HOLLAND & HART LLP
Laura K. Granier, Nevada Bar No. 7357
Ashley A. Peck, Utah Bar No. 13931
Melissa L. Reynolds, Utah Bar No. 15718
5441 Kietzke Lane, 2nd Floor
Reno, NV 89511
lkgranier@hollandhart.com
aapeck@hollandhart.com
melreynolds@hollandhart.com

Attorneys for Lithium Nevada Corp.

BEFORE THE STATE OF NEVADA

STATE ENVIRONMENTAL COMMISSION

In the Matter of: Appeal of Water Pollution Control Permit No. NEV2020104	**INTERVENOR LITHIUM NEVADA CORP.'S RESPONSE BRIEF TO GREAT BASIN RESOURCE WATCH'S OPENING BRIEF**

Pursuant to NAC 445B.8925.1, Lithium Nevada Corp. ("Lithium Nevada") files this Response to Great Basin Resource Watch's ("GBRW's") Opening Brief in its appeal of the Nevada Department of Environmental Quality's ("NDEP's") decision to issue Water Pollution Control Permit No. NEV2020104 (the "Permit") for the Thacker Pass Project ("Project"). For the reasons set forth below, NDEP's issuance of the Permit should be affirmed and GBRW's appeal dismissed.

I. STATEMENT OF FACTS

A. Thacker Pass Project

The Project" will be an open pit claystone lithium mining and processing operation in Humboldt County. The Project will include two waste rock storage facilities, coarse gangue stockpile, sulfuric acid plant, processing plant, and a clay tailings filter stack ("CTFS").[1] GBRW's appeal focuses exclusively on the CTFS. During operations, clay tailings, neutralization solids, and salts generated during processing will be sent to the CTFS.[2] The CTFS is designed so that seepage water, infiltration water, and stormwater runoff that comes into contact with the CTFS will drain to a reclaim pond (the "Reclaim Pond"), where it will evaporate or be pumped back to the process plant.[3] Tailings will be placed in the CTFS after the material is scarified to dry it to the allowable moisture content.[4] After compaction, the tailings will have a very low permeability of approximately 10^{-6} to 10^{-7} cm/s[5] meaning fluid will not easily flow through the CTFS. The CTFS "will be constructed as a zero-discharge facility and covered with cover soil/growth media at closure; therefore, no degradation to groundwater will occur."[6]

[1] *See* Fact Sheet, p. 1 (Feb. 23, 2022), Exhibit 1.
[2] *Id.*
[3] *See* WPCP Application, pt. 4.5 (Apr. 2, 2020), Exhibit 2.
[4] *See* Ex. 1, Fact Sheet, p. 12; Ex. 4, WPCP Application Att. J, *Engineering Design Report*, p. 16.
[5] *See* Ex. 3, NDEP Comment Responses, p. 3 (Feb. 25, 2022).
[6] Ex. 2, WPCP Application, pt. 3.5.2.3.

B. The Clay Tailings Filter Stack is designed as a zero-discharge facility to prevent the discharge of pollutants to waters of the State

The CTFS will consist of an 80-mil HDPE double-sided textured geomembrane underlain with a six-inch liner bedding material.[7] The liner bedding will consist primarily of fine-grained materials compacted to form a smooth, firm surface on which to place the geomembrane.[8] Liner bedding samples will be laboratory tested before and during construction and in-situ moisture/density tests will assure conformance with design specifications.[9] A Quality Assurance/Quality Control ("QA/QC") testing and inspection program will be implemented during installation of the geomembrane liner to ensure that installation is completed according to the manufacturer's recommendations, monitor the integrity of the seams, and ensure the minimum thickness of overlying cover materials is maintained.[10]

The CTFS will feature an underdrain seepage collection system which will be placed on the geomembrane surface and overlain by a two-foot thick overliner of sand and gravel.[11] [*See* Figure 1.] This high transmissivity layer will protect the geomembrane and "promote lateral drainage of seepage and stormwater runoff from the CTFS."[12] The piping system will consist of perforated secondary collection pipes located on the geomembrane, which drain to larger collection header pipes in each cell of the CTFS.[13] These collection header pipes connect to the Solution Outlet Channel, and then to an underdrain outlet pipe which will "convey flow into a Parshall Flume for measuring the seepage flow rate and then into the CTFS Reclaim Pond[.]"[14]

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[7] *See* Permit, Pt. I.C.1 (Feb. 25, 2022), Exhibit 5; Engineering Design Report, p. 17, Exhibit 4.
[8] *See* Ex. 4, Engineering Design Report, p. 17.
[9] *See id.* at pp. 17-18.
[10] *See id.* at p. 18.
11 *See* Ex. 5, Permit, Pt. I.C.1; Process Fluid Management Plan, p. 6 (Revised Feb. 9, 2021), Ex. 6; Ex. 1 at 11.
[12] Ex. 4, Engineering Design Report, p. 19.
[13] *Id.* at p. 18.
[14] *Id.* at pp. 18-19.

The CTFS will be constructed to direct precipitation runoff to the perimeter of the facility.[15] Stormwater overflow pipes will be located above the underdrain outlet pipe.[16] These pipes will be sized to convey stormwater runoff during a 100-year, 24-hour storm event into the CTFS Solution Outlet Channel, which drains to the Reclaim Pond.[17] As such, precipitation that comes in contact with the CTFS will run off and drain to the Reclaim Pond.

The CTFS will be equipped with a leak detection system consisting of "a layer of studded 60-mil HDPE geomembrane underneath the CTFS 80-mil primary HPDE liner along the southern channel, which runs along the downstream side of each cell."[18] At the outlet of each cell, a six-inch leak detection pipe will extend from the base of the channel to the crest of the haul road.[19] Any solution detected in the pipe will be in containment and discharge into the Reclaim Pond.

C. The Reclaim Pond is conservatively sized, double-lined, and equipped with a leak detection system to prevent any discharge of pollutants to waters of the State

The Reclaim Pond is also designed to contain solution and ensure no discharge of pollutants. It will be double-lined with a 60-mil HDPE, double sided textured geomembrane liner on bottom overlain by a 200-mil thick layer of geonet, and an 80-mil HDPE double sided, textured geomembrane liner above the geonet.[20] It is also equipped with a leak detection system – in the unlikely event of leakage through the 80-mil liner, fluid will flow along the geonet to the sump where the leak collection and recovery system ("LCRS") is located.[21] This will "allow for collection and recovery of leakage through the primary liner and eliminate the transfer of head

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[15] *See* Ex. 1, Fact Sheet, p. 12.
[16] Ex. 6, Process Fluid Management Plan, p. 6.
[17] *See* Ex. 1, Fact Sheet, p. 12.
[18] Ex. 1, Fact Sheet, p. 14. *See also* Permit, Pt. I.C.2.
[19] *See* Ex. 1, Fact Sheet, p. 14.
[20] Ex. 2, WPCP Application, pt. 4.9; Ex. 4, Engineering Design Report, p. 19.
[21] *See* Ex. 6, Process Fluid Management Plan, p. 6.

from the primary liner to the secondary liner."[22] A riser pipe will provide access for monitoring and recovery of any leakage through the primary liner.[23]

The Reclaim Pond is conservatively designed to handle greater volumes of seepage and precipitation than are expected to occur at the Project. It has an operating capacity of 74 gpm for 7 days,[24] which was based on a conservative analysis of *potential* flow from the CTFS by NewFields, calculated by subtracting the native moisture content of the ore from the moisture content at which the material would be stacked and assuming higher material permeability and greater square footage.[25] NewFields also conservatively assumed that the material would be stacked all at once, rather than gradually as will actually occur – which further overestimates flow.[26] A seepage analysis performed by Piteau Associates ("Piteau") in 2021 indicated that seepage from the CFTS itself during operation is not anticipated.[27] It further estimated the seepage rate from infiltration during closure to be 0.02 gpm, and applying conservative sensitivities, no more than 15.2 gpm.[28]

The Permit requires that Lithium Nevada contain a 25-year, 24-hour storm event[29] which results in 1.96 inches of precipitation depth.[30] Lithium Nevada again took a much more conservative approach, sizing its Reclaim Pond to handle a 100-year, 24-hour storm event[31] which results in 2.48 inches of precipitation depth.[32] The Reclaim Pond will also have three feet of

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[22] *Id.*
[23] Ex. 2, WPCP Application, pt. 4.9.
[24] *See* Ex. 1, Fact Sheet, p. 11.
[25] Ex. 3, NDEP Response to Comments, pp. 1; Ex. 1, Fact Sheet, pp. 10-16; 8 Nov. 2021 E-mail regarding NewFields Seepage Calculation.
[26] *See* 8 Nov. 2021 E-mail regarding NewFields Seepage Calculation, Exhibit 15.
[27] *See* Ex. 7, Piteau, CTFS Unsaturated Flow Modeling Revision 1, p. 6 (Sept. 2021).
[28] *See id.*
[29] *See* Permit, Pt. I.A.2.
[30] See WPCP Application, pt. 3.3; WPCP Application Att. H, *Technical Memorandum re: Thacker Pass Climate Analysis*, p. 9 (Dec. 10, 2019), Exhibit 8.
[31] *See* WPCP Application, pt. 2.7; Fact Sheet, p. 11.
[32] *See* WPCP Application, pt. 3.3; Ex. 8, Technical Memorandum re: Thacker Pass Climate Analysis, p. 9.

freeboard to allow for operational flexibility.[33] With these design components, the Reclaim Pond has "an operating capacity of 9.2 million gallons, can store a 100-year, 24-hour storm event runoff volume of 17.8 million gallons and has and additional 3.6 million gallons of storage available in the top 3 feet of freeboard. The "total pond volume to the crest is 30.6 million gallons."[34]

Lithium Nevada will monitor fluid levels in the Reclaim Pond daily.[35] Water collected in the Reclaim Pond will not be discharged.[36] Rather, it will either "be pumped back to the Process Plant or left to evaporate[.]"[37] The pumpback pipe capacity is 500 gpm, further ensuring no discharge.[38]

D. Seepage is anticipated to be minimal given the clay tailings and the CTFS design

Piteau estimated that that infiltration would only travel approximately 20 meters in 1,000 years.[39] The slow rate of infiltration is because clay tailings have low permeability, making it difficult for water to flow through the CTFS.[40] Clay tailings also have low hydraulic conductivity, which will result in a very long equilibration period.[41] Because of their low hydraulic conductivity, the tailings "will function as a 190 ft thick low permeability cap which will impede infiltration and enhance the functionality of the store and release cover."[42] Piteau anticipates that drying and compaction of the clay tailings will further reduce the hydraulic conductivity of the materials.[43] NDEP accounted for this when it issued the Permit.[44]

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[33] *See* Fact Sheet, p. 11.
[34] Fact Sheet, p. 15; *see* Permit, Pt. I.C.3; Process Fluid Management Plan, p. 6; Engineering Design Report, p. 19.
[35] *See* Process Fluid Management Plan, p. 7.
[36] *See* Engineering Design Report, p. 19.
[37] WPCP Application, sec. 4.5; *see also* Process Fluid Management Plan, p. 7.
[38] *See* Engineering Design Report, p. 20.
[39] *See* Ex. 11, Piteau, CTFS Modeling, pp. 6, 7.
[40] *Id.* at p. 2.
[41] *See id.* at p. 3.
[42] *Id.* at p. 2.
[43] *Id.*
[44] *See* NDEP Comment Responses, p. 152.

Piteau's infiltration modeling also demonstrated that moisture content through the CTFS was estimated to take several thousand years to equilibrate and produce any seepage to the underdrain system.[45] When any infiltration does reach the bottom of the CTFS, it will be captured by the seepage collection system and drain to the lined Reclaim Pond that will have been converted into an evapotranspiration (ET) Cell for passive evaporation (*see* Section I.C., *supra*). Piteau also estimated that seepage from infiltration during closure would be minimal, at 0.02 gpm for the facility as designed.[46]

E. The Tentative Plan for Permanent Closure ensures no discharge from the CTFS

The application included a tentative plan for the permanent closure "which describes the procedures, methods and schedule for stabilizing spent process materials."[47] Under the Tentative Plan, when operations cease, the CTFS slopes will be recontoured to provide long-term stability and mimic surrounding topography.[48] The CTFS will be overlain by a layer of cover soil, which will "promote the establishment of vegetation, reduce infiltration of meteoric water, and control erosion."[49] More specific details will be determined as part of the formal closure process.[50] Lithium Nevada must have an approved final plan for permanent closure before initiating permanent closure activities.[51]

As flow from the CTFS decreases and the required pond storage volume is reduced, the Reclaim Pond will be converted to an ET-Cell to passively evaporate any minimal seepage from the CTFS.[52] The ET-Cell will consist of two zones: an evaporation/evapotranspiration zone which

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[45] *See* Piteau, CTFS Modeling, p. 7.
[46] *Id.* at 6.
[47] NAC 445A.398.5.
[48] Ex. 9, Tentative Plan for Permanent Closure, p. 28 (Revised Sept. 24, 2021).
[49] *Id.* at 29.
[50] *See id.*
[51] *See* Permit, Pt. I.J.
[52] *See* Tentative Plan for Permanent Closure, p. 29.

will evaporate water when evaporation exceeds precipitation and allow plants to remove water through evapotranspiration; and an underlying storage zone which will consist of a coarse-grained material and store water when the inflow exceeds the evaporative loss rate.[53] Again, final details will be determined when the formal closure planning process begins.

F. The Permit requirements ensure that the Project prevents degradation of waters of the State and allow for adaptive management

The Permit imposes extensive requirements and limitations that will ensure no degradation of waters of the State. For example, it requires that Lithium Nevada contain all process fluids, including meteoric waters, that enter the fluid management system as a result of a 25-year, 24-hour storm event, and prohibits Lithium Nevada from releasing or discharging any contaminants from the system.[54] It also requires monitoring the leak detection systems, and that Lithium Nevada monitor the tailings for physical stability, geotechnical moisture content, percent compaction, and final placement location.[55] The Permit also places limits on the daily accumulation of flow in Lithium Nevada's leak detection sumps and prohibits the CTFS from being constructed in excess of 200 feet over the 80-mil geomembrane.[56] In addition, the moisture content of the tailings cannot exceed 46 % unless Lithium Nevada submits additional seepage analysis for Division approval.[57]

The Permit also requires that Lithium Nevada submit for review and approval "an additional sensitivity analysis analyzing the effect of moisture content on seepage rates from the [CTFS] to specify an allowable operating range for tailings placement."[58] It also requires that Lithium Nevada conduct neutralization studies of tailings material prior to its filtration and

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[53] *Id.*
[54] *See* Permit Pt. I.A.
[55] *See id.* at Pt. I.D.
[56] *See id.* at Pt. I.G.
[57] *See id.* at Pts. I.G.11, 12.
[58] *Id.* at Pt. I.B.8

stacking on the CTFS.[59] Lithium Nevada must also "submit annual progress reports to the Division for review and evaluation and . . . include the potential short-term and long-term impacts of neutralization methods on CTFS stability."[60] The Permit's limited five-year term allows NDEP to apply adaptive management and reassess permit conditions after Lithium Nevada conducts required monitoring during the first permit term.[61] If the monitoring results demonstrate that additional controls are necessary, those conditions can be added for the next Permit term. NDEP can also engage in adaptive management throughout the initial Permit term.[62] As NDEP noted in its Comment Responses, the monitoring, reporting, and inspection requirements will allow NDEP to confirm that the facility is being operated as designed.[63] If NDEP "determines the facility is not being operated as designed, additional analysis and permit modification, if necessary, will be required."[64]

II. STANDARD OF REVIEW

Review of administrative agency decisions requires deference to factual findings supported by substantial evidence limiting the determination to whether the agency acted arbitrarily or capriciously. *Nev. Pub. Emples. Ret. Bd. v. Smith*, 129 Nev. 618, 623-24 (2013). Although purely legal questions can be decided without deference, "when an agency's conclusions of law are closely related to its view of the facts, those conclusions are entitled to deference and [will not be disturbed] if they are supported by substantial evidence." *Id.* at 624. "Substantial evidence exists

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[59] *Id.* at Pt. I.N.3.
[60] *Id.*
[61] *See id.* at p. 1; NAC 445A.409.2.
[62] *See* NAC 445A.416 (minor modifications), NAC 445A.417 (major modifications).
[63] NDEP Comment Responses, p. 149.
[64] NDEP Comment Responses, p. 38. See also NDEP Comment Responses, p. 40 ("if it becomes apparent through the routine monitoring, reporting, and inspections required by Parts I.D and II.B of the Permit that there is a wide range of moisture contents, the model, closure plan, and ET Cell capacity can be updated accordingly.")

if a reasonable person could find the evidence adequate to support the agency's conclusion." *Elizondo v. Hood Mach., Inc.*, 129 Nev. 780, 784 (2013).

III. ARGUMENT

GBRW argues that NDEP made a legal error issuing the Permit, but it relies on inapplicable regulations and ignores critical facts associated with CTFS design to assert that regulatory requirements have not been met. NDEP's decision was supported by substantial evidence, and GBRW fails to refute that evidence or demonstrate the Permit was issued in error.

A. NDEP Has Not Made Any Error in Law or Fact in Determining There Will Be No Degradation of Waters of the State and that Regulatory Requirements Are Met.

In arguing that the CTFS will not minimize the discharge of pollutants to waters of the State, GBRW overlooks that this will be a zero-discharge facility: the CTFS is lined and has a leak detection system, and the Reclaim Pond is double-lined and leak protected. The Reclaim Pond is conservatively designed to accommodate significant seepage and precipitation that are not expected to occur. GBRW further relies on inapplicable regulations or contorted interpretations of the regulations that do apply. As NDEP correctly determined, all regulatory requirements have been met.

1. There is no regulatory requirement that tailings be neutralized or that Lithium Nevada obtain a variance under NAC 445A.430.

GBRW claims that the CTFS does not satisfy the requirements in Part 1 of NAC 445A.430 because the tailings are acidic. [Opening Brief, 2.] GBRW also argues that NDEP erroneously found that the 80-mil HDPE geomembrane will stabilize any contaminant release, suggesting that Lithium Nevada has not complied with NAC 445A.431. [Opening Brief, 3.] GBRW essentially argues that NDEP was required to mandate all tailings be neutralized or grant a variance from such a requirement. GBRW's argument is unsupported by law.

First, it relies on a regulation that does not apply to tailings facilities like the CTFS. NAC 445A.430 requires that "[s]pent ore *which has been left on leach pads* or which will be removed *from a pad* must first demonstrate stability of the discharge effluent[]" through compliance with certain WAD cyanide levels, pH levels and ensuring contaminants in meteoric waters will not degrade waters of the state. NAC 445A.430(1) (emphasis added). If these requirements cannot be achieved, NDEP can grant a variance if certain requirements are met, including if a permittee demonstrates that spent ore has been stabilized. NAC 445A.430(2). Thus, this regulation and its variance requirement only apply where (1) there is spent ore left on a leach pad or to be removed from a leach pad; and (2) there will be discharge effluent from that leach pad. This is not the situation with the CTFS – it does not contain a leach pad on which spent ore will be placed, and because it is a closed-loop, no-discharge facility, it will not result in *any discharge effluent*. [*See supra* §I.B-I.C.] NAC 445A.430 does not apply and, therefore, no variance was required.

GBRW's reliance on NAC 445A.431 in arguing that the project tailings must be neutralized is also flawed. NAC 445A.431 does apply to the Project and requires that "tailings must be *stabilized* during the final closure of a facility so as to inhibit the migration of any contaminant that has the potential to degrade the waters of the State." (emphasis added). However, stabilized is defined as "the condition which results when contaminants in a material are bound *or contained* so as to prevent them from *degrading waters of the State* under the environmental conditions that may reasonably be expected to exist at a site." NAC 445A.379 (emphasis added). As explained above, the CTFS is conservatively designed with multiple layers of protection, which will contain any contaminants and prevent them from entering waters of the State. Further, the system is conservatively designed to contain significantly more seepage and runoff than are reasonably expected to be present at the site. [*See supra* §I.C.] The CTFS complies with NAC

445A.431 because it is designed to stabilize tailings to prevent any migration of contaminants into waters of the State.

GBRW suggests that the HDPE liner cannot be relied on for containment based on cursory references to liner lifetimes and potential failures. Not only would this argument mean virtually every mining facility in Nevada (including those with leach solution directly on HDPE liners, unlike the CTFS) would not comply with the regulations, it is undermined by the ample evidence on liner life and failure rates NDEP cited in its response to comments.[65] NDEP cited to five different studies providing a range of lifetime predictions for liners under different field conditions. Notably, these evaluations were conducted by *fully immersing the liner in solution* and yet still found that liner lifetime ranged from 250 years to 1000 years.[66] This is much more conservative than anticipated field conditions at the CTFS, where the liner would only be exposed to minimal (if any) amounts of seepage combined with meteoric water. GBRW's arguments regarding potential liner failure are unsubstantiated and speculative at best.

2. The CTFS's conservative design ensures that there will be no release of contamination, consistent with NAC 445A.433.1(b).

GBRW argues that NDEP acted unlawfully because it contends the CTFS will not satisfy the requirements in NAC 445A.433.1(b). [Opening Brief, 3.] GBRW argues that this regulation is not satisfied because "the source of contamination, the tailings, is not designed to minimize the release of the contamination, but the source would be minimized if the tailings were neutralized." [*Id.*] GBRW also claims that, "[e]ven if NAC 445A.437 is satisfied NAC 445A.430 and NAC 445A.433 . . . must still apply." [Opening Brief, 3-4.] This is incorrect.

[65] *See* NDEP Comment Responses, pp. 39-40.
[66] *Id.*

GBRW makes an unsupported leap that defies the regulatory language. NAC 445A.433(1)(b) requires that "*sources* [] 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." GBRW incorrectly suggests that the "source" at issue here is the tailings. [Opening Brief, 3.] However, Nevada regulations define "source" as "any building, structure, facility or installation *from which there is or may be the discharge of pollutants*." NAC 445A.108 (emphasis added). Thus, even though this is a no-discharge facility, the "source" would be the CTFS, which, consistent with the regulation, has been conservatively designed to "minimize release of contaminants into groundwaters" as a no-discharge, closed loop facility to eliminate any potential release of contaminants. While Lithium Nevada has investigated technologies for neutralizing its tailings and will continue those studies pursuant to an express requirement of the Permit,[67] there is no regulatory requirement that the tailings be neutralized to satisfy NAC 445A.433(1)(b). To impose such a requirement in a contested case under these facts as GBRW requests would constitute unlawful *ad hoc* rulemaking in violation of NRS Chapter 233B.

GBRW also argues that the CTFS would "probably" have the highest geotechnical water content of any tailings storage facility ever constructed, suggesting this as a basis for stretching the language of the regulatory requirements. The water content in the CTFS is based on the unique characteristics of clay tailings (*i.e.*, higher water content than gold or copper tailings). The CTFS design reflects these realities and will manage and monitor any anomalies from expected conditions. NDEP has further incorporated extensive monitoring requirements into the Permit to address any uncertainty and respond to documented conditions, as needed. Notably, as NDEP indicated in response to comments, there are several facilities coming online with similar

[67] *See* Permit, Pt. I.N.3.

systems.[68] As NDEP correctly determined, the CTFS is designed to handle higher water content clay tailings and will ensure that any seepage is contained.

3. LNC has met all regulatory requirements for closure that are applicable at this time.

With respect to closure, GBRW argues that NDEP's decision was clearly erroneous due to an inadequate mine plan. GBRW relies on NAC 445A.446, which states, "[p]ermanent closure is complete when the requirements contained in NAC 445A.429, 445A.430 and 445A.431 have been achieved." [Opening Brief, 15.] It also cites to NAC 445A.429, which requires that, "[t]he holder of the permit must institute appropriate procedures to ensure that all mined areas do not release contaminants that have the potential to degrade the waters of the State." GBRW contends that NDEP must have required the type of seepage analysis GBRW submitted (the flaws of which are addressed below) before these conditions could be met, ignoring that Lithium Nevada has submitted the tentative plans for closure that are required at this time.[69]

GBRW's reliance on NAC 445A.446 is misplaced – the regulation is only triggered by permanent closure of the facility at the permit holder's request, the end of a permit term for a facility in temporary closure, or when the design life of a process component is reached. Even if NAC 445A.446 did apply to NDEP's issuance of the Permit, it provides that permanent closure is complete when the requirements of NAC 445A.429 (for prevention of releases of contaminants and degradation of waters of the State), 445A.430 (for stabilization of spent ore on leach pads) and 445A.431 (for stabilization of tailings) have been achieved. As discussed above, these regulatory requirements have either been met here (in the case of NAC 445A.429 and 431) or do not apply

[68] NDEP Comment Responses, p. 38.
[69] *See* WPCP Application Attachment P, *Temporary Closure Plan* (Apr. 2, 2020); Tentative Plan for Permanent Closure (Sept. 24, 2021), Exhibit 10.

(in the case of NAC 445A.430). Thus, GBRW's reference to NAC 445A.446 cannot sustain its flawed legal argument that NDEP's issuance of the Permit was unlawful.

B. GBRW's technical arguments rely on flawed calculations to critique NDEP's decision and fail to demonstrate that NDEP's decision was not supported by substantial evidence.

In the absence of a credible legal argument, GBRW relies primarily on a lengthy (and untimely) expert report provided by Dr. Steven H. Emerman ("Emerman Report")[70] that critiques the design and seepage calculations for the CTFS, provides its own alternative seepage calculations, and questions Lithium Nevada's technical capabilities to meet the Permit requirement for geotechnical water contents. The Emerman Report—which was not submitted during the public comment period on the Permit, could not have been considered by NDEP during the permit process, and cannot be the basis for remand now[71]—suffers from several critical flaws and cannot be relied on to either critique the valid seepage estimates in the record or provide valid alternate estimates of potential seepage associated with the CTFS. GBRW's unsubstantiated arguments about Lithium Nevada's ability to meet optimal operational requirements for geotechnical water content before stacking have no bearing on whether NDEP's decision to issue the Permit was valid and are belied by the record.

1. The analyses on which NDEP relied are not faulty and support that the design approaches for the facility are extremely conservative and will yield zero discharge.

NDEP relied on two analyses to estimate potential containment needs for seepage during operations and the potential for seepage from the tailings stack during closure: (i) NewField's

[70] Prediction of Seepage from the Clay Tailings Filter Stack (CTFS) at the Lithium Nevada Thacker Pass Mine, North Nevada, Great Basin Resource Water (Emerman, April 2022)("Emerman Report").

[71] Under NAC 445B.8914.5, the Commission will not consider evidence that was not submitted before issuance of the Permit unless there was a public comment period before Permit issuance and "the Commission determines that reasonable cause exists for the failure of a party to submit the evidence." GBRW has not shown that reasonable cause exists for its failure to submit the Emerman Report during the public comment period and, therefore, the report should be struck from the record and not considered by the Commission.

preliminary estimate for operational pond design purposes; and (ii) Piteau's more refined seepage analysis that utilized industry standard modeling and multiple sensitivity analyses. As described above, the NewFields analysis was a preliminary, ultra-conservative analysis which resulted in the calculation of an estimated 74 gpm potential flow from the CTFS facility, which was used for the purposes of designing the containment system and oversized Reclaim Pond.

The Piteau analysis took a more refined approach with the initial purpose of estimating seepage at closure through infiltration modeling. The Piteau analysis took into account the designed dimensions of the CTFS, the anticipated precipitation and evaporation based on climate reports in the record, the store and release cover for the CTFS, and the impermeable nature (low hydraulic conductivity) of the stacked clay tailings. Simulating infiltration rates through the engineered stack cover, the seepage rate from infiltration was estimated to be 0.02 gpm for CTFS as designed, with a conservative range of 0.02-2.42 gpm adding additional sensitivities.[72] Piteau conducted additional sensitivity analyses in a later report, estimating infiltration seepage for the CTFS as designed, alternative clay tailings (assuming permeability of silty loam, which is two orders of magnitude more permeable); no transpiration from plants; decreased evaporation/transpiration by 15%; simulating a 12-inch cover rather than the 24-inch cover planned for the CTFS; assuming 24-inch cover only without underlying tailings; and assuming twice the daily precipitation than expected.[73] Even these much more conservative seepage rates (based on conditions that are not expected) ranged only to 12.7 gpm for doubled precipitation and 15.2 gpm for cover only (without tailings). Given these conservative estimates, NDEP correctly

[72] *Id.* p. 5.
[73] Piteau Associates, Technical Memorandum re: Clay Tailing Filter Stack (CTFS) Unsaturated Flow Modeling Revision 1 (Revised September 21, 2021)("Piteau Report"), p. 4.

concluded that the design capacity of 15.2 gpm for the ET Cell at closure and 74 gpm during operations were highly conservative.[74]

2. GBRW's critique of these analyses and alternative seepage calculations rely on erroneous numbers to produce impossibly high seepage flows.

GBRW, in reliance on the Emerman Report, argues that Piteau's analyses are not reliable because they used optimal geotechnical water content for operations (46%), and contends that even small changes in the geotechnical water content can result in large changes to the seepage rate. To support this, GBRW relies primarily on a set of seepage calculations performed by Dr. Emerman, the results of which are presented in his report at pages 49-61 in graph form, but without the mathematical calculations to back them up. Given the timing of submittal and the lack of detail to support Dr. Emerman's analysis, the Report is not reliable and should not be considered by the Commission.[75] But even if it were timely, Emerman's critique ignores critical site-specific factors, and his own "calculations" erroneously relate Newfields' 74 gpm design number (as if it were an actual reference flow rate) to a reference hydraulic conductivity factor (10^{-6}), when these numbers are not related reference values. Using this erroneous relation in his equations scaled to an assumed range of tailings moisture contents, he calculates soil saturation numbers that ***exceed 100%*** for moisture contents of 52% or higher. But it is physically impossible for the tailings to be more than 100% saturated – they would resemble more of a slurry and could not possibly be used for CTFS construction. Emerman himself acknowledges his excess saturation calculations as an "obvious complication," noting that calculating seepage rates from them "is an almost academic exercise because the CTFS *could not actually be constructed out of oversaturated tailings*."[76]

[74] *See* Fact Sheet, p. 11; NDEP Comment Responses, pp. 1, 3, 40.
[75] *See* NAC 445B.8914.5.
[76] Emerman Report, p. 38 (emphasis added).

Yet, he goes on to make those very calculations, assuming moisture contents for the tailings of 34-58% to calculate seepage numbers, predicting seepage rates that span five orders of magnitude. On the upper end, he estimates that with a geotechnical water content of 52% throughout the entire CTFS, the seepage rate could range from 243-410 gpm; and for a geotechnical water content of 58% throughout the entire CTFS, the seepage rate could range from 2297-9215 gpm.[77] But Emerman's calculations use flawed equations that defy reality, and it is only his calculations using moisture contents of 52% or more (for which his calculations impossibly predict more than 100% saturation) that produce seepage estimates that are higher than the NewFields design calculation of 74 gpm.[78] Emerman also oversimplifies site conditions by providing flow estimates that assume the entire CTFS would be placed at that given moisture content, which is not consistent with design specifications providing for variability within the stack. Emerman's flawed calculations do not support GBRW's argument that NDEP did not require enough analysis to support issuance of the Permit.

In addition to the scaling and saturation flaws noted above, Emerman's calculations also do not appear to have considered the actual measured permeability of the clay or the capillary barrier, both of which are critical factors for analyzing potential seepage. The tailings will have very low permeability and seepage will be controlled by that permeability. This is one reason why Piteau need not have considered tailings consolidation for its analysis to be valid, as Emerman contends. [Opening Brief, 8-9.] Emerman's argument that tailings consolidation must have been considered for the seepage estimates to be valid ignores the nature of the materials and their extraordinarily low permeability. It also ignores that the tailings will have been compacted as they

[77] *Id.* at 48.
[78] *See id.* at 48 (referencing 52% and 58% predictions); 49-52 (Figures 18a-d predict rates exceeding 100 gpm only for moisture contents exceeding 52%).

are placed in the CTFS and will be gradually placed in 12-inch lifts.[79] Moreover, the entire bottom of the CTFS will have a capillary break (the transition from tailings to the underlying gravel) which means that for water to seep out, the bottom of the CTFS must be close to saturation which will take years. Until saturation is achieved, water will spread to drier layers of the CTFS and likely not be released. Even if the entire stack did reach a homogeneous moisture content, the moisture would continue to accrue at the bottom of the CTFS, but not seep out – similar to water in a damp but not fully saturated towel.

GBRW also argues that Piteau should have considered all four sensitivities *in combination* rather than separately. [Opening Brief, 7-8.] But pooling sensitivity analyses together would be unreasonably conservative and potentially unreliable because in some cases one sensitivity can cancel another out. For example, it would not make sense to combine Piteau's "cover only" sensitivity with the alternative tailings sensitivity for clay loam permeability, as these are mutually exclusive. Rather, the range of sensitivities addressed by Piteau sufficiently captures the design variables to conservatively provide a range of conditions.[80]

3. GBRW's concerns with achievability of the target geochemical water content have no basis and are irrelevant to this appeal given the Permit requirements addressing them.

GBRW also argues, based on the Emerman report, that the target geotechnical water content for the tailings material (46%) is unachievable. [Opening Brief, 16-19.] According to GBRW, despite NDEP having included precise values for this parameter that Lithium Nevada *must comply with* to operate under the Permit, NDEP should not have issued the Permit until Lithium Nevada demonstrates that it can consistently achieve that water content. GBRW ignores that, in addition to the Permit requirements, all of the engineering studies also require that these

[79] *See* Fact Sheet, p. 12.
[80] Piteau Report, pp. 3-4.

contents be achieved for required compaction of the tailings. The water content must be continuously monitored, and in the event there were a deviation from expectations or Permit requirements, it would be known long before a discharge could ever occur. In other words, Lithium Nevada must – and will – meet these values or will not be allowed to operate.

GBRW also ignores that in addition to the drying process applied during the pilot studies, at full scale buildout, traditional drying techniques will be applied to the tailings after filtration. Nevada is a net evaporation state, meaning that total evaporation exceeds annual precipitation. The climate report submitted with the application demonstrates that evaporation exceeds precipitation every month of the year.[81] If the geotechnical moisture contents is not aways be achieved through the first step of filtration, then Lithium Nevada can and will employ conventional moisture reduction techniques using plows or graders to loosen the clay tailings and allow the moisture to evaporate more quickly. This method of moisture reduction is very common in Nevada mining operations and in mining operations around the world.[82]

Contrary to GBRW's suggestion, the moisture content is directly verifiable in the field, and this verification is required by the Permit. Lithium Nevada will monitor moisture content of the tailings using a nuclear densometer.[83] Piezometers will also be installed at the base of the tailings to measure pore water pressures which will be an important early indicator of any potential seepage. The Permit currently prohibits placing tailings material in the CTFS that exceeds 46%.[84] Lithium Nevada is not currently authorized to use a wider percentage range for moisture content for tailings placement throughout the CTFS as Emerman assumes and, any wider range can only

[81] WPCP Application Attachment H, *Technical Memorandum re: Thacker Pass Climate Analysis*, pp. 7, 9-10 (Dec. 10, 2019).
[82] Ex. 13, NewFields, *Technical Memorandum re: Clay Tailings Filter Stack Liner System*, pp. 3 (Oct. 21, 2021).
[83] *See* Ex. 14, NDEP, *CLOSURE Technical Comments 3 for New Water Pollution Control Permit Application*, pp. 5-7 (Oct. 27, 2021).
[84] Permit, Pts. I.G.11, 12.

be considered after additional sensitivity analyses are conducted addressing whether a range in moisture content has any effect on seepage rates.[85] This study must be completed by July 10, 2022, which will be before any mining or placement of tailings occurs. This additional study requirement, while unnecessary given the conservative approach taken in design of containment during and after operation, adds an additional level of protection to anticipate any potential contingencies.

IV. CONCLUSION

For the reasons set forth in above, LNC respectfully requests that the Commission:

(a) find that GBRW failed to demonstrate that NDEP committed an error of law, acted arbitrarily or capriciously, or committed an abuse of discretion in issuing the Permit;

(b) find that NDEP's decision to issue the Permit was supported by substantial evidence; and

(c) dismiss GBRW's appeal with prejudice.

DATED this 20th day of May 2022.

HOLLAND & HART LLP

Laura K. Granier
Ashley A. Peck
Melissa L. Reynolds

Attorneys for Lithium Nevada Corp.

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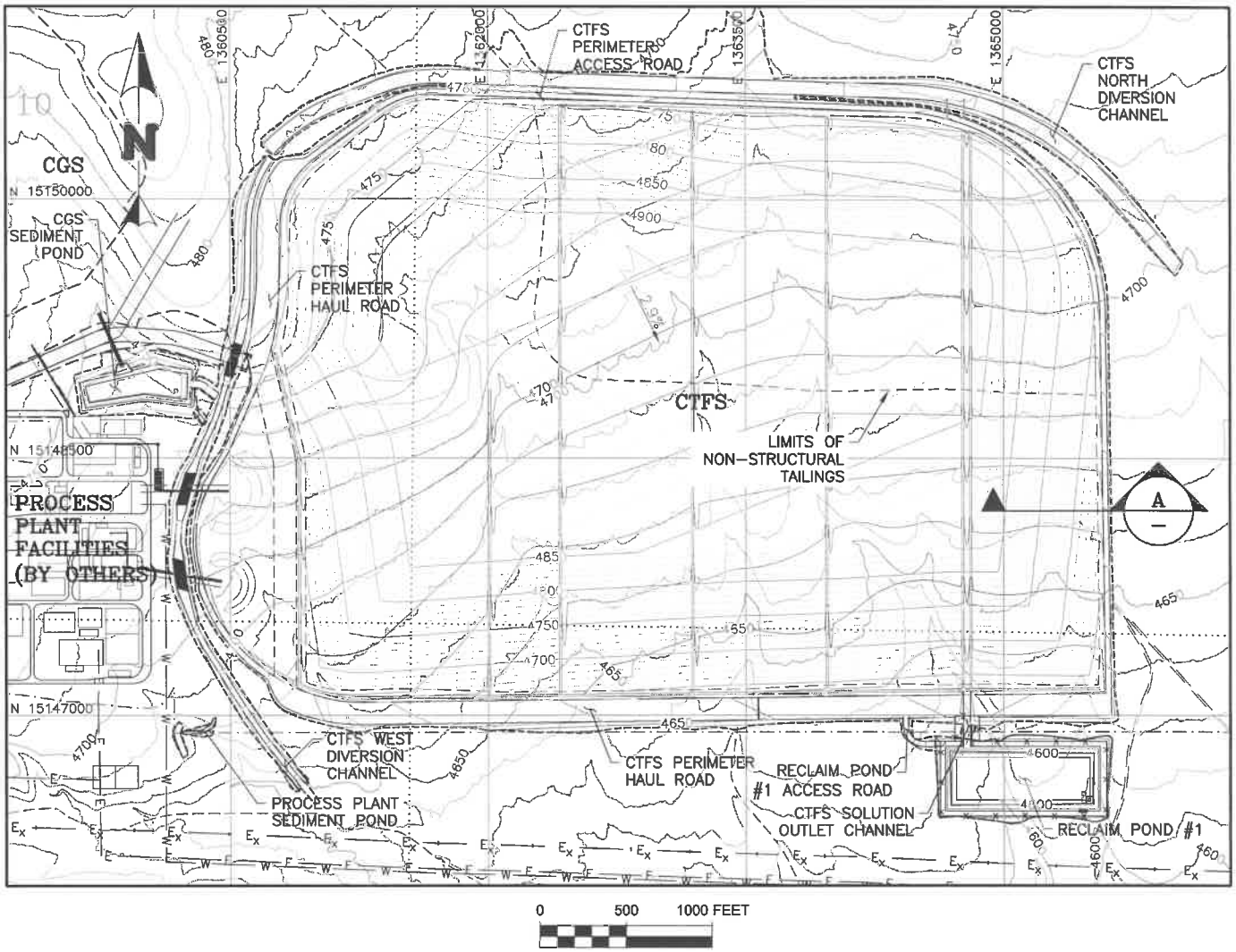
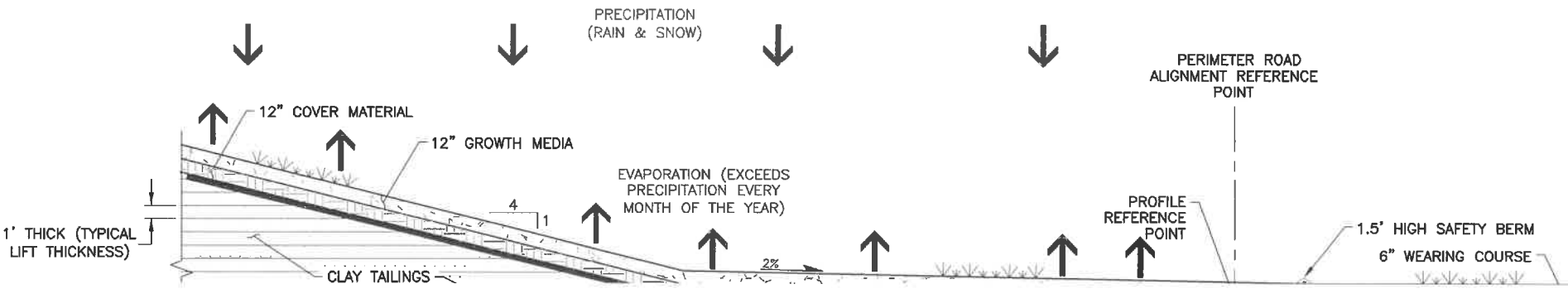
[85] Permit, Pt. I.B.8.





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