



# OHIO BRINE TASK FORCE



**“We are concerned about the long-term impacts on health and the environment”**

Casey Weinstein, Ranking Member  
Energy and Natural Resources committee  
77 South High Street  
10th Floor  
Columbus, OH 43215

Dear Ranking Member Weinstein,

The educational packet you are reviewing brings out the important facts concerning AquaSalina and brine products used for de-icing of roads. These facts are not revealed in the sponsor testimony presented by Representative Bob Young and Representative Don Jones in HB 282.

Representative Young and Representative Jones lead the committee to believe AquaSalina is an environmentally friendly product because all of the oil and gas components have been removed. This is simply not true. AquaSalina, as all oil and gas waste brine, no matter how it has been filtered or recycled is not depleted of oil and gas by products. It is true that the levels of some of the compounds have been reduced except for two components and those are Radium 226 and Radium 228.

The sponsors of HB 282 also want you to believe that there are studies that conclude that the use of brine from oil and gas waste on roads is environmentally friendly. Since there are no studies quoted, it cannot be assumed that this is a fact. There are numerous studies revealing the potential harmful effects of the use of oil and gas waste brine on roads.

<https://www.ehn.org/fracking-wastewater-spread-on-roads-2573426742.html>,  
<https://news.climate.columbia.edu/2018/12/11/road-salt-harms-environment/>,  
<https://pubs.acs.org/doi/10.1021/acs.est.8b00716>,

All of these studies (and these are just a few) reveal levels of radium in oil and gas waste brine that is not removed. Ohio does not require it and therefore the amounts of radium from the manufactured product is the same as it is in the wells from which it comes. By the way, most if not all of the oil and gas waste brine used to produce AquaSalina comes from well that are owned by Duck Creek Energy the company that manufactures AquaSalina. Where other well owners must dispose of their waste into Class II injection wells, Duck Creek takes its radioactive brine and bottles it for purchase by the public. ODNR conducted studies of conventional well brine and found that there were levels of radium far in excess of federal and state regulations for radium 226 and 228. It is inconceivable to allow 20,000 pCi/L of radium to be in a product when EPA drinking water standards only allow 5 pCi/L and OAC 3701:1-38-12 allows 60 pCi/L Radium 226 and 60 pCi/L of Radium 228 for a combined total of 120pCi/L for release into the environment. This amount of radioactive material asked to be allowed as a standard in this bill *defies* state and federal laws.

As the spreading of AquaSalina or any other oil and gas brine is used for dust control or deicing, the amount of radium will build rather than lessen and remain cumulative. One of the comments from ODNR

on HB 282 states “The bill allows for any person to use the “commodity” for ice and dust control. The long-term impact for private use is unknown. Regarding its radioactive content, commercial use for

road-spreading and person use at home present entirely different human exposure risks.” In fact, the long-term use of any oil and gas waste brine is unknown! There is no defense for this amount of radioactive material to be in a product that the public will be exposed to.

ODOT does use and has used AquaSalina as a deicing treatment on some state roads. Each district has the option of using it and many have chosen to not use it. Each year for the past 2 years ODOT has decreased significantly the use of AquaSalina. Quoting from ODOT’s public information officer on the use of AquaSalina, “ODOT had a 38.9% decrease from last year”.

We ask the members of this committee to educate yourselves on this dangerous bill. Other sponsors and former members of this committee rejected it over and over, and yet it comes before you again. The state has regulatory agencies for a good reason. ODNR/DOGRM regulates everything oil and gas. AquaSalina, no matter what label and what logo is put on it, it is a harmful radioactive by product of oil and gas waste.

This committee should not vote to pass this out of committee for consideration by the full house.

We will be testifying on this bill, however, if you have any questions, please contact us.

Sincerely,

Ohio Brine Task Force

Teresa Mills [tmills@benohio.org](mailto:tmills@benohio.org)

Roxanne Groff [roxannegroff1227@gmail.com](mailto:roxannegroff1227@gmail.com)



**OHIO DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF OIL AND GAS RESOURCES MANAGEMENT**



Comments regarding

**S.B. No. 171**

- The bill eliminates all current statutes that regulate the spreading of conventional oil & gas brine for ice and dust control for brine that is deemed a “commodity” by a third party of which the Division has no input.
- The bill eliminates current statutory requirements for local government approval for the spreading of conventional oil & gas brine for ice and dust control on that government’s roads for brine that is determined a “commodity”.
- Exempts “commodity” brine spreading from ten minimum safety standards for spreading, reporting requirements, and bonding and insurance requirements for brine haulers established in current law.
- Prevents cradle to grave tracking of brine hauling and disposal in Ohio. An owner could report brine production at a well, but without reporting requirements of “commodity” brine spreading, the Division would have no record of its disposal.
- Previously amended the statute to decrease the one-time brine hauler registration fee from \$500 to \$50 in response to past versions of the legislation.
- If the “brine” is a commodity and a third party approves the use, the draft states that no provision of Revised Code may apply to it. Thus, once a commodity always a commodity.
- The bill prescribes the criteria that the Division must use for approval as a commodity but, it also eliminates the Divisions ability to conduct regulatory oversight in a manner consistent with routine inspection policies established to ensure the safety of the public and the environment from Division permitted activities. The bill only allows testing four times a year by the Division.
- The bill requires the Division to accept the approval of third-party entities evaluation that the Division had no knowledge of, input on, or any legal authority to require any input on.
- Two of the listed third-party approvers that directly affect if brine is a “commodity” are and may be out of state with no Ohio regulatory oversight.
- The proscribed acceptance limit for Ra-226 @20,000 pCi/l and Ra-228 @2,500 pCi/l are inconsistent with concentrations currently approved in other States such as North Dakota and Colorado for the spreading of conventional oil & gas brine for ice and dust control. This value is four times higher than some other states that regulate brine spreading.
- The bill allows for any person to use the “commodity” for ice and dust control. The long-term impact for private use is unknown. Regarding it’s radioactive content, commercial use for road-spreading and personal use at home present entirely different human exposure risks.
- The bill requires the Division to approve brine as a commodity using criteria as a one-time approval process and specifically prohibits any future changes or updates to the process regardless of unanticipated or unintentional

consequences of its use.

- Because the Division regulates brine spreading, the Division will have to fulfill public records requests and answer questions of the public even though the Division had no part in the approval and cannot stop the brine as qualifying as a “commodity”.

# House Bill 282

## AQUASALINA

Aqua Salina is a product made by filtering brine from conventional wells and adding an anti-corrosive chemical. It has been sold to the general public as well as to the State of Ohio for use on our roads. A total of five legislative bills have been introduced during multiple General Assemblies seeking to protect this product from regulation.

All samples of AquaSalina tested by ODNR exceeded federal Drinking Water legal limits for combined Ra-226 and Ra-228, averaging 1,731 pCi/L, or *346 times* the EPA standard. The highest concentration found (from a container of AquaSalina purchased from a hardware store in Hartville, OH) was almost 500 times the standard. Ra-226 and Ra-228 radioactivity in all samples also exceeded State of Ohio limits for discharge to the environment (OAC 3701:1-38-12, App. C, Table II, Effluent Concentrations). The combined radium Ra226/Ra228 concentration in all samples of post-production AquaSalina, other than the Hartville Hardware sample, averaged within 10% of each other at 1,578.6 pCi/l. (ODNR Interoffice Memo 7/26/17; pdf at [benohio.org](http://benohio.org) issues page)

## UPDATE ON AQUASALINA TESTING

In February and March of 2020, the Ohio Department of Natural Resources did split sampling of AquaSalina with Nature's Own Sources. Their conclusion was that the process did not *increase* the concentration of Radium 226 and 228. However, this conclusion is irrelevant — it has nothing to do with whether the levels found are *safe*. They clearly are not! See below for a short breakdown of the concentration.

**Table 3** - Summary of DOGRM split-sample results from Table 1 (radiochemistry analysis).

Combined Ra226 & Ra228	Minimum pCi/l	Average pCi/l	Maximum pCi/l
Raw Brine (conventional wells)	1047	3715	9602
Finished Brine (AquaSalina)	901	2510	5628

**Table 4** - Summary of DOGRM split-sample results from Table 2 (indirect gamma analysis).

Combined Ra226 & Ra228	Minimum pCi/l	Average pCi/l	Maximum pCi/l
Raw Brine (conventional wells)	1328	3987	9541
Finished Brine (AquaSalina)	1328	3251	7415

- Aquasalina is approved for road use in 224 townships/municipalities in Ohio.
- Ohio Department of Transportation also uses AquaSalina on state roads in 29 counties.

Under federal and state Underground Injection Control (UIC) regulations, any waste containing radioactive concentrations exceeding those designated by the Nuclear Regulatory Commission (10 CFR 20 Appendix B, Table 2, Column 2) must be treated as radioactive and disposed of accordingly. For both radium-226 *and* radium-228, the threshold is 60 pCi/L for a combined threshold of 120 pCi/L. Only legal exemptions for oil and gas industry waste allow this radioactive waste to be both sold as a commodity and used indiscriminately on public roads with no assessment of environmental and public health impacts. Allowing the spreading of radioactive waste in the environment is a serious health issue that must be halted now! See HB 282 factsheet next page.

## Health Effects and Dangers of Radium

U.S. EPA and the National Academy of Sciences Committee on Biological Effects of Ionizing Radiation list radium as a known human carcinogen. (ATSDR ToxFAQs) Human exposure results in an increased incidence of bone, liver, and breast cancer. Radium-226 is especially dangerous because, unlike many radioactive isotopes, it dissolves readily in water. When the contaminated water is ingested, the body mistakes Ra-226 for dissolved calcium and deposits it in bones. Radium-226 is thus called a bone seeker. Radium 226 and 228 are the parents of radon gas, a major cause of lung cancer.

USEPA has set a health guideline of zero for all radioactive elements in drinking water. However, federal legal limits for radiation and radioactive contaminants are based on the cost of removing contaminants and don't necessarily reflect exposure levels considered safe by public health and medical officials. Since detection limits (minimum level needed for detectability) of radioactive substances in water are higher than health-based guidelines, even residents of communities with "no detected radiation" may face cancer risks from radioactivity in drinking water.

We have been told over and over that brine is safe because it is from waste produced by conventional wells rather than unconventional horizontal wells. As we suspected all along, this assumption is false; waste from conventional wells can be highly radioactive. Radium 226 has a half-life of 1,600 years, meaning that in 1,600 years, half of the radium concentration will still be present. Thus for the highest concentration tested from an Ohio well (9,602 picocuries), the concentration will still be 4,801 picocuries 1,600 years from now.

For more info, contact [info@benohio.org](mailto:info@benohio.org). Useful background and links at [rollingstone.com/politics/politics-features/oil-gas-fracking-radioactive-investigation-937389/](http://rollingstone.com/politics/politics-features/oil-gas-fracking-radioactive-investigation-937389/) published 1-21-20



## House Bill 282 fact sheet



**HB 282** will allow cancer-causing “brine” from vertically drilled oil and gas wells to be taken out from under the regulatory control of the Ohio Department of Natural Resources (Ohio DNR). If the owners of AquaSalina by Nature’s Own make a one-time paperwork filing showing that this radioactive oil and gas waste has been approved for use elsewhere, they will meet the requirement that will allow them to be free of Ohio environmental regulation.

**HB 282** removes and restricts Ohio DNR authority. ODNR will only be allowed to accept limited documentation that would supposedly demonstrate that the product is “not expected to result in damage or injury to public health and safety or the environment.” No proof will be necessary to document that AquaSalina is safe. No warning labels are required stating that the product contains radioactive isotopes, even when it is understood through recent testing, that they exceed safety limits for environmental discharge.

**HB 282** will prohibit the chief from future rulemaking that would protect public health or the environment.

**HB 282** will not only legalize others to sell radioactive oil and gas waste as a commodity; it also would give bulletproof protection to the drilling industry against liability.

**HB 282** will also extend to ORC 1509.222 and 1509.223, which will remove crucial oversight of the transportation and application of the radioactive commodity. No longer would haulers of the radioactive commodity be required to file an annual report on the location, date, time, and amounts of “brine” transported and disposed of at each location.

**HB 282** does not provide standards for testing of the product to prove its safety. No chemical disclosure or lab results are required.

**HB 282** limits the number of tests the chief can request on a particular product to four tests annually.

### **ODNR testing results of conventional brine for radioactivity as quoted in the ODNR report**

Advise Nature’s Own Source/AquaSalina that the average radioactivity in AquaSalina **exceeds** the 40 CFR 141.66 Drinking Water limits for combined Ra-226 and Ra-228 by a factor of 300; thus, human consumption of any amount of AquaSalina is highly discouraged. (ODNR Interoffice Memo 7/26/17)

Advise Nature's Own Source/AquaSalina that the radioactivity in AquaSalina exceeds State of Ohio discharge to the environment limits for Ra-226 and Ra-228 as delineated in Ohio Administrative Code 3701:1-38-12, Appendix C, Table II, Effluent Concentrations. (ODNR Interoffice Memo 7/26/17)...

Combined radium Ra226/Ra228 concentration in the Nature's Own Source/AquaSalina container purchased from Hartville Hardware was the highest identified in this study at 2,491 pCi/l. (ODNR Interoffice Memo 7/26/17)

The USEPA National Primary Drinking Water Regulation, 40 CFR 141.66 limits combined Ra226 and Ra-228 in drinking water to 5.0 pCi/l. All sample results (except the DOT tap water) exceed the regulation. (ODNR Interoffice Memo 7/26/17)

All sample results (except the DOT samples) exceed the state of Ohio discharge to the environment limits for Ra-226 and Ra-228 as delineated in Ohio Administrative Code 3701:2-38-12, Appendix C, Table II, Effluent Concentrations. (ODNR Interoffice Memo 7/26/17)

**WARNING!** We see House Bill 282 as an industry attempt to deregulate waste fluids from the oil and gas production industry. These wastes have proved to be radioactive at levels well above limits that have been deemed safe. If HB 282 were to pass the Ohio legislature, the public would never know where these radioactive waste fluids from vertical wells have been spread. It will not be that ODNR won't tell us; they won't know either! Currently, if a local government wants to spread the liquid waste from the oil and gas industries, they must pass a local resolution and provide that to ODNR, and document the amounts and source locations of the materials. Under HB 282, a local resolution will not be required if the fluids come from vertical wells, and your local elected officials may not even know it is being used.

**Contact Buckeye Environmental Network for more information [info@benohio.org](mailto:info@benohio.org)**





Division of Oil and Gas Resources Management  
Radiation Safety Section



Interoffice Memorandum

TO: Richard J. Simmers, Chief  
THROUGH: Scott Kell, Assistant Chief  
FROM: Chuck McCracken, Manager, Radiation Safety Section *clm*  
DATE: July 26, 2017  
RE: ASSESSMENT OF RA226 & RA228 RADIOACTIVITY IN AQUASALINA

As requested, an analytical assessment of the radioactive content of Nature's Own Source / AquaSalina and the vertical well brine associated with its production was initiated on May 24, 2017. During the month of June 2017, Radiation Safety Section (RSS) staff partnered with Environmental Safety Section staff to collect 14 samples from 6 locations in Ohio. All samples were sent to PACE Radiological Analytical Laboratory with the last of the analytical results being received back from PACE on July 5, 2017.

The attached radiological survey report no. 2017-044 details the RSS radiological assessment process and the results achieved. Based on the findings in this assessment, the following recommendations are being made for your consideration:

1. Advise Nature's Own Source/AquaSalina that our assessment finds that they are producing TENORM however, we require additional details about their production process to be absolutely certain. *(NOTE: We may need to collect additional pre and post samples)*
2. Advise Nature's Own Source/AquaSalina that the average radioactivity in AquaSalina exceeds the 40 CFR 141.66 Drinking Water limits for combined Ra-226 and Ra-228 by a factor of 300, thus human consumption of any amount of AquaSalina is highly discouraged.
3. Advise Nature's Own Source/AquaSalina that the radioactivity in AquaSalina exceeds State of Ohio discharge to the environment limits for Ra-226 and Ra-228 as delineated in Ohio Administrative Code 3701:1-38-12, Appendix C, Table II, Effluent Concentrations.
4. DOGRM should continue to analyze the radioactive concentrations in vertical formation brine to create an Ohio specific data set that can be used to further assess impacts to humans and the environment from the use of vertical brine from the oil and gas industry for dust suppression and road stability.

cf: Eric Vendel, Legal Counsel



**DIVISION OF OIL & GAS  
RESOURCES MANAGEMENT,  
RADIATION SAFETY SECTION**



**RADIOLOGICAL ASSESSMENT  
SPECIAL REPORT**

Report No: 2017-044

Permit No(s): Chief's Order 2004-82

Location(s): Nature's Own Source/AquaSalina  
246 North Cleveland Avenue Mogadore,  
OH 44260

Nature's Own Source/AquaSalina  
2850 W. 3<sup>rd</sup> Street  
Cleveland, OH 44113

Counties: Guernsey, Summit, Tuscarawas, Cuyahoga

Date(s): June 2, 2017, June 5, 2017, June 12, 2017,  
June 15, 2017 and June 21, 2017

Inspector: Robert Leidy Date: 07/20/2017

Robert Leidy  
Senior Health Physicist

Inspector: Paul Carder Date: 07/26/2017

Paul Carder  
Senior Health Physicist

Supervisor: Chuck McCracken Date: 07/26/2017

Chuck McCracken  
Section Manager

## 1.0 Purpose

At the request of the Chief, Division of Oil & Gas, an analytical assessment of the radioactive content of Nature's Own Source / AquaSalina and the vertical well brine associated with its production was conducted.

## 2.0 Scope of Action / Sampling Methodology

### May 24, 2017

Two Ohio Department of Natural Resources, Division of Oil & Gas Resources Management (DOGRM) staffs were assigned to go to Nature's Own Source /AquaSalina facility located at 246 North Cleveland Avenue, Mogadore, OH 44260 to collect pre and post-production samples of their liquid deicer, AquaSalina. Upon arrival staff was met by Stephanie Moore. The property owner, Jeff Moore, spoke to staff by phone and requested that they communicate directly with Mr. Dave Mansbery, the owner of Nature's Own Source/AquaSalina. Staff spoke with Mr. Mansbery, who was attending an Ohio DOT trade show. Mr. Mansbery said that AquaSalina is out of season and not currently in production but there is product on site. Mr. Mansbery offered to make arrangements for a qualified individual to be onsite to assist DOGRM staff by providing access and collecting split samples of AquaSalina. Staff suggested to Mr. Mansbery that he coordinate a return visit to the Mogadore facility with DOGRM Management. No samples were collected this day.

### June 2, 2017

A DOGRM Columbus office staff member collected two 1-liter samples from a container of AquaSalina that was in storage at the DOGRM Environmental Analytical Laboratory located at 325 N. 7th St., Cambridge, Ohio 43725. Each sample was preserved with HNO<sub>3</sub>. A chain of custody was created and the samples were delivered to the Pace Analytical Laboratories Service Center located at 4860 Blazer Pkwy, Dublin, OH 43017.

### June 2, 2017

A DOGRM Uniontown office staff member was assigned to go to Hartville Hardware located at 1315 Edison St., NW, Hartville, OH 44632. Staff purchased a 1.74 gallon container of AquaSalina at this location. Staff then went to Lowe's Home Center located at 940 Interstate Parkway, Akron, OH 44312 and at 12:20 pm, purchased a 2.11 gallon container of AquaSalina. Two 1-liter samples were collected from each of the 2 containers of AquaSalina. Each sample was preserved with HNO<sub>3</sub>. A chain of custody was created and the samples were delivered to the Pace Analytical Laboratories Service Center located at 4860 Blazer Pkwy, Dublin, OH 43017.

### June 12, 2017

Two DOGRM staff members were assigned to go to the ODOT Tuscarawas County Garage located at 384 Stonecreek Road SE, New Philadelphia, 44663 to collect samples of brine that was made by adding halite salt to tap water. Two 1-liter samples were collected and each sample was preserved with HNO<sub>3</sub>. A chain of custody was created and the samples were delivered to the Pace Analytical Laboratories Service Center located at 4860 Blazer Pkwy, Dublin, OH 43017.

### June 12, 2017

Two DOGRM staff members were met in Mogadore by representatives for Nature's Own

Source/AquaSalina, Larry Gibler, Jim Hogue and Precision Analytical staffer, Jeremy Bratnick. Samples were collected by DOGRM and Precision Analytical of pre and post-production liquid. Each DOGRM sample was preserved with HNO<sub>3</sub> and tamperproof seals were placed on the sample containers. A chain of custody was created and the DOGRM samples were delivered to the Pace Analytical Laboratories Service Center located at 4860 Blazer Pkwy, Dublin, OH 43017.

DOGRM staffs were then directed to the Nature's Own Source/AquaSalina's Cuyahoga County facility located at 7033 Mill Road, Brecksville, OH 44141 to collect additional samples. Upon arrival staff was told that the location was a corporate office only and AquaSalina was not produced there. Staff was told that the Cuyahoga County production facility is located on the Arcelormittal Steel Mill property located at 2850 W. 3rd St., Cleveland OH. Staff was then informed that DOGRM's legal department needed to contact Nature's Own Source/AquaSalina's lawyer, Scott Doran, to discuss obtaining samples. No samples were collected.

#### June 15, 2017

Two DOGRM staff members were met at the Nature's Own Source/AquaSalina production facility on the Arcelormittal Steel Mill property by company representatives, Larry Gibler, Jim Hogue and Precision Analytical staffer, Jeremy Bratnick. Samples were collected by DOGRM and Precision Analytical of pre and post-production liquid. Each DOGRM sample was preserved with HNO<sub>3</sub> and tamperproof seals were placed on the sample containers. A chain of custody was created and the DOGRM samples were delivered to the Pace Analytical Laboratories Service Center located at 4860 Blazer Pkwy, Dublin, OH 43017.

#### June 21, 2017

DOGRM staff returned to the ODOT Tuscarawas County Garage to collect samples of the raw water used to create the brine mixture sampled on June 12, 2017. Each sample was preserved with HNO<sub>3</sub>. A chain of custody was created and the samples were delivered to the Pace Analytical Laboratories Service Center located at 4860 Blazer Pkwy, Dublin, OH 43017.

### 3.0 Observations / Analytical Results

Sample Collection Location	Collection Date	Ra226 Results (pCi/l)*	Ra228 Results (pCi/l)*	Combined Results (pCi/l)*
Lowes – Canton [purchase]	6/2/17	1,059 ± 136	604 ± 111	1,663 ± 247
Hartville Hardware [purchase]	6/2/17	1,158 ± 144	1,333 ± 241	2,491 ± 384
ODNR Cambridge Lab	6/2/17	791 ± 41.8	604 ± 25.7	1,395 ± 67.5
AquaS Mogadore - PRE	6/12/17	925 ± 116	373 ± 69.8	1,298 ± 185.8
- POST	6/12/17	1,010 ± 126	432 ± 80.1	1,442 ± 206.1
AquaS Cleve - PRE (1)	6/15/17	595 ± 772	568 ± 127	1,163 ± 899
- POST (1)	6/15/17	949 ± 478	734 ± 129	1,683 ± 607
- PRE (2)	6/15/17	501 ± 462	387 ± 75	888 ± 537
- POST (2)	6/15/17	997 ± 545	713 ± 102	1,710 ± 647
ODOT tap water - PRE	6/21/17	1.90 ± 0.8	0.922 ± 0.4	2.8 ± 1.2
ODOT mixture - POST	6/12/17	2.77 ± 1.58	5.78 ± 7.67	8.55 ± 9.27

\* Analytical laboratory results reports are attached.

## 4.1 Findings, Discussions & Conclusions

### Findings

- All post-samples collected in this study were found to be increased in radioactivity activity from their respective pre-samples.
- There was an 11% increase in combined radium Ra226/Ra228 concentration between the pre and post-samples collected from the Nature's Own Source/AquaSalina Mogadore production facility.
- There was a 45% increase in combined radium Ra226/Ra228 concentration between the pre (1) and post (1) samples collected from the Nature's Own Source/AquaSalina Cleveland production facility.
- There was a 92% increase in combined radium Ra226/Ra228 concentration between the pre (2) and post (2) samples collected from the Nature's Own Source/AquaSalina Cleveland production facility.
- The combined radium Ra226/Ra228 concentration in the Nature's Own Source/AquaSalina container purchased from Hartville Hardware was the highest identified in this study at 2,491 pCi/l.
- The combined radium Ra226/Ra228 concentration in all samples of post-production AquaSalina (except the Hartville Hardware container sample) averaged within 10% of each other at 1,578.6 pCi/l.
- There are no production dates, lot numbers or other unique identifiers on the purchased containers of Nature's Own Source/AquaSalina.

### Discussions

- Formation brine is Naturally Occurring Radioactive Material (NORM). Technologically Enhanced NORM (TENORM) is NORM that has been increased in radioactivity by or as a result of human activity<sup>1</sup>. It would appear that Nature's Own Source/AquaSalina is producing TENORM however, without additional batch processing information from them, it cannot be determined with 100% certainty that the sampled pre-production brine has been increased in radioactivity due to the AquaSalina production processes.
- The USEPA National Primary Drinking Water Regulation, 40 CFR 141.66 limits combined Ra-226 and Ra-228 in drinking water to 5.0 pCi/l.
- The State of Ohio discharge to the environment limits for Ra-226 and Ra-228, as delineated in Ohio Administrative Code 3701:1-38-12, Appendix C, Table II, Effluent Concentrations, are 60 pCi/l for each (120 pCi/l for combined Ra226 & Ra228 and the unity rule applies).

<sup>1</sup> Abbreviated TENORM definition. Full definition found in ORC 3748.01 as stated in ORC 1509.074 (C)(1)

- The Pennsylvania Department of Environmental Protection (PADEP) TENORM Study Report, Revision 1, dated May 2016 assessed radiation exposure to humans from road spreading of conventional (vertical) well brine.
  - The assessment was based on surface soil samples taken from roads where brine spreading is known to have occurred. The specific radioactive concentration of the brine that was spread on these roads was not considered in the assessment.
  - The estimated total dose to a recreationist was modeled to be 0.441 mrem/yr, which is well below PADEP's 100 mrem/yr public exposure regulatory limit.
  - The report concluded that while limited potential was found for radiation exposure to recreationist using roads treated with brine from conventional (vertical) gas wells, further study of radiological environmental impacts from the use of brine from the oil and gas industry for dust suppression and road stabilization should be conducted.
- Other states in our region of the U.S. that allow road spreading of vertical oil and gas well brine include Michigan, Illinois, Pennsylvania and West Virginia.

### Conclusions

- Analytical results suggests that Nature's Own Source/AquaSalina is producing TENORM however, without additional batch processing information, it cannot be determined with 100% certainty that the sampled pre-production brine has been increased in radioactivity due to the AquaSalina production processes.
- All sample results (except the DOT tap water) **exceed** the USEPA 40 CFR 141.66 Drinking Water limits of combined Ra-226 and Ra-228 at less than or equal to 5.0 pCi/l.
- None of the sampled liquids (except DOT tap water) in this assessment are meant for human consumption.
- All sample results (except the DOT samples) **exceed** State of Ohio discharge to the environment limits for Ra-226 and Ra-228 as delineated in Ohio Administrative Code 3701:1-38-12, Appendix C, Table II, Effluent Concentrations.

These liquid effluent concentration limits were originally codified by the U.S. Nuclear Regulatory Commission to limit public radiation exposure to 50 millirem per year from ingestion of radioactive material discharged into rivers, streams and other bodies of water by companies and facilities licensed to possess and handle radioactive materials.

- None of the sampled liquids (except DOT tap water) in this assessment are meant for human consumption.
- Using the assumptions and findings in the PADEP study, RSS evaluated the post-processing sample results from this assessment and determined that it is unlikely that radiation exposure to Ohioans from road spreading of vertical brine would exceed the 100 mrem/yr public dose limit.

## 5.1 Recommendations

1. Advise Nature's Own Source/AquaSalina that our assessment finds that they are producing TENORM however, we require additional details about their production process to be absolutely certain. (NOTE: We may need to collect additional pre and post samples)
2. Advise Nature's Own Source/AquaSalina that the average radioactivity in AquaSalina exceeds the 40 CFR 141.66 Safe Drinking Water limits for combined Ra-226 and Ra-228 by a factor of 300, thus human consumption of any amount of AquaSalina is highly discouraged.
3. Advise Nature's Own Source/AquaSalina that the radioactivity in AquaSalina exceeds State of Ohio discharge to the environment limits for Ra-226 and Ra-228 as delineated in Ohio Administrative Code 3701:1-38-12, Appendix C, Table II, Effluent Concentrations.
4. DOGRM should continue to analyze the radioactive concentrations in vertical formation brine to create an Ohio specific data set that can be used to further assess impacts to humans and the environment from the use of brine from the oil and gas industry for dust suppression and road stabilization.



Center for Health, Environment & Justice

P.O. Box 6806 • Falls Church, VA 22040 • Phone: 703.237.2249 • Fax: 703.237.8389 • [www.chej.org](http://www.chej.org)

May 31, 2018

Teresa Mills  
Executive Director  
Buckeye Environmental Network  
2319 Parkridge Court  
Grove City, OH 43123

Dear Ms. Mills:

I have reviewed the Ohio Department of Natural Resources Division of Oil and Gas Resources Management (DOGRM), Radiation Safety Section Interoffice Memorandum, prepared by Chuck McCracken, Manager of the Radiation Safety Section on July the 26<sup>th</sup>, 2017 at the request of Richard Simmers, Chief, Division of Oil & Gas. This memo clearly and irrefutably shows that AquaSalina deicing brine is not fit to be sold to the public as it contains levels of radioactivity that present significant risks to public health and the environment.

This report evaluated the results of radiological testing of samples collected from a consumer product, AquaSalina, produced by Nature's Own Source. The product is sold as a deicing liquid that is produced from radioactive oil and gas industry waste. This report makes clear the public health risks that this product poses for consumers and for the environment. Unfortunately, the recommendations of the Radiation Safety Section of the DOGRM do not go far enough to protect the public and the environment from the high levels of radiation found in this consumer product. The testing done by DOGRM found the average level of radiation in the twelve samples collected from throughout the state to be 346 times greater than the U.S. EPA Drinking Water standard for combined Radium-226 and Radium-228. The concentrations of combined Radium-226 and Radium-228 ranged from a low of 1,395 picocuries per Liter (pCi/L) to a high of 2,491 pCi/L. The average concentration was 1,731 pCi/L.<sup>1</sup> The U.S. EPA Drinking Water standard for combined Radium-226 and Radium-228 is 5 pCi/L. The highest concentration found was almost 500 times this standard. This sample was taken from a container of AquaSalina purchased from a hardware store in Hartville, OH.

In addition, the concentration of combined Radium-226 and Radium-228 in all samples exceeded the environmental discharge limit of 120 pCi/L established in the Ohio Administrative Code 3701:1-38-12, Appendix C, Table II. The average concentration of combined Radium-226/228 was

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<sup>1</sup> DOGRM calculated an average concentration of combined Radium-226/228 of 1,579 pCi/L after deleting the highest concentration found without stating their rationale for doing this. Perhaps their reasoning was to "throw out" the highest reading as an outlier. Whatever their reason, it is inappropriate to do this because of the small number of samples. The analysis in this letter report includes the results of all samples including the highest reading.

more than 13 times the administrative code limit, with a range from 11.6 to 20.8 times greater than this limit.

DOGRM staff collected samples of the liquid deicing brine, AquaSalina, produced and sold to consumers by Nature's Own Source. A total of 14 samples were collected from 6 locations in Ohio. Four of these samples were background samples, two were untreated tap water and two were tap water mixed with halite solution. The remaining 10 samples of the AquaSalina product were collected from 5 locations. Eight of these samples (including 2 duplicates) were collected from 3 different production facilities where samples were collected as a pre- and post-production liquid product. The final two samples were collected from two stores where the finished AquaSalina consumer product was purchased.

The brine used in Nature's Own Source's AquaSalina product is treated radioactive oil and gas industry waste. The company's treatment process appears to increase the concentration of combined Radium-226/228 in the final product. All three post-treatment samples collected from Nature's Own Source production plants had substantially more radiation than the pre-treatment samples indicating that the addition of the radioactive oil and gas industry waste was the primary source of the radiation. The increase in combined Radium-226 and Radium-228 ranged from 11% to 92% in these three samples as shown in the DOGRM memorandum. Left untreated, the waste produced as a by-product of the oil and gas activity would be classified as a Naturally Occurring Radioactive Material (NORM). However, the treatment process used by Nature's Own Source to manufacture AquaSalina increases the radioactivity of the material resulting in a Technologically Enhanced NORM, or TENORM.

DOGRM wrongfully dismisses the potential health risks these findings pose by arguing that "it is unlikely that radiation exposure to Ohioans from road spreading of vertical brine would exceed the 100 mrem/year public dose limit" established by the U.S. Nuclear Regulatory Commission. This conclusion is inappropriate because it is based on a study conducted by the PA DEP in May 2016, and, unfortunately, the details on how the exposure calculations were estimated are not disclosed in the DOGRM report.

DOGRM did prepare a follow-up calculation in July of 2017, using the maximum concentration of combined radium found in the AquaSalina samples to calculate an estimated dosage of radiation a recreational Ohio citizen would experience from roads treated with the spreading of the radioactive brine product. This analysis did find that radioactive exposures were twice as high as in the PADEP study, as DOGRM simply adopted the PA DEP exposure estimates without providing any details on how the exposures were determined. For example, no details are provided on how the recreational user is exposed including by what routes of exposure, how often, over what period-of-time, via how many routes of exposure, or whether cumulative exposures were taken into consideration. These details have potentially huge variability. Furthermore, no specific reference to the PA DEP report is provided.

Without details on the exposure estimates, it is not possible to independently evaluate how this estimate was made. It is important, to note, however, the ease with which AquaSalina can contaminate watersheds, recreational areas, and drinking water supplies if its continued use and application is allowed. The inherent purpose of the product is to lower the freezing point of water, either preventing liquid water from freezing or making it easier for solid water to melt. The

intended use of this product brings huge volumes of water into direct contact with highly radioactive waste material before it flows off and joins the greater watershed. Streams, rivers and lakes used for recreation, fishing, and ultimately for drinking water, can be impacted by this radiation, with levels of radioactivity increasing greatly as more consumers apply this product. It is also problematic that AquaSalina is not only used for deicing roadways, but it can also be used by consumers on their sidewalks, driveways, and steps leaving increased risk of tracking the radioactive waste into residential homes.

The recommendations by DOGRM call for more testing, which certainly makes sense, and to alert Nature's Own Source who makes AquaSalina that their product exceeds these standards. But the recommendations fail to require the company to take any action to address this measure of risk. Consequently, the public will continue to be unaware of the risks using this product poses not only to human health but to the environment. Consumers will also be needlessly exposed to high levels of radiation when they use the product.

The state of Ohio would be derelict in its duty to protect the public and the environment from the high levels of radiation found in this consumer product if it takes no further action. At a minimum, more testing is needed, and further sales of this product should be halted until additional testing information can be acquired.

I hope these comments are helpful. Feel free to contact me if you have any questions or need further clarification.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen Lester", with a stylized flourish at the end.

Stephen Lester  
Science Director

Dear committee members,

Bill similar to House Bill 282 has been before the House and Senate committees for consideration since 2017. In early 2020, HB 545 was introduced by Representative Adam Holmes. Before Covid shut down institutions and access to our public officials in person, members of Buckeye Environmental Network and the Ohio Brine Task Force met with Representative Holmes and his aide. We presented much of the information before you in this packet for his review.

Representative Holmes then met with staff from ODNR to help understand their concerns with the bill. Those concerns are the same today as they were then, with the added concern of radiation exposure. The following is the information from Representative Adam Holmes.

May 11, 2020,  
4:28 PM

**Kyle.Miller@ohiohouse.gov <Kyle.Miller@ohiohouse.gov>**

Roxanne,

Thank you for the email. We are doing well and hope your family is too. We can certainly let you know when a date is set for sponsor testimony. In the meantime, Representative Holmes was wondering if we could schedule a follow up call with you for later this week or next? He would like to get your thoughts on a couple conversations he has had with other interested parties regarding HB 545. In particular a call he had with representatives from ODNR was very informative. I have attached our notes from that call to give you some background.

When you get the chance, please send let me know your availability and we will set up a call.

Sincerely,

Kyle Miller



*Legislative Aide, Office of Representative Adam Holmes  
Class of 2019, Capital University  
Phone: (614) 644-6014  
77 South High Street, 13<sup>th</sup> Floor  
Columbus, OH 43215*

## **Notes from Conference Call with ODNR Team Regarding HB 545**

**April 22, 2020**

Some of the reasons our office cited for introducing the bill were 1) It would support the oil and gas industry 2) It was a safe way to use the material. 3) It would drive revenue for smaller businesses.

ODNR cited the following concerns HB 545:

- 1) The brine used in AquaSalina's facility was filtered with a new technology that the company developed. It is not the same as brine that was traditionally used on the roads.
- 2) HB 545 would remove all regulatory authority from cities and townships by having brine declared a commodity. Therefore a locality would not be able to restrict the use of AquaSalina even though it is processed in a different way than other forms of brine.
- 3) HB 545 removes ODNR's jurisdiction over AquaSalina and places it in the hands of third parties like the Pacific Northwest Snow fighters. It does this by allowing any private certification entity to be the source for documentation that the product is safe for use. ODNR has no power into how such entities are certified, nor does the bill give them a mechanism to contest an entity's credibility.
- 4) ODNR would lose the ability to trace the distribution of AquaSalina in the state.
- 5) Lines 30-33 exempt any permit holder from all provisions under the ORC that are applicable to brine. This could prevent the EPA or Health department from intervening if a permit holder's product becomes a hazard.
- 6) There are studies that contest the claim that AquaSalina is safe for repeated, long term use on the roads.

## Cleveland Facility

