

**Minutes**  
**Chautauqua County Water Quality Task Force**  
**Frank W. Bratt Agricultural Center**  
**January 15, 2013**

**Call to Order:** by Chairman David Spann at 10:06 AM

**WQTF Members Present:** David Spann, Cassandra Pinkoski, Dave McCoy, Tom Erlandson, Kim Sherwood, Rhonda Lindquist, Peter Beeson, John Jablonski, Douglas Conroe, Craig Butler, Jonathon Mayr, Joe Galati, Peter George, Pierre Chagnon, Elisabeth Rankin, and Jacqueline Chiarot.

**Approval of Minutes:** Motion by C. Butler to approve the December 17, 2014 minutes. Seconded. Carried.

D. Spann welcomed E. Rankin to the meeting. E. Rankin is a representative from Assemblyman Andy Goodell's office and also from the Chautauqua County Legislature.

**Correspondence:** None

**Watershed Coordinator:** See attached.

**Old Business:**

1. Calamar Development Site Update – D. Spann shared correspondence from Brian Horrigan with the DEC and the stormwater plan preparer. The plan preparer came on site and made recommendations that need to be in place. Reports need to be made directly to Brian Horrigan directly and the recommendations need to be in place in order to avoid violations.
2. Stormwater Code Enforcement Letter – Motion to submit the draft letter (see attached) to the Chautauqua County Legislature by D. Conroe. Seconded. Carried.
3. Chautauqua Lake SPDES Permits Update – W. Boria with the Chautauqua County Health Department has received a copy of Maple Grove Jr./Sr. High School's updated SPDES permit.
4. Brine Report to Chautauqua County Legislature – Motion to submit the most recent brine report (see attached) to the Public Facilities Committee of the Chautauqua County Legislature by D. Conroe. Seconded. Carried.

**New Business:**

1. Change to 2% Bed Tax Grant Application – D. McCoy described the improvements desired for the application process to receive grant funding from the 2% Bed Tax Program. The first improvement would be to incorporate riparian buffers into the ranking criteria. It was discussed to include as an option for addition points if landowners agree to leave riparian buffers on the project. Also, concern to establish a separate category for education and outreach; invasive species management; as well as planning and engineering studies. The last consideration would be to make it clearer that the County is not responsible for maintenance of projects. The ranking committee will meet in the future to streamline the desired outcomes and will present their suggestions at the next WQTF meeting and at an upcoming Legislature Planning and Economic Development Committee meeting.

**Current Water Quality Concerns & Issues from the Floor**

1. J. Jablonski shared an article concerning windmills in Cassadaga/Sinclairville area. A public hearing was scheduled for January 20<sup>th</sup>.

2. D. Spann announced that Rob Halbohm from the NRCS, but is coming back to work for the Soil and Water Conservation District to spearhead the NYS Agricultural Environmental Management (AEM) initiative, focusing on Chautauqua Lake Watershed.
3. D. Spann shared with the group that he has been in contact with Angela Perkins from Cattaraugus County NRCS concerning the Goose Creek Project. Currently, the permit application is still with the engineer due to the multiple concerns the Army Corps of Engineers brought up during the site walk through. The permit has yet to be submitted to either the NYSDEC or the ACOE.
4. D. McCoy reported that Chautauqua County has been awarded through the NYS Water Quality Improvement Project Program. Six grants were received in the County: wastewater treatment plant upgrade for phosphorus removal by chemical addition (South and Center Chautauqua Lake Sewer District); Chautauqua Utility District wastewater treatment facility phosphorus removal project (Chautauqua Utility District); constructed wetland for Crescent Creek (Village of Lakewood); Chautauqua Lake road ditch stabilization project (Chautauqua County Soil and Water Conservation District); and Chautauqua Lake tributary stabilization program, Dewittville and Goose Creeks (County of Chautauqua).
5. R. Lindquist announced that Round 21 of the NYS Agricultural Non-Point Source grants will soon be announced that the grants gateway is open to submit.
6. Motion by D. Conroe to reimburse the Soil and Water Conservation District out of unspent WQTF funds for lunch. Seconded. Carried.
7. D. Spann announced that the Great Lakes Experience at Veteran's Park in Dunkirk has been scheduled for June 13<sup>th</sup>.
8. P. Chagnon shared updates on the Chautauqua Lake Alliance and sewer districts. The Alliance has received 501(c)3 status, They received 24 applications for executive director, interviewed a number of applicants, and narrowed it down to two for face-to-face interviews with the entire interim board next week. The South and Center Sewer District's board of directors approved plans to contract with engineers to do a more in-depth report on phosphorus. The North Sewer District's board of directors will discuss the scope of work at their next meeting, anticipating that they will also approve contracting to move forward with the project plan.

***Next Meeting:***

Date: **February 12, 2015**  
Time: **10:00 AM**  
Place: **Frank W. Bratt Agricultural Center**

***Adjournment:*** Motion by J. Galati to adjourn. Seconded. Carried.

***C. Pinkoski - Recorder***



*Chautauqua County*  
**DEPARTMENT OF PLANNING AND  
ECONOMIC DEVELOPMENT**

200 Harrison St., Suite 300 • Jamestown, New York 14701  
Phone (716) 661-8900 • Fax (716) 483-6679  
[www.planningchautauqua.com](http://www.planningchautauqua.com)

**Watershed Coordinator's Update 01/15/15**

**NYSDEC Activities of Interest**

- Comments on the NYSDEC Aquatic Invasive Species Management Plan were due on 12/15/15.
- The NYSDEC has announced updates of water quality assessment information for individual Waterbody Inventory/Priority Waterbodies List (WI/PWL). Most recently, WI/PWL Fact Sheets for the following Chautauqua County waterbodies have been revised/updated:
  - Waters of the West Branch French Creek Watershed (PDF, 519 KB), Allegheny River Basin.
  - Waters of the Brokenstraw Creek Watershed (PDF, 539 KB), Allegheny River Basin.

**Macrophyte Management Plan**

- Written comments on the MMS from the review committee are still being received.
- A meeting to discuss the comments and proposed changes to the MMS is scheduled for 1/20/15.

**Integrated Sewer Management Plan**

- Working with Post Journal reporter Jim McCarthy, Tom Carlson (NCLSD) and Tom Walsh (S&CCLSD) on an article about the ISMP

**North County Local Waterfront Redevelopment Plan**

- Public involvement activities are scheduled for 1/28. 1:00 to 3:00 pm at Eason Hall in Westfield and 5:30 to 7:30 pm at SUNY Fredonia Incubator in Dunkirk.

**Chautauqua Lake & Watershed Management Alliance (CLWMA)**

- The Alliance continues to interview for the Executive Director's position during the week of January 19<sup>th</sup>.
- Not for Profit status was granted by the IRS on 1/14.

**2% Occupancy Tax for Lakes and Waterways**

- Processed the second invoices for the Camp Merz project and visited the site on 12/31 to take construction photos.
- Processed the final invoices for the Village of Lakewood Green Infrastructure Baseball Field project.
- Processed Cornel Cooperative Extension voucher for final payment for the SAREP/4H project
- The Village of Silver Creek (Walnut Creek) streambank stabilization and North Harmony's Bly Hill ditch improvement projects have been pushed back until spring 2015. Contract extensions are being pursued.
- Received for processing the invoices for the Bear Lake 2% Agency Allocation and the work by Racine Johnson.
- Drafted a letter for the Waterways Panel to review a request for the County Attorney to offer his opinion on allowing the 2% Lakes and Waterways Grant Program to include funding opportunities focused on education, invasive species and O&M for past 2% projects.
- Preparing to accrue unspent 2% funding for agency allocations and 2014 Lakes & Waterways Grant program projects that were not advanced in 2014.
- The CLA is presenting to the Planning and Economic Development Committee on 1/21.

**Invasive Species**

- Considering adding an additional grant category to the 2016 2% Lakes and Waterways Grant Program to fund a local, collaborative invasive species management response effort.

**Chautauqua Lake and Waterways Website**

- CCPED now has administrative privileges to add/edit content.

**Lake Erie Management Commission**

- Attended the LEMC meeting on 11/24. The meeting focused on the north county dredging projects, education & outreach activities and planning for the Lake Erie Experience event.
- Coordinated a meeting with Dean Marine, the dredging contractor for the Barcelona project on 1/7. The meeting focused on advancing the Hanover and Dunkirk projects.
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*Kevin M. Sanvidge, Director*  
[SanvidgK@co.chautauqua.ny.us](mailto:SanvidgK@co.chautauqua.ny.us)

*Vincent W. Horrigan, County Executive*  
[HorriganV@co.chautauqua.ny.us](mailto:HorriganV@co.chautauqua.ny.us)

**Lake Erie Watershed Protection Alliance**

- Attended the 12/9 quarterly meeting in Brant, NY
- LEWPA has drafted and is circulating the supporting inter-municipal agreements for Erie, Cattaraugus and Chautauqua Counties for consideration.
- The Chautauqua County Attorney has prepared a resolution supporting the County's participation in LEWPA.

**Grants**

- Working to close out the NYSDOS Ellicott Grant (Chautauqua Lake and Watershed Management Plan Implementation) which provided funding for the Dredging Feasibility Study, Educational and Outreach Activities by the Chautauqua Watershed Conservancy and Chautauqua County Soil and Water Conservation District, Macroinvertebrate Study, Shoreline Cleanup by the Chautauqua Lake Association, and schematic design for restoration projects on Goose and Dutch Hollow Creeks.
- Reviewed the RFP for 604 (b) Water Quality Management Planning. Reached out to Southern Tier West Regional Planning and Development Board to assess their interest in leading an effort to submit a proposal.

**Community Outreach and Events**

- Initial planning for the second Chautauqua Lake Rally, most likely in March has begun.

220 Fluvanna Ave,  
Suite 600  
Jamestown, New York  
14701  
716-664-2351

**Member Agencies:**

Bear Lake Association  
Cassadaga Lakes Association  
Chautauqua County Department of Health  
Chautauqua County Department of Planning  
Chautauqua County Department of Public Facilities  
Chautauqua County Environmental Management Council  
Chautauqua County Soil & Water Conservation District  
Chautauqua County Town Hwy. Superintendents Association  
Chautauqua County Watershed Coordinator  
Chautauqua Lake Association  
Chautauqua Region Professional Wastewater Operators Association  
Chautauqua Watershed Conservancy  
Chautauqua Waterworks Association  
Conewango Creek Watershed Association  
Cornell Cooperative Extension  
Findley Lake Watershed Foundation  
Jamestown Community College  
NYS Department of Environmental Conservation  
Ohio River Valley Water Sanitation Commission  
Seneca Trail RC&D  
Southern Tier West Regional Planning & Development Board  
SUNY Fredonia  
The Nature Conservancy  
USDA Natural Resources Conservation Service  
USDA Farm Service Agency  
Western Southern Tier Building Officials' Association  
Western New York Crop Management Association



December 3, 2014

To: Chautauqua County Legislature

From: David Spann, Chairman Water Quality Task Force

Cc: Pierre Chagnon, Chairman, Chautauqua Lake Watershed Alliance  
Don Emhardt, Chairman, Chautauqua Lake Inter-Municipal Committee

Re: Chautauqua Lake Watershed Code Enforcement

Chautauqua County Legislature,

Our lake and waterway resources are a valuable natural and economic asset to the local communities. The County and other agencies have invested a significant amount in lake and watershed management aimed at reducing inputs of nutrients and sediment to the water bodies, especially over the last 10-15 years. The Task Force encourages investments in the private sector follow these same goals.

I was directed by Chautauqua County's Water Quality Task Force to bring to your attention current efforts in monitoring local stormwater issues in the County. The intent of this organization is not to stifle development within the County, but to see consistency among investments. Preventative protection on our construction sites, small and large, are necessary to preserve our lake and waterway resources. Efforts by regulatory agencies are not always able to accomplish this goal alone. The County needs to encourage the development of local regulations to protect our resources. We need to work cohesively with the private sector to proactively reduce runoff and erosion from disturbed sites within our county watersheds.

Due to recent concerns brought to the attention of this organization involving oversight of some construction projects, we are expressing our support for the development of a multi-jurisdiction code enforcement officer to oversee erosion and stormwater regulations in the County. A situation in the Town of Busti raised concerns over response time by NYS Department of Environmental Conservation (DEC) water resource staff, whose role is to enforce New York State stormwater regulations. Local code enforcement

officers are typically a part-time position, and their current option is to report violations to the DEC. With current personnel restraints on DEC departments, there is an ever increasing challenge for local code enforcement officers to receive support.

While municipalities have to wait on DEC responses, violations are continuing to pollute our lakes and waterways. The proposed position would not only be to enforce punishments on violators, but also be a source of information to guide local code enforcement and private investors before violations occur. The efforts and investments by different public and private interest groups to protect our lakes and waterways are now being compromised by inability to act on observed problems. With a county-wide or multi-municipal position, filled with a credentialed professional, such as a licensed engineer or certified professional in erosion and sediment control, a greater amount of oversight and authority can be insured. Local code enforcement officers can have a source they could rely on to help enforce regulations to protect our water quality. We, the Water Quality Task Force, urge the Chautauqua County Legislature to consider the merit of a position such as this being available to protect the natural resources that generate a major source of economic benefits to our communities.

Sincerely,

A handwritten signature in black ink, appearing to read "David Spann", written in a cursive style.

**David Spann, *Chairman of Chautauqua County's Water Quality Task Force***  
220 Fluvanna Ave, Suite 600  
Jamestown, NY 14701  
Email: [dspann@soilwater.org](mailto:dspann@soilwater.org)

USE of OIL and GAS WELL BRINE for ROADSPREADING in CHAUTAUQUA COUNTY  
January 12, 2015

Prepared by: William Boria, Chautauqua County Department of Health & Human Services

Contributors:

Doug Conroe, Chautauqua County Environmental Management Council  
Tom Erlandson, Chautauqua County Water Quality Task Force  
Greg Hallberg, Town of Ellery & Chautauqua County Highway Superintendents Assoc.  
Tom Pilling, Village of Lakewood & Chautauqua County Highway Superintendents Assoc.  
Claire Quadri, Chautauqua County Environmental Management Council  
David Wilson, Chautauqua County Soil & Water Conservation District  
Michael Wilson, State University of New York at Fredonia

INTRODUCTION

Public safety on our roads and highways is vital. Winter travel is especially challenging in Chautauqua County due to our location in the “snow belt” and the fact that we receive between 100 and 300 inches of snow annually. These significant totals, which do vary geographically, can be attributed in part to Lake Effect Snow events associated with the County’s location relative to Lake Erie, and, to a lesser extent, Lake Huron and Lake Ontario. Even more challenging is the job of highway departments to keep our roads plowed and as ice-free as possible. This is complicated by two factors - in today's busy society we are on the go and on the road more than ever before and there is a trend toward the decreased use of snow tires and the greater dependence on all-season tires and all-wheel-drive vehicles. We would like to be able to drive at the posted speed limit at all times, but it's just not possible.

The Chautauqua County Water Quality Task Force was asked by two organizations, private citizens and County legislators, to evaluate the efficacy of road-spreading oil and gas well brine for dust control and winter treatment of snow and ice. Specifically, WQTF was asked whether the County should consider a ban on road-spreading oil and gas well production brine, hereafter simply referred to as "brine." In response WQTF requested assistance from the Chautauqua County Environmental Management Council, whose members have expertise in areas valuable for such an evaluation. This report is intended to provide the Legislature with information about current and proposed NYS regulations regarding the road-spreading of brine, its current use in the county and potential environmental/human health impacts. Finally we provide recommendations for the legislature to consider regarding use of brine on area roads.

WHAT IS BRINE?

Production brine is a naturally occurring byproduct of extracting gas and oil from the earth. It is essentially very old groundwater present in the reservoir rock from which gas and/or oil is produced. It was created partly from ancient shallow seas that covered large portions of the continent 100's of millions of years ago, which is why it has a high salt content. Because brine

has been in the ground for so long, it has also dissolved trace elements from its host rock including metals such as iron, magnesium, strontium and lead. Moisture present in gas or oil producing rock formations can be carried to the surface where it is removed at the wellhead by a separator and stored in tanks for later removal. The basic chemical characteristics of brine vary significantly and are dependent on the rock formation from which the gas or oil is extracted. For example, brine from a Medina Sandstone gas well will have a different chemical composition than brine from an Onondaga Limestone gas well.

This report deals primarily with brine produced by traditional vertical gas wells that are typical to Chautauqua County. Brine from this area generally contains between 10 and 20% by weight of chloride salt compounds (Dresel and Rose, 2010). The most abundant salt is sodium chloride, followed by calcium chloride, magnesium chloride and a relatively small amount of potassium chloride. All of these compounds are effective at road deicing, with calcium and magnesium chloride being more effective at colder temperatures than sodium chloride. They are also effective as a binder and dust suppressant when spread on unpaved (dirt) roads in summer (Anderson and Gesford, 2007). Brine is either provided by oil and gas companies to highway departments for road spreading for free or disposed of as a waste product, usually through deep well injection.

## CURRENT REGULATIONS

Gas well brine is classified by the New York State DEC as a regulated 6NYCRR Part 360 solid waste material. When a solid waste can be used as "an effective substitute for a commercial product," the user can apply to NYSDEC for a beneficial use determination or BUD. If the user (in this case a highway department) provides DEC with certain required information, DEC will approve a BUD to spread brine on roadways.

The NYSDEC Division of Materials Management began a formal process for approving specific BUDs for road spreading brine in 2009. At that time, a guidance document establishing the procedures was issued and brine waste haulers were notified (see attached). Although this approval process is new, the practice of road spreading brine has been around for many years. Chautauqua County DPF's BUD request was approved in 2009 and many other municipalities have since complied with the requirements. It's likely though, that some municipalities are not yet in compliance, either because they are unaware of the regulations or due to simple inaction (NYSDEC, 2013).

Highlights and requirements of the NYSDEC program are:

- A NYSDEC Part 364 waste hauler's permit is required to transport waste brine on public roads from a wellhead storage tank to a highway department storage tank; this permit is obtained by the gas well company, trucking firm, or directly by a municipality.
- A BUD is required to actually road-spread brine; this is applied for by the highway department or other entity wanting to use it.
- A chemical analysis representative of the brine to be spread must be submitted with the application, along with other information.



- More than 40 BUDs for road-spreading oil & gas well brine have been issued in New York State; two of these were to county highway departments (Chautauqua and Cortland), the others were to multiple towns, villages, one city, several NYSDOT regions and some private haulers. (NYSDEC, 2013).
- Only production brine can be spread on roads and no spreading of drilling, fracturing or plugging fluids is allowed.
- It is prohibited to allow brine to flow into or run off into streams, creeks, lakes and other water bodies, though bridges can be treated when hazardous ice conditions warrant (NYSDEC, 2013).

The chemical analyses required to be submitted with a BUD application includes: calcium, sodium, chloride, magnesium, total dissolved solids, pH, iron, barium, lead, sulfate, oil & grease and BTEX (benzene, ethylbenzene, toluene, and xylene). A review of three BUD applications from Chautauqua County municipalities indicate that the chemical analyses being submitted is inconsistent with the policy requirements, yet BUDs are issued anyway. NYSDOT (2013) noted that when existing analytical information for a particular producing formation and area is judged to be adequate and representative, additional sampling and laboratory testing by the applicant may be waived, which has been a standard operating procedure.

#### HORIZONTAL DRILLING AND HIGH VOLUME HYDRAULIC FRACTURING (HVHF)

While the Governor recently enacted a ban on HVHF in New York State, it is ongoing in neighboring states and could be allowed sometime in the future in New York. Therefore it is noteworthy that the most recent draft environmental impact statement for HVHF released in 2011 by DEC included provisions for allowing the road-spreading of production brine from HVHF wells following the same procedures and regulations established in 2009 for traditional vertical gas wells, but adding total dissolved solids and naturally occurring radioactive material (NORM) to the chemical analysis. However, DEC notes that:

"...the data available to date associated with NORM concentrations in Marcellus Shale production brine is insufficient to allow road spreading under a BUD. As more data becomes available, it is anticipated that petitions for such use will be evaluated by the Department (NYSDEC, 2011 p5-141)."

#### CURRENT USE OF BRINE IN CHAUTAUQUA COUNTY

To determine how much brine is used on area roads, members of the Chautauqua County Highway Superintendents Association were surveyed and County DPF and NYSDOT contacted. Twenty two of the twenty seven towns and eleven of the fifteen villages in the county responded to the survey, a 78% response rate. The results show that, of those municipalities reporting, there are nine towns and four villages that spread brine for deicing, in addition to the County and NYSDOT. There are also nine towns and three villages that spread brine in summer for dust control. The City of Jamestown started road-spreading brine for deicing in 2012 on a limited/trial basis, and is considering increasing its use. The City of Dunkirk does not use brine on roads. Total brine spread in the county during 2012-2013 was approximately 1,500,000

gallons. The County DPF use of brine from 2008 to 2012 ranged from 930,000 to 1,470,000 gallons per year, which includes that used by NYSDOT (they share use of tanks and county maintains records for both). DPF use of brine has generally decreased since 2008. All municipalities use mined rock salt or a salt-sand mix on area roads in winter, with a total of approximately 56,000 tons of salt applied to roads in the county annually. It is recognized that brine totals may be incomplete because not all municipalities responded to the survey.

Many municipalities in the county utilize the County DPF Winter Operation Plan Book (2013) for application rates and procedures for spreading salt on roadways, which recommends an application rate of 200 pounds of salt per lane mile. This is equivalent to approximately 80 gallons of brine per lane mile. However, many factors control the amount of salt needed for road deicing and snow pack removal including road surface conditions, temperature and weather. The NYSDOT follows Maintenance Guidelines for Snow and Ice Control (2012) that recommends variable application rates that range from 115 to 450 pounds of salt per lane mile depending on conditions. This is equivalent to approximately 46 to 180 gallons of brine per lane mile.

The DOT Guidelines state that brine is especially useful as an anti-icing agent on bridge decks since they are prone to freezing before road surfaces. But because many bridges cross over waterways, runoff of brine into the water would likely occur if brine is spread on them. While this is against DEC regulations, it is acceptable if the brine is applied following DOT Guidelines.

Historically, the County DPF discontinued most brine use in 2001 due to transport costs and transferred their brine storage tanks to towns and villages. The County started using brine again in 2008, since it is now delivered for free by gas well companies. There is significant infrastructure of brine storage tanks throughout the county. The County DPF currently has 25 tanks with a combined storage of 264,000 gallons that it uses or shares with local municipalities and the NYSDOT. In addition, some towns and villages have their own storage tanks. All storage tanks are required to have secondary containment in case of spills or tank leaks.

Most municipalities that road-spread brine must dedicate a truck for that purpose except for NYSDOT whose trucks are equipped with both brine tanks and salt hoppers. It has been shown that mixing brine with salt during application or pre-wetting salt with brine before being spread makes salt work more effectively. Pre-wetting is especially effective and requires less salt to do the job (Donahey and Burkheimer, 1996; Cornell Local Roads Program, 2014). The NYSDOT in Mayville has the equipment to produce their own brine from salt, but they have not started doing so. In certain weather conditions, pre-treating roads with brine or rock salt (anti-icing) can be more effective and require less salt per storm than de-icing. Having to dedicate trucks for brine use is one of the drawbacks of using it. Other drawbacks include the time it takes to pump it from storage tanks into truck tanks and the need to refill truck tanks in the middle of plow runs.

## FINANCIAL IMPACT

There are approximately 2.5 pounds of salt in one gallon of brine (NYSDEC 1988). The cost of salt in 2013 was \$50/ton. Looking at straight costs of materials for 2012-2013, the 1.5 MG of brine used in the county is equivalent to approximately 1,845 tons of salt giving it a value of \$93,750. The 56,000 tons of rock salt used in the county over the same period cost \$2.8 million. The amount of brine used during this period represents about 3% of total salt used.

## ENVIRONMENTAL AND HEALTH CONCERNS

Little research has been done to identify impacts that road spreading of brine has on the environment and human health. A study by NYSDEC (1999) assessed the human health impact for exposure to naturally occurring radioactive materials (NORMS) related to oil and gas wells in the state. Field work and sampling for this study was done in Western New York including a number of sites in Chautauqua County. It looked at potential radiation exposure to oil and gas industry workers and the public through various pathways. One conclusion was that there was no threat to public health from the long-term (20 year) exposure to brine spread on dirt roads used daily by pedestrians. This study looked specifically at human exposure to radiation (via radium 226 and 228) from brine spread on the road surface, and not at the fate and transport of radium through the environment, which could lead to other exposure pathways, such as through contact with water. Results from 43 brine samples analyzed showed an average total radium concentration (Ra226+Ra228) of 1,822 pCi/L (picocuries of radiation per liter of liquid). This is a concern because the maximum contaminant level of total radium in drinking water is just 5 pCi/L and radium could build up in the environment because the half-life of Ra226 is about 1,600 years, and the half-life of Ra228 is 5.76 years (USEPA 2014).

Other contaminants routinely detected in brine that may be of a concern include metals (barium, iron, manganese, lead, strontium, zinc) and volatile organic chemicals (benzene, toluene, ethylbenzene, xylene, acetone). However, there is little consistent chemical data available that characterizes what exactly is in the brine spread on Chautauqua County roads. A comparison of the chemical characteristics of road salt, oil well brine and gas well brine is shown in Table 15.5, attached (NYSDEC 1988). The deep gas brine presented in this table is representative of Medina Sandstone brine produced in many Chautauqua County wells.

## RECOMMENDATIONS

1) More frequent and consistent chemical analysis of brine is needed. Suppliers of brine should be required to analyze it for the chemicals listed in the 2009 DEC policy statement annually by a NYSDOH-certified lab by collecting one sample per year from each geologic formation producing the brine that is delivered to highway departments. Because there is a particular concern with radiation in brine, it should also be measured. The analytical results should be submitted to *a County agency* and DEC.

- 2) Suppliers of brine should submit monthly reports that include the amount they deliver to each municipality and the geologic formation(s) from which it came. These reports should be submitted to a *County agency* and DEC.
- 3) Highway departments which spread brine should be required to have a current BUD and maintain records of the amount of brine spread daily and on which roads.
- 4) DEC should be required to verify that all brine spread on roads in Chautauqua County meet the specifications submitted to DEC with the BUD.
- 5) Highway Departments which spread brine should do so following written guidelines that include recommended application rates, procedures, equipment and a material handling safety plan. The NYSDOT (2012) and CCDPF (2013) have guidelines in place for snow and ice control but their focus is primarily on the use of rock salt and has little detail on use of well brine. These documents should be updated with greater detail and improved guidelines for road spreading oil and gas well brine.
- 6) Use of brine from HVHF wells should be prohibited for road spreading in Chautauqua County because of the concern related to high radiation levels and potential adverse chemistries of gas well brine produced from shale formations.
- 7) Chautauqua County should initiate or participate in studies to assess the following:
  - a) What are the risks of road spreading brine to public health and the environment?
  - b) Evaluate pre-wetting salt with brine rather than spreading straight brine. This is being done in some communities in New York (e.g. Town of Byron and Warren County) and it may be a way of using less brine and less salt for deicing, while achieving the same results. Likewise anti-icing can reduce total brine or salt used and should be encouraged where and when appropriate.
  - c) Spot-check brine transfers and storage for radioactivity.
  - d) Considering the common corrosion by brine, routinely inspect existing storage and transfer facilities for degradation.
  - e) Identify which county agency would be appropriate to monitor this activity and compile related data.
- 8) WQTF should reevaluate this issue after five years of brine chemistry data has been collected.

## REFERENCES

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