

THE GROUNDWATER SENTINEL



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A-Salt-ing Our Groundwater

(A continuation of the October 5th, 2010 Groundwater Summit on Road Salt Alternatives)

As summer passes into fall, many towns from around the State begin preparing for the upcoming winter months. In order to keep roads safe for vehicles and pedestrians, many municipalities will begin importing *traditional* deicing materials, usually consisting of rock salt (sodium chloride) and grit (sand). However, some New Jersey towns are now turning to more *untraditional* materials in order to fight the war on snow and ice. These *untraditional* methods include a variety of substances from pretreated salts, brine solutions, and organic products to name a few. By using these *untraditional* deicing materials, municipalities are enhancing public health and safety, reducing environmental impacts associated with *traditional* deicing materials, and most importantly reducing the overall cost of snow/ice removal procedures. With municipal budgets shrinking, *traditional* road salt costs increasing, and increasing environmental concerns more and more municipalities are looking into *untraditional* deicing materials.

Various municipalities, water utilities, and environmental groups are becoming aware that road salt (sodium chloride) is having an impact on the surrounding environment and local water supply. These environmental concerns are growing as more and more deicing materials are applied to roadways each year. Historically, studies have shown that roadside vegetation has been affected by sodium chloride; however, environmental concerns have grown to now include: soil, air, and water. Additionally, studies have shown that sodium chloride levels are generally at highest concentrations approximately two to three meters from the edge of the applied surface. In low concentrations, sodium is not considered a major threat to humans,



wildlife, or aquatic life; however, over time increased human consumption can cause hypertension and high blood pressure. As a result, the United States Environmental Protection Agency (USEPA) has a Recommended Upper Limit (RUL) of 50 mg/L for sodium; while the American Heart Association has a drinking water guidance concentration of 20 mg/L. Additionally, the USEPA has a RUL of 250 mg/L for chlorides. Municipalities are also realizing these compounds could potentially move downstream to other watersheds creating greater problems for downstream communities. In order to reduce the environmental impacts and human consumption of sodium chloride we will further explore the benefits in using a sodium chloride brine solution.

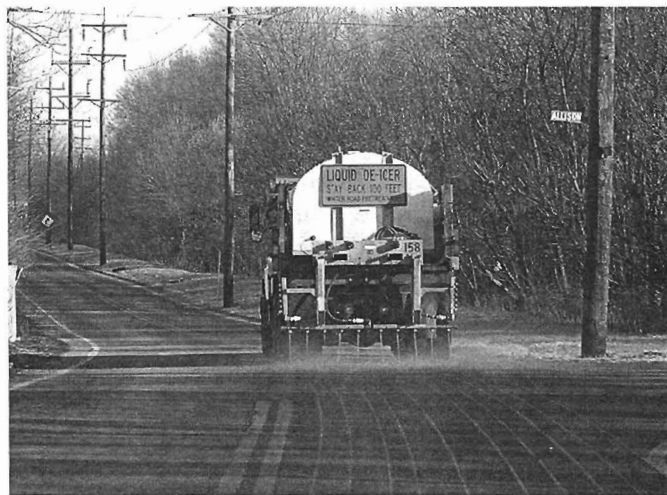
Municipalities around New Jersey are beginning to mix regular rock salt (sodium chloride) with water (or beet juice) to create a brine solution, sometimes referred to as "pickle juice". By dissolving rock salt into a brine solution, municipalities can achieve many benefits including:

reduced rock salt usage, reduced environmental impacts, increased cost savings, and reduced man hours. Some municipalities have also turned to calcium chloride (both used dry and in a wet solution). Calcium chloride has little to no negative impacts on the environment, however the material is considerably more costly making the material unappealing to most municipalities. Municipalities initially purchase rock salt as a solid and it is then added to water on-site to create the brine. Once the brine is created, the solution can be applied to road surfaces using truck mounted sprayers. It has been observed that 90% of a salt brine solution will remain on the road surface when compared to 45% of traditional rock salt. Brine solutions also vary in salt concentrations based on weather conditions. Municipalities in New Jersey typically use 20% rock salt brine solution. A 20% brine solution will reduce the amounts of rock salt applied to roadways. Additionally, the brine solution will allow more of the material to stay on the roadway reducing sodium and chloride impacts on the surrounding environment and local water supply. Proactive applications of the brine solution prior to a storm event is also recommended and will provide for safer roadways and reduced man hours. Cost savings are also favorable, as sodium chloride is usually one of the cheapest deicing agents available, while at the same time less is being consumed.

In order to achieve the highest efficiency when applying solid deicing chemicals or a brine solution, deicing vehicles should be equipped with speed controls for even distribution of deicing material. Speed controls regulate the amount of deicing material being distributed on the roadway. Therefore, speed controls will distribute the proper amount of material when the truck is servicing a highway or is stopped at an intersection. Trucks can also be equipped with computerized routing systems which can map truck locations and notify personnel the streets that were completed, require service, or currently in progress.

A routing system will provide a reduction in repeated roadways, and the ability to notify homeowners when their roadway will be serviced. Temperature controls can also be added to deicing vehicles which can provide valuable data to both the driver and office personnel. In order to mix the rock salt into a brine solution, initial start-up fees for equipment may be fairly high for some municipalities. However, after initial start-up municipalities will begin to see a drop in deicing costs as rock salt usage is reduced when using a brine solution and speed controls. Additionally, computerized routing will create greater efficiency, ultimately reducing work hours for municipal personnel. Simultaneously, environmental impacts will be reduced as the amount of rock salt is reduced and remains on the roadway.

In conclusion, many municipalities throughout the State are noticing a benefit in using a sodium chloride brine solution to fight the war on snow and ice. As sodium chloride prices continue to rise and negative impacts continue on the surrounding environment, more and more municipalities may begin looking into other deicing options. With benefits to the public, environment, and municipalities, it will be interesting to see if this *untraditional* salt brine solution becomes more of a *traditional* way of thinking.



For more information on groundwater topics, educational materials ("The Groundwater Adventures of Walter Wet"), and past issues of the SENTINEL, please visit our website, www.passaicriver.org/PVGWPC.html

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