
ENVIRONMENTAL Fact Sheet



29 Hazen Drive, Concord, New Hampshire 03301 • (603) 271-3503 • www.des.nh.gov

WD-DWGB-22-30

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Storage and Management of Deicing Materials

Storage and management of deicing material can be a source of contamination of surface water and groundwater, causing a violation of state water quality standards. These salt-based products dissolve in precipitation and either infiltrate through the ground surface to groundwater, or run off into surface water. Salt that infiltrates the subsurface at significant concentrations can also react with the soils and release metals into groundwater and surface water at concentrations that exceed water quality standards.

The term “deicing material” used here refers to deicing salts, and may include any of the following in either solid or liquid form: sodium chloride (often called rock salt), potassium chloride, calcium chloride, magnesium chloride, and other mixtures that contain salts (chlorides) including mixtures with abrasives, such as sand, cinder, slag, etc.

Need for Proper Management

Due to their high potential for causing groundwater and surface water pollution, salt storage facilities should not be placed in environmentally sensitive areas. The best strategy to prevent pollution from deicing materials and the associated liability is to use and store these materials responsibly. Facilities should develop good housekeeping practices to minimize loss and waste during the delivery, storage, loading and management of deicing materials.

Existing and new facilities that operate without impermeable surfaces and infiltrate brine to the ground or groundwater need to register with the New Hampshire Department of Environmental Services (NHDES) under Env-Wq 402, Groundwater Discharge Permit and Registration Rules. This is a free registration and is a method of tracking potential contaminant sources. If there are sensitive receptors nearby, some sites may be required to monitor drinking water wells and/or the groundwater. The registration form can be found at the Groundwater Discharge Permitting and Registration program page.

Best management practices (BMPs) for locating a new deicing materials storage facility should include the following:

- The facility should be located in an area that is not environmentally sensitive. Avoid areas where there are wells, reservoirs, or within the footprint of stratified-drift aquifers.
- The facility should be located on a flat site away from surface water and wetlands.
- Site drainage should be designed to direct clean stormwater away from the operations and storage areas in order to keep the stockpiles as dry as possible.
- Drainage that is contaminated with salt should be directed to a sewage treatment plant (subject to municipal approval), collected for use in pre-wetting activities or sent for proper disposal.

Structures and Work Areas

Ideally deicing material storage facilities should be completely enclosed, with storage and working areas on impervious surfaces such as asphalt or coated concrete. There should be stormwater drainage controls to prevent runoff water and snow melt from contacting or running through loading and material storage areas. Overhead cover to protect material from exposure to snow and rain should be installed to minimize runoff and inventory loss. A fixed roof is preferred over a tarp, because it is very difficult to keep storage piles completely covered with tarps during winter months and storm events.

Buildings should have concrete foundations and can be designed using dome, barn, or fabric style structures. For more information on constructing salt storage units, calculating how much space is needed for storage, and salting practices, see the Salt Institute's publications at www.saltinstitute.org. *The Salt Storage Handbook* contains tables that indicate how much space is required to cover different height piles, and provides surface areas of exposed salt piles, to help in calculating number and size of tarps for *temporarily* covering salt piles.

The following BMPs should be considered when storing and managing deicing materials.

Storage Structures

- All salt and sand/salt mixtures should be stored on pads of impermeable asphalt or concrete. Storage and loading areas should have an impermeable floor constructed of asphalt, concrete or other suitable material that extends around the buildings and work area exterior. The area should be sloped away to prevent stormwater from entering the loading areas or structure.
- Concrete pads and walls should be treated to prevent concrete deterioration (spalling).
- Structure hardware should be galvanized and concrete block buildings should be waterproofed inside.
- If using a three-sided building, the exposed salt at the open end should be covered.
- Stormwater and snowmelt runoff should be properly controlled. Building floors and storage pads should be sloped to prevent ponding and allow any water to drain away from the storage piles.

On-Site Management: Delivery/Handling/Loading

- All sand and sand/salt mixtures temporarily out in the open should be covered to prevent salt from being washed or blown from the pile.
- If a permanent under-roof work area is not possible, then storage and handling activities should be conducted on impermeable (bituminous) pads. Any deicing materials left outdoors should be completely covered with waterproof tarpaulins.
- All surplus materials must be removed from the site when winter activity is finished.
- Working areas should be bermed and sloped to allow snow melt and stormwater to drain away from the area. In some cases, it may be necessary to channel water to a collection point, such as a sump, holding tank, or lined basin for collection.
- Storage and distribution should only be conducted during the fall/winter season.
- Spreaders should not be overloaded such that material spills off the vehicle. A plan for loading operations to prevent overfilling vehicles and eliminating material spillage during transportation should be developed and implemented.
- Salt spilled at the storage yard and loading areas should be collected and returned to the storage pile.
- Annual inspection and repairs should be carried out prior to the start of each season. Ongoing inspection of storage structures, work areas, and deicing liquid storage tanks should be carried out during the season.
- Solid bagged materials should be stored securely, indoors if possible.

- Spreaders should only be washed at a location where the wash water is properly managed. (See NHDES fact sheet WD-DWGB-22-10 Management of Vehicle Wash Water.)
- Liquid storage tanks should be designed such that a plumbing failure will not result in release of the contents. Backflow prevention may be necessary on some plumbing applications.
- Liquid storage tanks should be protected from impact from vehicles moving about the yard and be located such that spilled material can be contained and retrieved in the event of a tank or piping failure. Secondary containment should be provided around large liquid storage tanks.

Brine Storage and Management

In recent years, brine has been used on roads prior to storms as an effective ice preventative, reducing the amount of deicing materials needed during a storm event. The water that runs off storage and loading areas can be collected into watertight tanks or lined basin(s) and re-used in pre-storm wetting of roads. Any brine storage should be designed with inert materials that are compatible with salt.

Brine stored using holding tanks must be managed so that there are no releases to drains, groundwater or surface waters. If there is a floor drain in a building where brine is stored, it must be connected to a municipal sewer system (with the approval of the local authority), routed to a registered holding tank or permanently sealed. (see fact sheet WD-DWGB-22-8 Holding Tanks for Floor Drains)

Storage ponds or collection basins used for brine storage must be lined and must not receive runoff from areas other than the storage and operations areas. The basin itself must be impermeable to prevent infiltration of the collected water into the ground. The basin may need a roof or cover to reduce the accumulation of snow and rain water. The collection of this runoff water would only be necessary during the winter maintenance months (November through March). During the remaining seven months of the year, the non-brine stormwater can be redirected from the brine storage to a natural discharge point.

The preferred management option for any brine collected is for use as a pre-wetting agent for roads prior to winter storms. The release of this collected water to the ground, groundwater, or a stormwater system during operation or at season's end is not permissible and as a consequence, this type of runoff management may require disposal of the brine by one of the following methods: (1) discharge directly to a publicly owned treatment works (POTW) with local approval; (2) pumping and transporting the salt water to a POTW system by tank truck; (3) evaporation; or (4) treatment to remove salt and on-site discharge under a Nondomestic Wastewater Registration.

References:

[Salt Institute](#)

[Michigan Department of Environmental Quality](#) Salt and Brine Storage Guidance

[Guide to Salt Storage Requirements for Small Commercial Snow Removal Services](#)

[Environnement Canada](#)

[Best Management Practices for Salt Use on Private Roads, Parking Lots & Sidewalks](#)

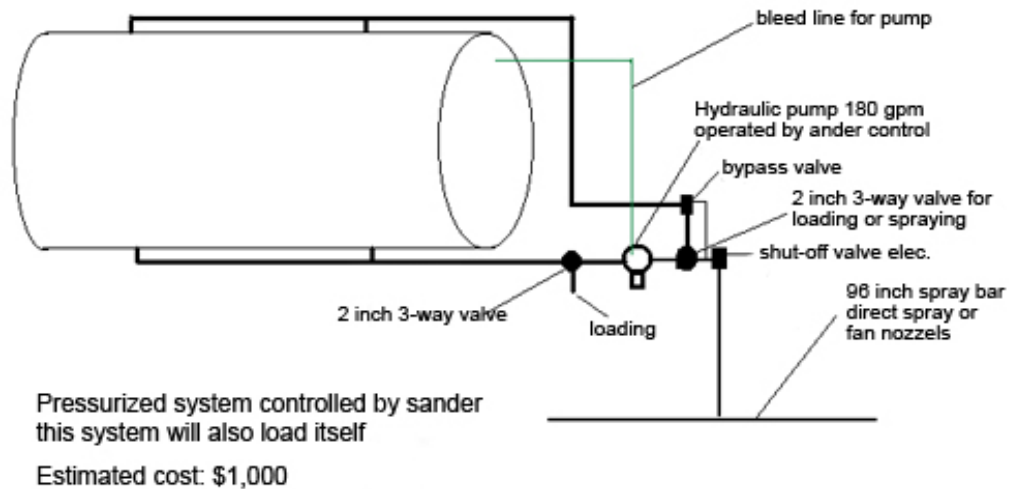
[SIMA](#) (Snow & Ice Management Assoc.)

For More Information

Please contact the Drinking Water and Groundwater Bureau at (603) 271-2513 or by email at dwgbinfo@des.nh.gov

Note: This fact sheet is accurate as of June 2019. Statutory or regulatory changes, or the availability of additional information after this date may render this information inaccurate or incomplete.

Figure 25: Graphic of Home-Made Brine Unit



http://www.iowadot.gov/maintenance/images/equipment/truck_back.jpg

5.1.4 Calibration

During winter operations, changes may occur in mechanical linkages, hydraulic systems and other components. Yearly calibration of equipment allows for better control of application rates for various gate height/openings. Gate height or gate openings should be adjusted to spread the desired chemical application rate for each set of unique conditions. Re-calibration should be done if any changes are made to the equipment or if a different deicing material is used. In addition to manufacturer specifications, see Appendix B for Hydraulic-Run Spreader Calibration and Appendix C for Pony Motor-Run Spreader Calibration. Keep a record of the calibration results with the vehicle and refer to it for the application settings recommended for the various weather conditions.

5.1.5 Storage and Site Management

In addition to managing how salt is applied to parking lots and roadways, it is also important to manage how dry salt, pre-wet salt, salt brine, salt/sand mixtures, and snow piles are stored and handled. This section was adapted from [DES Fact Sheet WD-DWGB-22-30](#).

Chloride storage facilities can contribute to both surface and ground water contamination. The location of a storage facility should not be in an area that is environmentally sensitive. Avoid areas where there are wells, reservoirs, or within the footprint of stratified drift aquifers.

Ideally deicing material storage facilities should be completely enclosed, with storage and working areas on impervious surfaces such as asphalt or

coated concrete. Buildings should have concrete foundations and can be designed using dome, barn, or fabric style structures.

Figure 26. Improper Site Management



There should be storm water drainage controls to prevent runoff water and snow melt from contacting or running through loading and material storage areas. Overhead cover to protect material from exposure to snow and rain should be installed to minimize runoff and inventory loss. A fixed roof is preferred over a tarp,

because it is difficult to keep storage piles completely covered with tarps during winter months and storm events.

As a general practice, site drainage should direct clean storm water away from the operations and storage areas in order to keep the stockpiles as dry as possible. In new facilities or facilities that are being retrofitted drainage that is contaminated with salt should be directed to a sewage treatment plant (subject to municipal approval), collected for use in pre-wetting activities or sent for proper disposal.

Salt Storage Structures

- All salt and sand/salt mixtures should be stored on pads of impermeable asphalt or concrete. Storage and loading areas should have an impermeable floor constructed of asphalt, concrete or other suitable material that extends around the buildings and work area exterior. The area should be sloped away from the structure to prevent storm water from entering the loading areas or structure.
- Concrete pads and walls should be treated to prevent concrete deterioration.
- Structure hardware should be galvanized and concrete block buildings should be waterproofed inside.
- If using a three sided building, the exposed salt at the open end should be covered.
- Storm water and snowmelt runoff should be properly controlled. Building floors and storage pads should be sloped to prevent ponding and allow any water to drain away from the storage piles.



**Figure 27.
Town of Derry NH
Salt Storage**

Brine Storage and Management

In recent years brine has been used on roads prior to storms as an effective ice preventative, reducing the amount of deicing materials needed during a storm event. The water that runs off storage and loading areas can be collected into watertight tanks or lined basin(s) and reused. Any brine storage should be designed with inert materials that are compatible with salt.

Brine stored in holding tanks must be managed so that there are no releases to drains, groundwater or surface waters. If there is a floor drain in a building where brine is stored, it must be connected to a municipal sewer, routed to a registered holding tank or permanently sealed. For the NHDES fact sheet on floor drains refer to Appendix D.

Storage ponds or collection basins used for brine storage must be lined and must not receive runoff from areas other than the storage and operations areas. The basin itself must be impermeable to prevent infiltration of the collected water into the ground. The basin may need a roof or cover to reduce the accumulation of snow and rain water. The collection of this runoff water would only be necessary during the winter maintenance months (November through March). During the remaining seven months of the year, the non-brine stormwater can be redirected from the brine storage to a natural discharge point.

The preferred management option for any brine collected is for use as a pre-wetting agent for roads prior to winter storms. The release of this collected water to the ground, groundwater, or a stormwater system during operation or at season's end is not permissible and as a consequence, this type of runoff management may require disposal of the brine by one of the following methods:

- 1) Discharge directly to a publicly owned treatment works (POTW) with local approval;

- 2) Pumping and transporting the salt water to a POTW system by tank truck;
- 3) Evaporation; or
- 4) Treatment to remove salt and onsite discharge under a Nondomestic Wastewater Registration.

All liquid storage tanks should be protected from impact by vehicles moving about the yard and be located such that spilled material can be contained and retrieved in the event of a tank or piping failure. Secondary containment should be provided around large liquid storage tanks.



Figure 28. Proper Brine Storage

Snow Storage and Disposal

The environmental effects of disposed snow result from high levels of sodium chloride, sand, debris and contaminants from automobile exhaust. It is the debris contained in plowed snow that makes it illegal to dump snow directly in water bodies. RSA 485-A:13,I(a) prohibits discharging wastes to surface waters without a permit. Groundwater is sensitive to snow dumping due to the high levels of sodium chloride in plowed snow. RSA 485-C:12 prohibits the sitting or operation of snow dumps within classified wellhead protection areas.

Figure 29. Snow Storage and Disposal

The following guidelines are designed to select safe places to dump plowed snow. Snow dumps are kept out of water bodies due to the litter and debris content. Litter and debris do not belong on the land surface either; after the snow melts, all litter and debris must be collected and disposed of properly.



- Disposed snow should be stored near flowing surface waters, but at least 25 feet from the high water mark of the surface water.

- A silt fence or equivalent barrier should be securely placed between the snow storage area and the high water mark.
- The snow storage area should be at least 75 feet from any private water supply wells, at least 200 feet from any community water supply wells, and at least 400 feet from any municipal wells. (Note: Snow storage areas are prohibited in wellhead protection areas [class GAA groundwater].)
- All debris in the snow storage area should be cleared from the site prior to snow storage.
- All debris in the snow storage area should be cleared from the site and properly disposed of no later than May 15 of each year the area is used for snow storage.

Onsite Management: Delivery/Handling/Loading

- All sand and sand/salt mixtures temporarily out in the open should be covered to prevent salt from being washed or blown from the pile.
- If a permanent covered work area is not possible, then storage and handling activities should be conducted on impermeable (bituminous) pads. Any deicing materials left outdoors should be completely covered with waterproof tarpaulins.
- All surplus materials must be removed from the site when winter activity is finished.
- Working areas should be bermed and sloped to allow snow melt and stormwater to drain away from the area. In some cases, it may be necessary to channel water to a collection point, such as a sump, holding tank, or lined basin for collection.
- Storage and distribution should only be conducted during the fall/winter season.
- Spreaders should not be overloaded such that material spills off the vehicle. A plan for loading operations to prevent overfilling vehicles and eliminating material spillage during transportation should be developed and implemented.
- Salt spilled at the storage yard and loading areas should be collected and returned to the storage pile.
- Annual inspection and repairs should be carried out prior to the start of each season.
- Ongoing inspection of storage structures, work areas, and deicing liquid storage tanks should be carried out during the season.
- Solid bagged materials should be stored securely, indoors if possible.
- Spreaders should only be washed at a location where the wash water is properly managed. Please refer to Appendix L for The DES fact sheet on the Management of Vehicle Wash Water.

- Liquid storage tanks should be designed such that a plumbing failure will not result in release of the contents. Backflow prevention may be necessary on some plumbing applications.

5.2 Information: Evaluate and Monitor Conditions

Knowing current and expected conditions is essential for planning snow and ice control operations. Weather and road conditions change constantly and must be monitored. The decision to initiate treatment can only be made if accurate information is available. Treatment options chosen should be modified as necessary to address road conditions as they develop.

Monitor and evaluate the following information to assist in making the right treatment decision:

- Start and end times of precipitation
- Type of storm, precipitation type and amount expected, wind, intensity
- Pavement, ambient and dew point temperatures and trends
- Road conditions and surfaces
- Post-storm forecast
- Traffic and accident information

Information can be obtained from local, state, and national weather and road services. Access to information can be obtained by phone, radio, internet radar forecasting services, RWIS data, and by truck mounted or hand-held pavement temperature sensors. Private weather and road condition forecasting services are also available by contract at a cost to the subscriber.

Truck mounted and hand-held infrared pavement temperature sensors are critical tools for operators because they provide real-time data and allow for application rate adjustments to be made accordingly.

Communication among operators and law enforcement officials can assist in making snow and ice management decisions.