

**NOMINATION FOR THE 2005 TAC ENVIRONMENTAL ACHIEVEMENT AWARD**  
**NOVA SCOTIA'S SALT MANAGEMENT PLAN**

**SCOPE OF NSTPW'S WINTER MAINTENANCE PROGRAM**

The Nova Scotia Department of Transportation and Public Works (NSTPW) apply approximately 270,000 tonnes of road salts annually during the winter months to provide snow and ice control on provincial highways. The winter maintenance program is carried out on approximately 22,000 kms of roads, operating out of 54 facilities around the Province. NSTPW spends approximately \$31 million annually on its winter maintenance program.



**NSTPW'S SALT MANAGEMENT POLICY**

The Salt Management Plan (SMP), developed by NSTPW and Jacques Whitford Environmental, provides a mechanism through which it can commit to implementing salt management best practices while fulfilling its obligation to provide safe, efficient and cost effective roadway systems.

The policy states that:

**“NSTPW is committed to the effective management of road salt and ensuring the public is provided with safe and efficient roads and highways, while minimizing the effects on the environment.”**

**HIGHLIGHTS OF NOVA SCOTIA'S SMP**

**SALT VULNERABLE AREAS**

As part of any salt management strategy, salt vulnerable area need to be identified and the potential for salt impacted drainage to affect these vulnerable areas must be assessed. Nova Scotia's SMP includes a salt vulnerability risk map that shows salt risk to groundwater, surface water and agricultural resources. Salt vulnerable areas are those areas where the combination of hydrogeology and drainage is such that immediate or long-term releases of sodium and chloride from highway de-icing or from a salt storage facility could adversely impact the environment

GIS maps of the following features were overlaid on a Provincial map to produce a salt vulnerability risk map of Nova Scotia:

- |             |           |                     |                   |
|-------------|-----------|---------------------|-------------------|
| % Elevation | % Slope   | % Wells             | % Protected Areas |
| % Bedrock   | % Geology | % Surficial Geology | % Water Supplies  |

The 54 Department salt storage facilities were placed on the salt vulnerability risk map and were each assigned a rating based on their salt handling practices and the amount of salt and/or sand stored outside. The ratings of the 54 facilities are multiplied by the areas vulnerability rating to obtain a relative priority number. This allows the Department to prioritize mitigation efforts aimed at improving salt handling operations.

### BEST MANAGEMENT PRACTICES

Through consultation with Department Staff the consultant develop sixteen best management practices (BMP) under the following salt related activities:



- %Storage & Handling
- %Application
- %Training
- %Highway Design
- %Drainage
- %Vegetation Management

In the Department's 3-year targets, these BMP's are to be implemented by all salt storage facilities in the first year of implementation of the SMP.



### GROUNDWATER MONITORING

The Province, with funding from Environment Canada, has installed 3 groundwater monitoring wells at salt storage facilities located in salt vulnerable areas. The Province is also developing a sampling program to assess the amount of sodium chlorides entering the groundwater. Many of the Department's salt storage facilities are at bases that have been subject to environmental assessment studies. During these assessments, numerous

groundwater monitoring wells were installed at many sites. The original purpose of these monitoring wells was to monitor the presence of hydrocarbons in the groundwater. The Department's hydro geologist will look at all of the groundwater monitoring locations and develop an annual sampling program to assess the levels of sodium chloride in the groundwater.

## **NOVA SCOTIA'S SALT MANAGEMENT PLAN**

Nova Scotia's SMP consists of three distinct manuals as shown below.

### **Level I Manual: Background and Planning**

This manual is a reference document and planning tool to be kept by the Department's designated SMP Coordinator. This manual includes background information relevant to the various SMP programs are developed; outlines the procedures for how data is collected and responsibility designated; and the training that will have to be provided to winter maintenance personnel. NSTPW staff can access this document on the Department's Intranet site, however it will be used predominately at the planning and implementation stage as a guidance document.

### **Level II Manual: Program Implementation**

This manual is the operational or "working" document, to be used by the Area Managers and Operations Supervisors and others involved in the collection of information to be compiled in the SMP. The Code identifies four areas of concern that must be addressed in the SMP.

In the Level II Manual, each area of concern is divided into specific winter maintenance programs:

*Y Storage and Handling*

*Y Salt Vulnerable Areas*

*Y Salt application*

*Y Training*

### **Level III Manual: Best Management Practices**

This document will contain all the salt BMPs associated with the Salt Management. The BMPs developed include: salt application; storage and handling; salt vulnerable areas; and training. In addition, BMPs will be included in this manual to address: road and bridge design (snow drift management); drainage and storm water management; vegetation management; and design and operation of maintenance yards.

## **SURVEY AND WINTER MAINTENANCE FACILITIES AUDITS**

The SMP was developed largely from information obtained through a questionnaire sent out to the supervisors of all the winter maintenance facilities (54) around the Province. In addition, site audits were carried out at five (5) winter maintenance facilities. Interviews were also conducted with various Department staff involved in the winter maintenance program. This process identified a number of salt best management practices. These practices will be recommended for implementation at all facilities.

## **PURPOSE**

Salt Management Programs have been developed by defining objectives and targets for current practices and then monitoring progress in implementing BMPs. Each program

identifies the responsibilities of staff, required training, and reporting procedures necessary to carry out the program.



## CONTENTS OF THE SALT MANAGEMENT PROGRAMS

The following section describes the process by which the Salt Management Programs (Level II Manual) were developed and implemented. Key elements of these Programs include setting objectives, targets, performance measures, and implementation. These elements are central to the successful tracking and monitoring of all key salt management practices, and are described below in detail.

### Program Objectives

Objectives are used to describe what NSTPW intends to achieve over the long and short term. Objectives can be as broad or specific as NSTPW requires. An example of a broad objective is *“to eliminate the storage of all sand (containing salt) outdoors”*. A more specific interim objective would be *“to eliminate the storage of sand (containing salt) outdoors in salt vulnerable areas”*.

### Program Targets

Targets are associated with specific objectives and describe when an outcome is to occur and by how much. Like objectives, targets can reflect short-term timelines or long-term endpoints. An example of a short-term target is *“to ensure the storage of sand (containing salt) outdoors in vulnerable areas is eliminated in 3 of the 6 high-risk sites (salt vulnerable areas) by 2006/07”*. An example of a long-term target is *“to ensure that the storage of sand (containing salt) outdoors will be eliminated by 2010/2011”*.

Setting both short-term and long-term targets and objectives will be necessary to effectively implement the SMP by breaking down major implementation requirements into more manageable sub-units. Each year, as work is completed at the winter maintenance facilities, the short-term targets and objectives will need to be reviewed and updated for the following fiscal period.

### Performance Measures

Performance measures describe what will be measured to track achievement of the objectives and targets. Measures can be specific *quantifiable* values, such as *“the number of tonnes of sand (containing salt) stored outdoors at the winter maintenance facilities”*. Alternatively, measures can be indexed, such as *“the percent of winter maintenance facilities where sand (containing salt) stored outdoors has been eliminated”*. For each target, there must be a specific performance measure established. This will be a critical item that will be used to prepare annual reporting documents to senior management during the annual review of the SMP.

## **RECORDS**

Records containing the annual objectives, targets, and measures are included in the Salt Management Programs (Level II Manual). Objectives will be based over a 3-year period; however, objectives and targets will be reviewed annually to account for shortcomings in the budget and/or new developments.

## **PURPOSE**

The SMP is the mechanism through which NSTPW commits to the implementation of salt best management practices. The success of the SMP will be based on the successful implementation, monitoring and reporting of BMPs that requires accountability of staff at all levels of the Department.

## **RESPONSIBILITIES**

Responsibilities for implementing the Salt Management Plan are set out for all staff, from the Deputy Minister level to the Equipment Operators themselves. The Department's SMP Coordinator is responsible for the review of the SMP in detail with senior management at the beginning of each fiscal year, along with providing the annual progress report to Environment Canada.

## **PURPOSE**

The purpose of the SMP is to implement salt best management practices while maintaining safe, efficient, and cost-effective roadway systems. The progress of BMPs must be monitored and recorded to determine if they are meeting the Department's objectives and to identify any issues or problems.

## **MONITORING PROCEDURES**

Continual monitoring or tracking of Department winter maintenance practices is a requirement of the Code. Environment Canada will be reviewing the progress of BMP implementation, compliance, and general progress in managing road salts. Improvement or success must be measurable and be recorded on an annual basis.

Monitoring will consist of tracking progress for all the current activities that make up the Department's winter maintenance program and are included in the SMP Programs Level III Manual.

Progress for the majority of current practices will be measured by "the number of" or "the percentage of" compared against a baseline "number" or "percentage". Therefore monitoring, for the most part, will be a relatively simple process.

## **REPORTING PROCEDURES**

A draft *Code Promotion Guide* was issued by Environment Canada in April 2004. Included in the document is a form (*Monitoring and Measuring Progress Reporting Form*) that, when completed, will provide the information required by Environment Canada (listed under Annex C of the Code).

The information gathered across Canada will be used by Environment Canada to monitor and measure progress in road salt use, implementation of best management practices, and the concentration of road salt in the environment.

### **External Reporting**

NSTPW will provide the Minister of Environment all the required information in its Salt Management Plan (SMP) in compliance with the information requested under Annex C of the Code.

## **RECOMMENDED TRAINING PROGRAM**

Nova Scotia's SMP outlines the list of recommended training programs that should be undertaken as part of the SMP process.

### **PURPOSE**

The success of the Department's SMP will depend on progress made in implementing salt BMPs into its winter maintenance program. Progress will be measured annually against baseline or current winter maintenance practices in place for the 2003/04 season.