BUREAU OF LAND MANAGEMENT

RED DEVIL MINE REMEDIATION PROPOSED PLAN PUBLIC MEETING

Tuesday, October 27, 2020

Virtual Community Meeting

ATTENDEES:

Lesli Ellis-Wouters, Communications Director, BLM
Bonnie Million, Anchorage Field Station Manager, BLM
Matt Varner, Presenter
Mike McCrum, Presenter
Maureen Clark
Natalie Travis
Anne Marie Palmieri
Catherine Billor
Court Reporter, Betty Caudle, Metro Court Reporting

ABSENT:
Joy Huntington, Facilitator, Uqaqti Consulting

P R O C E D I N G S

(On record 6:00 p.m.)

THE REPORTER: On record, 6:03 o'clock.

MEETING OVERVIEW (FACILITATORS)

LESLI ELLIS-WOUTERS: Good evening and welcome to the community meeting on the Red Devil Mine Remediation Proposed Plan. My name is Lesli Ellis-Wouters, communications director for the Bureau of Land Management in Alaska. And I want to thank you for taking the time tonight to participate in this discussion. It is important for us to provide this information to you in such a way that does not compromise your health in these difficult times, but also allows us to move forward on this important process for your community.

Tonight, we are using the Zoom webinar platform, which I hope you find to be an interactive experience. You will be able to ask questions verbally by raising your hand, which is the hand icon at the bottom of your screen, or you can type your question into the Q & A box by clicking on that icon also located on the bottom of your screen. For those of you on the phone, which right now I don't have anybody on the phone, so I'll go over those instructions should we get somebody. Please note in the upper left-hand corner of your screen is an information icon. It’s an eye and a circle. I’d encourage you to click on that and write down the webinar ID. This is in case you lose your internet connection and need to call in using a land or cell phone. You do not need to enter a participant ID if you call in, just hit the pound key and you will be joined.

The agenda is currently on the screen. After my opening remarks, we will hear from the Anchorage field office manager, followed by presentations, and a public testimony period.

You can ask questions at any time during the presentation by entering them into the Q & A block, or you can wait for a break in the presentation, and we can call on you when you raise your hand. With that, I’m going to turn it over to BLM’s Anchorage Field Office Manager Bonnie Million.

ANCHORAGE FIELD OFFICE MANAGER WELCOME

BONNIE MILLION: Thank you so much, Lesli. And good evening, everyone. I do want to start off by thanking you all for joining us in this virtual setting. If you’re anything like me, I would love to be able to meet with people in person again, but for obvious reasons, I think we’re taking the right approach here and just being a little cautious. It is out of the sincerest respect for the health and safety of all Alaska communities and our greater Alaska families that we are conducting these meetings virtually.

And what I do really like about this virtual setting is that we are able to provide multiple opportunities for folks to gather information and for us to receive feedback in a couple of different forums just so we can keep this really, really important remediation project moving forward.

As you might be aware, this project has been in the works ever since 2010 when the initial remedial investigation work started. We held community meetings in 2010 and 2011 giving information on the initial investigation work plans.

We came back out again in 2012 with some preliminary work plan results and the initial fish tissue study results that Matt's going to give a presentation on here in just a bit.

In 2014, we came out again requesting some public comments on some of the early actions that had occurred. And what was really great about those meetings is as a direct result of some of the comments that we received back, we actually went forward and did some modifications on the stream bank work at Red Devil Creek to try and keep some of those tailings up out of the creek in the interim while we're moving forward with this process.

So then from there, the team moved into a feasibility study stage. There's lots of modeling, lots and lots of data. It's a complicated project, right? And so we decided with all of this data and information that it would really be great and really beneficial if we came out to the communities and sort of started presenting some of this information in advance. And so the team came out again in 2017 and 2018 to summarize some of those investigation findings and some of the modeling results in anticipation of this public comment period here today. We had some additional analysis and some additional modeling based on comments that we received back from the EPA and the State DEC.

And that brings us to today, right, with our official public process now. We had originally planned for public meetings back in March, with predictable results with our current situation. And so now with these virtual meetings, we’re trying to pick up that ball and move it forward as the public comment period for this remediation project closes, I believe in the middle of December, December 18th.

So really the intent of these meetings is to present information to you, yes, but really it’s to hear back from you, to hear if you’ve got questions, if there are areas that we need to clarify and maybe get a little bit more detailed, and to hear your concerns about the proposed alternative that we are selecting.

So we’ve got multiple different ways for you to interact with us today. You can raise your hand and ask vocal questions, or there is the Q & A box at the bottom where you can type in your questions. And then at the very end, there will be an opportunity for you to give a more formal public testimony section. We do have a court reporter who is with us today, and she'll be capturing all of that. And, of course, if you're anything like me, sometimes it takes me a little while to process stuff. You can sit through this meeting. You can sit through -- we have another meeting schedule for Thursday. Think about it a little bit, digest it, and then send us an email with a comment or a concern. So lots of different ways to get involve. And I encourage you all to do so.

So with that, thank you all again so, so much for taking time out of your busy, busy evening schedules to join us. And I will now pass the baton over to Matt Varner with our first presentation.

MERCURY CONCENTRATIONS IN THE ENVIRONMENT

MATT VARNER: All right, thanks, Bonnie. I'll share my screen here. Good evening, everybody. My name is Matt Varner. I'm a fish biologist with the BLM. I work in Anchorage out of a state office. And I'm going to talk tonight about a multi-year fish study, fish tissue study that I led that really focused on the concentrations of mercury and other metals in fish species within a section of the Kuskokwim from Aniak to

McGrath.

The presentation is about 30 minutes long, and I'm really -- I'm just going to focus on just kind of broad overview of what we did and some of the key findings. During the presentation, I'm going to talk about mercury in the environment, why we focused on mercury in particular for this multi-year fish tissue study, and the results of the project specifically as it relates to the remediation of Red Devil Mine.

Cinnabar is the primary ore body containing mercury and is common in western Alaska. This slide shows the number of known cinnabar deposits in western Alaska. The Yukon watershed is shown here in tan. The Kuskokwim watershed is shown in an orange color. And that circled area is really focusing in on all the known cinnabar deposits within that region. And based on the density of those deposits, it's really why this area is referred to as the mercury belt of Alaska. So this underlying geology of cinnabar, the mercury, and obviously why we have mining in the region.

The mercury belt concept gives us a useful visualization of mercury deposits, both unmined, those natural sources, and unmined. And they're highlighted here in these first two bullets. In respect to permafrost, most folks don't realize that permafrost contains a substantial amount of mercury. And as that permafrost melts, mercury is released in the environment. So that's a third source to highlight.

This fourth bullet here identifies atmospheric deposition. And that's really an understanding that mercury gets in the atmosphere from manufacturing, emissions, or coal-fired power plants, wildfires, etcetera, and that that's carried away from the source and deposited elsewhere in the globe, including Alaska.

This slide is meant to illustrate how mercury moves and accumulates in the aquatic food web, especially at the highest levels within top predictors like Pike. We focus specifically on methylmercury because it's the most toxic form of mercury to humans. Methylmercury is created naturally through interactions of mercury in the water and sediments, specifically through interactions with a sulfate-reducing bacterium that's found in swampy areas, slews, and wetlands, which obviously are very common within the Kuskokwim region. Once methylmercury is available, it's easily taken up by things like algae, which is one of the first links in the aquatic food chain. Aquatic insects then consume that material, and they are eaten by higher-level predators like small fish, and that begins this accumulation of mercury up the food web. The concentrations are greatest at the top of the food web, and that's reflected by these little yellow dots as you move from left to right. Because mercury isn't easily shed, it accumulates as you move up the food chain. And that's why we see some of the highest levels of mercury in long-lived predatory fish like Pike and Burbot, which are also important subsistence foods.

The goal of this study was to build upon work that had been completed by Fish and Wildlife Service in the Lower Kuskokwim and the limited sampling that was done by USGS in the region. And both of those studies noted elevated concentrations of mercury, especially in areas downstream of areas that had been mined in the past. Unlike other contaminants studies, however, we focused on multiple levels of the food web. And we integrated fish tracking so we could better understand seasonal habitat use and fish proximity to potential mercury sources within this 270-mile portion of the Kuskokwim.

So, Lesli, I think is a good place to stop before I jump into some of the specific details.

LESLI ELLIS-WOUTERS: So if anybody out there has a question, you can ask it now either in the Q & A block or you can verbally ask a question by raising your hand. And that should be a little hand icon at the bottom of your screen. We’ve only got three of you, and I know one of you has already been through previous presentations, so give it a few minutes.

And I don’t see any hands raised or any questions, so I guess we’ll just keep rolling, Matt.

MATT VARNER: Okay, very good. I’m going to highlight some key conclusions, and then I’ll go into some of the details behind these key conclusions over the next several slides.

Basically, the results of this study indicated that aquatic life, both insects and fish, within Red Devil Creek had much higher mercury levels than most other creeks in the region, except possibly Cinnabar Creek, which is in the headwaters of the Holitna River. However, when we sampled Pike throughout the region, we found some of the lowest concentrations of mercury in the Kuskokwim near the Red Devil Mine. By integrating tracking, we were also able to find a pattern associated with some of those concentrations.

Burbot had relatively low concentrations of mercury compared to Pike within the Kuskokwim. But unlike Pike, there really wasn’t -- we really couldn’t discern a pattern using the tracking like we could with Pike.

So over the next dozen or so slides, I’m going to focus in on what we sampled in terms of tributaries, small fish, and really hammer in on Pike a little bit, because we do have quite a bit of information related to the tracking that helps paint a picture of what we think might be contributing most to mercury concentrations within that particular species in the Kuskokwim.

This slide illustrates the project area that we focused on. It was essentially Aniak to McGrath, and it included many tributaries, small and large. And we sampled them between 2010 and 2014.

One of our first efforts was to sample small streams. And when I say small streams, I mean wadable streams. And most of the streams had limited fish presence with fish generally only being found within the first 100 or so feet of the stream's confluence with a larger river like the Kuskokwim.

The most fish that we found was Slimy Sculpin, which is a small fish. It's usually less than three or four inches long, and it doesn't move very far within a small stream over the course of its whole lifetime. A pretty common fish throughout Alaska. Many of the small streams, when we initially sampled them, we assumed to be fishless. However, like I mentioned previously, we did find fish in about every sampled stream that we encountered, including Red Devil Creek. And so through this sampling, we were able to collect insects as well as many small fish, juvenile fish, and adults within the lower sections of these tributaries. And for the most part, it was, like I said, Sculpin, but we also found Grayling and Dolly Varden.

This map shows the location of eight of those small streams that we sampled. And we focused really in on the

Middle Kuskokwim bracketing around Red Devil Creek. We also sample one stream, it's a little bit out of the way, in the headwaters of the Holitna. And this particular stream, known as Cinnabar Creek, was included because it had been sampled in the past by USGS, and they had found elevated levels of mercury in fish. And part of the reason why they chose to sample it is because Cinnabar Creek had a small mercury mining operation on it in the past, and so they had reason to believe that there may have been a proximity to some source material there that could get in fish. And they, indeed, did find mercury in fish, as did we. And so I'll get to the results here right now.

So what you see here on this slide is total mercury concentrations in whole body samples for Slimy Sculpin, which again is that small fish. It kind of looks like a frog with fins, that's really the easiest way to describe it, a few inches long. And that's that top graph here that you see. And right off the bat, I think you notice that samples from Red Devil Creek in 2010 and 2011 had much higher total mercury concentrations than Slimy Sculpin from most other streams, with an exception probably being Cinnabar Creek, which also had elevated concentrations.

The graph below shows concentrations from composite samples of aquatic insects from these same streams. These are all small streams that are all wadable. And again, you see elevated concentrations in Red Devil Creek as well as in

Cinnabar Creek, but you also see some degree of mercury concentrations within all of the streams that we sampled, which certainly isn't a surprise given the geology of the region.

This next slide shows similar results, but for two other species of fish, Dolly Varden and Arctic Grayling. Here what you see on the top graph are results for Dolly Varden. Again, a very similar pattern, elevated concentrations within Red Devil Creek, slightly elevated concentrations within Cinnabar Creek, and then some degree of mercury being found across all of the streams that we sampled. Grayling is at the Y access on the graph as a slightly different scale. These concentrations for Grayling are much lower than what you see above for Dolly Varden, with the highest concentrations here being very low in general. So this really isn't a surprise. Arctic Grayling feed on insects. They don't eat other fish, unlike Dolly Varden, so you wouldn't expect to see concentrations very high within Grayling. But again, I think the important point here is that we did see mercury in all of the fish that we sampled from every stream with elevated concentrations in Cinnabar Creek and Red Devil Creek.

Lesli, this is another good spot to stop because the next several slides are going to focus on the large river sampling effort.

LESLI ELLIS-WOUTERS: Okay. Again, if we've got anybody that has questions, feel free to raise your hand or you can type them in the Q & A box at any time. I'm not seeing any hands getting raised. Still only three attendees right now, so I guess we'll just continue to march on. Feel free to raise your hand at any time and I'll know that you have a question, and we'll get to it. So thanks, Matt.

MATT VARNER: Very good. So I have about seven more slides left. And just to kind of preface jumping into those slides, I just wanted to highlight that what we found in small streams, again, was not surprising given the geology of the region. But one of the key questions that we had was how does Red Devil Creek influence the larger aquatic environment of the Kuskokwim? And to explore that question, we sampled predatory fish like Pike and Burbot. And that, in and of itself, wouldn't have been that insightful, but the integration of radiotelemetry into the project really provided quite a bit of understanding in terms of concentrations within fish tissue and where these fish were spending their time seasonally. And I'm going to dig into that.

In 2013, we tagged hundreds of fish. We tagged over 150

Burbot, almost 250 Pike, and close to 200 Grayling. The Burbot and Pike tags, because of the size of those fish and obviously the size of the tags, those tags lasted a little bit longer than the Grayling tags, but nonetheless, we were able to get one to two years out of all of these tags and did flights about every three or four months to understand where these fish were spending their time. For the analysis, we divided the region slightly differently than what you see for the small tributaries, but this was largely done to understand movement patterns of these fish, which can be fairly migratory. Both Burbot and Pike are known to be fairly migratory fish depending on the habitats that they're in (audio problems) or these particular species of fish were moving. So we broke the study area based on large (audio problems). Primarily, we were most interested in the residency of Pike and Burbot within the Kuskokwim in that (audio problems) how much do these species -- how much time do they spend within that particular area compared to the others.

And this chart shows total mercury concentrations specifically for Pike. And what you see here are the different sections of the study area and the concentrations of total mercury for Pike within those areas. And I want to focus your attention on these yellow bars. And these represent the areas where we saw the highest total mercury concentrations within Pike. And you'll see the George, the Holitna, and the Takotna.

The section of the river with (audio problems) George section. You can see it had some of the lowest average concentrations of total mercury in Pike within the entire study area. So this was significant, because what we found was that the Pike that we tagged in the George, Holitna, and Takotna, 90 percent of them stayed within those areas that they were captured. So we tagged them in the summer. And during the summer tracking, the fall tracking, the winter tracking, and the subsequent spring tracking, 90 percent of those fish were still in these watersheds over the course of two years. And so what that meant to us was that the tissue concentrations that we saw in terms of mercury correlated with these watersheds, not with the Red Devil Mine. In general, we found very few Pike captured within the mainstem Kuskokwim. And you'll see that reflected here. It shows the sample sizes of the Kuskokwim and the George. Even though we put forth the same effort to collect fish within all of these sections, our ability to capture Pike within the Kuskokwim above the George River and above Sleetmute was very low. And that's really because Pike, in particular, are visual predators. They prefer slow-moving, clear water slews and slack water areas, and the Kuskokwim really doesn't provide those habitats, at least not on that section of the river.

Again, these are the watersheds here where we found the highest average mercury concentrations, the George, downstream of Red Devil Mine; the Holitna, upstream of Red Devil Mine; and the Takotna, which flows into the Kuskokwim at McGrath.

Data from our project were very similar to results from a US Fish and Wildlife Service study on the Lower Kuskokwim and Lower Yukon. The Fish and Wildlife Service found higher concentrations in large Pike within the Lower Kuskokwim and Lower Yukon compared to smaller Pike, which certainly makes sense given that older, larger Pike would naturally have elevated levels compared to younger, smaller Pike. The point being, their overall values for the Lower Kuskokwim match very well with our data for the Middle Kuskokwim, but was certainly much lower than what we found specifically within the George, Holitna, and Takotna. So it certainly isn’t a surprise to see concentrations of mercury in the Lower Yukon, in the Lower Kuskokwim, and Middle Kuskokwim like we see, especially when you reflect back on the map that I showed early on in the presentation of the mercury belt in Alaska.

To wrap up, through this multi-year study, we found elevated levels of mercury in fish and aquatic insects on streams that had a history of mercury mining, such as Red Devil Creek. And although we found elevated concentrations in Red Devil Creek, we didn’t see similar concentrations in the fish community in the Kuskokwim near the mine site. And this is likely due to the very small size of Red Devil Creek compared to the Kuskokwim, so you can think of dilution and how that might contribute to what we found, but also the fact that there's limited quality of habitat for Pike within the mainstem Kuskokwim compared to streams like the -- or rivers like the Holitna, for example, which are clear water and provide lots of off-channel, backwater slews, etcetera.

Based on the tissue samples and telemetry data, it appears that underlying geology within these large tributaries in the Middle Kuskokwim, coupled with year-round habitat for species like Pike, have more of an influence on fish tissue concentrations of mercury.

All of these results are summarized in the report that's shown here, and it's available at the link located at the bottom of this slide here. And, you know, this has been a fairly high-level presentation very much focused on mercury, but there was much more to this study, and it's all included in this Technical Report #61. The link at the very bottom of this slide will take you to Alaska Department of Health and Human Services page, specific to fish consumption in Alaska, including guidance for the Kuskokwim.

Lastly, contact information is shown, as well as the contact information for Dr. Angela Matz who works for Fish and Wildlife Service and is an environmental toxicologist. She assisted me with the development of this study and the analysis, and she's a great resource for questions related to mercury in the aquatic environment. So with that, I'll take any questions that you might have.

LESLI ELLIS-WOUTERS: Yeah. And this presentation is also available on the Red Devil Project website, so you don't have to busily write down those addresses in there. They can access it from the project page, too. So if there are any questions on Matt's presentation, go ahead and hit your raise the hand or type in the Q & A block. And I guess, at this time, we'll go ahead and transition then over to Mike McCrum.

MIKE McCRUM: Thanks, Lesli.

LESLI ELLIS-WOUTERS: No problem. And I apologize, but Mike is not going to be turning his video on because it messes with the presentation, so we're just going to get his presentation and not be able to see your beautiful face, Mike. So with that, I guess you're screen sharing?

MIKE McCRUM: Yep, (indiscernible). Here we go. Can you see it?

LESLI ELLIS-WOUTERS: Yes. You are good to go.

MIKE McCRUM: Okay, thanks, Lesli.

RED DEVIL MINE PLAN PROPOSAL, MIKE McCRUM

MIKE McCRUM: Okay. We're going to talk tonight about Red Devil Mine and the CERCLA project that has been ongoing there for, as Bonnie mentioned, about 10 years. We're at the proposed plan stage, which means we have finished our investigation, and we finished the feasibility study during which we evaluated different cleanup options.

The proposed plan is a primary CERCLA document that's really intended to support seeking public comment, public input, on a cleanup alternative that, based upon the work we've completed already, we feel is preferred. But we can't move forward and make a final decision and develop a record of decision until we get public comment, so that's really what we're about tonight.

To that end, I want to spend some time going through the main results of the investigation. And I'd like to then also summarize some of the work that we did as part of the feasibility study. And then I'll finish up by talking about what our preferred alternative is and why it is preferred.

So this slide here in, you know, just a few words, summarizes an enormous amount of site-specific data collection and analysis. And what we found, not surprisingly, the primary contaminants of concern at this site are mercury and arsenic and antimony. Those three metals are contained within the minerals that are most abundant on this mine site. And mercury was the reason that the mine existed in the first place. There are some other contaminants of concern, but these three are the ones that are of greatest concern. The mine was an underground mine. And they processed the ore that came out of the underground mine onsite. And the remnants of that process, solid material that's been cooked to a fairly high temperature called tailings, are the main focus of our investigation. The tailings were place on the ground once they were finished processing them. They still contained, and still do contain, high concentrations of the three metals that are of greatest concern. And they've been on the ground for, you know, decades at this point, coming into contact with rain and snow and water in the creek, and they've leached those metals into the soil. They've also eroded into Red Devil Creek. And so those media area significantly affected by the presence of the tailings. Groundwater emerges from the bedrock aquifer into the vicinity of the creek where the tailings piles are greatest. And so when that groundwater comes in contact with the tailings, it's impacted as well. And as I mentioned, the tailings have eroded into the creek and they've moved down the creek and out into the Kuskokwim River. We found relatively high concentrations of those metals in the sediment at the bottom of the river, beginning at the mouth of Red Devil Creek and moving downstream.

The basis for the action that we believe needs to be taken at Red Devil Mine is based on two things, two main criteria. The first is the offsite migration of those tailings. And we took some action in 2014 to address that issue. We regraded some tailings piles, and we straightened out the creek, and we put in some walls to kind of prevent the tailings from reaching the creek. We put in a pond downstream to catch anything that would continue to move downstream. And so far, that system seems to be effective, but it's a temporary system. We put it into place so that we could prevent that offsite movement while we get through the process to a site-wide action.

The other criteria, the other basis for action, is a risk assessment that we did as part of the investigation. Back up here for a second. We did two risk assessments, and I'll talk about them in a little bit in more detail later on. But the first risk assessment focused on the mine site itself. And essentially it yielded high estimates of risk for humans and wildlife due to both direct and indirect exposure to those tailings and those metals. And so the offsite migration, coupled with the elevated risk, are really the basis for action.

So I want to elaborate a little bit on some of the work that we did as part of the investigation and what we found. This slide is an aerial photo of the mine site. You can see Red Devil Creek moves through the middle of the mine site right here. The mine site is more or less outlined by these black lines. This is the Kuskokwim River to the right. So you can see the mine occupies most of the lower section of Red Devil Creek. And like I said, even though it was an underground mine, they brought material up through shafts on this side of the creek and initially processed it here. And then that facility burned in the 1940s, I believe. And in the early 1950s, they built a bigger facility on this side of the creek, and so also there's quite a few tailings, quite a large volume of tailings, on the southside of the creek as well. The red dots that you see here are locations where we collected soil samples, both at the surface and in the subsurface, in an effort to try and establish where the tailings were, how they were distributed. The purple circles here indicate that we detected one or, in most cases, all three of the primary contaminants of concern. The size of the circle is proportionally to the concentrations. So if the circle is big, the concentration is high. You can see in this area here and this area here where the tailings are most prevalent, the concentrations are highest. They tend to diminish as you go downstream, because the tailings piles really stop right about here. But that material, through natural processes as well as kind of operation of the mine, tended to move down the valley and ultimately covered the barge landing that they put in here, and as I mentioned before, got out into the river as well.

So a similar view of the mine site. Here's Red Devil Creek. Here's the river. In this case, the red triangles are the locations where we collected surface water samples from Red Devil Creek in sediment. Again, the size of the circle is proportional to the concentration. The concentration trends here are really quite clear. You can see upstream of the mine site, the concentration in the water is really relatively low and similar to further upstream, suggesting that it's a background level. And as soon as the water comes into contact with the tailings in the mine site, the concentrations pop up dramatically, and they stay about the same level until you get down to the mouth of Red Devil Creek and into the river.

This is a little bit different look, but it's still a plan view of the mine site. Here's the river. They're kind of a little bit harder to see, but the river runs right through here. These are all ground surface contours. These are underground workings. Just in case you're curious as to what all these green and yellow lines are, it's a projection of where those tunnels were. And they got quite deep down in this part, down around 600 feet.

What I want to show with this slide are some of the groundwater data that we collected. We began by putting wells in down just around the creek where the tailings were. And later on in the investigation, we expanded that effort up into the higher elevations within the watershed up here. And again, the size of the circle is proportional to the concentration. What we see here is at the higher elevations within the watershed where there really are no tailings that we can discern, you know, the concentrations are pretty low. They're about the level that you would expect to see in groundwater in a bedrock aquifer like this. As you move downstream, they stay relatively low for the most part, except for where the underground workings are. And it's not really the workings themselves that are having this impact, but rather they indicate where natural mineralization still exists in the bedrock. And so what we're seeing in this particular well right here is the results of that natural mineralization affecting the concentrations in the groundwater as it moves down the slope to Red Devil Creek. And then of course in the immediate vicinity of the tailings, you can see the concentrations are considerably higher than they are further upslope. And then as you move back up the slope on this side, you get into lower concentrations as well. So between the soil and the surface water and the groundwater, we have a pretty clear indication that the tailings are having an effect on those media.

As I mentioned, we did a risk assessment on both the river and the mine site at two different times. Looking at the mine site first. This is kind of an oblique view of the mine. This is obviously the river here. This is that barge landing. Red Devil Creek runs right through here. This is well after the mine was closed, and much of it is overgrown, but the tailings piles were essentially right in here. What we found from the risk assessment, we looked at multiple exposure scenarios. What would happen if people were to live there? What would happen if they were to open another mine and people were to work there? What would happen if subsistence hunters simply moved across the mine site and perhaps drank water from the creek? We looked at the toxicity of the contaminants, and we also looked at potential cancer risk. And what we found was relatively high risk for both toxic exposure as well as cancer risk. The majority of the risk that we calculated was due to the presence of arsenic. While mercury did contribute to it, arsenic is really the thing that's most significant with regard to the calculated risk for the site. And those levels of risk for the mine site itself were relatively high.

The second risk assessment that we did focused on the sediment in the river. We know that the material from the mine site has moved into the river. The question was what impact is it having? If you recall from Matt's talk, there are fish in the river. However, those fish don't tend to spend a lot of time in the immediate vicinity of the mine. It really has nothing to do with the mine, per se, and more to do with the fact that this river at this location is deep, it's turbid, it's fast flowing, the habitat is really quite poor for fish, and so they're just not there. So as a result of that, and as a result of some of the other data that we collected dealing with toxicity and, you know, relative to the sediments in the river, the results of that risk assessment indicated that -- kind of the next results.

For cancer risk, we met the EPA standard, but we were above the DEC standard. And the same was true for the toxic risks. We met the EPA standard, but we were above the DEC standard. So unlike the mine, there's a little bit of a gray area here in terms of the results of the risk assessment.

Lesli, this might be a good time to stop and ask for questions.

LESLI ELLIS-WOUTERS: I’m still muted. So there we go. If anybody has any questions, I don’t see any in the question box, feel free to raise a hand. Questions? Comments? I’m not seeing any, Mike, so.

MIKE McCRUM: Okay.

LESLI ELLIS-WOUTERS: Feel free, if you have a question at any time, please feel free to raise your hand and then we can let you ask your question. So with that, go head, Mike.

MIKE McCRUM: Thanks. While I’ve got this slide up, this is a good opportunity to mention that through the entire investigation and feasibility study, and really developing the proposed plan, we worked very closely with both the EPA and the DEC. Not quite so much with the EPA in the last couple of years, but certainly with the DEC. I know Anne Marie is listening in, and she’s put a lot of time in on this project as well. At some point, it would be great if she could step in and relieve me of my presentation. Just kidding. At any rate.

So as I mentioned, we have high levels of risk at the mine site. Not so high levels of risk in the river, but they are there. So we took those results and we turned them into objectives for a cleanup action. Those objectives include, you know, preventing both direct and indirect contact for people to the tailings, as well as the effected media. We want to eliminate the impacts of the tailings on the creek water as well as the groundwater. And we understand that no matter what action we take, we’re going to have to monitor, the water in particular, after we take that action just to verify that the action is effective.

So we finished the investigation, and we’ve done our risk assessment, and we recognize that there’s a basis for action. And we have some feel for the nature of the problem and how widespread it is and what potential receptors are being affected. So in the feasibility study, we looked at a lot of different things. We looked at different ways that we might be able to address that risk. We looked at different technologies. We developed different alternatives. Ultimately, we came up with these four alternatives.

I’ll mention that alternative three, in particular, had multiple options. I'm really only going to talk about one of those options tonight, but we spent a lot of time looking at different ways that we could address the issues that we identified through the investigation.

The first alternative, SW1, is simply a no action alternative. We include that in there because it's part of the process. It's kind of a baseline condition if you will.

The second alternative is a relatively simple one. We would encircle the site with a 12-foot fence. The concept here is preventing humans and wildlife from entering the mine site and coming into contact (audio problems) which is somewhat effective in preventing that direct contact. There are other potential routes of exposure that, you know, a fence just wouldn't really address. So while we evaluated it and we left it in the feasibility study just to kind of provide a range, I don't think that's one that we would probably pursue.

Alternatives three and four are considerably more complex, if you will. They represent a much more complete approach to try to address the risk at all the different media in the site. Three and four are identical in that they both involve extensive evaluation of the soil and the sediment and the tailings, primarily in those areas along Red Devil Creek and along the Kuskokwim River where that material is most prevalent. Where these two alternatives differ is what we do with the material once it's excavated.

On alternative three, that material would be consolidated at a repository on the mine site. And under alternative four, that material would be placed in containers, the containers would be placed on barges and sent to a permitted facility, a permitted waste disposal facility in Oregon.

I've included the cost in this slide. They really do reflect the level of effort. And in the case of alternative four, the pretty considerable extensive disposal costs. Those are not the only criteria we used to select a preferred alternative, but they do kind of differentiate. They help you differentiate between the different alternatives.

This is kind of a graphical view of the areas of the mine site that would be affected by different alternatives. Alternative two, the fence, would essentially encircle everything in blue and yellow and part of this green around the site. This area encompasses about 190 acres. It's been surveyed. So relatively simple approach, but it would involve quite a bit of work in terms of fencing. Alternatives three and four, as I mentioned, involve a lot of the excavation. Most of the material to be excavated is shown in this yellow area. It kind of takes in most of the lower valley of Red Devil Creek, those tailings piles are right here. This is that area that is between the tailings piles and the river. This is that -- what was once called the barge landing. It still is a barge landing, but it has quite a bit of processed material on it. Some of that material has made its way down into the river. Neither of these alternatives involves excavating material from the river, and that's a result of the risk assessment that we did on the river. That sort of gray, if you will, result, not quite so clear that it would need to be excavated. And also removing material from a river like this would create some downstream migration problems. And so we decided not to take that kind of action in the deeper water. There are plans to excavate a small amount of material from the area just along the shore here, and also just below the water level here and here. That's based upon some sample we collected that showed a little bit higher levels of concentrations in the soil there.

Under alternatives three and four, there's a monofill right here. It's basically a small landfill. And this is the location where that processed building was. When the mine was closed, the building was left in place. One of the first things that BLM did 20 years ago was demolish the building. They laid out a large piece of Hypalon, which is a very heavy piece of rubber, over the building foundation. And they placed the building material and all the processing equipment, the kiln and the piping, on top of that piece of rubber. They added some tailings to kind of, you know, make it all smooth. And then they sealed up that Hypalon, and then they covered it with more tailings. It's referred to in the investigation and the feasibility reports as Monofill #2. Under both of those alternatives three and four, that monofill would be deconstructed. The Hypalon, the building materials, and the kiln would be shipped offsite for disposal. And whatever tailings and soil are associated with it would be consolidated with the rest of the tailings and the soil.

Under alternative three, all of that excavated material, including the tailings from the monofill, would be consolidated in a repository. This is kind of a representation of it just to simply illustrate the location that we're looking at. And then if that -- under that alternative, we would do extensive monitoring. And the area to be monitored is kind of covered in this blue. Most of the monitoring would involve groundwater sampling, although we would incorporate sampling in Red Devil Creek in that monitoring program as well.

And then also under both three and four, we would continue to monitor the sediment in the river. We believe that just since we've put some structures in place in Red Devil Creek in 2014 to prevent those tailings from moving into the river, we think we're starting to see small changes in the concentration, and the material, and the sediment, and we expect to see that continue over time.

So focusing a little bit on the repository because it's a little bit more involved than some of the other elements of that alternative. We're looking at somewhere between 205,000 and 210,000 cubic yards of material to be consolidated. The elevation difference between this spot and the river is about 300 feet. One of the reasons why we want to, you know, move it up is to get it out of an area where it comes into contact with water. It's when this material comes into contact with water and leaches those metals, is when you have the potential for environmental impacts. I'm going to talk more in a minute here about that design, but I just wanted to use this slide as an opportunity to show where this repository would be placed relative to the rest of the mine site.

So as I mentioned, the respiratory is a designed feature. There's a number of elements that have gone into it. It's been the subject of considerable discussion. It's also been the subject of considerable analysis. And the reason for that is this repository would be constructed with a very low permeability cap to prevent rain, and snowmelt, and other forms of water from coming into contact with the tailings. And if you're successful at doing that then you really eliminate the greatest potential for these tailings to affect the environment; and through affecting the environment, affecting wildlife and human health.

So I'm going to spend some time talking about the design of this and why it was designed the way it was. This is a cross-sectional view. The final tailings pile to be covered will be about 50 feet high. They'll cover an area of roughly five acres, so it will be a fairly decent size facility. We would construct it such that there would be a minimum separation between the bottom of the facility and the water table of about 10 feet. We think that (audio problems) the first 10 feet minimum.

In the next two slides, I want to talk a little bit about some design features. I want to talk a little bit about how this repository is attached, if you will, or connected to the ground surface here. And then I want to talk a little bit about the cap construction as well, and the process that we went through to establish what we believe would be the effectiveness of this in keeping those tailings dry.

So this is the first of those two circles. You can kind of see the tailings, and the soil, and the sediment here. Soil would be placed over the top of that pile. At the edge of it where the bedrock comes up, we would -- on top of the soil, we would place what's known as a geomembrane fabric. It's kind of a very heavy plastic fabric. It comes in really large rolls, and the seams are sealed so it's very, very effective in preventing water from moving through it. The soil underneath is to protect it so that none of the tailings would poke holes in it. And then we would place soil on top of it as well, again to protect it. And that soil on top, we would plant with grass. So the grass helps stabilize the slope, but it also transpires some of the rain that falls back into the atmosphere, thus helping to keep the entire structure dry.

One of the things that I want to emphasize here is the geomembrane would extend down into a trench that we would excavate on the side of the repository all the way around. And it would be placed down the wall and in the bottom. And then it would be backfilled with gravelly or heavy material. And that's what holds this thing in place and keeps it from moving and helps make sure that it's effective in preventing water from moving into the repository. The slopes would be designed to be about a three-to-one slope. So that does have some slope to it, but it's not super steep. And we want to keep it about that slope for the sake of stability. And then finally, we would excavate trenches around the outside of the repository. There really is not a lot of surface water that flows up in that part of the watershed, but at times like in the spring when the snow is melting, it could happen at a (indiscernible) temporary basis. So we would put those ditches in as a precaution.

This is another cross-sectional view of the repository. It's kind of generic if you will. Again, we've got, you know, the grass and the soil on top of the geomembrane liner, more soil underneath to protect the material that we're most interested in, the tailings here. Underneath, we would have a minimum of five feet of this loess, which is locally derived silty soil, and we would place that over the top of the bedrock, and then consolidate the tailings on top of that. And then as I mentioned, we would construct it such that we would try and maintain a minimum separation of 10 feet to the water table.

As I mentioned before, there was a lot of discussion about this design. And a lot of that discussion focused on whether or not in addition to a top cap, a bottom liner would be needed. One of the things that we did to, you know, evaluate that, we modeled. We simulated water movement through the facility and then into the subsurface. We used two different models to do that. We used a model designed by the EPA called Help to simulate movement of rain and snowmelt through this upper portion and into the tailings and soil and down to the bottom here, at the bottom of the dirt pile. Then from there, down to the water table, we simulated movement of what would then be leachate through that bedrock using a different model that looks at unsaturated flow down to the water table. For that second stage of modeling, we wanted to simulate what leachate would be like. We haven’t constructed the repository, so we don’t really have any data specific to that. But we have done some leaching work as part of the investigation and some leaching analysis. And we have groundwater data from the lower part of the watershed where the groundwater is in direct contact with the tailings. So we looked at all those sources of that information, and we came up with concentrations that are summarized in this little box here. These are really quite high concentrations of these three different contaminants of concern. We wanted to be conservative in that sense here. We didn’t -- we wanted to try and bias the analysis as much as we reasonable could towards the potential for this leachate to affect the groundwater as part of the analysis.

So this table kind of quickly summarizes the results of that leachate modeling that we did. Again, you can see the three contaminants here, the initial concentrations here in milligrams per liter, I showed you from the previous slide. This final column over here are not concentrations, but rather they are depths at which the leachate concentration for each of these three contaminants (audio problems) approaches zero. So by that, what I mean is as the leachate moves from the repository through that dirt layer underneath it and into the bedrock, that water interacts with everything around it and the concentrations tend to diminish. What we found through our simulation is that by the time that leachate reaches three feet below the bottom of the repository, concentrations of the antimony approach zero. The arsenic concentrations tended to approach zero at a much shallower depth, at less than a foot. And then the mercury concentrations approached zero at significantly less than a foot. So given the approach that we took, we used real data, you know, monthly data that collected in the Red Devil area for the rain and the snowmelt. We began our simulation during the construction period. We simulated rainfall and snowmelt into the tailings pile for two years before we added the cap, assuming that it would not be covered until the final stage of construction. And then we continued the simulation for another 48 years with the cap on. Obviously, less water moving into the pile at that point. And these depths of penetration represent the maximum depth of penetration after a 50-year simulation period. And then we have these DEC drinking water standards that we used as a basis of comparison. Not that we would necessarily -- leachate would be going into drinking water, per se, but we thought that this would be a good set of standards to use.

So based upon that analysis, we feel like the cap would be effective in protecting (audio problems) migrating into places where we would not want it to go.

So based upon that analysis and some of the other work that we did, alternative three is the preferred cleanup alternative. This is kind of a mock-up of what you saw before in terms of the different alternatives, but these are all areas that are incorporated into alternative three.

And these are some of the objectives that we setup for our cleanup. And I just want to run through them real quick and identify how alternative three meets those objectives. So by excavating a large volume of material from the bottom of the valley right around the Red Devil Creek and these tailings piles, we would certainly eliminate the direct and indirect human contact to those tailings. The tailings are affecting the groundwater in the shallow portion of the watershed as it emerges near Red Devil Creek. And so excavating them would also eliminate that tailings impact on the groundwater, and it would also eliminate the affect that it's having on Red Devil Creek, both the sediments and the water.

As I described, the analysis that we did, we believe that by moving that material and consolidating it in a facility, you know, very high above the river, at a relatively dry location, and the cap we believe would be effective in preventing it from coming into contact with water, thus it would protect groundwater quality in the area. And as I mentioned before, we would have to monitor this area to demonstrate that it is effective in protecting.

And then through the risk assessment that we did on the river, we identified some small areas that are nearshore that would present some risks to people if they were fishing or moving along the river, and so we would eliminate that risk due to direct and indirect contact by excavating it.

And then finally, as I mentioned before, we think that the (audio problems) early excavating that material from the area around Red Devil Creek would be even more effective. And so we would cutoff that supply of high concentration material, if you will, to the river. And we believe that just through the normal action of the river over time, those sediment concentrations would continue to diminish and approach some kind of a background level.

So that’s the preferred alternative and the work that we’ve done to get ourselves to this place. As we mentioned before, this is a presentation that we’re doing to make sure that people understand what it is that we think needs to be done at the Red Devil Mine site to address the risk that we’ve identified. We think that it’s effective, but we need to get comments from people to make sure that you understand what we’re trying to do, and we get your thoughts on whether or not the approach you think will work. So we would very much like you to comment. There’s various different ways you can comment, and we talked about some of those things. If, after this meeting, you have a thought that you didn’t have at the time, you can simply go to the Red Devil Mine website. The link is right there. You can email us. You can write us. The comments are what we’re actually looking for. So having said that, are there any questions?

LESLI ELLIS-WOUTERS: Okay. I guess that wraps up both presentations. Are there any questions on any of the material that’s been presented so far? Feel free to raise your hand, type it in the Q & A box. Okay. I’m not seeing any hands raised. This is the portion where we would turn it over to public testimony. I would just say if there’s any comments that you have, any questions, concerns, please feel free to raise your hand, and I can unmute your phone if you want to provide any kind of comment.

PUBLIC COMMENTS

LESLI ELLIS-WOUTERS: I guess I don’t see any hands raised. I’m going to assume that there’s nobody providing public comment tonight. There’s been no questions in the Q & A block. Bonnie, I’ll leave it up to you if you want to leave it open for a little while or --

BONNIE MILLION: No, I think maybe we’re good. Thank you all so much again for joining us here tonight and for taking time out of your evening schedule. I know that can be tough, so we really, really appreciate you all joining us. And thank you so much. We’ve got one more meeting that’s going to be Thursday afternoon, I believe starting at 1:00, Lesli?

LESLI ELLIS-WOUTERS: Yes, 1:00 o'clock.

BONNIE MILLION: Great, 1:00 o'clock on Thursday. And then of course we are available to setup additional meetings if the remaining time doesn't work. If you know folks out in the communities who might be interested, we've been reaching out and making phone calls, but if you hear anything through the grapevine, please feel free to pass on that offer. And thank you so much to the three of you for joining us tonight. Anne Marie, it was good to see you again virtually. And I hope you all are doing well. Take care.

LESLI ELLIS-WOUTERS: Thank you. And with that, I'm going to end this meeting. Have a good night.

(The meeting adjourned at 7:10 p.m.)

TRANSCRIBER'S CERTIFICATE

I, Gloria Schein, certify that the foregoing pages numbered 2 through 43 are a true, accurate and completed transcript of the proceedings in the October 27, 2020, Bureau of Land Management Red Devil Mine Remediation Proposed Plan, transcribed by me from a copy of the electronic sound recording to the best of my knowledge and ability.

_____________________ _________________________________

Date Gloria Schein, Transcriptionist