



Highway Division Maintenance Leadership Team Operational Notice

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| Number | Supersedes | Effective Date | Cancellation Date |
| MAI 170-1 | N/A | 7/1/2012 | |
| Subject | | Issuing Body | |
| Road Salt Pilot Project- Best Management Practices | | Maintenance & Operations Leadership Team  | |

Purpose

To provide guidance to minimize environmental and corrosive impacts from a new pilot project, as part of the winter maintenance program, using solid salt (NaCl) in two locations. The pilot project is occurring on US 95 between Nevada and Idaho (approximately 120 miles) and on I-5 from MP 0 (at the California border) to MP 11.

Background

Because salt can be toxic as well as corrosive to vehicles and highway structures, Best Management Practices (BMPs) or a local Salt Minimization Plan should be implemented to keep NaCl use to a minimum.

ODOT expectations for highway maintenance activities are listed in the ODOT Maintenance Guide. BMPs implemented by ODOT to minimize the impacts these maintenance activities can have on fish, fish habitat, and water quality are listed in the ODOT Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices (the Blue Book). Modification to the BMPs in the Blue Book requires concurrence with National Marine Fisheries Service, the Oregon Department of Fish and Wildlife, and ODOT maintenance managers. The Environmental Management System for ODOT Maintenance Yard Policy and Procedure Manual (EMS Manual) is the guiding document for material management at Maintenance Yards. Modifications to the EMS Manual require approval from the EMS Technical Team. Modification to ODOT Policy requires approval from the Maintenance & Operations Leadership Team.

Definitions

Pacific Northwest Snowfighters (PNS): The PNS Association is a group of technical experts from five western states and British Columbia. The group evaluates and establishes specifications for winter maintenance deicing products that emphasize safety, environmental preservation, infrastructure protection, cost effectiveness, and performance. Oregon is a PNS member state.

Process – Winter Road Salt (NaCl) Best Management Practices

Best Management Practices and goals for anti-icing and deicing are outlined in the Maintenance Guide, and Desired Conditions of Maintenance Features on State Highways, and the “Routine Road Maintenance Water Quality and Habitat Guide Best Management Practices, 2009,” (Blue Book). The appropriate storage, handling and

disposal of deicers are outlined in the "Environmental Management System Manual for ODOT Maintenance Yards, 2009."

Because salt (NaCl) is the most mobile, the most corrosive, and the most likely deicer chemical to negatively impact surface and groundwater resources, the ODOT Office of Maintenance and Operations (OMO) has developed the following Best Management Practices for locations that will be implementing the salt pilot project.

Purchase of Solid Salt Products

The purchase of solid salt products is limited by ODOT Procurement policies and commitments to regulatory agencies outlined in Blue Book. Commercial Road Salt can be contaminated with heavy metals or chemical additives.

- **Solid salt products applied to ODOT highways must be listed on Pacific Northwest Snowfighters Qualified Products List (PNS QPL) to minimize contamination.** The local manager should verify the product is listed on the PNS QPL before purchasing solid salt products from adjoining DOTs.

ODOT does not currently have a price agreement for solid salt. OMO will work with Procurement to solicit bids for solid salt purchases. Category 8B solid salt products appear to be the best product on the PNS QPL for ODOT's needs.

- **A quality assurance (QA) program for winter maintenance chemicals must be established.** A QA program tests purchased winter chemical products to ensure the product is not contaminated with potential pollutants.

Note: The current ODOT winter maintenance chemical QA program does not include methods for solid salt products. OMO will modify the current program to include solid salt prior to the completion of a solid salt purchasing agreement.

- **Ensure that salt purchased from another state meets ODOT's commitment to minimize chemical contaminants** by: 1) ensuring the product meets the PNS spec, and 2) ensuring the state has a QA program to test winter chemical products to ensure the product meets the PNS spec.

Application

Environmental and structural impacts of salt increase in risk as application rates increase. The higher the application rate the higher the risk of environmental or structural impacts. Application guidance for deicing chemicals is currently listed in the Maintenance Guide and in the Blue Book. In addition to existing guidance the following BMPs are recommended for solid salt:

- **The use of solid salt should be minimized.** Typical application rates for solid salt range from 150-300 lbs per lane mile as a deicer, depending on current and forecasted weather, and road conditions. Use the minimum amount necessary to meet management objectives.

Note: Category 8B solid salt products are not effective at melting pack at temperatures below 15°F, no matter how much is applied.

- **Products should be used for the intended purpose.** Solid salt should only be used when standard winter maintenance practices are ineffective. Plowing operations should be timed to allow maximum melting (by solid salt products) before snow is plowed off the road. Liquid chemical should be used proactively for anti-icing prior to snow and ice accumulation.
- **Anti-icing should be used.** Established best practices for snow and ice removal indicate that anti-icing (preventing snow and ice from bonding to the pavement) is the most effective means of snow fighting.
- **Winter deicing chemicals should not be used to “burn off” snow and ice.** Applying deicing chemicals to more than 2” of packed snow and ice should be avoided due to safety risks and the amount of chemical necessary.
- **Applications in ground and surface water sensitive areas should be limited.** Drinking water supplies, agricultural areas, and small freshwater streams are known to be sensitive to salt. Private and public drinking water sources are typically located near population centers. Freshwater wetlands may indicate shallow groundwater and can be salt sensitive areas. The RES/RAZ maps should be consulted for locations of salt-sensitive areas.
- **Application equipment should be properly calibrated at least annually.** Keep a record in the vehicle for spreader settings.
- **Accurate application records must be kept.**
- **If mixing sand and salt, the ratio of the load must be recorded on the application rate record.**

Material Management

Best management practices for the storage, handling, and disposal of materials at ODOT Maintenance yards are listed in the EMS Manual.

BMPs for equipment washing are listed in Section 5.9. The BMPs do not specifically address salt-laden wash water; however ODOT BMPs that currently apply to cleaning engines will likely be required by regulating agencies for washing salt contaminated equipment, especially if salt BMPs are added to the Blue Book. However, washing must at a minimum occur on a paved area and evaporated; discharging to the ground surface is not allowed. There is no effective treatment for the removal of salt.

Solid salt management guidelines are not currently included in the EMS Manual; however, some of the existing BMPs in the Winter Maintenance, Good Housekeeping, and Drainage sections are applicable. The following BMPs are suggested in addition to existing EMS guidance.

STORAGE

- **Solid salt must be stored on an impervious surface.** The surface must be constructed of a material that will prevent the migration of dissolved salt into the soil below.

- **Solid salt should be stored in a manner that protects the function and integrity of the product.** Product should be protected from the weather and other damaging elements (e.g. moisture, wind). Storage areas should be high and dry.
- **Solid salt storage areas should be located away from floor drains, stormwater conveyances, and waterbodies** where possible based on site constraints.
- **Solid salt must be stored in a structure that prevents the migration of solid or dissolved salt from entering the adjacent soil, surface water, or groundwater.** The structure should be free of gaps that allow solid or dissolved salt to escape. Approaches should be sloped to divert stormwater away from the storage area.

Note: Concrete floors and stem walls will not adequately contain salt without additional measures; a salt crust will form on the outside of concrete walls. Concrete needs to be mixed with epoxy or coated with asphalt to contain salt and minimize corrosion.

- **Permanent structures with bay doors are recommended.** Temporary structures and structures with open ends (e.g. open pole buildings and canopies) are known to be less effective at minimizing salt migration and diverting drainage. Tented structures retain condensation (moisture), which could be mitigated with the use of fans.
- **Structures must be large enough to accommodate equipment,** loading and unloading, and preferably annual anticipated product amounts.

HANDLING

Equipment Washing

- **Washing must occur on a paved surface.**
- **Where practical, chunks of hardened salt should be removed from application equipment prior to washing.** Hardened salt should be swept up and returned to the storage pile or managed as solid waste (e.g. trash).
- **Water from washing or rinsing equipment used to apply solid salt must be either directed to a municipal sanitary system or to a closed-loop system.** Examples of a closed loop system include evaporation from an impervious surface or collection in a storage tank. Wash water collection tanks should follow the BMPs for liquid winter maintenance chemical storage.
- **Approval from the municipality must be obtained prior to a significant change in washing practices.**

Loading and Unloading

- **Loading must occur on a paved surface.** The surface should be constructed of a material that will not absorb the product or allow dissolved salt to migrate. Loading should occur indoors.

- **Loading and unloading practices should minimize tracking of solid salt.** Overfilling and overloading should be minimized. Where appropriate, employ methods to capture solids before entering the storm system.
- **Solid salt that has escaped the storage area (e.g. tracked from equipment movement) should be swept up as soon as practical and disposed of appropriately (see below).**

DISPOSAL

- **Solid salt that cannot be applied to the highway and roadwaste (including sweepings) that contains salt should be managed as *solid waste* (e.g. trash).** Wastes should be stored in the same manner as solid salt product (see Storage above).
- **Salt-laden wash water must be directed to a municipal sanitary sewer, picked up and hauled by a licensed pumper, or evaporated off an impermeable surface (e.g., paved area or directed to a lined evaporation pond).**

TRAINING

- **All maintenance staff at pilot sections, including temporary or seasonal staff, must be trained in the proper use, handling, storage, and disposal of solid salt and salt-related waste materials.**
- **Training in the use of solid salt as a deicing chemical must be obtained by applicators prior to using solid salt.**

Protection of Bridge Structures

Bridge structures are of particular concern with salt use because they are made of corrosive materials and bridges are highly expensive to repair. Even one year of increased salt exposure will increase chloride levels on bridge decks and have significant detrimental impacts to bridge service life and preservation costs. ODOT Bridge Engineering Section has suggested the following BMPs be implemented for those locations where bridges will be exposed to the use of NaCl deicer.

BRIDGE BMPs

- **A bridge mitigation plan should be developed prior to applying salt, for all bridges within the application area.**
- **Chloride levels in bridges should be monitored annually to assess impacts of salt application.** Monitoring should begin in the summer before the pilot program begins. All liquids and salts applied in bridge areas should be accurately monitored and recorded so application effects on chloride levels can be assessed. Maintenance should consider use of GPS, rate monitors, and data loggers to accurately record salt application rates.

Responsibility

Action

State Maintenance and Operations Engineer, Maintenance and Operations Leadership Team (MLT)

- Establish and maintain practices and procedures to prevent or reduce impact on the environment
- Evaluate pilot project results annually and make adjustments to pilot program and BMPs as needed
- Review and approve District changes to District salt implementation plan
- Modify Ops Notice based on recommendations as appropriate

District Managers

- Establish clear expectations and accountability for work performance, implementation of best management practices, worker protection, environmental stewardship, and sustainability.
- Coordinate with the Bridge Engineering section on the development of bridge mitigation plans, as appropriate, and on annual bridge chloride level monitoring.
- Report to MLT at least annually on salt pilot lessons learned, effectiveness (number of applications, trigger points (weather conditions, road conditions, forecast, storm characteristics), quantities, locations where used
- Modify Winter Ops Plan as appropriate based on lessons learned with approval from MLT
- Recommend changes to best management practices

Transportation Maintenance Managers (TMM)

- Report on the effectiveness of solid salt in winter maintenance operations to DM
- Implement the Road Salt best management practices and procedures
- Follow the Material Management BMPs, and direct crews in following the Material Management BMPs, including storage, handling and disposal of solid salt
- Participate in appropriate training for solid salt applications and material handling
- Accurately record salt application rates and locations
- Complete monthly and annual audits of best management practice implementation and effectiveness.

Office of Maintenance
and Operations

- Ensure that solid salt products used by ODOT are on the PNS QPL
- Modify and maintain a quality assurance (QA) program that will have the capability to test solid salt products
- Support District Managers, Maintenance Managers, Maintenance Coordinators and crews in implementing solid salt product BMPs
- Coordinate and make available appropriate training for the proper use, handling, storage and disposal of solid salt products
- Coordinate with districts to develop and implement a process for annual and monthly solid salt BMP monitoring
- Based on district reports, evaluate BMP effectiveness and adequacy
- Support development of a means to evaluate the effectiveness of solid salt in closing current operational gaps in winter maintenance

