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August 24, 2006

Lynn Kent, Director
Department of Environmental Conservation, Division of Water
555 Cordova Street
Anchorage, AK 99501

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

Dear Ms. Kent,

This is a 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 pursuant to section 401 of the Clean Water Act. Following is a compilation of issues that we, the undersigned, feel have not yet been adequately addressed by DEC in the permitting process for ACG's Rock Creek and Big Hurrah projects.

Our request for informal review includes:

- (1) the requestor's name(s), mailing address, and telephone number(s);
- (2) an identification of the department's decision to be reviewed; and
- (3) a clear and concise statement of the reason for the request, including
 - (A) a statement of the nature and scope of the requestor's interests, and an explanation of how and to what extent those interests would be directly and adversely affected by the decision;
 - (B) the contested terms and conditions of the department's decision, and proposed alternatives; and
 - (C) copies of any documents or data that would assist the director in concluding the informal review.

18 AAC 15.185(a).

Our names, mailing addresses, and telephone numbers are provided in the heading of this letter as well as the signature portion. The decisions to be reviewed are stated in the previous paragraph. We, the requestors, are long-time residents of Nome, Alaska and the surrounding area, which is the area that will feel the direct impacts of the Rock Creek and Big Hurrah Mines project. We are concerned about the many and significant impacts of

the project on our properties, our community, and our subsistence gathering of local foods.

The issue of cyanide has catalyzed community-wide concern. The June 26, 2006 meeting was the first open public meeting forum where cyanide use was discussed, which is why the public was not more prepared to address it that time. Those who had inquired at earlier meetings had been assured that no chemicals would be used.

Some of us who have signed on to this request live or have camps downstream of the Rock Creek and Big Hurrah mine sites, but all of us care deeply for the health of the land and water from which we harvest our fish, our moose, our crabs, our seals, our berries and our greens. And for every signatory, there are many, many more in the community who share similar concerns. And concern is spreading.

It is us and other Nome and regional residents who will be directly and adversely impacted by the water quality impacts of the project on the Snake and Solomon River watersheds which provide drinking water to many residents; the water quality impacts from the destruction of hundreds of acres of wetlands that provide filtering for contaminants as well as nurseries for fish in the Snake and Solomon Rivers and other creeks and streams in the area; the air quality and noise impacts from thousands of truck trips between Big Hurrah and Rock Creek; the potential impacts from the use and storage of cyanide and other hazardous materials for the project; the potential impacts of acid generation and metals leaching from the rock storage and disposal from the project; and many other significant adverse impacts.

With this request for informal review, we also request a stay of the permit and certification decision under 18 AAC 15.210. A stay is crucial during consideration of this informal review because AGC issued a press release on August 22, 2006 that it intends to immediately begin construction activities for the project.

According to 18 AAC 15.210(a), DEC will consider the following factors when reviewing a request for stay:

(1) the relative harm to the person requesting the stay, the permit applicant, and public health, safety, and the environment, if a stay were granted or denied; (2) the resources that would be committed during the pendency of the proceedings under this chapter, if a stay were granted or denied; and (3) the likelihood that the person requesting the stay will prevail in the proceedings on the merits.

If the stay is denied the harm to the many people requesting this stay and informal review as well as to the environment is great. As you are aware, the impacts from the construction and operation of mines around the state, U.S., and the world are significant, and can be devastating and lasting. As we stated in our discussion of the interests we have at stake in this matter, we are long-time residents of Nome, and we will be directly impacted by the construction and operation of the Rock Creek Mine. These activities will impact our water quality, air quality, water supply, the food we eat, subsistence

activities, and enjoyment of our community. These impacts are real and strike at our livelihoods. The harm to AGC if the stay is granted, on the other hand, is purely financial. AGC only stands to lose in the timing of the huge financial windfall they receive when the gold hits the market. They paid a pittance for the mine sites, and actually made money due to the sale of gravel for the road constructed by the State for the project. This was a net gain to AGC and net loss to Alaska taxpayers. Requiring AGC to wait while the issues in this matter are resolved is a small price for the company to pay.

Similarly, the resources that will be committed to the project if AGC is allowed to proceed with the project while review occurs and the stay is denied are tremendous. As stated, once construction begins, the impacts are significant, and cannot be undone for a significant period of time. No resources are committed to the project if the stay is granted. It is DEC's duty to protect public trust resources, and to deny a stay during the pendency of this request is a waste of those trust resources.

Finally, the likelihood that we will prevail on the merits in this proceeding, we feel, are good. After a thorough review of the issues for this mine, it is clear to us that the project cannot proceed as proposed. The impacts are too great, and the return to us and the State is minimal or negative. The issues presented below are compelling and require a thorough review. We feel that once DEC management undertakes that review, significant changes to, if not outright denial of, the project will occur. As a result, a stay is warranted and must be granted.

The contested terms and conditions and any proposed alternatives are discussed below.

1. *The State Failed to Provide Adequate Public Notice.*

Background: The notice regulation 18 AAC 15.050(a) states:

Immediately after the service of a complete application for a solid waste disposal permit, a short-term variance from water quality standards, or a wastewater disposal permit, 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.

Our continuing concern: The State failed to give proper notice of the waste management permit application. A notice soliciting public comment and listing the date and time of a public hearing were published in the Nome Nugget on June 1, 2006, and June 22, 2006, but not on June 8, 2006, and June 15, 2006. These are *not consecutive notices* nor are they notices of the "complete application." Further, the second notice appeared only four days before the Public Hearing leaving an entirely inadequate time for review of the project, which encompassed eight thick volumes and comprised 2,100 pages.

Our proposed alternative: No alternative is available for this legal deficiency. Inadequate public notice makes the permits and authorizations invalid.

2. *The Waste Management Permit (WMP) is Legally Inadequate.*

a. *Lack of standards and public review*

Background: During the public comment period the issue was raised that the WMP incorporates the Solid Waste Management Permit Application, the Groundwater Injection Well Permit Application, the Plan of Operations, the Reclamation Plan, the Waste Management Plan, and the Monitoring Plan. These plans may be changed at any time, and approved changes become part of the permit.

It was noted that Alaska permitting regulation 18 AAC 15.100(c) provides that, “[a]ny 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.”

It was pointed out that approval of plans allowing changes to any of the operations at Rock Creek or Big Hurrah Mines clearly could cause “increase in emissions or discharges” or “detrimental environmental impacts,” thus triggering the issuance of a new permit or modification of the permit with the corresponding public notice and comment under 18 AAC 15.100.

Our continued concern: The agencies’ response was that DEC will evaluate each change to determine whether it warrants permit modification and public comment, and placed several references to 18 AAC 15.100 in the WMP. We feel this is an inadequate response to our concerns for the following reasons.

There are many instances in the WMP where there are no standards for various aspects of the project, or a plan has yet to be developed for a part of the project. For example, AGC’s proposals for handling potentially acid generating (PAG) development rock at the Big Hurrah Mine have not been incorporated into the Draft Permit. Section 1.7.1 states that, “The temporary storage [of] PAG development rock at the Big Hurrah Mine is prohibited unless specific written approval from ADEC has been received.” In fact, according to Draft Permit, Section 1.7.1.2.3., mining is prohibited at Big Hurrah pending DEC approval of an “operational development rock characterization and handling plan.”

There are no standards in the WMP to gauge the plan’s effectiveness other than that the ratio of neutralizing potential to acid generating potential (NP/AP) cutoff ratio shall not be less than 1:1. Specific performance standards that PAG development rock must achieve must be part of the WMP if the characterization and handling plan can be approved without a permit modification and public review. If not, there must be a provision for public review before the approval of storage PAG rock and mining activities at Big Hurrah.

Similarly, groundwater monitoring wells at Big Hurrah have not been located. Other provisions regarding Big Hurrah only discuss vague standards such as “minimize the risk,” “ensure adequate characterization and handling,” and “minimize or ensure that water quality standards are not exceeded.” The list continues in footnote 1 of Trustees for Alaska’s comments, which are incorporated herein by reference.

Our proposed alternative: The WMP must contain specific performance standards for unknown aspects of the permit, or specific provisions for public comment should be included for those parts of the WMP.

b. Lack of standards and safeguards related to transportation.

Background: Numerous public concerns have been raised concerning the 24/7 year-round tandem truck trips between Big Hurrah and Rock Creek. People have expressed concerns about the effect of the increased dust levels on subsistence activities and human health; public safety related to increased traffic and visibility; and responsibility for road maintenance, road repair, and snow removal.

Our continued concern: The agencies’ response to redirect these issues to the Alaska DOT to provide dust suppression and speed limits is inadequate.

Our proposed alternative: These issues will be a direct result of the mine’s planned operations and as such, mitigation plans should be required in the WMP, and not referred to another agency. Measurable limits of acceptable noise, and dust levels related to traffic should be identified, and methods of mitigation to be taken by AGC described. The potential of impacts of these methods (such as oiling or spraying roads) must also be identified and mitigated. Snow removal and road maintenance responsibilities should also be identified.

c. Lack of standards and safeguards for acid generation.

Background: Various comments raised issues regarding acid generation and neutralization potential of the development at both Rock Creek and Big Hurrah. The agency response states that the State’s consultant reviewed the geochemical data submitted by AGC, and found the data to be sufficient.

Our continued concern: The State does not provide specific responses to the issues raised, except to refer to various vague permit conditions. Thorough review of AGC’s Acid Base Accounting (ABA) testing is crucial to understanding the potential harmful impacts from metals leaching/acid mine drainage at the Big Hurrah and Rock Creek site. Underlying assumptions by AGC indicate that excess acid-buffering rock is available to buffer acid-producing rock is a common thread of the project plan, and yet there are no scenarios developed for how metals leaching/acid mine drainage would be addressed in the waste rock if it occurred. Total reliance placed upon AGC’s project plan without detailed analysis is inadequate for a project of this nature, which will be producing Au,

As, Sb, Mo, various cyanide complexes and other chemicals or elements and depositing them into the environment.

In addition, while ACG's consultant did at least review acid generating potential, the State appears to have completely ignored metal leaching. Arsenic and antimony generation is a problem due to their toxicity, which is well-documented. The response also does not indicate that any independent review occurred on the issue. It only states that the consultant reviewed what the applicant provided. Once the issue was raised, there was no independent verification by the consultant. We find this unacceptable when confronting the potential of long-term and widespread negative effects on local wildlife, fish, vegetation, water and air quality.

Our concerns regarding ABA testing for NP: The most relevant data for analysis of AGC's reclamation concepts for acid potential comes from Volume 8, Rock Creek and Big Hurrah geochemistry of Ore Rock and Development Rock testing, not within Volume 4.

AGC's Acid testing did not conform to the January 2003 US EPA sourcebook recommendations for ABA testing. The Water Management Consultants' Technical Memorandum referenced a 1999 US EPA report titled: *EPA and Hardrock Mining: A Source Book for Industry in the Northwest and Alaska*. A more recent version dated January 2003, would have been available at the time the Rock Creek Project plan was developed. A key finding of the January 2003 sourcebook is that NP and AP must be analyzed *consistent with expected waste rock or development rock*. AGC's Acid tests were done on *drill core samples*, while the actual mined ore material will be extracted using blasting agents to loosen the rock, then subjected to various landscaping techniques using heavy equipment, and finally crushed for cyanidation. This blasted, repositied, crushed, and/or cyanided waste and/or development rock from Big Hurrah and Rock Creek will likely have different particle sizes, and acid production and neutralization rates from the drill samples that were acid tested. Therefore, the conclusions of the ABA tests may be inaccurate.

The January 2003 US EPA sourcebook indicates that rock with uncertain acid behavior should be re-tested via alternate kinetic tests. According to AGC's confirmatory ABA testing it appears that additional alternate tests were done on separate samples to analyze the presence of NP, *but were not repeated or re-analyzed on rock samples that showed uncertain acid behavior*. On page 5 of the response to public comments, DEC indicates that they required an additional round of ABA test work. However, once again, the actual waste rock and development rock particle size and acid production and neutralization rates will likely be different from the core samples that were tested.

DEC did not adequately address the flaws with AGC's acid testing in regards to the length of time between sample collection and sample testing when first flush occurred. DEC's interest to verify the presence of NP by requiring an additional round of ABA testing raises reasonable concern because NP material at both sites is limited and generally not an effective buffer.

Table 2, Big Hurrah Ore Rock Acid Base Accounting

Net Neutralizing Potential	NP:AP
Uncertain behavior + Acid Potential	Uncertain behavior + Acid Potential
25 of 61 (40.9%)	31 of 61 (50.8%)

Table 3, Big Hurrah Development Rock Acid Base Accounting

Net Neutralizing Potential	NP:AP
Uncertain behavior + Acid Potential	Uncertain behavior + Acid Potential
140 of 271 (51.7%)	173 of 271 (63.8%)

Table 4, Rock Creek Ore Rock Acid Base Accounting

Net Neutralizing Potential	NP:AP
Uncertain behavior + Acid Potential	Uncertain behavior + Acid Potential
26 of 89 (29.2%)	64 of 89 (71.9%)

Table 5, Rock Creek Development Rock Acid Base Accounting

Net Neutralizing Potential	NP:AP
Uncertain behavior + Acid Potential	Uncertain behavior + Acid Potential
84 of 318 (26.4%)	173 of 318 (54.4%)

Tables 2 through 5 are summarized pH saturated paste data from Big Hurrah and Rock Creek ABA testing. By entering the pH Saturated Paste data into Excel[®] one is able to run descriptive statistics. Data of the ABA results taken from the May 26, 2006, memo to Doug Nicholson, AGC, from Brent Johnson & Kenneth Carroll, Water Management Consultants, show that ore & development rock pH ranges from 3.5 to 8.6 for Big Hurrah and 6.3 to 8.8 for Rock Creek.

When uncertain and acid generating rock samples are summated a significant portion of the samples comprise rock that deserve special attention and may contradict the assumptions throughout the project plan indicating that Big Hurrah and Rock Creek rock are not acid generating. Appropriate reclamation must address acid generation.

Our proposed alternatives: Contrary to AGC's assertions that acid generation is only a potential issue for Big Hurrah and not an issue for Rock Creek, DEC's approval of the WMP must be amended or reversed. Acid generation tests conducted by AGC do not reflect the type of rock that will likely be generated as waste rock or development rock.

Figure 2

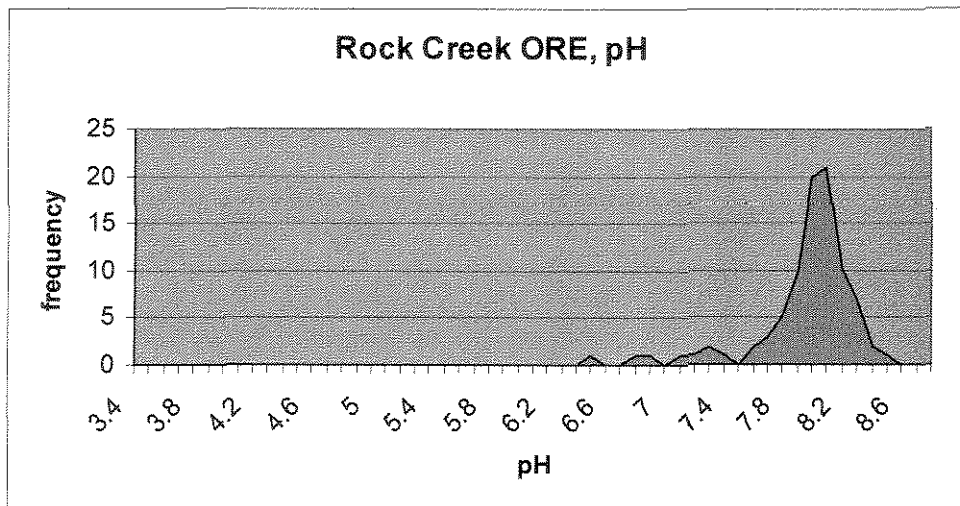


Figure 3

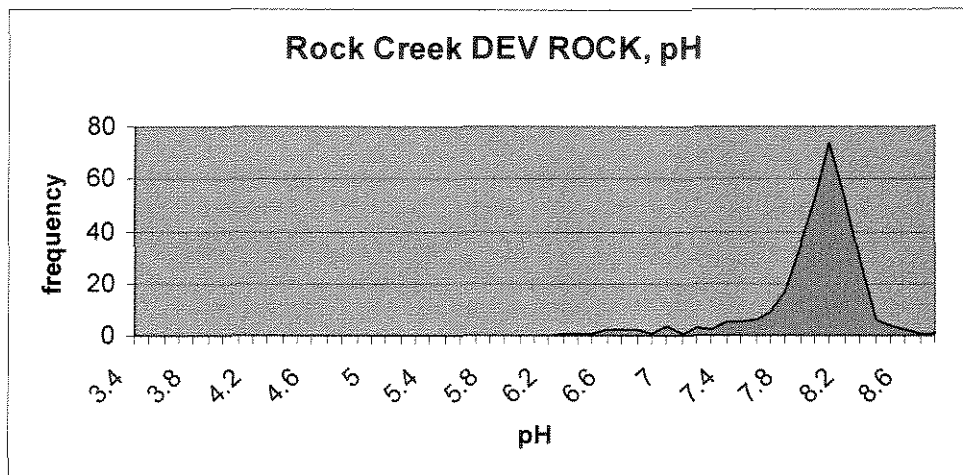


Figure 4

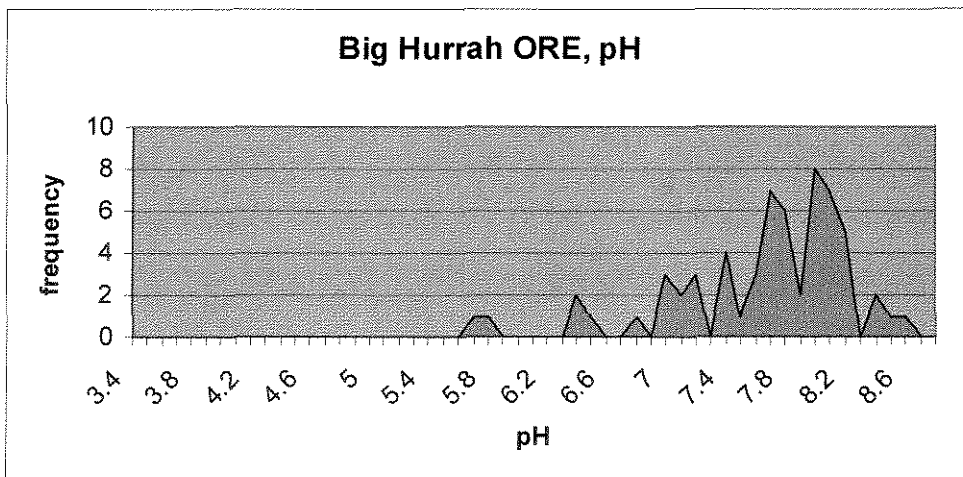
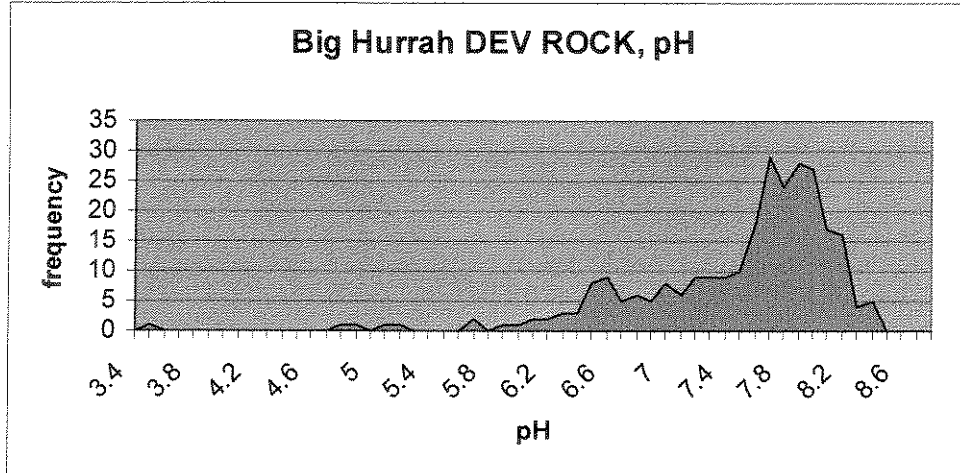


Figure 5



Figures 2 through 5 are frequency diagrams of saturated paste pH of Big Hurrah and Rock Creek ore and development rock. They show a skewed distribution with a majority of measurement between pH 7.8 to pH 8. The presence of acidic material in all rock samples is of concern and may mobilize elemental components in addition to elements that were shown to release immediately such as As, Sb, and Mo.

Our concern regarding PAG material: Merely segregating PAG material at the Big Hurrah site is not an effective measure to reduce the possibility of oxidation. In fact leaving the material as proposed is the most likely way to oxidize the PAG material. Deposition of PAG material in water may flush already oxidized contaminants such as As and Sb, however, that could take a very long time until the rock becomes dissolved or stable.

DEC indicates on page 6 of the WMP that it has not approved AGC's handling of Big Hurrah PAG material. We are concerned that DEC would approve the proposed plan without that crucial component. DEC cites the adequacy of Volume 8 as corroboration of NP and AP, which we do not find acceptable as we consider the validity of the information in Volume 8 suspect and open to alternative analysis.

Our concern for spatial orientation of samples: Spatial orientation of the rock samples is also crucial to understanding the acid potential of the mine. DEC should address how the samples are spatially oriented.

Table 6

ABA Sample depths Big Hurrah	
0-99	178
100-199	139
200-299	15
>300	15
blank	12

Table 7

ABA Sample depths Rock Creek	
0-99	150
100-199	164
200-299	71
>300	17
blank	17

Tables 6 and 7 represent efforts to understand the spatial relationship of drill samples tested for acidity and development areas within the Big Hurrah and Rock Creek sites. The data was produced using the “clientid” field identity to categorize drill hole sample depths. An “a” was assigned to samples that were less than 100 feet in depth, a “b” to samples greater than 100 feet and less than 200 feet in depth, a “c” to samples that were greater than 200 feet and less than 300 feet in depth, a “d” to samples greater than 300 feet in depth, and no assignment for samples that lacked an apparent depth. The “clientid” field contains numbers and dashes.

Table 8

clientid	pH, saturated paste
04-22-030	6.8

Table 8 is an excerpt from the Rock Creek ABA results table. In that table 04-22 represents the portion of the “clientid” that identifies the hole number. -030 represents the depth of the sample. In the case of 04-22-030 the category would be “a.”

From Tables 6 and 7 we see that the samples are shallow and less than 200 feet in depth. The Rock Creek pit is planned to have pit wall heights that range around 410 feet (Volume 1, pg 10). None of the samples collected for acidity are within the 400 foot depth range and relatively few are deeper than 300 feet.

A significant and perhaps less well-known mineralogy exists at the depth of pit wall height is planned. Rock has not been tested for acidity at the expected depth of the pit. Drill samples were taken under a sampling scheme that appears systematic but may not have been applied in an appropriate fashion.

Our proposed alternatives: Without sufficient statistical analysis of rock sample chemistry to sufficiently describe AP and NP, the public will not know if the drill sample data has been properly analyzed, and if DEC is acting with caution. This lack of proper analysis raises reasonable concern with DEC’s decision. DEC needs to conduct a power analysis of samples taken and adjust the permit, or reverse its decision on the Rock Creek mine permits.

Figure 6

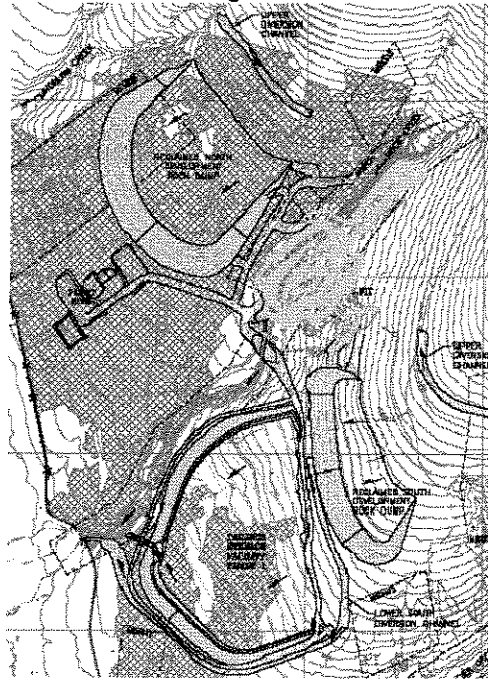


Figure 7

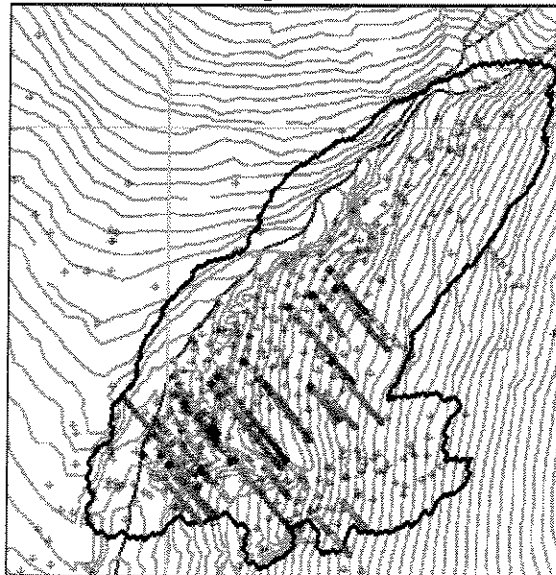


Figure 8

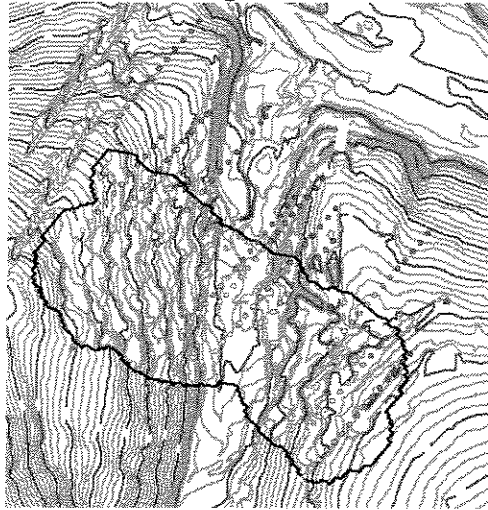
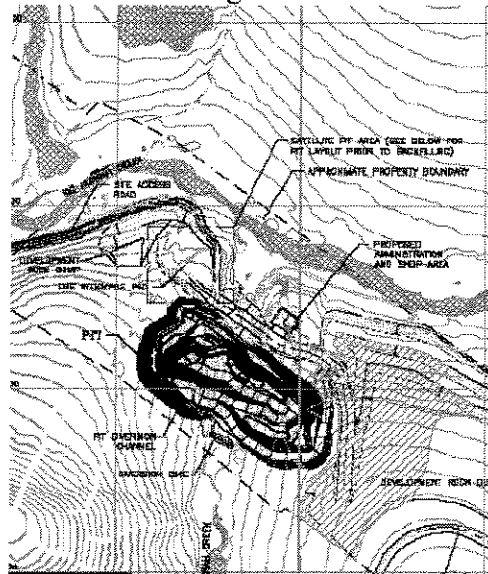


Figure 9



Figures 6 through 9 come from Volume 4 and 8 and show the spatial orientation of drill samples and pit locations.

Our concern regarding drill depths: The drill sample locations do not cover the entire area of the pit locations at Big Hurrah or Rock Creek. It is typical to include not only the entire area of the proposed pit in the sampling data, but also an additional 30 meters or so beyond the proposed pit boundary, since this material will form the walls of the pit on closure, and will also be subject to leaching due to blast fracturing. In addition, many of the samples at Big Hurrah were not taken from the rock to be mined. See Figure 8 above. This could potentially bias the data toward less potentially acid generating averages. DEC should address how the drill locations were placed in relation to the pits and adjust the permit or reverse it decision. Like the sample depths a power analysis should be done

to address the relationship of drill locations and pit locations. Pit locations are approximate and AGC may change or move the pit locations. Without sufficient statistical analysis of the drill locations the public will not know if DEC is proceeding with caution or appropriately.

Our concern regarding ABA testing for Net Neutralizing Potential (NNP): The NNP of Big Hurrah and Rock Creek rock is generally low but has some limited Neutralizing Potential (NP). AGC did *not* confirm the presence of CaCO_3 and the lack of that effective buffering compound affects the NP:AP ratios that could be applied for reclamation. FeCO_3 is not neutralizing because of the Fe^{+3} ion in the carbonate. The rates of acid production, and neutralization, and the amount of metals leaching are open to debate and DNR must adequately address acid production and neutralizing potential.

d. “Points of compliance”

Background: The comment was raised that “points of compliance,” or monitoring wells will usually be located no more than 50 feet outside a waste management area to ensure that water quality standards are not exceeded. DEC has included a new requirement for AGC to establish those points “where practicable.”

The comment also was raised that there are insufficient groundwater monitoring wells for the project.

Our continuing concern: The concern here is the same one raised in subsection a. There are no performance standards for the location of these wells. “Where practicable” is not an adequate standard, nor does the public receive an adequate opportunity to comment.

The failure to directly establish adequate groundwater monitoring wells violates 18 AAC 60.820-.825. AGC has not analyzed leachate characteristics, conditions of the surrounding land, and the impacts of the potential pollution to groundwater uses when selecting its points of compliance, as required under 18 AAC 60.825. Thus, scientist certification that well locations and design are sufficient to “detect contamination from each waste management area,” under 18 AAC 60.825(e) cannot be supported or accepted by DEC.

Our proposed alternative: The WMP must contain specific performance standards for unknown aspects of the permit, or specific provisions for public comment should be included for those parts of the WMP. In addition, the groundwater monitoring well network must comply with waste management regulations.

e. Dust control

Background: A comment was put forth that “reasonable measures” and “other effective measures” are not adequate descriptions of dust control for the site. The State responded that AGC must also comply with 18 AAC 50.034(d) governing air emissions, and that

DEC sometimes requires a dust control plan, which would constitute “reasonable measures.”

Our continuing concern: This response does not change the permit condition or make it more clear.

Our proposed alternative: The WMP must contain specific performance standards for unknown aspects of the permit, or specific provisions for public comment should be included for those parts of the WMP.

f. Corrective action and temporary closure

Background: Comments were made that provisions for corrective actions and temporary closure do not include specific standards. DEC responded that it would use discretion, and situations could require measures that would vary greatly.

Our continuing concern: This response does not change the permit condition or make it more clear.

Our proposed alternative: The WMP must contain specific performance standards for unknown aspects of the permit, or specific provisions for public comment should be included for those parts of the WMP.

g. Maximum credible earthquake

Background: A comment was raised that the maximum credible earthquake (“MCE”) should have been used as the design event for the tailings storage facility. DEC claims that it was not required to use this standard.

Our continuing concern: Army Corps of Engineers guidance provides that MCE should be the design event where “irreversible threat to human life due to the release or inundation of hazardous, toxic, or radioactive materials” could occur from the failure of the system. The tailings storage facility will contain toxic materials, and therefore, MCE is the proper standard to apply in this case.

Our proposed alternative: We propose no alternative in this case because DEC has applied the wrong standard. MCE must be applied in this case.

h. Ferrous sulfate cyanide destruction system

Background: A comment was raised that the ferrous sulfate cyanide destruction system was not discussed in any of the supporting documents for the project. The State merely stated that it is a common practice.

Our continuing concern: There is a lack of information about this process, its effectiveness, and monitoring for it. DEC has a duty to investigate this process and

inform the public about it. It has not met that duty in the response to this comment.

Our proposed alternative: No alternative is proposed on this issue because it is DEC's duty to inform the public about this process, and that applicant's burden to justify its use.

i. *Drinking water degradation*

Background: Moonlight Springs, the only source for the City of Nome's drinking water is approximately 2.5 miles from Rock Creek. DEC claims that it is unlikely that water from the project will affect the water supply because the water has not traveled far from the point of infiltration and the recharge area is very localized.

Our continuing concern: Protection of Nome's drinking water source *must* be ensured. AGC did *not* conclude that geologic formations are present that effectively act as impermeable dikes between the Rock Creek project and the recharge area of the City of Nome's only drinking water source.

It is imperative that DEC specifically address how Nome's water source is protected from the Rock Creek project in a sufficient and conclusive manner other than referencing only a portion of the "Recharge Area Evaluation for Moonlight Springs, Nome, Alaska, Report of Investigations 92-2, Munter, J.A., et.al."

The DNR, Division of Geological and Geophysical Surveys (DGGS) 1992 report for Moonlight Springs does *not* conclude that marble outcropping along Anvil Mountain or the fault along Anvil Creek are accurate boundaries of the recharge area. It only indicated they are *likely* boundaries based upon *indirect* geologic evidence inferred from limited outcrop geology.

In addition, page 16 of the DGGS report under the "LOW OR NON-RECHARGE AREAS" section states:

"... Data indicate that we cannot exclude highland areas between the Snake and Nome Rivers from contributing to Moonlight Springs discharges. The persistence of the springs through the winter and their location springs relatively near the coast suggest that some regional flow component may be present."

There are significant uncertainties involved with the conceptual model of groundwater flow for Moonlight Springs, which make it wholly inadequate to conclude that the Rock Creek project will not influence Moonlight Springs hydrology. The DGGS report for Moonlight Springs contains minimal inflow and outflow data, and very limited system geometry. The report lacks any flow net graphics, which would depict streamlines, and equipotentials. The report lacks mathematical simulation models for the flow data. The Piper plot likewise appears lacking in spatial data. The report lacked groundwater vectors which would govern chemical reaction rates, and spatial orientation of water chemistry along the flow system.

The DGGGS report also concluded that an area of approximately 7.2 square miles includes the primary and secondary recharge areas are important in maintaining aquifer pressure for the collection gallery of Moonlight Springs. *The larger secondary recharge area could encompass groundwater flow influences from Rock Creek.* Considering that limited if any groundwater flow studies were done for Rock Creek and Moonlight Springs, DEC's response, "it is highly unlikely that water from the Rock Creek project will have any affect on the water supply of moonlight springs," is based on limited testing, may not be accurate, and is completely inadequate when considering the potential consequences for the entire future of the City of Nome.

Nome is growing and will inevitably place increasing demands upon Moonlight Springs, especially when Nome's water use meets or exceeds Moonlight Springs discharge during low flow events or in winter.

Our proposed alternative: It is imperative that DEC require more extensive ground flow studies prior to authorizing the Rock Creek project. DEC should require flowmeters in the test wells, in addition to measuring water levels, until DEC can conclusively assess potential impacts to Moonlight Springs and ease public concerns.

I. Water management and Humidity Cell Testing (HCT)

Background: The following discussion refers to ACG's Volume 8, Figures 10 through 17 for Rock Creek HCT testing results, and Figures 18 through 20 for Big Hurrah HCT testing results.

Our continuing concern: As is obvious from the graphs in ACG's documents, the amount of HCT's for Rock Creek is substantially greater than the amount done at Big Hurrah. There is a lack of detailed HCT data for Big Hurrah, especially since it is shown to be more likely to generate acid. It is imperative to have that information for adequate review and analysis of potential water management actions.

There are ONLY three HCT tests for Big Hurrah. Two of the Big Hurrah HCT tests show decreasing pH over the 26 week period. DEC was shown that acidification in 2 of the 3 HCT tests pose a risk to adjacent waters. AGC's Big Hurrah HCT data is very limited and does not contain elemental releases over time other than Fe^{2+} , Fe^{3+} , SO_4 , and CaCO_3 equivalents, and was compiled for only 26 weeks. HCT data from Rock Creek show exceedances in arsenic, antimony and molybdenum in some of the HCT discharges. The reduced amount of ABA tests for the Big Hurrah site raises concern, especially considering that it will generate more acidic material than Rock Creek. Big Hurrah MWMP extracts also show elemental presence of regulated toxic elements.

Oxidation of Fe^{2+} to Fe^{3+} is a relatively slow process that may take as long as 1000 days at $\text{pH} < 4$. If Fe^{2+} is transported to the environment before it can form stable compounds, surface water may become strongly discolored. The Nome-Council highway is used heavily during the summer, and the public may become alarmed if Fe^{2+} or Fe^{3+} is

transported into surface water as it will be readily visible. DEC's zero discharge requirements for the pits and TSF must be adequately monitored.

Our proposed alternative: We feel additional tests need to be run at Big Hurrah, especially in light of the higher potential for acid generation.

DEC should assess how Fe^{2+} became mobilized during the acid tests, and how it may contribute to acidity in Big Hurrah and Rock Creek under background pH and site-specific conditions.

DEC should also determine if Fe^{3+} will contribute to pyrite oxidation in the absence of O_2 and if bacteria will contribute to the oxidization of pyrite and/or oxidize Fe^{2+} . AGC has indicated that it will cap waste rock with water, or within the tailings storage facility, and indicated that oxidization will be limited. However, other possible oxidation processes need to be addressed.

DEC should question the assumptions in the water balance models by AGC, as the elemental releases of toxic elements and the behavior of pH will affect water quality well into the future. These tables should also be reviewed in respect to any possible harmful dispersals to the environment.

Based upon our review DEC should amend or reverse its decision on the Rock Creek mine.

j. Water management & permit limitations

Background: In the response to comments, DEC cited 18AAC 15.100 and indicated they would review whether expansion or modification of the mining facilities warranted a new permit.

Our continuing concern: We believe that any changes in emissions or discharges for any reason should be made public and *should warrant a new permit* – not just expansion or modification of the mining facilities. AGC may never propose any changes or modifications to facility processes but there may be increases in emissions or discharges. DEC should not issue a 'new' permit if increased emissions or discharges occur *only* as a result of changes in AGC's facility processes but if they occur under *any* circumstances. DEC is wrongly limiting its permitting authority if it only applies it to increases in emissions or discharges corresponding to changes in facility processes.

Our proposed alternative: Specific permit conditions should be described to monitor if zero discharge is being maintained. Once leaks or seepage occur, the facility is no longer zero discharge, but the damage will be done, and it may be impossible to rectify. In accordance with 18AAC 15.090 such conditions can be easily described. Measurements should be at the most sensitive level possible; at least in parts per billion, if not part per trillion.

k. Water management & impacts to adjacent waters

Our continuing concern: Impacts to adjacent waters is a key aspect of the potential environmental impacts from this project. Just the fact that AGC is proposing to divert Rock Creek is a significant indication that surface waters migrating through the site are problematic for mining operations and may negatively impact adjacent waters because of the likelihood of contamination.

There are no profiles of the diversion ditches in Volume 5 or AGC's Stream Reclassification Petition. Without a profile of the diversion ditches it is not possible to determine if runoff will be appropriately contained within the diversion ditches. AGC has available a large climate data set that can be applied to design of the ditches and diversion of surface runoff, but it appears they have only applied average precipitation and may not have accounted for anomalous precipitation events. The profiles of the ditches are needed for the public to view how the ditches are designed to perform, and to assess their adequacy.

Our proposed alternative: DEC should require adequate and detailed diversion ditch profiles be provided for public review as they are a significant factor for water management.

l. Water management & Rock Creek surface water testing

Our continuing concern: We believe EPA's policy for background criteria should be applied to this project, and that the natural background criteria should be revisited by DEC. EPA has asserted that upstream water data should be used to obtain background water parameters for Rock Creek. Given the tremendous dependency local residents have for harvesting food from the Snake River and its associated drainages, we feel it is only prudent that EPA standards be applied.

AGC indicated in its stream reclassification petition that the mineral deposit in the upstream portion is different from the midstream portions, and that this factor precludes use of upstream water quality data for Rock Creek. We find this contradictory to statements made by AGC where they describe the mineral deposit as relatively homogenous. (Volume 8, Appendix B, technical memo page 23). AGC did *not* describe how the mineralization could be different in upstream Rock Creek or how the northeast striking Albion shear segregates mineralization from midstream and upstream areas.

Our proposed alternative: DEC should consider revising the background criteria for Rock Creek and incorporate EPA's background criteria.

m. Water management & thermal and seepage evaluation

Background: Volume 6 includes an appendix from Northern Geotechnical Engineering, Inc. (Northern), but relatively little narrative and NO raw data from which to reconstruct or analyze Northern's thermal and seepage evaluations.

Our continuing concern: We are concerned that the seepage evaluations were made from scaled models of the Tailings Storage Facility (TSF), with very little site specific information.

Northern recommends a geo-membrane on the upstream portion of the tailings dam, a cutoff trench in weathered bedrock, and passive cooling *as opposed to thermosyphons*. Northern did not recommend thermosyphons *because of seepage flow* and thermal inputs. That recommendation suggests higher seepage amounts than what AGC is planning for. AGC is apparently assuming that seepage will be minimal despite what appears to be a contradiction to the reasoning of Northern's recommendation.

AGC also proposes to collect seepage at the toe of the tailings dam. In its discussion of water management in Volume 2, page 31, AGC indicated the following:

“Water from the plant site area, along with water pumped from the open pit, seepage collected from the toe of the tailings dam, and rainfall and snowmelt within the TSF, will be collected and directed to collection sumps, which will be pumped to the Mill Recycle Water Pond for recycle back to the process plant.”

AGC indicated in Volume 5, Water Management Report, page 23 the following:

3.4.3 Seepage

Seepage from the tailings area will be minimized by keeping the stored volume of water low, and by appropriate design of the tailings dam.

Seepage from the pond was estimated as a function of the stored water volume. The seepage rate used was:

<i>Volume (m3)</i>	<i>Seepage (m3/day)</i>
<i>20,000</i>	<i>1.1</i>
<i>50,000</i>	<i>1.6</i>
<i>100,000</i>	<i>2.6</i>
<i>200,000</i>	<i>4.9</i>
<i>500,000</i>	<i>13.5</i>

3.4.4 Minor Losses

Other minor losses considered were net losses in the mill area such as loss to evaporation and product and gain from moisture in the ore and losses to the foundation pore spaces as the tailings elevation increased. The assumptions were:

- Approximately 3.3 m3/day (0.6 gpm) lost in the mill area; and*
- Approximately 50 m3/day (9 gpm) lost to pore spaces in the tailings foundation.*

AGC did NOT indicate that it would incorporate Northern's recommendation for a cutoff trench, and may not be incorporating Northern's characterization of seepage within the tailings. AGC is proposing to minimize seepage, while at the same time collecting seepage from the toe of the tailings dam. AGC's seepage characterization and seepage collection seem confusing when Northern is apparently indicating that seepage precludes thermosyphons and also suggests cutoff trenches. The cut off trenches are not detailed. Northern also recommends freezing of the cutoff trench to reduce inflow prior to placement of waste rock.

Seepage around and under the geo-membrane is an issue. In Volume 5 the word geo-membrane is not used even once or described. It concerns us that the water management section does not even describe the use of the geo-membrane, since its function is directly related to water management. The word geo-membrane is used once in Volume 2 and seems consistent with Northern's recommendation. However, AGC's selection of a geo-membrane consistent with Northern's recommendation was not for efficacy of reducing seepage, contrary to how AGC indicated it in the following in Volume 2, page 35:

Multiple scenarios to the alternative designs were evaluated and it was determined that the design which extended the geomembrane liner into the underlying weathered bedrock provided a greater reduction in seepage than designs which incorporated thermosyphon systems. The complete Tailings Alternative Analysis is attached in the Tailings Analysis section of the appendices under, Rock Creek Report, Tailings Alternative Analysis Final Report.

Northern's recommendation for passive cooling primarily stemmed from financial considerations, which we question given that Northern is a separate entity that would not have much financial interest in the decision of thermosyphons or passive cooling. However, we believe that the selection of passive cooling is attributable to the financial burden of operating and installing thermosyphons for the Rock Creek tailings storage facility. Contradictory to AGC's characterization of seepage on page 32 of Volume 2, Northern indicated the following:

The various evaluations conducted on several scenarios using thermosyphons indicated that the fluid flow through and under the dam was not significantly reduced by the extra cooling provided. The distribution of the fluid flow was altered however the total fluid

Northern does apparently conclude that thermosyphons could reduce seepage although only in a minor way over passive cooling with the application of a geo-membrane.

Our proposed alternative: ACG should be required to provide details of the cutoff trench, and detail their provisions for the freezing of the cutoff trench and TSF. These details should be consistent with Northern's recommendations.

n. Water management and Tailings Storage Facility (TSF)

Figure 23

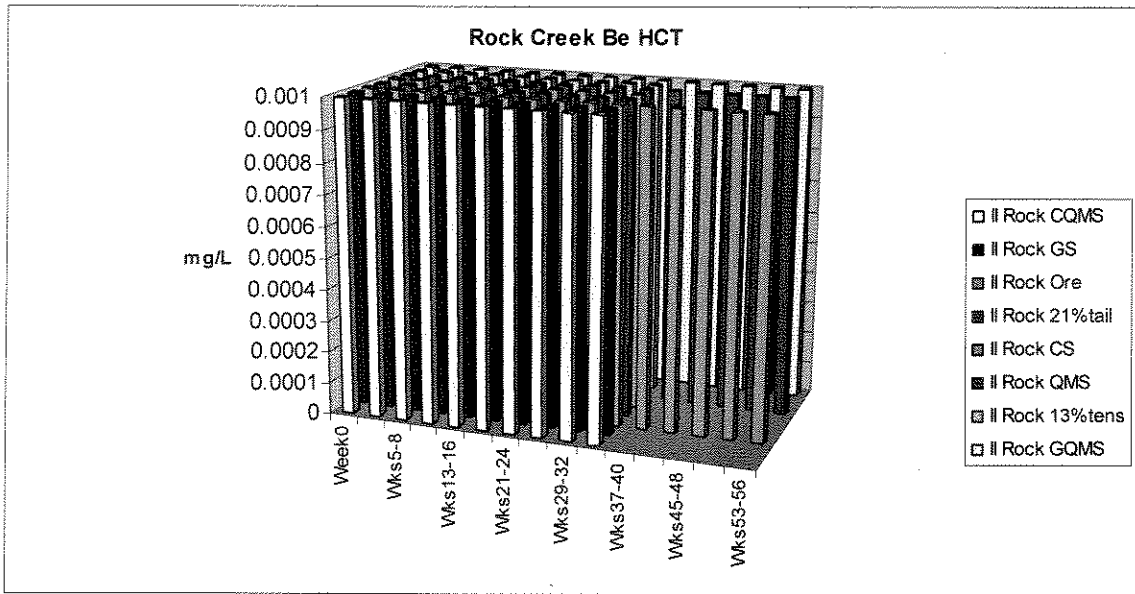


Figure 24

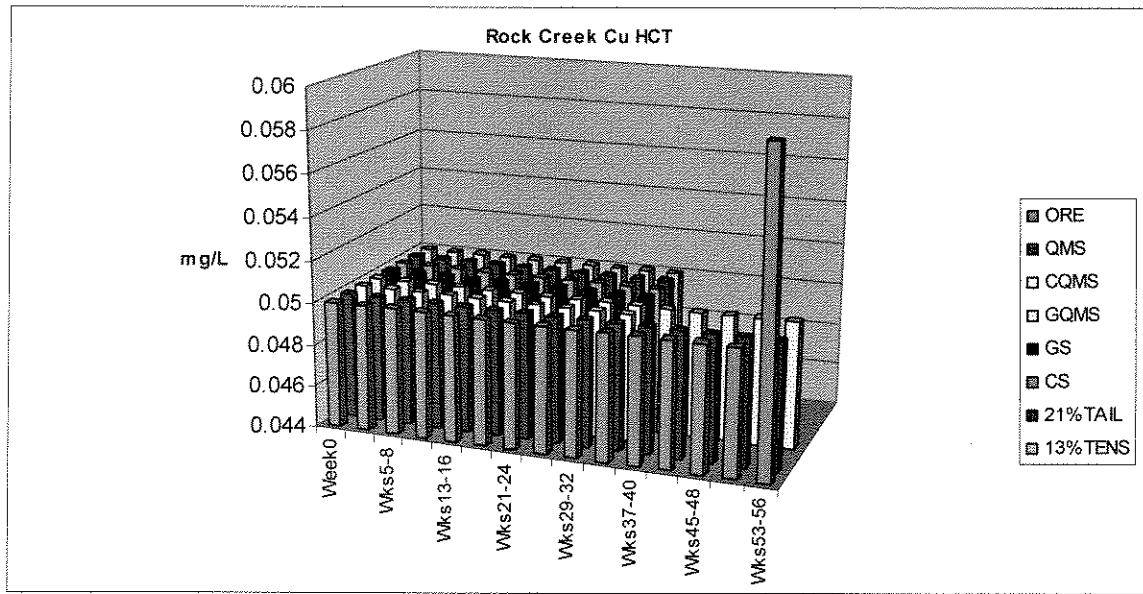


Figure 35

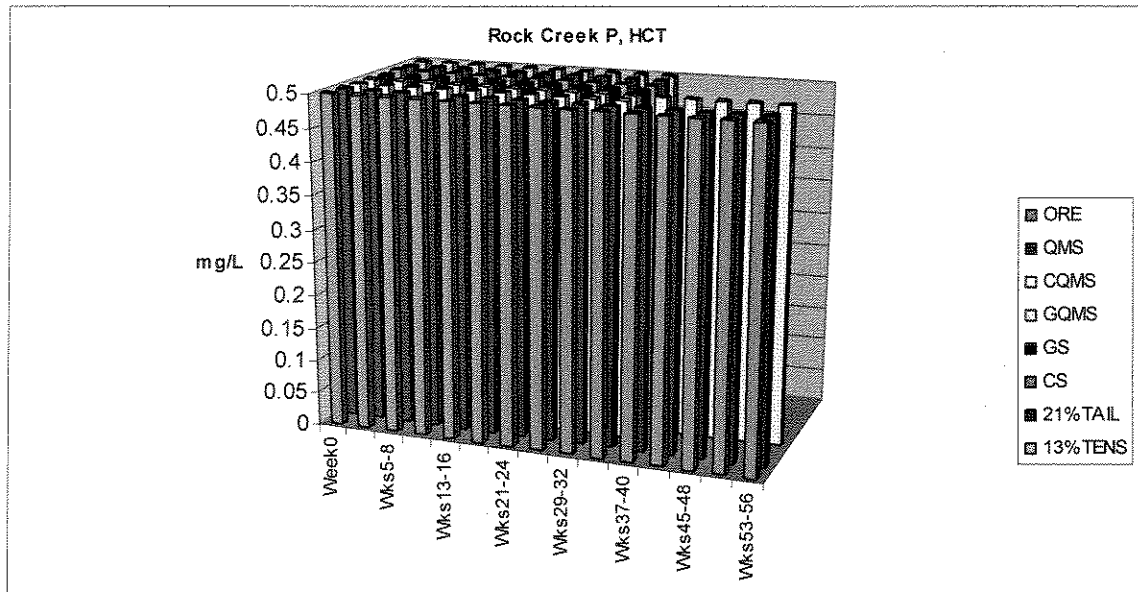


Figure 36

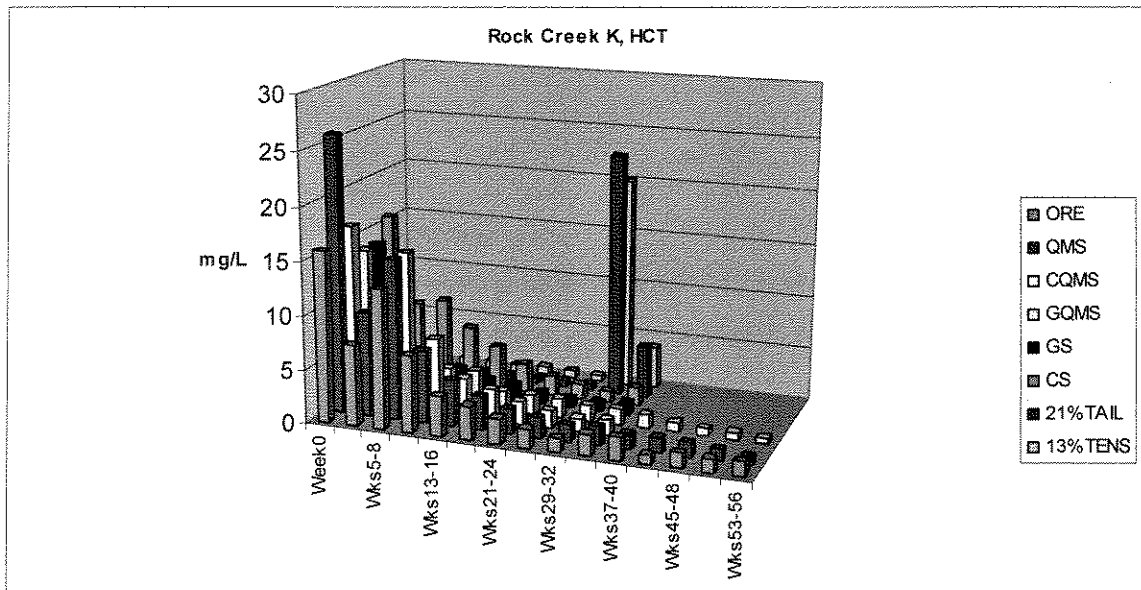


Figure 37

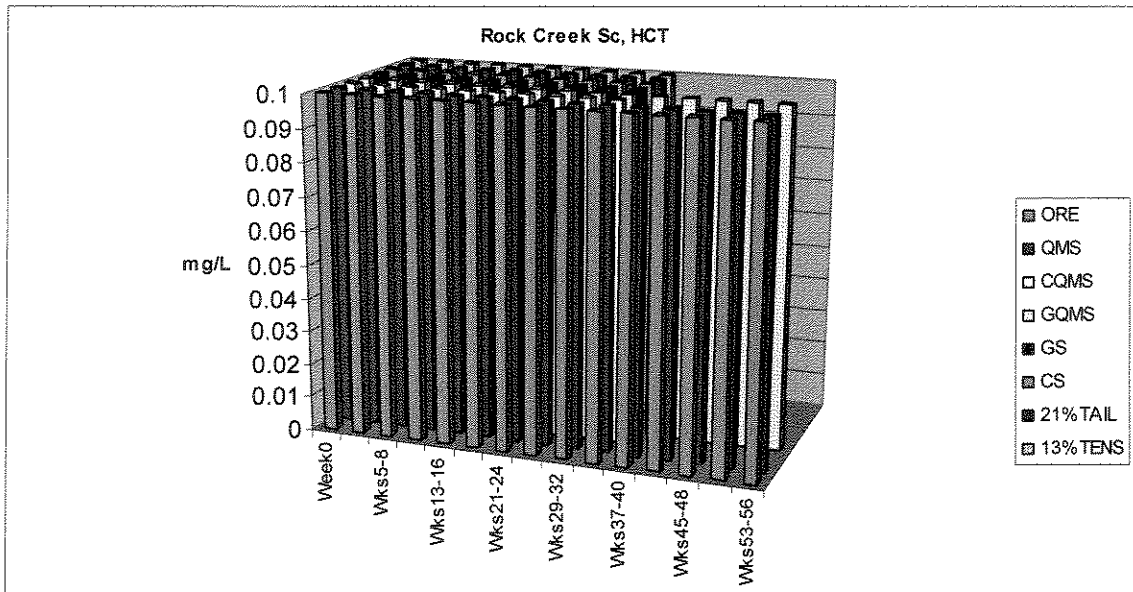


Figure 38

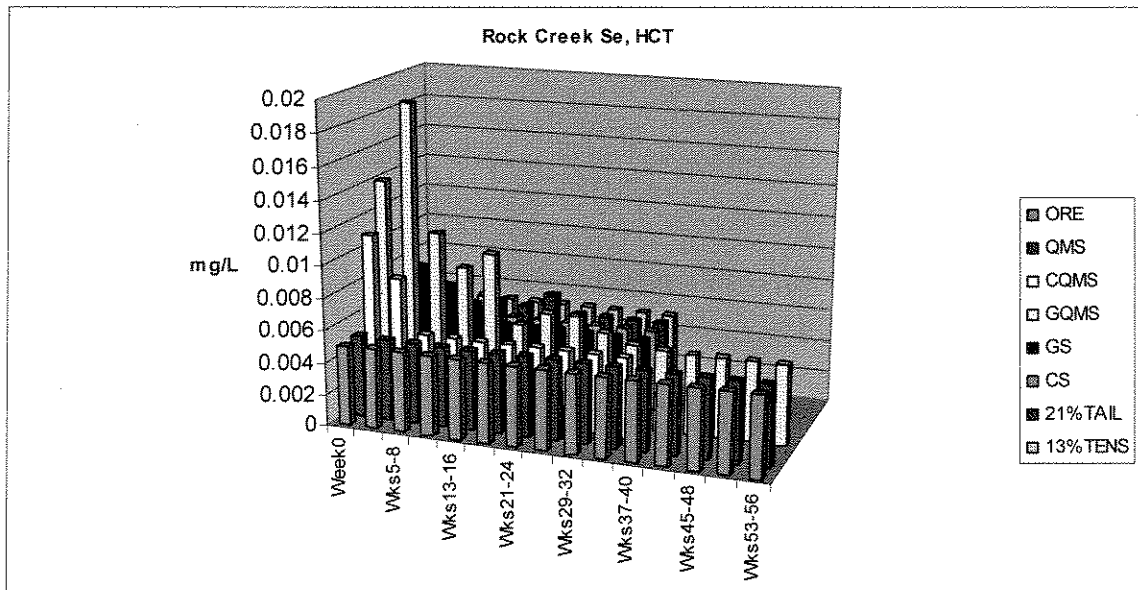


Figure 45

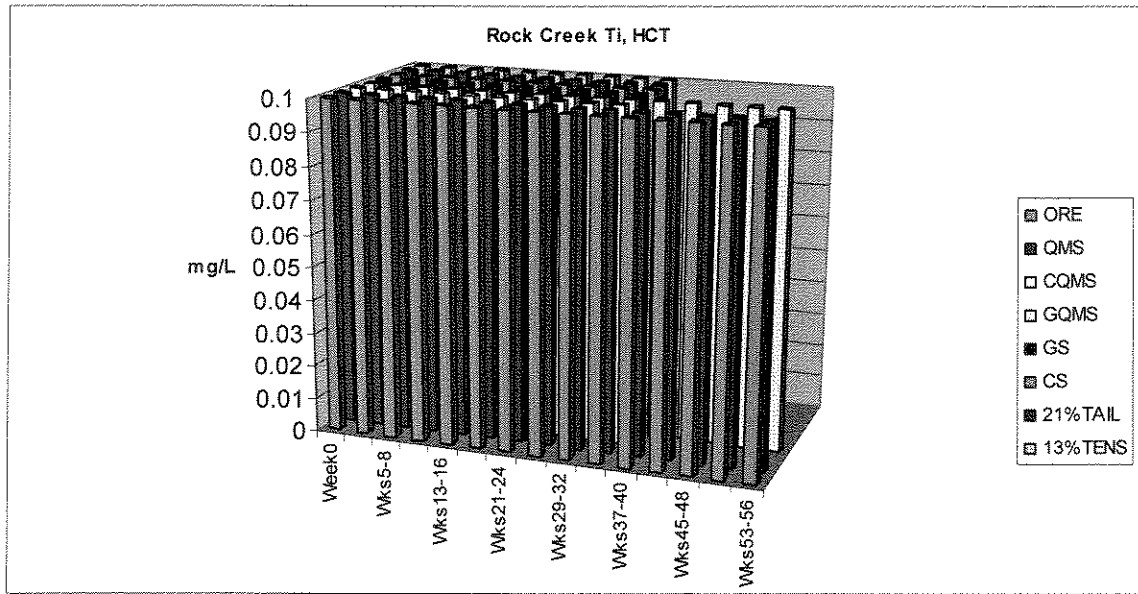


Figure 46

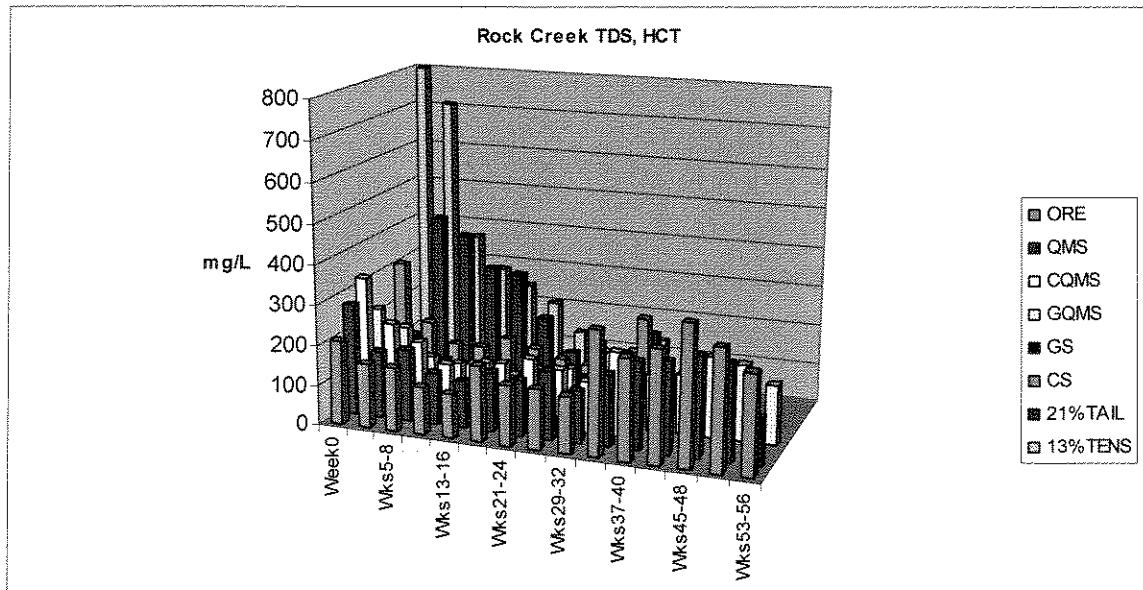


Figure 49

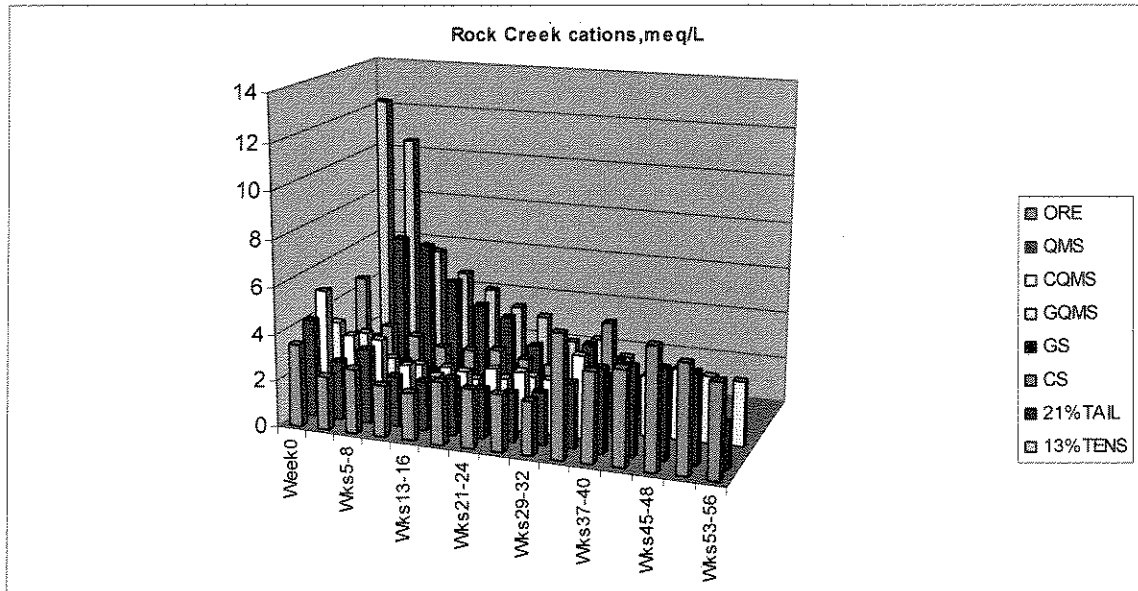


Figure 50

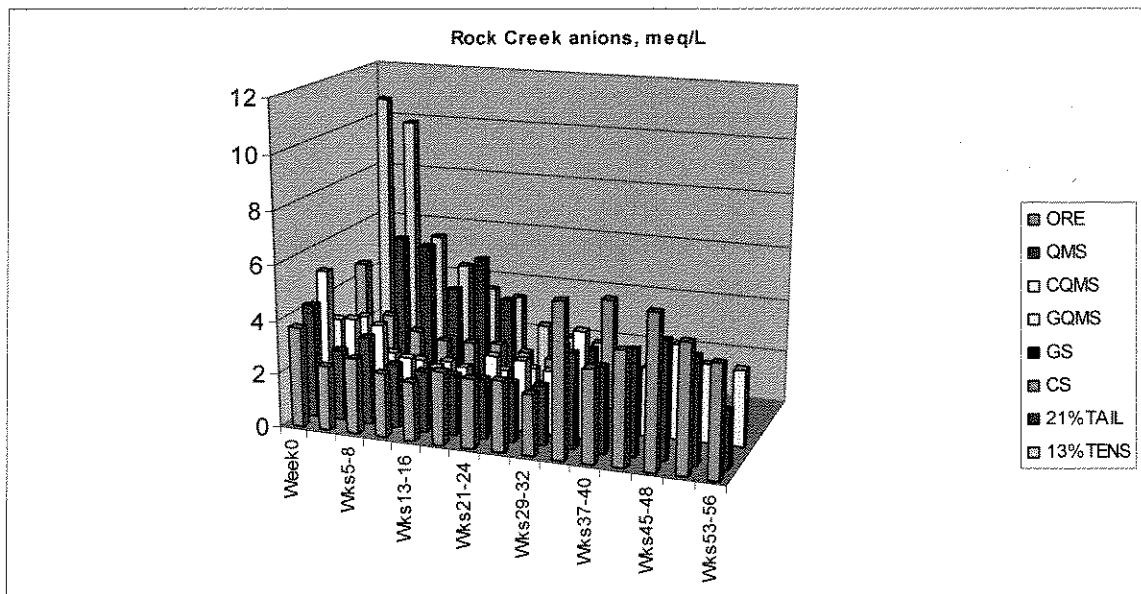
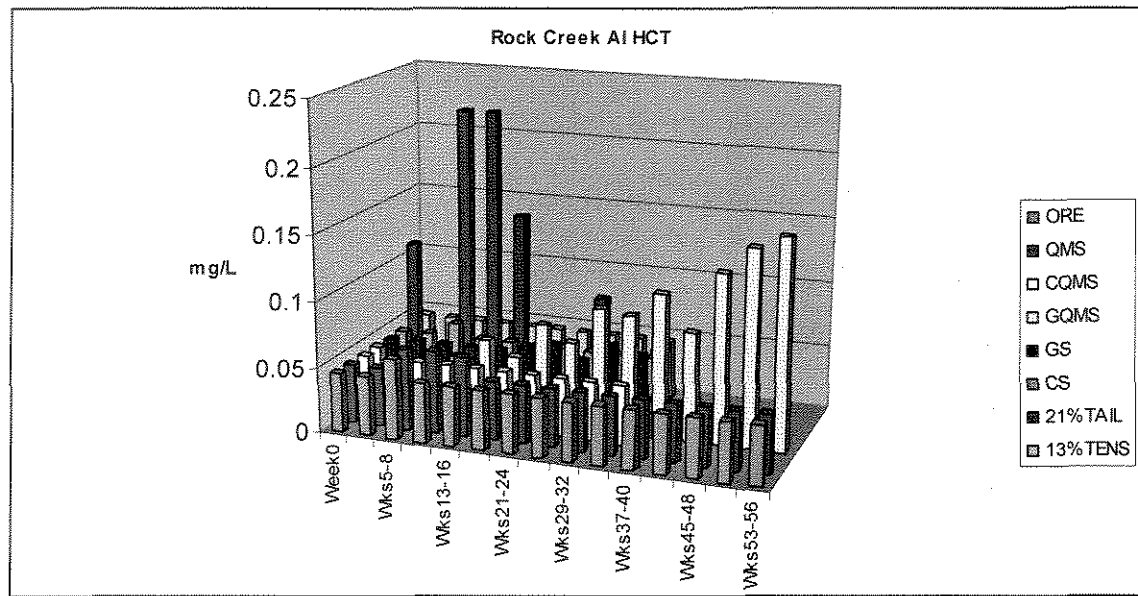


Figure 51



Figures 21 through 51 show elemental concentrations of various elements which were shown to release from Rock Creek HCT tests. The graphs were constructed from geochemistry data from Volume 8.

All of the elements in the above graphs are listed with the Agency for Toxic Disease Registry (ATDR), the Regulations and Advisories for Ba, Be, B, Cd, Cr, Co, Cu, Cyanide, Pb, Mn, Hg, Ni, Se, Sr, Tl, Sn, V, Zn, & Al. It appears that the TSF may be highly contaminated with regulated elements or substances and TSF monitoring must include an adequate chemical assessment for all listed elements. The pit lake will likely also contain many of those listed elements. The regulated and listed elements pose a risk to plant, animal, and human life through accumulation.

Our proposed alternative: The ATDR has published standards for dosage and exposure, and DEC should adopt permit conditions that address those dosage or exposure standards. We request that DEC also require daily chemical assessment in the TSF of the listed elements and compounds.

The above concerns, arguments and proposed alternatives actions should also be applied to the monitoring of the 'Development Rock Stockpiles' and the 'Pit Dewatering Wastewater Injection System.' In addition, surface water samples should be required daily. Monthly samples of surface water at the Big Hurrah and Rock Creek site are grossly deficient to monitor potential problems.

A further concern we have is that many of the analyses proposed by AGC do not meet the criteria established by EPA. A number of the listed chemicals in the chart below are subject to Section 313 of the Emergency Planning and Community Right-to-Know Act of 1986. The public must know in what amounts these chemicals may be present in ACG's operation, and AGC should be required to reduce the levels of listed contaminants within

“advisories” proposed by the Federal Government. DEC should address how these chemicals will be handled and the public must know the procedures that will be established to control them.

<u>Analyte</u>	<u>AGC Proposed MRL mg/L</u>	<u>ATDR Regulation & Advisory MRL</u>	<u>Reference</u>
Aluminum	20	0.05 - 0.2 mg/L	EPA
Antimony	1	0.145 mg/L	EPA
Arsenic	2	maximum .01mg/L	EPA
inorganic Arsenic	n/a	5x10 ⁻⁵ µg/L drinking water	DHHS
Barium	3		
1 day health advisory 10kg child		0.7mg/L	EPA
10 day health advisory 10kg child		0.7mg/L	EPA
lifetime health advisory Ba		2.0 mg/L	EPA
Beryllium	0.4		EPA
Beryllium method 6010		3 µg/L	EPA
Beryllium method 7090		50 µg/L	EPA
Beryllium method 7091		2 µg/L	EPA
State DEC standard	0.004		EPA
Boron NOT LISTED BY AGC		750 µg/L	EPA
Cadmium	0.1		EPA
Cadmium MCL		0.005 mg/L	EPA
Cadmium MCLG		0.005 mg/L	EPA
Calcium	200		EPA
Chromium	4		EPA
Chromium (III)		74 µg/L	EPA
Chromium (VI)		11 µg/L freshwater 50 µg/L saltwater	EPA
Cobalt	4		EPA
Cobalt effluent limitations max 1 day		3x10 ⁻⁴ kg/kkg	EPA
Cobalt effluent limitations average of daily for 30 consecutive days		1.2x10 ⁻⁴ kg/kkg	EPA
Cobalt groundwater method 6010		70 µg/L	EPA
Cobalt groundwater method 7200		500 µg/L	EPA
Cobalt groundwater method 7201		10 µg/L	EPA
Copper	1		EPA

Copper Action Level		1.3 mg/L	EPA
Copper MCLG		1.3 mg/L	EPA
Copper Groundwater method 6010		60 µg/L	EPA
Copper Groundwater method 7210		200 µg/L	EPA
Iron	10		EPA
Lead	0.4		EPA
Lead MCLG		ZERO	EPA
Lead Action Level		0.015 mg/L	EPA
Analyte	AGC Proposed MRL mg/L	ATDR Regulation & Advisory MRL	reference
Magnesium	200		EPA
Manganese	5		EPA
Mercury	0.0001		EPA
Hg for human health		1.2x10 ⁻⁴ µg/L (MAX)	EPA
Hg total recoverable		1.694 µg/L (MAX)	EPA
Hg (II) total recoverable		0.908 µg/L (continuous)	EPA
Molybdenum	10		EPA
Nickel	5		EPA
Nickel 1-day (10 kg child)		1.0 mg/L	EPA
Nickel 10-day (10 kg child)		1.0 mg/L	EPA
Nickel DWEL		0.7 mg/L	EPA
Nickel Lifetime		0.1 mg/L	EPA
Potassium	500		EPA
Selenium	2		EPA
Selenium MCLG		0.05 mg/L	EPA
Selenium MCL		0.05 mg/L	EPA
Selenium DWEL		0.2 mg/L	EPA
Selenium Health Advisory lifetime		0.05 mg/L	EPA
Selenium Groundwater (PQL)		750 µg/L	EPA
Selenium (concentration limits)		0.01 mg/L	EPA
Silver	1		EPA
Silver drinking water limits		0.05 mg/L	EPA
Silver water quality criteria humans and organisms		0.05 mg/L	EPA
Sodium	500		EPA
Strontium	5		EPA

Strontium drinking water guideline		4 mg/L	EPA
Strontium 10 kg child 1-day		25 mg/L	EPA
Strontium 10 kg child 10-day		25 mg/L	EPA
Strontium lifetime		4 mg/L	EPA
Strontium DWEL		20 mg/L	EPA
Thallium	0.3		EPA
Thallium ingesting water & organisms		13 µg/L	EPA
Thallium ingesting organisms only		48 µg/L	EPA
Tin	20		EPA
Titanium	20		EPA
Vanadium	5		EPA
Zinc	2		EPA
Zinc 1-day (10kg child)		6 mg/L	EPA
Analyte	AGC Proposed MRL mg/L	ATDR Regulation & Advisory MRL	reference
Zinc 10-day (10kg child)		6 mg/L	EPA
Zinc DWEL		10mg/L	EPA
Zinc Lifetime		2 mg/L	EPA

This table shows AGC's proposed Reporting Limits under the "AGC Proposed MRL mg/L" column. The ATDR advisories are shown under the "ATDR Regulation & Advisory MRL" column.

o. Water management and pit lakes

Background: Both the Big Hurrah and Rock Creek pit lakes will be emptied during operational activities over a three- to five-year time span, with the possibility that dewatering will occur into the future.

Our continuing concerns: We are concerned that the proposed dewatering cycles will afford time for oxidation of toxic material, and contribute to degraded water quality. The proposed Big Hurrah pit lake is relatively small and will be backfilled, and will not transition into a lake. However a pit feature at Big Hurrah will be formed within fractured bedrock that may oxidize deposited material, and mobilize toxic constituents into the environment. The Rock Creek pit lake will form from surface runoff after mine closure. A pit feature with exposed pit walls will be present for some time until the lake crests to the toe of the pit. Exposed pit walls will persist at the upstream portion of the lake that may oxidize and mobilize toxic constituents into the environment. The thermal calculations for the TSF did not take into consideration the thermal input of pit lake water.

Our proposed alternative: DEC must address how acidification will be avoided within the pit lakes in sufficient detail to address the concerns stated above.

3. *Certification under Section 401 of the Clean Water Act is not warranted in this case.*

Background: A comment stated that DEC could not certify that the project will comply with Alaska water quality standards because (1) significant wetlands will be “disturbed” and ultimately destroyed, and (2) the elimination of those wetlands will not comply with antidegradation requirements. DEC’s response was that the project was “designed to minimize the overall footprint of the facility to avoid wetlands where possible.” On the antidegradation issue, DEC acknowledged that it “is still working on implementation guidance for its antidegradation policy. The policy is clearly spelled out in 18 AAC 70.015 and can be used on a site-specific basis. With the absence of implementation guidance, staff has to use best professional judgment to make their decisions.”

Our continuing concern: Nowhere in DEC’s response does it address why the destruction of hundreds of acres of wetlands complies with Alaska’s water quality standards. The destruction of these wetlands will result in the loss of the natural filtering of fresh water as well as significant nurseries for fish in the rivers and creeks in the area. How does that significant impact comply with water quality standards? Whether or not the project footprint has been minimized is irrelevant to whether the project complies with water quality standards.

In addition, there is no analysis or discussion of how anti-degradation requirements are met in this case.

Further, DEC certified the project with 16 conditions. None of those conditions requires mitigation for the hundreds of acres of wetlands and fish spawning habitat destroyed.

In this case, the 404 permit will allow the destruction of significant wetlands. AGC promulgated an “environmental information document,” which includes less than one page of discussion about wetlands. According to that document, the Rock Creek Mine/Mill Complex site contains 681 acres of wetlands, which is over half of the 1,298-acre project area. Rock Creek Plan of Operations, Vol. 2 (Environmental Information Document) (May 2006) p. 218. Of the 681 acres of wetlands on the project site, 401 acres will be “disturbed” by the project. *Id.* Thus, 58% of the wetlands on site will be “disturbed,” or 31% of the project area. The environmental information document does not define what “disturbed” means, but presumably it means the destruction or significant alteration of the wetlands.

The destruction of significant wetlands violates the Clean Water Act because Army Corps regulations provide that:

Wetlands considered to perform functions important to the public interest include:

- (i) Wetlands which serve significant natural biological functions, including food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species; . . .
- (iii) Wetlands the destruction or alteration of which would affect detrimentally natural drainage characteristics, sedimentation patterns, salinity distribution, flushing characteristics, current patterns, or other environmental characteristics; . . .
- (vi) Wetlands which are ground water discharge areas that maintain minimum baseflows important to aquatic resources and those which are prime natural recharge areas;
- (vii) Wetlands which serve significant waste purification functions. . . .

33 CFR § 320.4(b)(2)(i), (iii), (vi), (vii).

The destruction of the wetlands for this project likely will result in the exceedance of water quality standards for the water supply for drinking, culinary, and food processing use, and likely will result in the exceedance of water quality standards for the growth and propagation of fish, shellfish, other aquatic life, and wildlife, in the waters that benefit from the wetlands' "food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species." 33 CFR 320.4(b)(2)(i). The Snake River watershed is a biologically productive watershed with many creeks that are served by the wetlands that will be "disturbed" for "food chain production, general habitat and nesting, spawning, rearing and resting sites for aquatic or land species." The wetlands also "serve significant waste purification functions." 33 CFR § 320.4(b)(2)(vii).

Our proposed alternative: Based on the above, DEC cannot certify that the proposed discharge of dredged or fill material for the proposed project will comply with the Clean Water Act or Alaska water quality standards.

Conclusion

DEC must reconsider its approval of the WMP and 401 Certification for the Big Hurrah and Rock Creek project. This project has been rushed through the process without adequate public review and without adequate technical support. The public is tremendously concerned about the impacts of this mine. The public is also concerned that there have not been enough public meetings so that they may engage mine officials in a public forum to discuss concerns and engage other professionals in a sufficient review of mine documents.

Thank you for your time and consideration.

Sincerely,



Austin Ahmasuk and all signators listed below

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