

DRAFT

**OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION**

MEMORANDUM

October 10, 2025

TO: Lee Warden, P.E., Permits and Engineering Group Manager

THROUGH: Richard Kienlen, P.E., Engineering Manager, New Source Permits Section

THROUGH: Alexandria Mills, E.I., Engineering Section

FROM: Jennie Doan, E.I., Engineering Section, ROAT

SUBJECT: Evaluation of Permit Application No. **2025-0054-C**
Stardust Power, LLC
Stardust Muskogee Lithium Refinery (SIC 2819/NAICS 325180)
Facility ID: 24588
Latitude: 35.67814°, Longitude: -95.37869°
Section 22, Township 14N, Range 18E, Muskogee County, Oklahoma
Physical Address: Southwest of the intersection of West 53rd and US-64 south
of Muskogee. The facility's entrance is off of West 53rd Street.

SECTION I. INTRODUCTION

Stardust Power, LLC (Stardust or applicant) has applied for an individual synthetic minor source construction permit in Muskogee to construct their lithium refinery that processes brine to recover lithium. The facility is expected to start construction in Summer 2025.

Based on the projected operations that will be constructed at this facility, the facility-wide emissions are estimated to be 73.26 TPY of NO_x, 42.81 TPY of CO, 14.49 TPY of VOC, 91.32 TPY of PM₁₀, and 9.76 TPY of HAPs. This facility qualifies for a "synthetic minor" permit because the facility's controlled emissions stay below the major source threshold of 100 TPY, the 10 TPY threshold for a single HAP, and the 25 TPY threshold for any combination of HAPs.

SECTION II. PROCESS DESCRIPTION

Stardust is designed to recover lithium from brine. The process uses chemical processes to separate and concentrate the lithium with the final solid product being bagged for transport and sale. Raw materials and brine are delivered to the facility via rail or truck.

The processes use several reagents, including hydrochloric acid (HCl), soda ash, lime, diatomaceous earth, sodium hydroxide, carbon dioxide, and an organic diluent, to leverage chemical reactions. The major chemical processes are boron extraction, calcium and magnesium extraction, carbonation, bicarbonation, and decarbonation. The following reagents are used within these processes:

- HCl – Working and breathing losses from these tanks are controlled by scrubbers. The manufacturer guarantees an exit concentration of HCl of less than 2 ppm. Neutralized liquids from the scrubber are routed to on-site water treatment.
- Soda Ash – Soda ash is delivered to the site via rail or truck. A dust collector on the receiving process minimizes PM₁₀ emissions associated with delivery. As the soda ash is prepared for use in the process, any particulates in the tanks are routed to a scrubber.
- Lime – Lime is delivered to the facility via rail or truck. The solid lime is delivered to a lime silo (510-BN-010) with particulate matter emissions controlled via a dust collector. The lime is mixed with water within the lime slaker with a wet scrubber controlling any emissions from the slaker.
- Diatomaceous Earth – Diatomaceous Earth is delivered in 25 kg bags which are manually emptied into the units' hoppers. The material is then metered with water into small mixing tanks. These agitated tanks will have minimal particulate emissions.
- Sodium Hydroxide – Sodium hydroxide (caustic soda) is delivered via truck. The sodium hydroxide is used in the boron solvent extraction process to undertake a pH adjustment to remove boron from loaded organic (the diluent). It is additionally used for pH adjustments in the calcium and magnesium removal reactors and IX columns, and in the bicarbonation IX columns, and as needed in the neutralizing tanks throughout the process.
- Carbon Dioxide – Carbon dioxide is delivered by truck to the facility as a liquid and transferred to a pressurized storage tank. This storage tank is used only for start-up of the facility as the CO₂ used under normal operations is generated from the chemical processes, captured, and reused within the process.
- Diluent – Stardust anticipates using Escaid 110 (or its equivalent) as the diluent for the process although other low vapor pressure hydrocarbons may be used. It is used as a carrier of an extraction reagent, which allows the elements of interest to be concentrated, at which stage the “organic” (a combination of diluent and extractant) floats to the surface to form a “blanket” on top of the brine, where it will flow to the next process step. Organic moves counter to the flow of the brine as the brine moves through the SX unit. The saturated hydrocarbon is regenerated through the SX scrub and stripping mixing tanks and settling tanks with the lean organic returned to the process. The organic vapors within the sealed system are controlled through the SX vent condenser.

REFINERY PROCESS

The refining process separates the lithium ions from the brine to create a saleable product meeting stringent specifications for use in micro chip manufacturing. There are six main portions of the refining process:

Brine Delivery & Storage

Brine meeting the specifications for processing is delivered to the site via truck and rail and transferred through closed piping to the brine feed tanks.

Boron Solvent Extraction

The extraction process uses a series of mixing and settling tanks to remove boron from the brine. The VOC and HCl vapors which may occur through these series of tanks are routed to a condenser and through carbon columns for control. Sludges (crud) generated from the boron extraction are routed to the on-site crud management processes.

Calcium & Magnesium Removal (Impurity Removal)

- Stage 1 - This stage of the refining process receives the low boron brine and uses lime to further the impurity removal processes. The agitated tanks are equipped with demisters on their vents to prevent the loss of water vapor from these tanks and preserve the lithium-containing waters in the tank. Solids are removed from the process as filter cake, and any waste liquids are routed to the onsite wastewater treatment processes.
- Stage 2 - The brine is mixed with soda ash through a series of agitated precipitation tanks. These tanks are equipped with demisters on their vents to prevent the loss of water vapor from these tanks. Solids are removed from the process as filter cake, and any waste liquids are routed to the onsite wastewater treatment processes.
- Stage 3 - The impurity removal columns operate in semi-batch mode with four associated tanks for neutralization, backwash, and wash water (two tanks). These tanks are equipped with demisters on their vents to prevent the loss of water vapor (and lithium) from these tanks. The discharge from this stage is considered a purified brine.

Carbonation

- Stage 1 – The purified brine entering the carbonation process contains primarily lithium chloride and sodium chloride. The carbonation process reduces the sodium chloride present in the brine. Lithium carbonate is formed and drops out of solution due to saturation forming a carbonation slurry. Vapors (primarily CO₂) are routed to the blanketing gas scrubber carbonation off-vent.
- Stage 2 – Water from overflow in the first stage is processed through additional filters and polishing processes. The slurry is routed through centrifuges for dewatering and separation of filtrate from the crude LiC (facility's abbreviation for lithium carbonate) slurry.
- Stage 3 – This stage focuses on removing sodium chloride and the recovery of any final lithium in the brine. Strong brine is combined with HCl to dissolve any salts carried through to this stage. The reaction drives lithium carbonate to lithium chloride and carbon dioxide. The carbon dioxide liberated in the reactors is routed to a stripping column, and the carbon dioxide is then routed to conditioning for reuse. Water from the neutralization reactors is also routed to the stripper column with its ultimate destination in the wastewater treatment system.

Bicarbonation

The crude LiC slurry and carbon dioxide are reacted within the bicarbonation process. The reactors are pressurized, and CO₂ from the reaction is routed to the bicarbonation off vent and the CO₂ gas conditioner. The liquid from these reactors flows to the bicarbonation candle filter as a bicarbonate

liquor. The candle filters separate liquids and solids into lithium liquor and a solid. The bicarbonate lithium liquor routes to the ion exchange portion of this process step. The solids are routed to the neutralization tank in the third stage of the carbonation process above.

- Pure Li Crystallizer - The bicarbonated brine is routed to the ion exchange (IX) unit. Hydrochloric acid and caustic soda are also used within the crystallizer skid. Outputs from the IX unit include spent caustic, spent acid, and the IX train product.
- Decarbonation - Three decarbonation reactors convert lithium bicarbonate to lithium carbonate. The liberated CO₂ is captured for reuse in the process as detailed under the CO₂ section above. Decarbonation product is routed to the pure LiC centrifuge. A second tank in this portion of the process, decarbonation overflow liquor surge drum, receives overflow liquor from the decarbonation process and the strong centrate from the centrifuge. The solids generated in this portion of the process route to a repulping process and then are returned to the carbonation process for reprocessing.
- Centrifuge – The decarbonation product is routed to the pure LiC centrifuges. The centrifuges have two outputs: pure LiC and strong centrate. The strong centrate is routed back to the polishing filters. The pure LiC proceeds to the dryer.
- LiC Drying – The pure LiC proceeds to drying as a precursor to final packaging. Baghouses control possible particulate matter emissions from the dryer and through the material handling steps.
- Bagging Plant – The bagging process is completely indoors in a clean room environment using robotic processes. Any dust generated in the bagging process is captured through ventilation filtration collection systems with any collected material returned to the process.

Repulping

In the event the quality assurance processes identify quality issues with bagged product, the bags will be opened, and the lithium repulped for reprocessing. The material is recontacted within an enclosed system and generally saturated with water, so particulate matter emissions will be minimal. The concentration of the solution in this tank is lower than the main process as the goal of the prior processing units is to capture the lithium. Losses are minimized by mixing product with process water. In addition, the prior processes are designed to avoid producing off-spec material. The expectation is that minimal retreatment will occur. Particulate matter emissions from the bag splitter and hopper are anticipated to be negligible.

Wastewater Treatment

Stardust Power's refinery design includes a zero liquid discharge wastewater system. The wastewater system includes crystallizers, precipitation tanks, thickener operations, and solid/liquid separation processes. The final products of the wastewater treatment processes include plant condensate (clean) water and salts. Solid discharges are routed to the salt handling system.

Salt Storage

Salt from sodium chloride crystallizer screw conveyor is dewatered to the extent possible and then routed to the salt stockpile. The salt stockpile has a dome covering to protect the material from

precipitation and is located within a concrete containment. Particulate matter emissions from the stockpile are due to wind erosion and transfer of material via conveyors and drop points.

Stormwater

The facility's processing areas are curbed with sumps routing any collected waters to two approximately one-million-gallon storage tanks. During rain events, stormwater that falls within the curbed areas will be collected and routed to these storage tanks with the waters then used for processing support.

PLANT SERVICES

Cooling Water System

Stardust Power's refinery design includes three induced draft evaporative coolers for cooling process waters. Process waters are contained within piping, and the use of municipal water or collected stormwater on the outside of that piping cools the process waters. Emissions from the evaporative coolers are based on vendor information. Minimal amounts of sodium hypochlorite, sulfuric acid, and anti-scale chemicals are stored in totes on site for maintaining the evaporative coolers. Emissions of these materials are expected to be negligible.

Boilers

There are two gas-fired boilers and two electric boilers that are used to produce steam.

Emergency Engines

The facility will include backup generators for running a portion of the plant in the event that electricity is unavailable. The seven emergency engines will operate only for testing (limited to 100 hours per year) or in the event of an emergency. The engines are anticipated to be Cat 3516 with Tier 2 packages. The engines are diesel fired and rated for 2,500-ekW, 3,650-hp each.

Fuel Storage

The facility will have diesel and gasoline storage onsite for site maintenance and vehicles.

SECTION III. EQUIPMENT

EUG 1 – Water Management

Processing units associated with the zero-discharge wastewater system. Emissions from these units are assumed to be negligible.

EU #	Description	Throughput, mt ⁽¹⁾ /hr (TPH)	Mfg./ Const. Date
530-CE-005A	ZLD Crystallizer Centrifuge	0.49 (0.54)	TBD
530-CE-007A	Sodium Chloride Crystallizer Centrifuge	99.1 (109.21)	TBD
530-FL-009	Wastewater Filter Press	36 (39.67)	TBD
530-CE-005B	Train 2 ZLD Crystallizer Centrifuge	0.49 (0.54)	TBD
530-CE-007B	Train 2 Sodium Chloride Crystallizer Centrifuge	99.1 (109.21)	TBD

EUG 2 - Reagents

EU #	Point	Description	Capacity, gal	Throughput	Mfg./ Const. Date	Control Device
530-TK-217	530-DM-217	HCl Day Tank	TBD	--	TBD	530-DM-217
510-BN-010	510-DC-008	Lime Bin Silo	--	138 lb/hr	TBD	510-DC-008
510-BN-007	510-DC-007	Soda Ash Receiver Bin	--	22 mt/hr (24.24 TPH)	TBD	510-DC-007
510-FD-013	510-FD-013	Soda Ash Unload Feeder	--	2,205 lb/hr	TBD	None
510-XM-174	510-SB-003	Lime Slaker	--	2.71 mt/hr (2.99 TPH)	TBD	510-SB-003
510-CV-041	510-SB-003	Lime Slaker Grit Screw Conveyor	--	2.71 mt/hr (2.99 TPH)	TBD	510-SB-003
710-XM-174	710-SB-003	Train 2 Lime Slaker	--	2.71 mt/hr (2.99 TPH)	TBD	710-SB-003
710-CV-041	710-SB-003	Train 2 Lime Slaker Grit Screw Conveyor	--	2.71 mt/hr (2.99 TPH)	TBD	710-SB-003
510-PFD-161	510-PFD-161	Diluent Delivery	--	20,000 gal/yr	TBD	None
510-PV-015	510-PV-015	CO ₂ Liquid Storage Tank	TBD	--	TBD	None
510-TK-171	510-TK-171	Organic Storage Tank	TBD	--	TBD	None
510-TK-172	510-SB-006	HCl Storage Tank	TBD	--	TBD	Scrubber 510-SB-006
510-TK-173		HCl Mix Tank	TBD	--	TBD	Scrubber 510-SB-006
510-TK-187	510-TK-187	Diluent Storage Tank	TBD	--	TBD	None
510-TK-241A	510-SB-009	Soda Ash Saturator Tank 1	TBD	--	TBD	Scrubber 510-SB-009
510-TK-241B		Soda Ash Saturator Tank 1	TBD	--	TBD	Scrubber 510-SB-009
510-TK-242A		Soda Ash Saturator Tank 2	TBD	--	TBD	Scrubber 510-SB-009
510-TK-242B		Soda Ash Saturator Tank 2	TBD	--	TBD	Scrubber 510-SB-009
510-TK-243A		Soda Ash Saturator Tank 3	TBD	--	TBD	Scrubber 510-SB-009
510-TK-243B		Soda Ash Saturator Tank 3	TBD	--	TBD	Scrubber 510-SB-009

EU #	Point	Description	Capacity, gal	Throughput	Mfg./Const. Date	Control Device
510-TK-244A		Soda Ash Saturator Tank 4	TBD	--	TBD	Scrubber 510-SB-009
510-TK-244B		Soda Ash Saturator Tank 4	TBD	--	TBD	Scrubber 510-SB-009

(1) Mt – metric tonnes

EUG 3 – Plant Services

EU #	Description	Capacity	Mfg./Const. Date	NSPS/NESHAP Subpart
520-PK-047	Cooling Tower	2,200-gpm	TBD	None
520-BO-001	Boiler	49-MMBTUH	TBD	NSPS Subpart Dc
520-BO-002	Boiler	49-MMBTUH	TBD	
540-GE-001	Cat3516 C	3,650-HP	TBD	NSPS Subpart IIII/NESHAP Subpart ZZZZ
540-GE-002	Cat3516 C	3,650-HP	TBD	
540-GE-003	Cat3516 C	3,650-HP	TBD	
540-GE-004	Cat3516 C	3,650-HP	TBD	
540-GE-005	Cat3516 C	3,650-HP	TBD	
540-GE-006	Cat3516 C	3,650-HP	TBD	
540-GE-007	Cat3516 C	3,650-HP	TBD	
540-GE-008	Cat3516 C	3,650-HP	TBD	
510-TK-100	Gasoline Storage Tank	TBD	TBD	None
510-TK-101	Diesel Storage Tank	TBD	TBD	None

EUG 4 – Brine Holding Tanks

These tanks hold incoming brine prior to processing. Minimal emissions are expected from these tanks.

EU #	Description	Capacity, gal	Mfg./Const. Date	Control Device
610-TK-005	Brine Feed Tank 1, Train 1	TBD	TBD	None
610-TK-006	Brine Feed Tank 2, Train 1	TBD	TBD	None
610-TK-007	Brine Feed Tank 3, Train 1	TBD	TBD	None
610-TK-008	Brine Feed Tank 4, Train 1	TBD	TBD	None
710-TK-005	Brine Feed Tank 1, Train 2	TBD	TBD	None
710-TK-006	Brine Feed Tank 2, Train 2	TBD	TBD	None
710-TK-007	Brine Feed Tank 3, Train 2	TBD	TBD	None
710-TK-008	Brine Feed Tank 4, Train 2	TBD	TBD	None
620-TK-009	SX Feed Tank	TBD	TBD	620-DM-009
630-TK-075	Impurity Removal IX Backwash Solution Tank	TBD	TBD	630-DM-075

EU #	Description	Capacity, gal	Mfg./ Const. Date	Control Device
730-TK-075	Impurity Removal IX Backwash Solution Tank	TBD	TBD	730-DM-075

EUG 5 – Brine Solvent Extraction

EU #	Description	Capacity, gal	Throughput	Mfg./ Const. Date	Control Device
620-TK-010	E1 Mix Tank 1	TBD	--	TBD	Condenser 620-CD-001 and Carbon 620-CM-012, 013, 014
620-TK-011	E1 Mix Tank 2	TBD	--	TBD	
620-TK-012	E1 Settler	TBD	--	TBD	
620-TK-013	E2 Mix Tank 1	TBD	--	TBD	
620-TK-014	E2 Mix Tank 2	TBD	--	TBD	
620-TK-015	E2 Settler	TBD	--	TBD	
620-TK-016	E3 Mix Tank 1	TBD	--	TBD	
620-TK-017	E3 Mix Tank 2	TBD	--	TBD	
620-TK-018	E3 Settler	TBD	--	TBD	
620-TK-020	Aqueous Tank	TBD	--	TBD	None
620-TK-021	Lean Aqueous Tank	TBD	--	TBD	None
620-TK-022	S1 Mix Tank 1	TBD	--	TBD	620-CD-001 and Carbon 620-CM-012, 013, 014
620-TK-023	S1 Mix Tank 2	TBD	--	TBD	
620-TK-024	Strip Settler 1	TBD	--	TBD	
620-TK-025	S2 Mix Tank 1	TBD	--	TBD	
620-TK-026	S2 Mix Tank 2	TBD	--	TBD	
620-TK-027	Strip Settler 2	TBD	--	TBD	
620-TK-028	S3 Mix Tank 1	TBD	--	TBD	
620-TK-029	S3 Mix Tank 2	TBD	--	TBD	
620-TK-030	Strip Settler 3	TBD	--	TBD	
620-TK-031	Scrub Mix Tank 1	TBD	--	TBD	620-CD-001 and Carbon 620-CM-012, 013, 014
620-TK-032	Scrub Mix Tank 2	TBD	--	TBD	
620-TK-033	SX Scrub Settler	TBD	--	TBD	
620-FL-003	Crud Filter	--	1.15 mt/hr (1.65 TPH)	TBD	None
620-TK-034	Stripped Organic Tank	TBD	--	TBD	620-CD-001 and Carbon 620-CM-012, 013, 014
620-TK-035	SX Strip Solution Tank	TBD	--	TBD	Demister 620-DM-035

EU #	Description	Capacity, gal	Throughput	Mfg./ Const. Date	Control Device
620-TK-036	Strip Acid Day Tank	TBD	--	TBD	Demister 620-DM- 036
620-TK-038	Crud Management Tank	TBD	--	TBD	None
620-TK-039	Crud Management Filtrate Tank	TBD	--	TBD	None
720-TK-010	E1 Mix Tank 1	TBD	--	TBD	720-CD- 001 and Carbon 720- CM-012, 013, 014
720-TK-011	E1 Mix Tank 2	TBD	--	TBD	
720-TK-012	E1 Settler	TBD	--	TBD	
720-TK-013	E2 Mix Tank 1	TBD	--	TBD	
720-TK-014	E2 Mix Tank 2	TBD	--	TBD	
720-TK-015	E2 Settler	TBD	--	TBD	
720-TK-016	E3 Mix Tank 1	TBD	--	TBD	
720-TK-017	E3 Mix Tank 2	TBD	--	TBD	
720-TK-018	E3 Settler	TBD	--	TBD	
720-TK-020	Aqueous Tank	TBD	--	TBD	
720-TK-021	Lean Aqueous Tank	TBD	--	TBD	None
720-TK-022	S1 Mix Tank 1	TBD	--	TBD	720-CD- 001 and Carbon 720- CM-012, 013, 014
720-TK-023	S1 Mix Tank 2	TBD	--	TBD	
720-TK-024	Strip Settler 1	TBD	--	TBD	
720-TK-025	S2 Mix Tank 1	TBD	--	TBD	
720-TK-026	S2 Mix Tank 2	TBD	--	TBD	
720-TK-027	Strip Settler 2	TBD	--	TBD	
720-TK-028	S3 Mix Tank 1	TBD	--	TBD	
720-TK-029	S3 Mix Tank 2	TBD	--	TBD	
720-TK-030	Strip Settler 3	TBD	--	TBD	
720-TK-031	Scrub Mix Tank 1	TBD	--	TBD	
720-TK-032	Scrub Mix Tank 2	TBD	--	TBD	
720-TK-033	SX Scrub Settler	TBD	--	TBD	720-CD- 001 and Carbon 720- CM-012, 013, 014
720-TK-034	Stripped Organic Tank	TBD	--	TBD	720-CD- 001 and Carbon 720- CM-012, 013, 014
720-TK-035	SX Strip Solution Tank	TBD	--	TBD	Demister 720-DM- 035

EU #	Description	Capacity, gal	Throughput	Mfg./ Const. Date	Control Device
720-TK-036	Strip Acid Day Tank	TBD	--	TBD	Demister 720-DM- 036

EUG 6 – Impurity Removal

EU #	Description	Capacity, gal	Throughput, mt/hr (TPH)	Mfg./ Const. Date	Control Device
630-CH-003	Impurity Precipitation Filter Cake Discharge Chute	--	0.05 (0.06)	TBD	None
630-CH-005	Impurity Precipitation 2 Belt Filter Chute	--	0.23 (0.25)	TBD	None
630-FL-006	Impurity Precipitation 1 Filter	--	0.19 (0.21)	TBD	None
630-FL-007	Impurity Precipitation 2 Belt Filter	--	0.77 (0.85)	TBD	None
630-FL-008	Polishing Filter 1	--	7.13 (7.86)	TBD	None
630-FL-009	Polishing Filter 2	--	7.13 (7.86)	TBD	None
630-TK-073	Impurity Removal IX Eluate Tank	TBD	--	TBD	None
730-CH-003	Train 2 Impurity Precipitation Filter Cake Discharge Chute	--	0.05 (0.06)	TBD	None
730-CH-005	Train 2 Impurity Precipitation 2 Belt Filter Chute	--	0.23 (0.25)	TBD	None
730-FL-006	Train 2 Impurity Precipitation 1 Filter	--	0.19 (0.21)	TBD	None
730-FL-007	Train 2 Impurity Precipitation 2 Belt Filter	--	0.77 (0.85)	TBD	None
730-FL-008	Train 2 Polishing Filter 1	--	7.13 (7.86)	TBD	None
730-FL-009	Train 2 Polishing Filter 2	--	7.13 (7.86)	TBD	None
730-TK-073	Train 2 Impurity Removal IX Eluate Tank	TBD	--	TBD	None

EUG 7 – Carbonation

EU #	Description	Throughput, mt/hr (TPH)	Mfg./ Const. Date	Control Device
640-CE-001	Crude LiC Centrifuge 1	18.76 (20.67)	TBD	None
640-CE-002	Crude LiC Centrifuge 2	18.76 (20.67)	TBD	None
740-CE-001	Train 2 Crude LiC Centrifuge 1	18.76 (20.67)	TBD	None
740-CE-002	Train 2 Crude LiC Centrifuge 2	18.76 (20.67)	TBD	None

EUG 8 – Bicarbonation

EU #	Description	Capacity, gal	Throughput, mt/hr (TPH)	Mfg./ Const. Date	Control Device
650-DR-001	Pure LiC Dryer	--	23 (25.35)	TBD	650-BH-002
650-MJ-001	Jet Mill	--	3.2 (3.53)	TBD	650-BH-003
650-CE-002	Pure LiC Centrifuge 2	--	21 (23.14)	TBD	None
650-CE-003	Pure LiC Centrifuge 1	--	21 (23.14)	TBD	None
650-FE-003	Air Mill Feed Screw Conveyor	--	3.2 (3.53)	TBD	650-BH-003
650-HP-005	Pure LiC Hopper	--	3.2 (3.53)	TBD	None
650-MS-001	Pure LiC Magnetic Separator	--	3.2 (3.53)	TBD	650-BH-003
650-RV-020	Pure LiC Dryer Baghouse Rotary Valve	--	3.2 (3.53)	TBD	None
650-TK-124	IX Preheater CIP Tank	TBD	--	TBD	None
650-TK-126	Bicarbonation IX CIP Tank	TBD	--	TBD	None
650-TK-128	Spent IX Acid Waste Buffer Tank	TBD	--	TBD	650-DM-128
650-TK-135	Decarbonation Preheaters CIP Tank	TBD	--	TBD	None
650-XM-003	Bagging Plant Feed Screen Splitter	--	3.2 (3.53)	TBD	None
650-XM-119	Bicarbonation Blanketing Gas Scrubber	--	3,500 scfm exhaust rate	TBD	None
650-XM-145	Pure LiC Air Mill Briquetting Machine	--	3.2 (3.53)	TBD	650-BH-003
750-DR-001	Train 2 Pure LiC Dryer	--	23 (25.35)	TBD	750-BH-002
750-MJ-001	Jet Mill	--	3.2 (3.53)	TBD	750-BH-003
750-CE-002	Train 2 Pure LiC Centrifuge 2	--	21 (23.14)	TBD	None
750-CE-003	Train 2 Pure LiC Centrifuge 1	--	21 (23.14)	TBD	None
750-FE-003	Train 2 Air Mill Feed Screw Conveyor	--	3.2 (3.53)	TBD	750-BH-003
750-HP-005	Train 2 Pure LiC Hopper	--	3.2 (3.53)	TBD	None
750-MS-001	Train 2 Pure LiC Magnetic Separator	--	3.2 (3.53)	TBD	750-BH-003
750-RV-020	Train 2 Pure LiC Dryer Baghouse Rotary Valve	--	3.2 (3.53)	TBD	None
750-TK-124	Train 2 IX Preheater CIP Tank	TBD	--	TBD	None
750-TK-126	Train 2 Bicarbonation IX CIP Tank	TBD	--	TBD	None
750-TK-128	Train 2 Spent IX Acid Waste Buffer Tank	TBD	--	TBD	750-DM-128

EU #	Description	Capacity, gal	Throughput, mt/hr (TPH)	Mfg./Const. Date	Control Device
750-TK-135	Train 2 Decarbonation Preheaters CIP Tank	TBD	--	TBD	None
750-XM-119	Bicarbonation Blanketing Gas Scrubber	--	3,500 scfm exhaust rate	TBD	None
750-XM-003	Train 2 Bagging Plant Feed Screen Splitter	--	3.2 (3.53)	TBD	None
750-XM-145	Train 2 Pure LiC Air Mill Briquetting Machine	--	3.2 (3.53)	TBD	750-BH-003

EUG 9 – Product Handling & Packaging

EU #	Description	Throughput, mt/hr (TPH)	Mfg./Const. Date	Control Device
660-TK-145	Product Silo Baghouse	3.2 (3.53)	TBD	660-BH-001
660-BN-001	Transporter Surge Bin	3.2 (3.53)	TBD	660-DC-001
660-HP-009	Hopper and Filling Unit	3.2 (3.53)	TBD	650-DC-005
660-PK-025	LiC Product Packaging	3.2 (3.53)	TBD	660-SB-004
660-SC-001	Bagging Plant Feed Screens (001, 002, and 003)	3.2 (3.53)	TBD	None
760-TK-145	Train 2 Product Silo	3.2 (3.53)	TBD	760-BH-001
760-BN-001	Train 2 Transporter Surge Bin	3.2 (3.53)	TBD	760-DC-001
760-HP-009	Train 2 Hopper and Filling Unit	3.2 (3.53)	TBD	760-DC-005
760-PK-025	Train 2 LiC Product Packaging	3.2 (3.53)	TBD	760-SB-004
760-SC-001	Train 2 Bagging Plant Feed Screens (001, 002, and 003)	3.2 (3.53)	TBD	None

EUG 10 – Off Spec Re-Treatment

EU #	Description	Throughput, mt/hr (TPH)	Mfg./Const. Date	Control
670-HP-011	Crude LiC Hopper	2.5 (2.76)	TBD	None
670-XM-020	Technical Grade - Rail Car Underpan	3.2 (3.53)	TBD	None

EUG 11 – Salt Storage

EU #	Description	Throughput, mt/hr (TPH)	Mfg./Const. Date
530-CV-011A	ZLD Crystallizer Salt Screw Conveyor	11 (12.12)	TBD
530-CV-013A	Sodium Chloride Crystallizer Salt Screw Conveyor	11 (12.12)	TBD
530-CV-015	Salts Belt Conveyor	22 (24.24)	TBD
530-PFD-183	Salt Stockpile Load	22 (24.24)	TBD
	Salt Pile Storage Losses	N/A	TBD
530-SR-001	Salts Radial Conveyor	22 (24.24)	TBD

EU #	Description	Throughput, mt/hr (TPH)	Mfg./ Const. Date
530-CV-011B	Train 2 ZLD Crystallizer Salt Screw Conveyor	11 (12.12)	TBD
530-CV-013B	Train 2 Sodium Chloride Crystallizer Salt Screw Conveyor	11 (12.12)	TBD

EUG 12 – Ancillary Units

This emission unit group is subdivided into three groups:

- 12A includes tanks containing potable water, process water, wastewater, and raw water. PM Emissions from this group are expected to be negligible.
- 12B includes tanks primarily containing brine or brine-like fluids.
- 12C includes all other ancillary units

EUG 12A

EU #	Description	Contents	Capacity , gal
414-TK-216	Water Treatment Feed Tank	Wastewater	TBD
414-TK-218	Wastewater Surge Tank	Wastewater	TBD
414-TK-219	Wastewater Precipitation Tank 1	Wastewater	TBD
414-TK-220	Wastewater Precipitation Tank 2	Wastewater	TBD
414-TK-221	Wastewater Precipitation Tank 3	Wastewater	TBD
414-TK-222	Wastewater Thickener Feed Tank	Wastewater	TBD
414-TK-223	Wastewater Crystallization Buffer Tank	Wastewater	TBD
414-TK-224	Filter Backwash Tank	Raw water	TBD
414-TK-225	Water Treatment Feed Tank 2	Wastewater	TBD
414-TK-250	ZLD Crystallizer Feed Tank	Wastewater	TBD
414-TK-251	ZLD Crystallizer Centrate Tank	Wastewater	TBD
414-TK-252	ZLD Crystallizer Dump Tank	Wastewater	TBD
414-TK-253	ZLD Crystallizer Wash Water Tank	Wastewater	TBD
414-TK-254	ZLD Crystallizer Seal Water Tank	Demineralized water	TBD
414-TK-260	Sodium Chloride Crystallizer Feed Tank	Process water	TBD
510-TK-188	Soda Ash Dissolution Water Tank	Water	TBD
520-TK-191	Cooled Water Tank	Raw water ⁽¹⁾	TBD
520-TK-192	Chilled Water Tank	Raw water	TBD
520-TK-193	Fire Water Tank	Raw water	TBD
520-TK-195	Plant Condensate Tank	Raw water	TBD
520-TK-197	Demineralized Water Tank	Water	TBD
520-TK-199	Cooled Water Tank	Water	TBD

EU #	Description	Contents	Capacity , gal
520-TK-200	Potable Water Tank	Municipal water	TBD
530-TK-216	Water Treatment Feed Tank 1 -	Raw water	TBD
530-TK-223	Wastewater Crystallization Buffer Tank -	Wastewater	TBD
530-TK-225	Water Treatment Feed Tank 2	Raw water	TBD
530-TK-230	Stormwater Collection Tank 1	Stormwater	TBD
530-TK-231	Stormwater Collection Tank 2	Stormwater	TBD
630-TK-055	Impurity Precipitation 1 Filter Cake Wash Tank	Raw water	TBD
630-TK-056	Impurity Precipitation 1 Filter Cloth Wash Tank	Raw water	TBD
630-TK-066	Impurity Precipitation 2 Belt Filter Cake Wash Tank	Raw water	TBD
630-TK-067	Impurity Precipitation 2 Belt Filter Cloth Wash Tank	Raw water	TBD
630-TK-068	Impurity Precipitation 2 Polishing Filter Cloth Wash Tank	Raw water	TBD
630-TK-076	Impurity Removal IX 1 st Wash Water Tank	Raw water	TBD
630-TK-077	Impurity Removal IX 2 nd Wash Water Tank	Raw water	TBD
640-TK-089	Carbonation Hotwell	Raw water	TBD
640-TK-092	Carbonation Polishing Filter Wash Tank	Raw water	TBD
640-TK-095	Crude LiC Centrifuge Washwater Tank	Raw water	TBD
640-TK-098	Neutralization Surge Tank	Process water	TBD
640-TK-099	Neutralization Reactor 1	Process water	TBD
640-TK-100	Neutralization Reactor 2	Process water	TBD
640-TK-101	Carbonation Condensate Tank	Raw water	TBD
640-TK-102	Carbonation Seal Water Tank	Raw water	TBD
640-TK-103	Carbonation Hot Wash Water Tank	Raw water	TBD
640-TK-131	Decarbonation Polishing Filter Wash Tank	Raw water	TBD
650-TK-120	Bicarbonation Polishing Filter Wash Tank	Raw water	TBD
650-TK-125	Decarbonation Feed Tank	Process water	TBD
650-TK-130	Decarbonation Overflow Liquor Surge Drum	Process water	TBD

EU #	Description	Contents	Capacity , gal
650-TK-132	Decarbonation Main Condensate Receiver	Raw water	TBD
650-TK-136	Pure LiC Centrifuge Demineralized Water Tank	Raw water	TBD
650-TK-137	Decarbonation Centrate Tank	Process water	TBD
650-TK-155	Decarbonate Condensate Tank	Raw water	TBD
650-TK-158	Decarbonated Centrate Surge Tank	Process water	TBD
650-TK-161	Bicarbonation and Decarbonation Seal Water Tank	Raw water	TBD
650-TK-162	Hot Wash Water Tank	Raw water	TBD
650-TK-163	Hot Demineralized Water Surge Tank	Demineralized water	TBD

(1) "Raw water" may encompass municipal water, recycled wastewater, captured stormwater, or condensate from the various processes.

EUG 12B

EU #	Description	Contents	Capacity
414-TK-261	Sodium Chloride Crystallizer Centrate Tank	Weak Sodium Chloride	TBD
414-TK-262	Sodium Chloride Crystallizer Dump Tank	Process water	TBD
414-TK-263	Sodium Chloride Crystallizer Purge Liquor Tank	Weak Sodium Chloride	TBD
510-TK-174	HCl Scrubber Neutralization Tank	Neutralizing Tank	TBD
630-TK-050	Impurity Precipitation 1 Tank 1	Brine	TBD
630-TK-051	Impurity Precipitation 1 Tank 2	Brine	TBD
630-TK-052	Impurity Precipitation 1 Tank 3	Brine	TBD
630-TK-053	Impurity Precipitation 1 Thickener Overflow Tank	Brine	TBD
630-TK-054	Impurity Precipitation 1 Filter Feed Tank	Brine	TBD
630-TK-058	Impurity Precipitation 1 Filtrate Tank	Brine	TBD
630-TK-059	Impurity Precipitation 1 Manifold Flush Drain Tank	Brine	TBD
630-TK-060	Impurity Precipitation 2 Feed Tank	Brine	TBD
630-TK-061	Impurity Precipitation 2 Tank 1	Brine	TBD
630-TK-062	Impurity Precipitation 2 Tank 2	Brine	TBD
630-TK-063	Impurity Precipitation 2 Tank 3	Brine	TBD

EU #	Description	Contents	Capacity
630-TK-064	Impurity Precipitation 2 Belt Filter Feed Tank	Brine	TBD
630-TK-065	Impurity Precipitation 2 Thickener Overflow Tank	Brine	TBD
630-TK-069	Impurity Precipitation 2 Polishing Filter Feed Tank	Brine	TBD
630-TK-070	Impurity Precipitation 2 Polishing Filter Reverse Flush Tank	Brine	TBD
630-TK-071	Impurity Removal IX Feed Tank	Brine	TBD
640-TK-080	Crude LiC Centrifuge Reslurry Tank 1	Brine	TBD
640-TK-085	Carbonation Feed Tank	Brine	TBD
640-TK-096	Strong Brine Tank	Brine solution	TBD
640-TK-097	Weak Brine Tank	Brine solution	TBD
670-TK-153	Bagged Crude LiC Repulping Tank	Brine	TBD
670-TK-154	Technical Grade Repulping Tank 1	Brine	TBD
670-TK-156	Bagged Crude LiC Repulping Tank	Brine	TBD
670-TK-157	Technical Grade Repulping Tank 2	Brine	TBD

EUG 12C

EU #	Description	Contents	Capacity (gal)
510-TK-178	Lime Transfer Tank	Lime slurry	TBD
510-TK-179	Lime Storage Tank	Lime slurry	TBD
510-TK-180	Diatomaceous Earth Mixing Tank 1	DE in slurry	TBD
510-TK-181	Diatomaceous Earth Mixing Tank 2	DE in slurry	TBD
510-TK-182	Diatomaceous Earth Mixing Tank 3	DE in slurry	TBD
510-TK-185	Caustic Soda Storage Tank	Caustic soda	TBD
510-TK-189	Dilute Soda Ash Storage Tank 1	Soda Ash and water	TBD
510-TK-190	Dilute Soda Ash Storage Tank 2	Soda Ash and water	TBD
510-TK-246	Saturated Soda Ash Storage Tank	Soda Ash and water	TBD
630-TK-074	Impurity Removal IX Neutralization Tank	Weak Caustic	TBD
640-TK-086	Carbonation Reactor 1	Brine and Solids	TBD
640-TK-087	Carbonation Reactor 2	Brine and Solids	TBD
640-TK-088	Carbonation Reactor 3	Brine and Solids	TBD
640-TK-090	Carbonation Slurry Holding Tank	Brine and Solids	TBD
640-TK-091	Carbonation Candle Filter Feed Tank	Brine and Solids	TBD

EU #	Description	Contents	Capacity (gal)
640-TK-093	Crude LiC Centrifuge Feed	Brine and Solids	TBD
640-TK-094	Crude LiC Centrifuge Reslurry Tank 2	Brine and Solids	TBD
650-RX-001	Decarbonation Reactors	Brine, lithium bicarbonate, and sodium chloride	TBD
650-RX-002	Decarbonation Reactors	Brine, lithium bicarbonate, and sodium chloride	TBD
650-RX-003	Decarbonation Reactors	Brine, lithium bicarbonate, and sodium chloride	TBD
650-TK-115	Bicarbonation Reactor 1	Lithium Carbonate crystals	TBD
650-TK-116	Bicarbonation Reactor 2	Lithium Carbonate crystals	TBD
650-TK-117	Bicarbonation Reactor 3	Lithium Carbonate crystals	TBD
650-TK-118	Bicarbonation Reactor 4	Lithium Carbonate crystals	TBD
650-TK-119	Bicarbonation Surge Drum	Lithium Carbonate crystals	TBD
650-TK-121	Bicarbonation Solids Re-Slurry Tank	Lithium Carbonate crystals	TBD
650-TK-122	Bicarbonation Filtrate Tank	Lithium Carbonate crystals	TBD
650-TK-123	Bicarbonation Slurry Holding Tank	Lithium Carbonate crystals	TBD
650-TK-127	Spent IX Caustic Waste Buffer Tank	Weak Caustic	TBD
650-TK-133	Decarbonation Product Tank	Lithium Carbonate crystals	TBD
650-TK-134	Fine LiC Repulp Tank	Lithium Carbonate crystals	TBD
650-TK-138	Decarbonation Slurry Holding Tank	Lithium Carbonate crystals	TBD
650-TK-139	Bicarbonation IX CIP Caustic Soda Day Tank	Caustic soda	TBD
660-TK-145	Product Silo	Lithium Crystals	TBD

SECTION IV. EMISSIONS

Emission units (EUs) have been arranged into Emission Unit Groups (EUGs) in the following outline. The potential emissions are assumed using continuous operation (8,760 hrs) unless stated otherwise. All PM emissions estimated under this section are PM₁₀ and PM_{2.5}, conservatively assuming PM_{2.5} and emission PM₁₀ are equal.

EUG 1 – Water Management

Processing Points

Emissions for these points are estimated using process rate and emission factor (EF) from AP-42 (08/82) Table 11.24-2 for “Material Handling and transfer – all minerals except bauxite (SCC 3-03-024-08)”.

$$PM_{10} (TPY) = \left[Process Rate, \frac{mt}{hr} \right] \times \left[\frac{1.102ton}{1mt} \right] \times \left[PM_{10} EF, \frac{lb}{ton} \right] \times \left[\frac{8,760hr}{yr} \right] \times \left[\frac{1ton}{2,000lb} \right]$$

EU #	Process Rate , mt ⁽¹⁾ /hr (TPH)	PM ₁₀ EF	PM _{10/2.5} Emissions	
		lb PM ₁₀ /ton materials	lb/hr	TPY
530-CE-005A	0.49 (0.54)	0.01	0.01	0.02
530-CE-007A	99.1 (109.21)	0.01	1.09	4.78
530-CE-005B	0.49 (0.54)	0.01	0.01	0.02
530-CE-007B	99.1 (109.21)	0.01	1.09	4.78
530-FL-009	36 (39.67)	0.01	0.40	1.73

⁽¹⁾ Metric ton per hour (mt/hr). 1 mt = 1.102 ton.

EUG 2 – Reagents

Processing Points

Emissions from this operation are based on process rate and emission factor from AP-42 (08/82), Section 11.24-2.

EU #	Process Rate ⁽¹⁾	PM ₁₀ EF	PM _{10/2.5} Emissions	
	lb/hr	lb PM ₁₀ /ton materials	lb/hr	TPY
510-FD-013	2,205	0.01	0.01	0.05

⁽¹⁾ Vendor Data, 11/27/2024.

Emissions from this operation are based on annual throughput and emission factor from AP-42 (07/08), Section 5.2-5 for distillate oil No. 2.

EU #	Annual Throughput	VOC EF	Uncontrolled VOC Emissions
	gal/yr	lb VOC/1000 gal	TPY
510-PFD-161	20,000	0.03	<0.001

Tanks

TANKS 5.1 program was used to estimate working and breathing emissions for the following tanks.

EU #	Calculation Method	Content	Throughput	VOC Emissions	HCl Emissions
			gal/day	TPY	TPY
510-TK-187	TANKS 5.1	Diluent	52	0.014	-
510-TK -171	TANKS 5.1	Organic (ESCAID product or similar product)	10	0.001	-
530-TK-217 (Point # Demister 530-DM-217)	TANKS 5.1	HCl	3,170	-	0.28

Control Devices

Emissions from control devices are based on the manufacturer guaranteed outlet concentration.

EU #	510-DC-007	510-DC-008	510-SB-003	710-SB-003	510-SB-006	510-SB-009
Control Device Type	Baghouse for Soda Ash Receiver Bin	Dust Collector for Lime Silo	Scrubber	Scrubber	Scrubber	Vent Quencher
Controlling Units	510-BN-007	510-BN-010	510-XM-174 510-CV-041	710-XM-174 710-CV-041	510-TK-172 510-TK-173	510-TK-241A and B 510-TK-242A and B 510-TK-243A and B 510-TK-244A and B
Emission Calculation Methods	Mass Balance	Mass Balance	Mass Balance	Mass Balance	Mass Balance	Mass Balance
Flow Rate, scf/h	93,325	156,000	18,000	18,000	86,521	102,630
Manufacturer Guarantee Outlet	0.005 gr/dscf	0.015 gr/dscf	0.005 gr/dscf	0.005 gr/dscf	10 ppm HCL	0.01 gr/dscf
Safety Factor, %	N/A	NA	N/A	N/A	250	N/A
Total Controlled PM_{10/2.5} Emissions, TPY	0.29	1.46	0.56	0.56	-	6.42
Total Controlled HCl Emissions, TPY	-		-	-	1.21	-

EUG 3 – Plant Services

Cooling Tower

Emissions from cooling tower are estimated using following equation.

$$PM\ rate\ \left(\frac{lb}{hr}\right) = F \times TDS \times DR \times C \times D \times \left(60\ \frac{min}{hr}\right) \times \frac{1}{1,000,000} \times \frac{1}{100\ \%}$$

- F = flow rate, gpm
- TDS = total dissolved solids, ppm
- C = cycle of concentration
- DR = drift rate, %
- D = density of water, lb/gal

EU #	Flow Rate	Total Dissolved Solids ⁽¹⁾	Cycle of Concentration	Drift Rate ⁽¹⁾	PM _{10/2.5} Emissions
	gpm	ppm	-	%	TPY
520-PK-047	2,200	7,500	5	0.005	3.17 ⁽²⁾

⁽¹⁾ Based on Engineering Thermal Equipment Proposal, 11/4/2024.

⁽²⁾ PM_{10/2.5} emissions included 75% safety factor.

Boilers

Emissions of NO_x and CO from the gas-fired boilers are based on the manufacturer’s guarantees. Emissions of VOC, SO₂, and PM₁₀ are estimated using emission factors from AP-42 (7/98) Table 1.4-2 and the heat inputs (49 MMBTUH each boiler).

Pollutant	EF Reference	EF
NO _x	Manufacturer’s Guarantee Data	9 ppm
CO	Manufacturer’s Guarantee Data	10 ppm
VOC	AP-42, Table (7/98), Table 1.4-2	5.5 lb/MMSCF
SO ₂	AP-42, Table (7/98), Table 1.4-2	0.6 lb/MMSCF
PM ₁₀	AP-42, Table (7/98), Table 1.4-2	7.6 lb/MMSCF

Pollutant	Emission (each) ⁽¹⁾		Total Emissions ⁽²⁾
	lb/hr	TPY	TPY
NO _x	0.72	3.15	6.30
CO	0.49	2.13	4.26
VOC	0.31	1.36	2.72
SO ₂	0.03	0.15	0.30
PM ₁₀	0.43	1.88	3.76

⁽¹⁾ Emission plus 15% safety factor.

⁽²⁾ Total emissions of two boilers.

Emergency Engines

NO_x, CO, VOC, and PM₁₀ emissions from the emergency diesel-fired engine are estimated using NSPS Subpart IIII Tier 2 engine standards. The SO₂, and formaldehyde are estimated based on

emission factors from AP-42 (08/00), Table 3.3-1 and 3.3-2. All emissions are estimated based on 500 hrs/yr of operation. The engines are rated at 2,500-eKW (3,650-HP).

Pollutant	EF	Emissions (each)		Total Emissions ⁽¹⁾
	g/kW-hr	lb/hr	TPY	TPY
NO _x + NMHC ⁽²⁾	6.08	33.48	8.37	66.96
CO	3.50	19.27	4.82	38.55
VOC ⁽³⁾	0.32	1.76	0.44	3.52
PM ₁₀	0.20	1.10	0.28	2.20
SO ₂	2.05 E-03 lb/hp-hr	7.48	1.87	14.97
H ₂ CO	1.18 E-03 lb/MMBTUH	0.01	<0.01	0.02

- (1) Total emissions for eight engines.
- (2) For diesel-fired engines with emission factors as combined NO_x + NMHC, TCEQ guidance used fraction of 0.95 for NO_x and 0.05 for NMHC (VOC). For Tier 2 engines the NO_x + NMHC emission factor is 6.40 g/kW-hr, which means 6.08 g/kW-hr of NO_x and 0.32 g/kW-hr for NMHC (VOC).
- (3) VOC emissions do not include H₂CO.

Fuel Storage

Tanks 5.1 program was used to estimate working and breathing emissions for the following tanks.

EU #	Calculation Method	Content	Throughput	VOC Emissions
			gal/yr	TPY
510-TK-100	TANKS 5.1	Gasoline	45,000	0.08
510-TK-101	TANKS 5.1	Diesel	7,000	<0.001

EUG 4 – Brine Storage and Feed

TANKS 5.1 program was used to estimate working and breathing emissions for the following tanks. Brine vapor pressure (less than 0.5 psia) is less than that of water. The demisters associated with tanks (620-TK-009, 630-TK-75, and 730-TK-75) are used to maintain water within the tank as it contains the lithium that is being recovered.

EU #	Calculation Method	Content	Throughput	VOC Emissions
			gal/yr	TPY
610-TK-005	TANKS 5.1	Brine/Solvent	642,290	0.026
610-TK-006	TANKS 5.1	Brine/Solvent	642,290	0.026
610-TK-007	TANKS 5.1	Brine/Solvent	642,290	0.026
610-TK-008	TANKS 5.1	Brine/Solvent	642,290	0.026
710-TK-005	TANKS 5.1	Brine/Solvent	642,290	0.026
710-TK-006	TANKS 5.1	Brine/Solvent	642,290	0.026
710-TK-007	TANKS 5.1	Brine/Solvent	642,290	0.026
710-TK-008	TANKS 5.1	Brine/Solvent	642,290	0.026
620-TK-009 (Point # Demister 620-DM-009)	TANKS 5.1	Brine/Solvent	24,762	0.001

EU #	Calculation Method	Content	Throughput	VOC Emissions
			gal/yr	TPY
630-TK-075 (Point # Demister 630-DM-0075)	TANKS 5.1	Brine/Solvent	9,632	<0.001
730-TK-075 (Point # Demister 730-DM-075)	TANKS 5.1	Brine/Solvent	9,632	<0.001

EUG 5 – Brine Solvent Extraction

Processing Points

Emissions from this operation are based on process rate and emission factor from AP-42 (08/82), Section 11.24-2.

$$PM_{10} (TPY) = \left[Process Rate, \frac{mt}{hr} \right] \times \left[\frac{1.102ton}{1mt} \right] \times \left[PM_{10} EF, \frac{lb}{ton} \right] \times \left[\frac{8,760hr}{yr} \right] \times \left[\frac{1ton}{2,000lb} \right]$$

EU #	Process Rate	PM ₁₀ EF	PM _{10/2.5} Emissions
	mt ⁽¹⁾ /hr (TPH)	lb PM ₁₀ /ton materials	TPY
620-FL-003	0.35 (0.39)	0.05	0.72

⁽¹⁾ Metric ton per hour (mt/hr). 1 mt = 1.102 ton.

VOC emissions are based on the losses through vapor displacement on the unit. The METSIM modeling program and organic vapor partial pressure data are used to calculate the potential concentration of organic in the vapor space.

$$VOC (TPY) = \left[VOC EF, \frac{g}{discharge\ event} \right] \times \left[\frac{1\ discharge\ event}{day} \right] \times \left[\frac{365\ days}{yr} \right] \times \left[\frac{1\ lb}{454\ g} \right] \times \left[\frac{1\ ton}{2,000lb} \right]$$

EU #	VOC EF ⁽¹⁾	# of Event ⁽²⁾	VOC Emissions
	g/discharge	discharge/day	TPY
620-FL-003	0.05	1	0.03

⁽¹⁾ Based on METSIM modeling program, it is estimated that the vent space contains 13 g VOC/m³ and 6 m³ displacement/discharge. This results in 78 g VOC/discharge.

⁽²⁾ The discharge event happens approximately one hour each day.

Tanks

TANKS 5.1 program was used to estimate working and breathing emissions for the following tanks.

EU #	Calculation Method	Content	Throughput	VOC Emissions	HCl Emissions
			gal/yr	TPY	TPY
620-TK-020	TANKS 5.1	Brine/Solvent	46,300,000	0.10	-
620-TK-021	TANKS 5.1	Brine/Solvent	46,300,000	0.10	-
620-TK-034	TANKS 5.1	Nonane	78,700,000	0.89	-
620-TK-035 (Point # Demister 620-DM-035)	TANKS 5.1	Brine/Solvent	1,200,000	<0.001	-
620-TK-036 (Point # Demister 620-DM-036)	TANKS 5.1	Dilute HCl	1,200,000	-	0.681
620-TK-038	TANKS 5.1	Nonane	12,000	0.002	
620-TK-039	TANKS 5.1	Nonane	46,000	0.004	
720-TK-020	TANKS 5.1	Brine/Solvent	46,300,000	0.10	-
720-TK-021	TANKS 5.1	Brine/Solvent	46,300,000	0.10	-
720-TK-034	TANKS 5.1	Nonane	78,700,000	0.89	-
720-TK-035 (Point # Demister 720-DM-035)	TANKS 5.1	Brine/Solvent	1,200,000	<0.001	-
720-TK-036 (Point # Demister 720-DM-036)	TANKS 5.1	Dilute HCl	1,200,000	-	0.681

Control Devices

Emissions from control devices are based on the manufacture guaranteed outlet concentration.

EU #	620-CD-001 and 620-CM-012/013/014	720-CD-001 and 720-CM-012/013/014
Control Device Type	Condenser and Carbon Columns	Condenser and Carbon Column
Controlling Units	620-TK-010 through 620-TK-018 and 620-TK-022 through 620-TK-034	720-TK-010 through 720-TK-018 and 720-TK-022 through 720-TK-034
Emission Calculation Methods	Manufacturer outlet's guarantee	Manufacturer outlet's guarantee
Flow Rate, scfm	4,709	4,709
Instrumentation	Conductivity to indicate breakthrough	Conductivity to indicate breakthrough
Manufacturer Guarantee Outlet	<0.5 ppm VOC	<0.5 ppm VOC
Safety Factor, %	300	300
Controlled VOC Emissions, TPY	0.72	0.72
Controlled HCl Emissions⁽¹⁾, TPY	0.072	0.072

⁽¹⁾ HCl is estimated at 10% of VOC values.

EUG 6 – Impurity Removal

Processing Points

Emissions from this operation are based on process rate and emission factor from AP-42 (08/82), Section 11.24-2.

$$PM_{10} (TPY) = \left[Process Rate, \frac{mt}{hr} \right] \times \left[\frac{1.102ton}{1mt} \right] \times \left[PM_{10} EF, \frac{lb}{ton} \right] \times \left[\frac{8,760hr}{yr} \right] \times \left[\frac{1ton}{2,000lb} \right]$$

EU #	Process Rate, mt ⁽¹⁾ /hr (TPH)	PM ₁₀ EF	PM _{10/2.5} Emissions	
		lb PM ₁₀ /ton materials	lb/hr	TPY
630-CH-003	0.05 (0.06)	0.01	5.51E-04	2.41E-03
630-CH-005	0.23 (0.25)	0.01	2.53E-03	0.01
630-FL-006	0.19 (0.21)	0.01	2.09E-03	9.17E-03
630-FL-007	0.77 (0.85)	0.01	8.49E-03	0.04
630-FL-008	7.13 (7.86)	0.01	0.08	0.34
630-FL-009	7.13 (7.86)	0.01	0.08	0.34
730-CH-003	0.05 (0.06)	0.01	5.51E-04	2.41E-03
730-CH-005	0.23 (0.25)	0.01	2.53E-03	0.01
730-FL-006	0.19 (0.21)	0.01	2.09E-03	9.17E-03
730-FL-007	0.77 (0.85)	0.01	8.49E-03	0.04
730-FL-008	7.13 (7.86)	0.01	0.08	0.34
730-FL-009	7.13 (7.86)	0.01	0.08	0.34

⁽¹⁾ Metric ton per hour (mt/hr). 1 mt = 1.102 ton.

Tanks

The following processing tanks' emissions are estimated using ideal gas law.

EU #	Calculation Method	Content	Throughput	HCl Emissions
			gal/yr	TPY
630-TK-073	Ideal Gas Law	50g/L Dilute HCl	92,600,000	2.35
730-TK-073	Ideal Gas Law	50g/L Dilute HCl	92,600,000	2.35

EUG 7 – Carbonation

Processing Points

Emissions from this operation are based on process rate and emission factor from AP-42 (08/82), Section 11.24-2.

$$PM_{10} (TPY) = \left[Process Rate, \frac{mt}{hr} \right] \times \left[\frac{1.102ton}{1mt} \right] \times \left[PM_{10} EF, \frac{lb}{ton} \right] \times \left[\frac{8,760hr}{yr} \right] \times \left[\frac{1ton}{2,000lb} \right]$$

EU #	Process Rate, mt ⁽¹⁾ /hr (TPH)	PM ₁₀ EF	PM _{10/2.5} Emissions	
		lb PM ₁₀ /ton materials	lb/hr	TPY
640-CE-001	18.76 (20.67)	0.01	0.21	0.91
640-CE-002	18.76 (20.67)	0.01	0.21	0.91
740-CE-001	18.76 (20.67)	0.01	0.21	0.91
740-CE-002	18.76 (20.67)	0.01	0.21	0.91

⁽¹⁾ Metric ton per hour (mt/h). 1 mt = 1.102 ton.

EUG 8 – Bicarbonation

Processing Points

Emissions from this operation are based on process rate and emission factor from AP-42 (08/82), Section 11.24-2.

$$PM_{10} (TPY) = \left[Process Rate, \frac{mt}{hr} \right] \times \left[\frac{1.102ton}{1mt} \right] \times \left[PM_{10} EF, \frac{lb}{ton} \right] \times \left[\frac{8,760hr}{yr} \right] \times \left[\frac{1ton}{2,000lb} \right]$$

EU #	Process Rate, mt ⁽¹⁾ /hr (TPH)	PM ₁₀ EF	PM _{10/2.5} Emissions	
		lb PM ₁₀ /ton materials	lb/hr	TPY
650-CE-002	20.98 (23.12)	0.01	0.35	1.52
650-CE-003	20.98 (23.12)	0.01	0.35	1.52
750-CE-002	20.98 (23.12)	0.01	0.35	1.52
750-CE-003	20.98 (23.12)	0.01	0.35	1.52
650-RV-020	3.20 (3.53)	0.01	0.04	0.15
650-HP-005	3.20 (3.53)	0.01	0.04	0.15
650-XM-003	3.20 (3.53)	0.01	0.04	0.15
750-RV-020	3.20 (3.53)	0.01	0.04	0.15
750-HP-005	3.20 (3.53)	0.01	0.04	0.15
750-XM-003	3.20 (3.53)	0.01	0.04	0.15

⁽¹⁾ Metric ton per hour (mt/hr). 1 mt = 1.102 ton.

Control Devices

Emissions from control devices are based on the manufacturer guaranteed outlet concentration.

EU #	650-XM-119	650-BH-002	650-BH-003
Control Device Type	Scrubber	Baghouse	Baghouse
Controlling Units	640-TK-086 – 088, 650-TK-115 – 118 650-RX-001 – 003; and CO ₂ recovery	650-DR-001 ⁽¹⁾	650-FE-003 650-MJ-001 650-XM-145 650-MS-001
Emission Calculation Methods	N/A	Manufacturer outlet’s guarantee	Manufacturer outlet’s guarantee
Flow Rate, scf/h	N/A	716,736	671,940
Manufacturer Guarantee Outlet	N/A	0.005 gr/dscf	0.005 gr/dscf
Safety Factor, %	N/A	N/A	N/A
Total Controlled PM_{10/2.5} Emissions, TPY	N/A ⁽²⁾	2.24	2.10

⁽¹⁾ The dryer is heated by steam supplied from the boilers, which passes through a heat exchanger.

⁽²⁾ This scrubber is used for CO₂ recovery. This unit will have no particulate emissions.

EU #	750-XM-119	750-BH-002	750-BH-003
Control Device Type	Scrubber	Baghouse	Baghouse
Controlling Units	CO ₂ recovery	750-DR-001 ⁽¹⁾	750-FE-003 750-MJ-001 750-MS-001 750-XM-145
Emission Calculation Methods	N/A	Manufacturer outlet’s guarantee	Manufacturer outlet’s guarantee
Flow Rate, scf/h	N/A	716,736	671,940
Manufacturer Guarantee Outlet	N/A	0.005 gr/dscf	0.005 gr/dscf
Safety Factor, %	N/A	N/A	N/A
Total Controlled PM_{10/2.5} Emissions, TPY	N/A ⁽²⁾	2.24	2.10

⁽¹⁾ The dryer is heated by steam supplied from the boilers, which passes through a heat exchanger.

⁽²⁾ This scrubber is used for CO₂ recovery. This unit will have no particulate emissions.

Tanks

The following processing tanks’ emissions are estimated using ideal gas law.

EU #	650-TK-124	650-TK-126	650-TK-128	650-TK-135
No. of Tanks	1	1	1	1
Emission Rate	4.19 lb/event	5.7 lb/event	0.13 lb/hr	1.87 lb/event
Number of events	52	52	N/A	52
Annual operating hours, hr	N/A	N/A	8,760	N/A

EU #	650-TK-124	650-TK-126	650-TK-128	650-TK-135
No. of Tanks	1	1	1	1
Liquid in Tank(s)	HCl Solution	HCl Solution	HCl Solution	HCl Solution
Emission Calculation Methods	Ideal Gas Law, assumption of headspace refilled/emptied 10 times per event ⁽¹⁾	Ideal Gas Law, assumption of headspace refilled/emptied 10 times per event ⁽¹⁾	Ideal Gas Law, assumption of 30% vapor is emitted every hour	Ideal Gas Law, assumption of headspace refilled/emptied 10 times per event ⁽¹⁾
Safety Factor	50%	50%	50%	50%
Controlled?	No	No	650-DM-128	No
Total HCl Emissions, TPY	0.16⁽²⁾	0.22	0.57⁽²⁾	0.07⁽²⁾

⁽¹⁾ An event is a weekly maintenance of the overall system.

⁽²⁾ Annual emissions included 50% safety factor.

EU #	750-TK-124	750-TK-126	750-TK-128	750-TK-135
No. of Tanks	1	1	1	1
Emission Rate	4.19 lb/event	5.7 lb/event	0.13 lb/hr	1.87 lb/event
Number of events	52	52	N/A	52
Annual operating hours, hr	N/A	N/A	8,760	N/A
Liquid in Tank(s)	HCl Solution	HCl Solution	HCl Solution	HCl Solution
Emission Calculation Methods	Ideal Gas Law, assumption of headspace refilled/emptied 10 times per event ⁽¹⁾	Ideal Gas Law, assumption of headspace refilled/emptied 10 times per event ⁽¹⁾	Ideal Gas Law, assumption of 30% vapor is emitted every hour	Ideal Gas Law, assumption of headspace refilled/emptied 10 times per event ⁽¹⁾
Safety Factor	50%	50%	50%	50%
Controlled?	No	No	750-DM-128	No
Total HCl Emissions, TPY	0.16⁽²⁾	0.22	0.57⁽²⁾	0.07⁽²⁾

⁽¹⁾ An event is a weekly maintenance of the overall system.

⁽²⁾ Annual emissions included 50% safety factor.

EUG 9 – Product Handling & Packaging

Processing Points

Emissions from this operation are based on process rate and emission factor from AP-42 (08/82), Section 11.24-2.

$$PM_{10} (TPY) = \left[\text{Process Rate, } \frac{mt}{hr} \right] \times \left[\frac{1.102ton}{1mt} \right] \times \left[PM_{10} EF, \frac{lb}{ton} \right] \times \left[\frac{8,760hr}{yr} \right] \times \left[\frac{1ton}{2,000lb} \right] \times [\# \text{ drop point}]$$

EU #	Process Rate	PM ₁₀ EF	No. of Drop Points	PM _{10/2.5} Emissions	
	mt ⁽¹⁾ /hr (TPH)	lb PM ₁₀ /ton materials		lb/hr	TPY
660-SC-001	3.20 (3.53)	0.01	3	0.11	0.46

EU #	Process Rate	PM ₁₀ EF	No. of Drop Points	PM _{10/2.5} Emissions	
	mt ⁽¹⁾ /hr (TPH)	lb PM ₁₀ /ton materials		lb/hr	TPY
660-HP-009	3.20 (3.53)	0.01	2	0.07	0.31
760-SC-001	3.20 (3.53)	0.01	3	0.11	0.46
760-HP-009	3.20 (3.53)	0.01	2	0.07	0.31

⁽¹⁾ Metric ton per hour (mt/hr). 1 mt = 1.102 ton.

Control Devices

Emissions from control devices are based on the manufacturer guaranteed outlet concentration.

EU #	660-BH-001	660-DC-001	660-DC-005	660-SB-004
Control Device Type	Baghouse	Dust Collector/ Baghouse	Dust Collector/ Baghouse	Scrubber
Controlling Units	660-TK-145	660-BN-001	660-HP-009	660-PK-025
Inlet Rate	N/A	N/A	N/A	0.42 mt/hr
Emission Calculation Methods	Manufacturer outlet's guarantee	Manufacturer outlet's guarantee	Manufacturer outlet's guarantee	Manufacturer outlet's guarantee
Flow Rate, scf/h	18,665	93,325	37,330	
Control Efficiency, %	N/A	N/A	N/A	99.9
Manufacturer Guarantee Outlet	0.005 gr/dscf	0.005 gr/dscf	0.005 gr/dscf	N/A
Total Controlled PM_{10/2.5} Emissions, TPY	0.06	0.29	0.12	4.05

EU #	760-BH-001	760-DC-001	760-DC-005	760-SB-004
Control Device Type	Baghouse	Dust Collector/ Baghouse	Dust Collector/ Baghouse	Scrubber
Controlling Units	760-TK-145	760-BN-001	760-HP-009	760-PK-025
Inlet Rate	N/A	N/A	N/A	0.42 mt/hr
Emission Calculation Methods	Mass Balance	Mass Balance	Mass Balance	Mass Balance
Flow Rate, scf/h	18,665	93,325	37,330	
Control Efficiency, %	N/A	N/A	N/A	99.9
Manufacturer Guarantee Outlet	0.005 gr/dscf	0.005 gr/dscf	0.005 gr/dscf	N/A
Total Controlled PM_{10/2.5} Emissions, TPY	0.06	0.29	0.12	4.05

EUG 10 – Off Spec Re-Treatment

Processing Points

Emissions from this operation are based on process rate and emission factor from AP-42 (08/82), Section 11.24-2.

$$PM_{10} (TPY) = \left[Process Rate, \frac{mt}{hr} \right] \times \left[\frac{1.102ton}{1mt} \right] \times \left[PM_{10} EF, \frac{lb}{ton} \right] \times \left[\frac{8,760hr}{yr} \right] \times \left[\frac{1ton}{2,000lb} \right]$$

EU	Process Rate	PM ₁₀ EF	PM _{10/2.5} Emissions	
	mt ⁽¹⁾ /hr (TPH)	lb PM ₁₀ /ton materials	lb/hr	TPY
670-HP-011	2.50 (2.76)	0.01	0.03	0.12
670-XM-020	3.20 (3.53)	0.01	0.04	0.15

⁽¹⁾ Metric ton per hour (mt/h). 1 mt = 1.102 ton.

EUG 11 - Salt Storage

Processing Points

Emissions from these points are based on process rate and emission factors from AP-42 (08/82), Section 11.24-2 and Webfire EF (SCC 30501607).

$$PM (TPY) = \left[Process Rate, \frac{mt}{hr} \right] \times \left[\frac{1.102ton}{1mt} \right] \times \left[EF, \frac{lb}{ton} \right] \times \left[\frac{8760hr}{yr} \right] \times \left[\frac{1ton}{2,000lb} \right]$$

EU #	Process Rate	PM ₁₀ EF	PM _{10/2.5} Emissions	
	mt/hr (TPH)	lb PM ₁₀ /ton materials	lb/hr	TPY
530-CV-011A	0.54 (0.60)	0.01 ⁽¹⁾	0.01	0.03
530-CV-013A	18 (19.84)	0.01 ⁽¹⁾	0.20	0.87
530-CV-015	36 (39.67)	0.018 ⁽²⁾	0.89 ⁽³⁾	3.91 ⁽³⁾
530-SR-001	36 (39.67)	0.018 ⁽²⁾	1.07 ⁽⁴⁾	4.69 ⁽⁴⁾
530-CV-011B	0.54 (0.60)	0.01 ⁽¹⁾	0.01	0.03
530-CV-013B	18 (19.84)	0.01 ⁽¹⁾	0.20	0.87

⁽¹⁾ Emission factor from AP-42 (08/82) Table 11.24-2.

⁽²⁾ Webfire emission factor (SCC 30501607).

⁽³⁾ Emissions included 25% safety factor.

⁽⁴⁾ Emissions included 50% safety factor.

Salt Stockpile

Emissions from these points are based on process rate and PM emission factor.

EU #	Description	Process Rate	PM EF	PM _{10/2.5} Emissions	
		mt/hr (TPH)	lb PM/ ton solid	lb/hr	TPY
530-PFD-183	Salt Stockpile Load	36 (39.67)	0.10 ⁽¹⁾	2.80	12.24
	Salt Pile Storage Losses	-	Calculated annually ⁽²⁾	-	1.53

- (1) Emission factor from AP-42 (11/06) Section 13.2.4 Equation 1 with $k = 0.35$ for $<10\mu\text{m}$, $M = 15\%$, and $U = 9.8$ mph average wind speed (highest for 2024). In addition, there is a reduction of 30% on the emission factor due to crystalline nature and cover of the drop zone.
- (2) Using AP-42 13.2.4, Muskogee daily average wind data, assuming a 50 foot tall pile, conically formed using angle of repose of salt, and average salt moisture content of 2.5%. This annual value includes a 500% safety factor and does not take into account the cover that is intended for this pile.

EUG 12: Ancillary Units

The emissions from these tanks are assumed to be maximum of 5 TPY for VOC and $\text{PM}_{10/2.5}$ since these tanks mainly store or process water, wastewater, or brine.

Facility-Wide Emissions

The following table shows facility-wide emissions based on the emissions calculations described above. The applicant has requested minor source emissions limits below major source levels.

Facility-Wide Controlled Emissions

EUG	NO _x	CO	VOC	PM _{10/2.5}	SO ₂	HAP
	TPY	TPY	TPY	TPY	TPY	TPY
1	-	-	-	11.33	-	-
2	-	-	0.02	9.34	-	1.49
3	73.26	42.81	6.32	9.13	15.27	0.02
4	-	-	0.21	-	-	-
5	-	-	2.94	0.72	-	1.51
6	-	-	-	1.48	-	4.70
7	-	-	-	3.64	-	-
8	-	-	-	15.66	-	2.04
9	-	-	-	10.58	-	-
10	-	-	-	0.27	-	-
11	-	-	-	24.17	-	-
12	-	-	5.00	5.00	-	-
Totals	73.26	42.81	14.49	91.32	15.27	9.76

Facility-Wide Controlled HAPs Emissions

HAP	Emissions
	TPY
Formaldehyde	0.02
HCl	9.73
Total	9.76

SECTION V. OKLAHOMA AIR POLLUTION CONTROL RULES

OAC 252:100-1 (General Provisions)

[Applicable]

Subchapter 1 includes definitions but there are no regulatory requirements.

OAC 252:100-2 (Incorporation by Reference) [Applicable]
This subchapter incorporates by reference applicable provisions of Title 40 of the Code of Federal Regulations. These requirements are addressed in the “Federal Regulations” section.

OAC 252:100-3 (Air Quality Standards and Increments) [Applicable]
Primary Standards are in Appendix E and Secondary Standards are in Appendix F of the Air Pollution Control Rules. At this time, all of Oklahoma is in attainment of these standards.

OAC 252:100-5 (Registration, Emissions Inventory and Annual Operating Fees) [Applicable]
Subchapter 5 requires sources of air contaminants to register with Air Quality, file emission inventories annually, and pay annual operating fees based upon total annual emissions of regulated pollutants. Required annual information (Turn-Around Document) shall be provided to Air Quality by April 1st every year.

OAC 252:100-7 (Permits for Minor Facilities) [Applicable]
This facility qualifies as a synthetic minor source because the uncontrolled emissions have the potential to exceed 100 TPY for the criteria pollutant and uncontrolled HAP emissions have the potential to exceed 10 TPY for any one HAP and 25 TPY for any aggregate of HAP.

OAC 252:100-9 (Excess Emissions Reporting Requirements) [Applicable]
Except as provided in OAC 252:100-9-7(a)(1), the owner or operator of a source of excess emissions shall notify the Director as soon as possible but no later than 4:30 p.m. the following working day of the first occurrence of excess emissions in each excess emission event. No later than thirty (30) calendar days after the start of any excess emission event, the owner or operator of an air contaminant source from which excess emissions have occurred shall submit a report for each excess emission event describing the extent of the event and the actions taken by the owner or operator of the facility in response to this event. Request for mitigation, as described in OAC 252:100-9-8, shall be included in the excess emission event report. Additional reporting may be required in the case of ongoing emission events and in the case of excess emissions reporting required by 40 CFR Parts 60, 61, or 63.

OAC 252:100-13 (Open Burning) [Applicable]
Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in this subchapter.

OAC 252:100-19 (Particulate Matter (PM)) [Applicable]
Section 19-4 regulates emissions of PM from new and existing fuel-burning equipment. Particulate emission limits are based on maximum design heat input rating, as described in Appendix C.

Appendix C specifies a PM emission limitation of 0.60 lb/MMBTU for all equipment with a heat input rating of 10 MMBTUH or less. For equipment with rated heat input greater than 10 but less than 1,000 MMBTUH, the PM limit is calculated using the equation from OAC 252:100 Appendix C, which is listed below.

$$E = 1.0428080X^{(-0.238561)}$$

Where:

E = allowable total particulate matter emissions in pounds per MMBTH

X = the maximum heat input in MMBTU

For boilers, AP-42 (7/98), Table 1.4-2 lists PM emission factors for natural gas-fired small heater to be 7.6 lbs/MMSCF or about 0.0076 lbs/MMBTU, which shows all units to be in compliance. For emergency generator, the PM emission factors are based on AP-42 (7/00) Table 3.2-3.

EU #	Description	Heat Rate	Appendix C PM ₁₀ Limitation	Potential PM ₁₀ Emissions
		MMBTUH	lb/MMBTU	lb/MMBTU
520-BO-001	Boiler	49	0.43	0.0076
520-BO-002	Boiler	49	0.43	0.0076
520-ENG-1	Cat3516 C	8.53	0.60	0.02
520-ENG-2	Cat3516 C	8.53	0.60	0.02
520-ENG-3	Cat3516 C	8.53	0.60	0.02
520-ENG-4	Cat3516 C	8.53	0.60	0.02
520-ENG-5	Cat3516 C	8.53	0.60	0.02
520-ENG-6	Cat3516 C	8.53	0.60	0.02
520-ENG-7	Cat3516 C	8.53	0.60	0.02
520-ENG-8	Cat3516C	8.53	0.60	0.02

Section 19-12 limits particulate emissions from new and existing directly fired fuel-burning units (and/or) emission points in an industrial process based on process weight rate, as specified in Appendix G.

For emission points with process rate less than 100 lb/hr or 0.05 TPH, the EU is exempted from this requirement. The EUs listed in the table are exempted since each point has a process rate less than 0.05 TPH.

EU #	Process Rate	Appendix G PM ₁₀ Limitation
	TPH	lb/hr
630-CH-003	0.04	0.51
630-FL-006	0.04	0.51
730-CH-003	0.04	0.51
730-FL-006	0.04	0.51

For emission points with process rate of 30 TPH or less, the allowable PM₁₀ emission rate is calculated with following equation.

$$E = 4.10P^{0.67}$$

Where:

E = allowable total particulate matter emissions in pounds per hour
 P = process weight rate in tons per hour (TPH)

EU #	Process Rate	Appendix G PM ₁₀ Limitation	Potential PM ₁₀ Emissions
	TPH	lb/hr	lb/hr
530-CE-005A	0.51	2.60	0.05
530-CE-007A	19.95	30.46	0.40
530-CE-005B	0.51	2.60	0.05
530-CE-007B	19.95	30.46	0.40
530-CV-011A	0.60	2.90	0.01
530-CV-013A	19.84	30.34	0.20
530-CV-011B	0.60	2.90	0.01
530-CV-013B	19.84	30.34	0.20
510-BN-010	0.07	0.68	0.41
510-FD-013	1.10	4.38	0.01
620-FL-003	0.17	1.23	0.17
630-CH-005	0.17	1.23	0.17
630-FL-007	0.17	1.23	0.17
630-FL-008 & 630-FL-009	15.73	25.97	0.16 (each)
730-CH-005	0.17	1.23	0.17
730-FL-007	0.17	1.23	0.17
730-FL-008 & 730-FL-009	15.73	25.97	0.16 (each)
640-CE-001	3.50	9.50	0.35
640-CE-002	3.50	9.50	0.35
740-CE-001	3.5	9.50	0.35
740-CE-002	3.5	9.50	0.35
650-CE-002	3.47	9.44	0.35
650-CE-003	3.47	9.44	0.35
750-CE-002	3.47	9.44	0.35
750-CE-003	3.47	9.44	0.35
650-RV-020	3.53	9.54	0.04
650-HP-005	3.53	9.54	0.04
650-XM-003	3.53	9.54	0.04
750-RV-020	3.53	9.54	0.04
750-HP-005	3.53	9.54	0.04
750-XM-003	3.53	9.54	0.04
660-SC-001	3.53	9.54	0.11
760-SC-001	3.53	9.54	0.11
670-HP-011	0.72	3.28	2.75
670-XM-020	3.53	9.54	0.03

For emission points with process rate greater than 30 TPH, the allowable PM₁₀ emission rate is calculated with following equation.

$$E = (55.00 \times P^{0.11}) - 40$$

Where:

E = allowable total particulate matter emissions in pounds per hour

P = process weight rate in tons per hour (TPH)

EU #	Process Rate	Appendix G PM ₁₀ Limitation	Potential PM ₁₀ Emissions
	TPH	lb/hr	lb/hr
530-CV-015	39.67	42.45	0.89
530-SR-001	39.67	42.45	1.07
530-FL-009	39.67	42.45	0.40
530-PFD-183	39.67	42.45	2.80
520-PK-047	650.52 ⁽¹⁾	72.16	0.72

⁽¹⁾ Process rate of cooling tower based on 2,600 gpm and water density of 8.34 lb/gal.

The projected PM₁₀ emission rates for the EUs listed above do not exceed the allowable emission rates.

OAC 252:100-25 (Visible Emissions and Particulates) [Applicable]
 No discharge of greater than 20% opacity is allowed except for short-term occurrences that consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity. Units subject to an opacity limit promulgated under section 111 of the Federal Clean Air Act are exempt from this section. The eight diesel-fired emergency generators are subject to the smoke opacity standards in 40 CFR §1039.105, therefore, all engines are exempted from this section. The gas-fired boilers at this facility are subject to this section. When burning natural gas there is little possibility of exceeding the opacity standards; therefore, no specific monitoring is required.. The permit will require that fuel-burning units be fueled only with natural gas and/or ULSD diesel to ensure compliance with these requirements.

OAC 252:100-29 (Fugitive Dust) [Applicable]
 No person shall cause or permit the discharge of any visible fugitive dust emissions beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or interfere with the maintenance of air quality standards. Under normal operating conditions, this facility will not cause a problem in this area, therefore it is not necessary to require specific precautions to be taken.

OAC 252:100-31 (Sulfur Compounds) [Applicable]
Part 2 limits the ambient air concentration of H₂S emissions from any facility to 0.2 ppmv (24-hour average) at standard conditions which is equivalent to 283 µg/m³. Fuel-burning equipment fired with pipeline natural gas will not have the potential to exceed the H₂S ambient air

concentration limit. The boilers at this facility use pipeline natural gas. The diesel-fired engines are required to use diesel with a maximum sulfur content of 0.05% sulfur by weight.

Part 5 limits sulfur dioxide emissions from new fuel-burning equipment (constructed after July 1, 1972). For gaseous fuels the limit is 0.2 lb/MMBTU heat input, 3-hour average. When combusting natural gas, the fuel-burning equipment shall only be fueled with pipeline natural gas. Pipeline natural gas is subject (under Part 72) to a limit of 0.5 grains of total reduced sulfur (TRS) per 100 scf. For liquid fuels, the limit is 0.8 lb/MMBtu. AP-42 (5/10), Table 1.3-1 lists SO₂ emissions at 142S lb/10³ gal where S represents the sulfur content of the fuel oil. For distillate fuel with a sulfur content of 0.00015%, this corresponds to an emission rate of 0.0015 lb/MMBtu. When combusting liquid fuels, the fuel-burning equipment shall only be fueled with distillate fuel oil with a sulfur content of 0.0015% or less.

The boilers only combust natural gas. The emergency engines combust diesel fuel with maximum sulfur content of 0.0015% or less. The permit requires the facility demonstrate compliance by providing the fuel (gas/diesel) company bill/tariff.

OAC 252:100-33 (Nitrogen Oxides) [Not Applicable]

This subchapter limits NO_x emissions from new fuel-burning equipment with rated heat input greater than or equal to 50-MMBTUH to emissions of 0.2 lb of NO_x per MMBTU. None of the fuel-burning equipment exceeds the 50-MMBTUH threshold. Therefore, this subchapter does not apply.

OAC 252:100-35 (Carbon Monoxide) [Not Applicable]

None of the following affected processes are located at this facility: gray iron cupola, blast furnace, basic oxygen furnace, petroleum catalytic cracking unit, or petroleum catalytic reforming unit.

OAC 252:100-37 (Volatile Organic Compounds) [Part 7 Applicable]

Part 3 requires VOC storage tanks constructed after December 28, 1974, with a capacity of 400 gallons or more and storing a VOC with a vapor pressure greater than 1.5 psia to be equipped with a permanent submerged fill pipe or with an organic vapor recovery system. The 500-gallon gasoline storage tank (510-TK-100) will be equipped with a submerged fill pipe.

Part 5 limits the VOC content of coatings used in coating lines or operations. This facility has no coating operation.

Part 7 requires fuel-burning and refuse-burning equipment to be operated to minimize emissions of VOC. The boilers and emergency engines are subject to this requirement.

OAC 252:100-42 (Toxic Air Contaminants (TAC)) [Applicable]

This subchapter regulates TAC that are emitted into the ambient air in areas of concern (AOC). Any work practice, material substitution, or control equipment required by the Department prior to June 11, 2004, to control a TAC, shall be retained, unless a modification is approved by the Director. Since no AOC has been designated there are no specific requirements for this facility at this time.

OAC 252:100-43 (Testing, Monitoring, and Recordkeeping) [Applicable]
 This subchapter provides general requirements for testing, monitoring and recordkeeping and applies to any testing, monitoring or recordkeeping activity conducted at any stationary source. To determine compliance with emissions limitations or standards, the Air Quality Director may require the owner or operator of any source in the state of Oklahoma to install, maintain and operate monitoring equipment or to conduct tests, including stack tests, of the air contaminant source. All required testing must be conducted by methods approved by the Air Quality Director and under the direction of qualified personnel. A notice-of-intent to test and a testing protocol shall be submitted to Air Quality at least 30 days prior to any EPA Reference Method stack tests. Emissions and other data required to demonstrate compliance with any federal or state emission limit or standard, or any requirement set forth in a valid permit shall be recorded, maintained, and submitted as required by this subchapter, an applicable rule, or permit requirement.

SECTION VI. FEDERAL REGULATIONS

PSD, 40 CFR Part 52 [Not Applicable]
 Final total emissions are less than the threshold of 250 TPY of any single regulated pollutant and the facility is not one of the 26 specific industries with a threshold of 100 TPY.

NSPS, 40 CFR Part 60 [Subpart Dc and IIII Applicable]
Subpart Dc, Small Industrial-Commercial-Institutional Steam Generating Units. This subpart affects steam generating units with a heat input capacity between 10 and 100 MMBTUH and that commence construction, modification, or reconstruction after June 9, 1989.

EU #	Description	Capacity	Subject?
520-BO-001	Boiler	49 MMBTUH	Yes
520-BO-002	Boiler	49 MMBTUH	Yes

Requirements	Compliance Demonstration
SO ₂ Emission Standards	Not applicable since the facility’s boilers do not combust coal or coal combination with other fuel per §60.42c.
PM Emission Standards	Not applicable since the facility’s boilers do not combust coal, wood, oil, or mixture of these fuels that contain per §60.43c.
Performance Test	Since the boilers combust only natural gas and are not subject to SO ₂ emission standards, the requirements under §60.44c do not apply to these boilers. Since the boilers combust only natural gas and are not subject to PM emission standards, the requirements under §60.45c do not apply to these boilers.
Emission Monitoring	Since the boilers combust only natural gas and are not subject to SO ₂ emission standards, the requirements under §60.46c do not apply to these boilers.

Requirements	Compliance Demonstration
	Since the boilers combust only natural gas and are not subject to PM emission standards, the requirements under §60.47c do not apply to these boilers.
Reporting Recordkeeping	Facility shall report and keep records per §60.48c.

Subpart Kc, Standards of Performance for Volatile Organic Liquid (VOL) Storage Vessels. This subpart regulates VOL storage vessels that meet all of the following requirements:

- (1) Storage vessels commenced construction, reconstruction, or modification after October 4, 2023.
- (2) Storage vessels with a capacity greater than or equal to 40,000 gal (151 m³) containing a VOL that, as stored, has a maximum true vapor pressure (TVP) equal to or greater than 0.5 psia (3.4 kPa); or
- (3) Storage vessels with a capacity greater than or equal to 20,000 gal (75.7 m³) but less than 40,000 gal (151 m³) containing a VOL that, as stored, has a maximum true vapor pressure equal to or greater than 1.5 psia (10.3 kPa).

EU	Capacity, gal	Content	Subject?
510-TK-187	TBD	Diluent	No, TVP <1.5 psia
510-TK-172	TBD	HCl	No, TVP <1.5 psia
610-TK-005	TBD	Brine	No, TVP <0.5 psia
610-TK-006	TBD	Brine	No, TVP <0.5 psia
610-TK-007	TBD	Brine	No, TVP <0.5 psia
610-TK-008	TBD	Brine	No, TVP <0.5 psia
710-TK-005	TBD	Brine	No, TVP <0.5 psia
710-TK-006	TBD	Brine	No, TVP <0.5 psia
710-TK-007	TBD	Brine	No, TVP <0.5 psia
710-TK-008	TBD	Brine	No, TVP <0.5 psia
620-TK-009	TBD	Brine	No, TVP <1.5 psia
620-TK-034	TBD	Nonane	No, TVP <1.5 psia
720-TK-034	TBD	Nonane	No, TVP <1.5 psia

This facility has tanks that meet the capacity threshold, but all the tanks on site store products that have vapor pressure less than the applicable threshold. Therefore, no tank at this site is subject to this subpart.

Subpart IIII, Stationary Compression Ignition Internal Combustion Engines. The provisions of this subpart are applicable to manufacturers, owners, and operators of stationary compression ignition (CI) internal combustion engines (ICE) that are constructed (ordered) after July 11, 2005, and manufactured after April 1, 2006 (July 1, 2006, for fire pump engines).

CI Engines

EU #	HP	Serial #	Mfg. Date
520-ENG-1	3,650	TBD	TBD
520-ENG-2	3,650	TBD	TBD
520-ENG-3	3,650	TBD	TBD

EU #	HP	Serial #	Mfg. Date
520-ENG-4	3,650	TBD	TBD
520-ENG-5	3,650	TBD	TBD
520-ENG-6	3,650	TBD	TBD
520-ENG-7	3,650	TBD	TBD
520-ENG-8	3,650	TBD	TBD

Engines' Emission Standards (Tier 2)

EU #	NO _x + NMHC	CO	PM ₁₀
	g/kW-hr	g/kW-hr	g/kW-hr
520-ENG-1	6.40	3.50	0.2
520-ENG-2	6.40	3.50	0.2
520-ENG-3	6.40	3.50	0.2
520-ENG-4	6.40	3.50	0.2
520-ENG-5	6.40	3.50	0.2
520-ENG-6	6.40	3.50	0.2
520-ENG-7	6.40	3.50	0.2
520-ENG-8	6.40	3.50	0.2

The engines will be Tier 2 certified engines. Therefore, if these engines are installed and operated according to manufacturer's specifications, they will comply with these emission standards.

In addition to emission standards, these engines shall comply with the following requirements.

Requirement	Compliance Demonstration
Fuel	Per §60.4207, the diesel-fired engines must use diesel fuel that meets the requirements under §1090.305. §1090.305 ULSD Standards. a) Maximum sulfur content of 15 ppm by weight b) Minimum cetane index of 40 <u>or</u> maximum aromatic content of 35 volume percent.
Monitoring	Per §60.4209(a), the owner/operator of an emergency stationary CI internal combustion engine that does not meet the standards applicable to non-emergency engines, listed under §60.4201(c), must install a non-resettable hour meter prior to startup of the engine. Per §60.4209(b), the owner/operator of a stationary CI internal combustion engine equipped with a diesel particulate filter to comply with the emission standards in §60.4204 (reduce PM emissions by 60%+ or limit to 0.15 g/kW-hr or 0.11 g/HP-hr), the diesel particulate filter must be installed with a backpressure monitor that notifies the owner or operator when the high backpressure limit of the engine is approached.
Operating/Compliance	Per §60.4211, there is no time limit on use of engine in emergency situation.

Requirement	Compliance Demonstration
	<p>Per §60.4211(f), the owner/operator of an emergency stationary CI engine is allowed to operate up to 50 hrs/yr in non-emergency situations, but the 50 hours are counted toward the 100 hrs/yr provided for maintenance and testing.</p> <p>Per §60.4214(b), if the stationary CI internal combustion engine is an emergency stationary internal combustion engine, the owner/operator is not required to submit an initial notification. Starting with the model years in table 5 to this subpart, if the emergency engine does not meet the standards applicable to non-emergency engines in the applicable model year, the owner/operator must keep records of the operation of the engine in emergency and non-emergency service that are recorded through the non-resettable hour meter. The owner must record the time of operation of the engine and the reason the engine was in operation during that time.</p>
Testing	No testing is required if the owner/operator operates a certified engine.

Subpart JJJJ, Stationary Spark Ignition Internal Combustion Engines (SI-ICE). This subpart promulgates emission standards for all new SI engines ordered after June 12, 2006, and all SI engines modified or reconstructed after June 12, 2006, regardless of size. The specific emission standards (either in g/hp-hr or as a concentration limit) vary based on engine class, engine power rating, lean-burn or rich-burn, fuel type, duty (emergency or non-emergency), and numerous manufacture dates. Engine manufacturers are required to certify certain engines to meet the emission standards and may voluntarily certify other engines.

This facility has no SI engines.

NESHAP, 40 CFR Part 61 [Not Applicable]
 There are no emissions of any of the regulated pollutants: arsenic, asbestos, beryllium, benzene, coke oven emissions, mercury, radionuclides or vinyl chloride except for trace amounts of benzene. Subpart J, Equipment Leaks of Benzene, concerns only process streams that contain more than 10% benzene by weight. Analysis of Oklahoma natural gas indicates a maximum benzene content of less than 1%.

NESHAP, 40 CFR Part 63 [Subpart ZZZZ Applicable]
Subpart Q, National Emission Standards for Hazardous Air Pollutants for Industrial Process Cooling Towers. This subpart affects all new and existing industrial process cooling towers that are operated with chromium-based water treatment chemicals and are either major sources or are integral parts of facilities that are major sources as defined in §63.401.

This facility is not a major source of HAP, and the facility’s cooling tower does not use chromium-based water treatment chemicals. Therefore, this subpart does not apply.

Subpart ZZZZ, Stationary Reciprocating Internal Combustion Engines (RICE). This subpart affects any existing, new, or reconstructed stationary RICE located at a major or area source of HAP emissions. For stationary RICE located at an area source of HAP emissions, a stationary RICE is existing if you commenced construction or reconstruction of the stationary RICE before June 12, 2006. Owners and operators of new engines and reconstructed engines at area sources meet the requirements of Subpart ZZZZ by complying with either 40 CFR Part 60 Subpart IIII (for CI engines) or 40 CFR Part 60 Subpart JJJJ (for SI engines).

This facility is an area source of HAP. The engines are manufactured after June 12, 2006, therefore, the engines are considered new engines. Per §63.6590(c), engines that demonstrate compliance with NSPS Subpart IIII are in compliance with this subpart. No further requirements apply for the engines under this subpart.

Subpart NNNNN, National Emission Standards for Hazardous Air Pollutants: Hydrochloric Acid (HCl) Production. This subpart affects HCl production facility that produces liquid HCl product at a concentration of 30 weight percent or greater during its normal operations and is located at, or is part of, a major source of HAP.

This facility stores HCl and uses HCl in some processes, but this facility does not produce liquid HCl. In addition, this facility is not a major source of HAP.

Subpart JJJJJ, National Emission Standards for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers Area Sources. This subpart affects an industrial, commercial, or institutional boiler located at an area source of HAPs.

Per §63.11195(e), a gas-fired boiler is not subject to this subpart. §63.11237 defined a gas-fired boiler as any boiler that burns gaseous fuels not combined with any solid fuels and burns liquid fuel only during periods of gas curtailment, gas supply interruption, startups, or for periodic testing, maintenance, or operator training on liquid fuel. This facility's boilers only combust natural gas, therefore, these boilers are not subject to this subpart.

Subpart VVVVVV, National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources. This subpart affects any facility that owns or operates a chemical manufacturing process unit (CMPU) that meets both conditions specified in §63.11494.

1. The CMPU is located at an area source of hazardous air pollutant (HAP) emissions.
 - a. A CMPU means all equipment which collectively functions to produce a product or isolated intermediate. A process includes, but is not limited to any, all, or a combination of reaction, recovery, separation, purification, or other activity, operation, manufacture, or treatment which are used to produce a product or isolated intermediate.
2. HAP listed in Table 1 to this subpart (Table 1 HAP) are present in the CMPU.

Table 1 HAP	
Type of HAP	Chemical Name
Organic compounds	1,3-butadiene 1,3-dichloropropene Acetaldehyde Chloroform Ethylene dichloride Hexachlorobenzene Methylene chloride Quinoline
Metal compounds	Arsenic compounds Cadmium compounds Chromium compounds Lead compounds Manganese compounds Nickel compounds
Others	Hydrazine

This facility has units that operate as a CPMU. However, this facility does not use or produce any of the HAP listed under Table 1. Therefore, this facility is not subject to this subpart.

Subpart BBBBBBBB, National Emission Standards for Hazardous Air Pollutants for Area Sources: Chemical Preparations Industry. A facility required to meet all the following conditions to be considered an affected source per §63.11579.

1. Owner or operator of a chemical preparations facility.
 1. Per §63.11588, “chemical preparations facility” means any facility-wide collection of chemical preparation operations, which include collection of mixing, blending, milling, and extruding equipment used to manufacture chemical preparations
2. The chemical preparations facility is a stationary area source of HAP.
 1. Per §63.11588, “target HAP” means metal compounds for chromium, lead, manganese, and nickel.
3. The chemical preparations facility has at least one chemical preparations operation in target HAP service.
 1. Per §63.11588, “in target HAP service” means that equipment in the chemical preparation operation either contains, contacts, or is processing target HAP-containing materials.

This facility does have mixing operations, but none of the operations contain a target HAP.

SECTION VII. COMPLIANCE

Tier Classification

This application has been classified as **Tier I** based on the request for construction of a minor source permit under the Traditional NSR Process.

The draft permit will undergo public notice on the DEQ's web site as required in OAC 252:4-7-13(g). The public, tribal governments, and the EPA will have 30 days to comment on the draft permit. Permits available for public review and comment are found at Air Quality section of the DEQ Web page: <https://oklahoma.gov/deq.html>

Landowner Affidavit

The applicant has submitted an affidavit that that the applicant owns the land where the facility will be constructed.

Enforcement Case/Violation

There is no enforcement case for this facility.

Testing

No testing is required at this time.

Inspection

An initial inspection is not required for construction permits.

Fee Paid

A fee of \$2,000 was paid for a minor source construction permit on December 13, 2024.

SECTION VIII. SUMMARY

The facility has demonstrated the ability to comply with all applicable Air Quality rules and regulations. There is no active enforcement case concerning this facility. Issuance of the construction permit is recommended, contingent on public review.

**PERMIT TO CONSTRUCT
AIR POLLUTION CONTROL FACILITY
SPECIFIC CONDITIONS**

**Stardust Power, LLC
Stardust Muskogee Lithium Refinery**

Permit No. 2025-0054-C

The permittee is authorized to construct in conformity with the specifications submitted to the Air Quality Division on January 20, 2025, and supporting document. The Evaluation Memorandum dated October 10, 2025, explains the derivation of applicable permit requirements and estimates of emissions; however, it does not contain operating limitations or permit requirements. Commencing construction and continuing operations under this permit constitutes acceptance of, and consent to, the conditions contained herein:

1. Facility's Equipment and Points of Emissions:

EUG 1 – Water Management

EU #	Description
530-CE-005A	ZLD Crystallizer Centrifuge
530-CE-007A	Sodium Chloride Crystallizer Centrifuge
530-FL-009	Wastewater Filter Press
530-CE-005B	Train 2 ZLD Crystallizer Centrifuge
530-CE-007B	Train 2 Sodium Chloride Crystallizer Centrifuge

EUG 2 - Reagents

EU #	Point	Description	Control Device
530-TK-217	530-DM-217	HCl Day Tank	530-DM-217
510-BN-010	510-DC-008	Lime Bin Silo	510-DC-008
510-BN-007	510-DC-007	Soda Ash Receiver Bin	510-DC-007
510-FD-013	510-FD-013	Soda Ash Unload Feeder	None
510-XM-174	510-SB-003	Lime Slaker	510-SB-003
510-CV-041	510-SB-003	Lime Slaker Grit Screw Conveyor	510-SB-003
710-XM-174	710-SB-003	Train 2 Lime Slaker	710-SB-003
710-CV-041	710-SB-003	Train 2 Lime Slaker Grit Screw Conveyor	710-SB-003
510-PFD-161	510-PFD-161	Diluent Delivery	None
510-PV-015	510-PV-015	CO ₂ Liquid Storage Tank	None
510-TK-171	510-TK-171	Organic Storage Tank	None
510-TK-172	510-SB-006	HCl Storage Tank	Scrubber 510-SB-006
510-TK-173		HCl Mix Tank	Scrubber 510-SB-006
510-TK-187	510-TK-187	Diluent Storage Tank	None
510-TK-241A	510-SB-009	Soda Ash Saturator Tank 1	Scrubber 510-SB-009
510-TK-241B		Soda Ash Saturator Tank 1	Scrubber 510-SB-009

EU #	Point	Description	Control Device
510-TK-242A		Soda Ash Saturator Tank 2	Scrubber 510-SB-009
510-TK-242B		Soda Ash Saturator Tank 2	Scrubber 510-SB-009
510-TK-243A		Soda Ash Saturator Tank 3	Scrubber 510-SB-009
510-TK-243B		Soda Ash Saturator Tank 3	Scrubber 510-SB-009
510-TK-244A		Soda Ash Saturator Tank 4	Scrubber 510-SB-009
510-TK-244B		Soda Ash Saturator Tank 4	510-SB-009

EUG 3 – Plant Services

EU #	Description	Capacity
520-PK-047	Cooling Tower	2,200 gpm
520-BO-001	Boiler	49-MMBTUH
520-BO-002	Boiler	49-MMBTUH
540-GE-001	Cat3516 C	3,650-HP
540-GE-002	Cat3516 C	3,650-HP
540-GE-003	Cat3516 C	3,650-HP
540-GE-004	Cat3516 C	3,650-HP
540-GE-005	Cat3516 C	3,650-HP
540-GE-006	Cat3516 C	3,650-HP
540-GE-007	Cat3516 C	3,650-HP
540-GE-008	Cat3516 C	3,650-HP
510-TK-100	Gasoline Storage Tank	TBD
510-TK-101	Diesel Storage Tank	TBD

EUG 4 – Brine Holding Tanks

EU #	Description	Capacity (gal)	Control Device
610-TK-005	Brine Feed Tank 1	TBD	None
610-TK-006	Brine Feed Tank 2	TBD	None
610-TK-007	Brine Feed Tank 3	TBD	None
610-TK-008	Brine Feed Tank 4	TBD	None
710-TK-005	Brine Feed Tank 1, Train 2	TBD	None
710-TK-006	Brine Feed Tank 2, Train 2	TBD	None
710-TK-007	Brine Feed Tank 3, Train 2	TBD	None
710-TK-008	Brine Feed Tank 4, Train 2	TBD	None
620-TK-009	SX Feed Tank	TBD	620-DM-009
630-TK-075	Impurity Removal IX Backwash Solution Tank	TBD	630-DM-075
730-TK-075	Impurity Removal IX Backwash Solution Tank	TBD	730-DM-075

EUG 5 – Brine Solvent Extraction

EU #	Description	Capacity (gal)	Control Device
620-TK-010	E1 Mix Tank 1	TBD	Condenser 620-CD-001 and carbon 620-CM-012, 013, 014
620-TK-011	E1 Mix Tank 2	TBD	
620-TK-012	E1 Settler	TBD	
620-TK-013	E2 Mix Tank 1	TBD	
620-TK-014	E2 Mix Tank 2	TBD	
620-TK-015	E2 Settler	TBD	
620-TK-016	E3 Mix Tank 1	TBD	
620-TK-017	E3 Mix Tank 2	TBD	
620-TK-018	E3 Settler	TBD	
620-TK-020	Aqueous Tank	TBD	None
620-TK-021	Lean Aqueous Tank	TBD	None
620-TK-022	S1 Mix Tank 1	TBD	620-CD-001 and Carbon 620-CM-012, 013, 014
620-TK-023	S1 Mix Tank 2	TBD	
620-TK-024	Strip Settler 1	TBD	
620-TK-025	S2 Mix Tank 1	TBD	
620-TK-026	S2 Mix Tank 2	TBD	
620-TK-027	Strip Settler 2	TBD	
620-TK-028	S3 Mix Tank 1	TBD	
620-TK-029	S3 Mix Tank 2	TBD	
620-TK-030	Strip Settler 3	TBD	
620-TK-031	Scrub Mix Tank 1	TBD	620-CD-001 and Carbon 620-CM-012, 013, 014
620-TK-032	Scrub Mix Tank 2	TBD	
620-TK-033	SX Scrub Settler	TBD	
620-FL-003	Crud Filter	--	
620-TK-034	Stripped Organic Tank	TBD	620-CD-001 and Carbon 620-CM-012, 013, 014
620-TK-035	SX Strip Solution Tank	TBD	Demister 620-DM-035
620-TK-036	Strip Acid Day Tank	TBD	Demister 620-DM-036
620-TK-038	Crud Management Tank	TBD	None

EU #	Description	Capacity (gal)	Control Device
620-TK-039	Crud Management Filtrate Tank	TBD	None
720-TK-010	E1 Mix Tank 1	TBD	720-CD-001 and carbon 720-CM-012, 013, 014
720-TK-011	E1 Mix Tank 2	TBD	
720-TK-012	E1 Settler	TBD	
720-TK-013	E2 Mix Tank 1	TBD	
720-TK-014	E2 Mix Tank 2	TBD	
720-TK-015	E2 Settler	TBD	
720-TK-016	E3 Mix Tank 1	TBD	
720-TK-017	E3 Mix Tank 2	TBD	
720-TK-018	E3 Settler	TBD	
720-TK-020	Aqueous Tank	TBD	
720-TK-021	Lean Aqueous Tank	TBD	None
720-TK-022	S1 Mix Tank 1	TBD	720-CD-001 and Carbon 720-CM-012, 013, 014
720-TK-023	S1 Mix Tank 2	TBD	
720-TK-024	Strip Settler 1	TBD	
720-TK-025	S2 Mix Tank 1	TBD	
720-TK-026	S2 Mix Tank 2	TBD	
720-TK-027	Strip Settler 2	TBD	
720-TK-028	S3 Mix Tank 1	TBD	
720-TK-029	S3 Mix Tank 2	TBD	
720-TK-030	Strip Settler 3	TBD	
720-TK-031	Scrub Mix Tank 1	TBD	
720-TK-032	Scrub Mix Tank 2	TBD	
720-TK-033	SX Scrub Settler	TBD	
720-TK-034	Stripped Organic Tank	TBD	720-CD-001 and Carbon 720-CM-012, 013, 014
720-TK-035	SX Strip Solution Tank	TBD	Demister 720-DM-035 ,
720-TK-036	Strip Acid Day Tank	TBD	Demister 720-DM-036

EUG 6 – Impurity Removal

EU #	Description	Control Device	Capacity (gal)
630-CH-003	Impurity Precipitation Filter Cake Discharge Chute	None	--
630-CH-005	Impurity Precipitation 2 Belt Filter Chute	None	--
630-FL-006	Impurity Precipitation 1 Filter	None	--
630-FL-007	Impurity Precipitation 2 Belt Filter	None	--
630-FL-008	Polishing Filter 1	None	--
630-FL-009	Polishing Filter 2	None	--
630-TK-073	Impurity Removal IX Eluate Tank	630-DM-073	TBD
730-CH-003	Train 2 Impurity Precipitation Filter Cake Discharge Chute	None	--
730-CH-005	Train 2 Impurity Precipitation 2 Belt Filter Chute	None	--
730-FL-006	Train 2 Impurity Precipitation 1 Filter	None	--
730-FL-007	Train 2 Impurity Precipitation 2 Belt Filter	None	--
730-FL-008	Train 2 Polishing Filter 1	None	--
730-FL-009	Train 2 Polishing Filter 2	None	--
730-TK-073	Train 2 Impurity Removal IX Eluate Tank	730-DM-073	TBD

EUG 7 – Carbonation

EU #	Description
640-CE-001	Crude LiC (facility's designation for Lithium Carbonate) Centrifuge 1
640-CE-002	Crude LiC Centrifuge 2
740-CE-001	Train 2 Crude LiC Centrifuge 1
740-CE-002	Train 2 Crude LiC Centrifuge 2

EUG 8 – Bicarbonation

EU #	Description	Capacity (gal)	Control Device
650-DR-001	Pure LiC Dryer	--	650-BH-002
650-MJ-0013	Pure LiC Air Mill	--	650-BH-003
650-CE-002	Pure LiC Centrifuge 2	--	None
650-CE-003	Pure LiC Centrifuge 1	--	None
650-FE-003	Air Mill Feed Screw Conveyor	--	650-BH-003
650-HP-005	Pure LiC Hopper	--	None
650-MS-001	Pure LiC Magnetic Separator	--	650-BH-003

EU #	Description	Capacity (gal)	Control Device
650-RV-020	Pure LiC Dryer Baghouse Rotary Valve	--	None
650-TK-124	IX Preheater CIP Tank	TBD	None
650-TK-126	Bicarbonation IX CIP Tank	TBD	None
650-TK-128	Spent IX Acid Waste Buffer Tank	TBD	650-DM-128
650-TK-135	Decarbonation Preheaters CIP Tank	TBD	None
650-XM-003	Bagging Plant Feed Screen Splitter	--	None
650-XM-119	Bicarbonation Blanketing Gas Scrubber	--	None
650-XM-145	Pure LiC Air Mill Briquetting Machine	--	650-BH-003
750-DR-001	Train 2 Pure LiC Dryer	--	750-BH-002
750-MJ-001	Train 2 Pure LiC Air Mill	--	750-BH-003
750-CE-002	Train 2 Pure LiC Centrifuge 2	--	None
750-CE-003	Train 2 Pure LiC Centrifuge 1	--	None
750-FE-003	Train 2 Air Mill Feed Screw Conveyor	--	750-BH-003
750-HP-005	Train 2 Pure LiC Hopper	--	None
750-MS-001	Train 2 Pure LiC Magnetic Separator	--	750-BH-003
750-RV-020	Train 2 Pure LiC Dryer Baghouse Rotary Valve	--	None
750-TK-124	Train 2 IX Preheater CIP Tank	TBD	None
750-TK-126	Train 2 Bicarbonation IX CIP Tank	TBD	None
750-TK-128	Train 2 Spent IX Acid Waste Buffer Tank	TBD	Demister 750-DM-128
750-TK-135	Train 2 Decarbonation Preheaters CIP Tank	TBD	None
750-XM-119	Bicarbonation Blanketing Gas Scrubber	--	None
750-XM-003	Train 2 Bagging Plant Feed Screen Splitter	--	None
750-XM-145	Train 2 Pure LiC Air Mill Briquetting Machine	--	750-BH-003

EUG 9 – Product Handling & Packaging

EU #	Description	Control Device
660-TK-145	Product Silo	660-BH-001

EU #	Description	Control Device
660-BN-001	Transporter Surge Bin	660-DC-001
660-HP-009	Hopper and Filling Unit	660-DC-005
660-PK-025	LiC Product Packaging	660-SB-004
660-SC-001	Bagging Plant Feed Screens (001, 002, and 003)	None
760-TK-145	Train 2 Product Silo	760-BH-001
760-BN-001	Train 2 Transporter Surge Bin	760-DC-001
760-HP-009	Train 2 Hopper and Filling Unit	760-DC-005
760-PK-025	Train 2 LiC Product Packaging	760-SB-004
760-SC-001	Train 2 Bagging Plant Feed Screens (001, 002, and 003)	None

EUG 10 – Off Spec Re-Treatment

EU #	Description	Control
670-HP-011	Crude LiC Hopper	None
670-XM-020	Technical Grade - Rail Car Underpan	None

EUG 11 – Salt Storage

EU #	Description
530-CV-011A	ZLD Crystallizer Salt Screw Conveyor
530-CV-013A	Sodium Chloride Crystallizer Salt Screw Conveyor
530-CV-015	Salts Belt Conveyor
530-PFD-183	Salt Stockpile Load
	Salt Pile Storage Losses
530-SR-001	Salts Radial Conveyor
530-CV-011B	Train 2 ZLD Crystallizer Salt Screw Conveyor
530-CV-013B	Train 2 Sodium Chloride Crystallizer Salt Screw Conveyor

EUG 12 – Ancillary Units

This emission unit group is subdivided into three groups.

- 12A includes tanks containing potable water, process water, wastewater, and raw water.
- 12B includes tanks primarily containing brine or brine-like fluids.
- 12C includes all other ancillary units

EUG 12A

EU #	Description	Contents	Capacity , gal
414-TK-216	Water Treatment Feed Tank	Wastewater	TBD
414-TK-218	Wastewater Surge Tank	Wastewater	TBD

EU #	Description	Contents	Capacity , gal
414-TK-219	Wastewater Precipitation Tank 1	Wastewater	TBD
414-TK-220	Wastewater Precipitation Tank 2	Wastewater	TBD
414-TK-221	Wastewater Precipitation Tank 3	Wastewater	TBD
414-TK-222	Wastewater Thickener Feed Tank	Wastewater	TBD
414-TK-223	Wastewater Crystallization Buffer Tank	Wastewater	TBD
414-TK-224	Filter Backwash Tank	Raw water	TBD
414-TK-225	Water Treatment Feed Tank 2	Wastewater	TBD
414-TK-250	ZLD Crystallizer Feed Tank	Wastewater	TBD
414-TK-251	ZLD Crystallizer Centrate Tank	Wastewater	TBD
414-TK-252	ZLD Crystallizer Dump Tank	Wastewater	TBD
414-TK-253	ZLD Crystallizer Wash Water Tank	Wastewater	TBD
414-TK-254	ZLD Crystallizer Seal Water Tank	Demineralized water	TBD
414-TK-260	Sodium Chloride Crystallizer Feed Tank	Process water	TBD
510-TK-188	Soda Ash Dissolution Water Tank	Water	TBD
520-TK-191	Cooled Water Tank	Raw water ⁽¹⁾	TBD
520-TK-192	Chilled Water Tank	Raw water	TBD
520-TK-193	Fire Water Tank	Raw water	TBD
520-TK-195	Plant Condensate Tank	Raw water	TBD
520-TK-197	Demineralized Water Tank	Water	TBD
520-TK-199	Cooled Water Tank	Water	TBD
520-TK-200	Potable Water Tank	Municipal water	TBD
530-TK-216	Water Treatment Feed Tank 1 -	Raw water	TBD
530-TK-223	Wastewater Crystallization Buffer Tank -	Wastewater	TBD
530-TK-225	Water Treatment Feed Tank 2	Raw water	TBD
530-TK-230	Stormwater Collection Tank 1	Stormwater	TBD
530-TK-231	Stormwater Collection Tank 2	Stormwater	TBD
630-TK-055	Impurity Precipitation 1 Filter Cake Wash Tank	Raw water	TBD
630-TK-056	Impurity Precipitation 1 Filter Cloth Wash Tank	Raw water	TBD
630-TK-066	Impurity Precipitation 2 Belt Filter Cake Wash Tank	Raw water	TBD
630-TK-067	Impurity Precipitation 2 Belt Filter Cloth Wash Tank	Raw water	TBD

EU #	Description	Contents	Capacity , gal
630-TK-068	Impurity Precipitation 2 Polishing Filter Cloth Wash Tank	Raw water	TBD
630-TK-076	Impurity Removal IX 1 st Wash Water Tank	Raw water	TBD
630-TK-077	Impurity Removal IX 2 nd Wash Water Tank	Raw water	TBD
640-TK-089	Carbonation Hotwell	Raw water	TBD
640-TK-092	Carbonation Polishing Filter Wash Tank	Raw water	TBD
640-TK-095	Crude LiC Centrifuge Washwater Tank	Raw water	TBD
640-TK-098	Neutralization Surge Tank	Process water	TBD
640-TK-099	Neutralization Reactor 1	Process water	TBD
640-TK-100	Neutralization Reactor 2	Process water	TBD
640-TK-101	Carbonation Condensate Tank	Raw water	TBD
640-TK-102	Carbonation Seal Water Tank	Raw water	TBD
640-TK-103	Carbonation Hot Wash Water Tank	Raw water	TBD
640-TK-131	Decarbonation Polishing Filter Wash Tank	Raw water	TBD
650-TK-120	Bicarbonation Polishing Filter Wash Tank	Raw water	TBD
650-TK-125	Decarbonation Feed Tank	Process water	TBD
650-TK-130	Decarbonation Overflow Liquor Surge Drum	Process water	TBD
650-TK-132	Decarbonation Main Condensate Receiver	Raw water	TBD
650-TK-136	Pure LiC Centrifuge Demineralized Water Tank	Raw water	TBD
650-TK-137	Decarbonation Centrate Tank	Process water	TBD
650-TK-155	Decarbonate Condensate Tank	Raw water	TBD
650-TK-158	Decarbonated Centrate Surge Tank	Process water	TBD
650-TK-161	Bicarbonation and Decarbonation Seal Water Tank	Raw water	TBD
650-TK-162	Hot Wash Water Tank	Raw water	TBD
650-TK-163	Hot Demineralized Water Surge Tank	Demineralized water	TBD

⁽²⁾ “Raw water” may encompass municipal water, recycled wastewater, captured stormwater, or condensate from the various processes.

EUG 12B

EU #	Description	Contents	Capacity
414-TK-261	Sodium Chloride Crystallizer Centrate Tank	Weak Sodium Chloride	TBD
414-TK-262	Sodium Chloride Crystallizer Dump Tank	Process water	TBD
414-TK-263	Sodium Chloride Crystallizer Purge Liquor Tank	Weak Sodium Chloride	TBD
510-TK-174	HCl Scrubber Neutralization Tank	Neutralizing Tank	TBD
630-TK-050	Impurity Precipitation 1 Tank 1	Brine	TBD
630-TK-051	Impurity Precipitation 1 Tank 2	Brine	TBD
630-TK-052	Impurity Precipitation 1 Tank 3	Brine	TBD
630-TK-053	Impurity Precipitation 1 Thickener Overflow Tank	Brine	TBD
630-TK-054	Impurity Precipitation 1 Filter Feed Tank	Brine	TBD
630-TK-058	Impurity Precipitation 1 Filtrate Tank	Brine	TBD
630-TK-059	Impurity Precipitation 1 Manifold Flush Drain Tank	Brine	TBD
630-TK-060	Impurity Precipitation 2 Feed Tank	Brine	TBD
630-TK-061	Impurity Precipitation 2 Tank 1	Brine	TBD
630-TK-062	Impurity Precipitation 2 Tank 2	Brine	TBD
630-TK-063	Impurity Precipitation 2 Tank 3	Brine	TBD
630-TK-064	Impurity Precipitation 2 Belt Filter Feed Tank	Brine	TBD
630-TK-065	Impurity Precipitation 2 Thickener Overflow Tank	Brine	TBD
630-TK-069	Impurity Precipitation 2 Polishing Filter Feed Tank	Brine	TBD
630-TK-070	Impurity Precipitation 2 Polishing Filter Reverse Flush Tank	Brine	TBD
630-TK-071	Impurity Removal IX Feed Tank	Brine	TBD
640-TK-080	Crude LiC Centrifuge Reslurry Tank 1	Brine	TBD
640-TK-085	Carbonation Feed Tank	Brine	TBD
640-TK-096	Strong Brine Tank	Brine solution	TBD
640-TK-097	Weak Brine Tank	Brine solution	TBD
670-TK-153	Bagged Crude LiC Repulping Tank	Brine	TBD

EU #	Description	Contents	Capacity
670-TK-154	Technical Grade Repulping Tank 1	Brine	TBD
670-TK-156	Bagged Crude LiC Repulping Tank	Brine	TBD
670-TK-157	Technical Grade Repulping Tank 2	Brine	TBD

EUG 12C

EU #	Description	Contents	Capacity (gal)
510-TK-178	Lime Transfer Tank	Lime slurry	TBD
510-TK-179	Lime Storage Tank	Lime slurry	TBD
510-TK-180	Diatomaceous Earth Mixing Tank 1	DE in slurry	TBD
510-TK-181	Diatomaceous Earth Mixing Tank 2	DE in slurry	TBD
510-TK-182	Diatomaceous Earth Mixing Tank 3	DE in slurry	TBD
510-TK-185	Caustic Soda Storage Tank	Caustic soda	TBD
510-TK-189	Dilute Soda Ash Storage Tank 1	Soda Ash and water	TBD
510-TK-190	Dilute Soda Ash Storage Tank 2	Soda Ash and water	TBD
510-TK-246	Saturated Soda Ash Storage Tank	Soda Ash and water	TBD
630-TK-074	Impurity Removal IX Neutralization Tank	Weak Caustic	TBD
640-TK-086	Carbonation Reactor 1	Brine and Solids	TBD
640-TK-087	Carbonation Reactor 2	Brine and Solids	TBD
640-TK-088	Carbonation Reactor 3	Brine and Solids	TBD
640-TK-090	Carbonation Slurry Holding Tank	Brine and Solids	TBD
640-TK-091	Carbonation Candle Filter Feed Tank	Brine and Solids	TBD
640-TK-093	Crude LiC Centrifuge Feed	Brine and Solids	TBD
640-TK-094	Crude LiC Centrifuge Reslurry Tank 2	Brine and Solids	TBD
650-RX-001	Decarbonation Reactors	Brine, lithium bicarbonate, and sodium chloride	TBD
650-RX-002	Decarbonation Reactors	Brine, lithium bicarbonate, and sodium chloride	TBD
650-RX-003	Decarbonation Reactors	Brine, lithium bicarbonate, and sodium chloride	TBD
650-TK-115	Bicarbonation Reactor 1	Lithium Carbonate crystals	TBD
650-TK-116	Bicarbonation Reactor 2	Lithium Carbonate crystals	TBD
650-TK-117	Bicarbonation Reactor 3	Lithium Carbonate crystals	TBD

EU #	Description	Contents	Capacity (gal)
650-TK-118	Bicarbonation Reactor 4	Lithium Carbonate crystals	TBD
650-TK-119	Bicarbonation Surge Drum	Lithium Carbonate crystals	TBD
650-TK-121	Bicarbonation Solids Re-Slurry Tank	Lithium Carbonate crystals	TBD
650-TK-122	Bicarbonation Filtrate Tank	Lithium Carbonate crystals	TBD
650-TK-123	Bicarbonation Slurry Holding Tank	Lithium Carbonate crystals	TBD
650-TK-127	Spent IX Caustic Waste Buffer Tank	Weak Caustic	TBD
650-TK-133	Decarbonation Product Tank	Lithium Carbonate crystals	TBD
650-TK-134	Fine LiC Repulp Tank	Lithium Carbonate crystals	TBD
650-TK-138	Decarbonation Slurry Holding Tank	Lithium Carbonate crystals	TBD
650-TK-139	Bicarbonation IX CIP Caustic Soda Day Tank	Caustic soda	TBD
660-TK-145	Product Silo	Lithium Crystals	TBD

2. Facility-Wide Emission Limits:

Pollutant	Limits, TPY
NO _x	89.99
CO	69.99
VOC	49.99
PM _{10/2.5}	98.99
Single HAP	<9.99
Total HAPs	<24.99

- a. NO_x, CO, VOC, PM₁₀/PM_{2.5}, and HAP emissions from the facility shall be based on equipment's capacity, material throughput, performance testing/emission factors/manufacture guarantees, and hours of operation, and shall be limited to the emission limits shown in the table above. Compliance with the emission limits for NO_x, CO, VOC, PM₁₀/PM_{2.5}, and HAP from the facility shall be determined monthly, and be based on a 12-month rolling total.
- b. **EUG 1 – Water Management:** Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on PM_{10/2.5} emissions identified in Specific Condition No. 2.
 - i. Processing Points – Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application or the latest emission factors from testing/EPA sources. The permittee shall

incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.

- c. **EUG 2 – Reagents:** Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on VOC, PM_{10/2.5}, and HAP emissions identified in Specific Condition No. 2.
 - i. Processing Points - Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application or the latest emission factors from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
 - ii. When operating, emissions from these operations shall be routed to the control device referenced in Specific Condition No. 1, or equivalent. The maximum exhaust concentration from the control devices shall not exceed the following concentration.

EUG 2 - Control Devices		
EU #	Outlet’s Concentration.	Operating Parameter
510-DC-007	0.005 gr/dscf for PM ₁₀	TBD
510-DC-008	0.015 gr/dscf for PM ₁₀	TBD
510-SB-003	0.005 gr/dscf for PM ₁₀	TBD
510-SB-006	10 ppm of HCl	TBD
510-SB-009	0.01 gr/dscf for PM ₁₀	TBD
710-SB-003	0.005 gr/dscf for PM ₁₀	TBD

- iii. Control Devices - Each calendar month the permittee shall record the emissions of these control devices using emission factors referenced in the permit application and/or emission factors from testing/EPA sources. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- d. **EUG 3 – Plant Services:** Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on NO_x, CO, VOC, PM_{10/2.5}, and HAP emissions identified in Specific Condition No. 2.
 - i. Cooling Tower
 - 1) Each calendar month the permittee shall record the emissions of cooling tower operation using manufacturer data, emission factors referenced in the permit application or the latest emission factors from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap. Facility shall conduct monthly TDS analysis/testing on the cooling towers. Calculations shall be performed each calendar month.
 - 2) Facility shall conduct initial testing with a TDS meter to determine the total dissolved solids (TDS) value within 180 days of start of operation of the cooling towers.
 - ii. Boilers

- 1) The permittee shall record the quantity of fuel consumed (monthly and 12-month rolling total) or utilize maximum potential fuel usage, and shall compute the emissions of NO_x, CO, VOC, PM₁₀, SO₂, and HAPs using the latest factors from AP-42 Section 1.4 tables or manufacturer's emission factors. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
 - 2) The fuel-burning equipment shall be fueled only with pipeline natural gas. Pipeline natural gas is subject (under Part 72) to a limit of 0.5 grains sulfur/100 scf. Compliance can be shown by a current gas company bill or supplier conformance statement/tariff. Compliance shall be demonstrated at least once every calendar year.
- iii. Emergency Engines
- 1) The permittee shall record the quantity of fuel used or actual hours of usage (monthly and 12-month rolling total), and shall compute the emissions of NO_x, CO, VOC, and PM₁₀ using manufacturer data or the latest factors from NSPS Subpart III, SO₂, and HAPs emission factors from AP-42 (08/00) Section 3.2-2. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
 - 2) These engines shall only be fired with low sulfur or ultra-low sulfur diesel fuel with less than 0.0015 % sulfur. Compliance can be shown by a current gas company bill or supplier conformance statement/tariff. Compliance shall be demonstrated at least once every calendar year.
 - 3) These engines shall have a permanent identification plate attached, which shows the make, model number, and serial number.
 - 4) These engines shall be equipped with a non-resettable hour-meter.
 - 5) The emergency engines shall be limited to the non-emergency operating hours listed under NSPS Subpart III. The permittee shall keep records of operating hours (emergency and non-emergency hours) for the engine.
- e. **EUG 4 – Brine Storage and Feed:** Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on VOC emissions identified in Specific Condition No. 2.
- i. Tanks – Each calendar month the permittee shall record the emissions of this operation using TANKS 5.1 program referenced in the permit application or the latest emission factors/methods from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- f. **EUG 5 – Brine Solvent Extraction:** Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on VOC, PM_{10/2.5}, and HCl emissions identified in Specific Condition No. 2.
- i. Processing Points - Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application, or the latest emission factors from testing/EPA sources. The permittee shall

incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.

- ii. During operation, the emissions from this operation shall be routed to the control device referenced in Specific Condition No. 1 or equivalent. The maximum exhaust concentration from the control devices shall not exceed the following concentration.

EUG 5 - Control Devices		
EU #	Outlet's Concentration	Operating Parameter
620-CD-001 and 620-CM-012, 013, 014	VOC: <0.5 ppm HCl: <0.05 ppm	TBD
720-CO-001 and 720-CM-012,013, 014	VOC: <0.5 ppm HCl: <0.05 ppm	TBD

- iii. Control Devices - Each calendar month the permittee shall record the emissions of these control devices using emission factors referenced in the permit application. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- iv. Tanks – Each calendar month the permittee shall record the emissions of this operation using TANKS 5.1 program referenced in the permit application or the latest emission factors/methods from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- g. **EUG 6 – Carbonation**: Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on HCl and PM_{10/2.5} emissions identified in Specific Condition No. 2.
 - i. Processing Points - Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application, or the latest emission factors from testing/EPA guidance. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
 - ii. Tanks – Each calendar month the permittee shall record the emissions of this operation using ideal gas law method referenced in the permit application or the latest emission factors/methods from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- h. **EUG 7 – Impurity Removal**: Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on PM_{10/2.5} emissions identified in Specific Condition No. 2.

- i. Processing Points - Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application, or the latest emission factors from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- i. **EUG 8 – Bicarbonation**: Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on PM_{10/2.5} and HCl emissions identified in Specific Condition No. 2.
 - i. Processing Points - Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application, or the latest emission factors from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
 - ii. During operation, the emissions from this operation shall be routed to the control device specified in Specific Condition No. 1 or equivalent. The maximum exhaust concentration from the control devices shall not exceed the following concentration.

EUG 8 - Control Devices		
EU #	Outlet’s Concentration	Operating Parameter
650-BH-002	PM ₁₀ : 0.005 gr/dscf	TBD
650-BH-003	PM ₁₀ : 0.005 gr/dscf	TBD
750-BH-002	PM ₁₀ : 0.005 gr/dscf	TBD
750-BH-003	PM ₁₀ : 0.005 gr/dscf	TBD

- iii. Control Devices - Each calendar month the permittee shall record the emissions of these control devices using emission factors referenced in the permit application. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- iv. Tanks – Each calendar month the permittee shall record the emissions of this operation using ideal gas law method referenced in the permit application or the latest emission factors/methods from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- j. **EUG 9 – Product Handling & Packaging**: Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on PM_{10/2.5} emissions identified in Specific Condition No. 2.
 - i. Processing Points - Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application, or the latest emission factors from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions

shall be summed with other emissions for determining compliance with the facility-wide cap.

- ii. During operation, the emissions from this operation shall be routed to the control device specified in Specific Condition No. 1, or equivalent. The maximum exhaust concentration from the control devices shall not exceed the following concentration.

EUG 9 - Control Devices		
EU #	Outlet's Concentration	Operating Parameter
660-BH-001	PM ₁₀ : 0.005 gr/dscf	TBD
660-DC-001	PM ₁₀ : 0.005 gr/dscf	TBD
660-DC-005	PM ₁₀ : 0.005 gr/dscf	TBD
660-SB-004	PM ₁₀ : 0.005 gr/dscf	TBD
760-BH-001	PM ₁₀ : 0.005 gr/dscf	TBD
760-DC-001	PM ₁₀ : 0.005 gr/dscf	TBD
760-DC-005	PM ₁₀ : 0.005 gr/dscf	TBD
760-SB-004	PM ₁₀ : 0.005 gr/dscf	TBD

- iii. Control Devices - Each calendar month the permittee shall record the emissions of these control devices using emission factors referenced in the permit application. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- k. **EUG 10 – Off Spec Re-Treatment:** Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on PM_{10/2.5} emissions identified in Specific Condition No. 2.
 - i. Processing Points - Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application, or the latest emission factors from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- l. **EUG 11 – Salt Storage:** Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on PM_{10/2.5} emissions identified in Specific Condition No. 2.
 - i. Processing Points - Each calendar month the permittee shall record the emissions of this operation using manufacturer data, emission factors referenced in the permit application, or the latest emission factors from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
- m. **EUG 12 – Ancillary Units:** Emissions from this operation shall be limited by (and will contribute to) the facility-wide cap on PM_{10/2.5} emissions identified in Specific Condition No. 2.

- i. EUG 12B and 12C - Each calendar month the permittee shall record the emissions of these operations using manufacturer data, engineering estimates, emission factors referenced in the permit application, or the latest emission factors from testing/EPA sources. The permittee shall incorporate monthly emissions into 12-month rolling total emissions. These emissions shall be summed with other emissions for determining compliance with the facility-wide cap.
 - ii. EUG12A: Emissions from these units are anticipated to be negligible and will be incorporated into the facility-wide emissions at a presumptive level of 5 TPY on a monthly 12-month rolling basis and substantiated no less frequently than on a calendar year basis using manufacturer data, engineering estimates, emission factors referenced in the permit application, or the latest emission factors from testing/EPA sources.
3. The differential pressure across the baghouse filters (650-BH-002, 650-BH-003, 660-BH-001, 750-BH-002, 750-BH-003, 760-BH-001) shall be maintained according to the manufacturer's recommendation or range established through testing and shall be recorded weekly.
4. The facility shall operate scrubbers (510-SB-003 510-SB-006, 510-SB-009, 660-SB-004, 710-SB-003, 760-SB-004) within the operating limits as recommended by manufacturers. The facility shall keep the following records for each scrubber system.
 - a. Records of monthly average scrubber's inlet liquid or recirculating liquid flow rate, as appropriate.
 - b. Records of the monthly average scrubber effluent pH.
 - c. Records of the differential pressure of the scrubbers.
5. At least once per month, the permittee shall visually inspect the venting, ductwork, and other conveyance systems to all scrubbers and from the various emissions units required to be vented to these control devices. Results of the inspection shall be recorded following each monthly inspection.
6. The boilers under EUG 3 are subject to 40 CFR Part 60, NSPS Subpart Dc, and shall comply with all applicable sections including, but not necessarily restricted to, the following.
 - a. §60.40c Applicability and delegation of authority.
 - b. §60.41c Definition
 - c. §60.42c Standard for sulfur dioxide (SO₂).
 - d. §60.43c Standard for particulate matter (PM).
 - e. §60.44c Compliance and performance test methods and procedures for sulfur dioxide.
 - f. §60.45c Compliance and performance test methods and procedures for particulate matter.
 - g. §60.46c Emission monitoring for particulate matter.
 - h. §60.48c Reporting and recordkeeping requirements.
7. The permittee shall comply with all applicable standards and requirements of 40 CFR Part 60, NSPS Subpart IIII, for the diesel-fired emergency generator engines and fire pump engine including, but not necessarily limited to, the following.
 - a. §60.4200 Am I subject to this subpart?
 - b. §60.4201 What emission standards must I meet for non-emergency engines if I am a

- stationary CI internal combustion engine manufacturer?
- c. §60.4202 What emission standards must I meet for emergency engines if I am a stationary CI internal combustion engine manufacturer?
 - d. §60.4203 How long must my engines meet the emission standards if I am a manufacturer of stationary CI internal combustion engines?
 - e. §60.4204 What emission standards must I meet for non-emergency engines if I am an owner or operator of a stationary CI internal combustion engine?
 - f. §60.4205 What emission standards must I meet for emergency engines if I am an owner or operator of a stationary CI internal combustion engine?
 - g. §60.4206 How long must I meet the emissions standards if I am an owner or operator of a stationary SI internal combustion engine?
 - h. §60.4207 What fuel requirements must I meet if I am an owner or operator of a stationary CI internal combustion engine subject to this subpart?
 - i. §60.4208 What is the deadline for importing or installing stationary CI ICE produced in the previous model year?
 - j. §60.4209 What are the monitoring requirements if I am an owner or operator of a stationary CI internal combustion engine?
 - k. §60.4210 What are my compliance requirements if I am a stationary CI internal combustion engine manufacturer?
 - l. §60.4211 What are my compliance requirements if I am an owner or operator of a stationary CI internal combustion engine?
 - m. §60.4212 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of less than 30 liters per cylinder?
 - n. § 60.4213 What test methods and other procedures must I use if I am an owner or operator of a stationary CI internal combustion engine with a displacement of greater than or equal to 30 liters per cylinder?
 - o. §60.4214 What are my notification, reporting, and recordkeeping requirements if I am an owner or operator of a stationary CI internal combustion engine?
 - p. §60.4215 What requirements must I meet for engines used in Guam, American Samoa, or the Commonwealth of the Northern Mariana Islands?
 - q. §60.4216 What requirements must I meet for engines used in Alaska?
 - r. §60.4217 What emission standards must I meet if I am an owner or operator of a stationary internal combustion engine using special fuels?
 - s. §60.4218 What parts of the General Provisions apply to me?
8. The permittee shall comply with all applicable standards and requirements of 40 CFR Part 63, NESHAP Subpart ZZZZ, National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE), for the diesel-fired emergency generator engines including, but not limited to, the following.
- a. §63.6580 What is the purpose of subpart ZZZZ?
 - b. §63.6585 Am I subject to this subpart?
 - c. §63.6590 What parts of my plant does this subpart cover?
 - d. §63.6595 When do I have to comply with this subpart?
 - e. §63.6600 What emission limitations must I meet if I own or operate a stationary RICE with a site rating of more than 500 brake HP located at a major source of HAP emissions?

- f. §63.6601 What emission limitations must I meet if I own or operate a new or reconstructed 4SLB with a site rating of greater or equal to 250 brake HP and less than or equal to 500 brake HP located at a major source of HAP emissions?
 - g. §63.6602 What emission limitations must I meet if I own or operate an existing stationary RICE with a site rating of equal or less than 500 brake HP located at an area source of HAP emissions?
 - h. §63.6603 What emission limitations and operating limitations must I meet if I own or operate an existing stationary RICE located at an area source of HAP emissions?
 - i. §63.6604 What fuel requirements must I meet if I own or operate a stationary CI RICE?
 - j. §63.6605 What are my general requirements for complying with this subpart?
 - k. §63.6610 By what date must I conduct the initial performance tests or other initial compliance demonstrations if I own or operating a stationary RICE with a site rating of more than 500 brake HP located at an area source of HAP emissions?
 - l. §63.6611 By what date must I conduct the initial performance tests or other initial compliance demonstration if I own or operate an existing stationary RICE with a site rating of less than or equal to 500 brake HP located at a major source of HAP emissions?
 - m. §63.6612 By what date must I conduct the initial performance tests or other initial compliance demonstration if I own or operate a new or reconstructed 4SLB SI stationary RICE with a site rating of greater than or equal to 250 and less than or equal to 500 brake HP located at a major source of HAP emissions?
 - n. §63.6615 When must I conduct subsequent performance tests?
 - o. §63.6620 What performance tests and other procedures must I use?
 - p. §63.6625 What are my monitoring, installation, operation, and maintenance requirements?
 - q. §63.6630 How do I demonstrate initial compliance with the emission limitations and operating limitations?
 - r. §63.6635 How do I monitor and collect data to demonstrate continuous compliance?
 - s. §63.6640 How do I demonstrate continuous compliance with the emission limitations and operating limitations?
 - t. §63.6645 What notifications must I submit and when?
 - u. §63.6650 What reports must I submit and when?
 - v. §63.6655 What records must I keep?
 - w. §63.6660 In what form and how long must I keep my records?
 - x. §63.6665 What parts of the General Provisions apply to me?
 - y. §63.6670 Who implements and enforces this subpart?
 - z. §63.6675 What definitions apply to this subpart?
9. Within 180 days of start-up of normal operation of the facility, the permittee shall conduct the performance tests in the following list or stack test for each emission point to demonstrate compliance with emission limits listed under Specific Condition No. 2 and to verify the control efficiencies listed under Specific Condition No. 2(d)(ii), 2(f)(ii), 2(i)(ii), and 2(j) (ii).
- a. The permittee shall use the following approved test methods for performance testing:

EP	Pollutant	Test Method
Baghouse		
510-DC-007	PM ₁₀	Method 22: Visual Determination of Fugitive Emissions or equivalent, or
510-DC-008		

EP	Pollutant	Test Method
650-BH-002		Method 9: Visual Opacity or equivalent. ⁽¹⁾
650-BH-003		
750-BH-002		
750-BH-003		
660-BH-001		
660-DC-001		
660-DC-005		
760-BH-001		
760-DC-001		
760-DC-005		
Condenser & Carbon Column		
620-CO-001 and 620-CM-012, 013, and 014	VOC	Method 18: Volatile Organic Compounds – Gas Chromatography or equivalent or Method 25A: Volatile Organic Compounds Emissions or equivalent.
	HCl	Method 26: Determination of Hydrogen Halide and Hydrogen Emissions from Stationary Sources Non-Isokinetic Method or equivalent, or Method 26A: Determination of Hydrogen Halide and Hydrogen Emissions from Stationary Sources Isokinetic Method or equivalent.
720-CO-001 and 720-CM-012, - 13, and 014	VOC	Method 18: Volatile Organic Compounds – Gas Chromatography or equivalent or Method 25A: Volatile Organic Compounds Emissions or equivalent.
	HCl	Method 26: Determination of Hydrogen Halide and Hydrogen Emissions from Stationary Sources Non-Isokinetic Method or equivalent, or Method 26A: Determination of Hydrogen Halide and Hydrogen Emissions from Stationary Sources Isokinetic Method or equivalent.
Scrubber		
510-SB-006	HCl	Method 26: Determination of Hydrogen Halide and Hydrogen Emissions from Stationary Sources Non-Isokinetic Method or equivalent, or Method 26A: Determination of Hydrogen Halide and Hydrogen Emissions from Stationary Sources Isokinetic Method or equivalent.
510-SB-003	PM ₁₀	Method 22: Visual Determination of Fugitive Emissions or equivalent, or Method 9: Visual Opacity or equivalent. ⁽¹⁾
510-SB-009		
660-SB-004		
710-SB-003		
760-SB-004		

⁽¹⁾ If there are visible emissions during method 22 observation, then method 9 is required.

- b. Performance testing and/or stack test shall be conducted while the units are operating under representative conditions.
- c. A protocol describing the testing plan shall be submitted to the Air Quality Division at least 30 days prior to the testing.
- d. A written report documenting the results of emissions testing shall be submitted within 60 days of completion of on-site testing.

10. The permittee shall maintain records of operations as listed below. These records shall be maintained on-site for at least five years after the date of recording and shall be provided to regulatory personnel upon request.
 - a. Records of monthly emissions and 12-month rolling totals per Specific Condition No. 2.
 - b. Records of monthly inlet raw brine for each train and 12-month rolling totals per Specific Condition No. 2(a).
 - c. Records of each baghouse weekly differential pressure per Specific Condition No. 3.
 - d. Records of fuel throughput and appropriate compliance document(s) per Specific Condition No. 2(e)(ii)(2) and 2(e)(iii)(2).
 - e. Records of operating hours for emergency engines per Specific Condition No. 2(e)(iii)(5).
 - f. Records of monthly inspection of conveyance systems to the control devices per Specific Condition No. 5.
 - g. Records of performance tests per Specific Condition No. 9.
 - h. Records required by NSPS Subparts Dc and IIII.
 - i. Records required by NESHAP Subpart ZZZZ.
 - j. Maintain list of miscellaneous tanks noting content, size, and date of installation.
11. Within 180 days of commencement of operation of any emission source(s) authorized by this construction permit, the owner/operator shall submit an administratively complete operating permit application.

**MINOR SOURCE PERMIT TO OPERATE / CONSTRUCT
AIR POLLUTION CONTROL FACILITY
STANDARD CONDITIONS**

(February 13, 2020)

A. The issuing Authority for the permit is the Air Quality Division (AQD) of the Oklahoma Department of Environmental Quality (DEQ) in accordance with and under the authority of the Oklahoma Clean Air Act. The permit does not relieve the holder of the obligation to comply with other applicable federal, state, or local statutes, regulations, rules, or ordinances. This specifically includes compliance with the rules of the other Divisions of DEQ: Land Protection Division and Water Quality Division.

B. A duly issued construction permit or authorization to construct or modify will terminate and become null and void (unless extended as provided in OAC 252:100-7-15(g)) if the construction is not commenced within 18 months after the date the permit or authorization was issued, or if work is suspended for more than 18 months after it is commenced. [OAC 252:100-7-15(f)]

C. The recipient of a construction permit shall apply for a permit to operate (or modified operating permit) within 180 days following the first day of operation. [OAC 252:100-7-18(a)]

D. Unless specified otherwise, the term of an operating permit shall be unlimited.

E. Notification to the Air Quality Division of DEQ of the sale or transfer of ownership of this facility is required and shall be made in writing by the transferor within 30 days after such date. A new permit is not required. [OAC 252:100-7-2(f)]

F. The following limitations apply to the facility unless covered in the Specific Conditions:

1. No person shall cause or permit the discharge of emissions such that National Ambient Air Quality Standards (NAAQS) are exceeded on land outside the permitted facility.

[OAC 252:100-3]

2. All facilities that emit air contaminants are required to file an emission inventory and pay annual operating fees based on the inventory. Instructions are available on the Air Quality section of the DEQ web page. <https://oklahoma.gov/deq.html>

[OAC 252:100-5]

3. Deviations that result in emissions exceeding those allowed in this permit shall be reported consistent with the requirements of OAC 252:100-9, Excess Emission Reporting Requirements.

[OAC 252:100-9]

4. Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in the Open Burning subchapter.

[OAC 252:100-13]

5. No particulate emissions from new fuel-burning equipment with a rated heat input of 10 MMBTUH or less shall exceed 0.6 lbs/MMBTU.

[OAC 252:100-19]

6. No discharge of greater than 20% opacity is allowed except for short-term occurrences which consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity.

[OAC 252:100-25]

7. No visible fugitive dust emissions shall be discharged beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or interfere with the maintenance of air quality standards. [OAC 252:100-29]
8. No sulfur oxide emissions from new gas-fired fuel-burning equipment shall exceed 0.2 lbs/MMBTU. No existing source shall exceed the listed ambient air standards for sulfur dioxide. [OAC 252:100-31]
9. Volatile Organic Compound (VOC) storage tanks built after December 28, 1974, and with a capacity of 400 gallons or more storing a liquid with a vapor pressure of 1.5 psia or greater under actual conditions shall be equipped with a permanent submerged fill pipe or with an organic material vapor-recovery system. [OAC 252:100-37-15(b)]
10. All fuel-burning equipment shall at all times be properly operated and maintained in a manner that will minimize emissions of VOCs. [OAC 252:100-37-36]

G. Any owner or operator subject to provisions of NSPS shall provide written notification as follows: [40 CFR 60.7 (a)]

1. A notification of the date construction (or reconstruction as defined under §60.15) of an affected facility is commenced postmarked no later than 30 days after such date. This requirement shall not apply in the case of mass-produced facilities which are purchased in completed form.
2. A notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable subpart or in §60.14(e). This notice shall be postmarked 60 days or as soon as practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change. The Administrator may request additional relevant information subsequent to this notice.
3. A notification of the actual date of initial start-up of an affected facility postmarked within 15 days after such date.
4. If a continuous emission monitoring system is included in the construction, a notification of the date upon which the test demonstrating the system performance will commence, along with a pretest plan, postmarked no less than 30 days prior to such a date.

H. Any owner or operator subject to provisions of NSPS shall maintain records of the occurrence and duration of any start-up, shutdown, or malfunction in the operation of an affected facility or any malfunction of the air pollution control equipment. [40 CFR 60.7 (b)]

I. Any owner or operator subject to the provisions of NSPS shall maintain a file of all measurements and other information required by this subpart recorded in a permanent file suitable for inspection. This file shall be retained for at least five years following the date of such measurements, maintenance, and records. [40 CFR 60.7 (f)]

J. Any owner or operator subject to the provisions of NSPS shall conduct performance test(s) and furnish to AQD a written report of the results of such test(s). Test(s) shall be conducted within 60 days after achieving the maximum production rate at which the facility will be operated, but not later than 180 days after initial start-up. [40 CFR 60.8]



PERMIT

AIR QUALITY DIVISION
STATE OF OKLAHOMA
DEPARTMENT OF ENVIRONMENTAL QUALITY
707 N. ROBINSON, SUITE 4100
P.O. BOX 1677
OKLAHOMA CITY, OKLAHOMA 73101-1677

Permit No. 2025-0054-C

Stardust Power, LLC,

having complied with the requirements of the law, is hereby granted permission to construct the Stardust Muskogee Lithium Refinery, located in Section 22, Township 14N, Range 18E, Muskogee County, Oklahoma, subject to standard conditions dated February 13, 2020, and specific conditions, both attached.

In the absence of construction commencement, this permit shall expire 18 months from the issuance date, except as authorized under Section B of the Standard Conditions.

DRAFT

Lee Warden, P.E.
Permits and Engineering Group Manager

Date Issued

Chris Celano
Stardust Power, LLC
9112 N. Kelley Avenue, Suite C
Oklahoma City, OK 73131

Subject: Construction Permit No. **2025-0054-C**
Stardust Muskogee Lithium Refinery (Fac. ID: 24588)
Section 22, Township 14N, Range 18E, Muskogee County

Dear Mr. Celano:

Enclosed is the permit authorizing construction at the referenced facility. Please note that this permit is issued subject to standard and specific conditions which are attached. These conditions must be carefully followed since they define the limits of the permit and will be confirmed by periodic inspections.

Also note that you are required to annually submit an emission inventory for this facility. An emission inventory must be completed through DEQ's electronic reporting system by April 1st of every year. Any questions concerning the form or submittal process should be referred to the Emission Inventory Staff at (405) 702-4100.

Thank you for your cooperation. If you have any questions, please refer to the permit number above and contact the permit writer at (918) 293-1615, or by e-mail at jennie.doan@deq.ok.gov. Air Quality personnel is located in the Regional Office at Tulsa, 9933 E. 16th Street, Tulsa, OK, 74128.

Sincerely,



Jennie Doan, E.I.,
Engineering Section
AIR QUALITY DIVISION

Enclosure

Muscogee Nation
Attn.: David Hill, Principal Chief
P.O. Box 580
Okmulgee, OK 74447

Subject: Construction Permit No. **2025-0054-C**
Stardust Power, LLC
Stardust Muskogee Lithium Refinery (Fac. ID: 24588)
Section 22, Township 14N, Range 18E, Muskogee County
Latitude: 35.67814°, Longitude: -95.37869°
Date Received: January 20, 2025

Dear Chief Hill:

The Oklahoma Department of Environmental Quality (ODEQ), Air Quality Division (AQD), has received the Tier I application referenced above. A Tier I application requires AQD to provide a 30-day public comment period on the draft Tier I permit on the ODEQ website. Since the proposed project falls within your Tribal jurisdiction, AQD is providing this direct notice. This letter notification is in addition to email notifications provided to tribal contacts on record.

Copies of draft permits and comment opportunities are provided to the public on the ODEQ website at the following location:

<https://oklahoma.gov/deq/permits/permit-assistance/permits-for-public-review.html>

If you prefer a copy of the draft permit, or direct notification by letter for any remaining public comment opportunities, if applicable, on the referenced permit action, please notify our Chief Engineer, Phillip Fielder, by e-mail at phillip.fielder@deq.ok.gov, or by letter at:

Department of Environmental Quality, Air Quality Division
Attn.: Phillip Fielder, Chief Engineer
P.O. Box 1677
Oklahoma City, OK, 73101-1677

Thank you for your cooperation. If you have any questions, I can be contacted at (405) 702-4237 and Mr. Fielder may be reached at (405) 702-4185.

Sincerely,



Lee Warden, P.E.
Permit and Engineering Group Manager
AIR QUALITY DIVISION

Cherokee Nation
Attn: Chuck Hoskin, Jr., Principal Chief
P.O. Box 948
Tahlequah, OK 74465

Subject: Construction Permit No. **2025-0054-C**
Stardust Power, LLC
Stardust Muskogee Lithium Refinery (Fac. ID: 24588)
Section 22, Township 14N, Range 18E, Muskogee County,
Latitude: 35.67814°, Longitude: -95.37869°
Date Received: January 20, 2025

Dear Chief Hoskin:

The Oklahoma Department of Environmental Quality (ODEQ), Air Quality Division (AQD), has received the Tier I application referenced above. A Tier I application requires AQD to provide a 30-day public comment period on the draft Tier I permit on the ODEQ website. Since the proposed project falls within your Tribal jurisdiction, AQD is providing this direct notice. This letter notification is in addition to email notifications provided to tribal contacts on record.

Copies of draft permits and comment opportunities are provided to the public on the ODEQ website at the following location:

<https://oklahoma.gov/deq/permits/permit-assistance/permits-for-public-review.html>

If you prefer a copy of the draft permit, or direct notification by letter for any remaining public comment opportunities, if applicable, on the referenced permit action, please notify our Chief Engineer, Phillip Fielder, by e-mail at phillip.fielder@deq.ok.gov, or by letter at:

Department of Environmental Quality, Air Quality Division
Attn.: Phillip Fielder, Chief Engineer
P.O. Box 1677
Oklahoma City, OK, 73101-1677

Thank you for your cooperation. If you have any questions, I can be contacted at (405) 702-4237 and Mr. Fielder may be reached at (405) 702-4185.

Sincerely,



Lee Warden, P.E.
Permit and Engineering Group Manager
AIR QUALITY DIVISION

**Department of Environmental Quality (DEQ)
Air Quality Division (AQD)
Acronym List**

9-8-2025

ACFM	Actual Cubic Feet per Minute	GACT	Generally Achievable Control Technology
AD	Applicability Determination	GAL	Gallon (gal)
AFRC	Air-to-Fuel Ratio Controller	GDF	Gasoline Dispensing Facility
API	American Petroleum Institute	GEP	Good Engineering Practice
ASTM	American Society for Testing and Materials	GHG	Greenhouse Gases
AVO	Audio, Visual, or Olfactory	GR	Grain(s) (gr)
BACT	Best Available Control Technology	H₂CO	Formaldehyde
BAE	Baseline Actual Emissions	H₂S	Hydrogen Sulfide
BBL	Barrel(s)	HAP	Hazardous Air Pollutants
BHP	Brake Horsepower (bhp)	HC	Hydrocarbon
BTEX	Benzene, Toluene, Ethylbenzene, Xylene	HCFC	Hydrochlorofluorocarbon
BTU	British thermal unit (Btu)	HFR	Horizontal Fixed Roof
C&E	Compliance and Enforcement	HON	Hazardous Organic NESHAP
CAA	Clean Air Act	HP	Horsepower (hp)
CAM	Compliance Assurance Monitoring	HR	Hour (hr)
CAS	Chemical Abstract Service	I&M	Inspection and Maintenance
CAAA	Clean Air Act Amendments	IBR	Incorporation by Reference
CC	Catalytic Converter	ICE	Internal Combustion Engine
CCR	Continuous Catalyst Regeneration	LAER	Lowest Achievable Emission Rate
CD	Consent Decree	LB	Pound(s) [Mass] (lb, lbs, lbm)
CEM	Continuous Emission Monitor	LB/HR	Pound(s) per Hour (lb/hr)
CFC	Chlorofluorocarbon	LDAR	Leak Detection and Repair
CFR	Code of Federal Regulations	LNG	Liquefied Natural Gas
CI	Compression Ignition	LT	Long Ton(s) (metric)
CNG	Compressed Natural Gas	LTPD	Long Tons per Day
CO	Carbon Monoxide or Consent Order	LPE	Legally and Practicably Enforceable
COA	Capable of Accommodating	M	Thousand (Roman Numeral)
COM	Continuous Opacity Monitor	MAAC	Maximum Acceptable Ambient Concentration
D	Day	MACT	Maximum Achievable Control Technology
DEF	Diesel Exhaust Fluid	MM	Prefix used for Million (Thousand-Thousand)
DG	Demand Growth	MMBTU	Million British Thermal Units (MMBtu)
DSCF	Dry Standard (At Standard Conditions) Cubic Foot (Feet)	MMBTUH	Million British Thermal Units per Hour (MMBtu/hr)
EGU	Electric Generating Unit	MMSCF	Million Standard Cubic Feet (MMscf)
EI	Emissions Inventory	MMSCFD	Million Standard Cubic Feet per Day
EPA	Environmental Protection Agency	MSDS	Material Safety Data Sheet
ESP	Electrostatic Precipitator	MWC	Municipal Waste Combustor
EUG	Emissions Unit Group	MWe	Megawatt Electrical
EUSGU	Electric Utility Steam Generating Unit	NA	Nonattainment
FCE	Full Compliance Evaluation	NAAQS	National Ambient Air Quality Standards
FCCU	Fluid Catalytic Cracking Unit	NAICS	North American Industry Classification System
FEL	Federally Enforceable Limit(s)		
FESOP	Federally Enforceable State Operating Permit		
FIP	Federal Implementation Plan		
FR	Federal Register		

NESHAP	National Emission Standards for Hazardous Air Pollutants	SCC	Source Classification Code
NH₃	Ammonia	SCF	Standard Cubic Foot
NMHC	Non-methane Hydrocarbon	SCFD	Standard Cubic Feet per Day
NGL	Natural Gas Liquids	SCFM	Standard Cubic Feet per Minute
NO₂	Nitrogen Dioxide	SCR	Selective Catalytic Reduction
NO_x	Nitrogen Oxides	SEP	Supplemental Environmental Project
NOI	Notice of Intent	SER	Significant Emission Rate
NSCR	Non-Selective Catalytic Reduction	SI	Spark Ignition
NSPS	New Source Performance Standards	SIC	Standard Industrial Classification
NSR	New Source Review	SIP	State Implementation Plan
		SNCR	Selective Non-Catalytic Reduction
O₃	Ozone	SO₂	Sulfur Dioxide
O&G	Oil and Gas	SO_x	Sulfur Oxides
O&M	Operation and Maintenance	SOP	Standard Operating Procedure
O&NG	Oil and Natural Gas	SRU	Sulfur Recovery Unit
OAC	Oklahoma Administrative Code	T	Tons
OC	Oxidation Catalyst	TAC	Toxic Air Contaminant
OGI	Optical Gas Imaging	TEG	Triethylene Glycol
PAH	Polycyclic Aromatic Hydrocarbons	THC	Total Hydrocarbons
PAE	Projected Actual Emissions	TPY	Tons per Year
PAL	Plant-wide Applicability Limit	TRS	Total Reduced Sulfur
Pb	Lead	TSP	Total Suspended Particulates
PBR	Permit by Rule	TV	Title V of the Federal Clean Air Act
PCB	Polychlorinated Biphenyls	µg/m³	Micrograms per Cubic Meter
PCE	Partial Compliance Evaluation	US EPA	U. S. Environmental Protection Agency
PEA	Portable Emissions Analyzer	VFR	Vertical Fixed Roof
PFAS	Per- and Polyfluoroalkyl Substance	VMT	Vehicle Miles Traveled
PM	Particulate Matter	VOC	Volatile Organic Compound
PM_{2.5}	Particulate Matter with an Aerodynamic Diameter <= 2.5 Micrometers	VOL	Volatile Organic Liquid
PM₁₀	Particulate Matter with an Aerodynamic Diameter <= 10 Micrometers	VRT	Vapor Recovery Tower
POM	Particulate Organic Matter or Polycyclic Organic Matter	VRU	Vapor Recovery Unit
ppb	Parts per Billion	YR	Year
ppm	Parts per Million	2SLB	2-Stroke Lean Burn
ppmv	Parts per Million Volume	4SLB	4-Stroke Lean Burn
ppmvd	Parts per Million Dry Volume	4SRB	4-Stroke Rich Burn
PSD	Prevention of Significant Deterioration		
psi	Pounds per Square Inch		
psia	Pounds per Square Inch Absolute		
psig	Pounds per Square Inch Gage		
RACT	Reasonably Available Control Technology		
RATA	Relative Accuracy Test Audit		
RAP	Regulated Air Pollutant or Reclaimed Asphalt Pavement		
RFG	Refinery Fuel Gas		
RICE	Reciprocating Internal Combustion Engine		
RO	Responsible Official		
ROAT	Regional Office at Tulsa		
RVP	Reid Vapor Pressure		