE OAK RIDGES MORAINE CONSERVATION PLAN

The direction for preparing site management and contingency plans stems from Part III of the ORMCP, "Protecting Ecological and Hydrological Integrity". The ORMCP contains a number of requirements aimed at protecting ecological and hydrological integrity including wellhead protection.

The following provisions from the ORMCP must be identified and implemented within wellhead protection areas:

Section 28 (4): *Every person who carries on a use listed in subsection (1) or (2), as owner or operator, shall prepare and maintain a site management and contingency plan that is aimed at reducing or eliminating the creation of materials referred to in subsection (1) or (2), as the case may be, and their release into the environment.*

This technical paper provides a guide for owners or operators within wellhead protection areas in developing a site management and contingency plan to prevent the unintentional release of contaminants to the environment. In developing site management and contingency plans, other Oak Ridges Moraine technical papers should be consulted where appropriate.

3. RATIONALE FOR THE REQUIREMENTS

The ORMCP prohibits the following in wellhead protection areas:

1) Storage, except by an individual for personal or family use, of,
   i) petroleum fuels,
   ii) petroleum solvents and chlorinated solvents,
   iii) pesticides, herbicides and fungicides,
   iv) construction equipment,
   v) inorganic fertilizers,
   vi) road salt, and
   vii) contaminants listed in Schedule 3 (Severely Toxic Contaminants) to Regulation 347 of the Revised Regulations of Ontario, 1990.
2) Generation and storage of hazardous waste or liquid industrial waste.
3) Waste disposal sites and facilities, organic soil conditioning sites, and snow storage and disposal facilities.

The ORMCP prohibits the following in the zero to two-year time of travel (TOT) zone (except for personal or family use):

1) Storage of animal manure.
2) Animal agriculture.
3) Storage of agricultural equipment.

The above ORMCP prohibitions do not apply to facilities that were established or were permitted prior to November 15, 2001. However, ORMCP Subsection 28(4) requires owners or operators who carry on the uses to prepare and maintain site management and contingency plans to reduce or eliminate the creation of the above-mentioned materials and their release into the environment.

Several of these contaminants are considered toxic, bioaccumulative, persistent, and difficult if not impossible to remove from groundwater once it has entered the subsurface. Their release may result in permanent damage to wildlife habitat, the ecosystem, and to the source of public water supply and human health. Proceeding proactively by preventing the release of the above-mentioned substances is the best way to ensure the protection of the ecosystem and the groundwater sources within the Oak Ridges Moraine.

4. IMPLEMENTING THE REQUIREMENTS

Each municipality is responsible for conducting wellhead protection studies to delineate and map the wellhead protection areas and to provide a basis for land use planning. Municipalities must

ensure that appropriate property use, as determined by the Official Plans, wellhead protection studies, and land use plans is followed. Municipalities must also be aware of any land uses within wellhead protection areas listed in Subsections 28(1) and 28(2) and, where necessary, provide assistance to the owners or operators of these land uses to pursue site management and contingency planning.

As per Subsection 28(4) of the ORMCP, a site management and contingency plan is required within wellhead protection areas for uses listed in Subsection 28(1), and within the zero to two-year time of travel zone for uses listed in Subsection 28(2).

The first stage involves a review of the site to determine if the subject property lies within the zero to two-year time of travel zone or in other (2 – 10, or 10 – 25 years of time of travel) wellhead protection zones. This can be done by reviewing the maps provided by the municipalities.

Site management plans are required for all wellhead protection zones; however, the focus within each zone shifts as the travel time increases. The land within the 0 to 2 year TOT area is highly sensitive and focuses on avoiding all possible risks, including those from bacteria and viruses. The land within the 2 to 10 year TOT area focuses on the minimization of chemical contaminants. The land within the 10 to 25 year TOT area focuses on addressing risks associated with persistent and hazardous contaminants.

The second stage is to conduct an inventory of the substances listed in Subsection 28(1) and 28(2) and the potential receptors, on and off-site. The property owner/operator is responsible for obtaining a qualified person to conduct this inventory. An assessment can then determine potential pathways for the substances to exit the subject property or to reach on-site receptors. The focus of the site management and contingency plan is to reduce and eventually eliminate the generation of the materials listed in Subsection 28(1) and 28(2) and to prevent their release. This is a long term, ongoing process, which requires continual review, reassessment and modification as the facility evolves over time.

The following outline suggests steps for developing a site-specific site management and contingency plan.

4.1 Environmental Policy

The first step in the development of the site management and contingency plan is to establish an environmental policy and set goals, as well as designate an on-site environmental officer to implement the plan. The policy should apply specifically to activities conducted at the subject site and should include a commitment to continual improvement and prevention of pollution.

It is important that the policy is documented and that all employees and visitors to the facility adhere to the mandatory conditions outlined in the policy.

4.2 Risk Identification

A qualified person shall conduct a survey on behalf of the owner/operator of the property, which includes:

- reviewing site-specific environmental issues;

- conducting an inventory listing all substances in Subsection 28(1) and 28(2), taking note of the name of the substance, the CAS Registry number, the UN number, the volume stored, location stored, length of time stored, rate of consumption; and
- obtaining Material Safety Data Sheets (MSDS) for each substance identified on-site.

4.3 Site Specific Evaluation of Potential Pathways

Once the potential sources have been identified, the potential risk associated with each source and the likelihood of it reaching an environmental receptor should be evaluated. This may involve the identification of potential on and off-site receptors and the potential pathways to groundwater contamination. The property boundary should be considered as a receptor for all sites.

Detailed documentation of identified risks and potentially hazardous compounds should be monitored over time and be reviewed regularly to support the risk assessment process.

4.4 Implementation

Once the potential risks and pathways have been identified, a standard operating procedure must be developed that will be upheld throughout the facility to ensure that the chances of environmental releases are minimized. The following steps are recommended:

- Define a management structure and provide resources to effectively manage environmental issues
- Document roles and responsibilities of individuals and identify an on-site environmental officer
- Demonstrate to employees the importance of conforming to the environmental policies and procedures
- Provide relevant employee training to ensure preparation for potential hazards involved with the work and preparation for emergency situations
- Keep and organize records for the following items, if relevant to site-specific activities:
    - Incident records
    - Complaint records
    - Pertinent contractor and supplier information
    - Inspection, maintenance and calibration records
    - Process and product information
    - Training records
    - Audit results
    - Records of significant environmental impacts
    - Information of applicable laws and regulations

- Emergency response and preparedness records
- Management review

- Develop a system for reporting environmental incidents
- Provide a mechanism for feedback and conduct regular reviews of the system, as the development of the management plan will be an ongoing process.
- Implement process and system modifications, or chemical substitutions when alternatives are identified.

4.5 Compliance with Laws and Regulations

Different aspects of environmental protection are regulated at several levels of government. A list of relevant legislation, codes, regulations, guidelines, and policies is in Appendix A.

4.6 Phase Out and Reduction of Substance Use

The focus of the site management and contingency plan is to reduce and eventually eliminate the generation of the materials listed in Subsection 28(1) and 28(2). The assessment of current facility operations will identify opportunities to reduce the generation of materials listed in Subsection 28(1) and 28(2) and assist in achieving long-term compliance.

Process or System Modification

Modifications to processes may be the most cost-effective way to reduce or prevent release of substances to the environment. Modifications can eliminate the need to use certain substances or steps in the chemical handling process, or may lead to elimination of an entire process.

Product/Chemical Substitution

It is becoming feasible in many situations to replace hazardous chemicals with non-hazardous chemicals. Parameters that should be reviewed when considering alternatives include toxicity, persistence, and bioaccumulation.

Agricultural activities within the 0 to 2 year TOT zone represent a threat to the water quality. Guidance for agricultural activities can be found in the Nutrient Management Act, which dictates the maximum allowable concentration for nutrients. Proper handling and containment of manure can significantly reduce the potential for groundwater and surface water contamination.

4.7 Prevention of Substance Release

The key to reducing the frequency and severity of environmental releases is by minimizing the potential of them from happening in the first place. The following list suggests proactive measures that could be incorporated into the site management and contingency plan to prevent the accidental release of substances.

- **Proper labeling** – Provide warning signs indicating the storage of potentially hazardous substances. Ensure that all materials are properly labeled and stored so that there is no confusion.

- **Chemical Handling Procedures** – Research storage and containment methods for chemicals on site and designs for spill countermeasures. Reference materials provided in *Environmental and Technical Information for Problem Spills* (EnviroTIPS) and the *Manual for Spills of Hazardous Materials* can provide some insight on how to handle a number of chemicals.
- **Materials compatibility** – Ensure that container materials are compatible with the substance stored, and with the equipment used to fill and move these materials.
- **Preventative maintenance** – Conduct regular equipment tests to identify potential malfunctions or failures early on. Include a detailed record keeping system, which details the test, results, and corrective actions taken.
- **Containment** – Design the operating facility with back-up containment systems to prevent the release of contaminants or a plan to implement these measures over time.
- **Housekeeping** – Encourage a clean, orderly work environment. The neat and orderly storage of bags and drums of chemicals can prevent materials and substances from becoming unnecessary hazards.

4.8 Emergency Response Plans

An Emergency Response Plan should be developed as part of the site management and contingency plan. It is the responsibility of the owner of the facility where an emergency has occurred, or the owner of the material being released, to initiate emergency response activities. The owner is responsible for retaining a qualified and competent spills response or hazardous materials contractor to provide adequate containment and removal. If any of the adverse effects (as described in Section 1 of the Environmental Protection Act [EPA]) are likely to occur, Section 92 of the EPA places the onus on this person to report the incident.

Section 93 of the EPA requires the responsible party to respond to the emergency in three ways:

1. Initial Response: stop the spill from continuing;
2. Containment and Clean Up: remove or render harmless the pollutant and everything that has been contaminated; and
3. Recovery: restore the natural environment to its pre-spill state.

1. The initial steps or activities of response plans typically focus on safety, stopping the spill from continuing, and notification. Accordingly, the sections of an Emergency Response Plan that address initial response activities often include:

- maps indicating locations of potential hazards accompanied by a brief description of each;
- shutdown procedures and valves/switches locations;
- contact information for individuals responsible for shutdown;
- contact information for police, fire emergency services, MOE (the MOE Spills Action Centre (SAC) can be reached 24 hours a day at 1-800-268-6060), municipalities;

- the Ontario Water Resources Act requires the notification of the Minister of the Environment if materials escape into waters or any shore or bank and may impair the quality of water
- the Gasoline Handling Act requires immediate notification of the Fuels Safety Branch of the MCCR, the Chief Fire Official of any fire or explosion, the SAC of any leak or spill, the local municipality of any leak, spill, fire, or explosion.

2. Once the initial steps are implemented, the focus turns to containment and clean up. The Emergency Response Plan should include sections that address:

- classifying unscheduled releases or events
- determining suitable actions
- determining the types and amounts of equipment, supplies, and personnel required to implement necessary and appropriate actions
- contact information for locating sources of equipment, supplies, and personnel
- environmental monitoring procedures.

3. After the accidental release, there is the recovery stage, which includes the assessment of potential damages and restoration. The responsible parties for the spill are required to retain the services of a qualified and competent environmental professional to design site-specific remedial action and restoration plans. The level of environmental restoration is determined by factors such as the size, persistence, and toxicity of the release.

4.9 Monitoring

A monitoring program will enable decision-makers to gather information about the state of the site in order to determine compliance with ORMCP Subsection 28(4). The monitoring to be carried out regarding site management and contingency plans for wellhead protection areas is at the compliance monitoring level. It is recommended that facility managers or property owners conduct regular audits of the facility to assess the potential risk of contamination at the facility to prevent substance release and identify areas where chemical substitutions or alternative processes can be used.

5. REFERENCES/LIST OF RESOURCES

1. Phyper, John-David and Ibbotson, Brett. The Handbook of Environmental Compliance in Ontario, Second Edition. McGraw-Hill Ryerson, Toronto. 1994. pp. 355-372

2. Saponara, Anthony and Roig, Randy A. ISO 14001 Environmental Management Systems: A Complete Implementation Guide. Specialty Technical Publishers, Inc. North Vancouver. 1999.

3. Environment Canada. Implementation Guidelines for Part 8 of the Canadian Environmental Protection Act, 1999 – Environmental Emergency Plans. 1999.

Additional Reading

1. Organisation for Economic Co-operation and Development (OECD Guiding Principles for Chemical Accident Prevention, Preparedness and Response: Guidance for Public Authorities, Industry (including Management and Labour), Communities and Other Stakeholders. Paris: OECD, 2002.
www.oecd.org/env/accidents

2. National Fire Protection Association (NFPA). NFPA 1600: Standard for Disaster/Emergency Management, 2000 Edition. Quincy, Massachusetts: NFPA, 2000.
www.catalog.nfpa.org

3. Canadian Standards Association (CSA). Emergency Planning for Industry: A National Standard for Canada (CAN/CSA-Z731-95). Toronto: CSA, 1995
www.csa-international.org

4. Canadian Association of Fire Chiefs. Community Self-Assessment Tool. Ottawa: Canadian Association of Fire Chiefs, 1999.
www.ptsc-program.org

5. Canadian Association of Fire Chiefs. Hazardous Substances Risk Assessment: A Mini-Guide for Municipalities and Industry. Ottawa: Canadian Association of Fire Chiefs, 1994.

APPENDIX A:

Relevant Legislation, Regulations, Guidelines, and BMPs

Federal

- Canadian Environmental Protection Act R.S.C. 1985, c.16 (4th Supp.)
- Canadian Environmental Protection Act Subsection 199 and 200
- Guidelines for Canadian Drinking Water Quality
- Fisheries Act R.S.C. 1985, c.F-14
- Transport of Dangerous Goods Act, 1992 S.C. 1992, c.34
- Transport of Dangerous Goods Regulation SOR/2001-286
- Canadian Council of Ministers of the Environment (CCME)
- Domestic Substance List
- Workplace Hazardous Materials Information System
- National Fire Code of Canada
- Canadian Environmental Assessment Act
- Environmental Contaminants Act

Provincial

- Environmental Protection Act R.S.O. 1990, c.E.19
- Environmental Protection Act, Regulation 360 – Spills
- Fire Code O.Reg. 388/97 (Section 4)
- Occupational Health and Safety Act, Revised Statutes of Ontario
- Ontario Water Resources Act, Revised Statutes of Ontario
- Surface Water Quality Guidelines
- Ontario Drinking Water Standards
- Ontario Building Code (O.Reg. 278/99) Section 8
- Guidelines for Environmental Protection Measures at Chemical Storage Facilities, October 1988
- Guideline for Use at Contaminated Sites in Ontario, Ministry of Environment and Energy, February 1997
- MISA, for Storm Water Control Study Protocol, August 1992
- Waste Audits and Waste Reduction Work Plans O. Reg. 102/94

In addition, specific legislation, codes, regulations, guidelines and policies are also applicable for substances identified in Subsection 28(1) and 28(2).

Petroleum fuels

- Technical Standards and Safety Act, 2000 (S.O. 2000, c.16)
- Federal above ground Storage Tank Technical Guidelines
- Federal under ground Storage Tank Technical Guidelines

- Environmental Code of Practice for Underground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products, March 1993
- Environmental Code of Practice for Aboveground Storage Tank Systems Containing Petroleum Products and Allied Petroleum Products, 1993
- Fuel Oil (O.Reg. 213/01) and Fuel Oil Code Adoption Document (June 1, 2001)
- Ontario Regulation 329 Fuel Oil Code
- Liquid Fuels (O.Reg. 213/01) and Liquid Fuels handling Code Adoption Docment (June 1, 2001)
- Gasoline Handling Act, Revised Statutes of Ontario
- Gasoline Handling Code, Regulation 521/93
- Petroleum Oil and Lubricants – Storage and Distribution, December, 1984
- Environmental Management Protocol for Operating Fuel Handling Facilities in Ontario (GA1/99, October 2001)

Petroleum solvents and chlorinated solvents

- Storage of PCB Material Regulations (SOR/92-507)
- Chlorobipheynls Regulations (SOR/91-152)
- Environmental Protection Act, Regulation 362, Waste Management – PCBs Regulation, Revised Regulations of Ontario
- Solvents O.Reg. 717/94

Pesticides, herbicides and fungicides

- Pest Control Products Act R.S.C. 1985, c. P-9
- Pest Control Products Regulation C.R.C. c. 1253
- Pesticides Act R.S.O. 1990, c. P.11
- General – Pesticides R.R.O. 1990, Reg. 914

Inorganic fertilizers

- Nutrient Management Act, 2002, S.O. 2002, c. 4

Road salt

- Snow Disposal and De-icing Operations in Ontario (Guideline B-4)

Severely Toxic Contaminants

- Canadian Environmental Protection Act, Ozone Depleting Substances Regulations, 1998
- Code of Practice for the Reduction of CFC Emissions from Refrigeration and Air Conditioning Systems
- Environmental Protection Act, Regulation 356, Ozone Depleting Substances - General, Revised Regulations of Ontario

Hazardous waste or liquid industrial waste

- Hazardous Products Act R.S.C. 1985, c. H-3

Agricultural Applications

- Nutrient Management Act, 2002, S.O. 2002, c. 4

Waste disposal sites and facilities, organic soil conditioning sites, and snow storage and disposal facilities

- Code of Good Practice for Handling Solid Wastes at Federal Establishments (Environment Canada)
- Environmental Protection Act, Regulation 583, General – Waste Management, Revised Regulations of Ontario
- Environmental Protection Act, Regulation 347 amended to O.Reg. 501/01, General – Waste Management and O.Reg. 558
- Snow Disposal and De-icing Operations in Ontario (Guideline B-4)
- Nutrient Management Act, 2002, S.O. 2002, c. 4