

March 13, 2020

Charles McCracken, Manager  
Radiation Safety Section  
Ohio Department of Natural Resources

Dear Chuck,

The information you shared with us last Wednesday was helpful. With respect to ODNR's *statements quoted below* regarding (I) testing results showing a lack of TENORM in conventional production brine at David Mansbery's AquaSalina production facilities in Mogadore and Cleveland (but showing no significant overall reduction in harmful NORM radiation from Radium-226 and Radium-228 concentrations) and (II) testing approximately one month earlier of Radium-226 and Radium-228 radioactivity found in AquaSalina, kindly respond to the questions set forth in section (III) below

- (I) **The August 19, 2019, ODNR letter from Charles D. McCracken to David Mansbery, "RE: Investigation of the effect on Radium-226 and Radium-228 concentrations in conventional production brine by the AquaSalina production processes at the Duck Creek, Inc. Mogadore and Cleveland facilities."**

Quotation (I). The last paragraph states:

Based on an assessment of the radiological analytical data from samples collected by DOGRM in 2017 and 2019, as supplemented by the data and statistical analysis results in the ToxStrategies Analysis 2 and the findings of the statistical analysis review by Dr. Kirk Cameron, MacStat Consulting, Ltd., DOGRM concludes that the Duck Creek Energy, Inc. process investigated, does not produce Technologically Enhanced Naturally Occurring Radioactive Material (TENORM).

- (II) **The July 26, 2017, ODNR Interoffice Memorandum from Charles D. McCracken to Richard J. Simmers through Scott Kell, "RE: ASSESSMENT OF RA-226 & RA-228 RADIOACTIVITY IN AQUASALINA."**

Quotation (II). Recommendations 2, 3, and 4 state:

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 AguaSalina 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.

**(III) Questions.**

A. With reference to the testing of AquaSalina and conventional brine and the decision addressed in Recommendation 2 of the July 26, 2017, ODNR Interoffice Memorandum discussed above, at this time does ODNR stand by its conclusion “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 AguaSalina is highly discouraged? If not, how and why did ODNR change its position?

B. With reference to the testing of AquaSalina and conventional brine and the decision addressed in Recommendation 3 of the July 26, 2017, ODNR Interoffice Memorandum discussed above, at this time does ODNR stand by its conclusion 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? If not, how and why did ODNR change its position?

C. Do you agree that the conclusion in the paragraph at the top of page 2 of the August 19, 2019, ODNR letter and its attachments is that “the Duck Creek Energy, Inc. process investigated, does not produce Technologically Enhanced Naturally Occurring Radioactive Material (TENORM)” but that, as was stated on behalf of ODNR in our recent meeting, you would never say AquaSalina and the brine used in its production is “safe”? If not, why not?

D. Do you still agree, as you indicated you did at our recent meeting, that just because the AquaSalina process did not increase the concentration of radioactive isotopes (create TENORM), the material is still radioactive? If not, why not?

E. Do you still believe, as you did in our recent meeting when we inquired about the risk of using AquaSalina and oil and gas brine from conventional wells, that you would never say those substances are “safe”? If not, why not?

F. With reference to the testing of AquaSalina and conventional brine and the decision addressed in Recommendation 4 of the July 26, 2017, ODNR Interoffice Memorandum discussed above, at this time does ODNR stand by its conclusion that “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”? If not, why not?

G. Since issuing the July 26, 2017, ODNR Interoffice Memorandum, have you continued testing AquaSalina and/or conventional brine “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”? If not, why not?

H. In our recent meeting, when you said (i) ODNR was “following the law” and (ii) you would never call the radioactivity in AquaSalina and the oil and gas brine used in its production “safe,” what did you mean by “following the law”? Did you mean “public health” and “safety” are not a concern of ODNR?

I. Has the Chief, pursuant to R.C. 1509.222(E), “adopt[ed] rules, issue[d] orders [or] attach[ed] terms and conditions to registration certificates as may be necessary . . . for protection of public health or safety” from radiation caused by the Radium-226 and Radium-228 in the oil and gas brine spread on roads pursuant to R.C. 1509.226, including but not limited to AquaSalina?

J. With respect to the Ohio Department of Health (ODOH) study that assumed a worker would spread oil and gas brine/AquaSalina only over a 1,000 square foot area, has ODNR conducted any research with respect to oil and gas brine/AquaSalina spreading pursuant to R.C. 1509.226 to determine just how many miles of roadway are normally covered in a normal workday? Do you realize that assuming the traveling lanes of a road are only 20 feet wide (as in township roads), ODOH’s 1,000 square foot test area is only fifty feet long? (For highways, the distance is shorter.) Have you considered that for every mile of township road, the fictitious worker in ODOH’s fictitious study would apply oil and gas brine/AquaSalina to 105.6 1,000 square foot sections of roadway? Do you realize that using ODOH’s fictitious annual estimate of 7.2 mrem/year for just one 1,000 square foot application area, the fictitious worker (not a trained radiation worker), whose legal limit for radiation under federal law is 100 mrem/year, would be exposed to radiation repeatedly in 105.6 of those application areas? Has ODNR conducted any actual tests of roadways and their shoulders on which oil and gas brine/AquaSalina has been applied to determine whether the harmful radiation particles (Radium-226 has a half-life to 1,600 years) remain and cumulate with each application thereby increasing the radiation dosage over time? (This will vary depending on the efficiency of the drainage from the paved roadway and the shoulders.) If not, why not?

K. When will the Chief take decisive action to protect public health and safety from the silent, malignant effects of Radium-226 and Radium-228 turned loose by the spreading of oil and gas brine/AquaSalina on roadways and other surfaces?

Looking forward to your response soon,

Teresa Mills

Roxanne Groff

Cc:

Mary Mertz

Eric Vendel

Brittney Colvin

Kenny Brown