

STATE OF ALASKA

DEPARTMENT OF ENVIRONMENTAL CONSERVATION SOLID WASTE PROGRAM

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FIELD INSPECTION REPORT HECLA GREENS CREEK MINING COMPANY (HGCMC)

Inspection Date: September 14, 2011, Wednesday
Report Date: September 27, 2011
Report Written By: Ed Emswiler, ADEC Solid Waste Program 
Weather: 49 degrees F., 0.51 inches precip., wind 9.4 mph SSE, rain
(reported at Juneau Airport)
HGCMC Personnel: Jennifer Saran, Eric Sundberg, Ted Morales
State Personnel: Ed Emswiler, ADEC Solid Waste Program
Federal Personnel:
Documentation: Photos were taken and are available for inspection at ADEC in
Juneau

Purpose of visit: The purpose of the site visit was to:

1. Observe the installation of the engineered geosynthetic liner system for the East Ridge Expansion (ERE).
2. Observe the location of a proposed surface water monitoring site in Greens Creek downgradient of Site 23/D and Site 54.

General Items:

Travel to Greens Creek was by charter aircraft provided by HGCMC at 8:30am. I met with Greens Creek officials at the Environmental Department building near the Hawk Inlet Cannery to discuss the objectives of the visit and then on to see the East Ridge Expansion and Site 23. I traveled back to Juneau by way of HGCMC chartered aircraft at 1:00pm.

East Ridge Expansion (ERE) at the Tailings Disposal Site

The ERE is to be carried out in accordance with the Stage 2 Tailings Storage Facility Expansion, East Ridge Expansion Design Overview by Klohn Crippen Berger, dated February 23, 2011 and approved by ADEC on April 21, 2011. Work to establish the relocation of Utilities, B-Road,

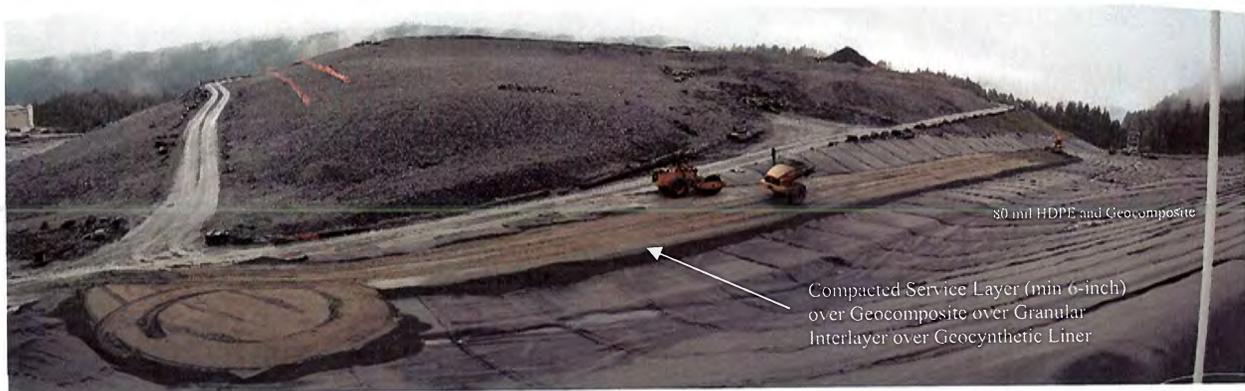
grading and establishment of the ERE foundation, foundation drains, instrumentation, above and below liner drains took place prior to this visit. The construction report with as-built drawings will detail how this was performed. The installation of the liner was nearly complete at the time of this visit. The installation of the granular interlayer, poly-flex geocomposite and compacted sand service layer were observed and appeared to be carried out according to the above mentioned plan. HGCMC reported the URS QA/QC representative was not at the tailings disposal facility to oversee the installation of the liner system during this inspection but was on-site if needed.



East Ridge Expansion (northern aspect)



East Ridge Expansion (central aspect)



East Ridge Expansion (southern aspect)



Drainage Layout North Termination ERE
to be



Upper Liner Anchor Trench – B-Road prism
extended over the trench with liner and geocomposite



Mechanically Stabilized Earth (MSE) Retaining Wall
at south end of ERE near truck wash

The slope in the expansion is as steep as 45%; however, the steeper portions of the expansion area are beneath the relocated B-Road. The static and seismic factors of safety chosen by HGCMC meet industry standards for geotechnical stability. HGCMC has considered the presence of the phreatic surface in their stability analysis, and the factors of safety meet or exceed the design standards.

On April 21, 2011, ADEC approved a waiver to Title 18, Chapter 60 of the Alaska Administrative Code (18 AAC 60.410(a)) that requires a monofill to be constructed on a slope less than 10% grade. The plan and waiver were approved within the limitations mentioned below:

1. No haul trucks or other wheeled equipment except for the smooth drum roller shall be allowed above the geomembrane on less than 3 feet of fill;
2. Continued close management and monitoring of the phreatic surface in the waste;
3. Stability and liquefaction should be reviewed during fill development and especially prior to closure;
4. HGCMC should continue to construct and monitor the two items dealing with the 3rd, 4th, and 5th bulleted items in the October 26, 2006 Inter-Office Memo from ADNR to ADEC

regarding future testing and modeling of the tailings pile at closure that were considered beyond the scope of the 2007 construction;

5. Construction quality assurance and quality control plan for all of the liner system installed in the tailings disposal facility. Third party testing of the geomembrane is called for in Section 3.3 of Specification 4.5. A construction quality assurance plan should be developed to clarify the duties of the third party;
6. ADEC will not approve tailings placement until a complete final report of the field construction quality assurance (CQA) is received with appendices to verify conclusions and signed by a professional engineer registered in the state of Alaska if received; and,
7. Foundation preparation for the liner shall minimize differential settlement in the vicinity of any oxidized rock protrusions that have been left in place to limit acid generation.

As evidenced in the photos above some wheeled equipment was operating above the liner on the granular interlayer and service layer. The equipment was necessary for the installation of the system although a condition of the waiver prohibited wheeled equipment above the geomembrane on less than 3 feet of fill. The presence of the equipment did not appear to be a problem.

To monitor water pressure six geotechnical instrumentation locations were to be established. Vibrating wire piezometers were to be placed above and below the liner to monitor pore pressures in the underdrains, in the service layer, and in the tailings. At five of the piezometer locations suction lysimeters and environmental sampling tubes were also planned. Four of the instrumentation locations were planned to be where existing monitoring wells have already been established so that instruments could be installed at depth in the foundation. The instrumentation would be useful as leak detection for the liner system. HGCMC reported all instrumentation below the liner was installed and the instrumentation above the liner will be installed once tailings placement begins in the ERE area. Additionally, the drains placed below the liner for the north and south of the ERE should also be useful in detecting leakage through the system.

HGCMC reported that active tailings placement will continue in the Northwest Expansion area through the winter and the ERE area will likely not receive waste until the spring of 2012. This may present a challenge in retaining the compacted sand service layer given winter storm and precipitation events. The upper service layer should be inspected and repaired if needed prior to tailings placement in the spring.

The upper anchor trench for the ERE will be covered by the prism for the relocated B-Road. In doing so the B-Road will become part of the liner system. Attention should be given to the B-Road in the area of the ERE after closure of the mine such that the liner system is not impaired during the demobilization procedure. HGCMC should keep track of this item.

East Ridge Stockpile (ERS)

HGCMC submitted a request dated March 7, 2011 for approval to establish a storage area for imported rock as a staging area for materials to relocate the B-Road. The request came with report by Klohn Crippen Berger dated February 16, 2011 that described the geotechnical stability of the rock stockpile that would be located at the staging area. The report indicated the placement of the stockpile may interfere with background monitoring wells located in close proximity to the storage site. Upon ADEC request HGCMC conducted further characterization

of the stockpile site to determine if there would be an impact on the wells. This was addressed in a March 23, 2011 report from EDE entitled “East Ridge Stockpile”. The report indicated that although there is not enough data regarding flow gradients in the vicinity of the proposed stockpile to predict with confidence it is probable that shallow groundwater would not likely flow from the proposed stockpile towards the 2010 monitoring wells. Rather the flow would be toward the downgradient wells drilled in 2000. The report also mentioned that it was possible that increased activity resulting from surface operations in the stockpile area could jeopardize the upgradient wells and that depending upon roads and other development in the area, HGCMC may wish to consider taking measures to protect the wells.

The stockpile area was observed at this inspection. The area was used as a pad to stage equipment rather than to stockpile earthen material as originally planned. HGCMC developed a substantial upgradient run-on diversion ditch around the stockpile in order to keep water from entering the pad and to properly direct the flow of stormwater away from the area.



East Ridge Stockpile Area



Run-on diversion at the East Ridge Stockpile Area



Run-on Diversion at the East Ridge Stockpile Area

Note: Groundwater Monitoring Wells MW-T-10-08A and MW-T-10-08B

Proposed New Surface Water Monitoring Station at Site 23/D

HGCMC has proposed to develop a new monitoring station downgradient of Site 23/D and Gallagher Creek in order to do the following:

1. gain a further understanding of water quality in Greens Creek associated with Site 23/D;
2. understand whether or not Site 23/D is contributing contaminants to Greens Creek;
3. develop a more reasonable downgradient surface water compliance monitoring station; and,
4. further understand unexplained decreasing trends in total alkalinity, lab pH and increasing trends of chromium and zinc at all of the upper Greens Creek sites (including background).

According to Title 18, Chapter 60 of the Alaska Administrative Code (18 AAC 60.810 Surface Water Monitoring) the points of compliance must be chosen so that highest concentrations of hazardous constituents migrating off the facility will be detected and the point of compliance will normally be located no more than 50 feet outside a waste management area boundary.

One of the objectives of the visit was to observe the new proposed monitoring station below Site 23/D. We were only able to view the general area from the B-Road. The area below Site 23 was heavily vegetated and the site was inaccessible due to steep and uneven terrain. Ted Morales who conducts monitoring for HGCMC mentioned that he fell into several sink holes in getting to the site and access to the site was difficult if not dangerous. It is recommended that all stations where monitoring must take place and access is difficult and dangerous be provided easy egress. ADEC supports the need for improved access to monitoring stations at the Greens Creek property. The USDA Forest Service who manages the property should allow this when needed.

Conclusions

1. On September 14, 2011 the HGCMC mine was visited to perform the various items mentioned at the beginning of this report.
2. The installation of the liner system for the ERE was observed and appeared to be going according to plan.
3. Observation of the new proposed monitoring station downgradient of Site 23/D was not possible due to inadequate egress.

Action Items

1. Construction quality assurance and quality control plan for all of the liner system installed in the tailings disposal facility is required. Third party testing of the geomembrane is called for in Section 3.3 of Specification 4.5.
2. ADEC will not approve tailings placement until a complete final report of the field construction quality assurance (CQA) is received with appendices to verify conclusions and is signed by a professional engineer registered in the state of Alaska.
3. The upper service layer at the ERE should be inspected and repaired if needed prior to tailings placement in the spring since winter storm events may erode this part of the liner system.

4. Attention should be given to the B-Road in the area of the ERE after closure of the mine such that the liner system is not impaired during the demobilization procedure. HGCMC should keep track of this item.
5. ADEC supports the need for improved access to monitoring stations at the Greens Creek property. The USDA Forest Service who manages the property should allow this when needed. This may include the establishment of boardwalks or other appurtenances.

Additional Comment:

The Alaska Department of Environmental Conservation appreciates the continuing cooperation of the Hecla Greens Creek Mining Company with the ADEC Solid Waste Program.

* * * *End of Report* * * *

