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"Technical Support for Grassroots Public Interest Groups"

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Attn. Matthew Reece
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RE: Scoping comments for the Greens Creek Mine North Extension Project SEIS

Background

In reviewing the information provided on the proposed tailings disposal facility North Extension Project, I also reviewed the financial surety calculations in the June 2020 General Plan of Operations. I have provided comments below on both below.

Scoping Comments

1. Need to evaluate the potential need for further TSF expansion for both the proposed and alternative TSF locations.

It might make more sense to not to expand the existing TSF into the Cannery Creek drainage if another TSF will be required to accommodate future mining requirements. Providing adequate expansion capability for future mining waste disposal needs for the foreseeable life of the mine must be carefully analyzed.

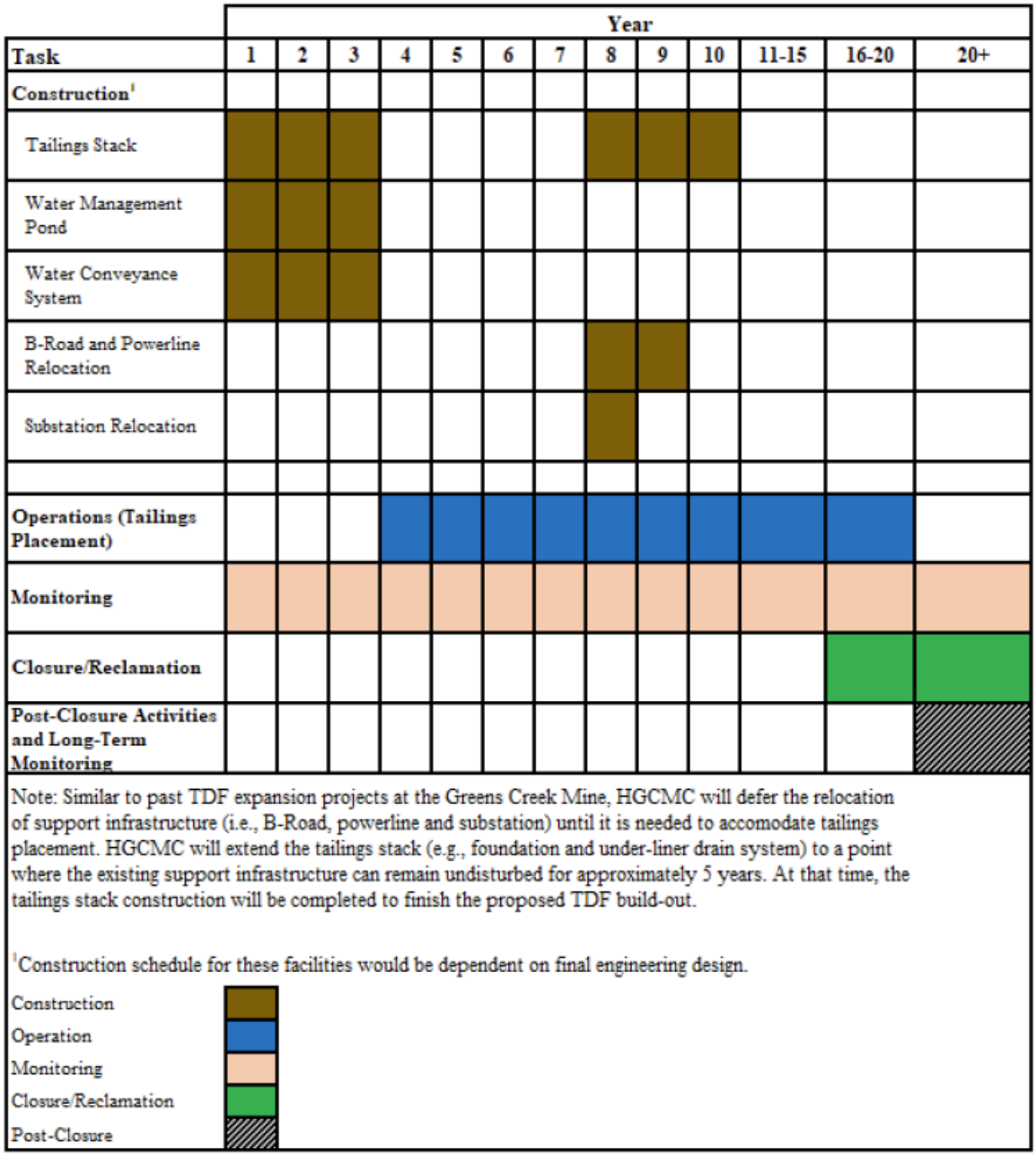
The TSF currently contains approximately 5.25 million cubic yards of material, with a remaining capacity of approximately 3.2 million cubic yards (HGCMC 2020b). Remaining existing TSF capacity is approximately enough to accommodate the existing identified ore reserves,[1] but would involve additional disturbance to the upper Cannery Creek drainage.

There are no monitoring wells north of the tailings impoundment. There are two freshwater monitoring sites on Cannery Creek. Site 37 is a background monitoring site about 50 meters above the B-road disturbance, and Site 1923 is downstream of the B-Road. It is not clear if Site 1923 would pick up seepage from the tailings impoundment. In addition, there is no monitoring data reported in the 2019 Annual Reports for either Site 1923 or Site 37, so the water quality there has not been disclosed.

TSF expansion must not only accommodate any new ore reserves that are identified by ongoing exploration, but must also accommodate most of the existing and future waste rock from the mine.

[1] In 2019 HGCMC placed 421,000 tons (238,000 cubic yards) of tailings in the TSF, and 379,000 tons of tailings were placed underground (HGCMC 2020b). Ore production rate is approximately 858,000 tons/year (485,000 cubic yards/year) (HGCMC 2020d). Using 2019 production data, the ratio of tailings to the TSF to total tailings produced is approximately 50%. As of December 31, 2019, Hecla estimates that it has proven and probable ore reserves of 10.721 million tons at Greens Creek (https://www.hecla-mining.com/greens-creek/). If approximately 50% of this reserve is to go to the TSF, then the amount of tailings storage required to accommodate existing reserves is 5.4 million tons (3 million cubic yards).

Figure 3-8, Conceptual Project Schedule



HGCMC acknowledges in its 2020 Amendment to the General Plan of Operations North Extension Project that its operational needs for tailings disposal may extend beyond the remaining capacity in the existing TSF, even with the proposed expansion. In Figure 3-8 above (HGCMC 2020d), tailings disposal requirements for Operations (Tailings Placement) for years 16-20 cannot be met by the proposed expansion.

Greens Creek needs ~ 0.5 million cubic yards/year of TSF storage for tailings and waste rock (485,000 yd^3 tailings and 61,000 yd^3 waste rock). Putting existing waste rock into the TSF will require ~2 million yd^3, so the proposed expansion of an additional 4 to 5 million cubic yards of tailings and waste rock

(HGCMC 2020d) would provide approximately 4-6 years of additional operation beyond existing reserves.

The following is a list of dumps: Site 23 – 1,160,000 yd^3 (HGCMC 2020b), Site 1350 – 9,140 yd^3, Site C – 50,000 yd^3, and Site E – 148,000 yd^3 (HGCMC 2020a). Present waste rock placement in Site 23 is approximately 61,000 cubic yards per year (HGCMC 2020b). In addition to the space required related to new ore reserves, existing waste rock, plus the waste rock produced for the next 11 years (671,000yd^3) must be accommodated. Total known waste rock requirements for the TSF will be over 2 million cubic yards.[2]

It is not clear why HGCMC is asking for an expansion now, 11 years before existing capacity will be exhausted (HGCMC 2020d), when it will only give them 4-6 years of additional capacity. It would seem that an expansion request would be more predictable 5 years or so from now, when future expansion needs are better understood.

2. Need to include an updated financial assurance calculation.

According ADNR's 2020 approval of the Greens Creek Reclamation Plan and Financial Assurance, "*The total financial assurance amount of $92,176,539 has been approved for the Hecla Greens Creek Mine. This amount has been adjusted annually to account for inflation based on the Anchorage CPI*" (ADNR 2020). In this same letter ADNR indicates this financial assurance amount will be in effect from February 20, 2020, for a period of 5 years, ending on February 20, 2025.

I would like to emphasize that it is important to not only have as many checks on the financial assurance calculation as possible, but how easy it is for the public to face financial risk even when all government and company efforts are being done in good faith.

In order to understand how the Greens Creek financial assurance amount was calculated, I reproduced both the spreadsheet HGCMC used in its 2020 Reclamation Plan to calculate the total reclamation and water treatment costs over time, as well as a spreadsheet to calculate the net present value and inflation-adjusted value of the financial assurance.

The HGCMC's Closure Cost Estimate User 20 table, on the following page, is part of the financial assurance calculation from the 2020 Reclamation Plan (HGCMC 2020c). In this table, HGCMC summarizes the calculated inflation-adjusted value of the financial assurance for both reclamation and long-term water treatment. These calculations are calculated from the Nevada Standard Reclamation Cost Estimator (SRCE) model. I have been able to reproduce the HGCMC value for the SCRE Costs of $192 million, and the subsequent inflation-proofed Reclamation and Water Treatment NPV Total values for years 1-5.

However, I believe there is a significant error in HGCMC's calculation of the value for "Water Treatment 5-200" in the Cost Closure Estimate User 20 shown on the next page (from HGCMC 2020c).

HGCMC's net present value of Water Treatment is $13,775,562. Using a Real Rate of Return of 2.69%, the difference between the 3.97% Rate of Return, and Inflation Rate of 1.28% used by HGCMC in its SCRE cost analysis, the NPV cost for water treatment for the 200-year period used by HGCMC, is $20.9 million, not $13.8 million.

I can reproduce the $13.8 million figure over 200-years by using a Rate of Return of 3.97%, instead of the Real Rate of Return of 2.69%.

[2] Site 23 (1,160,000 yd^3) + Site 1350 (9,140 yd^3) + Site C (50,000 yd^3) + Site E (148,000 yd^3) + 11-years production (671,000 yd^3) = 2,038,140 yd^3.

Closure Cost Estimate
User 20

Project Name: Reclamation Plan Update 2019 - Reclamation Plan
Date of Submittal: April 2019
File Name: 20191120 HGCMC SRCE Model V1.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: 2019 SRCE Cost Data File Version 7.xlsm
Cost Estimate Type: Surety Cost Basis: Greens Creek 2019 - November

User Sheet 20 - Fiancial Responsibility

SRCE Model Cost Summary $127,447,590

ROR		3.97%		
Inflation		1.28%		
Calander Year			**2020**	**2021**
Reclamation year			0	1
SRCE Costs	$	192,430,904	$ 7,076,031	$ 23,717,686
Reclamtation (years 1-4)				
NPV Total	$	72,721,614		
1 year of inflation	$	73,652,451		
2 year of inflation	$	74,595,202		
3 year of inflation	$	75,550,021		
4 year of inflation	$	76,517,061		
5 year of inflation	$	77,496,480		
Water Treatment (5-200)				
NPV Total	$	13,775,562		
1 year of inflation	$	13,951,889		
2 year of inflation	$	14,130,474		
3 year of inflation	$	14,311,344		
4 year of inflation	$	14,494,529		
5 year of inflation	$	14,680,059		
Grand NPV Total	**$**	**86,497,177**	Some of cells C30 and C22	
Inflation Adjusted Total	**$**	**92,176,539**	Some of cells C35 and C27	
Investment Growth				
Invested in year 2	$	13,775,562		
1 year of growth	$	14,322,452		
2 years of growth	$	14,891,053		
3 years of growth	$	15,482,228		

$13.8 million, using the HGCMC total cost spreadsheet, would be exhausted after 50-years of mine closure, leaving water treatment unfunded beyond 2070.

If the NPV calculation is terminated at 200-years, there is still an additional $155,372 that would be required to fund water treatment "in perpetuity" according my NPV calculation. While this $155,372 may initially seem to be inconsequential in comparison to the total amount of the bond calculated for 200-years, $93,610,344, it takes this amount invested for 200-years to provide funding for water treatment from year 200 to "perpetuity". This means that even if the NPV calculation assumptions are all correct, then money to pay for long-term water treatment will run out in 2219. The taxpayer then must pay for water treatment from 2220 onward. This shows the power, and consequence, of underestimating long-term treatment costs.

I believe using the Interest Rate instead of the Real Rate of Return was an honest mistake. But, it also means that neither the ADNR or USFS checked HGCMC's calculations. Quite frankly, that is a problem.

I also want to point out that there is no information available in the 2020 Reclamation Plan to verify that the assumed replacement cost for the water treatment plant is reasonable. This is major ongoing cost, and the assumptions used to develop this cost need to be explained.

The ADNR used the exact value calculated by HGCMC of $92,176,639 as the inflation-adjusted value for the 2020-2025 financial assurance. The inflation-adjusted financial assurances for the 200-year and "perpetuity" (600-year) calculations are shown in the tables below. Using all of HGCMC's assumptions and spreadsheet values, I estimate the true inflation-adjusted financial assurance should be $99,922,327, as summarized in the 600-year Financial Assurance table.

Net Present Value of Financial Assurance	
Cost Calculation Period	**Present Value***
100 Years	$91,556,726
200 Years	$93,610,344
300 Years	$93,758,779
400 Years	$93,765,230
500 Years	$93,765,684
600 Years	$93,765,716
Inflation = 1.28%	
Rate of Return = 3.97%	
Real Rate of Return = 2.69%	
*Results do not calculate PV for years 1-4	

5-Year Inflation-Proofed 200-year Financial Assurance	
Year	Reclamation FA
2020	$93,610,344
2021	$94,808,557
2022	$96,022,106
2023	$97,251,189
2024	$98,496,005
2025	$99,756,753
Inflation = 1.28%	

5-Year Inflation-Proofed 600-year Financial Assurance	
Year	Reclamation FA
2020	$93,765,716
2021	$94,965,917
2022	$96,181,481
2023	$97,412,604
2024	$98,659,485
2025	$99,922,327
Inflation = 1.28%	

The use of a pre-determined period of time, for example 200-years, to make a present value calculation is totally arbitrary. The actual determining factor is the period of time when no significant value is added to the present value. The Net Present Value calculation actually adds an additional $1 in year-600 to pay for the water treatment plant replacement in that year. So by adding 400-years on to the calculations we can get to a mathematically defensible "no additional value" point for the present value calculation. It very simple and easy to run the calculation to a point where no additional value is added. It involves only a matter of copying and pasting columns in an Excel spreadsheet. It is thorough – no guestimates.

The difference between the ADNR/USFS required inflation-adjusted financial assurance of $92.2 million, and the inflation-adjusted financial assurance calculated in the tables above is $7.7 million. That is the nominally the amount of the public liability for the financial assurance.

But, the real liability is much worse. Undervaluing a financial assurance means that it will be depleted before the water treatment operation is ceased. That means that at some point future generations will be responsible for paying those costs, at then present-day prices.

Assuming a $7.7 million deficit, only an 8% underestimation of the $92.2 million now required, means the financial surety will run out in year-50, instead of lasting until year-200, or in perpetuity (which is the theoretical endpoint). In this case, centuries of water treatment would either be forgone, or the then-public would need to pick up the tab. In today's costs, we are leaving a $1.3 million/year liability to a future generation.

The reason underfunding causes the financial assurance to be depleted so quickly is that beyond a hundred years or so each additional year adds only a relatively small amount to the present value compared to the cost requirements of early years. As an example, if the inflation-adjusted present day financial assurance is $100 low, the last century of the anticipated treatment goes unfunded. Adding the additional cost from each year of a present value calculation is a necessary and critical addition. Estimating high is safe and not very costly, estimating low could be very costly to future generations.

Underestimating a financial assurance has real consequences. It is only that those consequences will become apparent long after everyone associated with establishing the financial assurance is gone.

As a part of the EIS, the USFS must explain and document the reasons and calculations that justify a financial assurance amount. Both Alaska and US taxpayers are liable, should the financial assurance be underfunded.

In addition, in the 2014 Reclamation Plan the relocation of waste rock to the TSF was not anticipated, or included in the financial assurance estimate. The 2018 Environmental Audit includes a discussion of moving onsite topsoil for reclamation a distance of 1.4 miles, at a cost of $\$22/yd^3$ (HDR 2019), but the 2020 Reclamation Plan uses a cost of $\$8.58/yd^3$ to move Site 23 material to the TSF (HGCMC 2020c). Why does this significant disparity in cost estimates exist?

The distance between Site 23 and the TSF is over 6 miles, so a discussion of this disparity in moving costs is warranted. If the cost of moving waste rock 6+ miles is similar, and possibly more expensive than the cost of moving topsoil 1.4 miles, the cost of relocating 1.5 million cubic yards of waste rock would be over $30 million. Since this is a large cost item in the reclamation calculation, it should be carefully characterized and calculated for the EIS.

Thank you for the opportunity to comment on this Draft EIS.

Sincerely;

David M. Chambers, Ph.D., P.Geop

References

ADNR 2020. Hecla Greens Creek Mine Reclamation Plan Approval, No. J20202682RPA, Department of Natural Resources, Division of Mining, Land and Water, February 20, 2020

HDR 2019. Greens Creek Mine Environmental Audit, HDR, for Hecla Greens Creek Mining Company, January 2019

HGCMC 2020a. Inactive Production Rock Sites and Quarries 2019 Annual Report, Hecla Greens Creek Mining Company April 28, 2020

HGCMC 2020b. Active Tailings and Production Rock Site 2019 Annual Report, Hecla Greens Creek Mining Company April 29, 2019

HGCMC 2020c. General Plan of Operations Greens Creek Mine, Hecla Greens Creek Mining Company, June 2020

HGCMC 2020d. Amendment to the General Plan of Operations North Extension Project, Tailings Disposal Facility, Greens Creek Mine, Hecla Greens Creek Mining Company, October 13, 2020