TECHNICAL REVIEW

AND DETERMINATION OF COMPLIANCE
FOR:

LITHIUM NEVADA CORPORATION
THACKER PASS PROJECT

Humboldt County, Nevada
HA 30A – Kings River Valley/Rio King
HA 33A – Quinn River Valley/Orovada

Class II Air Quality Operating Permit

AP1479-4334
FIN A1270
Air Case 10677 – New

NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

BY

STATE OF NEVADA
DEPARTMENT OF CONSERVATION AND NATURAL RESOURCES
DIVISION OF ENVIRONMENTAL PROTECTION
BUREAU OF AIR POLLUTION CONTROL

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1.0 INTRODUCTION

On January 26, 2021, Lithium Nevada Corporation (Li NV) submitted an application for a new Class II Air Quality Operating Permit to the Nevada Division of Environmental Protection – Bureau of Air Pollution Control (BAPC). The Class II Air Quality Operating Permit application was deemed administratively complete on February 9, 2021.

Request for Information (RFI) #1, sent February 24, 2021, to request an Insignificant Activity Determination application be submitted for the Laboratory equipment. The application was received by the BAPC on March 31, 2021. This resulted in 35 stop days

Request for Information (RFI) #2, sent March 9, 2021, the BAPC asked for more information on the scrubber system that will be used for the acid plant. Request for Information (RFI) #3, sent March 31, 2021, the BAPC asked for more information on the scrubber system that will be used for the acid plant. The facility answered RFI #2 and #3 via email on April 4, 2021. This resulted in 24 stop days.

Request for Information (RFI) #4, sent May 13, 2021, the BAPC asked for more information on the neutralization tanks, lithium carbonate dryer, lime silo, and acid plant. The facility answered this RFI via email on May 24, 2021. This resulted in 11 stop days.

Request for Information (RFI) #5, sent August 18, 2021, the BAPC asked for more information on the leach tanks, neutralization filter system, and magnesium precipitation filter system. The facility answered this RFI via email on August 23, 2021. This resulted in 5 stop days.

Total stop days for this permitting action is **75** days.

In accordance with NAC 445B.3457(3)(b) the permit was to be issued 90 days after the official day of submittal (the day the application was deemed administratively complete) with the timeline being extended for any accumulated stop days this regulatory date was July 24, 2021. Based on the regulatory timeline the permit was to be issued on July 24, 2021. The permit is anticipated to be issued on February 25, 2022.

Public notice was required, because the Li NV facility is a new Class II Air Quality Operating Permit (NAC 445B.3457). Public notice started on October 18, 2021 and ended on November 18, 2021.

A public hearing was be held at 6 pm (PST) at the Boys and Girls Club of Winnemucca in Winnemucca, NV on November 18, 2021. Public outreach, the public hearing, and public comments are further discussed in Section 2.5 of this report.

The principal operation at the Li NV facility constitutes a non-metallic mineral mine, as defined by the two-digit SIC code 14. Because the primary mineral recovered is lithium, the facility can be further classified by the SIC code 1479, defined as “establishments primarily engaged in mining, milling, or otherwise preparing chemical or fertilizer mineral raw materials, not elsewhere classified.” The list of minerals under SIC code 1479 includes lithium mineral mining. The NAICS code for the Li NV facility is 212393 for “Lithium mineral mining and/or beneficiating.”

2.0 DESCRIPTION OF FACILITY AND PROCESS

2.1 FACILITY DESCRIPTION

Li NV is proposing to develop an open-pit lithium mining and lithium processing operation located in northern Humboldt County, Nevada. The Li NV facility is located 62 miles north of Winnemucca and about 20 miles west of Orovada, Nevada. The Li NV facility is accessed from Orovada by traveling approximately 19 miles west from the US Route 95 junction on State Route 293, then turning north onto the Li NV facility main access road. The Li NV facility is situated at the southern end of the McDermitt Caldera at an approximate elevation between 4,200 and 5,650 feet above sea level.

The Li NV facility will consist of open-pit lithium mining and lithium processing operations designed to produce a lithium carbonate end product, with the potential to produce other battery-grade lithium products in the future. In the proposed Li NV facility, lithium carbonate is recovered through ore crushing, acid leaching, and lithium processing. The on-site facilities will include a sulfuric acid plant to supply sulfuric acid for leaching. The sulfuric acid plant will also generate steam for energy that will provide power to support the Li NV facility.

2.2 PROPOSED PERMIT ACTION

The purpose of this permitting action is to issue a new Class II Air Quality Operating Permit. During this permitting process an Insignificant Activity (IA) determination was processed. The units included in this IA determination have been added to the IA list at the end of the Operating Permit.

2.3 PROCESS NARRATIVE

2.3.1 Mineral Processing (Systems 1 through 5)

Ore from the ore stockpile is fed by loader into one of two hoppers (PF1.001 and PF1.003) with a combined throughput of 960 tons per hour and transferred to a common conveyor (PF1.002 and PF1.004) feeding a mineral sizer (PF1.005) controlled by water sprays. Sized material is then fed to the attrition scrubbing process (PF.1006) controlled by water sprays.

In the attrition scrubbers and classification circuit, high-grade fine lithium material is separated from the low-grade coarse gangue using agitators and hydro cyclones. Attrition scrubbing is a slurry-based wet process comprised of recycled water and ore, which is intensely agitated to primarily scrub fine particles from large particle surfaces as well as break-up agglomerated particles. The attrition scrubbers require saturated material and have no potential to emit any regulated air pollutant. Particulate emissions from the mineral sizer and transfer into the attrition scrubber are controlled by water sprays. The run-of-mine lithium ore is a non-metallic clay material, and as such, these ore processing sources are subject to 40 CFR Part 60, Subpart OOO.

From the attrition scrubbers the slurry is fed through a wet screen to remove oversize material prior to pumping the undersize slurry to the classification circuit. The oversize material is transferred to the oversize stockpile by a stacker conveyor (PF1.007 and PF1.008) with a maximum throughput of 16 tons per hour. In the classification circuit, coarse gangue material is separated from the fine lithium material using hydro cyclones. The coarse material is then passed through a wet screen at a maximum throughput of 430 tons per hour and conveyed to the gangue stockpile (PF1.009 through PF1.011). Particulate emissions from the oversize and gangue material transfers to the stockpiles are controlled by material moisture content (comparable to transfers after a wet trommel). As these transfer points are downstream of a wet material processing operation, per 40 CFR §60.670(a)(2), Subpart OOO is not applicable.

2.3.1.1 Testing Requirements for Mineral Processing (Systems 1 through 5)

An initial opacity compliance demonstration will be required for each emission unit in Systems 1 through 5. System 4 – PF1.008 and System 5 – PF1.011 will require a moisture content sample that will need to be equal to or exceed 4% moisture content.

2.3.2 Purified Lithium Solution (Systems 6 through 11, 13 and 14)

Following the classification circuit, the ore slurry is thickened and pumped to the leaching process at a maximum throughput of 1,080 tons per hour. In the leach circuit, the lithium-bearing slurry is leached with sulfuric acid in a series of tanks (S2.001 through S2.003). Sulfuric acid mist and particulate (primarily consisting of sulfuric acid mist as condensable particulate matter) emissions from the leach tanks are controlled by a wet scrubber. Following leaching, the lithium-bearing solution is neutralized in a series of agitated tanks. Solids generated during leaching and neutralization are filtered and then conveyed to the clay tailings filter stack (CTFS) at a maximum throughput of 1,000 tons per hour (PF1.012 through PF1.022). Particulate emissions from the material transfers to the CTFS are controlled by material moisture content (comparable to transfers after a wet trommel).

Air pulses are used after the filtration step to push the slurry out of the neutralization filter pipes. These air pulses have the potential to cause particulate emissions as the air pulse follows the slurry out of the pipe, into the tank headspace, and out through one of four mist eliminators, that reduce any mist from the system and the particulate emissions from the filter vents (S2.004 through S2.007). The venting from these four vents is limited to 500 hours per year. The neutralization filter system also includes a filtrate blow vent (S2.008), with the potential for particulate emissions and is limited to 50 hour per year.

After neutralization, the lithium-bearing solution is purified by precipitation of magnesium, followed by ion exchange to remove residual magnesium and other divalent cations. The alkaline solids from the magnesium precipitation system are filtered, re-pulped, and reused in the neutralization tanks. Air pulses are used after the filtration step to push the slurry out of the magnesium precipitation filter pipes. These air pulses have the potential to cause particulate emissions as the air pulse follows the slurry out of the pipe, into the tank headspace, and out through one of two mist eliminators on the filter vents (S2.009 and S2.010). The venting from these two vents is limited to 200 hours per year. The magnesium precipitation filter system also includes a filtrate blow vent (S2.011), with the potential for particulate emissions and is limited to 50 hour per year.

2.3.2.1 Testing Requirements for Purified Lithium Solution (Systems 6 through 11, 13 and 14)

An initial opacity compliance demonstration will be required for each emission unit in Systems 6 through 11, 13 and 14. System 6 has initial and annual testing requirements for PM, PM_{10}, $PM_{2.5}$, and H_2SO_4. System 8 and System 14 will have initial and quarterly sampling requirements for total dissolved solids (TDS) content. System 9- PF1.013, PF1.015, PF1.017, and PF1.019; System 10- PF1.020; System 11- PF1.022 will require a moisture content sample that will need to be equal to or exceed 4% moisture content.

2.3.3 Lime and Soda Ash (Systems 19 and 20)

Slaked lime and soda ash solution are added for the magnesium precipitation process. Lime (S2.016 and S2.017) and soda ash (S2.017) are trucked to site and stored in silos at a maximum throughput rate of 80 tons per hour. The lime silo is limited to 4,380 hours of operation per year. The soda ash silo is limited to an annual throughput of 153,900 tons per year. Particulate emissions from the lime truck unloading and transfer to silo via bucket elevator are controlled by a common baghouse. Particulate emissions from the soda ash silo loading are controlled by a vent filter. Both the lime and soda ash silos discharge through sealed transfers.

2.3.3.1 Testing Requirements for Lime and Soda Ash (Systems 19 and 20)

An initial opacity compliance demonstration will be required for each emission unit in Systems 19 and 20. System 19 will be required to do initial and renewal testing for PM, PM_{10}, and $PM_{2.5}$.

2.3.4 Lithium End Product (Systems 12, 15 through 18)

After the removal of additional cations through ion exchange, lithium carbonate and sulfate salts (sodium sulfate and potassium sulfate) are extracted from the solution via crystallization. The sulfate salts are conveyed to the tailings collections conveyor and then to the CTFS (PF1.023 through PF1.025). Particulate emissions from the sulfate salts centrifuge discharge are controlled by an enclosure and the conveyor transfers are controlled by best operating practices.

The lithium carbonate crystals are dried (S2.012) and transferred via conveying hopper to the lithium carbonate storage bin (S2.013) at a maximum throughput rate of 5 tons per hour. From there, the lithium carbonate product is transferred to the packaging system (S2.014) where it is bagged for shipment to customers (S2.015). The packaging system has a maximum throughput of 16 tons per hour but is limited to 43,800 tons per year and 4,380 hours per year. The lithium carbonate dryer and packaging system are each controlled by a baghouse and the conveying hopper and lithium carbonate storage bin are each controlled by a vent filter.

2.3.4.1 Testing Requirements for Lithium End Product (Systems 12, 15 through 18)

An initial opacity compliance demonstration will be required for each emission unit in Systems 12, 15 and 18. Systems 15 and 18 will be required to do initial and renewal testing for PM, PM_{10}, and $PM_{2.5}$.

2.3.5 Sulfuric Acid Plant (Systems 21 through 24)

The sulfuric acid required for leaching the lithium bearing ore is produced on site in a sulfuric acid plant (S2.023). In the plant, molten sulfur at a maximum consumption rate of 51 tons per hour is reacted with air to produce sulfur dioxide, which is catalytically converted to sulfur trioxide and then absorbed in water to produce sulfuric acid. The process is strongly exothermic and produces a large amount of excess heat that is converted to steam and electricity. The plant is designed to produce 3,307 tons per day (3,000 metric tons per day) of sulfuric acid. In addition, the sulfuric acid plant produces carbon-free electricity that may help support the Li NV facility or may be sold to the grid.

Sulfur dioxide, sulfuric acid mist, and particulate (primarily consisting of sulfuric acid mist as condensable particulate matter) emissions from the sulfuric acid plant are controlled by a tail gas scrubber. The facility's proposed scrubber will have a Teflon outlet nozzle. Per NDEP's research, Teflon off-gases toxic particulates at 464°F. The temperature of the outlet is permitted to be approximately 79°F with a maximum temperature of 230°F. Per the facility: the Teflon outlet nozzle is manufactured from "Virgin" grade PTFE; PTFE is chemically inert, weatherable, and high temperature resistance; "Virgin" grade PTFE is FDA approved and is used in high temperature applications including in the food processing and services; Teflon nozzles in the DynaWave application last about 20 years; and the facility only replaces these nozzles due to any damage done to them during maintenance work.

The sulfuric acid plant is subject to 40 CFR Part 60, Subpart H. Given the state-of-the-art scrubber control for the plant tail gas, the sulfur dioxide and acid mist emissions from the sulfuric acid plant are well below the applicable emission standards (4 pounds SO_2 per ton of acid produced and 0.15 pounds H_2SO_4 per ton of acid produced) in Subpart H. The manufacturer guarantee of emissions for SO_2 is 7.5 parts per million volume (ppmv) and H_2SO_4 is 6 milligram per normal cubic meter of air (mg/N m^3). In addition, per Subpart H, the sulfuric acid plant exhaust stack is limited to 10 percent opacity. The sulfuric acid plant also emits nitrogen dioxides from the combustion of sulfur in air, but it is not expected to emit any hazardous air pollutants (HAPs).

Subpart H requires that the Li NV facility install and maintain a SO_2 Continuous Emission Monitoring System (CEMS). The BAPC will also require the installation of NO_X CEMS pursuant to NAC 445B.3405.

Sulfur for the sulfuric acid plant is delivered to the site and stored in one of two sulfur storage facilities (S2.019 and S2.020) at a maximum throughput of 47 tons per hour for each tank. Sulfur dioxide and hydrogen sulfide emissions from these storage facilities are controlled by caustic scrubbing. The scrubber solution also generates a small amount of particulate emissions.

During the initial startup of the sulfuric acid plant and after any maintenance downs, a propane-fired startup burner (S2.022) is required to heat the system prior to feeding molten sulfur. The startup burner has a maximum consumption rate of 315 gallons per hour with a maximum heat input of 28.82 million British thermal units per hour (MMBtu/hr). In addition, during initial startup and any time the sulfuric acid plant is down, a propane-fired package boiler (S2.021) is required to maintain heat and supply steam to the sulfur storage area and processing plant. The package boiler has a maximum consumption rate of 451 gallons per hour with a maximum heat input of 41.3 MMBtu/hr. The startup burner is limited to 200 hours per year of operation and the package boiler is limited to 550 hours per year. The startup burner and package boiler emit propane combustion products, including HAPs.

The package boiler is subject to 40 CFR Part 60, Subpart Dc as a steam generating unit with a heat input capacity greater than 10 MMBtu/hr and less than 100 MMBtu/hr, that combusts only natural gas fuel (liquefied petroleum gas) as defined in 40 CFR §60.41c.

2.3.5.1 Testing Requirements for Sulfuric Acid Plant (Systems 21 through 24)

An initial opacity compliance demonstration will be required for each emission unit in Systems 21 through 24. System 21 will be required to do initial and renewal testing for PM, PM_{10}, $PM_{2.5}$, SO_2, and H_2S. System 22 will be required to do initial and renewal testing for PM, PM_{10}, $PM_{2.5}$, NOx, CO and VOC. System and 23 will be required to do initial testing for PM, PM_{10}, $PM_{2.5}$, NO_x, CO and VOC. In addition to the CEMs unit mentioned above to monitor SO_2 emissions, System 24 will be required to do initial and annual testing for PM, PM_{10}, $PM_{2.5}$. SO_2, NO_x, and H_2SO_4.

2.3.5.2 Monitoring (System 21)

The sulfur used by Li NV will be source from the fuel energy industry that has the standard to treat the molten sulfur to 1,550 °F. Therefore, Li NV will be required to notify the Director within 72 hours if the molten sulfur is sourced from another source other than the fuel energy industry.

Support Activities

At the Li NV facility, several activities support mining and processing that are potential sources for emissions. These include emergency internal combustion (IC) engines, prill silo, cooling towers, fuel storage tanks, and a laboratory (discussed further below).

2.3.6 IC Engines (Systems 25 and 26)

The Li NV facility will operate two diesel-fired fire pumps (S2.024 and S2.025) that ensures fire water is available if the normal power supply is interrupted. These IC engines are process sources of combustion emissions, including HAPs. The two diesel-fired fire pump engines are rated for 422 horsepower (hp), will combust a maximum of 20.0 gallons, are manufactured on or after January 1, 2015, and are subject to 40 CFR Part 63, Subpart ZZZZ and 40 CFR Part 60, Subpart IIII.

The Li NV facility will operate two propane-fired emergency generators (S2.026 and S2.027) that supply power to maintain essential operations. These IC engines are process sources of combustion emissions, including HAPs. The two propane-fired emergency generator engines are rated for 168 hp, will combust a maximum of 13.9 gallons, are 4-stroke rich-burn engines manufactured on or after January 1, 2009, and are subject to 40 CFR Part 63, Subpart ZZZZ and 40 CFR Part 60, Subpart JJJJ.

2.3.6.1 Testing Requirements for IC Engines (Systems 25 and 26)

An initial opacity compliance demonstration will be required for each emission unit in Systems 25 and 26.

2.3.7 Gasoline Storage Tank (System 27) and Other Storage Tanks

A tank area with a 1,000-gallon gasoline tank (S2.028), a 25,000 gallons diesel tank (IA1.020), an 8,000 gallon highway diesel tank (IA1.021), a 20,000 gallon bulk oil tank (IA1.022), a 3,000 gallon bulk coolant storage tank (IA1.023), a 3,000 gallon bulk used oil tank (IA1.024), and a 3,000 gallon bulk used coolant tank (IA1.025) are located near the mine warehouse and shop. These storage tanks are potential sources of VOC emissions.

The 1,000-gallon gasoline storage tank is subject to 40 CFR Part 63, Subpart CCCCCC, as a gasoline dispensing facility with a monthly throughput of less than 10,000 gallons of gasoline. The diesel and other bulk storage tanks are insignificant activities per NAC 445B.288.2(d) (VOL tanks less than 40,000 gallons).

2.3.8 Cooling Towers

The Li NV facility includes two cooling towers (IA1.003 and IA1.004) to supply cool water to the sulfuric acid plant and lithium carbonate crystallization process. The cooling towers have the potential to emit particulates from the drift loss.

2.3.9 Laboratory

One small laboratory will be maintained on site for preparing and analyzing ore and waste rock samples. The laboratory may include various analytical instruments and sample preparation equipment, such as splitters/material transfers, crushers, screens, and pulverizers (IA1.005 through IA1.019). The sample preparation equipment has the potential to create particulate emissions. While the laboratory is controlled by a baghouse, this emission control is not considered in estimating potential uncontrolled emissions for the insignificant designation.

2.3.1 Ammonium Nitrate Prill Silo

The ammonium nitrate prill used for blasting is stored onsite in a storage silo (IA1.001 and IA1.002). The 80-ton silo has the potential to emit particulates from the silo loading and unloading.

2.4 PERMITTING DECISIONS

In the initial application for the Sulfuric Acid Plant Li NV requested that the SO_2 emissions be 6.5 ppmv. Based on an RFI response, Li NV requested that the SO_2 emission be increased to 7.5 ppmv. This increased SO_2 emission from 8.8 to 10.2 pounds per hour and 38.6 to 44.6 tons per year. This increase in emissions did not trigger any additional requirements.

12-month rolling averages will be required on Systems 1 and 24. This requirement will be reviewed to ensure its relevance at the next renewal.

Systems 4, 5, 9, 10 and 11 are required to conduct initial testing of the moisture content of the material discharged from these systems. There are no active controls for the transfers. However, Li NV claims that the material is saturated and therefore will be its own control. The BAPC agreed with the controls but requires initial testing with a minimum moisture content of 4%.

Emissions from System 8, 14, 15, 18, and 19 were calculated with an assumed maximum Total Dissolved Solids (TDS) concentration in the exhaust stack. The BAPC requires initial and quarterly sampling of the stack to determine continued compliance with the emission limit.

Due to the uncontrolled potential of sulfur compound emissions annual compliance testing will be required for Systems 6 and 24 (Sulfuric Acid Plant). Although, System 24 is required to operate and maintain a Continuous Emissions Monitoring System (CEMS) annual testing will still be required to serve as an extra protection measure to ensure the emission controls are working.

In addition, we requested that EPA, Region 9 review a draft of the permit. Based on their review we added some clarifying language to the permit if the facility sees visible emissions, some additional monitoring and recordkeeping requirements for their annual hours of operation on a monthly basis for systems with hourly restrictions, and the language "averaged over a daily basis" was added to hourly throughput limits on systems that have recordkeeping requirements averaged on a daily basis unless there was a maximum throughput requirement to not exceed.

2.5 PUBLIC OUTREACH, PUBLIC HEARING, AND PUBLIC COMMENT

Due to the public interest about this project NDEP set up a website to keep the public up to date on the permitting process, to alert them to upcoming meetings, and allow access to videos and presentations from past meetings.

Multiple public outreach meetings were held for this project by the NDEP prior to the public comment period. Dates and a summary of what was presented at these meetings is listed below:

- March 8, 2021: NDEP presented to the Humboldt County Commissioners. This presentation gave the Commissioners an overview of the State permitting process and gave a general timeline for the applications that have been submitted to the state for the project.
- April 22, 2021: NDEP presented to the Thacker Pass Concerned Citizens group. This meeting gave an overview of the permitting process, discussed testing, inspections, reporting, monitoring, and enforcement; how the community could receive public notices and tips on making effective comments.
- May 25 and June 24, 2021: On May 25, 2021 NDEP staff traveled to Orovada, NV to give a presentation of concerns/questions that had been received from the Thacker Pass Concerned Citizens group. The Bureau of Mining Regulation and Reclamation presented at this meeting and questions were taken after each slide. It was only possible to get through about half of this presentation so two meeting times were set up on June 24, 2021 for the BAPC to give the rest of the presentation.

As previously discussed, the public notice started on October 18, 2021 and ended on November 18, 2021. A public hearing was held at 6 pm (PST) at the Boys and Girls Club of Winnemucca in Winnemucca, NV on November 18, 2021. It is estimated that between 40 and 60 people attended this hearing. There were many interruptions during this hearing and it was decided to close the meeting after 9 public comments were heard. The meeting attendees were notified that any people that were unable to give spoken comment could submit their comment to the email address set up for the project.

At the start of the public notice period a list of comments and responses, relevant to the air quality and the air quality operating permit, that had been received was put on the NDEP Thacker Pass website and a copy of these comments and responses have been provided in Appendix 3.

The BAPC received many comments during the public notice period. Some were relevant to the AQOP and some were general comments for the project or opposing the project. The BAPC has reviewed and responded to all comments received and this document is part of the public record.

The Public Noticed permit with marked up changes made between Public Notice and Issuance has been provided in Appendix 4.

On June 16, 2021 and November 30, 2021, the NDEP met with members of the Fort McDermitt Paiute Shoshone Tribe to discuss their concerns. On December 9, 2021, the NDEP received formal comments from the tribe. The NDEP responded to the comments.

3.0 APPLICABLE REGULATIONS

3.1 NEVADA REVISED STATUTES

The Nevada Revised Statutes (NRS) are the current codified laws of the State of Nevada. The NRS is the statutory authority for the adoption and implementation of administrative regulations. The statutes relating to the control of air pollution are contained in Title 40, Public Health and Safety, Chapter 445B, Air Pollution, NRS 445B.100 through NRS 445B.640. The NRS specifies that the State Environmental Commission is the governing body given the power to adopt administrative regulations. Since the NRS is the enabling statutory authority, very few specific requirements are contained in the statutes. The NRS provides broad authority for the adoption and implementation of air pollution control regulations. This project will be subject to the NRS and will need to comply with all applicable regulations under the NRS. The NRS may be viewed online.

3.2 NEVADA ADMINISTRATIVE CODE

The Nevada Administrative Code (NAC) contains the regulations adopted by the State Environmental Commission (SEC), pursuant to the authority granted by the Nevada Revised Statutes (NRS), relating to the control of air pollution. The NAC requires, where State regulations are more stringent in comparison to Federal regulations, the State regulations are applicable. The NAC sets forth, by rule, maximum emission standards for visible emissions (opacity), PM_{10} (particulate matter less than 10 microns in diameter) and sulfur emitting processes. Other requirements are established for incinerators, storage tanks, odors and maximum concentrations of criteria air pollutants in the ambient air. Other NAC regulations specify the requirements for applying for and method of processing applications for operating permits. All the equipment considered in this application must meet, at a minimum, the applicable standards and requirements set forth in the NAC, specifically, the emission standards contained in NAC 445B.22027 through 445B.22033 for particulate matter, 445B.2204 through 445B.22047 for sulfur emissions, 445B.22017 for opacity, and the Nevada Ambient Air Quality Standards (NAAQS) as set forth in NAC 445B.310 through 445B.311. The NAC may be viewed online.

3.3 NEVADA APPLICABLE STATE IMPLEMENTATION PLAN

The Applicable State Implementation Plan (ASIP) is a document prepared by a state or local air regulatory agency and submitted to the United States Environmental Protection Agency (US EPA) for approval. Title I of the Clean Air Act is the statutory authority for the US EPA regulations that require a State to submit an ASIP. The contents of the ASIP are intended to show how a state, through the implementation and enforcement of the regulations contained in the ASIP, will either show how attainment of the NAAQS will be achieved or how a state will continue to maintain compliance with the national ambient air quality standards.

3.4 CODE OF FEDERAL REGULATIONS

The Code of Federal Regulations (CFR) are regulations adopted by the US EPA and published in the Federal Register pursuant to the authority granted by Congress in the Clean Air Act. The CFR addresses multiple aspects, including but not limited to, permitting requirements, performance standards, testing methods, and monitoring requirements. The CFRs may be viewed online.

3.4.1 NEW SOURCE PERFORMANCE STANDARDS

Section 111 of the Clean Air Act, "Standards of Performance for New Stationary Sources," (NSPS) requires US EPA to establish federal emission standards for source categories which cause or contribute significantly to air pollution. Each NSPS defines the facilities subject to these requirements and prescribes emission limits for specified pollutants, compliance requirements, monitoring requirements, and test methods and procedures. These standards are intended to promote use of the best air pollution control technologies, taking into account the cost of such technology and any other non-air quality, health, and environmental impact and energy requirements. These standards apply to sources which have been constructed or modified since the proposal of the standard. These standards can be found in the CFR at Title 40 (Protection of Environment), Part 60 (Standards of Performance for New Stationary Sources).

Generally, state and local air pollution control agencies are responsible for implementation, compliance assistance, and enforcement of the NSPS. US EPA retains concurrent enforcement authority and is also available to provide technical assistance when a state or local agency seeks help. US EPA also retains a few of the NSPS responsibilities such as the ability to approve alternative monitoring methods to maintain a minimum level of national consistency.

NSPS – 40 CFR Part 60 Subpart OOO – Standards of Performance for Nonmetallic Mineral Processing Plants – Systems 1, 2, and 3, are subject to the provisions of Subpart OOO.

NSPS – 40 CFR Part 60 Subpart Dc – Standards of Performance for Small Industrial-Commercial-Institutional Steam Generating Units – System 22, is subject to the provisions of Subpart Dc. System 23 is not subject to this subpart because it does not produce steam.

NSPS – 40 CFR Part 60 Subpart H – Standards of Performance for Sulfuric Acid Plants – System 24, is subject to the provisions of Subpart H.

NSPS – 40 CFR Part 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines – System 25, is subject to the provisions of Subpart IIII.

NS**PS – 40 CFR Part 60 Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines** – System 26, is subject to the provisions of Subpart JJJJ.

3.4.2 FEDERAL NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS

National Emission Standards for Hazardous Air Pollutants (NESHAP) are established in the CFR pursuant to Section 112 of the Clean Air Act Amendments of 1990. These standards regulate air pollutants believed to be detrimental to human health. The NESHAP program applies to all sources, both existing and new. These standards are codified in Title 40 CFR Parts 61 and 63.

Part 61, which predates the Clean Air Act Amendments of 1990, includes specific standards, reporting and recordkeeping requirements, and test methods for the initial eight hazardous air pollutants (HAPs): asbestos, benzene, beryllium, coke oven emissions, inorganic arsenic, mercury, radionuclides, and vinyl chloride. The regulations covering these eight hazardous air pollutants focused on health-based considerations. NESHAPs were established for certain operations that commonly emit the eight hazardous air pollutants.

Other substances were included for consideration due to the serious health effects, including cancer, which may occur from ambient air exposure to those substances. However, no specific restrictions were placed on facilities that used or released these compounds.

Under the Clean Air Act Amendments of 1990, Congress greatly expanded the Air Toxics program, creating a list of 189 substances to be regulated as hazardous air pollutants. Rather than regulating individual pollutants by establishing health-based standards, the new Air Toxics program granted the US EPA the authority to regulate specific industrial major source categories with NESHAPs based on maximum achievable control technology (MACT) for each source category. Thus, a number of NESHAPs have been established to regulate specific categories of stationary sources that emit (or have the potential to emit) one or more hazardous air pollutants.

The standards in 40 CFR Part 63 are independent of the NESHAPs contained in 40 CFR Part 61 which remain in effect until they are amended, if appropriate, and added to this part. More information on NESHAPs from the US EPA Unified Air Toxics Website may be viewed online.

NESHAPs may cover both major sources and area sources in a given source category. Major sources are defined as those facilities emitting, or having the potential to emit, 10 tons per year or more of one Hazardous Air Pollutant (HAP) or 25 tons per year or more of multiple HAPs. Major sources are required to comply with MACT standards. Area sources are defined as those facilities that are not major sources.

The Li NV facility is not a major source with respect to HAPs.

NESHAP – 40 CFR Part 63 Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines – Systems 25 and 26, are subject to the provisions of Subpart ZZZZ

NESHAP – 40 CFR Part 63 Subpart CCCCCC – National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities – System 27, is subject to the provisions of Subpart CCCCCC

3.4.3 PREVENTION OF SIGNIFICANT DETERIORATION DETERMINATION

The Prevention of Significant Deterioration (PSD) permitting program is a Clean Air Act permitting program for new and modified major stationary sources of air pollution. Implementation of the federal PSD regulations is delegated to the State of Nevada by U.S. EPA and these regulations are contained at 40 CFR Part 52.21. Therefore, BAPC implements the federal PSD regulations directly. These regulations specify federally required permitting procedures for each "major stationary source." The PSD regulations define a "stationary source" as "any building, structure, facility, or installation which emits or may emit any air pollutant subject to regulation under the Act."

A "building structure facility or installation" is defined as "all of the pollutant-emitting activities which belong to the same industrial grouping, are located on one or more contiguous or adjacent properties, and are under the control of the same person (or persons under common control) except the activities of any vessel. Pollutant-emitting activities shall be considered as part of the same industrial grouping if they belong to the same 'Major Group' (i.e., which have the same first two digit code) as described in the Standard Industrial Classification Manual, 1972, as amended by the 1977 Supplement."

"Major" is defined as the potential to emit of a stationary source, which equals or exceeds a specified threshold (in tons per year) of any air pollutant regulated under the Clean Air Act (40 CFR 52.21(b)(1)). The first threshold is for a stationary source that emits or has the potential to emit 100 tons per year or more of any regulated NSR pollutant and is defined as one of 28 specific categories of sources (see 40 CFR 52.21(b)(1)(i)(a)). The other applicability threshold is for any other stationary source that emits or has the potential to emit 250 tons per year of any regulated NSR pollutant (see 40 CFR 52.21(b)(1)(i)(b)). Li NV is not a major stationary source as defined by 40 CFR Part 52.21, because the facility does not have the potential to emit 100 tons per year or more of any regulated NSR pollutant. Li NV is one of the 28 specific source categories, because there is a sulfuric acid plant at the facility.

4.0 EMISSIONS INVENTORY

4.1 PROPOSED EMISSIONS

The facility-wide emissions inventory for the Li NV facility can be found below in Table 4.1-1. As can be seen, emissions of each criteria pollutant are below the BAPC's Class I operating permit threshold of 100 tons per year, including Insignificant Activities. As such, the Li NV facility qualifies as a Class II minor source under BAPC regulations. The BAPC has determined that Li NV facility requires controls and/or other limit restrictions to remain a Class II source and therefore qualifies as a Class II synthetic minor source. The detailed emissions inventory for the Li NV facility is included in Appendix 1.

Table 4.1-1
Lithium Nevada Corporation - A1270 - AP1479-4334
Annual PTE (tons/year)

	System	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	H_2SO_4	H_2S	HAPs	CO_{2e}
Sys	**Total**	**83.3**	**52.4**	**36.9**	**47.8**	**88.7**	**2.52**	**0.70**	**25.2**	**1.05**	**0.032**	**2,049.6**
1	**System 1 - Ore Handling Circuit**	25.2	9.25	1.53								
2	**System 2 - Mineral Sizer**	5.68	2.52	0.42								
3	**System 3 - Attrition Scrubber Feed**	3.15	1.16	0.19								
4	**System 4 - Oversize Material Handling Circuit**	0.063	0.023	0.004								

Table 4.1-1
Lithium Nevada Corporation - A1270 - AP1479-4334
Annual PTE (tons/year)

	System	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	H_2SO_4	H_2S	HAPs	CO_{2e}
Sys	**Total**	**83.3**	**52.4**	**36.9**	**47.8**	**88.7**	**2.52**	**0.70**	**25.2**	**1.05**	**0.032**	**2,049.6**
5	**System 5 - Gangue Handling Circuit**	2.54	0.93	0.14								
6	**System 6 - Leach Tanks**	1.33	1.33	1.33					0.26			
7	**System 7 - Neutralization Filter Vents**	0.22	0.22	0.22								
8	**System 8 - Neutralization Filter Filtrate Blow Vent**	0.005	0.005	0.005								
9	**System 9 - Tailings Feed Circuit**	3.78	1.39	0.23								
10	**System 10 - Tailings Collection**	1.97	0.72	0.12								
11	**System 11 - Tailings Stacking**	3.94	1.45	0.24								
12a	**System 12 - Sulfate Tailings Circuit**	0.26	0.10	0.016								
12b	**System 12 - Sulfate Tailings Circuit**	1.05	0.39	0.064								
13	**System 13 - Magnesium Precip. Filter Vents**	0.029	0.029	0.029								
14	**System 14 - Magnesium Precip. Filter Filtrate Blow Vent**	0.0004	0.0004	0.0004								
15	**System 15 - Lithium Carbonate Dryer**	2.18	2.18	2.18								
16	**System 16 - Lithium Carbonate Material Handling**	0.053	0.031	0.005								
17	**System 17 - Lithium Carbonate Storage Bin**	0.022	0.007	0.001								
18	**System 18 - Lithium Carbonate Packaging**	1.46	1.46	1.46								
19	**System 19 - Lime Silo**	1.16	1.16	1.16								
20	**System 20 - Soda Ash Silo**	0.076	0.026	0.004								
21	**System 21 - Sulfur Storage**	0.88	0.88	0.88	2.98					1.05		
22	**System 22 - Package Boiler**	0.13	0.13	0.13	0.20	2.42	1.86	0.30			0.021	1,584.2
23	**System 23 - Start-Up Burner**	0.033	0.033	0.033	0.050	0.61	0.47	0.076			0.005	402.4
24	**System 24 - Sulfuric Acid Plant**	24.94	24.94	24.94	44.55	85.32			24.9			
25	**System 25 - Fire Pumps**	0.010	0.010	0.010	0.0004	0.24	0.06	0.008			0.001	45.7
26	**System 26 - Emergency Generators**	0.007	0.007	0.007	0.0005	0.074	0.12	0.074			0.004	17.3
27	**System 27 - Gasoline Tank**							0.22				

Table 4.1-1
Lithium Nevada Corporation - A1270 - AP1479-4334
Annual PTE (tons/year)

	System	PM	PM_{10}	$PM_{2.5}$	SO_2	NO_X	CO	VOC	H_2SO_4	H_2S	HAPs	CO_{2e}
Sys	**Total**	**83.3**	**52.4**	**36.9**	**47.8**	**88.7**	**2.52**	**0.70**	**25.2**	**1.05**	**0.032**	**2,049.6**
IA1	**Ammonium Nitrate Prill Silo - Loading**	0.58	0.20	0.03								
IA2	**Sulfuric Acid Plant Cooling Tower**	0.51	0.51	0.51								
IA3	**Lithium Carbonate Cooling Tower**	0.99	0.99	0.99								
IA4	**Laboratory Equipment**	0.99	0.37	0.06								
IA5	**Diesel Tank, Off Road (Mine), 25,000 gallons**							0.015				
IA6	**Diesel Tank, Highway (Mine), 8,000 gallons**							0.001				
IA7	**Bulk Oil Tank, 20,000 gallons**							0.003				
IA8	**Bulk Coolant Tank, 3,000 gallons**							0.00003				
IA9	**Bulk Used Oil Tank, 3,000 gallons**							0.001				
IA10	**Bulk Used Coolant Tank, 3,000 gallons**							0.00003				

5.0 AMBIENT AIR IMPACT ANALYSIS

5.1 INTRODUCTION/ PURPOSE

The purpose of this analysis is to determine the likely air quality impacts resulting from operation of the Li NV facility under the conditions specified in their draft Air Quality Operating Permit.

5.2 CLASSIFICATION OF AIR BASIN

The facility is in Hydrographic Basin (HA) 30A – Kings River Valley/Rio King and HA33A – Quinn River/Orovada. HAs 30A and 33A are not triggered for any pollutant.

5.3 AIR QUALITY MODELING ANALYSIS

Nevada Division of Environmental Protection – Bureau of Air Quality Planning (BAQP) performed the air quality modeling analysis. The memo to BAPC from BAQP dated July 8, 2021 presents the results of the air quality analysis. The original results were updated from the original posting and was not updated when this technical review was originally drafted. The results of the latest analysis are presented below in Table 5.3-1 and in the memo is provided in Appendix 2. As can be seen, operation of Li NV will not result in violations of the Nevada AAQS, because the total impacts are less than the applicable AAQS values.

Table 5.3-1
Lithium Nevada Corporation - A1270 - AP1479-4334
Nevada Ambient Air Quality Impact Analysis

Pollutant	Averaging Period	Modeled Concentration	Background Concentration[e]	Total Impact	NAAQS	Percent of Standard	Location (UTM)	
							mN	mE
$PM_{2.5}$	24-hr (µg/m³)[a]	7.4	8	15.5	35	44%	4,616,899	411,048
	Annual (µg/m³)[b]	1.5	2.3	4.0	12	34%	4,616,645	414,250
PM_{10}	24-hr (µg/m³)	67.0	10.2	77.9	150	52%	4,616,765	411,377
SO_2	1-hr (ppb)[c]	41.1		41.3	75	55%	4,615,266	412,497
	3-hr (µg/m³)	81.9		81.9	1,300	6%	4,615,266	412,497
	24-hr (µg/m³)	10.3		10.3	365	3%	4,615,266	412,497
	Annual (µg/m³)	0.3		0.5	80	1%	4,616,646	414,231
NO_2	1-hr (ppb)[d]	57.9		62.8	100	63%	4,616,651	414,078
	Annual (µg/m³)	2.4		4.2	100	4%	4,616,650	414,117
CO	1-hr (µg/m³)	97		130	40,500	0%	4,616,644	414,268
	8-hr (µg/m³)	31		31	7,000	0%	4,616,361	414,156
H_2S	1-hr (µg/m³)	6.4		6.4	112	6%	4,616,640	414,381
Ozone	8-hr (ppm)	0.009		0.009	0.075	12%		

[a]98th percentile (8th high), averaged over 3 years

[b]Annual mean, averaged over 3 years

[c]99th percentile (4th high) of 1-hr daily maximum concentrations, averaged over 3 years

[d]98th percentile (8th high) of 1-hr daily maximum concentrations, averaged over 3 years

[e]$PM_{2.5}$ values are from the Jarbidge Wilderness Area. PM_{10} values are from Lehman Caves (Great Basin NP).

Note: Averaging over years must still follow 40 CFR Part 51 Appendix W concerning 1 year of on-site MET data or 5 years of offsite MET data and must be the specific percentile for each individual year

6.0 CONCLUSIONS / RECOMMENDATIONS

Based on the above review and supporting data and analyses, operation of the Li NV facility under the draft Class II Air Quality Operating Permit conditions will not result in violations of any applicable ambient air quality standards. Therefore, the BAPC recommends that the draft facility-wide operating permit be formally issued, with those applicable requirements, conditions, and restrictions contained therein:

Appendix 1 – BAPC Detailed Emission Inventory
Appendix 2 – NVAAQS Memo
Appendix 3 – Public Comments and Responses relevant to Air Quality Operating Permit Received Prior to October 18, 2021
Appendix 4 – Public Noticed Permit with Changes Shown

Benjamin Kahue — 2/25/2022

Ben Kahue, P.E., — Date
Permit Writer
Bureau of Air Pollution Control

Ashley Taylor — 2/25/2022

Ashley Taylor, P.E., — Date
Supervisor, Permitting Branch
Bureau of Air Pollution Control

Appendix 1

BAPC Detailed Emission Inventory

APPROVED
By Ashley Taylor at 2:13 pm, Feb 02, 2022

Emissions Calculation Spreadsheet

Lithium Nevada Corporation
Thacker Pass Project
3685 Lakeside Drive, Reno, NV 89509

FIN: A1270 | Basin: 30A, 33A (Kings River Valley/Rio King, Quinn River Valley/Orovada) | Increment Tracked: No, No
Permit No.: AP1479-4334 | Class: Class II AQOP | County: Humboldt
Facility UTM Coordinates: | NORTHING (m): 4,616,776 | EASTING (m) 413,910
Section: 1,12, 2-17, 7,8,14-23,29 | Township: 44N, 44N, 44N | Range: 34E, 35E, 36E | SAD Acreage: 5,545

Air Case Number Application Log (Multiple Applications): New 10677

Nevada Division of Environmental Protectio
Bureau of Air Pollution Control
Model Type: Facility Only

Date: 2/2/2022 | Ben Kahue
Approved: Date of Approval | Supervisor:

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
1	**System 1 - Ore Handling Circuit**																							
PF1.001	ROM Feed Hopper 1 Loading	3-05-020-06	4,617,041	411,344			24	8,760			480	4,204,800	tons Ore			PM	0.0030	lb/ton			1.44	6.31	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	For each source
PF1.002	ROM Feed Hopper 1 transfer to Sizer Feed Conveyor (via feed belt)	3-05-020-06	4,617,041	411,344												PM10	0.0011	lb/ton			0.53	2.31	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	For each source
PF1.003	ROM Feed Hopper 2 loading	3-05-020-06	4,617,034	411,356												PM2.5	0.00018	lb/ton			0.09	0.38	PM2.5 = PM10*(0.053/0.35)	For each source
PF1.004	ROM Feed Hopper 2 transfer to Sizer Feed Conveyor (via feed belt)	3-05-020-06	4,617,034	411,356																				
					Drop Length (ft):	PF1.001 - 6 PF1.002 - 4 PF1.003 - 6 PF1.004 - 4																		
					Drop Height (ft.):	PF1.001 - 17 PF1.002 - 12 PF1.003 - 17 PF1.004 - 12																		
					Drop Horizontal Dimension 1 (ft):	PF1.001 - 10 PF1.002 - 3 PF1.003 - 10 PF1.004 - 3																		
2	**System 2 - Mineral Sizer**																							
PF1.005	Mineral Sizer and Associated Transfers (In: Sizer Feed Conveyor, Out: Scrubber Feed Conveyor	3-05-020-03	4,616,990	411,439			24	8,760			960	8,409,600	tons Ore			PM	0.0014	lb/ton	Water Sprays	75.0%	1.30	5.68	AP-42 Table 11.19.2-2 Tertiary Crusher Uncontrolled	
																PM10	0.00060	lb/ton	Water Sprays	75.0%	0.58	2.52	AP-42 Table 11.19.2-2 Tertiary Crusher Uncontrolled	
																PM2.5	0.00010	lb/ton	Water Sprays	75.0%	0.10	0.42	PM2.5 = PM10*(0.053/0.35)	
					Drop Length (ft):	12.00																		
					Drop Height (ft.):	31.00																		
					Drop Horizontal Dimension 1 (ft):	3.00																		
3	**System 3 - Attrition Scrubber Feed**																							
PF1.006	Scrubber Feed Conveyor to Attrition Scrubber (wet process)	3-05-020-06	4,616,998	411,444			24	8,760			960	8,409,600	tons Ore			PM	0.00075	lb/ton	Water Sprays	75.0%	0.72	3.15	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	
																PM10	0.00028	lb/ton	Water Sprays	75.0%	0.26	1.16	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	
																PM2.5	0.000045	lb/ton	Water Sprays	75.0%	0.044	0.19	PM2.5 = PM10*(0.053/0.35)	
					Drop Length (ft):	6.00																		
					Drop Height (ft.):	20.00																		
					Drop Horizontal Dimension 1 (ft):	3.00																		
4	**System 4 - Oversize Material Handling Circuit**																							
PF1.007	Wet Screen to Oversize Conveyor	3-05-020-06	4,617,033	411,464			24	8,760			16	140,160	tons Gangue			PM	0.00045	lb/ton	Moisture Content	85.0%	0.0072	0.032	AP-42 Table 11.19.2-2 Conveyor Transfer (Uncontrolled)	For each source
PF1.008	Oversize Stacker to Oversize Stockpile	3-05-020-06	4,617,011	411,505												PM10	0.00017	lb/ton	Moisture Content	85.0%	0.0026	0.012	AP-42 Table 11.19.2-2 Conveyor Transfer (Uncontrolled)	For each source
																PM2.5	0.000025	lb/ton	Moisture Content	85.0%	0.00040	0.0018	PM2.5 = PM10*(0.053/0.35)	For each source
					Drop Length (ft):	PF1.007 - 6 PF1.008 - 11.5																		
					Drop Height (ft.):	PF1.007 - 10 PF1.008 - 23																		
					Drop Horizontal Dimension 1 (ft):	PF1.007 - 10 PF1.008 - 2																		

APPROVED
By Ashley Taylor at 2:13 pm, Feb 02, 2022

Emissions Calculation Spreadsheet

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3685 Lakeside Drive, Reno, NV 89509

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Air Case Number Application Log (Multiple Applications)
New 10677

Nevada Division of Environmental Protectio
Bureau of Air Pollution Control
Model Type:
Facility Only

Date: 2/2/2022 | Ben Kahue
Date of Approval | Supervisor:
Approved:

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
5	**System 5 - Gangue Handling Circuit**																							
PF1.009	Gangue Dewatering Screen to Gangue Conveyor	3-05-020-06	4,617,236	414,414			24	8,760			430	3,766,800	tons Gangue			PM	0.00045	lb/ton	Moisture Content	85.0%	0.19	0.85	AP-42 Table 11.19.2-2 Conveyor Transfer (Uncontrolled)	For each source
PF1.010	Gangue Conveyor to Gangue Stacker	3-05-020-06	4,617,280	414,458												PM10	0.00017	lb/ton	Moisture Content	85.0%	0.071	0.31	AP-42 Table 11.19.2-2 Conveyor Transfer (Uncontrolled)	For each source
PF1.011	Gangue Stacker to Gangue Stockpile	3-05-020-06	4,617,326	414,453												PM2.5	0.000025	lb/ton	Moisture Content	85.0%	0.011	0.047	PM2.5 = PM10*(0.053/0.35)	For each source
					Drop Length (ft):	PF1.009 - 16 PF1.010 - 3 PF1.011 - 20																		
					Drop Height (ft.):	PF1.009 - 19 PF1.010 - 6 PF1.011 - 40																		
					Drop Horizontal Dimension 1 (ft):	PF1.009 - 4 PF1.010 - 3 PF1.011 - 3																		
6	**System 6 - Leach Tanks**																							
S2.001	Leach Tank 1	3-05-020-99	4,617,186	414,430	Height (ft):	60.0	24	8,760			1,080	9,460,800	tons Slurry			PM	0.0059	gr/dscf	Wet Scrubber		0.30	1.33	Engineering Estimates	Emissions are combined
S2.002	Leach Tank 2	3-05-020-99	4,617,186	414,430	Diameter (ft):	2.50										PM10	0.0059	gr/dscf	Wet Scrubber		0.30	1.33	Engineering Estimates	Emissions are combined
S2.003	Leach Tank 3	3-05-020-99	4,617,186	414,430	Temp (°F):	180										PM2.5	0.0059	gr/dscf	Wet Scrubber		0.30	1.33	Engineering Estimates	Emissions are combined
					Exit Vel (fps):	47.1																		
					Vol (ACFM):	13,869.0																		
					Vol (DSCFM):	6,006.0																		
					Equipment Dimensions (ft)	37D x 40H																		
					Release Type:	Vertical										H2SO4	0.0011	gr/dscf	Wet Scrubber		0.06	0.26	Engineering Estimates	Emissions are combined
7	**System 7 - Neutralization Filter Vents**																							
S2.004	Neutralization Filter Vent 1	3-05-020-99	4,617,143	414,474	Height (ft):	30.0	24	500			1,080	540,000	Slurry			PM	0.0055	gr/dscf	Mist Eliminator		0.22	0.056	Engineering Estimates	For each source
S2.005	Neutralization Filter Vent 2	3-05-020-99	4,617,145	414,477	Diameter (ft):	1.70										PM10	0.0055	gr/dscf	Mist Eliminator		0.22	0.056	Engineering Estimates	For each source
S2.006	Neutralization Filter Vent 3	3-05-020-99	4,617,149	414,480	Temp (°F):	120										PM2.5	0.0055	gr/dscf	Mist Eliminator		0.22	0.056	Engineering Estimates	For each source
S2.007	Neutralization Filter Vent 4	3-05-020-99	4,617,152	414,483	Exit Vel (fps):	45.5																		
					Vol (ACFM):	6,200.0																		
					Vol (DSCFM):	4,709.0																		
					Release Type:	Vertical																		
8	**System 8 - Neutralization Filter Filtrate Blow Vent**																							
S2.008	Neutralization Filter Filtrate Blow Vent	3-05-020-99	4,617,147	414,479	Height (ft):	20.0	24	50					Slurry			PM	0.017	gr/dscf			0.20	0.0049	Engineering Estimates	
					Diameter (ft):	1.00										PM10	0.017	gr/dscf			0.20	0.0049	Engineering Estimates	
					Temp (°F):	Ambient										PM2.5	0.017	gr/dscf			0.20	0.0049	Engineering Estimates	
					Exit Vel (fps):	28.75																		
					Vol (ACFM):	1355.00																		
					Vol (DSCFM):	1355.00																		
					Release Type:	Vertical																		

APPROVED
By Ashley Taylor at 2:14 pm, Feb 02, 2022

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Nevada Division of Environmental Protectio
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Model Type: Facility Only

Date: 2/2/2022 | Ben Kahue
Approved: Date of Approval | Supervisor:

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
9	**System 9 - Tailings Feed Circuit**																							
PF1.012	Neutralization Filter 1 to Discharge Feeder 1	3-05-020-06	4,617,139	414,490			24	8,760			240	2,102,400	tons Clay/Neutral Tailings			PM	0.00045	lb/ton	Moisture Content	85.0%	0.11	0.47	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	For each source
PF1.013	Discharge Feeder 1 to Tailings Collection Conveyor	3-05-020-06	4,617,148	414,480												PM10	0.00017	lb/ton	Moisture Content	85.0%	0.040	0.17	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	For each source
PF1.014	Neutralization Filter 2 to Discharge Feeder 2	3-05-020-06	4,617,140	414,491												PM2.5	0.000027	lb/ton	Moisture Content	85.0%	0.0065	0.029	PM2.5 = PM10*(0.053/0.35)	For each source
PF1.015	Discharge Feeder 2 to Tailings Collection Conveyor	3-05-020-06	4,617,148	414,481																				
PF1.016	Neutralization Filter 3 to Discharge Feeder 3	3-05-020-06	4,617,141	414,492																				
PF1.017	Discharge Feeder 3 to Tailings Collection Conveyor	3-05-020-06	4,617,149	414,482																				
PF1.018	Neutralization Filter 4 to Discharge Feeder 4	3-05-020-06	4,617,142	414,493																				
PF1.019	Discharge Feeder 4 to Tailings Collection Conveyor	3-05-020-06	4,617,150	414,483																				
					Drop Length (ft):	PF1.012 - 13 PF1.013 - 12 PF1.014 - 13 PF1.015 - 12 PF1.016 - 13 PF1.017 - 12 PF1.018 - 13 PF1.019 - 12																			
					Drop Height (ft.):	PF1.012 - 29 PF1.013 - 16 PF1.014 - 29 PF1.015 - 16 PF1.016 - 29 PF1.017 - 16 PF1.018 - 29 PF1.019 - 16																			
					Drop Horizontal Dimension 1 (ft):	PF1.012 - 9 PF1.013 - 3 PF1.014 - 9 PF1.015 - 3 PF1.016 - 9 PF1.017 - 3 PF1.018 - 9 PF1.019 - 3																			

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
10	**System 10 - Tailings Collection**																							
PF1.020	Tailings Collection Conveyor to Tailings Conveyor 1	3-05-020-06	4,617,151	414,484			24	8,760			1,000	8,760,000	tons Clay/Neutral Tailings			PM	0.00045	lb/ton	Moisture Content	85.0%	0.45	1.97	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	
																PM10	0.00017	lb/ton	Moisture Content	85.0%	0.17	0.72	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	
																PM2.5	0.000027	lb/ton	Moisture Content	85.0%	0.027	0.12	PM2.5 = PM10*(0.053/0.35)	
					Drop Length (ft):	12.00																		
					Drop Height (ft.):	16.00																		
					Drop Horizontal Dimension 1 (ft):	3.00																		

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
11	**System 11 - Tailings Stacking**																							
PF1.021	Tailings Conveyor 1 to Tailings Stacker	3-05-020-06	4,617,251	414,584			24	8,760			1,000	8,760,000	tons Clay/Neutral Tailings			PM	0.00045	lb/ton	Moisture Content	85.0%	0.45	1.97	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	For each source
PF1.022	Tailings Stacker to Clay Tailings Filter Stack	3-05-020-06	4,617,231	414,625												PM10	0.00017	lb/ton	Moisture Content	85.0%	0.17	0.72	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	For each source
																PM2.5	0.000027	lb/ton	Moisture Content	85.0%	0.027	0.12	PM2.5 = PM10*(0.053/0.35)	For each source
					Drop Length (ft):	PF1.021 - 12 PF1.022 - 25																		
					Drop Height (ft.):	PF1.021 - 16 PF1.022 - 50																		
					Drop Horizontal Dimension 1 (ft):	PF1.021 - 3 PF1.022 - 3																		

APPROVED
By Ashley Taylor at 2:14 pm, Feb 02, 2022

Emissions Calculation Spreadsheet

Lithium Nevada Corporation	FIN:	A1270	Basin:	30A 33A	Kings River Valley/Rio King Quinn River Valley/Orovada	Increment Tracked:	No No	Air Case Number Application Log (Multiple Applications)	
Thacker Pass Project	Permit No.:	AP1479-4334	Class:	Class II AQOP	County:	Humboldt		New	10677
	Facility UTM Coordinates:		NORTHING (m):	4,616,776	EASTING (m)	413,910			
3685 Lakeside Drive, Reno, NV 89509	Section:	1,12 2-17 7,8,14-23,29	Township:	44N 44N 44N	Range:	34E 35E 36E	SAD Acreage:	5,545	

Nevada Division of Environmental Protectio
Bureau of Air Pollution Control
Model Type: Facility Only

Date:	2/2/2022	Ben Kahue
	Date of Approval	Supervisor:
Approved:		

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Annual	Heat Input (MMBtu) Hour	Annual	Throughput/ Fuel Usage Hour	Annual	Units	Power Output Amount	Units	Emission Factor Pollutant	Factor	Unit	Controls Type	Efficiency	Permit Emission Rate Hourly (lbs/hr)	Yearly (ton/yr)	References	For Each Source or Combined?
12a	System 12 - Sulfate Tailings Circuit																							
PF1.023	Na/K Sulfate Centrifuge discharge to Na/K Conveyor 1	3-05-020-06	4,617,137	414,470			24	8,760			40	350,400	tons Sulfate Tailings			PM	0.0015	lb/ton	Enclosure	50.0%	0.060	0.26	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	
																PM10	0.00055	lb/ton	Enclosure	50.0%	0.022	0.096	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	
																PM2.5	0.000091	lb/ton	Enclosure	50.0%	0.0036	0.016	PM2.5 = PM10*(0.053/0.35)	
					Drop Length (ft):	2.00																		
					Drop Height (ft.):	22.00																		
					Drop Horizontal Dimension 1 (ft)	2.00																		
12b	System 12 - Sulfate Tailings Circuit																							
PF1.024	Na/K Conveyor 1 transfer to Na/K Conveyor 2	3-05-020-06	4,617,139	414,471			24	8,760			40	350,400	tons Sulfate Tailings			PM	0.0030	lb/ton			0.12	0.53	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	For each source
PF1.025	Na/K Conveyor 2 to Tailings Collection Conveyor	3-05-020-06	4,617,141	414,474												PM10	0.0011	lb/ton			0.044	0.19	AP-42 Table 11.19.2-2 Conveyor Uncontrolled	For each source
																PM2.5	0.00018	lb/ton			0.0073	0.032	PM2.5 = PM10*(0.053/0.35)	For each source
					Drop Length (ft):	PF1.024 - 4 PF1.025 - 4																		
					Drop Height (ft.):	PF1.024 - 20 PF1.025 - 16																		
					Drop Horizontal Dimension 1 (ft)	PF1.024 - 2 PF1.025 - 2																		
13	System 13 - Magnesium Precip. Filter Vents																							
S2.009	Magnesium Precipitation Filter Vent 1	3-05-020-99	4,617,145	414,402	Height (ft):	38.0	24	200					Slurry			PM	0.0054	gr/dscf	Mist Eliminator		0.14	0.014	Engineering Estimates	For each source
S2.010	Magnesium Precipitation Filter Vent 2	3-05-020-99	4,617,148	414,405	Diameter (ft):	1.30										PM10	0.0054	gr/dscf	Mist Eliminator		0.14	0.014	Engineering Estimates	For each source
					Temp (°F):	120										PM2.5	0.0054	gr/dscf	Mist Eliminator		0.14	0.014	Engineering Estimates	For each source
					Exit Vel (fps):	50.8																		
					Vol (ACFM):	4,045.7																		
					Vol (DSCFM):	3,073.0																		
					Release Type:	Vertical																		
14	System 14 - Magnesium Precip. Filter Filtrate Blow Vent																							
S2.011	Magnesium Precipitation Filter Filtrate Blow Vent	3-05-020-99	4,617,147	414,404	Height (ft):	20.0	24	50					Slurry			PM	0.0034	gr/dscf			0.015	0.0004	Engineering Estimates	
					Diameter (ft):	0.50										PM10	0.0034	gr/dscf			0.015	0.0004	Engineering Estimates	
					Temp (°F):	Ambient										PM2.5	0.0034	gr/dscf			0.015	0.0004	Engineering Estimates	
					Exit Vel (fps):	42.3																		
					Vol (ACFM):	498.3																		
					Vol (DSCFM):	498.0																		
					Release Type:	Vertical																		
15	System 15 - Lithium Carbonate Dryer																							
S2.012	Lithium Carbonate Dryer transfer t	3-05-999-99	4,617,110	414,388	Height (ft):	60.0	24	8,760			5	43,800	tons Lithium Carbonate			PM	0.020	gr/dscf	Baghouse		0.50	2.18	BAPC Default Grain Loading	
					Diameter (ft):	1.00										PM10	0.020	gr/dscf	Baghouse		0.50	2.18	BAPC Default Grain Loading	
					Temp (°F):	302										PM2.5	0.020	gr/dscf	Baghouse		0.50	2.18	BAPC Default Grain Loading	
					Exit Vel (fps):	61.5																		
					Vol (ACFM):	2,898.1																		
					Vol (DSCFM):	2,897.0																		
					Release Type:	Vertical																		

APPROVED
By Ashley Taylor at 2:14 pm, Feb 02, 2022

Emissions Calculation Spreadsheet

Lithium Nevada Corporation
Thacker Pass Project
3685 Lakeside Drive, Reno, NV 89509

FIN: A1270 | Basin: 30A, 33A (Kings River Valley/Rio King, Quinn River Valley/Orovada) | Increment Tracked: No, No | Air Case Number Application Log (Multiple Applications)
Permit No.: AP1479-4334 | Class: Class II AQOP | County: Humboldt | New | 10677
Facility UTM Coordinates: NORTHING (m): 4,616,776 | EASTING (m) 413,910 | Model Type: Facility Only
Section: 1,12 / 2-17 / 7,8,14-23,29 | Township: 44N / 44N / 44N | Range: 34E / 35E / 36E | SAD Acreage: 5,545

Nevada Division of Environmental Protectio
Bureau of Air Pollution Control
Date: 2/2/2022 | Ben Kahue
Approved: Date of Approval | Supervisor:

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
16	**System 16 - Lithium Carbonate Material Handling**																							
S2.013	Lithium Carbonate Material Handling transfer	3-05-011-08	4,617,108	414,385	Height (ft):	10.0	24	8,760			5	43,800	Lithium Carbonate			PM	0.0024	lb/ton	Vent Filter	50.0%	0.012	0.053	AP-42 Table 11.12-2 Hopper Loading Uncontrolled	
					Diameter (ft):	0.50										PM10	0.0014	lb/ton	Vent Filter	50.0%	0.0070	0.031	AP-42 Table 11.12-2 Hopper Loading Uncontrolled	
					Temp (°F):	101										PM2.5	0.00023	lb/ton	Vent Filter	50.0%	0.0012	0.0051	PM2.5 = PM10*(0.053/0.35)	
					Exit Vel (fps):	107.6																		
					Vol (ACFM):	1,267.6																		
					Vol (DSCFM):	1,268.0																		
					Release Type:	Horizontal																		
17	**System 17 - Lithium Carbonate Storage Bin**																							
S2.014	Lithium Carbonate Storage Bin	3-05-011-07	4,617,112	414,380	Height (ft):	79.0	24	8,760			5	43,800	tons Lithium Carbonate			PM	0.0010	lb/ton	Vent Filter		0.0050	0.022	AP-42 Table 11.12-2: Cement Unloading to Elevated Storage Silo [Pneumatic] (Controlled	
					Diameter (ft):	0.50										PM10	0.00034	lb/ton	Vent Filter		0.0017	0.0074	AP-42 Table 11.12-2: Cement Unloading to Elevated Storage Silo [Pneumatic] (Controlled	
					Temp (°F):	101										PM2.5	0.000056	lb/ton	Vent Filter		0.00028	0.0012	PM2.5 = PM10*(0.053/0.35)	
					Exit Vel (fps):	107.6																		
					Vol (ACFM):	1,267.6																		
					Vol (DSCFM):	1,268.0																		
					Release Type:	Horizontal																		
18	**System 18 - Lithium Carbonate Packaging**																							
S2.015	Lithium Carbonate Packaging	3-05-999-99	4,617,113	414,360	Height (ft):	20.0	24	4,380			16	43,800	tons Lithium Carbonate			PM	0.020	gr/dscf	Baghouse		0.67	1.46	BAPC Default Grain Loading	
					Diameter (ft):	1.00										PM10	0.020	gr/dscf	Baghouse		0.67	1.46	BAPC Default Grain Loading	
					Temp (°F):	Ambient										PM2.5	0.020	gr/dscf	Baghouse		0.67	1.46	BAPC Default Grain Loading	
					Exit Vel (fps):	82.8																		
					Vol (ACFM):	3,900.0																		
					Vol (DSCFM):	3,900.0																		
					Release Type:	Vertical																		
19	**System 19 - Lime Silo**																							
S2.016	Truck transfer of Lime to Underground Hopper	3-05-011-07	4,617,197	414,358	Height (ft):	100.0	24	4,380			80	350,400	ton Lime			PM	0.020	gr/dscf	Baghouse		0.53	1.16	BAPC Default Grain Loading	Emissions are combined
S2.017	Underground Hopper and transfer to Silo (silo unloading through sealed transfers	3-05-011-07	4,617,197	414,358	Diameter (ft):	1.00										PM10	0.020	gr/dscf	Baghouse		0.53	1.16	BAPC Default Grain Loading	Emissions are combined
					Temp (°F):	Ambient										PM2.5	0.020	gr/dscf	Baghouse		0.53	1.16	BAPC Default Grain Loading	Emissions are combined
					Exit Vel (fps):	65.8																		
					Vol (ACFM):	3,100.0																		
					Vol (DSCFM):	3,100.0																		
					Release Type:	Vertical																		
20	**System 20 - Soda Ash Silo**																							
S2.018	Soda Ash Silo loading (silo unloading through sealed transfers)	3-05-011-07	4,617,088	414,456	Height (ft):	100.0	24	8,760			80	153,900	tons Soda Ash			PM	0.0010	lb/ton	Vent Filter		0.079	0.076	AP-42 Table 11.12-2: Cement Unloading to Elevated Storage Silo [Pneumatic] (Controlled	
					Diameter (ft):	1.00										PM10	0.00034	lb/ton	Vent Filter		0.027	0.026	AP-42 Table 11.12-2: Cement Unloading to Elevated Storage Silo [Pneumatic] (Controlled	
					Temp (°F):	Ambient										PM2.5	0.000056	lb/ton	Vent Filter		0.0045	0.0043	PM2.5 = PM10*(0.053/0.35)	
					Exit Vel (fps):	41.0																		
					Vol (ACFM):	1,930.0																		
					Vol (DSCFM):	1,930.0																		
					Release Type:	Horizontal																		

APPROVED
By Ashley Taylor at 2:14 pm, Feb 02, 2022

Emissions Calculation Spreadsheet

Lithium Nevada Corporation
Thacker Pass Project
3685 Lakeside Drive, Reno, NV 89509

FIN: A1270 | Basin: 30A, 33A | Kings River Valley/Rio King, Quinn River Valley/Orovada | Increment Tracked: No, No | Air Case Number Application Log (Multiple Applications)
Permit No.: AP1479-4334 | Class: Class II AQOP | County: Humboldt | New | 10677
Facility UTM Coordinates: | NORTHING (m): 4,616,776 | EASTING (m) 413,910
Section: 1,12 / 2-17 / 7,8,14-23,29 | Township: 44N / 44N / 44N | Range: 34E / 35E / 36E | SAD Acreage: 5,545

Nevada Division of Environmental Protection
Bureau of Air Pollution Control
Model Type: Facility Only

Date: 2/2/2022 | Ben Kahue
Approved: Date of Approval | Supervisor:

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
21	**System 21 - Sulfur Storage**																							
S2.019	Sulfur Storage 1	3-01-023-99	4,616,946	414,290	Height (ft):	30.0	24	8,760			47	411,720	tons Molten Sulfur			PM	0.0051	gr/dscf	Caustic Scrubber		0.10	0.44	PM from scrubber effluent (LNC 2020), (Schonlau 2020a)	For each source
S2.020	Sulfur Storage 2	3-01-023-99	4,616,942	414,293	Diameter (ft):	3.00										PM10	0.0051	gr/dscf	Caustic Scrubber		0.10	0.44	PM from scrubber effluent (LNC 2020), (Schonlau 2020a)	For each source
					Temp (°F):	140										PM2.5	0.0051	gr/dscf	Caustic Scrubber		0.10	0.44	PM from scrubber effluent (LNC 2020), (Schonlau 2020a)	For each source
					Exit Vel (fps):	7.3										SO2	0.0172	gr/dscf	Caustic Scrubber		0.34	1.49	Engineer Estimates base on exhaust SO2 concentration of 15 ppmv	
					Vol (ACFM):	3,100.0																		
					Vol (DSCFM):	2,300.0																		
					Release Type:	Vertical																		
																H2S	0.0061	gr/dscf	Caustic Scrubber		0.12	0.53	Engineer Estimates base on exhaust H2S concentration of 10 ppmv	For each source
22	**System 22 - Package Boiler**																							
S2.021	Package Boiler	1-02-006-02	4,616,986	414,165	Height (ft):	27.0	24	550	41.27	22,696.58	451	248,050	gallons Propane			PM	1.05	lb/1000 gallon			0.47	0.13	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Diameter (ft):	3.00										PM10	1.05	lb/1000 gallon			0.47	0.13	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Temp (°F):	363										PM2.5	1.05	lb/1000 gallon			0.47	0.13	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Exit Vel (fps):	35.0										SO2	1.59	lb/1000 gallon			0.72	0.20	Mass Balance with max Sulfur concentration of 185 ppm in Propane	
					Vol (ACFM):	14,832.0										NOX	19.5	lb/1000 gallon			8.79	2.42	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Vol (DSCFM):	8,606.0										CO	15.0	lb/1000 gallon			6.77	1.86	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
																VOC	2.40	lb/1000 gallon			1.08	0.30	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Release Type:	Vertical																		
																HAPS					7.65E-02	2.10E-02		
																CO2e					5760.7	1584.2		
23	**System 23 - Start-Up Burner**																							
S2.022	Start-Up Burner	1-02-006-02	4,617,002	414,213	Height (ft):	50.0	24	200	28.82	5,764.50	315	63,000	gallon Propane			PM	1.05	lb/1000 gallon			0.33	0.033	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Diameter (ft):	5.00										PM10	1.05	lb/1000 gallon			0.33	0.033	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Temp (°F):	950										PM2.5	1.05	lb/1000 gallon			0.33	0.033	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Exit Vel (fps):	175.1										SO2	1.59	lb/1000 gallon			0.50	0.050	Mass Balance with max Sulfur concentration of 185 ppm in Propane	
					Vol (ACFM):	206,338.0										NOX	19.5	lb/1000 gallon			6.14	0.61	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Vol (DSCFM):	196,069.0										CO	15.0	lb/1000 gallon			4.73	0.47	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
																VOC	2.40	lb/1000 gallon			0.76	0.076	AP-42 Table 1.5-1 Propane Industrial Boilers w/ safety factor	
					Release Type:	Vertical																		
																HAPS					5.34E-02	5.34E-03		
																CO2e					4023.6	402.4		

APPROVED
By Ashley Taylor at 2:14 pm, Feb 02, 2022

Emissions Calculation Spreadsheet

Lithium Nevada Corporation
Thacker Pass Project
3685 Lakeside Drive, Reno, NV 89509

FIN: A1270 | Basin: 30A, 33A | Kings River Valley/Rio King, Quinn River Valley/Orovada | Increment Tracked: No, No
Permit No.: AP1479-4334 | Class: Class II AQOP | County: Humboldt
Facility UTM Coordinates: | NORTHING (m): 4,616,776 | EASTING (m) 413,910
Section: 1,12, 2-17, 7,8,14-23,29 | Township: 44N, 44N, 44N | Range: 34E, 35E, 36E | SAD Acreage: 5,545

Air Case Number Application Log (Multiple Applications): New 10677

Nevada Division of Environmental Protection
Bureau of Air Pollution Control
Model Type: Facility Only

Date: 2/2/2022 | Ben Kahue
Approved: Date of Approval | Supervisor:

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
24	**System 24 - Sulfuric Acid Plant**																							
S2.023	Sulfuric Acid Plant	3-01-023-01	4,617,058	414,255	Height (ft):	199.0	24	8,760			51	446,760	tons Sulfur			PM	0.0052	gr/dscf	Tail Gas Scrubber		5.69	24.9	Engineering Estimates: PM+H2SO4 - 12 mg/Nm^3	
					Diameter (ft):	8.50										PM10	0.0052	gr/dscf	Tail Gas Scrubber		5.69	24.9	Engineering Estimates: PM+H2SO4 - 12 mg/Nm^3	
					Temp (°F):	79										PM2.5	0.0052	gr/dscf	Tail Gas Scrubber		5.69	24.9	Engineering Estimates: PM+H2SO4 - 12 mg/Nm^3	
					Exit Vel (fps):	48.2										SO2	0.0094	gr/dscf	Tail Gas Scrubber		10.17	44.6	Engineering Estimates: SO2 stack concentration = 7.5 ppmv	
					Vol (ACFM):	165,245.0										NOX	0.018	gr/dscf			19.48	85.3	Engineering Estimates: NOX stack concentration = 20 ppmv	
					Vol (DSCFM):	126,678.0																		
					Release Type:	Vertical										H2SO4	0.0052	gr/dscf	Tail Gas Scrubber		5.69	24.9	Engineering Estimates: H2SO4 - 6 mg/Nm^3 (with an additional X 2 Safety Factor)	
25	**System 25 - Fire Pumps**																							
S2.024	Fire Pump 1 (Mine)	2-02-001-02	4,617,714	410,835	Height (ft):	13.0	24	100	2.80	280.00	20	2,000	gallons Diesel	422.00	HP	PM	0.036	lb/MMBtu			0.10	0.0051	Manufacturer Specifications	For each source
S2.025	Fire Pump 2 (Process)	2-02-001-02	4,617,087	414,307	Diameter (ft):	0.50										PM10	0.036	lb/MMBtu			0.10	0.0051	Manufacturer Specifications	For each source
					Temp (°F):	891										PM2.5	0.036	lb/MMBtu			0.101	0.0051	Manufacturer Specifications	For each source
					Exit Vel (fps):	173.8										SO2	0.0015	lb/MMBtu			0.0042	0.00021	mass balance w/ 15 ppm S	For each source
					Vol (ACFM):	2,048.0										NOX	0.87	lb/MMBtu			2.45	0.12	Manufacturer Specifications	For each source
					Vol (DSCFM):	668.0										CO	0.23	lb/MMBtu			0.63	0.032	Manufacturer Specifications	For each source
																VOC	0.030	lb/MMBtu			0.084	0.0042	Manufacturer Specifications	For each source
					Release Type:	Vertical																		
																HAPS					1.06E-02	5.31E-04		
																CO2e					457.2	22.9		
26	**System 26 - Emergency Generators**																							
S2.026	Emergency Generator 1 (Mine)	2-02-010-01	4,617,211	410,977	Height (ft):	5.00	24	100	1.27	127.19	14	1,390	gallons Propane	168.00	HP	PM	0.054	lb/MMBtu			0.069	0.0034	CARB 1991	For each source
S2.027	Emergency Generator 2 (Mine)	2-02-010-01	4,617,211	410,979	Diameter (ft):	0.30								125.28	KW	PM10	0.054	lb/MMBtu			0.069	0.0034	CARB 1991	For each source
					Temp (°F):	960										PM2.5	0.054	lb/MMBtu			0.069	0.0034	CARB 1991	For each source
					Exit Vel (fps):	169.6										SO2	0.0038	lb/MMBtu			0.0049	0.00024	CARB 1991	For each source
					Vol (ACFM):	888.0										NOX	0.58	lb/MMBtu			0.74	0.037	40 CFR 60.4231(c) & 1048.101(b)(3)	For each source
					Vol (DSCFM):	275.0										CO	0.95	lb/MMBtu			1.21	0.060	40 CFR 60.4231(c) & 1048.101(b)(3)	For each source
																VOC	0.58	lb/MMBtu			0.74	0.037	40 CFR 60.4231(c) & 1048.101(b)(3)	For each source
					Release Type:	Vertical																		
																HAPS					4.12E-02	2.06E-03		
																CO2e					173.4	8.67		
27	**System 27 - Gasoline Tank**																							
S2.028	Gasoline Tank, 1,000 gallons	2-50-100-0120 2-50-199-5120	4,617,430	410,878			24	8,760				103,000	gallons Gasoline											
											9,999		gal/mo											
					Equipment Dimensions (ft)	6 H x 5.5 D										VOC	4.33	lb/1000 gallon			0.000	0.22	EPA Tanks	
					Release Type:	Vertical																		

APPROVED
By Ashley Taylor at 2:14 pm, Feb 02, 2022

Emissions Calculation Spreadsheet
Lithium Nevada Corporation
Thacker Pass Project
3685 Lakeside Drive, Reno, NV 89509

FIN: A1270 | Basin: 30A, 33A | Kings River Valley/Rio King, Quinn River Valley/Orovada | Increment Tracked: No, No
Permit No.: AP1479-4334 | Class: Class II AQOP | County: Humboldt
Facility UTM Coordinates: | NORTHING (m): 4,616,776 | EASTING (m) 413,910
Section: 1,12, 2-17, 7,8,14-23,29 | Township: 44N, 44N, 44N | Range: 34E, 35E, 36E | SAD Acreage: 5,545

Air Case Number Application Log (Multiple Applications): New 10677

Nevada Division of Environmental Protectio
Bureau of Air Pollution Control
Model Type: Facility Only

Date: 2/2/2022 | Ben Kahue
Approved: Date of Approval | Supervisor:

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
IA1	**Ammonium Nitrate Prill Silo - Loading**																							
IA1.001	Ammonium Nitrate Prill Silo - Loading	3-01-027-09	4,618,149	412,174	Height (ft):	30.0	24	8,760			80	29,200	AN Prill			PM	0.020	lb/ton			1.60	0.29	AP-42 Table 8.3-2: Bulk Loading Operations (Uncontrolled)	For each source
IA1.002	Ammonium Nitrate Prill Silo - Unloading	3-01-027-09	4,618,149	412,174	Diameter (ft):	0.50										PM10	0.0070	lb/ton			0.56	0.10	PM10=PM*0.35	For each source
	Request for IA determination status to be granted on October 18, 2021.				Temp (°F):	Ambient										PM2.5	0.0012	lb/ton			0.09	0.02	PM2.5=PM2.5/6.06	For each source
					Exit Vel (fps):	0.0030																		
					Vol (ACFM):	0.035																		
IA2	**Sulfuric Acid Plant Cooling Tower**																							
IA1.003	Sulfuric Acid Plant Cooling Tower	3-85-001-01	4,616,968	414,290	Height (ft):	35.0	24	8,760			278,000	2,435,280,000	gallons Water			PM	0.00042	lb/1000 gallon			0.12	0.51	(NDEP 2017), 1000 ppm TDS, 0.005% drift loss (LNC 2020)	
	Request for IA determination status to be granted on October 18, 2021.				Diameter (ft):	36.0										PM10	0.00042	lb/1000 gallon			0.12	0.51	(NDEP 2017), 1000 ppm TDS, 0.005% drift loss (LNC 2020)	
					Temp (°F):	Ambient										PM2.5	0.00042	lb/1000 gallon			0.12	0.51	(NDEP 2017), 1000 ppm TDS, 0.005% drift loss (LNC 2020)	
					Exit Vel (fps):	6.40																		
					Vol (ACFM):	388400.00																		
IA3	**Lithium Carbonate Cooling Tower**																							
IA1.004	Lithium Carbonate Cooling Tower	3-85-001-01	4,617,045	414,418	Height (ft):	35.0	24	8,760			539,100	4,722,516,000	gallons Water			PM	0.00042	lb/1000 gallon			0.23	0.99	(NDEP 2017), 1000 ppm TDS, 0.005% drift loss (LNC 2020)	
	Request for IA determination status to be granted on October 18, 2021.				Diameter (ft):	36.0										PM10	0.00042	lb/1000 gallon			0.23	0.99	(NDEP 2017), 1000 ppm TDS, 0.005% drift loss (LNC 2020)	
					Temp (°F):	Ambient										PM2.5	0.00042	lb/1000 gallon			0.23	0.99	(NDEP 2017), 1000 ppm TDS, 0.005% drift loss (LNC 2020)	
					Exit Vel (fps):	12.30																		
					Vol (ACFM):	752800.00																		

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	Location UTM (Zone 11) East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Operating Hours Annual	Heat Input (MMBtu) Hour	Heat Input (MMBtu) Annual	Throughput/ Fuel Usage Hour	Throughput/ Fuel Usage Annual	Throughput/ Fuel Usage Units	Power Output Amount	Power Output Units	Emission Factor Pollutant	Emission Factor Factor	Emission Factor Unit	Controls Type	Controls Efficiency	Permit Emission Rate Hourly (lbs/hr)	Permit Emission Rate Yearly (ton/yr)	References	For Each Source or Combined?
IA4	**Laboratory Equipment**																							
IA1.005	Splitter 1	3-05-020-06	4,617,159	414,334	Height (ft):	40.0	24	8,760			1	8,760	tons Samples			PM	0.23	lb/ton			0.23	0.99	AP42 11.192.2-2 - Conveyor Transfer, Tert. Crushing, Screening, Fine Crushing	Emissions are combined
IA1.006	Splitter 2	3-05-020-06	4,617,159	414,334	Diameter (ft):	0.50										PM10	0.085	lb/ton			0.085	0.37	AP42 11.192.2-2 - Conveyor Transfer, Tert. Crushing, Screening, Fine Crushing	Emissions are combined
IA1.007	Splitter 3	3-05-020-06	4,617,159	414,334	Temp (°F):	Ambient										PM2.5	0.014	lb/ton			0.014	0.061	PM2.5=PM10/6.06	Emissions are combined
IA1.008	Splitter 4	3-05-020-06	4,617,159	414,334	Exit Vel (fps):	212.20																		
IA1.009	Splitter 5	3-05-020-06	4,617,159	414,334	Vol (ACFM):	2500.00																		
IA1.010	Splitter 6	3-05-020-06	4,617,159	414,334	Vol (DSCFM):	2,500.0																		
IA1.011	Crusher 1	3-05-020-03	4,617,159	414,334																				
IA1.012	Crusher 2	3-05-020-03	4,617,159	414,334																				
IA1.013	Crusher 3	3-05-020-03	4,617,159	414,334																				
IA1.014	Screen 1	3-05-020-03	4,617,159	414,334																				
IA1.015	Screen 2	3-05-020-03	4,617,159	414,334																				
IA1.016	Screen 3	3-05-020-03	4,617,159	414,334																				
IA1.017	Pulverizer 1	3-05-020-03	4,617,159	414,334																				
IA1.018	Pulverizer 2	3-05-020-03	4,617,159	414,334																				
IA1.019	Pulverizer 3	3-05-020-03	4,617,159	414,334	0	Notes:																		
	Request for IA determination status to be granted on October 18, 2021.																							
IA5	**Diesel Tank, Off Road (Mine), 25,000 gallons**																							
IA1.020	Diesel Tank, Off Road (Mine), 25,000 gallons	4-04-003-16	4,617,430	410,867			24	8,760			725	6,350,000	gallons diesel											
					Equipment Dimensions (ft)	30 H x 12 D										VOC	0.0047	lb/1000 gallon			0.003	0.015	EPA Tanks	
					Release Type:	Vertical																		

APPROVED
By Ashley Taylor at 2:14 pm, Feb 02, 2022

Emissions Calculation Spreadsheet

Lithium Nevada Corporation
Thacker Pass Project
3685 Lakeside Drive, Reno, NV 89509

FIN:	A1270	Basin:	30A 33A	Kings River Valley/Rio King Quinn River Valley/Orovada	Increment Tracked:	No No	
Permit No.:	AP1479-4334	Class:	Class II AQOP	County:	Humboldt		
Facility UTM Coordinates:		NORTHING (m):	4,616,776	EASTING (m)	413,910		
Section:	1,12 2-17 7,8,14-23,29	Township:	44N 44N 44N	Range:	34E 35E 36E	SAD Acreage:	5,545

Air Case Number Application Log (Multiple Applications)	
New	10677

Nevada Division of Environmental Protectio
Bureau of Air Pollution Control
Model Type: Facility Only

Date:	2/2/2022	Ben Kahue
Approved:	Date of Approval	Supervisor:

System #	Unit Description	SCC	Location UTM (Zone 11) North (m)	East (m)	Stack/Fugitive Parameters		Operating Hours Daily	Annual	Heat Input (MMBtu) Hour	Annual	Throughput/ Fuel Usage Hour	Annual	Units	Power Output Amount	Units	Emission Factor Pollutant	Factor	Unit	Controls Type	Efficiency	Permit Emission Rate Hourly (lbs/hr)	Yearly (ton/yr)	References	For Each Source or Combined?
IA6	**Diesel Tank, Highway (Mine), 8,000 gallons**																							
IA1.021	Diesel Tank, Highway (Mine), 8,000 gallons	4-04-003-16	4,617,430	410,873			24	8,760			5	40,000	gallons diesel											
					Equipment Dimensions (ft)	21.5 H x 8 D										VOC	0.050	lb/1000 gallon			0.0002	0.0010	EPA Tanks	
					Release Type:	Vertical																		
IA7	**Bulk Oil Tank, 20,000 gallons**																							
IA1.022	Bulk Oil Tank, 20,000 gallons	4-04-003-13	4,617,410	410,854			24	8,760			14	120,000	gallons Bulk Oil											
					Equipment Dimensions (ft)	18 H x 14 D										VOC	0.050	lb/1000 gallon			0.0007	0.0030	EPA Tanks	
					Release Type:	Vertical																		
IA8	**Bulk Coolant Tank, 3,000 gallons**																							
IA1.023	Bulk Coolant Tank, 3,000 gallons	4-07-056-04	4,617,410	410,847			24	8,760			3	24,000	gallons Coolant											
					Equipment Dimensions (ft)	8 H x 8 D										VOC	0.0025	lb/1000 gallon			0.000007	0.000030	EPA Tanks	
					Release Type:	Vertical																		
IA9	**Bulk Used Oil Tank, 3,000 gallons**																							
IA1.024	Bulk Used Oil Tank, 3,000 gallons	3-06-300-06	4,617,410	410,850			24	8,760			14	120,000	gallons Used Oil											
					Equipment Dimensions (ft)	8 H x 8 D										VOC	0.017	lb/1000 gallon			0.0002	0.0010	EPA Tanks	
					Release Type:	Vertical																		
IA10	**Bulk Used Coolant Tank, 3,000 gallons**																							
IA1.025	Bulk Used Coolant Tank, 3,000 gallons	4-07-056-04	4,617,420	410,844			24	8,760			3	24,000	gallons Used Coolant											
					Equipment Dimensions (ft)	8 H x 8 D										VOC	0.0025	lb/1000 gallon			0.000007	0.000030	EPA Tanks	
					Release Type:	Vertical																		

Appendix 2

NVAAQS Memo

Memo

To: Ben Kahue, Ashley Taylor, BAPC

From: Scott Speckart, BAQP

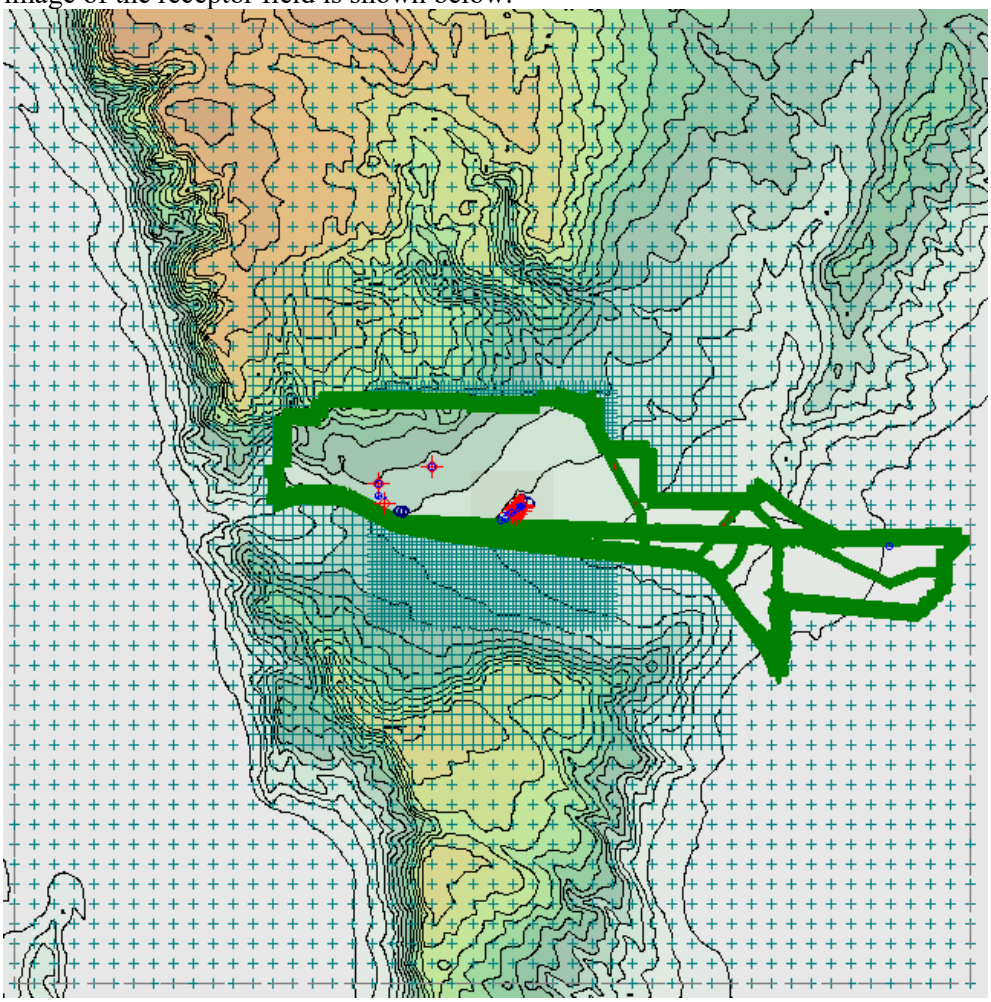
CC: Permitting Files by way of Permit Writer

Date: 7/8/2021

Re: NvAAQS/NAAQS Modeling Analysis – Lithium Nevada Corporation; Thacker Pass Project (A1270; AP1479-4334; AC10677)

The BAQP performed a modeling analysis to show compliance with the Nevada Ambient Air Quality Standards, and the National Ambient Air Quality Standards for aforementioned proposed permitting action. The technical details of the modeling analysis are presented in the table below. Unless otherwise noted, all sources were characterized in accordance with the most recent BAQP policy, EPA Guidance, and regulatory default options as described in 40 CFR Part 51 Appendix W.

NvAAQS Applicability Date	05/16/2018	
Hydrographic Area	HA30A and 33A	
AERMOD Version	v.19191	
Summary	Lithium Nevada applied for a new air permit, AP1479-4334 for their Thacker Pass project.	
Pollutants Analyzed	CO (1-hr, 8-hr), NO_2 (1-hr, Ann.), $PM_{2.5}$ (24-hr, Ann.), PM_{10} (24-hr.), SO_2 (1-hr, 3-hr, 24-hr, Ann.), H_2S (1-hr)	
Met Station	Surface: Lithium Nevada Onsite	Profile: Lithium Nevada Onsite
Anemometer Elevation	1597.0 m	
Met Years Used	2012-2013	
AERMET Version	v.19191	
Modeling Datum	NAD83	
Model Source Parameter Notes	Source location, release height, release temperature and flow rates were provided by the applicant and were verified based on the permit writer's spreadsheet. The emission rates are based on BAPC emissions calculations, which were based on the applicant requested operation parameters. .	
Plant Boundary	The plant boundary was specified as was in the submitted model, but with the modification of receptors on roads and corridors that have been publicly accessible.	

Model Receptors	19,741 receptors were utilized. The receptors were spaced 20 m along the plant boundary. The spacing increased to 500 m and covered an area of 576 km^2. As noted previously, corridors with possible public access contained receptors. An image of the receptor field is shown below: 	
Modeled Buildings	Buildings were modeled as in the application.	
Terrain Processing	AERMAP v.18081 was used to process the terrain within the model boundary, and assign base elevations for all receptors, sources, and buildings.	
Terrain Data Used	USGS DEM 1-degree (30m)	
Background Concentrations		PM_{10} 24-hr – 10.2 µg/m^3
	$PM_{2.5}$ Annual – 2.3 µg/m^3	$PM_{2.5}$ 24-hr – 8.0 µg/m^3
Additional Modeling Analysis Comments	Adjusted ustar was utilized. Also, the ARM 2 ratio method was utilized with the default ratios of a minimum of 0.5 and a maximum of 0.9.	
Analysis Results	The BAQP's analysis of the impacts of the proposed action to ambient air quality shows that the proposed action will not cause an exceedance of NvAAQS/NAAQS.	

Appendix 3

Public Comments and Responses relevant to

Air Quality Operating Permit Received Prior to October 18, 2021

Appendix 4

Public Noticed Permit with Changes Shown