



*Rochester Committee
for Scientific Information
Rochester, NY*

*RCSI Bulletin 167
Salt Storage in Monroe County*

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December 1973*

THE ROCHESTER COMMITTEE FOR SCIENTIFIC INFORMATION
P. O. Box 5236, River Campus Station
Rochester, New York 14627

Bulletin #167(C)
Chemical Pollution

December 1973

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by
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Summary

There are 36 municipal salt piles in Monroe County; the smallest contains a maximum of 50 tons of salt, the largest 30,000 tons. Neither Monroe County nor any community within the County has an ordinance controlling the storage of salt. A minimal standard is desirable because loss of salt from the pile into adjacent ground and water can cause unnecessary harm.

Adequacy of storage of salt in the County varies greatly. There is evidence of increased concern in the towns and villages and an increased willingness to store salt properly. This action has occurred without a law. For example, Fairport and Honeoye Falls transfer all leftover salt to the Towns of Perinton and Mendon for inside summer storage, several towns store salt in sheds, and Penfield is using revenue sharing funds to build the first dome in the County. Other communities have tried to cover their piles with flexible covers; most have given up after repeated vandalism. On the other hand, there are communities that have taken no or few precautions, leaving the piles on sand, uncovered and without catch basins. Some of these communities have no plans to change.

The best way to store salt is on a waterproof base pad placed on impermeable ground, surrounded by a drainage ditch and covered by an inflexible cover such as a building or dome. There are other acceptable ways. To avoid ground water contamination all need good management.

Twenty salt piles in the County are on waterproof pads, 7 have drainage ditches or catch basins for the brine, 7 are in buildings. The City pile on McKeefe Road, the smaller pile in Brighton, and the Clarkson and East Rochester piles are on pads in buildings with drainage ditches or catch basins.

This bulletin catalogues the ways in which salt is brought into and stored by municipalities in Monroe County and discusses acceptable ways to store salt. It does not consider the question of whether salting the streets is desirable. The great differences in storing practices by various towns and villages point out the need for a County study on the environmental impact of salt.

Introduction

Salt is stored in large piles from which trucks are filled to salt the streets during snowy weather. If the piles are improperly managed, runoff after a storm, seepage from the bottom of the pile or wind-blown dust can deposit large quantities of salt in nearby streams, wells, groundwater, and on plants and soil (10). The Salt Institute recognizes the hazards that may result from misplaced and carelessly cared-for stockpiles of salt and has published guidelines for the proper placement and management of salt piles. During the summer and fall of 1973 officials in city, town and village governments in Monroe County were asked how they store salt. Their answers are reported below.

Background

A. Location

The Salt Institute (see note) recommends that salt be piled near the area where it will be used, and where it is easily accessible for delivery, loading and spreading. Truck traffic must have good visibility in all directions and access roads should not open directly onto highways with heavy traffic (14, 16).

Salt should be stored far enough from buildings to prevent damage from air-borne salt dust to them or their surrounding vegetation (4). The Salt Institute suggests storage on "sites completely free of drainage to ground water" (14). More realistically, storage sites should be on relatively flat, well drained ground that is protected from brine runoff. The site should not be near wells or aquifers. Flood plains where the water table is high and there is a likelihood of flooding every ten years should be avoided.

B. Surface

The ground at the storage site should be relatively impermeable to water; shale and clay are particularly suitable.

All salt piles should be placed on a waterproof base pad that is strong enough to support truck traffic plus the weight of the salt and loading equipment. It should be large enough to contain the salt pile itself and all salt scattered or spilled during the loading of trucks. Asphalt and blacktop, which are water-impermeable, and air-entrained concrete which has been sealed with oil before use are the best materials for base pads.

C. Drainage

A salt storage pad should be designed as a convex crown so that water (and thus brine) does not collect or flow under the pile. The pad should have a slope of 1-2 percent so that surface water will drain away from the pile. Pads under enclosed salt piles should slope toward the front of the structure.

Ideally the pad should be surrounded by a ditch which diverts overland runoff so it does not reach the pile. Brine runoff from the storage and handling area itself should be collected by catch basins, or drainage ditches; tiles and pipes can be used to divert brine away from nearby wells, ponds, and small streams into sewers or large streams whose flow is sufficient to dilute the incoming brine. It is possible but expensive to collect the brine and use it as a deicing aid. A good solution is to minimize the brine runoff by good site selection and good housekeeping, and evaporate what is left.

D. Covering

A 2½ inch rainfall will dissolve over 1% of the salt in an uncovered stockpile containing 370 tons of salt. The percentage loss increases as pile size decreases (7). The hardened crust of salt which forms on an exposed salt pile cuts down salt runoff, but serious water supply contamination can still occur (6). This crust can also create handling problems. Salt piles which must be left uncovered should not be stocked until after the ground has frozen in the fall, and should be removed before the spring thaw.

Free standing salt forms a conical pile; a pile 26.5 feet high contains approximately 2,000 tons of salt and has a bottom diameter of 84.5 ft. (6).

Salt can also be stored in windrow shaped piles with conical ends, which are more efficient to cover than conical piles (16), but there are none in Monroe County.

Public works authorities and the Salt Institute agree that salt stockpiles should be covered. The covers are listed below in order of decreasing desirability:

1. Permanent building with doors
2. Permanent three-sided building with open face located away from prevailing winds
3. Three-sided concrete or wooden bunker with sliding roof or flexible cover such as a tarpaulin
4. Canvas, vinyl, polyethylene, plastic-laminated burlap, roofing paper or other flexible covering with overlapped stitched seams; held down by evenly distributed tires lashed together with rope and by timbers at the base
5. Sand.

A 'beehive' or dome structure makes it possible to store the salt in an interior free of posts, poles or pillars (8). Such a dome is the cheapest way to construct a salt storage building; its 1973 cost is about \$6.00 per ton of capacity (2). Penfield is in the process of having a dome designed and built to cover its salt pile. It will be paid for with Federal revenue sharing money.

Questionnaire

Tables 1 and 2 contain data on salt storage from the City of Rochester, all 19 Towns, and 9 of the 10 Villages in Monroe County; and from the Port Authority at Charlotte and B. R. DeWitt Co. at Scottsville Road, Chili. In most cases a resident of the community met with and questioned the highway supervisor. The representative in one village was not able to complete the questionnaire and return it in time for it to be included in this report.

The following questions were asked:

1. Does your municipality have an ordinance concerning salt storage?
2. How many deicing salt storage stockpiles do you have?
3. Where is each stockpile located?
4. Where do you obtain salt? From whom do you buy it? How is it transported to your municipality?
5. Do you fill up stockpiles once in the fall for the year, or replenish them several times during the winter?
6. Do you try to maintain the salt pile at a 'constant' size throughout the winter? If so, what size (tons)? If not, how large does the pile become during the winter?
7. What is the average (or summer 1973) size of the stockpile at the end of the salting season and throughout the summer?
8. Are the salt piles covered in winter? Summer? If so, with what material or structure? If not, have you ever tried in the past to cover them; what were the results?
9. On what surface does the stockpile sit?
10. What provisions, if any, are made for collecting salt-water runoff from the pile?
11. Where does drainage or runoff from each stockpile go, and what is its eventual destination? For example, does it go into a sewer, stream, the ground etc.; and from there does it go to Irondequoit Bay, Genesee River, Lake Ontario?
12. Do you know whether any part of your town uses ground water for drinking rather than Lake Ontario or reservoir water?
13. Have you changed salt storage practices recently? If so, how?
14. Do you have any plans or ideas for changes in your current salt storage practices? Please specify:

Tables 1 and 2 describe the location, size, surface, covering and drainage characteristics of the salt piles. Some schools, hospitals, parks and industries in the area have their own privately maintained stockpiles; these are not included here. No municipality has an ordinance governing salt storage.

Source of Salt for Monroe County

Each year the State Office of General Services provides several different salt companies with a list of all the municipalities in the state that want salt: how much they want, in what form, and where they want it delivered. The State accepts bids for each municipality independently, and the lowest bid is accepted in each case. The price a buyer pays depends on distance from the source, amount desired, mode of transport, etc.; thus different towns and villages will pay different amounts per ton for their salt (11). A municipality can opt to deal directly with a salt company, bypassing the state bid although this is generally more expensive (11). This year Fairport and Webster Village did not ask the state to bid for them; they are buying directly from the salt company (13).

The two major salt suppliers for Monroe County are the Morton Salt and International Salt Companies. Morton brings in most of its salt by boat from Fairport, Ohio, but can also supply the county by truck or rail from its Himrod mines in Seneca Lake, New York, Wyoming County (2, 3, 9, 15). International currently trucks in all salt from the Retsoff mines in York, Livingston County, New York; until a few years ago it brought in quantities of salt by boat from Cleveland, Ohio (2, 15).

Morton and International have both maintained stockpiles at Charlotte on Port Authority land from which they supplied salt to towns and villages in the County. In the fall of 1973, the Port Authority terminated its contract with International Salt Company; the Authority will now accept only salt shipped in by boat. The tonnage remaining in the International piles at Charlotte will be used up and not replaced. Morton Salt will continue to ship in new salt until the lake shipping season ends. The Port Authority will decide in July 1974 whether to permit Morton or any other company to store salt at Charlotte. They will have to weigh the income from the lease of land against the objections of local residents and conservationists to the pile.

International has started a new regional stockpile in Chili at 1535 Scottsville Road on land leased from the B. R. DeWitt Company, Inc.

The regional stockpiles at Charlotte and Scottsville Road will supply salt for most Monroe County towns and villages, and may also be used by towns or villages in neighboring counties (2, 13). The City of Rochester trucks its salt directly from the salt mine -- last year from Retsoff, this year from Himrod; the source varies depending on who gets the State bid.

Size of Monroe County Salt Piles

All respondents but 3 report that they try to maintain the salt piles at a constant size during the winter, replenishing them as needed. Brockport and Spencerport stock enough salt in the fall to last all winter. Morton ships all salt for the Charlotte pile before the lake shipping season ends in December; the pile is gradually depleted and extra salt can be brought in by rail in an emergency.

Most municipalities reported that their policy was to deplete salt piles at the end of the season, so summer storage piles are substantially smaller than winter piles. Several reported that essentially no salt remained in summer (see Table 1). Fairport and Honeoye Falls transfer all leftover salt to the towns of Perinton and Mendon for inside summer storage. Hilton puts the small amount of salt it has left into a fill next to its sewage treatment plant. Pittsford (Town and Village share a stockpile) reported a large summer stockpile for 1973; this was unusual; they stockpiled early because they expected a rise in salt prices. Normally Pittsford depletes its salt pile to low summer levels.

Surface Under the Salt Pile

Eight of the 36 municipal and regional stockpiles are on crushed stone or gravel, 10 are on sandy to clay soil, 17 are on pads of concrete or asphalt-like material; one did not report. In addition to the storage basepad, Charlotte has two unloading areas right along the river. Incoming salt is usually moved by truck to the nearby storage pad, but sometimes it is stored in the unloading area which has no basepad.

Covering of the Salt Piles

22 piles have no cover at all;
 3 are covered all year by fabricated cover,
 2 are covered just in summer by fabricated cover,
 2 are covered in summer by sand,
 4 are enclosed by a three sided shed,
 3 are in a four-sided building;
 none is under a dome or beehive, but Penfield is in the process of acquiring one.

Brighton, Chili, Fairport, Mendon and Sweden have tried to cover their salt piles with plastic or a fabric such as canvas in the past. All report that wind or vandals tore and destroyed the cover no matter what measures were taken to prevent damage; all abandoned their attempts to cover the piles. The plastic currently covering Perinton's salt pile has been damaged by vandalism; and the cover for the pile at Charlotte has been replaced four times already this year. De Witt, the managers of the Scottsville Road pile, plan to keep it covered at all times with a rubberized plastic cover. That pile is too new to have experienced vandalism. Covering regional salt piles with a dome or a building is expensive. The salt is used by a number of communities and perhaps they should all contribute toward a proper storage building.

Drainage Characteristics of Salt Piles

Seven communities have storage sites with catch basins or drainage ditches; none of the rest have any sort of drainage collection system.

The runoff from the large stockpile at the Port Authority may get into the waters at the mouth of the River, but the Genesee probably has enough flow to dilute the salt influx adequately.

The new stockpile at Scottsville Road (12) is on an old dump in a low area which, according to B. R. DeWitt, does not drain into adjacent creeks or the River by any overland route. Rainfall and pile runoff seeps into the ground. According to the Times Union the pile is in a 10 year flood plain, which was flooded last year (1).

All of Monroe County's drainage enters one of three drainage basin systems (see Table 2): Lake Ontario West Basin, Lake Ontario Central Basin or the Genesee River Basin. The Irondequoit Bay drainage basin is part of the Lake Ontario Central Basin (5).

Table 1. Monroe County Municipal Salt Piles

Municipality	Salt Pile Location	Surface	Covered?		Maximum or Average Size (Tons)
			Winter/Summer	Covering Material	
City of Rochester	a. 500 McKeefe Road b. Fall Street	blacktop concrete	no/yes yes/yes	carvas or plastic 4-sided building	6,000/3,000 1,500/new this fall
Town of Brighton	a. 1941 Elmwood Ave. b. 1941 Elmwood Ave.	asphalt asphalt	no/- yes/yes	none 3-sided shed	2,000/- 300/80
Town of Chili	a. 3235 Chili Ave. b. 3235 Chili Ave. (salt-sand mixture) c. 1535 Scottsville Rd. (see below)	asphalt asphalt -	no/no no/no - -	none none -	1,000/75 50/20-50 -
Town of Clarkson	Lake Road	cement	yes/yes	3-sided shed	200/50
Town of Gates	475 Trabold Road	bed of bank-run gravel	no/no	none	700/400
Town of Greece	647 Long Pond Road	blacktop	no/yes	8-10 in. sand	2,000/700
Town of Hamlin	a. 91 Railroad Ave. b. 91 Railroad Ave.	gravel concrete	no/- yes/yes	none garage	{ 1,500/none total/300
Town of Henrietta	475 Calkins Rd. (behind Town garage)	blacktop	no/no	none	max. 1500 / 250-500 av. 1000
Town of Irondequoit	25 Kings Highway North	gravel-cinders	no/no	sheltered on one side by cinders	2,500/500
Town of Mendon	Semmel Rd. (Town garage) (in 2 adjacent piles)	clay soil	no/no	none	2,000/200
Town of Ogden	2425 Union St. South	on ground	no/no	none	100/0-60
Town of Parma	a. Henry St., Hilton b. Henry St., Hilton (salt-sand mix)	blacktop ground	yes/yes no/no	3-sided building none	300/50-300 100 up to 100
Town of Penfield	Jackson Road	asphalt pad	no/no	none	
Town of Perinton	Parker Rd., Fairport Parker Rd., Fairport	gravel & sand ?	yes/yes yes/yes	plastic 3-sided shed	1,000/none none*/200-300

Table 1., continued

	Golf Ave. (Highway Garage)	earth	no/yes	fabricated plastic	2,000/2,700(1973) 50-100 normally**
Town of Pittsford (supplies Village Pittsford also)					
Town of Riga (supplies Village Churchville also)	a. 6475 Buffalo Rd. b. 6475 Buffalo Rd. (sand-salt mix)	ground ground	no/no no/no	none none	400/none 800-1000/none
Town of Rush	Rush-West Rush Rd. (Town garage)	1 ft. deep base of solid salt on a crushed stone drive gravel	no/yes	sand	200/100
Town of Sweden	40 White Road		no/no	none	300/0-100
Town of Webster	1005 Picture Parkway	compacted gravel with sandy loam clay	no/no	none	1,000/500
Town of Wheatland	28 Hanford Ave.	ground	no/no	none	150/50
Village of Brock- port	38 EastAve.(DPWgarage) sand:salt 2:1 mix	asphalt	no/no	none	600/5-10
Village of Church- ville	shares Town of Riga pile (see above)	--	--	--	--
Village of E. Rochester	Ontario Street	blacktop	yes/yes	masonry building	125/70
Village of Fairport	31 S.Main Street	sand, gravel	no/no	none	100/none(extra is removed to Perinton)
Village of Hilton	Marian St.,Hilton sand:salt 1:1 mix	blacktop	no/no	none	40/none(extra is removed to local fill area)
Village of Honeoye Falls	Lehigh Street	ground(clay & rock)	no/no	none	30/none(extra is removed to Mendon)
Village of Pittsford	shares Town of Pittsford pile (see above)				
Village of Scottsville					
Village of Spencerport	2425 Union St. S.	ground	no/no	none	not given/very little or none
Village of Webster	28 West Main St.	sandy loam	no/no	none	500/none
Charlotte Regional	4664 Lake Ave.(Port Authority property)	blacktop storage pad unloading areas are bare ground	yes/yes	flexible covering	30,000/unpredictable, Plan to deplete
Scottsville Rd. Chili, Regional	1535 Scottsville Rd., Chili	blacktop pad	yes/yes	plastic and rubber- ized cover	20,000/new, no data plan to deplete

* Perinton stores leftover salt in shed through summer. This reserve is the first used in winter; shed is empty most of winter.
** see text

Table 2. Municipal Salt Piles: Drainage and Water Receiving Runoff (Based on answers from municipal officials, representatives of B. R. DeWitt, Inc., Port Authority)

Municipality	Ground Water in Use in Municipality	Brine Runoff Collection System	Drainage Characteristics*	Drainage Basin
City of Rochester	none	a. basepad slopes toward catchbasins b. "no runoff"	a. not known b. no runoff	} Genesee River
Town of Brighton	few scattered wells	asphalt catchbasin in N.E. corner of site	runoff into Buckland Creek → Allens Creek → Irondequoit Creek → Irondequoit Bay	} Irondequoit Bay
Town of Chili	major part of town south of Black Creek relies on it	"no provisions needed"	"not enough runoff"	Black Creek Genesee River
Town of Clarkson	much of town	"little runoff"	into road ditch → Lake Ontario	Ontario West
Town of Gates	few homes on wells	railroad ditch pile is surrounded on 3 sides by earth "dike"	90% into groundwater, 10% into railroad ditch → ditch along Trabold Road → Little Black Creek →	
Town of Greece	some in N.W. part of town	catchbasins around storage area	into storm sewer → Round Pond Creek → Round Pond → Lake Ontario	Ontario West
Town of Hamlin	yes, particularly farms	none	into natural drainage ditch → creek	
Town of Henrietta	none	none	into Red Creek	
Town of Irondequoit	none	none	into creek behind Town garage → Lake Ontario	Ontario Central
Town of Mendon	25-50% of the population relies on it to the west	none (erosion ditch on it to the west)	in direction of Honeoye Creek (pile is 2000 ft. from Creek) thought to seep into ground rather than reach Creek	Genesee River
Town of Ogden	many wells still used in town	drainage ditch goes around the site	into ditch, through a field, into Ontario	Ontario West?
Town of Parma	few wells	?	into ditches?	
Town of Penfield	none	none	into ground (+ into Barge Canal)	Irondequoit Creek Barge Canal Irondequoit Creek
Town of Perinton	none	none	leaches into ground	
Town of Pittsford	Village is on wells	none	into ground and overlaid down hill to the S.E.W of the pile; into an ephemeral pond to SE → Black Creek? → Genesee	Genesee River

Table 2., continued

Town of Rush	large number of ground water wells	into Honeye Creek via a corn field→	Genesee River
Town of Sweden	yes	into ground	
Town of Webster	deep wells (no indication of extent)	into ground; into Mill Creek→Ontario	Ontario Central
Town of Westland	very few homes have individual wells	drainage ditch	
Village Brockport	none	into storm sewer	
Village Churchville	see Riga	into W. Branch Brockport Creek→Ontario	Ontario West?
Village L. Rochester	village on 3 artesian wells off Fairport Road	--	--
Village Fairport	none	catch basin	Irondequoit Bay
Village Hilton	none	into Irondequoit Creek→Irondequoit Bay	
Village Honeye Falls	none	into storm sewer→Barge canal	Ontario Central?
Village Pittsford	village is on wells	into storm sewer→Salmon Creek→Braddock's Bay→Ontario	Ontario West
Village Scottsville	village uses wells	into ground, a little overland directly into Honeye Creek	Genesee River
Village Spencerport	deep wells (no indication of extent)	not given	
Charlotte Regional	--	Into Four Mile & Mill Creek→Ontario	Ontario Central
Scottsville Road	--	pad slopes to catch-basins	Genesee River
		drains entirely into ground (old dump site) no direct runoff to stream or river due to topography. Site is on land bounded by the Genesee River, Little Black Creek & Black Creek; lies on 10-yr. flooded plain.	Genesee River

* Unless special provisions are made for catching leachate it will, of course, enter the ground.

Recent Changes in Salt Storage

19 municipalities listed 'no change' in recent salt storage policy. In other cases the following changes have occurred:

- (a) An additional pile has been added -
The City now has a small reserve pile on Fall St. for quick resupply of City salt trucks during a storm;
Brockport recently began its stockpiling; previously it had no pile, and obtained salt elsewhere;
The Scottsville Road pile is a new regional pile in Chili.
- (b) The stockpile has been moved to a new site -
Gates moved its pile from Wegman Rd. to Trabold Rd.;
Mendon moved its pile from Mendon Center Triangle east of Clover to Semmal Rd. in 1972;
The City moved its pile from Portland Ave. garage to McKeefe Rd. in Sept. 1973.
- (c) The pile now is covered -
Pittsford recently began to cover its pile in summer;
Perinton just started covering its pile year round;
East Rochester began enclosed storage four years ago.
- (d) A change in handling procedure has occurred -
Gates recently has maintained a smaller pile, replenishing several times, rather than a larger longer-lasting pile;
Perinton recently cut down on the tonnage stored;
Port Authority terminated International's lease for storage at Charlotte this year.

Plans to Change Salt Storage

The City, 4 Towns, 6 Villages and the regional piles have no plans for change. The other municipalities report the following plans or ideas:

- (a) Definite plans to enclose all year -
Fairport, Chili, Sweden and Penfield are in the process of acquiring or building inside storage facilities; Perinton is moving to a new site with covered storage.
- (b) Definite plans for summer covering -
Greece plans to begin covering with polyethylene in summer.
- (c) Hope to cover, if funds become available -
10 Towns are interested; 7 in a building, 2 in a flexible covering, 1 unspecified.
- (d) Plans or ideas to change runoff pattern -
Hamlin is looking at corrective measures in general.

Conclusions

1. The selection of a site for storage of salt should be based on ground composition, natural drainage characteristics and accessibility. Its choice should not be haphazard, but should be a part of planning for future development in a town or village. While most sites can theoretically be engineered to be safe, it makes economic sense to start with a good site so that less engineering is necessary. There is no justification for locating a salt pile in a floodplain, particularly one which floods on a 10 year average. Any pile currently located in a flood plain should be moved to a less environmentally hazardous site.

2. The minimum facility for safe salt storage should fill the following requirements:

- It should have an impermeable base pad which is crowned and ringed by a drainage ditch to divert overland runoff;
- The pile, except for the portion being actively worked, should be covered at all times;
- Good maintenance is important. Waste and spillage can be minimized through careful handling. Salt which is spilled and scattered during loading operations should be cleaned up as soon as possible after a storm or salt delivery. The working face of the pile should be covered when not in use for a significant amount of time.
- Brine runoff should be collected or diverted into a sewer or stream large enough to dilute it immediately. Many towns and villages still use some ground water for drinking and all use it for plant growth.

3. Salt piles should be covered. If possible communities should plan for inside storage.

4. Regional salt piles such as those at Charlotte and Scottsville Road provide a convenient supply of salt, allowing towns and villages to maintain relatively small local stockpiles. The town that accepts the large salt pile gets increased traffic and noise and possible ground and water pollution. Care of the regional piles which serve major parts of Monroe and neighboring counties should be the responsibility of the entire county, not only of the town where such a pile is located. They would be less hazardous and less of an eyesore if they were housed in a permanent building (probably a dome) on a well designed and drained pad, on land which is safe from flooding.

The great differences in storing practices by various towns and villages point out the need for a county study on the environmental impact of salt, which could be a basis for further action.

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Note: The Salt Institute is a body made up of representatives of U.S. and some Canadian major salt producers. It is based in Alexandria, Va. and handles any problems involving the whole salt industry.