STATE OF ALASKA

FRANK H. MURKOWSKI, GOVERNOR

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DIVISION OF WATER
DIRECTOR'S OFFICE

September 29, 2006
Certified Mail 7006-0810-0000-8656-9240

Austin Ahmasuk
P.O. Box 693
Nome, AK 99762

Re: Request for Informal Review and Stay of Rock Creek Mine Waste Management Permit and 401Certification

Dear Mr. Ahmasuk:

I have completed my review of your request for informal review of the Alaska Gold Company (AGC) Rock Creek and Big Hurrah Mines Project Waste Management permit 2003-DB0051, and Certificate of Reasonable Assurance (POA-2006-742-4) pursuant to Section 401 of the Clean Water Act.

Because your request was lengthy, I summarized in the enclosed document each appeal point, following the item organization of your request, and then provided a brief background and analysis (a summary of my review), and the Division's decision. In summary,

1. I am upholding all aspects of the permits with one exception. Division permit staff are directed to have AGC modify, and the Division approve, the monitoring plan to include monitoring of water quality in the Tailings Storage Facility (TSF) and the seepage collected from the toe of the TSF. The amendment to the plan should be accomplished by December 30, 2006, but no later than the date that AGC begins placement of tailings in the TSF. This change to the monitoring plan does not require any language changes to the permit.

2. Additional specific information listed in the WMP at 1.1.5 and 1.7 (and listed in the ADNR Rock Creek and Big Hurrah Mine Project Final Reclamation Plan Approval Dated August 9, 2006, pp 7-9) will be made available to the public upon receipt.

3. Public review and comment will be sought on changes to the Big Hurrah rock handling plan that may be driven by a review of the data collected under the WMP Sections 1.1.5 and 1.7.

4. The Division will comply with current regulations at 18 AAC 15.100 when determining whether changes to the facility process or operations require a new permit and if so, will follow the public notice and review procedures of 18 AAC 15.

5. Division permit staff are instructed to submit a revised antidegradation analysis to me within 15 calendar days of the date of this decision, and to focus that analysis on the regulatory criteria set out in 18 AAC 70.015.

Based upon my review of your request and the Department's records on this matter overall, I have decided not to stay the effect of the permit decisions.

This letter constitutes my final decision on your request for informal review. You have the right to seek further departmental review under 18 AAC 15.195. A request for a hearing under those provisions should comply with 18 AAC 15.200, and is due within thirty days of the date of service of this decision upon you. See 18 AAC 15.910.

Sincerely,

Lynn J. Tomich Kent

Lynn J. Tomich Kent
Director

Enclosure

cc: Charlotte McKay, Alaska Gold Company
Cameron Leonard, Department of Law
Tom Crafford, Department of Natural Resources
Sharmon Stambaugh, Department of Environmental Conservation
Jim Rypkema, Department of Environmental Conservation

ROCK CREEK/ BIG HURRAH WMP
INFORMAL APPEAL ANALYSIS
9/29/06

The following discussion is organized in such a way as to track the issues as identified by the request for informal review, following the number scheme used in that request. To the extent that some issues may be duplicative, that is reflected in our disposition of each issue.

Appeal Item 1. Public Notice. The appeal states that adequate public notice was not provided and that the notices were not "consecutive" in that they did not appear in two consecutive published editions of the paper.

Background and Analysis: The regulations governing public notice of permit applications, 18 AAC 15.050(a) states in part that "the department will publish two consecutive notices of the application in a newspaper of general circulation in the area that would be affected by the operation, and in other media the department considers appropriate to achieve sufficient public notice."

Public notice of the permit application was published in the Nome Nugget (a weekly newspaper) on June 1, 2006 and June 22, 2006. The second notice was published 4 days in advance of the public hearing and 8 days in advance of the close of the original public comment period (which was later extended for another 6 days). In addition, notification was placed on the State's Public Notices website on June 1, 2006. Based on a request from the Trustees for Alaska, the public comment period was also extended 6 days past the original comment closing date. The public notice for the comment period extension was published in the Anchorage Daily News, the Fairbanks News Miner and the Nome Nugget on June 29, 2006

The department acknowledges that there could be disagreement about the meaning of the term "consecutive" as used in 18 AAC 15.050(a). However, it is clear that the term modifies the word "notices," not the word "newspapers". Presumably the purpose of requiring consecutive public notices is to prevent the publication of duplicate public notices in the same edition of a paper. It is less clear that there is any purpose served by requiring that the two editions of the paper in which the public notice is posted be themselves consecutive. Indeed, having some time pass between the two public notices may well have the effect of alerting a larger segment of the public to the permit application and the scheduled hearing.

Division Decision: I conclude that the department's public notice in this case complied with 18 AAC 15.050(a). The two public notices were consecutive in the sense that one followed the other, even though they were not published in consecutive issues of the Nome Nugget.

In any case, even if the public notices did not comply with the precise language of the regulation, I conclude that there was substantial compliance, and that adequate public

notice was given. In fact, it could be argued that publishing the notice four days prior to the Nome meeting may be beneficial in terms of public notification, and resulted in a better turnout. Department records indicate that 58 people attended the public hearing, indicating that the public notices met the intended purpose. Extending the public comment period by 6 days beyond the required 30 days also provided additional time for the public to comment.

Appeal Item 2: Legal Inadequacy of the WMP Generally.

Appeal Item 2a. Lack of Standards and Public Review. The appellant's concern is that specific standards need to be identified in the permit on which the Department will base its decision on future plans or permit modification which may then become part of the permit without the opportunity for public comment.

Background and Analysis: This issue is primarily related to the portion of the Waste Management Permit that covers operations at the Big Hurrah pit, and to a lesser extent at the Rock Creek pit. This issue appears to center on the perception that the overall plan (operations, reclamation, waste management, and monitoring) for mine operation may change under the proposed permit, without providing opportunity for public comment and that the permit did not contain specific standards for approving or denying those plans.

The permit references regulation 18 AAC 15.100(c) which states: "A permit or variance authorizes only that operation specified in the permit or variance. Any expansion, modification, or other change in a facility process or operation which might result in an increase in emissions or discharges, or might cause other detrimental environmental impacts from the permittee's facility, requires a new permit or variance. Any other change in the operation requires an amendment to the permit or variance."

This section generally describes the changed conditions that would trigger a new permit, with a formal public review period.

The Waste Management Permit (WMP) included operations at Big Hurrah (Section 1.1.1) even though the mine can not operate at Big Hurrah until additional specific information listed in the WMP at 1.1.5 and 1.7 (and listed in the ADNR Rock Creek and Big Hurrah Mine Project Final Reclamation Plan Approval Dated August 9, 2006, pp 7-9) is submitted and approved by both ADEC and ADNR. The required additional information generally pertains to development rock characterization at Big Hurrah.

While considerable information was available at the time of permit issuance, it was not considered sufficient to provide an accurate estimate of the various types of (PAG, Non-PAG etc) rock such that a final handling, storage and disposal method could be approved. The public was not provided an opportunity to comment on data not yet available or on changes that data may compel to the rock handling plan for the Big Hurrah site, which will, upon approval, become part of the Waste Management Permit. However, the permit contains performance-based standards that must be met regardless

of revisions to the rock handling plan – Alaska's water quality standards must be met in surface and groundwater during and after mining.

Division Decision: I conclude that the WMP contains specific, performance-based standards. It is my decision that when information is submitted as required in the WMP at 1.1.5 and 1.7(and listed in the ADNR Rock Creek and Big Hurrah Mine Project Final Reclamation Plan Approval Dated August 9, 2006, pp 7-9), ADEC will make that information available to the public and will seek public comment on the revised handling, storage and disposal methods. Any permit change, or change to the documents required by the permit, that meet the "test" of 18 AAC 15.100(c) requiring a new permit will undergo public review and comment as well.

Appeal Item 2b. Lack of Standards and Safeguards Related to Transportation. The appellant asserts that dust from truck traffic will adversely impact subsistence activities and human health.

Background and Analysis: This issue involves transporting rock from the Big Hurrah site to the Rock Creek site for processing, via the public highway system and truck traffic at the Rock Creek and Big Hurrah sites.

Dust control specifically related to activities at the Rock Creek Mine will be addressed in the Air Quality Permit that is currently pending for this project. While the activities at Big Hurrah may not trigger the requirement for an Air Quality permit, Section 1.4.4 of the WMP contains general language regarding the need for dust control at the tailing storage facility (TSF), roads, and other mine components, including the Big Hurrah site.

Truck traffic, routes, loads, vehicle size and related issues associated with public roadways are generally not included in ADEC's waste management permits because they fall under the authority of another agency, in this case, the Alaska Department of Transportation (ADOT). A mitigating factor regarding transport of ore between Big Hurrah and Rock Creek is that the material is generally larger rock material, rather than ground ore, and should not produce dust by blowing off the loaded vehicles. The primary dust source should be limited to that generated by the truck traveling on a gravel road. ADOT currently performs dust control on the road between Big Hurrah and Rock Creek and AGC has indicated that they will provide reasonable dust control accommodations in cooperation with ADOT.

Division Decision: I conclude that because 1) generation of dust at the mine site will be addressed in the Air Quality Permit for this facility, 2) the permit addresses dust control at the Big Hurrah site, and 3) because the haul road between the mines is a public roadway and subject to rules that apply to public roads, amendments to the WMP are not necessary to establish additional dust control.

Appeal Item 2c. Lack of Standards and Safeguards for Acid Generation.

1. *The state is vague on how to address acid rock drainage.*

Background and Analysis: In addition to ADEC staff, the Department relied upon the state's consultant, Dr. Jay McNee of Lorax Environmental, to review and analyze the data for adequacy and to evaluate the potential to generate acid and to release metals. He concluded that the sampling showed a potential for acid generation and metals leaching, but careful management could mitigate this potential. Tests conducted to date indicate that there will be sufficient neutralizing rock to blend with potentially acid generating rock such that acid can be prevented from being generated by implementation of an approved rock handling plan.

The approved plan for handling acid generating rock at Big Hurrah requires the rock to remain submerged under water at closure, which is an accepted and proven method to reduce rock exposure to oxygen. The permit contains performance based standards requiring compliance with Alaska's water quality standards.

Division Decision: I conclude that the permit contains adequate safeguards related to acid rock drainage because continued and ongoing analysis of the rock at both the Rock Creek and Big Hurrah mines is required by the permit to confirm initial characterization of the rock types and to determine how the rock should be disposed of. The permit requires the company to predict rock quantities such that acid generating rock can be handled in an environmentally safe manner and that the proposed method of preventing acid generation at the Big Hurrah pit by submerging waste rock, is feasible.

2. *The state did not evaluate the potential for metal leaching.*

Background and Analysis: The State's consultant, Dr. Jay McNee, stated in a technical memo dated January 12, 2006, that "regardless of the potential for onset to acidic conditions, there appears to be the potential for metal leaching (arsenic, antimony, molybdenum) under pH neutral conditions."

If there is no acid generation in the pits then the release of metals will be limited or occur over a very long time period. Where there is a "first flush" of water that can be captured, it will be treated before discharge.

Division Decision: I conclude that the permit contains adequate safeguards and controls related to metal leaching under neutral conditions.

3. *AGC's acid testing did not conform to EPA's 2003 sourcebook.*

The Appellant suggests that the static tests that were performed on drill cores, are significantly different in grain size from run-of-mine waste rock and material crushed for cyanidation.

Background and Analysis: ADEC relied on Department staff and the expertise of it's consultant (Dr. Jay McNee) to: evaluate the adequacy and accuracy of AGC's acid testing program; to assure that the approach used in the analysis is consistent with industry standard; and to confirm that it would predict behavior under actual mining conditions. EPA's 2003 sourcebook was not specifically used in this evaluation; rather, an approach using the best available practice was used by the consultant.

With respect to grain or particle size, waste rock typically occupies a size range from millimeter to meter in scale. Measuring the ABA characteristics of a boulder is impractical, and likely irrelevant given its low surface area to volume ratio. Most of the geochemistry occurs in the fine grain-size fractions, which is where the analysis was focused, and is the reason samples are ground before testing. In this case, the drill core(s) was ground prior to being tested and is therefore representative of the fine, "reactive" fractions within a waste dump. As for tailings, tests would have been run on a typical tailings grain size material.

It is not possible or realistic to expect an exact grain-size match between waste rock and samples submitted for static testing; however, grinding to a relatively fine grain size equalized samples to a large degree. This is a standard protocol within the industry and is how virtually all ARD testing is run, particularly at the project development stage.

Division Decision: I conclude that the analysis used to evaluate the acid rock testing performed for this project was based on reasonable assumptions and is representative of anticipated conditions.

4. *Rock has not been characterized in the form it will ultimately take, i.e. crushed with varying particle sizes.*

The appellant contends that the analysis of core samples is not adequate and that testing should be in accord with both the January 2003 US EPA sourcebook and the EPA Hardrock Mining: A Source Book for Industry in the Northwest and Alaska. The appellant also contends that the conclusions of ABA tests on core samples may be inaccurate because they would not be the same as that for whole rock.

Background and Analysis: The Technical Memorandum to Doug Nicholson dated March 27, 2006, item 5, states that the characteristics of the drainages from rock with different characteristics was determined by looking at the relative exposed surface areas of those different rock types.

ADEC relied upon department staff and the expertise of the State's consultant. For Rock Creek the consultant found that sampling was marginal to adequate between proportions of rock types, and recommended that ongoing static tests occur during the operation. The consultant found for Big Hurrah that "The representivity between rock types appears good and that there appears to be an adequate number of samples for the tonnage to be removed in order to make determinations of waste management strategies."

Division Decision: I conclude that adequate safeguards are contained in the WMP because ongoing sampling and testing is required as mining progresses, including humidity cell and site crib tests using rock sizes that are generally in line with that which will be placed in the waste rock piles.

5. *ABA testing was not repeated on rock samples showing uncertain acid behavior.*

Background and Analysis: Uncertain behavior generally applies to rock with an acid balance ratio between 1:1 and 3:1. It indicates uncertainty in how the rock will behave when exposed to the environment and therefore needs to be subjected to additional testing. It does not necessarily mean that the samples should be retested. The permit (and the approved monitoring plan) calls for additional static and kinetic testing as the mining operation progresses. This requirement is a direct response to the ABA results. The additional sampling and testing would be performed on actual samples from the mining operation and be used to confirm or revise any assumptions made using preliminary or less complete data. Provisions in the permit provide a framework for modifying rock handling and sampling plans, including increasing bond requirements to address long term issues associated with closure of the facility.

Flexibility in dealing with parameters that can and typically do change during the course of a mining operation, is a necessary permit management and compliance tool.

Division Decision: I conclude that the permit contains adequate provisions and flexibility to protect the waters of the state.

6. *Length of time between taking and testing first flush samples too long.*

The appellant claims that DEC did not address the flaws in AGC's acid testing regarding the length of time between collecting the samples and when they were tested when the first flush occurred and that because of this, the test results are not valid.

Background and Analysis: The department surmises that the concern is that the metals associated with a first flush in the form of small particulate matter or from dissolution of metals exposed at the surface will not be the same for samples held for some period and the waste rock that is disposed. In general, sample aging is not a concern for static or kinetic tests. If a sample ages (and oxidizes) that is the natural process being assessed. It does not change the results of the interpretation. While it would be useful to know that the sample had aged when interpreting the results, there is no industry standard or "holding time" limitations as there are with some other types of analyses. In many projects, it is common to run static and/or kinetic tests on drill core that may be several years old. The tests provide an estimate of what may be in the first flush; additional assessment will occur when there is additional analysis of waste rock during operation as required in the approved monitoring plan.

Division Decision: I conclude that ADEC's evaluation of the adequacy of the test results is reasonable.

7. *Paste pH results may contradict assumptions about acid generation.*

Background and Analysis: ADNR plotted a graph of Neutralizing Potential (NP/AP) against Paste pH and found that there was no direct correlation between the two.

Division Decision: I conclude that ADEC's evaluation regarding acid generation is reasonable. Paste pH will not be used to determine long-term potential for acid generation.

8. *Uncertain and acid generating samples may contradict the assumption that the rock is non-acid generating. Reclamation must address acid generation.*

Background and Analysis: The state's consultant Dr. Jay McNee found there were sufficient samples for a first order assessment at Rock Creek. He did recommend ongoing tests for both sites, which has been incorporated into the Rock Creek Mine Plan of Operations Volume 7 Monitoring Plan, May 2006 (see Section 7.0). The WMP permit requires additional static and kinetic (humidity cell) tests as mining operations progress to evaluate the development rock and acid potential at both sites.

Division Decision: I conclude that the WMP contains adequate safeguards regarding acid generation.

9. *Concern regarding Potentially-Acid-Generating (PAG) material (at Big Hurrah)*

The appellant claims that analysis of the rock from Big Hurrah is subject to different interpretation to that which the applicant's consultants provided. However, the appellant also recognizes that the ADEC has not yet approved the Plan of Operations at Big Hurrah, but is concerned that ADEC would approve the plan without considering how PAG material at Big Hurrah will be handled.

Background and Analysis: Mining operations at Big Hurrah are prohibited until sufficient rock characterization information is provided. The final plan submitted for Big Hurrah will have to ensure that acid generating waste rock is satisfactorily addressed, both short and long term, including a thorough analysis of the feasibility of the water cover option within the pit.

Division Decision: I conclude that the WMP contains adequate safeguards regarding PAG rock at Big Hurrah. ADEC will fully evaluate the overall operational plan for Big Hurrah, including how the potentially-acid-generating material is handled. The performance standard in the permit must be met (cut off ratio of 1:1 or better) or the material must be placed under water, in order for the material to be mined.

10. *pH results show a skewed distribution.*

Background and Analysis: The appellant provided Figures 2 through 5 of the pH results of samples. Although skewed, these plots show that the skew is toward the higher pH rather than the acid side, so the requestor's concern for acid generation is not understood.

Division Decision: No further evaluation related to the pH diagrams is required.

11. *Leaving PAG material exposed will aggravate acid generation. Deposition of PAG material in water will flush out metals.*

Background and Analysis: PAG material that is blended with non-acid-generating (NAG) material will not pose a problem because acid should not be generated that will release metals. PAG material that is put back in the pit under water (as proposed at Big Hurrah) should not be exposed to oxygen long enough to be problematic. Section 1.7.1.2.2 of the WMP says that "operational development rock characterization and handling plan shall ensure that PAG development rock is temporarily stored, prior to disposal at mine closure, such that run-on water is minimized and runoff water does not reach waters of the state." If necessary a temporary polyethylene cover can be placed over the rock to keep water off it. For the PAG material under water, (see number 8 and 9 above) the proposal is to keep it covered at all times such that oxygen is not readily available. There should be no flushing action (apart from during initial filling, when the water can be treated if necessary), but there will be slow dissolution of metals into the water that will very slowly diffuse into the lake formed above the tailings. Because of the relative rates of inflowing surface water to diffusing interstitial water, metals release is not seen as a problem.

Under the permit, the department will monitor waste placement to ensure there are no permit or water quality violations.

Division Decision: I conclude that the WMP contains adequate safeguards regarding PAG rock.

12. *Inadequate drill depths and spatial extent of drilling program and sampling.*

The appellant states the spatial extent (both lateral and depth) of the exploratory drilling program is inadequate.

Background and Analysis: DEC relied on department staff, ADNR staff and the State's mining consultant Dr. Jay McKnee, to evaluate the adequacy of the drilling and sampling program. In a technical memo (Page 4/16, Section 1.2) from Dr. McNee dated January 12, 2006, Dr. McNee states that at Rock Creek, "the Phase I and Phase II sampling provide marginal to adequate representation between proportions of rock type (Table 1) and reasonable spatial distribution". He goes on to recommend that additional sampling and testing be performed as the mining operation progresses. It is not unusual for mining operations to obtain additional information as mining progresses.

DEC recognizes the fact that the whole extent of the ore body has neither been core drilled or fully analyzed. As with other mine developments, the department concedes that it is neither feasible nor reasonable to expect a mine proponent to fully understand the extent of the ore body and that continuing exploration and characterization will occur during the life of the mine. For Rock Creek, the State's consultant did conclude that the spatial distribution of cores was reasonable to characterize the rock at these mines, so the department did not feel inclined to require additional core drilling at this time, but does expect more during the development of the mine. The WMP clearly requires on-going sampling and analysis as mining progresses. This was recognized by both ADNR and ADEC which is why on-going static and kinetic testing is required in the permit.

Division Decision: I conclude that DEC's deliberations regarding the adequacy of the drilling and sampling program were adequate.

Appeal Item 2d. "Points of Compliance." The appellant is concerned that there are not enough groundwater compliance wells, and that the public does not have opportunity to comment on their location.

Background and Analysis: Three monitoring wells are to be located down slope of the tailings and waste rock sites at Rock Creek (see Volume 7, Rock Creek Mine Plan of Operations, Monitoring Plan, May 2006, Figures 4.1 and 4.2). Additional wells will be required to protect water quality as stated in the Plan of Operation (POO), Volume 7, Section 5.1.1.1: "New monitoring wells will be installed to depths and at locations approved by ADEC down gradient of any areas where injection well clusters will be installed. If a new monitoring well(s) is installed, six months of bi-monthly water quality sampling (12 samples) will be conducted prior to discharge of treated pit dewatering water to the injection wells." Also, for the Big Hurrah site, at Section 5.2.1.1 "A monitoring well will be installed at the toe of the development rock stockpile and northwest of the topsoil stockpile in a location approved by ADEC." Seeps will also be monitored (see WPM Section 1.8.1.8) at both sites that are down-gradient of the waste rock piles.

In addition, Waste Management Permit condition 1.1.3 requires the permittee to adhere to the requirements of ..... 18 AAC 72.500-72.600, Nondomestic Wastewater. Note that 18 AAC 72.600 requires the applicant to submit engineered plans for all non-domestic wastewater treatment and disposal systems. At that time, a detailed analysis will be made regarding the placement of monitoring wells to assure that the well location will intercept any plume and provide accurate water quality data.

Additional information must be submitted and approved for Big Hurrah before mining operations may proceed. When required information is submitted for Big Hurrah, ADEC will review the adequacy of the plan, including the number and location of the monitoring wells. Once approved by ADEC, the plan will become part of the permit. Any

changes to the permit that meet the "test" in 18 AAC 15.100(2)(c) requiring a new permit will undergo public review and comment.

Division Decision: I conclude that the WMP contains adequate conditions and requirements regarding the number and location of monitoring wells.

Appeal Item 2e. Dust Control. The appellant claims that neither "reasonable measures" nor "other effective measures" language is adequate to control dust.

Background and Analysis: For further background, see Appeal Item 2b above.

Division Decision: See Appeal Item 2b.

Appeal Item 2f. No Specific Standards for Temporary Closure or Corrective Actions.

Background and Analysis: The actions to be taken at temporary closure or to mitigate a problem are to protect the quality of surface and ground waters. The Department will have to be assured that whatever actions the company proposes will achieve this requirement.

Section 1.11 of the WMP requires that a temporary closure plan be submitted to ADEC no later than 10 days after the temporary closure has been initiated. That Section outlines the items that must be addressed in the temporary closure plan. In addition, the Rock Creek and Big Hurrah Mine Project Final Reclamation Plan Approval dated August 9, 2006 (page 4 of 15) contains similar language.

Because a temporary closure could occur at any time during a continuum of operational stages, it is not possible to provide specific details in the permit of what may need to be done to comply with the terms of the permit. Similarly, corrective actions would have to be specifically tailored to the situation at the time. Accordingly, the requirement for submittal of a plan for approval by ADEC, is an appropriate approach. If the response or action taken to temporarily close the site, or to mitigate a problem is unacceptable, the State has the ability to draw on the performance bond to complete the necessary actions.

Division Decision: I conclude that the WMP contains adequate safeguards regarding temporary closure and corrective actions.

Appeal Item 2g. Maximum Credible Earthquake.

Background and Analysis: The response to comments regarding this issue (page 17 and 18) provide an explanation of the rational used to determine the seismic event used in design of this facility. This issue has been reviewed by Alaska's Dam Safety engineer

and found to be consistent with state requirements. As a part of this review, DEC has discussed this again with the DNR dam safety office and has found that the response to comments is still appropriate. We have also confirmed that the limited provisions of 18 AAC 60, associated with this issue have been satisfied. A Certificate of Approval for the tailings dam has been issued by the ADNR.

Division Decision: I conclude that because the proposed facility meets the design and safety criteria necessary for approval under 11 AAC 93.171 the proposed permit provides adequate protection.

Appeal Item 2h. Ferrous Sulfate Cyanide Destruction.

Background and Analysis: Two references that describe Ferrous Sulfate Complexing are:

UNITED STATES DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT WASHINGTON, D.C. 20240, March 15, 2001 Solid Minerals Reclamation Handbook

EPA 530-R-94- NTIS PB94 TECHNICAL REPORT, TREATMENT OF CYANIDE HEAPLEACHES AND TAILINGS September 1994.

Ferrous sulfate destruction of cyanide is one of several methods that can be used. Monitoring will be required outside of the facility in ground water for cyanide. If there are violations of permit limits, then remediation action will be necessary by the company (such as capture and treatment until such time that water quality standards are met).

The seepage collection/interceptor system will be reviewed to assure that it is effective in capturing seepage from the tailings site. See Appeal Item 2m for additional discussion regarding water quality at the tailings facility.

Division Decision: I conclude that the Division has reviewed and considered the efficacy of Ferrous Sulfate Complexing and that the monitoring required by the permit will identify potential violations of the permit limit for cyanide.

Appeal Item 2i. Drinking Water Degradation. The appellant states that Moonlight Springs, the drinking water source for the City of Nome, may be vulnerable because of the proposed mining activity at Rock Creek.

Background and Analysis: The source for Nome's class A public drinking water system consists of three wells generally referred to as Moonlight Springs. The wells are located in a well field located about 3 miles south of the proposed mine site. The wells vary in depth from 81 feet to 122 feet and are reportedly completed in fractured limestone.

In 1992, the State of Alaska Department of Natural Resources (ADNR) Division of Geological and Geophysical Surveys prepared a report entitled "Report of Investigations 92-2 Recharge Area Evaluation for Moonlight Springs, Nome, Alaska." It identified a recharge area for Moonlight Springs. The Rock Creek Mine is close (within a couple miles) but outside the recharge area.

In December, 2004, the Department of Environmental Conservation, Drinking Water Program prepared a Source Water Assessment for Moonlight Springs that identified a risk-based *drinking water protection area* for this source. The report was prepared in cooperation with the City. The final report shows that the proposed Rock Creek mine is located outside of both the primary recharge and the secondary recharge zone for Moonlight Springs. Based on indications in both studies and on interviews with DNR hydrologists, the conclusion that the Moonlight Springs water source will not be adversely impacted by the proposed Rock Creek Mine, is reasonable.

Several studies and subsequent evaluations by qualified individuals all indicate that a connection between the Rock Creek Mine area and the Moonlight Springs water supply is highly unlikely.

Division Decision: I conclude that no changes need to be made to the WMP in order to protect this public water source.

Appeal Item 2I [sic]. Humidity Cell Testing of the Big Hurrah Rock.

Background and Analysis: Humidity cell tests have shown metal releases for the Rock Creek rock. Big Hurrah rock has greater potential for acid formation, so this should be tested even more thoroughly than Rock Creek rock and the permit includes a requirement to do so.

Division Decision: I conclude that the WMP requires not only additional static testing, but also additional humidity tests to be conducted during the life of the project to help characterize rock from different lithologies. DEC agrees that greater analysis of the ferrous/ferric activity and release of metals should be conducted and will investigate further independent review of these aspects as part of the on-going testing and analysis required under the WMP.

Appeal Item 2j. Water Management and Permit Limitations.

Background and Analysis: See Appeal Item 2a above

Division Decision: I conclude that existing regulation (18 AAC 15.100) and the WMP provides the necessary framework to determine when a new permit is required and when public review and comment is necessary. DEC actions will comply with current regulation.

Appeal Item 2k. Impacts to Adjacent Waters; Diversion Ditches. The appellant is concerned that runoff water may not be able to be adequately contained in the diversion ditches and that only the average precipitation may have been taken into account in the design.

Background and Analysis: Design details and ditch profiles were submitted in the Tailings Storage Facility design report (See Appendix A – Feasibility Design Drawings). From Volume 3, Tailings Storage Facility Operations and Maintenance Manual, Item 2.4: "Surface water above the TSF will be captured and conveyed around the facilities via the lower south diversion channel. This will minimize the amount of storm water required to be stored within the facility." The surface-water conveyance system has been sized to handle the predicted 100-year/24-hour storm event. There is similar language in the WMP section3.1.2.6.

Division Decision: I conclude that the ditch profiles and data were submitted and reviewed. No action required.

Appeal Item 2l. Water Management and Rock Creek Surface Water Testing. The appellant is of the opinion that EPA guidance be followed, such that natural background criteria be based on upstream values, rather than mid-section values where mineral composition is said by AGC to be different than that in the upper section. AGC provided no evidence of this difference, and also said that the mineral deposits are fairly homogenous.

Background and Analysis: Water quality in Rock Creek currently does not meet water quality standards, primarily with respect to arsenic. AGC has submitted a request to reclassify Rock Creek to remove the drinking water use. The reclassification request is being evaluated by ADEC's Water Quality Section. Reclassification of streams is addressed in 18 AAC 70.230, which requires in part, that a public hearing be held before waters of the state may be reclassified.

The Department has proposed regulatory changes to 18 AAC 70 that would allow natural water quality conditions of a waterbody anywhere in the state to be considered as the water quality criteria for that waterbody. While still pending, if these regulations become final, AGC may elect to follow the procedures of this new regulation.

The WMP is based on the taking into account the natural background levels of arsenic in Rock Creek and either re-classification of the stream or accounting for the elevated levels of arsenic under a regulation revision currently under consideration that accounts for naturally occurring elevated levels of contaminants.

Division Decision: I conclude that the permit adequately protects the waters of the state and that no changes to the WMP are currently necessary.

Appeal Item 2m. Water Management and Thermal Seepage Testing. There is no data and little narrative to enable a check of Alaska Gold's submittal on thermal and seepage evaluations at the tailings facility. The appellant is concerned that seepage evaluations were made from scaled models of the TSF with little site information. Details of the cutoff trench are required and the method of freezing this trench to isolate seepage flows.

Background and Analysis: ADEC does not dictate how AGC manages their tailings facility, but does require the submittal of documents that assure the waters of the state will be protected from contamination. Freeze-back is not being used as a method to achieve compliance, based on compliance with Alaska's Water Quality Standards (18 AAC 70).

Water quality will have to be met in the three monitoring wells just down-gradient of the tailings facility. If WQ standards are exceeded then AGS will have to change their facility and water management to cease the exceedance and ensure the standards are not exceeded in the future, either during operation or post closure. (See Waste Management Permit items 1.2.10 and 1.10.3). A seepage collection/interception system is proposed near the toe of the tailing dam. We agree that evaluating potential seepage from the tailing storage facility is important and that the effectiveness of the seepage control system should be carefully evaluated. See Appeal Item 2n for additional discussion.

Division Decision: I conclude that the WMP requires on-going monitoring and data collection, and provides adequate protection of the waters of the state.

Appeal Item 2n. Water Management and Tailings Storage Facility (TSF). The appellant contends that the TSF is highly contaminated with a suite of metals and that the pit lake will also contain these metals. Daily monitoring should be required. Analyses proposed by AGC do not meet EPA criteria.

Background and Analysis: The quality of tailings seepage water will provide important information on the likely quality of water to be expected post-closure, and any capture and/or treatment that may be required. However, it will be difficult to capture seepage water from the tailings facility; there is no liner under the TSF and the exposed pit wall available for seepage into ground water is large. Seepage water testing is not a requirement of either the WMP or the Operation and Closure monitoring Plan. We agree with the appellant that testing of the water in the tailing storage area is an important monitoring requirement as is analysis of the collected seepage water, but not necessarily on a daily basis.

Division Decision: I conclude that the WMP allows ADEC to require additional monitoring of the water in the tailings storage area and of the collected seepage water to be added to the approved monitoring plan. DEC will require the permittee to do so. With

this additional monitoring and analysis, the WMP adequately protects the waters of the state.

Appeal Item 2o. Water Management at Pit Lakes. The appellant is concerned that toxic materials will form in the pit walls during and after operations, especially above any final water elevation, and that thermal calculations for the TSF did not take into account thermal input of pit lake water.

Background and Analysis: Pit walls are expected to be the same or similar rock to that which has been drilled or cored. At Rock Creek leaching of metals is expected to be minor; there will likely be greater amounts of metals leached at the Big Hurrah pit. When there is sufficient water entering the pit to provide dilution, the metals leaching into the pit will not be a concern.

Pit lake water may not always fill and exit the pits, assuming the physical properties of the rock are similar at both the Rock Creek and Big Hurrah pits. From the Rock Creek Mine Project Water Management Report, April 2006, item 2.1: Outcrops and near surface bedrock are highly weathered and fractured. Drilling with an RC air rotary rig results in significant water return in many of the drill holes to the full depth, indicating at least moderate bedrock permeability over a significant portion of the site.

Pit lake water from the Rock Creek pit will not enter the tailings facility, so there will be no thermal effects on the tailings from this water.

The department does not have a concern with seepages into Rock Creek pit since there is little acid generating rock at this site, and accelerated leaching of metals is not expected. Water quality from the pit is expected to meet water quality standards or the quality of natural background water. For the pit at Big Hurrah, AGC will have to demonstrate compliance with standards or background prior to Department approval of the additional information required by both the WMP and DNR's Closure plan.

Division Decision: I conclude that the WMP provides adequate protection to the waters of the state.

Appeal Item 3. Certification under Section 401 of the Clean Water Act is not warranted in this case. The appellant is concerned that there is no analysis or discussion of how the antidegradation requirements are met in this case.

Background and Analysis: The Antidegradation Policy of the Alaska Water Quality Standards (18 AAC 70.015) states that the existing water uses and the level of water quality necessary to protect existing uses must be maintained and protected. The Department may allow a reduction of water quality only after finding that five specific criteria are met. The Department conducted an antidegradation analysis that evaluated the entire project with respect to these five criteria. The analysis looked at specific

pathways of water movement through the project site and how the project could affect water quality. The 401 certification of the Army Corps 404 permit requires sixteen alternative measures for the project to carry out to provide a reasonable assurance the project will comply with the water quality standards. These alternative measures address specific activities during construction and operation to prevent or minimize runoff.

Division Decision: I conclude the Department did conduct an antidegradation analysis that addressed the potential impacts of the project on water quality. However, I am dissatisfied with how the current analysis addresses the regulatory criteria, and I have decided to remand that narrow aspect of this matter to staff, with instructions to prepare a revised antidegradation analysis that follows the regulatory framework in a more rigorous manner.

CONCLUSION: Based on the above, I conclude that:

- No changes are necessary to the permit language.
- Division permit staff are directed to have the permittee modify, and the Division approve, the monitoring plan to include monitoring of water quality in the TSF and the seepage collected from the toe of the TSF. The amendment to the plan should be accomplished by December 30, 2006, but no later than the date that AGC begins placement of tailings in the TSF.
- Additional specific information listed in the WMP at 1.1.5 and 1.7 (and listed in the ADNR Rock Creek and Big Hurrah Mine Project Final Reclamation Plan Approval Dated August 9, 2006, pp 7-9) will be made available to the public upon receipt.
- Public review and comment will be sought on changes to the rock handling plan that may be driven by a review of the data collected under the WMP Sections 1.1.5 and 1.7.
- The Division will comply with current regulations at 18 AAC 15.100 when determining whether changes to the facility process or operations require a new permit and if so, will follow the public notice and review procedures of 18 AAC 15.
- Division permit staff are instructed to submit a revised antidegradation analysis to me within 15 calendar days of the date of this decision, and to focus that analysis on the regulatory criteria set out in 18 AAC 70.015.
- No stay of the permits is necessary to ensure protection of water quality.