ORIGINAL

NUNAVUT WATER BOARD

BENACHEE RESOURCES INC. WATER LICENSE APPLICATION

DECEMBER 7, 2004 VOLUME 2

LOCATION: KUGLUKTUK COMMUNITY COMPLEX

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(Hearing commenced at 8:40 a.m., December 7, 2004)

CHAIRPERSON: Good morning, welcome back. If I can ask Mr. Missal to please proceed with the presentation. Thank you.

GREG MISSAL: Thank you very much, Mr. Chair. Good morning to everyone. We will pick up on our presentation with our monitoring overview of the project, and Bruce Ott of AMEC Earth and Environmental will be giving this portion of the presentation for us. Thank you.

BRUCE OTT: Thank you, Greg. Good morning, Mr. Chair and members of the Board.

What I am going to present this morning is a summary of a summary as it were. For the size of this project, this is a very comprehensive monitoring program that has been proposed, and I don't want to keep everybody here all day, obviously, so we will be hitting the highlights, talking about the key points. But if you have some question about technical details, please bear with us, and we will get to those in the fullness of time.

The main purpose of the monitoring program is to detect project effects, when and if they occur. And monitoring has a key purpose of closing the loop on impact predictions.

What I am going to talk about this morning will be site monitoring that's right at the Jericho mine and the plant site, and receiving environment monitoring, that's the lakes, streams and a little bit about the land around the mine site, although this is a water license. And I will be taking you through the three phases of mining, construction, operation and closure.

The site monitoring, I'm going to start out with construction and operations because they are -- the activities are fairly similar, and then on closure, the activities change around a little bit. So I will run through the monitoring during construction and operations, and then I will finish off my talk with what is proposed during closure.

So the key elements for the site monitoring during this phase would be geotechnical, which Mr. Scott talked about previous, site water flows and chemistry, solids geochemistry, ground ice, thermal monitoring. You all remember the thermosiphons that were talked about yesterday, so I won't be touching on that either, and visual inspections, the day-to-day visual inspection of the facilities at the mine site.

For the flows and water chemistry monitoring, there is a comprehensive suite of monitoring that

will be done, and this slide provides you with a brief listing of the facilities that would be monitored. The ditches and ponds, of course, for collection of water, sumps, supernatant from the plant, treated sewage effluent, PKCA water, Stream C3, fresh water intake and the annual seepage survey that Kelly talked about last night.

Briefly this gives you an overview. You have all seen pictures of the site, and I'm not sure you can see them from where you are, but the red dots such as that one in the pit there and this one down at the west dam and some scattered around the site would be the focus of the monitoring for site water chemistry. Some of these things are a little tentative, of course, because you can't put a dot on the map before you have destructed something, obviously.

There is a comprehensive suite of parameters that will be measured there. This is detailed in the report. I don't want to spent a lot of time on this. Safe to say that major anions, physical parameters, full suite of metals and nutrients would be measured as part of the monitoring for water chemistry.

Sampling frequency. Just briefly, the frequency during PK discharge would be weekly, and

that is essentially planned to be June through September, and that's to -- primarily for permit or water license compliance.

The summer inflows would be measured biweekly, and through the summer. And any flows that were continuous, for instance the sewage plant effluent, would be measured on a monthly basis.

Moving into solids geochemistry, what I am talking about there is the waste rock and the coarse PK and the low-grade kimberlite ore. And a small amount of recovery plant rejects.

Samples, Kelly talked about this a little bit last evening with respect to acid base accounting or acid rock drainage. Samples to be collected from the blasting muck pile. Now, if anybody doesn't understand that term, muck isn't like mixed up mud and water, it is pretty chunky stuff because it is run of mine rock. And this monitoring would be every week for the first year of mining, and assuming that we end up with our minimal variability, sampling frequency would reduce to every other week for the remaining years of mining.

One of the things that needs to be kept in mind here is that we are making some assumptions that may or may not prove out during actual operation, in which case some of these things might

change a little bit.

Again, the detailed plan goes into a lot more detail on these things, so that if you have some questions left afterwards, we would be happy to answer them. What I am providing is an overview of what's going to take place.

And the muck piles will also be inspected for ground ice, as a small amount of ice had been -- had been encountered during the exploration phase, and therefore it has been identified as something that needs to be reviewed, needs to be monitored.

And we get down to the site inspection by mine personnel. Essentially, there is some detail here, but basically it is taking a look to make sure your house is in order every day, and that is just done by visual inspection and knowledge of the people that are working at the site as to how things ought to be -- how it ought to be operating.

A note is that prefreshet and freshet, there will be a focus on the west dam spillway channel to make sure there is no blockage or ice accumulations in the spillway, because that could cause some -- certainly could cause some major problems with respect to operations of the west dam.

Obviously the inspection will be costed during operation of the facility, and once an

operation is completed, the frequency -- inspection frequency would be reduced.

And the other key here for site monitoring is something that was mentioned previously is that the Stream C3 would be prior to any discharge which would likely be the dewatering of the PKCA facility. We will have an qualified hydrologist determine the potential for erosion under discharge scenarios, as was previously discussed.

Now, I would like to move on to receiving environment, that's the area outside -- mostly outside the immediate footprint of the mine or areas that won't be directly affected by the mine operation, other than the discharge from the PK.

The monitoring plan envisages looking or monitoring air quality, continuing the climate station operation, measuring water flows, water and sediment chemistry and aquatic effects and wildlife.

While air quality and wildlife probably aren't directly pertinent to the water license application, I have included them for completeness.

For air quality and climate, we are proposing two particulate monitoring stations to measure respirable particulate. And once the met. station is set up again, that would be operated to provide

site-specific information on things like precipitation and wind and relative humidity, radiation, et cetera, so that one can get an appreciation of evaporation.

I should mention that those -- operation of those two facilities will be in consultation with Environment Canada, who has expressed interest in how those things should operate.

We are also proposing to do lichen monitoring for metals that are picked up, could be picked up from the mine and dropped at remote sites, and that's patterned after what Ekati has done. And we are also going to look at dust, close-in dust effects from a couple of transects that are run perpendicular to dust sources, i.e., a road that will provide some measure of what direct effects dust might be having at the site.

That's briefly a suggestion of where the monitoring, the two monitoring stations could go, one there and one at the exploration camp.

These monitors that are proposed, for it to be a continuous monitor, they need AC power, so that's one of the limitations in that you can't run a cord a couple of kilometres across the tundra.

There it gives you an idea of where the lichen stations are. If you can see the red dots,

there is the centre of the operation, and they go from over here north of Willingdon Lake and on the east side of Contwoyto Lake, and then there is some spread around in a little bit closer.

For water flows, we are proposing Lake C3 outflow, and that would be by means of a continuous site recorder, and development or improvement of the station discharge relationship that has been developed for that flow.

Now a stage discharge relationship allows you to measure the height of the water with an instrument and relate that directly to the volume of water that's flowing out of the system, and it is a standard hydrological method that's used in situations where you don't have a dam or a weir or something like that that you can -- or a meter in a pipe that you can directly measure the discharge.

We are also measuring the flows of Stream C1, because the mine will have some effect on Stream C1. And there is a concern has been expressed that adequate flows need to be maintained to not -- so that fish habitat in the lower part of the stream that you may remember Rick Pattenden talked about yesterday evening aren't affected.

Now, this gives you an idea of approximate location for a gauge in the lake, and we are

proposing the gauging point for Stream C1 after it is built, because it won't be built initially, at this lower pond here, again, it is a suggestion of DFO, because it is the closest practical point to measure the flows in the lowest part of the stream, which is what's the key interest.

For water and sediment chemistry, we are talking about setting up 15 stations, they would be upstream close to the downstream very close to the discharge, downstream further away from the discharge and specifically downstream far enough to be on IOL land.

There would be monthly sampling, a mid-December sample when the ice is thick enough to simply get on the ice, and the water has stabilized in the lake, and then mid-April which is a late spring sample, and then monthly during the summer. We would do that for the lakes in the area. We are proposing for Lynne Lake, which is in the drainage which will not be directly affected, to sample once in summer, and this would be on an annual basis.

We are also proposing to sample the bottom sediments for chemistry, and the locations would be as above and similar to what is done at Ekati, we propose to sample those once every three years. Of course, along with this sampling, there is quality

assurance, quality control program to ensure that sample variability is due to what is actually going on in the field and not from some sampling or laboratory errors.

Again, a comprehensive set of monitoring parameters, physical parameters such as pH, hardness, conductivity, total suspended solids, et cetera, dissolved anions, as I mentioned before, nutrients, total and dissolved metals and total organic carbon, similar to the suite of parameters that was measured for the baseline.

Now, a lot of these parameters we are suggesting would be monitored but wouldn't be regulated, so it is important to know the difference there. And Kelly did mention that, I believe, yesterday, but it is worth reiterating that the parameters of concern need to be regulated, but there is a number of other parameters that are monitored that aren't of particular concern at the site but allow insight into what's going on with the chemistry.

Again, another map that's fairly busy. We are talking about monitoring outside basin, upstream sample right close to the downstream part of Stream C3, which is the discharge, near the edge of the mixing zone area here. In Carat Lake, in

this little lake here which is C1, which is close to the mine, at the outlet to Stream C1, up here in Jericho Lake and then up here in the Jericho River, which is well into IOL land.

Most mines now, I guess all mines in Canada at any rate need to have an aquatic effects monitoring program, and what that does is pick up chronic effects or subtle effects that water chemistry won't pick up because the critters and the plants are in the water all the time, so they are a much better barometer of what's going on.

Basically we are looking at nutrient loading effects, elevated suspended sediments, increase in metal contaminants, and the aquatic and looking at all the key elements of the aquatic biological community, periphyton, which is attached to algae, little bugs or benthic invertebrates that are on the bottom, phytoplankton, floating plants, zooplankton, floating animals and the fish, and we are proposing 17 stations to monitor these, which will give us comprehensive coverage of the area.

Sampling frequency, we have done preconstruction monitoring in '99 and 2004. The '99 results have been published. The 2004, because of need to get taxonomy and some other things done, won't be available until later in January.

I'm not going to run through, spend a lot of time with these things. You can see that most of these things are done on an annual basis, and everything but fish tissue will end up being done on an annual basis.

The reason for not doing -- there is two reasons for not doing fish tissue on an annual basis, one is that metals accumulate only slowly in fish tissue, so you won't get any -- you won't have any useful information by monitoring them very frequently, and the other reason is that if you keep on sampling fish and pulling fish out of the system that's a small lake like these lakes are, then pretty soon you don't have fish anymore, so why did you start it in the first place.

Again, this familiar map that shows where the sampling is going to be, it will be similar to the water chemistry. We have got this second control lake which is in a separate drainage, a control lake, Lake C3 which is the immediate receiving, and Carat Lake and up in Jericho Lake.

Sediment deposition doesn't need to be so intense, but, again, it will be these sites that you can see here. In addition, the outlet to the mouth of Stream C1, the water intake, and we have also got another one down here at the base of

Stream C3 where the discharge point is.

Very briefly on wildlife, a number of issues were raised by GN, and a wildlife management plan is being developed separate to the water license application with GN. Basically what we had indicated would be done in the monitoring plan that was submitted, along with a water license, is to look at all the critters that are up there, log any incidents of wildlife incidents, such as wolverines or foxes coming around, any collisions with caribou if they should happen.

I should point out that caribou or wildlife in general will have the right of way on the site, and that will be a no feeding of animals will be strictly enforced. There will be good -- very tight management of kitchen waste, et cetera, and that's really as much self-interest of the mine as anything, because otherwise you can have quite a problem with animals, or they can have quite a problem with you if they start interacting.

What we are proposing for monitoring reporting is the following five major reports for the water license. At any rate, for the first four are really the most important ones. An annual geotechnical report. Cam talked about the geotechnical. There would be an independent

engineer's report for the main structures at the site for requirements under the Mining Act.

Annual seepage and waste rock reports, Kelly touched on those. An annual aquatic effects monitoring program, that would be an annual report on the things that I discussed that would be done for aquatic effects. An annual surveillance network program report, which was the water and sediment chemistry, sediment for years that it is done. And the wildlife management agreement will almost certainly require an annual wildlife report.

Closure and abandonment, we are moving into a different phase. There is really two phases there, immediately after the mine closes when there is a long-term facility, stability needs to be assessed, and if there has been any success from -- depending on what comes out of the revegetation trials, we need to look at that.

Then the other phases, the longer-term monitoring to ensure that the predictive return to receiving environment guidelines. You recall yesterday from what Kelly indicated that discharge immediately from the mine, some elements would meet CCME and some wouldn't, and so the idea here is to monitor until we are assured that the site receiving water quality is acceptable for discharge

at the time the mine closes.

And of course they will require some longer-term monitoring of the pit refill. We would suggest that it might take up to 20 years if the pit filled naturally.

For site monitoring, it would be very similar to what was done during operation, except of course less frequently. Receiving environment, again, the same, but less frequently, likely down to operating or collecting samples only in the summertime when the water is open.

I have already talked briefly about the short-term site monitoring, the annual geotechnical inspection for stability for the pit, PKCA, dams, dikes, waste rock and stockpiles, C1 diversion and the borrow areas, i.e. all the major areas that were disturbed or modified.

Annual site water chemistry, again, would be for the main areas there where seepage was found. Some of this is a little less certain than during operation, because some of it is going to be driven by what comes out from the mine monitoring, of course, and then the pit filling rate.

Long term, until the pit fills, they would be monitoring of the C1 diversion and the pit water quality up to and on discharge.

We are proposing a reduced number of stations for receiving environment monitoring, and I have got a map that shows where those are.

Aquatic biota, at this point assuming that there aren't any significant effects from the mine operation, we would propose just that the AEMP program cease at the end of mining.

And that just gives you an idea of the spatial spread of what we are proposing for monitoring sites on closure. And that's the end of my talk.

Thank you for your time, Mr. Chair.

GREG MISSAL: I would like to now ask Court Smith with Nuna Logistics to come forward and speak about the reclamation security bonding for the project.

COURT SMITH: Good morning, Mr. Chair and members of the Board. Thank you for having us here today.

Nuna Logistics prepared an estimate and plan for the closure, and I would just like to present it. Briefly I will go a little bit through some of Nuna's similar work in the area so that you get a feel for what the type of work we do in the earth works and that sort of thing.

The ownership of Nuna is with Kitikmeot

Corporation and Nunacy, comprising 51 percent, so it is a federally registered company, a little over ten years old and 51 percent Inuit owned. We specialize in the north, in Northwest Territories and Nunavut.

Our work is in the field of contract mining and building earthworks. We build dams and dikes, similar to what Don Hayley presented earlier, we have built some of those. We do winter and all-weather roads, site services and crushing and support and that sort of thing, anything that revolves around moving and working with rock and soils.

We have worked at Ekati, Diavik, the winter road, Lupin and Snap Lake. In terms of our work with Tahera, we assisted early on in some of the field work in the exploration end. We have provided cost estimates for them while they were doing their planning and figuring out what to, you know, how they would build. We provided site development and open pit mining cost estimates, and also we prepared a reclamation study for them, cost estimate.

I am putting up a few slides about the misery pit at Ekati, and the reason for this is it is very similar to the projected work that would happen at

Jericho, both in size and types of facilities, and that sort of thing.

Nuna developed and operates the misery pit and the site around, and it is part of BHP's Ekati site, but it is located about 30 kilometres away, so it operates fairly independently of the Ekati site.

This is a picture of the site in the summertime. This is the camp section here and a shop, and another shop here, fuel tank, and this is a laydown area where we store materials that we would be using. You can see some drills sitting out here and a line-up of trucks here. This is the waste-rock pile for misery, and off the page, I will show you in a few minutes, is where the pit is.

Some of the dam control structures that you see in the background here are similar, they are for controlling the water at that site, very similar to what was talked about for the Jericho site.

This is a picture from a different angle of the same site. This is a picture of the open pit. This is comparable to what Jericho might look like three or four years into operation. You can see the haul ramp out of the pit there and comes down

and goes around and into the pit.

This picture is the same pit in the summer, and if you are wondering what it is like down in the pit, this shows a picture of a lot of construction activity or a lot of, sorry, mining activity down in the bottom of the pit.

You can see the drill operating and making the holes for the blasting, and you see trucks cycling in and out, and this is a loading piece loading those trucks and moving the rock out of pit. Up on the top you will see an explosives truck getting ready to load some holes that are up there.

In terms of the closure and reclamation at Jericho, our estimate was prepared based on numbers and engineering as performed by or as done by Tahera. The quantity and the scope, we checked both the quantity and the scope to see if we were comfortable with their reasonableness and completeness to make sure that we were comfortable there.

In terms of the assumptions for the closure, we made the assumption that the company had walked away, in effect, from the operation, which is our instructions as to what was necessary. Therefore, we looked at it as if we were going in and having

to move the equipment in to go and reclaim the property assuming that nobody was there. We assumed that everything was left sort of and walked away from.

Quite a bit of the surface facilities at Jericho will be Nuna owned and operated, the camp and the shop, et cetera.

During the mining operation, you try to do a little bit of planning towards the closure. In other words, you do some reclamation, but the reality is that you need most of the stuff that you are doing throughout the mining so that the reclamation that you can do ahead of time is somewhat limited, but you can partially reclaim the waste-rock piles and a few other things like that.

In terms of what our assumptions were in how we costed out the reclamation plan, we assumed that with the waste-rock piles that we would slope the edges and that we would put overburden or waste-rock layer on the upper bench.

On the PKC area, which is the processed kimberlite area, the east cell where the fine processed kimberlite is, we would overlay that with coarse kimberlite and overburden in waste rock. On the west dam, we would decommission it, and the west cell would be brought down to somewhere near