# NOTICE OF DECISION – Bureau of Mining Regulation and Reclamation

**Date of Posting: 03/02/2023**

**Deadline for Appeal: 03/12/2023**

**STC (Schlumberger Technology Corporation)**
**Clayton Valley Rapid Infiltration Basins and Limited Exemption**
**WPC Permit NEV2022101**

The Administrator of the Nevada Division of Environmental Protection (the Division) has decided to issue new Water Pollution Control Permit NEV2022101 to STC (Schlumberger Technology Corporation). This Permit authorizes the construction, operation, monitoring, and closure of approved rapid infiltration basins and a limited exemption of the water quality standards within Clayton Valley (Hydrographic Area 143) in Esmeralda County, Nevada. The Division has been provided with sufficient information, in accordance with Nevada Administrative Code (NAC) 445A.350 through 445A.447, to assure that the waters of the State will not be degraded by this operation, and that public safety and health will be protected.

The Permit will become effective 17 March 2023. The final determination of the Administrator may be appealed to the State Environmental Commission pursuant to Nevada Revised Statute (NRS) 445A.605 and NAC 445A.407. All requests for appeals must be filed by 5:00 PM, 12 March 2023, on Form 3, with the State Environmental Commission, 901 South Stewart Street, Suite 4001, Carson City, Nevada 89701-5249. For more information, contact Robert Kuczynski, P.E., Chief-Bureau of Mining Regulation and Reclamation (BMRR) at (775) 687-9397 or visit the Division public notice website at https://ndep.nv.gov/posts/category/land.

Written comments were received during the public comment period from Karen G. Narwold, Esq., Executive Vice President, Chief Administrative Officer and General Counsel, Albemarle Corporation. Richard Morrison, Nevada Operations Officer, STC, suggested Division clarification of Permit language via telephone conversations and e-mail. The text of all comments, in some cases paraphrased or excerpted, and the Division responses (in *italics)* are included below as part of this Notice of Decision.

**Karen G. Narwold, Written Comment:**
"GFLOW is not an approved model, is not suitable in this instance, and its use should be rejected."

***Division Response 1:***

*The commenter mischaracterizes the language of the BMRR Guidance Document Listing of Accepted Codes for Groundwater and Geochemical Modelling at Mine Sites ("Guidance", originally issued in 2018, updated 2021). The Guidance lists codes that are presumptively accepted by BMRR, but the Guidance does not preclude the use of other codes. The Guidance explicitly states that "Inclusion of codes on this list is not an endorsement by the NDEP, BMRR, or the State of Nevada of the particular code, nor is exclusion of a code a rejection of that code's ability to sufficiently solve groundwater flow and transport or geochemical modelling problems." The Guidance defines characteristics of the codes that are included in the list:*

- *Have undergone extensive peer review by outside agencies or have been reviewed by NDEP personnel for suitability*
- *Have publicly available guidance documents for users*
- *Are available for download*

*GFLOW meets these criteria. The code is distributed by the USEPA Center for Exposure Assessment Modelling, a long-standing and well-regarded group within the federal Environmental Protection Agency. The documentation for the code includes a user's manual, a separate document explaining basis concepts of the model, and a recommended reference for the analytic element method that underpins GFLOW. The code is freely available for download by the public.*

*The commenter omits reference to other BMRR guidance related to groundwater modelling at mine sites in Nevada. The BMRR Guidance for Hydrogeologic Groundwater Flow Modelling at Mine Sites (Newman, 2018) summarizes the background and general requirements for groundwater flow modelling studies submitted to the Division. As Newman (2018) states, "The goal of groundwater modelling submitted to the Division is to provide a tool that can be used to inform policy and permitting decisions made by the Division."*

*Newman (2018) goes on to discuss the range of methods that may be applicable to mining-related flow evaluations. The span of acceptable methods ranges from evaluations that do not include groundwater modelling at all to fully 3D numerical approaches. As Newman (2018) states, "Numerical models may not always be the appropriate modelling method, however; in some cases, more simple models may provide more useful results." Newman (2018) describes the analytic element method employed by GFLOW and suggests that "… it is effective in many instances and should be considered for mining applications."*

*BMRR itself requested the use of GFLOW for this application. The code meets the tests outlined by BMRR guidance documents for acceptability and usefulness.*

**Karen G. Narwold, Written Comment:**
"No 2D model is listed [in the BMRR Guidance]"

***Division Response 2:***
*The commenter suggests in several places that only codes capable of representing three-dimensional (3D) numerical models are listed in the Guidance and acceptable for use. This is incorrect. The Guidance lists both CXTFIT and Hydrus-1D. Both are 1-dimensional codes. Further, the codes such as MODFLOW that are capable of representing 3D problems are not exclusively 3D. They can also be used to model 1D and 2D flow fields.*

**Karen G. Narwold, Written Comment:**
"GFLOW is a 2D model... It is overly simplistic."

***Division Response 3:***
*All mathematical models are simplified representations of natural systems. In the case of Clayton Valley, flow can be expected to be primarily 2D and horizontal in nature except in the immediate vicinity of pumping wells or surface infiltration facilities. The vertical heterogeneity of the aquifer system acts to restrict the potential for vertical movement of brine compared to horizontal movement. Horizontal heterogeneity along the flow path is adequately represented by the selection of appropriate parameter values based on the range of values either measured in the field or anticipated based on general aquifer characteristics.*

*Gradients are primarily horizontal once de-lithiated brine is introduced into the subsurface. The analysis indicates that de-lithiated brine will not travel far enough to be drawn vertically into a downgradient pumping well.*

**Karen G. Narwold, Written Comment:**
"The assumption of homogeneity is an equally important weakness in the GFLOW model."

***Division Response 4:***
*The aquifer was modelled as a simplified saturated unit with uniform properties, although sensitivity analyses were run to test different possible values for the represented hydrologic properties based on the range of values observed in the literature and field data. This approach allowed for a reasonable assessment of water movement through the system without the inclusion of multiple hydrogeologic units and their respective properties.*

*Such a simplification is appropriate since (1) data does not exist for such detailed geologic information; (2) it is unreasonable to model every clay lens, sand lens, gravel pocket, etc. in a mathematical model; (3), the time it takes for a particle to travel between two points is essentially the average of the properties between Point A and B.*

**Karen G. Narwold, Written Comment:**

"…[T]he data and assumptions used by Stantec for many of the model input parameters are not representative of the RIB facility area"

***Division Response 5:***
*As described in the modelling memo prepared by Stantec, parameter values were based on field tests both within the Project and within the same aquifer nearby but outside the Project boundary. The uncertainty in model results due to uncertainty in parameter values was tested by a sensitivity analysis and include parameters that are more conservative than reported values. The sensitivity analysis indicated that discharge from the RIB system is not expected to affect Albemarle's wells under the full range of parameter values used in the analysis.*

**Karen G. Narwold, Written Comment:**
"…[I]t would be best practice to include potential pathways of higher permeability that could allow for faster transport of impacted water from the RIBs to Albemarle's production wells. Accordingly, the model depth should be extended to a depth of approximately 600 feet bgs to include the ash layer observed in these drill holes"

***Division Response 6:***
*If a greater thickness were to be assumed, the resulting estimate of travel distance away from the RIB would be shorter, not longer. This can be seen in the sensitivity analysis described in the modelling memo. Figure 2 in the memo represents the base-case aquifer thickness of 350 ft. Figure 5 represents the sensitivity analysis with an assumed aquifer thickness of 510 ft. As would be expected, the travel distance over the same time period is shorter for the thicker aquifer assumption than for the base case.*

*Site-specific and regional data show that the thickness used in the model is reasonable. Introduction of de-lithiated brine into the aquifer will occur in the uppermost part of the aquifer, not at depths of 600 feet. For the 12 wells for which data were provided, only one well (Well #3, log 136314) has a publicly available well log. The filed log notes two ash layers at 387-391 feet and 505-531 feet in the 547-foot depth reported. The first 222 feet of that log reports interbedded silt, a generally less permeable material than the sand and ash layers below that depth. Well logs for CV-1 and CV-3 drilled at the Pilot Plant project site, finer grained materials are present deeper than 500 feet, indicative of reduced overall permeability below this depth. The presence of interbedded silts would limit vertical transport toward the deeper layers rather than enhance the thickness of the transport zone as the commenter suggests.*

**Karen G. Narwold, Written Comment:**
"The Application model used 2.8 ft/d for hydraulic conductivity. This value selection is not adequately explained or documented.... This model should incorporate testing done within the deeper zones between the proposed RIBs and the ash unit."

***Division Response 7:***

*Hydraulic conductivity values were estimated based on field data available at the depths to which the RIB system is expected to operate and within the model boundary of 1 mile from the RIB center (Stantec, 2022). Test results within the deeper zones to the base of the model are not available, so the uncertainty related to hydraulic conductivity estimates was evaluated in the sensitivity analysis.*

*The commenter summarizes and discusses values from their own SEC report (SRK, 2021) for hydraulic conductivity from testing in ash layers that are both deeper than the zone of interest and outside the model domain. According to Zampirro et al., 2004, the Tufa Aquifer (which is primarily made up of the higher conductivity volcanic ash) resides in the northwest sector of the playa, away from the pilot plant. Hydraulic conductivity measurements of the five other primary lithium-bearing aquifers (Stantec, 2021; Table 7.4) are very similar to measurements taken near the test RIB facilities (Stantec, 2022), thus the values used in GFLOW are considered representative of the modelled area.*

**Karen G. Narwold, Written Comment:**
"This would indicate a difference in water level of 79.1 feet for a gradient of 32 vertical feet per 1,000 horizontal feet. This is significantly larger than the gradient of ~5 feet per 1,000 feet simulated in the GFLOW model."

***Division Response 8:***
*The commenter presents a calculated gradient between a water level at an unspecified well location taken in January 2021 near the proposed RIBs that is presumed to be well 120A based on the reported distance. Well 120A was reportedly drilled in 2011 but does not have a publicly available well log and may have pumping interference effects from other production wells nearby. Note that in January 2021 the RIB investigation had not yet been completed and thus no data were available from shallow monitoring wells or boreholes. Water level gradients that are calculated using water levels measured on different dates and from greatly different screen depths are considered unreliable.*

*A more appropriate evaluation would be to compare the hydraulic gradient from the model used for the RIB assessment to the gradients described in the Water Resource Baseline Characterization (Stantec, 2022). This comparison shows that the model acceptably reproduces both the magnitude and direction of the interpreted hydraulic gradient in the region of interest.*

**Karen G. Narwold, Written Comment:**
"The boundaries of the model are not shown, its boundary conditions other than Angel Island are not discussed"

***Division Response 9:***
*The boundary of the near-field model domain initially proposed and agreed with the NDEP was 1 mile from the center point of the proposed RIB facilities, which is stated*

*on page 2 of the model memo. This distance encompasses the RIB facilities pumping wells closest to the project area. The alluvial materials in Clayton Valley extend more than 4 miles in a counterclockwise arc from north-northwest to south-southwest. The remaining arc to the east includes Angel Island which is comprised of Cambrian/Miocene basement rocks and the southern extension of its accompanying fault. A conservative assumption of 50% lower hydraulic conductivity was assigned to the Angel Island rocks and no difference to the southern fault extension.*

*Modelling beyond the 1-mile distance would be non-informative due to the presence of pumping wells to the north-west. Effects of pumping wells further to the north or west would be indecipherable from those of the adjacent wells.*

**Karen G. Narwold, Written Comment:**
"There is no evidence in the Application record of calibration."

***Division Response 10:***
*Calibration can take many forms but is essentially a process of comparing model output to conditions measured in the field. The model adequately represents the groundwater levels and gradients presented in the Water Resource Baseline Report when run with the available data on average annual pumping rates. This qualitative calibration is sufficient for the intended purposes of the model.*

**Karen G. Narwold, Written Comment:**
"While a ten-year model simulation may be customary, it does not effectively evaluate the impact to the aquifer or Albemarle's existing beneficial use."

***Division Response 11:***
*Due to the short duration of RIB discharge and limited discharge quantity, the model duration is considered appropriate for this evaluation.*

**Karen G. Narwold, Written Comment:**
"The Fact Sheet states that "Clayton Valley is known for its lithium-bearing brines and has been un-officially managed as an exempt aquifer for decades." BMRR presents no evidence to support this statement. And there has been no prior reason to consider whether the aquifer is exempt because this is the first application that could degrade an existing beneficial use. To Albemarle's knowledge, BMRR has never officially permitted an aquifer exemption under NAC 445A.424(2) for Clayton Valley. The SPLO [Silver Peak Lithium Operation] does not add any non-native chemicals to the brine as it is processed in the evaporation ponds other than half-way through the evaporation process, where slaked lime is added strictly as a pH adjustment. Years of groundwater monitoring and reporting document that the SPLO does not elevate the concentration of any constituent naturally in the brine, subject to the natural variability of the brine. So, BMRR has not had reason to consider an exemption for the SPLO. And, as the only existing "industrial" beneficial use in Clayton Valley since the 1960s, the SPLO does not impair any beneficial uses of water as the result of its operations—which would violate

NAC 445A.120, NAC 445A.424(1), and the State policy set forth in NRS 445A.305—and would be against the SPLO's operational interests. Albemarle depends on the quality of the Clayton Valley brine for its lithium production, so Albemarle would not discharge any effluent that would impair Albemarle's own existing lithium production use. There is no current aquifer exemption.

STC has requested the Exemption precisely so that it can discharge effluent that will degrade the Clayton Valley aquifer quality and impair existing beneficial uses, specifically Albemarle's SPLO operations. The Exemption is strictly a least-cost approach for STC so that it can avoid treating Pilot Plant process water effluent to fully remove antiscalant, flocculant, hydrochloric acid, caustic, organics, cleaning chemicals, and whatever else STC uses in the Pilot Plant—whether for lithium extraction testing, equipment cleaning and maintenance, facility cleaning and maintenance, or vehicle fueling. Regardless of whether the GFLOW model shows impairment to Albemarle's operations in the next ten years (the modeled time span), the Application acknowledges that all discharged fluids will naturally flow to the lowest point in the Basin and that the natural flow is enhanced by production well pumping. Application § 3.2.2 at p. 3.2. The SPLO has reserves sufficient to operate for at least another thirty years and, within that time span, STC's RIB discharges will be pumped into the SPLO system if the Application and the Exemption are granted.

The Nevada legislature declared that it is the policy of the State "and the purpose of NRS 445A.300 to 445A.730, inclusive: (a) To maintain the quality of the waters of the State consistent with the public health and enjoyment . . . [and] the operation of existing industries." Relevant implement regulations provide:

- "The quality of any waters receiving waste discharges must be such that no impairment of the beneficial usage of water occurs as the result of the discharge." NAC 445A.120(2);
- "A facility, regardless of size or type, may not degrade the waters of the State to the extent that: . . . (c) The quality of those waters of the State which already exceed the criteria established by subsection 2 is lowered to a level that the Department finds would render those waters unsuitable for the existing or potential municipal, industrial, domestic or agricultural use." NAC 445A.242(1)(c).
- "The following minimum design requirements apply to all process components: (a) In areas where annual evaporation exceeds annual precipitation, a process component must achieve zero discharge. (b) All sources must be designed to minimize releases of contaminants into groundwaters or subsurface migration pathways so that any release from the facility will not degrade waters of the State." NAC 445A.433(1)(a)(b).

To meet State policy and the cited prohibitions against degradation of waters of the State and impairment of existing beneficial uses, BMRR must deny the Exemption. Whether the water quality in the aquifer that would be impacted by the requested

exemption is of drinking water quality or could be treated to drinking water quality is not the only criterion that BMRR must consider in order to comply with its State water quality protection mandate. NAC 445A.242(2) requires that if BMRR is considering an exemption, it must consider the criteria listed in Section 2. *See* NAC 445A.242(2) ("the following criteria *will* be considered by the Department") (emphasis added). Nevada courts interpret "will" as mandatory. *See Mineral County v. Lyon County*, 136 Nev. 501, 517, 473 P.3d 418, 429 (2020), citing *National Resources Defense Council, Inc. v. Perry*, 940 F.3d 1072, 1078 (9th Cir. 2019) ("The word 'will,' like the word 'shall,' is a mandatory term."). However, NAC 445A.242(2) makes equally clear that it is within BMRR's discretion whether to grant an exemption. *See* NAC 445A.242(2) (the "Department *may* exempt a body of groundwater") (emphasis added).

The Application acknowledges that the process will add constituents not found in native brine. Further, the Application specifies that the discharge to the RIBs will consist of two effluent streams: depleted brine discharged from pre-treatment; and "reject from the reverse osmosis system." The Application proposes to only sample this effluent quarterly. *Id.* Yet, the discharge is from a Pilot Plant, the purpose of which is to test various technologies for lithium extraction. Pilot Plant processes include brine pretreatment, brine polishing, freshwater/process water treatment and polishing, and reverse osmosis membrane cleaning. Plant equipment must be cleaned. Vehicles will be maintained and fueled at the Pilot Plant. It is not credible that only constituents found in native brine will be discharged to the RIBs. Even if that were the case, the Application acknowledges that several constituents found in native brine will be concentrated by the process. And, as discussed in the Section D of these comments, the discharge will be depleted of lithium— the very mineral that Albemarle's SPLO processes—and will by definition thereby impair Albemarle's existing beneficial use.

It would be unprecedented for BMRR to grant an aquifer exemption simply so that an applicant can avoid fully treating its wastewater. The Nevada legislature has addressed this issue in stating that a purpose of the water quality statute NRS 445A.300 to 445A.730, inclusive, is to encourage and promote the use of methods of waste collection and pollution control for all significant sources of water pollution (including point and diffuse sources). NRS 445A.565, while applicable to high quality waters, illustrates this State policy and purpose in requiring for any discharge from a point source "the highest and best degree of waste treatment available under the existing technology, consistent with the best practice in the particular field under the conditions applicable, and reasonably consistent with the economic capability of the project or development." NRS 445A.565(2)(a). Discharging effluent that is only pretreated does not meet the "highest and best degree of waste treatment available" criteria. Schlumberger describes itself as "the world's leading provider of technology and digital solutions . . . to the energy industry." STC certainly has the economic capability to provide sufficient treatment of its effluent to avoid the requested Exemption. BMRR must deny the Exemption."

***Division Response 12:***

*The exemption regulation has been in effect since 1989. There is no written documentation to indicate whether an exemption for Clayton Valley was formally applied for, reviewed and/or implemented other than anecdotal information relayed by retired employees.*

*The Permittee (STC) has met the exemption criteria established in Nevada Administrative Code (NAC) 445A.424(2), which states that the Division may "exempt a body of groundwater or portion thereof from the standards established in the regulation if an application for exemption is submitted as part of the application for a discharge permit".*

*In their revised RIB/Discharge Permit application submitted in April 2022, the Permittee included a request that NDEP exempt the body of groundwater beneath the mineral claims for the Clayton Valley Project from NAC 445A.424's degradation prohibition due to the chemical characteristics and use of the groundwater. To date, the Division has not granted any kind of water quality standards exemption, temporary or otherwise.*

*In support of the request, an analytic element model was initially prepared by Stantec for the Permittee, using the GFLOW model as requested by the Division in May of 2022 to evaluate the impacts of discharging up to 50 acre-feet of spent brine from a proposed lithium extraction pilot plant to the RIBs. Because of the sensitive nature of the request, the Division thoroughly reviewed the request and all data and documentation in support of their request. As part of the review process, the Division opted to run the GFLOW model with additional data to confirm Stantec's impact findings. The GFLOW model expanded upon the Stantec assessment to include additional hydrogeologic data for the Clayton Valley aquifer as well as sensitivity analyses to test model input parameters.*

*Based on Stantec's original impact analysis and the Division's requested comparative analysis, the Division determined that there would be insignificant impacts to the nearby Albemarle facility. Therefore, the Permittee's request for a water quality standards exemption is justified and authorizes the temporary exemption under the conditions and 50 acre-feet extraction/discharge life-of project limitation, established in WPCP NEV 2022101. It is noted here that Albemarle is limited to 20,000 acre-feet annually.*

*Should the Permittee propose to increase surface discharge and/or groundwater pumping rates, they will be required to submit a full-scale numerical groundwater flow model as a pre-application review document with a $1500 fee for Division review and approval. The numerical model will allow for 3D simulation of groundwater flow paths and a greater degree of complexity to be incorporated in the model framework, thus permitting a better understanding of impacts to surface and groundwater resources and nearby receptors.*

*A Division-approved code (https://ndep.nv.gov/uploads/land-mining-regs-guidance-docs/20210830_BMRR_CodesListing_Rev01_ADA.pdf) will be used to construct the flow model. Additionally, the numerical model must incorporate basin-scale climate (precipitation, evapotranspiration, etc.), nearby surface water features, geology, hydraulic stresses, steady-state and transient calibration, and any other aquifer testing as deemed necessary by the Division. This pre-application modification requirement has been incorporated into WPCP NEV2022101, Part I.B as a Schedule of Compliance item. If the model is determined to be acceptable and approved by the Division, Schlumberger will be required to submit a formal permit modification and fee for review and approval. Refer also to Division Responses 1 through 11 and 14.*

**Karen G. Narwold, Written Comment:**
"The proposed RIBs will directly discharge pollutants into and degrade waters of the State and impair Albemarle's beneficial use. The Application Seeks to Discharge Process Fluids from the Solution Mining and Chemical Processing in the Pilot Plant."

***Division Response 13:***
*The Division has determined that the temporary discharge of 50 acre-feet of treated brine solution into the RIBs will not further degrade background water quality of the Clayton Valley Aquifer to any appreciable levels that would warrant concern. Refer also to Division Responses 1 through 11.*

**Karen G. Narwold, Written Comment:**
"Although addressed under separate permit WPCP NEV2020114, the Pilot Plant would generate the contact process fluids that would be discharged through the RIBs. As highlighted in the STC's Pilot Plant application, the two post-mining process fluid streams of "depleted brine" and "membrane reject" (i.e., reject from the reverse osmosis system) would be routed to the RIBs for disposal."

"…[S]ix Albemarle production wells and the southeastern portion of one of the Silver Peak Lithium Operation evaporation ponds are within the one-mile radius of the proposed RIB. Given this proximity, pollutants will reach Albemarle's production wells due to: (i) the natural Basin gradient, and (ii) historical pumping of brine from the Silver Peak Lithium Operation wellfield. Even the GFLOW model shows that the pollutants from the RIBs will travel at least 1,000 feet, nearly reaching Albemarle's property boundary, within the ten-year modeled period. The Application proposes to construct two RIBs, increasing the size from the 3.2 acres originally proposed to 12 acres, at approximately 3 feet bgs and to use the RIBs to dispose of 168,000 gallons per day (equivalent to 61,337,520 gallons per year), all within 0.5 miles of Albemarle's nearest production well. The proposed volume of the discharge, the discharge quality, and the RIB's proximity to certain of Albemarle's production wells will have an adverse impact on at least those wells nearest the Project, thereby impacting the entire SPLO [Silver Peak Lithium Operation] system, including Albemarle's lithium products."

"If contaminated, Albemarle may have to shut down or replace one or more of its production wells. Replacement wells cost approximately $1 million, each, depending upon depth. In the meantime, Albemarle would also lose production. Any of these impacts would be costly and highly detrimental to the continued operation of Albemarle's Silver Peak Lithium Operation."

***Division Response 14:***
*Pursuant to NAC 445A.433, the pilot facility (WPCP NEV2020114) must achieve zero discharge; therefore, it is standard for BMRR to issue separate Permits for the processing facility and an associated discharge. Furthermore, based on our review of the Stantec's impact analysis and predictive modelling under various scenarios, we believe the removal of 50 acre-feet of brine solution and the return of 50 acre-feet of depleted lithium brine solution over an 18-month period will not impact the Silver Peak Lithium Operation, since Albemarle is authorized to remove and return 20,000 acre-feet of brine solution annually. The extraction and return of 50-acre feet of brine solution to the aquifer by STC constitutes 0.25% of the amount authorized for removal by NDWR for Albemarle's SPLO.*

**Karen G. Narwold, Written Comment:**
"Fact Sheet, Page 1: Based upon the preceding General Comments, if BMRR is inclined to issue a permit for the discharge of Pilot Plant process fluids, Albemarle urges BMRR to reconsider the type of permit to be issued. A RIB, a fluid management unit that is designed to promote effluent infiltration, should not be considered for the Clayton Valley Basin because it would degrade waters of the State and would impair Albemarle's existing beneficial uses. Any permit issued must meet the requirements of NAC 445A.350 to 445A.447, inclusive. The Application provides no basis that it should not meet the universal minimum design criteria in NAC 445A.433 which requires that in areas, such as Silver Peak, where annual evaporation exceeds annual precipitation, each process component must achieve zero discharge. NAC 445A.433(1)(a). Additionally, all sources must be designed to minimize releases of contaminants into groundwater so that any release from the facility will not degrade waters of the State. NAC 445A.433(1)(b). At the very least, the Draft Permit must include treatment of the Project's process effluent and significantly more monitoring than proposed in the Application. STC applied for an Exemption under NAC 445A.424(2) solely to avoid these design and treatment requirements to reduce costs. That is not the purpose of the exemption provision and BMRR should deny the exemption request."

"The Fact Sheet states that STC "has developed a contingency plan to construct three steel tanks (two-2.52 million gallons and one 378,000 gallon) on site within containment to store and evaporate the spent brine prior to final disposition." Fact

Sheet at 2. This should not be the "contingency plan," rather it should be the permitted approach. Without more details, Albemarle cannot comment further on the contingency, but it would likely address Albemarle's primary concern with the Project which is that the RIBs will discharge pollution in the form of non-native chemical constituents and diluted brine into the Clayton Valley aquifer and impair Albemarle's existing beneficial use. Evaporation of the spent brine that would prevent that discharge—or transportation of the spent brine to another, out-of-Basin location for disposal—would address the majority of Albemarle's concerns."

"Albemarle appreciates that BMRR has limited the discharge to 168,000 gallons per day and, in Section I.G.3, limited the total discharge to 50 acre-feet over the life of the Project, consistent with the limitations imposed by STC's only water right under Permit No. 87617".

***Division Response 15:***
*Pursuant to the Division's application administrative review regulations (NAC 445A.390 through 445A.398), there are no specific requirements to evaluate the impacts of a new process component and/or facility on an existing beneficial use.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.A.: The Application and Exemption do not meet requirement I.A.3. that the Permittee shall "[n]ot release or discharge any contaminants from the fluid management system that would result in degradation of wasters [sic] of the State." On that basis, it must be denied. Since the Engineering Design Report and Operational Design Plans do not meet the requirements of NAC 445A.397 and NAC 445A.398, respectively, and are still based upon site stratigraphic characteristic assumptions that do not match site conditions, "laboratory testing of materials" rather than field testing, and an unapproved, simplistic 2D groundwater model, BMRR should require STC to submit an impacts analysis using an approved 3D groundwater model, and an updated Engineering Design Report and Operational Design Plans for public comment before BMRR approves any permit to operate the RIBs."

"The Permit should require engineering design plans that include specifications for the fluid management system, fully characterize the process effluent from that system, include active effluent treatment, and demonstrate how the process components are sufficient to protect the waters of the State from degradation as required by NAC 445A.397 and 445A.433(1)(a). BMRR should require process operating plans that describe the methods to be used for the monitoring and controlling of all process fluids and document how the fluid management system will minimize the environmental impact resulting from discharging process fluids through the RIBs, as required by NAC 445A.398. The Draft Permit does not meet any of these requirements of state regulation and must be modified, if issued. The Draft Permit should expressly define

what would constitute degradation of State waters and be specific in Part I.A.3. that no chemical, petroleum, solvent, acid, organic or other process chemical used in the Pilot Plant can be discharged through the RIBs. Pure Energy understands that zero discharge of chemical process fluids is the law, and it is BMRR's responsibility to ensure compliance to avoid degradation of State waters and irreversible damage to existing beneficial uses."

***Division Response 16:***
*Refer to Division Responses 1 through 11.*

**Karen G. Narwold, Written Comment:**
"Part I.B.1.: For baseline data to meet the requirements of NAC 445A.440, in addition to Profile I analytes, the Draft Permit should require baseline data for at least sulfite and TOC—the contaminants the original application for WPCP NEV2022101 disclosed—but preferably for every chemical that STC proposes to use or store at the Pilot Plant under WPCP NEV2020114. Certainly, any chemical that STC proposes to use but not to treat and completely remove prior to discharge should be required to be monitored."

***Division Response 17:***
*It is the Division's policy to require the Permittee to submit an EDC to the Division requesting approval for the use of any chemical reagents not included in the application. Submittal does not guarantee immediate acceptance or approval to use a particular reagent. The Division maintains a list of approved reagents that is constantly updated. If a new chemical reagent is approved, the Division will determine at that time what constituents requiring monitoring, the analytical method required, and monitoring frequency at that time. The permit will also be updated to reflect any changes.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.B.5.[Permit Part I.B.6, ed.]: Albemarle strenuously objects to the Draft Permit's requirement in Part I.B.5. for a "revised, full-scale numerical groundwater model" only as a "compliance schedule" requirement and only if STC proposes any "modification to increase the volume of permitted surface discharge and/or groundwater pumping rate." Notwithstanding that the Project is for a Pilot Plant, the proposed effluent discharge equates to nearly 16.3 million gallons and STC certainly has the financial wherewithal and technology capability to prepare an approved groundwater model. Neither the Application nor the Draft Permit include *any* evidence supporting the Application's use of the unapproved GFLOW model. To the contrary, Section I.B.5. evidences that BMRR does not have adequate information from the Application and GFLOW modelling to understand the "impacts to surface and groundwater resources and nearby receptors." Draft Permit, Section I.B.5. In light of the proposed effluent discharge upgradient and only 0.5 mile from Albemarle's nearest production well, the results of an approved groundwater modelling analysis would provide information that is fundamental to whether a permit should be issued and the

conditions to include in the permit. This information must also be subject to public comment to meet the requirements of NAC 445A.402 and 445A.403. BMRR should deny the Application as incomplete and require "full-scale numerical groundwater model[ing]" now, before any permit for RIB discharge is issued. Once that information is available, it should be presented to the public for another public comment period. Specifically, all the information required by NAC 445A.395 and NAC 445A.397, in particular, to demonstrate that the Project design and proposed operation are "sufficient to protect the waters of the State from degradation" as required by NAC 445A.397(3), should be provided to the public for another public comment period before BMRR gives any further consideration to the Application. Albemarle objects to BMRR's consideration of the Application or any process fluid discharge without groundwater modelling using an approved 3D model per the Guidance and the resulting analysis being made available for public consideration, prior to permit issuance. The operation of the RIBs could have a multi-million dollar adverse effect on Albemarle's Silver Peak Lithium Operation, yet key information that would be generated by running an appropriate, approve groundwater model and would assist Albemarle to understand the full scope of the potential impacts is missing. Development and provision of this permit foundational information absolutely should not be a Schedule of Compliance condition to be done ***after*** the Draft Permit is issued, when STC's evaluation is no longer subject to public review, and the discharge damage to the SPLO operations has already been done.

If the Draft Permit is issued, BMRR should only permit the "contingency plan to construct three steel tanks (two-2.52 million gallons and one 378,000 gallon) on site within containment to store and evaporate the spent brine prior to final disposition." Fact Sheet at 2. Alternatively, BMRR must require that the Pilot Plant chemical effluent be fully treated before it is discharged through the RIBs. BMRR must also require significantly more monitoring to ensure that the design and operation of the Project protect waters of the State from degradation and that monitoring effectively and timely evaluates groundwater that may be affected by the Project operation, as required by NAC 445A.397 and NAC 445A.398. At a minimum, the Draft Permit must include one monitoring well up-gradient to establish baseline and two monitoring wells down-gradient of the RIBs to monitor effluent discharge impacts, in addition to the piezometers and the monitoring well for the Pilot Plant in order to meet the requirements of NAC 445A.440.

***Division Response 18:***
*Comment noted.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.C.: The Draft Permit should recognize that the Pilot Plant is an interconnected part of the Project fluid management system. As presented in the Draft Permit, brine is pumped from CV-9, goes into a void—the Pilot Plant which is not

mentioned—and is discharged through pipes, values, etc. to the discharge pipeline and the RIBs. This is a fiction. The Application is for the discharge of process fluids from a solution mining and chemical processing facility. The Draft Permit should identify the actual process effluent streams: depleted brine and "reject" from the reverse osmosis system and the expected pollutants contained in each."

***Division Response 19:***
*The Permit has been revised to reference the Pilot Facility as the source of the RIB discharge solution.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.D.: The Application is missing material information about estimated effluent chemistry from the Pilot Plant. STC has failed or is unable to provide the probable characteristics of the Pilot Plant waste streams that STC proposes to dispose of through the RIBs, consistent with NAC 445A.393, BMRR should hold STC to higher standards for monitoring."

***Division Response 20:***
*The Permit and Fact Sheet have been revised to reflect this requested change. Schedule of Compliance (SOC) items have been incorporated into WPCP NEV 2022101 to address any uncertainty in the water quality of the pilot plant discharge solution stream prior to discharge into the RIBs. SOC I.B.1 states that prior to the initial operation of the RIBs, the Permittee (STC) shall perform testing and analysis to compare specific parameter concentrations to discharge standards in Section I.G of the WPCP. STC must demonstrate through testing, analysis and reporting the spent brine tank discharge solution generated from the operation of the pilot facility (WPCP NEV 2020114) meets parameters in Sections I.D and I.G of the WPCP prior to discharge to the RIBs.*
*STC will operate the pilot facility to gather multiple samples from CV-9. Spent brine will be discharged to the double-lined above ground storage tanks. After the process has stabilized, at least three-acre ft of spent brine shall be accumulated in the above ground storage tanks and an aggregate sample will be taken from within the tank (the "Tank Discharge Sample" or TD) to determine suitability for discharge. The 3-acre-ft was chosen to consider any variation from CV-9 brine concentrations and provide more representative samples. The most likely adjustments after stabilization/steady-state is reached would be small increases in temperature and internal pumping rates with the aim at increasing lithium extraction efficiency (the front end of the process). After the impurity removal is optimized, the character of the spent brine is not expected to change except with variation from the source brine itself.*

*Profile I, Sulfites, and TOCs will be measured in the TD sample. Bench scale testing has shown that the two organics proposed for use can potentially increase in TOC concentrations when added to brine. The operation of the GAC Circuit (granular-activated carbon) will remove any residual TOCs. There are no plans to use any VOCs or SVOCs except for diesel. The diesel is segregated in a separate containment area*

*and is only used to power the generators. There is nothing within the process that could cause an increase in VOCs or SVOCs. All samples will be analyzed by a Nevada-certified lab and will follow chain of custody and other applicable protocols.*

- *For the Profile I analysis, the maximum value of constituents within the TD shall be no more 10% or 2-standard deviations above the maximum value of the samples collected, analyzed, and reported from CV-9 OR meet Profile I standards.*
- *For TOCs and Sulfites, the TD shall contain no more than the maximum value in samples collected from CV-9.*
- *These criteria consider natural variations in the native brine and the response of the process due to those natural variations.*
- *TD meeting these criteria shall be authorized for discharge to the RIBs and the Schedule of Compliance (SOC) Item shall be considered complete.*
- *TD not meeting the above criteria shall not be discharged to the RIBs and must be either retreated to meet the above-mentioned criteria or evaporated.*

*SOC I.B.6 states that should STC propose to increase surface discharge and/or groundwater pumping rates, they will be required to submit a new Permit application and a new, full-scale numerical groundwater flow model as a pre-application review document with a $1500 fee for Division review and approval. The numerical model will allow for 3D simulation of groundwater flow paths and a greater degree of complexity to be incorporated in the model framework, thus permitting a better understanding of impacts to surface and groundwater resources and nearby receptors.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.D.1., CV-9 is required to be equipped with a meter to measure all pumping. That requirement should be expressly stated, and the pumping volume information should be collected continuously, even if only reported monthly. Part I.D. footnote 4 should be added to the CV-9 parameter "volume pumped" and that parameter should be restated as "total volume pumped"."

***Division Response 21:***
*The Permit has been revised to reflect this requested change.*

**Karen G. Narwold, Written Comment:**
"Permit I.D.2. should require that STC sample and analyze each separate process fluid stream—the depleted brine process discharge; and reject from the reverse osmosis system—***before*** combination or discharge to the RIB or a RIB holding tank, to avoid this dilution factor."

***Division Response 22:***
*The Permit has been revised to reflect this requested change.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.D.2., the list of parameters for monitoring should include all chemicals used or stored in the Pilot Plant that could be in the depleted brine or "reject" effluent. Given that the discharging operation is a "pilot" plant that will be used to test different technologies, likely using different methods and chemicals, monthly monitoring frequency from the Spent Brine Tank is insufficient to be representative of the discharge through the RIBs, as required by Part II.E. That frequency is also insufficient to document compliance with regulatory non-degradation requirements. NAC 445A.397(3)(c) ("the monitoring system [must be] adequate to determine if the process components are operating so as to protect the waters of the State from degradation.")."

***Division Response 23:***
*Refer to Division Response 20 and 21.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.D.2. should require monitoring for this same list of organic compounds and Profile I compounds before discharge from any secondary containment."

***Division Response 24:***
*Refer to Division Response 20.*

**Karen G. Narwold, Written Comment:**
"The Fact Sheet states; "[a]ny significant change to the pilot facility impacting containment and fluid management system will require the formal submittal of a permit modification and application fee." Fact Sheet at 1. However, "significant change" is not defined. It should be defined as any change to the chemicals used in the Pilot Plant that have not been expressly approved for use by BMRR or any change in the technology or process components that will cause a variation in the effluent discharge. As required by NAC 445A.441, Part I.D.2. should also require additional monitoring whenever there is a change to the process or chemical inputs to the process prior to discharge of any process fluid to the Spent Brine Tank for discharge to the RIBs."

***Division Response 25:***
*Refer to Division Response 20.*

**Karen G. Narwold, Written Comment:**
"Consistent with the Technical Publication WTS-3, p. 3, NAC 445A.397, NAC 445A.398, and NAC 445A.440, the Draft Permit should require two additional monitoring wells down-gradient from the RIBs, assuming that CV-MW-2 is properly placed up-gradient of the RIBs. The down-gradient wells located in the most probable plume pathway and

within 250 feet of the RIBs. Simply including piezometers to measure formation of a discharge mound does not meet regulatory requirements."

***Division Response 26:***
*The extent and locations of groundwater monitoring proposed for WPCP NEV2022101 is consistent with the level of monitoring in Albemarle's permit, WPCP NEV 0070005.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.D.4: To meet the requirements of NAC 445A.440 through 445A.443, Part I.D.4. should require four monitoring wells, monitoring well MW-1 and the three RIB-related monitoring wells, and monitoring for this same list of compounds (the January Pilot Plant application, Appendix H. Sampling and Analysis Plan, Table 2 and Profile I compounds) at all monitoring wells weekly, but at a minimum on the quarterly schedule listed in the Draft Permit."

***Division Response 27:***
*The Permit has been revised to reflect additional monitoring as requested.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.D. should require STC to conduct more monitoring and provide greater documentation that the Project can be operated so as to protect the waters of the State from degradation, as required by NAC 445A.397(3). Accordingly, the sentence after the table in Part I.D. allowing the permittee to request a reduction in monitoring frequency after four quarters should be deleted. Monitoring should be done ***before*** any discharge, should continue for the full term of operations (until STC's water rights expire), and should include the full suite of organic chemicals that STC proposes to use or store in the Pilot Plant."

***Division Response 28:***
*The extent and locations of groundwater monitoring proposed for WPCP NEV2022101 is consistent with the level of monitoring in Albemarle's permit, WPCP NEV 0070005.*
*Boiler plate permit language will not be removed from the permit.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.E.: Release reporting should include notification to Albemarle of any release to the surface, to stormwater, or to groundwater in the smallest quantity that triggers reporting as specified in Part II.B. This notification requirement is included in the Pilot Plant permit WPCP NEV2020114 in Part II.B.3. The same notification requirements should be included in the RIBs Draft Permit."

***Division Response 29:***
For consistency with the Pilot Facility Permit, the RIB Permit has been revised to include Albemarle on spill/release reporting.

**Karen G. Narwold, Written Comment:**

"Permit Part I.F.: Sampling and analytical accuracy for TOC and any other sampled organic compounds should apply either infrared analysis (ISO-CEN EN 1484:1998 and ASTM) with a detection limit of 0.1 milligram per liter ("mg/L") or gas chromatography analysis with a detection limit of 2 mg/L."

***Division Response 30:***
*Comment noted, however the proposed infrared method procedure has not been fully approved for analytical laboratories listed in the State certification program.*

**Karen G. Narwold, Written Comment:**
Permit Part I.G1., the well naming convention is inconsistent with the listing in D.4. The reference to monitoring well should be to CV-MW-2.

***Division Response 31:***
*This has been corrected.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.G: Albemarle appreciates the total, life-of-project pumping limitation specified in G.2 per DWR Permit No. 87617".

***Division Response 32:***
*Comment noted.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.G.5. should be re-written: "The facility shall not degrade waters of the State and shall not exceed applicable water quality standards, reference values, or background concentrations." Compliance at four monitoring wells, MW-1 and 3 monitoring wells associated with the RIBs, should be required. For purposes of background comparison, it is critical that background sampling and analysis include all chemicals to be used or stored in the Pilot Plant and, at the very least, TOC. The Draft Permit should be clear that zero discharge of any organic compounds or other chemicals used in the Pilot Plant is permitted, as required by NAC 445A.433(1)(a). This Part should specify that any variation in a parameter between background and groundwater quality at one of the monitoring wells should trigger the evaluation required by NAC 445A.441."

***Division Response 33:***
*This is standard Division policy regarding groundwater reference value exceedances.*

**Karen G. Narwold, Written Comment:**
An additional permit limitation should be added to Part I.G. requiring that the facility shall not impair existing beneficial uses in the Clayton Valley Basin.

***Division Response 34:***
*Refer to Division Response 15.*

***Karen G. Narwold, Written Comment:***

*"Permit Part I.H.: The same requirement should be added for CV-9. Specifically, the Draft Permit should be clear that CV-9 is required to be equipped with an in-line flow totalizer to measure and determine total flow. That information should be monitored daily, even though required to be reported monthly."*

***Division Response 35:***
*The Permit has been revised to reflect this requested change.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.I.: This Part should require additional inspection and monitoring whenever there is a change to the process or chemical inputs to the process prior to discharge of any process fluid to the Spent Brine Tank for discharge to the RIBs. Any such change should be deemed a "material modification" as that term is defined in NAC 445A.365."

***Division Response 36:***
*Comment noted.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.J.: The draft final plan for permanent closure should be subject to public notice and a minimum of a 30-day comment period."

***Division Response 37:***
*The Division is not required by regulation to public notice a Final Plan for Permanent Closure; however, a Tentative Plan for Permanent Closure and Final Plan for Permanent Closure have been approved and are available for review upon request.*

**Karen G. Narwold, Written Comment:**
Permit Part I.L.: This provision should be deleted or it should state an absolute prohibition against disposal of Petroleum Contaminated Soils at the Project site. Introduction of petroleum contaminants into soil within less than a mile of Albemarle's operations, production wells, and evaporation ponds, could introduce unacceptable contaminants into Albemarle's wells, ponds, and products. This provision is also inconsistent with NAC 445A.397 and NAC 445A.398.

***Division Response 38:***
*This provision is standard boiler plate language and will remain in the Permit. It should be noted that Albemarle has an approved plan for temporary on-site storage of PCS.*

**Karen G. Narwold, Written Comment:**
"Permit Part I.M.: The chemical formulation of any proposed dust suppressant should not contain organic compounds or any chemicals that would have a deleterious effect on the Clayton Valley brine aquifer. This condition should be amended to add "and impairment of downgradient existing beneficial uses" after the clause "prevent degradation of waters of the State."

***Division Response 39:***
*Use of any suppressants, organic or non-organic, require prior approval from the Division before use.*

**Karen G. Narwold, Written Comment:**
"Permit Part II.A.1.: As commented above regarding Part I.B., Albemarle objects to the Draft Permit's inclusion of 3D groundwater modelling as a "compliance schedule" activity. Albemarle supports "modification" of the Schedule of Compliance by eliminating that provision and requiring that the results of a groundwater modelling impacts analysis using an approved 3D model be required prior to permit approval. That information should be provided for a complete application as required by NAC 445A.394."

***Division Response 40:***
*Refer to Division Responses 1 through 12.*

**Karen G. Narwold, Written Comment:**
"Permit Part II.A.3.: Any material omitted or incorrect information should also be provided to the public by notice and posting on BMRR's website."

***Division Response 41:***
*Depending on the significance of the information omitted or incorrect, the Division always has the discretion to re-issue the public notice.*

**Karen G. Narwold, Written Comment:**
"Permit Part II.B.1.: The two additional monitoring wells to monitor RIBs operations requested in Albemarle's comment to Part I.D. should be added to subpart a. of this Part. Part II.B.1.c. should include a requirement to notify Albemarle's Silver Peak operations contact whenever any release triggers remedial actions or activation of the Emergency Response Plan. An Emergency Response Plan is required by NAC 445A.398, yet the Application only refers to the Emergency Response Plan for the Pilot Plant. It is not clear whether the RIBs have an Emergency Response Plan and that should be clarified as a requirement in this section."

***Division Response 42:***
*Additional monitoring wells are not being considered at this time but may be required at a later date. The Permittee provided a revised application to the Division on 4 April 2022, addressing the comments listed in the 10 March 2022 letter, including an updated and detailed Emergency Response Plan pursuant to NAC 445A.398(4). The revised application is available for review during normal business hours.*

**Karen G. Narwold, Written Comment:**

"Permit Part II.B.2.b: This requirement should be corrected—CV-9 (identified by reference to Part I.D.1.) is *not* a dewatering well. In Part I.D.1., it is correctly identified as a "brine well." This section should require analytical results from CV-9 and all four monitoring wells associated with the Pilot Plant and RIBs operations. "

***Division Response 43:***

This has been corrected in the Permit.

**Karen G. Narwold, Written Comment:**

"Permit Part II.B.2.c: Any Pilot Plant or RIBs modifications should be required to be reported. The provision for "expansion" should be deleted from this provision given the limitations under DWR Permit No. 87617. The section should also require reporting of the total cumulative volume of water pumped from CV-9."

***Division Response 44:***

*Division approval is required for any change or modification to the Permit, pursuant to NAC 445A.4155 through 445A.418.*

**Karen G. Narwold, Written Comment:**

"Permit Part II.B.2.e: The circumstances warranting or requiring an "updated version of the facility monitoring and sampling procedures and protocols" should be clearly spelled out in the Draft Permit."

***Division Response 45:***

*The boiler plate language is sufficient as written.*

**Karen G. Narwold, Written Comment:**

"Permit Part II.B.2.g: All organic chemicals and petroleum products used or stored in the Pilot Plant should be added to the list of chemicals for sampling and graphing required by this Part."

***Division Response 46:***

*Comment noted.*

**Karen G. Narwold, Written Comment:**

"Permit Part II.B.3.: The Draft Permit should be clear as to whether the RIB facility includes an Emergency Response Plan since one is required by NAC 445A.398. A requirement to notify Albemarle's Silver Peak operations contact whenever any release triggers any form of reporting should be added to the Draft Permit, consistent with the requirements specified in WPCP NEV2020114 Parts II.B.3.a. and c. No releases of petroleum products or organic compounds should be permitted. Release reporting to the SPLO contact for any such compounds should be triggered when "a release of any quantity is discovered on or in groundwater" and any release of 25 gallons or more to soils."

***Division Response 47:***

*Refer to Division Responses 20 and 29.*

**Karen G. Narwold, Written Comment:**
"Permit Part II.B.4.: If reporting triggered under this provision is determined to pose an actual or potential hazard to human health or the environment outside the facility per section 4.a.vi., the release information should be reported to Albemarle's Silver Peak operations contact concurrently with reporting to the Administrator under this provision. Under section 4.d., "impact to existing beneficial uses" should be added after "degradation of waters of the State" consistent with regulatory requirements in NAC 445A.120 and NAC 445A.424(1)(c)."

***Division Response 48:***
*Refer to Division Response 15.*

**Karen G. Narwold, Written Comment:**
"Permit Part II.C.10.: Albemarle supports this provision and interprets it to mean that any injury to the Clayton Valley brine aquifer that damages Albemarle's operations, contaminates any of its operating wells or production or otherwise impairs Albemarle's existing beneficial uses is prohibited. The Draft Permit should be explicit that such "injury to persons or property" would be grounds for permit revocation or termination."

***Division Response 49:***
*Comment noted.*

**Karen G. Narwold, Written Comment:**
"Permit Part II.E.1.: Monthly monitoring of the Spent Brine Tank will not meet the requirement of this provision that monitoring "shall be representative of the monitored activity" if any chemical, technology, or process change has occurred at the Pilot Plant during the month. Monitoring of the Spent Brine Tank should be required whenever such changes, or other changes that affect the effluent quality or constituents, occur."

***Division Response 50:***
*Refer to Division Response 22.*

**Karen G. Narwold, Written Comment:**
"Permit Part II.E.6.: This Part should specify the analytical method and appropriate practical quantitation limits ("PQLs") for organic compounds in addition to Profile I parameters. Albemarle recommends specifying either infrared analysis (ISO-CEN EN 1484:1998 and ASTM) with a detection limit of 0.1 milligram per liter ("mg/L") or gas chromatography analysis with a detection limit of 2 mg/L. Due to the likelihood for organic compounds in the process fluids to be discharged via the RIBs, the lowest practicable PQLs (potentially more than 2 significant figures) should be required to detect pollutant discharges to the Clayton Valley aquifer."

***Division Response 51:***

*Comment noted.*

**Karen G. Narwold, Written Comment:**
"Permit Part II.F.: This Part should specify that all Pilot Plant process, chemical, technology and related modifications are covered by this requirement. Any change in chemical usage, lithium extraction or polishing reagent, or lithium extraction or polishing technology in the Pilot Plant should require advance notice to and approval by BMRR and be deemed a "material modification" as that term is defined in NAC 445A.365. Any such material modification should be deemed a "major modification" under NAC 445A.417 and trigger public notice and comment."

***Division Response 52:***
*Determination on the type of modification and fee required will be subject to the criteria pursuant to NAC 445A.4155, 445A.416 through 445A.418.*

**Karen G. Narwold, Written Comment:**
"Permit Parts II.F.3. and 4.: These provisions should be amended to expressly require that any change in chemical usage, lithium extraction or polishing reagent, or lithium extraction or polishing technology in the Pilot Plant triggers advance notice and written approval under these Draft Permit sections. Any such changes should be deemed a "major modification" under NAC 445A.417 and trigger public notice and comment."

***Division Response 53:***
*Refer to Division Comment 52.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 1.0: The comment in the Introduction that the brine is "not potable" and is high in TDS is intentionally misleading because the lithium and other salt minerals in the brine result in high TDS, thus the "poor" quality is what makes the brine a valuable mineral source. As addressed in the General Comments, the high TDS does not provide a rationale for the Exemption or to permit STC to discharge untreated process effluent in the Clayton Valley brine aquifer in violation of minimum design criteria set by NAC 445A.433. The statement that lithium-depleted brine would "reinfiltrate" is also misleading. It suggests that brine is simply being moved from one location to another. That is false. Brine is proposed to be pumped from 600 to 1,500 feet bgs, processed with various chemical compounds in the Pilot Plant to remove lithium. Process effluent will be mixed with wash-water from reverse osmosis membranes (potentially containing antiscalant and other cleaning chemical compounds) and would be disposed of via the RIBs. That is not "re-infiltration," it is disposal of untreated process fluids that will be significantly different than the brine pumped from the aquifer."

***Division Response 54:***
*Comment noted.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 2.1: The Application fee should not be based upon the dewatering section of NAC 445A.232. The fee would be more correctly assessed under "Discharge from . . . Any Other Commercial or Industrial Facility" between 50,000 gallons and 250,000 gallons per day at a fee of $ 3,000 or "Other Permitted Discharge" between 50,000 gallons and 250,000 gallons per day at a fee of $1,500."

***Division Response 55:***
*While it may appear that NAC 445A.232(1) "Discharge from . . . Any Other Commercial or Industrial Facility" might be the appropriate fee category for the proposed activity, it has always been the policy of the Division's mining program to utilize the fee structure established under NAC 445A.232(2), "Discharge to Groundwater from the Dewatering of a Mine" and "Mining". The fee has been consistently applied to rapid infiltration basins and 5-yar discharge permits since the implementation of the Nevada mining regulatory program in 1989.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 3.0: This section provides a general description of groundwater flow and purports to describe aquifer properties. It is largely based on Pure Energy wells and a "desktop evaluation of water wells." As discussion in General Comments, Section II.A., even after BMRR required groundwater modelling, the groundwater quality information is incomplete and aquifer degradation and impairment of Albemarle's existing beneficial uses are not accurately or sufficiently evaluated. STC's generalized, simplistic conclusion that "the aquifer is a single, multi-layer, unconfined aquifer system" is not applied in the GLOW [sic] model, which is even more simplistic. As well, Albemarle disagrees with the conclusion. The aquifers that have provided the lithium bearing brines are very dynamic systems that have been classified into six different confined and semi-confined aquifer systems. The GLOW [sic] model does not capture any of this complexity or site heterogeneity."

***Division Response 56:***
*Refer to Division Responses 1 through 11 for additional details.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 3.2.2: The limitations of a generalized site analysis are clear in this section. The Application makes only an "inferred potentiometric surface map" because STC has not conducted a site-specific analysis to confirm surface gradient at two-foot intervals as required by Technical Publication WTS-3. The Application does not include the required topographic map, either. Therefore, the Application states only that "the proposed RIB is placed ***approximately*** perpendicular to the direction of groundwater flow" because the Application does not contain the information needed to document that the proposed location ***is*** perpendicular to the direction of groundwater flow. Albemarle does agree with the conclusion that Albemarle's evaporation ponds are at the lowest elevation on the Clayton Valley floor. The consequence of that conclusion is that all surface water will flow to Albemarle's

Silver Peak Lithium Operation. Any pollutants discharged via the RIBs from the Pilot Plant lithium extraction process will flow through the vadose zone to the water table, toward Albemarle's production wells, and when pumped will contaminate Albemarle's operations."

***Division Response 57:***
*The WTS-3 RIB Guidance Document is specific to the Bureau of Water Pollution Control and is not used by BMRR. BMRR reviewed the February 2022 RIB application, identified several deficiencies of such significance that a new, updated application was submitted to the Division in April 2022 which addressed the deficiencies. The updated application is available for review by Albemarle at the Division's offices. Refer to Division Responses 1 through 11 for additional details regarding the hydrogeological studies and how the Division came about its decision.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 3.2.3: The well inventory focus solely on Pure Energy wells provides an incomplete analysis, resulting in incomplete and unrepresentative inputs to the GFLOW model. This section states that Stantec evaluate over 100 wells in the study area. Focus solely on the Pure Energy wells and use of only limited data from those wells severely limits the utility of the Application's groundwater impacts analysis."

***Division Response 58:***
*Had access to the additional data that is known to exist been made available to the Permittee and their consultant (Stantec), this would have been included in the GFLOW model. Refer to Division Responses 1 through 11 for additional details regarding the hydrogeological studies.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 3.3: This section focuses on water samples collected from Pure Energy's wells, a number of which are outside of the RIB facility area and may not be relevant. Here, the Application reiterates the high TDS and "poor" natural groundwater quality of the Clayton Valley brine aquifer. Those statements miss the point, Clayton Valley brine is high in lithium and other mineral salts that make the brine a valuable mineral source. The "poor" quality does not provide a rationale for STC to discharge its Pilot Plant chemical pollutants into and degrade the aquifer. NAC 445A.424 prohibits any facility from degrading waters of the State, even where the quality of the waters already exceed the criteria, if the quality is lowered to a level that would render those waters unsuitable for the existing industrial use. The proposed discharge of untreated chemical pollutants and lithium-depleted brine would impair Albemarle's existing beneficial use and violate NAC 445A.424. Consequently, an exemption should not be granted."

***Division Response 59:***
*Refer to Division Responses 1 through 11 for additional details regarding the hydrogeological studies and how the Division came about its decision.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 3.5: This section provides information relevant to site heterogeneity, but then that information is not effectively used in the GFLOW model. Similarly, area faulting is noted, but, again, not considered in the groundwater model. Moreover, at least some of the focus (e.g., on CV-8) relates to wells that are outside of the proposed RIB facility area."

***Division Response 60:***
*Refer to Division Responses 1 through 11 for additional details regarding the hydrogeological studies and how the Division came about its decision.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 5.0: The Application includes some information required by NAC 445A.397. However, STC failed to obtain important site-specific information, falling back to laboratory data rather than field data. Specifically, Stantec did not conduct flood basin testing in the field. Rather, it characterized the permeability of the sediments beneath the RIBs "by in situ, constant head permeability testing within [8] boreholes and laboratory testing of the sample materials."

"Permeability is a critical factor for groundwater modelling to determine impacts to the aquifer and existing beneficial uses, yet, site specific information is limited and was reportedly used primarily "to evaluate the potential for groundwater mounding during RIB operation" (*id.*) rather than evaluating compliance with non-degradation requirements."

***Division Response 61:***
*Had access to the additional data that is known to exist been made available to the Permittee and their consultant (Stantec), this would have been included in the GFLOW model. Refer to Division Responses 1 through 11 for additional details regarding the hydrogeological studies.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 5.2: The RIB facility design has been modified from the prior RIB application, reducing the configuration from three RIBs to two RIBs, but increasing the size to 12 acres. Moreover, now each RIB is proposed to include an "enhancement trench" 25-30 feet deep filled with more permeable material. The Application does not provide evidence or explanation for any of these engineering design revisions. More importantly, the Application contains little discussion as to how this design meets the requirements of NAC 445A.397 ("to protect the waters of the State from degradation") and 445A.398 (how the "plan is" "designed to minimize the environmental impact resulting from the release of process fluids")."

"Constructed berms for the RIB may require a dam safety permit or at least dam safety analysis. There is no evidence in the record that STC has consulted with or applied to the Department of Water Resources for a dam safety permit."

***Division Response 62:***
*BMRR reviewed the February 2022 RIB application, identified several deficiencies of such significance a new, updated application was submitted to the Division in April 2022 which addressed the deficiencies. The updated application is available for review by Albemarle at the Division's offices.*

*Submittal, review, and approval of Dam Safety Permit Applications are not the purview of the Division.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 5.3: The Application acknowledges that sodium, chlorides, and sulfates will increase over baseline values causing, by definition a discharge of pollutants and degradation. While the Application asserts that constituents used in the Pilot Plant not found in the native brine are removed prior to discharge, there is no transparency as to what these chemicals are, how they are removed, whether the removal processes will change with differing pilot test technologies, nor any proposal to monitor effluent for any such non-native chemicals."

"This discussion is inadequate to demonstrate that the Project will not degrade waters of the State or impair existing beneficial uses as required by, inter alia, NAC 445A.120, 445A.424(1), and 445A.433. By wholly ignoring the likelihood of impairment to Albemarle's existing beneficial uses, this section of the Application does not provide the evidence necessary to warrant BMRR's consideration of the Exemption."

***Division Response 63:***
*Refer to Division Responses 1-11. Pursuant to the Division's application administrative review regulations (NAC 445A.390 through 445A.398), there are no specific requirements to evaluate the impacts of a new process component and/or facility on an existing beneficial use.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 6.0: The monitoring section is inadequate to determine the impacts of the operation of the RIB as a process fluid management unit."

"Under both Technical Publication WTS3 and the requirements of NAC 445A.440 through NAC 445A.443, the Draft Permit must include monitoring wells to monitor the operation of the RIB. Technical Publication WTS-3 recommends one up-gradient well and two down-gradient wells. That scope of groundwater monitoring is also required by NAC 445A.397 and 445A.398. Given the likely chemical compounds to be contained in the

process fluids discharged through the RIB, it is critical that BMRR require the recommended three monitoring wells."

***Division Response 64:***
*The level of groundwater monitoring and frequency required by the Division for WPCP NEV2022101 is consistent with the monitoring requirements required for Albemarle's permit. Additional monitoring wells will be considered only if operational changes and water quality data warrants it.*

**Karen G. Narwold, Written Comment:**
"February 2022 Application Section 6.1.2: The critical information about the two process fluid effluent streams seems to be intentionally buried in this later section of the Application. Here, the Application confirms that two streams will be disposed of in the RIB: the depleted brine discharged from pre-treatment (e.g., this is not a dewatering stream, it is a process stream); and reject from the reverse osmosis system (a second process fluid effluent stream). This information is deficient."

"Despite STC stating it has conducted bench-scale testing in Section 2.3, p. 2.4, the Application fails to disclose the chemical make-up of either of these process fluids, even though STC proposes to discharge all of it directly into the Clayton Valley aquifer less than .25 miles from Albemarle's property boundary."

"Pursuant to NAC 445A.393, in light of STC's intentional failure to provide more complete information, BMRR should require increased monitoring for the Project. Specifically, the Application proposes to combine (e.g., blend) the two waste streams before sampling. This approach would save STC money, but more importantly, it would dilute the chemical constituents in the effluent, perhaps below detection limits. A large volume of lithium-depleted brine could mask the presence of organic compounds or other pollutants. Consistent with NAC 445A.443, BMRR should require that STC sample and analyze each separate process fluid stream, ***before*** combination or discharge to the RIB or a RIB holding tank, to avoid this dilution factor."

***Division Response 65:***
*Refer to Division Response 22.*

**Karen G. Narwold, Written Comment:**
"Application Section 6.2: The Application proposes to rely on the Emergency Response Plan for the Pilot Plant. Albemarle understands that BMRR's 10 March 2022 comments required a separate, RIB facility specific Emergency Response Plan. However, neither the Application nor the Draft Permit are clear regarding the Emergency Response Plan requirements. That point should be clarified in the Draft Permit".

***Division Response 66:***

*The Permittee provided a revised application to the Division on 4 April 2022, addressing the comments listed in the 10 March 2022 letter, including an updated and detailed Emergency Response Plan pursuant to NAC 445A.398(4). The revised application is available for review during normal business hours.*

**Karen G. Narwold, Written Comment:**
"Application Section 6.2: The Application contains many of the same deficiencies Albemarle noted in its comments to the application for WPCPNEV2020116. STC has completed required field studies but relied on laboratory analysis for critical permeability information and conducted a simplistic, groundwater modelling analysis only after BMRR required it to do so. The modelling was done with an unapproved model and used many inputs that are not representative of site conditions."

***Division Response 67:***
*Refer to Division Responses 1 through 11.*

**Karen G. Narwold, Written Comment:**
"Application Section 6.2: Application short-cuts fail to provide the information required by NRS 445A.300 to 445A.730, inclusive, and do not provide sufficient evidence that the Project will meet key non-degradation and operational requirements of numerous Nevada water laws, including NRS 445A.305 (articulating the State's policy to protect existing industry and promote pollution control), NAC 445A.424 (prohibiting degradation of State waters and protecting existing industrial uses), NAC 445A.433 (establishing minimum design criteria to prevent degradation of State waters). The RIBs will discharge non-native effluents from Pilot Plant operations into and will degrade waters of the State of Nevada and Albemarle's raw material source and irreparably negatively affect Albemarle's Silver Peak Lithium Operations."

***Division Response 68:***
*Comment noted.*

**Karen G. Narwold, Written Comment:**
"Section 6.2: The Application does not establish any need for the requested Exemption, other than cost savings for STC. Yet, the Exemption could cost Albemarle millions of dollars in lost production or damages. It is within BMRR's discretion whether to grant an exemption and the request should be denied here."

***Division Response 69:***
*Pursuant to Nevada Administrative Code (NAC) 445A.424(2), the Division of Environmental Protection (NDEP or Division) may "exempt a body of groundwater or portion thereof from the standards established in the regulation if an application for exemption is submitted as part of the application for a discharge permit". In their revised RIB/Discharge Permit application submitted in April 2022, the Permittee included a request that NDEP exempt the body of groundwater beneath the mineral claims for the Clayton Valley Project from NAC 445A.424's degradation prohibition due*

*to the chemical characteristics and use of the groundwater. To date, the Division has not granted any kind of water quality standards exemption, temporary or otherwise.*

*In support of the request, an analytic element model was initially prepared by Stantec for the Permittee, using the GFLOW model as requested by the Division in May of 2022 to evaluate the impacts of discharging up to 50 acre-feet of spent brine from a proposed lithium extraction pilot plant to the RIBs. Because of the sensitive nature of the request, the Division thoroughly reviewed the request and all data and documentation in support of their request. As part of the Division's review process, we (the Division) opted to run the GFLOW model with additional data to confirm Stantec's impact findings. The Division's GFLOW model expanded upon the Stantec assessment to include additional hydrogeologic data for the Clayton Valley aquifer as well as sensitivity analyses to test model input parameters.*

*Based on the impact analysis and predictive modeling results, the Division determined that there would be insignificant impacts to the nearby Albemarle facility, the Permittee's request for a water quality standards exemption is justified and authorizes the temporary exemption under the conditions and 50 acre-feet extraction/discharge life-of project limitation, established in WPCP NEV 2022101. It is noted here that Albemarle is limited to 20,000 acre-feet annually.*

*Should the Permittee propose to increase surface discharge and/or groundwater pumping rates, they will be required to submit a full-scale numerical groundwater flow model as a pre-application review document with a $1500 fee for Division review and approval. The numerical model will allow for 3D simulation of groundwater flow paths and a greater degree of complexity to be incorporated in the model framework, thus permitting a better understanding of impacts to surface and groundwater resources and nearby receptors.*

*A Division-approved code (https://ndep.nv.gov/uploads/land-mining-regs-guidance-docs/20210830_BMRR_CodesListing_Rev01_ADA.pdf) will be used to construct the flow model. Additionally, the numerical model must incorporate basin-scale climate (precipitation, evapotranspiration, etc.), nearby surface water features, geology, hydraulic stresses, steady-state and transient calibration, and any other aquifer testing as deemed necessary by the Division. This pre application modification requirement has been incorporated into WPCP NEV2022101, Part I.B as a Schedule of Compliance item. If the model is determined to be acceptable and approved by the Division, Schlumberger will be required to submit a formal permit modification and fee for review and approval.*

**Karen G. Narwold, Written Comment:**
"The RIBs discharge of lithium-depleted brine is also a pollutant; it will alter the physical and chemical integrity of the brine resource. The RIBs discharge of lithium-depleted brine will also negatively impact Albemarle's raw material source. For these

additional reasons, Albemarle requests that BMRR deny the Application and the Exemption and not issue the Draft Permit."

***Division Response 70:***
*Refer to Division Response 67 and for greater detail, Division Responses 1 through 11.*

**Karen G. Narwold, Written Comment:**
"The Fact Sheet identifies a suitable option as a "contingency plan." STC can operated the Pilot Plant, discharge the effluent to holding tanks, and evaporate the spent brine to final disposition. Albemarle would like to understand more details of that option but urges BMRR to consider it instead of Application's proposed RIB discharge approach."

***Division Response 71:***
*As a contingency, the Permittee submitted an Engineering Design Change (EDC) application for the design, construction, operation, and removal of three brine evaporation tanks at the Clayton Valley pilot facility on 24 October 2022. The Division did not request or require the Permittee to submit a contingency plan, this was strictly voluntary. The EDC was approved by the Division on 27 October 2022. All design documents are public documents and available for review during normal business hours.*

**Karen G. Narwold, Written Comment:**
"If BMRR declines to deny the Application, the Draft Permit should not be issued until STC completes a numerical modelling 3D simulation of groundwater flows with a BMRR approved model—not as a Schedule of Compliance requirement, but before any permit is issued. The resulting analysis should then be provided for review and comment by the public and Albemarle, followed by a new public comment period."

***Division Response 72:***
*Based on the assumptions utilized by the Permittee (and their consultant), our evaluation of the generated modelling results, the Division believes it has done a credible and thorough review of the predictive modelling exercise and refer also to Division Responses 1 through 11.*

**Karen G. Narwold, Written Comment:**
"Alternatively, Albemarle requests that BMRR hold a public hearing to provide missing information, discuss the groundwater modelling and to answer questions regarding the Application before making any decision regarding WPCP NEV2022101."

***Division Response 73:***
*Pursuant to NAC 445A.404(1), the Division determined that the amount of public interest regarding the issuance WPCP NEV2022101 did not warrant the scheduling of a*

*public hearing. The Division will meet with Albemarle to discuss the WPCP application and perceived deficiencies.*

**Richard Morrison, Comment:**
"SOC Item I.B.1 states that the Permittee shall submit a Profile I analysis of the discharge and monitoring well, CV-MW-2, for the Division to establish background groundwater quality at the facility. Background water quality shall be established and incorporated into this Permit prior to initiating operations. STC suggests Division clarification of SOC Item Part I.B.1."

***Division Response 74:***
*SOC Item Part I.B.1 was clarified and expanded to state the following:*

*I.B. Schedule of Compliance:*

1. *Prior to the initial operation of the RIBs, the Permittee shall determine the suitability of the spent brine tank discharge solution generated from the operation of the pilot facility (WPCP NEV2020114).*

   The Permittee shall operate the pilot facility to gather multiple samples from CV-9. Spent brine will be discharged to the double-lined above ground storage tanks. After the process has stabilized, at least three-acre ft of spent brine shall be accumulated in the above ground storage tanks and an aggregate sample will be taken from within the tank (the "Tank Discharge Sample" or TD) to determine suitability for discharge. Profile I, Sulfites, and TOCs will be measured in the TD. All samples will be analyzed by a Nevada-certified lab and will follow chain of custody and other applicable procedures.

   a. For the Profile I analysis, the maximum value of constituents within the TD shall be no more 10% above the maximum value of the measured and reported concentration samples collected from CV-9.

   b. For TOCs and Sulfites, the TD shall contain no more than the average value in samples measured and reported from CV-9.

   c. The maximum value of constituents from CV-9 will be determined by samples taken twice daily on a rolling basis for two weeks from the initiation of pilot plant operation. The maximum value of the constituents from those samples will be used as the "measuring stick" or "reference point" against which the proposed discharge will be compared as outlined in the WPCP.

   d. Prior to discharge, STC will compare the tanked brine to the natural maximum values measured in the CV-9 samples to ensure the discharge is within 10% of the maximum values collected from the sampling campaign.

e. These criteria consider natural variations in the native brine and the process performance due to these natural variations.

f. TD meeting these criteria shall be authorized for discharge to the RIBs and the Schedule of Compliance (SOC) Item shall be considered complete.

g. TD not meeting the above criteria shall not be discharged to the RIBs and must be either retreated to meet the above-mentioned criteria or evaporated.

**Richard Morrison, Comment:**
"I.G.2 Permit Limitations, states that water quality at monitoring well, MW-2, shall not substantially alter the chemical composition of brine currently extracted. STC suggests Division clarification of Part I.G.2.

**Division Response 75:**
*Permit Limitation Parts I.G.2 was re-numbered as I.G.6 and clarified to state the following:*

*The facility shall not degrade waters of the State to the extent that the aquifer water quality is substantially altered based on existing beneficial uses.*

**Richard Morrison, Comments:**
"I.G.6 Permit Limitations, states that the facility shall not degrade waters of the State to the extent that the aquifer water quality is substantially altered based on existing beneficial uses and constituent concentrations in the source or receiving water."

**Division Response 75:**
*Permit Limitation Parts I.G.6 was clarified to state the following:*

6. *The facility shall not degrade waters of the State to the extent that the aquifer water quality is substantially altered based on existing beneficial uses.*

***References Cited***

*Stantec, 2022. Water Resources Baseline Characterization. Clayton Valley Lithium Pilot Plant Project. Prepared by Stantec Consulting Services Inc. For Schlumberger Technology Corporation. March 30, 2022.*

*SRK 2021. SEC Technical Report Summary Pre-Feasibility Study Silver Peak Lithium Operation Nevada, USA. Report prepared by SRK Consulting (U.S.) Inc. for Albemarle Corporation. September 30, 2021.*

*Water Pollution Control Permit Application "Clayton Valley Rapid Infiltration Basins- April 4, 2022 Update", Submitted and prepared by Stantec on behalf of Schlumberger Technology Corporation.*

*Zampirro, D., 2004. Hydrogeology of Clayton Valley Brine Deposits, Esmeralda County, Nevada Danny Zampirro, RG, Chemetall Foote Corporation. Nevada Bureau of Mines and Geology 33: 271-280 2004*