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Field Inspection Report
Red Dog Mine
Tailings Storage Facility and Dams

Inspection Dates:	September 5-7, 2016
Report Date:	October 25, 2016
Weather:	Mostly Clear, Mid 50's F daytime, Mid 20's F Nighttime
Inspection Objectives:	Observation of jurisdictional dams and appurtenances
Operator Contact:	Robert Napier, Nancy Tracy (Teck Alaska)
Agency Personnel:	David Wilfong, ADNR-DMLW
Documentation:	Photos and field book notes may be reviewed at the Southeast Regional Office of ADNR

This report contains photographs and observations from the field inspection of the Red Dog Mine Tailings Facility, Main Dam (AK00201), Back Dam (AK00303), Wing Wall and nearby supporting infrastructure, along with aerial photographs of the Freshwater Reservoir Dam (AK00200.

The primary purpose of the inspection was to observe the progress of 2016 Stage X dam raise construction activities including the shear key and buttress approved in *Certificate of Approval to Modify a Dam FY201615-AK00201*. The photographs and captions that follow are in chronological order as observed on site.

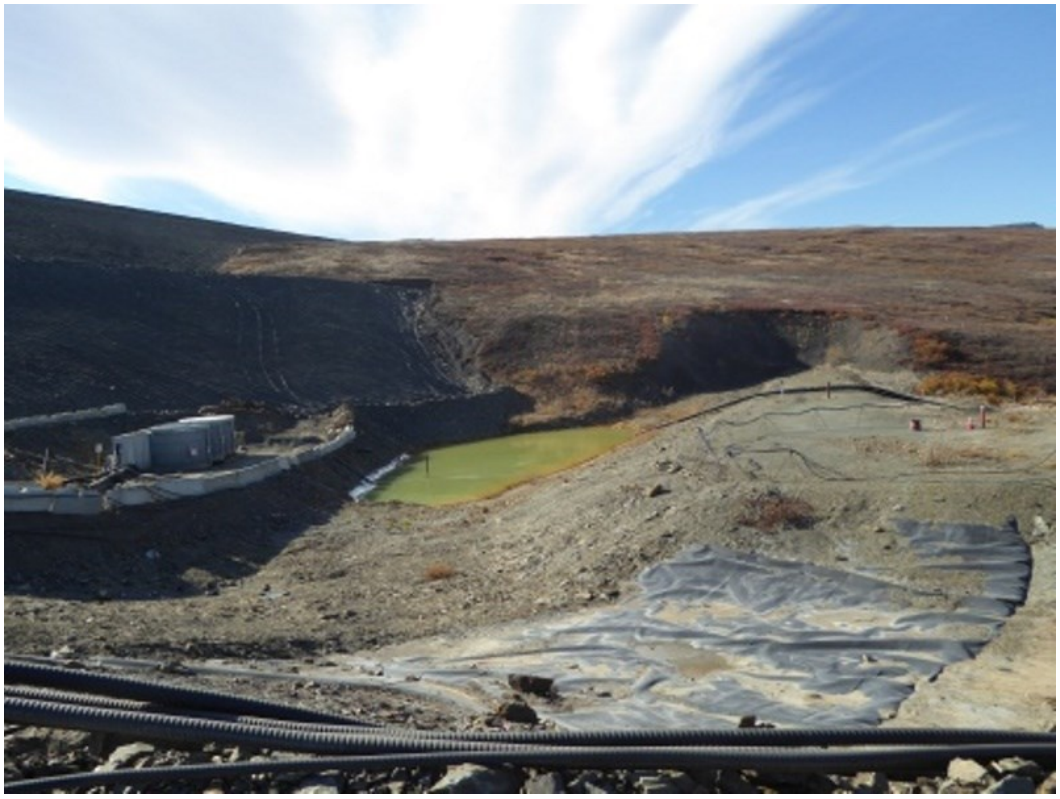

Figure 1 Seepage Collection Pond, pump-back wells, and part of the buttress near the toe of the downstream face of the Main Dam. Looking West.

Figure 2 The ground behind the seepage pump-back wells was mostly dry, with no standing water. The soil had a small amount of moisture in it and deformed slightly under-foot. Looking East.

Figure 3 "Ferrocrete" at the toe of the downstream face of the Main Dam. According to a Teck representative, the deposits are caused by a historic seep of acidic water from the Tailings Facility. The surrounding area was dry during the inspection. Looking South.

Figure 4 Surface water and ice near the middle pump-back well. The water was observed to be leaking from the top of the center well's pump. The water reports to the Seepage Collection Pond. Looking east.

Figure 5 Oblique View of the Main Dam and Buttress. Looking West.

Figure 6 Piezometer standpipe installed on the downstream face of the Main Dam. Looking South.

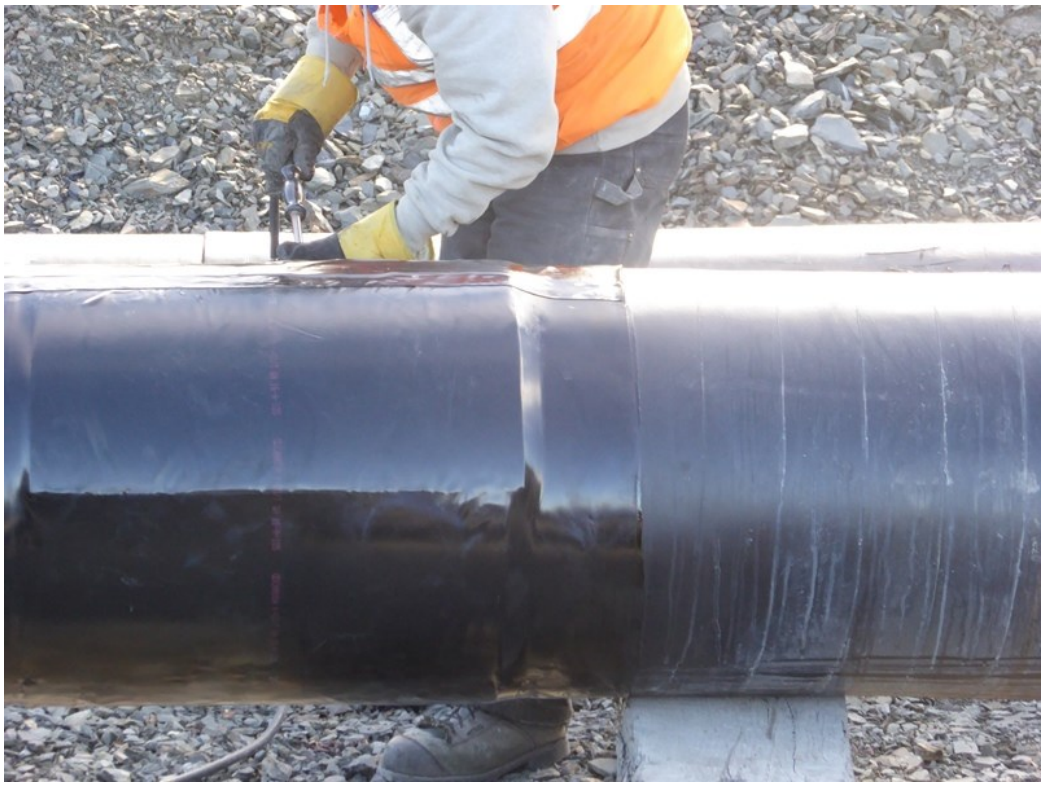

Figure 7 A worker finishing a splice on an insulated HDPE pipe on the buttress. The lines have thick insulation surrounding a 16-inch inner pipe to protect the fluid flowing inside from the sub-freezing temperatures. Looking South.

Figure 8 A sand density testing point on the buttress. Looking west.

Figure 9 West downstream groin of the Main Dam. Standing on the western end of the Buttress looking southwest.

Figure 10 Main Dam downstream embankment to buttress interface. Looking east.

Figure 11 Looking east along the crest of the Main Dam. The liner's filled anchor trench can be seen running along the top of the liner.

Figure 12 A joint connecting three pieces of the upstream HDPE liner on the Main Dam. Looking north.

Figure 13 The tailings beach and liner. Looking northeast.

Figure 14 Main Dam and Buttress. Workers are splicing insulated pipes together on the buttress. Looking west.

Figure 15 Tailings beach and upstream face of the Main Dam. Looking west.

Figure 16 Wing Wall on the northeast side of the Tailings Facility, with the Waste Rock Dump in the background. Looking east.

Figure 17 A tailings deposition pipeline. Looking north along the tailings beach causeway.

Figure 18 Pipe corridor running along the south end of the Wing Wall. Looking South.

Figure 19 The Wing Wall. Looking north.

Figure 20 Various outfalls draining into the Tailings Facility. The roller in the background is on the crest of the Main Dam. Looking north.

Figure 21 Looking north across the Tailings Facility at the upstream side of the Main Dam. Picture taken from the Back Dam.

Figure 22 Lateral view Back Dam's crest. Looking east.

Figure 23 Cracks in the gravel where a pipeline was buried under the roadway/frost protection layer on the crest of the Back Dam. The cracks were apparent in the road bed/frost protection layer fill only, and did not extend into the dam structure itself. Looking northeast.

Figure 24 Paint highlighting a crack on the crest of the Back Dam. The cracks were very thin and difficult to trace, but did not appear to extend past the frost protection layer. Looking down.

Figure 25 Fill placed on the tailings side of the Back Dam used to maintain haul truck access to the DD2 rock quarry. Haul trucks cannot travel on the crest of the Back Dam due to the possibility of damaging the insulating panels buried under the roadway. Looking northeast.

Figure 26 DD2 rock quarry access road. The road will be raised to near the elevation of the dam crest. Looking west.

Figure 27 A track-mounted drill digging a geotechnical drill hole near the Back Dam. The drilling is needed to explore the possibility of raising the dam another 20 feet to 1006 feet amsl. Looking southeast.

Figure 28 The crest of the Back Dam. The lighter colored fill on the right was recently placed. A Teck representative stated that it will be removed and reconstructed using 3-foot lifts according to the technical specifications. Looking west.

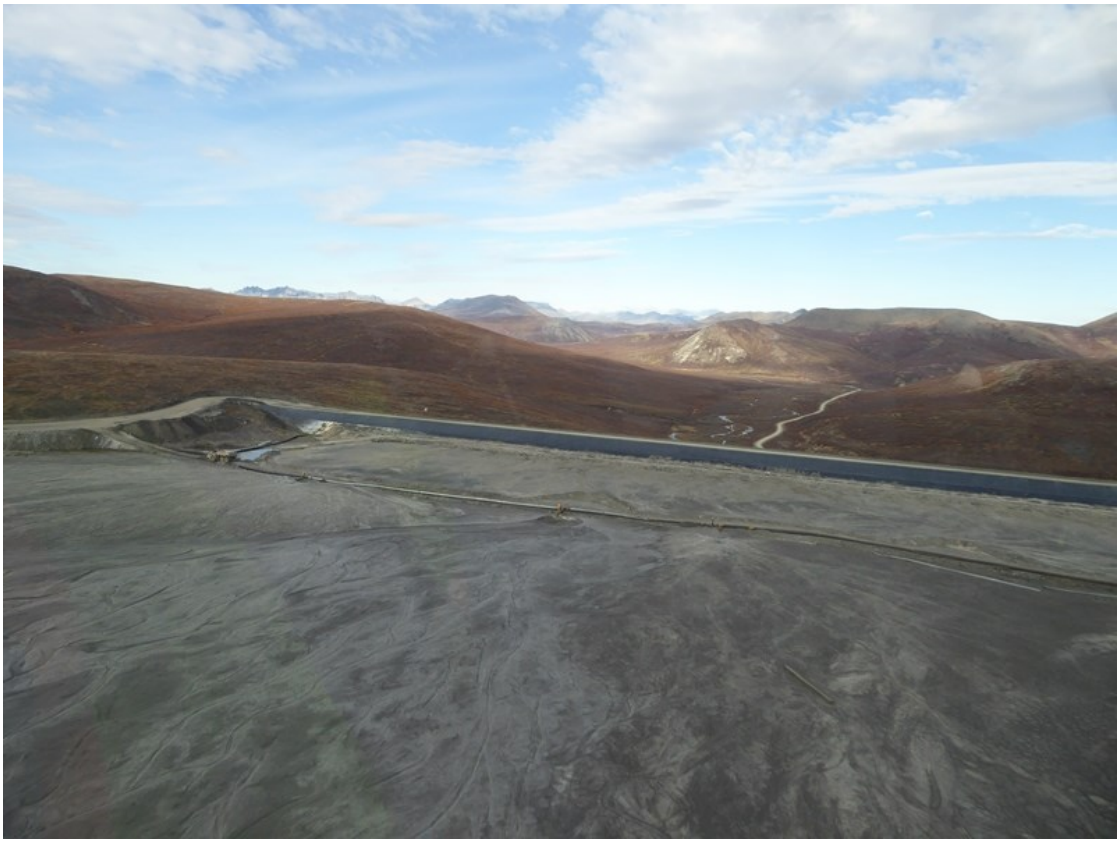

Figure 29 West end of the Main Dam and Tailings Beach. Looking northwest from the air.

Figure 30 East end of the Main Dam and Tailings Beach. Looking northeast from the air.

Figure 31Wing Wall and Tailings Beach. Looking east from the air.

Figure 32 Oblique view of the Main Dam and Tailings Beach. The north end of the Wing Wall in the upper right. Looking east from the air.

Figure 33 Seepage Pond and surrounding infrastructure. Looking northeast from the air.

Figure 34 Oblique view of the Main Dam and Tailings Beach. Looking west from the air.

Figure 35 Oblique view of the Back Dam. Looking east from the air.

Figure 36 Back Dam showing the area of cracks shown in Figure 23. Looking east from the air.

Figure 37 Oblique view of the Back Dam. Looking west from the air.

Figure 38 Downstream face of the Freshwater Reservoir Dam. The dark area at the bottom of the dam is an unauthorized repair to the dam. Looking north from the air.

Figure 39 Freshwater Reservoir Dam. Looking southwest from the air.

Summary of Key Observations

- Construction of the Main Dam was substantially complete.
- Construction of the Back Dam was near completion with areas of grading and finish work remaining.
- Work on the Back Dam Causeway continued.
- Geotechnical drill work was underway.
- Bulk gradation testing was completed.
- Minor surface cracks in the frost protection layer observed in the Back Dam and Wing Wall.

Conclusion

- Main Dam, Back Dam and Wing Wall construction were all on track to be completed by the end of the 2016 construction season.
- Final construction report should be submitted to ADNR Dam Safety when completed.

Thank you to Teck and the staff at the Red Dog Mine for a safe and informative visit.

End of Report