Technical Report Summary on the Lucky Friday Mine, Idaho, USA
S-K 1300 Report

Hecla Mining Company

SLR Project No: 101.00632.00022

February 21, 2022

SLR

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1.0 EXECUTIVE SUMMARY

1.1 Summary

SLR International Corporation (SLR) was retained by Hecla Mining Company (Hecla) to prepare an independent Technical Report Summary (TRS) on the Lucky Friday Mine (Lucky Friday or the Property), located in Shoshone County, Idaho, USA. Hecla owns and operates 100% of the Property via ownership through two of its 100% owned subsidiaries.

The purpose of this TRS is to disclose the results of the Mineral Resource and Mineral Reserve estimates for the Property with an effective date of December 31, 2021.

Hecla is listed on the New York Stock Exchange (NYSE) and currently reports Mineral Reserves of lead, zinc, silver, and gold in United States Securities and Exchange Commission (SEC) filings. This TRS conforms to SEC's Modernized Property Disclosure Requirements for Mining Registrants as described in Subpart 229.1300 of Regulation S-K, Disclosure by Registrants Engaged in Mining Operations (S-K 1300) and Item 601 (b)(96) Technical Report Summary. SLR visited the Property on October 5 and 6, 2021.

The Property includes the Lucky Friday mine and processing plant (or mill) in the city of Mullan, Idaho. The mine is a deep underground silver, lead, and zinc mine that produces silver and zinc concentrates from ore-bearing fissure veins. The plant is a concentrator facility producing silver and zinc concentrates that has a current operating rate of 1,000 short tons per day (stpd).

The Property commenced operations in 1942 and observed its 75th anniversary in 2017. In 2021, the underground operation mined 315,000 tons of ore and produced 32,000 tons of silver concentrates and 14,000 tons of zinc concentrates. The concentrates were transported 209 miles (mi) to the Teck Metals Ltd. (Teck) lead/zinc smelter in Trail, British Columbia, Canada in highway trucks operated by a contract shipper. This 2021 production profile amounted to 3.6 million ounces (Moz) of silver, 23,100 tons of lead, and 10,000 tons of zinc produced.

1.1.1 Conclusions

SLR offers the following conclusions by area.

1.1.1.1 Geology and Mineral Resources

- As prepared by Hecla and reviewed and accepted by SLR, the Lucky Friday Measured and Indicated Mineral Resources are estimated to total approximately 10.50 million tons (Mst) at an average grade of approximately 7.6 oz/ton Ag, 4.9% Pb, and 2.5% Zn. Inferred Mineral Resources are estimated at approximately 5.38 Mst at an average grade of approximately 7.8 oz/ton Ag, 5.8% Pb, and 2.4% Zn. All Mineral Resources are effective as of December 31, 2021 and are stated exclusive of Mineral Reserves.
- The drilling, core handling, logging, and sampling at Lucky Friday is being conducted according to common industry practice, in a manner appropriate for the deposit type and mineralization style.
- The chip sampling practices at the site are reasonable, appropriate for the mineralization style, and consistent with common industry practice.
- Bulk density estimates are conducted in a reasonable fashion, using an appropriate method.

- Samples are handled and transported securely and only in the custody of Hecla employees or bonded carriers.
- The assay quality assurance and quality control (QA/QC) protocols in place at Lucky Friday are rigorous, and the results to date are satisfactory.
- The sampling is done such that the samples are representative of the mineralized bodies. There are no concerns apparent with the assay results and they are suitable for use in a Mineral Resource estimate.
- The databases are managed in a secure environment, using conventional off-the-shelf software packages that are up-to-date and appropriate for the tasks to which they are applied. The staff are competent, well-trained, and experienced and they have been provided with clear and reasonable protocols to follow.
- The database on which resource estimation is based is properly configured and maintained and is appropriate for use in estimation of Mineral Resources and Mineral Reserves.
- The wireframe models for the veins are reasonable and representative of the host structures. Minor inconsistencies exist but are not considered to be a serious concern, and will be resolved with additional work.
- The sample grade distributions for silver, lead, and zinc are observed to be positively skewed which could result in biases in the block interpolations unless corrective measures are taken. Capping is currently being employed at Lucky Friday and this is viewed as appropriate.
- There is evidence of sub-populations within the grade distributions for several veins. Additional work may be warranted to identify and isolate these sub-populations if possible.
- Compositing of the samples is carried out in a reasonable fashion.
- The block model is configured appropriately and constructed with off-the-shelf software that is commonly used in the industry.
- The grade interpolations were conducted in a reasonable manner consistent with common practice using an appropriate estimation algorithm commonly used within the industry.
- The Mineral Resources are classified according to the Committee for Mineral Reserves International Reporting Standards (CRIRSCO) definitions and, as such, are consistent with the requirements of S-K 1300.
- The method used to apply the classification is broadly consistent with common industry practice, although the resulting categorizations appear somewhat aggressive for Measured.
- The net smelter return (NSR) cut-off value is a reasonable approach which has been applied in an appropriate manner.
- The validation methods used at Lucky Friday are appropriate, although they represent a fairly minimum standard of review.
- The stope optimization and reporting procedures are generally reasonable.
- The Mineral Resource estimate for Lucky Friday has been carried out in a reasonable fashion, consistent with conventional, although somewhat dated, industry practice.

1.1.1.2 Mining and Mineral Reserves

- Mineral Reserve estimates, as prepared by Hecla and reviewed and accepted by SLR, have been classified in accordance with the definitions for Mineral Reserves in S-K 1300. Mineral Reserves as of December 31, 2021 total 5.46 Mst grading 13.7 oz/ton Ag, 8.3% Pb, and 3.3% Zn and containing 74.7 Moz of silver, 452,000 tons of lead and 181,000 tons of zinc at an NSR cut-off value of US$208/ton.

- Measured and Indicated Mineral Resources were converted to Proven and Probable Mineral Reserves, respectively, through the application of modifying factors. Inferred Mineral Resources were not converted to Mineral Reserves.
- The Mineral Reserves are all located within the Gold Hunter deposit in seven separate veins. The 30 Vein is the most significant with 68% of the Mineral Reserve tonnage and 70% of the contained silver.
- Mineral Reserves are estimated by qualified professionals using modern mine planning software in a manner consistent with industry practice.
- Lucky Friday is an old, well established mine with many years of operating experience, providing the necessary expertise to safely and economically extract the Mineral Reserves.
- Mining at Lucky Friday utilizes mechanized underhand cut and fill, and underhand closed benching (UCB) with cemented paste backfill. In this method, the mining progresses downwards in a stope, occurring beneath the cemented paste backfill of the preceding lift. The mining methods used are appropriate to the deposit style, depth and geotechnical conditions and employ a range of modern mining equipment;
- The mine developed the UCB method for bulk mining of the 30 Vein. This method is designed to improve safety through the management of seismic events and to increase productivity. The UCB method is a bulk mining method which utilizes 27 ft deep blastholes with ore mucked in 11.5 ft benches.
- The current Mineral Reserve estimate is based on the use of UCB mining for the majority of the deposit and represents a change from previous mining methods and Mineral Reserve estimates.
- Over the past nine years, the mine production silver grade has been less than the Mineral Reserve grade estimate, indicating a poor correlation with production data.
- Stopes in the mine are relatively narrow with an eleven foot minimum mining width in the 30 Vein above the 7500 level, nine foot minimum width below the 7500 level, and eight foot minimum width in the Intermediate Veins.
- Stopes are diluted to the greater of the ore width or the minimum mining width. This dilution is assigned background metal grades based upon the block model estimates. Subsequently, the stopes are diluted by a further 15% for UCB stopes and 5% for cut and fill stopes with zero grade unplanned dilution.
- SLR is of the opinion that the 15% dilution estimate in the UCB mining is a potentially optimistic estimate considering the short time that the method has been in use, the impact of vein deviation over the 27 ft cut depth, the use of infill drill information as opposed to face by face mapping, changes in the vein along strike and dip, and potential overbreak from blasting.
- The 30 Vein Mineral Reserve includes internal low grade and waste blocks that do not meet the cut-off grade criteria but are included as the material must be mined considering the stope geometry and seismicity.
- The planned use of UCB mining at a nine foot minimum width (30 Vein at depth) is not based upon detailed layouts and represents potential risks related to production capacity and dilution estimates at depth.

- Extraction for all mining methods is assumed to be 100%.
- SLR verified that Hecla's selected metal prices for estimating Mineral Reserves are consistent with independent forecasts from banks and other lenders.
- The mine uses proven, modern trackless mobile equipment with load haul dump (LHD) units up to 3.5 yd^3 capacity.
- The life of mine (LOM) plan has been appropriately developed to maximize mining efficiencies, based on the current knowledge of geotechnical, hydrological, mining, and processing information on the Lucky Friday Mine.
- The equipment and infrastructure requirements for LOM operations are well understood.
- The LOM extends 17 years to 2038, with mine production projected to increase to an annual rate of approximately 425,000 tons. The increased production is based upon projected productivity improvements in mining, increased daily development advance, and higher utilization of the existing mine infrastructure, however, improvements may be difficult to achieve considering the extent of the mine, stope widths, and mining depths.
- Meeting growth requirements of the LOM plan (production and development) is typically a challenge for wide spread narrow vein mines. SLR is of the opinion that meeting the LOM plan will require ongoing effort to optimize the UCB mining method and attain planned increases in productivity.

1.1.1.3 Mineral Processing

- The Lucky Friday mill is a conventional silver and zinc flotation concentrator that has been in operation since 1942 and owned and operated by Hecla since 1958. Concentrates are shipped by highway trucks to the Teck smelter at Trail, British Columbia, Canada. The mill has a compact and efficient design that has been upgraded over the years including the addition of flash flotation in the grinding circuit, column flotation for concentrate cleaning, and on-stream analyzers for process control.
- The concentrator performed very consistently from 2016 through 2021 with steady lead, zinc, and silver head grades, silver and zinc concentrate grades, and recoveries. The mill operated in the 38 tons per hour (stph) to 44 stph range with a reported mill availability of 93%. Low production from 2017 through 2019 was due to labor issues.
- The mine plan includes a 20% increase in mill production from the current 340,000 tons per year (stpa), or 930 stpd, to 425,000 stpa, or 1,164 stpd, each at 92% availability. Work is being done to debottleneck the Plant including slurry pumping capacity to achieve the new targets.
- The target concentrate grade for lead is 60% for the best recovery, though the grade can be increased to 63% to 64% without significant loss of recovery.
- The focus of metallurgical testing is on plant performance including quality improvements and the potential to increase production. A significant metallurgical test program was performed to characterize the Gold Hunter deposit in 2008, including mineralogy, comminution testing, and flotation testing. The ore is very consistent, which benefits plant performance.
- In July 2011, an audit of the Lucky Friday process including detailed circuit sampling was performed to support studies to increase plant production. During the survey, the lead flash cell recovered 60% to 70% of the lead and silver in the plant feed, reducing the load on the lead cleaning circuit. The total silver, lead, and zinc recoveries to silver concentrate were 91.7%, 90%,

and 12%, respectively, to a concentrate containing 60% Pb, 130 oz/ton Ag, and 3.5% Zn. Zinc recovery to the zinc concentrate was 81.3% to a concentrate grading 48.6% Zn. Lead recovery to the zinc concentrate was 2.3% and the silver recovery to the zinc concentrate was 3.9%.

1.1.1.4 Infrastructure

- Lucky Friday has all of the infrastructure necessary for the ongoing operations and has plans for refurbishment or repair as necessary within the mine plan.

1.1.1.5 Environment

- Lucky Friday maintains a comprehensive environmental management and compliance program. All permits needed for current Lucky Friday operations are in place, and staff at the Property continually monitors permit/regulated conditions and files required reports with the applicable regulatory agencies at the federal, state, and local level.
- Hecla's Environmental Management System (EMS) follows a 13-element plan-do-check-act approach that ensures continuous improvement around issues including obligation registers, management of change, air quality, water and waste management, energy management, training, and reporting. This system promotes a culture of environmental awareness and innovation throughout the company. The EMS program is benchmarked against ISO-14001 and complements Canada's Towards Sustainable Mining (TSM) program. On a related matter, there appears to be good cross-discipline support for the overall environmental program.
- In previous resource/reserve reporting documents, Lucky Friday reported experiencing a number of alleged permit exceedances for water discharges (National Pollutant Discharge Elimination System (NPDES) and Multi-Sector General Permit (MSGP)) at the Property. Lucky Friday received an Environmental Protection Agency (EPA) Notice of Violation for non-compliance with the NPDES Permit and various discharges exceeding the maximum daily standard for lead (50 µg/L). In all instances, Lucky Friday has worked cooperatively with EPA to resolve these issues.
- Lucky Friday has developed reclamation/closure plan and the most recent cost estimate (2021) to perform this work is US$39.9 million. Reclamation and closure plans have been submitted to the appropriate agencies. Asset Retirement Obligation (ARO) legal obligations are updated regularly and based upon existing site conditions, current laws, regulations and costs to perform the permitted activities. The ARO is to be conducted in accordance with Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) 410.
- Lucky Friday reports that community relationships are excellent, and the company maintains an office in the city of Wallace to maintain a community presence.

1.1.2 Recommendations

SLR offers the following recommendations by area.

1.1.2.1 Geology and Mineral Resources

1. Conduct additional review of the sample grade distributions within the veins to see if coherent groupings of sub-populations can be isolated for interpolation purposes.

2. Modify the resource classification procedures to provide an opportunity for manual adjustments, as opposed to a strictly computer-driven approach. This will allow changes to be made to remove unrealistic artifacts in the classification.
3. Consider an additional level of block model validation, such as comparisons to alternative estimation methods.

1.1.2.2 Mining and Mineral Reserves

4. Continue the use of UCB mining in the 30 Vein and continue to attempt to improve the UCB method.
5. Conduct close monitoring of the stoping performance including regular surveys as the void is exposed and reconciliation of the stope designs to the Mineral Reserve estimates to confirm and, if necessary, refine the Mineral Reserve estimate
6. Calculate NSR values on a fully diluted basis and use these values to determine cut-off values and Mineral Reserve boundaries.
7. Evaluate the internal portions of Mineral Reserve material that fall below cut-off value within the 30 Vein to confirm that they are economically justifiable to mine and develop further cut-off criteria for must take material.
8. Undertake a more detailed dilution and extraction study, including consideration of the existing reconciliation studies, to better quantify the extraction, dilution, and other modifying factors that Hecla is currently applying to all production designs.
9. Use the results of the above noted studies to determine the actions necessary to align mine production grades with the Mineral Reserve estimates.
10. Review mining plans to define definitive actions to attain the planned improvements in mining productivity and daily development advance.
11. Further develop the plans for UCB mining at the planned nine foot minimum mining width.

1.1.2.3 Mineral Processing

1. Continue metallurgical testing to support the plan for increased production.
2. The ability to perform on-site metallurgical testing is limited due to the capabilities of the current laboratory. An upgrade to the laboratory is recommended and has been budgeted for 2024.

1.1.2.4 Infrastructure

1. Continue the upgrades, repairs, and rehabilitation to existing infrastructure to support the LOM plan.

1.1.2.5 Environment

1. Track and participate in the development of new environmental and mine permitting regulations that could impact operations.
2. Continue to perform internal and external audits of environmental compliance.
3. Even though opportunity is limited, investigate opportunities for concurrent reclamation to minimize financial obligation(s) at closure.
4. Continue to update reclamation and closure cost estimates on a regular basis.

1.2 Economic Analysis

1.2.1 Economic Criteria

An after-tax Cash Flow Projection has been generated from the LOM production schedule and capital and operating cost estimates, and is summarized in Table 1-2. A summary of the key criteria is provided below.

1.2.1.1 Physicals

- Total mill feed processed: 5.5 Mst
- Average processing rate: 892 stpd with the following production profile (Table 1-1):

Table 1-1: Production Summary
Hecla Mining Company – Lucky Friday Mine

Commodity	Head Grade	% Recovery	Recovered Metal	Annual Production	Payable Metal
Silver	13.7 oz/ton	96.4	72.0 Moz	4.2 Moz	67.4 Moz
Lead	8.3%	95.7	866 Mlb	51 Mlb	811 Mlb
Zinc	3.3%	93.7	340 Mlb	20 Mlb	251 Mlb

1.2.1.2 Revenue

- Metal prices used in the economic analysis are constant US$21/oz Ag, US$0.95/lb Pb, and US$1.25/lb Zn.
- Revenue is calculated assuming the above metal price forecast and incorporates a $1.8 million hedge gain for lead and zinc over the first three years of cash flow.
- Average LOM concentrate freight cost: $47/wet ton Cost, Insurance, and Freight (CIF) basis to customer's discharge points.
- Average LOM treatment charge: $139/dry metric tonne (dmt) silver concentrate plus $3.90/dmt for antimony penalty, $162/dmt zinc concentrate, and $8.70/dmt for iron and mercury penalties.
- Average LOM refining costs for concentrates: $0.10/dmt.

1.2.1.3 Capital and Operating Costs

- Mine life of 17 years
- LOM sustaining capital costs of $372 million
- LOM site operating cost of $187.81/ton milled (excludes financing and corporate overhead costs)
- LOM closure/reclamation $38.7 million in year after final production

1.2.1.4 Taxation and Royalties

Mining companies doing business in Idaho are primarily subject to U.S. corporate income tax, Idaho State income tax, and Idaho Mining License tax. The State of Idaho levies a mining license tax on mining net income received in connection with mining properties and activities in Idaho, at a rate of 7%. The U.S. corporate income tax rate is 21% and the Idaho state income tax rate is 6.5%.

No income tax is anticipated to be payable through the LOM. Hecla will use a combination of existing and forecasted depreciation expenses, allocation of expenses from other entities within the consolidated tax group, percentage depletion allowances, and existing net operating losses to generate zero annual taxable income through the LOM. However, the Lucky Friday Mine will still incur $4 million for Idaho State mining taxes during the LOM.

The current production zones in the LOM are not subject to any royalty to a third party/previous landowner.

1.2.2 Cash Flow Analysis

SLR has reviewed Hecla's Lucky Friday Mineral Reserves only model and has prepared its own unlevered after-tax LOM cash flow model based on the information contained in this TRS to confirm the physical and economic parameters of the mine.

The Lucky Friday economics have been evaluated using the discounted cash flow method by considering annual processed tonnages and grade of ore. The associated process recovery, metal prices, operating costs, refining and transportation charges, and sustaining capital expenditures were also considered.

The indicative economic analysis results, presented in Table 1-2 with no allowance for inflation, show a pre-tax and after-tax net present value (NPV), using a 5% discount rate, of $557 million and $554 million, respectively. The SLR Qualified Person (QP) is of the opinion that a 5% discount/hurdle rate for after-tax cash flow discounting of long lived precious/base metal operations in a politically stable region is reasonable and appropriate and commonly used. For this cash flow analysis, the internal rate of return (IRR) and payback are not applicable as there is no negative initial cash flow (no initial investment to be recovered) since Lucky Friday has been in operation for a number of years.

Table 1-2: Life of Mine Indicative Economic Results
Hecla Mining Company – Lucky Friday Mine

Description	US$ M
Realized Market Prices	
Ag (US$/oz)	$21.00
Pb (US$/lb)	$0.95
Zn (US$/lb)	$1.25
Payable Metal	
Ag (Moz)	67.4
Pb (Mlb)	811
Zn (Mlb)	251
Total Gross Revenue	**2,502**
Mine Cost	(415)
Mill Cost	(118)
Maintenance Cost	(270)
G & A Cost	(183)

Description	US$ M
Profit Sharing	(39)
Concentrate Freight Cost	(50)
Offsite Costs	(234)
Total Operating Costs	**(1,308)**
Operating Margin (EBITDA)	**1,194**
Total Tax Payable	(4)
Operating Cash Flow	**1,190**
Sustaining Capital	(372)
Closure/Reclamation Capital	(39)
Total Capital	**(411)**
Pre-tax Free Cash Flow	783
Pre-tax NPV @ 5%	**557**
After-tax Free Cash Flow	779
After-tax NPV @ 5%	**554**

1.2.3 Sensitivity Analysis

The Property's after-tax cumulative cash flow discounted at 5% from the model presented above were analyzed for sensitivity to variations in revenue, operating, and capital cost assumptions. The results of the sensitivity analysis demonstrate that the Mineral Reserve estimates are most sensitive to variations in metal prices, less sensitive to changes in metal grades and recoveries, and least sensitive to fluctuations in operating and capital costs.

1.3 Technical Summary

1.3.1 Property Description

The Lucky Friday silver-lead-zinc mine and mill complex is located approximately one-half mile east of Mullan in Shoshone County, Idaho, and 55 mi east of Coeur d'Alene, Idaho along Interstate Highway 90. The Property is located in the Coeur d'Alene District, which is one of, if not the most prolific silver mining camps in the world. Current production is from underground using both underhand and overhand mechanized cut and fill methods. Ore is processed using conventional crushing, grinding, and lead-zinc flotation with a current operating rate of 1,000 tpd. The operation currently employs approximately 400 full-time employees.

1.3.2 Land Tenure

The Lucky Friday Expansion Area (formerly known as the Gold Hunter vein system) is owned 81.5% by Hecla Limited and 18.5% by Silver Hunter Mining Company (Silver Hunter). Both companies are subsidiaries of Hecla. There are no encumbrances on the Property, nor are there any royalties payable.

The Lucky Friday vein system is 100% owned by Hecla Limited. The Property comprises approximately 710 acres of patented mining and millsite claims and fee lands, and 535 acres of unpatented mining claims.

1.3.3 History

The Lucky Friday deposit was discovered in 1880, and the Lucky Friday Silver-Lead Mines Company initiated commercial production from Lucky Friday in 1942. Hecla acquired ownership of Lucky Friday in 1964 via a merger with Lucky Friday Silver-Lead Mines Company.

In 1968, Hecla entered a series of agreements with Day Mines Inc., Abot Mining Company, and Independence Lead Mines Company, the owners of the Gold Hunter deposit and surrounding properties. Day Mines was merged in 1981 with a wholly owned subsidiary of Hecla, Hecla-Day Mining Corporation, which was merged into Hecla the following year. In 2001, Abot quit-claimed its interests to Hecla, and in 2007, Hecla acquired the assets of Independence Lead Mines Company through its wholly owned subsidiary, Silver Hunter Mining Company.

The total mine production from the Lucky Friday deposit now exceeds 108 Moz of silver making it the Coeur d'Alene District's fourth largest silver producer. The Gold Hunter deposit is the sixth largest silver producer in the district with 12 Moz mine in the historic workings and just over 45 Moz from more recent operations.

1.3.4 Geological Setting, Mineralization, and Deposit

The deposits of the Coeur d'Alene District, including Lucky Friday, are clastic metasediment hosted vein silver-lead-zinc deposits. They occur as veins in branching and anastomosing steeply dipping shears in metamorphosed sedimentary rocks of the Proterozoic-age Belt Supergroup. Host rocks are primarily quartzites and argillites of the Wallace (Gold Hunter) and Revett (Lucky Friday) Formations. Vein mineralization at Lucky Friday occurs as fracture-fillings, disseminations, and tabular masses of galena and tetrahedrite along with accessory pyrite in a gangue of iron carbonate (siderite), calcite, and quartz. The Lucky Friday zone is a single tabular body that curves from east-northeast to northeast in strike and dips almost vertically. The Gold Hunter system comprises a package of parallel veins striking at approximately 110° and dipping vertically to steeply southwards. There are Mineral Resources estimated on 16 of the Gold Hunter Veins. The most important of these in terms of resources and production is the 30 Vein.

1.3.5 Exploration

Currently, no exploration work is being conducted at Lucky Friday. Underground diamond drilling for Mineral Reserve definition is ongoing.

1.3.6 Mineral Resource Estimates

Mineral Resource estimates have been prepared for the Gold Hunter Veins as well as the Lucky Friday and Ancillary Veins. At Gold Hunter, estimates have been carried out for the 5, 20, 30, 40, 41, 50, 60, 70, 80, 90, 100, 110, 120, 130, 140, and 150 Veins.

The Mineral Resources at Gold Hunter are estimated using a block model method, with grades for silver, lead, zinc, and iron interpolated into the blocks by inverse distance squared (ID^2) weighting. The interpolations are constrained by wireframe models of the host veins. Grades are interpolated for silver, lead, zinc, and iron.

Sample data consists of diamond drill core and chip samples. High grades for silver, lead, and zinc are capped at the 95th percentile of the sample distributions for each vein. Capped samples are composited to a nominal three-foot length. Block grade interpolations are conducted in a series of three passes of progressively larger search radii and more liberal composite selection criteria.

Mineral Resources for Lucky Friday are estimated using a polygonal method based on longitudinal projections of the veins.

Tonnage factors are estimated using stoichiometric equations based on the assay values for iron, lead, and zinc. Different equations are used for the Gold Hunter and Lucky Friday deposits owing to differences in vein mineralogy.

The minimum width for the Gold Hunter and Lucky Friday Veins can be between eight feet and 11 ft, depending on the expected mining method. Veins are diluted with zero grade material to achieve the minimum width constraint.

Mineral Resources are classified according to the definitions in S-K 1300, and are reported exclusive of Mineral Reserves. The Mineral Resources, estimated by Hecla and reviewed and accepted by SLR, are reported using an NSR cut-off value of US$173/ton at Gold Hunter and US$207/ton at Lucky Friday. The Lucky Friday Mineral Resource estimate as of December 31, 2021, is presented in Table 1-3.

Table 1-3: Summary of Mineral Resources – December 31, 2021
Hecla Mining Company – Lucky Friday Mine

Zone	Tonnage (000 tons)	Grade			NSR (US$/t)	Contained Metal		
		Ag (oz/ton)	Pb (%)	Zn (%)		Ag (000 oz)	Pb (000 tons)	Zn (000 tons)
Measured	8,650	7.6	4.9	2.5	219	65,800	425	213
Indicated	1,840	7.6	5.1	2.4	224	14,000	93	44
Measured + Indicated	**10,500**	**7.6**	**4.9**	**2.5**	**220**	**79,800**	**518**	**258**
Inferred	5,380	7.8	5.8	2.4	244	41,900	312	130

Notes:

1. Classification of Mineral Resources is in accordance with the S-K 1300 classification system.
2. Mineral Resources were estimated by Hecla staff and reviewed and accepted by SLR.
3. Mineral Resources are exclusive of Mineral Reserves at Gold Hunter, whereas there are no Mineral Reserves currently at Lucky Friday.
4. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
5. Mineral Resources are 100% attributable to Hecla.
6. Bulk density was calculated by block, based on mineralogical content.
7. Mineral Resources are estimated at NSR cut-off grades of US$173/ton for Gold Hunter and US$207/ton for Lucky Friday.
8. NSR values were calculated using long-term metal prices of US$21.00/oz Ag, US$1.15/lb Pb, and US$1.35/lb Zn.
9. Numbers may not add due to rounding.

The SLR QP is of the opinion that with consideration of the recommendations summarized in in this section, any issues relating to all relevant technical and economic factors likely to influence the prospect of economic extraction can be resolved with further work.

1.3.7 Mineral Reserve Estimates

Mineral Reserve estimates, prepared by Hecla and reviewed and accepted by SLR, have been classified in accordance with the definitions for Mineral Reserves in S-K 1300 and are estimated to total 5.46 Mst grading 13.7 oz/ton Ag, 8.3% Pb, and 3.3% Zn and summarized in Table 1-4. While resources exist at the Lucky Friday deposit, Mineral Reserves are reported only for the Gold Hunter deposit, as this is the only area in the current LOM plan.

Table 1-4: Summary of Mineral Reserves – December 31, 2021
Hecla Mining Company – Lucky Friday Mine

Category	Tonnage (000 tons)	Grade			Contained Metal		
		Ag (oz/ton)	Pb (%)	Zn (%)	Ag (000 oz Ag)	Pb (000 tons)	Zn (000 tons)
Proven	4,691	13.92	8.43	3.40	65,313	395.3	159.4
Probable	765	12.26	7.47	2.83	9,386	57.2	21.7
Total Proven + Probable	**5,456**	**13.69**	**8.29**	**3.32**	**74,699**	**452.4**	**181.0**

Notes:

1. Classification of Mineral Reserves is in accordance with the S-K 1300 classification system.
2. Mineral Reserves were estimated by Hecla and reviewed and accepted by SLR.
3. Mineral Reserves are 100% attributable to Hecla.
4. Mineral Reserves are estimated at an NSR cut-off of $208/ton.
5. The NSR values reflect the discrete metallurgical responses for the Mineral Reserve blocks.
6. Mineral Reserves are estimated using an average long-term silver price of US$17.00/oz, lead price of US$0.90/lb and zinc price of US$1.15/lb.
7. A minimum mining width of 11 ft was used for 30 Vein above 7500 level, 9 ft for 30 Vein below 7500 level, and 8 ft for all other veins.
8. A bulk density of 0.086 tons/ft^3 was used for waste material. Mineral Reserve bulk density was calculated by block, based on mineralogical content.
9. Numbers may not add due to rounding.

Measured Mineral Resources were converted to Proven Mineral Reserves, and Indicated Mineral Resources were converted to Probable Mineral Reserves. Inferred Mineral Resources were not converted to Mineral Reserves and are not included in the LOM plan.

Mineral Reserves are estimated in seven veins all in the Gold Hunter deposit. The 30 Vein is the largest vein and contains 68% of the Mineral Reserve tonnage. The Mineral Reserves extend down to the 8100 level. Mineral Resources are converted to Mineral Reserves through the application of minimum mining widths of eight feet to eleven feet, NSR value cut-off grade, and stope optimizer designs followed by the application of external dilution.

1.3.8 Mining Methods

The mine is a shaft access deep mine developed to the 8300 level (feet below surface). Mining is mainly by rubber tired mechanized equipment with the primary mining by underhand stoping with paste backfill.

In 2021, Lucky Friday tested and proved the UCB mining method. The UCB method is a new, productive mining method developed by Hecla for proactive control of fault-slip seismicity in deep, high-stress, narrow-vein mining. The method uses bench drilling and blasting methods to fragment significant vertical and lateral extents of the vein beneath a top cut taken along the strike of the vein and under engineered, cemented backfill. The method is accomplished without the use of drop raises or lower mucking drives which may result in local stress concentrations and increased exposure to seismic events. Large blasts using up to 35,000 lb of pumped emulsion and electronic, programmable detonators fragment up to 350 ft of strike length to a depth of approximately 30 ft. These large blasts proactively induce fault-slip seismicity at the time of the blast and shortly after it. This blasted corridor is then mined underhand for two cuts. As these cuts are mined, little to no blasting is done to advance them. Dilution is controlled by supporting the hanging wall and footwall as the mining progresses through the blasted ore. The entire cycle repeats and stoping advances downdip, under fill, and in a destressed region. The method allows for greater control of fault-slip seismic events significantly improving safety. In conjunction, a notable productivity increase has been achieved by reducing seismic delays and utilizing bulk mining activities. In 2021, 86% of the tons mined were produced through the UCB method.

The mine is serviced by two shafts to surface and an internal shaft. Broken ore is hauled by truck to the shaft and then hoisted to surface. The mine ventilation system includes facilities for mine air cooling.

1.3.9 Processing and Recovery Methods

The Lucky Friday mill is a conventional silver and zinc flotation concentrator. The mill operates at a nominal 42 stph) and can be operated at rates of up to 54 stph for limited periods. Silver concentrate and zinc concentrate are produced. Concentrates are shipped by highway trucks to the Teck smelter at Trail, British Columbia, Canada.

The primary unit operations in the Lucky Friday concentrator include:

- Primary jaw crushing
- Secondary cone crushing
- Tertiary cone crushing
- Triple deck screen closing both secondary and tertiary crushing circuits
- Ball milling
- Lead flash flotation with concentrate reporting to silver concentrate thickener
- Hydrocyclone classification
- Lead rougher and scavenger flotation in conventional cells
- Lead rougher scavenger concentrate to lead rougher feed
- Lead rougher scavenger tailings to zinc conditioners
- Lead rougher concentrate cleaning and recleaning using column flotation cells
- Lead cleaner scavenger flotation of cleaner tailings in conventional cells followed by column cells
- Lead cleaner scavenger and cleaner scavenger column tailings to regrind milling
- Regrind milling closed with hydrocyclones
- Flash flotation, second cleaner column flotation and cleaner scavenger column flotation concentrates to silver concentrate thickener
- Zinc conditioning in mixed reactors
- Zinc flash flotation
- Zinc rougher and scavenger flotation in conventional cells
- Zinc rougher scavenger tailings to final tailings sump feeding sand plant

- Zinc rougher scavenger concentrate to zinc conditioning
- Zinc rougher concentrate cleaning and recleaning using column flotation cells
- Zinc cleaner scavenger flotation of cleaner tailings in conventional cells followed by column cells
- Zinc cleaner scavenger and cleaner scavenger column tailings to zinc rougher flotation
- Flash flotation, second cleaner column flotation and cleaner scavenger column flotation concentrates to silver concentrate thickener
- Lead and zinc concentrate thickening and filtration and concentrate storage
- Flotation tailings hydrocyclone classification, thickening and filtration of coarse sand
- Coarse sand stockpiled and delivered to mine backfill cement plant
- Sand thickener overflow to final tailings thickener
- Tailings thickener overflow to water treatment and process water tank
- Tailings thickener underflow to the tailings storage facility (TSF)

Mine ore discharges from the Silver Shaft skips into two coarse ore bins with a total live capacity of approximately 1,000 tons. Ore is crushed in three stages to 100% passing (P_{100}) 3/8 in. using a primary jaw, secondary cone, and tertiary cone crushers closed by a triple deck vibrating screen.

The ore is ground in a single ball mill and discharges to the flash flotation feed pump box where reagents are added. The slurry is pumped to a flash flotation cell to recover coarse lead and silver from the mill circulating load. Flash cell concentrate is final silver concentrate grade and flash cell underflow is pumped to a cyclone cluster for classification. The cyclone underflow returns to the mill and the cyclone overflow advances to lead rougher flotation.

The lead flotation circuit consists of conventional agitated flotation cells for rougher and rougher scavenger flotation, column flotation cells for lead cleaning, and a combination of conventional and column cells for lead cleaner scavenger flotation. Lead flash flotation, lead second cleaner, and lead cleaner scavenger concentrates report to the silver concentrate thickener. Lead cleaner scavenger tailings are reground and pumped to the lead cleaner scavenger column cell.

Lead rougher scavenger tailings report to the zinc conditioners and then to zinc rougher scavenger flotation. The zinc flotation circuit configuration is similar to the lead circuit, with conventional agitated flotation cells for rougher and rougher scavenger flotation, column flotation cells for zinc cleaning and a combination of conventional and column cells for zinc cleaner scavenger flotation. Zinc second cleaner and zinc cleaner scavenger concentrates report to the zinc concentrate thickener. Zinc rougher scavenger tailings are pumped to the final tailings sump and zinc rougher scavenger concentrate is recycled to the zinc conditioners.

Silver and zinc concentrates are thickened, filtered, and stockpiled in storage bunkers, then loaded into trucks and shipped to a smelter.

The flotation tailings are classified with hydrocyclones. The cyclone underflow slurry reports to the sand thickener and the thickener underflow sands are filtered and transported to the backfill cement plant for underground backfill. Sand thickener overflow is pumped to the tailings thickener. Thickener overflow is pumped to the water treatment plant for recycle as process water or for discharge and the underflow is pumped to a TSF where the solids settle out of the tailings slurry and clear water is treated and discharged.

1.3.10 Infrastructure

The mine infrastructure consists of:

- The Silver Shaft, an 18 ft diameter shaft sunk to 6,205 ft deep, and currently operating to the 5970 level, complete with man and skip hoisting facilities.
- The 5,489 ft deep, three compartment No. 2 Shaft used for man hoisting, supplies, and ventilation. This shaft services the mine to the 4900 level.
- The No. 4 winze is an 18 ft diameter circular concrete lined shaft extending from the 4,860 level and a maximum depth of 8,620 to provide services and rock handling to depth. Ore is hoisted to the 4900 level.
- Mine ventilation fans and ventilation system.
- Paste backfill distribution system.
- Electricity provided by the region's public utility company (Avista Energy) and fed through two separate substations to the mine.
- Offices and mine dry at the Silver Shaft.
- The lead-zinc-silver flotation concentrator with a nominal operating rate of 1,000 stpd.
- Adequate diesel generating equipment to power emergency facilities.
- Tailings storage facility.
- Two water filtration plants, one at the mill and one at the TSF.

1.3.11 Market Studies

The Lucky Friday Mine is an active producer and has been for over 75 years. Lucky Friday produces a silver-silver concentrate and a zinc concentrate which are sold to the Teck lead zinc smelter in Trail, British Columbia, Canada.

1.3.12 Environmental Studies, Permitting and Plans, Negotiations, or Agreements with Local Individuals or Groups

Lucky Friday has obtained the requisite construction and operating permits needed to operate the existing operations. Other than routine (annual renewal) permits, there are now outstanding permitting needs for the current LOM reserves. Environmental monitoring during operations includes surface water, groundwater, air quality, meteorology, aquatics and biological resources for regulatory compliance. These activities will continue after closure to assess reclamation success and release of financial assurance (bonding). Reclamation and closure plans have been submitted to the appropriate agencies. ARO legal obligations are updated regularly and based upon existing site conditions, current laws, regulations and costs to perform the permitted activities. The ARO is to be conducted in accordance with Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) 410.

1.3.13 Capital and Operating Cost Estimates

The Lucky Friday Mine is in operation and there is no pre-production capital. Capital costs over the LOM total $372 million and are summarized in Table 1-5.

Table 1-5: Capital Cost Summary
Hecla Mining Company – Lucky Friday Mine

Year ($ millions)	Total	2022 Year 1	2023 Year 2	2024 Year 3	2025 Year 4	2026 Year 5	27 to 38 (Years 6 to 13)
Drilling	27.0	3.0	3.0	3.0	3.0	2.0	13.0
Major Projects	75.0	24.0	5.0	12.0	7.0	3.0	24.0
Ore processing	13.0	2.0	7.0	3.0	0.0	1.0	0.0
Mobile Equipment	41.0	5.0	8.0	7.0	2.0	2.0	17.0
Mine Development	200.0	14.0	11.0	21.0	23.0	16.0	115.0
Mine Infrastructure	16.0	3.0	6.0	3.0	1.0	2.0	1.0
Total	**372.0**	**51.0**	**40.0**	**49.0**	**36.0**	**26.0**	**170.0**

The forecasted LOM operating costs totaling $187.81/t milled are summarized in Table 1-6.

Table 1-6: Operating Cost Summary
Hecla Mining Company – Lucky Friday Mine

Item	Units	Total	2022	2023	2024	2025	2026 to 2038
Production Costs							
Mining (Underground)	$ millions	415.3	29.3	32.0	29.9	29.2	294.8
Processing	$ millions	117.5	8.7	8.9	8.2	7.8	83.9
Maintenance	$ millions	269.9	20.3	20.6	19.9	18.2	190.9
G&A	$ millions	182.7	13.4	13.1	11.9	11.2	133.2
Profit share	$ millions	39.4	2.9	3.0	2.8	2.7	28.1
Total	**$ millions**	**1,024.7**	**74.5**	**77.6**	**72.7**	**69.0**	**731.0**
Cost per ton milled							
Mining (Underground)	$/ton	76.11	86.11	78.32	74.27	73.57	75.45
Processing	$/ton	21.54	25.44	21.88	20.42	19.63	21.47
Maintenance	$/ton	49.46	59.67	50.39	49.35	45.76	48.86
G&A	$/ton	33.48	39.22	31.94	29.56	28.06	34.10
Profit share	$/ton	7.22	8.42	7.30	6.94	6.68	7.20
Total	**$/ton**	**187.81**	**218.86**	**189.84**	**180.54**	**173.69**	**187.08**

Hecla-forecasted capital and operating costs estimates are derived from annual budgets and historical actuals over the long life of the current operation. According to the American Association of Cost Engineers (AACE) International, these estimates would be classified as Class 1 with an accuracy range of -3% to -10% to +3% to +15%, although with some variances to be expected in near term with the operation coming back to full production after the recent labor strike.

2.0 INTRODUCTION

SLR International Corporation (SLR) was retained by Hecla Mining Company (Hecla) to prepare an independent Technical Report Summary (TRS) on the Lucky Friday Mine (Lucky Friday or the Property), located in Shoshone County, Idaho, USA. Hecla owns and operates 100% of the Property via ownership through two of its 100% owned subsidiaries.

The purpose of this TRS is to disclose the results of the Mineral Resource and Mineral Reserve estimates for the Property with an effective date of December 31, 2021.

Hecla is listed on the New York Stock Exchange (NYSE) and currently reports Mineral Reserves of lead, zinc, silver, and gold in United States Securities and Exchange Commission (SEC) filings. This TRS conforms to SEC's Modernized Property Disclosure Requirements for Mining Registrants as described in Subpart 229.1300 of Regulation S-K, Disclosure by Registrants Engaged in Mining Operations (S-K 1300) and Item 601 (b)(96) Technical Report Summary. SLR visited the Property on October 5 and 6, 2021.

The Property includes the Lucky Friday mine and processing plant (or mill) in the city of Mullan, Idaho. The mine is a deep underground silver, lead, and zinc mine that produces silver and zinc concentrates from ore-bearing fissure veins. The plant is a concentrator facility producing silver and zinc concentrates that has a current operating rate of 1,000 short tons per day (stpd).

The Property commenced operations in 1942 and observed its 75th anniversary in 2017. In 2021, the underground operation mined 315,000 tons of ore and produced 32,000 tons of lead-silver and 14,000 tons of zinc concentrates. The concentrates were transported 209 miles (mi) to the Teck Metals Ltd. (Teck) lead/zinc smelter in Trail, British Columbia, Canada in highway trucks operated by a contract shipper. This 2021 production profile amounted to 3.6 million ounces (Moz) of silver, 23,100 tons of lead, and 10,000 tons of zinc produced.

2.1 Site Visits

SLR most recently visited the site on October 5 and 6, 2021. During the most recent site visit, the SLR Qualified Persons (QP) received a project overview by site management with specific activities as follows:

The SLR geology QP toured several stopes underground, inspected the core handling facility, and interviewed key personnel involved in the collection, interpretation, and processing of geological data and preparation of the Mineral Resource estimates.

The SLR mining QP visited production, development, and critical infrastructure areas in the underground mine. Both underhand cut and full and underhand closed bench production areas were visited where discussions were carried out on the mining cycle, productivities, dilution, and recovery. The QP discussed mining methods, mine economics, planning and scheduling activities, ventilation and refrigeration, and geotechnical procedures with relevant subject matter experts.

The SLR processing QP visited the surface infrastructure, including the hoist, emergency generators, warehousing, reagent storage, mechanical and electrical shops, electrical substation, compressor house. The mineral processing facilities were then toured included crushing, grinding, flotation, concentrate filtration and loading, sand filtration, cement addition and pumping, final tailings thickening filtration and pumping, and water treatment. The QP then toured the tailings impoundments, tailings water treatment plant and outfalls. Meetings were then held with the metallurgists to discuss the flowsheet, laboratory and plant metallurgical testing, and operating and maintenance information required for the reports.

The SLR ESG QP visited the surface facilities/operations and interviewed environmental and applicable staff manager(s) for environmental/social management/system(s); permitting/compliance program; reclamation/closure plan; and associated budget(s).

2.2 Sources of Information

During the preparation of this TRS, discussions were held with personnel from Hecla:

- Mr. Keith Blair, Chief Geologist, Hecla
- Mr. Carlos Aguiar, Lucky Friday General Manager, Hecla
- Mr. Ben Chambers, Lucky Friday Resource Geologist, Hecla
- Mr. Nick Furlin, Lucky Friday Chief Geologist, Hecla
- Mr. Andre Goedhals, Lucky Friday Project Manager, Hecla
- Mr. Bob Golden, Lucky Friday Chief Geotechnical Engineer, Hecla
- Mr. Karl Hartman, Lucky Friday Chief Engineer, Hecla
- Mr. Ben Henderson, Lucky Friday Drilling Manager, Hecla
- Mr. Wes Johnson, Lucky Friday Technical Services Manager, Hecla
- Mr. Jake Schuff, Lucky Friday Mill Metallurgist, Hecla
- Mr. Craig Shiner, Lucky Friday Mill Superintendent, Hecla
- Mr. Lance Boylan, Lucky Friday Health Safety and Environmental Manager, Hecla
- Mr. Russell Lawlar, Chief Financial Officer, Hecla

No previous Technical Report Summaries have been filed in respect of the Lucky Friday Mine.

This TRS was prepared by SLR QPs. The documentation reviewed, and other sources of information, are listed in Section 24.0 References.

2.3 List of Abbreviations

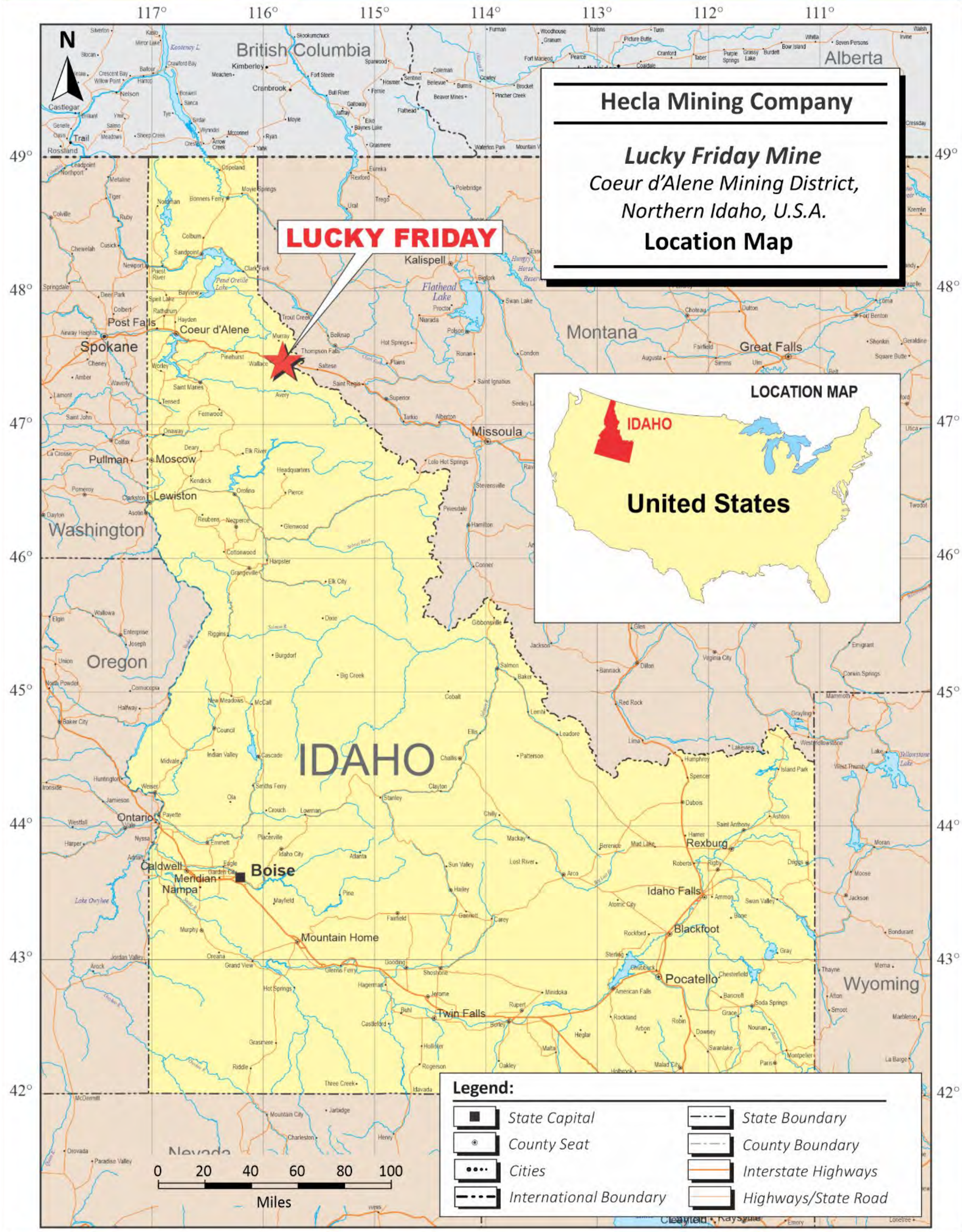
Units of measurement used in this TRS conform to the imperial system. All currency in this TRS is US dollars (US$) unless otherwise noted.

μ	micron	kPa	kilopascal
μg	microgram	kVA	kilovolt-amperes
a	annum	kW	kilowatt
A	ampere	kWh	kilowatt-hour
bbl	barrels	L	litre
Btu	British thermal units	lb	pound
°C	degree Celsius	L/s	litres per second
C$	Canadian dollars	m	metre
cal	calorie	M	mega (million); molar
cfm	cubic feet per minute	m^2	square metre
cm	centimetre	m^3	cubic metre
cm^2	square centimetre	MASL	metres above sea level
d	day	m^3/h	cubic metres per hour
dia	diameter	mi	mile
dmt	dry metric tonne	min	minute
dwt	dead-weight ton	μm	micrometre
°F	degree Fahrenheit	mm	millimetre
fasl	feet above sea level	mph	miles per hour
ft	foot	Mst	million short ton
ft^2	square foot	MVA	megavolt-amperes
ft^3	cubic foot	MW	megawatt
ft/s	foot per second	MWh	megawatt-hour
g	gram	oz	Troy ounce (31.1035g)
G	giga (billion)	oz/ton	ounce per short ton
Gal	Imperial gallon	ppb	part per billion
g/L	gram per litre	ppm	part per million
Gpm	Imperial gallons per minute	psia	pound per square inch absolute
g/t	gram per tonne	psig	pound per square inch gauge
gr/ft^3	grain per cubic foot	RL	relative elevation
gr/m^3	grain per cubic metre	s	second
ha	hectare	ton	short ton
hp	horsepower	stpa	short ton per year
hr	hour	stpd	short ton per day
Hz	hertz	stph	short tons per hour
in.	inch	US$	United States dollar
in^2	square inch	Usg	United States gallon
J	joule	USgpm	US gallon per minute
k	kilo (thousand)	V	volt
kcal	kilocalorie	W	watt
kg	kilogram	wt%	weight percent
km	kilometre	yd^3	cubic yard
km^2	square kilometre	yr	year
km/h	kilometre per hour		

3.0 PROPERTY DESCRIPTION

3.1 Location

The Property is located approximately one-half mile east of Mullan in Shoshone County, Idaho, and 55 mi east of Coeur d'Alene, Idaho along Interstate Highway 90 (Figure 3-1). The facility lies just north of the Interstate Highway near exit ramp 69. The Silver Shaft headframe is visible from the highway with the shaft collar approximately 70 ft above the valley floor. The Lucky Friday vein system lies adjacent to the Silver Shaft and the Lucky Friday Expansion Area (Gold Hunter vein system) lies approximately 5,000 ft northwest of the Silver Shaft.



February 2022 **Source: From 2017 RPA report.**

Figure 3-1: Lucky Friday Mine Location Map

3.2 Land Tenure

The Lucky Friday vein system is 100% owned by Hecla Limited. The Lucky Friday Expansion Area (formerly known as the Gold Hunter vein system) is owned 81.5% by Hecla Limited and 18.5% by Silver Hunter Mining Company (Silver Hunter). Both companies are subsidiaries of Hecla. Hecla controls 100% of the Lucky Friday Expansion Area.

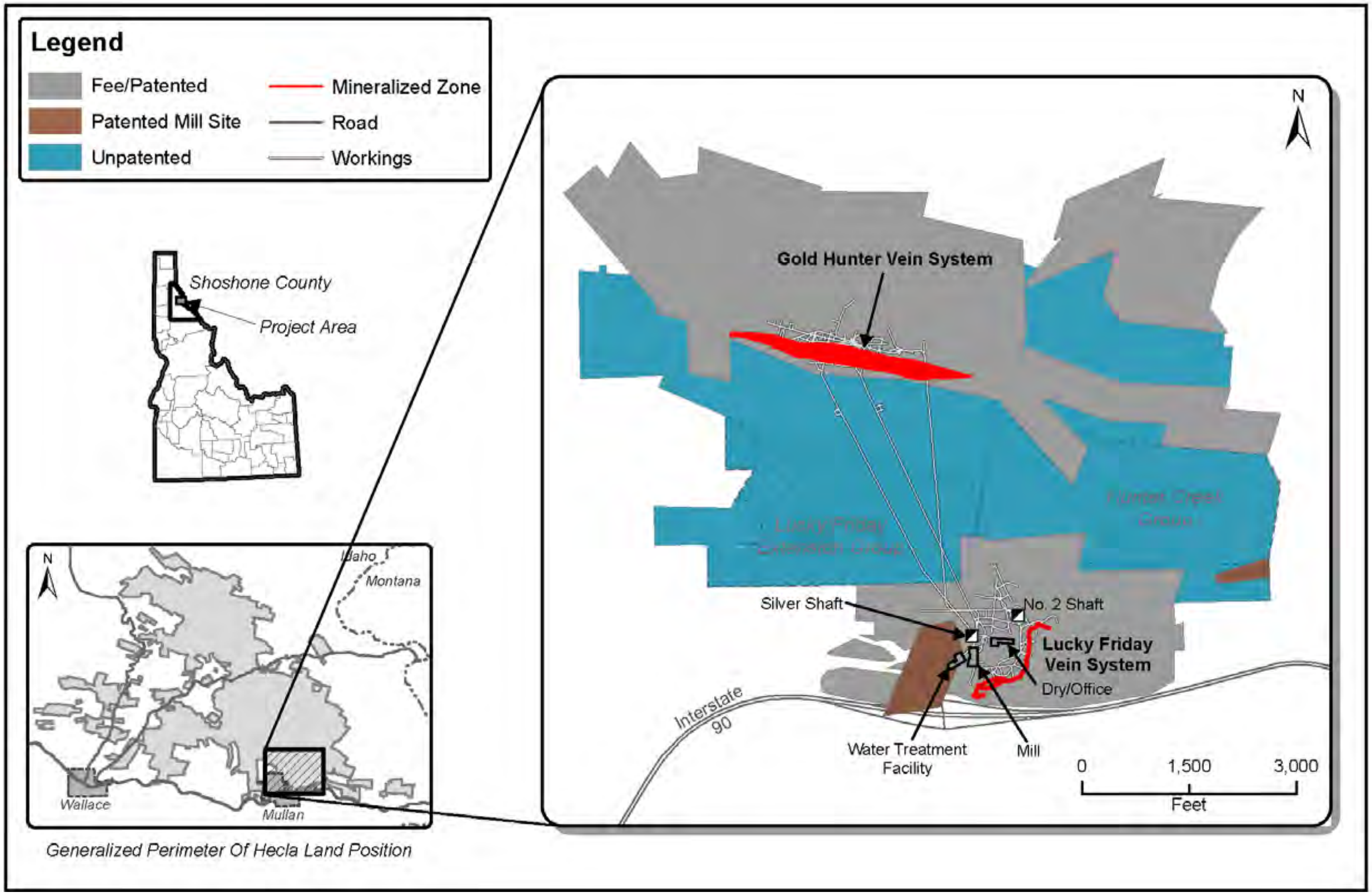
The Property, located in Sections 22, 23, 25, 26, 27, 34, 35, and 36, Township 48 North, Range 5 East, Boise Meridian, Shoshone County, Idaho, comprises approximately 710 acres of patented mining and millsite claims and fee lands, and 535 acres of unpatented mining claims. The Property lies within approximately 28 mi^2 of mineral interests controlled by Hecla and its affiliates, which includes patented mining and millsite claims, fee lands, and unpatented mining claims (Figure 3-2). The maintenance fees required to hold the unpatented mining claims have been paid annually to the U.S. Bureau of Land Management (BLM), and the claims are in good standing. Payment of property taxes on patented claims and fee parcels are current as of the date of this TRS. Lists of the patented and unpatented claims within the Lucky Friday area are provided in Appendix 27.4.

There are no royalties or back-in rights, however, there are intercompany transfers of royalties done between Silver Hunter and Hecla Limited. The surface rights to the patented mining claims are owned by a timber company, but Hecla has reserved rights to utilize the surface for mining-related purposes.

Certain unpatented mining claims are subject to a 1971 operating agreement between Hecla Limited (successor to Day Mines, Inc.) and Lucky Friday Extension Mining Company (LFX). The agreement grants Hecla a perpetual easement to crosscut the Hecla-LFX properties to conduct work in other properties such as the Gold Hunter. The 4050, 4900 and 5900 levels cross through this area. Hecla pays US$165 per claim annual maintenance fees to the BLM and the Shoshone County annual filing fees as required to maintain the unpatented claims in good standing on behalf of the parties. There are no royalties or back-in rights associated with the LFX group.

The Hunter Creek group, comprising nine unpatented mining claims, is subject to a 1971 agreement between Hecla and Hunter Creek Mining Company. Hecla owns a 50% interest in the unpatented claims and pays the US$165 per claim annual maintenance fees to the BLM and the Shoshone County annual filing fees as required to maintain the unpatented claims in good standing on behalf of the parties. There are no royalties or back-in rights associated with the Hunter Creek group.

Other than required annual maintenance fee payments for unpatented claims and tax payments for patented mining and millsite claims and fee lands, there are no additional obligations required to retain the properties. All of the unpatented mining claims are subject to the paramount title of the United States. The surface rights to the patented mining claims are owned by a timber company, but Hecla has reserved the right to use as much of the surface as in the reasonable judgment of Hecla is necessary for access and mining operations. There are no royalties or back-in rights encumbering the Property, and other than as described above, there are no payments or other agreements encumbering the properties.



Source: Hecla, 2021

Figure 3-2: Lucky Friday Complex Claim Map

3.3 Encumbrances

As stated above, there are no encumbrances on the Property.

3.4 Royalties

As stated above, there are no royalties payable.

3.5 Required Permits and Status

Operations at the Property are within the purview of numerous agencies (regulatory and non-regulatory) that require oversight, registration, and/or notification prior to initiating or significantly modifying facilities and operations at the Property. The Property has been in operation prior to inception of many regulatory programs, creation of certain regulatory agencies, and/or delegation of authority from the Federal government to the state agency.

The Property has obtained and maintains all the necessary registrations, authorizations, and permits necessary for operations to date and to continue operation of this facility well into the future (Table 3-1). Although some permits have expired or are set to expire, renewal applications were filed with the appropriate agency in each case or other measures were taken, as necessary, to administratively extend the prior conditions until such time as a renewed permit or additional authorization to utilize is issued.

Table 3-1: Environmental Authorizations, Operating Permits, and Registrations
Hecla Mining Company – Lucky Friday Mine

Type of Approval/Certificate	File Number	Agency	Purpose	Date of Approval
Certificate of Authorization	IDR05C290	USEPA	Authorization to utilize Nationwide MSGP	9/29/2008
Authorization to Discharge	ID-000017-5	USEPA	NPDES Wastewater Discharge permit for Outfalls 001, 002, & 003	9/14/2003
Permit to Construct/Operate	P-2010.0111	IDEQ	Permit to construct and operate portable air contaminant source (Concrete batch plant)	10/20/2010
DOT HazMat Registration	052912002005U	USDOT	Registration with DOT as Category E material shipper	5/30/2012
General Registration	GLTS-A-705715	NRC	Annual registration of on-site generally licensed devices.	2/13/2013 2014 Ackn. Pending
General Registration	ID00390	IDWR/US ACOE	ID used to identify MTIS#3 in National Dam inventory Total Surety value $239,542 approved by IDWR 94- xx20.	N/A
General Registration	ID00728	IDWR/US ACOE	ID used to identify MTIS#4 in National Dam inventory. Total Surety value $214,900 approved by IDWR for 94- xx25.	N/A

Type of Approval/Certificate	File Number	Agency	Purpose	Date of Approval
Certificate of Approval	94-xx25	IDWR	IDWR issued Cert. of Approval to impound water and tails at MTIS #4.	11/6/2013
PWS ID No.	1400028	IDEQ	IDEQ designation of PWS system operation.	2/6/1995
Operating Permit	731-10-000113	Idaho Fish & Game	Permit issued by Idaho Fish and Game to Operate Private Fish Pond.	6/21/2010
Waste Generator's Status	IDD009424862	USEPA	Majority of time Lucky Friday is a CESQG, however, periodic projects trigger status as SQG.	N/A

3.6 Other Significant Factors and Risks

SLR is not aware of any environmental liabilities on the Property. Hecla has all required permits to conduct the proposed work on the Property. SLR is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the proposed work program on the Property.

4.0 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

4.1 Accessibility

The Property is accessed from Coeur d'Alene on Interstate 90 eastwards to exit 69, which leads to Atlas Road. Travel north on Atlas Road for approximately 500 ft then right onto Friday Avenue. The mine security office is located approximately 1,200 ft east of the intersection of Atlas Road and Friday Avenue.

The nearest town is Mullan (pop. 692), which borders the western boundary of the mine and mill facilities. Spokane International is the nearest airport, located 94 mi west of the Property on Interstate 90. Spokane International is serviced by several major carriers with daily flights to a wide range of major cities.

4.2 Climate

The climate of the Coeur d'Alene district is strongly seasonal with warm summers and harsh winters. The mean temperature for Mullan is 44.7°F with average monthly minimums of 27.1°F in December and average monthly maximums of 63.0°F in July andAugust. Mean precipitation is 35.24 in. (expressed in inches of water), with November having the highest average precipitation and July the least. This is well above the mean precipitation for Idaho which records an average of 18.9 in. annually. Precipitation is observed an average of 158 days a year. An average annual snowfall for Mullan is 111.9 in., with December experiencing the most at an averageof 27.3 in. No snow is recorded between June and September. These data are based on records from 1975 to 1997 (Western Regional Climate Centre, 2009).

The mine is typically able to operate throughout the full year without any hindrance due to inclement or seasonal weather.

4.3 Local Resources and Infrastructure

The Property is located in the Silver Valley District of Idaho. This is an area with a long mining history and there is ready access to mining suppliers and skilled trades. The Property is immediately north of Interstate 90 at exit no. 69 and is easily accessible by automobile throughout the year on Idaho state maintained surfaced roadways. The project infrastructure and the infrastructure layout at the mine site are discussed in Section 15.0 of this TRS. There is sufficient suitable land available within the mineral tenure held by Hecla for tailings disposal, mine waste disposal, and installations such as the process plant and related mine infrastructure. All necessary infrastructure has been built and is sufficient for the projected life of mine (LOM) plan.

4.4 Physiography

The Coeur d'Alene District lies within the Bitterroot Mountains, a part of the Northern Rocky Mountain Region. The area is characterized by rugged terrain and high relief with abundant vegetation. Originally consisting of conifer forests, forest fires have diminished those trees in favor of second growth stands and brush. Principal conifers that remain are located in deep ravines and consist of pine, fir, hemlock, larch, cedar and spruce. Deciduous trees, mainly willow, alder and black cottonwood are found on the valley flats and along streams. Some aspen inhabit the high, open slopes, and willow and alder can be found on ridge slopes.

The Property is situated in an area of narrow valleys and wooded mountains. There is limited flat space in the mine area due to valley flats being restricted to the main stream and the lower reaches of some major tributaries. In only a few places do the flats exceed half a mile in width. Ridge crests range in altitude from 6,000 fasl to 7,000 fasl. The maximum relief between valley floors and adjacent ridge crests and peaks ranges from 3,000 ft to 4,000 ft.

5.0 HISTORY

5.1 Introduction and Previous Ownership

The Lucky Friday deposit was discovered in 1880 by J. F. Ingalis. Staking was initiated in 1889 by the Lucky Friday Group, and by 1906 the Property consisted of six claims. Gold Hunter mining production began in 1885, from a large surface gossan containing significant silver enrichment. In 1893, Gold Hunter Mining and Smelting Company (later changed to Gold Hunter Mines, Inc.) was incorporated to conduct mining activities on the Property.

The Lucky Friday Mining Company was incorporated in 1906 in the State of Washington and in Idaho in 1913. Some limited tunneling and trenching work was conducted. In 1938, John Sekulic acquired a lease and option to purchase the six claims and the following year formed the Lucky Friday Silver-Lead Mines Company to work the Property. A shaft was sunk to the 600 ft level and in 1942 the first commercial shipment of ore was made. Hecla began acquiring stock in Lucky Friday Silver-Lead Mines Company in 1958, with the purchase of a 38% interest and eventually, in 1964, the two companies merged.

Claims around the Gold Hunter had multiple ownerships until 1968. Day Mines, Inc. (Day Mines) acquired a majority interest in Gold Hunter Mines, Inc. in the 1950s. In 1955, the assets of Gold Hunter Mines, Inc. were conveyed by deed to a newly incorporated Gold Hunter Mining Company, and Gold Hunter Mines, Inc. was dissolved. The assets of Gold Hunter Mining Company were acquired by Day Mines in 1962, and the Gold Hunter Mining Company was dissolved.

The claims adjacent to the Gold Hunter deposit were owned by Abot Mining Company (Abot) and Independence Lead Mines Company. In 1968, Day Mines, Abot, and Independence Lead Mines Company (collectively referred to as DIA) entered into a series of agreements which allowed Hecla, as operator, to explore and develop the consolidated properties, including the Gold Hunter deposit. Day Mines was merged in 1981 with a wholly owned subsidiary of Hecla, Hecla-Day Mining Corporation, which was merged into Hecla the following year. In 2001, Abot quit-claimed its DIA property interests to Hecla. Hecla acquired the assets of Independence Lead Mines Company, including the DIA properties, in 2007 through its wholly owned subsidiary, Silver Hunter Mining Company.

Historical production for the Lucky Friday Mine to the end of 2020 was 165.7 Moz silver, 1.04 MT lead, and 210 KT zinc (Hecla, 2020) making it the Coeur d'Alene District's fourth largest silver producer.

5.2 Exploration and Development of the Lucky Friday Vein System

Exploration work spans a very broad time period and primarily consists of step-outs and progressively deeper investigations along known structures. There is a link between exploration and definition work, and often times the two general categories overlap.

A summary of early exploration on the Lucky Friday deposit is provided in Table 5-1. This area of the Property is currently inactive.

Table 5-1: Summary of Lucky Friday Vein Exploration by Elevation and Year
Hecla Mining Company – Lucky Friday Mine

Levels/Sublevels	Year	Description of Exploration Work Done
1400 level	1940	South drift on South Control Fault (SCF) outlined weak mineralization 500 ft west of the main Lucky Friday vein system.
		Development driven 500 ft to the Hunter Creek vein system north of the North Control Fault (NCF) with minor drifting on the South Star Fault (SSF) projection.
		The east split drift advanced from the Hunter Creek drift to test the eastern projection of the SSF. Found minor mineralization between the SSF and Whiteledge Fault (WLF).
2000 level	Late 1940s to 1951	Exploration hole from No. 1 shaft station to projection of SSF. No core was recovered from the fault zone.
		A northeast trending drift exposed veining between the NCF and SSF. Three drill holes on SSF and Hunter Creek targets were unsuccessful in discovering economic mineralization.
2800 level	1965 to 1967	The 1,250 ft Hunter Ranch drift driven west of intersection of the SCF and Lucky Friday Vein.
		Six holes drilled from the Hunter Ranch drift; three north and three south. One hole to the south intersected a 0.1 ft wide pyrite-chalcopyrite-quartz stringer; one of the holes to the north returned a sludge sample grading 0.7 oz/t Ag, 3.1% Pb, 0.1% Zn.
3050 level	1963 to 1966, 1988	Jutila Drift developed 3,500 ft east of Lucky Friday/NCF intersection. Fourteen diamond drill holes tested north and south of drift. No significant mineralization found except for where SSF crossed drift.
	1988	Jutila Drift drilled again to test downward projection of a mineralized zone exposed during surface construction.
4050 level	1973 to 1978, 1991 to 1993	The DMI drift west of Lucky Friday No. 2 shaft driven 1,300 ft. Two drill holes tested SCF projection with no success.
		Development confirmed the mineralization in the Silver Vein.
4250 level	late 1970s	Drifting and drilling on 40 Vein and on a link vein between NCF and SSF.
		Drifting to the southeast encountered mineralization 100 ft along the SCF.
4450 level	1989-1990	950 ft of SCF development encountered weak tetrahedrite and minor gold mineralization in a sub-economic “split vein”. Defined continuation of SCF mineralized zone to over 1,200 ft.
5100 level	1985-1994	Allied Silver tested 2,500 ft west of Lucky Friday system between the NCF and SCF. Eight diamond drill holes were drilled to the north and south.
		East and west projections of Silver Vein tested; low-grade disseminations 500 ft east and west of known mineralization.

Levels/Sublevels	Year	Description of Exploration Work Done
		The Tuesday Vein discovered in 1988 by extending the 5100 level 104 crosscut (hanging wall vein access).
		Development of the 40 Vein to the southeast near the 5100 level 112-development drift encountered mineralization that remains in resource.
		Weak mineralization and disseminated tetrahedrite encountered by hole 51-18 to test the SCF.
5300 level	1985 to 1994	Drilling to test the east, west and south projections of the Silver Vein zone intersected the 85 Vein southeast of the Silver Vein. Drilling also confirmed disseminated tetrahedrite mineralization in wall rock previously seen in 5100 level drilling.
		Testing of the far east projection of the SCF resulting in a tetrahedrite intersection. This was followed by the 4450 level South Control Fault Project.
		Drilling the east projection of the 40 Vein encountered weak mineralization confirming the downward projection of the Tuesday Vein. This drilling also suggested a “Link Vein” between the NCF and SSF.
5570 Sublevel	1994 to present	Drilling to test the Silver Vein yielded mixed results.
		Mineralization in the “Link Vein” between the NCF and SSF was confirmed but is currently subeconomic. More exploration is recommended.
Below 5570	1995 to present	Deep vein projections tested. Still open-ended to depth. Definition and exploration diamond drilling continuing on both the 30 and Intermediate Veins.

5.3 Exploration and Development of the Lucky Friday Expansion Area (Gold Hunter)

A summary of historical exploration on the Gold Hunter deposit is provided in Table 5-2.

Table 5-2: Summary of Gold Hunter Vein Exploration by Elevation and Year
Hecla Mining Company – Lucky Friday Mine

Levels/Sublevels	Year	Description of Exploration
4050 level	1974-1978	DIA drift advanced 3,700 ft north from LF No. 2 shaft to the down dip projection of the Gold Hunter Vein. Started in 1974, completed in 1977. An additional 390 ft of drifting to the west and seven drill holes were completed. Mineralization persisted for 800 ft of strike length but was subeconomic. The Gold Hunter zone was discovered in the Wallace Formation, 2,500 ft below Gold Hunter’s surface expression.
	1991-1993	The west exploration program tested the down rake projection of the Gold Hunter in 1991. Two holes were drilled and a 4 ft, 50 oz/ton Ag vein was intersected. This led to two years of exploration drilling that defined the 4050 level but was insufficient for a production decision. This prompted a re-evaluation of the deposit model.

Levels/Sublevels	Year	Description of Exploration
	2007-2008	A geological study was completed that defined Gold Hunter as a vein deposit and recommended deeper exploration and development. Hole GH29-01, drilled in 2007 from 4050 level to test the Gold Hunter zone 900 ft above 4050, yielded encouraging results. In 2008, surface drilling comprising seven holes tested the Gold Hunter Gap between the historic production and the mineralization on the 4050 level and confirmed the continuity of mineralization. Also in 2008, drift rehab, 700 ft of development, and 850 ft of drifting for drill stations were completed. Seven holes were drilled to target the zones above the 4050 level. The program was successful, but the project was suspended to focus on deeper resources.
	2010	Diamond drilling resumed in the fourth quarter of 2010 from station No. 4 to test above the 4050 level development and stoping conducted during 1991-1993. Four 3900 level holes were completed and one 3700 level hole was abandoned due to core recovery problems. Vein locations and grades were confirmed but only one intercept of economic tenor was returned. The target from this station switched late in the quarter to definition drill testing below the level, with four holes completed by year end.
	2011	Nine holes were drilled from station No. 4 on the east side of 4050 level, and four holes from station No. 1 on the west. Drilling resulted in small increment to the Intermediate Vein resources and upgrades to the 30 Vein resource. Recoveries were poor due to constraints regarding the drilling additives, and drilling was suspended.
4900 level	1995 to 2001	In 1995, the Gold Hunter tunnel drive began and yielded economic mineralization that resulted in a positive production decision in 1997. Full production was reached in 1998 and the area was mined, at full capacity, until 2001.
5900 level	2004 to present	Gold Hunter production was reduced from 2001 to Q1 2005 when the 5900 level drive reached mineralization. Far east projection drilling began in 2005 confirming the mineralized zone projected at least 1,400 ft east of the 15 stope economic limit at the 5800 level. Minor mineralization to the far east was confirmed by drilling in 2006 approximately 2,000 ft beyond the 4900 level economic limit. Access drive started in 2004, completed by mid-2006. Mineralization was encountered in vein characterization drilling. The 6400 level deep drill program confirmed deep mineralization in 2005. During 2006, Gold Hunter deep potential was successfully tested to the 7500 level confirming 1,000 ft of strike length. One hole returned an economic intersection below the 8000 level.

Levels/Sublevels	Year	Description of Exploration
		During 2006, the west Gold Hunter projection was tested but yielded equivocal results. In 2007, the deep west 6900 level was tested and resources were confirmed below the 7000 level. Faulting is thought to offset or terminate the deep west projection of Gold Hunter. Full production from the 5900 level reached in Q4 2006. Deep targets along the projected west 6900 level were tested during 2007 resulting in resource confirmation to depths below 7000 level. Far-west diamond drill holes indicate existence of a fault (Silver Fault?) that either offsets or terminates the west projection of the deep Gold Hunter resource. East exploration drifting in 2006 defined potential for Intermediate and 30 Vein mineralization below the 5900 level. East exploration work was completed on the Intermediate Veins during 2008, which resulted in expansion of the resource at the 5700 and 6100 levels. Two long exploration holes were drilled in 2008, one testing 1,800 ft north of the 5900 level Gold Hunter system on the east, and the second testing 2,975 ft north of the system on the west side. No significant mineralization was encountered in either hole. The west side hole, abandoned due to intersection with a water-charged fault, was cemented. Exploration to the east below the 5900 level continued during 2008 with testing reaching to the 6300 elevation. One hole reached the 7400 level and encountered good grade mineralization over a one foot horizontal width, approximately 600 ft east of the known economic boundary. Exploration to the west testing the Silver Fault offset was completed in late 2008 and confirmed the existence of another large fault that terminates or offsets mineralization. Late in 2008, Deep Gold Hunter exploration began and confirmed improved 30 and 40 Vein grades below 6300 level. Deep Gold Hunter exploration completed in late 2009, drilled the central and eastern areas with the deepest hole reaching the 7850 elevation. Drilling yielded generally positive results. A conditional simulation study was conducted late in 2009, which indicated that drill spacing was sufficient for characterization of the resource down to 7900 level. East exploration between the 6100 and 6400 levels confirmed narrow mineralization beyond the 2008 resource boundary. Evidence was found for increasing widths and grades with depth, to the east between the 6500 and 7900 levels. West exploration testing for a north offset on the Silver Fault was completed late in 2009, encountering local alteration and minor mineral occurrences along a fault. A large target area was defined between the Silver Fault and the Elk Fault east of the Star Mine.

Levels/Sublevels	Year	Description of Exploration
		During 2010, east deep exploration drilling confirmed Gold Hunter resource expansion and added approximately 400 ft to the strike of the east resource below the 6900 level. Intermediate Vein intercepts north of the deep projections of the 30-Vein returned economic widths and grades. East deep drill testing from the 5900 wash bay was completed late in the fourth quarter. Continued success with the deep drilling during 2010 program improved the confidence of deep resource projections to the 8300 level.
		Nine holes were collared from the 5900 No. 4 shaft station, and four additional holes were wedged from these. Drilling extended into the Silver Fault Zone; only six of the thirteen attempted holes penetrated the entire mineralized package. Dips of the deep west mineralization appeared to reverse from steeply south to steeply north; the economic vein assemblage that was encountered appeared to consist of two to four economic veins.
Mine-Based Exploration of GH Surface Veins	2007	A total of seven diamond drill holes were completed during 2007, testing targets beyond the western limits of the historic near-surface mining operations along the Gold Hunter System.
		The Gold Hunter, Yolande, and the American Commander areas were tested. The deepest hole extended from surface down to the 600 tunnel level at 2,770 ft MSL. No significant intercepts were encountered.

5.4 Historical Resource Estimates

The most recent Mineral Resource and Mineral Reserve estimates were disclosed on the Hecla web site (Hecla, 2020). The estimates were prepared by Hecla and are summarized in Table 5-3 and Table 5-4, respectively. The effective date, as stated on the web site, was December 31, 2020.

Table 5-3: Previous Mineral Resource Estimate – December 31, 2020
Hecla Mining Company – Lucky Friday Mine

Category	Tons (ton)	Grades			Contained Metal		
		(oz/ton Ag)	(% Pb)	(% Zn)	(oz Ag)	(ton Pb)	(ton Zn)
Measured	9,007,000	7.6	4.8	2.4	68,543,000	430,950	218,740
Indicated	2,275,000	7.8	5.3	2.2	17,844,000	120,390	50,970
Total M+I	11,282,000	7.7	4.9	2.4	86,386,000	551,340	269,710
Inferred	3,069,000	8.3	6.3	2.7	25,359,000	192,200	83,350

Notes:

1. In situ Measured, Indicated, and Inferred Resources from Gold Hunter and Lucky Friday vein systems are diluted for expected mining recovery.
2. The net smelter return (NSR) cut-off grades are US$170.18/ton for the 30 Vein, US$184.97/ton for the Intermediate Veins, and US$207.15/ton for the Lucky Friday Vein.

3. Metal prices used were US$21/oz Ag, US$1.15/lb Pb, and US$1.35/lb Zn.
4. Totals may not agree due to rounding.

Table 5-4: Previous Mineral Reserve Estimate – December 31, 2020
Hecla Mining Company – Lucky Friday Mine

Category	Tons (ton)	Grades			Contained Metal		
		(oz/ton Ag)	(% Pb)	(% Zn)	(oz Ag)	(ton Pb)	(ton Zn)
Proven	4,393,000	14.2	8.8	4.1	62,290,000	386,210	180,060
Probable	1,372,000	10.7	7.2	3.9	14,702,000	99,170	53,190
Total P + P	5,764,000	13.4	8.4	4.0	76,992,000	485,380	233,250

Notes:

1. The NSR cut-off grades are US$216.19/ton for the 30 Vein and US$230.98/ton for the Intermediate Veins.
2. Metal prices used were US$16/oz Ag, US$0.90/lb Pb, and US$1.15/lb Zn.
3. Totals may not agree due to rounding.

The December 31, 2020 Mineral Resource and Mineral Reserve estimates are superseded by the estimates reported in Section 11.0 of this TRS.

5.5 Past Production

As stated above, historical production for the Lucky Friday Mine to the end of 2020 was 165.7 Moz silver, 1.04 MT lead, and 210 KT zinc (Hecla, 2020).

6.0 GEOLOGICAL SETTING, MINERALIZATION, AND DEPOSIT

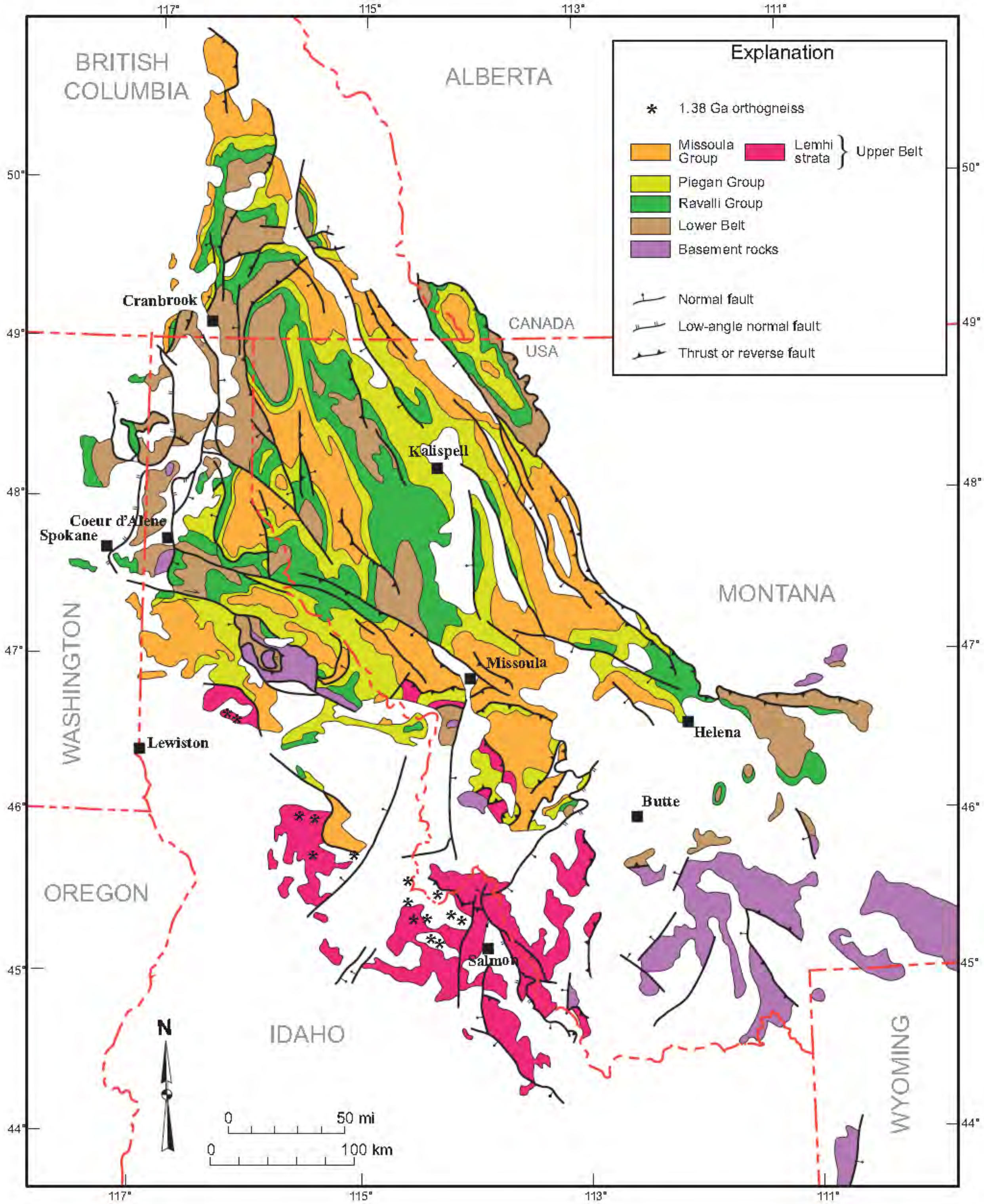
6.1 Regional Geology

The Coeur d'Alene Mining District is predominantly underlain by Middle Proterozoic (ca. 1.45 Ga to 1.40 Ga) meta-sedimentary and mafic intrusive rocks of the Belt Supergroup (Figure 6-1). The Belt consists of a thick sequence of variably metamorphosed marine, lacustrine, and sub-aerially derived quartzites and argillites with scattered carbonaceous horizons (Hobbs et al., 1965). The sequence is only rarely interrupted by magmatic events. The Belt Supergroup lies unconformably on top of Archean and Proterozoic crystalline basement.

These rocks correlate with the Purcell Supergroup in southern British Columbia and Alberta, and together, the Belt-Purcell comprises an enormous sedimentary basin which extends southwards to central Idaho and laterally from the Washington border to almost midway into Montana. It is thought to be a fault-bounded rift basin, which for most of its existence was remarkably stable as no unconformities have been found throughout its entire vertical extent (Lonn et al., 2020). The Belt Supergroup is estimated to be at least 15 km thick (Hobbs et al., 1965), possibly over 18 km thick (Jones et al., 2015), and subtends an area of greater than 200,000 km^2 (Lonn et al., 2020).

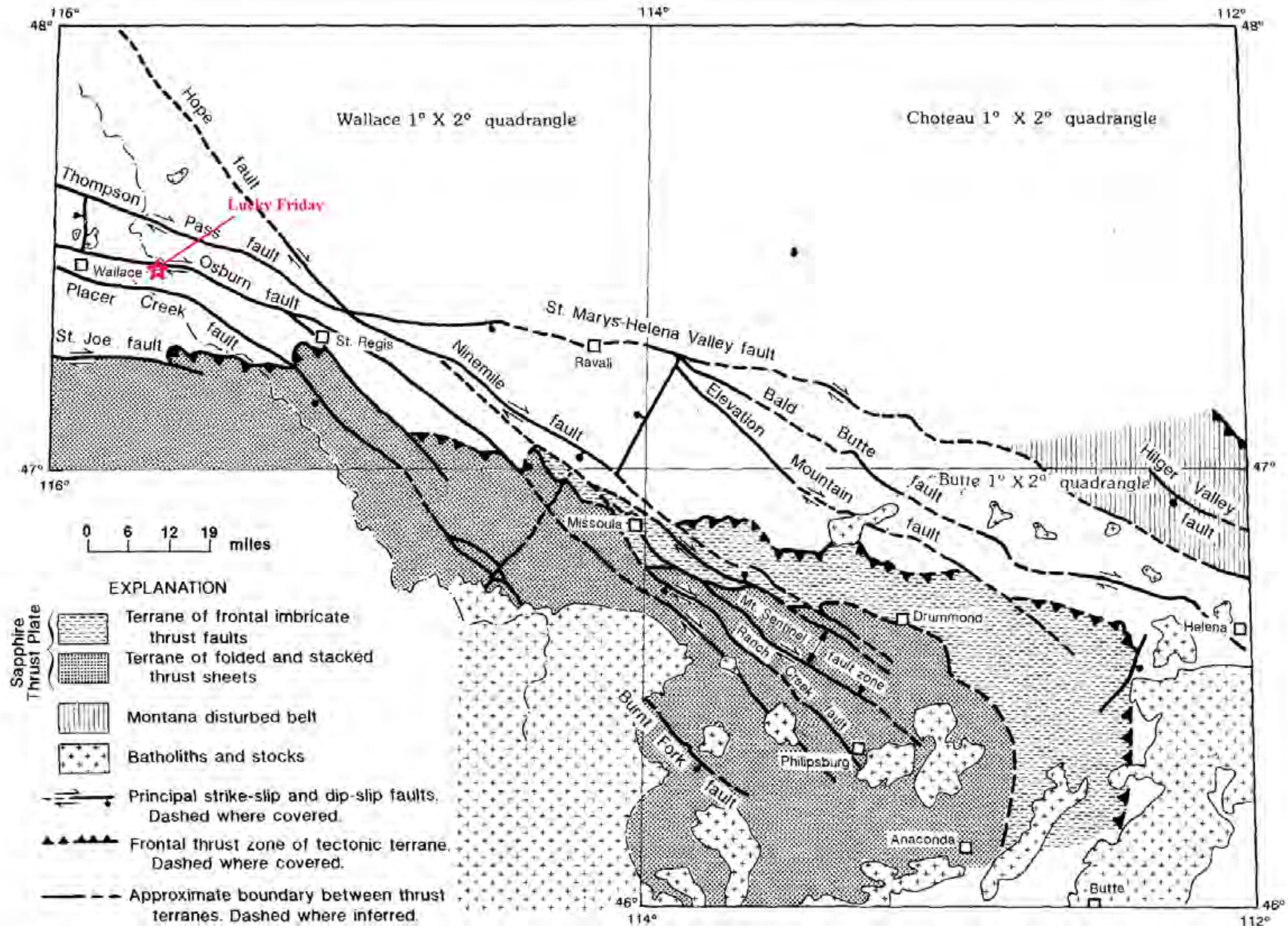
The Belt Purcell Supergroup was deposited near the margin of the North American craton within the Columbia supercontinent between 1.54 Ga and 1.30 Ga (Jones et al., 2015; Perelló et al., 2021). Deformation of the Belt is thought to have commenced at about 1.45 Ga with rifting and the detachment of the Australian and Antarctic cratons from the North American Craton. The region has undergone several episodes of deformation and metamorphism including the East Kootenay (1.38 to 1.325 Ga), Grenville (1.20 to 1.00 Ga), and Goat River (900 to 800 Ma) orogenies (Perelló et al., 2021). Most recently, deformation and faulting has occurred during Cordilleran tectonism (Jones et al., 2015) taking place from the Jurassic (ca 160 Ma) and extending into the Eocene (ca 50 Ma).

This prolonged tectonism has resulted in a complex series of synclines and anticlines that are often overturned. In the mine area, the primary structural feature is the Lewis and Clark Line (Figure 6-2), a crustal-scale shear corridor measuring 400 km long and up to 80 km wide trending west-northwest from Montana across the Idaho Panhandle (Wallace et al., 1990). The most recent displacement event likely took place in the Late Cretaceous and is estimated to have resulted in between 11 km and 28 km of right-lateral strike slip movement.



Source: Lonn et al., 2020

Figure 6-1: Regional Geology



Source: Wallace et al., 1990

Figure 6-2: Lewis and Clark Line

6.2 Local and Property Geology

The Belt Supergroup has been subdivided into four groups: the Lower Belt, Ravalli, Middle Belt, and the Missoula Groups (Harrison, 1972). In the Coeur d'Alene Mining District, Belt Supergroup rocks are further subdivided into six formations listed below (oldest to youngest):

- Prichard Formation (Lower Belt Group); Dark grey to black argillite with two quartzite horizons;
- Burke Formation (Ravalli Group); Grey argillaceous quartzite, including some characteristic beds of purple quartzite;
- Revett Formation (Ravalli Group); Competent, thick-bedded, white and grey quartzite, with some green-grey argillaceous quartzite beds;
- St. Regis Formation (Ravalli Group); Purplish-grey quartzite and argillite;
- Wallace Formation (Middle Belt Group); Light grey quartzite, limestone, and argillite;
- Striped Peak Formation (Missoula Group); Purplish-grey and greenish grey quartzite, and thinly laminated purplish-grey argillite.

These rock units are depicted in a stratigraphic column in Figure 6-4.

In the immediate mine area Belt Supergroup stratigraphy comprises the Revett, St. Regis, and Wallace Formations (Figure 6-3). The lowermost is the Revett Formation which is predominantly shallow marine quartzite, with local argillaceous lenses. It is immediately overlain by St. Regis Formation shallow marine shales and sandstones which are, in turn, overlain by the Wallace Formation. The Wallace Formation is primarily composed of fine-grained, thin-bedded calcareous or dolomitic sericitic slate, banded argillite, ferruginous and dolomitic limestone, and calcareous quartzite that grade into one another.

Cretaceous monzonitic intrusions, referred to as the Gem stocks, cut the stratigraphy approximately two miles northwest of the Star-Morning deposit. The Gem stocks are distributed along a northeast trend that is bounded to the southwest by the Dobson Pass Fault. Metamorphism associated with these intrusions, as well as an alteration facies locally described as "bleaching", obscures contact relationships. Younger dikes of dioritic composition also transect the area.

As stated above, these rocks are intensely folded into a complex series of synclines and anticlines that are often overturned. Faulting is also complex, with an older north-northwest-trending set of axial plane faults offset by later west-northwest right-lateral strike-slip faults. Structures related to this later strike-slip movement host most of the orebodies discovered in the district. Later, extensional faulting overprints these ore hosting structures. These structures are the principal control to ore formation in the district.

The Osburn Fault (OBF), which represents the largest fault in the district, passes just south of the mine (Figure 6-3). This is a major regional structure which divides the entire district into north and south sections. The fault strikes N80W and has undergone right lateral displacement in the order of 12 mi to 16 mi, depending on dip-slip movement. Subsidiary subparallel faults splay off of the main structure on both the north and south. To the north, the structural trend swings more to a north to north-northwest orientation. Other major producers of the district including the Bunker Hill and Sunshine mines are located on the south side of the OBF, but displaced westward. South of the OBF folds and faults trend east-west, whilst north of the OBF the larger folds trend northwest and the larger faults have a west to northwest strike.

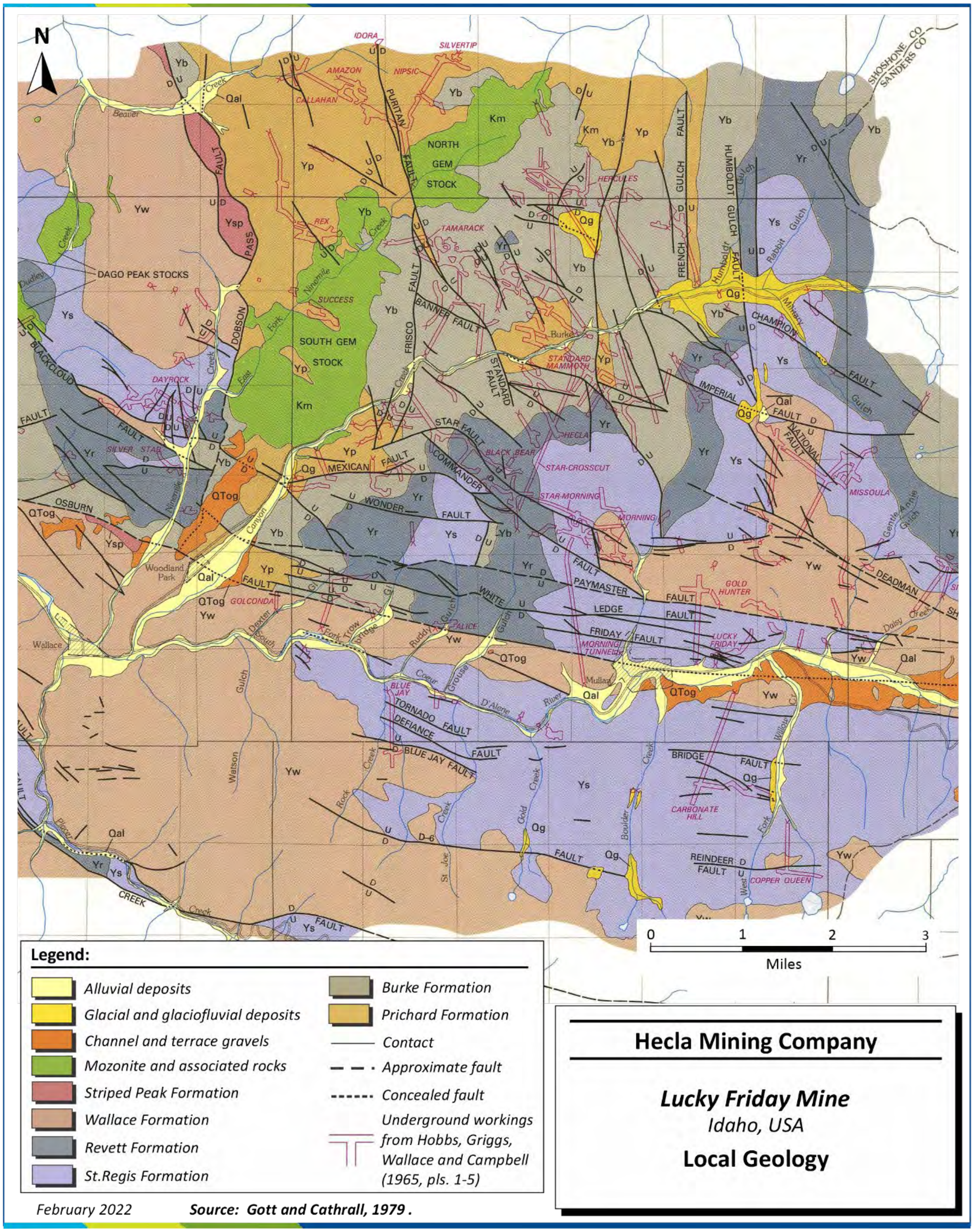
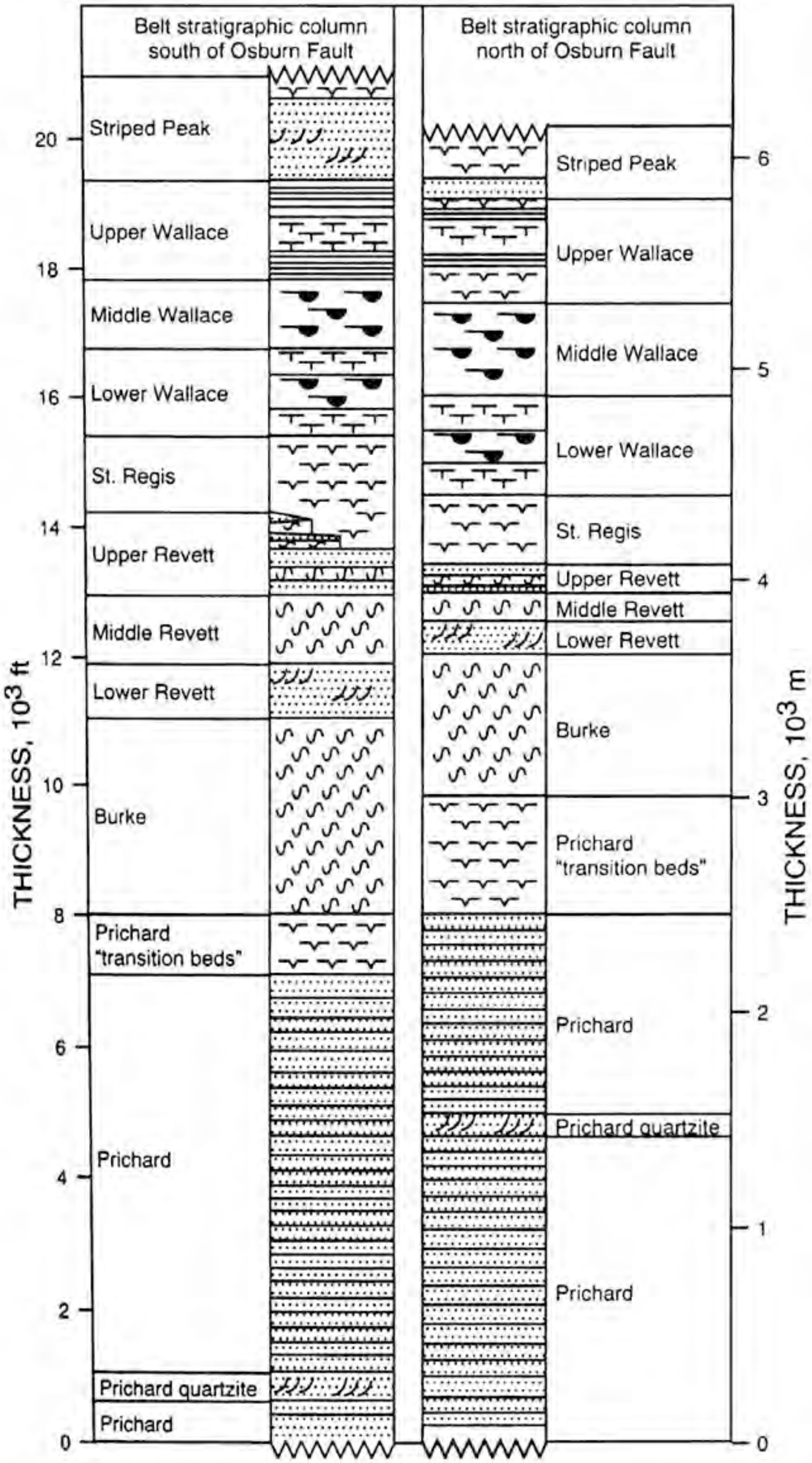


Figure 6-3: Local Geology



Source: Mitchell et al., 2021

Figure 6-4: Stratigraphic Column

The Dobson Pass Fault represents a major discontinuity that juxtaposes the Wallace and Prichard formations. All rocks, including the major silver-bearing veins and the Gem stocks, are cut by north-northwest striking lamprophyre dikes that are interpreted to be Tertiary in age (Hobbs et al., 1965).

The Lucky Friday deposits are fissure-hosted silver-lead-zinc veins typical of the Coeur d'Alene District. Principal vein systems are the Lucky Friday and Gold Hunter Veins (Figure 6-5). Economic mineralization consists of silver-bearing galena and tetrahedrite, with relatively minor amounts of sphalerite and chalcopyrite. These minerals occur in veins, fracture-fillings, and disseminations along with accessory pyrite and a gangue of iron carbonate (siderite), calcite, and quartz. Mineralization is strongly structurally controlled with a significant influence from the competency of the wall rocks. Ore bodies are best developed where faults and fractures intersect more siliceous and competent lithologies, and are less likely to occur in the comparatively incompetent argillites.

The Lucky Friday ore zone is a single tabular body that curves from east-northeast to northeast in strike and dips almost vertically. The host structure is a shear couple tensional feature, bounded by two major west-northwest-trending faults associated with the Osburn Fault (located 1,000 ft to the south). These bounding faults are termed the North and South Control Faults (NCF and SCF, respectively). Between these two structures, the vein and host stratigraphy are folded into a southwest-trending steeply plunging antiform called the Hook Anticline. The fracture hosting the Lucky Friday vein has undergone up to 200 ft of reverse movement.

Horizontal vein widths are in the order of five feet to six feet. The strongest mineralization occurs in the quartzitic rocks of the Revett Formation. Near surface, where the Lucky Friday vein traverses St. Regis Formation argillites, the mineralization is weak and discontinuous. Below the 1200 level, where the vein walls transition to Revett, vein widths and mineralization are much more robust.

Vein mineralization consists of very fine- to coarse-grained argentiferous galena, sphalerite, and local tetrahedrite. Gangue minerals are quartz and siderite with accessory pyrite and arsenopyrite. Gangue minerals often display cataclastic textures such as rounding and quartz or siderite "eyes" owing to post-ore movement of the faults. The wall rocks are generally weakly altered, with siderite proximal to the vein, grading to siderite with calcite distally, up a distance of 300 ft from the veins.

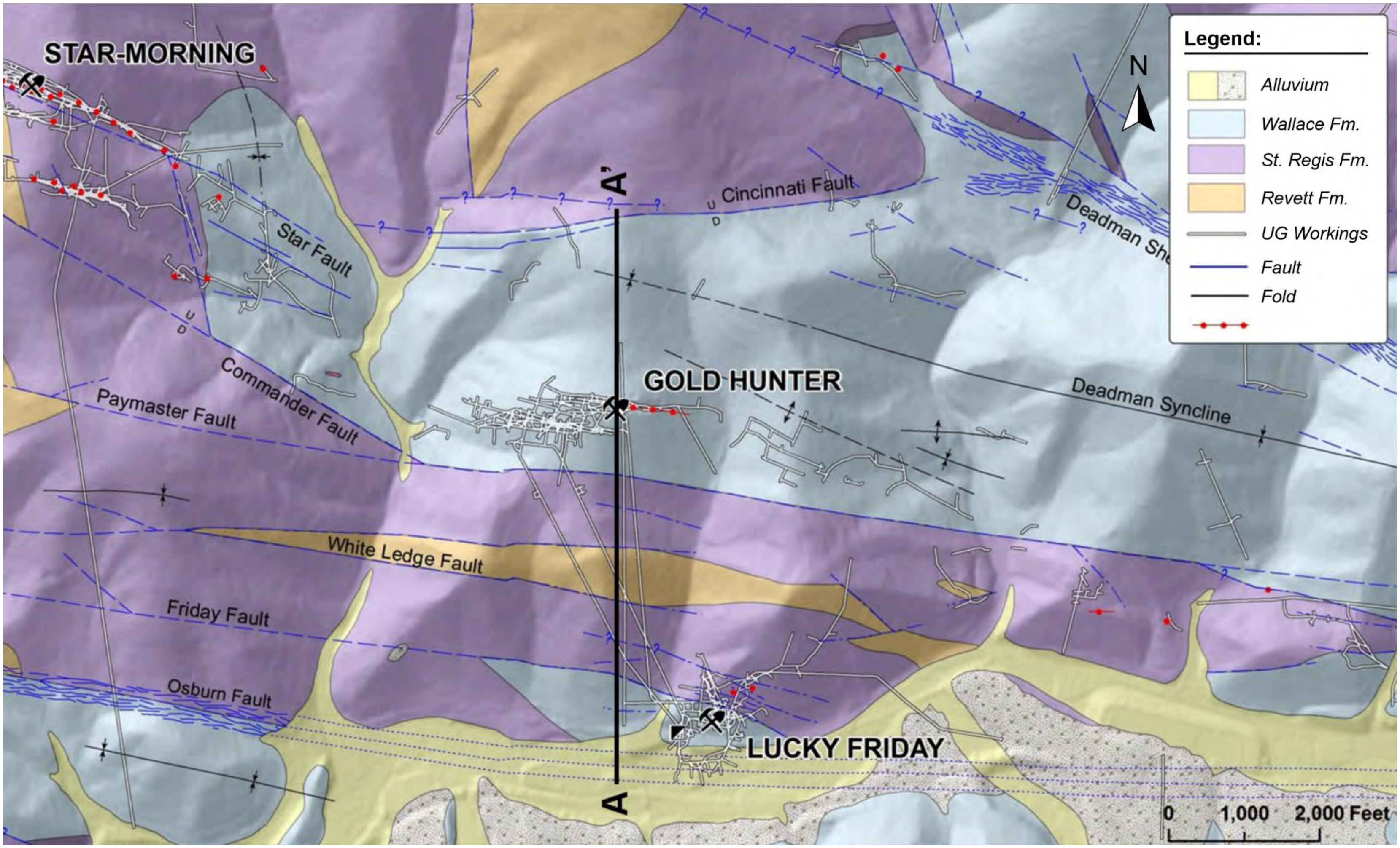
The Gold Hunter Vein system is located approximately 4,000 ft northwest of the Lucky Friday deposit (Figure 6-5 and Figure 6-6). The system comprises several closely spaced individual veins in a broad zone measuring approximately 200 ft wide and striking in a west-northwest direction. The present resource estimate includes material from 16 individual veins. Vein orientations are generally parallel, although they do intersect in places, and dips are near-vertical (Figure 6-7). The 30 Vein is the most important economically, both from a reserve and production point of view. The 30 Vein has been mined along a strike length of just over 2,200 ft on the 5900 level and slightly more at depth. The known vertical extent of mineralization on this structure is nearly 4,700 ft and is open-ended. Horizontal mining widths are typically in the order of five to seven feet but have been known to extend as far as 15 ft. Ore bodies on the other veins (termed "Intermediate Veins") have tended to be smaller, so far measuring in the hundreds of feet in strike and dip extent, and are somewhat narrower, generally in the 2.5 ft to 4.0 ft range.

The Gold Hunter veins are hosted in sheared argillites of the Wallace Formation and, at depth, the St. Regis Formation, which were at one time considered to be less prospective owing to their lower competence. The host unit is a 200 ft thick siliceous and relatively more brittle lens in the argillites. The Wallace Formation lithology consists of thinly bedded argillites, argillites alternating with silt caps, and local siltites. The more typical Wallace Formation dolomitic argillites and siltites are found distal to mineralization. Argillites proximal to mineralization are green to grey, becoming purple-coloured and hematitic further away from the mineralization. Fissility in the Wallace Formation is reduced in the vicinity of the Gold Hunter deposit, owing to an envelope of silica and siderite associated with the mineralization. It is believed this alteration hardened the host rock and made it more amenable to fracturing and development of sulphide orebodies.

The wall rocks at Gold Hunter have a metamorphic shear lineation that trends N83W and plunges to the west at 74° to 82°, roughly parallel to the ore bodies. This fabric has been observed at the surface discovery and is also noted at depth as sericite mineralization along bedding and cleavage surfaces. The Wallace Formation is folded to a nearly vertical orientation with a strike in the order of N80-85W and dipping 80-90S. Gold Hunter appears to be within the south limb of a faulted N80-85W-trending antiform.

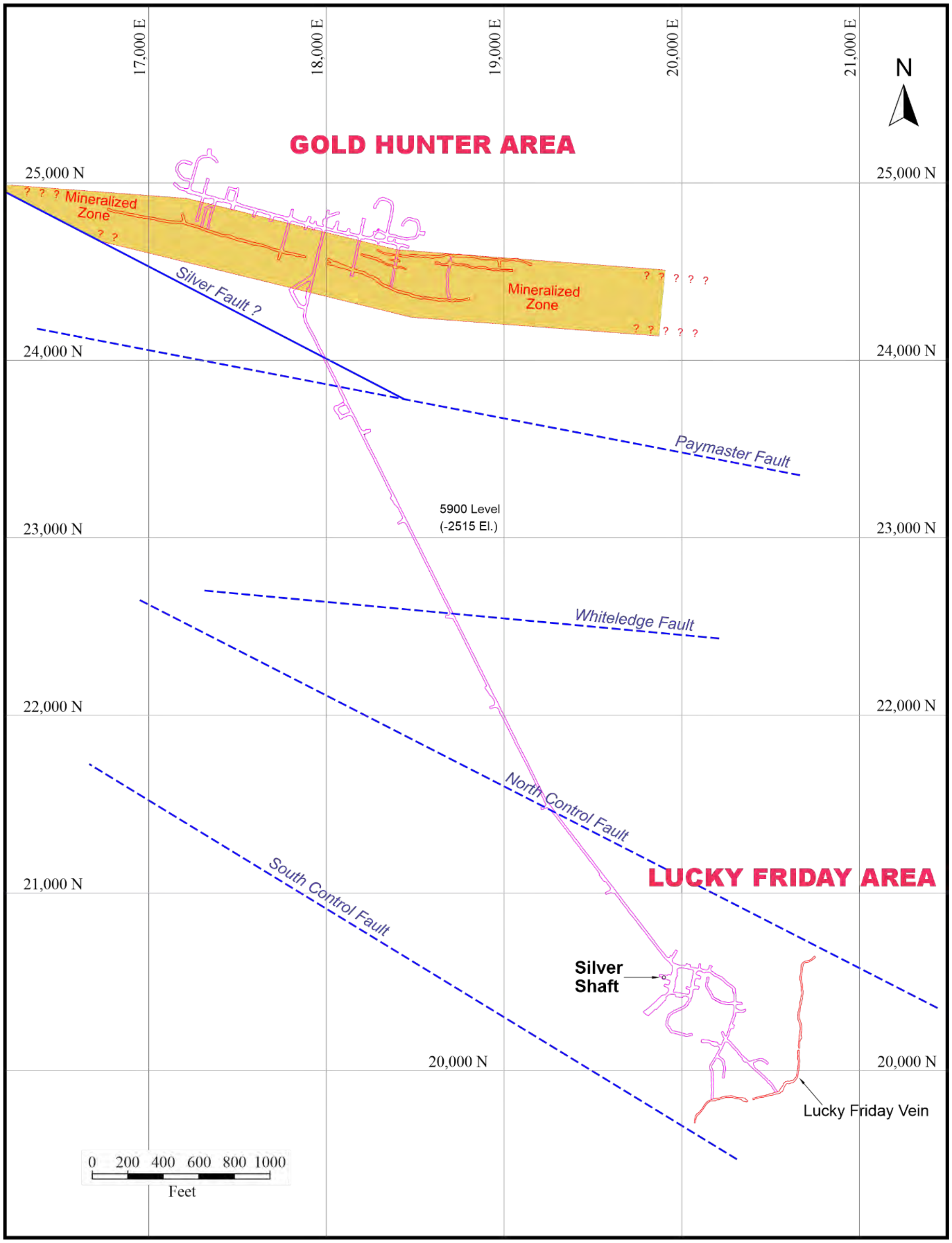
There is little carbonate locally in the Wallace Formation around the deposit. Proximal to the Gold Hunter deposit, carbonate takes the form of siderite that grades outward to low-iron siderite, to ankerite, and to calcite/dolomite distally. The carbonate alteration is closely related to the mineralization and is considered a key diagnostic indicator.

The Gold Hunter vein system lies between two west-northwest trending district fault structures. The faults lie approximately 1,500 ft apart and define the Star-Gold Hunter trend. To the north is the N80-85W striking and 80S dipping Independence Fault and to the south is the N80W-striking and 80S-dipping Paymaster Fault (Figure 6-5,Figure 6-6, and Figure 6-7).



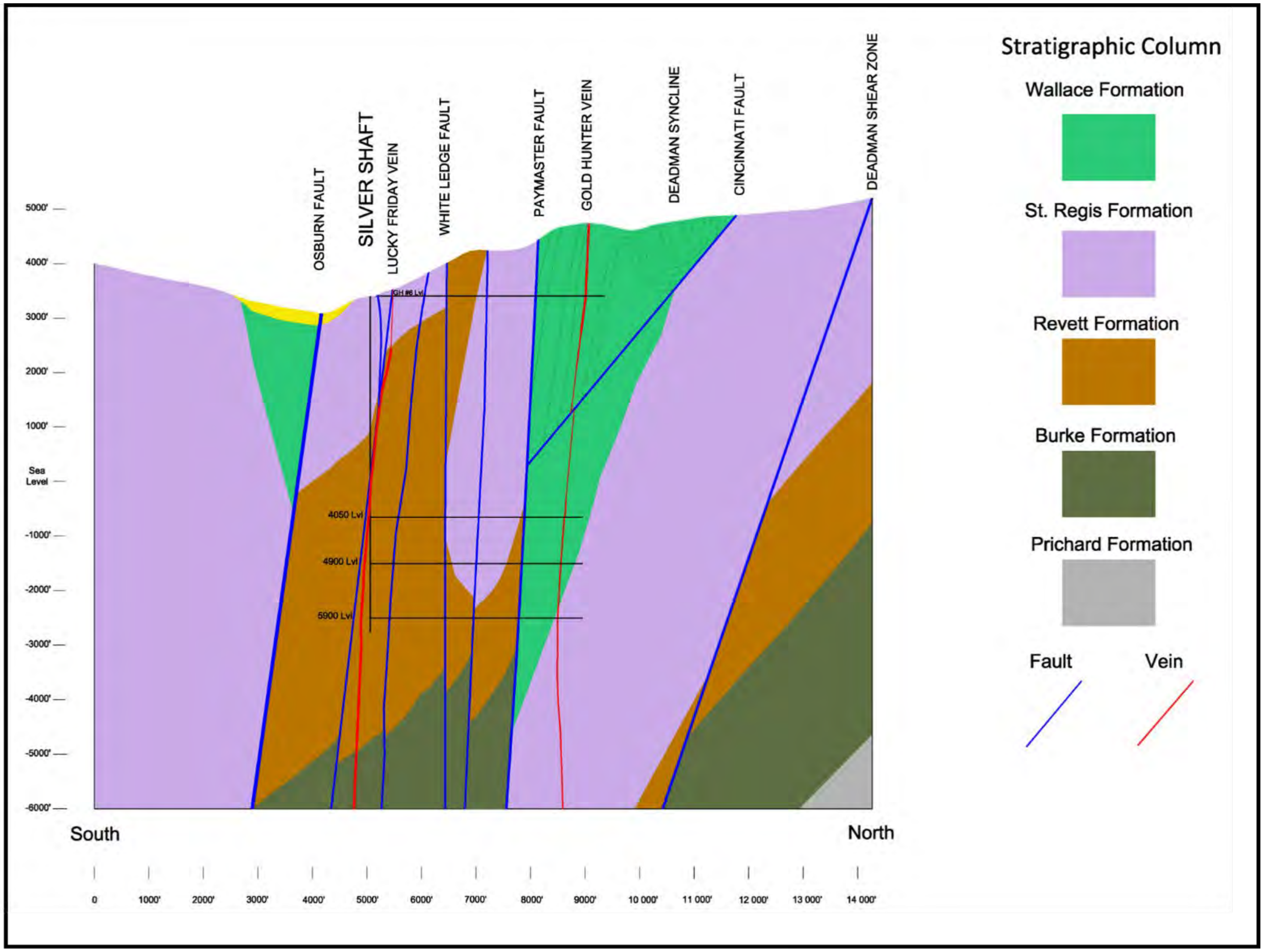
Source: RPA, 2017 (Digitized from Hobbs et al., 1965)

Figure 6-5: Property Geology



Source: RPA, 2017

Figure 6-6: Geological Plan 5900 Level



Source: RPA, 2017 (Digitized from Hobbs et al., 1965)

Figure 6-7: Cross Section

6.3 Mineralization

6.3.1 Lucky Friday Vein

Wall rock alteration consists of a weak carbonate zonation. Calcite dominates in areas distal to the mineralization that gives way to ankerite as the vein is approached and then is altered to siderite closer to the vein system. The geometry of this alteration depends upon wall rock porosity and permeability. Iron and magnesium in fluids flowing out from the vein systems altered the original calcite. Some host rocks contain dolomite, which compromises the alteration pattern. This alteration can be seen for distances of more than 300 ft from vein systems depending upon bedding orientations to the vein source. Additionally, disseminations of sulfide extend some distance into host stratigraphy. This sulfide material usually consists of galena, sphalerite, and tetrahedrite.

The Lucky Friday Vein has an economic strike length of up to 1,500 ft. The vein is a high angle south-southeast dipping vein that varies from inches to as much as 20 ft in width. The average varies from four to six ft over the full economic length.

The source for this mineralization is current unclear. The Lucky Friday Vein is connected with the NCF and SCF, which are mineralized locally. These may have been the major structural controls, enabling mineralizing fluids to flow into the host fissure, which eventually became the vein.

The vein consists of both gangue and sulfide mineralization. It contains quartz and siderite with lesser amounts of pyrite and arsenopyrite. Ore minerals include argentiferous galena, sphalerite, and local tetrahedrite.

Mineral textures vary. Gangue minerals are often cataclastic for quartz and siderite with milling evidenced by rounded mineral grains. Quartz and siderite "eyes" are common in Lucky Friday ores. Sulfide textures vary from very fine-grained to coarse-crystalline.

A simplified paragenesis begins with early quartz carbonate, plus or minus sericite and pyrite, followed by sphalerite, and then by tetrahedrite and argentiferous galena.

6.3.2 Gold Hunter Vein System

Gold Hunter historic mining extending from the surface at +4,700 ft MSL elevation to the 4900 level at -1,510 ft MSL elevation demonstrates grade trends and variability. The vein zones are stacked and parallel to sub-parallel with often ill-defined mineralized lenses. The historic surface mining had bulk resource grades of 4.1 oz/ton Ag and 3.9% Pb in three main lenses. On the 4050 level at the -675 ft MSL elevation there were five lenses at a bulk grade of 9.1 oz/ton Ag, 4.1% Pb, and 1.3% Zn. At 4900 level (-1,510 MSL) there are ten lenses at a bulk grade of 9.6 oz/ton Ag, 5.4% Pb, and 2.3% Zn.

Mine geologists report that silver, lead, and zinc bulk grades generally increase with depth. Lead and zinc content increases slightly relative to silver.

There are currently 101 definable, parallel veins identified in the Gold Hunter system. These vary in width and grade with the most productive being the 30-Vein. This vein has the greatest value, width, and economic length when compared to the other Gold Hunter veins. The 30-Vein averages more than four ft in width as a composite of closely spaced veins and veinlets. It strikes N83W and dips 80°S to vertically. The economic vein length is approximately 2,300 ft. This vein has yielded a significant percentage of total Lucky Friday Unit production since 1997 and has been largely mined out down to approximately 6000 level. The other "Intermediate" veins have shorter strike lengths and generally narrower widths. The distribution of silver, lead, and zinc varies randomly for each vein. Production from Intermediate veins is in the LOM plan and is anticipated to contribute proportionally more to the overall mill feed as time progresses.

The 5900 level development was completed and full production was reached at the end of 2006. It had been expected that overall grade trends would yield lower values at the 5900. Subsequent drilling and development indicated that the expected grade fall-off trends were not as dramatic as had been anticipated. The overall grade for 5900 level was lower, however, the mineable strike length increased by 600 ft relative to the 4900 level. Much of the composite grade decrease was due to the inclusion of more mineable strike length. The eastern side of the deposit is actually higher grade than expected and the western side a little narrower and lower than expected with the increase in length. Deep drilling results from 2008 to 2010 suggest improving grades below the 6500 level. Lucky Friday mine staff are of the opinion that reserve and resource estimates to the 7000 level have a very high level of confidence with appropriate drill grid spacing. There are also a number of drill intercepts from deep-seated drilling that extend resource estimates to the 8300 level.

As with Lucky Friday, the source of the Gold Hunter mineralization is not fully understood. The Gold Hunter zone’s downward projection eventually reaches an intersection with the Independence Fault, which hosted the Star Mine mineralization. Lucky Friday geologists consider that this fault may be the source structure for the Gold Hunter mineralization, forming a conduit whereby fluids moved along reactivated axial plane cleavage to form the deposit.

Individual vein constituents vary but a typical vein contains quartz and siderite with lesser amounts of pyrite and barite. Ore minerals include argentiferous galena, sphalerite, and local tetrahedrite. There are also minor amounts of other sulfosalts, including pyrargyrite (ruby silver), bournonite, and boulangerite.

Mineral textures vary. Gangue mineral textures are often cataclastic for siderite and local quartz. Sulfide textures vary from locally coarse crystalline galena to fine grained steel galena. Very fine grained sheared galena is observed to be more silver-rich that coarser grained variants. Sphalerite textures range from medium crystalline to fine-grained and is generally lower in iron content relative to the Lucky Friday Mine sphalerite.

A simplified paragenesis for the Gold Hunter begins with early quartz/carbonate/ sericite/pyrite, followed by sphalerite, then tetrahedrite/argentiferous galena, and lastly late stage cooling and development of additional sulfosalts minerals. It is currently believed that some of these sulfosalts may have formed as silver was released from argentiferous galena during deposit cooling.

6.4 Deposit Types

The deposits of the Coeur d’Alene District, including Lucky Friday, are classified by Beaudoin and Sangster (1996) as clastic metasediment-hosted vein silver-lead-zinc deposits. In addition to Coeur d’Alene, the world’s most prolific silver district, this deposit type embraces a number of historical mining localities including the Harz Mountains and Freiberg in Germany, Keno Hill and Kokanee Range in Canada, and Příbram in the Czech Republic. They are typified by the following general characteristics:

- Hosted in thick, monotonous sequences of fine- to medium-grained clastic sedimentary rocks transected by deep-seated regional-scale faulting
- Sedimentary basins occur in a wide range of tectonic environments, but all have been subject to deformation, intrusion, and regional metamorphism, typically greenschist facies

- Economic minerals are predominantly galena and sphalerite with minor accessory pyrite and a wide range of sulphosalt minerals including tetrahedrite, pyrargyrite, stephanite, bournonite, acanthite, and native silver.
- Gangue minerals typically comprise siderite and quartz with lesser amounts of dolomite or calcite
- Comparatively low gold content
- Temperature of sulphide mineral deposition in the range of 250°C to 300°C
- Hydrothermal alteration constrained to a few metres of the veins and characterized by sericite, silicification, and pyrite.

The signature for all economic deposits discovered within the Coeur d'Alene District is vein-like morphology hosted within the meta-sediments of the Belt Super Group. In the Lucky Friday Complex, as well as other sub-districts in the Coeur d'Alene District, veins occur as branching fissures that cross-cut or invade the sedimentary bedding or host rocks. Previous studies have indicated the veins are mesothermal origin (Leach, 1982). The vein structures are known to branch, split or bifurcate, forming duplexing and anastomosing geometries. The majority of veins strike west-northwest, are steeply- dipping, elongated down-dip and can have strike lengths over 4,000 ft and dip lengths over 8,000 ft (Hobbs et al., 1965).

It is generally accepted that the veins of the Coeur d'Alene District were formed during the Cretaceous to early Tertiary. Genesis of the ore bodies may have been a result of regional-scale metamorphism and the development of hydrothermal systems associated with the emplacement of the Idaho Batholith pluton and concurrent deformation. Metamorphic hydrothermal fluids most likely scavenged syngenetic metals (silver, lead, zinc, and copper) from Proterozoic Belt Supergroup strata and emplaced these metals within pre-existing or concurrent structural features (Fleck et al., 2002).

7.0 EXPLORATION

7.1 Exploration

Exploration work on the Property ceased in 2017 and has not resumed.

7.2 Drilling

7.2.1 Drilling Procedures

Historically, drilling at the mine was divided into two general categories: exploration and definition drilling. Holes that are drilled more distant from the active workings, typically to test specific geological targets, were termed exploration. As stated above, exploration drilling is not currently done, and hasn't for several years. Definition drilling, however, is currently being carried out in the immediate vicinity of the mine workings with the purpose of upgrading the confidence level of the Mineral Resources.

Diamond drilling for the Gold Hunter veins is primarily conducted from underground. The holes are fanned from purpose-built openings and targeted to intersect the 30 Vein on a 50 ft x 50 ft pattern. Although the target in the 30 Vein, several of the Intermediate Veins are captured as well. The holes are usually in the order of 350 ft long, with one hole in five extended to capture more veins, and for rock geochemical studies.

Drilling is carried out under contract by Dynamic Drilling of Osburn, Idaho, using a Sandvik DE130 (formerly Hagby 1000) machine. The drilling crew schedule is dependent on drill station availability and averages five day/week crew staffing to meet the planning horizons. Core size is NQ2 (1.99 in. diameter).

Figure 7-1 is a plan view showing the general distribution of diamond drill holes at Gold Hunter.

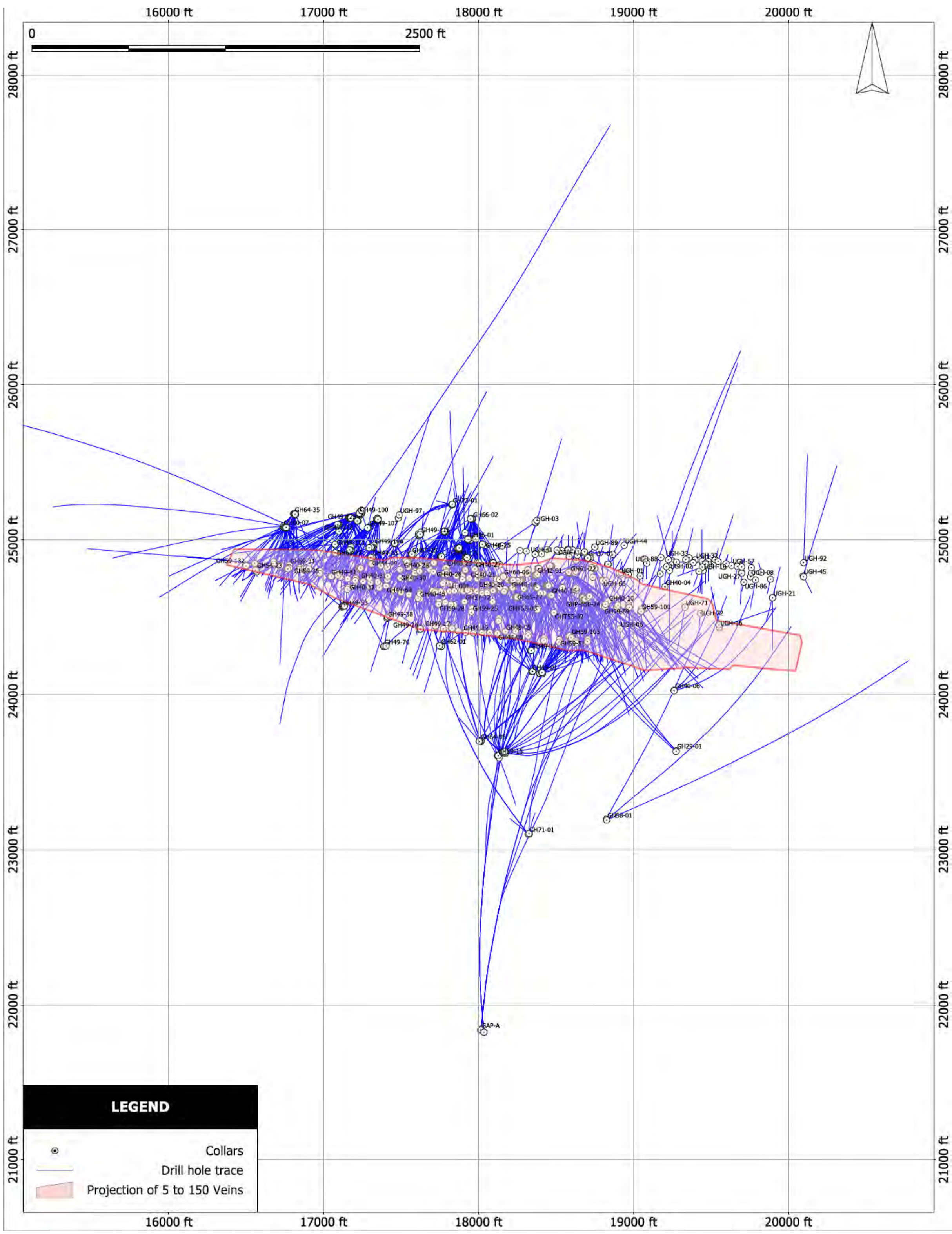
All holes are cemented for their entire length following completion.

The drillers place the core in waxed cardboard boxes which are then enclosed and taped shut prior to transport to the shaft station on the 5900 level. They are then placed in steel containers to be collected by mine staff and conveyed to the logging facility which is located near the mine offices.

The core logging facility has recently been completely reconfigured. Benches have been replaced with a series of roller-equipped racks that allow the boxes to be easily pushed with no lifting from station to station during the logging and sampling process. New lighting has been installed along with a water supply system with spray hoses, as well as cushioned flooring.

Upon receipt of the core at the logging facility, the boxes are laid out in order on the rollers. They are then examined to ensure correct block footages and core orientation. Zones of core loss are noted, and geotechnical logging is conducted. This includes measurement of recovery, rock quality designation (RQD), and recording the presence of "disking" (ie the separation of the core along closely spaced parting planes). Disking typically occurs in fault zones and is therefore important to note for ground control purposes.

Logging is conducted by a contract geologist supplied by Tamarack Geological Services of Osburn, Idaho. Data is digitally captured on notebook computers using GeoSequel, a commercially available software package.



Source: SLR, 2021

Figure 7-1: Gold Hunter Diamond Drill Plan

The core is then logged for lithology and mineralogy, as well as sedimentary structures, veins, faults, and other structural features. Following this, a third logging pass is made noting type, style, and intensity of alteration. During the logging process, features of note are marked with crayon so as to be visible in the core photos.

The core is then wetted and photographed using a purpose-built camera and lighting enclosure which provides uniform digital images. In addition to the notations on the core for geological information, the sample boundaries and numbers are also marked to allow for easier validation of the assay results using the imagery.

Specimens from each vein are measured for specific gravity (SG) using a water immersion method on unsealed core. This SG data is currently not being used for tonnage estimates.

7.2.2 Surveys

Hole locations and orientations are marked for the drillers by the supervising geologist. Once the hole has advanced for 50 ft, it is stopped, and the orientation checked with a Reflex EZ-Shot downhole survey instrument. If the orientation is within 3° of planned, the drillers are allowed to proceed. On reaching the target depth the drillers stop the hole and survey the entire length with the EZ-Shot. Surveys are made at the end of the hole progressing back upwards at 100 ft intervals to the 50 ft mark.

The EZ-Shot azimuth measurements are based on magnetics, and susceptible to interference from steel objects. Taking a reading 50 ft down the hole reduces the chance that the instrument will be influenced by any iron objects in the drift. The EZ-Shot instrument also records the magnetic field strength which is used to derive an average field strength for help in assessing individual orientation readings. If an obviously spurious measurement is recorded, it is discarded and replaced with an average of adjacent readings.

The hole collar locations are picked up by the mine surveyors, as are any breakthroughs noted in the drifts. This is to provide a means for gauging the accuracy of the downhole surveys, and to note any general trends in hole deviation.

The survey data is recorded on paper and forwarded to the supervising geologist for capture using the GeoSequel software. The surveyed holes are checked on screen in 3D to confirm that they were oriented as planned and in the correct location.

7.2.3 Drill Sampling

On completion of the logging, the core is marked for sampling. Samples range in length from a minimum of 0.5 ft to a maximum of four ft with breaks made based on lithological contacts or changes in estimated grade or mineralization style. Tags are placed in the boxes for each sample. Only the veins are sampled.

The core is not split, but rather sampled in its entirety. This is done primarily for efficiency and also because the mine has operated for so long there is no longer any need to retain the core for reference. It should be noted also that whole core provides a better sample owing to the additional volume of sample material. The core photographs are also of such high quality that it is possible to check the core in detail after it has been discarded.

Sample tag books are filled out with hole ID, location, from and to information, and a tag is placed in the sample bag. The sampled intervals are captured in GeoSequel and then checked using a validation routine to confirm that there are no overlaps or accidental gaps.

Assay Quality Assurance/Quality Control (QA/QC) samples consisting of either a blank, standard, reject duplicate, or pulp duplicate are entered into the sample stream at a rate of one in 20 samples. These are also recorded in the database.

Samples are placed in cloth bags which are then collected into reusable plastic shipping boxes ("tote"). The shipping list is generated in GeoSequel and place in the tote. A separate tote is used for each hole. The totes are shipped via commercial carrier to the ALS Global (ALS) laboratory in Reno, Nevada.

In the QP's opinion, the drilling, core handling, logging, and sampling at Lucky Friday is being conducted according to common industry practice, in a manner appropriate for the deposit type and mineralization style.

7.2.4 Chip Sampling

Cut and fill stopes and development headings are visited on a regular basis by mine technical staff, and every second face is sampled and mapped. Stope and drift faces at Gold Hunter are mapped and photographed, then chip sampled from rib to rib. Samples are chipped into cloth bags using a rock hammer. Samples are oriented horizontally across the face from north to south, with breaks at structures, vein boundaries, and changes in mineralization style or other noticeable features. Sample lengths are constrained to a minimum of 0.5 ft and a maximum of 4.0 ft. Sample boundaries are painted on the face before a photograph is taken for verification purposes.

Mapping and sampling is done five feet above the drift floor. The sampling geologists create their own control for the mapping, which is then tied in by the survey department. The samplers make note of the vein orientations as well as the horizontal width of the veins, and the actual horizontal width of the opening. The recording of these parameters provides the ability to more accurately estimate the dilution occurring in the stopes, and assists in reconciliation.

Data collected includes stope name, cut height, date of sample, planned mining width, actual mining width, and distance from reference point. Material is also coded as waste dilution, required material, vein, or internal dilution.

The chip samples are located by means of measurement from the nearest survey station or control point and the surveyed drift wall. Sample tickets and face maps are stored in paper files, one for each stope cut. The face maps are scanned and stored on the server along with the face photographs. On receipt of the assay data, the assays are copied to both the paper file and the digital database. Site geologists are responsible for location of the samples and with keypunching the sample information into the GeoSequel database.

The samples are stored as drill hole records, with the "collar" always located on the north side of the working face, five feet above the average stope floor. The sample strings are oriented at an azimuth of 186°. After the stope has been completed and the sampling reconciled with the final survey, the chip sample data are exported to CSV files for import to Leapfrog and Surpac.

In the SLR QP's opinion, the chip sampling practices at the site are reasonable, appropriate for the mineralization style, and consistent with common industry practice.

7.3 Hydrogeology Data

Hydrogeology data is not currently collected from the Lucky Friday drill holes.

7.4 Geotechnical Data

As stated above in the section of Drilling Procedures, geotechnical data in the form of core recovery, RQD, and presence of disking are recorded in the logging process.

8.0 SAMPLE PREPARATION, ANALYSES, AND SECURITY

8.1 Sample Preparation and Analysis

8.1.1 Core Samples

The core samples are shipped to ALS in Reno, Nevada for analysis. ALS is an independent commercial analytical company that is well known in the industry. The Reno laboratory has ISO/IEC 17025:2017 accreditation. There are two broad categories of analyses that are performed on these samples: one for the geochemistry holes and another for the rest of the definition holes. All samples are prepared with the following ALS protocol:

- Oven dried
- Crush to 70% minus 2 mm
- Split by rotary splitter to a 250 g sub-sample
- Pulverize to 85% passing 75 µ

All samples are run using aqua regia digestion of a 0.4 g sub-sample and Inductively Coupled Plasma Mass Spectrometry (ICP-MS) finish for silver, lead, zinc, and iron. Overlimits for these assays (ie greater than 1,500 ppm Ag, 20% Pb, or 30% Zn) are rerun using the following protocols:

- Silver – fire assay (FA) of a 30 g aliquot with gravimetric finish
- Lead and zinc – digestion of a one g sub-sample and analysis by titration

The overlimit re-assays also include copper. The copper assays are used for characterization of tailings for monitoring purposes and are not relevant to the resource estimation.

Geochemistry samples are also analyzed for a suite of 48 elements via four-acid digestion of a 0.25 g sub-sample with an ICP-MS finish. Overlimits for the geochemistry holes are rerun with ICP-MS but with a larger, 0.40 g, sub-sample. The upper detection limits for the ICP-MS are 100 ppm Ag, and 10,000 ppm for lean, zinc, and copper.

Assay results are returned via email or can be downloaded from the ALS Webtrieve web portal. The data comes in csv format which can be uploaded to directly to Maxgeo for validation and processing.

8.1.2 Chip Samples

Hecla has its own assay laboratory, located in the town of Gem, Idaho, ten miles from the mine (Gem). The laboratory comprises a sample preparation area, with atomic absorption (AA), wet assay, and FA capabilities.

Samples are picked up from the mine site five days per week, with most sample results returned within one day. Assay reports are posted up to the network as spreadsheet files, which can be retrieved by the geology department as they become available. The spreadsheets are created by the geology staff at the time the samples are collected, and the laboratory staff manually fill in the assay results.

Analytical protocols are the same for drill and chip samples, and are outlined below:

- Dry in sample ovens for 12-18 hr
- Coarse-crush in a jaw crusher to -1/2 in.

- Pass coarse material through a Jones riffle splitter to obtain a 250 g subsample
- Reduce the subsample to minus 100 mesh with a ring pulverizer
- Collect a 0.2 g aliquot for AA and collect the remainder of subsample pulp for storage; pulps are stored for at least six months
- Digestion by boiling for 15 minutes in 10 mil nitric acid plus 20 mil hydrochloric acid
- Add water to reach 200 mL volume
- Determine silver, lead, and zinc assay with AA
- Transfer results to the sample spreadsheet on the server
- Rerun over-limit assays as requested by the geology department

Samples grading higher than 50 g/t Ag are rerun using FA, and are also assayed for copper. Those grading greater than 12% Zn or 20% Pb are rerun using wet titration methods.

8.2 Bulk Density

Specific gravities (SG) are estimated from metal contents by means of a stoichiometric equation taking into account the most common minerals in the ore. The principal constituent minerals of the ore are assumed to be galena (PbS) and sphalerite (ZnS) in a gangue containing siderite ($FeCO_3$) and pyrite (FeS_2) along with silicates. The relative abundance of iron species is assumed to be 75% siderite and 25% pyrite.

The SG equation is as follows:

$$Density = 100 / ((Gangue\%/2.76) + (Galena\%/7.50) + (Sphalerite\%/4.00) + (Siderite\%/3.94) + (Pyrite\%/5.02)$$

Where:

- Galena% = Pb% / 0.866
- Sphalerite% = Zn% / 0.670
- Siderite% = (Fe% x 0.75) / 0.482
- Pyrite% = (Fe% x 0.25) / 0.466
- Gangue% = 100 – (Galena% + Sphalerite% + Siderite% + Pyrite%)

The SG calculation results have been checked in past years by means of comparison with analytical measurements taken by mine staff and by an outside laboratory. In 2011, a suite of 40 hand specimens were selected and sent to McClelland Laboratories, Inc., in Sparks, Nevada, where they were measured for bulk density and assayed by ICP. The measured bulk densities were compared to values calculated from the grades determined at the GEM Lab. The calculated density values were found to be generally higher than the measured values, particularly at lower grades.

In 2014, 94 bulk density determinations were made on core specimens using the water immersion method. The results of these measurements were compared with the calculated SG's and found to be positively biased (ie. Comparatively higher) at lower densities and negatively biased at the upper end. Overall, the measured SG's were 4.1% lower than the calculated values, however, reconciliations at that time indicated that the resource models were reporting less tons than recorded at the mill. This contradicts any assumption that the calculated densities might be positively biased in some way.

As stated in the previous section of this report, SG measurements are currently being made on core specimens from each vein intercept. This is a relatively recent addition to the core handling protocols and data has not been applied in estimation of tonnages but it is hoped that they can be used to check the SG equation shown above.

In the SLR QP's opinion, there is no indication of a large or systemic problem with the bulk density determinations, and this procedure is considered to be acceptable for use in resource estimation. The collection of SG measurements is viewed as a useful endeavour that may provide opportunities for fine-tuning the bulk density estimates in future.

8.3 Quality Assurance and Quality Control

Assay QA/QC samples are placed into the stream at a rate of one standard, pulp duplicate, and reject duplicate for every 20 samples for core and one in 25 for chips. These QA/QC samples comprise the following four types:

- Blank material
- Standard
- Reject duplicate
- Pulp duplicate

The blanks and standards consist of pulverized materials that are submitted to the laboratory in packets. Lucky Friday staff report that there is a plan in place to switch to coarse blank material once the current inventory has been used up. Five standards and the blank were prepared in 2010 by CDN Laboratories of Langley, British Columbia from materials provided by the mine. They were independently certified by Smee & Associates Consulting Ltd., of Vancouver, British Columbia. Table 8-1 shows the certified grades and two-standard deviation (2 SD) confidence limits of these standards. Standard F is the blank.

Duplicates can be either a second split of the crushed material (sometimes referred to as a Prep Duplicate) or a split of the pulp.

Table 8-1: Standards Grades
Hecla Mining Company – Lucky Friday Mine

Standard	Ag (g/t)		Pb (%)		Zn (%)		Fe (%)	
	Grade	± 2 SD	Grade	± 2 SD	Grade	± 2 SD	Grade	± 2 SD
A	17.1	1.7	0.69	0.05	0.44	0.03	12.54	0.43
B	97.1	4.2	2.69	0.12	0.77	0.04	13.54	0.51
C	208	19	6.07	0.27	3.18	0.23	22.58	1.25
D	398	35	10.98	0.89	4.96	0.37	23.62	0.63
E	863	36	19.08	1.86	7.26	0.38	20.24	1.46
F	1.1	N/A	0.01	n/a	0.01	n/a	6.02	0.60

The results of the QA/QC sampling are captured in Maxgeo along with the rest of the sample data. Utilities within the software are used to collate and plot the QA/QC results on control diagrams for reporting purposes. The day-to-day validation process consists of a review by the supervising geologist of individual standards results as the assay reports are downloaded. Results that are out-of-spec (OOS) trigger a review and re-assay of all samples from the last acceptable control sample in stream to the next acceptable value (ie all samples surrounding the failure). The assay report will not be posted to the database until QA/QC issues are resolved.

8.4 SLR Review of QA/QC Results

SLR reviewed the sample QA/QC results as tabulated by Lucky Friday personnel for the period since restart of the mine in 2019 until July 25, 2020. The data provided consisted of standards control charts for both the ALS and Gem laboratories.

8.4.1 Blanks

Results for blanks (ie Standard F) are reviewed as they are received and stored as spreadsheets. The SLR QP compiled 458 blanks results from the assay certificates and found several instances of blanks assays that were more than ten times the DL. Results for lead were worst with 73 OOS assays. Zinc returned 29 OOS, while for iron and silver it was just one. These results were all from the ALS laboratory and were ICP analyses. In the SLR QP's opinion, these blanks results are not a cause for serious concern, however, the comparatively high number of OOS results for lead suggests that there may be a problem with the blank material itself. It is recommended that this be reviewed and corrected if necessary.

8.4.2 Duplicates

Duplicates results were plotted on scatter diagrams to look for evidence of bias or unusual dispersion. Example plots of these values are provided in Figure 8-1 and Figure 8-2. The SLR QP reviewed the pulp and reject duplicates results for silver, lead, zinc, and iron and did not find any concerns.

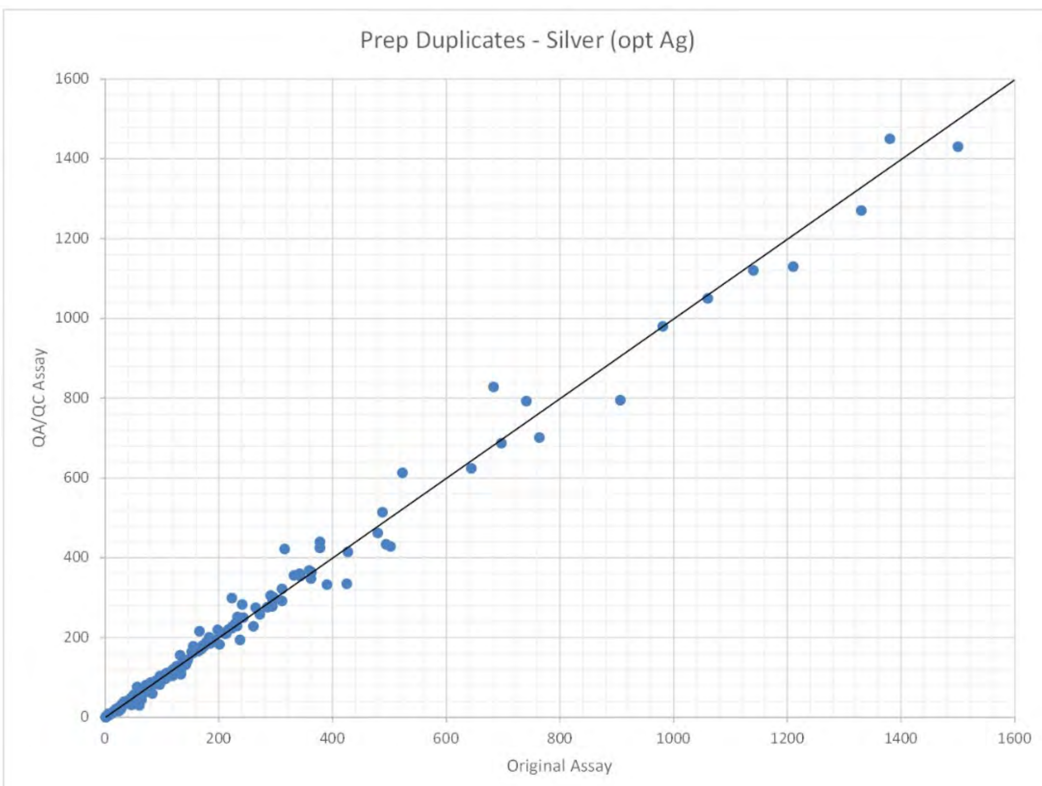


Figure 8-1: Prep Duplicates – Silver

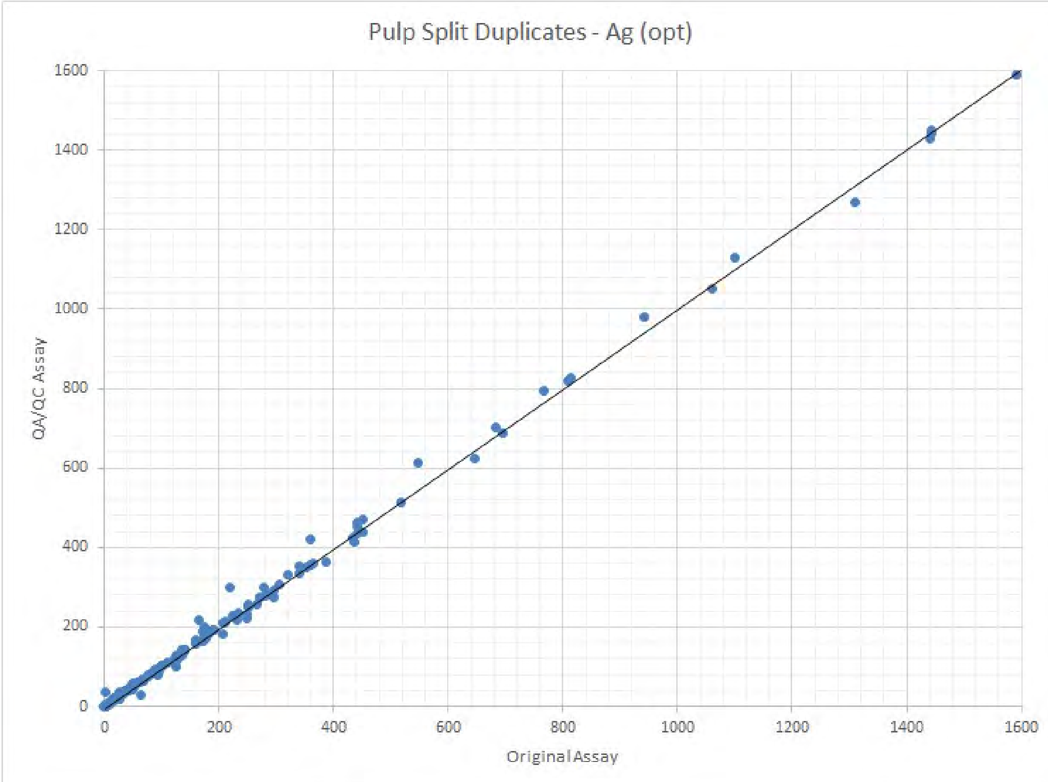


Figure 8-2: Pulp Split Duplicates – Silver

8.4.3 Standards

8.4.3.1 ALS Laboratory

The QA/QC assays for iron in all standards were routinely below the certified value (CV), generally below the 2 SD limit, often less than 3 SD. Slightly better performance was seen for Standards A and C, with the worst results for Standard D.

Silver results were observed to be satisfactory for Standards A and B. Standards C, D, and E, however, yielded assays that initially suggested there was a possible issue with the certified reference materials. Figure 8-3 and Figure 8-4 show the control chart for silver and zinc, respectively, in Standard C. The majority of the assays are within the acceptable range of ±2 SD from the CV. There are several, however, that plot within a relatively narrow range between 170 g/t Ag and 180 g/t Ag (Figure 8-3) and at approximately 4.25% Zn (Figure 8-4). Similar patterns occur for silver in Standards C, D, and E, lead in Standards B, C, D, and E, and for zinc in Standards C, D, and E. This pattern of failures does not appear in the results for iron, only silver, lead, and zinc.

On further review, it was found that the control plots were capturing preliminary assays that had been run using methods not appropriate for the grade of the standards. The "failed" standards had actually all been rerun using the proper protocols which were found to have returned acceptable results.

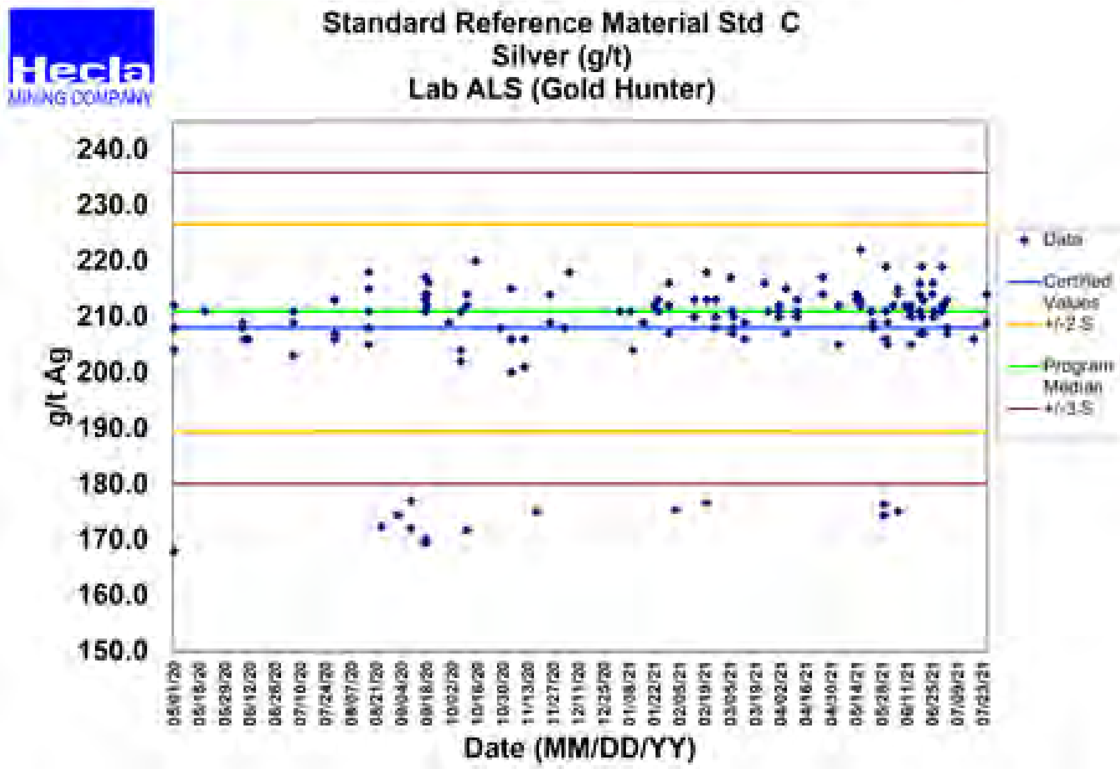


Figure 8-3: Example Control Chart for Silver – Standard C (ALS)

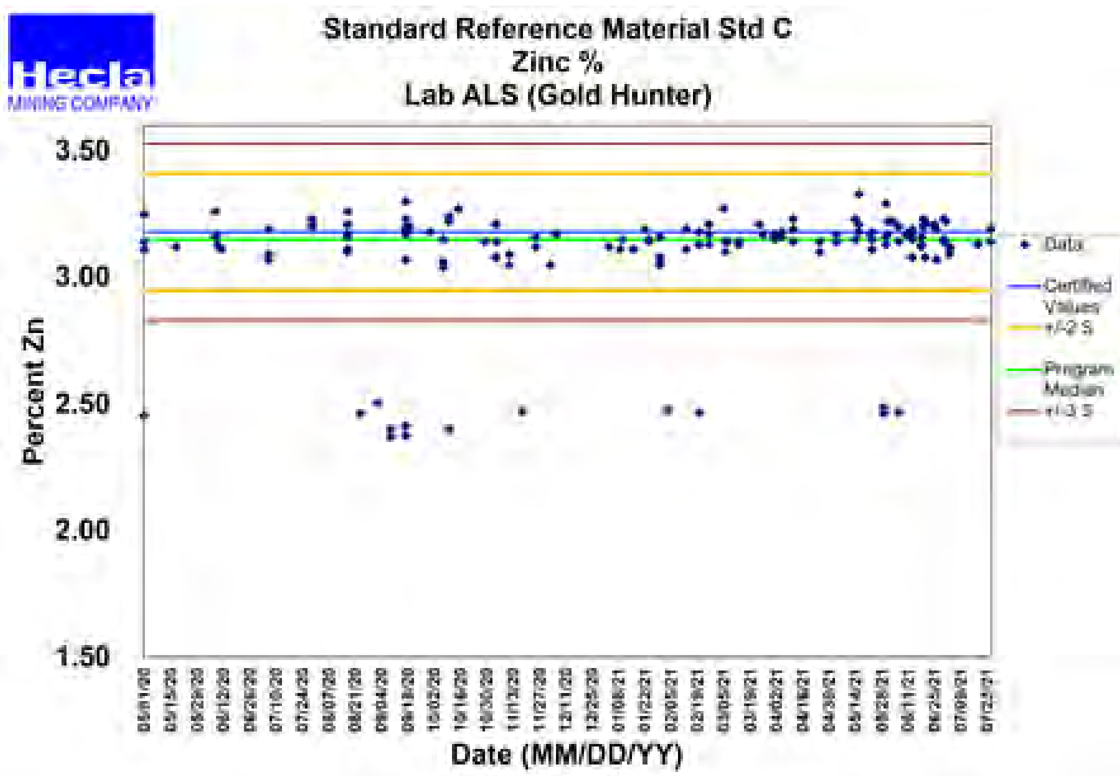


Figure 8-4: Example Control Chart for Zinc – Standard C (ALS)

8.4.3.2 Gem Laboratory

Control charts for Standards A, B, C, and D were made available for review. Standard E was not used for the channel sampling.

The results for iron were very similar to those for the ALS laboratory in that the assays were uniformly lower than the CV and often below the 2 SD failure limit. Performance for Standards B and C was best of the four, with the majority of samples assaying just within the tolerance limits. Results for Standards A and D were routinely below the 2 SD limit with most below 3 SD.

Silver and zinc performance was very good for Standards A and B, while for C and D, showed similar patterns of repetitive failure as those seen for the ALS results. Each showed several failures spaced over time with grades that clustered in the same ranges as those seen from ALS.

There were no results for lead for Standard A. Results for Standards B and C were somewhat low, but generally acceptable, with a protracted period of fairly recent failures occurring for Standard C. Standard D yielded a similar pattern to that seen for ALS, with generally good results and sporadic failures, all within a narrow grade range. An example of the control plot for lead in Standard D is provided in Figure 8-5 below.

Again, the reason for the "failed" standards was found to be due to an improper selection of preliminary assays by the control plotting utility.

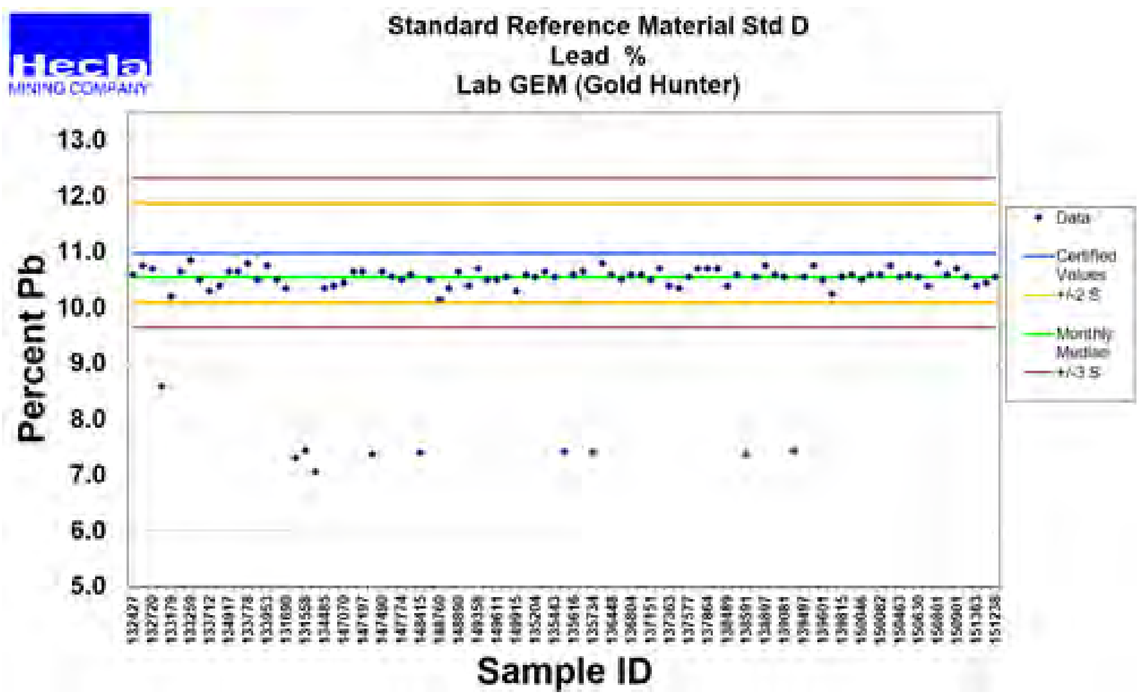


Figure 8-5: Example Control Chart For Lead – Standard D (Gem)

8.5 Sample Security

As stated in the previous section of this report, the core and chip samples are collected and transported by either Lucky Friday company staff or contractors and bonded commercial freight carriers. The site is secure and access is restricted to these authorized personnel.

8.6 QP Comments

In the SLR QP's opinion, the sample preparation and analysis are carried out using conventional methods commonly used in the industry. The security procedures at Lucky Friday are reasonable and consistent with standard practice.

In the SLR QP's opinion, the QA/QC program as designed and implemented is quite rigorous, with a fairly high rate of control sampling for an operation as mature as Lucky Friday. There is a persistent low bias for iron shown in results for both the ALS and Gem laboratories. This does not affect the economic grades of the resource but could have an impact on tonnage estimates insofar as iron grades are used in the stoichiometric calculation for estimating SG. The fact that both laboratories yield similar results leads to the conclusion that there may be some issue with the standard materials or the certification.

The pattern of observed failures for silver, lead, and zinc has been found to be due to a plotting error. Preliminary assays have been captured and plotted on the control diagrams instead of the final assay results. There is no real concern with any of the standards assays for silver, lead, or zinc. SLR's QP does recommend, however, that the reporting protocol be amended to ensure that the proper assays are selected from the database for plotting.

In the SLR QP's opinion, the QA/QC protocols in place at Lucky Friday are rigorous, and the results are satisfactory. There are no concerns apparent with the assay results and they are suitable for use in a Mineral Resource estimate.

9.0 DATA VERIFICATION

9.1 Database Procedures

Drilling and chip sampling data are captured and stored in a database managed with Maxgeo software. As stated above, the core logging information is captured using GeoSequel. Photographic information is stored digitally and is manipulated using Imago. Geological interpretation and wireframe construction is done using Leapfrog. Surpac is used for surveyed openings, block modeling, and estimation of Mineral Resources and Mineral Reserves.

On completion of a downhole survey, the data are input to GeoSequel and the hole is reviewed in 3D on screen to check for obvious inconsistencies. The downhole data includes magnetic susceptibility measurement which can flag areas of high magnetite and potential for compromised results. In extreme cases, a re-survey is carried out but more typically a suspect reading is simply discarded and replaced with an average of the adjacent measurements.

Core assay results are sent from the lab as comma-delimited (CSV) text files which can be imported directly into the Maxgeo database. Results can also be downloaded via the ALS Webtrieve web portal. Once imported, the assay QA/QC results are checked and any concerns resolved with the laboratory.

The results are also checked against the core photographs and logs to check for unusual or perhaps spurious data. The Imago core photo utility is linked to Leapfrog so that individual sections of core can be retrieved by selecting them on screen, which greatly expedites this process.

The mine workings are surveyed, and then wireframe models are created of the stopes and development headings. These wireframes are exported to other downstream software packages for use by both the geology and engineering staff. Chip samples are corrected to agree with the surveyed drift outlines.

On receipt of the assay results, the data are input and checked against the face photographs for any inconsistencies. Validation utilities included with GeoSequel and Maxgeo are run to flag errors in data capture such as missing or overlapping intervals. The GeoSequel interface also includes templates that limit the allowable data entries to acceptable values.

When the drilling and chip sampling data has been validated and all concerns resolved, it is cleared for use in geological interpretation and resource modelling.

The data is stored on the mine site server, and backed up to the corporate office in Coeur d'Alene on a quarterly basis. Access to the site network is limited to authorized users only.

9.2 SLR Validation Procedures

9.2.1 Previous Audits

SLR, previously Roscoe Postle Associates Inc. (RPA), which is now part of SLR, and its predecessor Scott Wilson RPA, have conducted audits of the Mineral Resource and Mineral Reserve estimates at Lucky Friday on three previous occasions, in 2006, 2009-2010, and 2013. For each of these audits, spot checks were made of portions of the database. In 2017, RPA conducted a review of the Mineral Resource and Mineral Reserve estimates but not a full audit.

For the 2006 audit, checks were made of approximately 47% of the assays from holes drilled from 2004 and 2005, along with 5% of the chip samples taken in the same period. No errors were found.

During the 2009 site visit, checks were conducted of the complete dataset for 26 of the 228 holes drilled since 2006. The digital logs and sample data were exported from the database and compared to the paper logs filed in the geology office. The assays, lithology, collar coordinates, and downhole surveys were compared with the original hard-copy data. Several minor inconsistencies were noted, most due to survey errors that had been corrected in the digital database but not in the logs. No other errors were found.

The chip samples were loaded into Gemcom (now called GEMS) software and inspected in plan and 3D views to check for gross location errors. None were found. SLR also ran the Gemcom validation utilities to check for overlapping sample intervals, etc., and again, no errors were found.

The sample composites for the 50 and 90 veins were regenerated in Gemcom and compared to the ones created by the proprietary composite compiler then in use at Lucky Friday. No inconsistencies were found.

In 2013, SLR inspected approximately 200 chip sample file records and compared them to the database. Fifteen sampled intervals were found for which the assay data had not been entered.

The drill and channel information was compiled into GEMS and tested using the database validation utility. No errors were found. Inspections were made of the data on-screen in section and plan views and it was noted that some vein intercepts were not sampled. On further review, it was found that there were 117 cases of intercepts without samples, most of which were known to Lucky Friday staff. Some were found to have poor recovery, and in others the vein was so narrow that it was hard to recognize. There were some that should have been sampled and were not, and these were addressed. In the SLR QP's opinion, these missing intercepts would not have affected the Mineral Resource estimates.

SLR compared chip sample results to the laboratory report spreadsheet for 17,943 samples in the database. The comparison focused on data collected since 2009, and comprised 22% of the entire chip sample database of 81,541 records. There were 104 samples for which the stored results differed in some way from the laboratory report. SLR's QP concluded that although they could possibly be errors, they were more likely deliberate changes made to accommodate re-assays, and that in any case, an error rate of 104 in 17,943 was considered acceptable.

9.2.2 Current Audit Validation

For the current audit, the SLR QP was provided with all of the ALS assay reports from the mine restart in 2020 to September 23, 2021. These reports included assay results for a total of 12,779 drill samples consisting of 1,329 from the geochemistry holes (ICP results) and the balance of 11,450 from the conventional definition drilling. The data was captured in an Access database and compared to the samples currently in the Surpac database. Approximately 15% or 2,027 of the samples were for assay QA/QC and were not included in the Surpac database for use in resource modeling. These samples were excluded in the validation exercise although they were reviewed in the course of an overall inspection of QA/QC results (see Section 8.0 of this TRS). A total of 10,752 samples in the database were checked against the assay certificates.

For the definition holes there were 9,617 samples matched to the assay table in Surpac, and of these, there were a total of seven discrepancies found. All were noted to be of low severity and comprised assays apparently posted to the wrong sample interval, in all cases to adjacent samples in the assay table. They have since been corrected. In the SLR QP's opinion, had these discrepancies not been caught, they could have contributed to minor local errors in the interpolated grades in the block model. The overall consequence to the resource estimate would likely have been trivial. The overall error rate of seven in 9,610 samples, or 0.07%, is considered to be well within an acceptable error rate.

The check of the samples from the geochemistry holes yielded 21 discrepancies between the certificates and the values stored in the database. All of these discrepancies were in the lead and zinc fields and comprised slight differences between the reported values and the stored ones. Further investigation found that there were a number of re-assays conducted that yielded slightly different results from those in the original analyses. As such, there were no errors in the data for the geochemistry holes.

In addition to the checks described above, the SLR QP confirmed that the conversion from ppm Ag to oz/ton Ag was correct for all of the samples captured in the validation exercise. SLR also confirmed that the SG calculations for the samples were conducted correctly.

The entire database, comprising records for 30,014 drill holes and channels, was imported into GEMS and scanned for FROM-TO errors. Out of 177,502 sampled intervals, there were seven instances of overlapping samples in the assay table for an implied error rate of 0.0039%. These were reviewed and it was found that all but one were channel samples located in areas of the mine that have been mined out. The remaining instance was in a drill hole, at a location not within any known vein occurrence. In the SLR QP's opinion, these errors are very small in number and will not have any effect on the Mineral Resource estimates.

The SLR QP conducted a visual inspection of the wireframes for the 20, 30, and 40 Veins, comparing them to the drill intercepts and the chip samples. In general, the wireframe models appeared to honor the drill holes and chip sample vein coding but there were a number of places where they did not agree. Some of these apparent discrepancies appeared to be due to a lag in updates to the vein assignments in the database following addition of addition drilling. This should be resolved for the next block model interpolation.

There were no cases of unusual hole orientations, obviously incorrect collar locations, or implausible hole traces observed.

9.3 Validation Limitations and SLR QP Comments

In the SLR QP's opinion, while it is not possible to completely validate every element of a database as large and complex as that for Lucky Friday, there is nothing to date to suggest that there are serious or systemic concerns. The databases are managed in a secure environment, using conventional off-the-shelf software packages that are up-to-date and appropriate for the tasks to which they are applied. The staff are competent, well-trained, and experienced and they have been provided with clear and reasonable protocols to follow. Over time, these protocols have been updated to incorporate modernized work practices and tools as well as the evolving demands of the operation. Independent spot checks conducted by SLR over a broad span of years indicate that the data capture and validation protocols have been rigorously observed. As such, the database is properly configured and maintained and is appropriate for use in estimation of Mineral Resources and Mineral Reserves.

10.0 MINERAL PROCESSING AND METALLURGICAL TESTING

The Lucky Friday mill has been operating for more than 70 years. Testing and evaluations are routinely performed to improve recoveriesand efficiencies in the concentration processes. Historical metallurgical studies are summarized in the following sections. Some of these studies were investigative in nature and did not result, or have not yet resulted, in direct modifications to the process or facilities. Action was taken as required or applicable.

10.1 Metallurgical Testing of Gold Hunter Ore by Dawson Metallurgical Laboratories-2008

In 2008 a significant test program was conducted at Dawson Metallurgical Laboratories(DML). The DML reports issued for the test program are noted below.

- Comminution and Flotation Test Work on Gold Hunter Ore and IntermediateVein Samples. By DML, Salt Lake City, Utah. April 2008.
- Additional Test Work Conducted on Lucky Friday Ore Samples. By DML, SaltLake City, Utah. June 2008.

10.1.1 Sample Composites Tested

Samples tested were from the 30 Vein of the Gold Hunter zone and the 20, 50, 60, 70, 80, 90, and 110 veins from the Intermediate Vein zone. A sample of hard ore, a composite that was 60% Gold Hunter and 40% Intermediate Vein material, and a wall rock dilution sample were available for testing. The wall rock sample was prepared from NQ-drill core from the eastern portion of the Intermediate Vein between the 4900 and 5900 level of Gold Hunter. The hard ore sample was from the 30-Vein stope hoisted from the 5900 pocket. The sample was a hand-picked grab sample fromthe crusher belt. The third sample consisted of a 60% Gold Hunter ore with 40% Intermediate Vein material. The Gold Hunter and Intermediate Vein samples, representing nine veins, were taken from 13 active stopes from the 4900 and 5900 levels.

Head analysis of the Gold Hunter composite and each of the Intermediate Veins were run. Results shown in Table 10-1 indicate most samples to be similar and suitable for processing through the exiting operation. Vein 110 is anomalous in silver, copper, arsenic, and antimony and would probably require additional work to determine a viable process.

Table 10-1: DML Head Analysis Summary
Hecla Mining Company – Lucky Friday Mine

Sample Description		Ag (oz/ton)	Pb (%)	Zn (%)	Fe(t) (%)	$Fe(CO_3)$ (%)	Cu (%)	S(t) (%)	S= (%)	As (%)	Sb (%)
Gold Hunter (GH) Composite		18.75	12.6	4.42	21.1	19.8	0.082	5.06	5.03	0.017	0.146
				Intermediate Vein (IV) Samples							
Vein	20	10.27	9.41	1.99	13.10	12.90	0.032	2.97	2.97	0.010	0.067
Vein	50	7.09	3.99	4.82	22.00	18.10	0.039	9.58	2.58	0.077	0.157
Vein	60	8.66	5.50	4.74	23.20	19.40	0.032	8.67	8.67	0.048	0.134

Sample Description		Ag (oz/ton)	Pb (%)	Zn (%)	Fe(t) (%)	$Fe(CO_3)$ (%)	Cu (%)	S(t) (%)	S= (%)	As (%)	Sb (%)
Vein	70	36.17	11.30	5.78	12.90	10.90	0.198	7.95	7.89	0.038	0.271
Vein	80	18.73	11.40	2.52	14.90	14.10	0.090	3.80	3.73	0.015	0.122
Vein	90	14.85	11.10	1.44	11.80	11.50	0.058	3.11	3.11	0.006	0.087
Vein	110	62.71	6.38	7.92	13.80	10.10	6.110	9.87	9.79	0.500	2.590
IV Compo	Wt. Ave.	23.39	8.38	4.31	16.13	13.92	0.992	6.78	6.75	0.105	0.515
IV Compo	Assay	22.37	8.27	4.25	15.70	13.70	0.986	6.59	6.54	0.114	0.501
Wall Rock (dilution)		0.058	0.048	0.051	7.13	5.51	0.006	0.51	N/A	N/A	N/A

10.1.2 Comminution Summary

Comminution test results are summarized in Table 10-2. Results indicate the Gold Hunter-Intermediate Vein composite is relatively soft and non-abrasive. The wall rock is slightly harder than the Gold Hunter-Intermediate Vein composite.

Table 10-2: DML Grinding Test Results Summary
Hecla Mining Company – Lucky Friday Mine

Sample	Abrasion Index, (g)	Crusher Work Index (kWh/ton)	Rod Mill Work Index (kWh/ton)	Ball Mill Work Index (kWh/ton)	SAG Product Work Index (kWh/ton)
Hard Ore, 100%	0.061	4.1	7.5	9.8	10.8
Composite Blend 60% GH; 40% IV	0.13	4.9	10.7	11.4	11.9
Wall Rock, 100%	0.093	4.7	15	12.2	12.9

10.1.3 Semi-Autogenous Grinding Modelling Study

Semi-autogenous grinding mill (SAG) design test results from the DML were submitted to Starkey and Associates for analysis. Starkey evaluated various scenarios to increase the throughput capacity from 38 to 44 short tons per hour (stph) for the existing three stage crushing and 9.5 ft diameter x 12 ft long single stage ball mill grinding circuit to 66 stph, 90 stph, and 225 stph. The expansion to 66 stph and 90 stph made use of the existing ball mill.

Grinding capacity was increased by eliminating the existing crushing circuit and adding an 1,800 hp or 2,500 hp autogenous grinding (AG) or SAG mill depending on the desired tonnage. For the expansion to 225 stph a 4,800 hp single stage SAG mill was recommended by Starkey. In this scenario, the existing ball mill was not needed.

10.1.4 Flotation Test Summary

Scoping flotation kinetic tests to evaluate the response of the Gold Hunter and each Intermediate vein were run at standard conditions. Results indicated that silver and lead recovery to the lead rougher concentrate averaged over 95% and 93%, respectively,for all samples. Zinc rougher recovery averaged 72.8%.

Rougher kinetic tests evaluating Gold Hunter to Intermediate vein blends ranging from100% Gold Hunter to 100% Intermediate Vein in 25% increments were run to evaluatethe effect of the blend. Results for silver and lead were very similar for all blends. Zinc recovery declined by approximately 4% as the percentage of IV was increased from zero to 100%.

Rougher kinetic tests to evaluate the effect of plant water on flotation kinetics and metalrecovery were run on water blends from 100% fresh water to 100% plant water in 20% increments. Results indicate that water had no effect on ultimate metal recovery, but may reduce lead and silver flotation kinetics.

Rougher kinetic tests were also run to evaluate the effects of wall rock dilution on the IVcomposite. Results indicated lead and silver recovery was not affected by dilution of one part ore to three parts wall rock. Zinc recovery was affected by dilution falling from 77% to 47% at this dilution level.

Batch cleaning tests indicated that lab results for the zinc final concentrate was lowergrade than achieved in the Plant. The effect of mechanical cells used in the lab compared to column cells used in the Plant was suspected as the problem. Several stages of mechanical cleaners were added to the lab procedure in an attempt to moreclosely simulate plant results concerning zinc final concentrate grade.

A seven cycle locked cycle test was then conducted on the 60% GH 40% IV composite.Results summarized in Table 10-3 indicate that the lead circuit performed as expected.

Lead and silver recovery to the combined silver concentrate and final concentrate grade were good. Results for zinc indicated good recovery to the final concentrate, but at a much lower than expected concentrate grade. At the time it was believed this was due to thedifference between lab mechanical and plant column cells.

Table 10-3: Dawson Locked Cycle Test Summary, Cycles 5 to 7
Hecla Mining Company – Lucky Friday Mine

Product	Cycle	Wt%	Assay				Distribution, %			
			Ag oz/ton	Pb%	Zn%	Fe%	Ag	Pb	Zn	Fe
Comb. Pb Final Conc.	5,6,7	13.74	122.9	61.4	3.7	6.4	88.2	91.7	13.7	4.6
Zn No. 4 Cleaner Conc.	5,6,7	8.57	7.5	2.1	34.6	17.1	3.3	2	81	7.7
Zn Scavenger Tail	5,6,7	77.69	2.1	0.75	0.25	21.5	8.5	6.3	5.3	87.7
Head (calc.)		100	19.2	9.2	3.66	19.0	100	100	100	100
Head (assay)			20.2	10.87	4.35	18.9				

Notes:

1. TEST No. 33 Cycle 5-7
2. Primary Grind =144 Microns with 60% Hecla Tailings Recycle Water and 40% Hecla Site Fresh Water

10.1.5 QEMSCAN Analysis and Additional Studies

Follow-up work on the locked cycle test products was also conducted by DML andreported in June of 2008.

In the follow-up work, the zinc scavenger tailing from the locked cycle test noted abovewas screened. Results indicated that the 80% passing (P_{80}) size was approximately 173 microns compared to the target P_{80} of approximately 150 microns. It was concludedthat the coarser grind contributed to the relatively low zinc concentrate grade.

Additional follow-up work at DML indicated that exposing a sample to the atmosphere for one month did not affect the silver flotation response, but the lead rougher recovery was reduced by approximately 4%. The lead that did not report to the silver concentrate was activated and did report to the zinc concentrate. Zinc recovery to the rougher was lower after the exposure to the air by approximately 3%.

Samples of plant lead rougher circuit feed and tailing were collected, screened, and thescreen fractions were assayed. Results indicated the silver and lead lost to the tailing are concentrated in the minus 325 mesh fraction. This fraction contains approximately 50% of the weight, 60% of the silver, and 70% of the lead.

Estimates of the silver and lead recovery by size fraction were made. Results of this analysis indicate that the silver recovery was relatively constant for all size fractions, butthe lead recovery in the coarse fractions was approximately 10% lower than the lead recovery in the fine fraction.

The locked cycle test final lead and zinc concentrates were submitted to SGS Lakefield (SGS) for chemical, mineralogical, and quantitative evaluation of minerals by scanning electron microscope (QEMSCAN) analysis. Good agreement between the SGS and DML chemical analysis was noted.

QEMSCAN analysis of the concentrate indicated the silver concentrate was primarily galena (66%) with some pyrite (7%), sphalerite (5.5%), tetrahedrite (5%), and lower concentrations of copper sulfides, siderite, and quartz. The galena and pyrite in the silver concentrate were primarily free or liberated but the sphalerite, tetrahedrite, and gangue reporting to the silver final concentrate had higher percentage of middling material. Similaranalysis indicated the zinc concentrate was primarily sphalerite (60%) with pyrite (26.5%)and siderite (6.3%) and lower concentrations of galena and quartz. The sphalerite and pyrite in the zinc concentrate were primarily free or liberated but the galena, siderite, and quartz reporting to the zinc final concentrate had higher percentage of middling or locked material.

SGS QEMSCAN liberation analysis of the locked cycle test silver concentrate indicated that finer grinding to 106 microns would improve lead liberation and improve recovery and grade. It is noted that the locked cycle grind was coarser than desired and coarser than achieved in the Plant operation, so this recommendation should be confirmed on plant samples.

SGS QEMSCAN liberation analysis of the locked cycle test zinc concentrate indicatedthat finer grinding to 106 microns would improve zinc liberation and that pyrite was activated during the zinc activation process. It is noted that the locked cycle grind wascoarser than desired and coarser than achieved in the Plant operation, so this recommendation should be confirmed on plant samples.

The locked cycle test lead and zinc concentrates were submitted for ICP analysis. Results are summarized in Table 10-4.

Tailing from the DML work were not characterized for acid forming potential.

Table 10-4: Locked Cycle Test Flotation Concentrate ICP Scan Results
Hecla Mining Company – Lucky Friday Mine

Element	Units	Pb Concentrate	Zn Concentrate
Ag	oz/ton	> 29.2	5.64
Al	%	0.1	0.15
As	ppm	1,710	2,920
Ba	ppm	190	160
Be	ppm	<0.5	<0.5
Bi	ppm	5.5	0.6
Ca	%	0.18	0.11
Cd	ppm	451	3,590
Ce	ppm	3.5	6.5
Co	ppm	43	101
Cr	ppm	30	50
Cs	ppm	0.5	0.8
Cu	%	3.00	0.14
Fe	%	6.7	15.95
Ga	ppm	1.0	4.2
Ge	ppm	<0.5	0.5
Hf	ppm	<1	<1
In	ppm	0.47	3.97
K	%	0.04	0.06
La	ppm	<5	<5
Li	ppm	2.0	3.0
Mg	%	0.05	0.06
Mn	%	0.26	0.36
Mo	ppm	9.2	7.3
Na	%	<0.02	<0.02
Nb	ppm	<1	<1
Ni	ppm	50.0	108.0
P	%	>10	2.53
Rb	ppm	2.0	4.0
Re	ppm	0.03	0.02
S	%	19.2	34.6
Sb	%	1.00	0.027
Sc	ppm	<1	1

Element	Units	Pb Concentrate	Zn Concentrate
Se	ppm	<10	30
Sn	ppm	5	2
Sr	ppm	15	10
Ta	ppm	<0.5	<0.5
Te	ppm	<0.5	<0.5
Th	ppm	<2	<2
Ti	%	0.01	0.01
Tl	ppm	6	19.40
U	ppm	<1	1.00
V	ppm	<5	<5
W	ppm	<1	1
Y	ppm	1	3
Zn	%	4.29	>10
Zr	ppm	<5	7

10.2 Lucky Friday Mill Audit Report by Blue Coast Metallurgy Ltd. – 2011

In July of 2011, Blue Coast Metallurgy (Blue Coast) was retained to perform an audit ofthe Lucky Friday process operation to support studies to increase plant production.

Forty three process streams were sampled every 10 to 15 minutes during a two hour period on two consecutive days. The results during the two surveys were in line with plant trends during the period so the audit results were considered valid. During the survey, the lead flash cell recovered 60% to 70% of the lead and silver in the plant feed. This reduced the load on the Pb cleaning circuit. The total silver, lead, and zinc recovery to the silver concentrate were 91.7%, 90%, and 12%, respectively, to a concentrate containing 60% Pb, 130 oz/ton Ag, and 3.5% Zn. Zinc recovery to the zinc concentrate was 81.3% to a concentrate grading 48.6% Zn. Lead recovery to the zinc concentrate was 2.3% and the silver recovery to the zinc concentrate was 3.9%.

11.0 MINERAL RESOURCE ESTIMATES

11.1 Summary

Table 11-1 lists the Mineral Resource estimate for the Lucky Friday Mine, prepared by Hecla and audited by SLR. Mineral Resources have been classified in accordance with the definitions for Mineral Resources in S-K 1300.

Table 11-1: Summary of Mineral Resources – December 31, 2021
Hecla Mining Company – Lucky Friday Mine

Zone	Tonnage (ton)	Grade			NSR (US$/t)	Contained Metal		
		Ag (oz/ton)	Pb (%)	Zn (%)		Ag (oz)	Pb (tons)	Zn (tons)
				Measured				
Gold Hunter	8,230,000	7.4	4.6	2.5	207	60,600,000	379,000	207,000
Lucky Friday	393,000	12.2	11.4	1.5	459	4,790,000	44,700	5,910
Silver Vein	8,030	15.9	1.0	0.2	293	128,000	82	15
Ancillary Veins	19,800	14.0	6.7	1.9	403	277,000	1,320	376
Total	**8,650,000**	**7.6**	**4.9**	**2.5**	**219**	**65,800,000**	**425,000**	**213,000**
				Indicated				
Gold Hunter	1,660,000	7.4	4.6	2.3	204	12,300,000	76,000	38,600
Lucky Friday	139,000	9.5	11.0	3.7	446	1,320,000	15,300	5,080
Silver Vein	10,000	13.3	1.0	0.2	248	133,000	100	20
Ancillary Veins	28,600	9.0	6.0	1.4	297	258,000	1,710	409
Total	**1,840,000**	**7.6**	**5.1**	**2.4**	**224**	**14,000,000**	**93,100**	**44,100**
				Total Measured and Indicated				
Total	**10,500,000**	**7.6**	**4.9**	**2.5**	**220**	**79,800,000**	**518,000**	**258,000**
				Inferred				
Gold Hunter	4,900,000	7.6	5.3	2.3	229	37,400,000	261,000	111,000
Lucky Friday	449,000	9.2	10.9	4.1	404	4,110,000	48,900	18,500
Silver Vein	10,000	13.3	1.0	0.2	248	133,000	100	20
Ancillary Veins	21,800	10.2	9.0	2.5	397	222,000	1,980	548
Total	**5,380,000**	**7.8**	**5.8**	**2.4**	**244**	**41,900,000**	**312,000**	**130,000**

Notes:

1. Classification of Mineral Resources is in accordance with the S-K 1300 classification system.

2. Mineral Resources were estimated by Hecla staff and reviewed and accepted by SLR.
3. Mineral Resources are exclusive of Mineral Reserves at Gold Hunter, whereas there are no Mineral Reserves currently at Lucky Friday.
4. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
5. Mineral Resources are 100% attributable to Hecla.
6. Bulk density was calculated by block, based on mineralogical content.
7. Mineral Resources are estimated at NSR cut-off grades of US$173/ton for Gold Hunter and US$207/ton for Lucky Friday.
8. NSR values were calculated using long-term metal prices of US$21.00/oz Ag, US$1.15/lb Pb, and US$1.35/lb Zn.
9. Numbers may not add due to rounding.

The SLR QP is of the opinion that with consideration of the recommendations summarized in Sections 1.0 and 23.0 of this TRS, any issues relating to all relevant technical and economic factors likely to influence the prospect of economic extraction can be resolved with further work.

11.2 Gold Hunter

11.2.1 General Approach

The Mineral Resources are estimated using a block model method, with grades for silver, lead, zinc, and iron interpolated into the blocks by inverse distance squared (ID^2) weighting. The interpolations are constrained by wireframe models of the host veins to prevent smearing of grades out into the wall rocks. The wireframe models are created using implicit modeling in Leapfrog based on vein codes assigned by the mine geologists to the sample intervals. These wireframes are then exported to Surpac, where the block models and grade interpolations are generated. Both Leapfrog and Surpac are off-the-shelf mining software packages that are in common use in the industry.

The block models are diluted with zero grade material out to the minimum widths for the expected mining method. Polylines are drawn in longitudinal views of the veins to encompass coherent volumes of above cut-off grade material such that small clusters of resource-grade blocks that are too isolated to pursue are eliminated from the Mineral Resources. The resource blocks are then evaluated for inclusion of Mineral Reserves, and parsed out into stope blocks. The remaining material that meets the resource cut-off grade criterion is reported as Mineral Resources.

The Mineral Resources reported in Table 11-1 are derived from block model estimates made in December 2021. This block model was an updated version of one completed at mid-year 2021, and has not changed very much from that time. Much of the audit work was conducted on the mid-year model.

Mineral Resources are reported exclusive of Mineral Reserves.

11.2.2 Resource Database

The database has been compiled in Access and includes a total of 1,101 drill holes and 28,974 channels, encompassing 184,098 sampled intervals. Sample types are predominately chips and core, although nine samples, coded as Vein 5, were identified in the database as "cuttings". A summary of this database is provided in Table 11-2 and Table 11-3.

The channel samples are stored as pseudo-drill holes, with a common orientation defined by the sampling protocols. The start point of a channel (or "collar") is always on the north side of a drift face and channels are oriented as horizontal lines with azimuth 186.28°.

The Longhole and Geo Tech hole types do not have sampling.

The assay table contains fields for, among others, from, to, hole ID, sample ID, certificate number, sample type, and hole type. Assay values for silver, lead, zinc, iron, and copper are stored along with calculated values for SG and NSR. Samples within identified veins are coded with an integer value pertaining to the structure name (e.g., 30 for 30 Vein).

The cut-off date for the database used in the Mineral Resource estimate was November 30, 2021.

Table 11-2: Summary of Holes – Gold Hunter
Hecla Mining Company – Lucky Friday Mine

Type	Number	Length (ft)
Channel	28,974	272,332
	Diamond Drill	
Definition	301	192,131
Exploration	187	174,829
Mine	13	611
Unspecified	522	228,224
PFS	49	27,046
Pre-Production	170	53,680
	Non-Resource	
GeoTech	29	10,335
Total	30,075	905,507

Table 11-3: Summary of Samples – Gold Hunter
Hecla Mining Company – Lucky Friday Mine

Hole Type	Number of Samples	Length (ft)
Channel	113,058	262,513
Definition	23,667	33,853
Exploration	15,236	21,110
Mine	47	176
Not Specified	21,987	44,153
PFS	4,440	12,411
Total	178,435	374,216

11.2.3 Geological Modelling

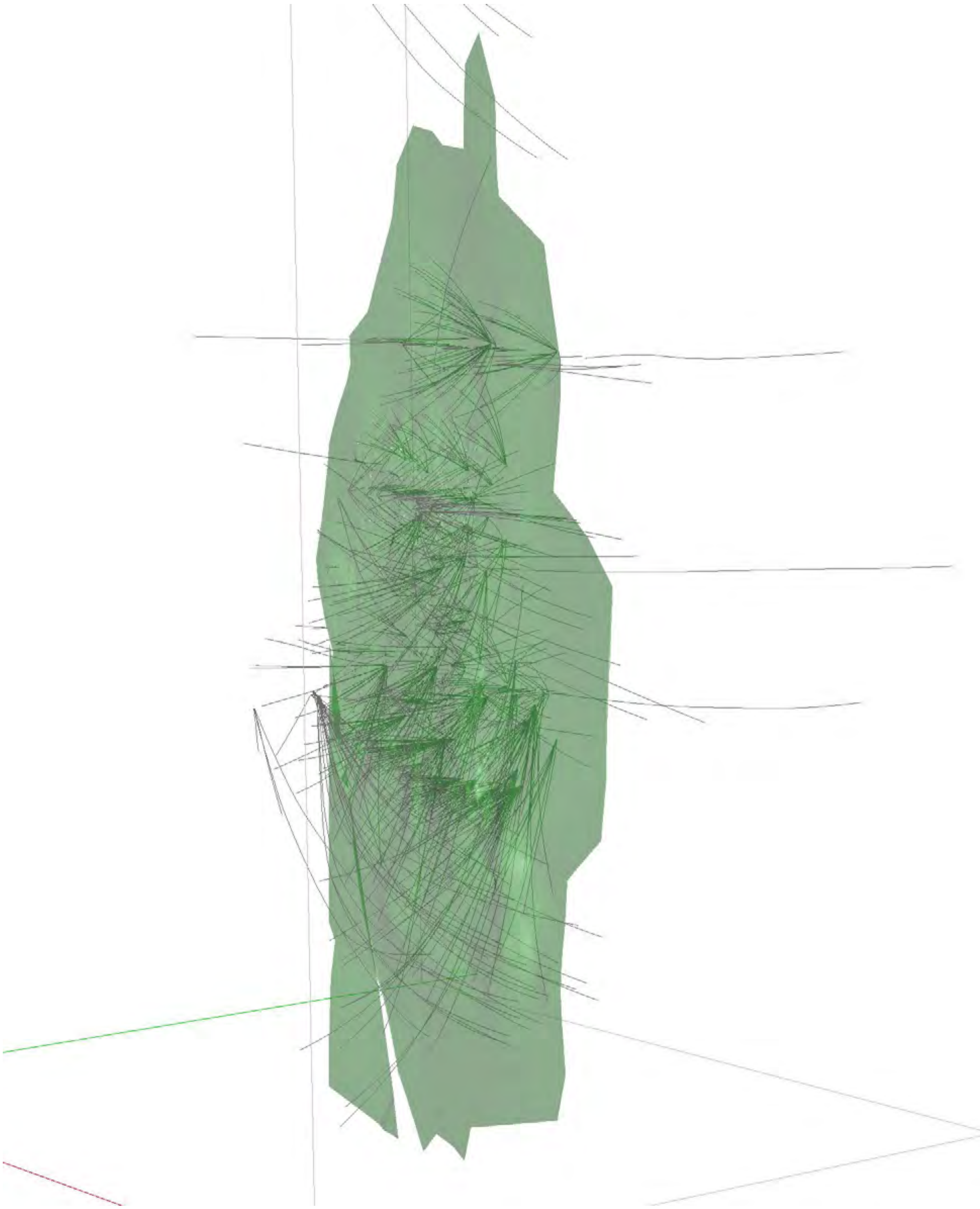
The Gold Hunter veins are narrow near-vertical structures that are generally tabular in aspect and parallel to one another, with occasional bifurcations. There are codes within the database for 101 individual veins, although some may not be fully interpreted, and may actually be parts of other known structures. Mineral Reserves are reported for eight of the Gold Hunter veins: 20, 30, 50, 60, 70, 80, 90, and 110. Mineral Resources have been estimated for those eight veins plus an additional eight: the 5, 40, 41, 100, 120, 130, 140, and 150 veins.

Wireframe models of these 16 structures were constructed using Leapfrog and exported to Surpac for use in block modeling. Drill hole and chip samples were assigned codes according to vein number and composited from hanging wall (north) to footwall (south). The start and end points for each composite were used to create surfaces representing the vein contacts. Leapfrog's implicit modeling utility was then applied to generate the wireframe models of the veins. Where appropriate, the wireframe models were truncated against known faults. An example of this would be the western end of the 30 Vein. Typically, in the absence of a known geological limit, the wireframes are constrained to a nominal distance of 300 ft from exterior drill holes.

The effective minimum width for the wireframe models was the composite lengths, which can be as short as 0.1 ft. For resource reporting purposes, dilution is added at zero grade to bring the vein to the expected minimum mining width. This mining width will vary from eight to eleven feet depending on the planned mining method.

A 3D view of the 30 Vein is shown in Figure 11-1.

The SLR QP inspected the wireframe models for the veins and compared them to the chip samples and diamond drill holes. While, in general, they were found to be reasonably representative of the vein contacts, there were instances of improperly selected intervals. This resulted in exclusion of some samples that were coded as in a vein, and inclusion of others that were either not coded or coded as another vein. It was also apparent in some cases where the veins intersected one another there appeared to be ambiguities in the sample vein code assignments. These occurrences are not considered to materially affect the resource estimates, but in the SLR QP's opinion, it would be best to correct them as required.



NOT TO SCALE

Source: SLR, 2021

Figure 11-1: 30 Vein 3D View Looking Northwest

11.2.4 Exploratory Data Analysis

Only the chip and core samples are used in resource estimation.

Of the 177,502 samples in the database, 98,849 were tagged with codes for the 16 veins on which resources were estimated. Length-weighted, non-declustered statistics for silver, iron, lead, and zinc in these samples are provided in Appendix 1. The analyses were carried out on non-declustered data in order to provide a preliminary overview of the data set and confirm some of the assumptions used in preparing the resource estimates. In addition to the statistics, histograms and probability plots were generated for each domain. Examples of these plots for silver in the 30 Vein are provided in Figure 11-2.

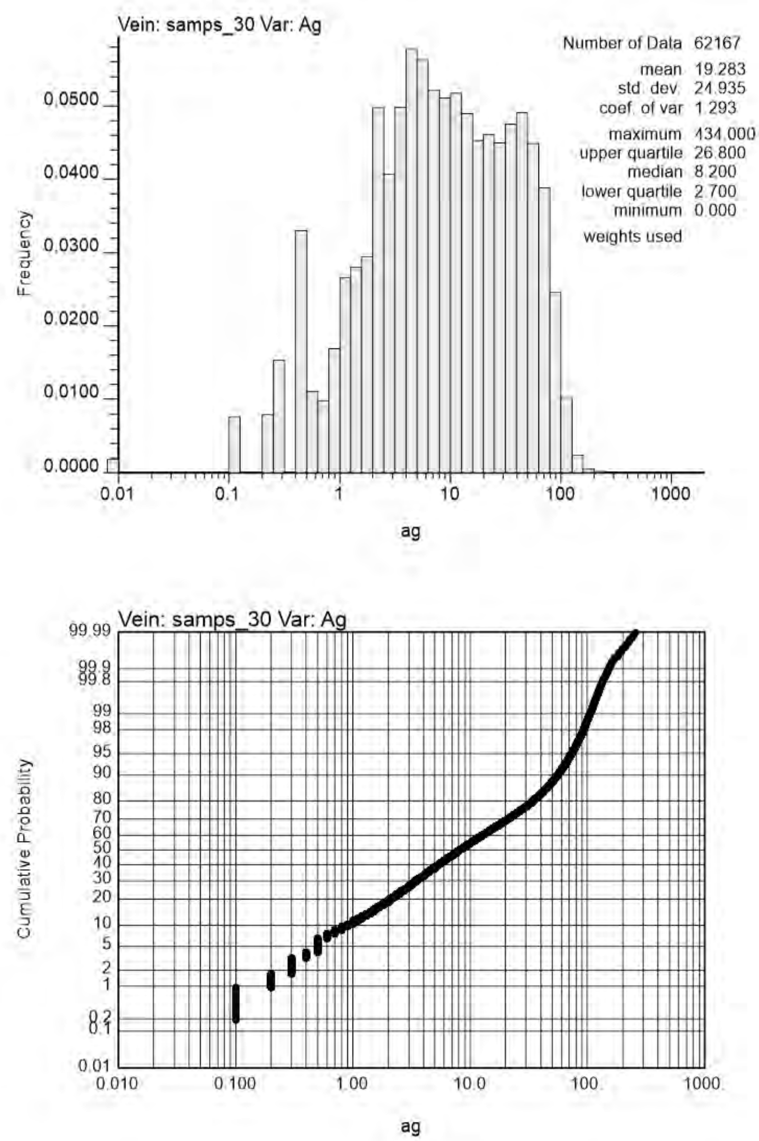


Figure 11-2: Log Histogram and Probability Plot For Silver – 30 Vein

The SLR QP notes that the statistical analyses show a complex mix of different distributions and properties. There is one consistent characteristic in that the grade distributions for silver, lead, and zinc are positively skewed. This is observed to be particularly severe in 5 Vein, for silver in the 100 to 150 Veins, inclusive, and zinc in the 80 to 150 Veins, inclusive. Coefficients of variation (CV) for these veins are observed to be higher than 1.5, and occasionally greater than 2.0 or even 3.0. The positive skewness and high CV's indicate that the samples are not normally distributed, and may be prone to bias from the upper tail of the distributions.

Many populations, such as silver and lead in the 80 Vein; lead in the 50 Vein; and lead, zinc, and silver in the 30 Vein (see Figure 11-2) appear to be combinations of two or more log normal distributions. The sample distributions are also observed to have comparatively low CVs, more in line with normal populations.

It is further noted that in most of the 5 and 100 to 150 domains listed above there are significant numbers of very low grade and zero grade samples, which could contribute to higher CV's and skewness. Typically, 5% to 10% of the silver, lead, and zinc samples in these domains have zero grades. Zinc and lead in 120 and 130 Veins have 20% zero grades. By contrast, for silver in 30 Vein, only 0.2% of samples are zeros (see Figure 11-3). This may be due in part to the fact that 30 Vein has, by far, the greatest degree of mining and the highest number of chip samples. It is reasonable to expect that these chip samples would have a higher probability of being mineralized relative to the core samples.

The iron samples are distinct from the other elements in that they do not display the same distributions and degree of skewness. They often appear to normally distributed, with some displaying bi- or multi-modal distributions. The CV's for iron are uniformly low in all domains.

In the SLR QP's opinion, positively skewed sample distributions of the type displayed by silver, lead, and zinc indicate that there is a risk of over-estimation of block grades due to the disproportionately large influence of the highest grade sample in the distribution. A common industry practice to address this risk is to cap or cut the highest grade samples to a predetermined level prior to grade interpolation. It is noted that this practice is employed at Lucky Friday, and is described in the next section of this report.

It is best practice to constrain grade interpolations within domains of like geostatistical and statistical characteristics. If the mean, the local variance, and the variance of differences between pairs of samples throughout the domain are constant, then the data set is said to be stationary. Stationarity is considered essential to allow meaningful geostatistical inference and modeling.

The complexity and multi-modal characteristics observed in the domains for Gold Hunter suggest that there may be sub-domains within some veins (ie high and/or low grade zones). If clusters of high or low grade samples exist within a vein, it would be appropriate to separate these into separate zones. If it hasn't already been tried, the SLR QP recommends that a study be undertaken to find and isolate sub-domains within the veins. This not viewed as a serious concern but merely an opportunity to fine-tune the estimates.

11.2.5 Treatment of High Grade Assays

As stated in the section entitled Exploratory Data Analysis, the sample grade distributions for most domains are positively skewed, with a tail of high grade samples. In order to limit the disproportionate effect that these high grade samples can impose on the average grade for the domains, top cuts have been applied to silver, lead, and zinc. Iron is not capped. The top cuts are nominally set at the 95th percentile of the distributions, and applied to the samples prior to compositing.

Table 11-4 lists the cap values as recorded in the Surpac macro (Surpac) used to apply the caps in the database prior to compositing. These were checked against 95th percentiles as determined by an analysis conducted by Lucky Friday personnel in December 2020 (2020 analysis) as well as an analysis conducted by the SLR on the mid-year resource estimate database (SLR analysis). The analysis was conducted on samples greater than 0.05 oz/ton for silver or 0.05% for lead and zinc, as this was the constraint used in the 2020 analysis.

It was found that the cap values used in the Surpac macro were very similar but not exactly identical to those derived in the 2020 analysis in all but two cases. For lead in 150 Vein, a top cut of 25.5% Pb was derived in 2020, while in the macro it appears as though a value of 19.5% Pb was used. In the 30 Vein, according to the macro, zinc was capped at 32.9% Zn, compared the 11.9% Zn derived in 2020. For all other domains and elements, the differences between the macro values and the 2020 analysis were very small and resulted in little or no change to the capped average grades of the samples.

The SLR analysis found that the top cuts used in the macro tended to be higher than the 95th percentile, and instead were generally in the range of the 95th to the 97th percentile. The reason for this may be due to additional samples added to the database since the 2020 analysis. During the analysis, the SLR QP evaluated each top cut and found that they appeared to be somewhat conservative. Metal loss for some domains was often observed to be in excess of 10%, and at times more than 20%. The highest metal loss typically occurred for silver and zinc in domains 5, 90, 100, 110, 120, 130, 140, and 150, which were identified in the statistical analyses as most vulnerable to bias.

In the SLR QP's opinion, in spite of this apparent discrepancy between reported and actual top cuts used, the top cut values were uniformly within an acceptable range, with the possible exception of zinc in the 30 Vein. The top cut of 32.9% Zn seems somewhat high, and is observed to have affected only 15 out of 62,212 samples. For all intents, zinc in 30 Vein is uncapped, however, 30 Vein appears to be a domain that is not particularly vulnerable to bias, and may not require much capping.

Table 11-4: Top Cuts
Hecla Mining Company – Lucky Friday Mine

Vein	Silver				Lead				Zinc			
	Uncapped (oz/ton)	Top Cut (oz/ton)	Capped (oz/ton)	Percent Change	Uncapped (%)	Top Cut (%)	Capped (%)	Percent Change	Uncapped (%)	Top Cut (%)	Capped (%)	Percent Change
5	12.37	72.0	10.45	-15.6%	3.00	21.0	2.75	-8.5%	0.87	9.2	0.75	-13.6%
20	12.03	54.8	10.49	-12.8%	5.96	23.8	5.71	-4.1%	4.01	15.0	3.84	-4.1%
30	19.28	81.5	18.58	-3.6%	11.67	41.8	11.48	-1.7%	3.22	32.9	3.22	0.0%
40	7.44	30.9	6.87	-7.6%	5.68	22.9	5.40	-5.0%	5.68	16.8	5.51	-2.9%
41	7.52	31.4	6.84	-9.0%	6.04	25.5	5.71	-5.5%	5.33	15.9	5.14	-3.5%
50	6.69	32.7	6.12	-8.6%	4.82	21.4	4.54	-5.9%	3.72	15.5	3.47	-6.6%
60	15.06	62.4	14.07	-6.6%	7.16	25.3	6.89	-3.8%	5.70	20.2	5.53	-2.9%
70	14.50	83.2	13.53	-6.7%	6.64	27.5	6.38	-3.8%	3.77	19.4	3.62	-4.0%
80	13.53	58.5	12.78	-5.5%	10.49	42.0	10.16	-3.1%	2.25	13.7	2.01	-10.6%
90	12.50	55.3	11.43	-8.6%	9.57	40.4	9.17	-4.1%	1.86	12.1	1.58	-15.1%
100	12.34	69.9	10.06	-18.4%	3.43	19.8	3.21	-6.5%	1.63	11.9	1.43	-12.1%
110	21.35	125.1	18.40	-13.8%	2.85	14.1	2.60	-8.9%	2.38	14.7	2.22	-6.5%
120	7.25	44.1	5.40	-25.4%	3.10	19.0	2.88	-7.1%	1.56	12.1	1.42	-8.9%
130	10.44	51.0	8.72	-16.5%	5.63	26.9	5.20	-7.6%	2.25	14.2	1.85	-17.6%
140	5.32	39.7	4.36	-18.2%	2.81	18.8	2.67	-5.1%	2.30	13.3	1.96	-14.9%
150	5.13	28.3	4.47	-12.8%	4.03	21.4	3.75	-7.0%	1.44	7.0	0.73	-49.7%

11.2.6 Compositing

Due to the variation in lengths of the samples, it is necessary to composite them to ensure consistency in the sample support for grade interpolation. Sample lengths are observed to range from a minimum of 0.1 ft to a maximum of 17.6 ft. Although the protocol is for samples to be between 0.5 ft and 4.0 ft, there are a number of samples collected before the current limits were in place. In addition, there are cases where core loss resulted in samples exceeding the proscribed limits. These instances comprise a relatively small proportion of the database, and will most likely occur in portions of the deposit that have been mined out. Figure 11-3 is a probability plot of sample lengths, demonstrating that 90% of the samples fall between 0.5 ft and 4.0 ft.

The veins at Gold Hunter are comparatively narrow, and so a base composite length of 3.0 ft is used. Composites are generated in Surpac using the “best fit” utility, which attempts to fit as many 3.0 ft composites as possible within a given vein intercept. Since the vein intercepts are rarely an even multiple of three in length, there is often a smaller composite left on the margin of the interval. For narrow veins where only one 3.0 ft composite can be fit, smaller composites between 0.1 ft and 1.5 ft in length are appended to that 3.0 ft composite. In wider sections, smaller composites are retained and treated as a full-length composite in the grade interpolations. The resulting composites range in length from 0.1 ft to 4.5 ft, with approximately 75% falling between 2.5 ft and 3.5 ft.

The SLR QP notes that the base composite length is less than the maximum allowable sample length of 4.0 ft, which will likely result in breaking of samples during the compositing. Breaking samples can artificially lower the sample variance and co-variance which can lead to incorrect geostatistical inference. However, it is further noted that approximately 83% of samples are 3.0 ft or less in length which suggests the impact of this practice will be relatively minor. In the SLR QP’s opinion, the compositing procedure used at Gold Hunter is a reasonable compromise between honoring the vein widths and preserving sample lengths.

Non-declustered statistics for the composite grades weighted by length x SG are provided in Appendix 2. The SLR QP notes that capping and compositing the samples (or just compositing in the case of iron) resulted in significant moderation in the CV’s for all four elements in virtually all domains.

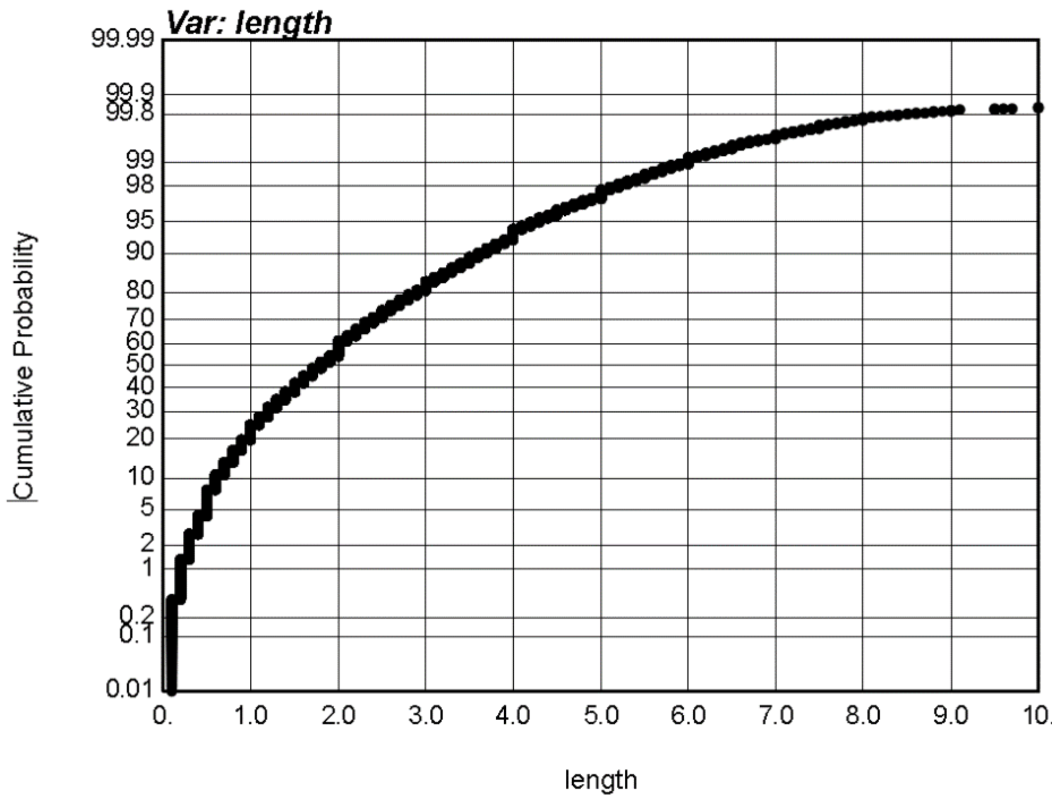


Figure 11-3: Probability Plot of Sample Lengths

11.2.7 Geostatistics

For many years, the search parameters at Gold Hunter have been based on geostatistical analyses conducted for the 30 Vein. Only the 30 Vein was included in the geostatistical analyses because by far most of the data comes from that vein. The same search parameters derived from the 30 Vein were applied to the Intermediate Veins, except that the ranges were reduced by a factor of 75%.

The interpreted variogram models were “forced” into an orientation which matched a vertical best-fit plane through the 30 Vein. The ellipsoids projected onto this plane were generally consistently oriented with the major axis plunging at -75° towards the west, which is parallel to the observed plunge of the mineralization. The SLR QP notes also that this is consistent with variogram results dating back through several years.

For the current model the geostatistical analysis was not redone, primarily because there is very little change in the results year on year. As a check, however, the SLR QP carried out an analysis on the 30 Vein using GEMS software. The analyses were run in true 3D and not constrained to a plane as had been done previously. Only non-zero composites were included in the analyses. The covariance values were normalized to the population variance, which means the ideal sill for all elements was 1.0. It is noted, however, that many of the experimental variograms failed to reach this sill. For interpretive purposes, the variogram models were forced to fit the 1.0 sill, however, it is recognized this may not be an optimal approach.

Table 11-5 lists the parameters of the interpreted variogram models. All models are exponential and comprise two structures. The models along with the experimental variogram results are shown in Appendix 3.

Table 11-5: Variogram Models
Hecla Mining Company – Lucky Friday Mine

Element	Structure	Gamma	Orientations (Az/Plunge)			Ranges (ft)		
			Major	Semi-Major	Minor	Major	Semi-Major	Minor
Ag	C0	0.308						
	C1	0.420	254.9/-77.9	108.8/-10.1	197.7/6.6	12.0	9.7	1.1
	C2	0.272				208.9	169.6	19.2
Fe	C0	0.261						
	C1	0.285	237.2/-82.9	106.1/-4.7	195.7/5.4	16.7	14.8	1.8
	C2	0.454				337.6	299.0	36.7
Pb	C0	0.372						
	C1	0.445	252.7/-78.3	107.3/-9.6	196.2/6.5	18.9	14.9	2.9
	C2	0.183				233.5	183.9	36.3
Zn	C0	0.274						
	C1	0.298	259.0/-76.7	99.2/-12.5	188.2/4.4	30.1	19.8	2.2
	C2	0.428				995.9	653.5	72.4

The analysis tended to yield consistent results for all metals in terms of orientations. The major and semi-major axes were all broadly oriented within a plane striking 100° dipping 85° to the south-southwest. This is the general strike and dip of the Gold Hunter Veins and is an expected result. The major axes all plunge at approximately 78° toward the west, which is consistent with previous geostatistical models. There is only a comparatively subtle anisotropy within the plane of the vein (ie between the major and semi-major axes). Nugget effects range between 26% and 37% of the total sill.

All experimental variograms for the major and semi-major axes were coherent and easily interpreted. Downhole variograms did not yield interpretable curves, and so the nugget effects were estimated from the experimental variograms. The reason for the incoherence of the downhole variograms is not known.

Total ranges along the major and semi-major axes for most elements tended to be in the order of 170 ft to 300 ft. An exception to this was zinc, which had a major axis range of just under 1,000 ft (see Table 11-5). The experimental variograms all showed a relatively steep rise in covariance to approximately 50% to 60% of the total sill for the first structure (C1), and noticeably flattening for the second structure (C2).

11.2.8 Block Model Geometry

The block model was created in Geovia Surpac, which is an off-the-shelf mining software package, commonly used in the industry. The model comprises an array of blocks rotated about the Z-axis by 12° such that they are aligned with the average strike of the veins. Parent block size is 16 ft (X) x 16 ft (Y) x 20 ft (Z), with sub-blocks down to 8 ft (X) x 0.5 ft (Y) x 10 ft (Z).

Block model geometry is summarized in Table 11-6. The variables stored in the model are listed in Table 11-7.

Table 11-6: Block Model Geometry
Hecla Mining Company – Lucky Friday Mine

Parameter		Value
Origin:	X:	15,600
	Y:	24,100
	Z:	-5,600
Rotation:		12°
Extents:		
(ft)	X:	4,720.0
	Y:	1,300.0
	Z:	6,700.0

Table 11-7: Block Model Variables
Hecla Mining Company – Lucky Friday Mine

Variable	Number	Minimum	Maximum	Description
X	5,131,166	16,390.40	20,086.26	Block centroid easting
Y	5,131,166	24,121.51	24,935.60	Block centroid northing
Z	5,131,166	-5,305.00	1,055.00	Block centroid elevation
classification	5,131,166	1	1	Internal use
size_X	5,131,166	8	16	Block size easting
size_Y	5,131,166	0.5	16	Block size northing
size_Z	5,131,166	10	20	Block size elevation
aniso_dist	5,131,166	12.236	2736.805	Anisotropic distance to nearest composite
class	5,131,166	1	3	Classification (1 = Measured, 2 = Indicated, 3 = Inferred)
comp_num	5,131,166	3	16	Number of composites used
dh_num	5,131,166	2	16	Number of drill holes used

Variable	Number	Minimum	Maximum	Description
id2_ag_opt	5,131,166	0.00	110.69	ID^2 silver grade
id2_fe_pct	5,131,166	0.53	42.28	ID^2 iron grade
id2_pb_pct	5,131,166	0.00	41.12	ID^2 lead grade
id2_zn_pct	5,131,166	0.0000	22.3000	ID^2 zinc grade
id2_sg	5,131,166	2.78	5.32	Specific gravity (calculated from ID^2 grades)
id2_tf	5,131,166	0.09	0.17	Tonnage factor (calculated from ID^2 grades)
mined_heading	5,131,166	n/a	n/a	String variable to described mined status
mined_status	5,131,166	n/a	n/a	String variable to describe stoped status
nsr_lrp	5,131,166	0	1956.49	Estimated NSR for Long Range Plan
nsr_reserve	5,131,166	0	1738.06	Estimated NSR for Reserves
nsr_resource	5,131,166	0	2223.74	Estimated NSR for Resources
true_dist	5,131,166	5.782	2197.704	True distance to nearest composite
vein_code	5,131,166	5	5000	Vein descriptor

In the SLR QP's opinion, the block model is configured appropriately in a manner consistent with industry practice. The sub-blocking is somewhat unconventional in that it has produced some very narrow blocks, however, this is deemed necessary in order to honor the vein wireframes.

11.2.9 Search and Interpolation Parameters

Grades for silver, lead, zinc, and iron are estimated into the blocks using ID^2 weighting. The grade interpolations are conducted in three passes of progressively increasing search ranges. Search ellipsoids are oriented in vertical planes parallel to overall vein strike with the major axis plunging at 75° to the west. Search parameters are listed in Table 11-8.

Search ranges for Measured and Indicated in the Intermediate Veins were 75% of those for 30 Vein, which is consistent with historical practice at Lucky Friday. The reduced ranges have traditionally been applied in the Intermediate Veins owing to the fact that there is less data informing the estimates for these zones and so a more conservative approach was deemed warranted.

In the SLR QP's opinion, the search ranges and orientations are broadly supported by the variography, and are appropriate. The very long ranges for Pass 3 are used to ensure all blocks within the vein wireframe models are filled. The constraints applied in constructing these wireframes ensure that the interpolations are not allowed to extend too far. Currently these Pass 3 blocks are only classified as Inferred Mineral Resources.

Table 11-8: Search Parameters
Hecla Mining Company – Lucky Friday Mine

Vein	Metal	Pass	Number of Composites		Major Axis Orientation				Anisotropy Ratios	
			Min	Max	Dist (ft)	Azim	Dip	Plunge	Semi-Major	Minor
30 Vein	Ag	1	4	16	155	282	90	-75	1.56	3.2
		2	3	16	230	282	90	-75	1.56	3.2
		3	2	16	5000	282	90	-75	1.56	3.2
	Pb	1	4	16	155	282	90	-75	1.57	5.49
		2	3	16	235	282	90	-75	1.57	5.49
		3	2	16	5000	282	90	-75	1.57	5.49
	Zn	1	4	16	700	282	90	-75	2.21	27.8
		2	3	16	1045	282	90	-75	2.21	27.8
		3	2	16	5000	282	90	-75	2.21	27.8
	Fe	1	4	16	315	282	90	-75	2.11	21.3
		2	3	16	475	282	90	-75	2.11	21.3
		3	2	16	5000	282	90	-75	2.11	21.3
Interm.	Ag	1	4	16	115	282	90	-75	1.56	3.2
		2	3	16	170	282	90	-75	1.56	3.2
		3	2	16	5000	282	90	-75	1.56	3.2
	Pb	1	4	16	115	282	90	-75	1.57	5.49
		2	3	16	175	282	90	-75	1.57	5.49
		3	2	16	5000	282	90	-75	1.57	5.49
	Zn	1	4	16	525	282	90	-75	2.21	27.8
		2	3	16	785	282	90	-75	2.21	27.8
		3	2	16	5000	282	90	-75	2.21	27.8
	Fe	1	4	16	235	282	90	-75	2.11	21.3
		2	3	16	355	282	90	-75	2.11	21.3
		3	2	16	5000	282	90	-75	2.11	21.3

Blocks were assigned integer codes for the veins according to their centroid locations (ie. The centroid must be inside of a wireframe to receive a code). The wireframe models were configured as “hard” boundaries with respect to the grade interpolations. This meant that only composites coded for a particular vein could be used to estimate blocks within that vein.

In the SLR QP’s opinion, the grade interpolations were conducted in a reasonable manner consistent with common practice using an appropriate estimation algorithm commonly used within the industry.

11.2.10 Bulk Density and Tonnage Factors

As discussed in the section of this report entitled Sample Preparation, Analyses, and Security, SG is estimated from metal contents by means of a stoichiometric equation taking into account the most common minerals in the ore. The equations and description of the process is repeated here.

The principal constituent minerals of the ore are assumed to be galena (PbS) and sphalerite (ZnS) in a gangue containing siderite ($FeCO_3$) and pyrite (FeS_2) along with silicates. The relative abundance of iron species is assumed to be 75% siderite and 25% pyrite.

The SG equation is as follows:

$$Density = 100 / ((Gangue\%/2.76) + (Galena\%/7.50) + (Sphalerite\%/4.00) + (Siderite\%/3.94) + (Pyrite\%/5.02)$$

Where:

- Galena% = Pb% / 0.866
- Sphalerite% = Zn% / 0.670
- Siderite% = (Fe% x 0.75) / 0.482
- Pyrite% = (Fe% x 0.25) / 0.466
- Gangue% = 100 – (Galena% + Sphalerite% + Siderite% + Pyrite%)

These SG values are then used to derive tonnage factors (TF) for each block, and which are then used in estimation of block tonnages. The TF equation is as follows:

$$TF = 1 / (2{,}000 / (62.4 \times SG))$$

The SLR QP conducted checks of both the SG and TF calculations to confirm that they had been correctly done. In the SLR QP's opinion, the estimations of SG and TF have been done in a reasonable fashion.

11.2.11 Classification

Under S-K 1300, Mineral Resources and Mineral Reserves must be classified according to the definitions of the Committee For Mineral Reserves International Reporting Standards (CRIRSCO). Relevant aspects are summarized below:

Mineral Resource: A concentration or occurrence of material of economic interest in or on the Earth's crust in such form, grade/quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade/quality, continuity and other geological characteristics of a Mineral Resource are known, estimated, or interpreted from specific geological evidence and knowledge, including sampling.

Inferred Mineral Resource: That part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade/quality continuity.

An Inferred Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

Indicated Mineral Resource: That part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit.

Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade/quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.

Measured Mineral Resource: That part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit.

Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade/quality continuity between points of observation.

A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proved Mineral Reserve or to a Probable Mineral Reserve.

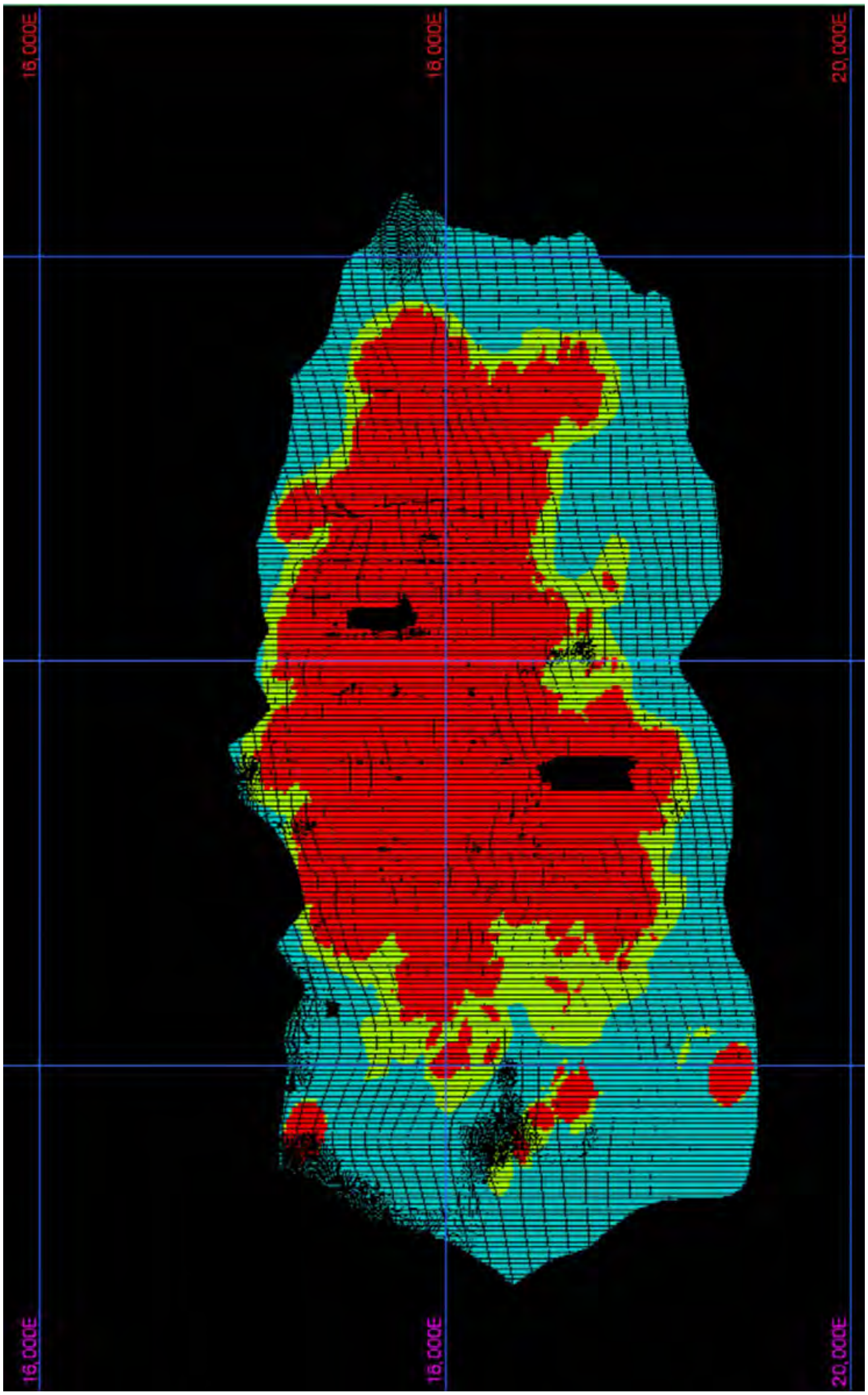
Modifying Factors: Are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, infrastructure, economic, marketing, legal, environmental, social, and governmental factors.

At the time of interpolation, the blocks are coded with a preliminary classification according to Pass number. Pass 1 is coded as Measured, Pass 2 Indicated, and Pass 3 Inferred. The dilution rind blocks, which are not captured in the grade interpolation, are coded according to the adjacent blocks within the vein wireframe.

The classification coding is based the silver search ellipsoids (see Table 11-8). So for Measured Mineral Resources, the blocks will be within a 155 ft x 99 ft ellipsoid of a sample in the 30 Vein, and 115 ft x 74 ft for the Intermediate Veins. Search distances for Indicated are 230 ft x 147 ft in the 30 Vein, and 170 ft x 109 ft in the Intermediate Veins. The Inferred class is assigned to blocks up to a distance of 5,000 ft x 3,205 ft from a sample point.

The SLR QP notes that these distance criteria, particularly for Measured, appear to be somewhat aggressive based on the variograms. This, coupled with the minimum composites constraint applied for Pass 1, means that a Measured block could be informed by as few as four sample points. Conceivably, those four composites could even come from a single drill hole, however, the narrow nature of the veins makes this unlikely. The overall result is that there is quite a high proportion of the resources that have been classed as Measured whereas it might be more appropriate to class some of this material as Indicated.

Figure 11-4 is a longitudinal view of the 90 Vein depicting the resource classification as red for Measured, green for Indicated, and cyan for Inferred. As expected, there is a fairly broad area of Inferred on the periphery owing to the liberal search criteria used to apply this classification. The Measured also appears to be quite widespread, even though there are comparatively few areas informed by close-spaced sampling. There appears to be only a thin veneer of Indicated or even Inferred surrounding the Measured which, in the SLR QP's opinion, is unusual and somewhat unrealistic.



Source: SLR, 2021

Note: Inferred blocks are cyan, Indicated green, and Measured red.

Figure 11-4: 90 Vein Classification

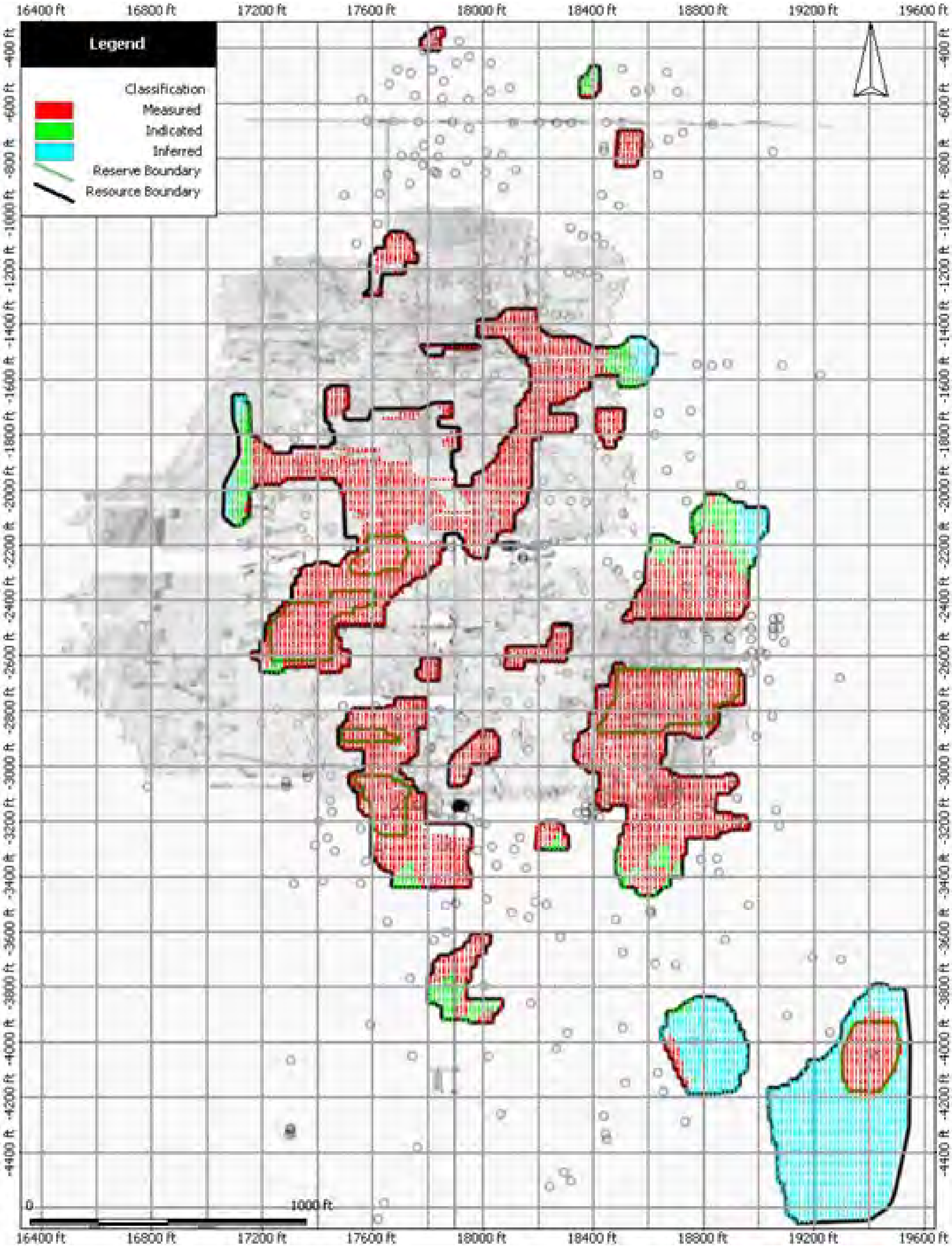
There are also small bodies of Measured that are completely isolated and surrounded by Indicated. In the SLR QP's opinion, these isolated pockets of Measured should be downgraded to Indicated.

Figure 11-5 is also a longitudinal projection of the 90 Vein on which just the reserve and resource blocks have been plotted, again color-coded according to classification. Drill hole pierce-points appear as circles. In the lower right corner of the diagram are two areas of predominantly Inferred material. In the eastern-most area, there is an oval-shaped zone of Measured surrounded by Inferred with no buffer of Indicated. Further inspection shows that this area of blocks is largely informed by only two drill hole pierce-points inside and possibly one or two outside of what has been outlined as resource.

In the western-most area of Inferred there is a thin sliver of Measured along the western margin of the resource boundary which is also juxtaposed against Inferred material. There appear to be no drill holes piercing this Measured material, although there are several holes in the surrounding area which likely informed these blocks. Comparison to Figure 11-4 suggests that this resource boundary just clipped a bit of the Measured from a nearby zone.

In the SLR QP's opinion, it is unusual to have Measured and Inferred blocks in contact with one another without Indicated between them. This is likely a result of the classification method being purely driven by the computer without much user intervention. The Measured blocks in these two cases should have been manually downgraded to Indicated, at best.

It is recommended that the classification procedures be enhanced to allow for a greater level of inspection and manual revision before further processing and reporting. It may be preferable to derive a classification method that is independent of the estimation passes in order to fine-tune the process without interfering with the interpolations.



Source: SLR, 2021

Figure 11-5: 90 Vein Classification

The SLR QP further notes, that a significant volume of Inferred Mineral Resources have been added since the previous estimate. The reason for this is that large portions of many veins, which had been previously excluded from eligibility for classification, were allowed to be included. The SLR QP inspected these additions for all veins and concludes that they are appropriate for consideration for Inferred Mineral Resources. For the most part they represent comparatively small gaps between drilled areas, or extensions of known structures. They all are included within the interpreted vein wireframe models, and generally extend for a distance of 200 ft to 400 ft from the nearest sample, occasionally as far as 600 ft. In the SLR QP's opinion, it is reasonable to include these sections of the veins for potential classification as Inferred Mineral Resources.

In the SLR QP's opinion, the Mineral Resources are classified according to the CRIRSCO definitions and, as such, are consistent with the requirements of SK 1300. The method used to apply the classification is broadly consistent with common industry practice. Some of the distance criteria appear somewhat aggressive, although it is observed they are more restrictive than historical practice. Prior to 2019, for example, the search ellipsoid for Measured in the 30 Vein was 195 ft x 90 ft compared to the current 155 ft x 99 ft. This is partially offset by the fact that, due to the new mining methods introduced, more reliance is now placed on drill holes than more closely-spaced and numerous chip samples.

The classification parameters are considered to be appropriate given the long mining history,11-21iltiter, as outlined above, there are opportunities for improvement. It is unlikely that the changes proposed here will significantly impact the total reserve base except possibly for an increase in Probable Mineral Reserves (or Indicated Mineral Resources) at the expense of Proven (Measured).

11.2.12 NSR Cut-Off Grades

The NSR value is used as the primary cut-off grade for the blocks. This value is derived from the interpolated metal contents using metal prices which have been discounted for metallurgical recovery, transport, and smelter terms. For Mineral Resources, metal prices used as the basis of this calculation were US$21.00/oz Ag, US$1.15/lb Pb, and US$1.35/lb Zn. After application of provisions for recovery, sales, transportation, payables, and smelter charges, the NSR multipliers for each metal were as follows:

- Ag: US$16.86 per oz/ton
- Pb: US$19.77 per percent of lead
- Zn: US$18.64 per percent of zinc

For Mineral Resources, the cut-off NSR value used was the approximately equivalent to the sum of 2016 mining, milling, maintenance, and G&A costs, which was US$173/ton.

In the SLR QP's opinion, the NSR cut-off is a reasonable approach which has been applied in an appropriate manner. The application of the stope optimizer is also appropriate and consistent with industry best practice.

11.2.13 Validation

The block models were validated by the following methods:

- Visual inspection and comparison of block and composite grades in cross section views
- Comparison to the previous year's estimates

Visual inspection is a good way to determine if the block grade interpolations are honoring the composite grades. Hecla personnel report that there is good agreement between composite and block grades. The SLR QP conducted a brief inspection of several veins to confirm this.

Comparison to the previous year's estimates is the principal validation method employed. For some years, there has been relatively little change to the block grade estimates and so any estimation errors are usually fairly obvious.

In the SLR QP's opinion, while the validation methods used at Lucky Friday are appropriate, they represent a fairly minimum standard of review. There are other techniques that could and should be applied to confirm that the grade interpolations are reasonable and unbiased. Examples of other validation methods include:

- Comparison of global composite and block means
- Comparison with block grades generated using an alternative interpolation method (ie ordinary kriging or nearest neighbor)
- Drift analysis.

11.2.13.1 Comparison of Mean Composite and Block Grades

The SLR QP carried out a comparison of density-length-weighted mean composite grades to tonnage-weighted block grades for the Measured and Indicated blocks. The results of this comparison are shown in Table 11-9.

Table 11-9: Comparison of Global Block and Composite Grades
Hecla Mining Company – Lucky Friday Mine

Composites SgxLength-Weighted Mean Grades					Measured and Indicated Blocks Tonnage-Weighted Mean Grades					Percent Difference				
Vein	Ag (oz/ton)	Fe (%)	Pb (%)	Zn (%)	Vein	Ag (oz/ton)	Fe (%)	Pb (%)	Zn (%)	Vein	Ag (oz/ton)	Fe (%)	Pb (%)	Zn (%)
5	11.08	12.33	3.06	0.84	5	9.20	13.24	2.96	0.80	5	-16.9%	7.4%	-3.2%	-5.1%
20	11.32	19.48	6.23	4.24	20	8.95	16.73	4.94	2.76	20	-20.9%	-14.1%	-20.7%	-34.9%
30	20.74	20.06	12.76	3.38	30	18.73	19.43	11.66	3.87	30	-9.7%	-3.1%	-8.6%	14.3%
40	7.20	25.69	5.66	5.70	40	4.76	25.09	3.88	4.43	40	-33.9%	-2.3%	-31.4%	-22.3%
41	7.09	24.07	6.00	5.33	41	5.64	22.89	4.68	3.90	41	-20.5%	-4.9%	-22.1%	-26.8%
50	6.46	21.90	4.83	3.76	50	5.87	20.20	4.54	3.03	50	-9.1%	-7.7%	-5.9%	-19.4%
60	15.58	14.47	7.56	6.07	60	8.16	14.72	5.59	3.04	60	-47.6%	1.7%	-26.0%	-49.9%
70	15.07	12.24	7.06	4.02	70	8.44	13.01	5.99	2.48	70	-44.0%	6.3%	-15.1%	-38.4%
80	14.41	11.45	11.55	2.17	80	9.67	12.31	7.58	2.18	80	-32.9%	7.5%	-34.4%	0.4%
90	12.97	12.54	10.51	1.71	90	9.04	13.42	7.46	1.90	90	-30.3%	7.0%	-29.0%	11.3%
100	10.45	14.16	3.51	1.58	100	5.83	13.60	3.82	1.57	100	-44.2%	-4.0%	8.8%	-0.7%
110	19.12	16.34	2.82	2.42	110	12.80	14.47	3.29	2.44	110	-33.1%	-11.5%	16.8%	0.7%

Composites SgxLength-Weighted Mean Grades					Measured and Indicated Blocks Tonnage-Weighted Mean Grades					Percent Difference				
Vein	**Ag (oz/ton)**	**Fe (%)**	**Pb (%)**	**Zn (%)**	**Vein**	**Ag (oz/ton)**	**Fe (%)**	**Pb (%)**	**Zn (%)**	**Vein**	**Ag (oz/ton)**	**Fe (%)**	**Pb (%)**	**Zn (%)**
120	5.72	13.33	3.20	1.57	120	5.89	13.64	3.57	1.89	120	2.9%	2.3%	11.5%	20.7%
130	9.68	12.45	5.94	2.03	130	7.16	11.83	4.28	1.99	130	-26.0%	-5.0%	-28.0%	-2.0%
140	4.65	9.92	2.90	2.14	140	5.12	9.53	3.38	2.00	140	10.2%	-3.9%	16.7%	-6.5%
150	4.75	9.40	4.09	0.78	150	4.28	7.25	3.36	0.75	150	-9.9%	-22.9%	-17.9%	-4.4%

The estimated block grades for silver, lead, and zinc in the Intermediate Veins are observed to be generally lower than the composite grades, and in some cases, significantly so. In the SLR QP's opinion, the block grade estimates for the Intermediate Veins appear to be conservative for silver and zinc. Lead shows both positive and negative variances suggesting that the global estimate may be unbiased or nearly so. The block iron grades for all zones are generally within 10% of the composites, as are the block grades for all metals in the 30 Vein.

It is recommended that an attempt should be made to resolve the apparent biases in the grade interpolations, perhaps by adjusting the capping strategy, domain assignments, and/or interpolation strategies. This is not viewed as a fatal flaw in the estimate but merely as an opportunity for improvement of the local vein grade estimates that may then be reflected in the global estimates.

11.2.13.2 Drift Analysis

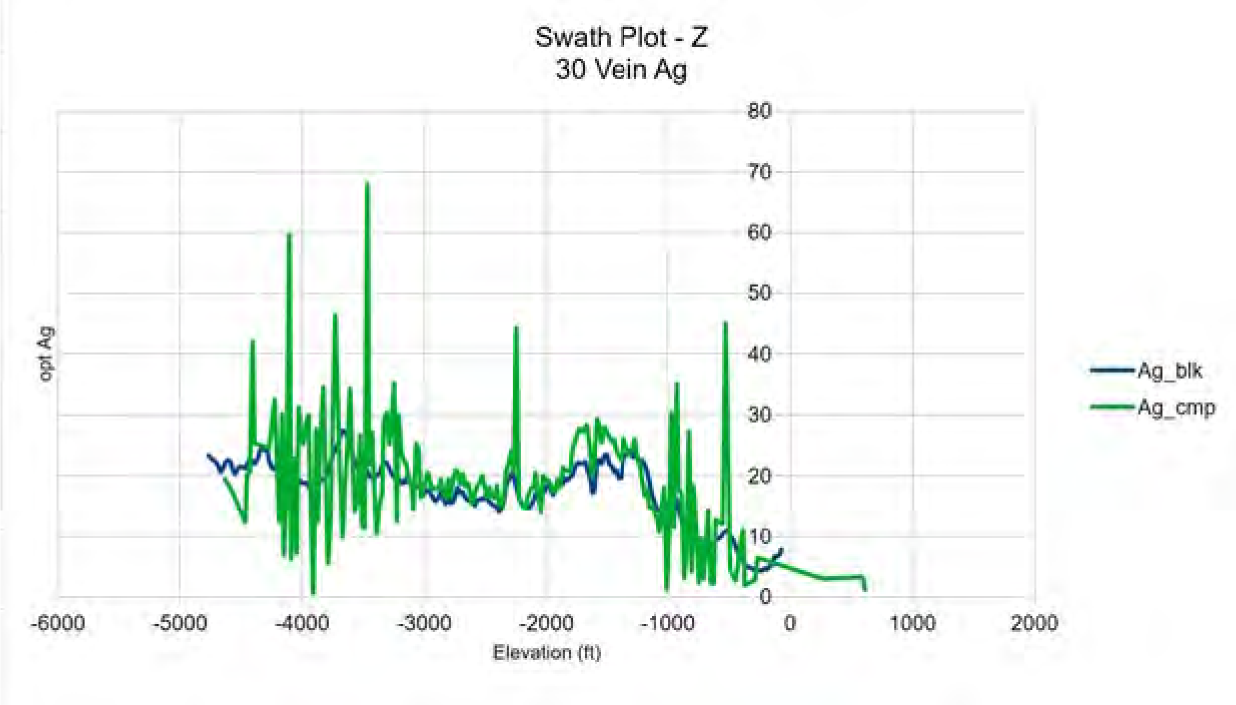
The SLR QP carried drift analyses (also known as swath plots) for the X and Z direction of all the veins. Composite grades were weighted by length x sg, and the blocks were weighted by tonnage. Individual swaths were generated at widths of twice the parent block size, which was 16 ft in the X direction and 20 ft in the Z direction, not accounting for the 12° rotation of the block model. As such, the swaths in the X direction are not coincident with the block columns, however, this is inconsequential to the result as the analysis is based on block centroid coordinates.

In general, the swath plots displayed good agreement between composites and blocks although there were several instances of localized biases for silver, lead, and zinc in some domains. Overall, the 30 Vein, which contains the highest proportion for any domain of the Mineral Reserves and Mineral Resources, showed excellent agreement. Block and composite iron grades were found to agree quite well for all domains.

Figure 11-6 shows example swath plots in the Z direction for silver and lead in the 30 Vein, both of which indicate good agreement between blocks and composites. It is quite evident in these diagrams that there is significantly more variability of composite grades in the upper and lower extremities of the vein. These areas are sampled predominantly by drill holes, as opposed to the central section, which is informed by closely-spaced chip sampling.

Figure 11-7 shows similar diagrams for silver and zinc in the 60 Vein. There is reasonably good agreement between the composite and block grades except in the area between approximately -1,200 ft and -2,000 ft in elevation. In this are the block grades appear to be somewhat muted relative to the composites, and this might explain the difference in global mean grades observed in Table 11-9. The reason for this apparent localized bias is not known, but it was observed in several veins.

As stated above, the SLR QP is of the opinion that refinements to the interpolation and search parameters may yield improvements to the local block grade interpolations. Again, this is not viewed as a fatal flaw in the estimate but merely as an opportunity for improvement.



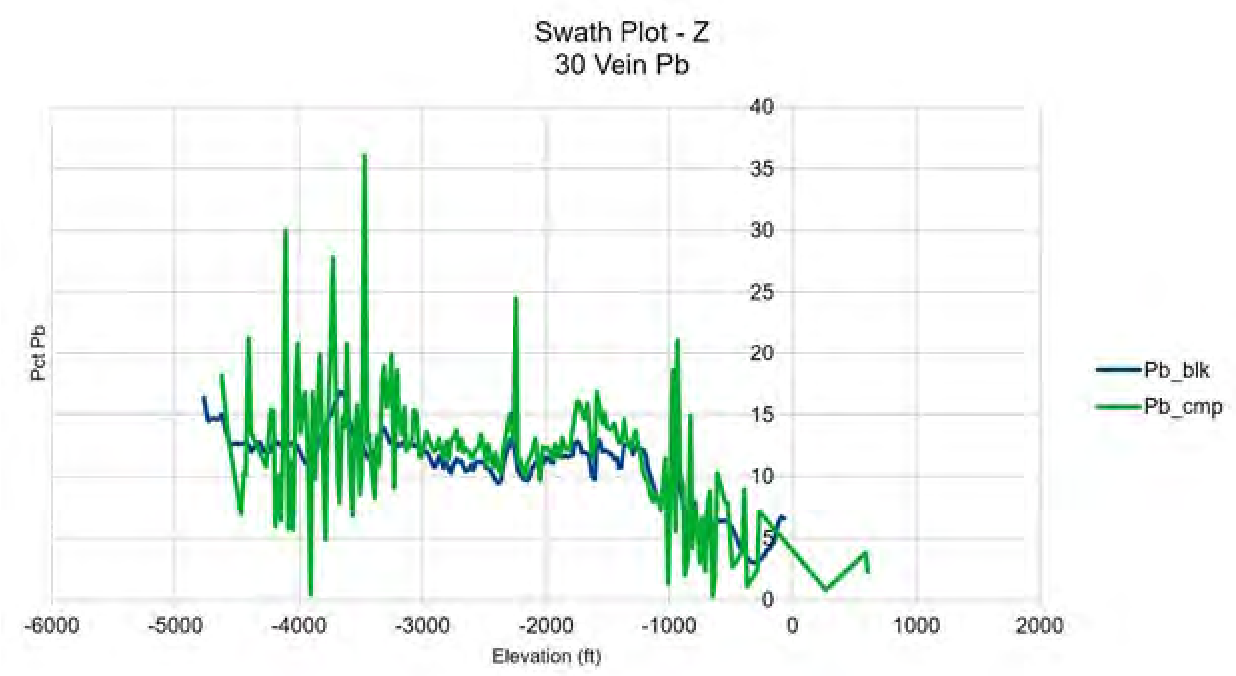


Figure 11-6: Drift Analyses – 30 Vein

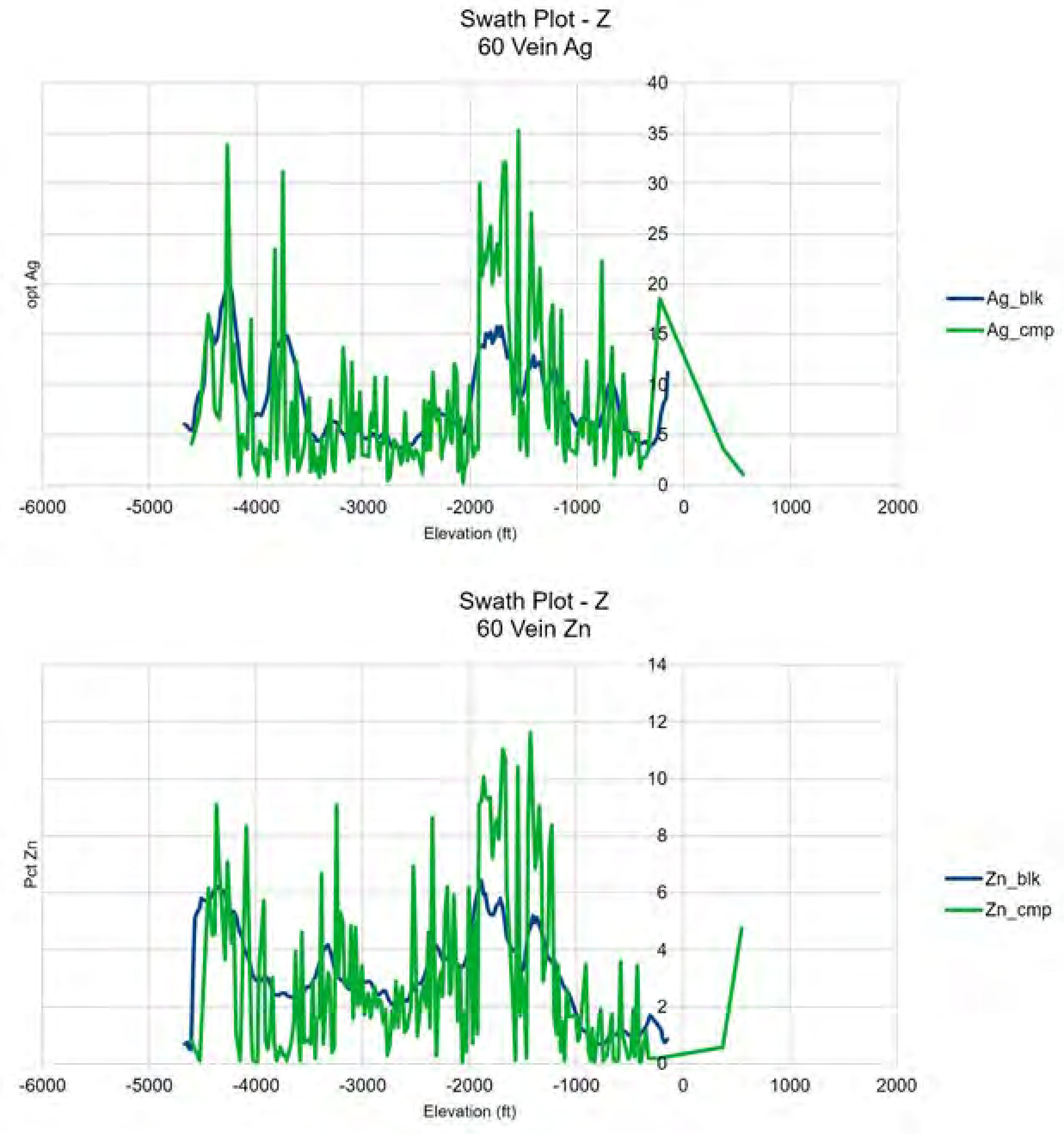


Figure 11-7: Drift Analyses – 60 Vein

11.2.13.3 Estimation Using an Alternative Method

As a further check, the SLR QP conducted block model estimates for the 30 Vein and 110 Vein using ordinary kriging (OK) and nearest neighbor (NN) methods. The estimates were carried out using Geovia GEMS software, and employed the same composites and wireframe models as were used by Hecla for the current models (ID^2). Calculation methodologies for the tonnage factors and block NSR values were identical to those used for the ID^2 models. The variogram models described in subection 11.2.7 of this TRS were used for the interpolations. Search parameters were also the same as those used in the ID^2 models. The block size was 10 ft x 2.5 ft x 10 ft, and a percent model was used instead of sub-blocking.

Figure 11-8 shows tonnage and grade curves for the two veins using the NSR cut-off. For both veins, there was good agreement between the OK and ID^2 models across a wide range of NSR cut-off grades. The NN model tended to yield markedly lower tons at a higher grade than the other two methods.

Table 11-10 shows the tonnage and grade for each of the 30 and 110 Veins at a US$200/t NSR cut-off grade. Note that these volumes are for unclassified blocks within the entire vein structure, without provision for mining depletion. They should not be considered estimates of Mineral Resources, and are shown here for comparative purposes only.

Table 11-10: Comparison of Block Models at the US$200/t Cut-Off
Hecla Mining Company – Lucky Friday Mine

Method	Tons (ton)	Grade				NSR (US$/t)	Contained Metal		
		(oz/ton Ag)	(% Pb)	(% Zn)	(% Fe)		(oz Ag)	(Units Pb)	(Units Zn)
				30 Vein					
NN	5,575,185	23.35	14.30	4.54	19.49	761.14	130,180,570	79,725,146	25,311,340
OK	6,927,032	18.95	11.90	3.86	19.29	626.78	131,267,256	82,431,681	26,738,344
ID^2	7,009,295	19.69	12.07	3.87	19.08	642.68	138,013,019	84,602,191	27,125,972
				110 Vein					
NN	1,267,086	14.87	5.37	4.19	14.52	434.83	18,841,569	6,804,252	5,309,090
OK	1,754,015	11.29	4.13	3.12	14.38	330.13	19,802,829	7,244,082	5,472,527
ID^2	1,719,604	12.99	4.11	3.39	14.32	363.46	22,337,656	7,067,572	5,829,458

Note: One Unit = 20 lbs

The ID^2 model results appear to be the least conservative of the three in that it tends to yield marginally higher grades and metal contents than either OK or NN. In the SLR QP's opinion, the results of this comparison indicate a reasonable agreement between methods and do not indicate that there are any concerns with the current block model.

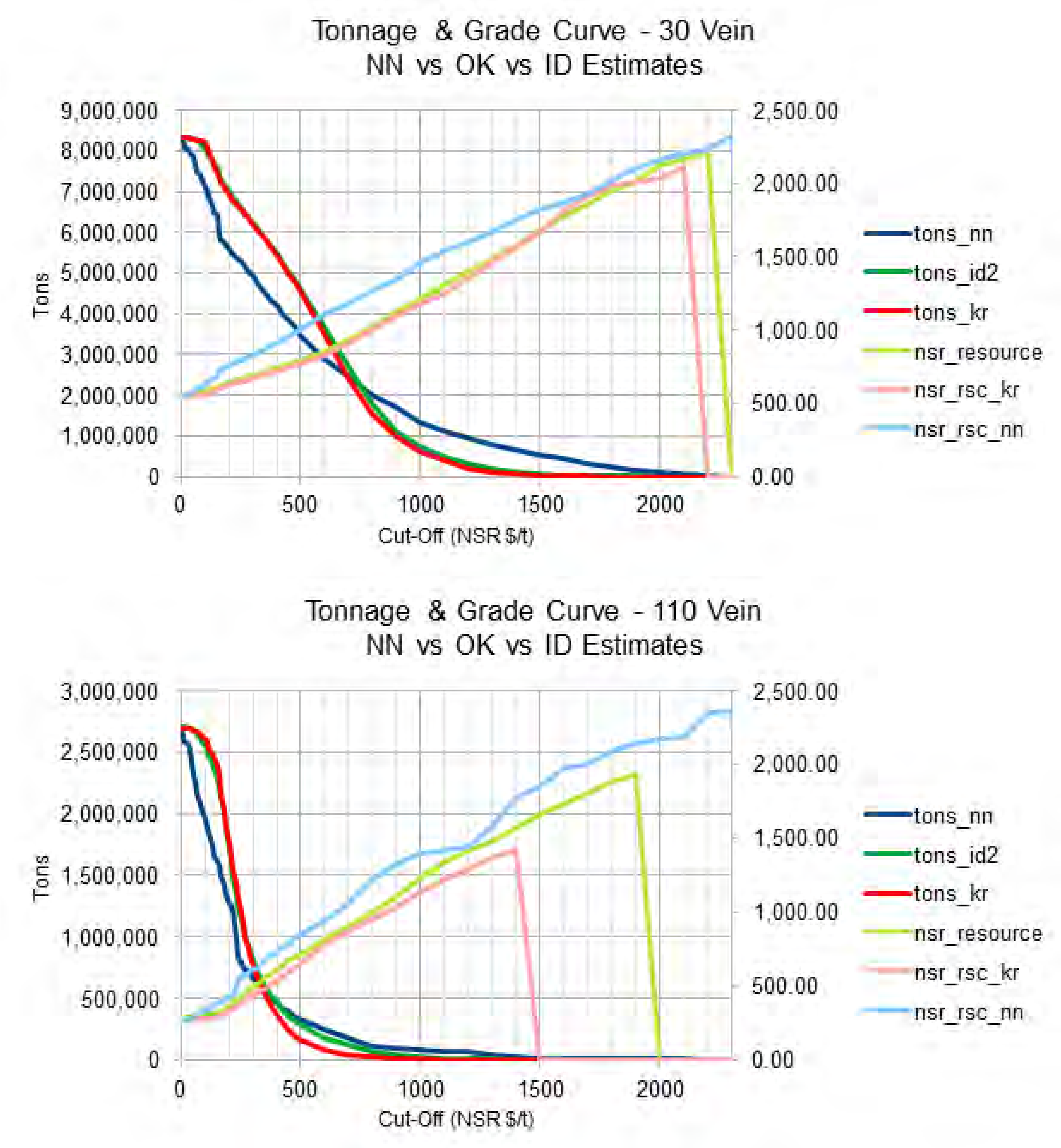


Figure 11-8: Tonnage and Grade Curves

11.2.14 Reconciliation

Reconciliation is discussed in Section 13.0 of this TRS.

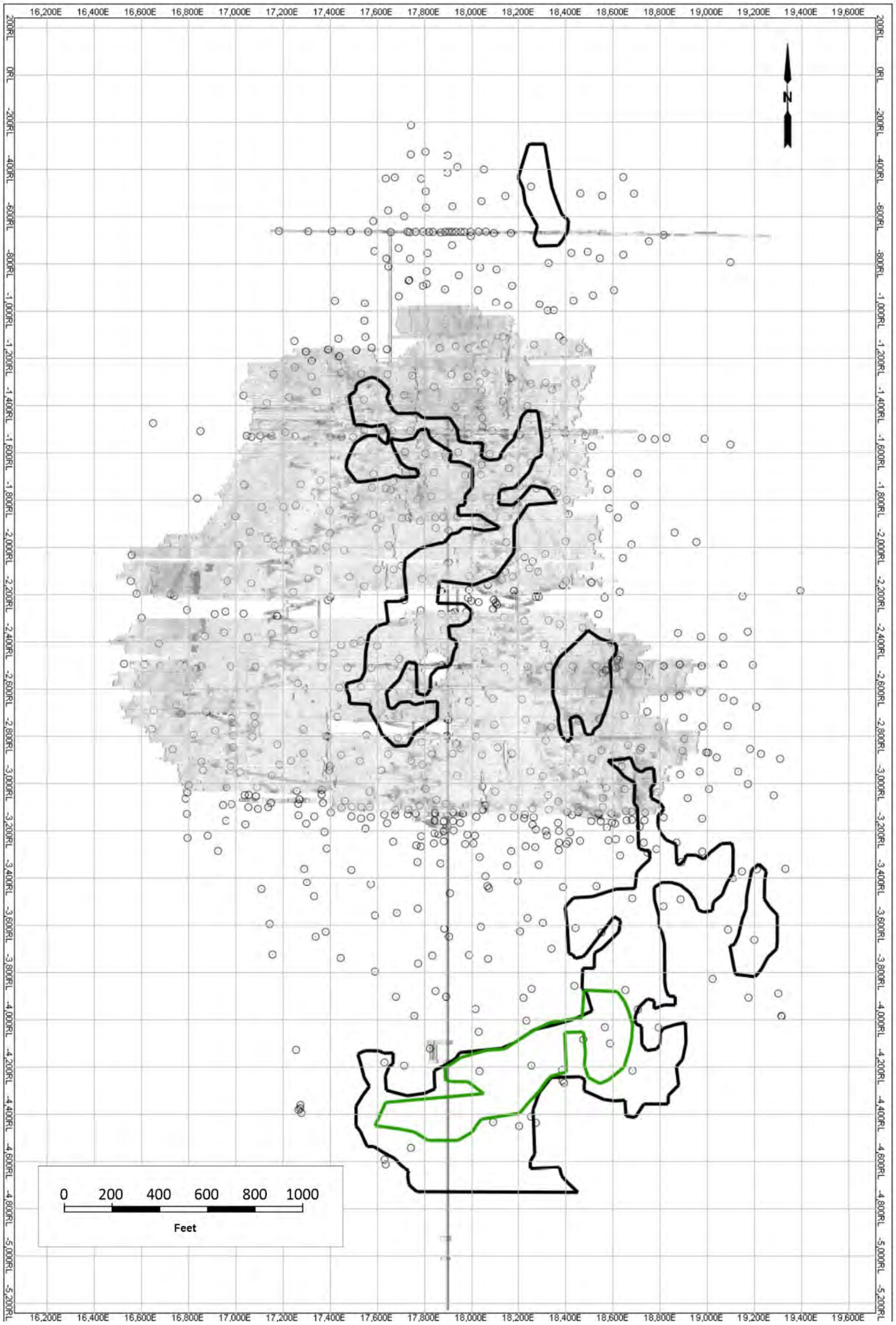
11.2.15 Reserve and Resource Designation and Reporting

The resource model is passed along to the engineering team for processing with the stope optimizer utility in Deswik. Deswik is a commercially available software package that is widely used within the industry. The optimizer agglomerates blocks of similar grade characteristics into coherent volumes that are appropriate for use in stope design. The process is constrained by user-assigned values for NSR values, resource classification, tonnage factors, minimum widths, and stope dimensions, among other things. Zero grade diluting material is added where necessary to achieve a minimum width of eight feet for Mineral Resources or 11 ft for Mineral Reserves. The diluted vein material, tagged by stope names, is inspected on longitudinal projections and polyline boundaries are drawn around reserve and resource volumes. Examples of these longitudinal projections are provided in Figure 11-9 for the 50 Vein and Figure 11-10 for the 30 Vein. Note that the grey hatched area represents the projection of the 30 Vein stoping in order to provide a location reference.

Blocks captured within the reserve boundaries that meet the NSR cut-off and classification criteria are evaluated and tagged in the block model (green outline in Figure 11-9). Blocks which meet the resource NSR cut-off grade and are outside of the reserve boundaries or disqualified from inclusion as reserves for some other reason are tagged as resource (black outline in Figure 11-9). Blocks that fail to meet the criteria for either reserve or resource are tagged for exclusion. The processed blocks are captured in spreadsheets for addition of “unplanned dilution” and summing by vein and category. Blocks are captured and summed following which the unplanned dilution is added (15% for reserves, 5% for resources. Material tagged as reserves are reported as Mineral Reserves. Blocks outside the reserve outlines are reported as Mineral Resources exclusive of Mineral Reserves.

Figure 11-10 depicts the 30 Vein with the blocks colored to show the classification.

In the SLR QP’s opinion, the stope optimization and reporting procedures are reasonable, and are being executed in an appropriate manner. As such, the Mineral Resources have been tabulated in a fashion consistent with industry best practice.



Source: Hecla, 2021

Figure 11-9: Longitudinal Projection – 50 Vein

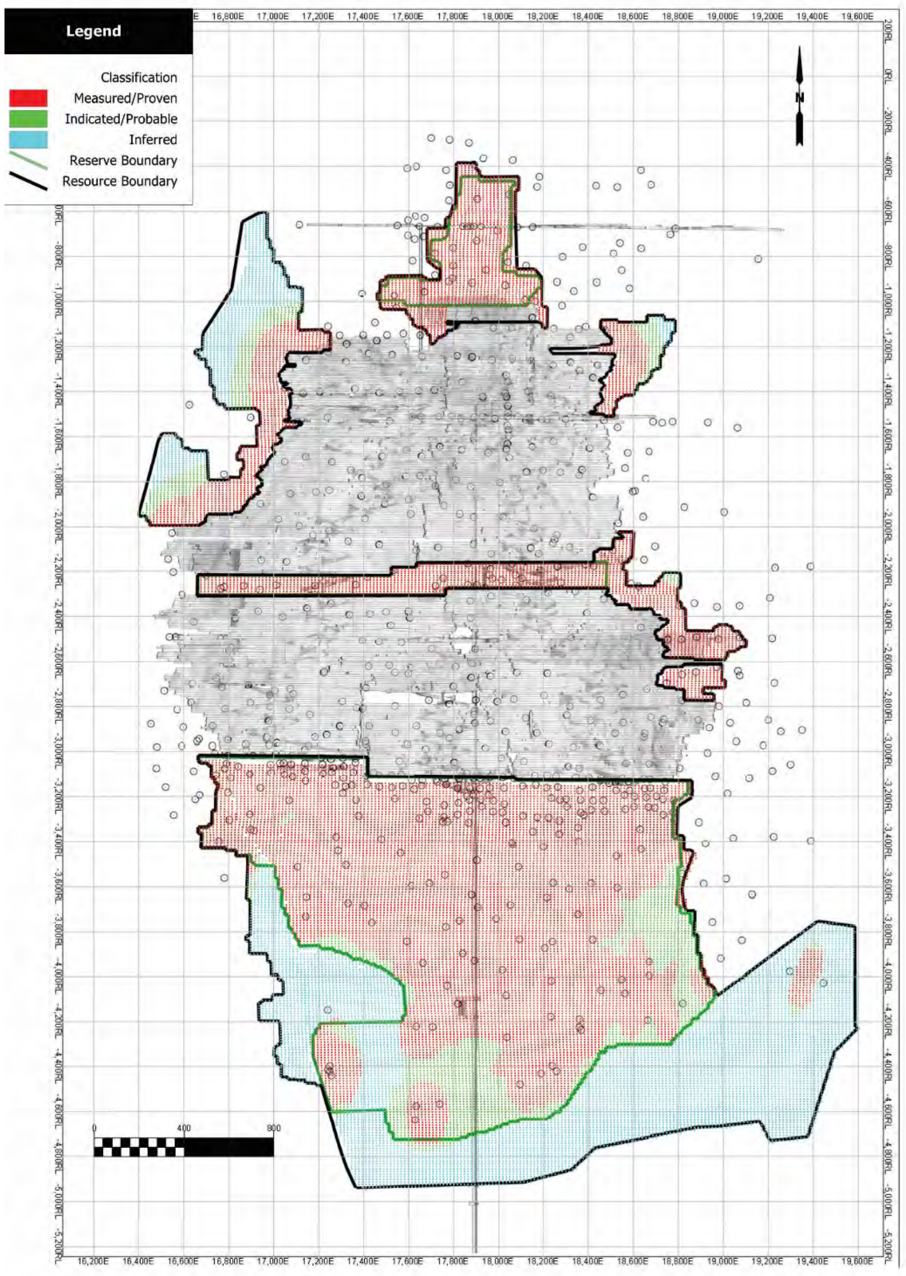


Figure 11-10: Longitudinal Projection – 30 Vein

11.2.16 Gold Hunter Mineral Resource Statement

The Gold Hunter Mineral Resources, exclusive of Mineral Reserves and sorted by vein to December 31, 2021 are summarized in Table 11-11.

Table 11-11: Gold Hunter Mineral Resources to December 31, 2021
Hecla Mining Company – Lucky Friday Mine

Vein	Tons	Ag (oz/ton)	Pb (%)	Zn (%)	NSR ($/t)	Silver (oz)	Lead (Tons)	Zinc (Tons)
				Measured				
5	267,000	11.6	2.3	0.6	252	3,080,000	6,160	1,640
20	764,000	7.7	4.4	3.0	273	5,900,000	33,400	23,100
30	390,000	10.2	5.9	0.9	305	3,960,000	23,000	3,600
40	861,000	5.0	3.9	4.9	254	4,270,000	33,800	42,600
41	1,020,000	5.9	4.8	3.9	265	5,970,000	48,500	39,200
50	690,000	6.4	4.5	3.0	254	4,420,000	31,000	21,000
60	675,000	7.2	4.1	2.6	251	4,860,000	27,900	17,400
70	658,000	8.0	4.4	1.8	256	5,240,000	29,200	12,100
80	1,120,000	7.2	5.6	1.4	258	8,110,000	62,500	15,900
90	846,000	7.0	6.0	1.6	267	5,930,000	51,000	13,400
100	215,000	7.7	3.6	1.7	233	1,650,000	7,730	3,730
110	528,000	10.4	2.5	1.8	258	5,510,000	13,100	9,410
120	63,700	6.4	4.7	2.0	238	407,000	3,010	1,260
130	111,000	10.2	6.9	2.0	345	1,130,000	7,670	2,250
140	21,600	4.7	3.9	3.0	212	102,000	836	640
150	1,970	4.9	4.8	0.4	185	9,660	95	8
Total	**8,230,000**	**7.4**	**4.6**	**2.5**	**262**	**60,600,000**	**379,000**	**207,000**
				Indicated				
5	74,800	10.4	2.7	0.7	242	777,000	2,040	521
20	171,000	7.3	3.9	2.5	249	1,260,000	6,720	4,350
30	100,000	11.9	6.7	0.8	350	1,200,000	6,750	854
40	53,900	6.0	4.4	3.3	251	325,000	2,390	1,800
41	270,000	6.6	5.6	4.5	305	1,780,000	15,000	12,200
50	156,000	5.7	4.3	2.9	235	893,000	6,690	4,470
60	111,000	6.7	4.1	1.8	226	743,000	4,530	1,980

Vein	Tons	Ag (oz/ton)	Pb (%)	Zn (%)	NSR ($/t)	Silver (oz)	Lead (Tons)	Zinc (Tons)
70	77,300	6.4	4.5	1.2	217	492,000	3,450	892
80	159,000	6.5	4.5	1.6	228	1,030,000	7,110	2,570
90	110,000	8.0	6.4	1.1	281	877,000	6,990	1,240
100	47,400	7.1	3.0	1.3	203	337,000	1,420	617
110	182,000	9.0	3.0	2.4	254	1,630,000	5,360	4,280
120	20,000	5.9	3.8	1.6	204	117,000	751	322
130	46,600	7.0	6.2	2.3	282	327,000	2,870	1,050
140	52,400	5.4	3.6	2.5	209	282,000	1,890	1,330
150	30,900	7.4	6.6	0.6	267	229,000	2,050	188
Total	**1,660,000**	**7.4**	**4.6**	**2.3**	**258**	**12,300,000**	**76,000**	**38,600**
				Measured and Indicated				
5	341,000	11.3	2.4	0.6	250	3,860,000	8,200	2,160
20	935,000	7.7	4.3	2.9	269	7,160,000	40,200	27,400
30	491,000	10.5	6.1	0.9	314	5,160,000	29,800	4,460
40	915,000	5.0	4.0	4.9	253	4,600,000	36,200	44,400
41	1,290,000	6.0	4.9	4.0	274	7,750,000	63,500	51,300
50	846,000	6.3	4.5	3.0	250	5,310,000	37,700	25,500
60	786,000	7.1	4.1	2.5	248	5,610,000	32,400	19,400
70	735,000	7.8	4.4	1.8	252	5,740,000	32,600	13,000
80	1,280,000	7.1	5.4	1.4	254	9,140,000	69,600	18,500
90	956,000	7.1	6.1	1.5	269	6,810,000	58,000	14,600
100	262,000	7.6	3.5	1.7	227	1,980,000	9,150	4,340
110	710,000	10.1	2.6	1.9	257	7,140,000	18,500	13,700
120	83,700	6.3	4.5	1.9	230	525,000	3,760	1,580
130	158,000	9.2	6.7	2.1	327	1,460,000	10,500	3,300
140	74,000	5.2	3.7	2.7	210	384,000	2,730	1,970
150	32,800	7.3	6.5	0.6	263	239,000	2,140	196
Total	**9,890,000**	**7.4**	**4.6**	**2.5**	**261**	**72,900,000**	**455,000**	**246,000**

Vein	Tons	Ag (oz/ton)	Pb (%)	Zn (%)	NSR ($/t)	Silver (oz)	Lead (Tons)	Zinc (Tons)
				Inferred				
5	8,700	5.8	3.4	0.8	189	50,000	297	69
20	218,000	4.9	4.0	4.2	252	1,070,000	8,640	9,220
30	1,330,000	10.8	6.4	1.9	361	14,400,000	84,900	25,800
40	124,000	6.1	4.1	3.6	266	757,000	5,120	4,520
41	200,000	6.0	4.6	3.6	273	1,190,000	9,170	7,290
50	225,000	5.4	4.5	3.0	247	1,210,000	10,200	6,680
60	578,000	7.0	5.5	2.7	289	4,030,000	31,600	15,300
70	445,000	7.7	6.1	2.3	306	3,420,000	27,000	10,100
80	598,000	6.2	5.2	1.4	247	3,720,000	31,400	8,570
90	313,000	8.0	6.1	0.7	282	2,500,000	19,100	2,160
100	17,700	4.3	3.7	1.8	186	75,400	651	309
110	460,000	6.3	3.4	3.4	249	2,880,000	15,800	15,700
120	28,900	4.8	3.9	1.2	187	138,000	1,140	333
130	137,000	7.1	4.8	1.1	248	973,000	6,590	1,540
140	47,200	4.2	3.9	2.7	209	200,000	1,840	1,290
150	164,000	5.1	4.5	1.0	204	832,000	7,410	1,680
Total	**4,900,000**	**7.6**	**5.3**	**2.3**	**290**	**37,400,000**	**261,000**	**111,000**

Notes:

1. Classification of Mineral Resources is in accordance with the S-K 1300 classification system.
2. Mineral Resources were estimated by Hecla staff and reviewed and accepted by SLR.
3. Mineral Resources are exclusive of Mineral Reserves.
4. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
5. Mineral Resources are 100% attributable to Hecla.
6. Bulk density was calculated by block, according to mineralogical content.
7. Mineral Resources are estimated at an NSR cut-off grade of US$173/t.
8. NSR values were calculated using long-term metal prices of US$21.00/oz Ag, US$1.15/lb Pb, and US$1.35/lb Zn.
9. Numbers may not add due to rounding.

11.3 Lucky Friday Mine

The Lucky Friday Unit encompasses the Lucky Friday Vein proper, as well as the Silver vein, and nearby related structures termed the Ancillary Veins. No Mineral Reserves have been estimated for Lucky Friday because the area has been dormant for some years and there is no LOM plan for this mining area. As such, there are only Mineral Resources at Lucky Friday. The estimation procedures have been largely unchanged and there has been no additional data added since cessation of mining. The only changes that have been incurred over the years were due to variations in costs and metal prices, which in turn, changed the NSR cut-off criteria applied to the blocks.

Mineral Resources are estimated by means of a polygonal method compiled within Excel spreadsheets. The database for the estimate consists of chip/channel samples. Drill results are used as a guide to confirm continuity, but are not generally included in the grade estimates. Mean sample grades are calculated from assay results for silver, lead, and zinc. Iron was not routinely assayed and so it is an estimated value.

Specific gravity is estimated using a formula similar to that used for Gold Hunter. This formula differs somewhat, however, due to the lower siderite content at Lucky Friday. The formula is as follows:

Density = 100 / ((Gangue%/2.7) + (Galena%/7.5) + (Sphalerite%/4.0) + (Iron%/7.8)

Where:

- Galena% = Pb% / 0.866
- Sphalerite% = Zn% / 0.670
- Gangue% = 100 – (Galena% + Sphalerite% + Iron%)
- Iron% = 10.5 if Pb%>8.0, else 7.0

The polygons are drawn on longitudinal projections of the veins using the outlines of the development and stoping as constraints, along with any bounding faults. The veins are broadly folded and so the orientations of longitudinal projections for different vein areas changes to align with the average vein strike. Where a block is extrapolated downwards from a single heading, the down-dip limits are defined as follows:

- Measured – 100 ft from drift or stope level
- Indicated – 100 ft from the boundary of the Measured resource limit
- Inferred – extends downwards to the elevation limit of the mine (-3104 ft elevation).

An example longitudinal projection showing the block dimensions along with vein stoping and development is provided in Figure 11-11.

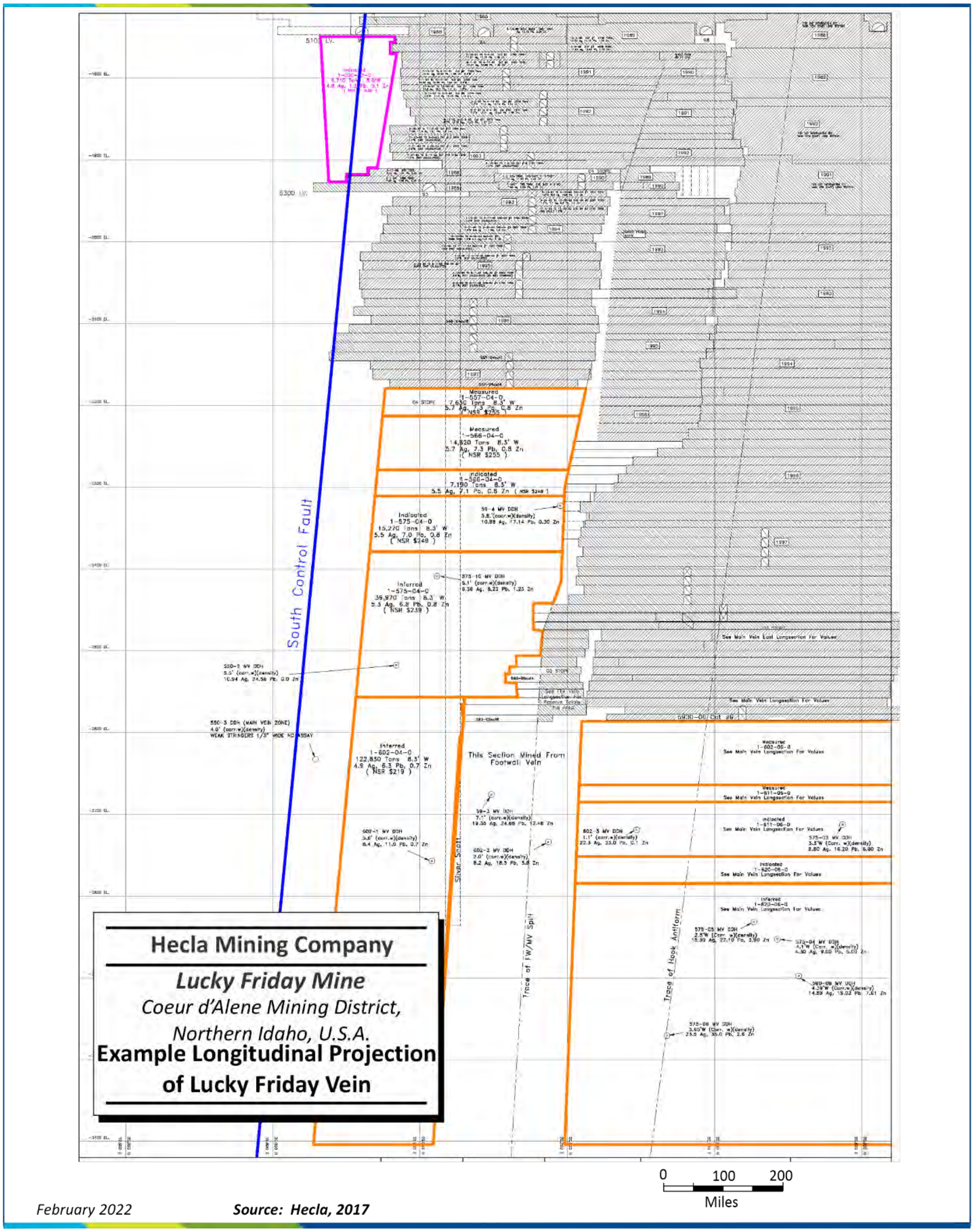


Figure 11-11: Example Longitudinal Projection of Lucky Friday Vein

For a given block, the samples are listed in a spreadsheet in the order that they were taken along the drift or stope, along with their widths, grades, and distance from the nearest survey station. Each sample is assigned a strike length interval based on limits place at half the distance to the adjacent samples. A sample volume weighting factor per vertical foot is calculated by multiplying the length interval by the sample width. The metal content per vertical foot is derived for each of the samples using the following formula:

Metal Content per Vertical Foot = L x W x G x TF

Where:

- L = sample strike length interval
- W = sample width
- G = assayed grade
- TF = tonnage factor

The volume-weighted mean grade would then be:

Average Grade = ∑ Metal Contents / ∑ (L x W x TF)

Where:

- L = sample strike length interval
- W = sample width
- TF = tonnage factor

The volume is estimated by multiplying the aggregate area of influence for the samples by the vertical dimension of the block. In the case of a block bounded on top and bottom by development, that vertical dimension would be half the distance between the levels. For blocks extrapolated downwards, the block height would be as listed above in the classification parameters. Tonnage is estimated by multiplying the volume by the estimated tonnage factor.

The veins at Lucky Friday tend to be discrete structures with little or no value in the walls. The chip sampling was done across the vein only, as opposed to Gold Hunter, where the sampling transects the entire face. The resource grade calculations are done using three different methods in order to derive estimates for the following scenarios:

- the vein only
- the ideal mining width ("mineable")
- the actual mined width.

The resource grade spreadsheets are configured to allow the calculation of the average grade for each of these scenarios. The calculation for the vein only is done using the vein widths as recorded during the sampling. To estimate the grades and volumes for the mineable case, the vein widths are diluted to a minimum mining width, which is either eight or ten feet depending on expected mining method. The dilution is incorporated in the calculation by adding zero grade material to the sample widths using the following rules:

If the in-situ vein is less than the minimum, the sample width is increased with zero grade material to achieve that minimum.

If the vein is wider than the minimum, one foot of dilution of zero grade material is added on both walls (total of two feet).

For the "actual mined" calculation, the widths are increased to the stope (or drift) widths measured at each sample location. As is the case for the other two scenarios, the diluting material is considered to be zero grade.

Drilling results indicate that the grades in the Lucky Friday system diminish gradually with depth. To account for this observed trend, the average stope chip/channel grades are reduced for blocks which extend downwards below the lower limits of development. The degree of this reduction increases with depth according to the values listed in Table 11-12.

Table 11-12: Depth Reduction Factors
Hecla Mining Company – Lucky Friday Mine

Distance to Block Mid-Point (ft)	Reduction Factor
<100	1.0000
100	0.9785
125	0.9730
150	0.9680
175	0.9620
200	0.9570
225	0.9520
250	0.9460
275	0.9410
300	0.9350
325	0.9300
350	0.9250
375	0.9190
400	0.9140
425	0.9090
450	0.9030

An NSR cut-off grade, similar to that used at Gold Hunter, is applied to the blocks and the tons and grade summed in each classification category. The NSR cut-off grade applied at Lucky Friday was US$207/t. For the current estimate the NSR multipliers were updated with the values listed in subsection 11.2.12 of this TRS. These multipliers were as follows:

- Ag: US$16.86 per oz/ton
- Pb: US$19.77 per percent of lead
- Zn: US$18.64 per percent of zinc

The NSR cut-off grade is higher than the $173/ton used at Gold Hunter to reflect different mining costs.

During an earlier audit, the SLR QP reviewed several of the block estimate spreadsheets and confirmed that the calculations were correct. In addition, the longitudinal projections of the Lucky Friday Vein were inspected to confirm that the block outlines were reasonable. A cursory review of the spreadsheets and longitudinal sections were made for this audit to confirm that there were no major changes. In the SLR QP's opinion, the Mineral Resource estimate for Lucky Friday has been carried out in a reasonable fashion, consistent with conventional, although somewhat dated, industry practice.

11.3.1 Lucky Friday Mineral Resource Statement

The Mineral Resources estimate to December 31, 2021 for the Lucky Friday area is summarized in Table 11-13.

Table 11-13: Lucky Friday Mineral Resources – December 31, 2021
Hecla Mining Company – Lucky Friday Mine

Area	Tonnage (ton)	Grade			NSR (US$/t)	Contained Metal		
		Ag (oz/ton)	Pb (%)	Zn (%)		Ag (oz)	Pb (tons)	Zn (tons)
Measured								
Lucky Friday	393,000	12.2	11.4	1.5	459	4,790,000	44,700	5,910
Silver	8,030	15.9	1.0	0.2	293	128,000	82	15
Ancillary	19,800	14.0	6.7	1.9	403	277,000	1,320	376
Total	**421,000**	**12.4**	**11.0**	**1.5**	**453**	**5,200,000**	**46,100**	**6,310**
Indicated								
Lucky Friday	139,000	9.5	11.0	3.7	446	1,320,000	15,300	5,080
Silver	10,000	13.3	1.0	0.2	248	133,000	100	20
Ancillary	28,600	9.0	6.0	1.4	240	258,000	1,710	409
Total	**178,000**	**9.6**	**9.6**	**3.1**	**402**	**1,710,000**	**17,100**	**5,510**
Total Measured and Indicated								
Total	**598,000**	**11.5**	**10.6**	**2.0**	**438**	**6,910,000**	**63,200**	**11,800**
Inferred								
Lucky Friday	449,000	9.2	10.9	4.1	404	4,110,000	48,900	18,500
Silver	10,000	13.3	1.0	0.2	248	133,000	100	20
Ancillary	21,800	10.2	9.0	2.5	311	222,000	1,980	548
Total	**480,000**	**9.3**	**10.6**	**3.9**	**397**	**4,460,000**	**50,900**	**19,000**

Notes:

1. Classification of Mineral Resources is in accordance with the S-K 1300 classification system.

2. Mineral Resources were estimated by Hecla staff and reviewed and accepted by SLR.
3. Mineral Resources are exclusive of Mineral Reserves.
4. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
5. Mineral Resources are 100% attributable to Hecla.
6. Bulk density was calculated according to mineralogical content.
7. Mineral Resources are estimated at an NSR cut-off grade of US$207/t.
8. NSR values were calculated using long-term metal prices of US$21.00/oz Ag, US$1.15/lb Pb, and US$1.35/lb Zn.
9. Numbers may not add due to rounding.

12.0 MINERAL RESERVE ESTIMATES

12.1 Summary

The current Mineral Reserve estimates, as prepared by Hecla and reviewed and accepted by SLR, reported as of December 31, 2021 are summarized in Table 12-1. While resources exist at the Lucky Friday deposit, Mineral Reserves are reported only for the Gold Hunter deposit, as this is the only area included in the current LOM plan.

The Lucky Friday Veins have been inactive since 2005 when operation in the Lucky Friday Veins were curtailed due to low metal prices, seismicity concerns, development cost, and metallurgical performance issues. Increased metal prices may render the Lucky Friday resource economic at some future date. Work on re-evaluating the remaining Lucky Friday resource will be undertaken as time permits, with the intent of its possible inclusion in future LOM plans.

Table 12-1: Summary of Mineral Reserves – December 31, 2021
Hecla Mining Company – Lucky Friday Mine

Category	Tonnage (000 tons)	Grade			Contained Metal		
		Ag (oz/ton)	Pb (%)	Zn (%)	Ag (000 oz Ag)	Pb (000 tons)	Zn (000 tons)
Proven	4,691	13.92	8.43	3.40	65,313	395.3	159.4
Probable	765	12.26	7.47	2.83	9,386	57.2	21.7
Total Proven + Probable	**5,456**	**13.69**	**8.29**	**3.32**	**74,699**	**452.4**	**181.0**

Notes:

1. Classification of Mineral Reserves is in accordance with the S-K 1300 classification system.
2. Mineral Reserves were estimated by Hecla and reviewed and accepted by SLR.
3. Mineral Reserves are 100% attributable to Hecla.
4. Mineral Reserves are estimated at an NSR cut-off value of $208/ton.
5. The NSR values reflect the discrete metallurgical responses for the Mineral Reserve blocks.
6. Mineral Reserves are estimated using an average long-term silver price of US$17.00/oz, lead price of US$0.90/lb, and zinc price of US$1.15/lb.
7. A minimum mining width of 11 ft was used for 30 Vein above 7500 level, 9 ft for 30 Vein below 7500 level, and 8 ft for all other veins.
8. A bulk density of 0.086 tons/ft^3 was used for waste material. Mineral Reserve bulk density was calculated by block, based on mineralogical content.
9. Numbers may not add due to rounding.

Mineral Reserves by vein are presented in Table 12-2.

Table 12-2: Mineral Reserves by Vein – December 31, 2021
Hecla Mining Company – Lucky Friday Mine

Vein	Tonnage (000 tons)	Grade			Contained Metal		
		Ag (oz/ton)	Pb (%)	Zn (%)	Ag (000 oz Ag)	Pb (000 t)	Zn (000 t)
30	3,731	14.21	8.98	3.68	53,007	335.2	137.4
50	218	9.36	6.95	5.34	2,037	15.1	11.6
60	234	14.94	8.39	3.16	3,500	19.6	7.4
70	245	10.44	6.34	1.62	2,560	15.5	4.0
80	463	11.23	8.14	2.16	5,201	37.7	10.0
90	244	12.05	9.27	1.11	2,941	22.6	2.7
110	321	17.01	2.05	2.47	5,453	6.6	7.9
Total	**5,456**	**13.69**	**8.29**	**3.32**	**74,699**	**452.4**	**181.0**

Notes:

1. Classification of Mineral Reserves is in accordance with the S-K 1300 classification system.
2. Mineral Reserves were estimated by Hecla and reviewed and accepted by SLR.
3. Mineral Reserves are 100% attributable to Hecla.
4. Mineral Reserves are estimated at an NSR cut-off value of $208/ton.
5. The NSR values reflect the discrete metallurgical responses for the Mineral Reserve blocks.
6. Mineral Reserves are estimated using an average long-term silver price of US$17.00/oz, lead price of US$0.90/lb, and zinc price of US$1.15/lb.
7. A minimum mining width of 11 ft was used for 30 Vein above 7500 level, 9 ft for 30 Vein below 7500 level, and 8 ft for all other veins.
8. A bulk density of 0.086 t/ft^3 was used for waste material. Mineral Reserve bulk density was calculated by block, based on mineralogical content.
9. Numbers may not add due to rounding.

The SLR QP is not aware of any risk factors associated with, or changes to, any aspects of the modifying factors such as mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

12.2 Conversion to Mineral Reserves

Mining methods used in this Mineral Reserve estimate include underhand closed benching (UCB), and overhand or underhand mechanized cut and fill (LFUL). Minimum mining dimensions vary by mining method and are discussed in section 12.4.

To permit more precision in defining reserve extents the block model is sub-blocked around the vein solids that were created for Mineral Resource estimation. The sub-blocked model is used for all Mineral Reserve and planning estimates.

The mining method for a given area is determined based on vein thickness, desired production rate, and seismic risks. Production designs are created based on the geometries relevant to the selected mining method which are discussed in subsection 13.1.3. Mineral Reserve outlines are created around the production locations that meet the NSR cut-off threshold, while also ensuring that adverse pillar geometries are not created that could become seismically active, and that mining does not cease near a problematic structure. Production locations outside the Mineral Reserve outlines are not included in Mineral Reserves. Once designs are completed, access ramps and other supporting infrastructure are designed to facilitate production mining.

The production design wireframes are evaluated against the sub-blocked model to generate tons and grade for each location. An unplanned dilution factor is then applied that accounts for rock overbreak and backfill dilution both of which are treated as having zero metal grade.

Internal portions of the 30 Vein which did not meet the block cut-off grade value were included in the stopes and in the Mineral Reserves as the material will have to be mined to avoid the generation of stress inducing geometry. SLR reviewed the material and concurs with its inclusion as Mineral Reserves.

Only Measured and Indicated Mineral Resources were converted to Mineral Reserves. Any Inferred Mineral Resources included within the Mineral Reserve designs are carried at zero grade.

12.3 Cut-Off Grade

The cut-off grade (COG) for Mineral Reserves is calculated and expressed in terms of NSR value per ton. The COG NSR value used for stope design of all mining methods is $208.00/ton, as presented in Table 12-3. This COG reflects the property-wide operating costs and sustaining capital costs distributed on a per-ton basis. Operating costs from 2021 were used as the basis for cut-off grade calculations. From 2017 to January 2020, operations were on care and maintenance due to a strike.

Table 12-3: NSR Cut-off Values (US$/ton)
Hecla Mining Company – Lucky Friday Mine

Description	Mining	Maintenance	Mill	G&A	Sustaining Capital	Total
Operating Costs (US$/ton)	64.84	33.25	15.43	59.72	34.75	208.00

Net smelter return is calculated on a unit metal value basis using actual smelter contract terms, freight costs, and forecast metal prices. Metal prices and metallurgical recoveries used to calculate NSR are as follows:

- Silver: US$17.00/oz, 96.9%.
- Lead: US$0.90/lb, 94.7%.
- Zinc: US$1.15/lb, 91.2%.

Standard industry terms for payability, treatment and refining charges, and shipping were applied to calculate the NSR formula. The NSR value is calculated and applied to every block in the block model allowing for NSR values to then be calculated and assigned to individual stopes after planned dilution has been applied. The NSR calculation formula by unit metal value is as follows:

$$NSR = (13.22 * [Ag\ oz/ton]) + (15.29 * [Pb\ \%] * 100) + (15.78 * [Zn\ (\%] * 100)$$

SLR independently verified the NSR estimation methodology. Variances were noted in the application of concentrate freight costs, however this constitutes a relatively minor impact to NSR values. SLR recommends that the mine review the unit metal value calculations for future estimates.

SLR notes that an unplanned dilution factor, discussed in subsection 12.4, is applied to all designs after the NSR calculation has been completed. Realized NSR values should thus be expected to be lower than estimated due to unplanned dilution. SLR estimated the impact of this change would be a reduction in Mineral Reserve totals of approximately 90,000 t, or 2%, of total Mineral Reserves. SLR does not consider the difference to be material and SLR recommends that Hecla change this methodology for future Mineral Reserve estimates and complete NSR calculations and Mineral Reserve compilation on fully diluted material.

12.4 Dilution

Planned and unplanned dilution is applied to all Mineral Reserves. Planned dilution is added to the stope designs which expands the designs up to a minimum mining thickness. Unplanned dilution is applied as a mass percentage on undiluted Mineral Reserves. A schematic showing the application of dilution to the vein model is shown in Figure 12-1.

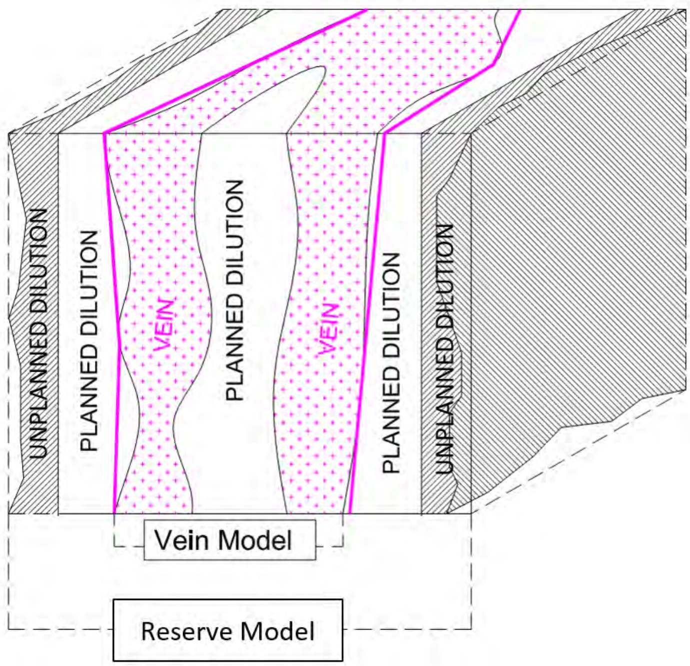


Figure 12-1: Dilution Schematic

The minimum mining width depends on the maximum size of equipment that will be used to mine the vein and is varied by location depending on the level of productivity required and dilution deemed acceptable within each vein. Three minimum mining widths are currently used in the LOM which are applied as follows:

- 8.0 ft – all Intermediate Veins
- 11.0 ft – 30 Vein above 7500 level
- 9.0 ft – 30 Vein below 7500 level

Stopes are designed using a stope optimizer tool that first divides the vein solid along strike length based on anticipated development round lengths. The vein width is interrogated and if the resulting width is less than the minimum mining width specified for that area, additional dilution is added to the stope until the stope width is equal to the minimum mining width specified. Maximum mining width is also defined for all mining methods 20 ft. No areas in reserve met the 20 ft maximum width.

After stope solids are increased to the minimum mining thickness, an unplanned dilution factor is applied. This factor accounts for small scale variations in vein location, limits of mine equipment selectivity, unplanned overbreak, and rehandle dilution. For areas mined by underhand cut and fill the unplanned dilution factor is 5% based on observed performance. For areas mined by UCB, the unplanned dilution factor is 15% reflecting the lower selectivity inherent to the method. Planned dilution tons are given background metal grades in the block model. Unplanned dilution is assigned zero metal grade.

SLR is of the opinion that the 15% dilution estimate in the UCB mining is potentially optimistic and requires further validation, considering the short time that the method has been in use, the impact of vein deviation over the 23 ft cut depth, the use of infill drill information as opposed to face by face mapping and potential overbreak in longhole blasting due to factors such as blast hole misalignment. SLR recommends close monitoring of the stoping performance including regular surveys as the void is exposed and reconciliation to the stope designs and to the Mineral Reserve estimates to confirm and refine the dilution estimate.

12.5 Extraction

Extraction for all mining methods is assumed to be 100% based on experience. SLR considers this assumption to be reasonable as any material left in a stope on a given cut does become available when the subsequent lower cut is mined. The assumption does not include any allowance for losses due to potential "frozen" section in the UCB blasts. SLR recommends this assumption be reviewed within the above recommended reconciliation work to refine future estimates.

12.6 Comparison to Previous Estimates

The 2021 Mineral Reserve estimate represents a change from the 2020 Mineral Reserve estimate as the estimation for the 30 Vein, the largest single vein in the estimate, has been changed to reflect the change to the UCB mining method. Mineral Reserves decreased by 308,000 tons, 2.3 Moz of silver, 33,000 tons lead, and 52,000 tons zinc, due to:

- 2021 production,
- Removal of the low grade 40 Vein material,
- Increase tons but decrease grade of the 30 Vein due to dilution of the UCB method,
- An increase in tons but decrease in the grade of all the other veins. A summary of gains and losses and the variance is shown in Table 12-4.

Table 12-4: Mineral Reserve Comparison 2020 to 2021
Hecla Mining Company – Lucky Friday Mine

Vein	Tons (000)	Ag (oz/ton)	Pb (%)	Zn (%)	Oz Ag (000)	Tons Pb (000)	Tons Zn (000)
December 31, 2021 Proven & Probable Mineral Reserve Estimate							
30	3,731	14.21	8.98	3.68	53,007	335.2	137.4
40	0				-	-	-
50	218	9.36	6.95	5.34	2,037	15.1	11.6
60	234	14.94	8.39	3.16	3,500	19.6	7.4
70	245	10.44	6.34	1.62	2,560	15.5	4.0
80	463	11.23	8.14	2.16	5,201	37.7	10.0
90	244	12.05	9.27	1.11	2,941	22.6	2.7
110	321	17.01	2.05	2.47	5,453	6.6	7.9
Totals	**5,456**	**13.69**	**8.29**	**3.32**	**74,699**	**452.4**	**181.0**
December 31, 2020 Proven & Probable Mineral Reserve Estimate							
30	3,287	16.72	10.70	4.22	54,953	351.6	138.7
40	1,371	4.53	3.78	4.98	6,213	51.8	68.3
50	166	10.15	7.39	4.13	1,681	12.3	6.8
60	171	15.18	8.65	3.54	2,602	14.8	6.1
70	169	12.77	7.30	1.63	2,165	12.4	2.8
80	246	11.95	9.91	2.30	2,940	24.4	5.7
90	137	13.76	10.77	0.77	1,890	14.8	1.1
110	216	21.03	1.56	1.79	4,547	3.4	3.9
Totals	**5,764**	**13.36**	**8.42**	**4.05**	**76,992**	**485.4**	**233.3**
Mineral Reserve Percent Variance 2020 to 2021							
	Tons	**Ag Grade**	**Pb Grade**	**Zn Grade**	**Ag Oz**	**Tons Pb**	**Tons Zn**
30	14%	-15%	-16%	-13%	-4%	-5%	-1%
40	-100%	-100%	-100%	-100%	-100%	-100%	-100%
50	31%	-8%	-6%	29%	21%	24%	70%
60	37%	-2%	-3%	-11%	34%	33%	22%
70	45%	-18%	-13%	-1%	18%	26%	43%
80	88%	-6%	-18%	-6%	77%	55%	77%
90	78%	-12%	-14%	43%	56%	53%	154%
110	48%	-19%	31%	38%	20%	94%	105%
Totals	**-5%**	**3%**	**-2%**	**-18%**	**-3%**	**-7%**	**-22%**

A more detailed breakdown of the change in Mineral Reserves from 2020 to 2021 is shown in Table 12-5.

Table 12-5: Mineral Reserve Change 2020 to 2021 After Production
Hecla Mining Company – Lucky Friday Mine

December 31, 2021 Proven & Probable Mineral Reserve Estimate							
Item	Tons (000)	Ag (oz/ton)	Pb (%)	Zn (%)	Oz Ag (000)	Tons Pb (000)	Tons Zn (000)
2020 Reserve	5,764	13.4	8.4	4.0	76,992	485.4	233.3
2021 Mining	322	11.6	7.6	3.4	3,733	24.5	10.9
2020 Depleted	5,443	13.5	8.5	4.1	73,258	460.9	222.3
Other Changes	14	0.3	(0.2)	(0.8)	1,441	(8.5)	(41.3)
2021 Reserve	5,456	13.7	8.3	3.3	74,699	452.4	181.0

The mine production grades fell short of the Mineral Reserve grades in 2021. Over the period 2013 to 2021 the annual production grades for silver and lead have been less than the average Mineral Reserve grades at the end of the period. The silver production grades have been 69% to 88% of the Mineral Reserve grades while the lead grades have been 70% to 89% of the Mineral Reserve grades. The zinc production grades have generally exceeded the plan ranging from 97% to 123% of the average Mineral Reserve grades. This is an overall view and includes the period of reduced operations through a long strike and it does not look forward to potential high grade areas ahead of the present mining. SLR considers the historical grade reconciliation to show that further refinements to the Mineral Reserve estimation process, notably in the areas of dilution, should be reviewed and if necessary changes to the estimation process should be implemented.

12.7 Mineral Reserve Reconciliation

SLR has reviewed the Mineral Reserve reconciliation and recognizes that the 2021 Mineral Reserve estimate includes a significant revision to the mining method with the use of UCB in the 30 Vein and that the historical accuracy of the Mineral Reserve estimate may not be representative of future performance. SLR is of the opinion that reconciliation should be an implicit part of the mining process, and reconciliation targets should be a key performance indicator for operations. The reconciliation between the block models and production remains an important validation tool in evaluation of the performance of the block models. SLR is of the opinion that monthly reconciliation analyses should be completed and that the results of those analyses should be applied to modify practices and to refine the estimation parameters for the Mineral Reserve estimation process.

The mine completes regular analyses between the mine and mill production data and the Mineral Reserve estimates on a stope by stope basis and considering total production.

The reconciliation analysis follows Parker (2013) which uses three factors:

The F1 factor usually relates short term (ore control) model tonnages, grades and metal content to ore Mineral Reserves depleted. The F1 factor may be used to check and calibrate the selectivity of mineral resource models and/or planned dilution assumed in transfer from mineral resources to ore Mineral Reserves. The F1 factor is the grade control prediction divided by the ore Mineral Reserve.

The F2 factor relates received at mill (measured by the mill) tonnages, grades and metal content to delivered to mill production tonnages, grade and metal content. The F2 factor enables a check on unplanned dilution entering the ore stream between ore control and the mill. The F2 factor is the mill production divided by the grade control prediction.

The F3 factor is F1×F2 (mill production divided by Mineral Reserve estimate) and enables a comparison of a mine's (measured by mine) ability to recover the tonnage, grade and metal content estimated in Mineral Reserves.

SLR is of the opinion that reconciliation variances of 10% or less are indicative of a well run mine and good Mineral Reserve estimate. Variations between 10% and 20% are indicative of problems in the mining/ore control systems and Mineral Reserve estimation parameters and investigation of the potential issues is warranted. Variations in excess of 25% are considered significant and actions to improve the controls and estimates are required.

12.7.1 Previous Reconciliation Reviews

SLR has previously reviewed the mine reconciliation analyses in the course of Mineral Reserve reviews for the mine. SLR considers the information to be relevant and provides a summary of the past results and comments.

There are several factors that can cause the tonnage variance:

- More dilution in mining than is included than in the model, which may come from the backfill (although the backfill is cemented) and more likely from overbreak from the stope walls.)
- Bulk density estimation.
- Survey changes between the initial and final surveys
- The reconciliation does not account for material in the ore and waste passes, bins or tied up in inventory on the stope floor

SLR noted that the higher mill tonnage indicate that some misclassification of ore and waste has occurred resulting in waste being sent to the mill. In 2017, the Lucky Friday technical personnel identified the potential concerns with both dilution and ore-waste classification. At that time SLR recommended that studies of all aspects of the estimation and quantification of dilution, grade control procedures, communication between the geology department and mine personnel, and the implementation of systems to better measure the tonnage delivered to the mill be continued.

12.7.2 2021 September YTD Reconciliation

The mine provided reconciliation data for the period Q1 through Q3 of 2021. The QP's analysis of the reconciliation data is shown below. The actual production, forecast production, and Mineral Reserve estimates are presented in Table 12-6.

Table 12-6: Q1 to Q3 2021 Reconciliation Data
Hecla Mining Company – Lucky Friday Mine

Stope	Tonnage (tons)	Ag (oz/ton)	Pb (%)	Zn (%)	Ag (oz)	Pb (tons)	Zn (tons)
				Adjusted Actuals Q1 to Q3 2021			
12 stope	70,881	11.6	8.4	3.1	819,178	5,971	2,199
15 stope	67,782	8.0	5.8	4.2	545,314	3,919	2,851
16 stope	63,488	15.0	8.7	4.7	954,672	5,504	2,992
19 stope	33,086	10.8	6.5	0.5	356,683	2,150	182
Inventory	6,503	9.9	6.4	2.9	64,286	4,183	191
YTD:	241,739	11.3	7.4	3.5	2,740,133	17,962	8,416
				Forecast			
12 stope	51,519	12.2	9.9	3.1	630,158	5,103	1,622
15 stope	63,869	8.3	6.5	4.0	530,371	4,128	2,556
16 stope	53,649	19.7	10.3	5.8	1,057,462	5,501	3,128
19 stope	33,907	15.3	8.1	0.7	519,369	2,748	238
YTD:	202,944	13.5	8.6	3.7	2,737,360	17,480	7,544
				Adjusted Model			
12 stope	49,539	14.9	11.7	3.4	737,849	5,773	1,685
15 stope	45,049	10.0	7.4	4.6	451,983	3,351	2,081
16 stope	46,407	22.3	12.8	5.7	1,037,136	5,950	2,665
19 stope	24,641	11.8	6.1	0.5	289,955	1,514	114
Swell	10,785	13.3	6.8	4.1	143,418	737	442
YTD:	176,421	15.1	9.8	4.0	2,660,341	17,323	6,987

The F1, F2 and F3 factors for the Q1 to Q3 2021 data are shown in Table 12-7.

Table 12-7: Q1 to Q3 2021 Reconciliation Results
Hecla Mining Company – Lucky Friday Mine

Stope	Tonnage (tons)	Ag (oz/ton)	Pb (%)	Zn (%)	Ag (oz)	Pb (tons)	Zn (tons)
				F 1 Factor			
12 stope	104%	82%	85%	93%	85%	88%	96%
15 stope	142%	83%	87%	87%	117%	123%	123%
16 stope	116%	88%	80%	102%	102%	92%	117%
19 stope	138%	130%	132%	152%	179%	182%	209%
Total	123%	89%	86%	94%	109%	105%	115%
				F 2 Factor			
12 stope	138%	94%	85%	99%	130%	117%	136%
15 stope	106%	97%	89%	105%	103%	95%	112%
16 stope	118%	76%	85%	81%	90%	100%	96%
19 stope	98%	70%	80%	78%	69%	78%	76%
Total	119%	84%	86%	94%	100%	103%	112%
				F3 Factor			
12 stope	143%	78%	72%	91%	111%	103%	131%
15 stope	150%	80%	78%	91%	121%	117%	137%
16 stope	137%	67%	68%	82%	92%	93%	112%
19 stope	134%	92%	106%	119%	123%	142%	159%
Inv/Swell	60%	74%	94%	72%	45%	57%	43%
Total (adjusted)	137%	75%	76%	88%	103%	104%	120%

SLR considers the F3 factor to be the most important in the analysis of the Mineral Reserve estimate. In this case the analysis shows that for all of the stopes the tonnage milled exceeds the Mineral Reserve estimate and the metal grades fall short of the Mineral Reserve estimates for all but lead and zinc in the 19 stope. The total metal content exceeds the calculated Mineral Reserve estimate metal content but SLR notes that for the period under review the 65,318 tons of extra production had grades of 1.2 oz/ton Ag, 1.0% Pb, and 2.2% Zn. At these grades the extra tonnage had an NSR value of approximately $66/ton. The material potentially represents dilution which was not included in the model estimates and while metal targets may have been met extra tons had to be mined and processed to meet that goal.

SLR is of the opinion that dilution in excess of the Mineral Reserve estimate, whether in the stope or in mixing or misclassification in the material handling systems, may be a factor in the poor tonnage and grade reconciliation. The large variation in the tonnage reconciliation may also mask issues in the estimation of the metal grades.

12.7.3 2021 UCB Mining Reconciliation

The mine provided reconciliation data for 2021. This data provides a baseline for expectations of the UCB mining method and support of the Mineral Reserves statement. Lucky Friday has not previously used the UCB mining method for reserve reporting. In 2020 and through 2021, design parameters and dilution factors were developed to support the Mineral Reserve statement. The mine's analysis of the reconciliation data is presented in Table 12-8.

Table 12-8: 2021 Reconciliation Data
Hecla Mining Company – Lucky Friday Mine

Stope	Tonnage (tons)	Ag (oz/ton)	Pb (%)	Zn (%)	Ag (oz)	Pb (tons)	Zn (tons)
			Milled				
12 stope	92,673	11.7	8.6	3.2	1,084,522	7,996	2,945
15 stope	90,174	7.9	5.6	4.0	713,411	5,088	3,610
16 stope	88,914	16.0	9.1	4.6	1422855	8,096	4,132
19+21 stope	43,629	10.7	6.7	0.5	465782	2,919	223
2021	315,391	11.7	7.6	3.5	3,686,570	24,099	10,910
			Forecast				
12 stope	78,091	12.8	10.1	3.0	997,907	7,851	2,372
15 stope	88,837	7.6	5.6	3.4	673,278	4,983	3,063
16 stope	82,569	17.3	10.0	4.6	1,425,352	8,294	3,803
19+21 stope	45,089	10.3	5.7	0.4	466,474	2,549	173
2021	294,586	12.1	8.0	3.2	3,563,011	23,677	9,411

The F2 factors for the 2021 data are shown in Table 12-9. Since no reserve was issued for UCB in 2021 the F1 and F3 factors cannot be compared.

Table 12-9: 2021 Reconciliation Results
Hecla Mining Company – Lucky Friday Mine

Stope	Tonnage (tons)	Ag (oz/ton)	Pb (%)	Zn (%)	Ag (oz)	Pb (tons)	Zn (tons)
			F2 Factor				
12 stope	119%	92%	86%	105%	109%	102%	124%
15 stope	102%	104%	101%	116%	106%	102%	118%
16 stope	108%	93%	91%	101%	100%	98%	109%
19+21 stope	97%	103%	118%	133%	100%	115%	129%
Total	107%	97%	95%	108%	103%	102%	116%

SLR notes that the mine's analysis of the short term forecast versus actual production shows a good correlation. The 30 Vein average production grades for 2021 are lower than the Mineral Reserve estimates.

SLR recommends that:

- Reconciliation analyses be continued.
- Dilution estimates for the mining be reviewed and amended as necessary to reflect the experience with the mining method and equipment in use.
- The ore handling systems be reviewed to address the potential for the mixing of ore and waste and/or the misdirection of ore and waste throughout the material handling systems.
- The material accounting methods and systems, from the stope to the mill, be reviewed to determine if changes or additional controls are required to improve the material accounting.
- Future Mineral Reserve estimates be modified to incorporate the results of reconciliation studies.

13.0 MINING METHODS

The Lucky Friday operation is a deep, narrow vein, mine which commenced operations in 1942. Operations were on care and maintenance due to a strike from 2017 to January 2020, at which time operations resumed. The operation produces silver contained in silver and zinc concentrates.

Mining methods used at Lucky Friday include underhand closed benching (UCB), and overhand or underhand mechanized cut and fill (LFUF) using mechanized mining equipment. Stopes are back filled with cemented paste fill from the process plant tailings. Mine operations are currently close to 6,500 ft below surface and the mine will continue to below the 8,000 ft level in the current long-range plan. Mine production for the period from 2016 to 2021 is summarized in Table 13-1.

Table 13-1: Lucky Friday Mine Production Summary
Hecla Mining Company – Lucky Friday Mine

Year		2016	2017	2018	2019	2020	2021
Ore Milled	tons	293,875	70,718	17,309	57,091	179,201	321,837
Grade							
Ag	oz/ton	12.69	12.38	10.78	11.83	11.85	11.6
Pb	%	7.78	7.10	7.19	7.86	7.49	7.6
Zn	%	3.92	4.01	4.20	4.25	3.88	3.4
Recovery to Concentrate							
Ag Recovery	%	96.4%	95.8%	90.6%	93.7%	95.6%	95.5%
Pb Recovery	%	95.7%	94.3%	90.9%	91.4%	94.8%	94.6%
Zn Recovery	%	93.7%	90.4%	92.7%	84.5%	90.6%	91.1%
Silver concentrate	tons	36,420	8,238	1,790	6,378	20,806	37,768
Zinc concentrate	tons	17,530	4,121	1,016	3,467	10,960	16,638
Ag in Silver Concentrate	oz/ton	98.74	101.80	94.42	99.24	97.66	94.4
Pb in Silver Concentrate	%	60.1%	57.5%	63.2%	64.3%	61.2%	61.2%

13.1 Mine Operations

13.1.1 Underground Mine Access and Layout

The Lucky Friday mine operation has been designed and constructed to target two broad vein systems: the Lucky Friday and Gold Hunter Veins. The Lucky Friday Vein was actively mined until 2001, is now inactive, and contains infrastructure critical to the active Gold Hunter area. Mining is underway or planned in the 30, 50, 60, 70, 80, 90, and 110 Veins of the Gold Hunter deposit. The 30 Vein is the largest single vein and the source of the majority of the production.

Access to all underground workings is via the 6,205 ft deep Silver Shaft. The Silver Shaft is near the idle Lucky Friday vein system and 5,000 ft south-southeast of the Gold Hunter system (Figure 13-1). The 18 ft diameter, concrete lined, circular, two-compartment shaft has a hoisting capacity of 12 tons per skip.

Shaft stations are developed on 200 ft centers beginning on the 4900 level. Broken material reports to the Silver Shaft through level pockets and transfers to the 5370 and 5970 loading pockets.

The No. 2 shaft is the 5,489 ft deep, three compartment (four compartment at lower levels) shaft used for man hoisting, supplies, and ventilation.

Access to Gold Hunter is through the 4900 and 5900 level main haulage levels and 4050 access level. Two interlevel ramps connect the 4900 level and 5900 level and three ramps are being developed between the 5900 level and the 6500 level. Below the 6500 level, only two ramps will continue to the 7500 level.

The No. 4 Shaft is a 4,800 ft winze with hoistroom located at the 4760 level and bottom at 8620 level. The No. 4 Shaft provides access to deep-seated portions of the Gold Hunter vein system. Construction commenced in 2010 and was completed in 2016.

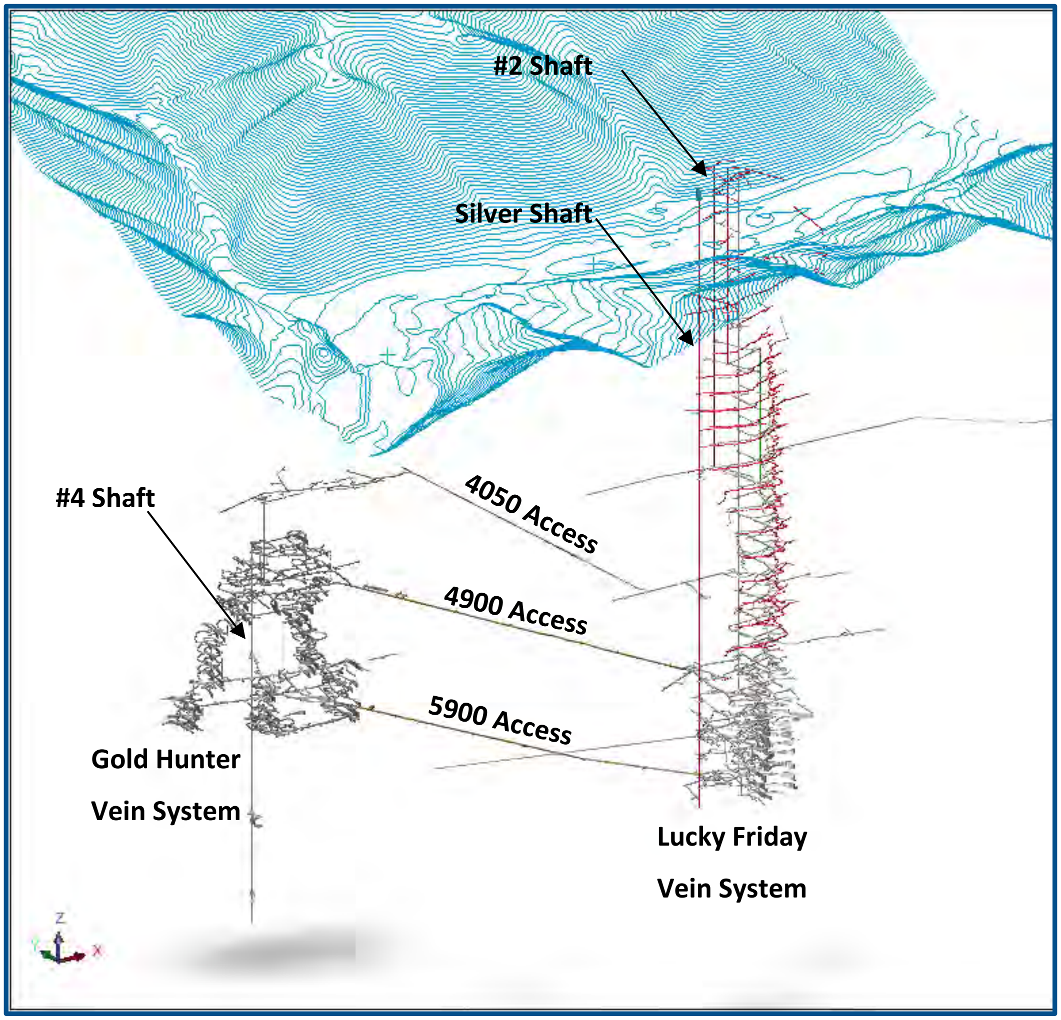


Figure 13-1: Isometric View of As-built Lucky Friday Workings

13.1.2 Mine Development

All mine development is completed using conventional drill and blast mining techniques. Ramps and sublevels are driven at nominally 12 ft wide by 14 ft high and drilled using single boom or two boom jumbos. Ramps are typically located in the footwall with swinging-ramp crosscuts driven into the vein to access the ore. Level spacing depends on vein size and geometry, but typically four to five stope cuts are taken from each sublevel.

13.1.3 Production Mining

In the late 1980s Lucky Friday LFUL mining was implemented in some areas of the mine to control seismic risk and create a safter working environment. Today underhand techniques continue to be the primary method used, with overhand employed in areas with no seismic risk.

In 2020, an adaptation to UCB mining was developed by Lucky Friday. This change was made to control the release of mining induced seismic events and to improve seismic exposure thereby improving the safety conditions in the mine. The UCB method is applied in the 30 Vein.

13.1.3.1 Underhand Cut and Fill (LFUL)

In cut and fill mining, levels are typically spaced at 50 ft vertical centres. The vein is accessed through a single slot drive driven roughly perpendicular to the vein strike. Once the slot drive is driven across the vein an ore drive is driven in both directions along the vein until either backfill from an adjacent stope is encountered or the vein becomes uneconomic.

Cut and fill drives are developed using conventional drill and blast techniques, with single boom jumbos drilling 8 ft rounds. Material is removed with loaders to muck bays and eventually to trucks to report to shaft pockets. Ground support is installed after each round according to standards in the ground control management plan. Each stope round is mapped and sampled by the geology department, and a projection-map is developed from the collected data and used to guide the next cut’s extraction.

In the overhand cut and fill technique the slot drive and first cut commence on the bottom and progress upward, such that equipment and personnel work on top of backfill. Conversely, in the more commonly used underhand technique, mining progresses downwards, such that equipment and personnel work on unbroken rock, and cemented backfill and the previous cut horizon is overhead. Typically, five cuts are taking from a single sublevel.

All cuts are backfilled with cemented paste fill. Prior to paste backfilling a 1.5 ft bed of broken ore material is emplaced to prevent the backfill from being damaged during blasting of the subsequent lift below. Additionally, vertical rebar bolts are placed in the bedded material in a regular pattern such that plates and nuts can be attached to the bolt ends when exposed during the next development sequence. In this manner the backfill exposed overhead is always fully supported.

The overhand and underhand stoping methods are shown schematically in Figure 13-2.

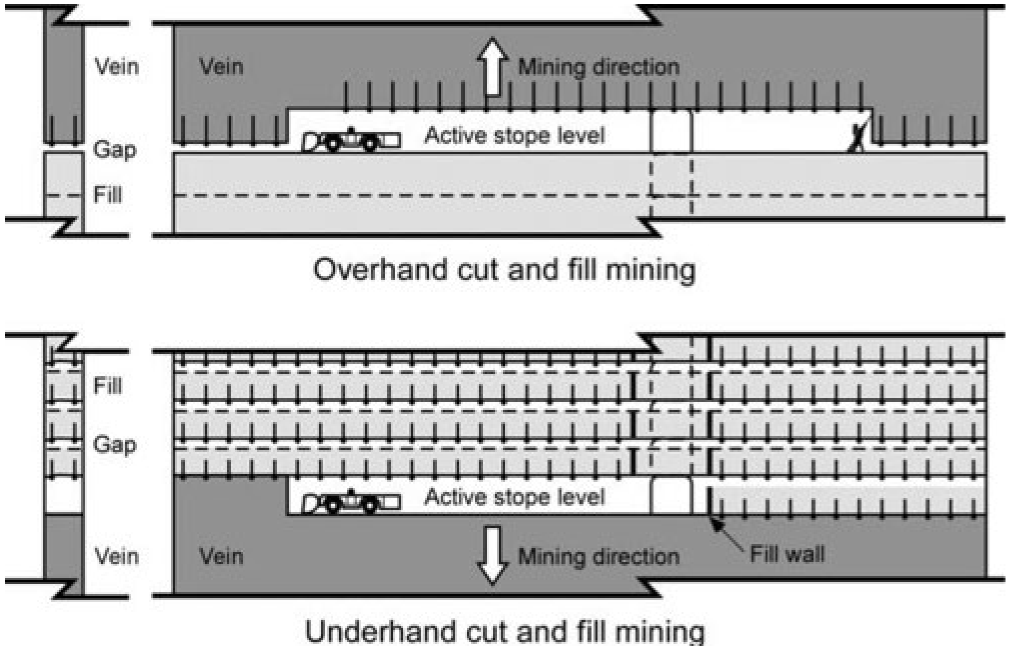


Figure 13-2: Mechanized Overhand and Underhand Stoping

The geometry and thickness of the vein being mined, as well as equipment being used, dictates the cut and fill stope widths. The Intermediate Veins are typically narrow and mined with 1 yd^3 loaders and single boom jumbos, which can effectively mine to a minimum mining thickness of 6.5 ft. In thicker veins where 2 yd^3 loaders are used the minimum mining thickness is 8.0 ft.

13.1.3.2 Underhand Closed Bench

The UCB method is an adaptation of underhand cut and fill mining developed by Lucky Friday for use in high stress mining environments where seismic events are anticipated. It was first used in 2020 and is in full use in the 30 Vein stopes. Work continues to refine the method. A summary of the UCB mining method cycle follows and corresponds to the five steps shown in Figure 13-3.

In Step 1 the open stope (termed "Cut 0") has a minimum stope opening height of 13 ft (to accommodate the size of the longhole drill) and is 11 ft wide to accommodate a 3 yd^3 capacity LHD. The mined height is 11.5 ft high, with the additional 1.5 ft achieved by placing rock on the floor of the previous cut before backfilling. When the cut is excavated the loose rock falls out leaving a 13 ft high opening. The orebody in the floor of the stope is drilled with a series of vertical blasthole rings to a depth of 27 ft and blasted with emulsion explosive that is initiated with programmable, electronic detonators. The 27 ft hole length permits for an overall vertical blast advance of 23 ft with an allowance for 4' of subdrill. The result of this blast is that the fragmented ore will swell vertically up into the Cut 0 open stope void.

In Step 2, the swell in Cut 0 is extracted to the original Cut 0 floor-line using load-haul-dump (LHD) After mucking of the swell, there are two, 11.5 ft high cuts of fragmented ore beneath the open stope as shown in Step 3.

In Step 4, Cut 0 is backfilled with engineered paste fill and Cut 1 (the first fragmented cut below Cut 0) is accessed from the footwall crosscut by slabbing out the floor and intersecting the orebody. Since the ore has been fragmented by the blast, LHDs are used (little or no additional blasting required) to muck out Cut 1 below the cured paste. The mucking advances along the strike of the orebody to the end of the blasted section. As the mucking advances, the stope back and walls are supported with wire mesh and rockbolts.

In Step 5, Cut 1 is backfilled with engineered paste and allowed to cure for approximately three days followed by mucking out the final fragmented Cut 2.

At the completion of Step 5, all the ore fragmented by the blast has been extracted, resulting in a solid un-blasted floor, and the UCB process starts over again with drilling and blasting of the solid floor. This process repeats for the extraction of 23 ft of ore in two downward-progressing stope cuts.

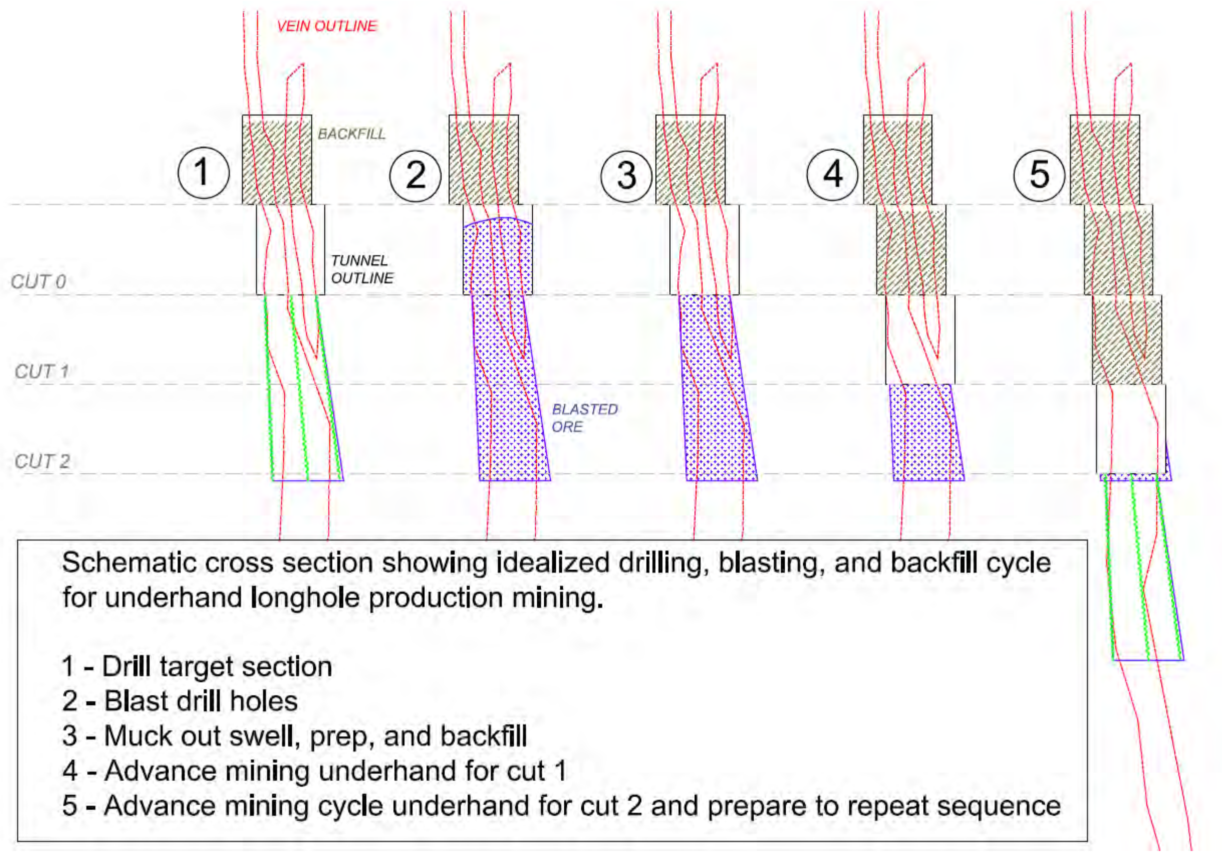


Figure 13-3: Underhand Closed Bench Mining Method Schematic

The UCB method was developed specifically for improvement in the safety of mining personnel in seismically active rock masses. In particular, the method is designed to proactively trigger fault-slip seismicity by blasting at a time of choosing of the mine operations when personnel can be restricted from the affected area. The exact location of faults is generally unknown until they are intercepted in mining, thus presenting a seismic hazard. In typical cut and fill mining, unstable slip on these faults can occur at any time as a result of stress redistribution around the small, excavated stope which is slowly and incrementally advanced horizontally beneath the engineered fill as described earlier. In addition to fragmenting the ore in the floor of the stope, the stress wave induced by the blast transmits down through the orebody and surrounding wall rock causing both stress disruption and deformation on any near-stope fault surface that it encounters. If the fault is critically-stressed the dynamic disruption to clamping and shear stress-induced by the stress wave will cause slip to occur with subsequent energy release as a seismic event. The large amount of explosive detonated in the UCB blast (up to 37,000 lb as opposed to 150 lb in typical cut and fill face blast) facilitates triggering of the fault slip at the time of the blast, thus relieving stored energy and allowing resumption of personnel access within a short time thereafter. This concept is illustrated in Figure 13-4.

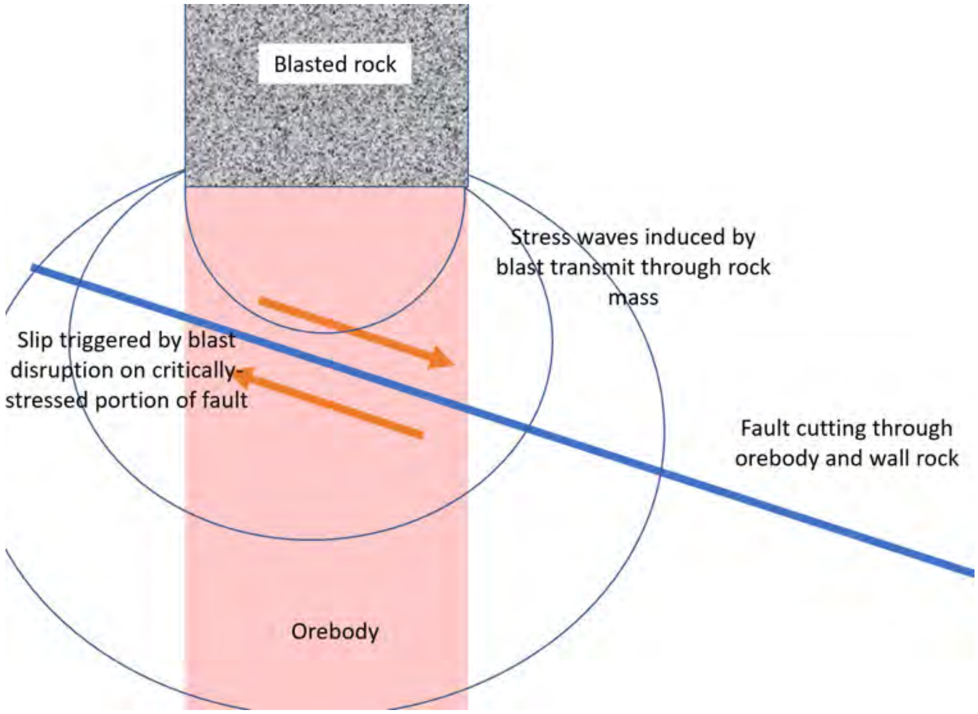


Figure 13-4: Conceptual Fault-Slip in UCB Cross Section

The drilling and blasting techniques were changed in 2021 to use three inch diameter blast holes with ring burden on 4.5 ft and four to five holes across the stope. Blasthole design targets a corridor of 10 ft to 11 ft wide for the bench. Hole toe spacing is kept to no wider than four feet and is commonly less than four feet. SLR notes that the stated 4.5 ft spacing and four holes represents a minimum blasting width of 13.5 ft assuming the perimeter holes are located on the stope limit. This configuration may lead to overbreak and extra tonnage beyond the Mineral Reserve limits. The stope is opened with a 27 ft deep burn cut using nine four inch diameter holes in a two foot square and nine three inch diameter blast holes for a five foot square cut.

Management indicate that experience to date has shown that mining productivities are better than in LFUL. The productivity improvement is from less seismic delays and the ability to increase working areas on the 30 Vein. The improved seismic control allowed a fourth stope to be developed on the 30 Vein increasing working faces by 133%. Management is of the opinion that the combination of reduced seismic delays and increased working areas is estimated to improve 30 Vein productivity by greater than 150%. Benching with vertical blastholes does not permit as much selectivity compared to LFUL and thus unplanned dilution in UCB mining is estimated by Hecla to be 15%. Continuous improvement studies are ongoing with focus being on improving productivities, reducing cycle times, and reducing dilution.

UCB is currently being used to mine all bottom 30 Vein stopes and is planned for use in lower 30 Vein for the remainder of the mine life.

SLR visited the UCB stope on October 5, 2021 and based upon that visit and its review of the technical information SLR concurs with the use of UCB as a safer, more productive, mechanized option for underhand stoping. SLR offers the following observations:

- Despite the use of the method since 2020 there was not a reconciliation records between actual production and Mineral Reserve estimates;
- The use of a 27 ft deep burn cut to open the stope presents a potential risk as the long cut may freeze or fragment poorly leading to either a loss of ore, or difficult mucking of larger material, or the existing requirement to drill into a frozen muckpile with a jumbo
- The 15% dilution added to the stopes amounts to a total of 1.6 ft of stope width at the minimum 11 ft mining width. SLR considers this to be insufficient to account for potential drill hole misalignment, variations (pinches and swells) in vein size both along strike and down dip, and the usual tendency for stope width to expand in the face of the plan to increase production tonnage.
- The dilution risk will increase at depth in the 30 Vein where the minimum mining width has been reduced to 9 ft.
- Continued closely spaced infill drilling information will be necessary for stope planning as there is no opportunity for face mapping after the mining moves beneath the initial undercut elevation.

13.1.3.3 Conventional Mining

Although the current LOM plan does not include any conventional mining blocks, this method, using hand held drills and scrapers, has been used in the past and may be used again at some time in the future.

13.1.4 Ore and Waste Handling

LHD's are used to move broken rock from the headings to haul trucks or ore passes. The LHD fleet consists of 1 yd^3, 2 yd^3, and 3.5 yd^3. Ore and waste haulage is accomplished using 20 ton trucks.

Rock is either hoisted in No. 4 shaft to the 4900 level and trucked to the 4900 Silver Shaft bins or trucked on internal ramps to the 4900 or 5900 level Silver Shaft bins. From there rock is hoisted to coarse bins on surface.

13.1.5 Backfill

All production stopes are backfilled with paste fill produced from a mixture of tailings sand and binder. Binder content varies between 6% and 10% by weight depending on the strength requirement with binder consisting of 75% ground granulated blast furnace slag (GGBF) and 25% cement. Between 0.4 tons to 0.6 tons of backfill are required per ton of ore mined to achieve the targeted fill height of within 1.5 ft of the back. There is a net surplus of tailings as 0.5 tons to 0.7 tons of tailings are produced per ton of ore mined.

Prior to filling the stope the fill area is prepped by spreading a 1.5 ft thick layer of prep muck across the floor. Six foot long dywidags are then stood in the preparation muck on a 4 ft by 4 ft pattern to provide a measure of concrete reinforcement and securing of the back during the next cut. Pour lengths are limited to approximately 150 ft to ensure uniform paste flow and minimization of cold joints.

Quality testing of the fill is performed for the pour from the first stope cut of any given slot. Four samples are collected and UCS tests conducted at three, seven, 14, and 28 days. The data for testing is reported to the mine engineering department. The fill typically develops 200 psi (1.38 MPa) or greater UCS after seven days. This is used as a design criterion for fill mat strength. Mining cannot take place beneath paste fill until a UCS of at least of 200 psi (1.38 MPa) is achieved. If the fill does not develop this strength, it is reported to mine management who alert the underground staff that the fill should be observed for settlement and that extra support beneath the wider span stope entry area may be required.

A sand storage facility is located on surface beside the process plant with a capacity of 5,000 tons. Sandfill is sent underground through a slickline installed in the Silver Shaft with branches to the Gold Hunter side installed on the 4900 level and the 5900 level. The backfill system capacity is 110 stph. A schematic of the backfill distribution system is presented in Figure 13-5.

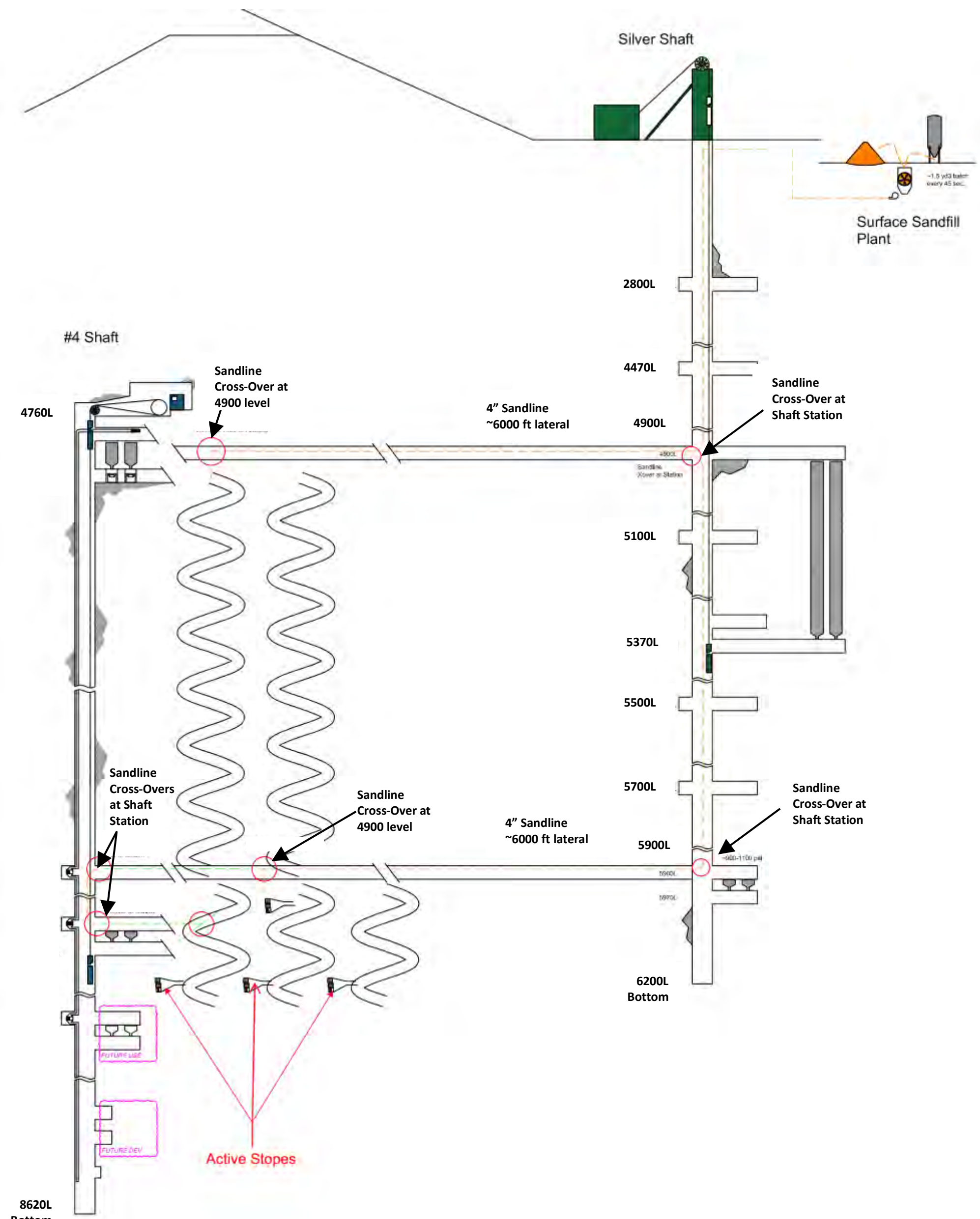


Figure 13-5: Backfill Schematic

13.2 Ground Conditions

The Gold Hunter deposit is located in the Wallace formation which is folded to subvertical with stratigraphy striking N80 to 85W and dipping 80° to 90°S. The Gold Hunter zone lies between two significant west-northwest trending district-scale fault structures. To the north is the Independence fault trending N80 to 85W dipping 80°S. The Paymaster fault lies to the south at N80W dipping 85°S. These faults are separated by approximately 1,500 ft around the mine and define the trend of the Star-Gold Hunter mineral belt.

The rockmass is primarily composed of thinly-bedded argillites, argillite alternating with silt caps, and local siltites. The bedding spacing ranges from several inches to feet, surfaces often coated with talcy, slickensided material and highly irregular in shape. The bedding thus results in significant anisotropy with respect to mechanical response to stress. Drifts driven perpendicular to bedding tend to be quite stable, whereas drifts driven parallel to bedding typically show buckling or high deflection of the wall beds.

The rock mass quality and material properties of the Gold Hunter Veins and wall rock materials were determined from geotechnical logging and laboratory testing of exploration boreholes drilled from the footwall ramp across the orebody and into the hangingwall at approximately the 6100 level. Geotechnical logging is not typically completed on new diamond drill holes.

RQD in the vein package is often over 80%. The wall rocks grade from silty argillites to stronger siltites that are sometimes cut by low-angle fault planes. The wall rocks exhibit anisotropy via cleavage that is oriented parallel to the orebody. The 30/40 vein package consists of ore minerals (sphalerite and galena with some pyrite) in a matrix of siderite, quartzite, and siltite gangue.

The mean UCS for the footwall rocks is 15,300 psi +/- 7,000 psi (106 MPa +/- 48 MPa) and 15,700 psi +/- 5,800 psi (108 MPa +/- 40 MPa) for the vein package rocks.

The measurements indicate a primary stress direction of approximately N40W and a ratio of horizontal to vertical stress ration of between 1.5 and 2.

13.2.1 Ground Support

Ground support standards have been designed for standard excavation types based on the purpose of the excavation and excavation size. The standards are a minimum support requirement that can be increased where conditions warrant as determined by miners or underground supervisors. Active faces are inspected by supervisors every shift and mapped by a geologist after each blast. If hazards are identified they are communicated to mine operations management and engineering so that remedial action can be taken.

Development headings are typically driven with an arched back and supported in the walls with 4 ft long splitsets installed on a 3 ft by 3 ft pattern to within three feet of the floor. In the back 4 ft long splits are installed on a 3 ft (radial) by 4 ft (longitudinal pattern), and 6 ft dywidag bolts on a 4 ft by 8 ft pattern. Eight foot dywidags are used when the drift span exceeds 14 ft wide. Galvanized wire mesh is installed in all bolted areas.

In underhand production headings the walls are supported with 4 ft long splits sets installed on a 3 ft by 3 ft pattern to within 3 ft of the floor. The back is secured by plating the protruding dywidags that were installed in the backfill pour above and installing 3 ft split sets on a five-spot pattern between the existing dywidags. Galvanized wire mesh is installed in all bolted areas.

Variations of the above support regimes exist for different development and production opening sizes and functions.

Where required, shotcrete is applied to the rock surface to prevent rockmass unravelling or shearing along bedding. This is specified on an as-needed basis as recommended by mine supervision or the engineering department. Shotcrete is produced on surface using a local supplier, in 5 yd^3 batches and sent underground via slickline. The shotcrete is a wet-mix design with a nominal compressive strength of 4,500 psi. A minimum thickness of two inches is applied to the rock surface through screen or welded wire mesh.

Rock bolts are regularly pull tested to check both bolt and bond strength. Bolts are loaded to 50% of the anchorage capacity of the fixture as defined by the manufacturer.

13.2.2 Seismic Monitoring

There are two basic seismic source mechanisms operating at the Gold Hunter: pillar-type/strain bursting, and slip along geologic structure. Pillar-type rockbursts occur when brittle rock in pillars or exposed faces is stressed beyond its strength limits, typically near a free face. The host rock mass at the Gold Hunter is composed of thinly-bedded argillites and more thickly-bedded siltites or quartzites. These rocks typically fail via anisotropic plastic yielding due to non-violent shearing on bedding and cleavage surfaces. Deformation is particularly pronounced when driving drifts parallel to bedding which allows buckling of the thin beds into the drift. The orebody and gangue materials may contain more brittle rocks, including quartzite, siderite and quartz.

Structural-slip events involve unstable slip-on geologic structures such as faults and bedding planes. At the Gold Hunter, observations of movement on north-dipping fault structures at the east end of the orebody below 5300 level appear to be associated with some of the larger events.

Both the Lucky Friday and Gold Hunter areas are monitored for seismicity using an ESG underground, mine-wide microseismic system. The ESG system was installed in late 2011. A schematic showing the seismic monitoring systems including location of geophones is show in Figure 13-6.

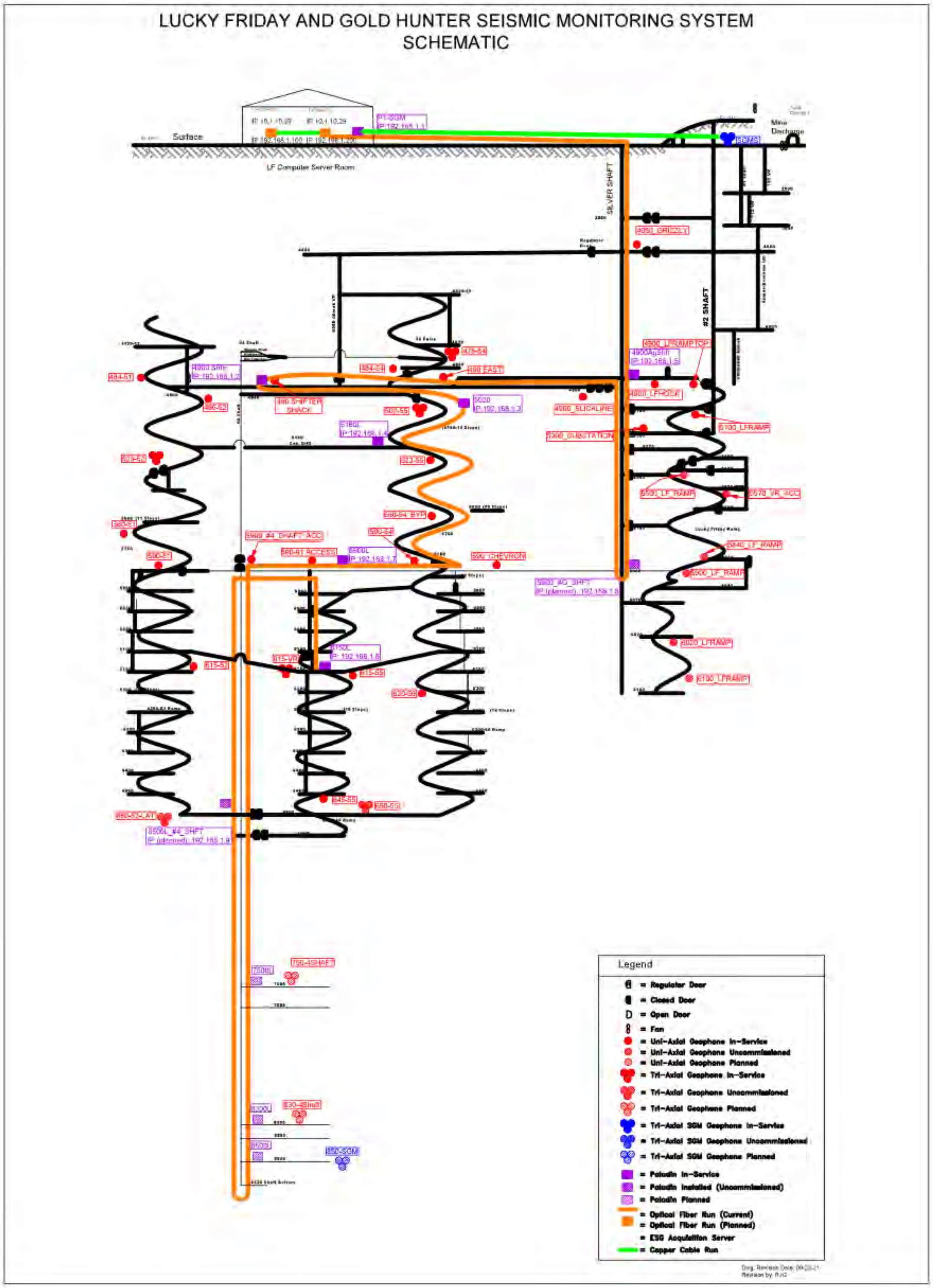


Figure 13-6: Lucky Friday ESG Seismic Monitoring System Schematic

The timing of seismic events with respect to blasting is of critical importance in planning a mitigation strategy for the mine since blasting tends to trigger a large portion of the seismicity. Approximately 65% of all recorded events (regardless of size) occur with blasting, and that the blasting-related events decay to the background rate within approximately half an hour to one hour of the blasting window.

The key principles used by Lucky Friday to limit seismic risk can be summarized as follows:

- Integration of geotechnical information into mine planning processes to ensure geotechnical assessment informs planning and scheduled decisions.
- Restriction of stope blasting to the end of shift when miners are at prescribed, safe locations, as well as development of personnel exclusion and re-entry protocols for all production areas.
- Development of ground support standards that include use of dynamic ground support methods to limit damage potential in areas of possible seismic impact.
- Use of modern monitoring technology to determine areas of increased seismic risk, and use collected information to assist in improving our understanding of evolving seismic issues.
- Education of the work force in recognition and reporting of geotechnical hazards to mine management.
- Conversion to the UCB method in the 30 Vein.
- Mining sequence and not creating unfavorable geometries

13.2.3 Hydrological Investigation

Lucky Friday does not have hydrological issues and no hydrological investigation is completed.

13.3 Mine Equipment and Personnel

In 2022, the long-range plan has 296 hourly and 101 salary employees. Headcount is expected to be remain relatively static through mine life, with hourly employees increasing to 302 by 2026. It is expected that overall staffing numbers will decrease toward the end of the mine life.

The current mobile equipment fleet at Lucky Friday is presented in Table 13-2. Forecast retirement dates for each piece of equipment have been calculated and replacement costs allocated accordingly in the budget. Some larger LHDs, and mechanized bolters, and additional longhole drills will be purchased to support the change to UCB mining method and production and safety continuous improvements initiatives. Current longhole drilling is done by a contracted buggy mounted long hole drill.

Hecla plans to purchase two Cat R1600 loaders for development starting in 2022.

Table 13-2: Lucky Friday Mobile Equipment Fleet
Hecla Mining Company – Lucky Friday Mine

Equipment Type	Unit Make	Quantity
LHD, 1 & 1-1/4 yard	Joy, JCI	6
LHD, 2 yard	Atlas Copco ST-2G & Wagner ST-2D	8
LHD, 3.5 yard	CAT R1300G	5 (8 by 2023)
Haul Truck, 20 ton	Atlas Copco / Epiroc MT-2010	7

Equipment Type	Unit Make	Quantity
Cement Truck	Normet, Marcotte M35	3
Shotcrete Sprayer	Normet Spraymec	1
Development Drill	Secoma	4
Development Drill	Sandvik DD210V	4
Development Drill	Epiroc S2	1
Bolter	Sandvik DS310	1
Bolter	Epiroc Boltec S	1

13.4 Mine Infrastructure

13.4.1 Shafts

There are two shafts and one winze at Lucky Friday.

The Silver Shaft is a 6,205 ft deep, 18 ft diameter concrete lined circular shaft. It provides fresh air to the mine, is used to transport personnel and material, and is used to hoist muck with an 12 ton skip.

No. 2 Shaft is 5,489 ft deep, three compartment (four compartment at the lower levels) timbered shaft that is used as an exhaust and secondary egress. The shaft has a hoist that is capable of hoisting personnel and materials.

No. 4 Shaft is a 18 ft diameter winze located in the Gold Hunter area with hoistroom at 4760 level and bottom at 8620 level. It is used to skip ore and waste to the 4900 level. The shaft was completed in 2016.

13.4.2 Ventilation

The Silver Shaft is the primary ventilation intake. A minor intake split crosses from the Silver Shaft to the Gold Hunter on the 4050 level, providing fresh air to the No. 4 Shaft plant above the 4900 level. The 5900 level delivers fresh air to the lower Gold Hunter workings. Exhaust crosses back to the Lucky Friday side on 4900 level where a pair of 400 hp exhaust booster fans direct exhaust to surface via the No. 2 Shaft and a network of airways consisting of boreholes, Alimak raises, and the old No. 1 Shaft. There are two 250 hp exhaust fans at No. 2 shaft on surface.

The ventilation system is currently moving 225,000 cfm of air through the mine. The ventilation network total pressure is approximately 19 in. of water gauge.

Auxiliary fans ventilate development headings and stopes. Stopes require a minimum of 30,000 cfm of ventilation during operation to permit equipment access. Other small auxiliary fans provide ventilation for various underground infrastructure such as shops, pump rooms,refrigeration stations, and the like.

13.4.3 Refrigeration

Temperature underground are a concern due to a limited ventilation capacity, high thermal rock gradient, and deep workings. Lucky Friday strives to maintain wet bulb temperatures below 85°. A key component of this control is the underground refrigeration system. The cooling strategy includes bulk air cooling (BAC) for development in the two main ramps, and supplemental spot cooling for stopes, because they intake air from development ramp exhaust.

The central refrigeration plant (CRP) on 4900L currently has four closed-loop chillers that supply chilled water to BAC locations on the 5900 level and the 6500 level. A fifth and sixth chiller will be installed on the 4900 level in 2022 and 2023 that will allow for one plant to be offline for maintenance. The addition of these will also permit the construction of a new BAC location on the 7500 level necessary for mining at greater depth.

On the 5900 level two open-loop chillers provides spot cooling to stope spray chambers. This will be moved and expanded through the mine life as the main mining fronts advances. The mine currently has eight 50 ton spray chambers that provide spot cooling to stoping areas on various sublevels.

As the mine does not make much ground water, most pumping duties are related to the refrigeration plant's heat rejection processes.

A cooling system schematic is presented in Figure 13-7.

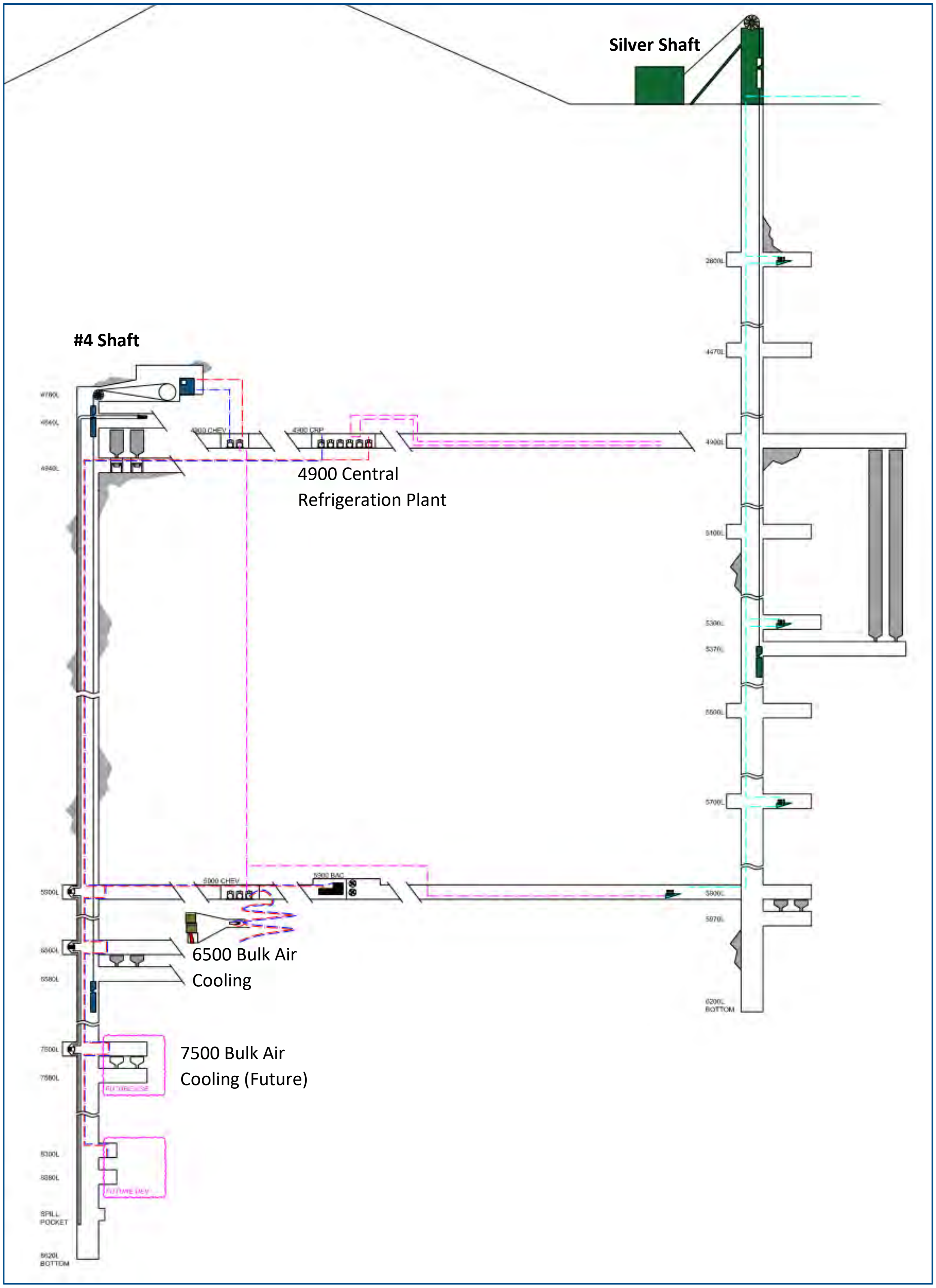


Figure 13-7: Mine Cooling System Schematic

13.4.4 Other Underground Infrastructure

In addition to the infrastructure discussed above, the following key facilities are located underground:

- 1,000 gpm pumping facilities – three stations along Silver Shaft
- 13.8kV power feed down the Silver Shaft
- Paste backfill slickline in the Silver Shaft, and reticulation piping on the main levels
- Concrete/shotcrete borehole and mixer truck loading station on 4900 level
- Mine communications – land-line telephone, mine phones, leaky feeder, and fiber-optic data,
- Emergency facilities – refuge chambers in strategic locations

13.5 Mine Plan

13.5.1 Ore Scheduling Criteria

The 30 Vein accounts for 80% to 90% of annual ore production from 2022 to 2028. The proportion of total production from 30 Vein begins to decline in 2029 until being fully depleted in 2034. Until recently, 30 Vein was split into three stopes that were mined independently. To increase production potential Lucky Friday has transitioned to mining 30 Vein in four stopes by using UCB and an additional access ramp and plans to continue this practice through to 2031 when the first of these stopes is exhausted at depth. The increased number of active faces is planned to provide higher crew productivities and greater flexibility to improve stope cycles and to respond to upset conditions in the mining cycle. A long section of the 30 Vein stoping plan is presented in Figure 13-8.

Mining of the Intermediate Gold Hunter Veins make up the balance of ore production. Through the mine life between one and three Intermediate Vein stopes are mined each year depending on vein size and location.

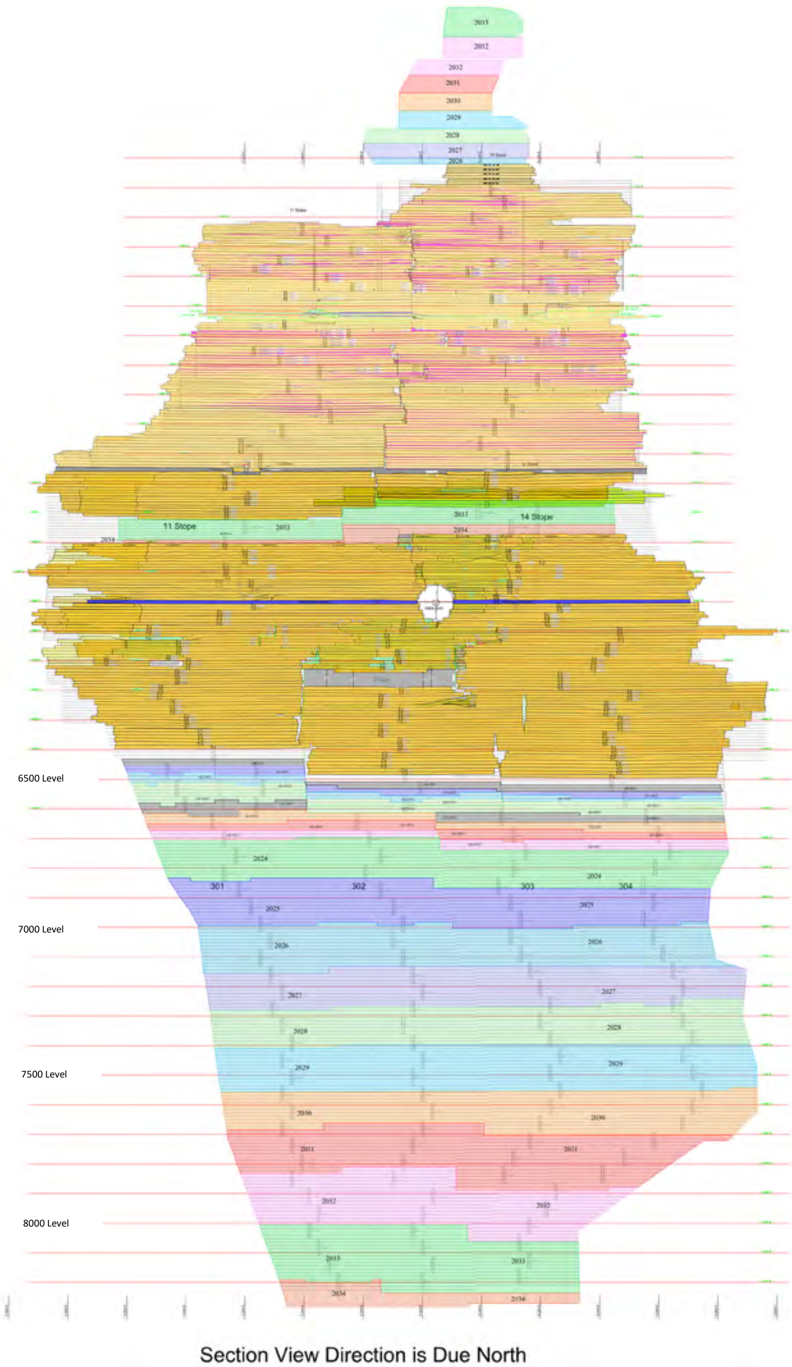


Figure 13-8: 30 Vein Stoping Plan

13.5.2 Mine Plan Overview

The 30 Vein is currently being mined near the 6500 level and is planned to be mined downwards, in a flat front, at a rate of approximately 100 ft per year. Two spiral ramps will be driven ahead of the production front such that infrastructure such as ventilation, refrigeration, and ore and waste handling facilities can be constructed ahead of time.

Primary service levels containing major infrastructure include 6500 level – scheduled for completion in 2022, 4050 level – scheduled in 2025, and 7500 level – scheduled in 2026.

Production totals through the LOM are presented by year in Table 13-3.

Table 13-3: Annual LOM Production
Hecla Mining Company – Lucky Friday Mine

	Tons	Tons per Day	Ag (oz/ton)	Pb (%)	Zn (%)
2022	378,744	1,038	13.3	9.1%	3.8%
2023	422,331	1,157	14.4	9.2%	3.4%
2024	418,173	1,146	13.8	8.5%	3.8%
2025	397,393	1,089	13.3	8.3%	4.0%
2026	383,085	1,050	16.2	10.4%	3.8%
2027	378,808	1,038	17.0	11.3%	3.8%
2028	378,770	1,038	13.6	9.0%	4.1%
2029	402,026	1,101	11.6	7.8%	3.0%
2030	307,780	843	12.6	7.5%	2.9%
2031	347,613	952	14.4	7.5%	2.6%
2032	364,645	999	13.5	7.2%	2.2%
2033	411,522	1,127	13.3	7.4%	2.8%
2034	295,909	811	12.7	6.0%	2.7%
2035	200,684	550	13.2	5.2%	3.4%
2036	179,682	492	12.4	6.1%	3.3%
2037	120,322	330	11.4	8.8%	2.9%
2038	68,681	188	11.6	10.7%	3.7%
Total	**5,456,168**		**13.7**	**8.3%**	**3.3%**

The planned production areas color coded by NSR value are shown to the end of the mine life, alongside the current mine as-built, in Figure 13-9 and Figure 13-10.

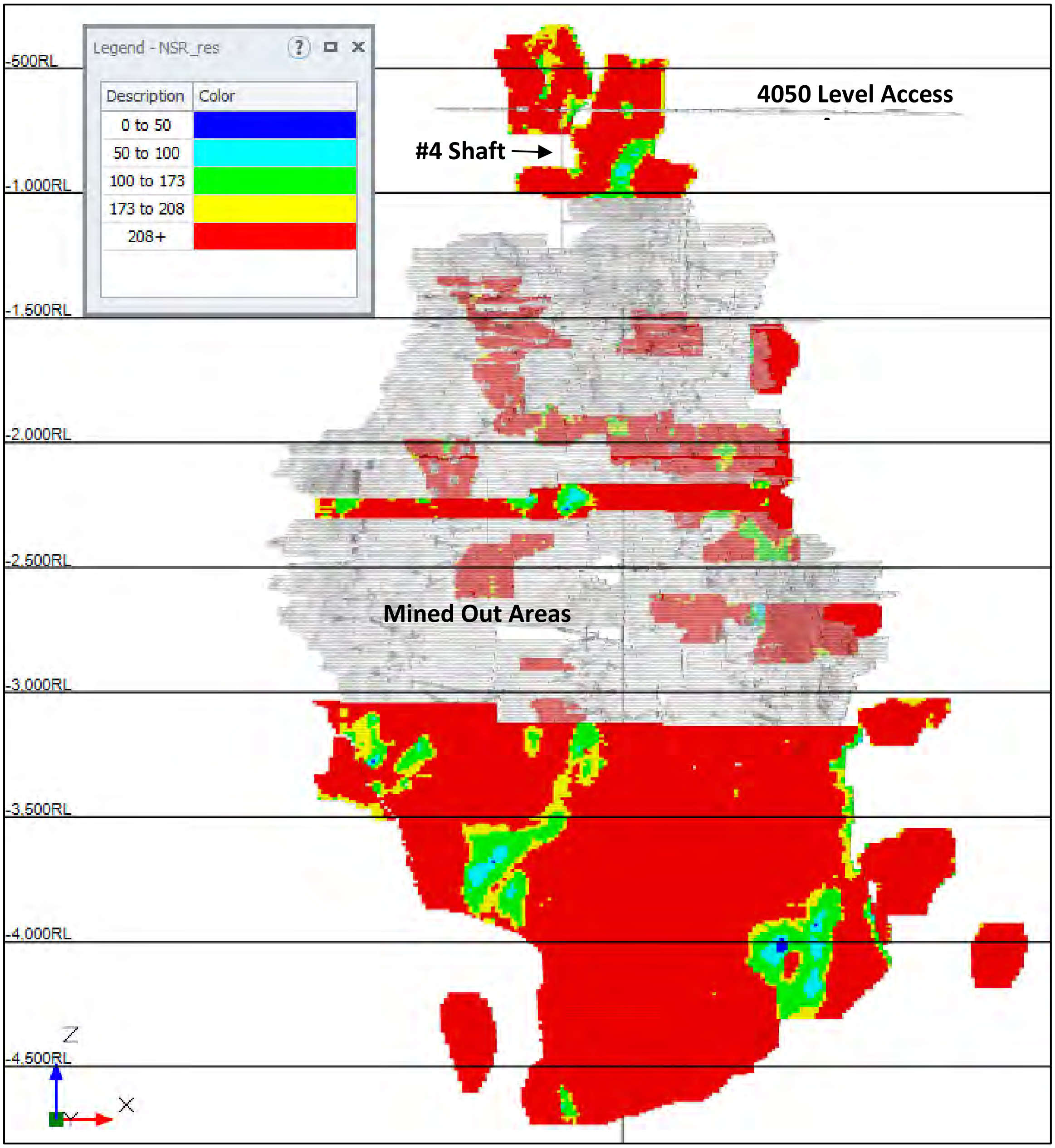


Figure 13-9: Longitudinal Section – 2D View

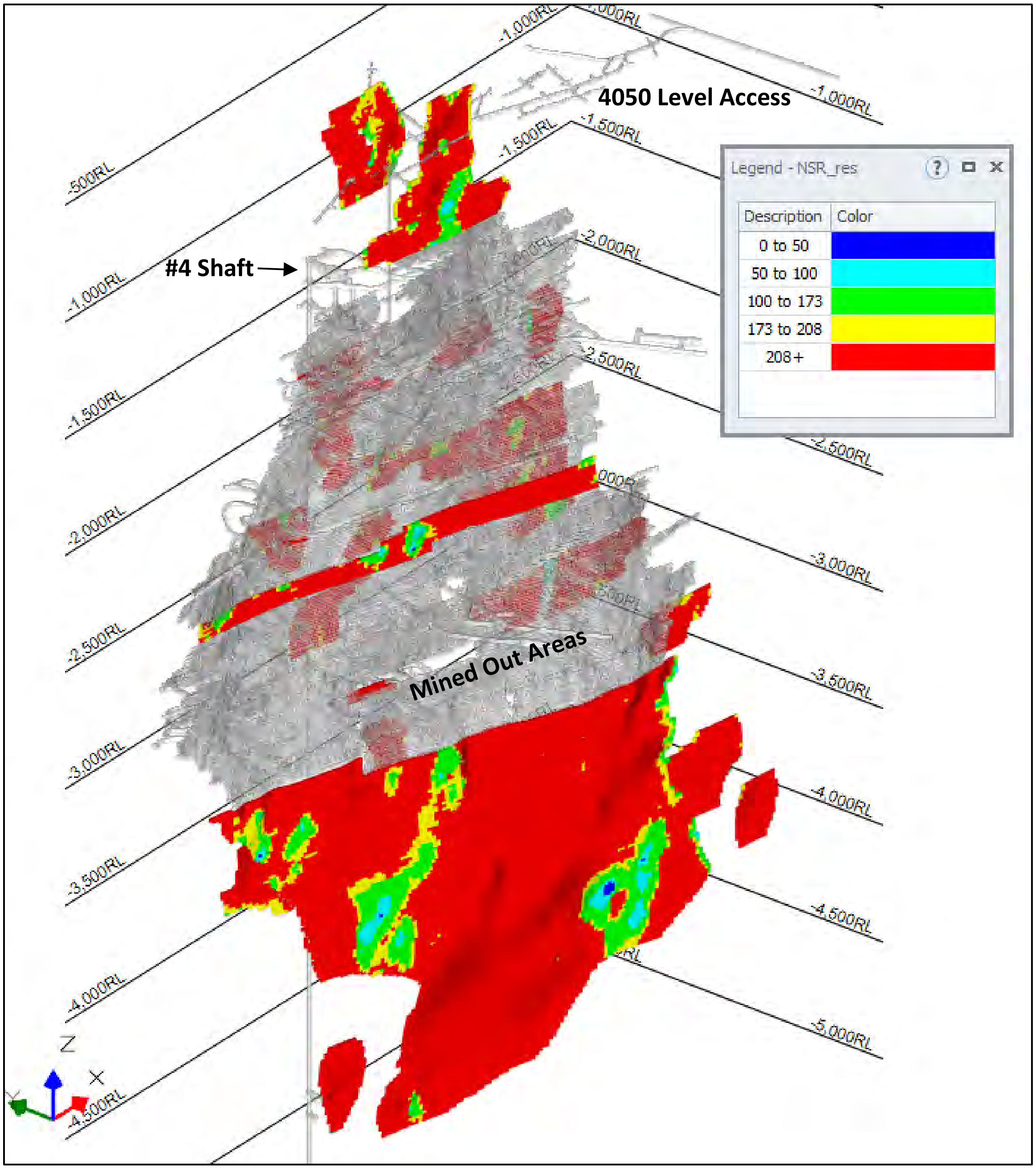


Figure 13-10: Longitudinal Section – Oblique View

Lucky Friday reports lateral development in "expensed" and "capital" categories. Expensed development represents all slot drives connecting waste development to stopes, and capital development captures all other development outside of ore.

The underground development totals for the LOM plan are presented in annual detail in Table 13-4. Development requirements to meet and sustain the increasing production rate are included in the LOM plan.

Table 13-4: Annual Development Plan
Hecla Mining Company – Lucky Friday Mine

Year	Tonnage		
	Expensed	**Capital**	**Total**
2022	47,343	107,057	154,400
2023	52,791	119,588	172,380
2024	52,272	126,097	178,369
2025	49,674	143,892	193,566
2026	47,886	104,016	151,902
2027	47,351	119,421	166,772
2028	47,346	76,517	123,864
2029	50,253	76,629	126,883
2030	38,472	110,552	149,025
2031	43,452	85,093	128,545
2032	45,581	75,731	121,312
2033	51,440	75,731	127,171
2034	36,989	75,766	112,755
2035	25,085	75,000	100,085
2036	22,460	25,000	47,460
2037	15,040		15,040
2038	8,585		8,585
Total	**682,021**	**1,396,092**	**2,078,113**

The October 2021 YTD development rate has been 21.4 ft/day. Development advance is expected to increase significantly over the next four years in both vertical and level development. Level development rates are projected to rise to over 35 ft per day by 2024 and to continue to average over 35 ft per day through 2030.

Management plans to facilitate this increase with two new Caterpillar R1600 loaders for ramp development in 2022, two new Caterpillar R1300 loaders in 2022, one new Caterpillar R1300 in 2023 in conjunction with the Epiroc S2 two boom commissioned in 2021. The haulage fleet also increased to seven haul trucks in 2022 with the newer haul trucks being the larger Epiroc MT-2200 model vs the MT-2010 model

13.5.3 Mine Plan Discussion

The mine plan is based upon the continuation of UCB mining in the 30 Vein plus conventional mining in the Intermediate Veins. The planned increase in annual tonnage is based upon assumed productivity increases in the UCB mining coupled with improved utilization of the mine facilities such as hauling and hoisting.

Management's mine planning strategy is to increase production at Lucky Friday by implementing the following improvements;

- Continue to improve the UCB cycle through continuous improvement effort
- Create 4, equally spaced stopes on the 30 Vein
- Increase loader fleet to meet production profile by purchasing additional loaders.
- Implement a proactive maintenance program for the mobile fleet
- Service hoist installation
- Coarse ore bin replacement
- Confirmation that the hoisting and plant can support the increase.
- Revise the organization charts and recruit the necessary hourly and salary staff to support the plan.

SLR is of the opinion that:

- The UCB method is considered to be a good option based upon the depth and seismicity issues.
- More detailed plans outlining how the increased development rates and production tonnages will be attained should be developed with particular attention to mine manpower requirements.
- Attaining the planned increases in head grade, production tonnage and development advance is generally an onerous task and this is exacerbated in a deep narrow vein operation.

13.6 Mine Workforce

Current mining manpower totals 242 and is summarized as follows:

- Mine operations – 178
- Mine maintenance – 38
- Mine supervision and technical services – 26

14.0 PROCESSING AND RECOVERY METHODS

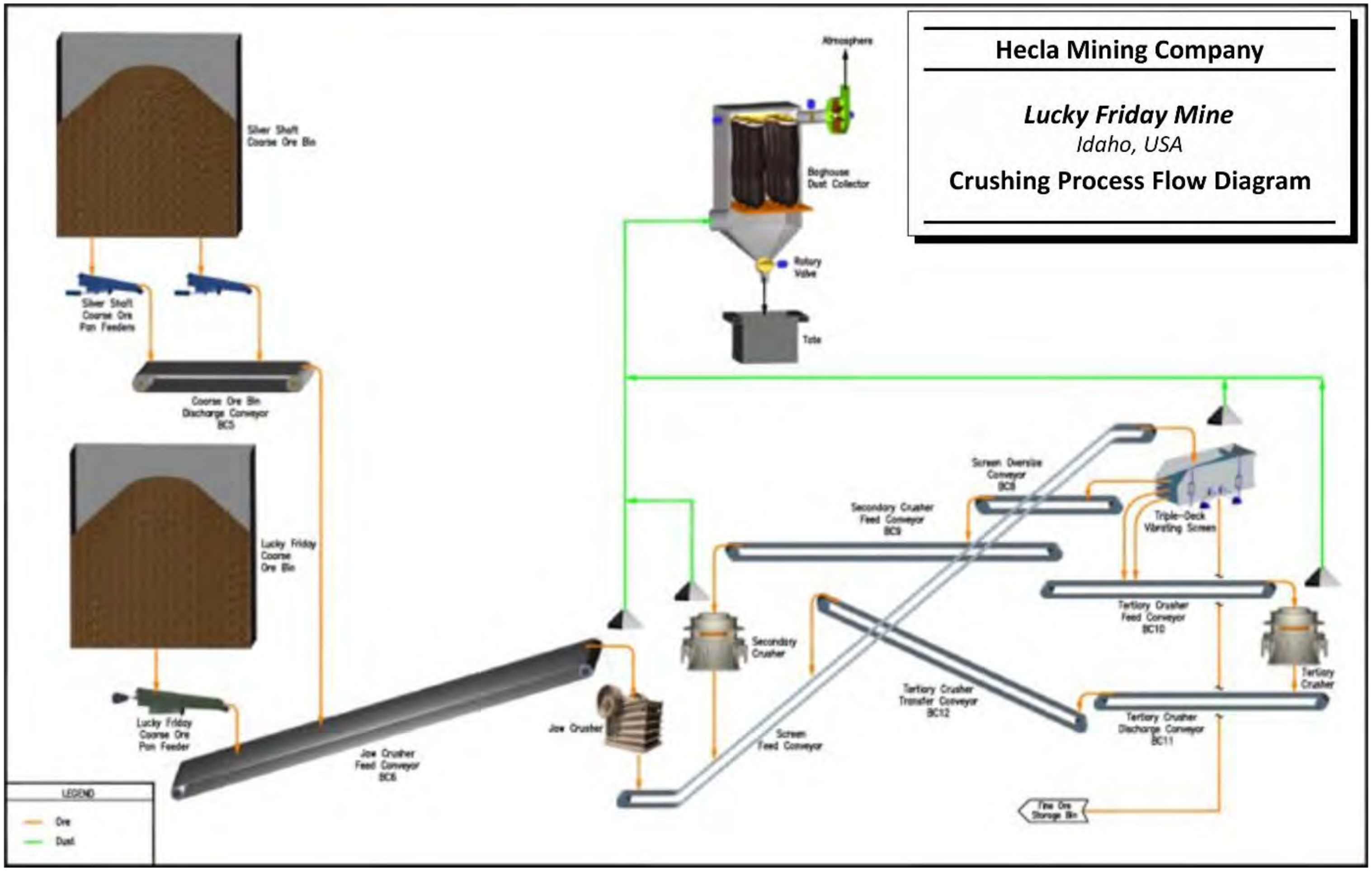
Processing ore at the Lucky Friday uses a conventional lead/zinc flotation flow sheet, with process control guided by a real-time On-Stream Analyzer. Process steps include crushing, grinding, flotation, concentrate dewatering, and tailings dewatering/disposal.

14.1 Crushing

Run of mine (ROM) ore discharges from the ore skips in Lucky Friday Silver shaft into one of two coarse ore bins with capacities of 400 tons and 800 tons. The ore is drawn from the bottom of the bins using variable speed pan feeders and a belt scale is used to control the feed rate to the crushing circuit. Coarse ore is crushed in a three stage crushing plant consisting of a primary jaw crusher, a secondary standard cone crusher and tertiary short head cone crusher with a triple deck screen to close the crushing circuit. Crushing circuit operating time averages approximately 50% with an average throughput rate of 80 tons to 85 tons per operating hour.

The primary crusher, a 20 in X 36 in Kue Ken jaw crusher, reduces ROM ore from minus 12 in. to P_{100} 3 in. Primary crushed ore is delivered to a 5 ft x 12 ft triple deck vibrating screen for sizing. Top deck oversize material is conveyed to the secondary 3 ft Simons standard cone crusher and reduced to P_{100} 1 in. A magnet removes metal from the secondary cone crusher feed to prevent damage to the crusher. The oversized material from both the middle and bottom deck of the triple deck screen is conveyed to a 3 ft Simons short head cone crusher. A second magnet prevents metal from entering the short head crusher. Both the standard and short head crusher discharges returns to the triple deck screen to be reclassified. Triple deck screen undersize material with a P_{100} $^3/_8$ in. is conveyed to a 400 ton fine ore storage bin. Dust from the crushing area is collected through dust extraction ducts feeding a bag house dust collector.

Figure 14-1 represents a process flow diagram for the crushing process.



February 2022

Source: Hecla, 2014

Figure 14-1: Crushing Process Flow Diagram

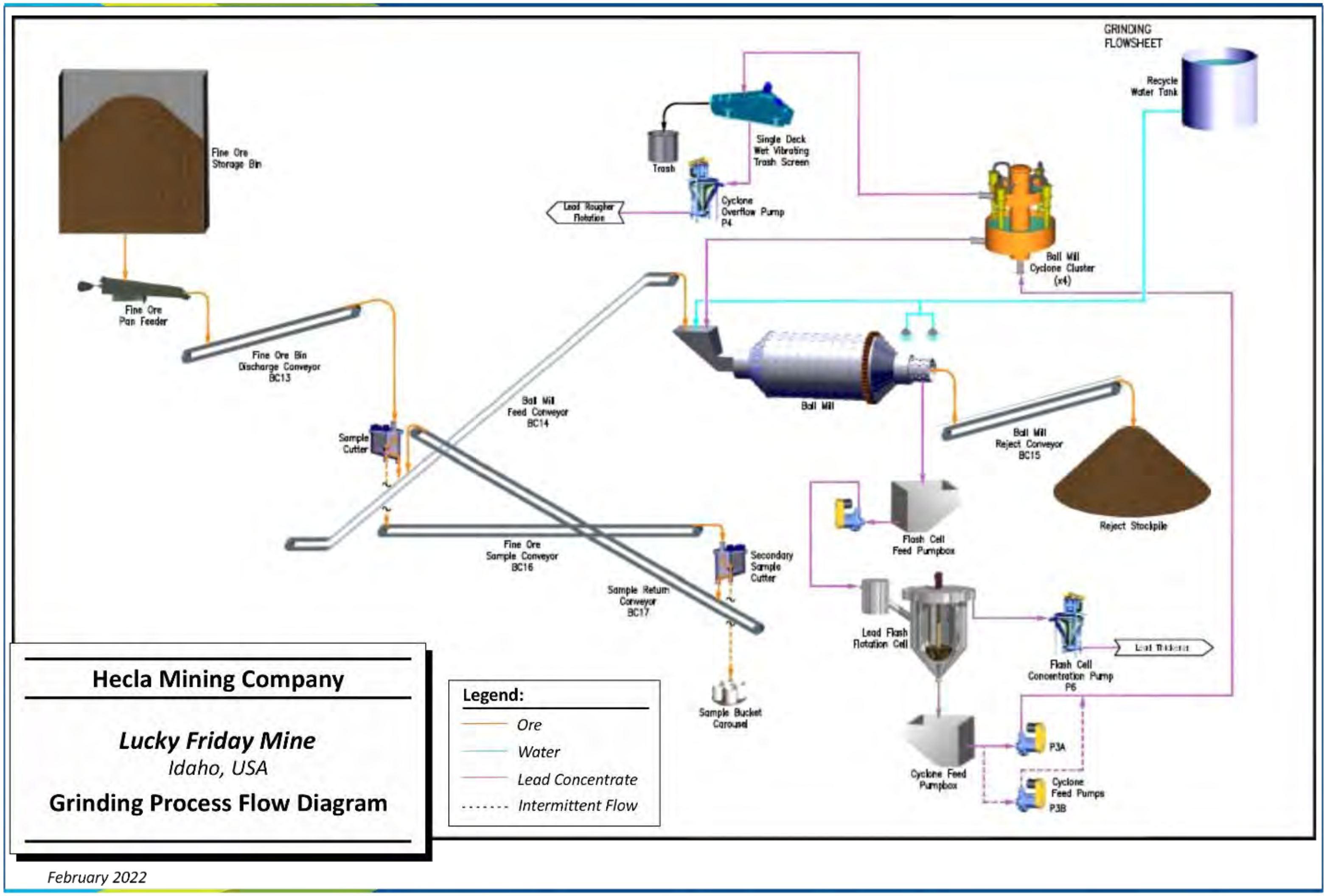
14.2 Grinding

Material from the fine ore bin is discharged by two hydraulic feeders. A 12 hour shift composite feed sample is collected from a conveyor transfer point using primary and secondary automatic sample cutters. The material feed rate to the ball mill is measured by a belt scale. Fine ore, reagents, cyclone underflow, and water feed the ball mill. Overall mill operating time averages 92% and from 2007 to 2013 the average annual mill feed rate ranged from 40.0 stph to 43.6 stph. Operating performance continued in the 37 stph to 44 stph range from 2016 through 2021 (see subsection 14.8).

The ore is ground in one 9.5 ft diameter x 12 ft effective grinding length (EGL) ball mill driven by a 600 hp motor. Water, collector, and frother are added to the ball mill discharge slurry in the flash flotation cell feed pump box and then pumped to an SK-240 lead flash flotation unit cell. Flotation reagents are added to the flash cell tailing and the pulp is pumped to a cyclone cluster for classification. Cyclone overflow is screened to remove trash and then pumped to the lead rougher circuit. Cyclone underflow returns to the ball mill. The cyclone overflow is typically 40% solids with a particle size of 80% passing 150 microns.

The flash flotation cell is used to recover coarse fractions of lead and silver from the mill circulating load to minimize over grinding of the dense materials. The flash cell has proven to be capable of producing a final concentrate grade product, assaying approximately 63% Pb and greater than 100 oz/ton Ag. Typically, approximately 50% of the lead and silver values are recovered to final concentrate through this route. Another benefit of the flash flotation unit cell is in reducing the amount of lead reporting to the lead circuit. When high grade ore is processed through the mill, this increased capacity is fully utilized.

Figure 14-2 represents a simplified process flow diagram of the grinding process.



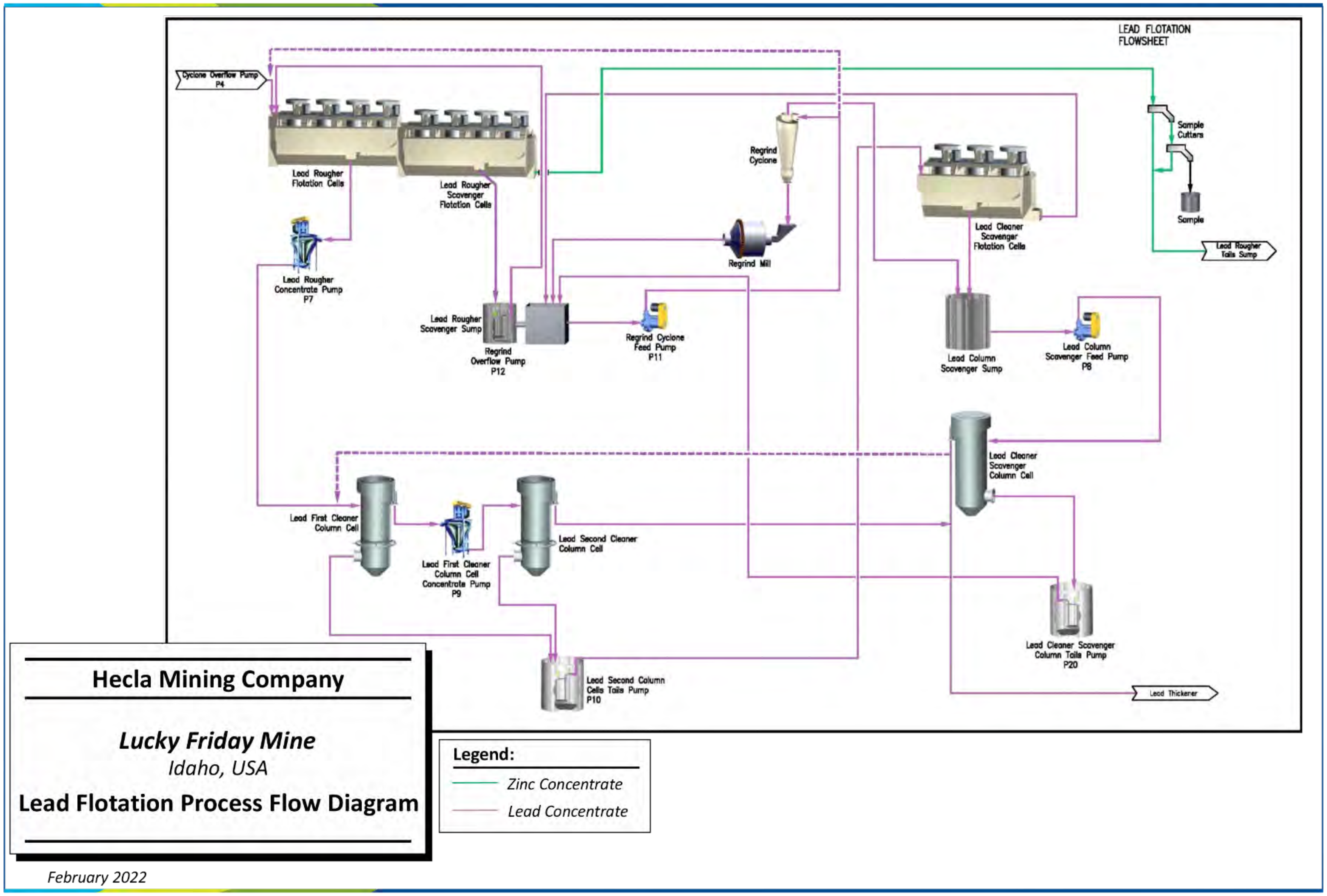
Source: Hecla, 2014

Figure 14-2: Grinding Process Flow Diagram

14.3 Flotation

Lead rougher flotation consists of one bank of five WEMCO 66D conventional flotation cells. Concentrate from the roughers, containing about 38% Pb, reports to the first cleaner column flotation cell while the tailings flows by gravity into a bank of 5 Denver DR-24 conventional flotation cells for lead scavenging. Reagents for collecting, frothing, and conditioning are added to the slurry as needed. Lead scavenger concentrate is pumped back to the rougher feed and the lead scavenger tailings are fed to the zinc flotation circuit.

Lead rougher concentrate slurry reporting to the lead first cleaner column flotation cell is upgraded from approximately 38% Pb to approximately 50% Pb and then pumped to the second Pb cleaner column. Tailings from the first and second Pb cleaner column cells are combined and pumped to a set of four Denver 21 conventional cleaner scavenger flotation cells. Cleaner scavenger concentrate is pumped to a cleaner scavenger column cell while the tailings are pumped to the lead rougher feed. Concentrate from the cleaner scavenger column cell is pumped to the silver concentrate thickener and the tailings are pumped to the lead rougher feed. Final silver concentrate is a combination of lead flash flotation cell, second cleaner column and cleaner scavenger column concentrates and averages 63% Pb and 100 oz/ton Ag. The silver concentrate passes through a primary and secondary sampler before reporting to the silver concentrate thickener. The lead circuit flow diagram is shown in Figure 14-3.



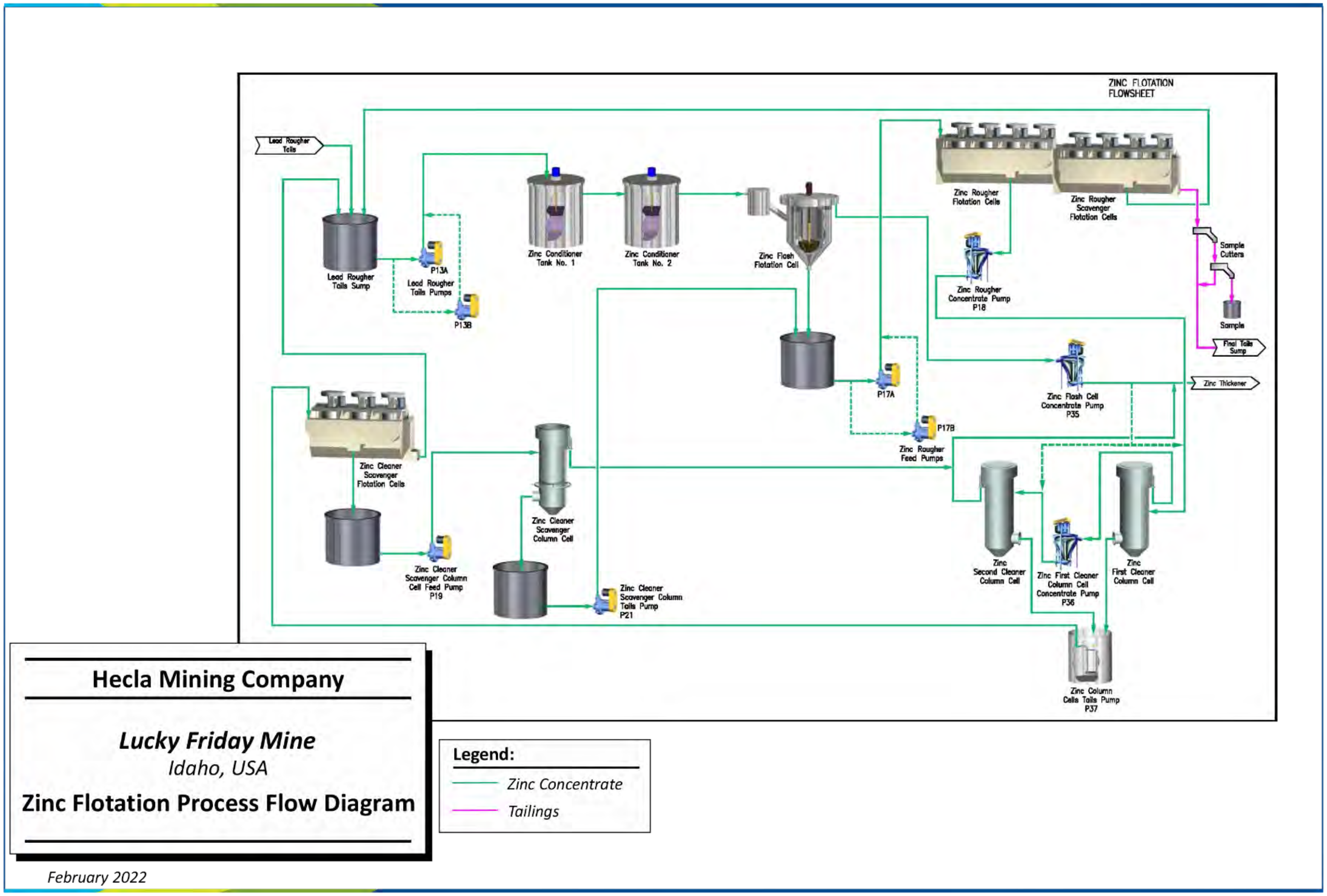
Source: Hecla, 2014

Figure 14-3: Lead Flotation Process Flow Diagram

Lead circuit tailings are mixed with reagents to activate the zinc in the two conditioning stages and flow by gravity to the zinc rougher flotation circuit. Flow rate through the two conditioner tanks is designed for adequate retention time for the reagents to fully condition the slurry for zinc flotation. The second conditioning tank overflows into the zinc flash flotation cell. The concentrate from the flash flotation cell is pumped directly to the zinc concentrate thickener and the tailings from the zinc flash flotation cell are pumped to zinc rougher flotation. Zinc rougher and rougher scavenger flotation consists of a bank of five conventional WEMCO 66D cells for roughing followed by a bank of five conventional Denver DR-24 cells for scavenging. Zinc rougher scavenger tailings report to final tailings.

Zinc rougher concentrate is pumped to the first zinc cleaner column cell. First cleaner column concentrate is pumped to the second cleaner column. Second cleaner column concentrate is pumped to the zinc concentrate thickener. First and second clean column tailings are combined and pumped to a bank of four Denver 21 conventional cleaner scavenger flotation cells. The cleaner scavenger concentrate is pumped to a zinc cleaner scavenger column cell and the cleaner scavenger tailings are pumped to the lead rougher tailings sump prior to the zinc conditioners. The zinc cleaner scavenger column concentrate is pumped the zinc concentrate thickener and zinc cleaner scavenger column tailings are pumped to the feed of the zinc rougher cells. Final zinc concentrate is a combination of the zinc flash flotation, second cleaner column and cleaner scavenger column concentrates.

Figure 14-4 represents the Zn circuit flow diagram.



Source: Hecla, 2014

Figure 14-4: Zinc Flotation Process Flow Diagram

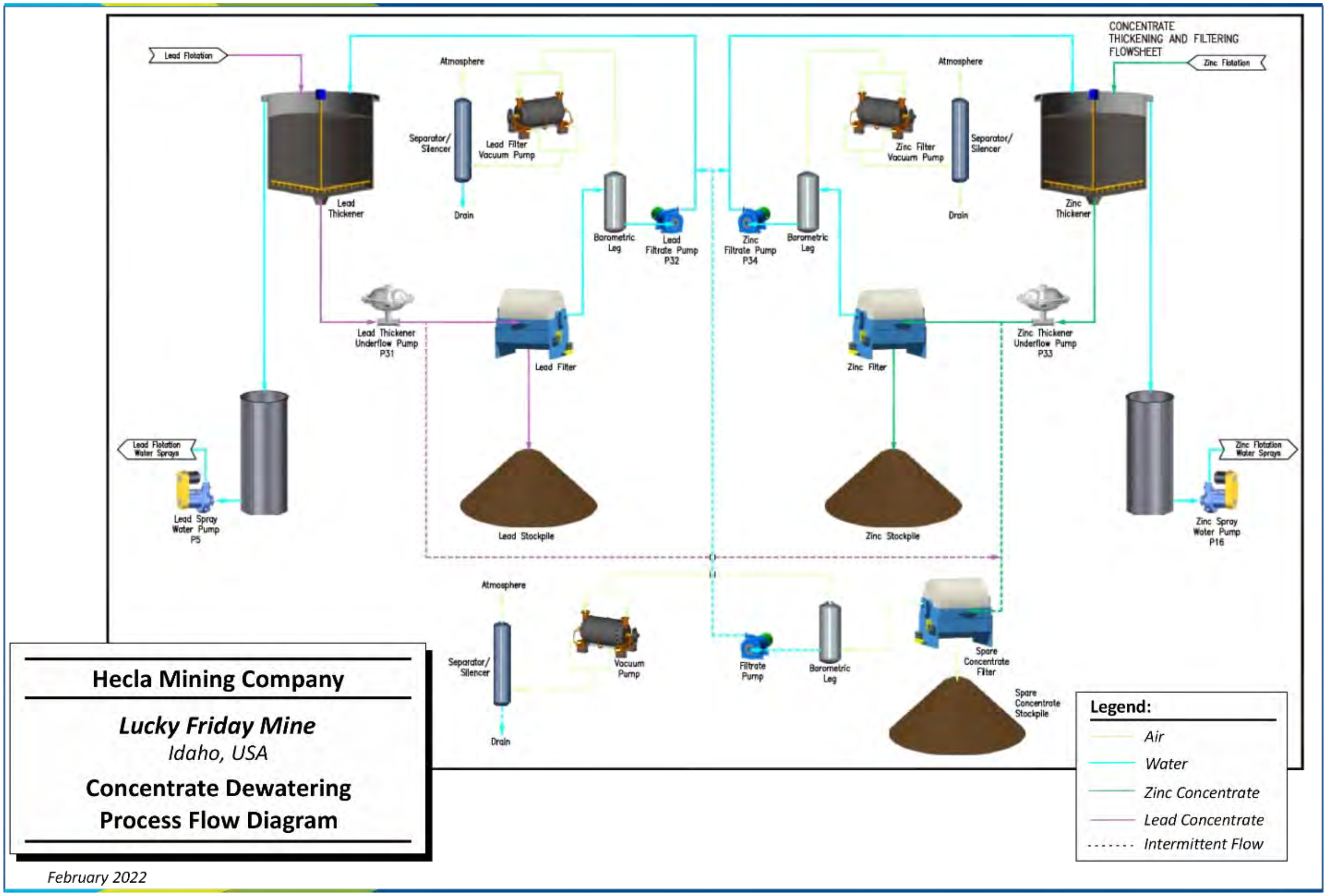
14.4 Concentrate Dewatering

After lead and zinc concentrates have passed through their respective samplers they enter the center well of the final concentrate thickeners. The lead and zinc concentrate handling systems are mirrored like the flotation circuits. Both thickeners are 12 ft diameter high-rate solid-liquid separators producing a bed of solids in the cone of the thickener. Concentrate thickener underflow at approximately 60% solids is pumped to the concentrate filters. Overflow water from the thickener re-enters the flotation circuit as spray water in the froth launders. Separate lead and zinc spray water systems are installed.

The paste discharging from the thickener is pumped by air powered diaphragm pumps to vacuum drum filter for each product. Silver concentrate is filtered by a drum filter equipped with a vacuum pump for dewatering to less that 8% moisture. Zinc concentrate is dewatered to approximately 6% moisture using the same method as the silver concentrate filter. The dry filter cake concentrate falls off of the filter drum into a bunker directly below it. Lead/silver concentrate and zinc concentrate are shipped in highway trucks to a smelter daily for further processing and refining.

Figure 14-5 shows the concentrate dewatering flow diagram.

During the seventy years of operation at Lucky Friday, regulations concerning worker exposure to dust and other air borne contaminates have evolved from none to the relatively stringent rules in place today. Hecla has responded to meet these regulations and is committed to providing a safe work environment. In the future, more stringent regulations may be imposed. It is not known if these potential changes will have a material effect on the concentrator operation or concentrate transportation.



Source: Hecla, 2014

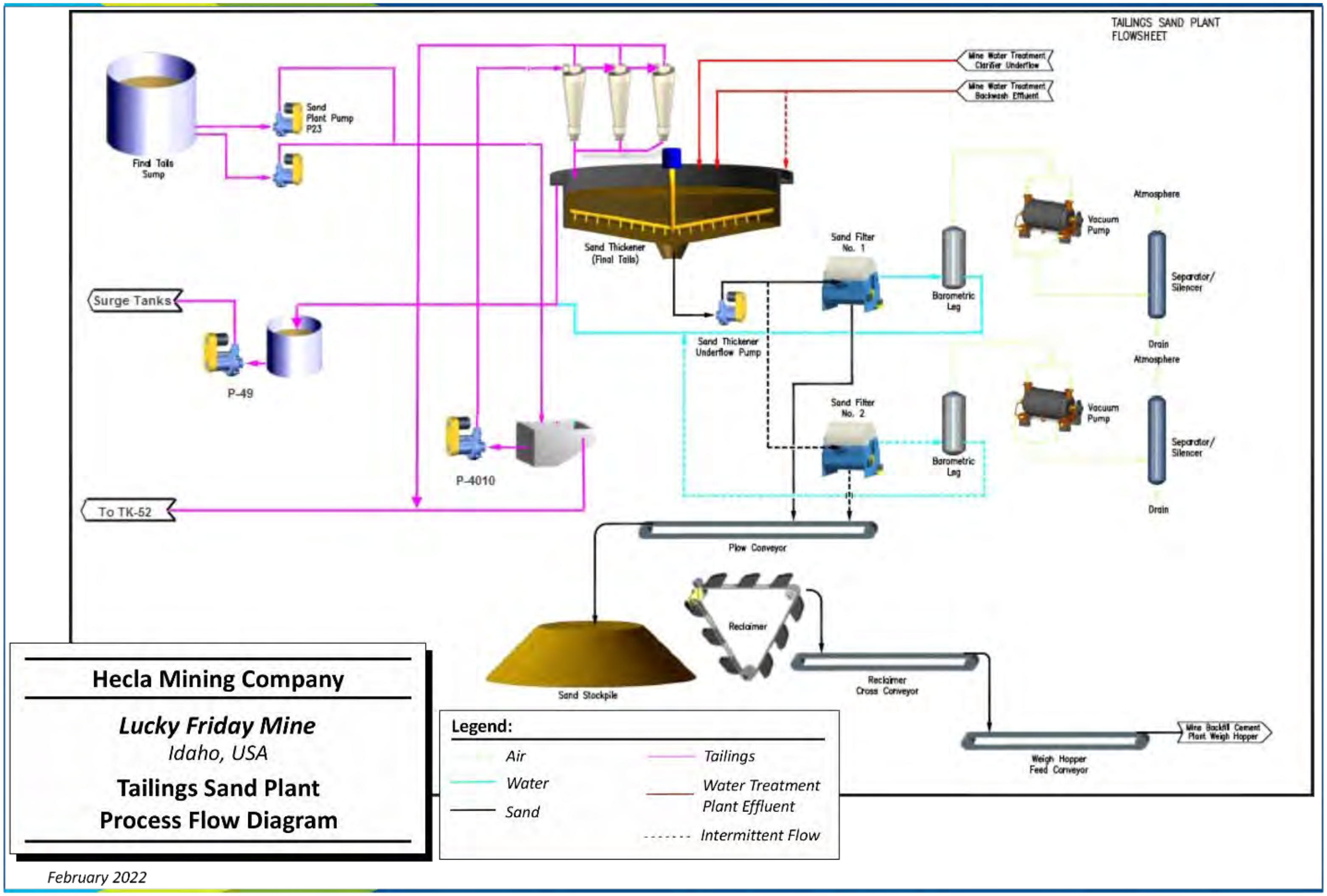
Figure 14-5: Concentrate Dewatering Process Flow Diagram

14.5 Tailings Dewatering and Disposal

All material entering the mill not reporting to concentrates is processed as final tails. The final tails stream is sampled as a 12 hour composite for assay. Final tailings produced by the concentrator flotation processes are handled in two separate ways, backfill and whole tails. First, the tails are classified by a cluster of cyclones with the coarse fraction (sand) dewatered, filtered, and the resultant sand is mixed with cement to backfill stopes in the underground mine.

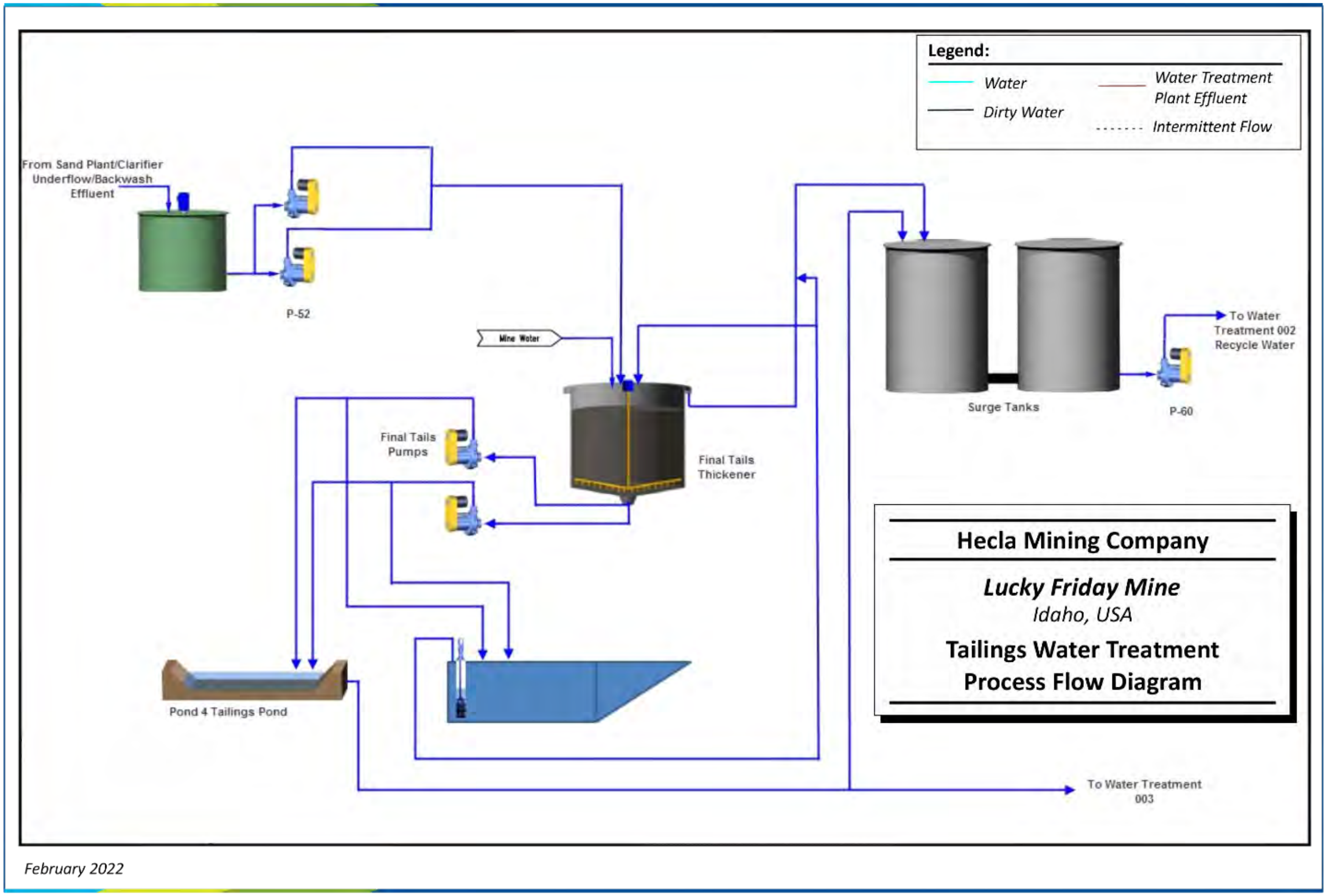
Figure 14-6 shows the sand plant flow diagram.

Whole tails report to the final tails thickener. Overflow of the thickener is reused as process water or sent to a water treatment plant for discharge while the higher solids underflow is pumped out to a tailings dam where the solids settle out of the tailings slurry and clear water is discharged via a water treatment plant into the Coeur d'Alene River. The final tails flowsheet is shown in Figure 14-7.



Source: Hecla, 2014

Figure 14-6: Tailings Sand Plant Process Flow Diagram



Source: Hecla, 2014

Figure 14-7: Tailings Water Treatment Process Flow Diagram

14.6 Water Systems

Make up water used in the process can be from the mine, reclaim water from the MTIS, or tailing thickener overflow depending on availability and system requirements. Lead and zinc concentrate thickener overflow are used as launder spray water for the respective system.

14.7 Water Treatment Plants

Excess water from the process or the MTIS is treated in one of two water treatment plants. Plant 002, located near the mill complex has a capacity of 375 gallons-per- minute (gpm). Plant 003, located near the No. 3 MTIS has a capacity of 750 gpm. The process to treat the water is the same at both plants. Water is treated with sodium sulfide solution and flocculent to facilitate removal heavy metals and suspended solids. The water is then processed through a lamella clarifier and the clarifier overflow is pumped through multi-media filters to remove the solids. The effluent is sampled for regulatory purposes and discharged as described in Section 17.0.

14.8 Mill Production

A summary of mill production and performance from 2016 through 2021 are presented in Table 14-1. The concentrator performed very consistently with steady lead, zinc and silver head grades, lead and zinc concentrate grades and recoveries through the period. The mill operated in the 38 stph (839 stpd) to 44 stph (971 stpd) range with a reported mill availability of 92%. Low production from 2017 through 2019 was due to labor issues.

Table 14-1: Hecla Lucky Friday Mill Production from 2016 through 2021
Hecla Mining Company – Lucky Friday Mine

Hecla Lucky Friday Mill Production	2016	2017	2018	2019	2020	2021
Ore milled, tons	293,875	70,718	17,309	57,091	179,208	321,837
Ag Contained, oz	3,730,620	875,614	186,609	675,280	2,124,369	3,744,719
Ag Feed Grade, oz/ton	12.7	12.4	10.8	11.8	11.9	11.6
Ag Produced, oz	3,596,010	838,658	169,041	632,944	2,031,874	3,564,128
Ag Recovery, %	96.4	95.8	90.6	93.7	95.6	95.2
Ag Payable, oz	3,365,540	781,506	162,546	565,923	1,892,954	3,325,313
Ag Rec, % (Payable)	90.2	89.3	87.1	83.8	89.1	88.8
*Ag Rec to Pb Conc, oz/ton	11.7	11.3	9.8	10.8	10.8	10.7
Ag Rec to Pb Conc, %	91.8	91.7	90.8	91.4	91.4	92.1
Ag Grade in Pb Conc, oz/ton	90.6	93.3	85.7	90.7	89.3	91.6
Pb Feed, tons	22,855	5,022	1,244	4,486	13,423	24,454
Pb Produced, tons	21,876	4,737	1,131	4,098	12,727	23,137
Pb Payable, tons	20,451	4,397	1,063	3,739	11,840	21,500

Hecla Lucky Friday Mill Production	2016	2017	2018	2019	2020	2021
Pb Concentrate, tons	36,420	8,238	1,790	6,378	20,806	,37,768
Pb Feed Grade, %	7.8	7.1	7.2	7.9	7.5	7.6
Pb Conc Grade, %	60.1	57.5	63.2	64.3	61.2	61.7
Pb Rec to Conc, %	95.7	94.3	90.9	91.4	94.8	94.6
*Pb Rec to Pb Conc, %	7.2	6.5	6.6	7.3	6.9	7.0
Pb Rec to Pb Conc, %	92.4	91.8	91.9	92.5	92.2	92.6
Pb Rec Payable, %	89.5	87.6	85.4	83.4	88.2	87.9
Zn Feed, tons	11,510	2,834	726	2,428	6,949	11,080
Zn Produced, tons	10,787	2,560	673	2,052	6,298	9,669
Zn Payable, tons	7,945	1,874	457	1,510	4,555	7,124
Zn Concentrate, tons	17,530	4,121	1,016	3,467	10,960	16,638
Zn Feed Grade, %	3.9	4.0	4.2	4.3	3.9	3.4
Zn Conc Grade, %	61.5	62.1	66.2	59.2	57.5	51.3
Zn Rec to Conc, %	93.7	90.4	92.7	84.5	90.6	89.9
*Zn Grade to Zn Conc, %	3.1	3.1	3.3	3.4	3.0	2.6
Zn Rec to Zn Conc, %	78.3	78.5	78.9	79.0	78.2	76.3
Zn Rec, Payable, %	69.0	66.1	62.9	62.2	65.5	64.3

*Values are based on established Lucky Friday metal distribution equations.

14.9 Process Workforce

Current processing manpower totals 78 and is summarized as follows:

- Plant operations – 39
- Mill maintenance/electrical – 21
- Mill supervision and technical services – 18

15.0 INFRASTRUCTURE

15.1 Access Roads

The Lucky Friday Mine is located immediately north of and adjacent to Interstate Highway 90, one mile east of Mullan, Idaho.

15.2 Power

Power is supplied to an on-site substation by Avista Utilities at 115 kVA. Peak electrical demand is approximately 11 MVA, with on average of 80% used underground, and the remaining 20% on surface. Underground power is supplied at 13.8 kVA cable in the Silver Shaft.

15.3 Water

The Lucky Friday operation uses approximately 450 gpm of water which is fully supplied by a year-round spring located above the mine site.

15.4 Accommodation Camp

There is no accommodation facility at the Lucky Friday mine. Workers are sourced from local communities.

15.5 Site Infrastructure

Mine surface and underground infrastructure is currently in serviceable condition and is in use. Repairs and improvements to facilities are included in the mine sustaining capital plan.

Surface infrastructure is shown in Figure 15-1.

15.5.1 Surface Infrastructure

Key Lucky Friday surface plant infrastructure includes the following installations:

- 1,000 tpd Ag/Pb/Zn flotation concentrator,
- Mine operations buildings and shops,
- Paste backfill mixing and pumping plant,
- Silver Shaft headframe and hoisting complex (primary mine access/intakeventilation),
- No. 2 Shaft hoisting facility (secondary escape/exhaust ventilation),
- Surface maintenance shop,
- Tailings transport and storage facilities,
- Two discharge water treatment plants,
- Electrical power substations and distribution lines,
- Compressed air supply system with a maximum capacity of 13,350 cfm
- And extensive surface laydown/parking/storage areas.

Tailings are stored in the Pond 4 Lift. Construction of this lift was completed in 2013 and the lift is projected to be full in October 2023. Hecla is working on Lift 3 permitting with planned construction in 2022. Pond 4 Lift 3 is estimated to be full in September 2026. Engineering and design of Pond 5 Lift 1 is planned for 2023 with construction in 2024-2025.

Figure 15-1: Infrastructure Layout

16.0 MARKET STUDIES

The Lucky Friday Mine produces silver contained in silver and zinc flotation concentrates. Lucky Friday is an active producer and has been for over 75 years.

16.1 Markets

16.1.1 Overview

Global mined zinc output is approximately 13 million metric tons metal per year, contained in approximately 25 million metric tons of zinc concentrate. Global zinc smelting capacity is approximately 14 million metric tons zinc metal per year and includes 1 million to 1.5 million metric tons of capacity to refine zinc secondary by-products into metal.

Global mined lead output is only approximately 4.6 million metric tons metal per year, contained in approximately 8 million metric tons of concentrates. Global lead smelting capacity is significantly higher at 6.7 million metric tons lead metal and also includes the capability to produce approximately 1 million metric tons lead metal from scrap and residues.

Hecla produces approximately 53,000 metric tons zinc and 44,000 metric tons lead metal in concentrates annually at its two mines in Alaska and Idaho. Hecla's total output comprises less than 1% of both global zinc mine capacity and global lead mine capacity. Because Hecla's concentrate products also contain significant amounts of payable gold and silver, they are sought after by smelters who capture additional value from recovering precious metals through processing and refining zinc and silver concentrates. The current market for Hecla concentrate products is both very liquid and very strong, globally. Hecla's primary customer base operates in Korea, Japan, Canada and China. Its concentrate products have also been exported to and processed in Mexico, Belgium, Italy, England, Germany and the Netherlands.

Global silver supply is approximately 1 billion ounces with mine production accounting for around 80% of silver supply. The majority of silver produced is as a by-product of lead, zinc, copper and gold mines. According to the Silver Institute, lead-zinc mines are the biggest contributors to global silver supply, accounting for about 32% of silver mine production in 2020. Mexico, China and Peru produce 50% of world's silver, while the United States accounts for only 4% of world silver production.

Silver demand is primarily composed of Industrial demand, which accounts for 50% of total silver demand of 1 billion ounces. Investment demand (physical and exchange traded products) and jewelry and silverware account for 25% share each respectively. Silver has the highest electrical conductivity of all metals and this property positions silver as a unique metal for multitude of uses in electronic circuitry in automotive and electronics. Silver's use in photovoltaic cells has also seen a rapid expansion in the past 5 years and is expected to be one of the key growth areas in green energy.

Gold supply is approximately 165 Moz, with mine production contributing 75% of gold supply and recycling accounting for the remaining 25%. In terms of gold demand, jewelry fabrication accounts for approximately 55% of total demand while Investment in physical bars, coins and Exchange Traded Funds is at 25% of overall demand. Gold's use in technology applications was around 11 Moz, or 8% of total demand in 2021, according to the World Gold Council. Accommodative fiscal and monetary policies globally due to COVID-19 lent support to investment demand for gold in 2020 as gold prices reached record levels in 2020.

16.1.2 Commodity Price Projections

Metal prices used in the estimation of Mineral Resources and Mineral Reserves are determined by Hecla's corporate office in Coeur d'Alene, Idaho, USA. Lucky Friday Mineral Reserves are estimated using a silver price of $17.00/oz, lead price of $0.90/lb and a zinc price of $1.15/lb. Mineral Resources are estimated using a silver price of $31.00/oz, lead price of $1.15/lb and a zinc price of $1.35/lb. The difference in prices is the result of a longer historical period used as the basis for the Mineral Resource estimation.

Table 16-1 shows the realized metal prices Hecla has received for sales of its products.

Table 16-1: Hecla Historical Average Realized Metal Prices
Hecla Mining Company – Lucky Friday Mine

Metal Prices	2019	2020	2021	3 Year Avg.
Silver ($/oz)	16.65	21.15	25.24	21.01
Lead ($/lb)	0.91	0.84	1.03	0.93
Zinc ($/lb)	1.14	1.03	1.44	1.20
Gold ($/oz)	1.413	1,757	1,796	1,655

The economic analysis performed in the LOM plan assumes an average silver price of $21.00/oz, lead price of $0.95/lb and a zinc price of $1.25/lb based upon analysis of consensus metal price forecasts by financial institutions. Based on macroeconomic trends, the SLR QP is of the opinion that Hecla's realized metal pricing will remain at least at the current three -year trailing average or above for the next five years.

16.2 Contracts

16.2.1 Concentrate Sales

Concentrates produced at the Lucky Friday mill are transported 209 mi to the Teck lead-zinc smelter in Trail, British Columbia, Canada in highway trucks operated by a contract shipper. The shipping contract commenced in 2017 and was amended in July 2021 to increase rates and to incorporate a bonus for drivers based upon safe performance and absence of traffic violations. Shipping rates are considered to be competitive and within industry norms.

Hecla has a frame contract with Teck that is dated January 1, 2021. The sales contract is commingled with the smelting/refining agreement, as Hecla sells 100% of Lucky Friday production to the smelter. No concentrate brokers are used, though representatives and umpires provide settlement assistance services from time to time. Treatment costs and refining costs vary depending on the concentrate type.

16.2.2 Forward Sales

Hecla uses financially-settled forward contracts to manage the exposure to:

- changes in prices of silver, gold, zinc and lead contained in our concentrate shipments between the time of shipment and final settlement; and
- changes in prices of zinc and lead (but not silver and gold) contained in our forecasted future concentrate shipments.

These forward contracts are not designated as hedges for accounting purposes. At the time of this TRS, the forward contracts in place cover the period to the end of the first quarter of 2024 for lead and to the end of 2024 for zinc. The contracts are summarized in Table 16-2.

Table 16-2: Lead and Zinc Forward Sales Summary
Hecla Mining Company – Lucky Friday Mine

		Unit	Total / LOM	2022	2023	2024
Lead	Hedged	tons	44,427	19,650	23,150	1,626
	% of LOM payable Pb	%	11%	64%	67%	5%
	Hedge price	US$/lb	0.99	0.98	1.00	0.97
Zinc	Hedged	tons	14,334	4,785	5,715	3,833
	% of LOM payable Zn	%	11%	58%	70%	42%
	Hedge price	US$/lb	1.30	1.30	1.30	1.31

16.2.3 Other Contracts

Hecla crews perform all mining and milling duties with the exception of specialty construction. For these project-oriented efforts, contractors with particular expertise relating to the work being done are retained to do the work. In some cases, these are design-build contracts, in others, purely construction. Hecla also contracts with various consultancies and engineering firms for studies and design work as needed to augment the skills of the in-house staff.

17.0 ENVIRONMENTAL STUDIES, PERMITTING, AND PLANS, NEGOTIATIONS, OR AGREEMENTS WITH LOCAL INDIVIDUALS OR GROUPS

Lucky Friday has a well-established and effective environmental and permitting management program. Staff is knowledgeable and experienced in site and regulatory requirements. Budgets are reasonable and there were no critical path permitting items referenced that would limit production. A reclamation/closure plan and estimates to perform this activity are in place. The budgets and staffing to perform required programs are adequate and indicative of activities and responsibilities.

17.1 Environmental Studies and Monitoring

Unlike many other mines and jurisdictions in the US, activities and facilities at the Lucky Friday operations predate the requirement for establishment of environmental baseline(s). Regardless, there are still monitoring programs in place to assess compliance with permits and standards.

Lucky Friday reports experiencing a number of alleged permit exceedances for water discharges (NPDES and MSGP) at the mine. Lucky Friday received an EPA Notice of Violation for non-compliance with the NPDES Permit and various unpermitted discharges exceeding the maximum daily standard for lead (50 µg/L). In all instances, Lucky Friday has worked cooperatively with EPA to resolve these issue(s).

Lucky Friday falls under Hecla's Environmental Management System (EMS) which follows a 13-element plan-do-check-act approach that ensures continuous improvement around issues including obligation registers, management of change, air quality, water and waste management, energy management, training, and reporting. This system promotes a culture of environmental awareness and innovation throughout the company. The EMS program is benchmarked against ISO-14001 and complements Canada's Towards Sustainable Mining (TSM) program.

Internal and external audits are performed to assess compliance with corporate, permit, regulatory and industry requirements. Findings are documented and tracked.

17.2 Permitting

Permitting Operations at the Lucky Friday fall within the purview of numerous entities (regulatory and non-regulatory), including state and federal environmental agencies that require oversight, registration, and/or notification prior to initiating or significantly modifying facilities and operations at the mine. All necessary registrations, authorizations and permits required for operations to date, and for continued operation of this facility, are in place. Although some permits have expired or are set to expire, renewal applications are filed with the appropriate agency in each case or other measures were taken, as necessary, to administratively extend the prior conditions until such time as a renewed permit or additional authorization to utilize is issued.

Listed below in Table 17-1 are the permits that Lucky Friday has in place.

Table 17-1: Permits and Authorizations
Hecla Mining Company – Lucky Friday Mine

Type of Approval/Permit	Reference #	Agency	Purpose	Date of Approval
Certificate of Authorization	IDR053139	USEPA	Authorization to utilize Nationwide MSGP	9/29/2008
*Authorization to Discharge	ID-000017-5	USEPA	NPDES Wastewater Discharge for Outfalls 001, 002, 003	9/14/2003
DOT HazMat Registration	052912002005U	USDOT	Registration for Category E Material Shipper	5/30/2012
General Registration	ID000390	IDWR/USACOE	ID used to identify MTIS #3 in National Dam Inventory	N/A
General Registration	ID000728	IDWR/USACOE	ID used to identify MTIS #4 in National Dam Inventory	N/A
Certificate of Approval	94-xx20	IDWR	IDWR Issued Cert. of Approval to impound water and tails in MTIS #3	8/27/2020
Certificate of Approval	94-xx25	IDWR	IDWR Issued Cert. of Approval to impound water and tails in MTIS #4	8/27/2020
PWS ID No.	1400028	IDEQ	IDEQ designation of PWS System operation	2/6/1995
Operating Permit	731-10-000113	Idaho Fish & Game	Permit to Operate Private Fish Pond	6/21/2010
Waste Generator's Status	IDD009424862	USEPA	Majority of time Lucky Friday is a CESQG. However, periodic projects may trigger status as a SQG	N/A

Lucky Friday is evaluating alternatives and designs for meeting a proposed new discharge standard for copper. Currently, Lucky Friday is piloting two types of advanced treatment technologies to reach the final Biotic Ligand Model (BLM) based copper effluent limits in the most recent updated individual NPDES Permit. The BLM based limits are significantly lower than the previous hardness-based limits in the expired permit. The Permit explains the difference of BLM and hardness-based effluents and how and when the BLM was introduced to the State's water quality standards.

Lucky Friday is evaluating two types of treatment: 1) ion exchange and 2) ultra-filtration. Sampling to date indicate that copper is primarily in the colloidal phase especially after treatment with the organo-sulfide PTB-50. It is understood that both treatment options are viable, and Luck Friday is testing both for efficacy and efficiency.

In addition to the above efforts to test advanced water treatment technologies, Lucky Friday has been working on collecting site specific data to re-run the BLM and Dissolved Metal Translator in an attempt to revise the final permit limits which are effective after a five-year compliance window.

17.2.1 Site Monitoring

Lucky Friday operates through permission granted by multiple permits, which are summarized in Table 17-1. The permits contain requirements for site monitoring including air, water, waste, and land aspects of the Property. The permit-required data are maintained by the facility, and exceptions to the monitoring obligations are reportable to the permitting authority. Monitoring is conducted in compliance with permit requirements, and management plans are developed as needed to outline protocols and mitigation strategies for specific components or activities.

17.2.2 Water

The mine has operated under an EPA issued NPDES Permit regulating the point source discharges from three existing process water outfalls (Outfall 001, Outfall 002, and Outfall 003) since 1973.

The Property maintains a single authorization to utilize the MSGP issued by the EPA. This currently active authorization is applicable to discharges of stormwater runoff from all areas of the mine including development rock stockpiles, support facilities, access roads, and nearby borrow pit developed to supplement materials used to construct impoundment structure embankments.

17.2.3 Hazardous Materials, Hazardous Waste, and Solid Waste Management

Lucky Friday manages its hazardous materials, hazardous wastes and solid wastes in accordance and compliance with issued permits and applicable regulatory requirements.

17.2.4 Tailings Disposal, Mine Overburden, and Waste Rock Stockpiles

All mine waste rock is eventually used for construction of tailings impoundments. The volume requirement for the impoundment structures far exceeds the volume of waste rock that the mine produces and additional material is added from on-site borrow pits and off-site quarries, as needed. Pond construction is an annual activity occurring during the late spring/summer/fall construction season. Plans going forward have construction activity in progress through the end of the mine life. All waste produced by the mine is expected to be consumed in this fashion. MTIS No. 4 is equipped with a gravel blanket and toe drain system located in the foundation of the dam. This feature is designed to intercept meteoric waters which infiltrate into the embankment and transport it to the water treatment plants.

Before being used in impoundment construction, mine waste rock is temporarily stored in two areas: the mine waste dump located near the Silver Shaft and the Silver Mountain storage area that is situated between the mine and the tailings impoundment area. Waste is dumped on surface until the waste dump is full, and then trucked either to the impoundment construction area or temporarily stockpiled. Excess waste is temporarily stored at the Silver Mountain storage area until it can be incorporated into the impoundment structure. This process addresses fluctuations in impoundment construction material demand.

17.3 Reclamation and Closure

The strategy of the Lucky Friday Reclamation and Closure Plan is to return disturbed areas to either a near-natural condition, or condition amenable to future industrial use depending on location and potential future beneficial use options. Individual areas have been assessed for future value added to the City of Mullan and surrounding area. Key buildings and land will be retained for long-term water treatment. Provisions for operational support during the post-closure period are included in the cost estimate.

17.3.1 Reclamation and Permit Requirements

The State of Idaho currently requires reclamation of Mine Tailings Impoundment Structures (MTIS). Those structures are regulated by State-Specific regulations and by Idaho Department of Water Resources (IDWR). IDWR require MTISs to be "abandoned" (i.e., limited reclamation) in a stable and maintenance free condition as defined by Idaho Administrative Procedures Act (IDAPA) 37.03.05 (Rule 45), for which these structures are bonded (IDAPA 37.03.05, Rule 40). The abandonment and reclamation of MTIS 1 and 2 (per IDWR requirements) was completed in 2013 and 2012, respectively.

Lucky Friday is situated completely on privately owned ground. In 2019, the Idaho Department of Lands (IDL) adopted the temporary rule (IDAPA 20.03.02) which was intended to prevent new or expanded underground mines from becoming public hazards if they are abandoned. A recently approved (July 1st, 2021) Idaho rulemaking (IDAPA 20.03.02) requires underground mines which existed prior to July 1, 2019, to develop a reclamation plan if the mine expands its surface disturbance by 50% or more after that date. The final rule requires State approval of a reclamation application that will include total reclamation cost financial assurances, planned reclamation of disturbed sites, and a water management plan for underground mines that expand their surface disturbance by 50% or more.

SLR notes that the final rule does not apply to underground mines that existed prior to July 1, 2019, and have not expanded their surface disturbance by 50% or more after that date. Currently, Lucky Friday has no plans to expand the site that will reach the relevant threshold.

17.3.2 Reclamation and Closure Cost

The Lucky Friday operation has developed a Closure, Reclamation, Post-Closure, and Cost Estimate Plan (Plan). This Plan is intended to satisfy three distinct objectives:

1. Return surface disturbed areas to a stable and productive condition following mining;
2. Provide for public safety; and,
3. Protect long-term land, water and air resources in the area.

The most recent version of the Plan was updated in 2020 and utilized the 2021 LOM plan to estimate the schedule for post closure activities. The updated 2021 LOM plan has forecasted production to 2035. Major closure and reclamation activities are assumed to begin the year following the cessation of production (2037) and last for approximately three years. Post-Closure activities primarily consist of long-term water treatment and monitoring immediately following closure and extending for a period of 30 years.

The most recent cost estimate (2021) to meet these objectives of the current plan is $39,869,900. Reclamation and closure plans have been submitted to the appropriate agencies. Asset Retirement Obligation (ARO) legal obligations are updated regularly and based upon existing site conditions, current laws, regulations and costs to perform the permitted activities. The ARO is to be conducted in accordance with Financial Accounting Standards Board (FASB) Accounting Standards Codification (ASC) 410.

Finally, it is noted that Lucky Friday has developed a Reclamation/Closure plan that addresses facilities and activities even when there is no specific regulatory requirement to do so.

17.4 Social Governance

The Lucky Friday operation has been investing in the region for many decades, including direct employment and contributions to state and local taxes. SLR is not aware of any formal commitments to local procurement and hiring but Lucky Friday has indicated they have long-standing relationships with local vendors, and where possible also purchase through local and regional services and supplies.

Lucky Friday looks for opportunities to work collaboratively with stakeholders to support activities that are of benefit to the communities in which the company operates.

SLR was not able to independently verify adequacy of management of social issues and though no specific adversarial issues were raised, it was relayed by staff that Lucky Friday, in most cases, has a positive relationship with stakeholders. In the event of a complaint, Lucky Friday works directly with affected community member(s) to develop a mutually acceptable resolution.

Public affairs representatives from Lucky Friday formally engage with the community on an ongoing basis and serve as the face of the company. They sit on boards of community and business organizations at regional and local levels, participate in discussions with government officials, and act as a point of contact within the community. In doing so, they keep stakeholders apprised of critical issues to the operations, understand important topics in the community, and seek to listen to any questions or concerns. Lucky Friday indicated that this strategy allows them to maintain an ongoing relationship with stakeholders and collaborate with communities to find solutions should any issues arise.

18.0 CAPITAL AND OPERATING COSTS

Hecla's forecasted capital and operating costs estimates are derived from annual budgets and historical actuals over the long life of the current operation. According to the American Association of Cost Engineers (AACE) International, these estimates would be classified as Class 1 with an accuracy range of 3% to -10% to +3% to +15%, albeit with some variances to be expected in near term with the operation coming back to full production after the recent labor strike.

18.1 Capital Costs

The Lucky Friday Mine is in operation and there is no pre-production capital. The capital is summarized in Table 18-1.

Table 18-1: Capital Cost Summary
Hecla Mining Company – Lucky Friday Mine

Year ($ millions)	Total	2022 Year 1	2023 Year 2	2024 Year 3	2025 Year 4	2026 Year 5	27 to 38 (Years 6 to 13)
Drilling	27.0	3.0	3.0	3.0	3.0	2.0	13.0
Major Projects	75.0	24.0	5.0	12.0	7.0	3.0	24.0
Ore processing	13.0	2.0	7.0	3.0	0.0	1.0	0.0
Mobile Equipment	41.0	5.0	8.0	7.0	2.0	2.0	17.0
Mine Development	200.0	14.0	11.0	21.0	23.0	16.0	115.0
Mine infrastructure	16.0	3.0	6.0	3.0	1.0	2.0	1.0
Total	**372.0**	**51.0**	**40.0**	**49.0**	**36.0**	**26.0**	**170.0**

The major elements of the capital plant include:

- Development $135 million
  - Four accesses to support mining in 30 Vein
  - Delays or reduction may result in shortfalls in meeting the production plan
- #2 Shaft Renovation $28 million
  - Pipe and timber replacements to meet regulatory requirements as this shaft provides the second egress and exhaust ventilation way.
- Pre-production drilling $28 million
  - Pre-production drilling for areas to be mined and to guide the 7500 level mine development.
  - The drilling is expected to increase the confidence in the mine plan and to reduce unplanned dilution.
- Construction $26 million
  - Construction of facilities to support production on 6500 and 7500 levels including shops warehouse areas, air coolers and more.

- Pond 4 and Pond 5 tailings storage facility (TSF) $32 million
  - Design, engineering and construction of ponds 4 and 5.
- Silver shaft service hoist $8 million
  - Installation of conveyance for men and materials, hoist replacement and improvements to hoisting capacity.

The capital estimates have been prepared by mine personnel and contractors. The capital programs will be managed by the mine personnel. Contingency is not included in the capital estimates.

The SLR QP considers the capital plan to be appropriate for the mine. Delays in a number of the projects may reduce the ability to achieve the LOM plan and certain items such as maintaining the second access and ensuring sufficient tailings storage are critical to the continued operation.

Working capital costs, composed of accounts receivable, accounts payable, and product and supply inventories, are included in the mine cash flow and net to zero over the LOM. Accounts receivable balances fluctuate based upon period-end sale amounts and the average duration of time between shipments and receipt of payment. Accounts payable vary over time based upon the average portion of a period's expenditures that are typically unpaid at the end of the period. Inventory values fluctuate based upon the estimated quantities of product produced and the average duration of time between production and sale of products. Depending on the assumptions in the LOM, the working capital variation at the end of the mine life can be positive or negative. In the case of the Lucky Friday Mine, Hecla expects the end-of-life accounts payable to be greater than the other working capital items, such that an estimated $4.3 million cost to draw down working capital to zero will be incurred.

18.2 Operating Costs

18.2.1 Operating Cost History

The operating costs for the mine for the period 2016 to October 2021 YTD are summarized in Table 18-2. Unit costs are not shown for 2017 through 2019 as the mine was not in full operation. Furthermore, the 2020 costs reflect a restart period as operations were restarted in January 2020.

Table 18-2: 2016 to 2021 Operating Cost Data
Hecla Mining Company – Lucky Friday Mine

	Units	2016	2017	2018	2019	2020	2021
Production Costs							
Mining	$ millions	22.4	6.0	3.2	3.5	17.3	27.3
Concentrator	$ millions	5.4	2.9	1.6	1.0	5.0	7.3
Maintenance	$ millions	11.5	7.4	4.7	3.4	16.1	17.2
General Plant	$ millions	14.4	11.9	8.6	10.5	10.4	11.2
Profit sharing	$ millions	6.3	1.3	-	-	0.8	3.5
Total	**$ millions**	**60.0**	**29.5**	**18.1**	**18.4**	**49.6**	**66.5**
Cost per ton milled							

	Units	2016	2017	2018	2019	2020	2021
Mining	$/ton	76.46	n/a	n/a	n/a	96.97	84.80
Concentrator	$/ton	18.20	n/a	n/a	n/a	27.76	22.68
Maintenance	$/ton	39.22	n/a	n/a	n/a	89.59	53.43
General Plant	$/ton	48.89	n/a	n/a	n/a	57.89	34.79
Profit sharing	$/ton	21.54	n/a	n/a	n/a	4.46	10.87
Total	**$/ton**	**204.31**	**n/a**	**n/a**	**n/a**	**276.68**	206.57

18.2.2 Operating Cost Estimate

The forecasted LOM operating costs totaling $187.81/t milled are summarized in Table 18-3.

Table 18-3: Operating Cost Summary
Hecla Mining Company – Lucky Friday Mine

Item	Units	Total	2022	2023	2024	2025	2026 to 2038
Production Costs							
Mining (Underground)	$ millions	415.3	29.3	32.0	29.9	29.2	294.8
Processing	$ millions	117.5	8.7	8.9	8.2	7.8	83.9
Maintenance	$ millions	269.9	20.3	20.6	19.9	18.2	190.9
G&A	$ millions	182.7	13.4	13.1	11.9	11.2	133.2
Profit share	$ millions	39.4	2.9	3.0	2.8	2.7	28.1
Total	**$ millions**	**1,024.7**	**74.5**	**77.6**	**72.7**	**69.0**	**731.0**
Cost per ton milled							
Mining (Underground)	$/ton	76.11	86.11	78.32	74.27	73.57	75.45
Processing	$/ton	21.54	25.44	21.88	20.42	19.63	21.47
Maintenance	$/ton	49.46	59.67	50.39	49.35	45.76	48.86
G&A	$/ton	33.48	39.22	31.94	29.56	28.06	34.10
Profit share	$/ton	7.22	8.42	7.30	6.94	6.68	7.20
Total	**$/ton**	**187.81**	**218.86**	**189.84**	**180.54**	**173.69**	**187.08**

18.2.3 Workforce Summary

The current Lucky Friday workforce totals 362 persons as of January 2022. The breakdown by department is shown in Table 18-4 consisting of 86 salaried and 276 hourly employees, of which the majority of the hourly employees have the United Steelworkers, Paper and Forestry, Rubber, Manufacturing, Energy, Allied Industrial, and Service Workers International Union as their bargaining agent as of December 31, 2021.

Table 18-4: Current Manpower
Hecla Mining Company – Lucky Friday Mine

	Hourly FTE	Salary FTE	Total
Mine	178	16	194
Plant	39	12	51
Maintenance	59	16	75
G&A	0	42	42
Total	**276**	**86**	**362**

The Lucky Friday full time equivalent (FTE) workforce for 2020, 2021, and the LOM plan is summarized in Table 18-5. The 2020 workforce levels reflect the start-up of the mine after the strike.

Table 18-5: LOM Manpower Levels
Hecla Mining Company – Lucky Friday Mine

	Hourly FTE	Salary FTE	Total
2020 Actual	241	86	327
2021 Actual	276	86	362
2022	292	105	397
2023	300	105	405
2024 – 2035	288	94	382

SLR notes that in terms of tonnage (ore plus waste) mined per day, the 2022 performance requires a 15% increase in productivity compared to the 2021 performance. The SLR QP is of the opinion that if the productivity does not increase it will be necessary to increase the number of employees. This may be a difficult task considering the skilled nature of the work and the worldwide demand for skilled personnel. SLR considers the required increase in productivity to pose a potential risk to meeting the LOM plan.

19.0 ECONOMIC ANALYSIS

19.1 Economic Criteria

An after-tax Cash Flow Projection has been generated from the LOM production schedule and capital and operating cost estimates, and is summarized in Table 19-2. A summary of the key criteria is provided below.

19.1.1 Physicals

- Total mill feed processed: 5.5 Mst
- Average processing rate: 892 stpd with following production profile (Table 19-1).

Table 19-1: Production Summary
Hecla Mining Company – Lucky Friday Mine

Commodity	Head Grade	% Recovery	Recovered Metal	Annual Production	Payable Metal
Silver	13.7 oz/ton	96.4	72.0 Moz	4.2 Moz	67.4 Moz
Lead	8.3%	95.7	866 Mlb	51 Mlb	811 Mlb
Zinc	3.3%	93.7	340 Mlb	20 Mlb	251 Mlb

19.1.2 Revenue

- Metal prices used in the economic analysis are constant US$21/oz Ag, US$0.95/lb Pb, and US$1.25/lb Zn.
- Revenue is calculated assuming the above metal price forecast and incorporates a $1.8 million hedge gain for lead and zinc over the first three years of cash flow.
- Average LOM concentrate freight cost: $47/wet ton Cost, Insurance, and Freight (CIF) basis to customer's discharge points.
- Average LOM treatment charge: $139/dmt silver concentrate plus $3.90/dmt for antimony penalty, $162/dmt zinc concentrate, and $8.70/dmt for iron and mercury penalties.
- Average LOM refining costs for concentrates: $0.10/dmt.

19.1.3 Capital and Operating Costs

- Mine life of 17 years
- LOM sustaining capital costs of $372 million
- LOM site operating cost of $187.81/ton milled (excludes financing and corporate overhead costs)
- LOM closure/reclamation $38.7 million in year after final production

19.1.4 Taxation and Royalties

Mining companies doing business in Idaho are primarily subject to U.S. corporate income tax, Idaho State income tax and Idaho Mining License tax. The State of Idaho levies a mining license tax on mining net income received in connection with mining properties and activities in Idaho, at a rate of 7%. The U.S. corporate income tax rate is 21% and the Idaho state income tax rate is 6.5%.

No income tax is anticipated to be payable over the LOM. Hecla will use a combination of existing and forecasted depreciation expense, allocation of expenses from other entities within the consolidated tax group, percentage depletion allowances, and existing net operating losses to generate zero annual taxable income through the LOM. However, the Lucky Friday Mine will still incur $4 million for Idaho state mining taxes during the LOM.

The current production zones in the LOM are not subject to any royalty to a third party/previous landowner.

19.2 Cash Flow Analysis

SLR has reviewed Hecla's Lucky Friday Reserves only model and has prepared its own unlevered after-tax LOM cash flow model based on the information contained in this TRS to confirm the physical and economic parameters of the mine.

The Lucky Friday economics have been evaluated using the discounted cash flow method by considering annual processed tonnages and grade of ore. The associated process recovery, metal prices, operating costs, refining and transportation charges, and sustaining capital expenditures were also considered.

The indicative economic analysis results, presented in Table 19-2 with no allowance for inflation, show a pre-tax and after-tax NPV, using a 5% discount rate, of $557 million and $554 million, respectively. The SLR QP is of the opinion that a 5% discount/hurdle rate for after-tax cash flow discounting of long lived precious/base metal operations in a politically stable region is reasonable and appropriate and commonly used. For this cash flow analysis, the internal rate of return (IRR) and payback are not applicable as there is no negative initial cash flow (no initial investment to be recovered) since Lucky Friday has been in operation for a number of years.

Table 19-2: After-Tax Cash Flow Summary
Hecla Mining Company – Lucky Friday Mine

Project Timeline				**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**
Commercial Production Timeline in Years				**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**
Time Until Closure In Years		**US$ & US Units**	**LoM Avg / Total**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**-1**
Market Prices																					
Silver		US$/oz	**$21.00**	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00	21.00
Lead		US$/lb	**$0.95**	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Zinc		US$/lb	**$1.25**	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25	1.25
Physicals																					
Total Ore Processed		kt	5,456	340	409	403	397	389	355	393	411	289	352	369	427	345	209	180	120	69	-
Silver Grade, Processed		opt	13.7	12.9	14.2	14.4	13.1	15.5	17.1	14.5	12.0	11.9	14.3	13.6	13.3	12.9	13.0	12.4	11.4	11.6	-
Lead Grade, Processed		%	8.3	9.0	9.0	8.8	8.2	9.9	11.4	9.6	8.0	7.3	7.7	7.1	7.4	6.2	5.2	6.1	8.8	10.7	-
Zinc Grade, Processed		%	3.3	4.0	3.4	3.7	4.1	3.7	3.7	4.1	3.3	3.0	2.4	2.3	2.6	2.8	3.4	3.3	2.9	3.7	-
Contained Silver, Processed		koz	74,699	4,399	5,799	5,806	5,223	6,041	6,064	5,692	4,933	3,446	5,041	5,029	5,670	4,432	2,724	2,232	1,371	796	-
Contained Lead, Processed		kst	453	31	37	35	32	39	41	38	33	21	27	26	32	21	11	11	11	7	-
Contained Zinc, Processed		kst	181	14	14	15	16	14	13	16	14	9	9	9	11	10	7	6	3	3	-
Average Recovery, Silver		%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	96.4%	--
Average Recovery, Lead		%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	95.7%	–
Average Recovery, Zinc		%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	93.7%	–
Recovered Silver		koz	72,003	4,240	5,589	5,597	5,034	5,823	5,845	5,487	4,755	3,322	4,859	4,847	5,465	4,272	2,626	2,152	1,321	768	-
Recovered Lead		kst	433	29	35	34	31	37	39	36	32	20	26	25	30	21	10	11	10	7	-
Recovered Zinc		kst	170	13	13	14	15	13	12	15	13	8	8	8	10	9	7	5	3	2	-
Payable Silver		koz	67,426	3,961	5,235	5,239	4,702	5,454	5,479	5,131	4,448	3,110	4,562	4,550	5,126	4,004	2,457	2,014	1,237	717	-
Payable Lead		klb	810,546	55,141	66,106	63,533	58,003	69,002	72,703	67,397	59,270	37,610	48,352	47,247	56,633	38,435	19,365	19,662	18,913	13,173	-
Payable Zinc		klb	251,454	18,972	19,081	20,416	22,798	19,694	18,270	22,114	18,803	11,979	11,928	11,938	15,542	13,524	9,927	8,124	4,845	3,498	-
Cash Flow																					
Silver Gross Revenue	57%	$000s	1,415,940	83,177	109,938	110,019	98,741	114,544	115,050	107,752	93,403	65,309	95,805	95,560	107,640	84,085	51,605	42,288	25,971	15,054	-
Lead Gross Revenue	31%	$000s	770,019	52,384	62,801	60,357	55,103	65,552	69,068	64,027	56,307	35,729	45,934	44,885	53,802	36,513	18,397	18,679	17,968	12,515	-
Zinc Gross Revenue	13%	$000s	314,317	23,715	23,852	25,519	28,498	24,617	22,837	27,642	23,504	14,974	14,911	14,923	19,428	16,905	12,409	10,155	6,057	4,372	-
Zinc and lead hedge gain/(loss)		$000s	1,800	(1,836)	2,348	1,288	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Revenue Before By-Product Credits	**100.0%**	**$000s**	**2,502,076**	**157,440**	**198,939**	**197,183**	**182,341**	**204,713**	**206,955**	**199,421**	**173,214**	**116,012**	**156,649**	**155,368**	**180,870**	**137,503**	**82,410**	**71,121**	**49,996**	**31,941**	-
Silver Gross Revenue		$000s	1,415,940	83,177	109,938	110,019	98,741	114,544	115,050	107,752	93,403	65,309	95,805	95,560	107,640	84,085	51,605	42,288	25,971	15,054	-
Lead Gross Revenue		$000s	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc Gross Revenue		$000s	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gross Revenue After By-Product Credits		**$000s**	**1,415,940**	**83,177**	**109,938**	**110,019**	**98,741**	**114,544**	**115,050**	**107,752**	**93,403**	**65,309**	**95,805**	**95,560**	**107,640**	**84,085**	**51,605**	**42,288**	**25,971**	**15,054**	-
Mining Cost		$000s	(415,258)	(29,310)	(32,000)	(29,900)	(29,230)	(29,700)	(29,700)	(26,359)	(26,359)	(26,359)	(26,359)	(26,359)	(26,359)	(26,359)	(19,769)	(14,827)	(14,827)	(1,483)	-
Process Cost		$000s	(117,501)	(8,660)	(8,940)	(8,220)	(7,800)	(8,210)	(8,210)	(7,553)	(7,553)	(7,553)	(7,553)	(7,553)	(7,553)	(7,553)	(5,665)	(4,249)	(4,249)	(425)	-
Maintenance Cost		$000s	(269,868)	(20,310)	(20,590)	(19,870)	(18,180)	(18,700)	(18,700)	(17,189)	(17,189)	(17,189)	(17,189)	(17,189)	(17,189)	(17,189)	(12,892)	(9,669)	(9,669)	(967)	-
G&A Cost		$000s	(182,697)	(13,350)	(13,050)	(11,900)	(11,150)	(11,650)	(11,650)	(11,650)	(11,650)	(11,650)	(11,650)	(11,650)	(11,650)	(11,650)	(8,738)	(6,553)	(6,553)	(6,553)	-
Profit Share		$000s	(39,413)	(2,865)	(2,983)	(2,796)	(2,654)	(2,730)	(2,730)	(2,510)	(2,510)	(2,510)	(2,510)	(2,510)	(2,510)	(2,510)	(1,883)	(1,412)	(1,412)	(377)	-
Concentrate Freight Cost		$000s	(49,580)	(3,471)	(3,968)	(3,923)	(3,801)	(4,130)	(4,221)	(4,186)	(3,647)	(2,317)	(2,796)	(2,747)	(3,357)	(2,435)	(1,391)	(1,309)	(1,103)	(775)	-
TC/RC Cost		$000s	(233,704)	(16,228)	(18,808)	(18,245)	(17,217)	(19,066)	(19,289)	(18,803)	(16,336)	(10,796)	(14,140)	(13,999)	(16,499)	(12,454)	(7,429)	(6,517)	(4,757)	(3,121)	-
Subtotal Cash Costs Before By-Product Credits		$000s	(1,308,021)	(94,194)	(100,339)	(94,854)	(90,033)	(94,186)	(94,501)	(88,251)	(85,245)	(78,374)	(82,197)	(82,007)	(85,118)	(80,151)	(57,766)	(44,536)	(42,569)	(13,700)	-
By-Product Credits		$000s	1,086,136	74,263	89,001	87,164	83,601	90,169	91,905	91,669	79,811	50,703	60,845	59,807	73,230	53,418	30,806	28,834	24,024	16,887	-
Total Cash Costs After By-Product Credits		**$000s**	**(221,885)**	**(19,931)**	**(11,339)**	**(7,690)**	**(6,432)**	**(4,018)**	**(2,596)**	**3,419**	**(5,434)**	**(27,671)**	**(21,352)**	**(22,200)**	**(11,888)**	**(26,733)**	**(26,960)**	**(15,702)**	**(18,545)**	**3,186**	-
Operating Margin	**48%**	**$000s**	**1,194,055**	**63,246**	**98,599**	**102,329**	**92,308**	**110,526**	**112,454**	**111,170**	**87,969**	**37,638**	**74,452**	**73,361**	**95,752**	**57,353**	**24,645**	**26,586**	**7,427**	**18,240**	-

Project Timeline			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Commercial Production Timeline in Years			**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**	**2035**	**2036**	**2037**	**2038**	**2039**
Time Until Closure In Years	**US$ & US Units**	**LoM Avg / Total**	**17**	**16**	**15**	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**-1**
EBITDA	$000s	1,194,055	63,246	98,599	102,329	92,308	110,526	112,454	111,170	87,969	37,638	74,452	73,361	95,752	57,353	24,645	26,586	7,427	18,240	-
Depreciation/Amortization Allowance	$000s	(494,032)	(22,440)	(26,224)	(28,487)	(29,855)	(30,897)	(31,083)	(30,570)	(30,891)	(28,104)	(38,271)	(37,915)	(43,096)	(37,560)	(26,816)	(24,441)	(16,491)	(10,892)	-
Earnings Before Taxes	**$000s**	**700,024**	**40,806**	**72,375**	**73,842**	**62,453**	**79,630**	**81,371**	**80,600**	**57,077**	**9,535**	**36,181**	**35,446**	**52,657**	**19,792**	**(2,171)**	**2,145**	**(9,064)**	**7,349**	-
ID Mine License Tax	$000s	(4,069)	(265)	(378)	(403)	(327)	(457)	(470)	(472)	(300)	(119)	(195)	(191)	(277)	(113)	(31)	(31)	-	(39)	-
Income Tax Payable	$000s	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Net Income	**$000s**	**695,955**	**40,541**	**71,997**	**73,439**	**62,126**	**79,172**	**80,901**	**80,128**	**56,778**	**9,415**	**35,986**	**35,255**	**52,380**	**19,680**	**(2,202)**	**2,114**	**(9,064)**	**7,310**	-
Non-Cash Add Back - Depreciation	$000s	494,032	22,440	26,224	28,487	29,855	30,897	31,083	30,570	30,891	28,104	38,271	37,915	43,096	37,560	26,816	24,441	16,491	10,892	-
Working Capital	$000s	-	1,500	2,762	1,687	(243)	(144)	(1,397)	564	1,799	786	(1,175)	(1,016)	523	(291)	(1,267)	(3)	1,853	(1,560)	(4,377)
Operating Cash Flow	**$000s**	**1,189,986**	**64,481**	**100,983**	**103,612**	**91,738**	**109,925**	**110,587**	**111,262**	**89,469**	**38,304**	**73,082**	**72,154**	**95,999**	**56,949**	**23,346**	**26,552**	**9,280**	**16,641**	**(4,377)**
Capital Spend	$000s	(372,000)	(51,000)	(40,000)	(49,000)	(36,000)	(26,000)	(23,000)	(23,000)	(23,000)	(33,000)	(17,000)	(15,000)	(15,000)	(11,000)	(5,000)	(5,000)	-	-	-
Closure/Reclamation Costs	$000s	(38,714)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	(38,714)
Total Capital	**$000s**	**(410,714)**	**(51,000)**	**(40,000)**	**(49,000)**	**(36,000)**	**(26,000)**	**(23,000)**	**(23,000)**	**(23,000)**	**(33,000)**	**(17,000)**	**(15,000)**	**(15,000)**	**(11,000)**	**(5,000)**	**(5,000)**	-	-	**(38,714)**
Cash Flow Adj./Reimbursements	**$000s**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LoM Metrics																				
Economic Metrics																				
Discount Factors	BOP	5%	0.9524	0.9070	0.8638	0.8227	0.7835	0.7462	0.7107	0.6768	0.6446	0.6139	0.5847	0.5568	0.5303	0.5051	0.4810	0.4581	0.4363	0.4155
a) Pre-Tax																				
Free Cash Flow	**$000s**	**783,341**	13,746	61,361	55,016	56,065	84,382	88,057	88,734	66,768	5,424	56,277	57,345	81,276	46,061	18,378	21,583	9,280	16,680	(43,091)
Cumulative Free Cash Flow	$000s		13,746	75,107	130,123	186,188	270,570	358,627	447,361	514,129	519,553	575,830	633,175	714,451	760,512	778,889	800,472	809,752	826,432	783,341
NPV @ 5%	**$000s**	**557,021**	13,091	55,656	47,524	46,125	66,116	65,710	63,061	45,191	3,496	34,549	33,528	45,257	24,427	9,282	10,382	4,251	7,278	(17,905)
Cumulative NPV	$000s		13,091	68,748	116,272	162,397	228,513	294,223	357,284	402,475	405,972	440,521	474,049	519,306	543,734	553,016	563,397	567,649	574,926	557,021
b) After-Tax																				
Free Cash Flow	**$000s**	**779,272**	13,481	60,983	54,612	55,738	83,925	87,587	88,262	66,469	5,304	56,082	57,154	80,999	45,949	18,346	21,552	9,280	16,641	(43,091)
Cumulative Free Cash Flow	$000s		13,481	74,464	129,076	184,814	268,739	356,326	444,588	511,057	516,361	572,444	629,597	710,596	756,544	774,891	796,442	805,722	822,364	779,272
NPV @ 5%	**$000s**	**553,991**	12,839	55,313	47,176	45,856	65,757	65,359	62,726	44,988	3,419	34,430	33,417	45,103	24,368	9,266	10,367	4,251	7,261	(17,905)
Cumulative NPV	$000s		12,839	68,152	115,328	161,184	226,942	292,300	355,027	400,015	403,435	437,864	471,281	516,384	540,751	550,017	560,384	564,635	571,896	553,991
Operating Metrics																				
Mine Life	Years	**17**																		
Average Daily Processing Rate	t/d ore milled	**892**	946	1,135	1,118	1,104	1,080	987	1,092	1,142	803	977	1,025	1,185	957	582	499	334	191	-
Mining Cost	$ / t ore milled	$76.11	86.11	78.32	74.27	73.57	76.40	83.59	67.05	64.10	91.23	74.94	71.44	61.78	76.51	94.40	82.52	123.23	21.59	-
Processing Cost	$ / t ore milled	$21.54	25.44	21.88	20.42	19.63	21.12	23.11	19.21	18.37	26.14	21.48	20.47	17.70	21.93	27.05	23.65	35.31	6.19	-
Maintenance Cost	$ / t ore milled	$49.46	59.67	50.39	49.35	45.76	48.10	52.63	43.72	41.80	59.49	48.87	46.59	40.29	49.89	61.56	53.81	80.36	14.08	-
G&A Cost	$ / t ore milled	$33.48	39.22	31.94	29.56	28.06	29.97	32.79	29.63	28.33	40.32	33.12	31.58	27.31	33.82	41.72	36.47	54.46	95.41	-
Profit Share	$ / t ore milled	$7.22	8.42	7.30	6.94	6.68	7.02	7.68	6.38	6.10	8.69	7.14	6.80	5.88	7.29	8.99	7.86	11.73	5.49	-
Total Site Operating Costs	**$ / t ore milled**	**$187.81**	218.86	189.84	180.54	173.69	182.61	199.80	166.00	158.70	225.88	185.55	176.88	152.96	189.44	233.72	204.30	305.09	142.76	-

19.3 Sensitivity Analysis

The Project's after-tax cumulative cash flow discounted at 5% from the model presented above were analyzed for sensitivity to variations in revenue, operating, and capital cost assumptions.

Positive and negative variations were applied independently to each of the following parameters:

- Metal grades
- Metal recoveries
- Metal prices
- Operating costs
- Capital costs

Table 19-3 shows the sensitivity cases analyzed, which are shown in the chart in Figure 19-1. Because of the Project's 30-year operating history, values for capital and operating costs, metal recoveries, and metal grades are well understood. Therefore, these parameters were flexed over a smaller range compared to metal prices, which are more volatile and were evaluated over a wider range of sensitivity.

Table 19-3: Sensitivity Analysis Summary
Hecla Mining Company – Lucky Friday Mine

Variance From Base Case	Head Grade (oz/ton Ag)	NPV at 5% (US$ M)
0.90	12.3	398
0.95	13.0	476
1.00	**13.7**	**554**
1.05	14.4	630
1.10	15.1	701
Variance From Base Case	**Recovery (% Ag)**	**NPV at 5% (US$ M)**
0.90	86.8	398
0.95	91.6	476
1.00	**96.4**	**554**
1.05	101.2	630
1.10	106.0	701
Variance From Base Case	**Metal Prices (US$/oz Ag)**	**NPV at 5% (US$ M)**
0.80	16.80	201
0.90	18.90	378
1.00	**21.00**	**554**
1.10	23.10	721
1.20	25.20	893
Variance From Base Case	**Operating Costs (US$/t milled)**	**NPV at 5% (US$ M)**
0.90	169.03	625
0.95	178.42	590
1.00	**187.81**	**554**
1.08	201.90	500
1.15	215.98	447
Variance From Base Case	**Capital Costs (US$ M)**	**NPV at 5% (US$ M)**
0.90	370	584
0.95	390	569
1.00	**411**	**554**
1.08	442	532
1.15	472	509

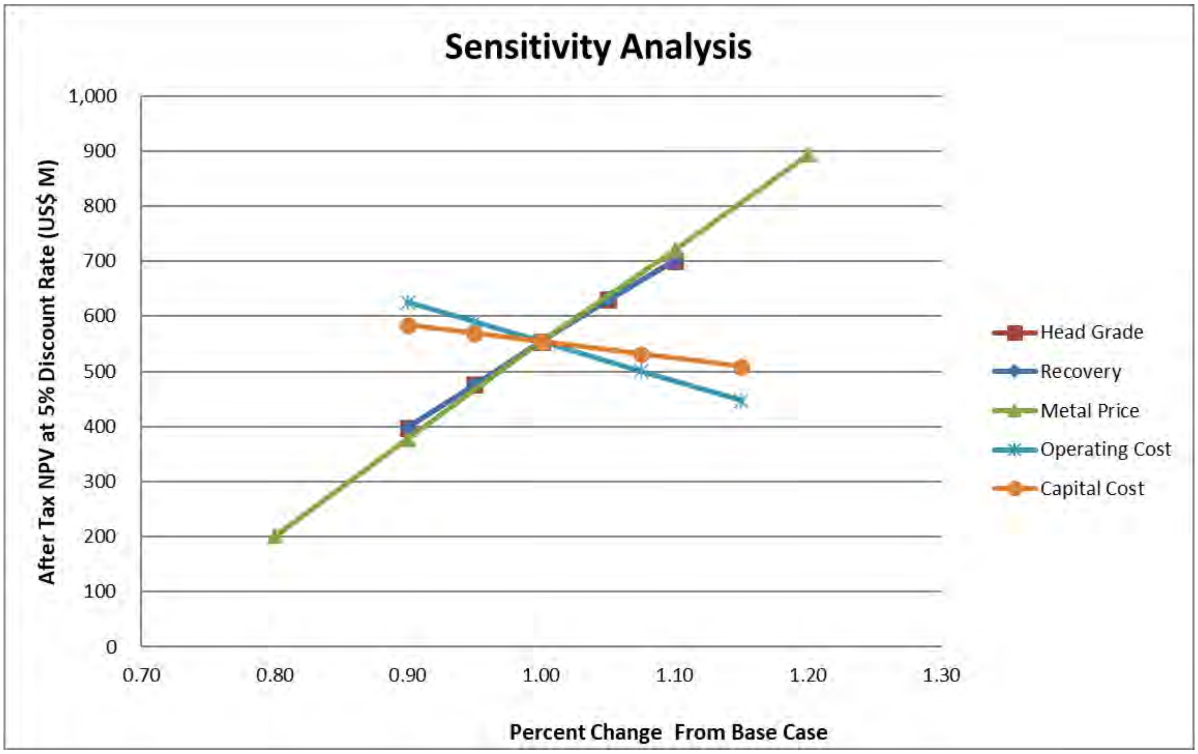


Figure 19-1: After-tax NPV at 5% Sensitivity Analysis

The results of the sensitivity analysis demonstrate that the Mineral Reserve estimates are most sensitive to variations in metal prices, less sensitive to changes in metal grades and recoveries, and least sensitive to fluctuations in operating and capital costs.

20.0 ADJACENT PROPERTIES

There are several lead-zinc-silver mines in the Silver Valley mining district in Idaho. The Mineral Resource and Mineral Reserves stated in this TRS are contained entirely within Hecla's mineral leases, and information from any other operations was not used in this TRS.

21.0 OTHER RELEVANT DATA AND INFORMATION

No additional information or explanation is necessary to make this TRS understandable and not misleading.

22.0 INTERPRETATION AND CONCLUSIONS

SLR offers the following conclusions by area.

22.1 Geology and Mineral Resources

- As prepared by Hecla and reviewed and accepted by SLR, the Lucky Friday Measured and Indicated Mineral Resources are estimated to total approximately 10.50 Mst at an average grade of approximately 7.6 oz/ton Ag, 4.9% Pb, and 2.5% Zn. Inferred Mineral Resources are estimated at approximately 5.38 Mst at an average grade of approximately 7.8 oz/ton Ag, 5.8% Pb, and 2.4% Zn. All Mineral Resources are effective as of December 31, 2021 and are stated exclusive of Mineral Reserves.
- The drilling, core handling, logging, and sampling at Lucky Friday is being conducted according to common industry practice, in a manner appropriate for the deposit type and mineralization style.
- The chip sampling practices at the site are reasonable, appropriate for the mineralization style, and consistent with common industry practice.
- Bulk density estimates are conducted in a reasonable fashion, using an appropriate method.
- Samples are handled and transported securely and only in the custody of Hecla employees or bonded carriers.
- The assay QA/QC protocols in place at Lucky Friday are rigorous, and the results to date are satisfactory.
- The sampling is done such that the samples are representative of the mineralized bodies. There are no concerns apparent with the assay results and they are suitable for use in a Mineral Resource estimate.
- The databases are managed in a secure environment, using conventional off-the-shelf software packages that are up-to-date and appropriate for the tasks to which they are applied. The staff are competent, well-trained, and experienced and they have been provided with clear and reasonable protocols to follow.
- The database on which resource estimation is based is properly configured and maintained and is appropriate for use in estimation of Mineral Resources and Mineral Reserves.
- The wireframe models for the veins are reasonable and representative of the host structures. Minor inconsistencies exist but are not considered to be a serious concern, and will be resolved with additional work.
- The sample grade distributions for silver, lead, and zinc are observed to be positively skewed which could result in biases in the block interpolations unless corrective measures are taken. Capping is currently being employed at Lucky Friday and this is viewed as appropriate.
- There is evidence of sub-populations within the grade distributions for several veins. Additional work may be warranted to identify and isolate these sub-populations if possible.
- Compositing of the samples is carried out in a reasonable fashion.
- The block model is configured appropriately and constructed with off-the-shelf software that is commonly used in the industry.
- The grade interpolations were conducted in a reasonable manner consistent with common practice using an appropriate estimation algorithm commonly used within the industry.

- The Mineral Resources are classified according to the CRIRSCO definitions and, as such, are consistent with the requirements of S-K 1300.
- The method used to apply the classification is broadly consistent with common industry practice, although the resulting categorizations appear somewhat aggressive for Measured.
- The NSR cut-off value is a reasonable approach which has been applied in an appropriate manner.
- The validation methods used at Lucky Friday are appropriate, although they represent a fairly minimum standard of review.
- The stope optimization and reporting procedures are generally reasonable.
- The Mineral Resource estimate for Lucky Friday has been carried out in a reasonable fashion, consistent with conventional, although somewhat dated, industry practice.

22.2 Mining and Mineral Reserves

- Mineral Reserve estimates, as prepared by Hecla and reviewed and accepted by SLR, have been classified in accordance with the definitions for Mineral Reserves in S-K 1300. Mineral Reserves as of December 31, 2021 total 5.46 Mst grading 13.7 oz/ton Ag, 8.3% Pb, and 3.3% Zn and containing 74.7 Moz of silver, 452,000 tons of lead and 181,000 tons of zinc at an NSR cut-off value of US$208/ton.
- Measured and Indicated Mineral Resources were converted to Proven and Probable Mineral Reserves, respectively, through the application of modifying factors. Inferred Mineral Resources were not converted to Mineral Reserves.
- The Mineral Reserves are all located within the Gold Hunter deposit in seven separate veins. The 30 Vein is the most significant with 68% of the Mineral Reserve tonnage and 70% of the contained silver.
- Mineral Reserves are estimated by qualified professionals using modern mine planning software in a manner consistent with industry practice.
- Lucky Friday is an old, well established mine with many years of operating experience, providing the necessary expertise to safely and economically extract the Mineral Reserves.
- Mining at Lucky Friday utilizes mechanized underhand cut and fill, and UCB with cemented paste backfill. In this method, the mining progresses downwards in a stope, occurring beneath the cemented paste backfill of the preceding lift. The mining methods used are appropriate to the deposit style, depth and geotechnical conditions and employ a range of modern mining equipment;
- The mine developed the UCB method for bulk mining of the 30 Vein. This method is designed to improve safety through the management of seismic events and to increase productivity. The UCB method is a bulk mining method which utilizes 27 ft deep blastholes with ore mucked in 11.5 ft benches.
- The current Mineral Reserve estimate is based on the use of UCB mining for the majority of the deposit and represents a change from previous mining methods and Mineral Reserve estimates.
- Over the past nine years, the mine production silver grade has been less than the Mineral Reserve grade estimate, indicating a poor correlation with production data.

- Stopes in the mine are relatively narrow with an eleven foot minimum mining width in the 30 Vein above the 7500 level, nine foot minimum width below the 7500 level, and eight foot minimum width in the Intermediate Veins.
- Stopes are diluted to the greater of the ore width or the minimum mining width. This dilution is assigned background metal grades based upon the block model estimates. Subsequently, the stopes are diluted by a further 15% for UCB stopes and 5% for cut and fill stopes with zero grade unplanned dilution.
- SLR is of the opinion that the 15% dilution estimate in the UCB mining is a potentially optimistic estimate considering the short time that the method has been in use, the impact of vein deviation over the 27 ft cut depth, the use of infill drill information as opposed to face by face mapping, changes in the vein along strike and dip, and potential overbreak from blasting.
- The 30 Vein Mineral Reserve includes internal low grade and waste blocks that do not meet the cut-off grade criteria but are included as the material must be mined considering the stope geometry and seismicity.
- The planned use of UCB mining at a nine foot minimum width (30 Vein at depth) is not based upon detailed layouts and represents potential risks related to production capacity and dilution estimates at depth.
- Extraction for all mining methods is assumed to be 100%.
- SLR verified that Hecla's selected metal prices for estimating Mineral Reserves are consistent with independent forecasts from banks and other lenders.
- The mine uses proven, modern trackless mobile equipment with LHD units up to 3.5 yd^3 capacity.
- The LOM plan has been appropriately developed to maximize mining efficiencies, based on the current knowledge of geotechnical, hydrological, mining, and processing information on the Lucky Friday Mine.
- The equipment and infrastructure requirements for LOM operations are well understood.
- The LOM extends 17 years to 2038, with mine production projected to increase to an annual rate of approximately 425,000 tons. The increased production is based upon projected productivity improvements in mining, increased daily development advance, and higher utilization of the existing mine infrastructure, however, improvements may be difficult to achieve considering the extent of the mine, stope widths, and mining depths.
- Meeting growth requirements of the LOM plan (production and development) is typically a challenge for wide spread narrow vein mines. SLR is of the opinion that meeting the LOM plan will require ongoing effort to optimize the UCB mining method and attain planned increases in productivity.

22.3 Mineral Processing

- The Lucky Friday mill is a conventional silver and zinc flotation concentrator that has been in operation since 1942 and owned and operated by Hecla since 1958. Concentrates are shipped by highway trucks to the Teck smelter at Trail, British Columbia, Canada. The mill has a compact and efficient design that has been upgraded over the years including the addition of flash flotation in the grinding circuit, column flotation for concentrate cleaning, and on-stream analyzers for process control.

- The concentrator performed very consistently from 2016 through 2021 with steady lead, zinc, and silver head grades, silver and zinc concentrate grades, and recoveries. The mill operated in the 38 stph to 44 stph range with a reported mill availability of 93%. Low production from 2017 through 2019 was due to labor issues.
- The mine plan includes a 20% increase in mill production from the current 340,000 stpa, or 930 stpd, to 425,000 stpa, or 1,164 stpd, each at 92% availability. Work is being done to debottleneck the Plant including slurry pumping capacity to achieve the new targets.
- The target concentrate grade for lead is 60% for the best recovery, though the grade can be increased to 63% to 64% without significant loss of recovery.
- The focus of metallurgical testing is on plant performance including quality improvements and the potential to increase production. A significant metallurgical test program was performed to characterize the Gold Hunter deposit in 2008, including mineralogy, comminution testing, and flotation testing. The ore is very consistent, which benefits plant performance.
- In July 2011, an audit of the Lucky Friday process including detailed circuit sampling was performed to support studies to increase plant production. During the survey, the lead flash cell recovered 60% to 70% of the lead and silver in the plant feed, reducing the load on the lead cleaning circuit. The total silver, lead, and zinc recoveries to silver concentrate were 91.7%, 90%, and 12%, respectively, to a concentrate containing 60% Pb, 130 oz/ton Ag, and 3.5% Zn. Zinc recovery to the zinc concentrate was 81.3% to a concentrate grading 48.6% Zn. Lead recovery to the zinc concentrate was 2.3% and the silver recovery to the zinc concentrate was 3.9%.

22.4 Infrastructure

- Lucky Friday has all of the infrastructure necessary for the ongoing operations and has plans for refurbishment or repair as necessary within the mine plan.

22.5 Environment

- Lucky Friday maintains a comprehensive environmental management and compliance program. All permits needed for current Lucky Friday operations are in place, and staff at the Property continually monitors permit/regulated conditions and files required reports with the applicable regulatory agencies at the federal, state, and local level.
- Hecla's EMS follows a 13-element plan-do-check-act approach that ensures continuous improvement around issues including obligation registers, management of change, air quality, water and waste management, energy management, training, and reporting. This system promotes a culture of environmental awareness and innovation throughout the company. The EMS program is benchmarked against ISO-14001 and complements Canada's TSM program. On a related matter, there appears to be good cross-discipline support for the overall environmental program.
- In previous resource/reserve reporting documents, Lucky Friday reported experiencing a number of alleged permit exceedances for water discharges NPDES and MSGP at the Property. Lucky Friday received an EPA Notice of Violation for non-compliance with the NPDES Permit and various discharges exceeding the maximum daily standard for lead (50 µg/L). In all instances, Lucky Friday has worked cooperatively with EPA to resolve these issues.
- Lucky Friday has developed reclamation/closure plan and the most recent cost estimate (2021) to perform this work is US$39.9 million. Reclamation and closure plans have been submitted to the

appropriate agencies. ARO legal obligations are updated regularly and based upon existing site conditions, current laws, regulations and costs to perform the permitted activities. The ARO is to be conducted in accordance with FASB ASC 410.

- Lucky Friday reports that community relationships are excellent, and the company maintains an office in the city of Wallace to maintain a community presence.

23.0 RECOMMENDATIONS

SLR offers the following recommendations by area.

23.1 Geology and Mineral Resources

1. Conduct additional review of the sample grade distributions within the veins to see if coherent groupings of sub-populations can be isolated for interpolation purposes.
2. Modify the resource classification procedures to provide an opportunity for manual adjustments, as opposed to a strictly computer-driven approach. This will allow changes to be made to remove unrealistic artifacts in the classification.
3. Consider an additional level of block model validation, such as comparisons to alternative estimation methods.

23.2 Mining and Mineral Reserves

1. Continue the use of UCB mining in the 30 Vein and continue to attempt to improve the UCB method.
2. Conduct close monitoring of the stoping performance including regular surveys as the void is exposed and reconciliation of the stope designs to the Mineral Reserve estimates to confirm and, if necessary, refine the Mineral Reserve estimate
3. Calculate NSR values on a fully diluted basis and use these values to determine cut-off values and Mineral Reserve boundaries.
4. Evaluate the internal portions of Mineral Reserve material that fall below cut-off value within the 30 Vein to confirm that they are economically justifiable to mine and develop further cut-off criteria for must take material.
5. Undertake a more detailed dilution and extraction study, including consideration of the existing reconciliation studies, to better quantify the extraction, dilution, and other modifying factors that Hecla is currently applying to all production designs.
6. Use the results of the above noted studies to determine the actions necessary to align mine production grades with the Mineral Reserve estimates.
7. Review mining plans to define definitive actions to attain the planned improvements in mining productivity and daily development advance.
8. Further develop the plans for UCB mining at the planned nine foot minimum mining width.

23.3 Mineral Processing

1. Continue metallurgical testing to support the plan for increased production.
2. The ability to perform on-site metallurgical testing is limited due to the capabilities of the current laboratory. An upgrade to the laboratory is recommended and has been budgeted for 2024.

23.4 Infrastructure

1. Continue the upgrades, repairs, and rehabilitation to existing infrastructure to support the LOM plan.

23.5 Environment

1. Track and participate in the development of new environmental and mine permitting regulations that could impact operations.
2. Continue to perform internal and external audits of environmental compliance.
3. Even though opportunity is limited, investigate opportunities for concurrent reclamation to minimize financial obligation(s) at closure.
4. Continue to update reclamation and closure cost estimates on a regular basis.

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25.0 RELIANCE ON INFORMATION PROVIDED BY THE REGISTRANT

This TRS has been prepared by SLR for Hecla. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to SLR at the time of preparation of this TRS,
- Assumptions, conditions, and qualifications as set forth in this TRS, and
- Data, reports, and other information supplied by Hecla and other third party sources.

For the purpose of this TRS, SLR has relied on ownership information provided by Hecla and verified by the Senior Property and Contract Coordinator. SLR has not researched property title or mineral rights for Hecla as we consider it reasonable to rely on Hecla's Land Administration personnel who are responsible for maintaining this information..

SLR has relied on Hecla for guidance on applicable taxes, royalties, and other government levies or interests, applicable to revenue or income from the Lucky Friday in the Executive Summary and Section 19.0. As Lucky Friday has been in operation for over ten years, Hecla has considerable experience in this area.

The Qualified Persons have taken all appropriate steps, in their professional opinion, to ensure that the above information from Hecla is sound.

Except for the purposes legislated under provincial securities laws, any use of this TRS by any third party is at that party's sole risk.

26.0 DATE AND SIGNATURE PAGE

This report titled "Technical Report Summary on the Lucky Friday Mine, Idaho, USA" with an effective date of December 31, 2021 was prepared and signed by:

Signed *SLR International Corporation*

Dated at Bothell, WA
February 21, 2022

SLR International Corporation

27.0 APPENDIX 1

27.1 Sample Statistics

Table A1:Sample Statistics - Silver (oz/ton)
Hecla Mining Company – Lucky Friday Mine

Zone	Count	Min	Mx	Mean	Median	Stdev	Variance	CV
5	1,033	0.00	477.40	12.37	2.90	28.23	797.08	2.28
20	3,928	0.00	350.10	12.03	5.40	21.77	473.76	1.81
30	62,212	0.00	434.00	19.28	8.20	24.93	621.65	1.29
40	6,666	0.00	127.70	7.44	3.60	10.26	105.20	1.38
41	4,064	0.00	202.10	7.52	3.30	11.48	131.73	1.53
50	2,733	0.00	100.30	6.69	2.90	10.71	114.79	1.60
60	3,443	0.00	229.70	15.06	4.94	21.72	471.72	1.44
70	3,161	0.00	270.10	14.50	3.60	25.47	648.81	1.76
80	7,925	0.00	233.00	13.53	5.60	18.76	351.86	1.39
90	3,815	0.00	330.00	12.50	4.60	19.98	399.02	1.60
100	1,595	0.00	291.70	12.34	3.30	28.00	784.20	2.27
110	3,280	0.00	1,105.10	21.35	6.90	47.01	2,209.57	2.20
120	599	0.00	225.00	7.25	2.20	21.87	478.38	3.02
130	388	0.00	217.00	10.44	3.00	20.39	415.83	1.95
140	173	0.00	129.40	5.32	1.80	13.34	178.02	2.51
150	114	0.00	90.80	5.13	2.30	10.31	106.32	2.01

Table A2:Sample Statistics - Iron (%)
Hecla Mining Company – Lucky Friday Mine

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
5	1,033	0.10	43.70	11.78	10.00	7.52	56.54	0.64
20	3,928	0.00	47.40	18.85	18.90	8.44	71.17	0.45
30	62,212	0.00	53.50	19.81	19.50	8.14	66.28	0.41
40	6,666	0.20	59.50	25.35	26.20	7.75	60.12	0.31
41	4,064	0.10	49.00	23.52	25.10	9.06	82.02	0.39
50	2,733	0.50	45.50	20.88	20.91	10.31	106.30	0.49
60	3,443	0.10	42.10	14.19	13.70	7.19	51.67	0.51
70	3,161	0.00	47.90	11.97	11.50	5.89	34.65	0.49
80	7,925	0.00	38.20	11.31	10.80	5.35	28.58	0.47
90	3,815	0.10	37.00	12.37	11.90	5.85	34.26	0.47

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
100	1,595	0.50	39.30	13.82	13.90	6.16	37.95	0.45
110	3,280	0.50	38.90	15.92	15.50	6.93	47.96	0.43
120	599	0.40	40.40	12.97	13.40	6.10	37.26	0.47
130	388	0.50	33.20	12.12	11.70	6.24	38.97	0.51
140	173	0.30	27.60	9.66	8.20	5.77	33.31	0.60
150	114	0.90	26.30	9.17	8.32	5.84	34.07	0.64

Table A3:Sample Statistics - Lead (%)
Hecla Mining Company – Lucky Friday Mine

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
5	1,033	0.00	54.60	3.00	0.80	5.87	34.50	1.96
20	3,928	0.00	78.40	5.96	3.50	7.15	51.19	1.20
30	62,212	0.00	78.20	11.67	6.10	12.81	164.01	1.10
40	6,666	0.00	79.50	5.68	3.00	7.00	49.04	1.23
41	4,064	0.00	56.10	6.04	2.90	7.83	61.29	1.30
50	2,733	0.00	68.30	4.82	2.40	6.46	41.71	1.34
60	3,443	0.00	67.20	7.16	3.90	8.11	65.81	1.13
70	3,161	0.00	68.70	6.64	3.60	8.11	65.70	1.22
80	7,925	0.00	82.60	10.49	5.50	12.47	155.51	1.19
90	3,815	0.00	79.20	9.57	4.50	12.31	151.50	1.29
100	1,595	0.00	58.80	3.43	1.40	5.60	31.39	1.63
110	3,280	0.00	73.20	2.85	1.10	4.69	22.01	1.64
120	599	0.00	49.10	3.10	0.70	5.61	31.46	1.81
130	388	0.00	52.00	5.63	1.80	8.98	80.69	1.60
140	173	0.00	71.00	2.81	0.70	4.95	24.55	1.76
150	114	0.00	43.80	4.03	1.90	6.41	41.11	1.59

Table A4:Sample Statistics - Zinc (%)
Hecla Mining Company – Lucky Friday Mine

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
5	1,033	0.00	39.60	0.87	0.10	2.50	6.23	2.87
20	3,928	0.00	40.90	4.01	2.00	4.98	24.84	1.24
30	62,212	0.00	49.80	3.22	1.50	4.12	17.01	1.28
40	6,666	0.00	43.20	5.68	4.40	5.07	25.70	0.89

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
41	4,064	0.00	34.30	5.33	3.80	5.19	26.90	0.97
50	2,733	0.00	61.50	3.72	1.60	5.20	27.01	1.40
60	3,443	0.00	40.60	5.70	2.30	6.80	46.18	1.19
70	3,161	0.00	43.10	3.77	0.60	6.02	36.21	1.59
80	7,925	0.00	42.70	2.25	0.30	4.47	19.94	1.99
90	3,815	0.00	39.40	1.86	0.20	4.34	18.81	2.33
100	1,595	0.00	29.90	1.63	0.20	3.78	14.28	2.32
110	3,280	0.00	33.60	2.38	0.30	4.36	19.05	1.84
120	599	0.00	30.00	1.56	0.10	3.53	12.45	2.26
130	388	0.00	34.80	2.25	0.10	5.32	28.27	2.37
140	173	0.00	33.70	2.30	0.10	5.23	27.32	2.27
150	114	0.00	31.10	1.44	0.10	5.14	26.38	3.56

27.2 Composite Statistics

Table A5: Composite Statistics - Silver (oz/ton)
Hecla Mining Company – Lucky Friday Mine

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
5	723	0.00	72.00	11.08	4.10	15.35	235.56	1.39
20	2,715	0.00	54.80	11.32	7.10	11.32	128.11	1.00
30	46,382	0.00	81.50	20.74	14.28	18.30	334.91	0.88
40	5,296	0.00	30.90	7.20	4.50	6.82	46.49	0.95
41	2,895	0.00	31.40	7.09	4.58	6.77	45.81	0.95
50	1,754	0.00	32.70	6.46	3.78	6.72	45.15	1.04
60	2,144	0.00	62.35	15.58	8.21	15.65	245.01	1.00
70	1,930	0.00	83.20	15.07	5.64	19.12	365.44	1.27
80	4,905	0.00	58.50	14.41	9.95	12.84	164.93	0.89
90	2,185	0.00	55.30	12.97	7.50	12.60	158.73	0.97
100	1,011	0.00	69.90	10.45	4.42	15.03	225.98	1.44
110	1,972	0.00	125.05	19.12	9.96	22.66	513.54	1.19
120	359	0.00	44.05	5.72	2.97	7.61	57.97	1.33
130	220	0.00	51.00	9.68	4.57	11.41	130.12	1.18
140	105	0.00	39.70	4.65	2.36	6.80	46.30	1.46
150	75	0.20	28.25	4.75	2.90	5.49	30.12	1.16

Table A6: Composite Statistics - Iron (%)
Hecla Mining Company – Lucky Friday Mine

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
5	723	0.30	40.57	12.33	10.20	7.12	50.73	0.58
20	2,715	0.50	42.30	19.48	19.10	7.52	56.48	0.39
30	46,382	0.00	47.00	20.06	19.85	7.08	50.12	0.35
40	5,296	0.49	51.15	25.69	25.93	6.75	45.51	0.26
41	2,895	0.10	45.90	24.07	24.51	7.68	58.98	0.32
50	1,754	0.60	42.53	21.90	20.80	9.54	91.06	0.44
60	2,144	0.40	38.50	14.47	14.14	5.89	34.71	0.41
70	1,930	0.20	39.60	12.24	11.82	5.19	26.91	0.42
80	4,905	0.70	35.00	11.45	11.11	4.46	19.92	0.39
90	2,185	0.80	37.00	12.54	12.20	4.85	23.49	0.39
100	1,011	0.60	36.90	14.16	14.19	5.43	29.50	0.38
110	1,972	1.00	35.83	16.34	15.93	5.67	32.18	0.35
120	359	0.50	32.40	13.33	13.56	5.08	25.78	0.38
130	220	0.80	29.80	12.45	12.24	5.12	26.20	0.41
140	105	0.30	25.10	9.92	9.57	4.97	24.71	0.50
150	75	0.90	26.30	9.40	8.80	5.21	27.12	0.55

Table A7: Composite Statistics - Lead (%)
Hecla Mining Company – Lucky Friday Mine

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
5	723	0.00	21.00	3.06	1.53	4.13	17.05	1.35
20	2,715	0.00	23.85	6.23	4.53	5.33	28.44	0.86
30	46,382	0.00	41.80	12.76	9.80	9.79	95.89	0.77
40	5,296	0.00	22.90	5.66	3.71	5.09	25.87	0.90
41	2,895	0.00	25.50	6.00	3.86	5.55	30.82	0.92
50	1,754	0.00	21.40	4.83	3.14	4.52	20.43	0.94
60	2,144	0.00	25.30	7.56	5.53	6.01	36.14	0.80
70	1,930	0.00	27.50	7.06	4.69	6.19	38.33	0.88
80	4,905	0.00	41.95	11.55	8.23	9.46	89.40	0.82
90	2,185	0.00	40.40	10.51	6.74	9.42	88.69	0.90
100	1,011	0.00	19.80	3.51	2.19	4.06	16.46	1.16

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
110	1,972	0.00	14.10	2.82	1.78	2.98	8.89	1.06
120	359	0.00	19.00	3.20	1.60	3.98	15.85	1.24
130	220	0.00	23.60	5.94	2.62	6.74	45.42	1.13
140	105	0.00	12.40	2.90	1.67	3.30	10.90	1.14
150	75	0.04	18.34	4.09	2.40	4.74	22.43	1.16

Table A8: Composite Statistics - Zinc (%)
Hecla Mining Company – Lucky Friday Mine

Zone	Count	Min	Max	Mean	Median	Stdev	Variance	CV
5	723	0.00	9.20	0.84	0.16	1.58	2.51	1.88
20	2,715	0.00	14.95	4.24	2.60	4.16	17.29	0.98
30	46,382	0.00	32.88	3.38	1.95	3.65	13.33	1.08
40	5,296	0.00	16.80	5.70	4.74	4.05	16.44	0.71
41	2,895	0.00	16.80	5.33	4.31	4.08	16.66	0.77
50	1,754	0.00	15.50	3.76	2.31	3.82	14.56	1.01
60	2,144	0.00	20.20	6.07	4.15	5.54	30.72	0.91
70	1,930	0.00	19.45	4.02	1.80	4.89	23.87	1.21
80	4,905	0.00	13.70	2.17	0.81	2.91	8.48	1.34
90	2,185	0.00	12.10	1.71	0.48	2.59	6.73	1.52
100	1,011	0.00	11.90	1.58	0.37	2.50	6.23	1.58
110	1,972	0.00	14.70	2.42	0.99	3.17	10.03	1.31
120	359	0.00	12.05	1.57	0.30	2.45	5.98	1.56
130	220	0.00	14.20	2.03	0.50	3.18	10.08	1.56
140	105	0.00	13.30	2.14	0.16	3.33	11.11	1.56
150	75	0.04	7.00	0.78	0.11	1.46	2.14	1.86

27.3 Semi-Variograms

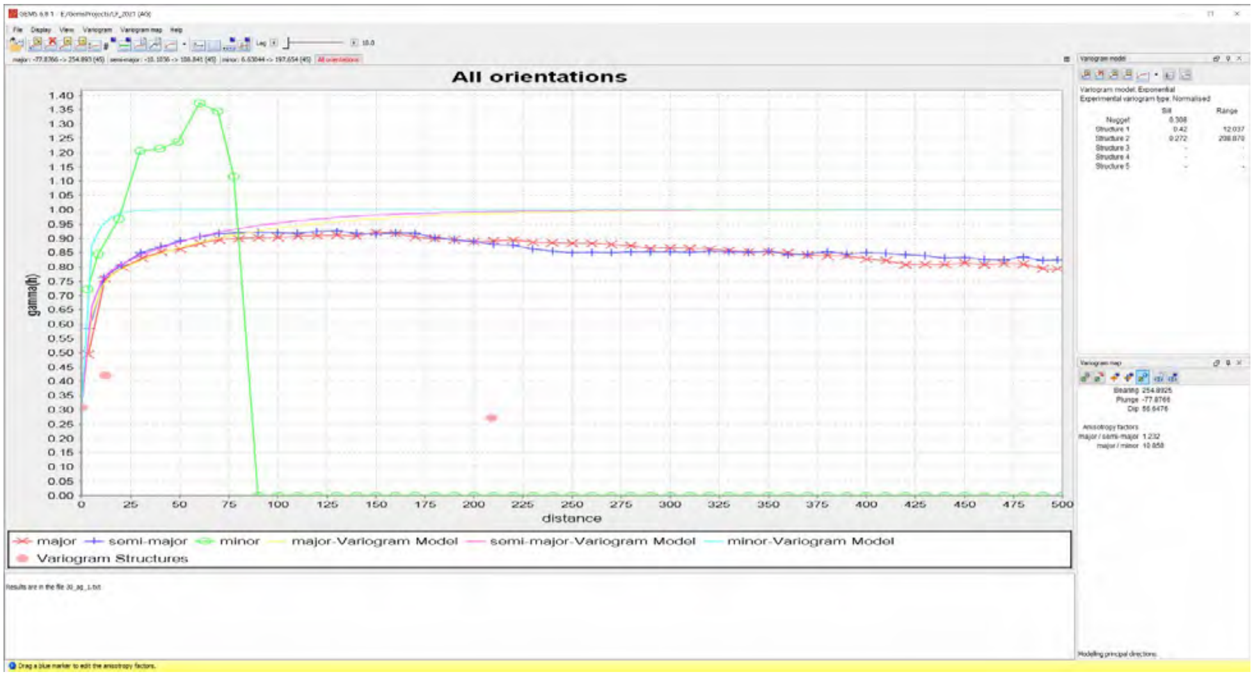

Figure A1: Variogram Model For Silver – 30 Vein

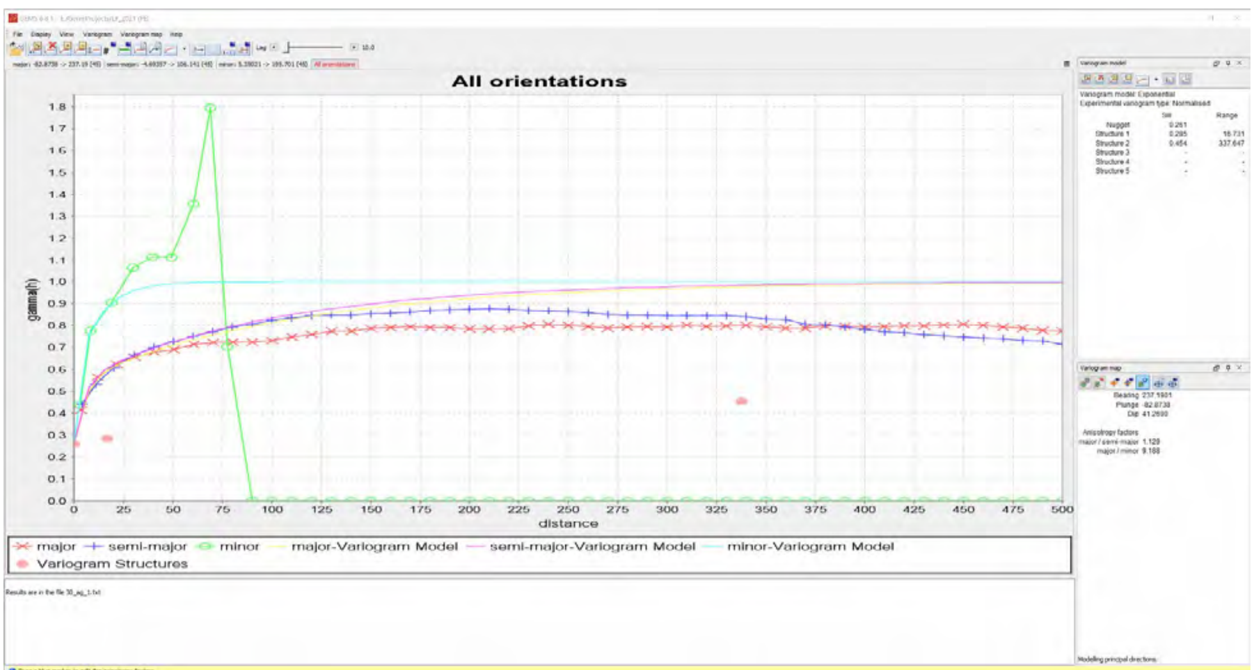

Figure A2: Variogram Model For Iron – 30 Vein

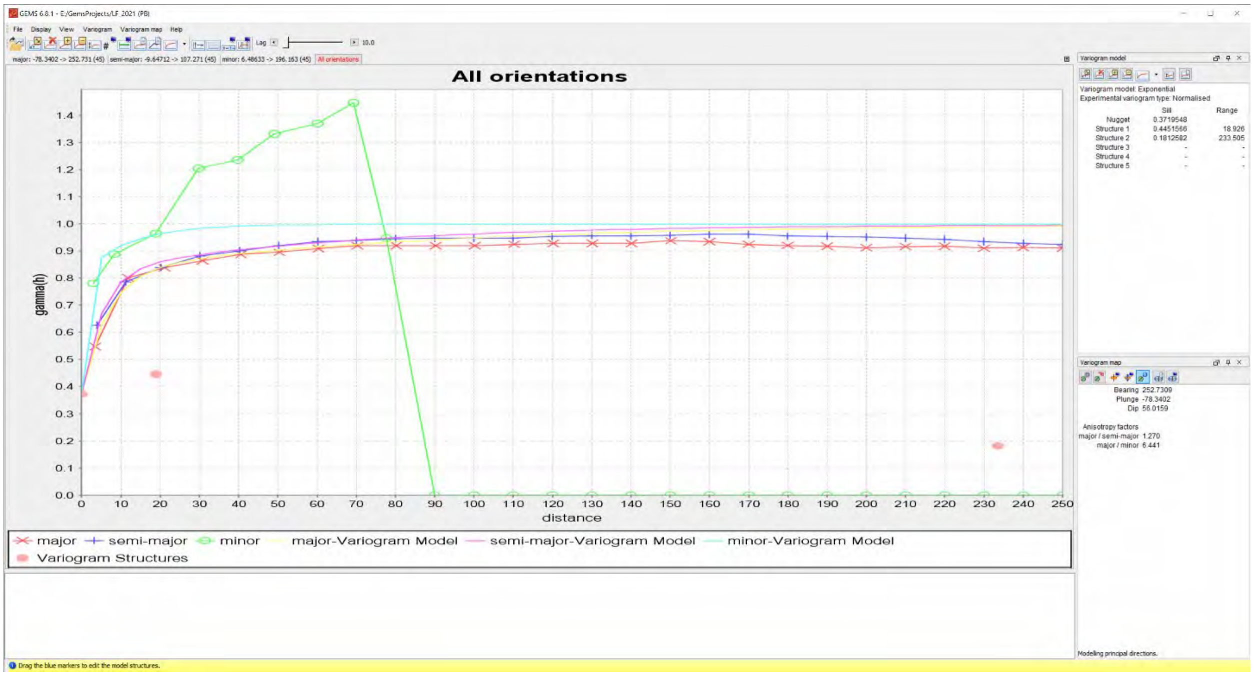

Figure A3: Variogram Model For Lead – 30 Vein

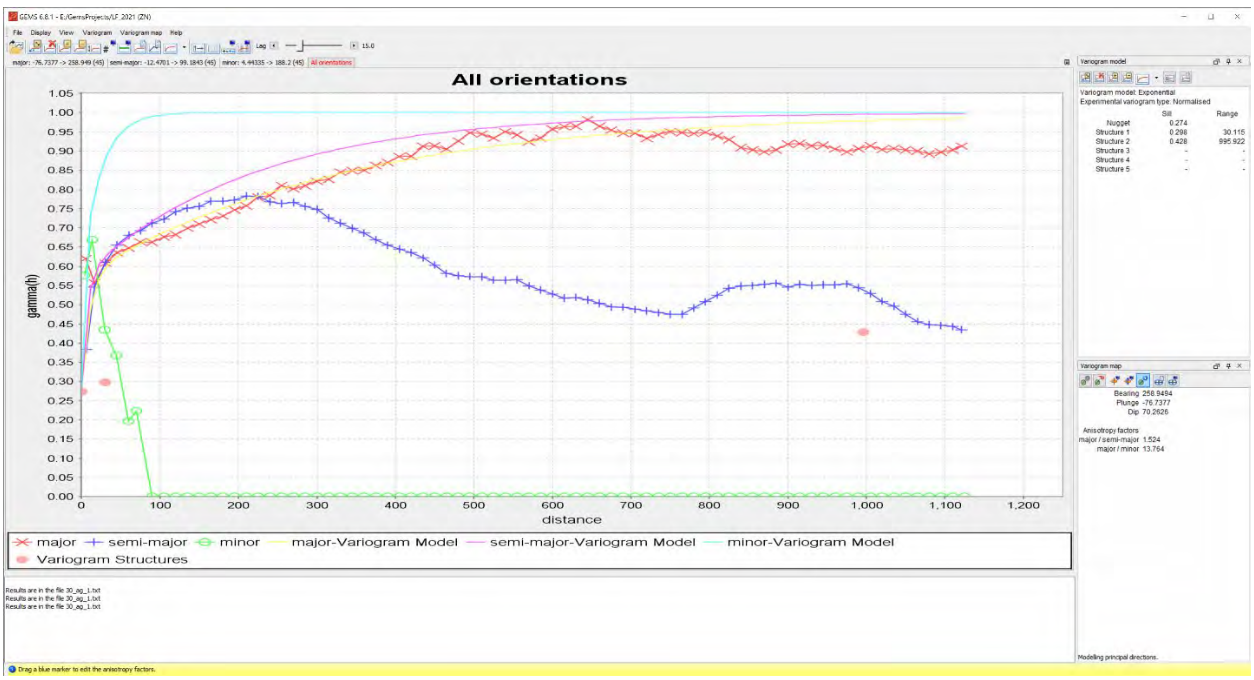

Figure A4: Variogram Model For Zinc – 30 Vein

27.4 List of Claims

Table A9:Unpatented Mineral Claims – Lucky Friday Mine
Hecla Mining Company – Lucky Friday Mine

Claim Name	BLM Serial Number	BLM Legacy Serial Number	Township Range Section Quadrant	Original Location Date	Ownership
Alameda	ID101349088	IMC13875	48N 5E 26 NE	7/2/1921	Hecla Limited
Atlie	ID101433030	IMC11455	48N 5E 27 NE,NW	8/28/1915	Silver Hunter
Aubert Abot	ID101433808	IMC62560	48N 5E 26 SE	5/30/1981	Hecla Limited
Aubert Abot Fraction	ID101481552	IMC62559	48N 5E 26 SE	5/31/1981	Hecla Limited
Aubert Gold Hunter Fraction	ID101432795	IMC62558	48N 5E 26 NW,SW	5/28/1981	Hecla Limited
Black Hawk	ID101482202	IMC13880	48N 5E 26 SE	7/2/1921	Hecla Limited
Black Rock	ID101483505	IMC13878	48N 5E 25 NW	11/2/1919	Hecla Limited
			48N 5E 26 NE		
Commander Fraction	ID101379219	IMC11432	48N 5E 26 NW	5/24/1900	Silver Hunter
Creek	ID101433319	IMC11424	48N 5E 25 SW	10/5/1945	Hecla Limited
Crown Point	ID101482263	IMC11420	48N 5E 25 SW	04/20/1897	50/50 Hecla Limited/Hunter Creek
			48N 5E 26 SE		
Crown Point Fraction	ID101454042	IMC11417	48N 5E 25 SW	6/1/1909	50/50 Hecla Limited/Hunter Creek
			48N 5E 26 SE		
Dewey	ID101433468	IMC11415	48N 5E 26 SW,SE	1/1/1911	50/50 Hecla Limited/Hunter Creek
Eleanor	ID101431582	IMC13876	48N 5E 25 NW	5/30/1957	Hecla Limited
			48N 5E 26 NE		
Elm Orlu	ID101485812	IMC13558	48N 5E 26 SW	11/15/1945	25/75 Hecla Limited/Lucky Friday Extension
Elm Orlu Fraction	ID101370264	IMC13560	48N 5E 26 SW	11/15/1945	Lucky Friday Extension
			48N 5E 27 SE		
Elm Orlu No. 2	ID101482888	IMC13559	48N 5E 26 SW	11/15/1945	Lucky Friday Extension
			48N 5E 27 SE		

Claim Name	BLM Serial Number	BLM Legacy Serial Number	Township Range Section Quadrant	Original Location Date	Ownership
Friday Fraction	ID101432648	IMC11426	48N 5E 25 SW	5/1/1962	Hecla Limited
			48N 5E 26 SE		
			48N 5E 35 NE		
			48N 5E 36 NW		
Gem Dandy	ID101884485	IMC199547	48N 5E 26 NE	9/18/2009	Hecla Limited/Silver Hunter
Gem Dandy Fraction	ID101359015	IMC212723	48N 5E 26 NE,NW,SE,SW	4/18/2013	Hecla Limited/Silver Hunter
Harold	ID101484841	IMC11430	48N 5E 26 NW	4/5/1911	Silver Hunter
			48N 5E 27 NE,SE		
Hippie Fraction	ID101484856	IMC11427	48N 5E 27 NE	9/15/1967	Silver Hunter
Holiday	ID101433299	IMC11431	48N 5E 27 NE,SE	1/1/1915	Silver Hunter
Hunter	ID101481945	IMC11423	48N 5E 25 SW	10/5/1945	Hecla Limited
			48N 5E 26 SE		
Irene	ID101482808	IMC13874	48N 5E 26 NE	8/6/1951	Hecla Limited
Karl Jr. Fraction	ID101750698	IMC214836	48N 5E 27 NW	7/28/2015	Hecla Limited
Leslie Fraction	ID101350317	IMC11425	48N 5E 26 SW,SE	6/9/1968	Hecla Limited
Mexican	ID101481250	IMC11418	48N 5E 25 SW	10/17/1889	50/50 Hecla Limited/Hunter Creek
			48N 5E 26 SE		
Miles	ID101434994	IMC11435	48N 5E 26 NW,SW,SE	1/1/1911	Silver Hunter
Molly No. 1	ID101430729	IMC13551	48N 5E 26 SW	6/6/1945	Lucky Friday Extension
			48N 5E 27 SE		
			48N 5E 34 NE		
			48N 5E 35 NW		
Molly No. 2	ID101482598	IMC13552	48N 5E 26 SW	5/26/1945	Lucky Friday Extension
			48N 5E 35 NW		
Molly No. 3	ID101480722	IMC13553	48N 5E 26 SW	5/25/1945	50/50 Hecla Limited/Lucky Friday Extension
			48N 5E 35 NW		

Claim Name	BLM Serial Number	BLM Legacy Serial Number	Township Range Section Quadrant	Original Location Date	Ownership
Moon	ID101483360	IMC11422	48N 5E 25 SW	7/24/1929	50/50 Hecla Limited/Hunter Creek
Morning Glory	ID101434498	IMC11436	48N 5E 26 SW,SE	8/19/1915	Silver Hunter
North	ID101348892	IMC11414	48N 5E 26 SW,SE	7/22/1929	50/50 Hecla Limited/Hunter Creek
Panama	ID101480936	IMC11456	48N 5E 27 NE,NW	7/19/1915	Silver Hunter
Panama No. 3	ID101434985	IMC11458	48N 5E 27 NE,NW	8/30/1915	Silver Hunter
Panama Fraction	ID101866653	IMC213620	48N 5E 27 NE	12/17/2013	Hecla Limited/Silver Hunter
Park Ave Fraction	ID101373608	IMC13561	48N 5E 26 SW	8/3/1967	25/75 Hecla Limited/Lucky Friday Extension
Pat	ID101431290	IMC11437	48N 5E 26 SE	7/14/1944	Silver Hunter
Pat Fraction	ID101334010	IMC13557	48N 5E 26 SW,SE	9/12/1950	Lucky Friday Extension
Pat No 1	ID101435088	IMC13554	48N 5E 27 SE	6/6/1945	Hecla Limited
Pat No 2	ID101434861	IMC11438	48N 5E 26 SW,SE	7/14/1944	Silver Hunter
Pat No 2	ID101304179	IMC13555	48N 5E 26 SW	6/4/1945	Lucky Friday Extension
Pat No 3	ID101433909	IMC13556	48N 5E 27 SE 48N 5E 26 SW 48N 5E 27 SE	6/6/1945	Lucky Friday Extension
Pinch Hitter	ID101434399	IMC13881	48N 5E 26 SE	4/12/1929	Hecla Limited
Silver Hunter	ID101884484	IMC199546	48N 5E 27 NE	9/18/2009	Silver Hunter
Silver Reef	ID101431093	IMC11421	48N 5E 25 SW	10/17/1889	50/50 Hecla Limited/Hunter Creek
Silver-Lead	ID101484084	IMC13877	48N 5E 26 SE 48N 5E 26 NE	1/1/1920	Hecla Limited
South	ID101481517	IMC11416	48N 5E 26 SW,SE	7/23/1929	50/50 Hecla Limited/Hunter Creek
Springfield	ID101452781	IMC11433	48N 5E 26 NW,SW 48N 5E 27 SE	04/25/1897	Silver Hunter

Claim Name	BLM Serial Number	BLM Legacy Serial Number	Township Range Section Quadrant	Original Location Date	Ownership
Star	ID101348544	IMC11419	48N 5E 26 SE	7/23/1929	50/50 Hecla Limited/Hunter Creek
White Ledge	ID101484653	IMC14790	48N 5E 26 SW,SE	11/5/1945	Hecla Limited
Wonder	ID101481101	IMC11434	48N 5E 26 SW	9/20/1915	Silver Hunter

Table A10: Patented Mineral Claims – Lucky Friday Mine
Hecla Mining Company – Lucky Friday Mine

Claim Name	Mineral Survey Number	Township Range Section	Ownership
Gold Hunter	MS 612	48N 5E 26	Hecla Limited
Yolande	MS 719	48N 5E 26	Hecla Limited
Ryan Millsite	MS 732	48N 5E 35	Hecla Limited
Thomas Brennan Millsite	MS 733	48N 5E 35	Hecla Limited
P. M. Hennessey Millsite	MS 734	48N 5E 35	Hecla Limited
P. T. Kavanah Millsite	MS 735	48N 5E 35	Hecla Limited
Enterprise	MS 1033	48N 5E 26	Hecla Limited
Away Up	MS 1245	48N 5E 26	Hecla Limited
Joe Dandy		48N 5E 26	
True Blue	MS 1249	48N 5E 22/27	Silver Hunter
Victor		48N 5E 22/27	
Mary Norem	MS 1285	48N 5E 27	Silver Hunter
Cuban Republic	MS 1363	48N 5E 27	Silver Hunter
Jersey Minor	MS 1459	48N 5E 26	Hecla Limited
America	MS 1471	48N 5E 25/26	Silver Hunter
Commander	MS 1492	48N 5E 26	Silver Hunter
Clear Grit	MS 1501	48N 5E 26/27	Hecla Limited
Lost Wonder	MS 1504	48N 5E 27	Hecla Limited
Paymaster		48N 5E 26/27	
Northern Light	MS 1832	48N 5E 26	Hecla Limited
Spokane		48N 5E 26	
America	MS 1927	48N 5E 25/26	Hecla Limited
Bacchus		48N 5E 25/26	
General Boulanger		48N 5E 25/26	
Switzerland		48N 5E 23/26	

Claim Name	Mineral Survey Number	Township Range Section	Ownership
Gettysburg	MS 2196	48N 5E 22/27	Silver Hunter
Lion		48N 5E 27	
Mabel May Millsite	MS 2246B	48N 5E 36	Hecla Limited
Enterprise	MS 2390	48N 5E 22	Hecla Limited
Hennessy Fraction	MS 2563	48N 5E 26	Hecla Limited
Jap		48N 5E 26	
Ted		48N 5E 26	
Victor Fraction		48N 5E 26	
U.S. Permit No. 1	MS 2857	48N 5E 25	Hecla Limited
U.S. Permit No. 2		48N 5E 25	
Iron Cap	MS 2943	48N 5E 25/26	Hecla Limited
Missoula		48N 5E 25/26	
Good Friday	MS 3028	48N 5E 35	Hecla Limited
Lucky Friday		48N 5E 35	
Lucky Friday Fraction No. 2		48N 5E 35	
Northern Light		48N 5E 26	
Pointer	MS 3399	48N 5E 22/23/26	Hecla Limited
Red Doc		48N 5E 22/23/26	