

AJ Mine Advisory Committee (AJMAC)

MINUTES

Thursday, March 10, 2011
5:30 PM
Assembly Chambers

Committee Members: Donna Pierce (Chair), Kurt Fredriksson (Vice Chair), Rorie Watt (Liaison), Sam Smith, Maria Gladziszewski (on phone), Laurie Ferguson Craig, Gregg Erickson, Frank Bergstrom
Presenters: Mike Satre and Sam Smith
Others: Dave Chambers (on phone)

I. Call to Order

Pierce - Called meeting to order. This is the AJ Mine Advisory Committee of March 10, 2011. All members are present.

II. Agenda Review

Pierce – This will be an informational work session meeting with a question and answer session from the Committee. There will be public testimony at our next meeting. Maria Gladziszewski and David Chambers are on conference call. Mr. Chambers will be scheduled for the next meeting. We have two items for discussion, one on tailings technology from Mike Satre and the small mine concept presented by Sam Smith. Then we will have time for comments and questions from the Committee on non agenda items.

III. Approval of Minutes

A. February 23, 2011 – Approved

IV. Items for Information

A. Tailings

Mike Satre – Is the Executive Director of the Council of Alaska Producers; he was formerly the Technical Services Manager for the Greens Creek Mine and is now Vice Chair of the CBJ Planning Commission.

He has worked at the Greens Creek Mine in various capacities and programs including exploration, underground production geologist, resource reserve generation, long range mine planning, and has spent the last three years as the Technical Services Manager at Greens Creek. In that capacity he oversaw the mine engineering, mining geology and the mine exploration programs. Currently he was loaned out by Greens Creek to run a trade organization called the Council of Alaska Producers, an entity that represents the metal-producing mines in Alaska and assists in large development projects. He is here to provide this Committee with some background information on mine tailings.

Tailings are the rocky material that you have to mine through to get to the ore or the non-ore bearing rock that surrounds the ore, and the materials that are left over after the milling process. At Greens Creek we do not have a final processing mill, so we ship the ore out to several mills that mill it very fine. In order to support the ground that we mine through we put a vast amount of our tails back underground to fill the voids that we create. We do this in two different ways, one is called conventional placement, where we mix the tails with anywhere from 6 to 12% of cement to give it some strength. We place it in haul trucks, where they take it back

underground, dump it on the ground and take a jammer, which is an underground loader, with a stinger and flat panel. The jammer takes the tailings and jams them into the voids, of typically 15 foot wide by 15 foot high, and as the cement cures it will provide stability in the void that we created to mine the ore.

In some sections of the mine, we use a process called long holing that creates larger voids. In this case, we drive a 15 by 15 maybe to 100 foot long drift at one level and come up 60 to 100 feet above that, drill holes down from the over cut down to the under cut, fill those with powder blast anywhere from 8 to 10 to 60,000 tons at a time, which leaves a very large void that you cannot put people with equipment into, we use remote control muckers or machines to remove the rock. Because the voids are larger, the process for backfilling is different. Because of this, in 2001 we built an underground paste plant.

What happens is we filter out the tails of the mill, we mix them with cement, no water, load it into the haul trucks, drive it underground, which is on the same level we entered into the mine, which is a very short haul cycle; we dump the tails in the paste plant. It is a multi-level facility within the mine. The tails are dumped into a hopper with an automated mix of water, then pumps are used to distribute the material through a series of pipes throughout the mine so that we can remotely place the paste tails. Then they let it cure before they can mine adjacent to the area. Between conventional and paste tails Greens Creek is able to place between 60 to 70 percent back underground into the mine.

The tails that we cannot place because we don't have enough void area could be between 30 to 60 percent of the total. These tails are trucked to Hawk Inlet, to an engineered dry stack facility, where they remove the top soil and stockpile it for later use. The stockpiling of these tails which mostly consists of pyrite is a significant part of the Greens Creek operation, one of the longer lasting issues at Greens Creek, in being a long term environmental liability. The stock piled tailings consist of 12 percent moisture. All water that contacts this material reports to our wastewater treatment facility, so any normal water that is flowing toward it is diverted around it and any rain water is collected, will report to the wastewater treatment facility. When this facility is closed we will cover the material up with a series of layers, including the original top soil. It will be reseeded with vegetation then left to return to a natural condition, with the exception that long term water diversion structures must be maintained for long periods of time.

Every mine is different because of what the tailings consist of, as far as their disposal process. It is thought that AJ mine tailings would not consist of a lot of pyrite. When you are trying to develop a mine the first thing you would do is to try to figure out where you are going to place your tailings.

Ferguson Craig – Asked if once the Greens Creek dry stack facility is closed, will it be continually monitored with employees on site indefinitely?

Satre – Did not feel he was qualified to answer this question.

Fredriksson – Asked if there would be any issues with water contact with the pasted tailings.

Satre – There are common tests that take place throughout the industry to make sure that the paste tailings are safe.

B. *Small Mine Concept*

Pierce - Sam Smith will discuss the results of an internal study done in 1997 that he participated in as an Echo Bay employee. At the time, he and others studied a conceptual mine that would have been much smaller than the one for which Echo Bay applied for permits. While this effort did not create a mine plan, the study does offer useful information about how many of the issues that concern everyone might be addressed. Sam is not here either to defend or present a proposal. He has been asked to explain the study.

Smith – Came to Alaska in 1982 as an engineer with a mining company. He has spent years at Greens Creek doing environmental work, also doing conceptual planning. He then went to work for Echo Bay on the AJ property, for about 4 years doing mining engineering work. He then went to work for Kvaerner, who contracted with Echo Bay to do the AJ Mine close out work. Toward the end of Echo Bay's effort to open the AJ Mine they decided to take a look at a 3,500 tons per day mine concept that would mill about 2,000 tons per day. To control costs, one of the things that was important was to try to reduce the amount of ore they would have to mill. In the AJ, the valuable minerals are in the quartz, and therefore easy to distinguish from non-ore bearing rock. To make it a more favorable proposal, they considered sorting the rock out by hand to reduce the mill feed.

Other features of the proposal were similar to concepts that Echo Bay had already proposed, including the creation of a sea level access to the ore body. They looked at the type of mining method called long-hole stoping method, which permits controlling more closely the mine-run ore grade, as opposed to caving method, which has huge blasts underground to get the ore to run. We did not do a feasibility study or a complete mine plan. We did look at the ore reserves, but there would have to be some additional exploration drilling to verify the grade of the ore body.

The tailings disposal method would have been underground, and most of the facility supporting the mine would have been underground as well. This included the mill and maintenance shops. Surface facilities would have included an office, change house, small warehouse. With the size of the mine and the noise making facilities being underground, noise would not be much of an issue. The waste rock which would have been about 1,500 tons per day, would have been the rock that does not go through the milling process, including the development rock. At the time, they considered that the rock would have been made available for sale to the public. The rock from the AJ is non-acid producing rock.

Most of the equipment would have been kept inside the mine. The traffic issue, would be lessened with using the rock dump area as a staging area for materials in and out of Juneau, and using a busing system for mine employees, to alleviate vehicle traffic.

As for employment opportunities - there would be skilled and unskilled labor, with miners, mill technicians, electricians, engineers of various types, geologists, accountants, office staff, management, mechanics, and more. Most would live in Juneau and surrounding areas. Financial impact on Juneau would mostly be positive, with significant tax advantage to the City.

Water used in the mining process would be treated and released into Gastineau Channel; it would not be pumped into Gold Creek. The importance of the sea level adit for the mine is that mine water would exit the mine at the rock dump, and water would be easy to handle. The drain tunnel would remain in operation as it is today, about 300 feet above sea level. Initially they would dispose of the tailings underground in some of the large mine voids which have tremendous capacity. Then as they develop new openings that would provide additional space. The use of cemented tailings would have to be considered in a detailed mining plan, which is a big undertaking.

Ore resource and mine life would be 8 to 12 million tons; revenue ounces of gold 782,000 of the mine's life. In order to come up with these numbers we assumed based on information of work that was done on the old AJ Mine. The AJ Mine lost about 9 percent of gold through their sampler, their selection process of the ore and as a result of this with a milling grade of about 0.118 ounces per ton. We looked at trying to use as many of the facilities that are already in place in the mine. These would all need some type of work done on them to make them work properly. One of them is the shaft that is in good shape; but the hoist that brought the rock from the lower levels to the haulage was removed. The lower levels in the mine go to about minus 1,000 feet. That is 1,000 below sea level. There is still ore below that, but we had not proven any ore below that level. These are some of the things that they were looking at to make this show some promise.

The mining methods they were looking at were large stopes, that when they were finished would be about 150 feet long by 150 feet wide and 200 feet high. They would be excavated by a long hole stoping method, which should not cave in. They would be drilling down holes from the top and the bottom, then blast slabs, then the rock would be brought to the mill's sorting area. Types of underground disposal methods would be dry tailings paste that might have cement in it or hydraulic backfill, which has been used in mines for over 100 years. They basically have well drained sand that they pull the water out through piping systems that allows people to work on top, underneath and on the sides of it. Surface disposal would not be recommended. We didn't think it was necessary. The same goes for submarine tailing disposal. With the large amount of material available, if we did the sorting and we disposed of the waste rock through sales we didn't see why all the tailings could not be placed underground. We went through all the stopes that are existing, primarily at the haulage level and determined that there is room in those stopes for 8.2 million tons and as we mine new stopes we end up with another 7.7 million tons; this is based on the size of the ore reserve. Stope capacity for storage would be 15.9 million tons and required capacity for disposal would be 6.1 million.

This mine would function like most modern mines. In the mining areas we would be using dump machines, trucks and would also be using ore passes. From higher levels to lower levels we would use rubber tired equipment and in some cases rail. There is a rail track on about 900 feet below sea level that would be repaired and used; this level has been filled with water for about 50 years. We would use rail on this level and bring the rock to the existing main shaft. One would have to install a new hoist system in the shaft, and then the rock could be hoisted up to the haulage level.

The old haulage level is the four level, about 400 feet above sea level. We would be thinking in terms of a sea level adit for the new haulage level, which we would drill a new tunnel, which could open out in several different areas. It would be preferred to keep it in the rock dump area because of Thane Road's access not being a very viable road. The ore sorting, grinding, concentrating would all take place underground. The processing of tailing material and disposal would also take place underground. Warehousing of some supplies and explosives would be stored underground. Equipment maintenance shops would be underground. Water treatment facilities for the most part would be underground. Power generating, would have to be looked at really hard, the mine would have to provide sufficient power generating capacity to operate the whole mine. This has been true for Greens Creek and Kensington mines also. We would hope that if the mine were to go ahead that it might allow AEL&P to make another phase of Lake Dorothy, or something like this, which would provide part of the power required to operate the mine. The power requirement to run the mine is about 4 mega watts.

There were about five Echo Bay Mine employees that participated in the 1997 study. The engineers were John Barry, Anthony Williams, and myself, and Lance Miller and Stuart Morris were the geologists. We want to emphasize that this is not a mine plan. This is one approach that could be used to develop the AJ mine. A potential investor would probably look at the study pretty hard and have improvements. In some areas additional drilling would need to be done to sufficiently characterize the ore body. The spacing now is a little too wide for a more selective mining method. This would be done after a developer had reached an agreement. A lot of underground stabilizing work would have to take place before we could do anything. One of the benefits of reopening the mine would be requiring the investor to maintain the inner workings of the mine, which if left undone could cause the City problems down the road.

Surface facilities - what they looked at was an adit near sea level, preferably between the old AJ Steam Plant and the Little Rock Dump. Echo Bay looked at one down at Thane at the old Alaska Gastineau maintenance facilities, but the rock dump is a better location for this proposal. This would all have to be looked at, depending on availability of real-estate.

Blasting of a new portal could be handled with not too much noise or interruption. Waste rock from mine operations would be hauled from underground and stock piled on the surface. It could also be conveyed out of

the mine; this would be the ideal way. Noise barriers could be constructed to prevent noise from going across the channel. With this scheme, traffic would be very light; there would be some shift change traffic. Parking would be an issue, so bussing would be considered. A new mine would provide about 200 new jobs at the mine, with competitive wages and benefits with other mines in Southeast Alaska. The economic committee that is working on this figured that the royalties from the mine could be from \$2 to 3 million a year. Also the City would benefit from revenues from property taxes, sales tax, and from employees supporting existing businesses, which would provide improvement in the local business climate and the impression of Juneau being a good place for new businesses to relocate.

Water quality is the primary issue on everyone's mind. He feels that what would happen would be for the existing mine drainage to continue to be directed to the drain tunnel, consistent with the water quality standards. Other drainage from active work areas would be treated and released to the drainage tunnel possibly or used in the milling process followed by treatment and release to an outfall in Gastineau Channel.

Ferguson Craig – Asked for an explanation on the nature of the ore body as described in the 1997 attempt to open the AJ Mine by Echo Bay. It said that the ore was scattered all through the rock in areas, which make it harder to get to.

Smith – The scattered ore description is correct in some of the mine areas, but in others the ore is closer together, which will hold more gold in this type of zone. The investor would pick the areas where there were more concentrations of ore to be mined economically. This would be true with a small or large mine, so there will be a lot of gold left in the mine just because of the economic costs related to mining in areas that have the described scattered ore bodies.

Ferguson Craig – Asked about the break-even point on the price of gold.

Smith – In an economical feasibility study you would determine what your capital cost would be to develop the mine, which would include the costs it would take to get the mine ready for operation, building the mill, and surface facility, putting in the generating equipment which would probably be a couple hundred million dollars, also, treatment costs, and how much they are going to give you for the gold.

Erickson – In 1997 Echo Bay decided that it was not economically viable to pursue (the small mine concept) because of the price of gold. Is there any other reason besides the current price of gold that has brought this small mine back to life after 14 years of dormancy?

Smith – Other than that, there have been people that have shown some interest in opening the mine; primarily, it is the price of gold. He feels that the price of gold is not going to go down in the near future. There have been a lot of improvements in paste tailings. Reserve estimating has continued to improve with computer systems, and milling still takes a lot of horse power.

Watt - With regard to what has changed, I'll offer a few comments. I have heard from the Mayor and other Assembly Members three specific reasons why we are looking at re-opening the AJ Mine. First, there is a concern about the local and state economy, second the rise in gold prices changes the economics of the AJ, and third, the smaller mine concept was not widely known about in the community, was not given a public review.

Bergstrom – The way it works in the mining business, a junior mining company would come in, take a piece of property and try to convert it to ounces and sell the ounces to a major mining company. A major is a company that actually mines gold, and typically they want to replace their ounces they are pulling out of their reserve. To be viable you have to have reserves, so they are out seeking to buy reserves. They do not necessarily want to buy property, they want to buy reserves. So the juniors come in and do a bunch of drilling and do a reasonable plan concept model that says you can get these reserves, these ounces at this price, therefore I will sell them at

this price knowing that you will be able to gain a profit as well. That company will have to buy your property with those ounces and they will have to do the hard design work and feasibility study to then obtain financing to build it and mine it. You will have to have a lease arrangement at the start of the process. You will have to negotiate the lease, but you will have to have some general guidelines set up.

Watt – When setting up a lease, what we are going to talk about is what we have to have and what we want to have. One of the main requirements will be about protection of the drinking water system. When looking at the small mine concept, the deep north mining is below the drain tunnel, so below the drinking water system, below the discharge point of the drain tunnel. What we need to know is how the concern of our drinking water system would go into a lease, and then from the junior mining company and then on to the major mining company.

Ferguson Craig – This helps us envision what we would look at as a community. Rorie will have to write up something that will try to entice some mining companies to come in here. Here's a sample ad: For lease, low grade ore body, directly connected to municipal water supply, adjacent to busy downtown area business district and residential homes, under close scrutiny of skeptical citizenry, near avalanche zone, and salmon fisheries and recreation areas.

Smith – That's not exactly how it would probably be worded (laughter). If the City decides to go forward with the project, it would be important to make interested companies aware of the various issues, but it would be up to them to decide if they want to pursue the project.

Bergstrom – Suggested that the desired conditions could be placed in a solicitation, an RFP that would eventually culminate into a lease with a junior mining company. The lease would help quantify the viability of the project early on. The City will need to make some commitments. No one is going to come in here and spend a lot of money without a possibility of making some money.

Pierce – Ask how is this small mine concept different from what Echo Bay was planning, in regards to what the Planning Commission was considering with mine drainage with potential impacts to the water?

Smith – From what he remembers there was some talk about plugging up the drain tunnel and running all the water out through what they called the Bradley Adit. There was going to be a lot of caving and it was going to be difficult to have control of the water and have the water come out the drain tunnel. There would be mining above 4 level in this case. He feels that if mining were to take place above 4 level that the water quality could be controlled. At the close of the Echo Bay they obtained a NPDES permit which the City now holds and is liable for compliance and subject to enforcement.

Fredriksson – Would like to have personnel from the Department of Natural Resources that deal with State leasing to come speak to this Committee on how they deal with water quality protection from small and large mine leases.

V. Next Meeting Dates and Future Agenda Items

Pierce – The next three meetings are on March 30th, April 7th and April 18th at 5:30 p.m. in the Assembly Chambers. March 30th we will have the Economic Subcommittee report. David Chambers will be here. There may be room on the agenda to bring someone in from the Department of Natural Resources. April 7th we will work on the report to present to the Assembly. Rorie is working on writing in a neutral voice, the informational part of the report. We would like the Committee to provide draft comments, maybe according to an outline that we prepare. Then take the commonalities of the comments and have the Committee take a look at the comments. We can talk about this at the next meeting. It is a challenge with the timeframe that we have and with the public hearing and the May 1st due date to try to get to a report; we may end up with another meeting in April. It will be important for everyone to be physically here for the April meetings. Laurie Ferguson Craig will be gone from April 11th through April 21st. Gregg Erickson cannot meet on April 18th.

Erickson – Wanted to make sure that David Chamber’s received the minutes or is directed to the AJ Mine website information, so he will be aware of what has taken place in this Committee. Also, he is concerned with the public view that we are trying to attempt to open another Echo Bay Mine. Wanted to clarify that that is not what the committee is investigating. Noted that the SEACC letter suggested coauthor’s Jim Kuipers, P.E. and Maest of a 2006 study of Comparison of Predicted and Actual Water Quality at hard rock mine, and asked that they be invited to provide comments to this Committee.

Ferguson Craig – Asked to have information on where we would get water if for some reason our water was not going into the wells and the Salmon Creek water supply was down, what are our other alternatives. This should go into our report.

Pierce - The more pertinent question would be what is the risk of exposure for events that would drain water away of the aquifer. This would need to be part of the report.

Bergstrom – In assessing our charge there is really only one question, under what conditions should the City promote the reopening of the AJ Mine project. I thought it would be worthwhile to go back and look at the history of the mine, was this ever a mine or not. Was this an attempt to mine gold or an attempt to mine stock holders? I looked at David Stone’s book, Hard Rock Gold on the history of the AJ Mine. I put together a two page list showing this history, in red showing its ground breaking firsts. The list shows the success of the adits and the relation to hydro power at Salmon Creek. This timeline history is important to potential developers, which would help them to see what types of factors that were present at the time of full operation, to help them develop the mine in the most efficient way. He discussed a list of discussion topics, which included ownership and ore, mine and mill, infrastructure and community.

Erickson – Would like Rorie to provide a mine restoration obligation list that the City might require in a lease.

Fredriksson – There will be another Economic Subcommittee meeting March 17th at noon at the JEDC conference room. The public is invited.

ADJOURNEMENT at 8:22 p.m.