



Red Dog Mine and Anarraaq-Aktigiruaq Exploration Program Field Inspection Report

Inspection Date:	August 6, 2025
Time:	8:00 AM to 4:45 PM
Weather:	Overcast with scattered showers, 5-10 mph winds, with an average temperature of 56°F
Agency Personnel:	Jesse White, William Groom, Aaron Kruse, and Jonathan Kummer
Teck Personnel:	Frank Bendrick, Marie-Christine Noel, and Katie Mountain (intern).
AA-River Personnel:	Dave Rush, Tim Egger (Construction Contractors)
Inspection Objectives:	Site Inspection

Operations:

This report includes two separate operations in the same region of Alaska operated by subsidiary corporations of Teck Resources Limited. The first is Red Dog Mine operated by Teck Alaska, Inc. (TAK). The second is the Anarraaq-Aktigiruaq Exploration Program (AAEP) operated by Teck America, Inc. (TAI) (Map 1).

The Red Dog Mine is in the De Long Mountains (Western Brooks Range) approximately 50 miles northeast of Kivalina and 80 miles north of Kotzebue. The mine is primarily on Northwest Arctic Native Association (NANA) land and a single State upland mining lease located on the southeastern edge of the tailings storage facility (TSF). Red Dog Mine is an open-pit truck-and-loader operation milling approximately 556,000 tonnes of zinc concentrate in 2024¹. Red Dog is the world's largest zinc mines²⁻³ making Teck Resources one of the largest zinc producers in the world.

Nine miles north of the Red Dog Mine is the Anarraaq-Aktigiruaq Exploration Program (AAEP). The exploration project is situated along the upper reaches of Ikalukrok tributaries within the Wulik River drainage of the De Long Mountains. The main deposit resides on state claims with access crossing state

¹ Teck Operations, *Red Dog*, Teck Resources Limited, website available at: <https://www.teck.com/operations/united-states/operations/red-dog/> (accessed 12/24/2025)

² The world's ten largest zinc mines. Available at <https://www.mining-technology.com/marketdata/ten-largest-zincs-mines/> (accessed 12/05/2025)

³ Teck Operations, *Red Dog*, Teck Resources Limited, website available at: <https://www.teck.com/operations/united-states/operations/red-dog/> (accessed 12/05/2025)

and NANA lands. Gravity surveys combined with geologic mapping and geochemistry led to the discovery of the AAEP deposit and several extensions of the Red Dog deposit, doubling its reserves⁴.

Field Inspection Plan, Execution and Summary Schedule:

The primary objective of the Alaska Department of Natural Resources (DNR) Large Mines Permitting Team is to inspect active disturbance, water management, and reclamation at Large Mine Sites. The inspection plan was designed to allow for selecting additional sites for inspection in an opportunistic fashion, and as time allowed. DNR conducts annual inspections to ensure compliance of both the Red Dog Mine and AAEP Plan of Operations Approvals (F20219958POOA, F20229339POA.01) and Reclamation Plan Approvals (F20219558RPA.02, F20229339RPA.02), respectively, as required under AS 27.19, AS 38.05, 11 AAC 86 and 11 AAC 97. DNR is the lead agency regarding mining activities on state and private land for surface disturbance, water use, and reclamation.

At approximately 4:00 PM on August 5th, DNR staff arrived at the Red Dog Airport via an Alaska Airlines charter courtesy of TAI. It's a 3-mile bus ride from the airstrip to the main camp. Upon arrival, DNR staff were assigned rooms and attended a safety brief of the mine and associated facilities. The following morning DNR staff met with Red Dog Operations Environmental Coordinator, Frank Bendrick, to discuss the inspection plan for the following day.

On August 6th, the inspection began by driving to the Anarraq and Aktigiruaq Access Road (AAAR) which starts at the Red Dog Creek Laydown Pad and Red Dog Creek Bridge. After viewing the bridge abutment, the inspection party continued to the AAEP project to view active geotechnical drilling for the proposed South Portal Connector Road (Map 3). After completing inspections along the road, the group continued to the TSF (Tailings Storage Facility), Main Dam, Seepage Collection, Pump Back Facility, Outfall 001, Red Dog Creek Water Diversion, Mine Water Collection System, Mine Sump Pump to TSF, Kiviqsuak seep, creek diversion at the confluence of Rachel and Middle Fork of Red Dog creeks, West Spur Dump, Main Pit, Qanaiyaq Pit, Main Waste Rock Dump (WRD), Material Site - DD2, Bons Creek, Bons Reservoir, and Bons Dam (Map 2).

The following day, DNR staff were invited to visit the Port and its facilities accessed by the De Long Mountain Transportation System (DMTS). Multiple stops were made along the DMTS to view active material sites, water draw locations for dust suppression, storage yards, and road construction. The DMTS crosses multiple lands managed by the National Park Service, NANA, and DNR's Land and Water sections. After a quick tour of the port, we returned to the Red Dog Mine for an inspection debrief then a flight back to Anchorage with a connection to Fairbanks.

Findings:

A summary of findings can be found below with a description of active sites that were visited. Detailed route maps with areas of interest, including photos of all inspected sites with observations notes, are in Appendix A.

1. Inspection of Active Areas of Disturbance and Reclamation

- 1.1. DNR staff arrived at the Red Dog Creek Bridge and laydown area located at the end of Fish Creek Road (Map 2, Photos 1-10).

The laydown area's primary function was for bridge assembly and now is used to support road construction activities for the Anaarraq and Aktigiruaq Access Road (AAAR). Equipment was

⁴ Kelley, K.D., and Jennings, S., 2004, A special issue devoted to barite and Zn-Pb-Ag deposits in the Red Dog District, Western Brooks Range, Northern Alaska [preface]: *Economic Geology*, v. 99, no. 7, p. 1267–1280.

staged onsite with several Connex for storage, culverts, sandbags, and a large dumpster. The area was well organized and maintained.

During spring break-up of Red Dog Creek, snow and ice damming diverted stream flow towards the bridge abutment, washing away some of the abutment armor rock. Teck had concerns about undercutting and began implementing temporary measures for remediation. Heating methods used to assist in melting the snow and ice contributed to the blockage. In mid-May, the jersey barriers were adjusted and sandbags placed in the gaps between them. In late May, the jersey barriers and sandbags were removed. By mid-July the Red Dog Creek Abutment Reconstruction Plan was authorized by ADF&G followed by immediate construction work that lasted approximately 3 weeks. Design modifications and repairs including adding blocks and rock filled gabion cages covered with coarse material were completed by mid-August.

All material used for the AAAR was purchased from Red Dog Material Site - DD2. At the time of inspection, the original road base was being raised and graded within approximately 3 feet of finished height. The Red Dog Creek bridge construction was completed and in good condition.

Visible dust collectors for monitoring airborne particles from vehicles and silt fences were put in place along the AAAR to control soil erosion and stormwater runoff of road sediment from entering adjacent wetlands. Grayling Jr. Creek Bridge did not experience the breakup issues that occurred at Red Dog Bridge. From Grayling Jr. Creek Bridge, we viewed active geo-tech drilling on the opposite side of the Ikalukrok Creek on the proposed path of the South Portal Connector Road to future camp, laydown, and portal. DNR photographed the area proposed for portal excavation where there currently is a temporary tent with an orange flag, situated above an older wood drilling platform.

- 1.2. Active haul truck activity was underway within the Qanaiyaq Pit (Photo 24). DNR staff only observed the area from its periphery which is currently being filled with waste rock. Most of the pit has already been filled and graded in preparation for closure. The remaining high walls will be stabilized and left in place as part of the final reclamation for the site. DNR staff could not visit the Qanaiyaq South Pit area during this inspection due to slick and muddied access road conditions.
- 1.3. DNR staff arrived at the top of the WRD and observed the progress of reclamation activities from the previous year. Since last year, the access road and surrounding areas have been ripped, graded, scarified, and recently seeded adjacent to a lined drainage ditch, which was in good condition. Most seeding efforts occurred in the spring with aerial seeding efforts taking place the previous fall. Early aerial seeding covered the western extent of the Main WRD and the entirety of the northern and western slopes. Vegetative growth looks well established on the western end of the WRD; however, good vegetative cover is sparse on the WRD slopes. Sprouts were just beginning to surface on all areas of recent scarifying.

During the previous year, rilling was prevalent along the slopes of the WRD due to a large rain event. Rills were found along most of the extent of the WRD slopes washing away seeds and causing enlarging furrows running downslope within graded areas of top cover. Large amounts of material were found within the ditch that runs the length along the base of the WRD slopes from erosion. Since then, TAK has used best management practices to correct these erosional issues. Re-grading of rilled areas was undertaken and seeds were sewn by hand to reestablish soil stability. Care was taken when re-grading as to not compact the top cover so seeds can more easily take root. Below the Main WRD along the main access road to the mine, a plot was fertilized to test if it would promote a faster germination for slope stabilization. This area resides next to a successful 17-acre vegetative test plot that was originally established in 2017. Rilling still persists in some areas after it was tracked by a dozer, no ripping occurred. DNR has noted that TAK has made significant progress in remediating these erosional issues and will continue to

monitor slope stability and vegetative growth as part of their reclamation requirements. (See photos 25-29 and 32-35)

A small storage yard was in place at the base of the WRD along the main mine access road. At time of inspection, TAK was moving Conex storage containers from a yard adjacent to the TSF. This area will become inundated with water as the TSF fills. The new storage yard resides at the base of the Main WRD. Here, DNR staff were able to photograph the lined ditch that runs the length of the WRD. The ditch still had top cover material that continues to wash into it from areas that have not yet been stabilized.

- 1.4. DNR staff viewed the Main Pit infill from the West Spur Dump (Photos 30 and 31).
- 1.5. Material Site DD2 (photos 37-39) is an active material site with several stockpiles for construction material adjacent to the southwestern edge of the TSF. All active excavation observed was at the western extent, above and behind the older pits which have since filled with water. All current material for AAEP road came from top of DD2.

2. Water Management

- 2.0. The TSF Main Dam and Seepage Collection Pond, dam, and pump back facility (Map 2, Photos 11-15) looked well maintained and in good working order. The seepage collection pond was empty except for small puddles resulting from precipitation. An active drill rig was situated in the center-middle of the Main Dam installing instrumentation including inclinometer, piezometer, thermistor, and GPS.
- 2.1. Observations of active water discharge exiting Outfall 001 noting that the treated water discharge point had a steady flow of clean clear water (Photo 16). A distinct boundary between the natural mineralized background water and treated water is noticeable within the mixing zone at Outfall 001 (Photo 17). The Mine Water Collection System and main sump had a minor amount of bright rusty orange water and sediments (Photo 18). The sump was not operating at the time of inspection. When the sump's reservoir contains enough water, it is pumped directly into the TSF. The Middle Fork Red Dog Creek Diversion contained naturally clouded orange flowing water and the Mine Water Diversion Dam was in good condition (Photo 19).
- 2.2. The Kivisauk seep originates from a rivulet on the backside of Qanaiyaq South Pit and now is collected and piped to Hilltop Creek (Photos 20 and 21), which is part of the water management and treatment system. DNR staff did not go to Kivisauk seep's collection point, it was only viewed at the discharge point. Current water flow volumes sampled exiting the Kivisauk Seep fill a 5-gallon bucket in approximately 45 seconds. Zinc oxide precipitates are visible just below the diversion pipeline outfall and is the result of natural background mineralization. Teck staff indicated that no chemical signature to show mine contact was found with monitoring. The diversion pipeline has been in place for approximately 5 years, and TAK is proposing that it be disconnected to allow seep water to flow back into its natural drainage.
- 2.3. DNR personnel viewed the confluence of Rachel and Middle Fork of Red Dog Creeks (Photo 22) and downstream pipeline diversion (Photo 23). Both creeks contain flowing naturally clouded orange background water that converge and enter the diversion pipeline which empties into the diversion ditch near the mine water collection system (Photo 19) upstream from Outfall 001.
- 2.4. DNR staff stopped at Bons Reservoir to take some photographs of the freshwater supply for the mine. The reservoir was free of visible debris, and everything was in good working order. (See photos 40 and 41)

Conclusion and Recommendations:

Overall, both TAI and TAK facilitate their exploration, construction, and mining activities in a manner which prevents unnecessary and undue degradation of NANA land, State land and State water resources. All observed activities conform with the Plan of Operations and Reclamation Plan Approvals, and current activities meet the state's requirements under AS 27.19.020 and 11 AAC 97. DNR finds Red Dog Mine and AAEP operations are in good condition and consistent with industry standards.

Report prepared by: Jesse Garnett White and Aaron Kruse

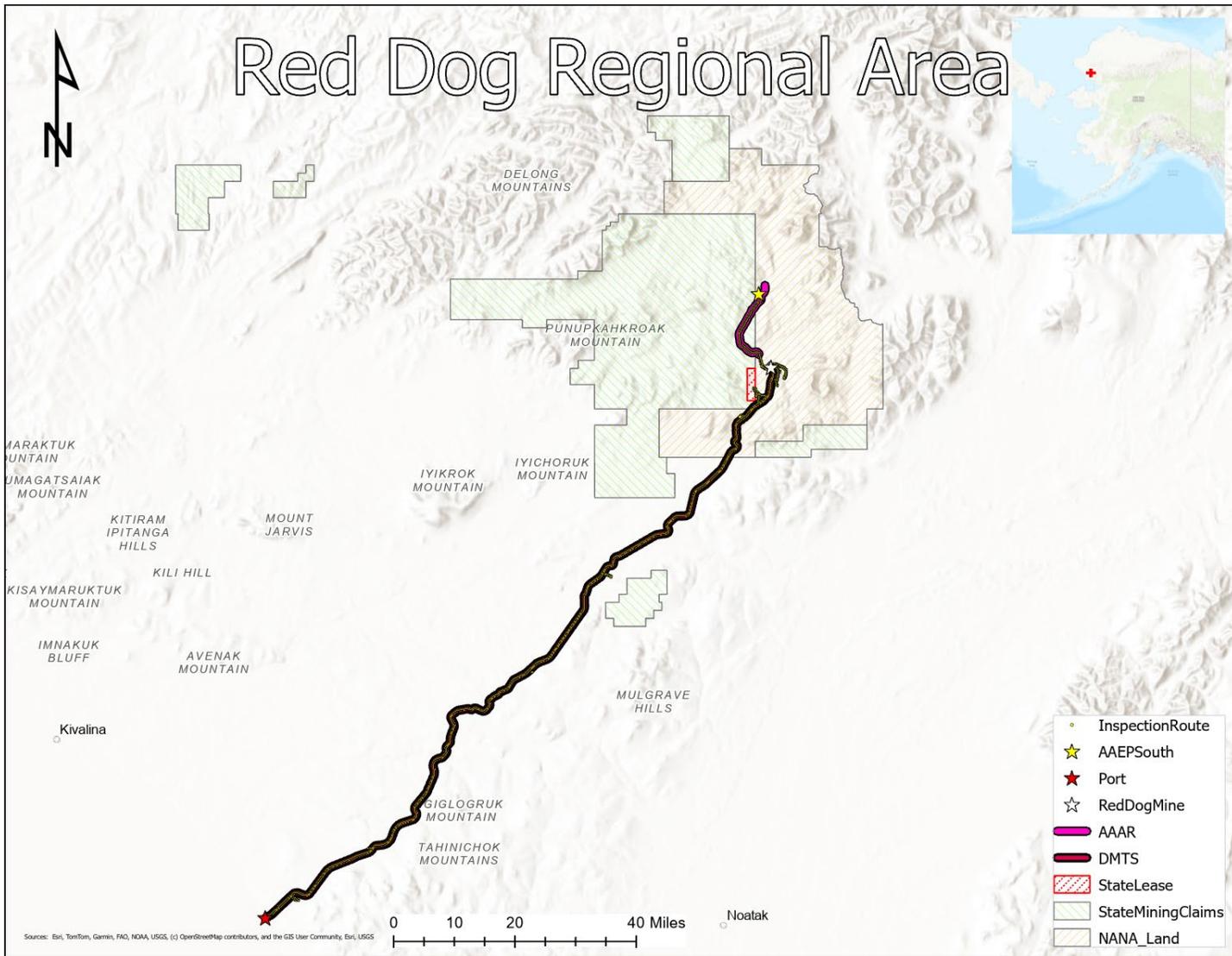
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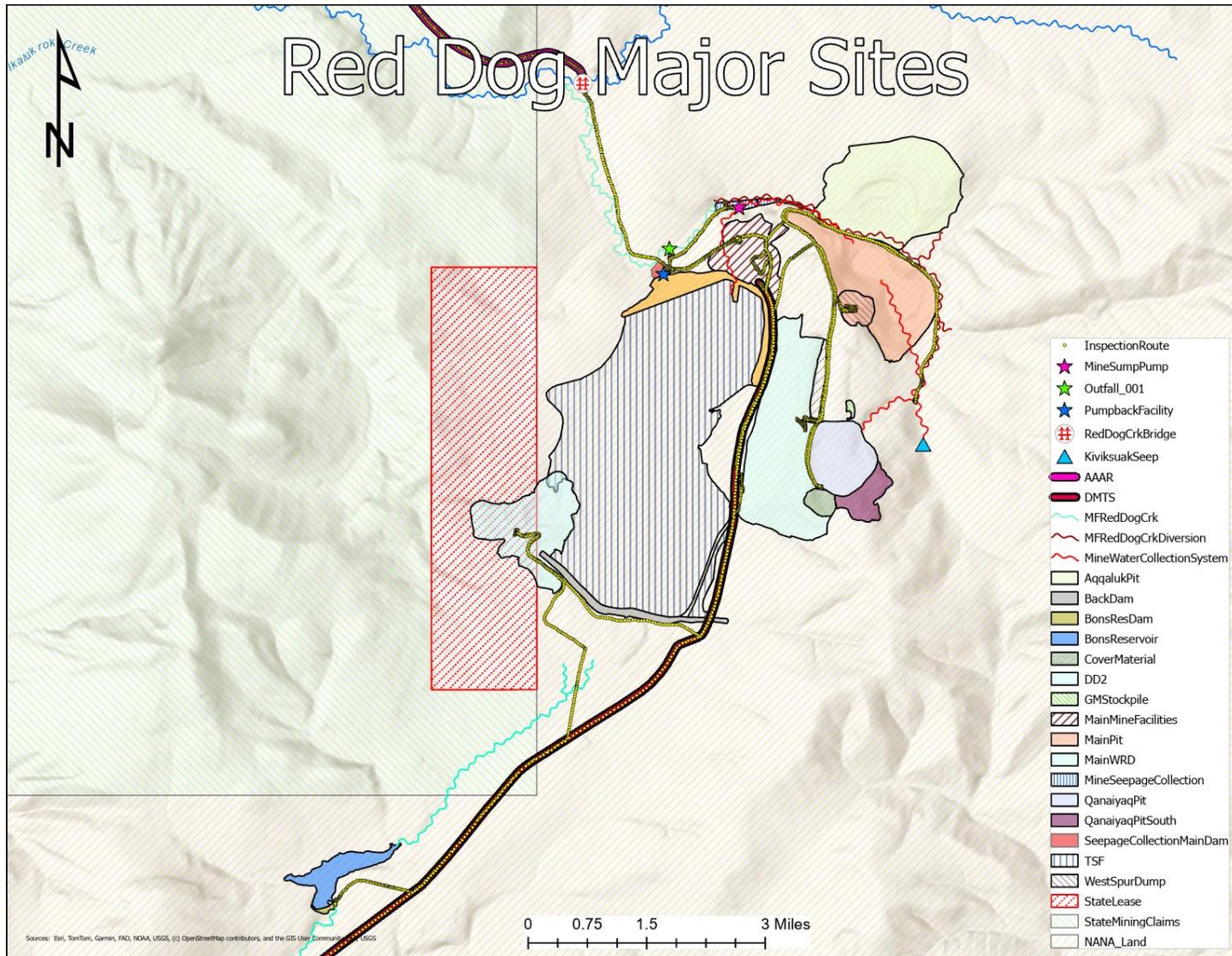
Kim Bustillos (DNR)
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Jacob Rowland (Teck)
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Appendix A

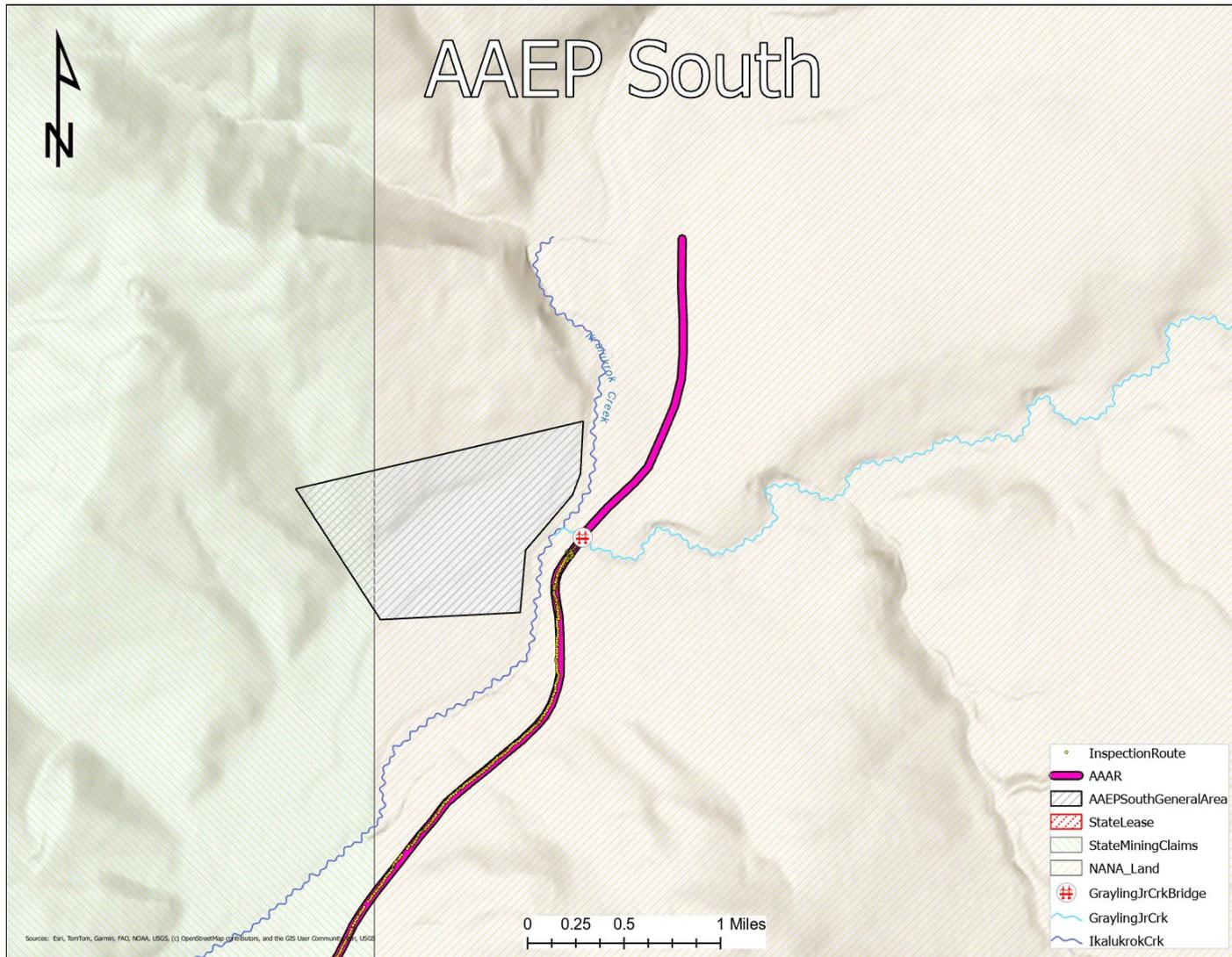
Inspection Maps and Observations of Note



Map 1: Locations of Inspection Route, Red Dog Port, Red Dog Mine, AAEP South and Land Ownership. The De Long Mountain Transportation System (DMTS) is between the Port and Red Dog Mine and the AAEP Exploration Road is between Red Dog Creek Bridge and AAEP.



Map 2: Red Dog Mine Major Sites, Roads, Creeks, and Land Management.



Map 3: General Location of proposed AAEP South Portal and Pad, Grayling Jr. Creek Bridge, and Grayling Jr. and Ikalukrok creeks.

Field Inspection Observations of Note with Photos in Sequence of Inspection

Photo 1: Red Dog Creek Bridge surface and construction.



Photo 2: Red Dog Creek Bridge and construction.



Photo 3: Red Dog Creek Bridge reinforced north bridge abutment. Cover material is observed which overlays gabion cages put in place to stabilize abutment (circled).



Photo 4: Equipment crossing Red Dog Creek Bridge and construction.

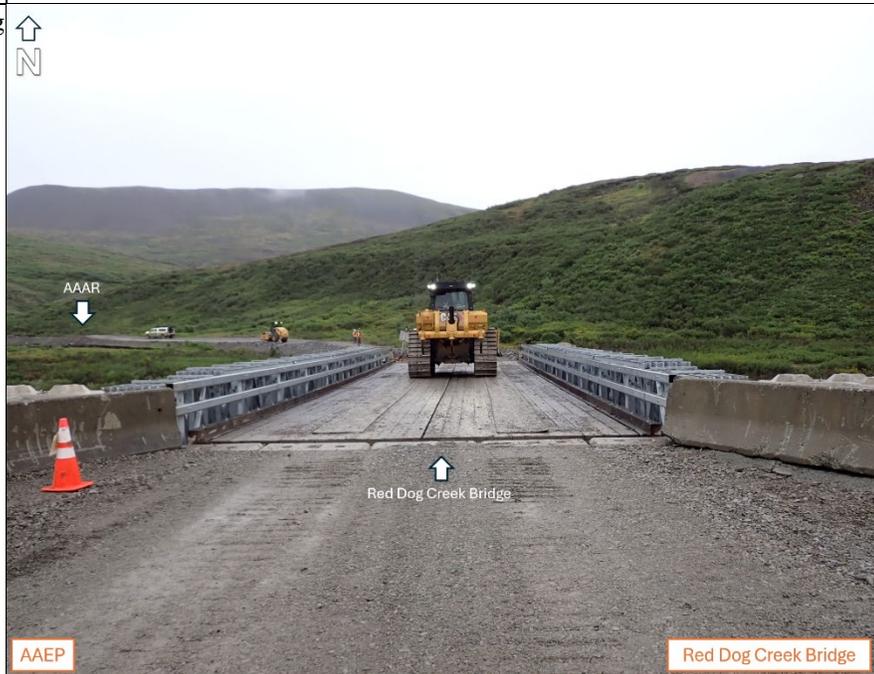


Photo 5: Red Dog Creek Bridge reinforced south bridge abutment.



Photo 6: Geotech drilling rig in operation along the proposed AAEP South Portal Connector Road.



Photo 7: AAEP South Portal Area. Proposed location for portals (circled).



Photo 8: Bridge crossing at Grayling Jr. Creek across from the proposed South Portal Pad, camp, and associated facilities. Ikalukrok Creek to the left. Mount Raven enshrouded in clouds in the background.



Photo 9: View of Grayling Jr. Creek bridge abutment.



Photo 10: Grayling Jr. Creek Bridge, bridge abutment. Abutment is well armored with riprap boulders.



Photo 11: TSF Dam. Drill rig instrumentation installation. Photo taken just east of the seepage collection area.



Photo 12: View of the TSF dam face and drill rig.

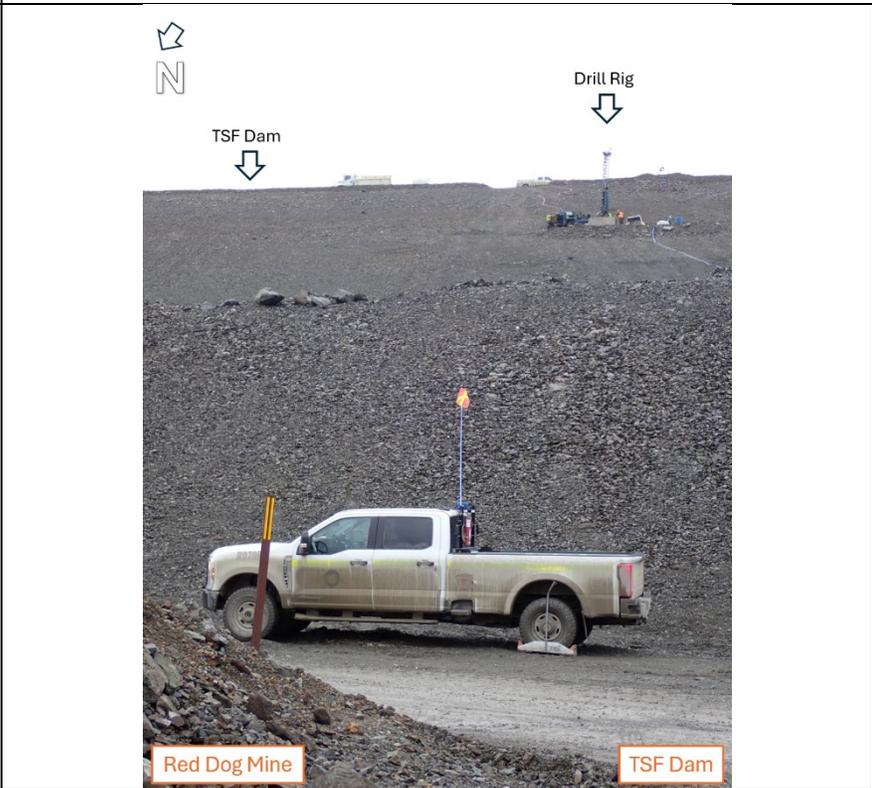


Photo 13: TSF pump back building below the TSF Dam. Note the seepage collection dam and empty seepage collection pond.



Photo 14: Another view of the TSF Dam and drill rig with pump in the foreground.

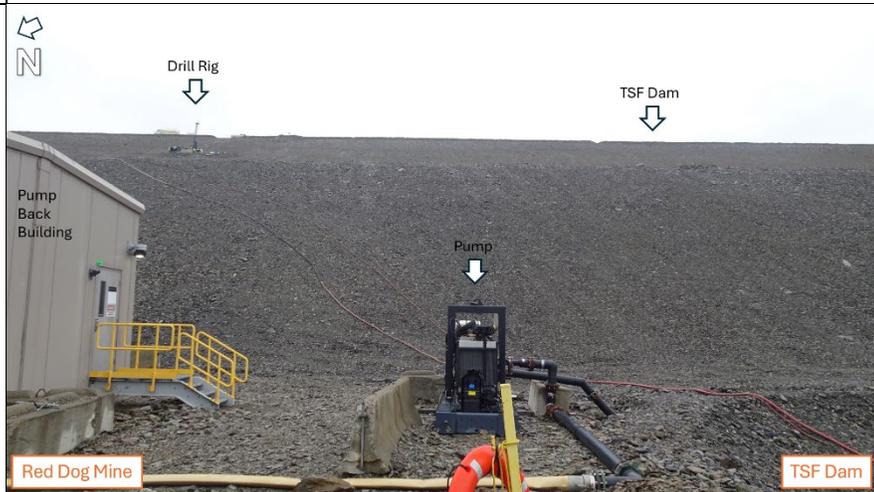


Photo 15: Seepage collection dam and empty pond below the TSF Dam.



Photo 16: Outfall 001. Note the cleanliness and clarity of the water exiting Outfall 001 compared with naturally occurring clouded orange waters of the Middle Fork of Red Dog Creek.



Photo 17: Treated water exiting outfall 001 mixing with natural clouded orange waters of the Middle Fork of Red Dog Creek. Note the bed, banks, and surrounding rocks that are intensely stained with red-orange colors due to the weathering of mineralized bedrock.



Photo 18: Mine seepage collection pond and main sump adjacent to the diverted Middle Fork Red Dog Creek.



Photo 19: Middle Fork Red Dog Creek diversion adjacent to the mine seepage collection and dam.



Photo 20: Kiviqsuak Seep pipe and discharge into Hilltop Creek. Flows to Middle Fork Red Dog Creek diversion pipeline and mine water treatment system



Photo 21: Water flowing to Middle Fork Red Dog Creek diversion pipeline and mine water treatment system originating from Hilltop Creek. Piped water from the Kiviqsuak seep enters above this location. Middle Fork of Red Dog Creek on the opposite side of the road.



Photo 22: Natural confluence of Rachel creek (left) and Middle Fork Red Dog Creek (right).



Photo 23: Water entering the Middle Fork Red Dog Creek diversion pipeline.



Photo 24: Qanaiyaq Pit highwall and active construction (deposition of waste rock).



Photo 25: Top of the Main Waste Rock Dump (WRD) and old access road.

This area has been scarified, prepped, and seeded.



Photo 26: Top of the Main WRD exhibiting seed growth. Partial view of the old access road that has been scarified, prepped, and seeded.

Note TSF in the valley below.

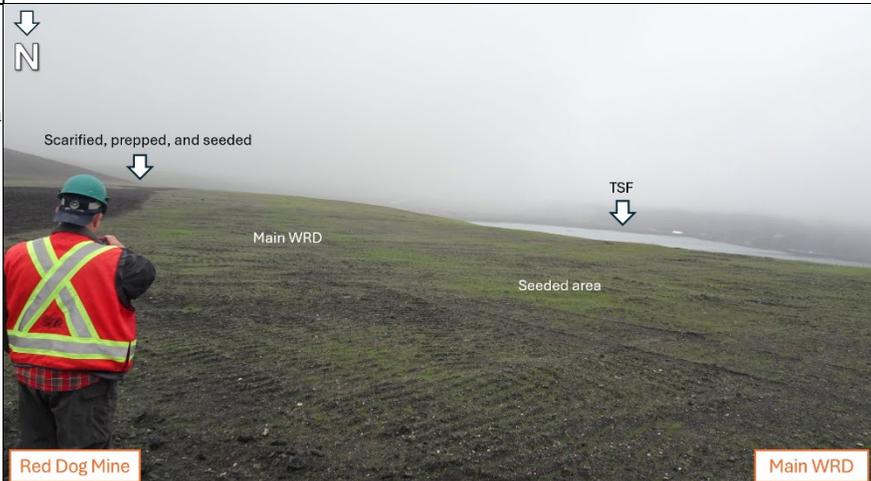


Photo 27: Top of the Main WRD, drainage ditch, and seed growth. Scarified, prepped, and seeded area to the left of the drainage ditch. Slopes in the background are stored cover material.

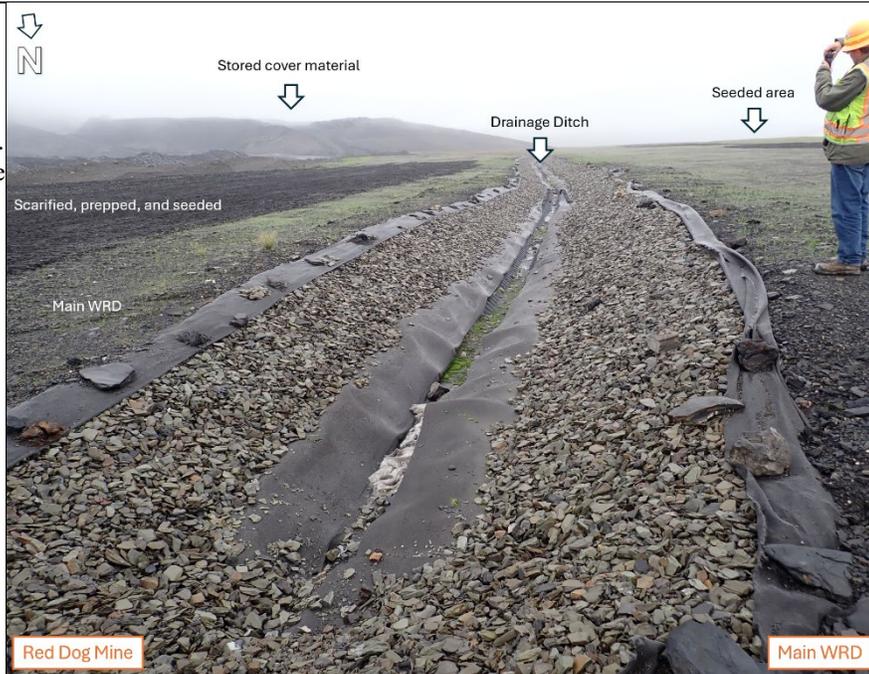


Photo 28: Graded and seeded west facing slope of the Main WRD.

Note partial view of the TSF and Kivalina East Laydown Yard at the south end of the TSF in the valley below.

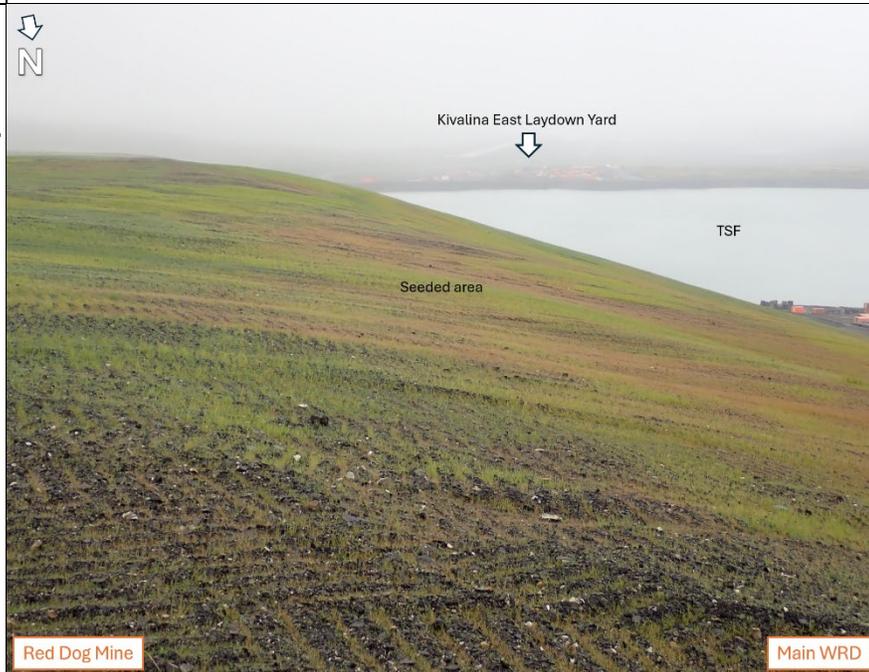


Photo 29: Graded and seeded west facing slope of the Main WRD with views of the TSF and Conex, Water Treatment, and Contractor laydown yards. Areas next to the TSF are being relocated across the main mine access road.



Photo 30: View of the Main Pit infill from the West Spur Dump. Aqqaluk pit in the background.

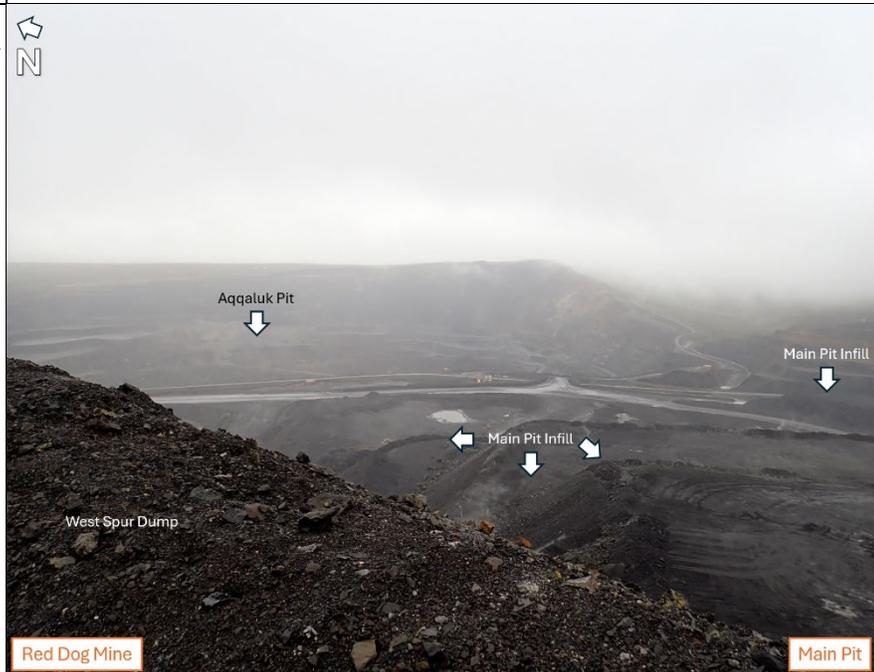


Photo 31: View of the Main Pit Waste Rock Infill from the West Spur Dump.



Photo 32: Graded and seeded west facing slope of the Main WRD.

Various stages of vegetative germination and growth, along with rilling and erosion are visible on the WRD slope.

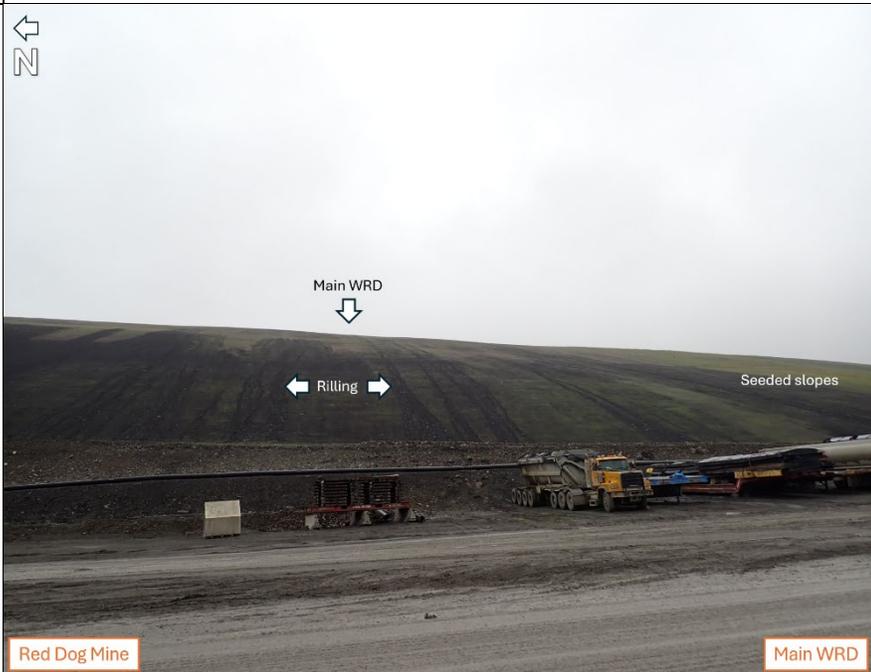


Photo 33: Graded and seeded west facing slope of the Main WRD. Lined drainage ditch in the foreground.

Various stages of vegetative germination and growth, along with rilling and erosion are visible on the WRD slope.



Photo 34: Lined drainage ditch at the base of the Main WRD.



Photo 35: Another view of the lined drainage ditch at the base of the Main WRD. Note no top cover material has flowed into lined ditch. This area is just below the well-established vegetative test plot from 2017. Soil is stable and prevents erosion.



Photo 36: Another view of the lined drainage ditch at the base of the Main WRD. Ongoing rilling allows material to flow into this section of the lined ditch.



Photo 37: Material site DD2 and water infill.

In the background, the Main WRD and distribution of cover material including the test strip are visible. At the base of the Main WRD are the Conex, Water Treatment, and Contractor Laydown yards and TSF. To the far left are the Main Mine Facilities.



Photo 38: High walls and water infill of material site DD2.



Photo 39: Pile of ripped up asphalt at DD2. DD2 highwall in the background.



Photo 40: Bons Reservoir.



Photo 41: Bons Creek.

