Department of Energy
Washington, DC 20585

May 27, 2015

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Deputy Director
Mail Stop T8F5
Washington, DC 20555-0001

Subject: U.S. Department of Energy Office of Legacy Management Response to U.S. Nuclear Regulatory Commission's Comments regarding U.S. Department of Energy Report Entitled *Alternatives Analysis of Contaminated Groundwater Treatment Technologies, Tuba City, Arizona, Disposal Site*

To Whom It May Concern:

Thank you for your letter dated January 13, 2015, referencing the U.S. Nuclear Regulatory Commission staff review comments regarding the U.S. Department of Energy Office of Legacy Management (DOE-LM) report titled *Alternative Analysis of Contaminated Groundwater Treatment Technologies, Tuba City, Arizona, Disposal Site, September 2014*. DOE-LM offers the following response to each of your comments:

> *"Section 4.5.3 states that the WAIV is most efficient if used in an area with low humidity and steady winds. The Tuba City site is, in general, a windy site with frequent gusts that can be very strong in nature. Are the textile sheets capable withstanding strong abrupt gusts?"*

DOE Response:

The developer of WAIV technology, Lesico CleanTech, was contacted to provide a response to this question. They stated that properly anchored, taut textile sheets can withstand gusty winds. Lesico CleanTech recently modified the design of the anchoring hooks and the bottom anchoring beam. The units with these improvements have successfully operated in 62 to 75 mile per hour wind gusts.

Damage to the textile sheets has occurred only if significant mineral deposits are formed and the sheets are allowed to flap loosely, which results in mechanical fatigue because the sheets are exposed to the sharp edges of the deposits. This failure can be prevented by periodically acid rinsing the sheets to minimize mineral deposition and maintaining tight sheet mounting to eliminate slack.

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"Could contaminated water potentially be blown off the textile sheets by strong gusts and be re-deposited downwind of the facility?"

DOE Response:

The main advantage of the WAIV technology as opposed to other enhanced solar evaporation techniques (e.g. spray ponds) is WAIV's reduced potential for release of fugitive water. The air-brine interface is stabilized by the hydrophilic nature of the textile sheets. Lesico CleanTech performed a six-month field test that showed practically no fugitive release beyond four meters of the immediate footprint of the unit. However, if strong winds are forecast, influent flow to the WAIV unit can be shut down as an additional precaution.

For the sites prone to gusting winds, Lesico CleanTech offers an additional engineered control for fugitive water through use of a hydrophobic liner material. The liner is placed beneath the WAIV unit and extends 4 meters in all directions beyond the WAIV unit footprint. The lined perimeter area is sloped to return any fugitive water that hits the liner to a collection point. WAIV units could also be installed on an "island" in an existing solar evaporation pond, such that any fugitive release from the WAIV unit would land in the pond.

"For both RO IX and MVR, the Environmental score was 60. Are there estimates of what percentage of the antiscalant, NaCl, soda ash, and cleaning agents will go to the reinjection trench and to the evaporation ponds?"

DOE Response:

The RO IX system produces a high purity (deionized) permeate stream that carries virtually no contaminant load. Similarly, the MVR system produces a high purity (distilled) condensate stream with virtually no contaminants. The high purity streams from the RO IX and the MVR systems would be discharged to the infiltration trench with non-detectable concentrations of antiscalant and cleaning agents. Antiscalant and cleaning agents are segregated into the treatment process waste streams (RO brine or MVR concentrate) and these streams are routed to the evaporation pond. The NaCl present in extracted groundwater will be concentrated in the process waste stream and routed to the evaporation pond as well. However, there will be a measurable concentration of sodium in the high purity water discharged to the infiltration trench due to soda ash addition as described below.

The high purity product streams from RO IX and MVR typically exhibit an acidic pH which must be neutralized prior to discharge. Soda ash is the neutralizing reagent, thus 100 percent of the soda ash goes to the reinjection trench. For both systems a dose of soda ash at about 70 milligrams per liter (mg/L) is projected to increase the pH to a range of 7 to 7.5. The high purity streams will carry a total dissolved solids (TDS) concentration of 220 milligrams per liter (mg/L) and a sodium concentration of 48 mg/L to the infiltration trench. By comparison the site's extracted groundwater (before treatment) has a TDS concentration of 3,550 mg/L and sodium at 260 mg/L.

"For MVR, the "NaCl Makedown" shown in Figure 3 was not explained In Section 5.1.2. Explaining the Figure would help the reader understand the process."

DOE Response:

A new sentence has been added prior to the last sentence of the text in Section 5.1.2 under the heading "Pretreatment Softening" explaining the NaCl makedown. The last three sentences now read as follows:

"The existing salt silos and regenerant solution tanks can be utilized with the new IX system. Treated water (approximately 5 gpm) will be recycled back to the NaCl Storage and Feed System to provide water for NaCl solution makedown and column rinses associated with a regeneration cycle. The estimated flow rate of spent regenerant is 5 gpm."

The modified report, *Alternative Analysis of Contaminated Groundwater Treatment Technologies, Tuba City, Arizona, Disposal Site, September 2014* has been finalized and is available on the Legacy Management website, http://www.lm.doe.gov/Tuba/Documents.aspx.

Please contact me at (970) 248-6073 or at Rich.Bush@lm.doe.gov if you have any questions. Please address any correspondence to:

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Sincerely,

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