COLORADO
Division of Reclamation, Mining and Safety
Department of Natural Resources

# MINERALS PROGRAM INSPECTION REPORT
# PHONE: (303) 866-3567

**The Division of Reclamation, Mining and Safety has conducted an inspection of the mining operation noted below. This report documents observations concerning compliance with the terms of the permit and applicable rules and regulations of the Mined Land Reclamation Board.**

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| **MINE NAME:** Nahcolite Project | **MINE/PROSPECTING ID#:** M-1983-194 | **MINERAL:** Carbonates | **COUNTY:** Rio Blanco |
| **INSPECTION TYPE:** Monitoring | **WEATHER:** Clear | **INSP. DATE:** April 3, 2023 | **INSP. TIME:** 09:00 |
| **OPERATOR:** Natural Soda LLC | **OPERATOR REPRESENTATIVE:** Kirk Daehling | **TYPE OF OPERATION:** 112d-3 - Designated Mining Operation | |
| **REASON FOR INSPECTION:** Normal I&E Program | **BOND CALCULATION TYPE:** None | **BOND AMOUNT:** $4,466,425.00 | |
| **DATE OF COMPLAINT:** NA | **POST INSP. CONTACTS:** DRMS | **JOINT INSP. AGENCY:** None | |
| **INSPECTOR(S):** Amy Yeldell | **INSPECTOR'S SIGNATURE:** Amy Yeldell | **SIGNATURE DATE:** April 17, 2023 | |

## GENERAL INSPECTION TOPICS

**The following list identifies the environmental and permit parameters inspected and gives a categorical evaluation of each**

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|---|---|---|
| **(AR) RECORDS---------- PB** | **(FN) FINANCIAL WARRANTY-------- N** | **(RD) ROADS---------- N** |
| **(HB) HYDROLOGIC BALANCE---------- Y** | **(BG) BACKFILL & GRADING---------- N** | **(EX) EXPLOSIVES--------- N** |
| **(PW) PROCESSING WASTE/TAILING---- Y** | **(SF) PROCESSING FACILITIES------- Y** | **(TS) TOPSOIL---------- N** |
| **(MP) GENL MINE PLAN COMPLIANCE- Y** | **(FW) FISH & WILDLIFE---------- N** | **(RV) REVEGETATION---- N** |
| **(SM) SIGNS AND MARKERS---------- N** | **(SP) STORM WATER MGT PLAN---- Y** | **(RS) RECL PLAN/COMP-- N** |
| **(ES) OVERBURDEN/DEV. WASTE--------- N** | **(SC) EROSION/SEDIMENTATION--- N** | **(ST) STIPULATIONS------- N** |
| **(AT) ACID OR TOXIC MATERIALS------- N** | **(OD) OFF-SITE DAMAGE----------N** | |

**Y = Inspected / N = Not inspected / NA = Not applicable to this operation / PB = Problem cited / PV = Possible violation cited**

The following inspection topic(s) were identified as having a Problem (PB), which includes correction actions and a deadline whereby the Operator must demonstrate compliance with the conditions of the Permit and the requirements of the Act and Rules. Failure to address the corrective actions by the deadline may cause the Division to escalate the Problem to a Possible Violation (PV) and schedule the issue for formal hearing before the Mined Land Reclamation Board (Board).

**INSPECTION TOPIC:** Availability Of Records

**PROBLEM**: Two additives (crystal habit modifier and defoamer) and a corrosion inhibitor (oxygen scavenger chemical) are being utilized on site. The Division does not have sufficient information on these products. This is cited as an inspection problem.

**CORRECTIVE ACTIONS:** Please provide the Division with Safety Data Sheets for each of the materials mentioned above by the corrective action due date.

**CORRECTIVE ACTION DUE DATE:** 6/16/23

## OBSERVATIONS

This inspection was conducted as part of the Colorado Division of Reclamation, Mining, and Safety (Division) normal monitoring program. The Nahcolite Project is a 112d-3 permitted site that includes a total of 12,248 permitted acres with a maximum disturbance of 260 acres. At this time, approximately 100 acres have been affected. The Division holds $4,466,425.00 in financial warranty. The site is located approximately 25 miles southwest of Meeker, Colorado in Rio Blanco County. Kirk Daehling and Nathan Fisk represented the operator and accompanied Amy Yeldell of the Division on the inspection. No representative from White River Field Office BLM was present for the inspection.

This is the first quarter inspection for 2023. The focus of this inspection was the process building and internal equipment, the well field and evaporation pond was not inspected. No changes to production level or staffing have occurred or are anticipated in the near future.

Division staff first checked in at the main office. Prior to commencement of the inspection, a safety video was presented. Additional site specific PPE (hair net and metallic ear protection) was provided. The Division then proceeded to inspect the process building.

Pregnant liquor from the well field first enters into a series of heat exchangers and crystallizers which help cool down the pregnant liquor which in turn drops out the bicarb. The solution leaving the crystallizers is approximately 15% solids. The crystallizers are large tanks with mechanical agitators. There are four crystallizers in each of the trains (2 trains total) connected in series. Between each crystallizer (1-3) is an external plate and frame type heat exchanger, where pregnant liquor (hot) is cooled by counter current flow of the barren liquor (cool) and heat is exchanged between the two. Crystallizer No. 4 is cooled with a cooling tower water.

Last summer the original #4 crystallizer in Train #1 was replaced with a new stainless steel crystallizer (Photo One). Eventually the other three crystallizers in Train 1 will be replaced with stainless steel ones. The concrete curbing around the sump of Crystallizer #4 had also recently been repaired (Photo Two). In general the pregnant

liquor is mildly corrosive to concrete. NSI has applied epoxy to one area so far and plans to eventually coat all concrete in epoxy to prevent it from eroding.

Next the boiler area was inspected. Barren liquor is reheated prior to reinjection for mining. At the time of the inspection both boilers were online. The boilers are fueled by natural gas. Routine boil outs (descale/clean out inside of boiler) are conducted as necessary for optimal performance of equipment. The flushed material reports to process pond #2 since it does not meet food grade standards. All other sumps report back to the barren liquid lines. At the time of the inspection all floor sumps within the boiler room appeared to be dry and in good working order (Photo Three).

A food grade additive, crystal habit modifier (seed crystal), is stored within the boiler room (Photo Four). This product is added in low concentrations (less than 20 pm). This additive helps keep particles flat and maintain shape throughout processing. The additive also helps give the sodium bicarbonates something to initially bind to rather than scaling up the process equipment.

Also stored within the boiler room are four oxygen scavenger units which deaerate or remove dissolved oxygen from the boiler feed water and boiler by the use of a chemical additive. This process is essential because dissolved oxygen within the boiler is very corrosive at higher temperatures and pressure. Without treatment it could lead to pitting, leaks or equipment failure. Extra barrels of the liquid oxygen scavenger chemical are on site and the extra corrosion inhibitor chemical is stored on spill pallets (Photo Five). In the event of a spill the material would be contained within the floor sump system.

Outside of the boiler room contained within the process building to the south is the Heat Exchanger No. 1. This is the final heating point of the hot barren liquor prior to it going back into the well field for reinjection. The heat exchanger is located within the containment area which reports to the 3ac process pond via a 6-inch sump line (Photo Six).

The Division then inspected the Train 2 crystallizers which are cone shaped on the bottom rather than flat bottomed like Train 1. During the inspection it was noted that several of the heat exchanger plates of Train 2 were leaking (Photo Seven). This was described as typical because the bicarb solution is corrosive. Internal plates are replaced as needed. All leaking bicarb solution within the process building reports to in floor containment sumps, which then pumps the material back into the barren liquor tank for reinjection. If the sump overflows a 6-inch overflow pipe gravity feeds material into the 3 acre process pond.

Adjacent to the Train 2 crystallizers is the defoamer tank (Photo Eight). This anti-foamant is utilized within the barren liquor streams.

The inspection then proceeded to the dewatering stage. The concentrated bicarb solution leaves the crystallizers as a slurry and goes to the hydroclones for thickening. The under flow from the hydroclones is 50% moisture and is fed to the centrifuge. Within they centrifuge the slurry is spun for further dewatering. Material exiting the centrifuge has approximately 4% moisture remaining and is referred to as "wet cake". All liquid from the dewatering stage is returned to the crystallizer area where it is now in the barren stream, which is used to cool the crystallizer feed streams. All seed crystal removed in the centrifuge is recirculated within the barren stream and re-used.

From the centrifuge, the wet cake screw transports, the wet cake into the mixer where it is combined with recycled dry product to enhance drying and handling. The mixture then goes through thermal drying. The flash dry blows super-heated air vertically. As the dry cake is introduced into the hot air it dries and becomes lighter and is blown upward into the dry cyclone. The cyclone helps to filter out the air and size particles before going

to the bag house. At the end of the drying system materials contain approximately 3% moisture. Particles are then sorted based on crystal size and packaged accordingly (Photo Nine).

Currently modifications are being made to replace the existing cyclone with a new one. During the inspection, new ducting was observed on cribbing (Photo Ten). The existing beam needed to be removed and replaced with a larger sized one, to account for the new conveyor. The replacement dry cyclone will recover 92% of solids. The existing cyclone has a 90° angle for material to enter into the bag house decreasing its efficiency (Photo Eleven). The new cyclone will use conveyors to feed material straight through the cyclone then into the bag house. It is anticipated that Train 2 will be shut down for approximately five days to swap out equipment.

Lastly the bagging facility was observed. All packaging is automated. Product is metered out and place into a bag or sack. Once sealed the completed bags are then QC weighted, stamped with an ID, x-rayed and if passed loaded onto pallets. QC process for the super sacks have a similar process upon filling them. Acceptable bags are then stacked on a pallet, wrapped and ready for off-site transport.

Two additives (crystal habit modifier and defoamer) and a corrosion inhibitor (oxygen scavenger chemical) are being utilized on site. While these materials are being stored within the secondary containment of the process facility, the Division does not have sufficient information on these products. This is cited as an inspection problem. Please provide the Division with Safety Data Sheets for each of the materials mentioned above by the corrective action due date (June 16, 2023).

Responses to this inspection report should be directed to Amy Yeldell at the Division of Reclamation, Mining and Safety, Room 215, 1001 E 62nd Ave, Denver, CO 80216. Direct contact can be made by phone at 303-866-3567 Ext 8183 or via email at amy.yeldell@state.co.us

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## PHOTOGRAPHS

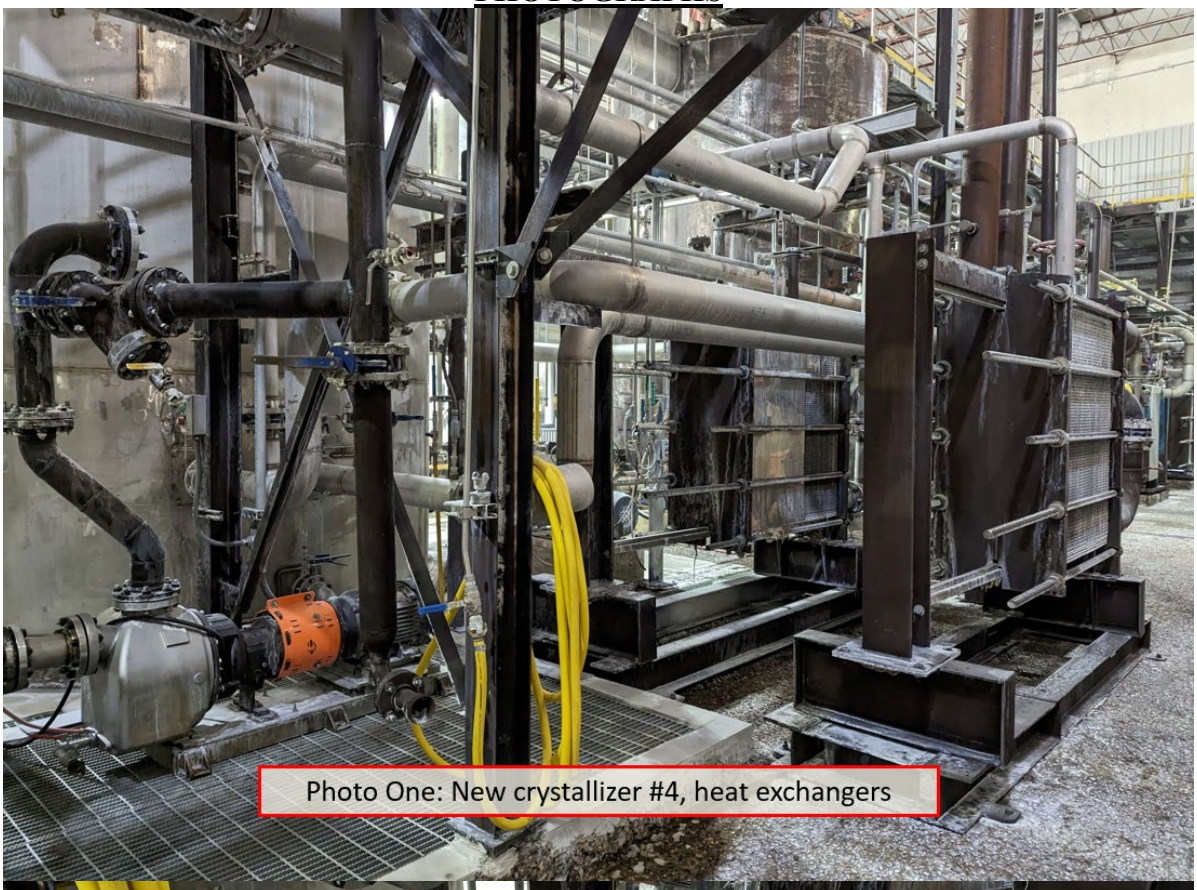

Photo One: New crystallizer #4, heat exchangers

Photo Two: repair concrete sump near crystallizer #4

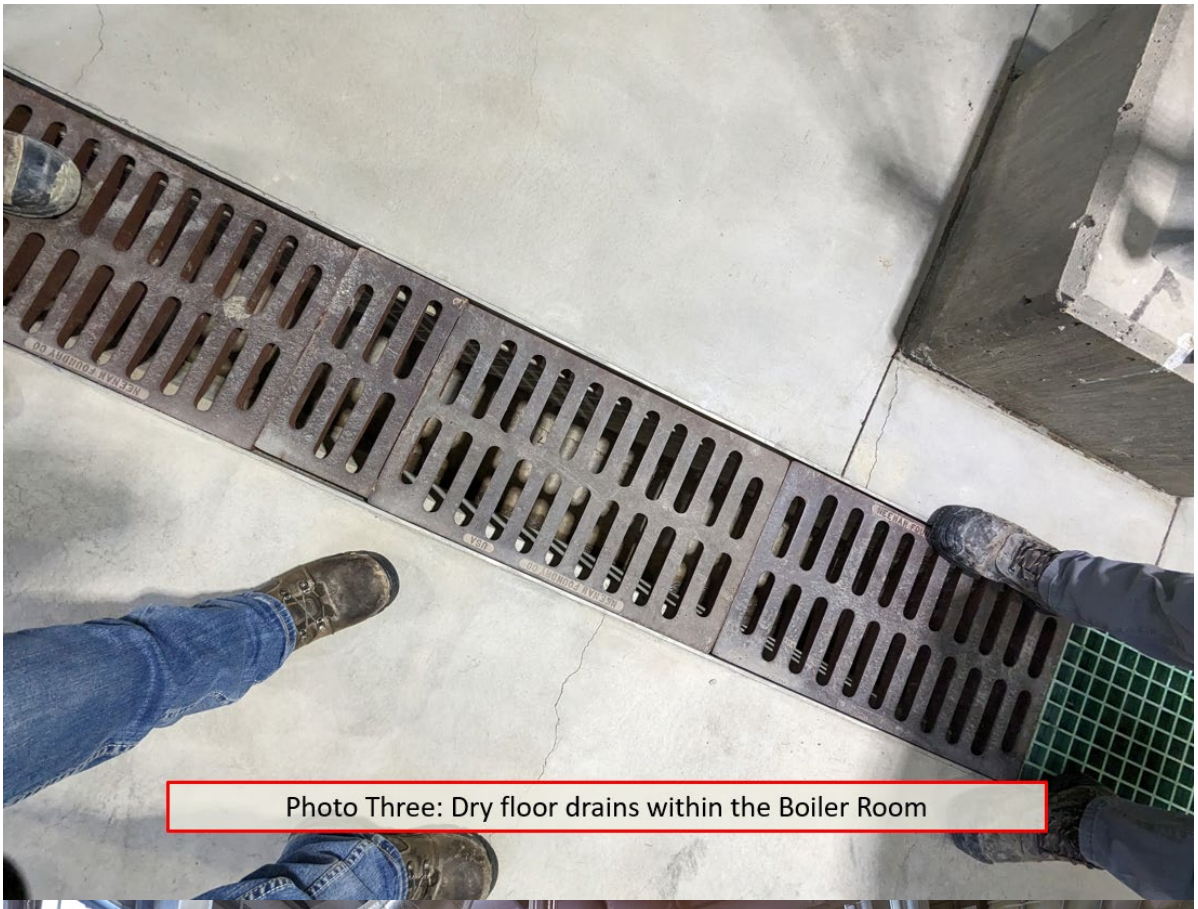

Photo Three: Dry floor drains within the Boiler Room

Photo Four: Totes of Crystal Habit Modifier stored within the Boiler Room

Photo Five: Oxygen Scavenger units (blue) and additional oxygen scavenger chemical (white drums)

Photo Six: Heat Exchanger No. 1 located within containment structure

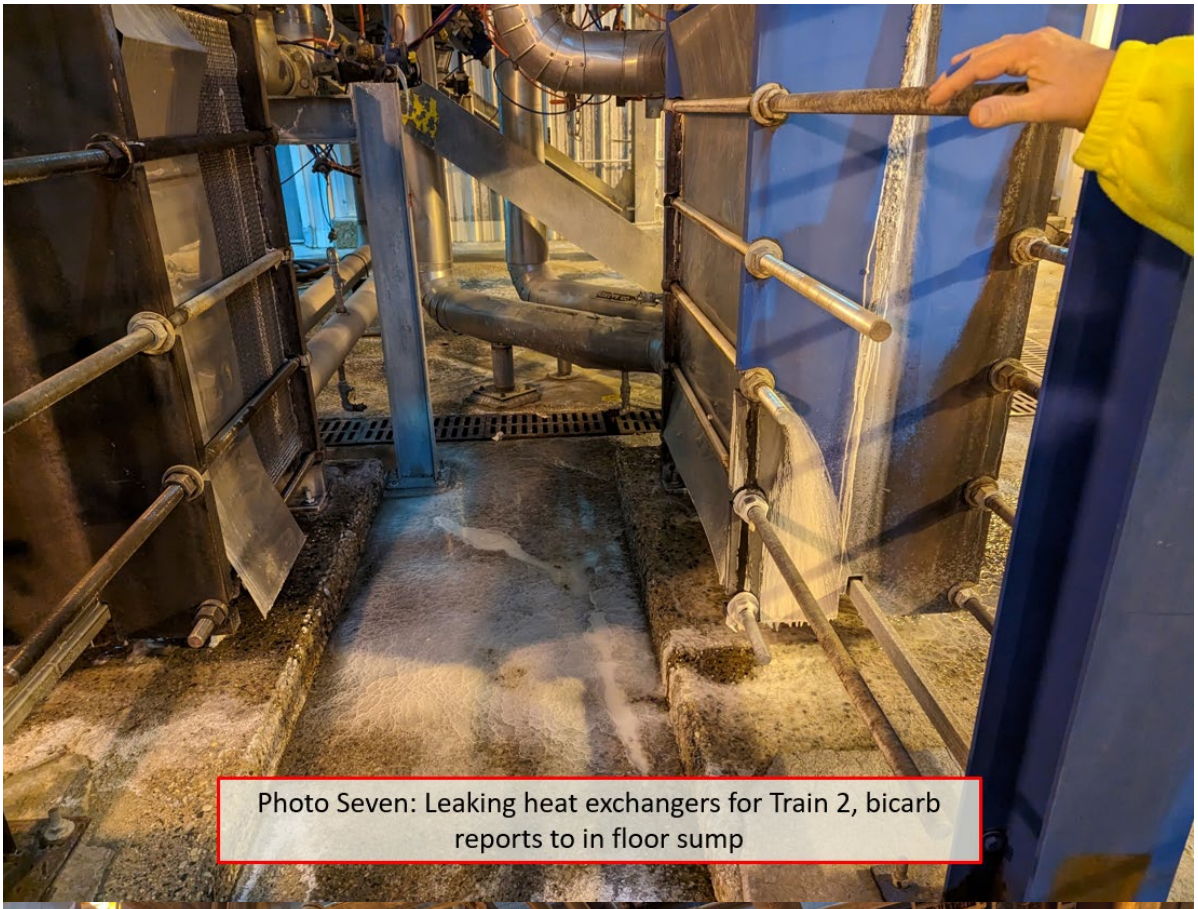

Photo Seven: Leaking heat exchangers for Train 2, bicarb reports to in floor sump

Photo Eight: Defoamer tank located adjacent to Train 2

Photo Nine: Sorter screens to size bicarb particles for packaging

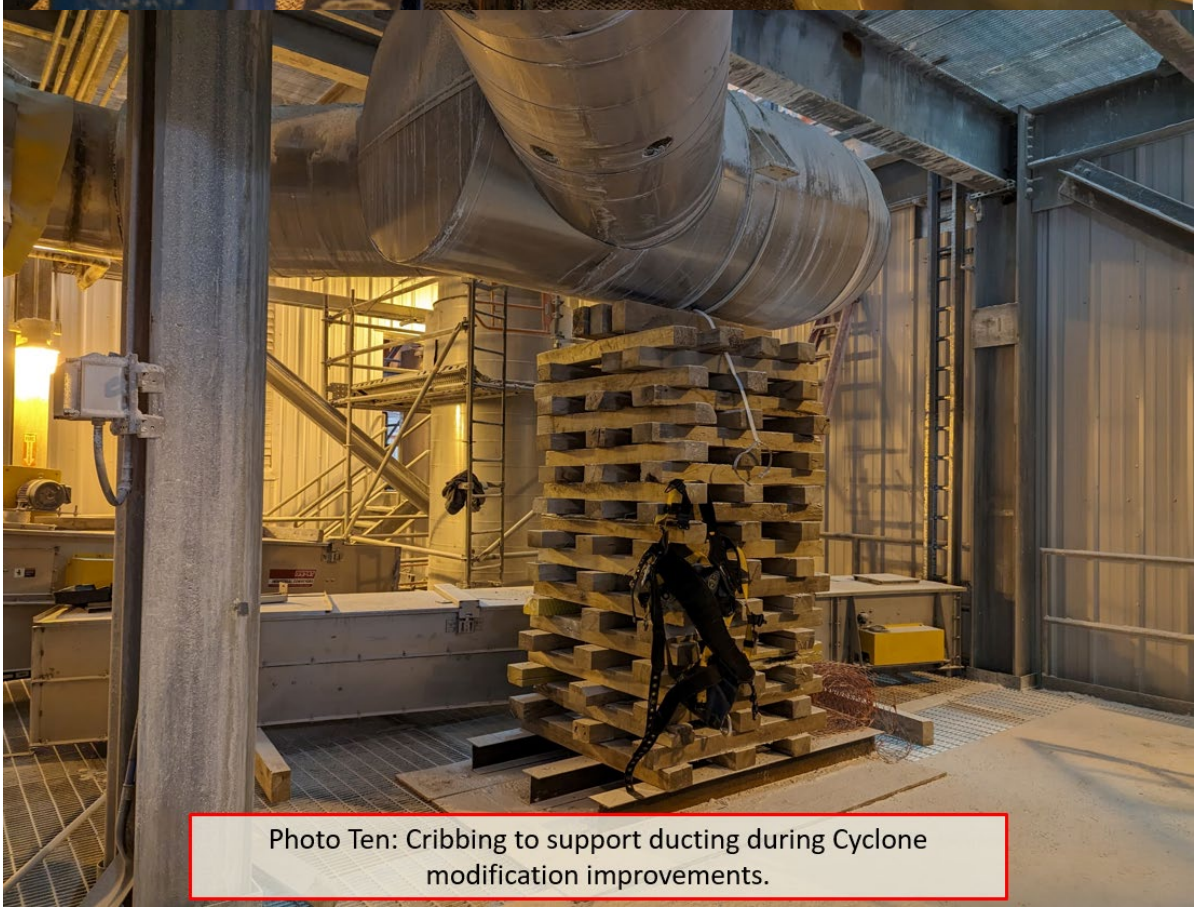

Photo Ten: Cribbing to support ducting during Cyclone modification improvements.

Photo Eleven: Original cyclones that are being replaced