



THE STATE
of **ALASKA**
GOVERNOR BILL WALKER

Department of Natural Resources

DIVISION OF MINING, LAND & WATER
Water Resources Section

550 West 7th Avenue, Suite 1020
Anchorage, Alaska 99501-3579
Main: 907.269.8600
TDD: 907.269.8411
Fax: 907.269.8947

February 26, 2018

EMAIL AND HAND DELIVERY

Hecla Greens Creek Mining Company
P. O. Box 32199
Juneau, AK 99803-2199
Attention: Mr. Keith Malone

RE: NOTICE OF VIOLATIONS OF THE ALASKA WATER USE ACT, DAM SAFETY STATUTES AND PERTINENT REGULATIONS AT GREENS CREEK MINE

Dear Mr. Malone:

This letter is a Notice of Violations (NOV) to Hecla Greens Creek Mining Company (HGCMC) regarding violations of Title 46, Chapters 15 and 17 of the Alaska Statutes (*Water Use Act* and *Supervision of Safety of Dams and Reservoirs*) and violations of Title 11, Chapter 93 of the Alaska Administrative Code (*Water Management*). The violations occurred at the Greens Creek Mine site on Admiralty Island, Alaska. This letter includes an opportunity for HGCMC to remedy these violations through a consent agreement.

RELEVANT AUTHORITY

Approval from the Alaska Department of Natural Resources (ADNR) is required to appropriate or divert water and to construct, modify or operate a dam.

Water Use Act

To obtain a right to appropriate a significant amount of water under the Water Use Act, there must first be an application for a permit to appropriate. Under AS 46.15.040 *Criteria for issuance of permit* paragraph (a)(2) reads:

The commissioner shall issue a permit if the commissioner finds that ... (2) the proposed means of diversion or construction are adequate.

In addition, in 11 AAC 93.040 *Application for a water right*, paragraph (a) reads:

A person may not lawfully appropriate a significant amount of water of the state without first obtaining a permit to appropriate, a certificate of appropriation, or a temporary water use authorization under this chapter.

Further, 11 AAC 93.040(c)(8) requires that:

[a]n application [for a water right] must include the following items: ... (8) a description of any impoundment, diversion, or withdrawal structures, including dimensions, construction materials, plans and specifications and operation plans, and an application to construct or modify a dam, as defined in AS 46.17.900, if 11 AAC 93.171 requires an application;

To obtain an authorization for *temporary* use of a significant amount of water under AS 46.15.155, the provisions of 11 AAC 93.210 and 11 AAC 93.220 must be complied with, including the requirement that a person receive authorization before temporary use of a significant amount of water.

Supervision of Safety of Dams and Reservoirs

Approval is required under dam safety statutory provisions to construct and operate a dam. Pursuant to AS 46.17.040 *Approval required*, paragraph (a) reads:

Except in the performance of routine maintenance and operations not affecting structural safety, a person may not construct, enlarge, repair, alter, remove, maintain, operate, or abandon a dam or reservoir without the approval of the department.

Further, a certificate of approval is required by regulations to construct a dam at 11 AAC 93.171, *Dam construction, repair, or modification*:

Before construction, repair, or modification of a dam, a person must apply to the department under this section for a certificate of approval...

Also, 11 AAC 93.173, *Certificates of Approval*, paragraph (d) reads in part:

Water may not be impounded behind a newly constructed dam, and additional water may not be impounded behind a repaired or modified dam, until the department issues...a certificate of approval to operate a dam.

BACKGROUND

In 1988, the Greens Creek Mining Company applied to ADNR for approval to construct the “Greens Creek Tailings Dam.” The purpose of the dam was to store “dewatered” tailings and “process” water (or more accurately, “contact” water using current jargon). On May 6, 1988, ADNR issued *Certificate of Approval* No. 88-4 for construction of the Greens Creek Tailings Impoundment Dam. At some point, the name of this structure was changed to the Upper Cannery Tailings Impoundment Dam and assigned the National Inventory of Dams (NID) identification number AK00203. In 1993, mine operations were suspended “due to low metal prices.” After mining operations resumed, the reservoir of the Upper Cannery Tailings Impoundment Dam was partially filled with tailings and the capacity for open contact water was reduced, concentrating the accumulated storage of contact water into Pond 6. In 2004, the Stage 2 expansion of the tailings storage facility (TSF) planned to incorporate Pond 6 and the Upper Cannery Tailings Impoundment Dam into the TSF and construct Pond 7 for contact water storage. The Kennecott Greens Creek Mining Company submitted an application dated March 9, 2005 for approval to construct the Pond 7 Dam. On May 2, 2005, ADNR issued *Certificate of Approval to Construct a Dam* number 2005-6-AK00307 for the Pond 7 Dam (NID# AK00307). The influence of the TSF and other areas of the mine contributing flow to Pond 7 was identified in Special Condition 7 of the certificate and in special conditions of succeeding *Certificates of Approval to Operate a Dam* for the Pond 7 Dam issued by ADNR in 2007, 2009 and 2013. Those contributing areas were originally identified as sources called Pond 23, Pond 9 and DB-04, but now include collection points identified as the TSF, Pond 23, Pond A, Pond C, and Pond D. Flow is transferred to Pond 7 through sumps, pumps, pipelines and other components.

On March 29 and 31, 2017, HGCMC contacted the Dam Safety and Construction Unit (Dam Safety) of ADNR via telephone to discuss the modification of Pond 7 and the construction of Pond 10 at the Greens Creek Mine. Based on our understanding of the project from those conversations, ADNR Dam Safety advised HGCMC to apply for a *Certificate of Approval to Modify a Dam* for the Pond 7 Dam. The application was required by 11 AAC 93.171 as well as the terms and conditions of the *Certificate of Approval to Operate a Dam* for the Pond 7 Dam because of the changes to the site hydrology and the pond operation resulting from the expansion of the tailings storage facility (TSF) and other modifications to Pond 7.

On April 11, 2017, HGCMC submitted via email a cover letter and an ADNR application form for a *Certificate of Approval to Modify a Dam* for the Pond 7 Dam. On April 13, 2017 HGCMC met in person with ADNR Dam Safety in Anchorage and submitted the respective application fee deposit required by 11 AAC 93.171(f)(1)(B) for the modification, as well as other information including a revised operation and maintenance (O&M) Program for the Pond 7 Dam dated April 2017. Additional submittals from HGCMC in April 2017 included construction schedules, drawings, specifications, a construction quality assurance (CQA) plan, and an ADNR *Hazard Potential Classification and Jurisdictional Review (HPCJR)* form for the Pond 10 embankment prepared by Klohn Crippen Berger (KCB), the engineer of record for the Pond 7 Dam. On May 1, 2017, HGCMC submitted a letter from KCB describing the proposed modification of Pond 7 by the interconnection with Pond 10.

On May 9, 2017, ADNR Dam Safety responded to HGCMC with a letter regarding “Status of Compliance with Terms and Conditions of *Certificate of Approval to Operate a Dam*, Pond 7 Dam (AK00307)” (included here as Attachment A). This letter reviewed the Pond 7 Dam for compliance with *Certificate of Approval to Operate a Dam* number FY2013-9-AK000307 dated April 8, 2013 and described a limited administrative and technical review of the recent application for modification of Pond 7 and identified seven deficiencies. In the May 9 letter, ADNR Dam Safety issued a “temporary” *Certificate of Approval to Operate a Dam* number FY2017-21-AK00307 dated May 9, 2017 for the Pond 7 Dam based on the revised O&M program submitted by HGCMC (otherwise the terms and conditions were the same as the preceding certificate, including the expiration date of August 12, 2017¹). Also in the May 9 letter, ADNR Dam Safety returned the completed *HPCJR* form for the Pond 10 embankment, assigned the dam a Class II (significant) hazard potential in accordance with 11 AAC 93.157 based on information provided in the form by KCB, and concluded that the barrier necessary to construct Pond 10 was a dam under state law and an appurtenant feature to Pond 7:

ADNR Dam Safety finds that the artificial barrier necessary to construct Pond 10 will be a dam under state regulatory jurisdiction. Any construction on this project in progress represents a violation of AS 46.17.040. Any feature or work on this project that may not meet minimum regulatory standards is built at the sole risk of Hecla and subject to change.

In the May 9 letter, ADNR Dam Safety asked HGCMC to apply for a *Certificate of Approval to Construct a Dam* for the Pond 10 Dam. Also, ADNR Dam Safety requested that HGCMC submit *HPCJR* forms for several other ponds at the mine site that collect and contain “contact” water before transfer to Pond 7 for storage, prior to treatment and discharge permitted under authority of the Alaska Department of Environmental Conservation (ADEC).

In a letter dated June 16, 2017, HGCMC provided: a summary of a meeting on June 6, 2017 with ADNR, the ADEC, and the U. S. Forest Service; an application for a *Certificate of Approval to Construct a Dam* for the Pond 10 Dam and the respective application fee deposit; a revised *HPCJR* form proposing a Class III (low) hazard potential for the Pond 10 Dam; an *HPCJR* form for the Sand Pit Dam and respective design drawings first dated April 15, 2016; a revised scope of work for the periodic safety inspection for the Pond 7 Dam required by 11 AAC 93.159 and due in 2017; and schedules for the pending work. In a letter dated June 29, 2017, HGCMC provided the *HPCJR* forms for dams at the other ponds contributing to Pond 7 and 10 including Pond 23, Pond A, Pond C, and Pond D, and an updated schedule for the completion of Pond 10 construction.

¹ Subsequently, ADNR Dam Safety has administratively extended the expiration date of this certificate until June 30, 2018.

VIOLATIONS

As set forth below, ADNR has identified violations of state law by HGCMC. This notice of violations is based on the information available to ADNR as of the date of this letter, and does not address any other violations of local, state or federal law whether based on the facts described herein or otherwise.

Violation Number 1—Modification of a dam (Pond 7) without approval

Special Condition 7 of the *Certificate of Approval to Operate a Dam* number FY2013-9-AK00307 dated April 8, 2013 for the Pond 7 Dam reads:

For any modifications, major repairs, removal or abandonment of the dam, a separate certificate of approval must be obtained from the Department.

The expansion of the TSF at the Greens Creek Mine, including the design and construction of Pond 10, were significant modifications to the design and operation of the Pond 7 Dam based on the following documents submitted by HGCMC:

- Chapter 6 of the HGCMC *Stage 3 Phase 1 Expansion Design Overview Report* dated December 2013 by KCB
- The report *Hecla Greens Creek Mine Tailings Storage Facility Stage 3 Phase 1 Expansion Project Wastewater Collection and Containment* dated December 17, 2013 by KCB and EDE Consultants (included in Appendix II of the preceding reference)
- The HGCMC Stage 3 Phase 1 Expansion drawing package by KCB marked “Approved for Construction” signed and dated March 3, 2015
- The letter from KCB to HGCMC dated May 1, 2017 regarding the “Stage 3 Phase 1 Expansion Pond 7 Modification”

The “Hecla S3P1 Master Schedule...Revision Date 13-Apr-17” shows the “Start Year 1 Work Milestone” on “13-May-15.” Based on the *Pond 10 Construction Summary Report* by KCB dated August 24, 2017, drilling and blasting in the area of a “flow control structure” between Pond 7 and Pond 10 occurred on October 5, 2016, the last day of the 2016 construction season. Work resumed on May 5, 2017, the first day of the 2017 construction season and the last day of construction reported therein was July 21, 2017. A letter from M3 Engineering and Technology Corporation (M3) to HGCMC dated November 6, 2017 documents the inspection of electrical and mechanical equipment associated with Pond 7, Pond 10 and the flow control structure that were constructed later in the year, including outstanding tests necessary before the system is placed into service. The application for a *Certificate of Approval to Modify a Dam* for the Pond 7 Dam and the respective application fee deposit were submitted to ADNR Dam Safety in April 2017. A *Certificate of Approval to Modify a Dam* for the Pond 7 Dam has not been issued by ADNR Dam Safety for the work which was planned by HGCMC and KCB since at least 2013, and for which construction began the year before the application was submitted.

Violation Numbers 2 and 3—Construction of a dam (Pond 10) without a *Certificate of Approval to Construct a Dam*

Based on the *Pond 10 Construction Summary Report* by KCB dated August 24, 2017, the Pond 10 Dam construction began on June 29, 2016 with excavation in the footprint of the facility. KCB “Daily Observation Reports” included therein appear to indicate that compacted fill placement began for the Pond 10 embankment on July 20, 2016. The application for a water right for Pond 10 was not received until June 7, 2017 and an application for a *Certificate of Approval to Construct a Dam* for the Pond 10 Dam and the respective application fee deposit were not submitted to ADNR until June 16, 2017. Neither a *Permit to Appropriate Water* nor a *Certificate of Approval to Construct a Dam* for the Pond 10 Dam were issued at the time construction began, nor have they been issued by ADNR for this work

which was planned by HGCMC and KCB since at least 2013, and for which construction began the year before the applications were submitted.

Violation Numbers 4 and 5—Operation of a dam (Pond 10) without a *Certificate of Approval to Operate a Dam* and/or an authorization to divert water.

In an email on December 14, 2017, HGCMC notified ADNR Dam Safety that Pond 10 was accumulating water overflowing from Pond 7 through the recently constructed modification of the Pond 7 Dam. In other words, the flow control structure on the common crest of the embankment between Pond 7 and Pond 10 was diverting water from Pond 7 into Pond 10, meaning HGCMC was “operating” the Pond 10 Dam without approval. On December 18, 2017, HGCMC notified ADNR Dam Safety that 1.5 million gallons of water was in the Pond 10 reservoir. On December 28, 2017, HGCMC verbally reported that Pond 10 was emptied by pumping the water back to Pond 7. Neither a *Temporary Water Use Authorization* nor a *Certificate of Approval to Operate a Dam* for the Pond 10 Dam have been issued by ADNR.

Violation Numbers 6, 7 and 8—Construction and operation of a dam (Sand Pit Dam) without a *Certificate of Approval to Construct or Operate a Dam* or an authorization to divert water

A separate dam referred to as the “Sand Pit Dam” was built to contain saturated organic material removed from the Pond 10 footprint and appears to have been constructed and placed into operation by the end of June 2016. No applications were received by ADNR. Neither a *Temporary Water Use Authorization*, nor a *Certificate of Approval to Construct a Dam*, nor a *Certificate of Approval to Operate a Dam* have been issued by ADNR for this work.

Violation Number 9—Diversion (removal) of water without authorization from the Sand Pit Dam.

In a letter dated May 30, 2017, HGCMC informed ADNR that a “small electric pump” was being used to pump water from the Sand Pit Dam impoundment. During a meeting on June 6, 2017, ADNR understood HCGMC to say that water was siphoned from the impoundment with a 2.5-inch line over a 2-day period. In a letter dated June 16, 2017, HGCMC wrote, “No work has been conducted at the Sand Pit in 2017 except for pumping standing water from behind the barrier into the drainage ditch.” ADNR is uncertain about quantity and duration of water diverted, but a *Temporary Water Use Authorization* would have been required and was not requested or issued for this activity.

CONCLUSIONS

As set forth above, violations of the Alaska water management statutes and regulations occurred because of the expansion of the TSF and the unauthorized modification of the Pond 7 Dam, the unauthorized construction and operation of the Pond 10 Dam and the Sand Pit Dam, and the unauthorized diversion of water related to Ponds 7 and 10 and the Sand Pit Dam. While we believe that HGCMC has taken some steps to address the known deficiencies, additional information and actions including investigations, analyses, evaluations, monitoring, and possible mitigation are necessary to bring the Greens Creek Mine into compliance with state law.

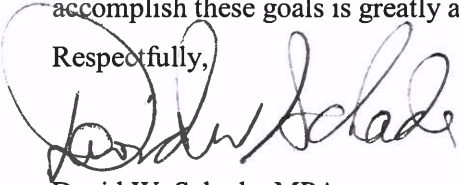
While ADNR has the authority to order HGCMC to remove all unauthorized structures, at this time, based on the information now known, ADNR does not believe such an order is in the best interest of the state.

To remedy these violations and gain regulatory compliance with the Water Use Act and dam safety statutes and regulations, ADNR requires the corrective actions described in Attachment B, which may be memorialized in a consent agreement with HGCMC. These corrective actions include: payment of civil damages; demonstration of financial ability, posting of bond, or provision of other financial

assurance; a geophysical investigation of groundwater around the TSF, Pond 7 and Pond 10; an independent technical evaluation of pertinent aspects of the integrated water management system at the Greens Creek Mine including the TSF, Pond 7, Pond 10, Pond 23, Pond A, Pond C, Pond D and all appurtenant features; the completion of any outstanding design, construction, investigations, engineering evaluations, or operational details of the system; and, the submittal of a final O&M program that includes ongoing data collection, inspections and reporting. Furthermore, HGCMC must demonstrate to the ADNR's satisfaction that adequate additional measures and processes have been implemented by HGCMC to ensure future compliance with all statutes and regulations related to the design, construction and operation of the TSF, the dams at Pond 7 and Pond 10 and the respective appurtenant features that comprise the integrated water management system at the Greens Creek Mine. Additional requirements may be identified based on the information that is developed in the conduct of the work described herein, or if HGCMC fails to maintain compliance with the respective statutes and regulations in the future.

We look forward to meeting with you on March 1, 2018 to further discuss these issues. ADNR recognizes HGCMC's expressed interest to regain compliance and commitment to design, construct and operate the TSF and water management system at the Greens Creek Mine "per best practices in the mining industry."² Your continued cooperation in addressing the outstanding issues necessary to accomplish these goals is greatly appreciated.

Respectfully,



David W. Schade, MPA
Water Resources Section Chief



Charles Cobb, P.E.
State Dam Safety Engineer

Attachments: A—Letter from ADNR to HGCMC dated May 9, 2017 with attachments
B—Corrective Actions for HGCMC

cc: Luke Russell, Vice President, External Affairs, Hecla Mining Company
Andrew Mack, Commissioner, ADNR
Heidi Hansen, Deputy Commissioner, ADNR
Brent Goodrum, Director, ADNR-DMLW
Kyle Moselle, ADNR-OPMP
Seth Beausang, ADOL
Ashley Brown, ADOL
Andrew Sayer-Fay, ADEC
Allan Nakanishi, ADEC
Al Ott, ADF&G
Jackie Timothy, ADF&G
Chad VanOrmer, USFS
Earl Stewart, USFS
Matthew Reece, USFS

C:damsafe/projects/GreensCreek/NOV/HGCMC NOV 022618

² Letter dated June 16, 2017 from HGCMC to ADNR

ATTACHMENT A

Letter from ADNR to HGCMC dated May 9, 2017 with attachments



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May 9, 2017

CERTIFIED MAIL

Hecla Greens Creek Mining Company
P. O. Box 32199
Juneau, AK 99803-2199

Attention: Mr. Keith Malone

**RE: STATUS OF COMPLIANCE WITH TERMS AND CONDITIONS OF
CERTIFICATE OF APPROVAL TO OPERATE A DAM
POND 7 DAM (AK00307)**

Dear Mr. Malone:

On April 13, 2017, representatives of Hecla Greens Creek Mining Company (Hecla) met with the Dam Safety and Construction Unit (Dam Safety) of the Alaska Department of Natural Resources (ADNR) in Anchorage Alaska. In that meeting, Hecla described improvements at the Greens Creek Mine that affect the operation of the Pond 7 Dam (National Inventory of Dams identification number AK00307). The Pond 7 Dam is regulated by ADNR Dam Safety as outlined in the *Certificate of Approval to Operate a Dam* number FY2013-9-AK00307 (*COA to Operate*) issued under the authority of Alaska Statute (AS) 46.17 and Article 3 of Chapter 93 in Title 11 of the Alaska Administrative Code (11 AAC 93).

The improvements described by Hecla that affect the Pond 7 Dam include recent expansions to the tailings dry stack facility and plans to construct a new pond in 2017, referred to as Pond 10, immediately adjacent to Pond 7. In the meeting, Hecla provided an application and fee deposit for a *Certificate of Approval to Modify a Dam* for the Pond 7 Dam as well as other supporting information, in response to a previous phone call with ADNR Dam Safety on March 31, 2017. Additional submittals were provided to ADNR Dam Safety attached to a letter from Hecla dated April 20, 2017. Based on these submittals, ADNR Dam Safety conducted an administrative review of the project and the application submittals provided by Hecla. The following information provides an initial assessment of the status of compliance with the terms and conditions of the *COA to Operate* for the Pond 7 Dam and the first, limited administrative and technical review of the application for a *Certificate of Approval to Modify a Dam*.

FINDINGS OF REVIEW**Pond 7**

The *COA to Operate* requires the Pond 7 Dam to be operated in accordance with the document “Hecla Greens Creek Mining Company, Pond 7-AK00307, Operation and Maintenance Program, Revised” (O&M Program) dated January 22, 2013. Special Condition 3 in Attachment A to the *COA to Operate* requires the O&M Program to be updated to “as needed” and submitted to ADNR Dam Safety. In addition, Special Condition 5 requires a review of the “Pond 7 hydrology and hydraulics design and as-built configurations, as well as the flows contributed from other areas of the mine.” Further, Special Condition 7 requires a certificate of approval from ADNR for modifications to the Pond 7 Dam. The application submitted to ADNR Dam Safety in our meeting was for the connection between Pond 7 and the new Pond 10, as discussed in the phone call.

ADNR Dam Safety reviewed the submittals from Hecla included with the application for a *Certificate of Approval to Modify a Dam* for compliance with the requirements of 11 AAC 93.171. Those regulations describe a multi-part application process intended to be flexible and adaptable to a broad range of construction-related activity associated with dams. ADNR Dam Safety utilizes a spreadsheet based tracking log to provide a basis for dialogue on the administrative and technical review of the application. This file will be transmitted to Hecla separately and includes a list of the submittals included with your application and administrative and technical comments based on a limited review of those submittals. Some key points from that review are included herein.

Pond 10

According to a schedule included with your submittals, Pond 10 construction began in April of this year. Under the Alaska dam safety regulations, 11 AAC 93.157(b) requires the owner of an “artificial barrier” to the flow of water to submit a form provided by ADNR to determine the “hazard potential classification” of the dam as described in 11 AAC 93.157(a) and the applicability of the dam safety regulations (jurisdictional status) as described in 11 AAC 93.151. The submittals from HECLA included the ADNR form *Hazard Potential Classification and Jurisdictional Review (HPCJR)* completed by Mr. Rick Friedel, P.E. of Klohn Crippen Berger Ltd. (KCB) for the artificial barrier that will form Pond 10. Based on that form, ADNR finds that the Pond 10 Dam appears to represent a Class II (significant) hazard potential dam as described under 11 AAC 93.157(a)(2)(D) due to the risk to important anadromous fish habitat. If so, the Pond 10 Dam meets the definition of a dam under AS 46.17.900(3)(C) based on 11 AAC 93.151(b). A copy of the *HPCJR* form submitted by Hecla with the last page completed by ADNR Dam Safety is attached.

Please note that 11 AAC 93.157(b) allows the owner of the artificial barrier to propose the hazard potential classification with supporting information and 11 AAC 93.157(c) and (d) provides authority for ADNR to reject the proposal and assign a higher classification than proposed based on the available information. In effect, this allows the hazard potential classification to be adjusted to as accurate of a classification as possible based on the level of information available. If Hecla disagrees with the Class II (significant) hazard potential assigned by ADNR to the Pond 10 Dam, a revised *HPCJR* form must be submitted with additional information to support an alternative classification.

Otherwise, ADNR Dam Safety finds that the artificial barrier necessary to construct Pond 10 will be a dam under state regulatory jurisdiction. Any construction on this project in progress represents a violation of a AS 46.17.040. Any feature or work on this project that may not meet minimum

regulatory standards is built at the sole risk of Hecla and subject to change. In any case, the design of the flow through structure represents an enlargement to the Pond 7 reservoir as defined in AS 46.17.900(5) which ADNR Dam Safety herein asserts make the Pond 10 system “appurtenant works” to Pond 7, under state regulatory jurisdiction regardless of the hazard potential classification and subject to approval for construction under 11 AAC 93.171. Please submit an application for a *Certificate of Approval to Construct a Dam* for the Pond 10 Dam including the respective application fee based on the costs described in 11 AAC 93.171(f)(4)(D), calculated in accordance with 11 AAC 05.010(a)(8)(J).

Deficiencies

The following information summarizes deficiencies identified by ADNR Dam Safety in the limited administrative and technical review of the Greens Creek tailings storage facility and water management system and the submittals provided by Hecla for the dams at Pond 7 and Pond 10. ADNR Dam Safety notes the following:

1. The Pond 7 Dam was and is being operated out-of-compliance with the *COA to Operate* since the expansions of the tailings storage facility in 2015 and 2016 increased the area contributing runoff into the Pond 7 collection system.
2. Special Condition 4 of the *COA to Operate* requires a periodic safety inspection (PSI) for the Pond 7 Dam in accordance with 11 AAC 93.159 by June 13, 2017. A courtesy reminder for this inspection was sent to Hecla in early March 2017. The PSI must be conducted by a qualified, professional engineer who is currently licensed to practice engineering in Alaska. The engineer and the scope of the inspection must be approved in advance by the Dam Safety and Construction Unit. At this point, ADNR Dam Safety has not received a proposal for the PSI due next month.
3. Currently, ADNR Dam Safety asks the inspection engineer to provide an assessment of the condition of the dam using specific terminology in guidelines provided by ADNR. After the 2012 PSI, ADNR Dam Safety assigned the Pond 7 Dam a condition of “poor-more analysis needed” based on recommendations in the 2012 PSI report for a detailed review of the site hydrology after the tailings storage facility was expanded into Pond 6. This is the reason for Special Condition 5 of the *COA to Operate*. Special Condition 5 requires a review of the “Pond 7 hydrology and hydraulics design and as-built configurations, as well as the flows contributed from other areas of the mine.” Recent submittals from Hecla include the report, “Stage 3 Phase 1 Tailings Expansion Project Wastewater Collection and Containment” by KCB/EDE Consultants dated December 17, 2013 (KCB/EDE, 2013). This report provides a comprehensive review and generally meets this requirement; however, the precipitation frequency (PF) estimates are referenced from the site water balance report by EDE dated 2010 (EDE, 2010). EDE, 2010 indicates the PF values are based on a hydrology reference document known as TP-47, published in 1963 by the U.S. Weather Bureau, a predecessor agency of the National Weather Service. For PF estimates, TP-47 is superseded by Version 2.0 of Volume 7 in Atlas 14, *Precipitation-Frequency Atlas of the United States* published by the National Oceanic and Atmospheric Administration in 2012. ADNR Dam Safety notes that Hecla indicates in the introduction to the revised O&M Program dated April 2017 included with the recent submittals that the site water balance is being updated in 2017. This report should be submitted to ADNR Dam Safety upon completion.

4. A key element of an Initial Application Package (IAP) required under 11 AAC 93.171(f)(1)(F) is a proposal from the design engineer that “outlines the proposed scope of work...to adequately provide for the protection of life and property...based on...the size and type of dam [and] the hazard potential classification...” Under 11 AAC 93.171(c) the applicant must obtain ADNR approval for the proposal before completing the application process. The purpose of this provision is to preclude misunderstandings about the standard of care expected for the design and construction of the work for which approval is required. Because the application submitted by Hecla is after the fact, such an agreement does not exist.
5. Submittals from Hecla to ADNR Dam Safety include the drawing package by KCB dated March 6, 2015 titled “Tailings Storage Facility, Stage 3 Phase 1 Expansion”. Those drawings include civil drawings for Pond 10 including the geomembrane lined, embankment dam. ADNR Dam Safety notes that the liner system for Pond 10 includes a primary and secondary geomembrane with a leak detection system. The level of detail appears to be inadequate for certain features. Note that Detail 1 on drawing D-64030 does not show how the double liner system is sealed to the above liner intake pipe. Detail 2 shows the primary liner leak detection system intake, which may not be constructable as shown. This detail references Detail 5 on drawing D-64023 which is a typical, archaic pipe boot detail that does not appear to be constructable as shown there or in Detail 2 on D-64030. These features are critical to the hydraulic performance of the liner system which can affect both the reliability of the leak detection system and the safety of the dam.
6. Submittals from Hecla to ADNR include the “Construction Quality Plan for S3P1 TSF Expansion” by AECOM dated April 22, 2016. Section 1.10, *Design Modifications*, states, “the CQA Field Manager shall draft a DM request for review and approval by the CQA Project Director and the Designer...The CQA Project Director shall review the DM request, in coordination with the Design Engineer, and shall either approve, approve with revisions, or disapprove the request. A typical special condition to a *Certificate of Approval to Construct or Modify a Dam* issued by ADNR requires that any modification to the design must be approved by the design engineer, and any modification that can affect the safety of the dam must also be approved by ADNR Dam Safety. Furthermore, the DMs must also be numbered sequentially and included in the construction completion report required under 11 AAC 93.171(f)(6).
7. KCB/EDE, 2013 provides a detailed description of the various features around the Greens Creek Mine that are necessary to manage water and contribute to the performance requirements of Pond 7. These features include artificial barriers that form Ponds A, C, D, and 23 and runoff diversions and wastewater collection features at the tailings storage facility, 920 site and Hawk Inlet facilities. An *HPCJR* form was completed for the Pond 7 Dam before construction in 2005 and the dam was assigned a Class III (low) hazard potential. An *HPCJR* form was completed for the Pond A embankment in 2006 and it was found to be non-jurisdictional based on the available information at that time. ADNR Dam Safety is not aware if the other artificial barriers have been reviewed and herein requests that Hecla complete a current review of the several artificial barriers at the Greens Creek Mine including Pond A and Pond 7. In any case, please note that surface water diversions and other related features at mines are typically considered as appurtenant works to a jurisdictional dam when their potential failure could have adverse impacts on the operation of the dam, unless those

features are regulated by another agency such as the Alaska Department of Environmental Conservation (ADEC), e.g. a wastewater treatment plant.

CONCLUSIONS AND SUMMARY

The Pond 7 Dam was being operated under a valid and current *Certificate of Approval to Operate a Dam*. At this point, ADNR Dam Safety asserts that Hecla is out of compliance with the Alaska dam safety regulations based on a limited administrative and technical review of the submittals provided by Hecla to date, as described herein.

The submittals from Hecla included a revised O&M Program dated April 2017. To move towards compliance for Hecla, ADNR Dam Safety is issuing the attached “temporary” *Certificate of Approval to Operate a Dam* which will be valid until August 12, 2017 (60 days after the PSI due date) in order to allow Hecla time conduct the PSI and to resolve the outstanding issues identified herein.

Please provide a response to this letter by May 30, 2017 that includes your proposal and schedule to bring Hecla into compliance with the Alaska dam safety regulations.

Your continued attention to the safety of the dams at the Greens Creek Mine will be greatly appreciated.

Respectfully,



Charles Cobb, P.E.
State Dam Safety Engineer

Attachments: *Hazard Potential Classification and Jurisdictional Review* form for Pond 10 Dam
Temporary Certificate of Approval to Operate a Dam No. FY2017-21-AK00307

cc: Brent Goodrum, ADNR
Dave Schade, ADNR
Kyle Moselle, ADNR
Marty Lentz, ADNR
Brent Martellaro, ADNR
Dave Wilfong, ADNR
Allan Nakanishi, ADEC
Will Collingwood, ADEC,
Matthew Reece, USFS



Alaska Dam Safety Program

HAZARD POTENTIAL CLASSIFICATION AND JURISDICTIONAL REVIEW

This form is used to review and indicate the hazard potential classification of an artificial barrier in accordance with 11 AAC 93.157 and to determine if the barrier is a dam under the jurisdiction of the Alaska dam safety regulations, based on the definition articulated under Alaska Statute 46.17.900 (3), and summarized as follows:

"Dam" includes an artificial barrier, and its appurtenant works, which may impound or divert water and which...

- has or will have an impounding capacity at maximum water storage elevation of 50 acre-feet and is at least 10 feet in height measured from the lowest point at either the upstream or downstream toe of the dam to the crest of the dam; or
- is at least 20 feet in height measured from the lowest point at either the upstream or downstream toe of the dam to the crest of the dam; or
- poses a threat to lives and property as determined by the department after an inspection.

In accordance with 11 AAC 93.151, an artificial barrier with a Class I or Class II designation is determined to meet the third definition of a dam, regardless of its geometry.

Please complete items 1 through 21. Attach additional information as necessary. This form must be certified and stamped on page 3 by an Alaska-registered professional engineer, qualified in accordance with 11 AAC 93.193.

1. Name of barrier: Not assigned Pond 10 Dam
- National Inventory of Dams (NID) number: Pending (Assigned by Department)
- Name of stream: N/A
- General location and region: Hawk Inlet Admiralty
- Legal location: Township 44S Range 65E Section 26 Meridian CRM
- Purpose and type of barrier: Storm water management
- This barrier is: Existing Proposed Under construction
- Current hazard potential classification: I II III Not assigned

2. Owner: Hecla Greens Creek Mining Company
- Address: PO Box 32199
- Juneau, AK 99803
- Contact name: Christopher Wallace
- Phone: (907) 790-8473

3. Is barrier federally owned, or regulated by the Federal Energy Regulatory Commission?
- Yes (stop here) No (complete form)

4. Maximum crest height of barrier: 19 feet

- Measured from: Upstream toe Downstream toe Offstream toe
 Basis of height: Conceptual design drawing Detailed design drawing
 As-built drawing Field measurement NID data

5. Maximum impoundment volume: 44.8 _____ acre-feet

Surface area of reservoir at maximum storage: 3.4 _____ acres
 Average depth of reservoir above bottom of barrier: 21 _____ feet (live storage)

- Basis of volume estimate: Surface area multiplied by average depth
 Bathymetry
 NID data
 Other: Based on detailed design surfaces. (above liner intake)

= above grade

6. Downstream development: Yes No Unknown

what?

Type of development (check all that apply):

- | | |
|------------------------------------------------------------|----------------------------------------------------------------------------|
| <input type="checkbox"/> Homes | <input type="checkbox"/> Power or communication utilities |
| <input type="checkbox"/> School | <input type="checkbox"/> Water or wastewater treatment facilities or lines |
| <input type="checkbox"/> Community halls, churches, etc. | <input type="checkbox"/> Overnight campgrounds |
| <input type="checkbox"/> Industrial or commercial property | <input type="checkbox"/> Public parks or trails |
| <input type="checkbox"/> Major highway | <input type="checkbox"/> Fish hatchery or processor |
| <input type="checkbox"/> Primary roads | <input type="checkbox"/> Barrier owner's property or facilities |
| <input type="checkbox"/> Secondary or rural roads | <input type="checkbox"/> Other utilities: _____ |
| <input type="checkbox"/> Railroads | <input type="checkbox"/> Other development: _____ |

Basis of observations: Ground reconnaissance Aerial reconnaissance
 Aerial photo Other:

Date of observations: _____

7. Proximity of development to downstream channel (add maps or other information as necessary):

Distance downstream from barrier: n/a
 Distance from stream bed: n/a
 Relative elevation above streambed: n/a

8. Is development in the inundation zone of a flood from an uncontrolled release of water from the barrier?

Yes No Unknown

9. Was a dam break analysis conducted?

Yes No

Basis of determining inundation zone:

- Simplified DAMBRK model
 DAMBRK model
 NWS FLDWAV model
 HEC-1 model
 Other: _____

(Please attach calculations)

Maximum depth and velocity of flow through development: _____

10. Is development at risk from improper operation or a "sunny day" failure?

Yes No Unknown

11. Is development at risk from an incremental increase in the flood if the barrier fails under flood conditions?

Yes No Unknown

Flood condition evaluated: 100 year 1/2 PMF PMF Other: _____

12. Could an uncontrolled release cause other significant property damage or loss?

Yes No Unknown

Description: _____

13. Could an uncontrolled release effect public health?

Yes No Unknown

Description: _____

14. Is the reservoir created by the barrier the primary water supply for a community of more than 500 residents?

Yes No Unknown

Is a backup water supply available?

Yes No Unknown N/A

15. Is barrier located on waters important to anadromous fish?

Yes No Unknown

Are anadromous fish waters at risk of damage or loss if an uncontrolled release occurs?

Yes No Unknown N/A

16. Proposed hazard potential classification: Class I (High) Class II (Significant) Class III (Low)

17. Basis of classification: Quantitative - Numerical dam break analysis conducted
 Qualitative - Limited engineering calculations
 Preliminary - No engineering calculations

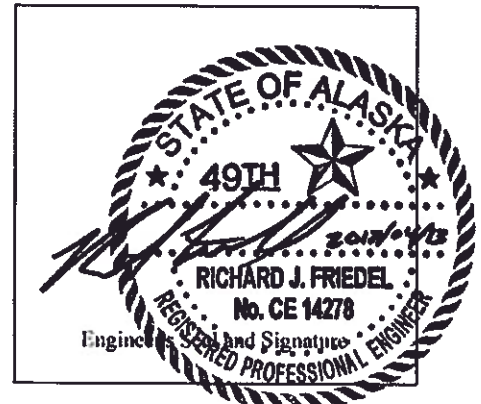
18. Comments: This determination was made based on a review of the potential run-out zone to the east of Pond 10 using the available aerial imagery, ADNR anadromous fish zones (Apr.4, 2014) and discussions with Hecla Greens Creek Mining Company. As no development or risk to public health were identified in the run-out zone of a theoretical failure of Pond 10, no further detailed calculations or assessment were undertaken. The only potential risk to anadromous fish zones is if a failure were to occur in the SE corner where the dam is only 8 ft high.

19. Certified by: Rick Friedel (Print name)

Date: Apr. 13/2017

Company: Klehn Crippen Borge Ltd.

Phone: 604-251-8528



Notes:

1. This form must be certified and stamped by an Alaska-registered professional engineer qualified in accordance with 11 AAC 93.193.
2. The information presented in this form may be overruled based on current data that reveals a higher level of confidence in the quality of information necessary to make the appropriate determinations.
3. Anadromous fish waters are determined in accordance with 11 AAC 195.010 (a).
4. Alaska dam safety regulations are articulated under 11 AAC 93.151 through 11 AC 93.291 (Article 3).

NID No. To be assigned by ANR
pending approval for construction

FOR DEPARTMENT USE ONLY

Jurisdictional Status of Barrier:

Dam under state jurisdiction

Barrier is not a dam under state jurisdiction

Reasons:

- Height
- Height and storage volume
- Hazard potential classification
- Anadromous fish stream
- Other: _____

Reasons:

- Height
- Height and storage volume
- Hazard potential classification
- Federal ownership or regulation
- Other: _____

Concur with proposed hazard potential classification: * Yes No

Hazard potential classification based on current information: Yes No

Official hazard potential classification:

Class I (High) Class II (Significant) Class III (Low)

Comments: * Applicant did not propose a hazard potential class. "Potential risk" to anadromous fish habitat indicated. Class II assignment by ANR in accordance with 11 AAC 93.157(a)(2)(b). Hazard potential classification may be changed based on additional information presented in qualitative or quantitative analysis.

Reviewed by: Charles F. Cobb

Title: State Dam Safety Engineer

Signature: Ch F Cobb

Date: May 2, 2017

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF MINING, LAND AND WATER
DAM SAFETY AND CONSTRUCTION UNIT



Temporary Certificate of Approval to Operate a Dam

The **State of Alaska** under AS 46.17, and the regulations adopted under this statute, grants to:

Hecla Greens Creek Mining Company

The temporary approval to operate the following structure on **Admiralty Island** in accordance with the terms and conditions contained in this certificate:

Pond 7 Dam (NID ID#AK00307)

The location of this project is: T43S, R65E, S26, Copper River Meridian


The holder of this certificate shall:

- Operate the Pond 7 Dam and appurtenance works in accordance with accepted practice and the Operation and Maintenance Program dated April 2017, temporarily approved by the Department concurrent with this certificate.
- Except for claims or losses arising from negligence of the State, defend and indemnify the State against, and hold it harmless from any and all claims, demands, legal actions, loss, liability and expense for injury or death of persons, and damages to or loss of property, arising out of or connected with the exercise of the approval granted by this certificate.
- Comply with all applicable laws, regulations and conditions.
- Allow representatives of the Department to inspect the work and records covered by this certificate at all times determined necessary by the Commissioner.
- Follow special conditions that apply to the operation of this dam as found in Attachment A, attached hereto and made a part hereof.

**TEMPORARY CERTIFICATE OF APPROVAL TO OPERATE A DAM
Pond 7 Dam**

This temporary *Certificate of Approval to Operate a Dam* supersedes any other *Certificate of Approval to Operate a Dam* for the Pond 7 Dam and shall become invalid 60 days after the Periodic Safety Inspection due date specified under Attachment A. A valid certificate shall be issued with revised special conditions based on information contained in a current Periodic Safety Inspection Report approved by the Department and dam safety regulatory standards current at the time of the inspection.

This temporary *Certificate of Approval to Operate a Dam* is granted subject to the pertinent statutory provisions in AS 46.17 and in Administrative Regulations in Article 3 of 11 AAC 93.

APPROVED BY: Charles F. Cobb, P. E.
TITLE: State Dam Safety Engineer
Division of Mining, Land and Water
SIGNATURE: 
DATE: May 9, 2017

State of Alaska)
) SS.
Third Judicial District)

This is to certify that on May 9th, 2017, before me appeared Charles F. Cobb, known by me to be the Director of Authorized Representative of the Division of Mining, Land and Water, Alaska Department of Natural Resources, and acknowledged to me that this Certificate of Approval was voluntarily executed on behalf of the State of Alaska.


Notary Public in and for the State of Alaska
My Commission expires: With Office



COPY
ORIGINAL

**TEMPORARY CERTIFICATE OF APPROVAL TO OPERATE A DAM
Pond 7 Dam**

Attachment A – Special Conditions

1. The Pond 7 Dam (AK00307) is temporarily approved to operate as a Class III (low) hazard potential dam as defined in 11 AAC 93.157 at a crest elevation of approximately 144 feet.
2. Inspect the Pond 7 Dam in accordance with the procedures outlined in the “Hecla Greens Creek Mining Company, Pond 7-AK00307, Operation and Maintenance [O&M] Program” revised in April 2017. Inspect the dam after all significant seismic or precipitation events. Maintain records of all inspections, including routine inspections listed in the O&M Program.
3. Document any routine operations and maintenance procedures that deviate from or are not included in the O&M Program. Update the O&M Program with each periodic safety inspection cycle as described herein, or as needed and submit it to the Department.
4. Perform a Periodic Safety Inspection as required by 11 AAC 93.159 on the Pond 7 Dam and appurtenance works by June 13, 2017. The frequency for Periodic Safety Inspections shall be at five year intervals as required by regulation for a Class III (low) hazard potential dam. The Periodic Safety Inspection must be performed by an engineer qualified in accordance with 11 AAC 93.193(b). Prior approval of the engineer and the scope of the inspection must be agreed upon in advance with the Department.
5. Implement the recommendations of the inspection engineer in the 2012 periodic safety inspection report, including the review of the Pond 7 hydrology and hydraulics design and as-built configurations, as well as the flows contributed from other areas of the mine.
6. Any significant problems that may develop with the dam or appurtenant works which could affect the safety of the dam shall be reported to the Dam Safety and Construction Unit of the Department within 24 hours.
7. For any modifications, major repairs, removal or abandonment of the dam, a separate certificate of approval must be obtained from the Department.
8. The requirements for operation, abandonment or removal of the Pond 7 Dam must be included in each revision of the detailed mine reclamation plan. Sufficient funds for these requirements must be identified and included in the financial assurance required per: AS 27.19.020-040; 11 AAC 97.200-450; 11 AAC 93.171(d); 11 AAC 93.171(f)(2)(C); 11 AAC 93.171(f)(4)(F); and 11 AAC 93.172(a)(6)(C); other applicable Alaska laws; and the *Memorandum of Understanding between the Alaska Department of Natural Resources, Alaska Department of Environmental Conservation and the U.S. Department of Agriculture, Forest Service Concerning Reclamation/Closure/Post-Closure Bonding for the Greens Creek Mine* (June 30, 2014), or any revisions thereof. Submit a copy of associated sections of the Reclamation Plan and financial assurance instrument to the Dam Safety and Construction Unit of the Department during each review and revision cycle.

End of Attachment A

D/F:damsafe/dam projects/greens creek/certificates/temp COAOp FY2017-21-AK00307

ATTACHMENT B

Corrective Actions for Hecla Greens Creek Mining Company

**Corrective Actions
for
Hecla Greens Creek Mining Company**

The Alaska Department of Natural Resources (ADNR) will require Hecla Greens Creek Mining Company (HGCMC) to take corrective actions to remedy the violations specified in the Notice of Violation dated February 26, 2018. HGCMC's agreement to take these corrective actions may be memorialized in a consent agreement. Corrective actions are needed to ensure that the water management facilities at the Greens Creek Mine on Admiralty Island, Alaska are constructed and operated to the minimum standard of care necessary for the protection of life and property. The water management facilities at the Greens Creek Mine include the tailings storage facility (TSF) and Ponds 7, 10, 23, A, C, and D which are subject to regulation by ADNR in whole or in part under the authority of AS 46.15, AS 46.17, AS 27.19 and respective regulations.

ADNR herein requires HGCMC take the following corrective actions:

- 1.No later than April 30, 2018, HGCMC will pay damages in an amount to be determined by discussion between ADNR and HGCMC.
- 2.No later than April 30, 2018, HGCMC will provide a bond or other form of financial assurance subject to ADNR approval, in an amount and period to be negotiated between ADNR and HGCMC, including an amount and period sufficient to pay the cost of mitigation for: any unforeseen problems that may be discovered in routine monitoring and inspections or problems discovered in the additional investigations, analyses, and evaluations required herein for the TSF expansion, the Pond 7 modification, the Pond 10 construction, and other aspects of the integrated water management system; for the financial assurance required in 11 AAC 93.171(f)(2)(C)(ii) and, the cost of mitigation for the Sand Pit Dam as described in Item 5.
- 3.No later than April 30, 2018, HGCMC will provide a written response to the violations alleged in the letter from ANDR to HGCMC dated February 26, 2018, an explanation of how these violations occurred, and a plan, subject to ADNR's approval, to correct any deficiencies to the company's processes to ensure future compliance with regulatory requirements. The plan must include a specific description of how HGCMC will address and prevent future irregularities and/or failures of HGCMC project management, engineering, and/or construction quality assurance that results in a failure to request the necessary authorizations required from ADNR. HGCMC must include a schedule to implement any proposed corrections or improvements.
- 4.No later than April 30, 2018, HGCMC will provide a certified cost estimate and application fee supplement for the Stage 3 Phase 1 (S3P1) TSF expansion, as required under 11 AAC 93.171(f)(4)(D) and (E) respectively. The application fee deposits submitted by HGCMC for the Pond 7 modification (\$4,588) and the Pond 10 construction (\$23,762) may be included in the calculation for the total fee.
- 5.No later than April 30, 2018, HGCMC must submit a plan and schedule to remove the Sand Pit Dam and its respective contents and reclaim the site to pre-existing conditions, or re-use the site in accordance with plans approved by the respective regulatory authorities.

Corrective Actions for HGCMC

- 6.No later than April 30, 2018, HGCMC must submit a plan and schedule to complete all outstanding work on the S3P1 expansion including first fill testing of Pond 10, other punch-list items from previous construction inspections, and any new work for respective features.
- 7.No later than April 30, 2018, HGCMC must submit a plan and schedule to complete the items included in the following list:
- a. Submit a final operations and maintenance (O&M) manual that meets the requirements of 11 AAC 93.197 including the emergency action plan requirements of 11 AAC 93.164(e) for Class II (significant) hazard potential dams as defined in 11 AAC 93.157 for the TSF, the Pond 7 Dam the Pond 10 Dam and the respective appurtenant features of the integrated system. The O&M Manual should include the following items which will be special conditions to the *Certificate of Approval to Operate a Dam*:
 - i. An annual instrumentation report for the TSF, the Pond 7 Dam, the Pond 10 Dam and the respective appurtenant features as an integrated system shall be submitted to ADNR which shall include, but not be limited to: thermistor, piezometer, inclinometer, water level, seepage pumpback, and survey data. The report shall be in summary form and in a format acceptable to ADNR. The annual instrumentation report is due by March 31 of each year.
 - ii. An annual water management plan shall be submitted to ADNR by April 30 of each year during active mine operations which shall include, but not be limited to:
 - a description of the accumulated tailings, the amount of water transferred from the TSF and respective underdrains to Pond 7 and Pond 10 in the preceding year, and the remaining storage capacity of the constructed TSF
 - an updated water balance forecast based on the most current actual data available that includes the historic and projected water quantities and flow rates collected and transferred from the TSF, Pond 23, Pond A, Pond C and Pond D and other collections points to Pond 7 and Pond 10, and the quantity and flow rates of water discharged from the water treatment plant
 - the current estimated construction schedule for remaining phases of the TSF
 - a current input file for the computer water balance model
 - other information pertinent to the operation and performance of the TSF, the Pond 7 Dam, the Pond 10 Dam and the respective appurtenant features of the integrated water management system
 - iii. An annual performance report prepared by an engineer qualified in accordance with 11 AAC 93.193(b) shall be submitted to the Department by October 31 of each year during active mine operations. At a minimum, the report shall include:
 - the findings of a visual inspection of the TSF, the Pond 7 Dam, the Pond 10 Dam and the respective appurtenant features of the integrated system when clear of snow
 - photographs of key features of the TSF, the Pond 7 Dam, the Pond 10 Dam and the respective appurtenant features of the integrated system and other observations during the visual inspection
 - a review and evaluation of routine inspection and maintenance reports

Corrective Actions for HGCMC

■ a review and evaluation of monitoring data included in the annual instrumentation report and any additional monitoring data available at the time of the site visit.

The report shall be in summary form and in a format acceptable to the Department. This requirement will be waived for each year that a periodic safety inspection (PSI) required by 11 AAC 93.159 is conducted, but the PSI must include the above listed information in addition to meeting the other requirements of 11 AAC 93.159.

- b. Conduct an electro-magnetic field based geophysical survey to map groundwater flow paths under and around the perimeter of the TSF and Pond 7 and Pond 10 to the maximum extent practicable based on recommendations of the respective geophysical expert. The specific geophysical method and plan are subject to ADNR approval. The final report must be submitted to ADNR immediately upon completion.
- c. Provide for an independent engineering evaluation of the TSF, the Pond 7 Dam, the Pond 10 Dam and the respective appurtenant features of the integrated system including all water management features of the surface operations. The scope of services of the evaluation and the independent engineers are subject to ADNR approval. The scope of services must include an evaluation of the static and seismic stability of the TSF in the expanded configuration; the liner system design and construction in the S3P1 expansion and Pond 10; and the underdrain performance at the TSF, Pond 7 and Pond 10 including a detailed description of the underdrain construction, the measured piezometric pressures, and the seepage collection system for Pond 10, as recommended by KCB in the report on the 2017 PSI of the Pond 7 Dam. In addition, the scope of services must include a review of all other construction and operational problems identified by HGCMC, KCB, M3 Engineering or the construction contractors in 2016, 2017 or 2018 that required or require mitigation including those verbally reported by HGCMC to ADNR such as groundwater uplift pressures on the liner systems in Pond 10 and the TSF, poor quality HDPE pipe welds that required excavation of the upstream slope and crest of the Pond 10 Dam, and hydrogen sulfide gas production from the wet wells located in the Pond 10 Dam. The final report must be submitted to ADNR immediately upon completion.
- d. Submit all existing and pending geotechnical reports, instrumentation plans and data reports, engineering design evaluations and reports including seepage, stability and deformation analyses, construction completion reports, and any independent reviews for the TSF including the S3P1 expansion.
- e. Provide design reports, run-off calculations, as-built construction records, stage-storage curves, operation and maintenance plans and other relevant information for the TSF and all collection ponds and appurtenant works for areas contributing flow to the Pond 7/10 complex including a current mine water balance.

The corrective actions described above are based on ADNR's understanding of the limited information currently available and additional information or actions may be requested upon receipt and review of the items listed above. Also, additional special conditions may be added to the *Certificate of Approval to Operate a Dam* as a better understanding develops of the performance, operation, maintenance and mitigation requirements of the TSF, the Pond 7 Dam, the Pond 10 Dam and the respective appurtenant features of the integrated system.