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TREVALI MINING CORPORATION

TECHNICAL REPORT ON THE PERKOA MINE, BURKINA FASO

NI 43-101 Report

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1 SUMMARY

EXECUTIVE SUMMARY

Roscoe Postle Associates Inc. (RPA) was retained by Trevali Mining Corporation (Trevali) to prepare an independent Technical Report on the Perkoa underground zinc mine (Perkoa), located in Burkina Faso, which is operated by Nantou Mining Burkina Faso S.A. (Nantou Mining). Trevali holds a 90% interest in Nantou Mining while the Burkina Faso State holds a 10% interest, in accordance with the Mining Code. The purpose of this report is to support the disclosure of the Mineral Resource and Mineral Reserve estimates prepared by Nantou Mining and reviewed by RPA as of December 31, 2017. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects. RPA visited the property from January 15 to January 18, 2018.

Trevali is a zinc focused, base metals mining company with four commercially producing operations. Trevali is actively producing zinc and lead-silver concentrates from its 2,000 tonne per day (tpd) Santander mine in Peru, its 3,000 tpd Caribou mine in the Bathurst Mining Camp of northern New Brunswick, Canada, and its 2,000 tpd Rosh Pinah mine in Namibia.

The Perkoa underground zinc mine and milling operation is located in the Sanguié Province, 120 km west of the capital city of Ouagadougou, Burkina Faso. The Perkoa mine has been in operation since 2012 and currently produces zinc concentrates at a nominal processing rate of 2,000 tpd.

On August 31, 2017, Trevali finalized definitive agreements with Glencore International PLC (Glencore) and certain of its subsidiaries whereby Trevali acquired a portfolio of zinc assets from Glencore, including a 90% interest in the Perkoa mine.

Perkoa Mineral Resources, estimated as at December 31, 2017, are summarized in Table 1-1.

TABLE 1-1 PERKOA MINERAL RESOURCE SUMMARY – AS AT DECEMBER 31, 2017
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn (%)	Contained Zn (Tonnes)
Measured	2.63	15.65	412,300
Indicated	2.22	11.44	253,400
Measured and Indicated	**4.85**	**13.73**	**665,700**
Inferred	0.68	8.9	60,900

Notes:
1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 5% Zn, with a zinc price of US$1.20/lb and a €/US$ exchange rate of 1.08.
4. Shown on a 100% ownership basis.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Numbers may not add due to rounding.

Perkoa Mineral Reserves, estimated as at December 31, 2017, are summarized in Table 1-2.

TABLE 1-2 PERKOA MINERAL RESERVE SUMMARY – AS AT DECEMBER 31, 2017
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn (%)	Contained Zn (Tonnes)
Proven	2.29	13.93	318,700
Probable	1.04	11.14	116,000
Proven and Probable	**3.33**	**13.06**	**434,700**

Notes:
1. CIM (2014) definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated at an NSR cut-off value of $100/t inclusive of capital expenditure, incremental stopes greater than US$80/t are included based on individual financial analysis.
3. Mineral Reserves are estimated using an average consensus forecast zinc price of US$1.20/lb and a €/US$ exchange rate of 1.08.
4. Shown on a 100% ownership basis.
5. Numbers may not add due to rounding.

RPA is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource and Mineral Reserve estimates.

CONCLUSIONS

Based on a site visit, discussion with Nantou Mining personnel, and review of available documentation, RPA offers the following interpretations and conclusions.

GEOLOGY AND MINERAL RESOURCES

- The geology and mineralization is well understood by Nantou Mining geology personnel.
- The drilling procedures employed by Nantou Mining conform to industry best practice and the resultant drilling pattern is sufficient to interpret the geometry and the boundaries of the mineralization with confidence. All drilling sampling was carried out under the direct supervision of appropriately qualified geologists. There are no drilling, sampling, or recovery factors that could materially impact the accuracy and reliability of the results.
- Drilling, sampling, sample preparation, and analyses were appropriate for the style of mineralization and adequate for Mineral Resource estimation.
- In 2017, the quality assurance/quality control (QA/QC) results showed an improvement over the 2016 results, with a significant reduction in large variances for certified reference materials (CRM) and better performance of the new granodiorite core blank material. Overall, the QA/QC program, as designed and implemented by Nantou Mining, is adequate, and the assay results within the database are suitable for use in a Mineral Resource estimate.
- The assumptions, parameters, and methodology of the Mineral Resource estimation are appropriate for the style of mineralization.
- The updated variography study provides better interpolation parameters and will result in more accurate Mineral Resource estimations, especially for the Hanging Wall lenses.
- Mineral Resources were estimated consistent with Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM (2014) definitions).
- Measured plus Indicated Mineral Resources total 4.85 million tonnes (Mt) grading 13.73% Zn for a total of approximately 665,700 t of contained zinc.
- Inferred Mineral Resources total 0.68 Mt grading 8.9% Zn for a total of approximately 60,900 t of contained zinc.

EXPLORATION

- The areas covered by the exploration licences, as well as other areas along the Perkoa Mine Horizon, are very prospective for both base and precious metals.
- Rapid progress has been made over the last year with respect to exploration activities at Perkoa.

- Over 40 prospective targets have been generated, in four main clusters, along the Perkoa Mine Horizon within the POA and Guido exploration permits.

MINING AND MINERAL RESERVES

- The Mineral Reserve estimate has been prepared utilizing acceptable estimation methodologies and the classification of Proven and Probable Mineral Reserves conform to CIM (2014) definitions and NI 43-101.

- Mining and milling costs used for the Mineral Reserve Net Smelter Return (NSR) calculation have been extracted directly from the 0.67 Mt per annum mining cost estimation physicals prepared by Nantou Mining in mid-2017. The values are based on the average operating costs from the first half of 2017.

- In addition to site operating costs, the Mineral Reserve estimate takes into consideration metallurgical recoveries, concentrate grades, transportation costs, smelter treatment charges, and royalty in determining economic viability.

- The NSR cut-off value used for Mineral Reserve estimation is reasonable.

- Stope shapes have been designed manually using Surpac software. The resultant shapes were evaluated against the geological resource model to report the tonnes and grade for each stope shape.

- Stope modifying factors were applied, post-geological interrogation, to generate the final diluted and recovered Mineral Reserve.

- The Proven and Probable Mineral Reserve totals 3.33 Mt at 13.06% Zn for a total of 434,700 t of contained zinc.

MINERAL PROCESSING

- The process plant is a conventional sulphide flotation plant capable of processing 2,000 tpd, currently operating at approximately 1,900 tpd, and includes crushing, screening, and grinding, followed by zinc flotation and filtering to produce a zinc concentrate.

- Over the past five years of operation, the process plant has produced a zinc concentrate in the range of 50.6% Zn to 53.0% Zn from head grades ranging from 6.3% Zn to 15.2% Zn. Recovery of zinc has been in the range of 89.3% to 96.7%.

- In general, the Perkoa concentrate is considered “clean” by industry standards, with mercury and iron being two elements incurring small penalties.

- There are no other by-product credits.

- Zinc concentrates are trucked 1,200 km to the port of Abidjan, Côte d’Ivoire.

ENVIRONMENTAL, SOCIAL, COMMUNITY

- There is no evidence of environmental risks that could materially impact Nantou Mining’s ability to extract the Mineral Resources or Mineral Reserves at the Perkoa mine.

- The Perkoa mine has a Health, Safety, Environment and Community (HSEC) Policy (2014) outlining its commitment to the environment as well as procedures aligned to the requirements of applicable Burkina Faso legislation.

- The approved Environmental Management Plans (EMP) integral to the Environmental and Social Impact Assessment (ESIA) provide the framework for Perkoa mine's environmental management.

RECOMMENDATIONS

RPA offers the following recommendations.

GEOLOGY AND MINERAL RESOURCES

- A comprehensive data process map should be undertaken, including logging and sampling inputs, database review, and mine to mill production reconciliation studies.

- The Microsoft Access format diamond drill hole database should be modified so that only the Drill Hole Database Administrator has secured rights to revise or add data. RPA also recommends that the drill hole database include a field for QA/QC completed and a final Drill Hole Signoff by the Database Administrator.

- Additional effort should be undertaken to monitor QA/QC inputs and results. Also, the potential source of blank contamination must be investigated and remedied. Although the granodiorite core has performed much better than the historical quartz vein blank material, some minor metal content is still being reported.

- The composite length should be reviewed from the current 1.5 m to 2.0 m.

- Grade capping should be applied to the raw assays prior to compositing as per industry best practices.

- A reconciliation of the resource model versus the actual tonnage and grade, as determined by the process facility, should be included as a standard practice for the annual Mineral Resource estimation.

- A study should be undertaken on the Crown Pillar to determine if the mineralization can be reported as part of the Mineral Resource estimate.

EXPLORATION

- In-mine drilling should continue to explore for economic downdip potential.

- The comprehensive detailed review, compilation, and systematic exploration targeting plan should be continued prior to any future significant exploration expenditures.

- The 2018 exploration budget of approximately $3.5 million, including exploration targeting, 20,000 m of diamond drilling, geochemistry, and geophysics, is well warranted.

MINING AND MINERAL RESERVES

- A review of the Mineral Reserves based on current zinc prices should be carried out.

- The possibility of recovering the Crown Pillar should be studied as it is a potential source of mill feed once the current reserves are mined out.

MINERAL PROCESSING

- Zinc recoveries (92% to 94%) and concentrate grades (52% to 53%) are reasonable, however, both of these may be improved to maintain the upper range of recoveries and concentrate grades with further metallurgical testing.

ENVIRONMENTAL, SOCIAL, COMMUNITY

- Malaria is a threat to the employees and contractors working at the mine. Although strict controls are put in place by the mine, there are a high number of infections per year based on the location of the mine. Training and Awareness programs will need to continue and possibly be extended beyond employees as infections may be occurring out of the mine workplace or camp site.

- The permit for the closure and reclamation of cell one at the tailings facility is required to comply with the regulatory framework. The risk is being managed by the onboarded contractor Knight Piésold and continuous engagement with the authorities by the Perkoa mine.

- The update to the mine wide financial closure will need to be completed in 2018 to comply with the requirements from Bureau des Mines et de la Geologie du Burkina (BUMIGEB).

- The Perkoa mine is actioning a detailed plan to manage the expired chemicals on site. At the time of writing this report, all the expired Zinc Sulphate and Zinc Metabisulphate had been removed from the Perkoa mine by Saphyto for safe disposal, as regulated.

- New facilities are to be constructed in line with regulatory requirements for the storage of chemicals on site. The documentation has been submitted for regulatory approval.

- Waste management was identified as a potential risk to the Perkoa mine. As such, a detailed waste action management plan was developed and reviewed during the site visit. The action plan details a remediation plan for the waste that is currently on site, followed by the planning of a formalized waste management facility on site.

- The mandate from the government to conduct an acid rock drainage potential study at the mine will assist in understanding mitigation measures that need to be developed, managed, and monitored in order to provide an accurate closure liability costing and rehabilitation plan for the mine.

- There will need to be a stakeholder management plan that is developed to address the one percent levy that has been imposed from government. Although the mine will possibly not be able to direct the spend of that levy, community perceptions regarding lack of local benefits and misappropriation of development funds could pose risk to the project, regardless of whether these perceptions are substantiated.

ECONOMIC ANALYSIS

As part of the 2018 Budget process carried out in mid-2017, Nantou Mining has developed a life of mine plan (LOM) which forecasts production to 2022 with a total of 3.33 Mt being mined at a grade of 13.1% Zn. A Cash Flow Projection has been generated from the current LOM production schedule and capital and operating cost estimates, and is summarized in Table 1-3. Metal prices, as provided by Trevali, are based on consensus, long term forecasts from banks, financial institutions, and other sources. All costs are presented in US dollars. Some of the key parameters and assumptions for the after-tax cash flow on a 100% basis are as follows.

REVENUE (100% BASIS)

- 1,900 tpd
- Head grade: 13.1% Zn
- Mill recovery averaging: 93.3%
- Metal price: based on consensus forecast per year, averaging $1.20 per pound zinc
- Smelting and transport costs totalling $0.38 per pound payable zinc.
- NSR: $182 per tonne milled.

COSTS (100% BASIS)

- Mine life: 4.8 years
- Sustaining capital: $24.5 million
- Average operating cost over the mine life: $103/t milled
- Closure costs: $7.0 million
- Salvage costs: nil
- NSR Royalty: $18.7 million
- Net cash cost (equivalent to C1 cost), including sustaining capital, of $0.87 per pound of payable zinc.
- After-tax Net Present Value (NPV) at 8%: $188 million

Income tax losses may be carried forward for four years, while losses resulting from depreciation of assets can be carried forward indefinitely. Nantou Mining has a substantial income tax loss carry-forward and is not subject to corporate income tax until the income tax loss carry-forward has been used.

TABLE 1-3 CASH FLOW SUMMARY - 100% BASIS
Trevali Mining Corporation - Perkoa Mine

	INPUTS	UNITS	TOTAL	2018	2019	2020	2021	2022	2023
MINING									
Operating Days		days	1,763	365	365	365	365	303	-
Tonnes mined per day		tonnes / day	1,888	1,951	1,876	1,859	1,877	1,877	-
Production		'000 tonnes	3,329	712	685	679	685	569	-
Zn Grade		%	13.1%	13.5%	13.2%	12.1%	12.5%	14.1%	0.0%
PROCESSING									
Mill Feed		'000 tonnes	3,329	697	699	701	687	545	-
Zn Grade		%	13.1%	13.5%	13.2%	12.1%	12.5%	14.1%	0.0%
Contained Zn		tonnes	434,636	94,233	92,478	84,811	86,017	77,098	-
Recovery Grade & Lossess									
Zn Concentrate		%	93.3%	92.5%	93.5%	93.5%	93.5%	93.5%	0.0%
Recovered Amount									
Zn Concentrate		tonnes	405,400	87,124	86,467	79,298	80,426	72,086	-
Grades in Concentrate									
Zn Concentrate		tonnes	767,369	166,847	163,145	149,619	151,746	136,012	-
Zn grade in concentrate		%	52.8%	52.2%	53.0%	53.0%	53.0%	53.0%	0.0%
Concentrate Moisture		%	7.50%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%
Total Tonnes Concentrate		wmt	824,922	179,360	175,381	160,840	163,127	146,213	-
Total Recovered Zn		**tonnes**	**405,400**	**87,124**	**86,467**	**79,298**	**80,426**	**72,086**	**-**
REVENUE									
Metal Prices		**Input Units**							
Zn		US$/lb Zn	$1.20	$1.25	$1.20	$1.20	$1.20	$1.13	$0.00
Zn Metal Payable %									
Payable Zn		%		84.7%	84.9%	84.9%	84.9%	84.9%	0.0%
Zn Metal Payable									
Payable Zn		tonnes	344,011	73,776	73,415	67,328	68,286	61,205	-
Gross Revenue									
Total Gross Revenue		**US$ '000**	**$909,826**	**$202,884**	**$194,551**	**$178,420**	**$180,957**	**$153,013**	**$0**
Total Charges									
Transport to Port									
Zn Concentrate		US$ '000	$73,556	$14,487	$15,353	$15,319	$15,848	$12,550	$0
Freight Rollback									
Zn Concentrate		US$ '000	$32,914	$7,156	$6,998	$6,418	$6,509	$5,834	$0
Treatment (Including Fe & Hg Penalties)									
Zn Concentrate		US$ '000	$178,726	$37,493	$37,185	$35,382	$36,210	$32,456	$0
Total Charges		US$ '000	$285,197	$59,137	$59,536	$57,119	$58,566	$50,840	$0
US$/Lb payable Zn		US$/Lb payable Zn	$ 0.38	$ 0.36	$ 0.37	$ 0.38	$ 0.39	$ 0.38	
Net Smelter Return		**US$ '000**	**$624,628**	**$143,747**	**$135,015**	**$121,301**	**$122,391**	**$102,174**	**$0**
Royalty NSR	3.0%	US$ '000	$18,739	$4,312	$4,050	$3,639	$3,672	$3,065	$0
Net Revenue		**US$ '000**	**$605,890**	**$139,435**	**$130,965**	**$117,662**	**$118,719**	**$99,108**	**$0**
Unit NSR		**US$/t milled**	**$182**	**$200**	**$187**	**$168**	**$173**	**$182**	**$0**
OPERATING COST									
Mining (Underground)		US$/t milled	$49.86	$49.66	$48.38	$49.19	$51.18	$51.18	$0.00
Processing		US$/t milled	$34.72	$34.79	$33.68	$34.22	$35.57	$35.57	$0.00
G&A		US$/t milled	$18.53	$18.26	$18.03	$18.34	$19.08	$19.08	$0.00
Total Operating Cost		**US$/t milled**	**$103.11**	**$102.72**	**$100.08**	**$101.75**	**$105.83**	**$105.83**	**$0.00**
Mining (Underground)		US$ '000	$165,970	$34,632	$33,810	$34,477	$35,157	$27,894	$0
Processing		US$ '000	$115,592	$24,261	$23,537	$23,980	$24,431	$19,384	$0
G&A		US$ '000	$61,691	$12,734	$12,602	$12,851	$13,106	$10,398	$0
Total Operating Cost		**US$ '000**	**$343,253**	**$71,627**	**$69,948**	**$71,308**	**$72,695**	**$57,676**	**$0**
Operating Cashflow		US$ '000	$262,636	$67,808	$61,016	$46,355	$46,025	$41,433	$0
CAPITAL COST									
Sustaining		US$ '000	$24,462	$10,450	$7,764	$5,239	$710	$300	$0
Reclamation and closure		US$ '000	$7,000	$0	$0	$0	$0	$0	$7,000
Total Capital Cost		**US$ '000**	**$31,462**	**$10,450**	**$7,764**	**$5,239**	**$710**	**$300**	**$7,000**
Net Cash Cost, including Capital		US$/Lb payable Zn	$0.87						
PRE-TAX CASH FLOW									
Net Pre-Tax Cashflow		US$ '000	$231,174	$ 57,358	$ 53,253	$ 41,116	$ 45,315	$ 41,133	$ (7,000)
Cumulative Pre-Tax Cashflow		US$ '000		$ 57,358	$ 110,611	$ 151,727	$ 197,042	$ 238,174	$ 231,174
Taxes		US$ '000	$0	$ -	$ -	$ -	$ -	$ -	$ -
After-Tax Cashflow		US$ '000	$231,174	$ 57,358	$ 53,253	$ 41,116	$ 45,315	$ 41,133	$ (7,000)
Cumulative After-Tax Cashflow		US$ '000		$ 57,358	$ 110,611	$ 151,727	$ 197,042	$ 238,174	$ 231,174
PROJECT ECONOMICS									
Pre-tax NPV at 5% discounting	5.0%	US$ '000	$202,732						
Pre-tax NPV at 8% discounting	8.0%	US$ '000	$188,295						
Pre-tax NPV at 10% discounting	10.0%	US$ '000	$179,585						
After-Tax NPV at 5% discounting	5.0%	US$ '000	$202,732						
After-Tax NPV at 8% discounting	8.0%	US$ '000	$188,295						
After-tax NPV at 10% discounting	10.0%	US$ '000	$179,585						

SENSITIVITIES

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined through analysis of cash flow sensitivities:

- Head grade
- Zinc recovery
- Zinc price
- Operating costs
- Sustaining capital costs

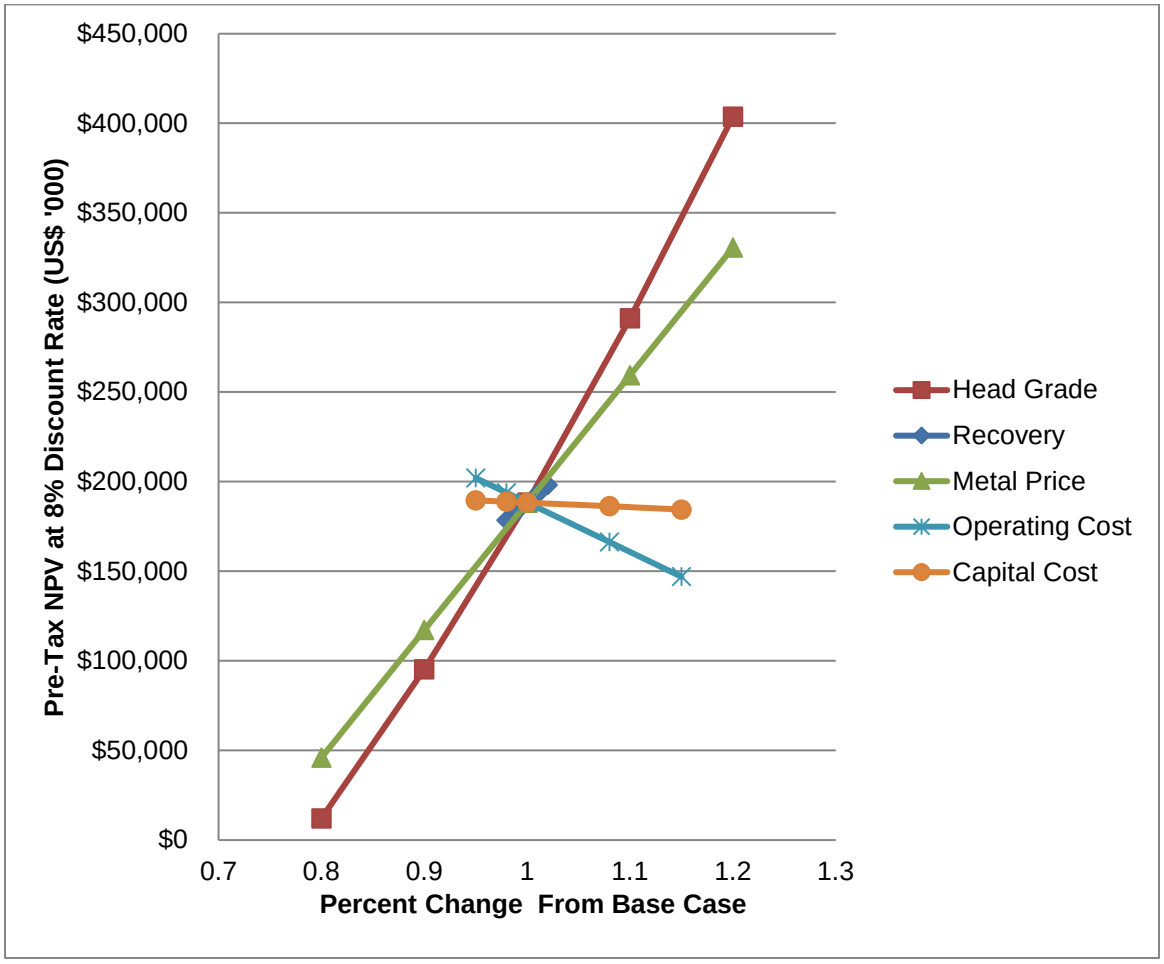
Pre-tax NPV at 8% discount sensitivities over the Cash Flow Projection have been calculated, and are shown in Table 1-4 and Figure 1-1. The Project return is most sensitive to the product of changes in the head grade and zinc price followed by changes in the operating costs, recovery, and capital costs.

TABLE 1-4 SENSITIVITY ANALYSIS
Trevali Mining Corporation – Perkoa Mine

	Head Grade (%)	NPV at 8% ($M)
0.80	10.4	12
0.90	11.8	95
1.00	**13.1**	**188**
1.10	14.4	291
1.20	15.7	404
	% Recovery	**NPV at 8% ($M)**
0.98	91.4	179
0.99	92.3	183
1.00	**93.3**	**188**
1.01	94.2	193
1.02	95.1	198
	Zinc Price ($/lb)	**NPV at 8% ($M)**
0.80	0.96	46
0.90	1.08	117
1.00	**1.20**	**188**
1.10	1.32	259
1.20	1.44	331
	Operating Costs ($M)	**NPV at 8% ($M)**
0.95	326	202
0.98	336	194
1.00	**343**	**188**
1.08	371	166
1.15	395	147

	Capital Costs ($M)	NPV at 8% ($M)
0.95	29.9	190
0.98	30.8	189
1.00	**31.5**	**188**
1.08	34.0	186
1.15	36.2	184

FIGURE 1-1 SENSITIVITY ANALYSIS



TECHNICAL SUMMARY

PROPERTY DESCRIPTION AND LOCATION

Perkoa is located in the Sanguié Province of Burkina Faso, approximately 120 km west of the capital city of Ouagadougou. The property's latitude and longitude are 12° 22' N and 2° 36' W.

LAND TENURE

The Perkoa mine consists of one exploitation permit (the Perkoa Exploitation Permit), which contains the Perkoa main zone deposit (Perkoa deposit) and two exploration permits (the Perkoa Exploration Permits), all located on contiguous ground.

The Perkoa Exploitation Permit, held by Nantou Mining, was granted on March 20, 2007, and formally grants Nantou Mining the rights to develop and operate the Perkoa mine. It is scheduled to expire on March 20, 2027. Boundary Ventures Limited (BVL) holds 90% of the share capital of the exploitation company while the Burkina Faso State holds 10%, in accordance with the Mining Code. BVL was a joint venture between Blackthorn Resources Ltd. (Blackthorn) and Glencore that explored the potential of the Perkoa deposit and four exploration permits (POA, Guido, Seboun, and Sepaogo) from 2010 to 2014. The total area of the Perkoa Exploitation Permit is 6.24 km^2 and the permit is of sufficient size for the mining operations.

The Perkoa Exploitation Permit is surrounded by the Perkoa Exploration Permits, held by Nantou Exploration S.A. (Nantou Exploration), which currently cover a total area of 231.83 km^2. Nantou Exploration is owned 100% by Trevali. The Burkina Faso Mining Law gives the exploration permit holder the exclusive right to explore for the minerals requested on the surface and subsurface within the boundaries of the exploration permit.

EXISTING INFRASTRUCTURE

There is limited existing infrastructure or services in the general area that are suitable to support the Perkoa mine other than good road access to the mine site. All existing infrastructure in place is to support the local subsistence and small-scale agricultural practices.

As power from the National Grid is deemed unreliable, the Perkoa mine generates its own power by way of diesel generators. Water is supplied by a pipeline from a recently constructed dam at Seboun, approximately 18 km to the northeast of the mine.

HISTORY

The Perkoa mine area has been explored and investigated by a variety of companies for approximately 38 years. The initial exploration was undertaken as part of a wider United Nations Development Program (UNDP) research program, however, this was followed by

further exploration by La Société Minière et Métallurgique de Peñarroya (Peñarroya), Boliden AB (Boliden), Billiton Plc (Billiton) (now BHP Billiton), and Metorex (Pty) Limited (Metorex), before AIM Resources Ltd. (AIM Resources), which subsequently changed its name to Blackthorn, took over the project in 2005.

In late 2010, a joint venture between Blackthorn (39.9%) and Glencore (50.1%) was formed (BVL). In March 2013, an agreement was reached for Glencore to provide additional equity funding to the Project. Blackthorn elected not to fund its equity share of the $80 million funding and, as a result, its interest in the project was diluted from 39.9% to 27.3%. In May 2014, Blackthorn and Glencore reached an agreement whereby Glencore acquired Blackthorn's 27.3% interest in the Perkoa Project, thereby allowing Blackthorn to exit the Perkoa Project and increasing Glencore's interest to a 90% level. As of August 31, 2017, Trevali finalized the purchase of Glencore's 90% interest in the Perkoa Project. Production at the Perkoa mine commenced in May 2013 and is ongoing at present.

GEOLOGY AND MINERALIZATION

The Perkoa deposit lies in a felsic to intermediary series of volcanic and volcanoclastic rocks, within the Paleoproterozoic Birimian Supergroup of West Africa. The prospective Birimian rocks in Burkina Faso are the same sequences that host major gold deposits in Burkina Faso and in neighbouring Ghana and Mali. The Birimian greenstone belts of West Africa are renowned for their gold mineralization, however, known occurrences of base metals are scarce. The Perkoa deposit represents the only significant zinc-silver massive sulphide mineralization discovered in the Birimian to date and it is also the first zinc-silver massive sulphide mineralization discovered in this region. Only zinc is currently being recovered at the Perkoa mine.

The Perkoa mine area is located in the central part of the Boromo greenstone belt, which comprises volcanic and sedimentary rocks of the Lower Palaeozoic Birimian Supergroup that have been metamorphosed to lower greenschist facies. At least three phases of deformation have affected the Boromo belt and mafic to felsic dykes and granitic bodies were emplaced in several intrusive phases. The zinc mineralization has been dated at 2,120 Ma to 2,141 Ma (Billiton, 1998).

In the Perkoa mine area, the Birimian sediments, lavas, and pyroclastics strike from northeast to southwest and generally dip steeply to the northwest. Several units of andesitic lavas with

subordinate andesitic tuffs, separated by sequences of tuffs interlayered with fine grained clastic sediments, make up the lithological package in the Perkoa mine area.

A number of syn-tectonic and post-tectonic intrusive bodies have been emplaced within the meta-sediments, which range from large plutons of granitic and dioritic composition, to smaller ultramafic to rhyolitic intrusions. Crosscutting lineaments with a northwest-southeast orientation are common although major displacements along these lineaments are rare.

The Perkoa deposit has been classified as a volcanogenic massive sulphide (VMS) deposit. VMS deposits are lenses and sheets of massive sulphide that form from seafloor hydrothermal systems where metal rich fluids (black smoke) precipitate on (exhalative) or near the seafloor (sub-seafloor replacement.).

The Perkoa mineralization occurs as a series of stacked, northeast-southwest striking tabular VMS lenses hosted, and separated by, tuffaceous material that has been overturned with an average dip of approximately 70°. The deposit is unusual for its high concentrations of zinc and barium mineralization, and relatively low levels of lead and copper.

MINERAL RESOURCES

Geological interpretation and Mineral Resource estimation were completed by Nantou Mining and reviewed by RPA, with an effective date of December 31, 2017 (Table 1-1). The Mineral Resources have been completed to a level that meets industry standards and are compliant with CIM (2014) definitions. As of year-end 2017, total Measured and Indicated Mineral Resources are estimated to be 4.85 Mt grading 13.73% Zn, containing approximately 665,700 t of zinc. In addition, Inferred Mineral Resources are estimated to be 0.68 Mt grading 8.9% Zn, containing approximately 60,900 t of zinc.

The geological interpretation comprised wireframes for mineralization and lithological domains, which were developed using Surpac software. The wireframes for lithology, including dykes, were generated based on logging of the major lithological units. The cut-off grade for mineralization wireframes was 5% Zn.

Composites were made using Surpac software using the wireframe intercept technique where intercepts of the geological drill or channel traces are coded to the geological database. Composites were made for each domain, including lead, silver, copper, pyrrhotite, pyrite, and

density, at a 1.5 m length. A grade cap, which varied per domain, was applied to the composites to avoid the use of anomalous data leading to local overestimation of the grade. A 5 m by 5 m by 5 m block model was constructed which was then sub-blocked down to a minimum size of 1.25 m. Updates to the variography and search ellipsoids were used in the Ordinary Kriging (OK) interpolation due to the addition of new analytical data, revised wireframes and the isolation of a sub-domain on the southern side of the main fault. Inverse Distance (ID) and Nearest Neighbour (NN) interpolation methods were used for comparison and validation of the model against the OK results.

Mineral Resource classification is based on the interpolation pass estimate attribute as well as the Qualified Person's level of geological knowledge and information (e.g., sufficient density of underground development or underground diamond core drilling in the area).

Following estimation and classification, the block model was depleted using the actual development and stoping voids solids from survey pick-ups and cavity monitoring surveys (CMS). Once the mining depletion had been completed, any "unrecoverable" areas, such as unbroken ore from completed stopes, design pillars, abandoned low grade areas, crown pillars, etc., are considered as unrecoverable, completely sterilized, and extracted from the Mineral Resource estimate.

RPA reviewed the Perkoa block model in Micromine software. The block model was validated by completing a series of visual inspections. The checks showed good agreement between drill hole composite values along sections and plans. The overall compiled Mineral Resource estimate had no material differences to that reported.

MINERAL RESERVES

As of year-end 2017, Proven and Probable Mineral Reserves total 3.33 Mt grading 13.06% Zn containing approximately 434,700 t of zinc (Table 1-2). RPA is not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

Mineral Reserves are estimated from the Measured and Indicated Mineral Resources. RPA has performed an independent verification of the block model tonnes and grade, and in RPA's opinion, the process has been carried out to industry standards.

MINING METHOD

The Perkoa mine is an underground operation, however, a small open pit was mined to reach near surface material during initial start-up to increase plant throughput as the underground mine ramped up production. The pit is now complete. Underground mining commenced in 2013, with contractors carrying out all aspects of the mining process.

All mining operations are currently being carried out by a mining contractor, which supplies manpower and equipment. Nantou Mining personnel provide geological and engineering services.

Longhole stoping is being used as the primary extraction method. There are several variations on this mining method employed such as longitudinal and transverse, with both bottom-up and top-down mining sequences. The exact method chosen is dependent on the orebody geometry. Stopes are backfilled either with cemented rock fill (CRF) or waste.

Longitudinal bottom-up stoping has been used above 190 level. Due to the orebody width and mine sequencing, stopes between 190 level and 280 level are mined using the transverse method with primary and secondary stopes, with some longitudinal retreat mining occurring at the extremities of the orebody. All of the primary stopes above 280 level have been mined out with the remaining ore to be mined as secondary stopes.

A recoverable sill pillar is being established on 310 level in order to be able to convert the mining below 310 level to a bottom-up longitudinal retreat method, which is expected to reduce the amount of development required. As well, a higher percentage of waste backfill instead of CRF can be used with this method which is expected to lower the mining cost.

The majority of the stopes to be mined are located in the Footwall Lens of the orebody. Bottom-up mining will be utilized between 400 level and 310 level and top-down longitudinal retreat will be utilized between 400 level and 520 level. The current limit of the Proven and Probable Mineral Reserves is at 520 level. The majority of the stopes below 520 level are in a portion of the orebody which is classified as an Inferred Mineral Resource. This area will require infill drilling in order to upgrade the Inferred Mineral Resource to a Measured or Indicated Mineral Resource.

For the Hanging Wall Lens, bottom-up mining will be utilized between 430 level and 310 level and top-down longitudinal retreat primary and secondary stoping will be utilized between 430 level and 520 level. The current limit of the Proven and Probable Mineral Reserves is at 520 level. The majority of the Hanging Wall stopes below 520 level are in a portion of the orebody which is classified as an Inferred Mineral Resource. This area will require infill drilling in order to upgrade the Inferred Mineral Resource to a Measured or Indicated Mineral Resource.

MINERAL PROCESSING

The process plant at Perkoa is a conventional sulphide flotation plant capable of processing 2,000 tpd and is currently operating at approximately 1,900 tpd. The process plant includes crushing, screening, and grinding, followed by zinc flotation and filtering to produce a zinc concentrate. The process plant originally included a lead recovery circuit, however, this circuit is no longer used and has been reconfigured to increase capacity in the zinc recovery circuit due to higher zinc head grades.

Over the past five years of operation, the process plant has produced a zinc concentrate in the range of 50.6% Zn to 53.0% Zn from head grades ranging from 6.3% Zn (open pit) to 15.2% Zn (underground). Recovery of zinc has been in the range of 89.3% to 96.7%.

Zinc concentrates are trucked 1,200 km to the port of Abidjan, Côte d'Ivoire.

PROJECT INFRASTRUCTURE

Current infrastructure includes power, water, sewerage, a diesel storage facility, fire protection, and explosives magazines.

Buildings on site include change houses, office blocks, gate houses, a clinic, and ablution facilities. Appropriate security fencing and access control prevents inadvertent access onto the property and enhances safety.

The supply of power from the national grid is unreliable. Power for all areas of the mine, with the exception of the underground mine, are supplied from the central power station. The power station has five Caterpillar 3516B-HD (2 MVA) generators installed in an industrial type structure of masonry and corrugated iron construction with a concrete floor. Power usage at

the central power station is approximately 2.5 MW to 3.2 MW, which means that normally three generators run at approximately 60% capacity, at any one time.

An 11 kV overhead power transmission line is installed between the central powerhouse and the mine switch room to provide power to the underground mine.

Plant tailings are deposited into a tailings storage facility (TSF) immediately adjacent to the process plant.

MARKET STUDIES

Global zinc demand continues to rise by between 2% to 4% per annum (or 280,000 t to 560,000 t of zinc metal) driven by gross domestic product (GDP) growth, urbanization, and infrastructure development, and as a "mid-cycle" commodity with expanding markets for consumer goods (automobiles, appliances, etc.). Mine closures and production cuts over the past few years have constrained primary supply which has driven the zinc price to near-decade highs.

Zinc smelters are scaling back/curtailing refined zinc metal production due to concentrate shortages. Benchmark zinc smelter treatment charges (TCs) dropped to US$172/tonne in 2017, with no smelter price participation (0% escalators), a 10-year low. TCs for 2018, are US$147/t.

Consensus forecast is for continued strength in zinc prices in reaction to ongoing supply deficits. Wood Mackenzie, an independent global commodity forecast consultant, is predicting robust zinc commodity prices over the short-term; averaging US$1.71/lb in 2018, US$1.87/lb in 2019, and a long-term forecast price of US$1.23/lb.

ENVIRONMENTAL, PERMITTING, AND SOCIAL CONSIDERATIONS

The Perkoa mine has a HSEC Policy (2014) outlining its commitment to the environment as well as procedures aligned to the requirements of applicable Burkina Faso legislation. These commitments are then implemented and managed through a HSEC system, which is aligned to the principles of ISO 14001:2004 Environmental Management System. The current Environmental Management System (EMS) is based on the overarching procedures of

Glencore, however, Trevali is in the process of implementing its corporate EMS, and the EMS at Perkoa and the procedures will be updated and aligned with this corporate framework.

The approved EMP provides the framework for Perkoa mine's environmental management and outlines mitigation measures and monitoring programs, to reduce and manage negative impacts on the biophysical and social environment. Environmental audits must be carried out in accordance with Article 4 of Decree No. 2015-10000 of October 28, 2015 laying down detailed rules for carrying out environmental audits. As per these requirements, regular monitoring and evaluation of environmental performance through compliance audits is undertaken by BUMIGEB.

The Perkoa mine has areas of waste disposal, including a tailings pond with additional extensions that were implemented in 2017, waste treatment facilities, and a scats stockpile, and generates both general and hazardous waste. The mine currently has a tailings facility licensed by the Ministry of Environment that comprises three areas. At the present stage of development of mine activities, only the first and second cells were constructed. The Perkoa mine proposes to build a third cell for the receipt of its mining waste for a period of two years. The third cell is required as the first cell is full and will be managed under a closure and rehabilitation process and the second cell is almost at the maximum of its nominal design storage capacity.

The Perkoa mine has a procedure in place for publicizing recruitment, signed by Nantou Mining and the Youth Committee on June 12, 2015 to use only local unskilled labour and to favour local labour if qualification is required. Stakeholder management is being successfully managed on site by the implementation of a tripartite committee, comprised of representatives from Nantou Mining, the local community, and the government.

In terms of corporate social responsibility, projects are consistent with those as required by the EMP. In 2013-2016 corporate social projects included compensation for displaced graves and structures, construction of replacement houses, Perkoa Health and Social Promotion Centre, community water boreholes, and a literacy program.

The National HIV/AIDS infection rate for Burkina Faso is approximately 1.8%. The mine is actively involved in the prevention of HIV/AIDS and was presented with an award from the Government for "Significant Contribution to Community HIV/AIDS Program".

Of concern is the threat of malaria to the employees and contractors working at the mine. Although strict controls are put in place by the Perkoa mine, there are a high number of malaria cases reported annually. Spraying schedules and training and Awareness programs will need to continue to be rolled out and extended beyond employees as infections may be occurring out of the mine workplace or camp site.

CAPITAL COSTS

Sustaining capital is mainly for mine development, process plant upgrades, tailings dam expansion, maintenance, and power plant upgrades. Table 1-5 presents the LOM Plan sustaining capital cost, including closure costs.

TABLE 1-5 LIFE OF MINE PLAN SUSTAINING CAPITAL COSTS
Trevali Mining Corporation – Perkoa Mine

	Units	2018	2019	2020	2021	2022	2023	Total
Mining	$ M	7.3	0.5	0.3	-	-	-	**8.1**
Plant	$ M	0.3	0.5	0.2	-	-	-	**0.9**
Tailings Dam	$ M	0.0	6.0	4.0	-	-	-	**10.0**
Engineering	$ M	2.3	0.6	0.4	0.4	-	-	**3.7**
Services	$ M	0.5	0.3	0.3	0.3	0.3	-	**1.7**
Total Sustaining	$ M	10.4	7.8	5.2	0.7	0.3	-	**24.5**
Closure Cost	$ M	-	-	-	-	-	7.0	**7.0**
Total	**$ M**	**10.4**	**7.8**	**5.2**	**0.7**	**0.3**	**7.0**	**31.5**

OPERATING COSTS

Based on the operating cost experience to date, the LOM Plan operating costs are summarized in Table 1-6.

TABLE 1-6 LIFE OF MINE PLAN OPERATING COST
Trevali Mining Corporation – Perkoa Mine

	Units	2018	2019	2020	2021	2022	Total
Mine	$ M	34.6	33.8	34.5	35.2	27.9	**166.0**
Plant	$ M	24.3	23.5	24.0	24.4	19.4	**115.6**
Indirect Costs	$ M	12.7	12.6	12.9	13.1	10.4	**61.7**
Total Costs	**$ M**	**71.6**	**69.9**	**71.3**	**72.7**	**57.7**	**343.3**
Milled	**t ('000)**	**697**	**699**	**701**	**687**	**545**	**3,329**
Cost/t Milled	**$/t**	**102.72**	**100.08**	**101.75**	**105.83**	**105.83**	**103.11**

2 INTRODUCTION

Roscoe Postle Associates Inc. (RPA) was retained by Trevali Mining Corporation (Trevali) to prepare an independent Technical Report on the Perkoa underground zinc mine (Perkoa), located in Burkina Faso (Perkoa). The purpose of this report is to support the disclosure of the Mineral Resource and Mineral Reserve estimates, prepared by Nantou Mining Burkina Faso S.A. (Nantou Mining) and reviewed by RPA, as at December 31, 2017. This Technical Report conforms to NI 43-101 Standards of Disclosure for Mineral Projects.

Trevali is a zinc focused, base metals mining company with two commercially producing operations. Trevali is actively producing zinc and lead-silver concentrates from its 2,000 tonne per day (tpd) Santander mine in Peru, its 3,000 tpd Caribou mine in the Bathurst Mining Camp of northern New Brunswick, Canada, and its 2,000 tpd Rosh Pinah mine in Namibia.

The Perkoa underground zinc mine and milling operation is located in the Sanguié Province, 120 km west of the capital city of Ouagadougou, Burkina Faso. The Perkoa mine has been in operation since 2013 and currently produces zinc concentrates at a nominal processing rate of 2,000 tpd. Trevali holds a 90% interest in Nantou Mining while the Burkina Faso State holds a 10% interest, in accordance with the Mining Code.

On August 31, 2017, Trevali finalized definitive agreements with Glencore International PLC (Glencore) and certain of its subsidiaries whereby Trevali acquired a portfolio of zinc assets from Glencore, including a 90% interest in the Perkoa mine.

SOURCES OF INFORMATION

A site visit was carried out from January 15 to January 18, 2018, by Mr. Torben Jensen, P.Eng., RPA Principal Mining Engineer, and Mr. Ian Blakley, P.Geo., RPA Principal Geologist. Ms. Tracey Jacquemin, Pr.Sci.Nat., Corporate Manager, HSEC with Trevali, last visited the site from March 15 to 17, 2018.

RPA conducted tours of the core processing area, the processing plant, and underground operations including contractor diamond drilling. RPA also visited the main exploration target sites located on the POA and Guido Exploration Permits.

Discussions were held with the following Nantou Mining personnel:

- Olaf Meijer, General Manager
- Bastien Fresia, Senior Geologist
- Besim Ertem, Mining Manager
- Thiombiano Youmandja, Mine Engineer
- Paul Laframboise, Plant Manager
- Matthew James, Senior Exploration Geologist
- Jake Clark, Exploration Geologist

Mr. Blakley reviewed the geology, sampling, assaying, and resource estimate work and is responsible for Sections 2 to 12, 14, and 23. Mr. Jensen reviewed the mining, reserve estimate, and economics and is responsible for Sections 15, 16, 18, 19, 21, and 22. Ms. Jacquemin reviewed the environmental and permitting aspects and is responsible for Section 20. Mr. Avakash A. Patel, P.Eng., Vice President, Metallurgy and Principal Metallurgist, RPA, reviewed the metallurgical aspects and is responsible for Sections 13 and 17. The authors share responsibility for Sections 1, 24, 25, 26, and 27 of this Technical Report.

The documentation reviewed, and other sources of information, are listed at the end of this report in Section 27 References.

LIST OF ABBREVIATIONS

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

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

3 RELIANCE ON OTHER EXPERTS

This report has been prepared by RPA for Trevali. The information, conclusions, opinions, and estimates contained herein are based on:

- Information available to RPA at the time of preparation of this report,
- Assumptions, conditions, and qualifications as set forth in this report, and
- Data, reports, and other information supplied by Trevali and other third party sources.

For the purpose of this report, RPA has relied on ownership information provided by Trevali. RPA has not researched property title or mineral rights for the Perkoa mine and expresses no opinion as to the ownership status of the property.

RPA has relied on Trevali for guidance on applicable taxes, royalties, and other government levies or interests, applicable to revenue or income from the Perkoa mine.

Except for the purposes legislated under provincial securities laws, any use of this report by any third party is at that party's sole risk.

4 PROPERTY DESCRIPTION AND LOCATION

The Perkoa mine is located in the Sanguié Province of Burkina Faso, approximately 120 km west of the capital city of Ouagadougou (Figure 4-1). The property's latitude and longitude are 12° 22' N and 2° 36' W.

The Perkoa mine consists of one exploitation permit (the Perkoa Exploitation Permit), which contains the Perkoa main zone deposit (Perkoa deposit) and two exploration permits (the Perkoa Exploration Permits), all located on contiguous ground.

MINERAL RIGHTS AND LAND OWNERSHIP

The exploitation and exploration permits comprising the Perkoa mine are subject to Burkina Faso's 2003 Mining Code No. 31–2003/AN, dated May 8, 2003 (the Burkina Faso Mining Law).

Under the Mining Code, an exploitation permit is granted by a government decree passed on the basis of a proposal by the Mining Minister, pursuant to the recommendation of the National Mining Commission. An exploitation permit is granted to any holder of an exploration permit which has provided evidence of the existence of an economic deposit in accordance with the Mining Code.

EXPLOITATION PERMIT

The Perkoa Exploitation Permit, held by Nantou Mining, was granted on March 20, 2007 and formally grants Nantou Mining the rights to develop and operate the Perkoa mine. It is scheduled to expire on March 20, 2027. Boundary Ventures Limited (BVL) holds 90% of the share capital of the exploitation company while the Burkina Faso State holds 10%, in accordance with the Mining Code. This 10% state participation must be maintained when there is an increase in the capital of the company. The government also collects various taxes and duties on the imports of fuels, supplies, equipment, and outside services, as specified by the Burkina Faso Mining Law. In addition, there is a 3% royalty, payable to the government, on all base metal production in Burkina Faso.

The Mining Convention between Nantou Mining and the Government of Burkina Faso, which was signed by the Minister of Mines of Burkina Faso on August 27, 2008, sets out the fiscal and legal terms with respect to the operation of the Perkoa Exploitation Permit, including taxation rates applicable to the project, per the 2003 Mining Code. The Convention is valid for 20 years commencing on the date of the grant, and may be renewed for subsequent periods of five years.

The Perkoa Exploitation Permit's perimeter is defined by UTM coordinates of the corner posts as listed in Table 4-1 and the permit's limit is shown in Figure 4-2. The total area is 6.24 km^2 (624 ha) and is of sufficient size for the mining operations.

TABLE 4-1 PERKOA EXPLOITATION PERMIT BOUNDARY COORDINATES
Trevali Mining Corporation – Perkoa Mine

Permit Name	Points	Datum	Zone	X	Y	Surface Area (km^2)
Perkoa	A	Adindan BF	30 N	542,500	1,369,100	6.24
	B	Adindan BF	30 N	545,100	1,369,100	
	C	Adindan BF	30 N	545,100	1,366,700	
	D	Adindan BF	30 N	542,500	1,366,700	
1 PERMIT						**6.24**

The new Burkina Faso Mining Code was approved by the transitional government and came into effect on June 16, 2015, however, an application decree is required for the Mining Code to be operational. Trevali does not expect a material impact of the new Mining Code on Nantou Mining, as it has fiscal stability clauses in its existing Mining Convention.

RPA is not aware of any environmental liabilities on the property. Nantou Mining has all required permits to conduct the work on the property. RPA is not aware of any other significant factors and risks that may affect access, title, or the right or ability to perform the work on the property.

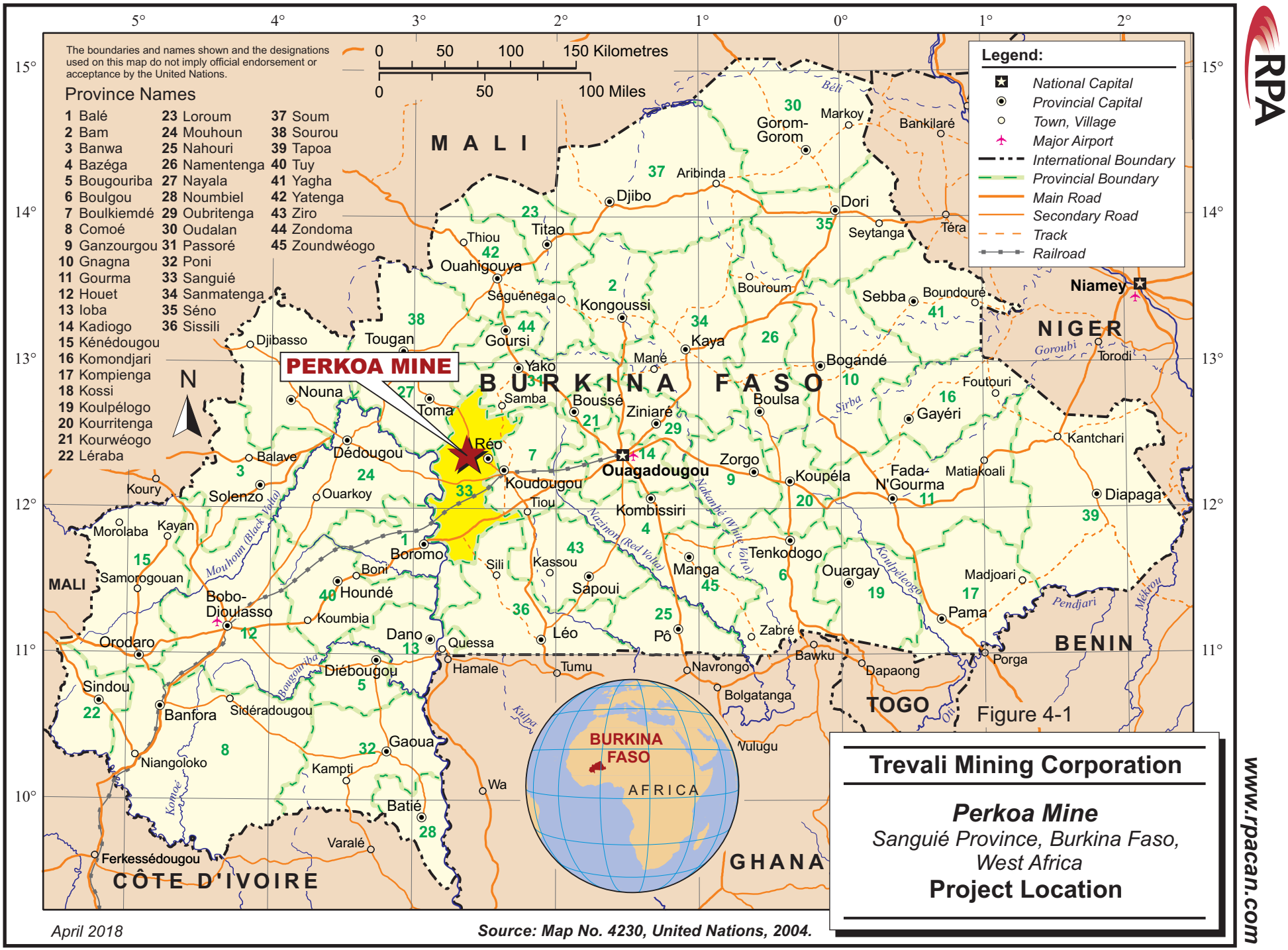


Figure 4-1

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso, West Africa

Project Location

April 2018

Source: Map No. 4230, United Nations, 2004.

www.rpacan.com

Note: For Permit Boundary Co-ordinates see Table 4-1

Figure 4-2

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Exploitation Permit Map

0 250 500 750 1000

Metres

April 2018

Source: Google Earth, 2017.

EXPLORATION PERMITS

The Perkoa Exploitation Permit is surrounded by the Perkoa Exploration Permits, held by Nantou Exploration S.A. (Nantou Exploration), which currently cover a total area of 231.83 km^2. Nantou Exploration is owned 100% by Trevali.

The Burkina Faso Mining Law gives the exploration permit holder the exclusive right to explore for the minerals requested on the surface and subsurface within the boundaries of the exploration permit. Exploration permits are guaranteed by the Law and its associated arrêtés (decrees) provided that the permit holder complies with reporting requirements and annual exploration expenditures totalling 270,000 CFA francs/km^2, or approximately $650/km^2.

The exploration permit also gives the holder the exclusive right, at any time, to convert the exploration permit into an exploitation permit, in accordance with the law. Each exploitation permit application requires a separate Feasibility Study (FS), however, there are precedents in Burkina Faso for variations to this rule (e.g., Etruscan's Youga project).

Exploration permits are valid for a period of three years from date of issue and may be renewed for two more consecutive terms of three years each for a total of nine years; however, on the second renewal, at least 25% of the original area must be relinquished.

The Perkoa Exploration Permits have been granted by the Minister of Mines, Quarries, and Energy (MMCE) as an arrêté under Burkina Faso's 2003 Mining Code (Code Minier, No. 31–2003/AN dated May 8, 2003).

The POA Exploration Permit was originally granted to Blackthorn Resources Limited (Blackthorn) by arrêté N° 07-098/MCE/SG/DGMGC on July 10, 2007 and was subsequently transferred to Nantou Exploration by arrêté N° 2015-000073/MME/SG/DGMGC on March 2, 2015. The third renewal application was submitted to MMCE on May 12, 2016. The application was approved on October 26, 2017 and backdated to July 10, 2016. The POA Exploration Permit, listed as arrêté N° 17/187, is now valid until July 10, 2019.

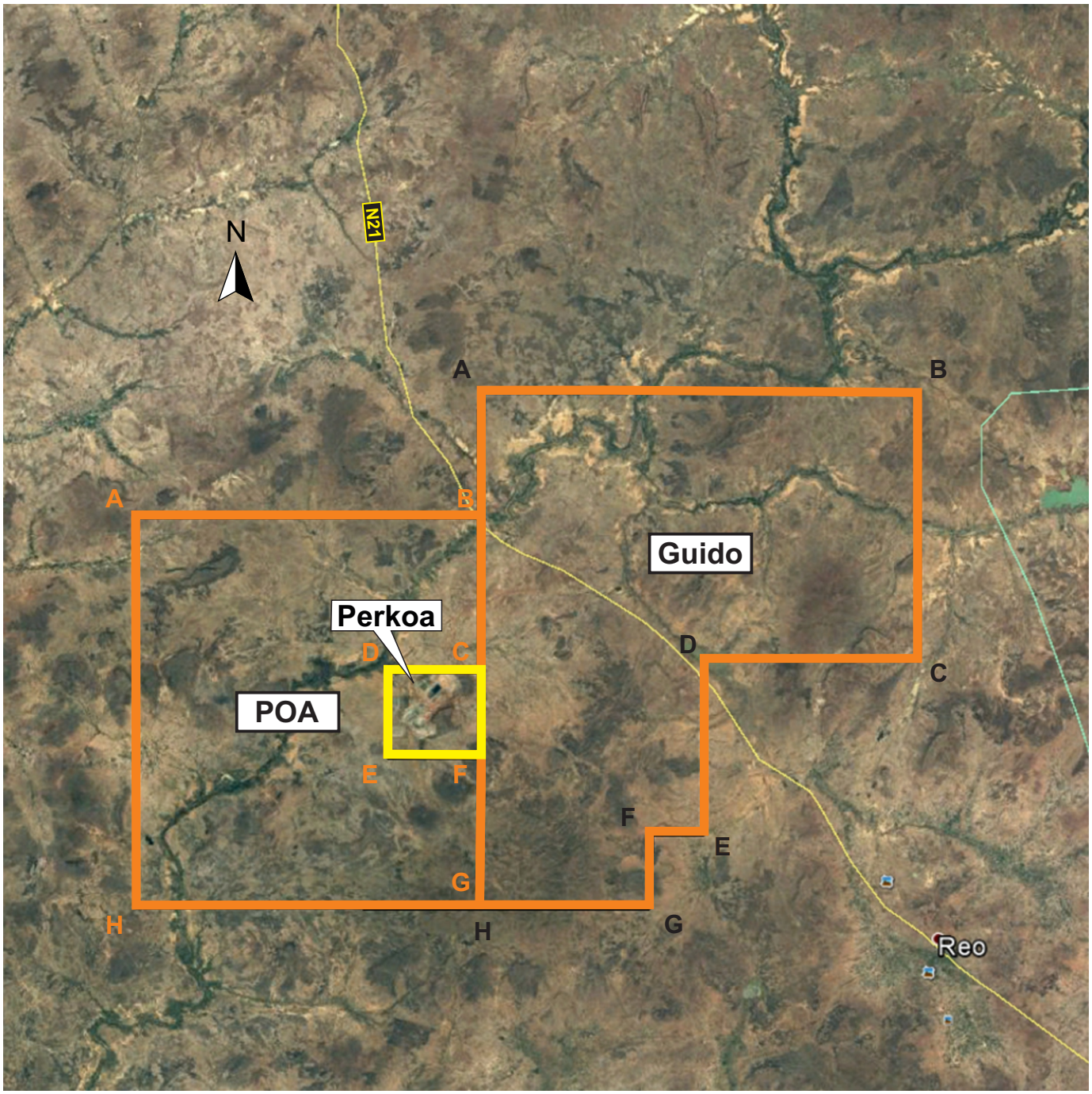
The Guido Exploration Permit was originally granted to Blackthorn by arrêté N° 07-098/MCE/SG/DGMGC on July 10, 2007 and was subsequently transferred to Nantou Exploration by arrêté N° 2015-000073/MME/SG/DGMGC on March 2, 2015. The third renewal application was submitted to MMCE on May 12, 2016. The application was approved on

October 26, 2017 and backdated to July 10, 2016. The Guido Exploration Permit, listed as arrêté N° 17/188, is now valid until July 10, 2019.

Exploration permit boundary coordinates (projection Clark 1880; Adindan BF) are listed in Table 4-2 and the permits are shown in Figure 4-3.

TABLE 4-2 EXPLORATION PERMIT BOUNDARY COORDINATES
Trevali Mining Corporation – Perkoa Mine

Permit Name	Points	Datum	Zone	X	Y	Surface Area (km²) / (ha)
POA	A	Adindan BF	30 N	535,400	1,373,400	99.5 / 9,950
	B	Adindan BF	30 N	545,100	1,376,400	
	C	Adindan BF	30 N	545,100	1,369,100	
	D	Adindan BF	30 N	542,500	1,369,100	
	E	Adindan BF	30 N	542,500	1,366,700	
	F	Adindan BF	30 N	545,100	1,366,700	
	G	Adindan BF	30 N	545,100	1,362,500	
	H	Adindan BF	30 N	535,400	1,362,500	
Guido	A	Adindan BF	30 N	545,100	1,376,900	132.33 / 13,233
	B	Adindan BF	30 N	557,400	1,376,900	
	C	Adindan BF	30 N	557,400	1,369,422	
	D	Adindan BF	30 N	551,383	1,369,422	
	E	Adindan BF	30 N	551,383	1,364,569	
	F	Adindan BF	30 N	549,868	1,364,569	
	G	Adindan BF	30 N	549,868	1,362,500	
	H	Adindan BF	30 N	545,100	1,362,500	
2 PERMITS						**231.83 / 23,183**



Note: For Permit Boundary Coordinates see Tables 4-1 and 4-2

0 2.5 5.0 7.5 10
Kilometres

Legend:
- *Exploration Permit Boundary*
- *Exploitation Permit Boundary*

Figure 4-3

Trevali Mining Corporation

Perkoa Mine
Sanguié Province, Burkina Faso
Exploitation and Exploration Permit Map

April 2018

Source: Google Earth, 2018.

SURFACE RIGHTS

Surface rights in the area of the Perkoa Exploitation Permit belong to the State of Burkina Faso. Utilization of the surface rights is granted by the Perkoa Exploitation Permit under the condition that the current users are properly compensated. All the taxes relating to Nantou's Mining Rights have been paid to date and the concession is in good standing.

ROYALTIES AND LEASE OBLIGATIONS

Other than the royalty on the revenues from mineral production to the Government of Burkina Faso, RPA is not aware of any royalties, back-in rights, payments, or other agreements and encumbrances to which the property is subject.

5 ACCESSIBILITY, CLIMATE, LOCAL RESOURCES, INFRASTRUCTURE AND PHYSIOGRAPHY

ACCESSIBILITY

The Perkoa mine is located in the Sanguié Province of Burkina Faso, approximately 120 km west of the capital city of Ouagadougou. The location of the mine is shown in Figure 4-1. Driving time from Ouagadougou is approximately 2.5 hours along paved roads, except for the last 7 km, which are on graded laterite road.

The project is 35 km by road from the country's third largest town, Koudougou, which is linked to neighbouring states of Cote d'Ivoire, Ghana, and Togo by paved roads and by rail to Abidjan, the capital of Cote d'Ivoire.

Burkina Faso is serviced by two international airports, one in Ouagadougou, and the other in Bobo-Dioulasso. There are numerous secondary airfields throughout the country. Asphalt highways connect the main cities and neighbouring countries, and a narrow-gauge railroad connects Kaya and Ouagadougou with the port city of Abidjan in Côte d'Ivoire. A modern cellular telephone network has been established in the country.

CLIMATE

The Perkoa region is of the Sudanese north type with two distinctive seasons: (i) a long dry season from October to May with temperatures between 15°C and 41°C, (ii) a season of rainfall from June to September with temperatures between 22°C and 35°C.

The annual precipitation ranges from 703 mm to 994 mm. The average monthly quantity is between 207 mm and 226 mm. The month of August is the wettest. The average evaporation is 3,524 mm.

Burkina Faso's climate allows for exploration to be carried out throughout the year. Geological fieldwork and rotary drilling are usually conducted during the dry season between January and May, while diamond drilling can be conducted throughout the year.

LOCAL RESOURCES

The main activity of the local population is subsistence agriculture and to a lesser extent the raising of animals. Crops grown include cereals (sorghum, millet, and corn), which annually occupy more than 85% of the sewed surfaces and constitute the principal food of the population. Some cash crops, mainly cotton, and peanuts are cultivated.

The Project is named after the nearest village, Perkoa, and borders three other villages, Sanguié, Bonyolo, and Pouni Naorth. Perkoa is divided into three main areas: Piokoura, Negoulidouan, and Dakoulitio.

INFRASTRUCTURE

There is limited existing infrastructure or services in the general area that are suitable to support the Perkoa mine. There is good road access to the mine site. All existing infrastructure in place is to support the local subsistence and small-scale agricultural practices. Power from the National Grid is deemed unreliable. The Perkoa mine generates its own power by diesel generators.

Water is supplied by a pipeline from a recently constructed dam at Seboun, approximately 18 km to the northeast of the mine.

The surface and underground infrastructure at the Perkoa mine includes the following:

- A 1,800 tpd to 2,000 tpd process plant.
- A tailings pond comprising three cells, a polishing pond, and a process water pond.
- A crushing plant.
- Administrative buildings, a warehouse, a dry, an infirmary, a laboratory, a main garage.
- A warehouse for reagents and lubricants.
- A decline and a series of ramp-connected levels.
- Power supply to the plant, mine, workshops, camp, and offices is provided by five diesel Caterpillar 3516B-HD (2MVA) generators.
- Mining equipment.

Figure 5-1 presents an overview photograph of Perkoa.

FIGURE 5-1 PERKOA OVERVIEW

PHYSIOGRAPHY

The site topography is relatively flat; with a prominent hill directly to the southeast of the underground mine area. Topographical elevations range between 265 MASL and 271 MASL. The prominent hill southeast of the mining areas shows elevations ranging from the 271 MASL on the surrounding plain to a maximum of 293 MASL.

6 HISTORY

PRIOR OWNERSHIP

The Perkoa mine area has been explored and investigated by a variety of companies for approximately 38 years. The initial exploration was undertaken as part of a wider United Nations Development Program (UNDP) research program, however, this was followed by further exploration by La Société Minière et Métallurgique de Peñarroya (Peñarroya), Boliden AB (Boliden), Billiton Plc (Billiton) (now BHP Billiton), and Metorex (Pty) Limited (Metorex), before AIM Resources Ltd. (AIM Resources), which subsequently changed its name to Blackthorn, took over the project in 2005.

In late 2010, a joint venture between Blackthorn (39.9%) and Glencore (50.1%) was formed. In March 2013, agreement was reached for Glencore to provide additional equity funding to the project. Blackthorn elected not to fund its equity share of the $80 million funding and, as a result, its interest in the Project was diluted from 39.9% to 27.3%. In May 2014, Blackthorn and Glencore reached an agreement whereby Glencore acquired Blackthorn's 27.3% interest in the Perkoa Project, thereby allowing Blackthorn to exit the Perkoa Project and increasing Glencore's interest to a 90% level. As of August 31, 2017, Trevali finalized the purchase of Glencore's 90% interest in the Perkoa Project. Production at the Perkoa mine commenced in May 2013 and is currently ongoing.

EXPLORATION AND DEVELOPMENT HISTORY

The key milestones of the Project are described in the following sections.

UNDP – BUMIGEB: 1979 – 1982

Various anomalies including Perkoa were discovered following regional soil geochemistry conducted by the Bureau des Mines et de la Geologie du Burkina (BUMIGEB), the Burkina Faso state run geological research and mining company, between 1979 and 1982 during an exploration program funded by a United Nations Development Programme (UNDP):

- Regional soil geochemical surveys.
- Follow-up soil geochemical surveys.
- Ground geophysical surveys including magnetics and electromagnetic (EM).

- Surface diamond drilling included 12 inclined drill holes totalling 2,359.5 m.

PEÑARROYA – BUMIGEB: 1983 – 1986

More detailed geochemistry as well as auger drilling, geophysics, and diamond drill holes undertaken confirmed the Perkoa zinc-silver volcanogenic massive sulphide (VMS) deposit. The following work was completed between 1983 and 1986 in a joint venture between Peñarroya and BUMIGEB:

- Additional ground geophysical surveys.
- Surface diamond drilling included 39 inclined drill holes totalling 12,925.4 m.
- A pre-feasibility study report.

BOLIDEN: 1990 – 1992

Boliden undertook a drilling program and defined a maiden resource for Perkoa:

- Surface diamond drilling included 23 inclined drill holes totalling 6,476.0 m.

BILLITON: 1996 – 1997

Billiton undertook further drilling as well as geotechnical work and re-estimated the resource. The following work was completed between 1996 and 1997 by Billiton:

- Surface diamond drilling including six inclined and vertical drill holes totalling 1,283 m.
- Re-sampling of 19 historical drill holes for check analyses and metallurgical testwork. The check assays by Billiton did not find major discrepancies in the zinc assays.
- Soil geochemical survey (50 m by 50 m grid).
- Re-interpretation of regional geophysical airborne magnetics and EM data.
- Pre-feasibility study.

METOREX: 1999 – 2004

Metorex acquired the project from Billiton on September 30, 1999.

No field work was carried out by Metorex on the Perkoa deposit. A geochemical anomaly situated 5 km southwest of Perkoa (Prospect AF1 of Billiton) was tested by induced polarization (IP) geophysical techniques, reverse circulation (RC) drilling, and diamond drilling in December 2002. Three DD holes, totalling 500 m in length, were drilled at this anomaly and

intersected semi-massive pyrite/pyrrhotite mineralization, which was considered to be of little economic significance by Metorex.

AIM RESOURCES: 2005 – 2008

In 2005, AIM Resources obtained ownership of Perkoa and commenced drilling for exploration and metallurgical testwork.

- December 2005 – Bankable Feasibility Study (BFS) completed by Snowden Mining Industry Consultants (Snowden).
- March 2007 – Exploitation Licence for Perkoa awarded to AIM Resources.
- March 2007 – Project construction commenced for a 525,000 tpa mining operation based on the design developed in the December 2005 BFS.
- July 2008 – Construction halted and Perkoa was placed on a care and maintenance program due to declining zinc prices.

BVL: 2010 – 2014

BVL was a joint venture between Blackthorn and Glencore that explored the potential of the Perkoa deposit and four exploration permits (POA, Guido, Seboun, and Sepaogo) from 2010 to 2014.

The significant exploration work completed during this phase included:

- Versatile Time Domain Electromagnetic (VTEM) System airborne geophysical survey.
- Airborne magnetic survey.
- Ground IP geophysical surveys.
- Rotary Air Blast (RAB) drilling and geochemical sampling.

GLENCORE: 2014 – MID 2017

In 2015, Glencore took over all responsibility for exploration. Glencore's review concluded that mine definition drilling should be prioritized, however, regional exploration must be undertaken well in advance of reserves depletion.

Glencore's exploration observations for the Perkoa area included:

- The Perkoa deposit appears to be a good conductor.
- IP surveys are not suitable for base metal deposit discrimination.

- Soil and stream sediment sampling could have significant limitations resulting in low confidence levels.
- Surface geological mapping is problematic due to the weathered terrain.

The principal exploration recommendation was that proven geophysical exploration techniques (airborne, surface, and downhole) should be employed in the search for large blind base metal deposits along the strike of the Perkoa deposit (the Perkoa Mine Horizon).

HISTORICAL MINERAL RESOURCE AND RESERVE ESTIMATES

On December 21, 2005, Snowden issued a BFS on behalf of AIM Resources.

The 2005 Mineral Resource estimate for Perkoa (Table 6-1) was classified as Measured and Indicated Resources using the guidelines of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code) (December, 2004).

TABLE 6-1 PERKOA MINERAL RESOURCE SUMMARY – AS AT AUGUST 29, 2005
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn Grade (%)	Contained Zn (Tonnes)
Measured	0.43	17.2	74,000
Indicated	6.29	16.3	1,025,300
Measured + Indicated	**6.72**	**16.4**	**1,099,300**
Inferred	-	-	-

Notes:
1. JORC (2004) definitions were followed for Mineral Resources.
2. Mineral Resources are estimated at a cut-off grade of 5% Zn.
3. Snowden 2005 Bankable Feasibility Study.
4. Numbers may not add due to rounding.

The 2005 Mineral Reserve estimate for Perkoa (Table 6-2) was classified as Proved and Probable Reserves using the guidelines of the JORC Code (December, 2004).

TABLE 6-2 PERKOA MINERAL RESERVE SUMMARY – AS AT AUGUST 29, 2005
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn Grade (%)	Contained Zn (Tonnes)
Proved	0.24	14.2	34,100
Probable	6.03	14.5	874,300
Proved + Probable	**6.27**	**14.5**	**908,400**

Notes:
1. JORC (2004) definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated at a cut-off grade of 9% Zn.
3. Snowden 2005 Bankable Feasibility Study.
4. Numbers may not add due to rounding.

These estimates prepared for AIM Resources are considered to be historical in nature and should not be relied upon. These estimates are relevant as these are indicative of the mineralization on the property. Trevali is not treating the historical estimates as current Mineral Resources or Mineral Reserves and these have been superseded by the Mineral Resource and Mineral Reserve estimates in Sections 14 and 15 of this report.

Mineral Resource and Mineral Reserve estimation were completed by Perkoa and reviewed by RPA, with an effective date of December 31, 2016 (Table 6-3 and 6-4, respectively).

TABLE 6-3 PERKOA MINERAL RESOURCE SUMMARY – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn (%)	Contained Zn (Tonnes)
Measured	3.04	15.5	470,800
Indicated	1.22	12.4	151,000
Measured and Indicated	4.26	14.6	621,800
Inferred	1.64	12.9	211,000

Notes:
1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 5% Zn.
4. Shown at 100% ownership.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Numbers may not add due to rounding.

TABLE 6-4 PERKOA MINERAL RESERVE SUMMARY – AS AT DECEMBER 31, 2016
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn (%)	Contained Zn (Tonnes)
Proven	1.70	15.8	268,900
Probable	0.78	13.7	107,400
Proven and Probable	**2.48**	**15.1**	**376,300**

Notes:
1. CIM (2014) definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated at an NSR cut-off value of $100/t inclusive of capital expenditure, incremental stopes greater than US$78/t are included based on individual financial analysis.
3. Mineral Reserves are estimated using an average consensus forecast zinc price of US$0.99 per pound and a €/US$ exchange rate of 1.11.
4. Shown at 100% ownership.
5. Numbers may not add due to rounding.

The 2016 Mineral Resource and Mineral Reserve estimates were completed to a level that meet industry standards and were compliant with the terms and definitions provided in the Canadian Institute of Mining, Metallurgy and Petroleum (CIM) Definition Standards for Mineral Resources and Mineral Reserves dated May 10, 2014 (CIM (2014) definitions). RPA was not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the 2016 Mineral Resource and/or Mineral Reserve estimate.

PAST PRODUCTION

Table 6-5 presents the past production of the property from 2013 through to year-end 2017.

TABLE 6-5 HISTORICAL MINE AND CONCENTRATOR PRODUCTION
Trevali Mining Corporation – Perkoa Mine

	Units	2013	2014	2015	2016	2017	Total
Open Pit Mining	t	321,254	49,304	-	-	-	**370,558**
Underground Mining	t	221,889	466,377	551,814	580,411	721,503	**2,541,994**
Total Mining	t	543,143	515,681	551,814	580,411	721,503	**2,912,552**
Ore Processed	t	548,201	495,651	513,283	590,083	657,933	**2,805,151**
Zinc Grade	%	6.3	13.6	15.0	15.0	15.2	**13.1**
Zinc Recovery	%	92.8	96.7	89.3	92.1	92.5	**92.6**
Zinc Concentrate	t	63,648	126,015	130,269	153,715	170,707	**644,354**
Zinc Concentrate Grade	%	50.6	51.6	52.8	53.0	51.6	**52.1**
Zinc Metal Contained	t	32,215	64,976	68,804	81,422	92,731	**340,148**

7 GEOLOGICAL SETTING AND MINERALIZATION

REGIONAL GEOLOGY

The Perkoa deposit lies in a felsic to intermediary series of volcanic and volcanoclastic rocks, within the Paleoproterozoic Birimian Supergroup of West Africa. The prospective Birimian rocks in Burkina Faso are the same sequences that host major gold deposits in Burkina Faso and in neighbouring Ghana and Mali. The Birimian greenstone belts of West Africa are renowned for their gold mineralization, however, known occurrences of base metals are scarce. The Perkoa deposit represents the only significant zinc-silver massive sulphide mineralization discovered in the Birimian to date and it is also the first zinc-silver massive sulphide mineralization discovered in this region. Only zinc is currently being recovered at the Perkoa mine.

The Perkoa project area is located in the central part of the Boromo greenstone belt, which comprises volcanic and sedimentary rocks of the Lower Palaeozoic Birimian Supergroup that have been metamorphosed to lower greenschist facies. At least three phases of deformation have affected the Boromo belt and mafic to felsic dykes and granitic bodies were emplaced in several intrusive phases. The zinc mineralization has been dated at 2,120 Ma to 2,141 Ma (Billiton, 1998).

The extensive development of laterite and the paucity of outcrop have not allowed for detailed surface mapping to take place. Consequently, geological maps are based on limited information.

LOCAL GEOLOGY

In the Perkoa mine area (Figure 7-1), the Birimian sediments, lavas, and pyroclastics strike from northeast to southwest and generally dip steeply to the northwest. Several units of andesitic lavas with subordinate andesitic tuffs, separated by sequences of tuffs interlayered with fine grained clastic sediments, make up the lithological package in the project area.

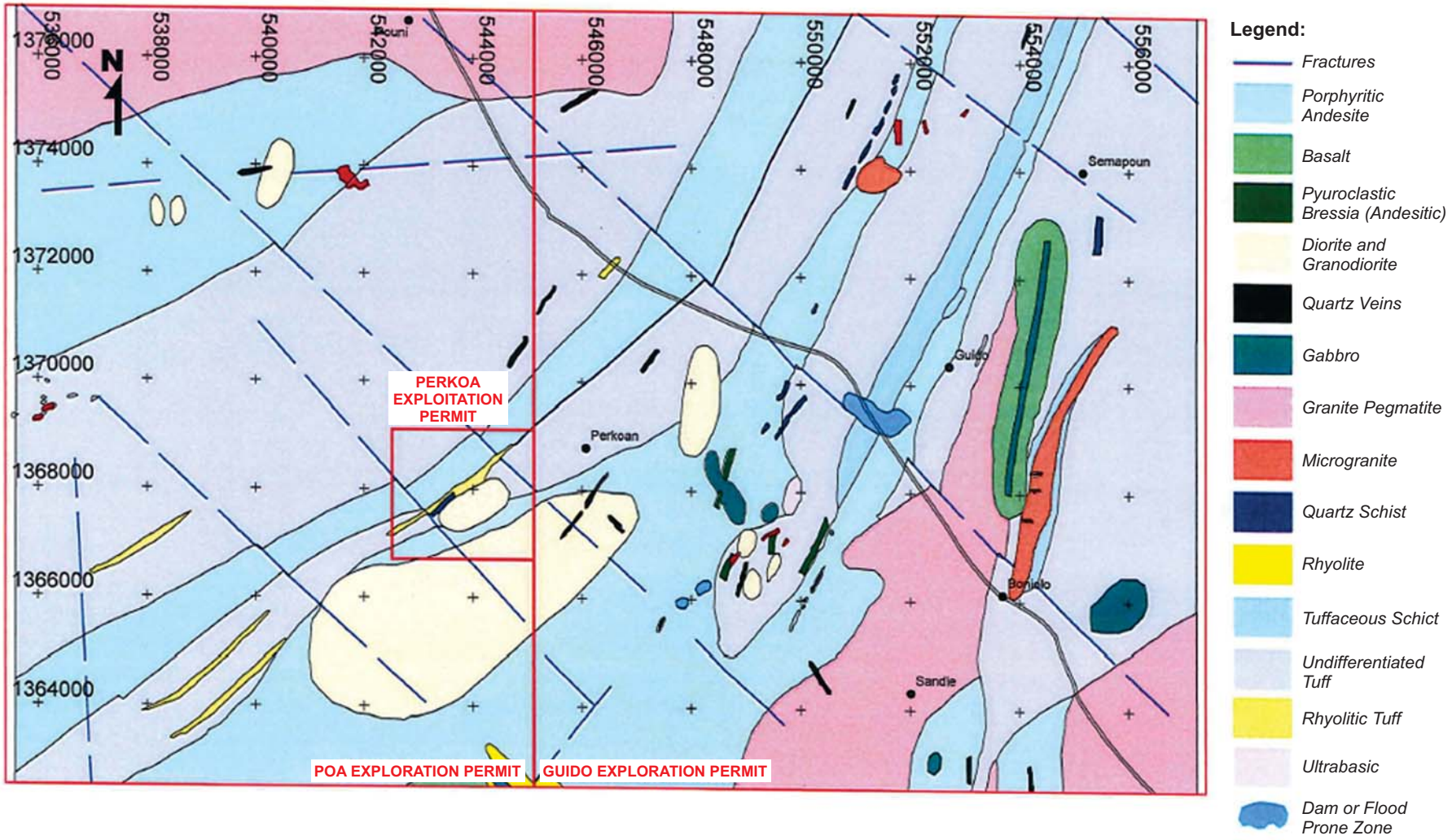


Figure 7-1

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Local Geology

April 2018

Source: Nantou Mining, 2017.

A number of syn-tectonic and post-tectonic intrusive bodies have been emplaced within the meta-sediments, which range from large plutons of granitic and dioritic composition to smaller ultramafic to rhyolitic intrusions. Crosscutting lineaments with a northwest-southeast orientation are common although major displacements along these lineaments are rare.

PROPERTY GEOLOGY

The Perkoa mineralization occurs as a series of stacked, northeast-southwest striking tabular VMS lenses hosted, and separated by, tuffaceous material that has been overturned with an average dip of approximately 70° (Figure 7-2). The deposit is unusual for its high concentrations of zinc and barium mineralization, and relatively low levels of lead and copper.

The stratigraphic hanging wall is represented by andesites. Six mineralized lenses, hosted within the tuffs, have now been identified; one main lens called “Footwall Lens” (split into normal and high grade domains due to plutonic activity which had locally caused remobilization of zinc), one minor thin (less than 2 m) lens in the footwall, which is sometimes intermixed with the main orebody, and four minor lenses in the stratigraphy above called “Hanging Wall Lenses”. A granitic pluton is present in the footwall of the deposit and locally intrudes into the mineralized orebody, creating enriched remobilized areas. The volcanics in contact with the granodiorite are locally metasomatized, forming a silica-magnetite-garnet skarn.

Dyke structures crosscut the deposit, most notably a large granitic dyke 5 m to 20 m thick striking east-northeast to west-southwest and dipping an average of 50°, and have replaced areas of mineralization. Smaller families of andesitic and basaltic dykes crosscut the deposits and are typically sub-horizontal and sub-vertical respectively. Finally, the deposit is cut by several felsic to intermediary intrusive rocks, which tend to reappear in more or less regular intervals and can be interpreted as the feeders of lavas and intrusions found locally above and below the mineralized sequence.

One major reverse fault, which is split into several minor to major ones, crosses the entire orebody from the southern point of the open pit on surface to the northern point of the deepest part of the mine and seems to play an important role on the geological continuity of the orebody and other structural elements.

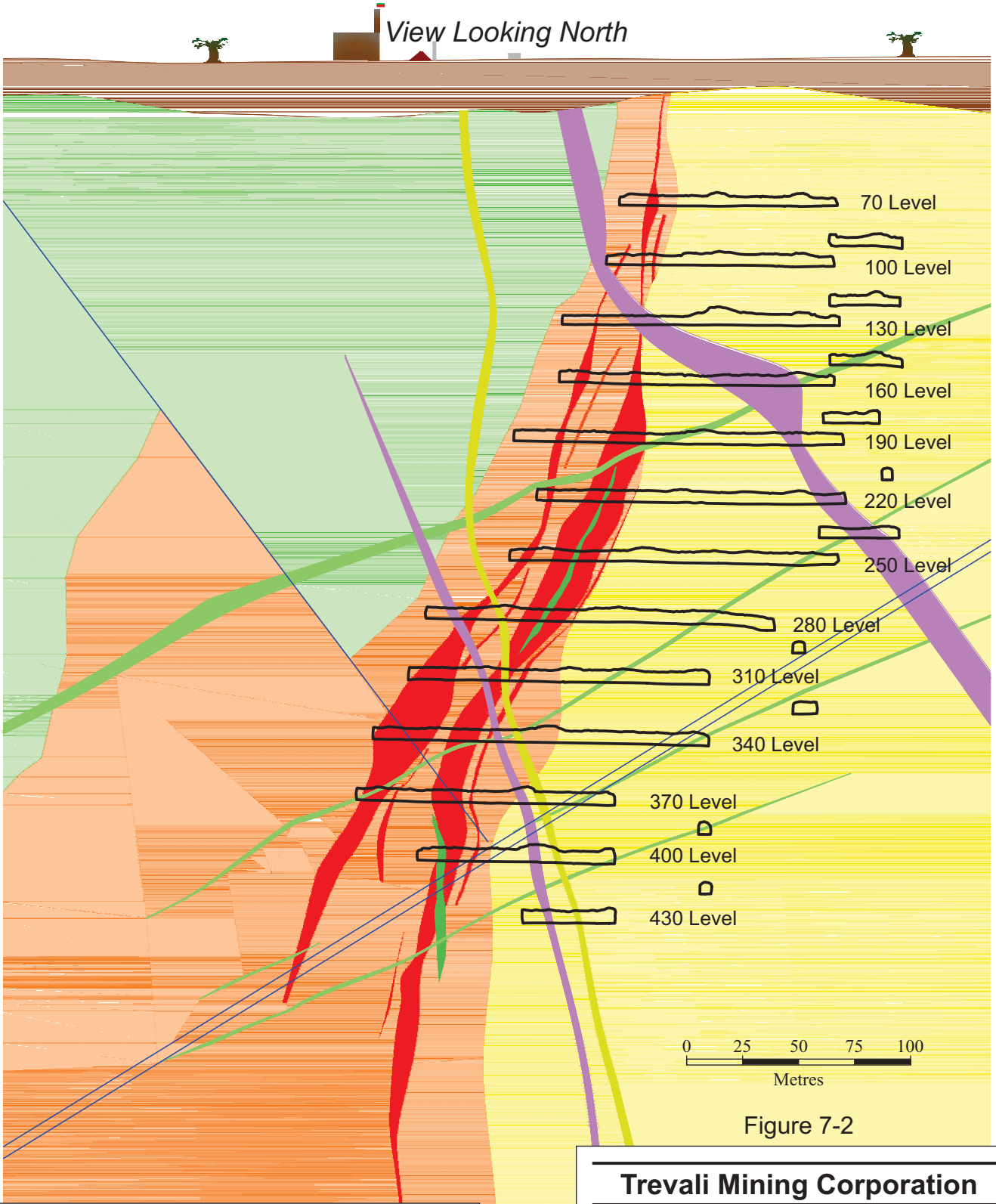


Figure 7-2

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Schematic Vertical Cross Section of the Perkoa Deposit

April 2018

Source: Nantou Mining, 2018.

MINERALIZATION

The Footwall Lens is the thickest (up to 25 m to 30 m) most continuous and typically the highest grade of all the lenses. It is a massive sulphide lens, with sharp hanging wall and footwall contacts and is interpreted to have formed at or near the seafloor. The Footwall Lens typically has higher zinc grades than that of the Hanging Wall Lenses and represents the majority of the overall Mineral Resources. The Footwall Lens is composed of approximately the same proportions (20% to 25%) of coarse grained sphalerite and pyrite, a minor content of pyrrhotite, plus localized galena associated with silver. Locally barite (up to 15%) is a common constituent of the gangue. In the upper northeastern area of the deposit, the Footwall High Grade Lens has grades in excess of 50% Zn near the contact between the sulphide lens and granodiorite pluton. This is due to the late heat driven re-modification of the sulphide mineralization by the granodiorite. Zinc grades in the footwall average between 9% and 15%.

The Hanging Wall Lenses are typically thinner (up to 15 m) than the Footwall Lens and represent more interbedded features of massive, vein type, sulphide replacement, or disseminated VMS together with tuffaceous material along the same geological horizon. These lenses are interpreted to represent sub-seafloor replacement by sulphides. In these lenses, the pyrite and pyrrhotite content is higher than that of the Footwall Lens, while barite content is lower and almost no lead and silver are present. Due to the interbedded and disseminated nature of the Hanging Wall Lenses, they are typically of lower average zinc grade, however, they are found to have some enriched zones in proximity to fault zones and/or intrusions

High temperature alteration, ferruginous and copper minerals can be found in small proportions in the Hanging Wall lenses, especially at depth or in relation to local structural features. From 310 level and below, assay results from both grade control samples and underground drill holes show a progressive enrichment in copper in the hanging wall main lens. Perkoa is known to host trace copper (generally below 10 ppm), but values in the hanging wall are progressively increasing up to 0.6% on 370 level. A preliminary “copper area” lens is being modelled to investigate the potential.

REGIONAL EXPLORATION TARGETS

A 2008 airborne VTEM survey revealed that the Perkoa sulphide deposit gives a strong EM and magnetic response. A total of 46 other targets have been generated with four main clusters of anomalies, all located along the prospective Perkoa Mine Horizon. The principal regional exploration targets located along strike from Perkoa, marked on the VTEM survey, are presented in Figure 7-3 and discussed below.

AF1

AF1 is located approximately 5 km southwest from Perkoa and is centred on two VTEM/EM targets. Around the principal VTEM anomaly, the composition of the volcanics changes from andesitic clastic/lapilli tuffs with minor andesite flows to a mafic volcanic package, with pillow basalts interbedded with mafic clastic tuffs. Silica-sericite-pyrite alteration is abundant and historic drilling intersected pyrite-pyrrhotite stringers.

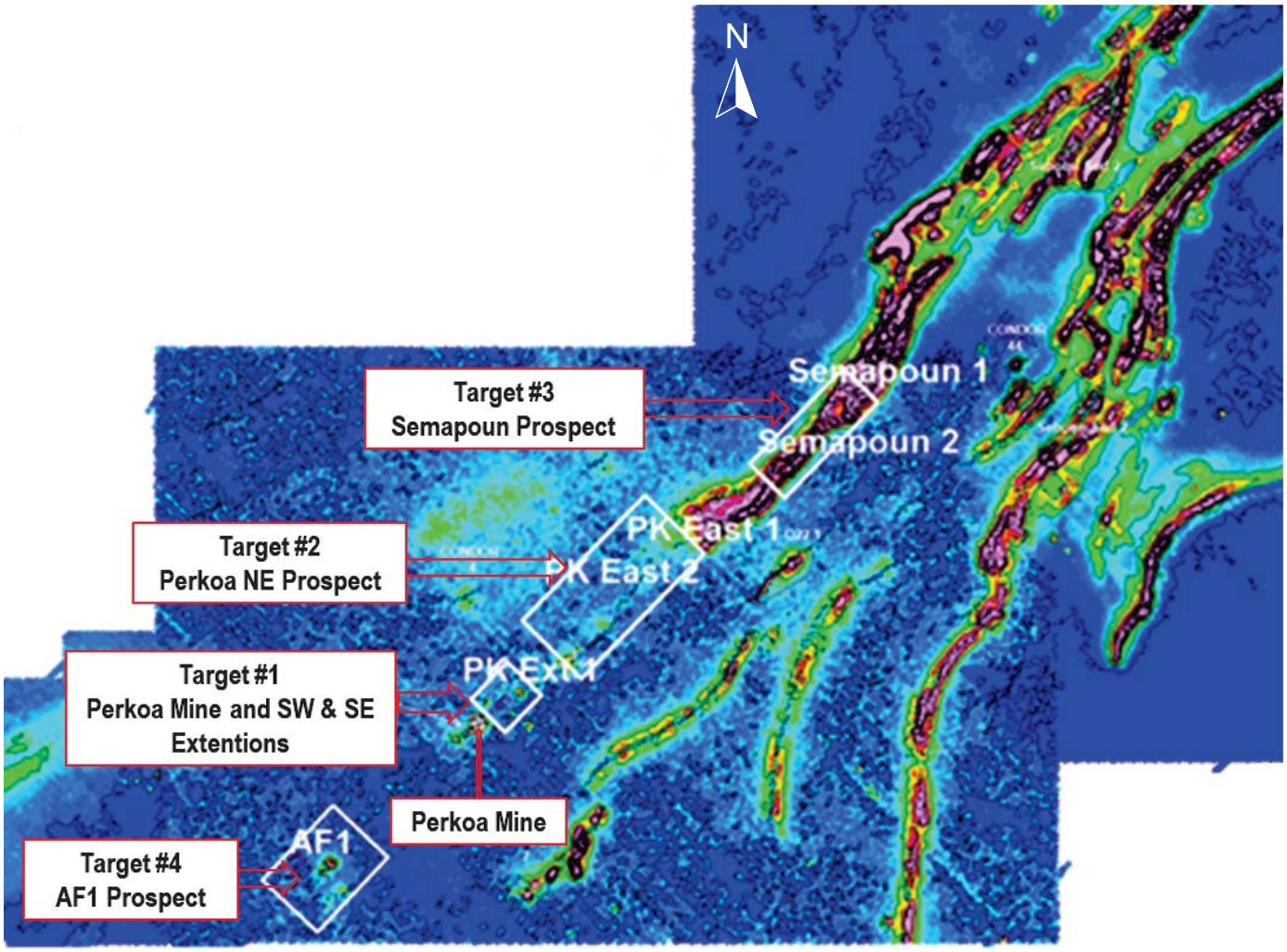
With an outcropping gossan and extensive alteration within the same volcanic package as Perkoa, AF1 is interpreted as being the second “VMS style” hydrothermal system along the horizon. The prospect is considered to consist of multiple stacked targets.

PERKOA NORTHEAST

Perkoa Northeast is a broad area located approximately 2.7 km to 7.0 km northeast of Perkoa. The volcanic package is dominated by interbedded andesitic clastics and crystal tuffs, with minor andesite flows and graphitic tuffs. Broad zones of intense silica-sericite plus sulphide stringers and chlorite-pyrite alteration have been mapped. Historic drilling intersected semi-massive pyrrhotite possibly a feeder zone to a massive sulphide.

SEMAPOUN

Semapoun is located approximately 11 km along strike, to the northeast of Perkoa. The geology is dominated by graphitic shales but Mn-Fe rich cherts and silicified tuff have been mapped along the Perkoa Mine Horizon. Historic RAB drilling identified anomalous Zn.



0 5 10
Kilometres

Figure 7-3

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Principal Brownfields Exploration Targets Located Along Strike from Perkoa, Marked on the Vtem Survey

April 2018

Source: Nantou Mining, 2018.

8 DEPOSIT TYPES

The Perkoa deposit has been classified as a VMS deposit (Billiton, 1998). VMS deposits are lenses and sheets of massive sulphide that form from seafloor hydrothermal systems where metal rich fluids (black smoke) precipitate on (exhalative) or near the seafloor (sub seafloor replacement.).

Worldwide, VMS deposits are major sources of zinc, copper, lead, silver, and gold.

VMS deposits generally display a massive sulphide horizon, overlying an alteration or stringer zone, and metal zonation is common. As VMS deposits commonly occur in groups or clusters, there is good potential for additional discoveries of mineralization in the Perkoa area.

The Perkoa deposit has also undergone later re-modification driven by late heat from the granodiorite intrusion located in the footwall. This resulted in recrystallization of the sulphides and metasomatism of the surrounding host rocks.

The important characteristics of this deposit type, that have been used to guide exploration and evaluation at Perkoa, have included:

- The relationship between the VMS deposit type and the steeply dipping planar brittle/ductile shear zones and regional zones of deformation which provided sources and pathways for the hydrothermal solutions.
- The occurrence in volcanic-sedimentary successions and often at an interface between two lithological units.
- Characteristic metal zonation.

9 EXPLORATION

EXPLORATION PROCESS AND TECHNIQUES

Upon completion of the purchase transaction, Trevali took over all responsibility for exploration as of September 2017 and have since ramped up exploration activities, building a new exploration team, with experience of the local geology. RPA concurs with Trevali's opinion that Perkoa should be considered as an emerging unexplored belt with analogies to Canadian VMS camps. Given the intensity of the mineralisation at Perkoa, especially its high grade nature, it is highly likely that Perkoa is not an isolated deposit.

Trevali has two goals with the exploration at Perkoa; (i) discover additional tonnes at the Perkoa deposit, and (ii) discover a new deposit in this unexplored, frontier VMS camp.

PERKOA MINE 2017 EXPLORATION ACTIVITIES

Following a comprehensive review of the data and geology of Perkoa by Trevali, new insights to the deposit were gained. A strong northeast plunge to the orebody was identified, with a coincident, northeast plunging, stretch lineation, identified in the surrounding rocks. The 2017 in-mine diamond drilling program focussed on down-plunge Mineral Resource extension drilling. In-mine exploration was based on the following considerations:

- The mineralization within the Perkoa deposit has a well-developed northeasterly plunge;
- No drilling has been conducted down plunge; and
- Mineralization remains open at depth below the orebody and along strike.

Perkoa 2017 in-mine resource conversion and expansion exploration drilling included 12,347.5 m of underground drilling and 12,756.6 m of surface drilling.

OPEN PIT MAPPING AND SAMPLING

The Perkoa open pit was re-mapped in October 2017. Sixty-three orientation samples were collected from both the northeast and southwest walls of the open pit in order to characterize the dispersion of the mineralization in the oxidized host rocks in the open pit:

- Forty-two of these samples were from two chip lines; and,
- Twenty-one of these samples were from point surface samples.

HISTORICAL CORE RE-LOGGING

In February and March 2017, seven historical holes (PS106, PS321, PS322, PS307GT, PS303, PS305GT, and PS323) were re-logged for geological interpretation allowing for improved targeting of the deep part of the deposit and the identification/confirmation of local to regional geological features.

UNDERGROUND MINERAL RESOURCE EXTENSION DRILLING EXPLORATION

Underground drilling was conducted from March to December 2017. This drilling, which is discussed further in Section 10, was planned to upgrade resources to the Measured and Indicated categories from 400 to 460 levels.

Of particular note was Drill Hole PU340 which was drilled to target the down-plunge depth extension of the hanging wall lens, and intercepted 12.05 m grading 8.68% Zn; including 7.00 m grading 11.74% Zn and 8.15 m grading 10.34% Zn at the 580 Level. This demonstrated the potential for additional material to be defined at depth. Follow up drilling is planned for 2018.

SURFACE RESOURCE EXTENSION DRILLING EXPLORATION

In 2017 surface exploration drilling targeted areas to the north of the deposit and at depth which could not be tested from current underground drilling platforms:

- **PX17_001**. This hole failed/cancelled.
- **PX17_002B** (777 m total depth) targeted the northeast extension. It intersected a strong sulphide stringer zone. Beginning with pyrite-pyrrhotite with chalcopyrite flecks, it continued into a sphalerite-pyrite stringer zone with intense chlorite-silica alteration. The hole then intersected a series of dykes and structures, which appears to be a major structure, locally termed “the big blue fault”, before continuing into another sulphide stringer zone. The hole will be surveyed with Borehole Electromagnetics (BHEM) in early 2018.
- **PX17_003** (662 m total depth) targeted the Perkoa Northeast extension. It only intersected a zone of minor disseminated/stockwork pyrite-pyrrhotite. The hole will be surveyed with BHEM in early 2018.
- **PX17_004** (914 m total depth) dropped significantly and intersected the target approximately 120 m below the designed intercept point, returning a broad zone of disseminated sulphide with minor sphalerite. The hole will be surveyed with BHEM in early 2018.

Three holes were drilled to test the main historic geophysical targets within the Exploitation Permit:

- **PX17_005** (512 m total depth) was drilled in the centre of a geophysical anomaly, but failed to intersect the source of the anomaly. A BHEM survey is planned for 2018.
- **PX17_006** (521 m total depth) was drilled to test the Perkoa Southwest EM anomaly, but failed to intersect any significant sulphide mineralization. The hole will be surveyed with BHEM in early 2018.
- **PX17_007** (575 m total depth) was drilled to test the VTEM/EM anomaly underneath Tailings Pond No. 2. This hole intersected a wide zone of disseminated pyrrhotite (2% to 5%) with minor associated alteration between 300 m to 350 m. The pyrrhotite is thought to explain this EM/VTEM anomaly, however, BHEM will be conducted on this hole in 2018.

2017 REGIONAL EXPLORATION ACTIVITIES

Trevali's regional exploration program is focussed on the discovery of new deposits within the economic transport distance of the Perkoa Mill. Trevali's 2017 exploration activities outside the Perkoa Exploration Permit, conducted under the auspices of 100% owned Nantou Exploration, included:

APPLICATION FOR ADDITIONAL GROUND

- Renewal applications for the POA and Guido Exploration Permits were approved in 2017.
- In addition, a 716 km^2 WorldView2 imagery with 50 cm resolution around Perkoa has been purchased. This high quality data will greatly aid mapping and regional exploration activities.

BUILD UP NANTOU EXPLORATION TEAM

- A dedicated senior exploration geologist was been hired along with three other experienced geologists.
- Trevali has retained a VMS specialist and geophysical consultants to provide advice and exploration guidance.

ACQUISITION AND REINTERPRETATION OF ALL EXISTING EXPLORATION DATA

- The existing exploration data includes geology, geochemistry, and geophysics.

- Nantou geologists are continuing a program that was initiated by Trevali in 2017, consisting of re-logging and re-sampling historical surface holes for inductively coupled plasma mass spectrometry (ICP-MS) analyses. The goal of this program is to generate a geochemical model using Leapfrog to determine indicators for future exploration. Nantou geologists have also attempted to map and better understand the volcanic stratigraphy.

- The Perkoa geophysical dataset has been reprocessed and the positioning of targets has been corrected.

- A first pass geological map of Perkoa Northeast was completed. Mapping was completed at 1:5000 scale. Although limited by outcrop coverage, a reasonable understanding of the geology of the area has been developed and two hydrothermal systems were identified within 5 km of Perkoa with associated geophysical and geochemical anomalies.

- A first pass geological map of AF1 was completed. Mapping was completed at 1:5000 scale and a good understanding of the geology of the area has been developed, and a hydrothermal system identified.

- The historic electronic exploration data was organized, cleaned, and validated. This data includes regional RC, diamond, and RAB drilling, soil sampling, trench sampling, and grab samples. There does appear to be missing data, which is reportedly in paper reports/folders.

- Over 40 prospective targets have been generated, in four main clusters, along the Perkoa Mine Horizon within the POA and Guido Exploration Permits.

SURFACE POINT SAMPLING PROGRAM

During the fourth quarter of 2017, approximately 21-point rock samples were collected by Nantou Exploration.

SURFACE SOIL SAMPLING PROGRAM

During the fourth quarter of 2017, approximately 674 soil samples (435 at Perkoa Northeast and 239 at AF1) were collected by Nantou Exploration. All samples were collected from the bottom of small pits dug 20 cm to 40 cm deep, below any wind blown or organic material and sieved to a -6 mm fraction. Sample spacing was based on a 25 m by 200 m grid.

SURFACE CHANNEL SAMPLING PROGRAM

During the fourth quarter of 2017, approximately 241 channel samples were collected by Nantou Exploration.

At Perkoa Northeast, 199 channel samples were collected from the 10 channel lines which have been completed. This sampling campaign has been targeting zones of alteration and stockworking, which is possibly part of a footwall alteration/feeder zone to the mineralized horizon, over which there are EM/VTEM anomalies. The geologists ensured that the lines were clean, and all continuous samples of rock (or saprolite) were taken.

Trenching was also conducted at AF1 with 250 m completed by year end 2017 (Figure 9-1).

FIGURE 9-1 AF1 TRENCHING

PROPOSED 2018 EXPLORATION ACTIVITIES

IN-MINE EXPLORATION

For 2018, approximately 5,000 m of underground drilling is proposed in order to target Measured Resources from 460 to 640 levels. This will be following up on the success of PU340, which discovered the extension to the Hanging Wall lens. The 2017 surface drilling will be followed up with downhole EM surveys.

As the mineralization is still open at depth, an additional 5,000 m of underground drilling is proposed to target new inferred resources from the 640 to 790 Levels. No drilling has

previously been conducted at these depths, which is targeting further extensions to the Hanging Wall Lens.

IN-MINE GEOPHYSICS

The 2017 surface and underground diamond drilling programs will be followed up in 2018 with downhole electromagnetic surveys (Crone) scheduled to start in Q1 2018. Petrophysical data on the rocks at Perkoa will also be collected. This will aid in the re-processing and re-interpretation of historic geophysical surveys.

REGIONAL EXPLORATION

The 2018 regional exploration program will be focussed on developing targets along the Perkoa Mine Horizon. The 2018 budget is approximately $3.5 million. As there are already over 40 targets generated from airborne EM, the targets will be evaluated by combining mapping, geochemistry, and further geophysics (including detailed ground EM and gravity). Geological mapping and first pass fieldwork on identified gossan outcrops will form the foundation of the exploration. The strongest targets will be tested with diamond drilling in the second half of the year.

The current goals of the regional exploration program is to increase Inferred Mineral Resources to support the Long Range mine planning, and to discover a new deposit.

REGIONAL GEOPHYSICS

Ground EM surveys will be conducted over selected targets, to verify the position of potential conductors. In addition, a gravity survey is proposed, initially over selected target areas within the belt to determine its effectiveness. This combined approach should allow for potential massive sulphide bodies to be distinguished from EM responses caused by stringer zones of pyrrhotite and graphitic shale.

DISCUSSION

In RPA's opinion, the areas covered by the exploration licences, as well as other areas along the Perkoa Mine Horizon, are very prospective for both base and precious metals. For base metals, the presence of the Perkoa VMS deposit is an indicator of the prospectivity for this type of deposit, which generally occurs in clusters.

A significant amount of exploration work has been carried out on the permits by previous operators which can be used for target generation. In RPA's opinion, Trevali should continue its comprehensive detailed review, compilation, and systematic exploration targeting plan, prior to any future significant greenfields exploration expenditures.

RPA also notes that due to the ability to take advantage of existing Perkoa infrastructure and processing facilities, the minimum size and grade thresholds for a potentially economic deposit would be smaller than the same thresholds for a stand-alone greenfields discovery.

In RPA's opinion, regional exploration activities should focus on the discovery of new, and/or upgrade of known, near surface exploration targets in the size range of approximately 250,000 t to 500,000 t. Based on the current life of mine (LOM) plan, a shortfall of production starting in 2022 will be approximately 500,000 t. Filling this gap with pittable resources will then allow mining of the crown pillar which will, in effect, extend the LOM to approximately 2025. This will also allow additional exploration time to explore for a Perkoa sized exploration target.

10 DRILLING

DRILL HOLE DATABASE

The Perkoa drill hole database contains 436 holes, totalling 86,623 m of surface and underground diamond core drilling (DDH). In addition, there are 54 geotechnical drill holes totalling 1,350 m. The database also contains grade control face and channel samples which have been converted into 980 pseudo drill holes totalling 6,722 m (Table 10-1).

TABLE 10-1 DRILL HOLE DATABASE
Trevali Mining Corporation – Perkoa Mine

	Diamond Drilling		Geotechnical Drilling		Grade Control Pseudo Holes		Total	
	No.	Metres	No.	Metres	No.	Metres	No.	Metres
Surface	133	42,314.98					133	42,314.98
Underground	303	44,307.56	54	1,350.00	980	6,721.59	1,339	52,517.15
Total	**436**	**86,622.54**	**54**	**1,350.00**	**980**	**6,721.59**	**1,472**	**94,832.13**

The drilling history is summarized below:

- Over the course of several campaigns prior to 2005, a total of 23,000 m of historical drilling was conducted by previous operators as described in Section 6. The aim of this drilling was to estimate Indicated Mineral Resources as well as limited Measured Mineral Resources for FS purposes.

- Almost 6,000 m of surface drilling was added during the 2011 to 2012 period in order to define the silver rich areas within the upper portion of the mine, with the aim of defining additional resources for conversion to open pit reserves.

- Between the end of 2013 and June 2015, 17,530 m of underground infill drilling was completed. Drilling followed the development of the underground mine and helped define most of the upper part of the mine from 70 to 280 levels.

- Between December 2015 and September 2016, 9,218 m of underground infill drilling was completed to upgrade the resources to a higher classification between 280 and 430 levels and complete the definition of the upper areas of the deposit.

- Between March and October 2017, approximately 8,796 m of surface diamond drilling was successfully completed targeting the bottom part of the orebody, local extension for resource upgrade and validation of the bottom inferred part of the orebody (460 level to 550 level), and local deposit exploration.

- Between October and December 2017, an additional 3,961 m were drilled from surface, targeting near-mine exploration targets, especially on the northeast-deep trend of the mineralization as well as localized deposit geophysical targets.

- In 2017, 12,348 m of underground diamond drilling was completed to upgrade the resource classification. This campaign is ongoing with a forecasted completion in March 2018, and should upgrade the current Indicated and Inferred Mineral Resources in the deep part of the mine to a Measured classification.

Figure 10-1 presents a schematic vertical cross section of the Perkoa deposit illustrating drill traces. Figure 10-2 presents a plan map illustrating drill hole collars.

Prior to June 2017, all DDHs were drilled NQ core size and split for sampling. Since June 2017 underground drill holes have been drilled BQ size core, with the entire core sent for sampling. Core recovery is estimated to be greater than 95%. All surface drill core is retained. For underground drilling, only a few split witness holes have been kept due to storage limitations.

Diamond drill spacing is generally 80 m by 80 m for Inferred, 50 m by 50 m for Indicated, and 25 m by 25 m for Measured Mineral Resource classification. Occasionally, a 20 m by 20 m drill spacing pattern is completed when detailed geological information is required (e.g., dyke locations). All drilling is completed by Canadian contractors.

Underground diamond drilling was ongoing during RPA's 2018 site visit. RPA visited the drill rig drilling hole number PU-374-3, located in a drill station of the 430 Level decline (Figure 10-3). RPA also visited the surface core processing facility which has undergone significant enhancements since RPA's 2017 visit (Figure 10-4). During the site visit RPA reviewed core from hole number PU 379, as well as the new bulk density / specific gravity determination set-up.

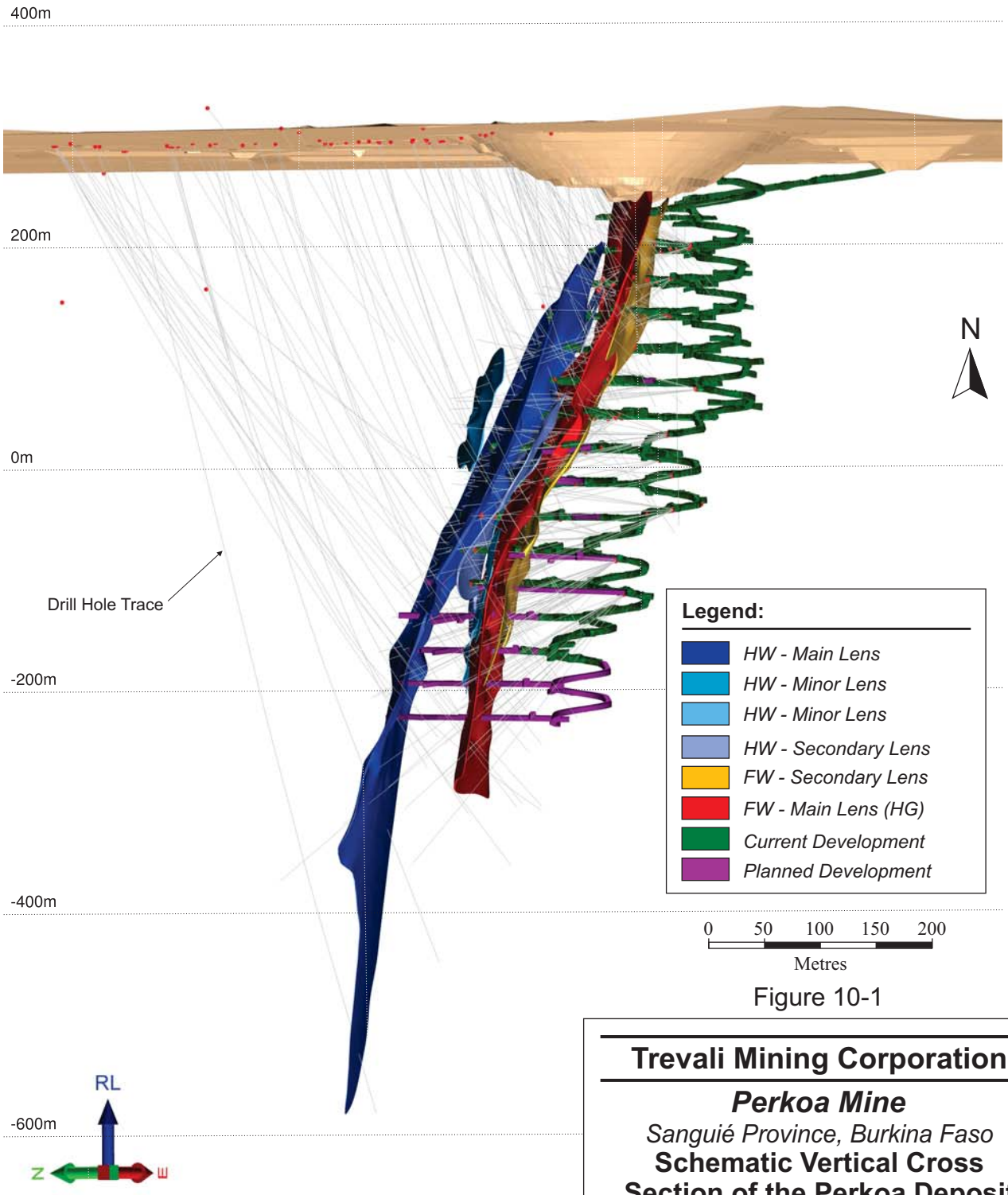


Figure 10-1

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Schematic Vertical Cross Section of the Perkoa Deposit Illustrating Drill Traces

April 2018

Source: RPA, 2018.

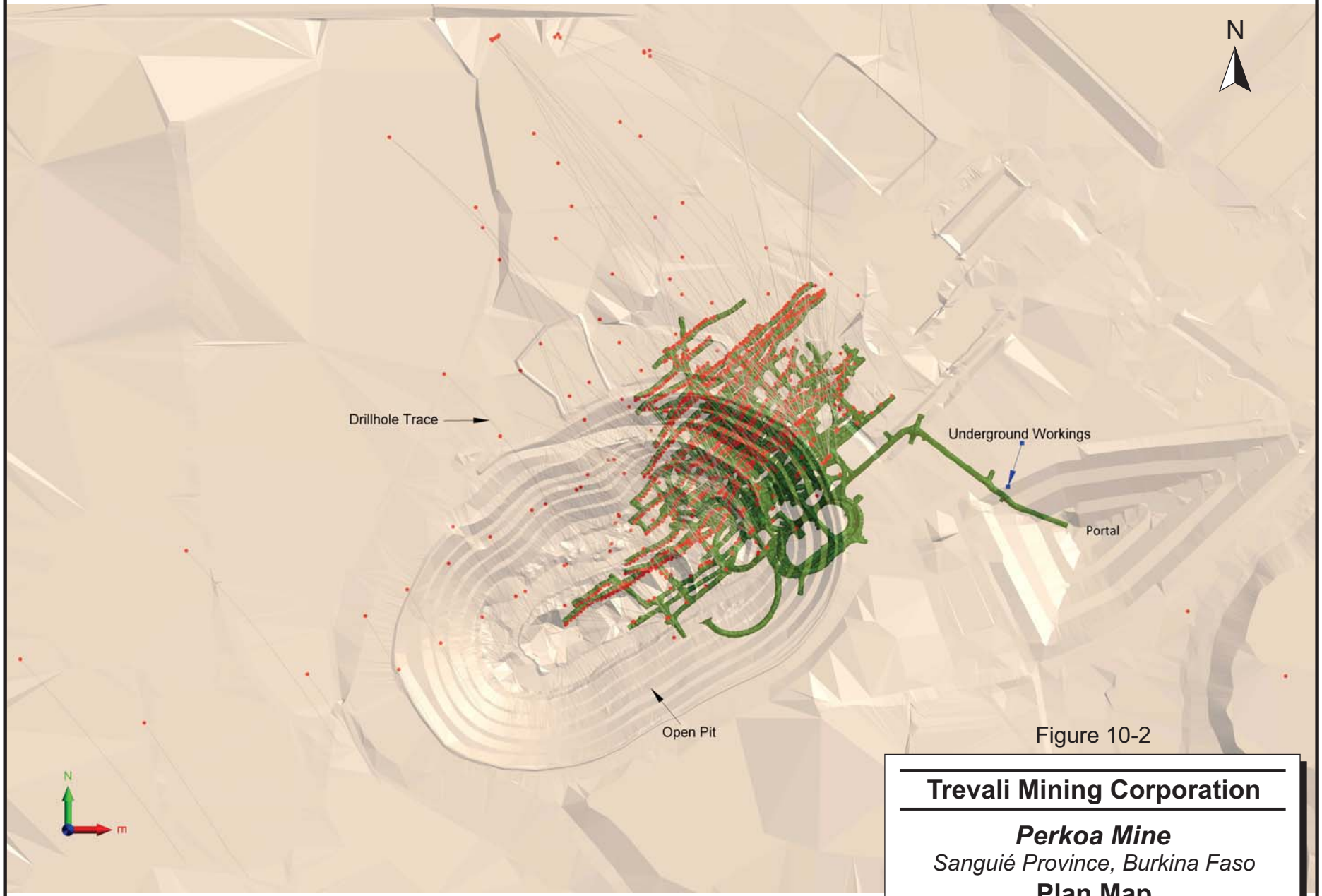


Figure 10-2

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Plan Map
Illustrating Drill Hole Traces

April 2018

Source: RPA, 2018.

FIGURE 10-3 PERKOA DIAMOND DRILLING – 430 LEVEL RAMP

FIGURE 10-4 PERKOA CORE PROCESSING FACILITY

SURVEY GRIDS

The current survey grid used at Perkoa is UTM WGS 84 Zone 30 north.

In 2013, underground development intersected traces of historical surface drill holes, and their coordinates in the database were found incorrect. The error was discovered to be a conversion error that occurred when AIM Resources converted all local grid collar coordinates to Clark 1880 and all collar coordinates converted to or recorded in Clark 1880 were later converted to WGS 84. The error was noted and corrected in 2014 by Glencore personnel onsite, who took the original survey coordinates and used an accurate conversion calculation to obtain the correct coordinates in WGS 84. These collar coordinate conversion adjustments have been verified by underground development which intersected historical drill traces or by underground confirmation DDHs which almost twinned the holes where errors were suspected.

DRILL PLANNING AND SITE PREPARATION

Drill holes are planned in Surpac software. Consideration is given to the orientation of the drilling in relation to the geological structures, to provide for unbiased sampling.

The Geologist, Drill Foreman, Mine Planner, Mine Surveyor, and Mine Manager all sign off on the drill hole plan prior to initiating drilling.

COLLAR SURVEYS

All surface drill hole collars are surveyed using a differential global positioning system (DGPS). A collar location, as well as a foresight and backsight for each side of the skid mounted surface rigs, are surveyed in order to facilitate drill line-up. Upon completion of the drill hole, the Mine Surveyors pick up the collar location as well as the sides of the rig to check accuracy.

Drill locations for underground drill holes are marked by the Perkoa Mine Survey Department. Surveyors mark the foresight and backsight drift walls and steel marker pins are drilled into the walls. Drillers are given drill instruction sheets showing the section lines, the direction of drilling, and the dip of the borehole. Drillers are allowed to field fit the collar position by up to 50 cm in any direction.

The drill foreman and geologist check the machine set-up before drilling starts and the underground production geologists visit the drill each day to review Environment Health and Safety (EHS). The Mine Surveyors pick up the as drilled collar location upon completion of drilling.

DOWNHOLE SURVEYING

Historic downhole surveying was carried out approximately every 50 m downhole.

Downhole surveying is currently conducted using a REFLEX Act III Rapid Descent digital core orientation system. For underground drilling, an initial survey is taken at 15 m to ensure the correct drill hole trajectory. If correct, subsequent surveys are taken at 30 m downhole intervals as well as at the total depth. At the end of the hole, a final multi-shot survey is taken back up the hole with an average survey interval of approximately three metres.

For surface drilling, the first survey is taken approximately 15 and then every 30 m downhole during drilling operations. Upon hole completion, a full multi-shot survey is taken at 15 m intervals up from the bottom of the hole.

All survey data is checked for any azimuth or dip variances prior to incorporation into the drill hole database.

GEOLOGICAL CORE LOGGING

Nantou Mining has a detailed procedure manual outlining drill hole logging and core sampling procedures. Prior to 2017, all logging was completed either on paper forms or in MS Excel. Currently, Nantou Mining geologists are using a customized MS Access logging form with the same database structure as the Surpac Drill Hole Database. Nantou Mining geologists are also now providing additional geological descriptions when logging, rather than just relying on codes. As is standard, more detailed descriptions are completed for the regional exploration geological core logging.

CORE PREPARATION

The drill core is delivered to the surface Core Processing Facility (CPF) by the drilling contractor. Prior to undertaking geological core logging and sampling, the geologist ensures that the core on all trays of the required borehole to be logged is identified by the borehole number and sequences (marked on the core trays) and sorted in proper order.

The geologist initially checks the entire drill hole core for the drilled depth, recovery, cavities (rare), and core blocks. The core is then carefully examined for structural features and fabric lineaments such as beddings and mineralization.

Surface core to be split is reviewed to determined equal structural and mineralization distribution on both sides of selected axial planes. The selected axial planes are then marked with a marker and fitted together in readiness for core splitting.

CORE LOGGING

The geologist initially checks the core for lithological contacts, core angles and extent of economical mineralization limits, Geological Footwall, Assay Footwall, Base of Banded Ore and Assay Hanging wall (GFW/AFW/BBO-AHW), by visual determination and estimations.

A comprehensive geological analysis of the core is then initiated by examining and recording all geological information on a standard logging form including the following details:

- Borehole Number.
- Location (Mine, Level and Section).
- Collar Coordinates (Easting and Northings) and Elevation.
- Bearing (Azimuth).
- Survey (Inclination and Azimuth).
- Drilling Dates (Dates when drilling of the hole was started and stopped).
- Date of Core Logging.
- Name of the Geologist (who logs the borehole).
- Descriptive notes and comments
- Ground conditions.
- Drilled interval (metres).
- Recovery (metres of core recovered or percentage of recovered core).
- Core angles (in degrees).

- Formation.
- Member (name of member of the rock formation).
- Sample number.
- Depth interval (of sampled core in metres).
- Recovery (metres or percentage of core recovered).
- Visual percentage estimation of mineralization.
- Zinc, lead, and silver assay grades.
- Mineralization type.
- Descriptions (colour, grain sizes and shapes, alterations, textures, veining, mineralization habits, core condition, as well as rock hardness and Rock Quality Designation (RQD)).

The core is photographed in a wet state just outside the core shed in natural light.

GEOTECHNICAL LOGGING

Geotechnical logging is conducted on the drill core by the geotechnical geologist who also performs the underground geological mapping. The use of oriented core has yet been implemented at Perkoa. Items recorded include:

- RQD.
- Number of discontinuities per metre.
- Joint Number (JN), Joint Roughness (JR), Joint Alteration (JA).
- Q-System.

CORE SAMPLING

HISTORIC PRACTICES

Based on SRK (2009), the core from BUMIGEB drill holes was sampled every one metre within the mineralized zones. The Boliden and BHP Billiton core were sampled with respect to rock facies contacts with the mineralized zone resulting in varying sample intervals between four and six metres.

CURRENT PRACTICES

Economical mineralization limits of ore minerals (GFW/AFW/BBO-AHW) are visually identified and carefully marked on the logged core in readiness for sampling. Sampling criteria are

focussed on sections containing grades higher than 5% sphalerite by visual estimation, however, currently, all sections with main mineralization areas (e.g., within the VMS) are sampled.

Main selection criteria for infill program sampling are as follows:

- Samples need to be limited to major lithological borders (i.e. minor dykes smaller than 50 cm in length can be sampled within an ore sample as internal dilution).
- Ore sample length must be limited to one meter and must not be smaller than 0.5 m, if the lithology allows it.
- Waste samples must be between 0.5 m and 1.5 m.
- For underground infill drilling:
  - All areas containing grades higher than 5% sphalerite (visual estimation) are considered as mineralized samples and must be sampled systematically. Other areas should not be sampled unless they represent a continuity in an existing orebody (between two other richer areas or on the borders of an orebody).
  - If the mineralization is interrupted by a non-economic area (major dyke, pillar, etc.) the area should not be sampled if bigger than 10 m. If smaller than 10 m, the full area will be sampled.
- For surface infill drilling:
  - All areas containing grades higher than 5% sphalerite (visual estimation) are considered as mineralized samples and must be sampled systematically. Any other mineralized areas (containing Zn, Ag, Pb, and Au) will be sampled with the same criteria as the waste (longer samples) for information purposes and records.
  - If the mineralization is interrupted by a non-economic area (major dyke, uneconomic mineralization, etc.) the area should not be sampled if bigger than 10 m. If smaller than 10 m, the full area will be sampled.
- All the ore sample areas must be “closed”: two samples of 1.5 m (adjusted on major lithologies) must be taken on each side of the mineralization to ensure a good closure of the mineralized area. This applies to waste portions described in the point above.
- All the samples must be identified on the core by clear marks showing the start and the end of the samples as well as the cutting line when necessary.
- The tag corresponding to each sample is inserted between the core and the block to make sure that the sample numbers are consecutive. QA/QC samples (blanks, duplicates, and reference material) are inserted after every 25th sample (one reference material, one blank, one reference material, one duplicate) in the sequence of sampling.
- Photos of good quality must include the marks on the core for verification and QC control.

Bulk density is conducted on drill core prior to splitting. Pre-2018, a minimum of 60%, and preferably 100%, of the sample length was tested using a standard Archimedean water displacement method. A new bulk density apparatus, installed in 2018, now allows for 100% of the sample length to be tested for bulk density.

The geologist samples half of the split core in interval limits of a quarter of a metre to one metre. Samples do not cross lithologies. One and one-half metre intervals are used for shoulder samples and in waste areas.

The Core Shed Attendant splits the marked core into half along the marked axial planes using a diamond saw and then lays the core back in the original positions on the core trays.

The sampled core pieces are packed in new small sample plastic bags and tagged with duplicate labelled sample tickets. The Geologist also ensures that the Quality Assurance/ Quality Control (QA/QC) process is followed during sample submission.

The small sample bags are then packed into larger bags which are secured to prevent contamination and spilling of samples during transportation to the assay laboratory.

All samples sent to the assay laboratory are listed in a submission form. This submission form includes:

- The name of person authorized and the goods dispatched.
- Any special analysis instructions.

Sample batches are composed of a maximum of 100 assays and QA/QC elements. Once prepared and validated by the geology department head, they are sent to the Ouagadougou laboratory (SGS or ALS in this case) to be prepared (crushed and dry) prior to being sent to the respective Vancouver labs by air freight for analysis.

Prior to September 2017, samples were delivered directly to SGS Ouagadougou by Perkoa mine transportation personnel and the reject samples were retained by SGS Ouagadougou and pulps are kept in either SGS Johannesburg or SGS Ouagadougou.

Since September 2017, samples are delivered directly to ALS Minerals (ALS) Ouagadougou by Perkoa mine transportation personnel or by courier. Once assay results are confirmed the

rejects are delivered to Perkoa and securely stored in containers. Pulps are currently retained by ALS in Vancouver, Canada.

UNDERGROUND CHANNEL SAMPLING

Nantou Mining has a detailed geological procedures manual for underground sampling. The purpose of this sampling is to determine the actual mineral grades of the exposed ore for use in determining the size and intersection grade, for use in Mineral Resource estimates.

- The initial procedure is to determine that the work area is safe and that the required personal protective equipment (PPE) is conformed with.
- Channel sampling is generally completed on the Northern or Southern wall.
- The geologist or geological assistant will then mark with paint all the contacts of the main geological units. The exposure will then be examined to determine the extent of mineralization and mark the probable sampling limits.
- Having completed this classification, a tape measure is then set up, at a height of 1.5 m above the bench, placing the zero at the extremity of the exposure.
- The previously marked geological units and probable assay limits are subdivided into suitable sample lengths ensuring that there are no sections that cross lithologies. The maximum sample length is 2.0 m and the minimum is 0.2 m.
- The position of all sample divisions in relation to the tape line are recorded as a simple sketch (not to scale diagram) in a field note book and the tape line is fixed to a survey peg. Positions of other main features relevant to the exposure are also marked on the sketch.
- A horizontal guide line corresponding with the tape is then drawn across the marked sampling sections marked earlier.
- Samples are then chipped using a hammer and chisel along the chalked guide line drawn on the sampling face. The groove cut or in effect the ideal groove should be 10 cm wide by 3.0 cm deep.
- In hard materials where groove cut may fall short of the ideal size, a suitable sample is obtained by taking equitable volumes from across the intersection following the guide line.
- Extra care is taken in sampling large concentration of minerals as they may not representative of the sample section as a whole.
- Clean polythene bags are used for sample collection. The sampler places a sample ticket number in each bag at site. No sample will be moved until the entire exposure is fully sampled and the samples have been verified by the sampler.

- Before leaving the site, the sampler must counter check the work completed against the field book entry. The number of samples in the field book must be equal to the physical samples in the bags.

- Underground samples are brought to surface by the sampler, and then packed and delivered directly to the Perkoa Mine Laboratory.

11 SAMPLE PREPARATION, ANALYSES AND SECURITY

HISTORIC SAMPLE PREPARATION AND ANALYSIS

No information is available on the sample preparation, assay laboratory, or QA/QC for the pre-2005 drill holes.

Samples collected by Blackthorn Resources were assayed for Zn, Pb, Ag, Cu, and As at Transworld Laboratory (TWL) in Tarkwa, Ghana, using aqua regia digestion (ARD) with an atomic absorption (AA) finish.

Samples collected by Blackthorn Resources following the BFS (2008 to 2011) were analyzed by ALS laboratories (ALS) in Vancouver, Canada after sample preparation in Ouagadougou, Burkina Faso. The samples were analyzed by four acid digestion with inductively coupled atomic emission spectrometry (ICP-AES) finish.

The first channel and face samples collected onsite on mining levels 70-130 (160-220 elevation) were all analyzed by ALS in Vancouver, Canada after sample preparation in Ouagadougou, Burkina Faso. These samples were analyzed using AA acid digestion with ICP-AES finish. All samples assayed thereafter for channel and face samples were analyzed at the onsite mine laboratory by pressed pellet X-ray fluorescence (XRF) analysis.

For the period 2013 to mid-2017, core samples were sent to SGS Ouagadougou for crushing and grinding. The pulps were then sent to SGS South Africa for analysis. The SGS commercial geochemical analytical laboratories in Burkina Faso and South Africa are officially recognized by the South African National Accreditation System (SANAS) for meeting the requirements of the ISO/IEC 17025 standard for specific registered tests for the minerals industry.

Prior to analysis, the pulps were weighed (SGS Code WGF79) and test samples were dry screened to ensure -75 µm passing (SGS Code SCR32).

The main assaying suite was SGS Ore-Grade Analysis Code ICP13B. The pulps were analyzed by two acid digestion with ICP-AES finish for lead, zinc, and silver. Ore-grade packages were used to analyse samples that have high concentrations of pay metals. Typically, ore-grade analyses were accomplished by adjusting the sample weight and final solution volume ratio, thus expanding the linear range of the analysis.

SGS also inserted a suite of internal laboratory blanks and certified reference materials (CRMs or standards). The frequency of inserted quality control materials was approximately 14%.

CURRENT SAMPLE PREPARATION AND ANALYSIS

A decision was made in early 2017 to change the analytical laboratory from SGS South Africa to SGS Canada to facilitate improved sample turn-around times. Following an in-country sample preparation laboratory review held in August 2017, the laboratory was changed later to ALS.

All new assays are now prepared (crushed and dried) at ALS in Ouagadougou prior to being sent to ALS in Vancouver for analysis.

The ALS commercial geochemical analytical laboratory in Burkina Faso (independent Abilab Burkina SARL laboratories in Ouagadougou, Burkina Faso, which is part of the ALS Chemex group) is officially recognized by the South African National Accreditation System (SANAS) for meeting the requirements of the ISO/IEC 17025 standard for specific registered tests for the minerals industry.

The ALS Vancouver laboratory is accredited by the Canadian Association for Laboratory Accreditation (No. A1719) in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system.

Iron and copper are now analyzed systematically and are included in the block model for metallurgical and geological purposes.

After receipt at the Ouagadougou laboratory facility the samples are sorted, weighed, and logged into the ALS Laboratory Information Management System. The raw samples are dried

before being crushed so that 75% of the sample passes at 2 mm. A 1.5 kg riffle split sub sample is removed for further preparation with the remainder being retained as a coarse reject. This 1.5 kg sub sample is further pulverized to pass 85% at 75 µm and then a screen test is used to ensure that the particle size is sufficient. Twenty percent of pre-pulped samples delivered to the laboratory are screened to ensure that 85% of the sample is less than 75 µm.

Samples are assayed using ICP-AES (ALS Code ME-OG46) with a method precision: ± 5%. A prepared sample is digested in 75% aqua regia for 120 minutes. After cooling, the resulting solution is diluted to volume (100 ml) with de-ionized water, mixed, and then analyzed by ICP-AES or by AA. The elements analyzed and reported are listed in Table 11-1.

TABLE 11-1 ALS ME-OG46
Trevali Mining Corporation – Perkoa Mine

Element	Symbol	Units	Lower Limit	Upper Limit
Silver	Ag	ppm	1	1,500
Copper	Cu	%	0.001	40
Iron	Fe	%	0.01	100
Lead	Pb	%	0.001	20
Zinc	Zn	%	0.001	60

Samples values below 0.01% Zn are returned as being below detection limit. Sample values obtained above 30% are re-analyzed by titration (Zn-VOL50), which can determine values up to 100% Zn (Method Precision: ± 3.5% / Reporting Limit: 0.01% Zn to 100% Zn).

ALS has internal QA/QC procedures to ensure the results are accurate. During sample preparation, this includes the use of barren material to clean crushers and pulverizers at the beginning of each job run, confirmation of every 50th sample passing at 2 mm and 75 µm (SCR34), as well as determining the dust loss percentage every week.

PERKOA MINE LABORATORY

The Perkoa Mine Laboratory utilizes XRF spectroscopy. In pressed pellet XRF, samples are compressed into a pellet and analyzed instrumentally. Only lower levels of metal concentrations can be detected accurately by this method. The advantages of XRF include rapid analysis time and accurate analyses, arising from the fact that inter-element corrections are well known and highly predictable.

The Perkoa Mine Laboratory analyses are used only for mine production sampling (channel samples, face samples, stockpile samples) and for process plant sampling.

The general process for geology samples includes:

- Receive and log in samples.
- Weigh and dry in over for one hour at 100°C.
- Crush to 2 mm and riffle split to 200 g.
- Add 0.5 g of wax to 4.5 g of sample to create a 5.0 g pellet (for each sample two pellets are made).
- Perkoa matrix matched XRF standards are used at the start and end of every XRF run.
- Normal expected variance is approximately ±2% Zn. Variances result in sample re-runs. The laboratory maintains a QA/QC spreadsheet which is reviewed daily.
- Reports are sent electronically to the Geology Department.

Plant samples, which arrive in liquid state, are kept separate from Geology samples at all stages of preparation and analysis. In the weigh room, there are separate work benches for geology and metallurgical samples.

RPA toured the Perkoa Mine Laboratory, and in RPA's opinion, it is professionally run. This laboratory is not certified and assays are not used in the Mineral Resource estimate. The Perkoa Mine Laboratory XRF assays are, however, used to determine concentrate grades. Composite samples are sent to Alfred H. Knight International Ltd. for independent confirmation.

QUALITY ASSURANCE AND QUALITY CONTROL

The QA/QC of the Perkoa geological database is subdivided into several exploration campaigns and periods of data collection.

HISTORICAL QUALITY ASSURANCE AND QUALITY CONTROL

The historical surface drill holes and surface drilling completed by Blackthorn Resources had their QA/QC evaluated in the Snowden 2005 BFS. The BFS listed all QA/QC issues and reviews of assays that had been completed for the FS and financing of the project. SRK (2009) considered the sample preparation and analytical quality of the data to be reasonable and the

quality of the data to be appropriately reflected in the classification criteria used to estimate the Mineral Resources.

Figures 11-1 to 11-4 present the QA/QC evaluation for all sampling conducted by Blackthorn Resources following the BFS (2008 to 2011) for drill holes P316 to P336. Some low results, compared to the defined grade of the standard, were noted and considered to be due to the samples not being fully digested.

FIGURE 11-1 ZINC STANDARD SAMPLE RESULTS GBM995-8

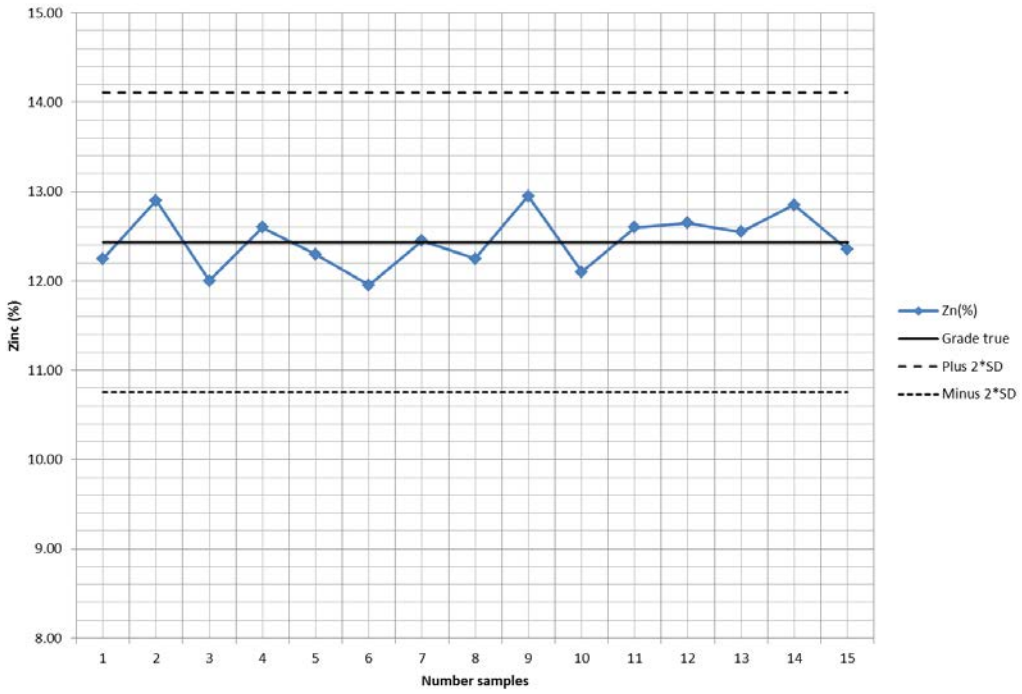


FIGURE 11-2 ZINC STANDARD SAMPLE RESULTS GBM308-12

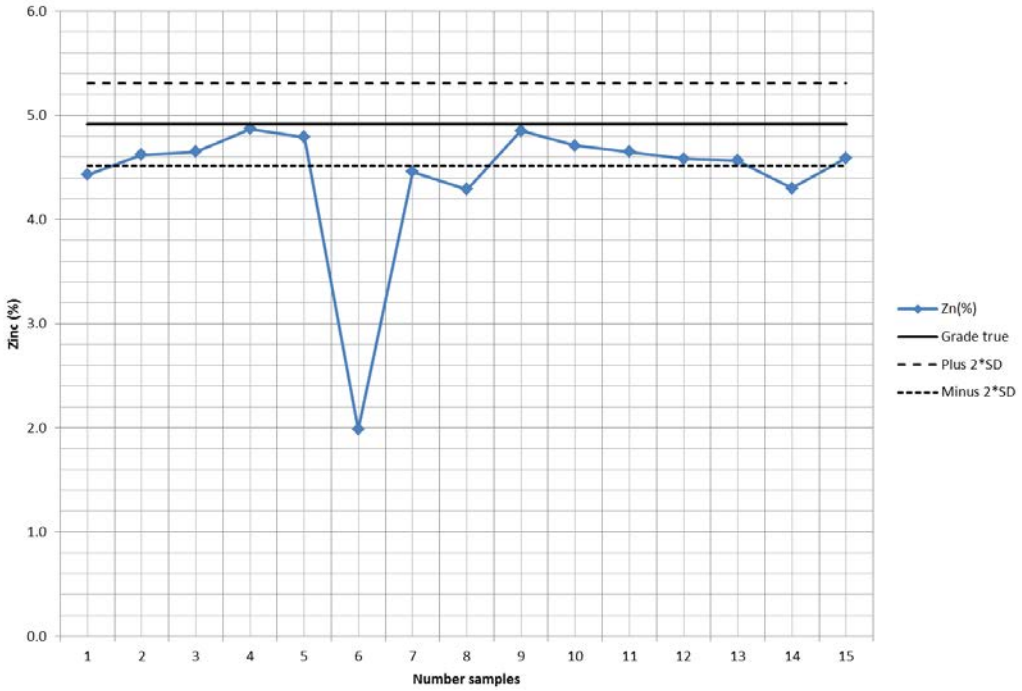


FIGURE 11-3 ZINC STANDARD SAMPLE RESULTS GBM308-14

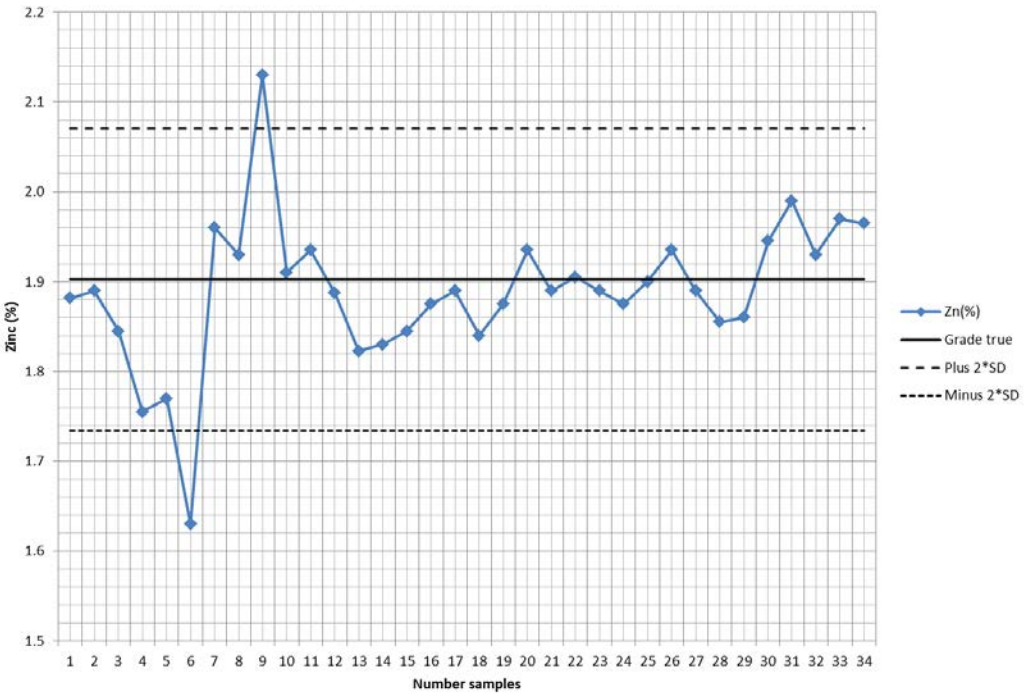
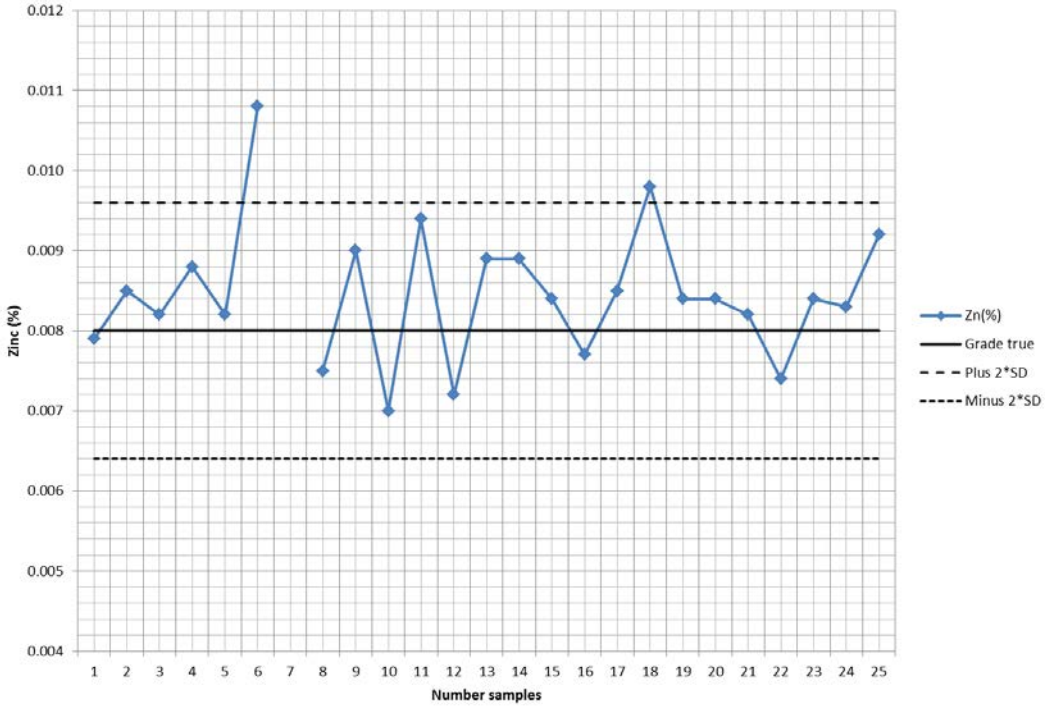


FIGURE 11-4 ZINC STANDARD SAMPLE RESULTS GBM307-38



The initial underground face and channel samples were all found to pass QA/QC based on blank, duplicate, and standard analysis for these batches.

2016 QUALITY ASSURANCE AND QUALITY CONTROL

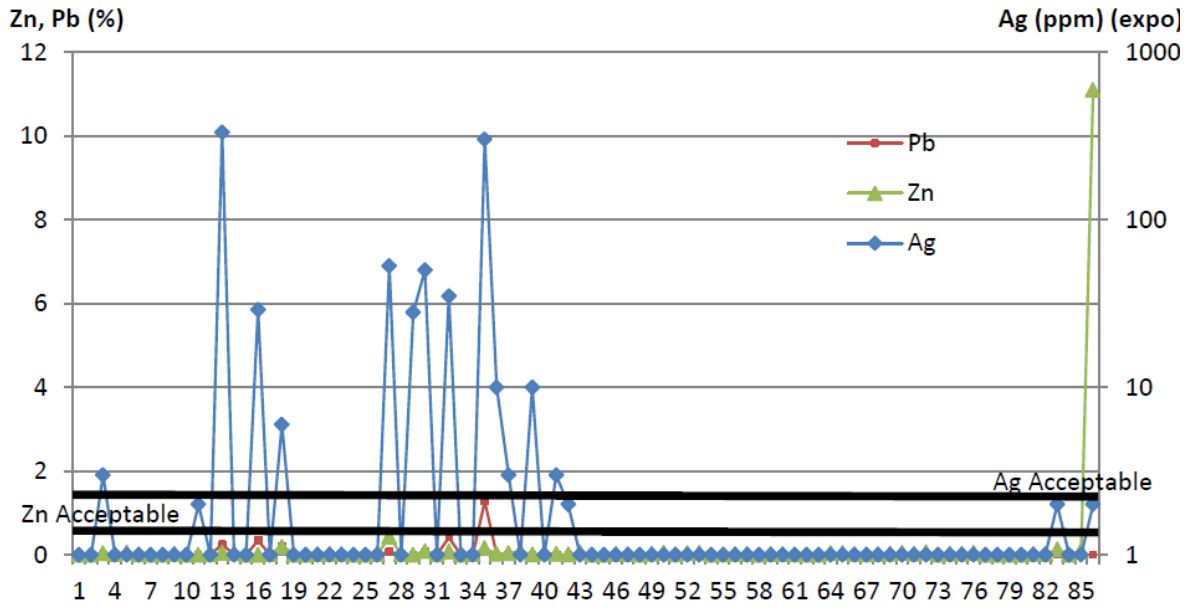
The following discussion on QA/QC results is based on assays processed by SGS and received during the period from April 4, 2016 to June 21, 2016. Nantou Mining's insertion rate for blanks and standards is 1 in 25.

BLANKS

The regular submission of blank material is used to assess contamination during sample preparation and to identify sample numbering errors.

Figure 11-5 illustrates the unacceptable values for silver results.

FIGURE 11-5 BLANKS



After an investigation, Nantou Mining determined that the quartz vein blank material being used was not completely non-mineralized. The source of blanks, for insertion at the core shed, was changed in mid-2016 to be granodiorite core sourced from the top of surface drill holes.

CERTIFIED REFERENCE MATERIALS (STANDARDS)

Results of the regular submission of certified reference materials (CRM) are used to monitor analytical accuracy and to identify potential problems with specific batches. Specific pass/fail criteria are determined from the standard deviation (SD) provided for each CRM. The conventional approach for setting standard acceptance limits is to use the mean assay ± two SD as a warning limit and ± three SD as a failure limit. Results falling outside of the ± three SD failure limit must be investigated to determine the source of the erratic result, either analytical or clerical. At Perkoa, the failure criterion is two consecutive standards outside the ± two SD limit.

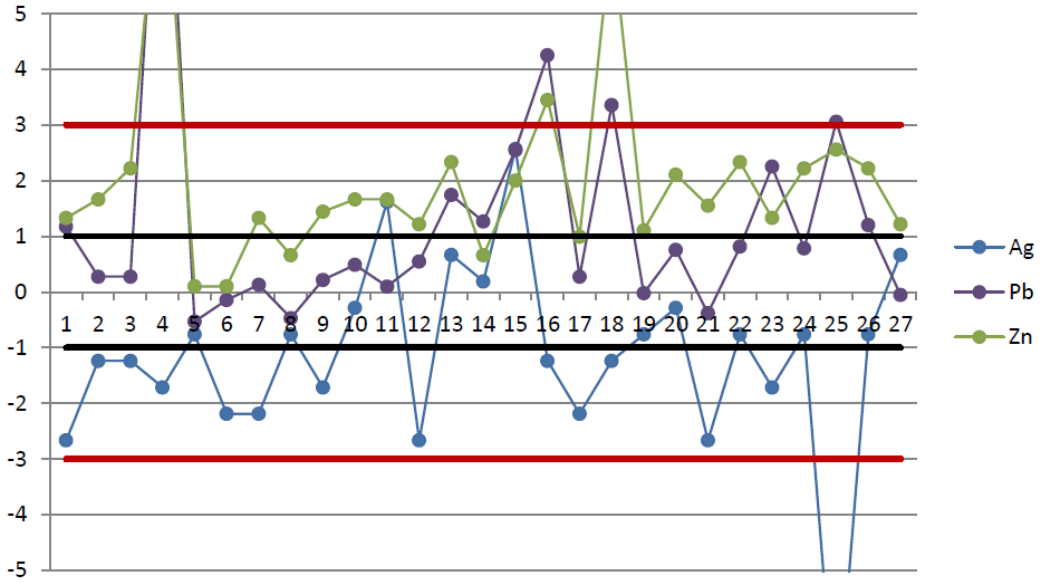
Table 11-2 lists the Geostats Pty Ltd (Geostats) certified ore grade base metal reference materials utilized in the 2016 QA/QC program.

TABLE 11-2 GEOSTATS PTY LTD CRMS – 2016
Trevali Mining Corporation – Perkoa Mine

Standard	No. of Insertions	Element	Grade	1 SD	2 SD	3 SD
GBM310-14	28	Ag (g/t)	59.6	2.5	5.0	7.5
		Pb (%)	8.9465	0.3355	0.6710	1.0065
		Zn (%)	17.9106	0.8084	1.6168	2.4252
GBM308-14	25	Ag (g/t)	40.2	2.6	5.2	7.8
		Pb (%)	0.6514	0.0234	0.0468	0.0702
		Zn (%)	1.9025	0.0840	0.1680	0.2520
GBM910-11	25	Ag (g/t)	19.2	1.2	2.40	3.6
		Pb (%)	1.3372	0.0622	0.1244	0.1866
		Zn (%)	3.9325	0.1654	0.3308	0.4962

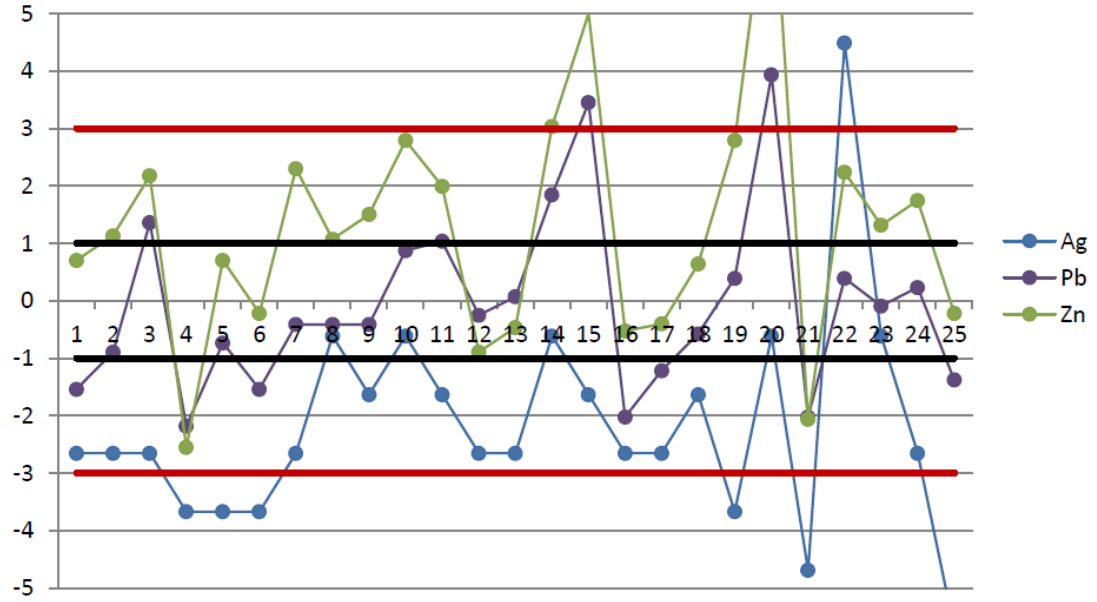
Figures 11-6, 11-7, and 11-8 present control charts for High Grade, Middle Grade, and Low Grade CRMs. The black lines represent ± one SD limits and the red lines represent ± three SD limits.

FIGURE 11-6 CRM – GBM310-14



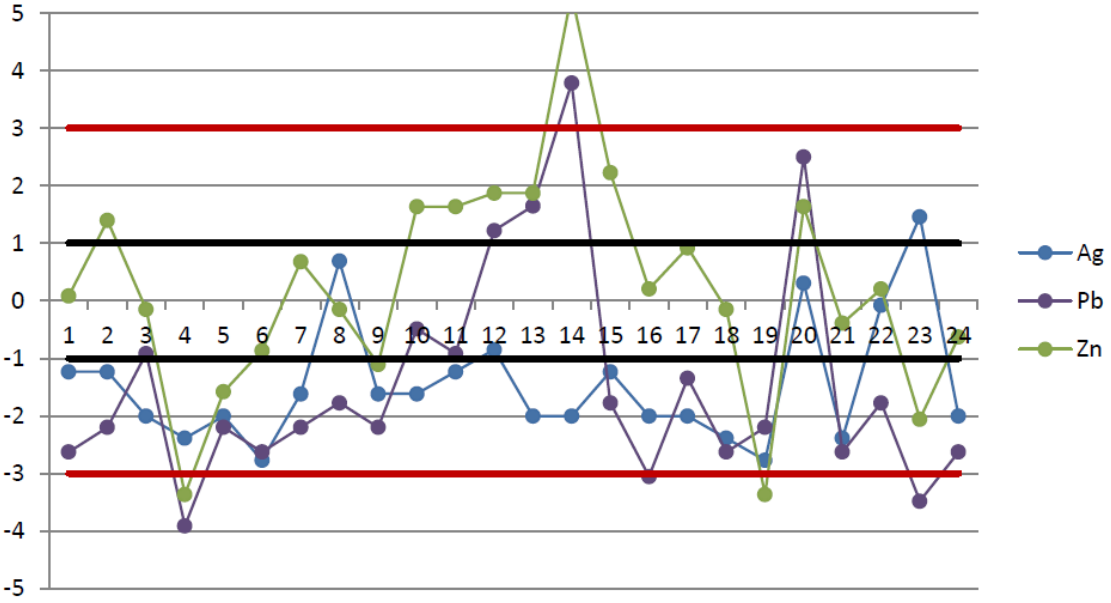
The graph for CRM GBM310-14 shows a large variance in the results and substantial deviations for high grade reference material, as almost all zinc and silver results fall outside of the ± one SD limit. There also appears to be a high assaying bias.

FIGURE 11-7 CRM – GBM910-11



The graph for CRM GBM910-11 shows a large variance in the results and substantial deviations for middle grade reference material, as the majority of the zinc and silver results fall outside of the ± one SD limit. There appears to be a high grade bias for the zinc assays.

FIGURE 11-8 CRM – GBM308-14



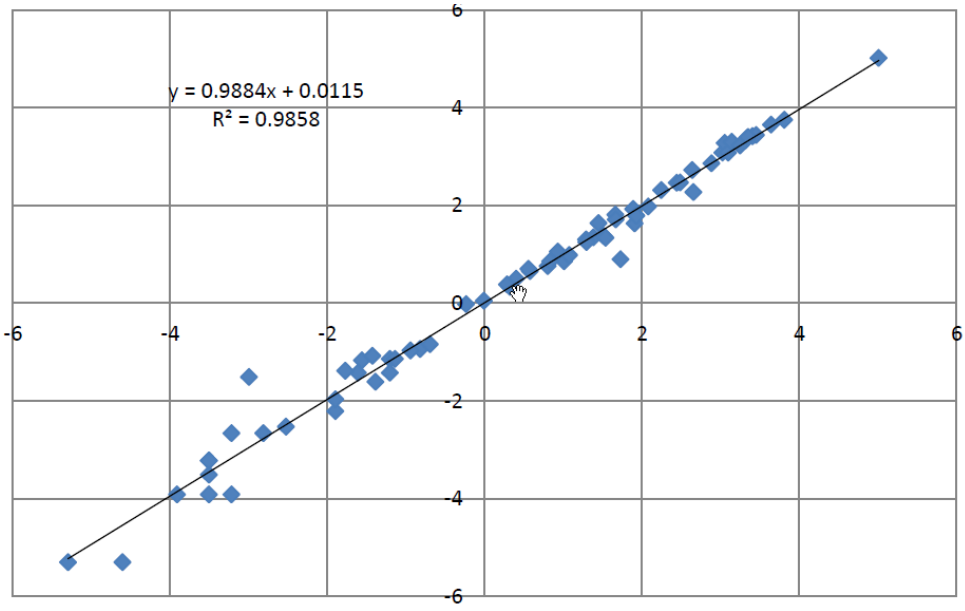
The graph for CRM GBM308-14 shows a large variance in the results and huge deviations for low grade reference material, as the majority of the lead and silver results fall outside of the ±

one SD limit. In this case, zinc is still biased high, while silver and lead appear to be biased low.

DUPLICATES

Figure 11-9 presents a plot of 70 pairs of original vs. duplicate assays for Zn%. Generally, there is a good correlation between the two sets of results with only a slight bias seen in the high and low grade populations.

FIGURE 11-9 ZN% ORIGINAL ASSAYS VS. DUPLICATES



Overall, results from the 2016 QA/QC program indicated that:

- The blank material was not barren.
  - The source material has been changed for future drill programs.
- CRM results indicated a large variance and a poor reconciliation with expected values.
  - There may be matrix effects that need to be investigated.
- Duplicates showed bias in the analysis with the original values higher than the duplicate values.
  - Umpire assaying was recommended for the 2017 QA/QC program.

2017 QUALITY ASSURANCE AND QUALITY CONTROL

The following discussion on QA/QC results is based on assays processed by SGS and ALS Vancouver laboratories received during the period from January1 to December 10, 2017.

BLANKS

Granodiorite core, sourced from the top of surface drill holes, was used for blank material staring in mid-2016. The granodiorite core has performed much better than the historical quartz vein blank material, however, some minor metal content is still being reported.

Figure 11-10 illustrates the results for zinc. One blank reported a suspicious value of 0.44% Zn, which is very close to the accepted limit of 0.5% Zn. Nantou Mining chose to not re-assay this batch as no other QA/QC element demonstrated abnormal data in this batch.

Five blanks reported results over 0.1% Zn No with the other blanks demonstrating small scale variances. As the geological cut-off is established at 5% Zn, it was deemed that all batches were acceptable and no batch has been reanalyzed for the blanks.

It is possible, however, that the variance in the results may come from contamination in the core processing facility. RPA recommends that a review of possible contamination causes and corrective actions be implemented.

FIGURE 11-10 BLANKS – ZN ASSAYS

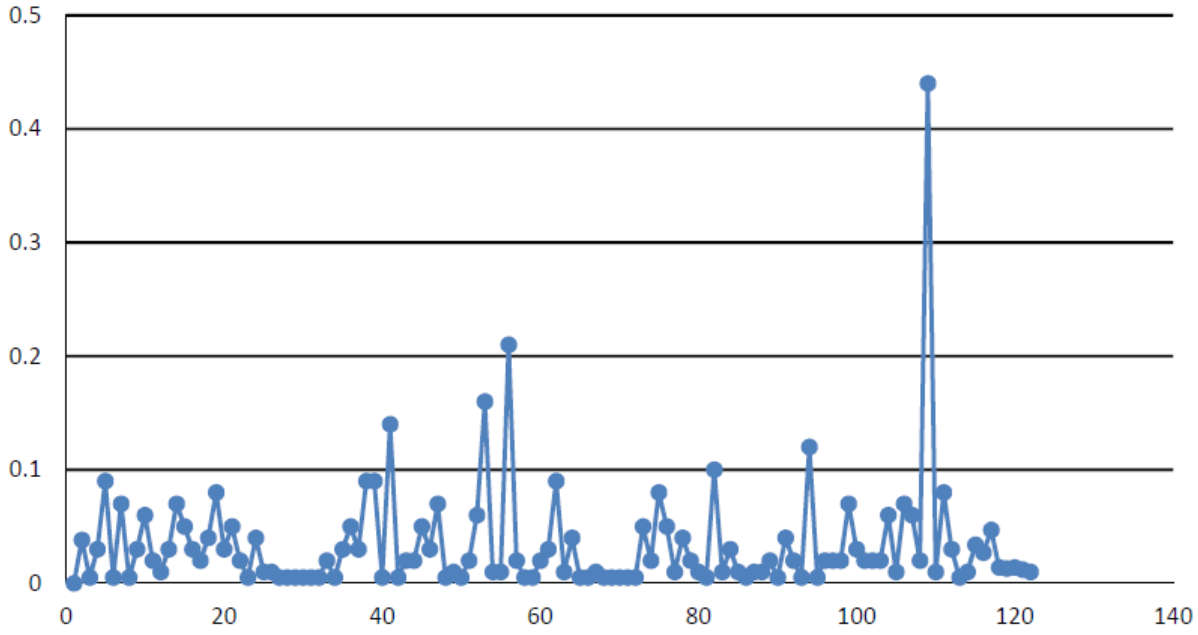
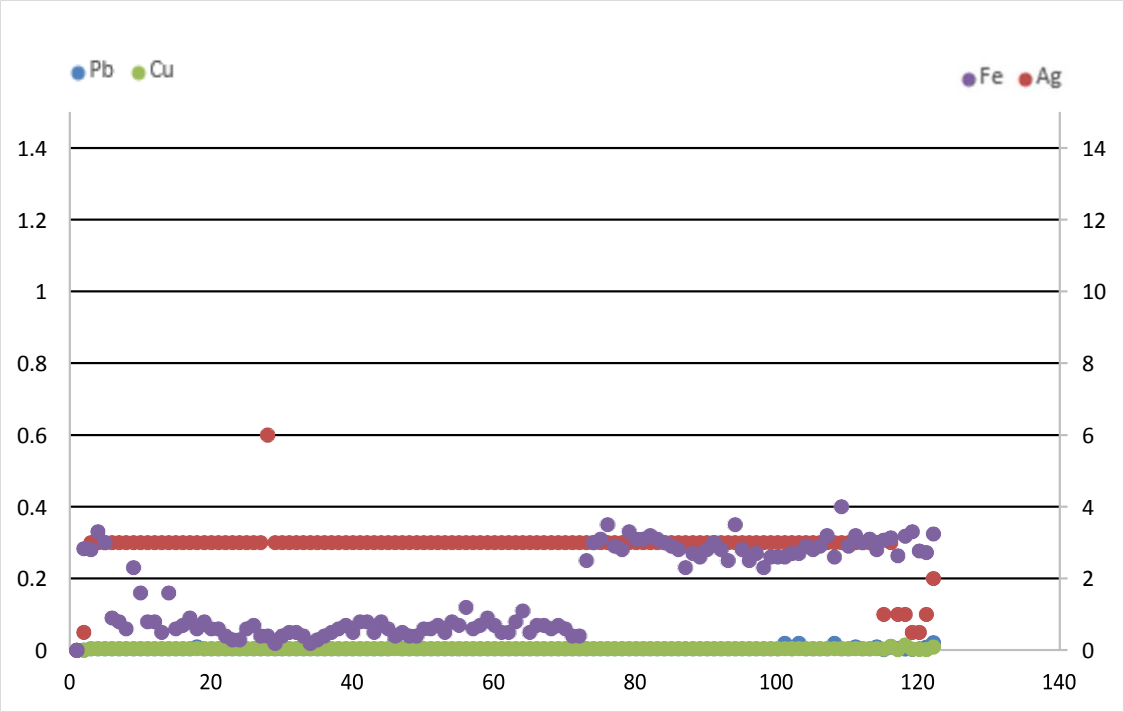


Figure 11-11 presents the results for other metals. One anomalous silver value reached 6 g/t. No issues were found with lead and copper. Iron values, however, demonstrated two different sills: one at 0.7% Fe and the other at 3% Fe. The variance is believed to be due to mineralogical variances in different granodiorite samples (possibly two distinct blank batches).

FIGURE 11-11 BLANKS – PB, CU, FE AND AG ASSAYS



CERTIFIED REFERENCE MATERIALS (STANDARDS)

Table 11-3 lists the Geostats Pty Ltd (Geostats) certified ore grade base metal reference materials utilized in the 2017 QA/QC program.

TABLE 11-3 GEOSTATS PTY LTD CRMS – 2017
Trevali Mining Corporation – Perkoa Mine

Type	Standard	No. of Insertions	Unit	Element				
				Zn (%)	Pb (%)	Ag (%)	Cu (%)	Fe (%)
High Grade	GBM310-14	38	Grade	17.9106	8.9465	59.6	0.0116	1.575
			1 SD	0.8084	0.3355	2.1	0.0058	0.07875
			3 SD	2.4252	1.0065	6.3	0.0174	0.23625
	GBM309-10	3	Grade	18.7866	4.9144	47.3	0.0503	-
			1 SD	1.0366	0.2408	2.9	0.0029	-
			3 SD	3.1098	0.7224	8.7	0.0087	-
	GBM910-11	34	Grade	4.0055	1.3656	19.2	0.1305	12.1
			1 SD	0.1628	0.0621	1.10	0.00	0.61
			3 SD	0.4884	0.1863	3.3	0	1.83
	GBM913-11	6	Grade	7.8969	3.5846	32.5	0.1453	8.48
			1 SD	0.2849	0.1541	2.3	0.007265	0.424
			3 SD	0.8547	0.4623	6.9	0.021795	1.272
Low Grade	GBM308-14	33	Grade	1.9025	0.6514	40.2	3.7188	32
			1 SD	0.084	0.0234	2.6	0.1217	1.6
			3 SD	0.252	0.0702	7.8	0.3651	4.8
	GBM915-9	10	Grade	1.9314	0.9502	50	2.2767	8.874
			1 SD	0.0617	0.0406	3.9	0.0585	0.4437
			3 SD	0.1851	0.1218	11.7	0.1755	1.3311

Figures 11-12 and 11-13 present control charts of High Grade CRM results for Zn, and other metals, respectively. The Y-axis represents SD. One sample demonstrated unacceptable values and will be re-analyzed. Anomalies on other metals for the last three samples (all ALS) are being investigated.

FIGURE 11-12 HIGH GRADE CRMS – ZN%

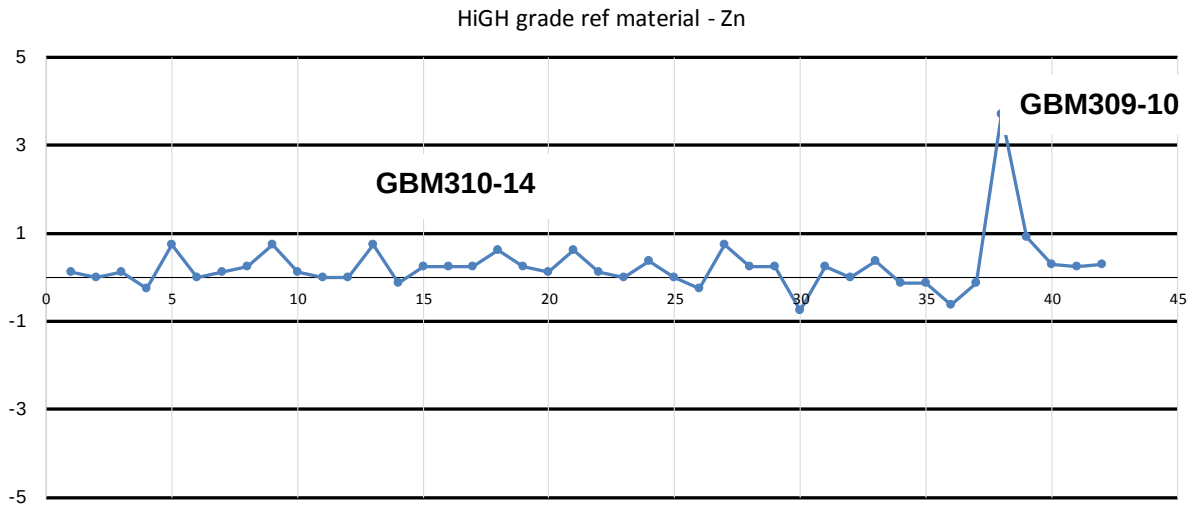
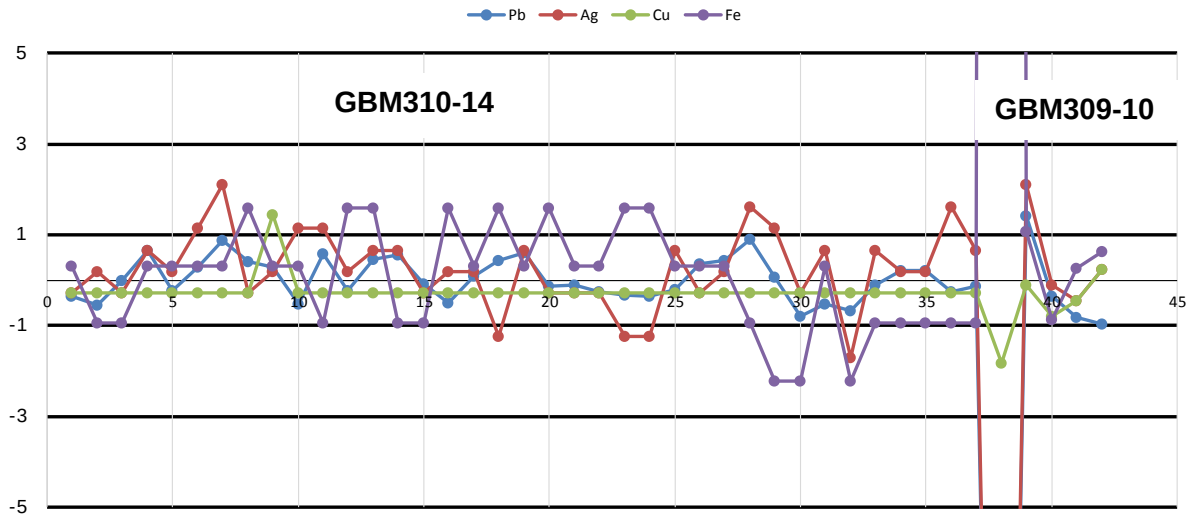


FIGURE 11-13 HIGH GRADE CRMS – OTHER ELEMENTS



Figures 11-14 and 11-15 present control charts of Medium Grade CRM results for Zn, and other metals, respectively. The Y-axis represents SD. There appears to be a low slight bias on the Zn Medium Grade reference material analyses. There is a chance that this can lead to slightly underestimate, however, the results are still within the acceptable limits of three SD.

Overall good results for the other metals, with some swings, however, all the reported data is still within the three SD limits.

FIGURE 11-14 MEDIUM GRADE CRMS – ZN%

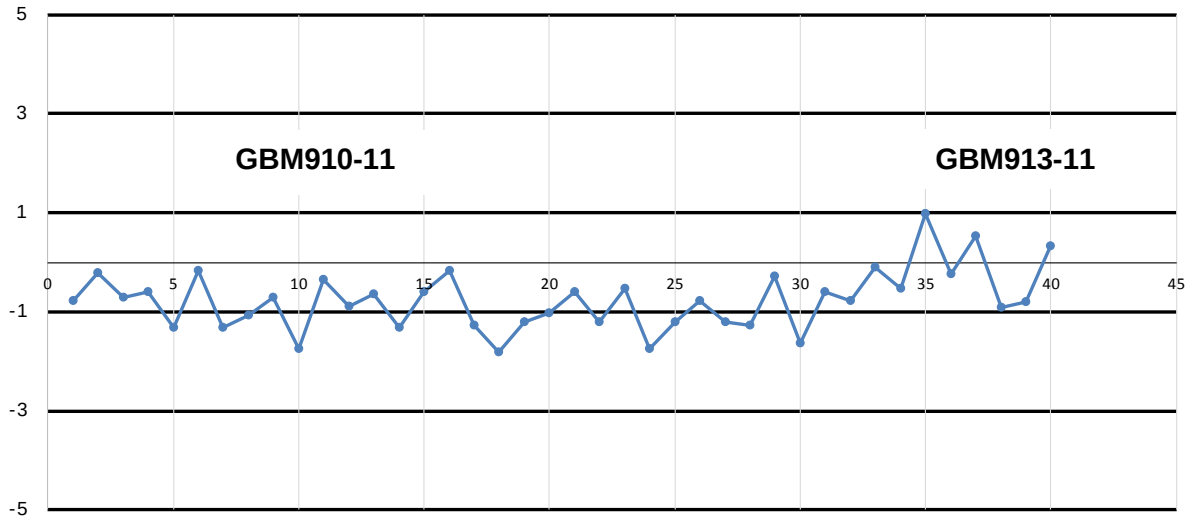
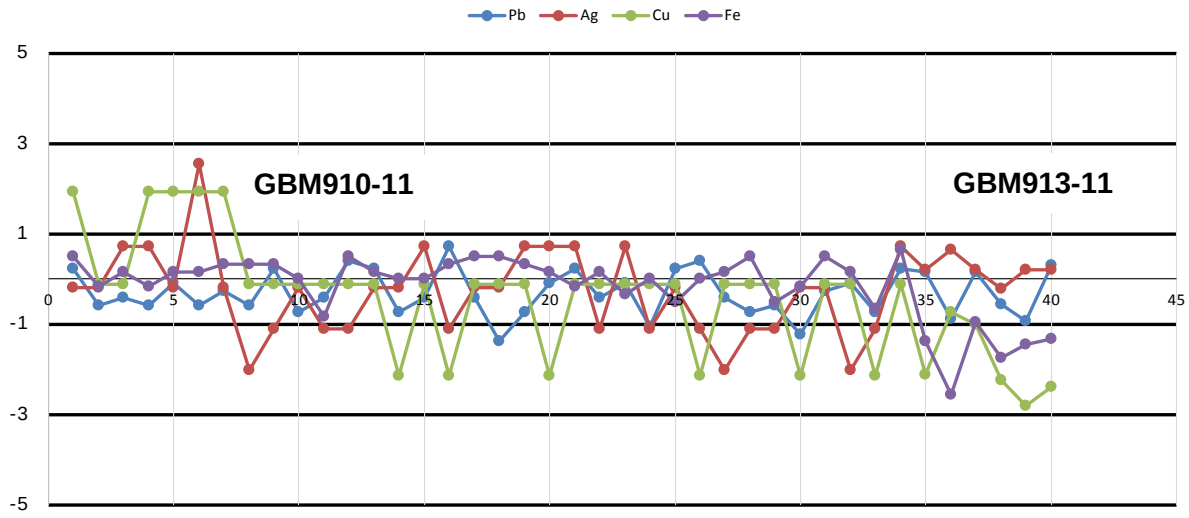


FIGURE 11-15 MEDIUM GRADE CRMS – OTHER ELEMENTS



Figures 11-16 and 11-17 present control charts of Low Grade CRM results for Zn, and other metals, respectively. The Y-axis represents SD. There appears to be a low slight bias for all metals on the Zn Low Grade reference material analyses. However, DDH PUD36472 reported all values outside of the accepted three SD even if surrounding blanks and other reference material demonstrated good results. Perkoa took the decision to change the CRM as it was considered to be potentially not well conserved. After this change, no bias was observed in the zinc results even if the other base metals show variable results.

FIGURE 11-16 LOW GRADE CRMS – ZN%

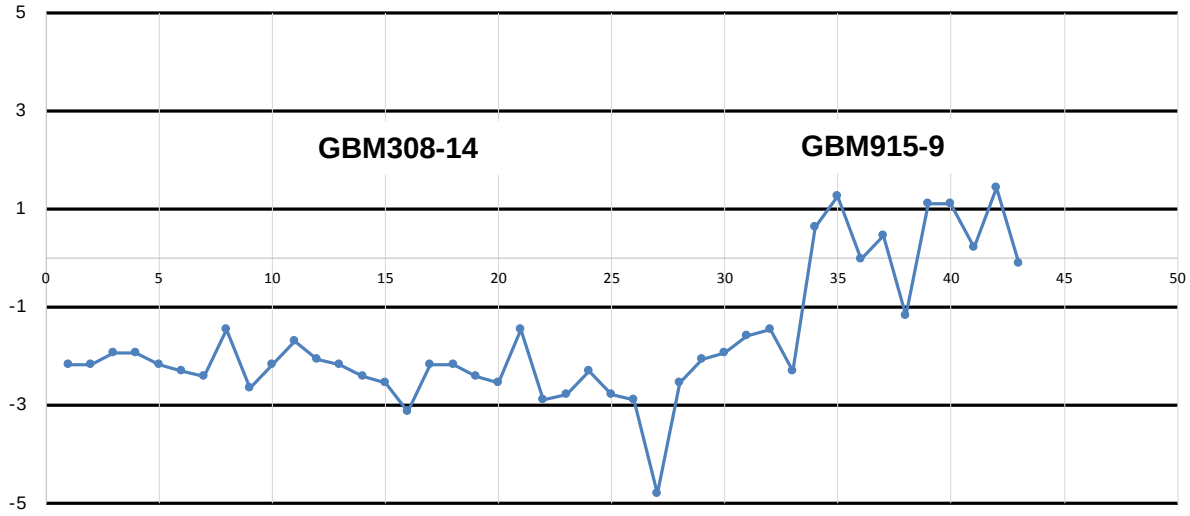
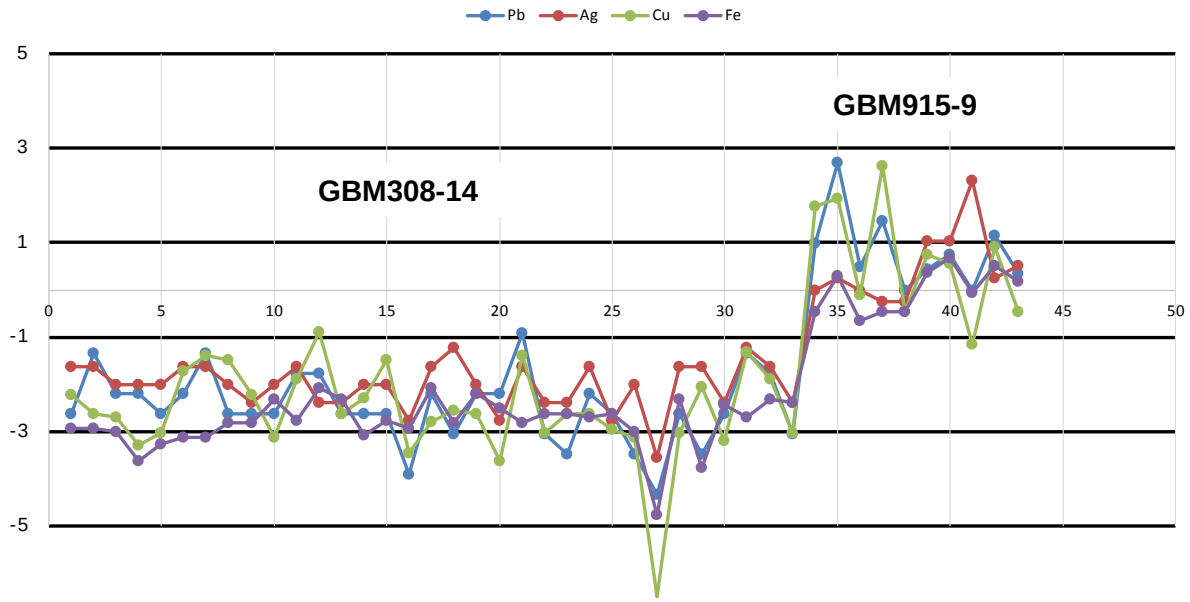


FIGURE 11-17 LOW GRADE CRMS – OTHER ELEMENTS



DUPLICATES

Figures 11-18 and 11-19 present plots of 70 pairs of original versus duplicate assays for Zn% and other elements, respectively. Generally, there is a good correlation between the two sets of results with only a slight bias seen in the high and low grade populations, which are more spread out. The two anomalous low grade Zn samples are thought to be a result of close to detection limit, or located in a heterogeneous stringer zone.

FIGURE 11-18 ZN% ORIGINAL ASSAYS VS. DUPLICATES

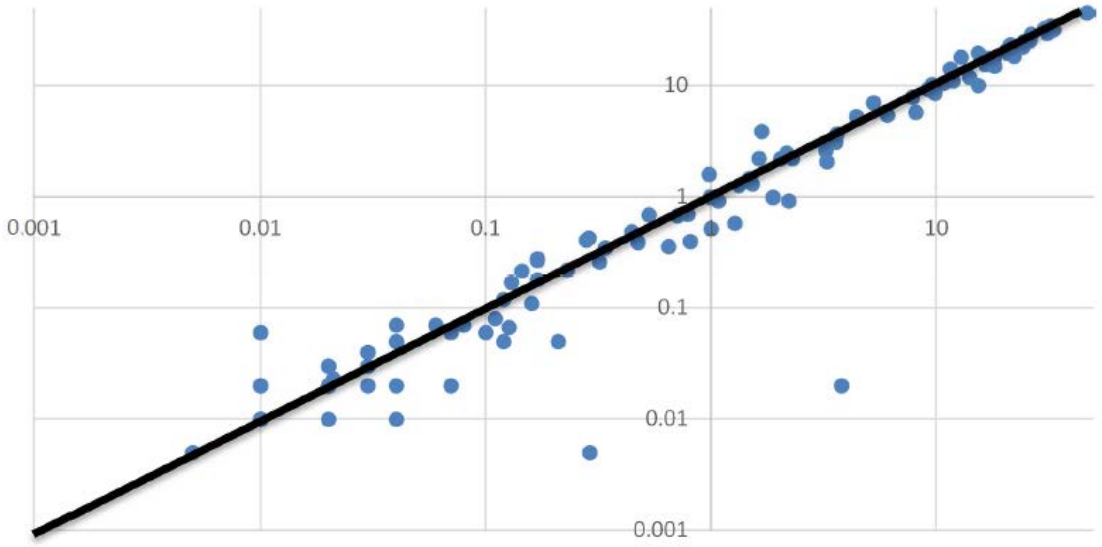
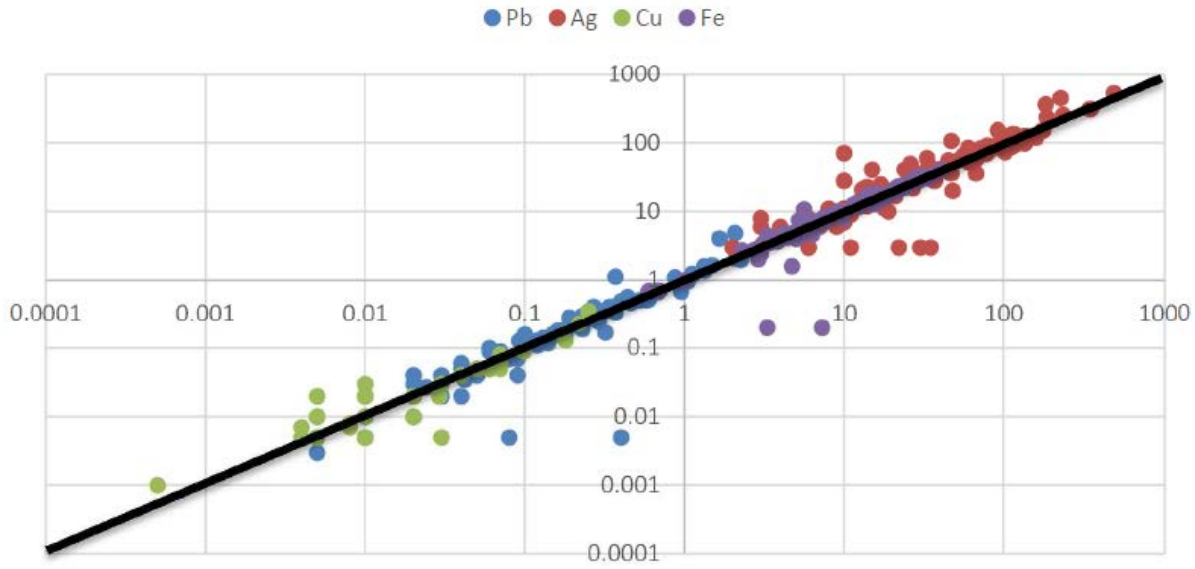


FIGURE 11-19 OTHER ELEMENTS ORIGINAL ASSAYS VS. DUPLICATES



Overall, results from the 2017 QA/QC program indicate that:

- The new granodiorite core blank material is performing well, however, some minor metal content is still being reported.
- The 2017 CRM QA/QC results show an improvement over the 2016 results with a significant reduction in large variances.
- Duplicates show no distinct biases for Zn or the other elements analyzed.
    - Umpire assaying is recommended for the 2018 QA/QC program.
- The new ALS Webtrieve system now allows the receipt of regular assay results which will allow Nantou Mining to rapidly identify issues.

In RPA's opinion, the QA/QC program, as designed and implemented by Nantou Mining, is adequate, and the assay results within the database are suitable for use in a Mineral Resource estimate.

RPA recommends, however, that more effort be undertaken to monitor QA/QC inputs and results. Also, the potential source of blank contamination must be investigated and remedied.

SECURITY

RPA is not aware of any security issues at the Perkoa mine, core processing center, or the Perkoa Mine Laboratory. Access to these sites is restricted to authorized personnel and the facilities are securely locked when not in use.

Logging, sampling, and analytical data are captured in an MS Access database, which resides on the company servers, and is backed up daily. The integrity of this database is the responsibility of a Database Manager.

Drill and mine samples are handled and transported only by Nantou Mining personnel or contractors. Core samples are conveyed to ALS Ouagadougou by Nantou Mining transportation personnel or by courier. Pulp sample transport is the responsibility of ALS who rely on commercial carriers. Assay results are sent electronically to the Drill Database Administrator and are also accessible on the ALS Webtrieve system which is securely accessed via the internet.

12 DATA VERIFICATION

HISTORICAL DRILL HOLE DATA VALIDATION

Snowden (2005) and SRK (2009) report that they validated the historical drill hole data.

PERKOA DRILL HOLE DATA VALIDATION

All data imported into the drill hole database is verified by the Database Manager. Assays are received electronically from ALS, and QA/QC is reviewed prior to importation as well as visually displayed using Surpac software.

RPA SITE VISIT

During the January 2018 site visit, RPA toured the underground operations to review geology and mineralization types in a number of exposures. RPA also observed the core logging, sampling, QA/QC, and database management procedures conducted by the Mine Geology department.

RPA also reviewed the geological modelling techniques and Mineral Resource estimation methodology with Nantou Mining geologists.

RPA is of the opinion that database verification procedures for Perkoa comply with industry standards and are adequate for the purposes of Mineral Resource estimation.

RPA recommends, however, that a comprehensive data process map, including logging and sampling inputs, database review, and production reconciliation studies, be undertaken in 2018.

13 MINERAL PROCESSING AND METALLURGICAL TESTING

HISTORICAL METALLURGICAL TESTWORK

The following is an extract from the 2005 Snowden BFS.

Three different laboratory testwork campaigns have been undertaken on the Perkoa deposit in the past.

- Penarroya in 1987
- Billiton in 1998
- AIM Resources (Mintek) in 2005.

All of the parties did their own sampling and Billiton also carried out preliminary testwork on the archived Boliden core samples. From all of this testwork a number of broad conclusions were drawn.

Where similar testwork has been carried out, all three parties achieved very similar results in their metallurgical testwork, with the main conclusions being as follows:

- The Perkoa deposit is a high grade zinc deposit that consists of massive sulphides.
- The main sulphide constituents are sphalerite, pyrite, pyrrhotite, and barite with trace quantities of quartz, chlorite, and muscovite.
- The silicates are liberated from the sulphides at a coarse crush size and it is possible to reject the less dense silicates using dense medium separation without significant losses of zinc.
- Based on Bond Work Index testwork the orebody can be classified as soft, with the mining waste being harder.
- The sphalerite is liberated from the iron sulphides at a relatively coarse grind of 65% passing 75 µm.
- The flotation response of the ore is generally good and a simple rougher stage is required to make good zinc recoveries >95% at concentrate grades >50% Zn. It is, however, necessary to have a relatively low percentage of solids in the slurry fed to the flotation plant to minimize the interaction of gangue with the fast floating sphalerite.
- Variability testwork has shown that some areas within the orebody respond better to flotation than others, however, there is no way to quantify the relative proportions of

"good" and "poor" ores at this stage. The predictions made in this report, however, are based on the entire bulk composite that was made up from the samples provided by Snowden and included these poor response ores - and should therefore reflect an "average" response.

- The iron content of the sphalerite crystals is high at about 7% Fe, which cannot be removed by physical means, and in order to produce concentrates with a low iron content there is a significant drop in zinc recovery.

- In general, the Perkoa concentrate can be considered "clean" with mercury and iron being two elements incurring small penalties.

- There is silver present in the ore, however, it is unlikely that it will generate any revenue. There are also no other elements that are concentrated that are likely to produce a revenue stream from the smelter.

- A high grade iron sulphide concentrate (>50% sulphur) can be produced from the zinc flotation tailings and there may be some economic benefit that can be realized from it. This would have to be the subject of another study.

- No pilot plant testwork was done by any of the parties.

CURRENT METALLURGICAL TESTWORK

Testwork completed in 2017 with XPS determined that, within the orebody, there are zones that have an increased pyrrhotite content, which impacts recovery and concentrate grade. Test work to date has failed to improve or mitigate these effects.

Since 2015, Nantou Mining has been carrying out a number of improvements to the processing plant including: ongoing improvements in process control; improved reagent dosing controls; improved operator knowledge base (basic training); removal of commissioning and engineering deficiencies; improved water consumption monitoring; improved water balance and discharge tracking management; and improved tailings deposition and monitoring. Continuous improvement includes commissioning of a metallurgical laboratory; improved Courier on-stream analyzer reliability; flowsheet development; operational parameters/ targeting/feedback; power supply stability; and commissioning of a regrind mill in October 2017.

14 MINERAL RESOURCE ESTIMATE

SUMMARY

Geological interpretation and Mineral Resource estimation were completed by Nantou Mining and reviewed by RPA, with an effective date of December 31, 2017. The Mineral Resources have been completed to a level that meets industry standards and are compliant with the terms and definitions provided in the CIM (2014) definitions.

Table 14-1 lists the Mineral Resources as at December 31, 2017.

TABLE 14-1 PERKOA MINERAL RESOURCE SUMMARY – AS AT DECEMBER 31, 2017
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn (%)	Contained Zn (Tonnes)
Measured	2.63	15.65	412,300
Indicated	2.22	11.44	253,400
Measured and Indicated	**4.85**	**13.73**	**665,700**
Inferred	0.68	8.9	60,900

Notes:
1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 5% Zn, with a zinc price of US$1.20/lb and a €/US$ exchange rate of 1.08.
4. Shown at 100% ownership.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Numbers may not add due to rounding.

RPA is not aware of any environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors that could materially affect the Mineral Resource estimate.

Perkoa Mineral Resources are presented as a series of discrete mineralized domain wireframes (Figure 14-1).

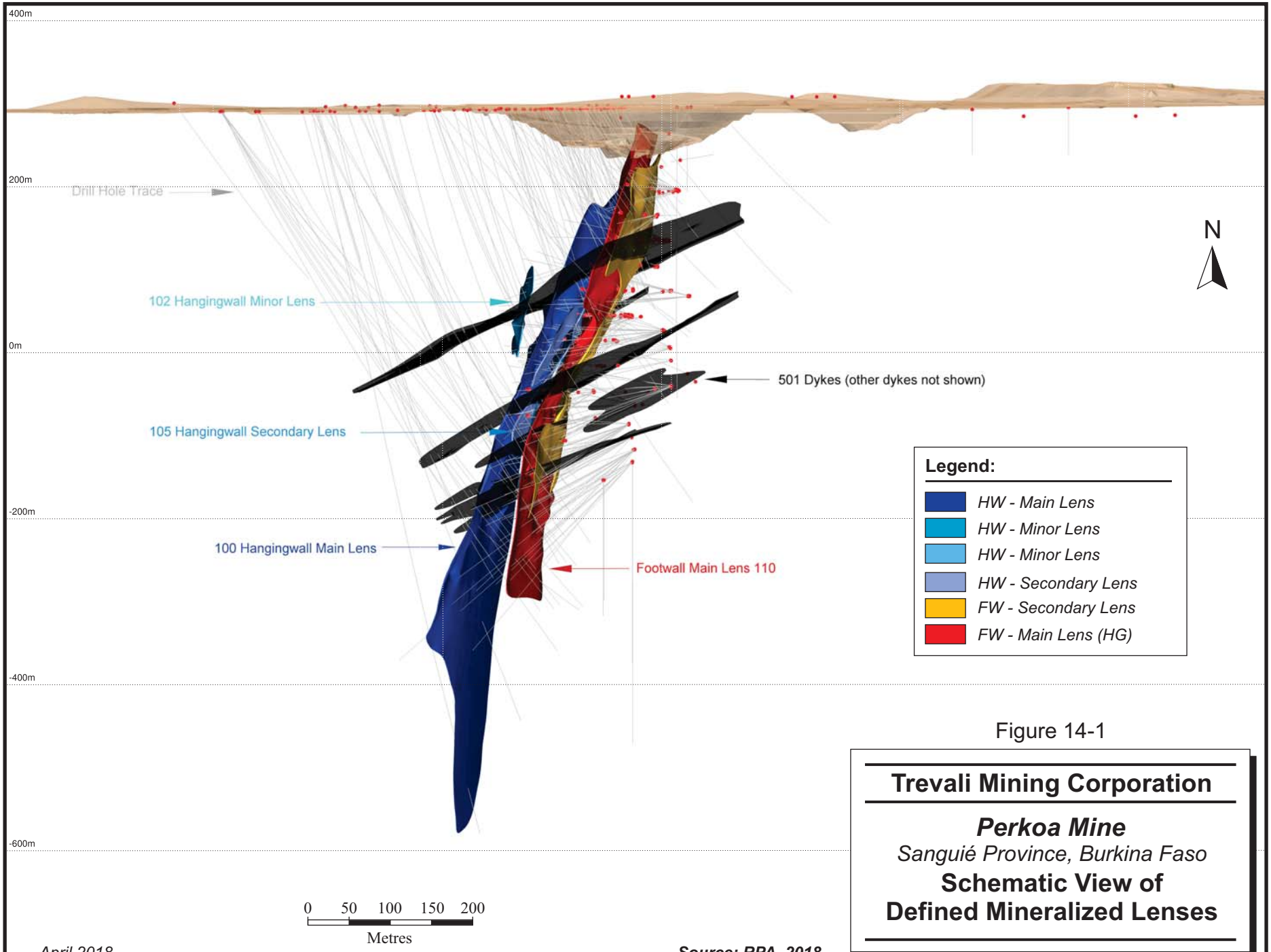


Figure 14-1

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Schematic View of Defined Mineralized Lenses

April 2018

Source: RPA, 2018.

Table 14-2 lists the Mineral Resources individually for each domain and resource category. The dimensions of the envelope containing currently defined mineralized lenses are approximately 800 m along strike, approximately 260 m across strike, and with a maximum depth of approximately 850 m below surface. The current Mineral Resource is estimated to 550 m below surface.

TABLE 14-2 PERKOA MINERAL RESOURCE SUMMARY BY DOMAIN – AS AT DECEMBER 31, 2017
Trevali Mining Corporation – Perkoa Mine

Classification	Domain	Tonnes	Zn Grade (%)	Contained Zn (Tonnes)
Measured	100	766,100	10.49	80,300
	103-105	73,400	12.17	8,900
	110	1,736,900	18.07	313,900
	111	57,900	15.74	9,100
	Total	**2,634,300**	**15.65**	**412,300**
Indicated	100	975,200	10.00	97,500
	103-105	206,600	10.08	20,800
	110	814,600	13.43	109,400
	111	218,900	11.76	25,700
	Total	**2,215,300**	**11.44**	**253,400**
Measured + Indicated	100	1,741,300	10.21	177,800
	103-105	280,100	10.63	29,800
	110	2,551,500	16.59	423,300
	111	276,800	12.59	34,900
	Total	**4,849,700**	**13.73**	**665,700**
Inferred	100	348,300	7.6	26,400
	102	73,500	8.9	6,500
	103-105	85,900	9.4	8,100
	110	90,700	11.4	10,300
	111	86,400	11.1	9,600
	Total	**684,900**	**8.9**	**60,900**

Notes:
1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 5% Zn, with a zinc price of US$1.20/lb and a €/US$ exchange rate of 1.08.
4. Shown at 100% ownership.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Numbers may not add due to rounding.

During 2017, a series of changes were made to the Mineral Resource estimate due to increased drilling density and improved information:

- Updates to the variography and search ellipsoids were used in the Ordinary Kriging (OK) interpolation due to the addition of new analytical data, updated wireframes and the isolation of a sub-domain on the southern side of the main fault.

- The Mineral Resources from the 370 level to the 460 level have been completely upgraded to a Measured classification.

- The Mineral Resources below the 490 level are now almost completely upgraded to an Indicated classification, due to a more confident knowledge of the deepest area of the existing orebodies resulting from 2017 drilling and mapping.

RESOURCE DATABASE

The Perkoa assay database used for the Mineral Resource estimate is composed of 20,318 samples comprising:

- **Historical Surface DDH:** Consisting of 6,197 assays for Zn and Ag, plus non-systematic Pb assays and rare Cu assays.

- **2017 Infill Program Surface DDH:** Consisting of 459 assays for Zn, Pb, Ag, Fe, Cu, and density.

- **2017 Near Deposit Exploration DDH:** Consisting of 132 assays for Zn, Pb, Ag, Fe, Cu, and density.

- **Face and Channel Samples:** Consisting of 3,902 assays for Zn, Ag, and Pb, 1,274 of which have been analyzed directly at the Perkoa site by the plant assay laboratory or by portable XRF. These samples are not used in the block model process as the method/laboratory accuracy is not sufficient. Some face and channel samples were used in the estimation process, however, these were analyzed by SGS and the independently certified assays were used in the estimation. No face/channel samples taken after June 2014 are included in the resource database.

- **Underground DDH:** Consisting of 9,628 assays. All of the samples were historically analysed for Zn, Ag and Pb with 4,013 of those assays (2017 results) also having been analysed for Fe and Cu.

RPA notes that a total of 403 of the underground DDH assay results were not completed by the laboratory by year-end 2017. Visual estimations for pyrrhotite and pyrite were, however, added to the DDH database to allow for wireframe construction. Bulk density measurements were processed manually (air weight/water weight). The bulk density measurements of the holes for which the assay results are not yet received were utilized for the interpolation of the bulk density.

Underground drilling, which has higher confidence in the survey data due to direct survey of collar in WGS 84 and downhole surveys every 3 m, supersedes surface drill holes.

Following validation, the Perkoa assay database used for the Mineral Resource estimate and Zn grade compositing consists of 17,271 samples as per the following:

- 6,526 assays from surface DDH;
- 1,479 assays from underground sampling; and
- 9,266 assays from underground DDH.

GEOLOGICAL MODEL

The geological interpretation comprises wireframes for mineralization and lithological domains, which were developed using Surpac software. The wireframes for lithology, including dykes, were generated based on logging of the major lithological units. Continuous updating of wireframes is undertaken by Nantou Mining geologists, based on updates of the geological information from underground mapping, core logging, and both underground and core sampling and assaying.

In the case of missing assays, the Nantou Mining geologists have used the estimated grade intersections based on core logging to adjust the relevant wireframes.

Six of the historical surface DDH have been removed, during the interpretation process, as they have been challenged by underground drilling and one underground DDH has been removed due to considerable doubt regarding its position, following subsequent wireframe interpretation.

A number of the basaltic and andesitic dykes are too small to accurately model for resource estimation purposes. In previous years, a 12% dilution factor was added to the Mineral Reserve estimation methodology to account for geological dilution. The current methodology is to incorporate the internal dilution that these dykes cause into the resource interpolation. This is achieved by leaving the dyke “waste” grades in the intercepts and composites for the estimation. These grades then dilute the local area during estimation to model the geological loss effects of the cross cutting dykes. These dykes are too small to be selectively mined around and so this approach is suitable for estimating the internal dilution of the Mineral Resource and resultant Mineral Reserve.

Table 14-3 lists the mineralization and lithological wireframe domains used for the Mineral Resource estimate. Figure 14-2 presents a typical section illustrating the location of the various lens.

TABLE 14-3 MINERALIZATION AND LITHOLOGICAL WIREFRAME DOMAINS
Trevali Mining Corporation – Perkoa Mine

Code	Domain Name – Description
110	Footwall Main Lens
112	Footwall Main Lens - High Grade Area
113	Footwall Main Lens – Main Zone
114	Footwall Main Lens – Low Grade South of the Fault
111	Footwall Secondary Lens
100	Hanging Wall Main Lens
102	Hanging Wall Minor Lens
103	Hanging Wall Minor Lens
105	Hanging Wall Minor Lens
500	Granitic Dyke
501	Andesitic Dyke
502	Mafic, Basaltic Dyke
503	Andesitic Sill / Dyke
504	Felsic, Rhyolitic Dyke

MINERALIZATION DOMAINS

FOOTWALL MAIN LENS

The three subdomains in the Footwall Main lens (110) are characterized by massive coarse grained, Zn-rich and pluri-metallic mineralization:

- **112:** Intruded high grade zone, shape and grade altered by intrusion of granodiorite.
- **113:** Main zone of Perkoa.
- **114:** Low grade zone south of the main faulting system, faulted and intruded. A new Footwall lens named 114 has been added to create a different domain on the southern part of the “Big Blue” fault where the grade distribution and the orebody morphology are altered and differ from the main mineralization body (Figure 14-3).

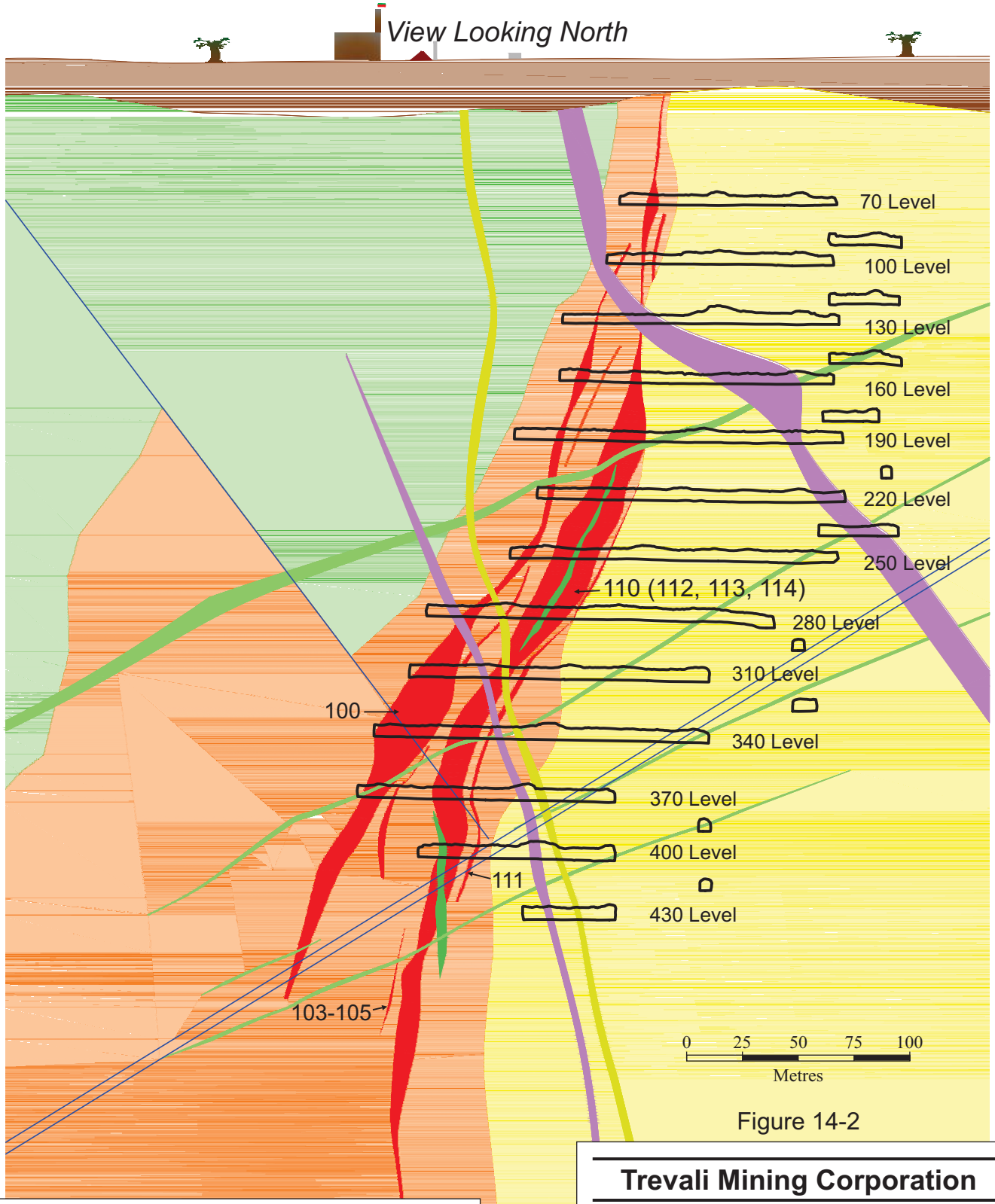


Figure 14-2

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Perkoa Typical Section Illustrating Location of Main Lense

Legend:

- *Andesite/Basalts*
- *Tuffs and volcanics*
- *Granodiorite Intrusives*
- *Intermediate Dykes*
- *Intermediate Dykes*
- *Granitic Dykes*
- *Porphyry Felsic Dykes*
- *Ore Body Main Faults*

April 2018

Source: Nantou Mining, 2018.

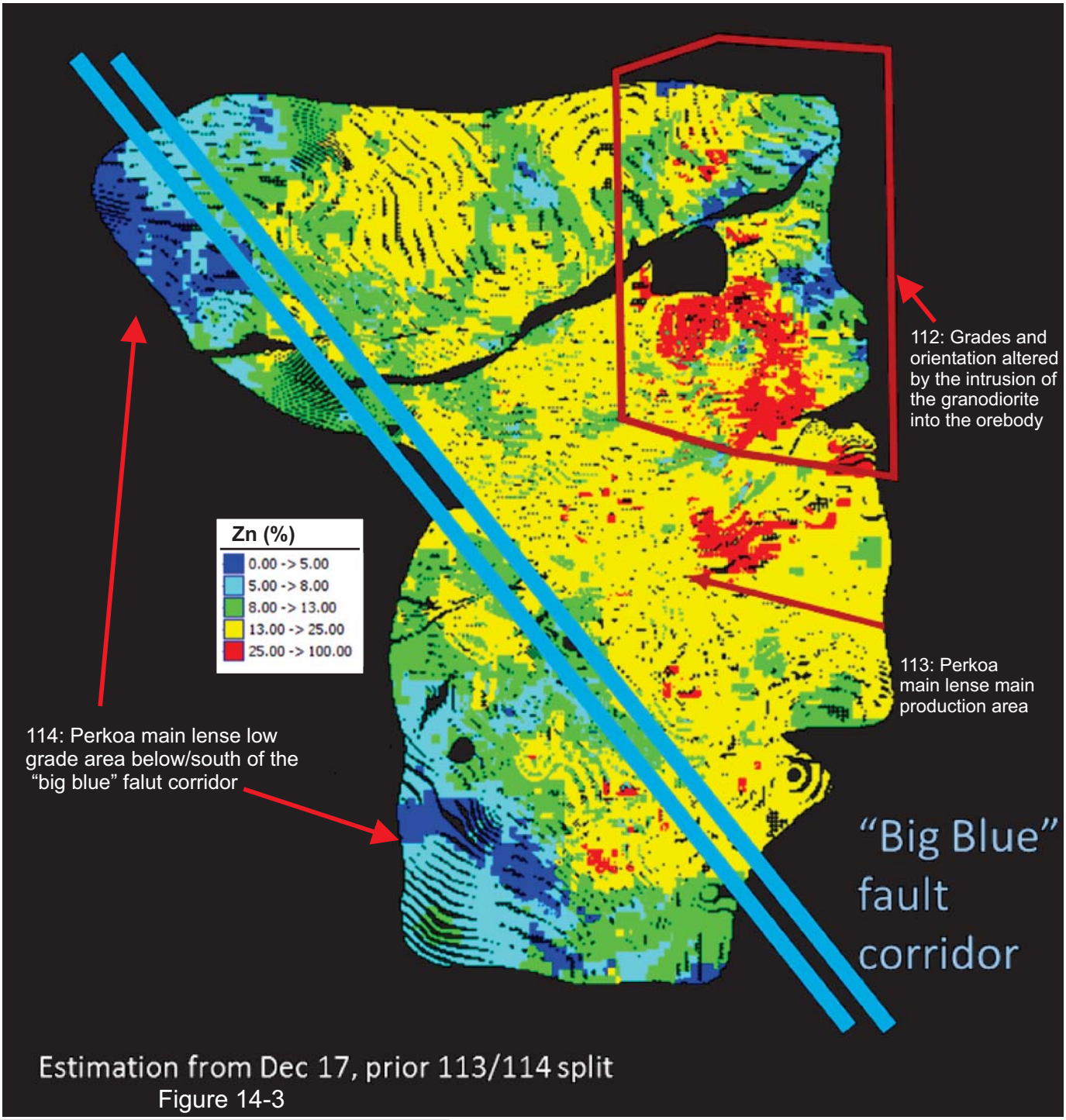


Figure 14-3

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

2017 SubDomain Locations for the Perkoa Main Footwall Lens (Longitudinal View)

0 30 60 90 120

Metres

April 2018

Source: Nantou Mining, 2018.

FOOTWALL SECONDARY LENS

The Footwall Secondary lens (111) is composed of coarse grained massive sulphide of pyrite and sphalerite in a thin layer of mineralization almost parallel to the main lens. The Footwall Secondary lens has been extended to 550 level as a result of 2017 drilling.

HANGING WALL MAIN LENS

One domain for the main Hanging Wall lens (100) is composed of a mix of dissemination, replacement, and veins of massive fine-grained mineralization. Lens 100 has a lower content of economical metals and is less pluri-metallic. It is the only area with substantial Cu content. The Hanging Wall Main lens (100) has been extended to 520 level as a result of 2017 drilling. Significant volume loss occurred in both the northern and the southern part of the Hanging Wall Main lens where the mineralization seems to be discontinuous and partially cut by geological features (intrusions and faults).

HANGING WALL MINOR LENSES

One domain for the Hanging Wall Minor mineralization (lenses 103 and 105) is located between the Hanging Wall Main and the Footwall Main lenses. It has a composition of dissemination and has local veining of fine grained mineralization. The lens is mostly low grade with some local enriched areas at intrusion contacts.

For the 2017 Mineral Resource estimate, a small new secondary lens (103) has been modelled in the Hanging Wall between the Footwall Main and the Hanging Wall Main lenses. Lens 103 is interpolated along with lens 105 as both lenses are basically part of the same mineralogical horizon of disseminated to semi-massive mineralization in the Hanging Wall and are similar in grade, morphology, and extent.

CUT-OFF GRADE

The cut-off grade for mineralization wireframes is 5% Zn based on the approximate cost of milling and transport of ore to surface.

The resource 5% Zn cut-off grade is honoured for most areas of the Footwall lenses as the grades are typically always greater than 5% Zn. Some lower grade portions are included, however, if there is lithological continuity and/or internal waste within the domain. The Hanging

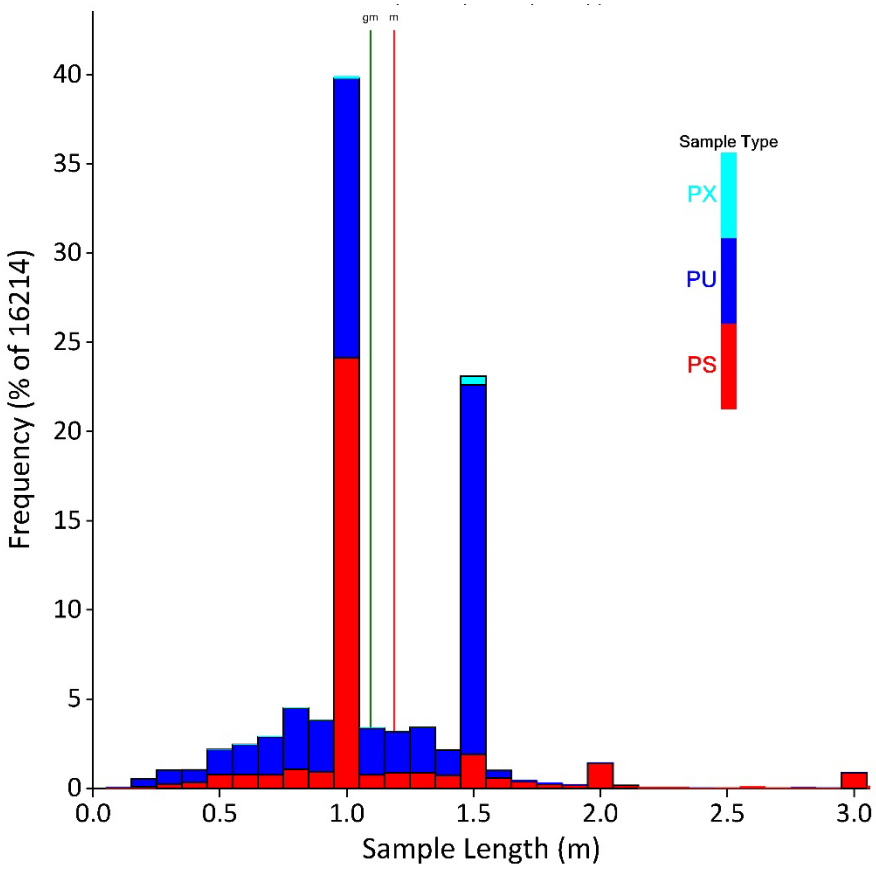
Wall lenses include material below the 5% Zn resource cut-off grade whenever the material is required to be included to maintain geological continuity in the same lithological horizons.

Generally, this means that the wireframes are not simply grade shells but wireframes of the geological horizons that bear zinc mineralization, the grade of which varies locally.

COMPOSITING

Approximately 55% of the samples for Perkoa diamond drilling are one metre and 30% of the samples are 1.5 m in length (Figure 14-4).

FIGURE 14-4 HISTOGRAM OF SAMPLE LENGTHS GROUPED BY SAMPLE TYPE



A composite length of 1.5 m was used based on historical work. Composites were made using Surpac software using the wireframe intercept technique where intercepts of the geological drill or channel traces are coded to the geological database. Composites, including lead, silver,

iron, coper, pyrrhotite, pyrite, and density, were calculated for each domain at a length of 1.5 m. A minimum composite length of 20 cm was required in order to be included, however, RPA notes that the composite files include composite lengths less than 20 cm. The number of composites for zinc estimation are given in Table 14-4.

TABLE 14-4 DOMAIN COMPOSITES
Trevali Mining Corporation – Perkoa Mine

Code	Name – Description	No of Composites
110	Footwall Main Lens	3,186
112	Footwall Main Lens - High Grade Area	1,107
113	Footwall Main Lens – Main Zone	2,399
114	Footwall Main Lens – Low Grade South of the Fault	322
111	Footwall Secondary Lens	350
100	Hanging Wall Main Lens	902
102	Hanging Wall Minor Lens	34
103 & 105	Hanging Wall Minor Lens	358

For the Footwall Main domain, the 112 and 113 lenses are overlapping to allow a smooth transition at the border of the two domains (soft boundary), whereas lens 114 is separated by a hard boundary and the composites are completely independent from one domain to the other.

Composites at zero grade, due to absence of data (e.g., pending assays), were deleted, unless they represented a modelled dyke intersection. Composites that intersected modelled dykes were voided during the estimation process. The intrusives that are not modelled (too small or that are not continuous enough) are taken into account in the compositing and will slightly dilute the composites, which results in an induced dilution for minor intrusions.

Compositing for the other attributes of the block model comprises the face and channel samples analyzed on site as they are interpolated only for informational purpose.

In RPA's opinion, the optimum composite length should be 2.0 m, with a minimum length of 0.5 m, as compositing to 1.5 m results in the splitting of predominate median standard sample length of 1.0 m.

TREATMENT OF HIGH GRADES (CAPPING)

For the 2017 Mineral Resource estimate grade capping was reviewed, per lens, using histograms and log probability charts. A grade cap was then applied to the composites to avoid the use of anomalous data leading to local overestimation of the grade (Table 14-5).

TABLE 14-5 GRADE CAPPING
Trevali Mining Corporation – Perkoa Mine

Code	Name – Description	Cap Value (%Zn)
110	Footwall Main Lens	n/a
112	Footwall Main Lens - High Grade Area	50
113	Footwall Main Lens – Main Zone	50
114	Footwall Main Lens – Low Grade South of the Fault	40
111	Footwall Secondary Lens	32
100	Hanging Wall Main Lens	30
102	Hanging Wall Minor Lens	30
103 & 105	Hanging Wall Minor Lens	34

In RPA's opinion, the grade caps are reasonable as demonstrated in the histograms and log probability plots, and are more appropriate than the previously used single 50% Zn grade cap. RPA is of the opinion that grade capping should be applied to the raw assays prior to compositing as per best industry practice.

BLOCK MODEL

The block model is rotated, with a size of 5 m by 5 m by 5 m, which is then sub-blocked to a minimum size of 1.25 m (Table 14-6).

TABLE 14-6 BLOCK MODEL DESCRIPTION
Trevali Mining Corporation – Perkoa Mine

Type	Y	X	Z
Minimum Coordinates (m)	1,366,761.4	542,157.1	-429.4
Maximum Coordinates (m)	1,369,264.9	544,659.1	317.5
Parent Block Size (m)	5.00	5.00	5.00
Sub-Block Size (m)	1.25	1.25	1,25
Rotation (°)	0	44	0

The block model contains the key fields as listed in Table 14-7.

TABLE 14-7 BLOCK MODEL FIELDS
Trevali Mining Corporation – Perkoa Mine

Model Field	Description
Zn	Zinc Grade (%)
Ag	Silver Grade (g/t)
Pb	Lead Grade (%)
Fe	Iron Grade (%)
Cu	Copper Grade (%)
Po	Pyrrhotite
Py	Pyrite
Domain	Wireframe Domains (identifying the Mineralization lenses and Dykes)
Res_cat	Resource Category (Measured, Indicated, Inferred, Waste)
Density	Bulk Density (Specific Gravity)

SPATIAL ANALYSIS (VARIOGRAPHY)

Variogram parameters for the 2017 estimation were drawn from an updated variography study conducted in early 2018. The previous variogram parameters were based on a 2014 study using limited data. For 2017, variogram parameters have also been defined for lead, silver, copper, iron, bulk density, pyrite, and pyrrhotite.

Table 14-8 presents the variogram parameters per lens for Zn%.

TABLE 14-8 VARIOGRAM PARAMETERS PER LENS – ZN%
Trevali Mining Corporation – Perkoa Mine

Domain	Nugget	Sill 1	Range 1 (m)	Maj/Med 1	Maj/Min 1	Sill 2	Range 2 (m)	Maj/Med 2	Maj/Min 2
112	-	0.46	37	2.467	2.643	0.54	91	1.517	3.033
113	0.20	0.52	42	1.024	2.800	0.28	444	2.313	22.200
114	0.18	0.36	48	3.000	2.286	0.46	108	1.440	3.600
100	0.05	0.53	21	1.050	1.400	0.42	74	1.805	4.353
111	0.12	0.72	100	0.962	8.333	0.16	246	1.171	12.300
103 & 105	0.08	0.36	43	2.150	7.167	0.56	154	1.925	15.400

Table 14-9 summarizes the zinc ellipsoid parameters used for the interpolation of each lens by the OK method.

TABLE 14-9 ELLIPSOID PARAMETERS PER LENS – ZN%
Trevali Mining Corporation – Perkoa Mine

Domain	Min No. Samples	Max No. Samples	Max Sample / Hole	Az (deg)	Dip (deg)	X	Y	Z	Distance (m)		
									Pass 1	Pass 2	Pass 3
112	7	22	6	30	70	14.076	(69.353)	204.764	30	60	90
113	7	27	6	45	80	44.136	(75.998)	215.149	30	200	445
114	7	22	6	60	80	(19.683)	79.372	56.384	30	65	110
100	7	27	6	70	50	(51.710)	46.997	13.796	15	40	75
111	7	22	6	40	80	67.731	(62.727)	194.494	40	85	245
103 & 105	7	22	6	45	70	70.000	-	135.000	10	100	155

The same parameters are used for zinc, density, and secondary estimation. The parameters for lens 110 are only used for secondary attributes estimates (lead, silver, pyrite, and pyrrhotite), whereas the more accurate lens 112 and 113 parameters are used for zinc and density.

In RPA's opinion, the updated 2017 Perkoa variography study provides better interpolation parameters and will result in more accurate Mineral Resource estimations, especially for the Hanging Wall lenses, where the impact on the Hanging Wall Main lens is significant. A discontinuity in the grade has been discovered in this region that highlights the complexity of this mineralization.

BLOCK MODEL INTERPOLATION

For each mineralization lens, three methods of interpolation are applied in order to interpolate the Zn grade:

- OK is used as a primary estimation method and the results of this interpolation are used in the final block model for Mineral Resource reporting.
- ID and NN interpolation methods are also used in order to compare and validate the model against the kriging results.

The block model interpolation is completed in three passes. If the minimum number of assays is not found during the first pass, the ellipse is enlarged in the consecutive pass to try to find more assays. If the requirement is still not reached, the ellipse is increased again (Table 14-10). For each step, an attribute code of either 1, 2, or 3 is assigned to the block. A default value of 0 is applied to all the blocks that have not been interpolated due to a lack of data.

TABLE 14-10 SEARCH DISTANCE PER ESTIMATION PASS – ZN%
Trevali Mining Corporation – Perkoa Mine

Lens	Major Distance 1st Pass (m)	Major Distance 2nd Pass (m)	Major Distance 3rd Pass (m)
112	30.0	60.0	193.6
113	30.0	60.0	74.6
114	30.0	60.0	130.1
100	30.0	60.0	193.6
111	20.0	40.0	60.0
103 & 105	30.0	60.0	130.0

BULK DENSITY

Since mid-2015, Nantou Mining has been systematically measuring specific gravity on diamond drill core samples using a standard Archimedean water displacement method (air weight/water weight) procedure. This has allowed for higher precision for estimating bulk density in the block model. The mean interpolated bulk density values, per domain, are listed in Table 14-11.

TABLE 14-11 MEAN BULK DENSITY PER DOMAIN
Trevali Mining Corporation – Perkoa Mine

Code	Domain Name - Description	Mean Bulk Density t/m^3
110	Footwall Main Lens	3.9
111	Footwall Secondary Lens	3.6
100	Hanging Wall Main Lens	3.7
102	Hanging Wall Minor Lens	3.7
105	Hanging Wall Secondary Lens	3.4
500	Granitic Dyke	2.8
501	Andesitic Dykes	2.9
502	Mafic, Basaltic Dyke	3.0
503	Andesitic Sills Dykes	3.0
504	Felsic, Rhyolitic Dyke	2.9

Default bulk density for the tuff host waste rock is fixed at 3.0 t/m^3, which represents a mean value based on 4,302 measurements. Mean bulk density values based on physical measurements are assigned to each dyke's domain. Dyke 502 is located far from the mineralization and is only modelled for geotechnical purpose.

MINERAL RESOURCE CLASSIFICATION

Mineral Resource classification is based on the interpolation pass estimate attribute as well as the Qualified Person's level of geological knowledge and information (e.g., sufficient density of underground development or DDH in the area).

- For every interpolated block, a resource category attribute is assigned according to the level of estimation of the block (e.g., 1 for Measured, 2 for Indicated, and 3 for Inferred).
- The categories of the two well defined main lenses (domains 112, 113, and 100) are adjusted to fit the geological information (good density of geological mapping, channel sampling, or DDH information in the area).
- The other domain resource categories are adjusted to include the number of holes used for the interpolation, requesting three holes to be classified as per the pass estimate criteria. This aims to take into account the geological discontinuity of those lenses as well as the greater uncertainty due to the lower amount of information (e.g. not drilled systematically).

Using this data, and to reduce the "spotted dog" effect, wireframes are created using Surpac software to represent the areas of Measured, Indicated, and Inferred Mineral Resources defined for each lens. Resource class is then assigned to each interpolated block in the relevant box using Surpac software.

In RPA's opinion, the Mineral Resource classification at Perkoa is in accordance with CIM (2014) definitions.

MINING DEPLETION

Following estimation and classification, the block model is depleted using the actual development and stoping void solids from survey pick-ups and cavity monitoring surveys (CMS). All the attributes of the affected blocks are then reset to default values. One copy of the non-voided block model is also saved for past-production reconciliation purpose, as well as to assist in estimation validation.

UNRECOVERABLE AND STERILIZED MATERIAL

Once the mining depletion had been completed, any "unrecoverable" areas, such as unbroken ore from completed stopes, design pillars, abandoned low grade areas, crown pillars, etc., are

considered as unrecoverable, completely sterilized, and are extracted from the Mineral Resource estimate.

Table 14-12 outlines the losses from mining and pillars, which was extracted from the block model.

Additional solid wireframes were created in Surpac to represent these different areas and extract the data in a similar fashion to that described in Mineral Resource Classification.

TABLE 14-12 LOSS FROM MINING AND PILLARS
Trevali Mining Corporation – Perkoa Mine

Lens	Description	Tonnes	Zn Grade (%)	% Measured	% Indicated	% Inferred
Main	280 and Above	225,664	16.9	100	0	0
Main	340 and 370 Block 16	5,369	14.4	97	2	0
Main	400-21	834	13.0	100	0	0
Main	370-23 and North	5,891	16.5	100	0	0
HW	160 to 250 HW Stopes	30,305	12.9	100	0	0
	Total	**268,063**	**16.4**	**100**	**0**	**0**

Table 14-13 lists the areas that have been determined to be potentially uneconomic and are not included in the Mineral Resource estimate. Generally, this material is located in the two main lenses for which no mine plan has yet been established (future pillars, crown pillar, actual and planned low grade or un-mineable areas). Most of the secondary lenses are also not considered in the mine plan due to geotechnical or economic reasons. In practice, however, part of the secondary lenses are included in some mined stopes, and/or are mined as development ore when intersected.

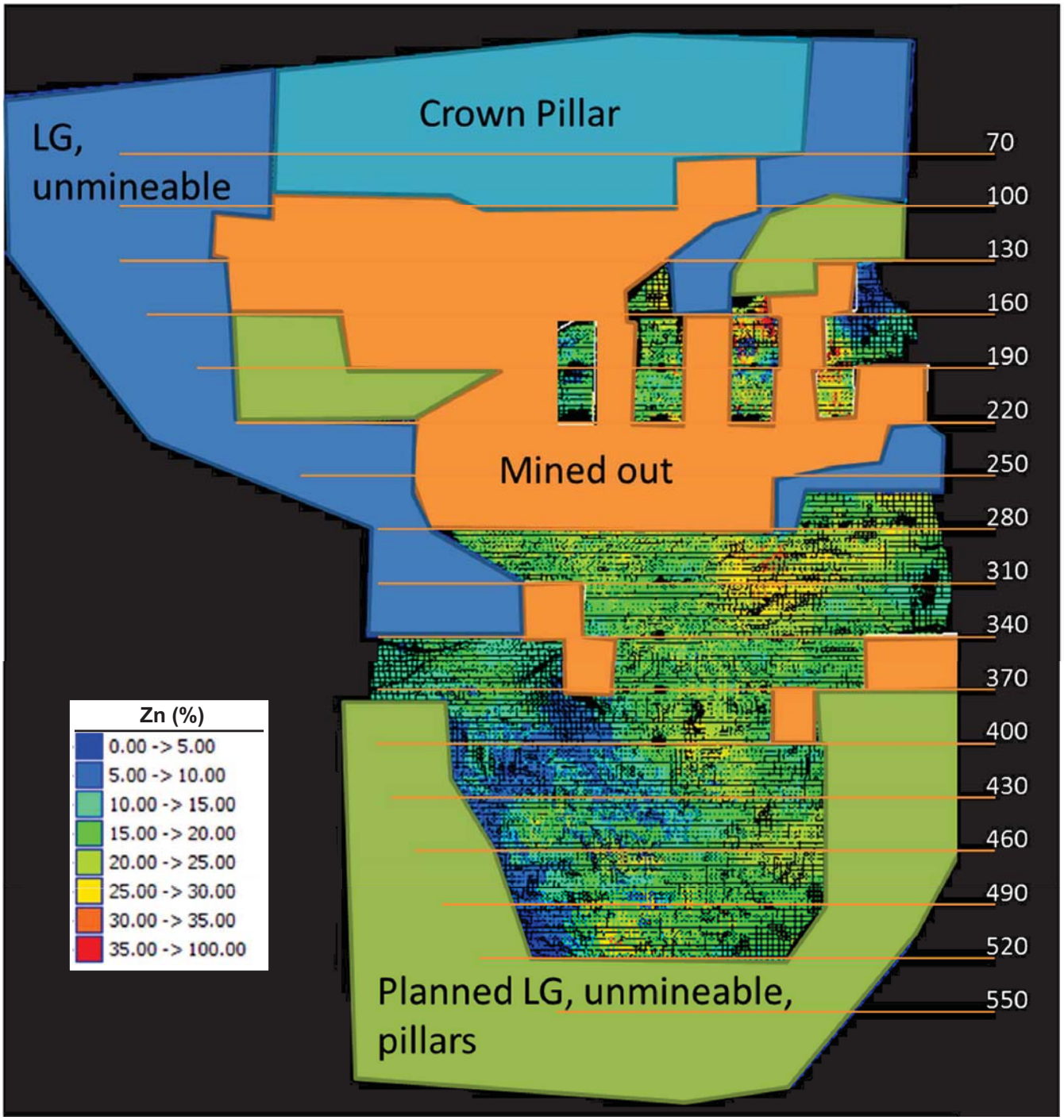
TABLE 14-13 POTENTIALLY UNECONOMIC AREAS
Trevali Mining Corporation – Perkoa Mine

Lens	Description	Tonnes	Zn Grade (%)	% Measured	% Indicated	% Inferred
Main	Crown Pillar 100 and Above Blocks 9 to 21	220,974	14.0	78	22	0
Main	Southern Part from 340 and Above	180,565	9.8	19	61	20
Main	160 Block 19 and 20	2,975	14.6	100	0	0
Main	100 and Above Block 22 and 23	43,653	8.0	64	36	0
Main	340 and Below – South and Deep	88,716	8.9	2	70	28
Main	160 and 130 Blocks 20 to 22	43,144	17.0	100	0	0

Lens	Description	Tonnes	Zn Grade (%)	% Measured	% Indicated	% Inferred
Main	430 and 400 Blocks 22 and 23	37,458	14.6	89	11	0
Main	220 and 190 Blocks 9 and 10	55,940	12.5	83	17	0
Main	Pillar Between 280 Uppers and 250-23	16,407	20.6	100	0	0
HW	250 and Above	353,964	8.5	73	22	5
HW	Level 280	140,114	7.9	75	16	9
HW	280 Down – South Side	136,431	7.2	5	31	65
HW	280 Down – North Side	324,585	6.3	4	53	43
	Total	**1,664,926**	**9.4**	**46**	**34**	**19**

Figure 14-5 presents the Footwall Main lens mined out and sterilized areas.

Figure 14-6 presents the Hanging Wall Main lens mined out and sterilized areas.



Looking Northwest

Figure 14-5

Trevali Mining Corporation

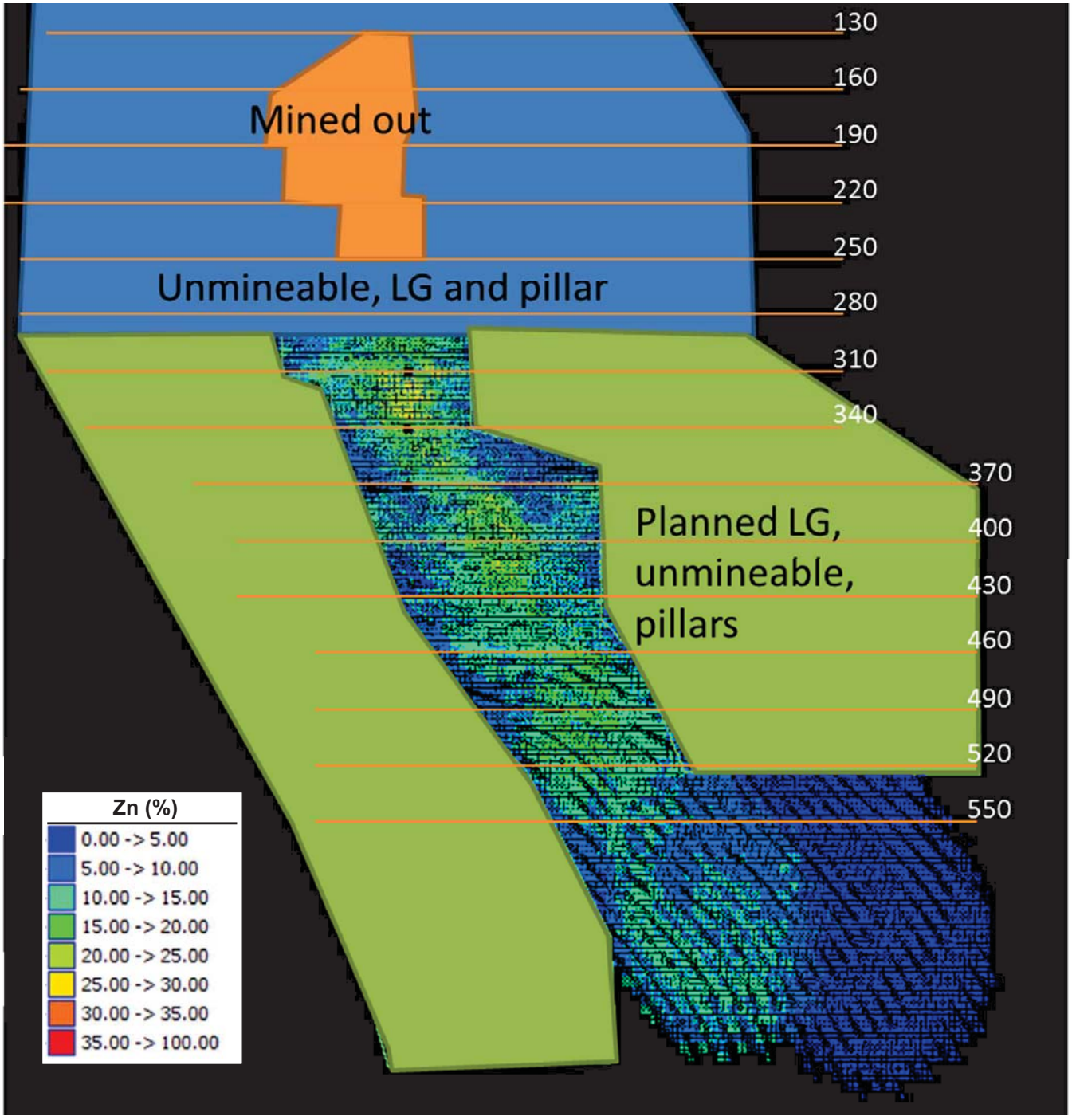
Perkoa Mine

Sanguié Province, Burkina Faso

Footwall Main Lens-
Mined Out and Sterilized Areas

April 2018

Source: Nantou Mining, 2018.



Looking Northwest

0 30 60 90 120
Metres

Figure 14-6

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Hanging Wall Main Lens Mined Out and Sterilized Areas

April 2018

Source: Nantou Mining, 2018.

COMPARISON TO PREVIOUS ESTIMATE

Table 14-14 presents a comparison between the 2016 and 2017 Perkoa Mineral Resource estimates.

TABLE 14-14 COMPARISON TO PREVIOUS ESTIMATE
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn (%)	Contained Zn (Tonnes)
2016 Measured	3.04	15.50	470,800
2017 Measured	2.63	15.65	412,300
Measured Variance	**-0.41**		**-58,500**
2016 Indicated	1.22	12.40	151,000
2017 Indicated	2.22	11.44	253,400
Indicated Variance	**-1.00**		**-102,400**
2016 Inferred	1.64	12.9	211,000
2017 Inferred	0.68	8.9	60,900
Inferred Variance	**-0.96**		**-150,100**

Notes:
1. CIM (2014) definitions were followed for Mineral Resources.
2. Mineral Resources are inclusive of Mineral Reserves.
3. Mineral Resources are estimated at a cut-off grade of 5% Zn.
4. Shown at 100% ownership.
5. Mineral Resources that are not Mineral Reserves do not have demonstrated economic viability.
6. Numbers may not add due to rounding.

As a result of the 2017 drilling program, the Mineral Resources from 370 Level to 460 Level have been completely upgraded to a Measured classification and the Mineral Resources below 490 level are now almost completely upgraded to an Indicated classification.

2017 mining was estimated at 0.74 Mt grading 15.0% Zn for Measured and 0.03 Mt grading 16.8% Zn for Indicated material. A further 0.27 Mt grading 16.4% Zn has been categorized as unrecoverable and was not included in the 2017 Mineral Resource estimate.

RPA VALIDATION

RPA reviewed the Perkoa Mineral Resource interpolation inputs and methodology. Data was loaded into Micromine v.16.5 geological software. The block model was validated by completing a series of visual inspections against wireframes and drill holes. The checks showed good agreement between drill hole composite values along sections and plans. RPA's overall compiled Mineral Resource estimate showed no material differences to that reported.

Figures 14-7 through 14-10 present voided Zn interpolation results and Mineral Resource classification results for the main Perkoa Footwall and Hanging Wall lenses.

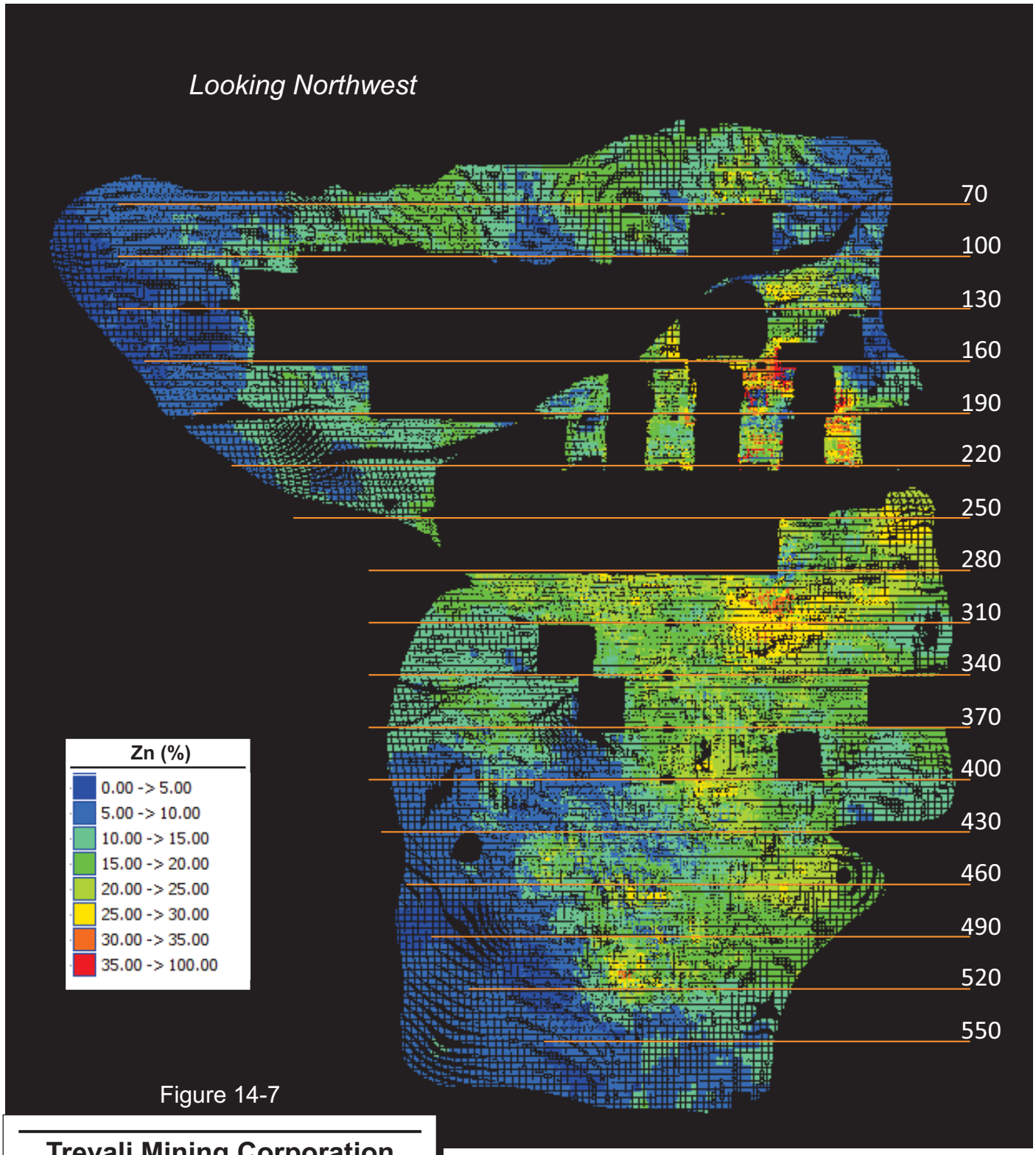


Figure 14-7

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Footwall Main Lens
Interpolation Zn (%)

April 2018

Source: Nantou Mining, 2018.

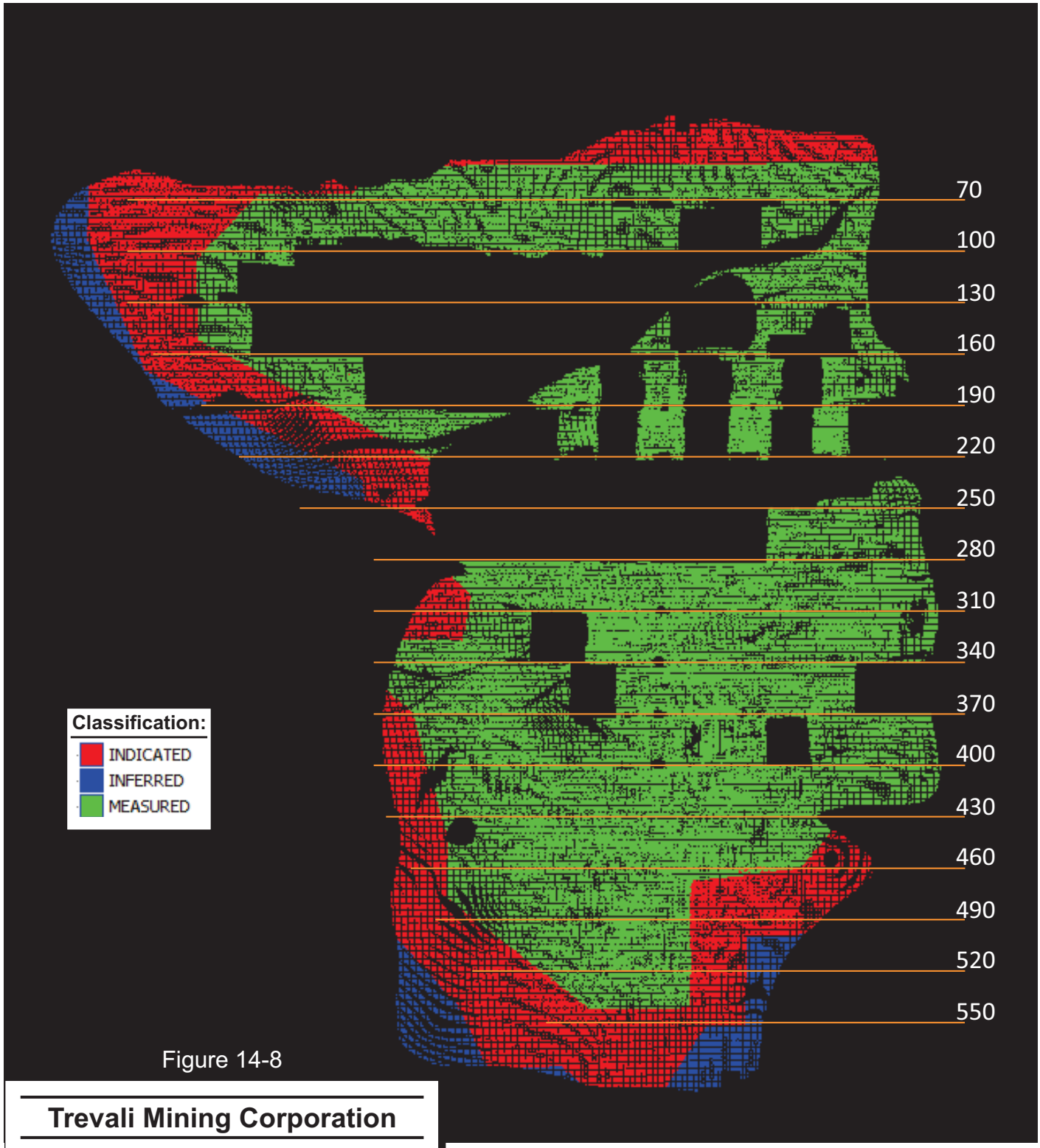


Figure 14-8

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Footwall Main Lens Mineral Resource Categories

April 2018

Source: Nantou Mining, 2018.

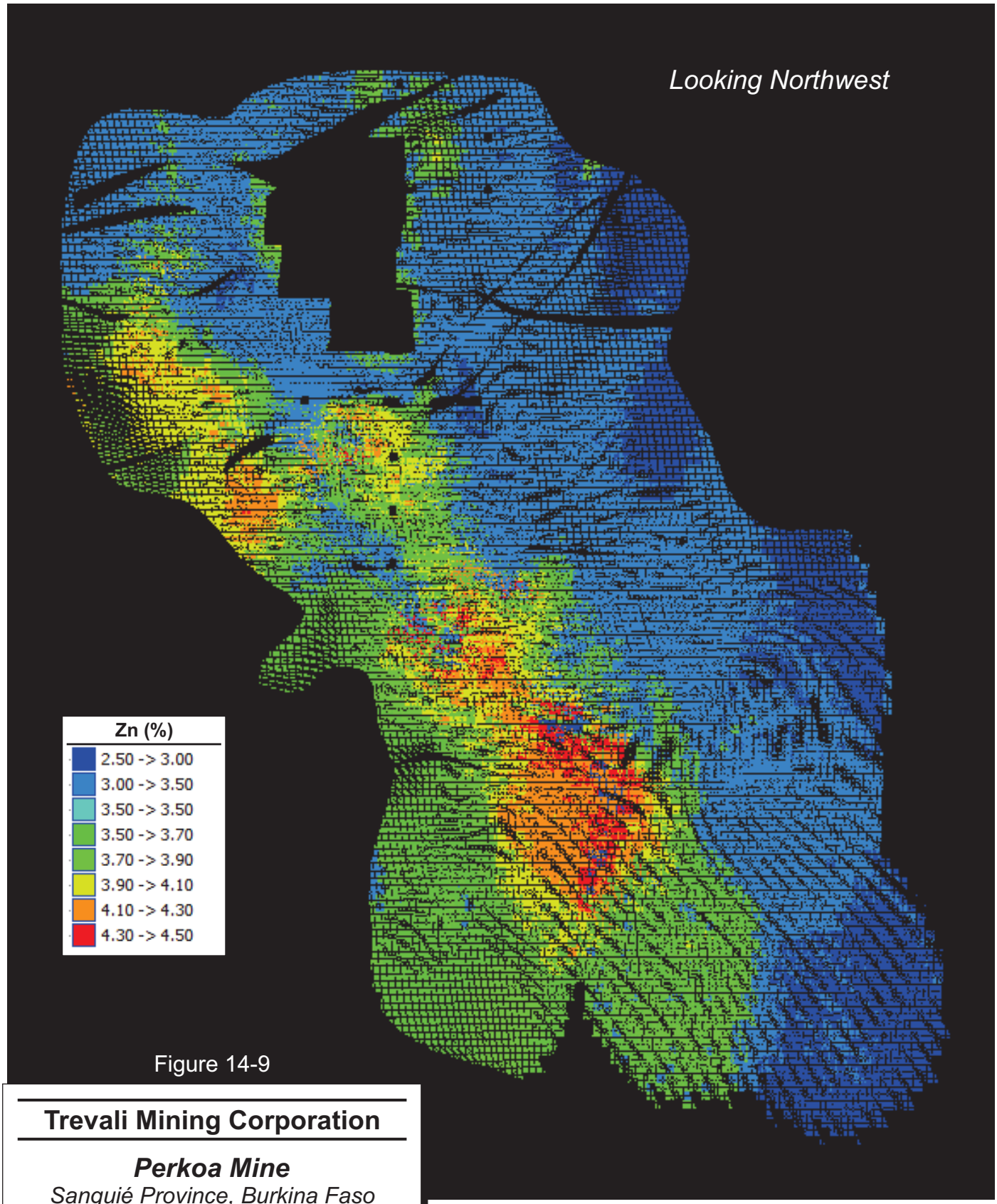


Figure 14-9

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Hanging Wall Main Lens Interpolation

April 2018

Source: Nantou Mining, 2018.

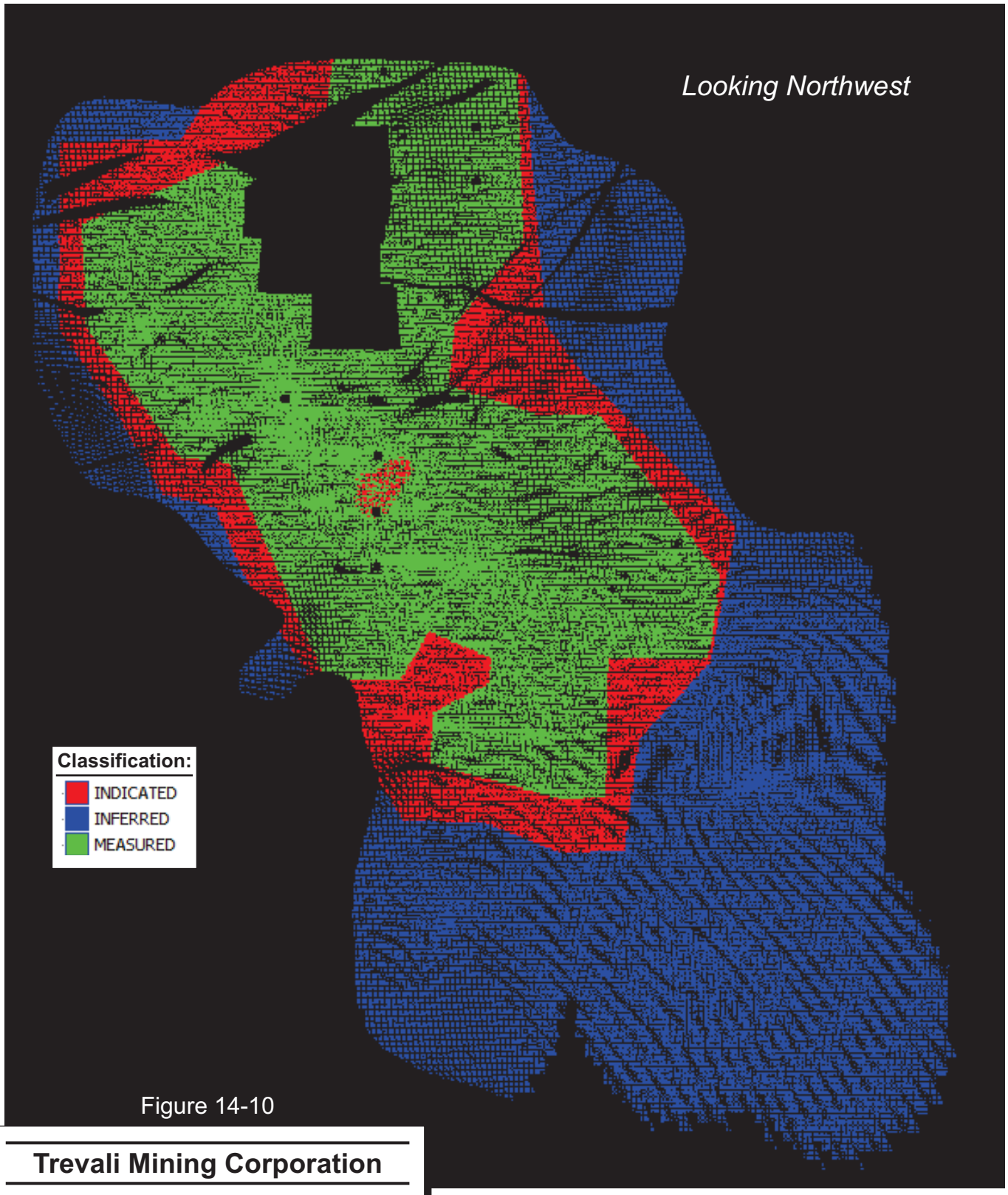


Figure 14-10

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Hanging Wall Lens Mineral Resource Categories

April 2018

Source: Nantou Mining, 2018.

RECONCILIATION

Nantou Mining has a standard end of month (EOM) production measurement system that reports and provides reconciliation between geology and the monthly mine production.

- The contractor records the trucks loaded underground on a daily basis. The location from which trucks are loaded must be recorded (stoping, development, stockpile). The trucks from underground tip the ore in the demarcated areas on the ROM pad according to the geologist's plan.
- The geologist records the number of trucks reporting to the ROM pad and underground location. The truck count for the past 24 hours is reported to the geologist at the end of the night shift.
- The geologist compares the truck count to the contractor daily production sheet. The number of trucks must be agreed at every daily morning mining meeting. Any discrepancies are corrected the same day.
- The surveyors perform a mid-month and EOM CMS survey report including: 1) total tons blasted, 2) total removed from stope, 3) total hauled to the surface, and 4) closing floor stock.
- The geologist and the contractor agree on the mid-month and EOM production reconciled with the CMS stope scans. Any discrepancies are highlighted.
- Densities are adjusted based on final grade.
- The surveyors perform a ROM pad and Fine Ore Stockpile (FOS) survey every Monday and Friday. The stockpile measurement is reconciled with the production recorded by the geology and the crushed tons reported by the plant. Any discrepancies are highlighted and explained.
- The geologist records the daily tonnes crushed as per Conveyor 1 (Primary Crusher). The ROM stockpile is calculated and reported on a daily basis. Average ROM pad's grade is adjusted according to production and crush grades.
- The geologist conducts a control of the truck loads at least two times per month. For each control, a minimum of eight trucks must be called randomly to a demarcated area and the actual load must be measured over the weighbridge. Adjustment to the trucks capacities and ROM pad densities must therefore be performed according to the results.
- At the end of the month, geology and survey departments perform a reconciliation of the total production as agreed on a daily basis with the EOM CMS measurement. The final figure is reported as the mine ore production.

Figures 14-11 to 14-13 present charts of the Perkoa mine production Zn grades versus reported process plant Zn grades from July 1, 2015 to December 31, 2017.

Figure 14-11 shows the daily Zn grade reported by the mine (Block Model adjusted with grade control) in grey, the daily Zn grade reported by the processing plant (measured on the conveyor just before milling) in red, and the variance between the two reported in green. Values below the black line indicate an underestimation of Zn grade by the mine, and above black line indicates an overestimation of Zn grade by the mine.

Figure 14-12 shows the variability in daily reporting of Zn grades from mine production (blue) and feed (orange). All data are centred on their average so the left scale is representing the variance (in STD deviation). The mine variability results from the various grades of the stopes being mined during a same period. The feed variability represents the ability of keeping the feed stable (blending and stockpiling).

Figure 14-13 is the same as Figure 14-12, however, the data is not centred. The left axis represents the variability in Zn grade instead of standard deviation.

In RPA's opinion, the overall reconciliation between geology and the monthly mine production is reasonable.

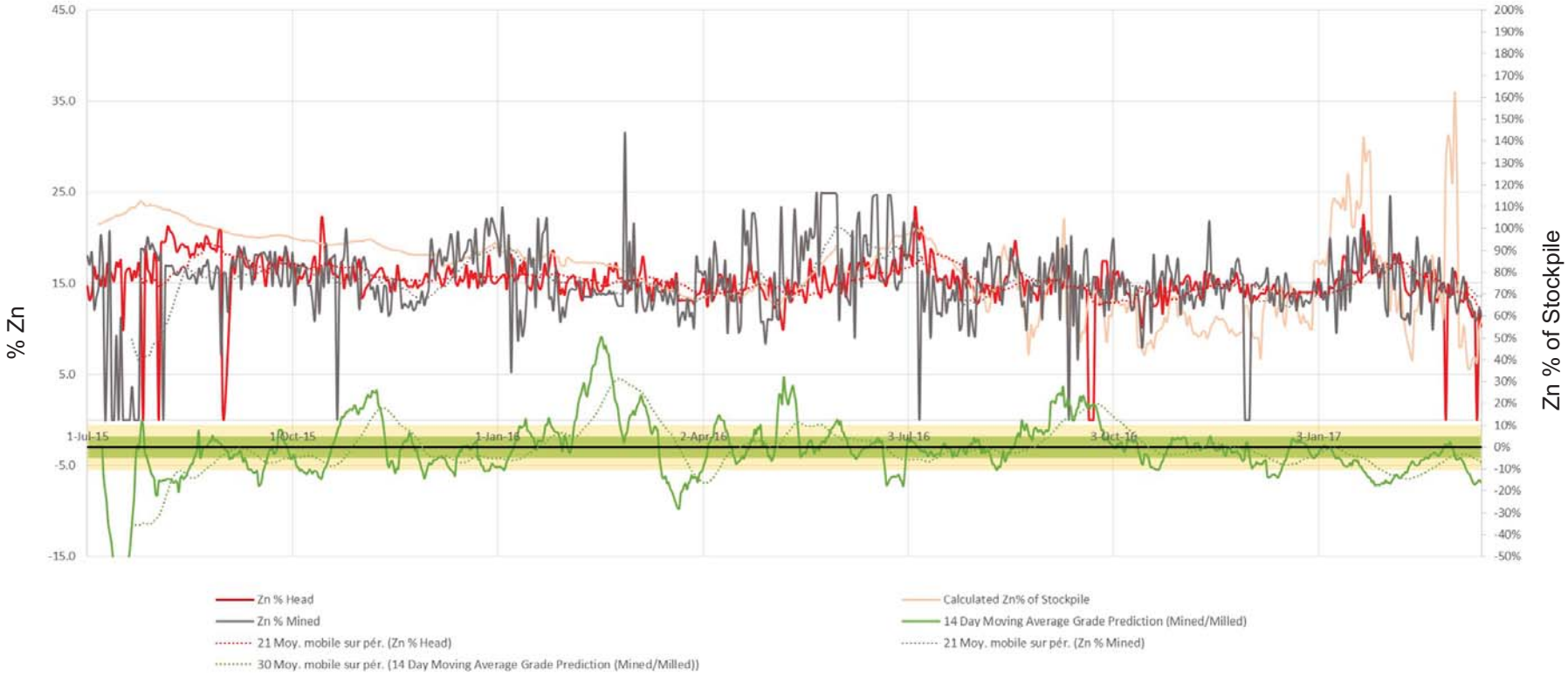


Figure 14-11

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Zn Trends at Perkoa

Source: Nantou Mining, 2018.

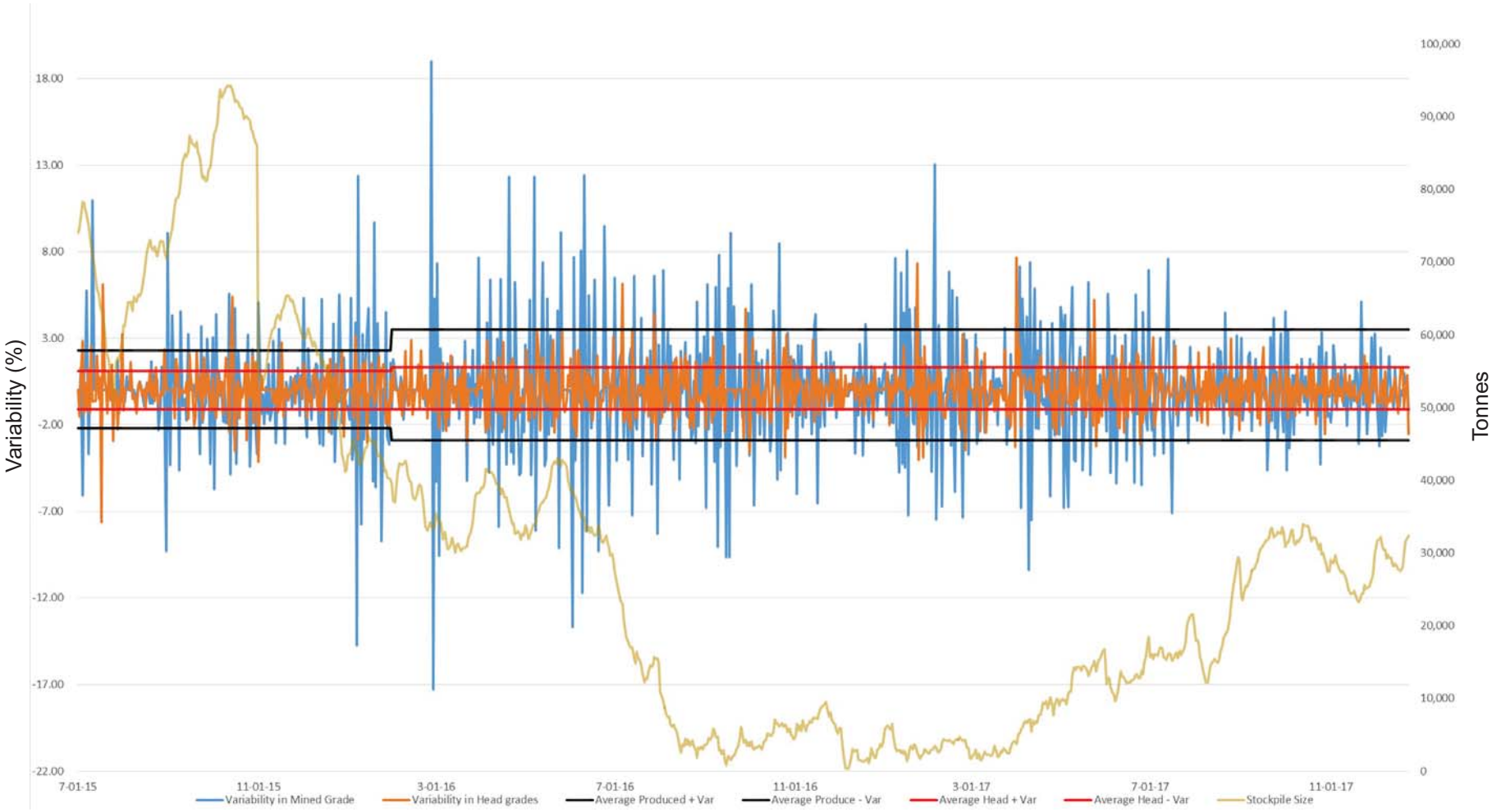


Figure 14-12

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Estimated Production Grade vs. Head Grade

April 2018

Source: Nantou Mining, 2018.

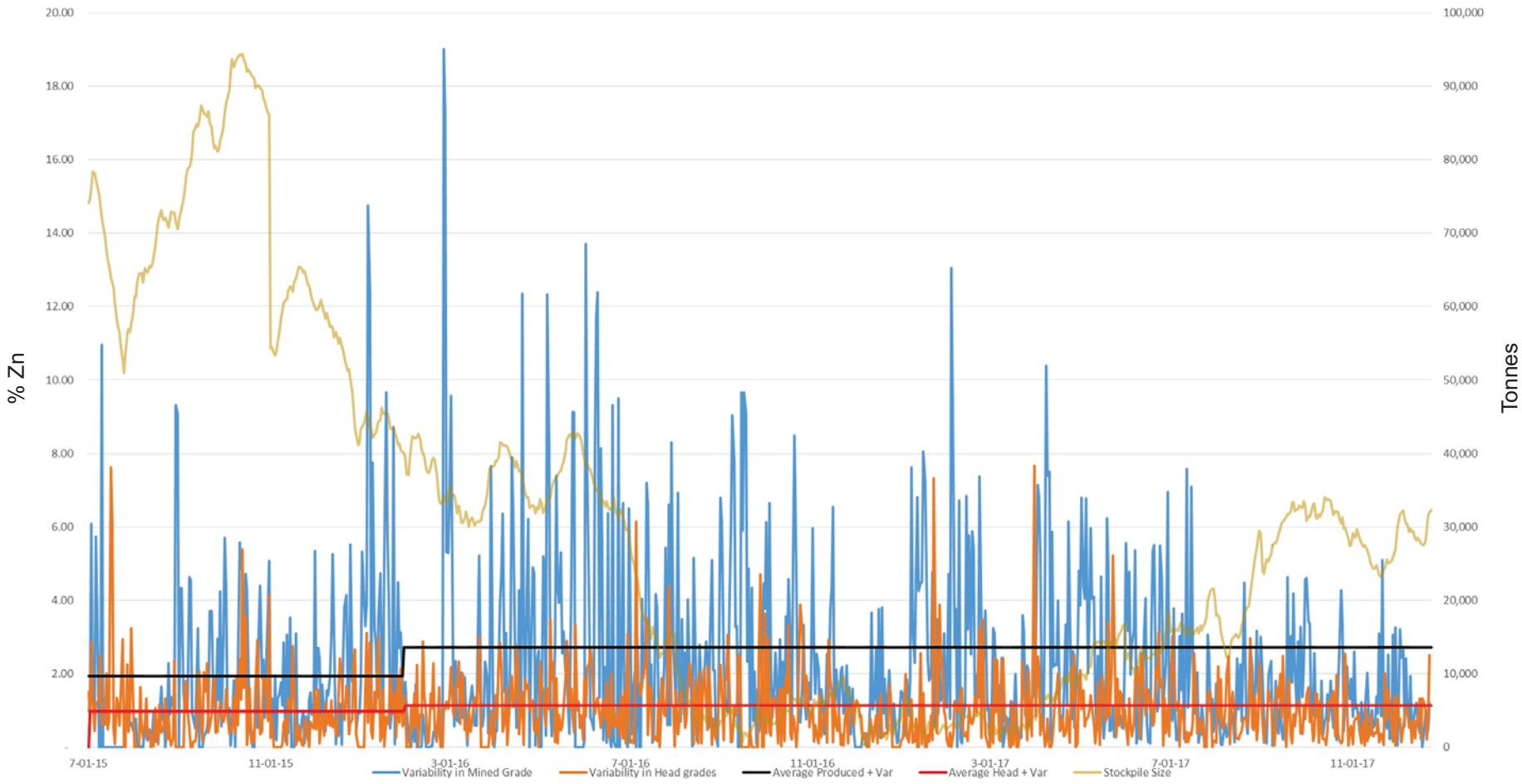


Figure 14-11

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Variability of Estimated Production Grade vs. Head Grade

April 2018

Source: Nantou Mining, 2018.

15 MINERAL RESERVE ESTIMATE

The Mineral Reserve estimate was completed by Nantou Mining and reviewed by RPA with an effective date of December 31, 2017 (Table 15-1). RPA is not aware of any mining, metallurgical, infrastructure, permitting, or other relevant factors that could materially affect the Mineral Reserve estimate.

TABLE 15-1 PERKOA MINERAL RESERVE SUMMARY – AS AT DECEMBER 31, 2017
Trevali Mining Corporation – Perkoa Mine

Classification	Tonnes (M)	Zn (%)	Contained Zn (Tonnes)
Proven	2.29	13.93	318,700
Probable	1.04	11.14	116,000
Proven and Probable	**3.33**	**13.06**	**434,700**

Notes:
1. CIM (2014) definitions were followed for Mineral Reserves.
2. Mineral Reserves are estimated at an NSR cut-off value of $100/t inclusive of capital expenditure, incremental stopes greater than US$80/t are included based on individual financial analysis.
3. Mineral Reserves are estimated using an average consensus forecast zinc price of US$1.20 per pound and a €/US$ exchange rate of 1.08.
4. Shown at 100% ownership.
5. Numbers may not add due to rounding.

Mineral Reserves are estimated from the Measured and Indicated Mineral Resources. RPA has performed an independent verification of the block model tonnes and grade, and in RPA's opinion, the process has been carried out to industry standards.

The Mineral Reserve estimation at the Perkoa mine has been completed by the Senior Mine Planner, who has sufficient long term planning experience, and is reviewed by the Glencore Zinc Technical Services Team.

In order to evaluate Mineral Reserves, Nantou Mining has developed an internal life of mine (Internal LOM) plan, effective December 31, 2017, which includes Proven and Probable Mineral Reserves as well as factored Inferred Mineral Resources. After scheduling all development and stopes using Minesched software, the mined Mineral Resource tonnes were classified as Proven Mineral Reserve tonnage, Probable Mineral Reserve tonnage, and

Internal LOM only tonnage. The Internal LOM only tonnage is not included in the official Mineral Reserve estimate as it comprises Inferred Mineral Resources.

KEY FINANCIAL ASSUMPTIONS

MINING REVENUE

Revenue of any given parcel of material is calculated using a Net Smelter Return (NSR) equation, which takes into account all the latest financial and recovery information to generate a single revenue dollar figure for any particular grade combination found in the mine. The calculation uses 2017 assumptions for metal prices, current concentrator recoveries, and budgeted downstream transport and realization costs.

The NSR equation used in the 2017 Mineral Reserve estimate is NSR_LT = (14.49 x Zn%). The equation is applied throughout the geological model to populate an NSR field for each individual block.

A zinc metal price assumption of $1.20/lb and a €/US$ exchange rate assumption of 1.08 are based on average long term price for the next five years.

Metallurgical recovery and concentrate grade assumptions are based on the 2017 actual results with a zinc recovery of 92.9% and a zinc concentrate grade of 53.4%. The metallurgical recovery used for reserve estimation is based on average recovery and concentrate grade curves according to an average reserve grade of 13.2% Zn. Although there is likely to be a differential recovery tendency throughout the orebody, only one set of recovery figures is used for all material types found in the deposit.

OPERATING AND CAPITAL COSTS

Mining and milling costs used for the Mineral Reserve NSR calculation have been extracted directly from the actual 2017 operating costs.

The costs include:

- All operating costs (mining, on-site crushing, ore transport to mill and milling).
- All administration costs.

The average mining, milling, and maintenance cost over the Internal LOM is $80.00/t. This cost increases to $102.80/t with the inclusion of general and administrative (G&A) costs for the underground operation.

MINING MODIFYING FACTORS

The block model provided for use in the Mineral Reserve estimate was in Surpac format.

Stope shapes were generated based on the above mentioned geological block model and revenue parameters. These shapes represent all available mineable shapes, which meet several important requirements:

- Create a net profit given the expected material revenue, and the cost per tonne (long term NSR > $100), or each stope must prove itself to be profitable to mine based on an individual financial analysis. Some stopes exist in the LOM plan down to $80/t however, these are deemed profitable based on activity based accounting.
- Stope dimensions are such that it meets the current mine plan (level spacing, etc.).
- Stope geometry is practically feasible to extract (drilling angle limitations, etc.).
- Stope shapes meet geotechnical limitations (hanging wall stability).
- Exclude material which is either already mined out or planned to be mined by December 31, 2017.
- Exclude majority of material which is of low geological confidence (Inferred Mineral Resources).

Stope shapes have been designed manually using Surpac software respecting the above-mentioned criteria. The resultant shapes were evaluated against the geological resource model to report the tonnes and grade for each stope shape.

Stope modifying factors were applied, post-geological interrogation, in the Reserve spreadsheet to generate the final diluted and recovered Mineral Reserve. The Mineral Reserve spreadsheet was used to categorize the Mineral Reserves into Proven and Probable classifications.

The Mineral Reserve spreadsheet, which summarizes the conversion from resources to reserves, indicates that each individual stope or mining block is assessed separately and that an estimate of the internal waste to be mined is carried out for each stope. This quantity of

estimated waste can vary from a low of 0% of the Mineral Resource to a high of 37%. The waste is added to the resource tonnage at zero grade to arrive at a Mineral Reserve tonnage and grade. An additional 15% unplanned dilution is then added and then a 95% recovery is applied. This recovery has been applied to allow for any ore loss that may occur during stope extraction and aligns with historical data on site.

Measured and Indicated Mineral Resources are respectively converted to Proven and Probable Mineral Reserves.

The final Mineral Reserves are based on stopes that must meet the following criteria:

- The stope must be mineable. Geology and geotechnical information are used to determine the optimal dimensions, practical geometry criteria, and whether a stope can be extracted safely.

- The stope must be profitable.
  - The stopes are first created using an incremental cut-off NSR grade of $80 per tonne. This value reflects the current costs of trucking the ore to the surface, onsite crushing, and concentrating. This value assumes that all other costs leading up to this point are sunk costs.
  - During the optimization process, the low grade stopes are discarded if they do not meet the economic criteria of the long term NSR > $100. However, some marginal stopes can be included in the LOM where development is required to access some other area of the deposit or to mine some other stopes. Hence the full cost of production is reduced. An in-house “stoping cost evaluation” spreadsheet is used to evaluate in detail those specific areas of the mine and determine whether a stope or a mining front is economic or not when marginal.
  - Finally, several stopes of the Hanging Wall plus the full 550 level have been discarded from Mineral Reserves and LOM as the operation cost exceeds the profit from these lower grade stopes. Additional diamond drilling targeting the 550 level, the deep part of the Hanging Wall lens, and some marginal areas will be completed during Q1 2018 to assess the possibility of economical optimization for those zones of the deposit.

16 MINING METHODS

The Perkoa mine is an underground operation, however, a small open pit was mined to reach near surface material during initial start-up to increase plant throughput as the underground mine ramped up production. The pit is now complete. Underground mining with contractors carrying out all aspects of the mining process commenced in February 2013.

All mining operations are currently being carried out by a mining contractor, which supplies manpower and equipment. Nantou Mining personnel provide geological and engineering services.

The mine is accessed via an 85 m long decline in the box cut prior to entering the portal. The main decline has currently been developed to between the 460 m and 490 m level (approximately 450 m below the surface). Figures 16-1 and 16-2 are longitudinal sections of the current mine development plan.

The decline and associated cross cuts are excavated in the competent quartz diorite of the footwall. The 5.3 m wide x 5.5 m high decline is a spiral and the level spacing is set at 30 m. Each level is identical with a footwall drive, sumps, and services cubbies (Figure 16-3). A ventilation shaft connects all levels of the mine and acts as an emergency egress via the sinking bucket (kibble). A further secondary ventilation ramp egress exists into the completed open pit to allow personnel to escape on foot in an emergency situation. A 35 m crown pillar has been maintained between the open pit and underground production workings. The top extraction level is 70 level with mining currently occurring down to 400 level.

Longhole stoping is being used as the primary extraction method. There are several variations on this mining method employed such as longitudinal and transverse, with both bottom-up and top-down mining sequences. The exact method chosen is dependent on the orebody geometry. Stopes are backfilled with either cemented rock fill (CRF) or waste.

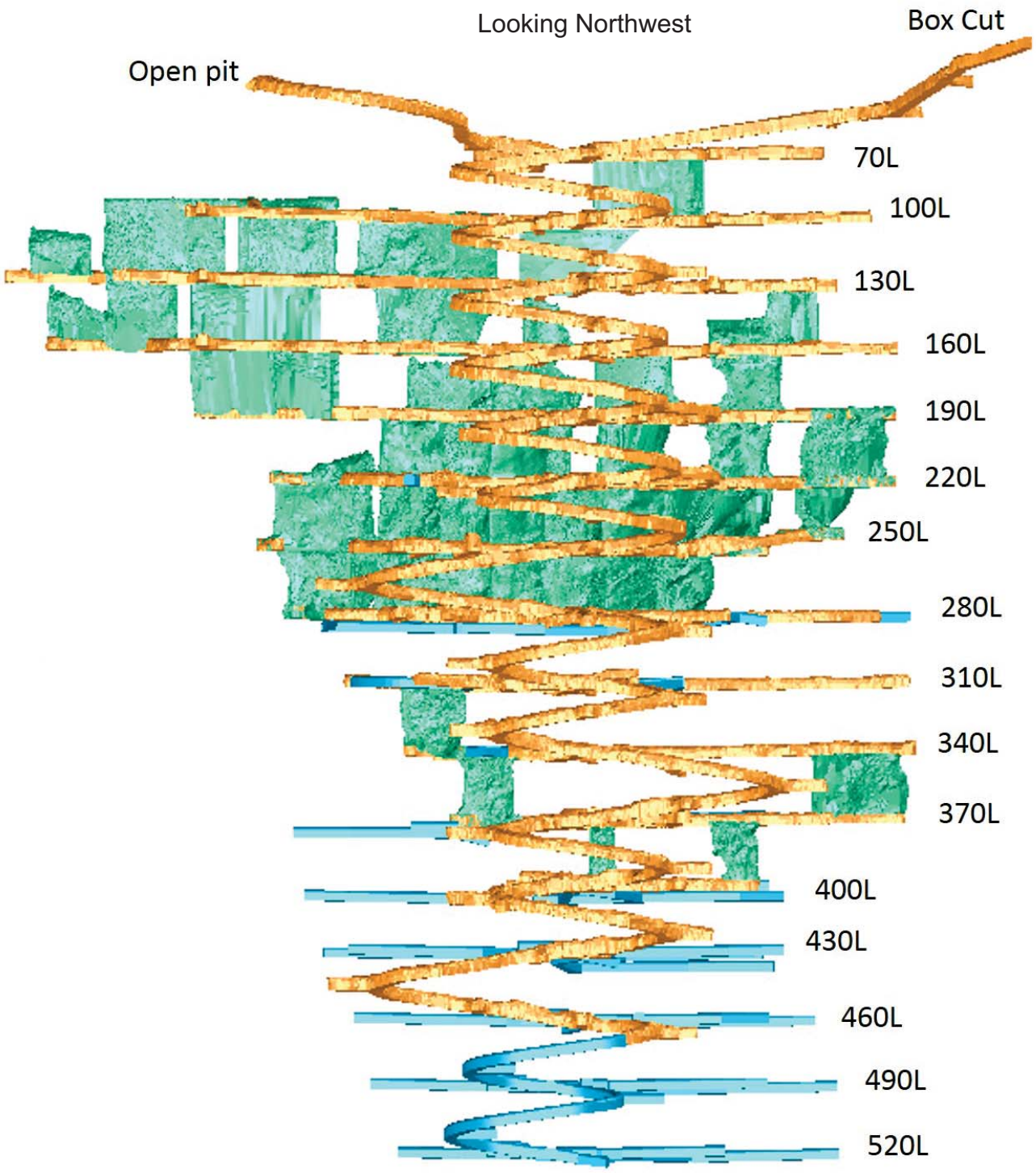


Figure 16-1

Trevali Mining Corporation

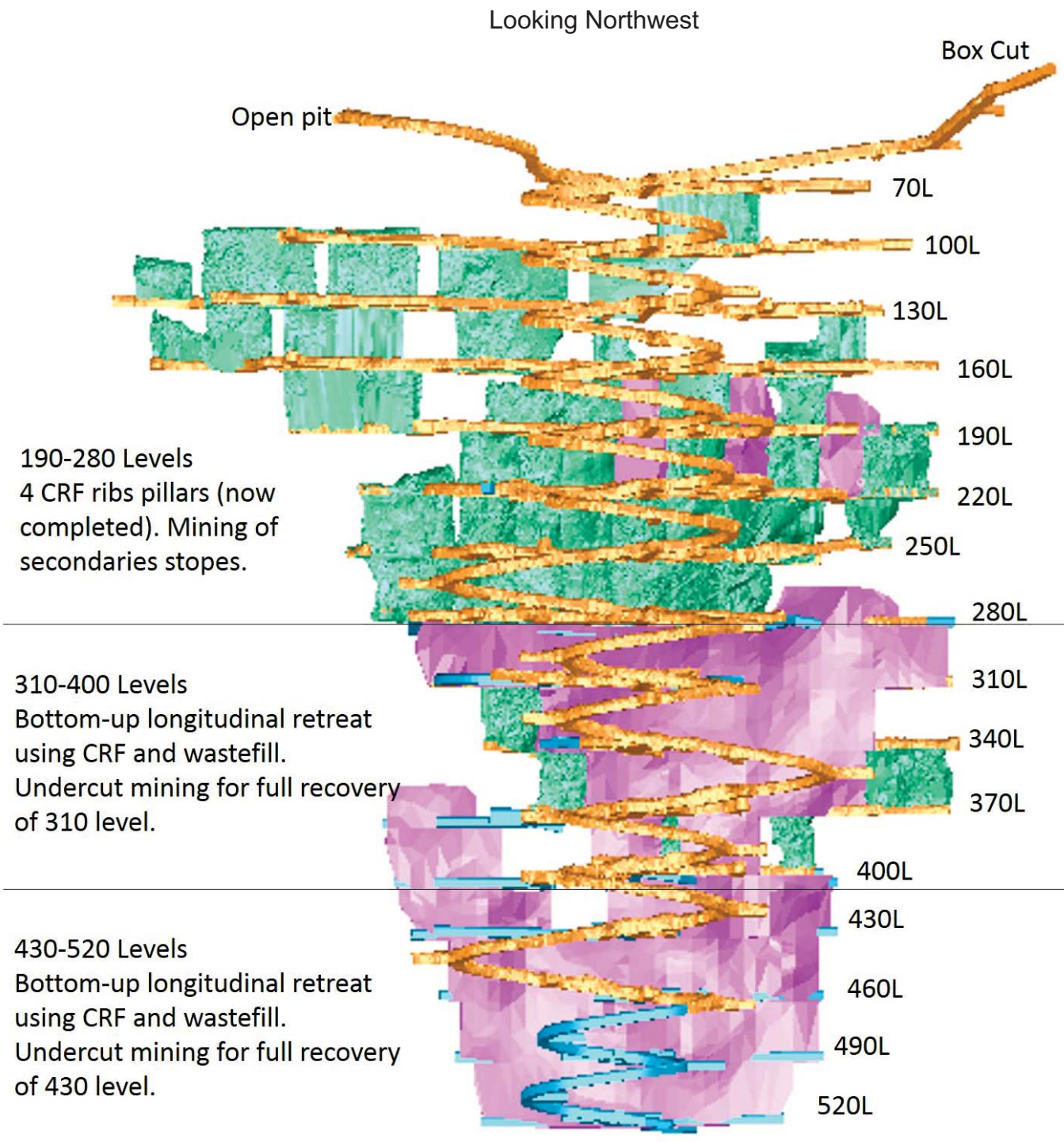
Perkoa Mine

Sanguié Province, Burkina Faso

Isometric View - Existing and Proposed Development

April 2018

Source: Nantou Mining, 2018.



April 2018

Source: Nantou Mining, 2018.

Figure 16-2

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Isometric View - Existing and Proposed Development and Stoping

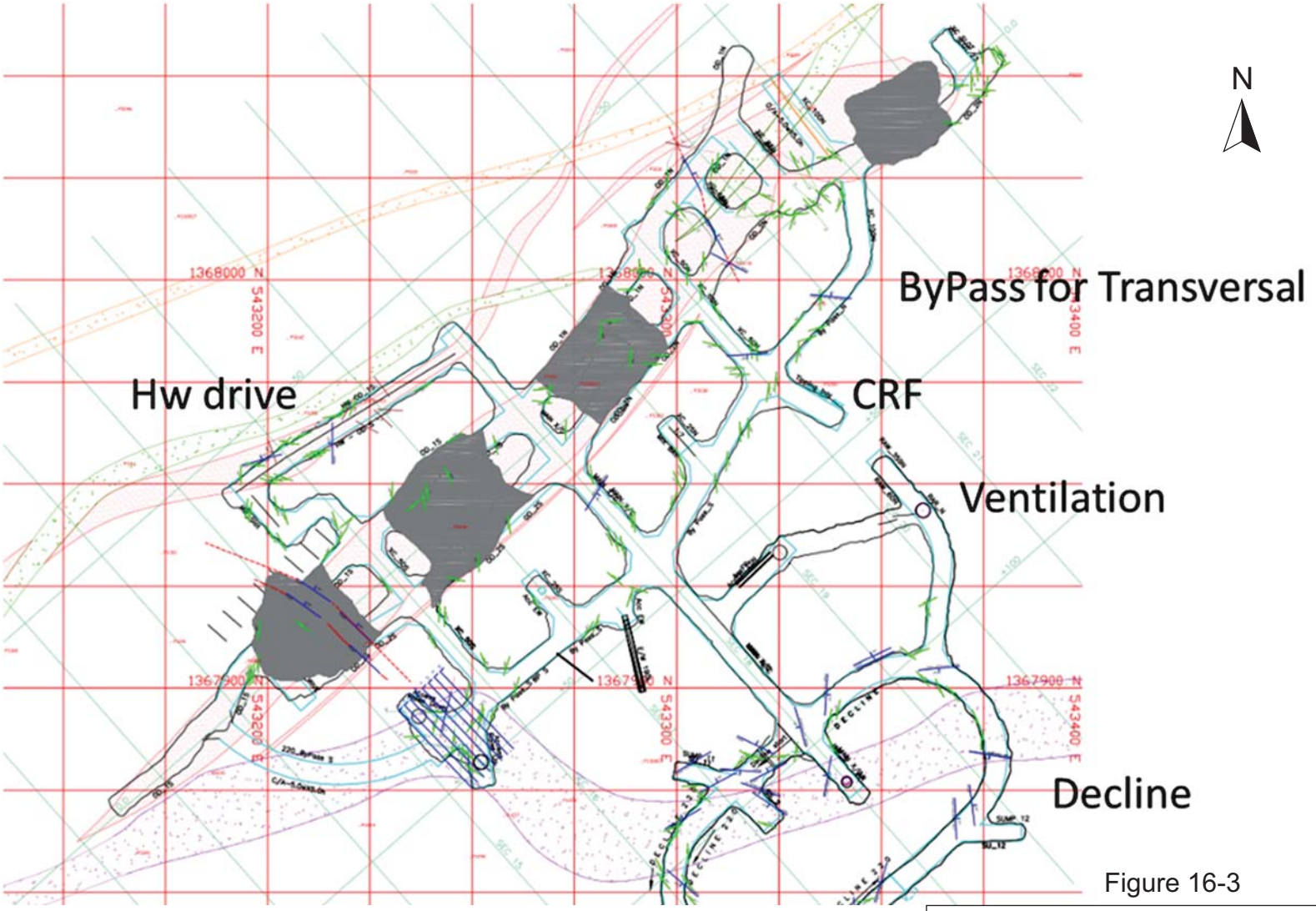


Figure 16-3

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Typical Level Design

April 2018

Source: Nantou Mining, 2016.

Longitudinal bottom-up stoping has been used above 190 level. Due to the orebody width and mine sequencing, stopes between 190 level and 280 level are mined using the transverse method with primary and secondary stopes, with some longitudinal retreat mining occurring at the extremities of the orebody (Figure 16-2). All of the primary stopes above 280 level have been mined out with the remaining ore to be mined as secondary stopes (Figure 16-3).

A recoverable sill pillar has been established on 310 level in order to be able to convert the mining below 310 level to a bottom-up longitudinal retreat method which is expected to reduce the amount of development required. As well, a higher percentage of waste backfill instead of CRF can be used with this method which is expected to lower the mining cost.

The majority of the stopes to be mined are located in the Footwall Lens of the orebody (Figure 16-4). Figures 16-4 and 16-5 are longitudinal sections of the current mining plan (green fill denotes a mined out stope) for the Footwall and Hanging Wall Lenses. The Hanging Wall stopes (Figure 16-5) are mined in a combination of top-down open stope longitudinal retreat and bottom-up mining utilizing CRF.

For the Footwall lens, bottom-up mining will be utilized between 400 level and 310 level and top-down longitudinal retreat primary and secondary stoping will be utilized between 400 level and 520 level. The current limit of the Proven and Probable Mineral Reserves is at 520 level. The majority of the Footwall Lens stopes below 520 level are in a portion of the orebody which is classified as an Inferred Mineral Resource. This area will require infill drilling in order to upgrade the Inferred Mineral Resource to a Measured or Indicated Mineral Resource.

For the Hanging Wall lens, bottom-up mining will be utilized between 430 level and 310 level and top-down longitudinal retreat primary and secondary stoping will be utilized between 430 level and 520 level. The current limit of the Proven and Probable Mineral Reserves is at 520 level. The majority of the Hanging Wall stopes below 520 level are in a portion of the orebody which is classified as an Inferred Mineral Resource. This area will require infill drilling in order to upgrade the Inferred Mineral Resource to a Measured or Indicated Mineral Resource.

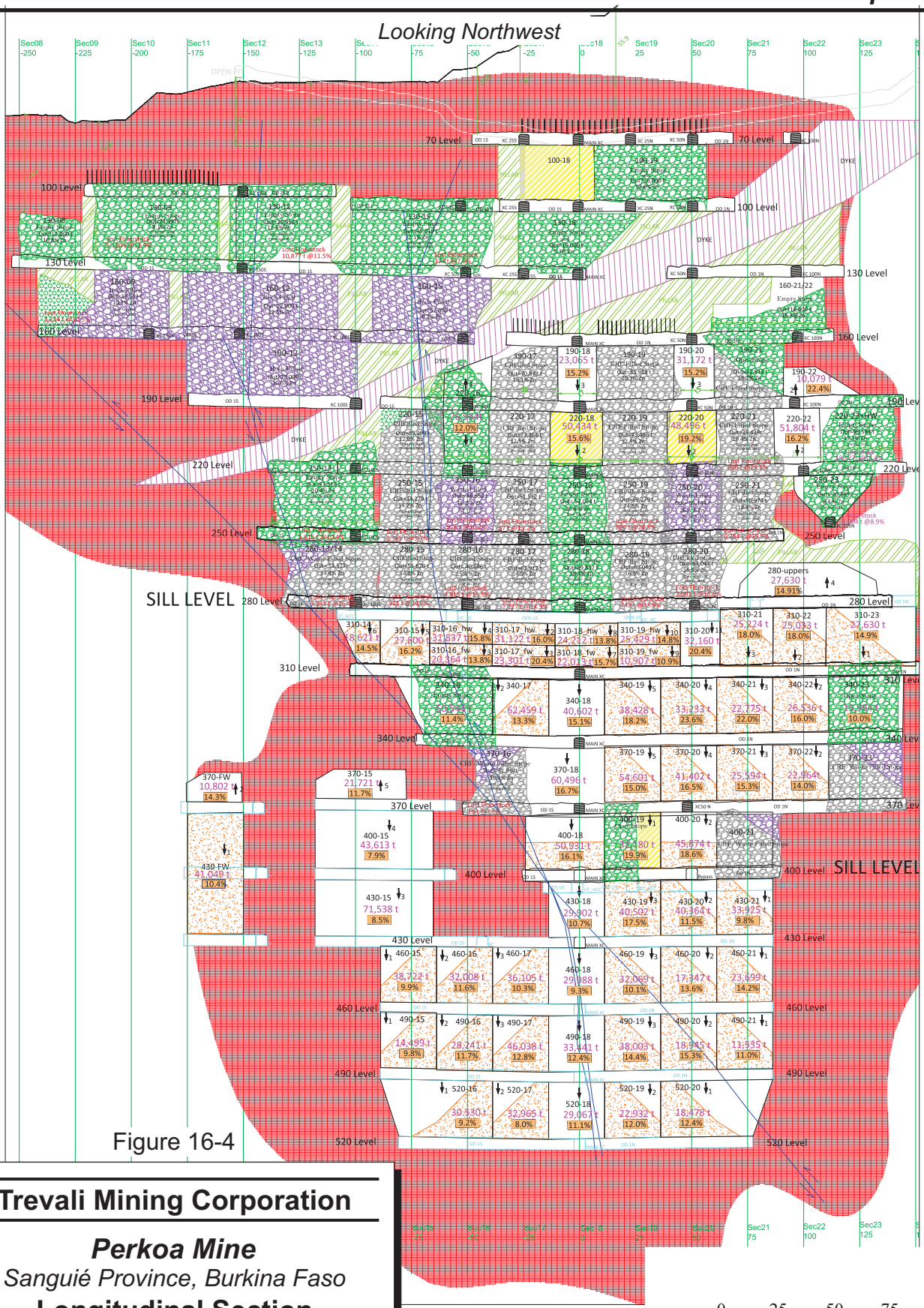


Figure 16-4

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Longitudinal Section
Footwall Main Lens

April 2018

Source: Nantou Mining, 2018.

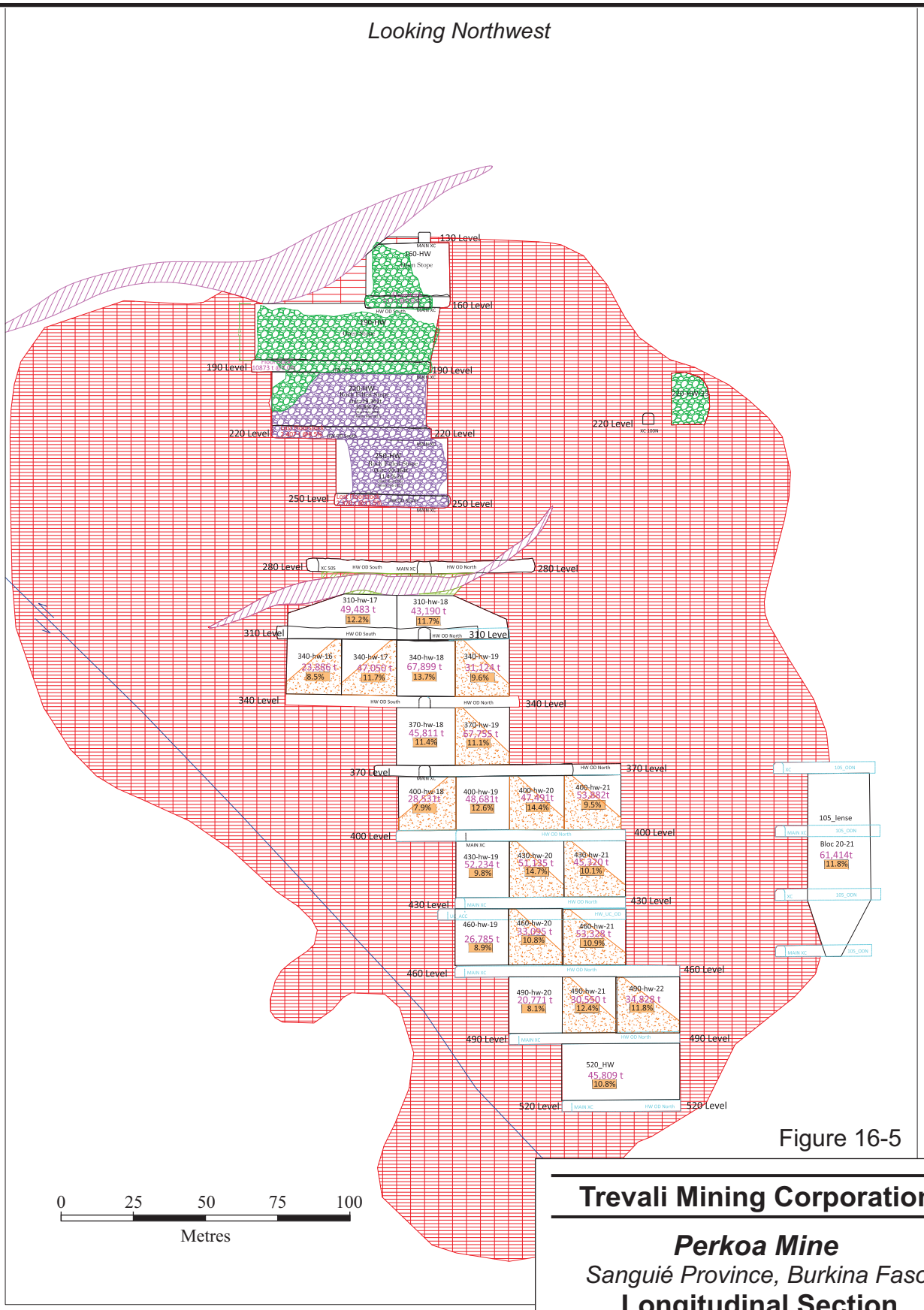


Figure 16-5

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Longitudinal Section
Hanging Wall Lens

April 2018

Source: Nantou Mining, 2018.

When the full stope area has been mined out, voids are backfilled with CRF for primary stopes. Secondary stopes are filled with waste. The fill serves both to support stope walls and to provide a working platform for equipment when mining the next slice. Run of mine (ROM) waste and crushed material (100 mm all-in) is mixed with different binder percentages, depending on the application. The CRF is mixed in dedicated underground sumps. During 2017, a total of 356,000 t of CRF and waste were placed, which was approximately 55% of the stoping ore mined during the year.

Production drilling is by one Sandvik DL421 longhole drill with either 89 mm or 102 mm holes being drilled. Drill productivity is approximately 350 m/day. Burden is 2.8 m and spacing is 3.2 m. Figure 16-6 illustrates some typical stope drilling patterns.

Ore and waste is loaded by three scooptrams. The scooptrams are remotely operated using line of site and full tele-remote operation technology. Approximately 70% of each stope is mucked with the tele-remote scooptrams. Three 60 t trucks take the ore to the ROM pad (ore stockpile), and waste to the waste dump. In addition, there are a dozen or so pieces of assorted heavy mobile equipment to support the mining and processing operations.

Explosives, ammonium nitrate, slurry mix, and accessories are transported to the site from Ouagadougou by BME, the explosives supplier which is a member of the Omina Group. All charging underground is provided by the mining contractor using its own equipment.

Nantou Mining only keeps the minimum required stock on hand (approximately four days) as BME have a large storage and manufacturing facility 15 km away. Emulsion is the primary explosive used. The explosives are stored in a small magazine located at the southern perimeter of the site behind the oxide and open pit waste dumps. There are separate areas for emulsion and initiation systems, all stored in Mine Department approved facilities. In addition, Nantou Mining has a day magazine underground which is used to hold one to two days' supply in a magazine built to South African Mine Regulation standards.

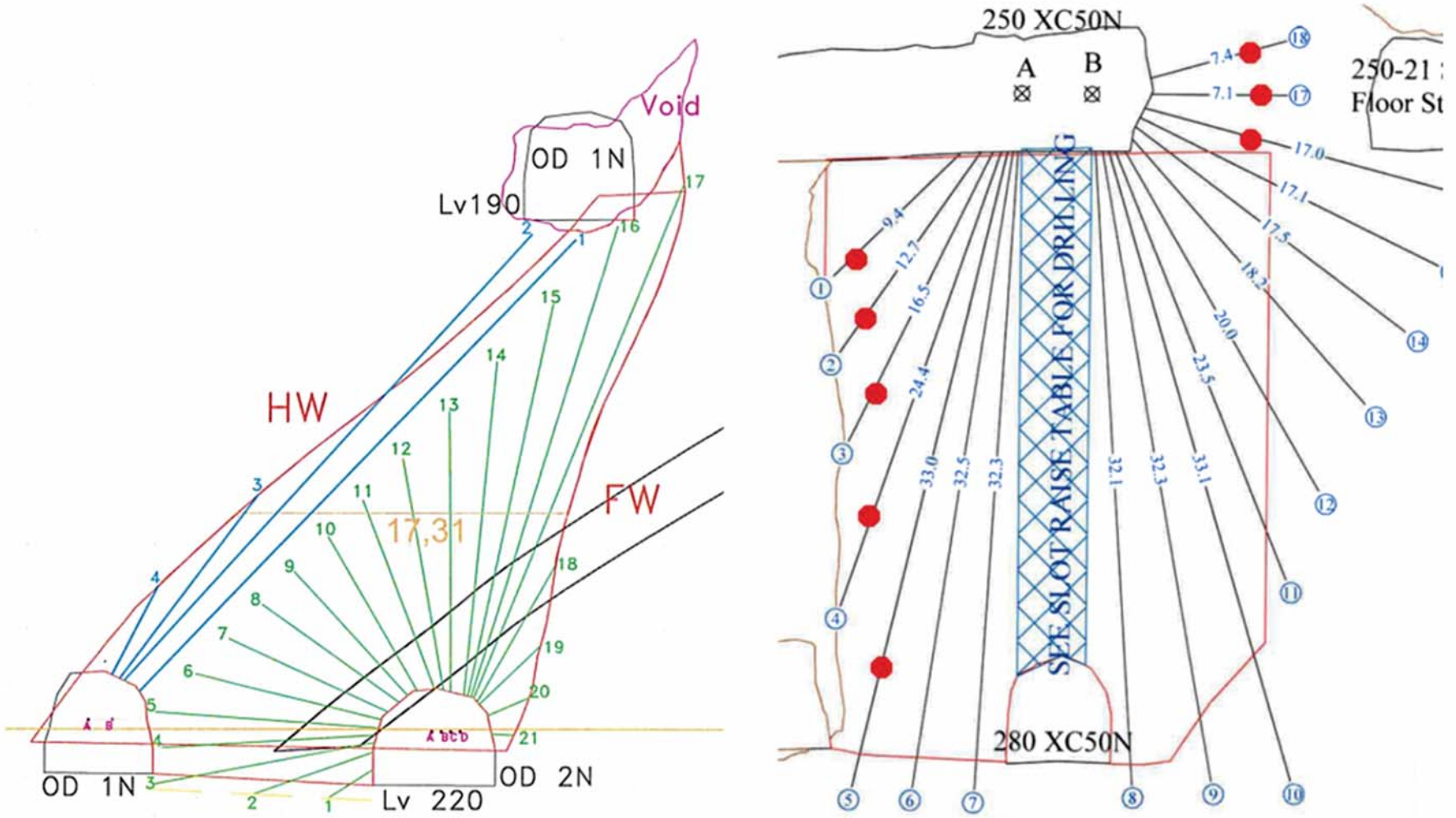


Figure 16-6

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Typical Stope Drilling

April 2018

Source: Nantou Mining, 2016.

GEOMECHANICS, GROUND SUPPORT

Ground conditions at Perkoa have been classified into three types, Type 1, Type 2, and Type 3, with Type 1 being good ground. Type 1 ground is usually in the quartz diorite footwall rock, Type 2 ground is the hanging wall unit, and the Type 3 ground classification is used where the rock is very weak, either from blasting or from complex structures, such as dykes.

Ground conditions observed during the underground visit were good. Nantou Mining has developed ground support standards for various sizes of development headings. Permanent excavations, such as declines, remuck bays, level accesses, ventilation accesses, etc., are supported with nine 2.4 m double corrosion protection (DCP) grouted expansion bolts every two metres along the drift, plus wire mesh to within 3.7 m of the floor, and 2.4 m long 47 mm splitsets every two metres along both walls of the drift. Temporary excavations, such as ore drives, are supported with eleven 2.4 m long 47 mm splitsets every two metres along the drift plus wire mesh to within 3.05 m of the floor.

INFRASTRUCTURE

MINE VENTILATION

Nantou Mining is using an exhaust ventilation system with three 315 kW axial flow primary ventilation fans located on surface near the northeastern edge of the open pit and currently delivering 200 m^3/s to the underground. These fans exhaust the air through a dedicated up-casting ventilation shaft that intersects all levels. The fresh air intake is down the decline, and at each sublevel, there is a secondary booster fan taking fresh air into the workings. During 2018, the ventilation system is being expanded to include two new fresh air intakes. The decline will remain the primary fresh air route and the north return air way (RAW) will remain the primary exhaust shaft. The ventilation management plan was designed by external consultants and onsite engineers monitor and update the plan monthly.

During 2017, Nantou Mining transformed the existing escapeways into pressurized fresh air ways, allowing the safe travel or safe shelter from 520 level up to 70 level, in the event of an emergency. Also planned for 2018 is a system to rapidly exhaust air from the explosive magazine directly to the north RAW in the event of an explosion/fire inside the magazine.

A second access has been established into the open pit at 70 level and is also considered a fresh air intake. Escape ways have been established in fresh air and are sealed from the rest of the mine by utilizing the 70 level access.

In RPA's opinion, the ventilation system is appropriate and provides an adequate quantity of fresh air for the operation.

MINE DEWATERING

The mine is considered a dry mine with little or no ground water inflows, however, on each level there is a dewatering sump with a single Flygt 37 kW pump. Water is pumped up to the next level until 70 level is reached. Here, water enters a settling dam before overflowing to a clear water dam where a single Mono pump capable of handling 5 L/s pumps the water to surface.

On 280 level, a new pump station has been being built and all water below 70 level drains to 280 level before being pumped to 70 level. This station currently consists of one 130 kW Mono pumps with a capacity of 12.5 L/s pumping water in one of two rising mains to surface. A second standby Mono is in the process of being installed. The existing pumping system will be retained as a backup.

Great care has been taken to manage rainfall in the portal box cut as this is the biggest exposure to flood. The box cut walls have either been sheeted with plastic or shotcreted and the benches have been concreted to control storm water runoff. Two separate sumps have been built in the box cut to capture water so as to minimize water entry into the portal. One sump is at the portal entrance and the other is mid-way up the box cut. Each has two Flygt pumps, one 37 kW and one 90 kW, and both sumps pump water to the surface.

MINE POWER

The underground mine is supplied with power from five Connell power generators that contain Caterpillar 3516B generators, assembled in shipping containers. The generators have an output of 1.6 MW-0.4 kV and are located adjacent to the underground mine ventilation fans. A transformer is located at the switch room and steps the power up from 400 V to 11 kV for distribution to the underground mine. Diesel is supplied to each generator by fuel truck.

ORE STOCKPILES

The mine has an established stockpile plan, which includes high grade (18% to 20% Zn), medium grade (14% to 18% Zn) and low grade (~10% Zn). Each day, the geology department issues stockpile blending instructions to the processing plant with the aim of achieving a more consistent head grade in the range of 13% to 14% and 13% to 14% Fe as well as a Zn:Fe ratio of 1.0. As of January 18, 2018, the total ore on the stockpile was 51,500 t grading 16.7% Zn and 16.3% Fe.

LIFE OF MINE PLAN

As part of the 2018 Budget process, carried out in mid-2017, Nantou Mining has developed a LOM plan based on the Proven and Probable Mineral Reserves, which projects production to 2022 with a total of 3.33 Mt being mined at a grade of 13.1% Zn.

The LOM plan schedule has been built around economic stopes that exceed the $80/t incremental mining cost. Stopes have been cut using Surpac geology and mining software using the resource block model constrained to $100/t NSR. The required development has then been designed in order to reach these mining locations.

The LOM plan schedule is based upon a process plant capacity of 690,000 tpa to 700,000 tpa and is shown by year in Table 16-1.

TABLE 16-1 LIFE OF MINE PLAN PRODUCTION SCHEDULE
Trevali Mining Corporation – Perkoa Mine

ROM Production		2018	2019	2020	2021	2022	Total
Stope Ore	000 t	614	660	679	679	569	**3,200**
Development Ore	000 t	98	25	-	6	-	**129**
Total Ore	000 t	712	685	679	685	569	**3,329**
Average Production	t/d	1,951	1,876	1,859	1,877	1,877	**1,888**
Zinc Grade	%	13.5	13.2	12.1	12.5	14.1	**13.1**
Development							
Opex Development	metres	1,380	359	-	70	-	**1,809**
Capex Development	metres	1,291	17	-	-	-	**1,308**
Total	metres	2,670	376	-	70	-	**3,117**
Rounds/Day		7	1	-	-	-	**-**

ROM Production		2018	2019	2020	2021	2022	Total
Drilling							
Blasthole Drilling	metres	53,172	43,680	44,492	44,032	36,870	**222,246**
Sandvik m/d		146	120	122	121	110	**126**

17 RECOVERY METHODS

PROCESS DESCRIPTION

The process plant at Perkoa is a conventional sulphide flotation plant capable of processing 2,000 tpd and is currently operating at approximately 1,900 tpd. The process plant includes crushing, screening, and grinding, followed by zinc flotation and filtering to produce a zinc concentrate (Figure 17-1). The process plant originally included a lead recovery circuit, however, this circuit is no longer used and has been reconfigured to increase capacity in the zinc circuit due to higher zinc head grades.

The ROM ore is fed through a grizzly to the primary jaw crusher at a rate of approximately 150 tonnes per hour (tph). The product is sent to a secondary cone crusher circuit operating in closed circuit with a screen, splitting at 10 mm. The screen oversize (+10.0 mm) is sent to the cone crushers. Product from the cone crushers is returned to the primary screen. The undersize (-10.0 mm) from the primary screen is sent to the mill feed stockpile.

From the mill feed stockpile, the ball mill (10.5 ft x 16 ft) is fed at a rate of 85 tph to 88 tph solids feed pending on variations in mineral hardness. The ball mill operates in closed circuit with cyclones to produce a zinc flotation feed with a minimum of 60% of the cyclone overflow product passing 200 mesh (75 µm)(P_{60} 75µ).

The flotation feed is sent to a conditioner where reagents (hydrated lime, copper sulfate ($CuSO_4$), xanthate, and frother) are added before it passes on to rougher tank cells. High grade concentrate from the first three roughers is sent to final concentrate and the low grade concentrate from the last rougher is sent to the cleaner circuit.

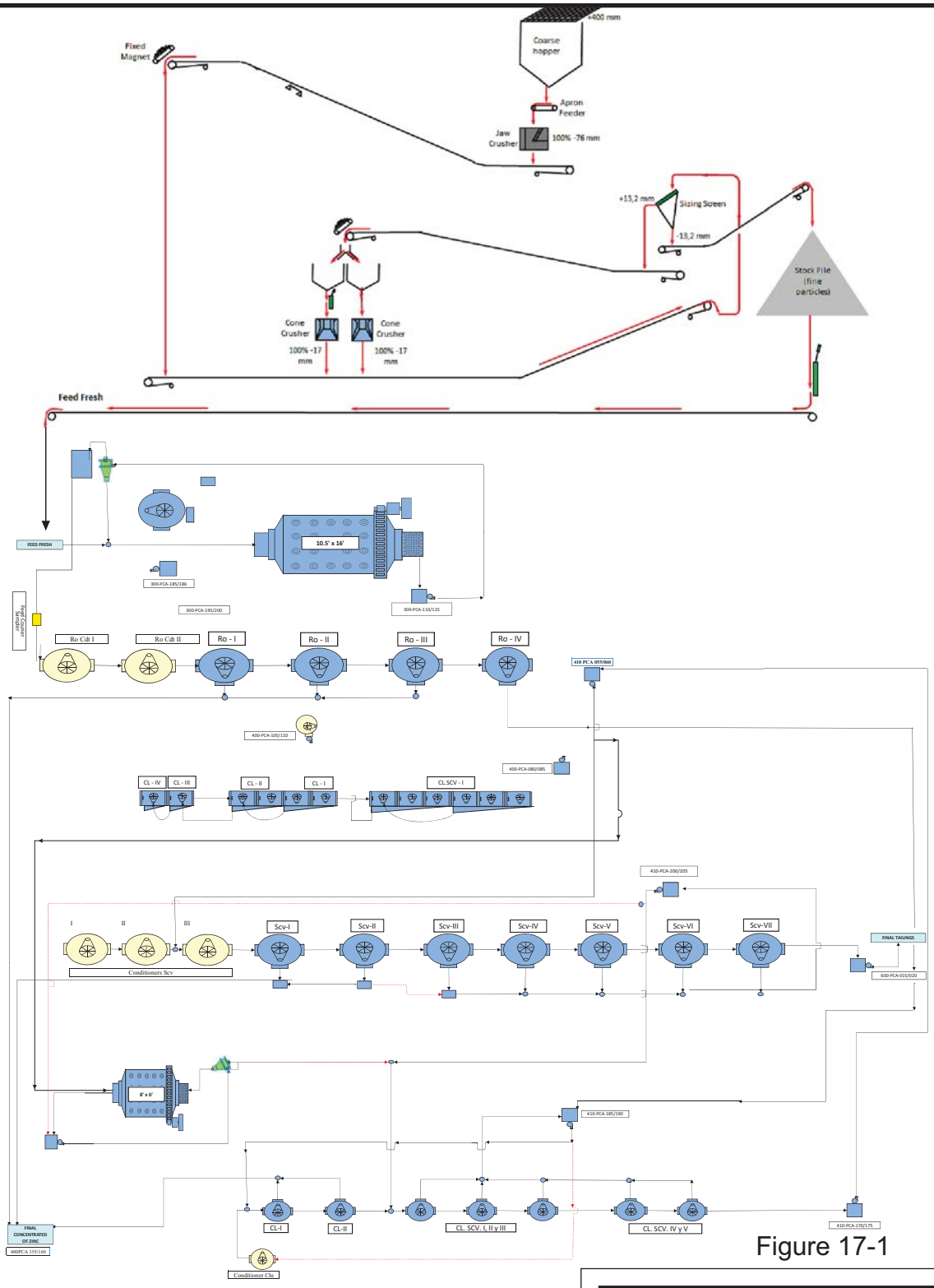


Figure 17-1

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Process Plant Flowsheet

April 2018

Source: Nantou Mining, 2018.

The rougher tailings go to the scavenger circuit, where the concentrate from the first and second scavenger cells is sent to final concentrate, while the concentrate from the rest of the scavenger cells is sent to the regrinding circuit. Cyclone overflow is sent to the cleaner/scavenger circuit. Concentrate from the first three cleaning cells is sent to final concentrate. The scavenger concentrate is recycled to the head of the cleaning circuit while the tails from the cleaner circuit are combined with the rougher tails to feed the scavenger circuit. The scavenger tailings go to the final tailings.

The concentrate from the cleaners is sent to final concentrate, with the tailings sent to the cleaner/scavenger circuit, where the concentrate is recirculated back to the head of the cleaner circuit. The cleaner/scavenger circuit tailings are sent to the head of the scavenger circuit.

The final concentrate is sent to a zinc concentrate thickener and Larox pressure filter for dewatering.

The final zinc concentrate from the Larox filter is discharged onto a drying floor, where it is dried and stockpiled until loaded onto trucks for dispatch to the port of Abidjan, Cote d'Ivoire.

HISTORICAL PLANT PERFORMANCE

From 2013 to 2017, the process plant produced (Table 17-1) a zinc concentrate in the range of 50.6% Zn to 53.0% Zn from head grades ranging from 6.3% Zn (open pit) to 15.2% Zn (underground). Recovery of zinc has been in the range of 89.3% to 96.7%. In general, the Perkoa concentrate can be considered "clean", with mercury and iron being two elements incurring small penalties.

TABLE 17-1 HISTORICAL CONCENTRATOR PERFORMANCE
Trevali Mining Corporation – Perkoa Mine

	Units	2013	2014	2015	2016	2017	Total
Ore Processed	000 t	548	496	513	590	658	**2,805**
Zinc Grade	%	6.3	13.6	15.0	15.0	15.2	**13.1**
Zinc Recovery	%	92.8	96.7	89.3	92.1	92.5	**92.6**
Zinc Concentrate	000 t	63.6	126.0	130.3	153.7	170.7	**644.3**
Zinc Concentrate Grade	%	50.6	51.6	52.8	53.0	51.6	**52.1**
Zinc Metal Contained	000 t	32.2	65.0	68.8	81.4	92.7	**340.1**
Availability	%	N/A	N/A	75.2	83.2	90.2	**-**

PRODUCTION SCHEDULE

The LOM plant production schedule is shown in Table 17-2.

TABLE 17-2 LIFE OF MINE PLAN PLANT PRODUCTION SCHEDULE
Trevali Mining Corporation – Perkoa Mine

ROM Production		2018	2019	2020	2021	2022	Total
Total Processed	000 t	697	699	701	687	545	**3,329**
Average Production	t/d	1,910	1,915	1,920	1,882	1,882	**1,903**
Zinc Grade	%	13.5	13.2	12.1	12.5	14.1	**13.1**
Zinc Recovery	%	92.5	93.5	93.5	93.5	93.5	**93.3**
Zinc Concentrate	000 t	166.8	163.1	149.6	151.7	136.0	**764.4**
Zinc Concentrate Grade	%	52.2	53.0	53.0	53.0	53.0	**52.8**
Zinc Metal Contained	000 t	87.1	86.5	79.3	80.4	72.1	**405.4**
Payable Zn Metal Produced	000 t	73.8	73.4	67.3	68.3	61.2	**344.0**

LIFE OF MINE MAJOR CONSUMABLES

Table 17-3 lists the LOM major consumables and energy requirements. All consumables are readily available. The Perkoa mine has ample water supply to handle all activities.

TABLE 17-3 LIFE OF MINE MAJOR CONSUMABLES
Trevali Mining Corporation – Perkoa Mine

Mill Consumables	Units	Usage	Total/Year (000 kg)
Grinding Balls (1”)	g/t	41	28.7
Grinding Balls (2½”)	g/t	820	574
Methyl Isobutyl Carbinol (MIBC)	g/t	10	7
Copper Sulphate	g/t	800	560
Sodium Isopropyl Xanthate (SIPX)	g/t	70	49
Orifloc 4014 and 1024	g/t	7.5	5.3
Lime (Calcium Hydroxide)	g/t	3,200	2,240

Energy			MW/Year
Mine	kW/t	18.9	12,400
Mill	kW/t	37.8	25,900
Surface	kW/t	6.3	4.150
Total/year	**kW/t**	**63.0**	**42,450**

CONCENTRATE HAULAGE

Zinc concentrates are trucked 1,200 km to the port of Abidjan, Côte d'Ivoire. In 2017, 178,756 wet metric tonnes (wmt) were hauled in 4,157 trips (11 trucks per day, 45 tonnes per truck). A round trip takes seven days; three days from site to Abidjan and four days to return due to delays at the border between Côte d'Ivoire and Burkina Faso. The trucks backhaul clinker for the local cement market. This helps to reduce costs, however, it increases the haul cycle.

Transportation of concentrates involves several parties requiring close supervision to co-ordinate and organize each party's internal priorities including:

- The safe loading of transport trucks.
- On site weighing of transport trucks.
- On site sampling of concentrate.
- Assay and quality monitoring.
- Safety inspection of transport trucks prior to leaving site.
- Road conditions.
- Customs and duty inspections.
- Port congestion.
- Socio-political situations.

During 2017, a total of 137,769 wmt of zinc concentrates were shipped from the port on a sales basis. Destinations were Belgium, Italy, Germany, and Spain.

18 PROJECT INFRASTRUCTURE

SUMMARY

Current infrastructure includes power, water, sewerage, a diesel storage facility, fire protection, and explosives magazines. Water is supplied by a pipeline from a recently constructed dam at Seboun, approximately 18 km to the northeast of the mine.

Buildings on site include change houses, office blocks, gate houses, a clinic and ablution facilities. Appropriate security fencing and access control prevents inadvertent access onto the property and enhances safety.

The Perkoa mine site infrastructure plan is shown in Figure 18-1. The key Perkoa mine facilities include:

- A Camp
- Administration Building
- HSEC Training Center & Medical Clinic Building
- Services Office Building
- Administration and Finance Building
- Human Resources Building
- Mining & Survey Office Building
- Geology Offices
- Mine Services Lamp Room and Change House
- IT Communication and (Backup) Server Room
- Concentrates Storage Shed
- Geology Core Shed
- Lunch Rooms
- Mining Change House and Laundry
- Mining – Electrical Workshop
- Mining – Mobile Equipment Workshop
- Main Warehouse Area
- Supply Chain Warehouse – Container Yard
- Mining – Muster Room
- Mining – Contractor Main Offices

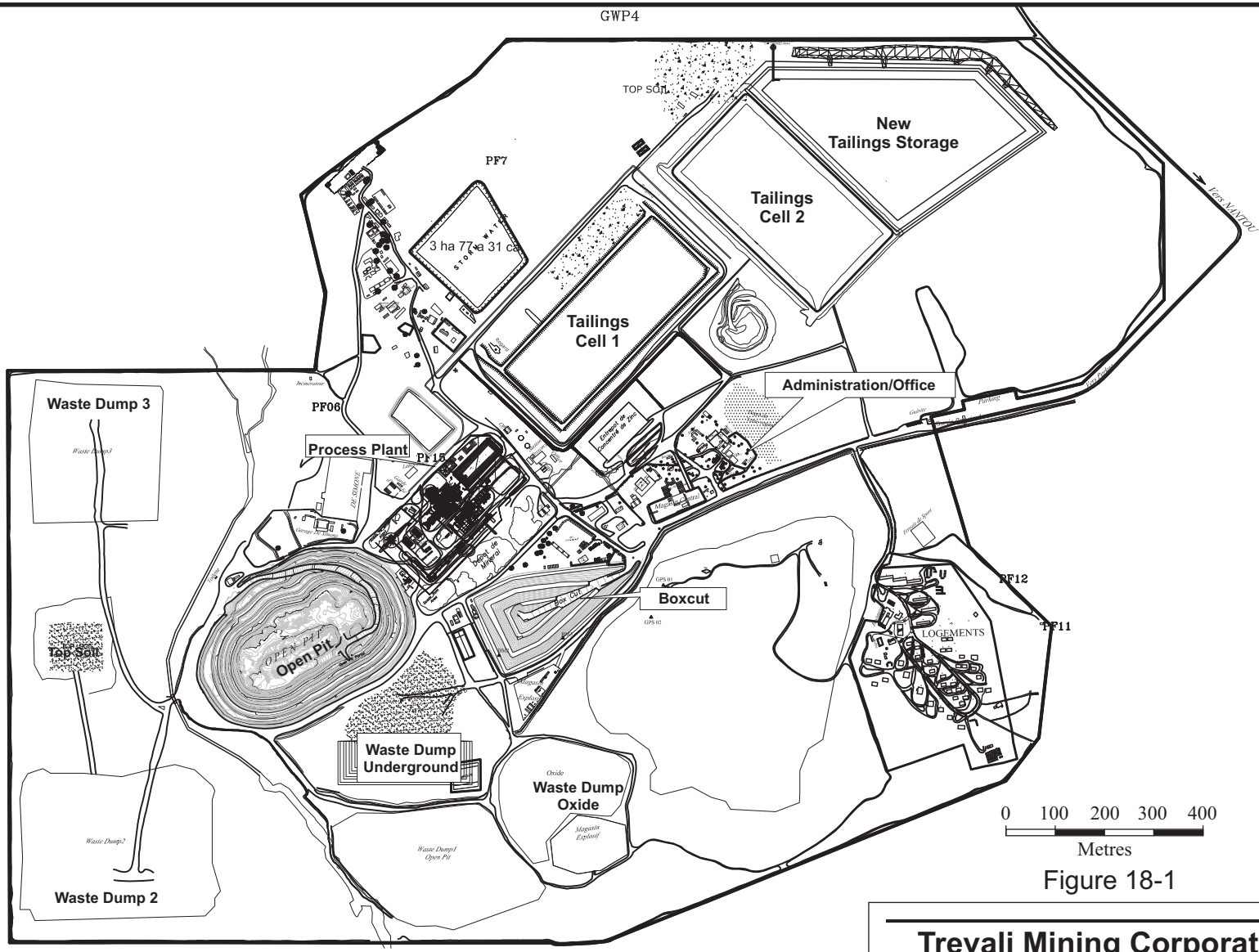


Figure 18-1

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Site Plan

Source: Nantou Mining, 2018.

- Mining – Stores Offices and Yard
- Plant Main Mechanical and Boilermaker Workshop
- Fuel Farm (property of TOTAL Burkina SA)
- Mobile Equipment Workshop
- Mobile Equipment Offices
- Diesel Generator Plant

POWER

The supply of power from the national grid is unreliable.

Power to the plant, mine, workshops, camp and offices is supplied from a central powerhouse which has five Caterpillar 3516B-HD (2 MVA) generators. Power usage at the central power station is approximately 2.5 MW to 3.2 MW, which means that normally three generators run at approximately 60% capacity, at any one time.

An 11 kV overhead power transmission line is installed between the central powerhouse and the mine switch room to provide power to the underground mine.

Fire detection and automatic AFFF fire suppression systems are installed on the individual generator sets and in the switch room.

Routine servicing and condition monitoring is done on site with the assistance of Burkina Equipment, the local Caterpillar representative. Regular overhauls of the generator units are scheduled and outsourced to Burkina Equipment.

There are a further approximately 10 mobile generators available with outputs from 20 kVA to 500 kVA to rig for power where required, such as for pumping of water.

Nantou Mining has a maintenance department consisting of 110 personnel, of which >90% are nationals.

TAILINGS STORAGE FACILITY

Plant tailings are deposited onto a tailings storage facility (TSF) immediately adjacent to the process plant (Figure 18-2). The initial Environmental and Social Impact Study carried out in 2006 was based on the construction of a TSF composed of three cells with an area of 7 ha, 10 ha, and 9 ha respectively. Two of the three cells have been constructed. The original starter dam is full and filling of the Phase 2 dam started in January 2016. The Phase 2 dam was completed in September 2017. The Phase 1 dam is approaching fill completion with the Phase 2 dam awaiting completion of the filling cycle of Phase 1. Phase 3 will begin construction towards the end of 2018 or beginning of 2019. A Phase 4 lift is planned which connects all three phases to create one final dam by lifting the structural. The decision to construct the Phase 4 wall is dependent on life of mine as the construction of Phase 3 will provide enough capacity to handle all of the tailings in the current LOM plan.

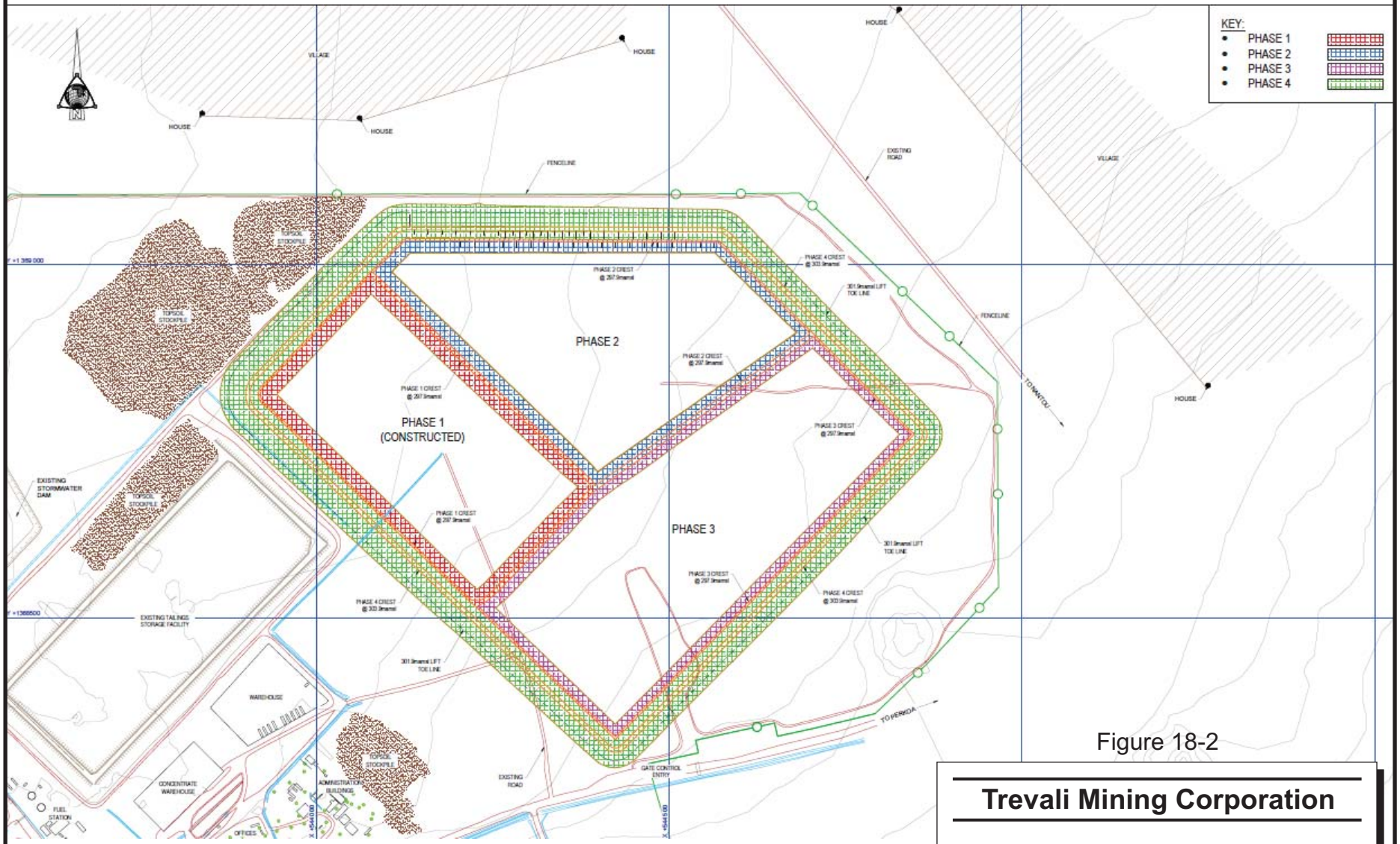


Figure 18-2

Trevali Mining Corporation

Perkoa Mine

Sanguié Province, Burkina Faso

Tailings Storage Facility

April 2018

Source: Nantou Mining, 2016.

19 MARKET STUDIES AND CONTRACTS

MARKETS

Global zinc demand continues to rise by between 2% to 4% per annum (or 280,000 t to 560,000 t of zinc metal) driven by gross domestic product (GDP) growth, urbanization, and infrastructure development, and as a "mid-cycle" commodity with expanding markets for consumer goods (automobiles, appliances, etc.). Mine closures and production cuts over the past few years have constrained primary supply which has driven the zinc price to near-decade highs.

Zinc smelters are scaling back/curtailing refined zinc metal production due to concentrate shortages. Benchmark zinc smelter treatment charges (TCs) dropped to US$172/tonne in 2017, with no smelter price participation (0% escalators), a 10-year low. TCs for 2018, are US$147/t.

Consensus forecast is for continued strength in zinc prices in reaction to ongoing supply deficits. Wood Mackenzie, an independent global commodity forecast consultant, is predicting robust zinc commodity prices over the short-term; averaging US$1.71/lb in 2018, US$1.87/lb in 2019, and a long-term forecast price of US$1.23/lb.

CONTRACTS

As part of the August 31, 2017 definitive agreements (transaction), Trevali entered into life of mine concentrate offtake agreements with Glencore for all concentrates at International Benchmark terms, that is, average London Metal Exchange (LME) pricing for any given shipping period and smelter charges based on the industry annual negotiations between third party smelting and mining groups.

RPA has reviewed the concentrate treatment charges, payable amounts, and commodity prices projected by Trevali. The results support the assumptions used in this Technical Report: In summary, current concentrate treatment charges are lower (Teck and Korea Zinc recently settled at $147/t flat) and average LME spot commodity prices are higher those used in the report.

In 2016, Nantou Mining executed a Mining Services Contract with Byrnecut Burkina Faso SARL for a period of six years, in which Byrnecut provides all personnel and equipment in order to carry out mine services including all development and production.

Nantou Mining has a contract with Damco Burkina Faso S.A. for the transport of zinc concentrates from the Perkoa mine to the port of Abidjan, Cote d'Ivoire and to provide backhaul services, as required.

20 ENVIRONMENTAL STUDIES, PERMITTING, AND SOCIAL OR COMMUNITY IMPACT

The Perkoa mine has a HSEC Policy (2014) outlining its commitment to the environment as well as procedures aligned to the requirements of applicable Burkina Faso legislation. These commitments are then implemented and managed through a HSEC system, which is aligned to the principles of ISO 14001:2004 Environmental Management System (EMS). The current EMS is based on the overarching procedures of Glencore, however, Trevali is in the process of implementing its corporate EMS, and the EMS at Perkoa and the procedures will be updated and aligned with this corporate framework.

Burkina Faso's legal system is based on civil law modelled predominantly on principals from the French legal system. At the apex of the legal system, the Burkina Faso Constitution is the supreme law which was adopted by referendum of June 2, 1991 and revised three times by the Law No. 002/97/ADP of January 1997, the Law No. 003-2000/AN of April 11, 2000 and the Law No.001-2002/AN of January 22, 2002. The Constitution provides that the riches and natural resources of the country belong to the people and must be used to improve their living conditions. The Environmental Code (Law No 006 of 2013), containing five titles and 148 articles, aims to protect human beings against harmful effects or nuisances and risks that hinder and jeopardize their existence due to environment degradation, and to improve their living conditions.

ENVIRONMENTAL STUDIES

The approved Environmental Management Plan (EMP) provides the framework for Perkoa mine's environmental management and outlines mitigation measures and monitoring programs, to reduce and manage negative impacts to the biophysical and social environment. Environmental audits must be carried out in accordance with Article 4 of Decree No. 2015-10000 of October 28, 2015 laying down detailed rules for carrying out environmental audits. As per these requirements, regular monitoring and evaluation of environmental performance through compliance audits is undertaken by BUMIGEB.

A BUMIGEB audit inspection report of May 23, 2016 highlights the need for a water sampling and analysis program to be developed in terms of oxides in the ore, establishing an effective dust mitigation system, the implementation of measures to limit discharge from activities on site, design a suitable area for the storage of minerals on site to minimize soil, surface water and groundwater contamination, maintain the water balance on mine and to conduct a study to evaluate the Potential of Generation of Acid (PGA) at the open pit, tailings pond, and the scats stockpiles. At the time of the writing of this report, a proposal from Knight Piesold dated July 28, 2017 and November 15, 2017 was reviewed which described the process to evaluate and provide the relevant reporting to address the above requirements. This work will be undertaken during 2018 by the Perkoa mine.

The Perkoa mine has areas of waste disposal including a TSF with additional extensions that were implemented in 2017, waste treatment facilities, and a scats stockpile and generates both general and hazardous waste. The mine currently has a tailings pond licensed by the Ministry of Environment that comprises three areas. At the present stage of development of mine activities, only the first and second cells were constructed. A third cell is required as the first cell is full and will be managed under a closure and rehabilitation process and the second cell is almost at the maximum of its nominal design storage capacity. The new cell will be fully located within the current operating licence and will be a lined facility. The Government mandated Nantou Mining to undertake an acid rock drainage potential assessment during 2017. Internal tests have been conducted, however, the formal geochemical testing will take place using Knight Piesold during 2018. The results of this study may have implications for the tailings pond expansion, and will need to be managed accordingly upon receipt of the results. The impact of these results is currently unknown and cannot be used to validate the risk profile, however, as a mitigation measure the TSF expansions have been designed with the use of High Density Polyethylene (HDPE) liners. The results of the study may require additional environmental rehabilitation, monitoring, and implementation of management measures to ensure the effects are minimized or avoided, where possible. The first cell of the TSF has since been decommissioned and is under technical review for closure and reclamation by Knight Piésold.

A current focus is the Waste Management and storage of chemicals at the Perkoa mine. An official inspection letter issued to site in May 2017 outlined several steps to implement regarding the disposal of expired chemicals and improvements to site chemical storage facilities. These recommendations are currently being implemented. Waste management was

identified by site as a potential risk. As such, a detailed waste action management plan was developed which details a remediation plan for the waste that is currently on site, followed by the planning of a formalized waste management facility.

Runoff from the plant is directed via a series of canals. The mine has commenced with the lining of these canals which will be completed during 2018. The water from the canals is diverted to a stormwater reservoir and then transferred to treatment ponds. Process water from the plant is treated and reused. The water volumes required to operate the processing plant are pumped from the Seboun reservoir, with drinking water being sourced from an underground aquifer. This water is treated to be potable and then transported via a distribution network to the treatment plant and other facilities as required. As the mine is a net consumer of water, it is recommended that a water hierarchy of use be generated by implementing consumption monitoring, improving the water balance, discharge tracking, and improving the tailing deposition monitoring. This would assist in utilizing water that can be reused in certain processes rather than sourcing from the reservoir.

PROJECT PERMITTING

As per the requirements of the Burkina Faso Legislative Framework, there was an Environmental and Social Impact Assessment (ESIA) compiled and submitted in June 2006 in accordance with Article 17 of the Environmental Code (Law No. 005/97). During 2010, the Perkoa mine underwent a review and the design of the mine was amended to include the addition of an open pit, an expansion of the plant, a waste incinerator, increased waste disposal area, and a stream diversion. The ESIA for the changes to the mine plan was approved and an authorization issued on December 26, 2012 by the Minister of Environment and Sustainable Development in terms of the Environmental Code of Burkina Faso (Law No. 006 of 2013). An ESIA was also conducted by TEFA OMEGA SERVICES BUNEE-EIES for the changes to the tailings ponds. Approval was granted on the ESIA on December 22, 2016 (Reference TdR 20161222 (Environmental Code of Burkina Faso Law No. 006 of 2013).

Closure and reclamation for the first cell of the tailings facility is currently not permitted. The work is being undertaken by Knight Piésold to attain the permit and Nantou Mining is in discussions with the authorities regarding the legislative process. This risk will require close management to ensure that the permitting is prioritized and continuous consultation with the

authorities is undertaken to permit the closure and reclamation of the first cell of the tailings facility during 2018.

SOCIAL OR COMMUNITY REQUIREMENTS

The new Mining Code, which was passed by the Conseil National de Transition on June 26, 2015, proposes the creation of a new fund called “Mining Fund for Local Development”. The holders of exploitation permits and authorizations for quarrying exploitation shall be subject to the payment of 1% of their turnover to the fund and the State shall pay 25% of the collected mining royalties to the new fund. It is to be noted that the Perkoa mine was accruing for this levy although at the time, there was no requirement to pay this until the implementation measures and details for the management of this were released by the government. The regulations have since been promulgated (January 2018) and the 1% will be paid to the government once the details of the fund are released to facilitate the payment of the funds. There is no mechanism in place for how the funds will be allocated and, if perceived by the local community to be distributed to unaffected areas, this may lead to community protests or strike.

The Perkoa mine has a procedure in place for publicising recruitment, signed by Nantou Mining and the Youth Committee on June 12, 2015, to use only local unskilled labour and to favour local labour if qualification is required. Stakeholder management is being successfully managed on site by the implementation of the tripartite committee. The tripartite committee is comprised of representatives from Nantou Mining, the local community, and the government.

In terms of corporate social responsibility, projects are consistent with those as required by the EMP. These include the construction of a community centre, primary school, as well as social expenses, including cultural displacement, construction of replacement houses, Perkoa Health and Social Promotion Centre, community water boreholes, and a literacy program. The Perkoa mine is evaluating further projects for 2018 that have a focus on increasing the number of women in mining and assisting in creating the opportunity for skills development in the local communities as identified by the Perkoa mine.

The National HIV/AIDS infection rate for Burkina Faso is approximately 1.8%. The mine is actively involved in the prevention of HIV/AIDS and was presented with an award from the Government for “Significant Contribution to Community HIV/AIDS Program”.

Of concern, is the threat of malaria to the employees and contractors working at the mine. Although strict controls are put in place by the Perkoa mine, there are a high number of malaria cases reported annually. Training and Awareness programs will need to continue to be rolled out and extended beyond employees as infections may be occurring out of the mine workplace or camp site.

The mine has a fleet of approximately 70 trucks per week that transport zinc concentrate to the port in Abidjan, Cote d'Ivoire. The trucks carry approximately 45,000 t of zinc concentrate over 3,861 trips per annum. RPA notes that there is risk associated with an environmental incident associated with any accident/ and or road transport. The load may be in international territories and international environmental legislation (penalties and fines) may be imposed. This is aligned with the requirements of the Environment Code of Burkina Faso (Law No. 006 of 2013) Article 145: The management of environmental issues in cross-border nature is done in consultation with the State(s) concerned in compliance with international standards applicable.

MINE CLOSURE REQUIREMENTS

The Perkoa mine developed a Preliminary Reclamation and Closure Plan in 2005 as part of the Environmental Impact Assessment (EIA) for the application for the Mine Operations Licence. The conceptual closure plan was revised in 2010 due to some changes to the mine and associated infrastructure.

According to the ESIA of the Amendment to the Development Plan for the Perkoa mine, Burkina Faso (Aecom, 2012), the plan is structured in accordance with best practice and would satisfy requirements underlying laws relating to the rehabilitation and closure of mining in South Africa. South African legislation requires that plans be based on the assessment of potential residual risks associated with exploitation and that the objectives of the process be specified in terms of post-closure land use. The conceptual closure plan was developed in the context of the proposed post-closure use of land, namely subsistence agriculture, but also in the context of the mine's environmental policies and accounting policies, and the key environmental issues identified during the EIA process.

As at September 2012, the total cost of rehabilitation and closure for the Perkoa mine amounted to US$7.0 million. As detailed in the audit report of May 23, 2016, BUMIGEB

requires the compilation and submission of a technical and financial evaluation closure report for approval in accordance with Article 12 of Decree No 2007-845 / PRES / PM / MCE / MEF of December 26, 2007 on the management of the Mining Environment Rehabilitation Fund. Rehabilitation and closure costs are required to be reviewed by the Perkoa mine to meet these requirements of BUMIGEB. A proposal from Knight Piésold dated July 28, 2017 was reviewed during the writing of this report and it is recommended that the updated technical and financial evaluation closure report be conducted during 2018 and submitted to BUMIGEB.

DISCUSSION

Based on the site visit conducted from February 8 to 14, 2018 and March 15 to 18, 2018 at the Perkoa mine, the review of available reports and documents as well as discussions held with management, there are environmental regulatory processes that are in process with the authorities for which permits have currently not been issued. With the current engagement with the regulatory authorities regarding the permitting status, the risk, if managed, is not deemed to have the potential to materially impact the extraction of Mineral Resources or Mineral Reserves. There are, however, environmental and social and regulatory risks that need to be mitigated and managed, as detailed above and outlined below:

- Malaria is a threat to the employees and contractors working at the mine. Although strict controls are put in place by the mine, there are a high number of infections per year based on the location of the mine. Training and Awareness programs will need to continue and possibly be extended beyond employees as infections may be occurring out of the mine workplace or camp site.

- The permit for the closure and reclamation of cell one at the tailings facility is required to comply with the regulatory framework. The risk is being managed by the onboarded contractor Knight Piésold and continuous engagement with the authorities by the Perkoa mine.

- The update to the mine wide financial closure will need to be completed in 2018 to comply with the requirements from BUMIGEB.

- Perkoa Mine has acted on the instruction from the Minister regarding the storage of obsolete and expired chemicals on site. A detailed action plan has been drafted and implemented to manage the expired chemicals on site. At the time of writing this report, all the expired Zinc Sulphate and Zinc Metabisulphate had been removed from the Perkoa mine by Saphyto for safe disposal, as regulated. Facilities are required to be constructed in line with the regulatory requirements and the documentation has been submitted for regulatory approval.

- Waste management was identified as a potential risk to the Perkoa mine. As such, a detailed waste action management plan was developed by the Perkoa mine and reviewed during the site visit. The action plan details a remediation plan for the waste that is currently on site, followed by the planning of a formalized waste management facility on site.

- The mandate from the government to conduct an acid rock drainage potential study at the mine will assist in understanding mitigation measures that need to be developed, managed, and monitored at the mine and will provide an accurate closure liability costing and rehabilitation plan for the mine.

- There will need to be a stakeholder management plan that is developed to address the one percent levy that has been imposed from government. Although the mine will possibly not be able to direct the spend of that levy, community perceptions regarding lack of local benefits and misappropriation of development funds could pose risk to the project, regardless of whether these perceptions are substantiated.

21 CAPITAL AND OPERATING COSTS

CAPITAL COSTS

Sustaining capital is mainly for mine development, process plant upgrades, tailings dam expansion, maintenance, and power plant upgrades.

Table 21-1 presents the LOM plan sustaining capital cost, including closure costs.

TABLE 21-1 LIFE OF MINE PLAN SUSTAINING CAPITAL COSTS
Trevali Mining Corporation – Perkoa Mine

	Units	2018	2019	2020	2021	2022	2023	Total
Mining	$ M	7.3	0.5	0.3	-	-	-	**8.1**
Plant	$ M	0.3	0.5	0.2	-	-	-	**0.9**
Tailings Dam	$ M	-	6.0	4.0	-	-	-	**10.0**
Engineering	$ M	2.3	0.6	0.4	0.4	-	-	**3.7**
Services	$ M	0.5	0.3	0.3	0.3	0.3	-	**1.7**
Total Sustaining	$ M	10.4	7.8	5.2	0.7	0.3	-	**24.5**
Closure Cost	$ M	-	-	-	-	-	7.0	**7.0**
Total	**$ M**	**10.4**	**7.8**	**5.2**	**0.7**	**0.3**	**7.0**	**31.5**

Mining sustaining costs include the main decline development to 520 level, main pumping station development and equipping, mining equipment purchases, rock mechanics studies, tailings CRF studies, ventilation infrastructure, and stay in business costs.

Sustaining capital includes the construction of the TSF 2 Phase 3 facility which is estimated to cost $6 million in 2019 and $4 million in 2020.

Plant sustaining costs include various plant equipment including a belt magnet on the conveyor, a ball mill girth gear, and a new compressor.

Maintenance sustaining costs include

- Spare alternator for the generating station
- Power line to garage and tailings
- Generator for Seboun Dam and other mine site areas
- Three cooling tower radiators

- An additional second-hand CAT 966 Wheel Loader
- Mobile 40 Ton Rough Terrain Crane to cover complete property
- Procure a 30 t MAN Tipper Truck for concentrate movement
- Manitou Lift to cover complete property
- Replacement of light vehicles
- Replace concentrate/material loaders
- Finish off concentrate storage shed and modify Larox building for proper ventilation
- New brick buildings to replace ageing housing - USD 50k per 8x14 double unit, including veranda.
- New reagents/chemicals storage warehouse to comply with chemical storage requirements
- Concreted area, roofing, toilets, archive
- Tools, equipment

Rehabilitation and closure costs have been estimated to be $7 million.

OPERATING COSTS

Based on the operating cost experience to date, the LOM Plan operating costs are summarized in Table 21-2.

TABLE 21-2 LIFE OF MINE PLAN OPERATING COST
Trevali Mining Corporation – Perkoa Mine

	Units	2018	2019	2020	2021	2022	Total	Cost/t Milled
Mine	$ M	34.6	33.8	34.5	35.2	27.9	**166.0**	**49.86**
Plant	$ M	24.3	23.5	24.0	24.4	19.4	**115.6**	**34.72**
Indirect Costs	$ M	12.7	12.6	12.9	13.1	10.4	**61.7**	**18.53**
Total Costs	**$ M**	**71.6**	**69.9**	**71.3**	**72.7**	**57.7**	**343.3**	**103.11**
Milled	**000 t**	**697**	**699**	**701**	**687**	**545**	**3,329**	
Cost/t Milled	**$/t**	**102.72**	**100.08**	**101.75**	**105.83**	**105.83**	**103.11**	

Table 21-3 presents a breakdown of the LOM plan mine operating cost.

TABLE 21-3 LIFE OF MINE PLAN MINE OPERATING COST
Trevali Mining Corporation – Perkoa Mine

Mine	Units	2018	2019	2020	2021	2022	Total
Management & General	$ 000	1,658	1,709	1,740	1,773	1,407	**8,286**
Mine Technical Services	$ 000	1,329	1,759	1,794	1,829	1,451	**8,162**
Secondary Development	$ 000	4,513	1,205	1,229	1,254	995	**9,196**
Stoping	$ 000	5,000	5,228	5,332	5,438	4,315	**25,312**
Tramming / Hauling	$ 000	18,469	20,224	20,624	21,031	16,686	**97,035**
ROM Stockpile Pad and Plant Feed	$ 000	801	819	834	850	674	**3,979**
Mine Power Generation	$ 000	2,862	2,867	2,924	2,982	2,366	**13,999**
Total Costs	**$ 000**	**34,632**	**33,810**	**34,477**	**35,157**	**27,894**	**165,970**
Milled	**000 t**	**697**	**699**	**701**	**687**	**545**	**3,329**
Cost/t Milled	**$/t**	**49.66**	**48.38**	**49.19**	**51.18**	**51.18**	**49.86**

Table 21-4 presents a breakdown of the LOM plan plant operating cost.

TABLE 21-4 LIFE OF MINE PLAN PLANT OPERATING COST
Trevali Mining Corporation – Perkoa Mine

Plant	Units	2018	2019	2020	2021	2023	Total
Engineering Services - Management & General	$ 000	1,648	1,556	1,587	1,619	1,284	**7,693**
Vehicle Maintenance Workshop	$ 000	817	840	856	872	692	**4,076**
Plant Mechanical & Electrical	$ 000	1,974	2,037	2,076	2,116	1,679	**9,882**
Plant - Management & General	$ 000	2,616	2,716	2,771	2,826	2,242	**13,172**
Plant Technical Services	$ 000	903	932	950	969	769	**4,522**
Crushing & Conveying	$ 000	1,395	1,305	1,328	1,351	1,072	**6,451**
Milling	$ 000	1,722	1,503	1,529	1,556	1,234	**7,544**
Flotation	$ 000	4,136	4,282	4,352	4,424	3,510	**20,702**
Thickening & Filtration	$ 000	866	762	776	790	626	**3,820**
Thickener & Tails Dam	$ 000	547	290	295	301	239	**1,672**
Plant Power Generation	$ 000	7,637	7,314	7,460	7,609	6,037	**36,057**
Total Costs	**$ 000**	**24,261**	**23,537**	**23,980**	**24,431**	**19,384**	**115,592**
Milled	**000 t**	**697**	**699**	**701**	**687**	**545**	**3,329**
Cost/t Milled	**$/t**	**34.79**	**33.68**	**34.22**	**35.57**	**35.57**	**34.72**

Table 21-5 presents a breakdown of the LOM plan general and administration cost.

TABLE 21-5 LIFE OF MINE PLAN GENERAL AND ADMINISTRATION COST
Trevali Mining Corporation – Perkoa Mine

G&A	Units	2018	2019	2020	2021	2022	Total
General Perkoa Site Maintenance Workshop	$ 000	753	773	788	802	637	**3,752**
Services - Management & General	$ 000	3,115	3,142	3,204	3,268	2,593	**15,322**
Finance & Legal Services	$ 000	985	1,016	1,036	1,057	839	**4,934**
Information Technology	$ 000	799	821	838	854	678	**3,990**
Supply Chain Services	$ 000	746	773	788	804	638	**3,750**
Safety, Health	$ 000	415	422	430	439	348	**2,054**
Emergency Response Services (Medical & Fire)	$ 000	151	156	159	162	129	**756**
Environmental & Quality (SHEQ)	$ 000	647	663	676	689	547	**3,222**
Human Resources	$ 000	1,521	1,567	1,599	1,631	1,294	**7,611**
Corporate Social Responsibility	$ 000	2,127	2,032	2,073	2,115	1,678	**10,024**
Accommodation	$ 000	548	229	234	238	189	**1,438**
Security Services	$ 000	522	515	526	536	425	**2,525**
Engineering Power Generation	$ 000	363	451	459	468	372	**2,113**
Other Operating Expenses/Income	$ 000	42	42	42	42	33	**201**
Total Costs	**$ 000**	**12,734**	**12,602**	**12,851**	**13,106**	**10,398**	**61,691**
Milled	**000 t**	**697**	**699**	**701**	**687**	**545**	**3,329**
Cost/t Milled	**$/t**	**18.26**	**18.03**	**18.34**	**19.08**	**19.08**	**18.53**

MANPOWER

Table 21-6 presents a breakdown of the LOM plan manpower quantities.

TABLE 21-6 LIFE OF MINE PLAN MANPOWER
Trevali Mining Corporation – Perkoa Mine

	2015 Actual	2016 Actual	2017 Actual	2018 Forecast	2019 Forecast	2020 Forecast	2021 Forecast	2022 Forecast
Nantou Mining								
Mining/Technical Services	28	32	32	31	30	30	30	30
Processing/Lab/Exports	83	95	92	95	95	95	95	95
Maintenance	89	93	98	110	110	110	110	110
Finance/Admin/IT/SCM/HR	41	46	53	55	55	55	55	55
HSEC/Security/Camp	36	34	29	32	32	32	32	32
Expatriates	17	23	23	23	20	20	20	20
Total Direct Employees	294	323	327	346	342	342	342	342
Contractors	276	309	307	306	300	300	300	300
Total	**570**	**632**	**634**	**652**	**642**	**642**	**642**	**642**

22 ECONOMIC ANALYSIS

As part of the 2018 Budget process carried out in mid-2017, Nantou Mining has developed a LOM plan, which projects production to 2022, with a total of 3.33 Mt being mined at a grade of 13.1% Zn. A Cash Flow Projection has been generated from the current LOM production schedule and capital and operating cost estimates, and is summarized in Table 22-1. The associated process recoveries, metal prices, operating costs, refining and transportation charges, royalties, and capital expenditures (sustaining) were also taken into account. All costs are based on fourth quarter of 2017 estimates and presented in US dollars. Metal prices, as provided by Trevali, are based on consensus, long term forecasts from banks, financial institutions, and other sources. Some of the key parameters and assumptions for the after-tax cash flow are as follows:

REVENUE (100% BASIS)

- 1,900 tpd.
- Head grade: 13.1% Zn.
- Mill recovery averaging: 93.3%.
- Metal price: based on consensus forecast per year, averaging $1.20 per pound zinc.
- Smelting and transport costs totalling $0.38 per pound payable zinc.
- NSR: $182 per tonne milled.

COSTS (100% BASIS)

- Mine life: 4.8 years.
- Sustaining capital: $24.5 million.
- Average operating cost over the mine life: $103/t milled.
- Closure costs: $7.0 million.
- Salvage costs: nil.
- NSR Royalty: $18.7 million.
- Net cash cost (equivalent to C1 cost), including sustaining capital, of $0.87 per pound of payable zinc.
- After-tax Net Present Value (NPV) at 8%: $188 million.

TABLE 22-1 CASH FLOW SUMMARY - 100% BASIS
Trevali Mining Corporation - Perkoa Mine

	INPUTS	UNITS	TOTAL	2018	2019	2020	2021	2022	2023
MINING									
Operating Days		days	1,763	365	365	365	365	303	-
Tonnes mined per day		tonnes / day	1,888	1,951	1,876	1,859	1,877	1,877	-
Production		'000 tonnes	3,329	712	685	679	685	569	-
Zn Grade		%	13.1%	13.5%	13.2%	12.1%	12.5%	14.1%	0.0%
PROCESSING									
Mill Feed		'000 tonnes	3,329	697	699	701	687	545	-
Zn Grade		%	13.1%	13.5%	13.2%	12.1%	12.5%	14.1%	0.0%
Contained Zn		tonnes	434,636	94,233	92,478	84,811	86,017	77,098	-
Recovery Grade & Lossess									
Zn Concentrate		%	93.3%	92.5%	93.5%	93.5%	93.5%	93.5%	0.0%
Recovered Amount									
Zn Concentrate		tonnes	405,400	87,124	86,467	79,298	80,426	72,086	-
Grades in Concentrate									
Zn Concentrate		tonnes	767,369	166,847	163,145	149,619	151,746	136,012	-
Zn grade in concentrate		%	52.8%	52.2%	53.0%	53.0%	53.0%	53.0%	0.0%
Concentrate Moisture		%	7.50%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%
Total Tonnes Concentrate		wmt	824,922	179,360	175,381	160,840	163,127	146,213	-
Total Recovered Zn		**tonnes**	**405,400**	**87,124**	**86,467**	**79,298**	**80,426**	**72,086**	**-**
REVENUE									
Metal Prices		**Input Units**							
Zn		US$/lb Zn	$1.20	$1.25	$1.20	$1.20	$1.20	$1.13	$0.00
Zn Metal Payable %									
Payable Zn		%		84.7%	84.9%	84.9%	84.9%	84.9%	0.0%
Zn Metal Payable									
Payable Zn		tonnes	344,011	73,776	73,415	67,328	68,286	61,205	-
Gross Revenue									
Total Gross Revenue		**US$ '000**	**$909,826**	**$202,884**	**$194,551**	**$178,420**	**$180,957**	**$153,013**	**$0**
Total Charges									
Transport to Port									
Zn Concentrate		US$ '000	$73,556	$14,487	$15,353	$15,319	$15,848	$12,550	$0
Freight Rollback									
Zn Concentrate		US$ '000	$32,914	$7,156	$6,998	$6,418	$6,509	$5,834	$0
Treatment (Including Fe & Hg Penalties)									
Zn Concentrate		US$ '000	$178,726	$37,493	$37,185	$35,382	$36,210	$32,456	$0
Total Charges		US$ '000	$285,197	$59,137	$59,536	$57,119	$58,566	$50,840	$0
US$/Lb payable Zn		US$/Lb payable Zn	$ 0.38	$ 0.36	$ 0.37	$ 0.38	$ 0.39	$ 0.38	
Net Smelter Return		**US$ '000**	**$624,628**	**$143,747**	**$135,015**	**$121,301**	**$122,391**	**$102,174**	**$0**
Royalty NSR	3.0%	US$ '000	$18,739	$4,312	$4,050	$3,639	$3,672	$3,065	$0
Net Revenue		**US$ '000**	**$605,890**	**$139,435**	**$130,965**	**$117,662**	**$118,719**	**$99,108**	**$0**
Unit NSR		**US$/t milled**	**$182**	**$200**	**$187**	**$168**	**$173**	**$182**	**$0**
OPERATING COST									
Mining (Underground)		US$/t milled	$49.86	$49.66	$48.38	$49.19	$51.18	$51.18	$0.00
Processing		US$/t milled	$34.72	$34.79	$33.68	$34.22	$35.57	$35.57	$0.00
G&A		US$/t milled	$18.53	$18.26	$18.03	$18.34	$19.08	$19.08	$0.00
Total Operating Cost		**US$/t milled**	**$103.11**	**$102.72**	**$100.08**	**$101.75**	**$105.83**	**$105.83**	**$0.00**
Mining (Underground)		US$ '000	$165,970	$34,632	$33,810	$34,477	$35,157	$27,894	$0
Processing		US$ '000	$115,592	$24,261	$23,537	$23,980	$24,431	$19,384	$0
G&A		US$ '000	$61,691	$12,734	$12,602	$12,851	$13,106	$10,398	$0
Total Operating Cost		**US$ '000**	**$343,253**	**$71,627**	**$69,948**	**$71,308**	**$72,695**	**$57,676**	**$0**
Operating Cashflow		US$ '000	$262,636	$67,808	$61,016	$46,355	$46,025	$41,433	$0
CAPITAL COST									
Sustaining		US$ '000	$24,462	$10,450	$7,764	$5,239	$710	$300	$0
Reclamation and closure		US$ '000	$7,000	$0	$0	$0	$0	$0	$7,000
Total Capital Cost		**US$ '000**	**$31,462**	**$10,450**	**$7,764**	**$5,239**	**$710**	**$300**	**$7,000**
Net Cash Cost, including Capital		US$/Lb payable Zn	$0.87						
PRE-TAX CASH FLOW									
Net Pre-Tax Cashflow		US$ '000	$231,174	$ 57,358	$ 53,253	$ 41,116	$ 45,315	$ 41,133	$ (7,000)
Cumulative Pre-Tax Cashflow		US$ '000		$ 57,358	$ 110,611	$ 151,727	$ 197,042	$ 238,174	$ 231,174
Taxes		US$ '000	$0	$ -	$ -	$ -	$ -	$ -	$ -
After-Tax Cashflow		US$ '000	$231,174	$ 57,358	$ 53,253	$ 41,116	$ 45,315	$ 41,133	$ (7,000)
Cumulative After-Tax Cashflow		US$ '000		$ 57,358	$ 110,611	$ 151,727	$ 197,042	$ 238,174	$ 231,174
PROJECT ECONOMICS									
Pre-tax NPV at 5% discounting	5.0%	US$ '000	$202,732						
Pre-tax NPV at 8% discounting	8.0%	US$ '000	$188,295						
Pre-tax NPV at 10% discounting	10.0%	US$ '000	$179,585						
After-Tax NPV at 5% discounting	5.0%	US$ '000	$202,732						
After-Tax NPV at 8% discounting	8.0%	US$ '000	$188,295						
After-tax NPV at 10% discounting	10.0%	US$ '000	$179,585						

TAXATION AND ROYALTIES

The fiscal regime that applies in Burkina Faso to the mining and metals industry consists of a combination of corporate income tax (BIC), value added tax (VAT), royalties and taxes on mining activities (e.g., flat fees and surface fees).

The mining and metals industry in Burkina Faso is governed by the Burkina Faso General Tax Code, the Burkina Faso Mining Code (issued on May 8, 2003) and the UEMOA (West African Economic and Monetary Union) Mining Code (issued on December 23, 2003). The fiscal regime consists of a combination of corporate income tax, royalties, and several flat fees.

An annual tax rate of 27.5% is payable by resident companies, however, holders of exploitation permits are subject to a reduced rate of 17.5%.

Mining companies are subject to three types of royalties and contributions: flat fees, surface fees, and tax on mining and quarry substances and products.

A flat fee is payable on mining titles or the authorization for the sale of mine substances. This fee is also payable on the renewal, extension, sale (marketing), transfer, and sublease of such instruments. The fee payable is determined according to the nature of the mining title (such as prospecting, industrial operating, mining concession, semi-industrial operating, artisanal operating licence, or permit) held by the company. The amount due varies between US$2,000/km^2 and US$150,000/km^2 per year.

An annual surface tax is payable by mining companies that hold prospecting permits and mining concessions. The rate varies, depending on the type of mining licence concerned, from US$5/km^2 to US$40,000/km^2, per year.

Most mining substances extracted are subject to specific mining taxes when they are removed from stock, based on the product's market value. Those taxes may be deducted in calculating taxable benefits. The rate varies from 3% to 8% of the turnover depending on the substance (such as bauxite, gold, diamonds, precious gems, iron, or others of special interest). Nantou Mining is subject to a 3% mining tax (royalty).

Income tax losses may be carried forward for four years, while losses resulting from depreciation of assets can be carried forward indefinitely. Nantou Mining has a substantial

income tax loss carry-forward and is not subject to corporate income tax until the income tax loss carry-forward has been used.

CASH FLOW ANALYSIS

Considering the Project on a stand-alone basis, the undiscounted pre-tax cash flow totals $231 million over the mine life.

The after-tax NPV at an 8% discount rate is $188 million.

SENSITIVITIES

Project risks can be identified in both economic and non-economic terms. Key economic risks were examined through analysis of cash flow sensitivities:

- Head grade
- Zinc recovery
- Zinc price
- Operating costs
- Sustaining capital costs

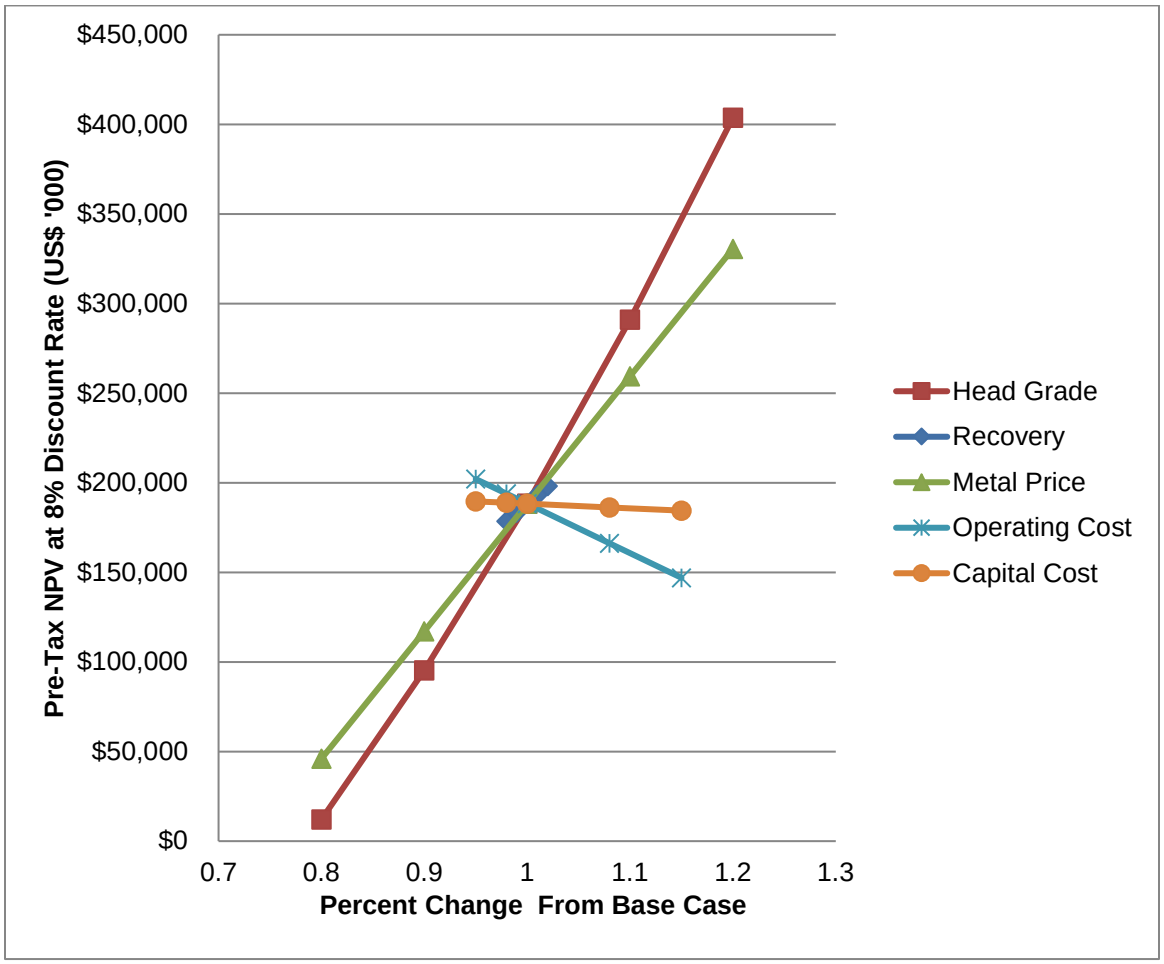
Pre-tax NPV at 8% discount sensitivities over the Cash Flow Projection have been calculated per Table 22-2. The sensitivities are shown in Table 22-2 and Figure 22-1. The Project return is most sensitive to the product of changes in the head grade and zinc price followed by changes in the operating costs, recovery, and capital costs.

TABLE 22-2 SENSITIVITY ANALYSIS
Trevali Mining Corporation – Perkoa Mine

	Head Grade (%)	NPV at 8% ($M)
0.80	10.4	12
0.90	11.8	95
1.00	**13.1**	**188**
1.10	14.4	291
1.20	15.7	404
	% Recovery	**NPV at 8% ($M)**
0.98	91.4	179
0.99	92.3	183
1.00	**93.3**	**188**
1.01	94.2	193
1.02	95.1	198

	Zinc Price ($/lb)	NPV at 8% ($M)
0.80	0.96	46
0.90	1.08	117
1.00	**1.20**	**188**
1.10	1.32	259
1.20	1.44	331
	Operating Costs ($M)	**NPV at 8% ($M)**
0.95	326	202
0.98	336	194
1.00	**343**	**188**
1.08	371	166
1.15	395	147
	Capital Costs ($M)	**NPV at 8% ($M)**
0.95	29.9	190
0.98	30.8	189
1.00	**31.5**	**188**
1.08	34.0	186
1.15	36.2	184

FIGURE 22-1 SENSITIVITY ANALYSIS



23 ADJACENT PROPERTIES

The Perkoa mine is the sole project of economic interest in the area and there are no adjacent properties of significance from a mining perspective.

24 OTHER RELEVANT DATA AND INFORMATION

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

25 INTERPRETATION AND CONCLUSIONS

Based on a site visit, discussion with Nantou Mining personnel, and review of available documentation, RPA offers the follow interpretations and conclusions.

GEOLOGY AND MINERAL RESOURCES

- The geology and mineralization is well understood by Nantou Mining geology personnel.
- The drilling procedures employed by Nantou Mining conform to industry best practice and the resultant drilling pattern is sufficient to interpret the geometry and the boundaries of the mineralization with confidence. All drilling sampling was carried out under the direct supervision of appropriately qualified geologists. There are no drilling, sampling, or recovery factors that could materially impact the accuracy and reliability of the results.
- Drilling, sampling, QA/QC, sample preparation, and analyses were appropriate for the style of mineralization and adequate for Mineral Resource estimation.
- In 2017, the QA/QC results showed an improvement over the 2016 results, with a significant reduction in large variances for CRM and better performance of the new granodiorite core blank material. Overall, the QA/QC program, as designed and implemented by Nantou Mining, is adequate, and the assay results within the database are suitable for use in a Mineral Resource estimate.
- The assumptions, parameters, and methodology of the Mineral Resource estimation are appropriate for the style of mineralization.
- The updated variography study provides better interpolation parameters and will result in more accurate Mineral Resource estimations, especially for the hanging wall lenses.
- Mineral Resources were estimated consistent with CIM (2014) definitions.
- Measured plus Indicated Mineral Resources total 4.85 Mt grading 13.73% Zn for a total of approximately 665,700 t of contained zinc.
- Inferred Mineral Resources total 0.68 Mt grading 8.9% Zn for a total of approximately 60,900 t of contained zinc.

EXPLORATION

- The areas covered by the exploration licences, as well as other areas along the Perkoa Mine Horizon, are very prospective for both base and precious metals.
- Rapid progress has been made over the last year with respect to exploration activities at Perkoa.

- Over 40 prospective targets have been generated, in four main clusters, along the Perkoa Mine Horizon within the POA and Guido exploration permits.

MINING AND MINERAL RESERVES

- The Mineral Reserve estimate has been prepared utilizing acceptable estimation methodologies and the classification of Proven and Probable Mineral Reserves conform to CIM (2014) definitions and NI 43-101.

- Mining and milling costs used for the Mineral Reserve NSR calculation have been extracted directly from the 0.67 Mt per annum mining cost estimation physicals prepared by Nantou Mining in mid-2017. The values are based on the average operating costs from the first half of 2017.

- In addition to site operating costs, the Mineral Reserve estimate takes into consideration metallurgical recoveries, concentrate grades, transportation costs, smelter treatment charges, and royalty in determining economic viability.

- The NSR cut-off value used for Mineral Reserve estimation is reasonable.

- Stope shapes have been designed manually using Surpac software. The resultant shapes were evaluated against the geological resource model to report the tonnes and grade for each stope shape.

- Stope modifying factors were applied, post-geological interrogation, to generate the final diluted and recovered Mineral Reserve.

- The Proven and Probable Mineral Reserve totals 3.33 Mt at 13.06% Zn for a total of 434,700 t of contained zinc.

MINERAL PROCESSING

- The process plant is a conventional sulphide flotation plant capable of processing 2,000 tpd, currently operating at approximately 1,900 tpd, and includes crushing, screening, and grinding, followed by zinc flotation and filtering to produce a zinc concentrate.

- Over the past five years of operation, the process plant has produced a zinc concentrate in the range of 50.6% to 53.0% from head grades ranging from 6.3% Zn to 15.2% Zn. Recovery of zinc has been in the range of 89.3% to 96.7%.

- In general, the Perkoa concentrate can be considered “clean”, with mercury and iron being two elements incurring small penalties.

- There are no other by-product credits.

- Zinc concentrates are trucked 1,200 km to the port of Abidjan, Côte d’Ivoire.

ENVIRONMENTAL, SOCIAL, COMMUNITY RISKS

- There is no evidence of environmental risks that could materially impact Nantou Mining's ability to extract the Mineral Resources or Mineral Reserves at the Perkoa mine if managed.

- The Perkoa mine has a HSEC Policy (2014) outlining its commitment to the environment as well as procedures aligned to the requirements of applicable Burkina Faso legislation.

- The approved EMPs integral to the ESIA provide the framework for Perkoa mine's environmental management.

26 RECOMMENDATIONS

RPA offers the following recommendations.

GEOLOGY AND MINERAL RESOURCES

- A comprehensive data process map should be undertaken, including logging and sampling inputs, database review, and mine to mill production reconciliation studies.
- The Microsoft Access format diamond drill hole database should be modified so that only the Drill Hole Database Administrator has secured rights to revise or add data. RPA also recommends that the drill hole database include a field for QA/QC completed and a final Drill Hole Signoff by the Database Administrator.
- Additional effort should be undertaken to monitor QA/QC inputs and results. Also, the potential source of blank contamination must be investigated and remedied. Although the granodiorite core has performed much better than the historical quartz vein blank material, some minor metal content is still being reported.
- The composite length should be reviewed from the current 1.5 m to 2.0 m.
- Grade capping should be applied to the raw assays prior to compositing as per industry best practices.
- A reconciliation of the resource model versus the actual tonnage and grade, as determined by the process facility, should be included as a standard practice for the annual Mineral Resource estimation.
- A study should be undertaken on the Crown Pillar to determine if the mineralization can be reported as part of the Mineral Resource estimate.

EXPLORATION

- In-mine drilling should continue to explore for economic downdip potential.
- A comprehensive detailed review, compilation, and systematic exploration targeting plan is required prior to any future significant exploration expenditures.
- The 2018 exploration budget of approximately $3.5 million, including exploration targeting, 20,000 m of diamond drilling, geochemistry, and geophysics, is well warranted.

MINING AND MINERAL RESERVES

- A review of the Mineral Reserves based on current zinc prices should be carried out.

- The Mineral Reserve estimate should be updated once the additional drill hole information is available.

- The possibility of recovering the crown pillar should be studied as it is a potential source of mill feed once the current reserves are mined out.

MINERAL PROCESSING

- Zinc recoveries (92% to 94%) and concentrate grades (52% to 53%) are reasonable, however, both of these may be improved to maintain the upper range of recoveries and concentrate grades with further metallurgical testing.

ENVIRONMENTAL, SOCIAL, COMMUNITY

- Malaria is a threat to the employees and contractors working at the mine. Although strict controls are put in place by the mine there are a high number of infections per year based on the location of the mine. Training and Awareness programs will need to continue and possibly be extended beyond employees as infections may be occurring out of the mine workplace or camp site.

- The permit for the closure and reclamation of cell one at the tailings facility is required to comply with the regulatory framework. The risk is being managed by the onboarded contractor Knight Piésold and continuous engagement with the authorities by the Perkoa mine.

- The update to the mine wide financial closure will need to be completed in 2018 to comply with the requirements from BUMIGEB.

- The Perkoa mine is actioning a detailed plan to manage the expired chemicals on site. At the time of writing this report, all the expired Zinc Sulphate and Zinc Metabisulphate had been removed from the Perkoa mine by Saphyto for safe disposal, as regulated.

- New facilities are to be constructed in line with regulatory requirements for the storage of chemicals on site. The documentation has been submitted for regulatory approval.

- Waste management was identified as a potential risk to the Perkoa mine. As such, a detailed waste action management plan was developed by the Perkoa mine and reviewed during the site visit. The action plan details a remediation plan for the waste that is currently on site, followed by the planning of a formalized waste management facility on site.

- The mandate from the government to conduct an acid rock drainage potential study at the mine will assist in understanding mitigation measures that need to be developed, managed, and monitored in order to provide an accurate closure liability costing and rehabilitation plan for the mine.

- There will need to be a stakeholder management plan that is developed to address the one percent levy that has been imposed from government. Although the mine will possibly not be able to direct the spend of that levy, community perceptions regarding lack of local benefits and misappropriation of development funds could pose risk to the project, regardless of whether these perceptions are substantiated.

27 REFERENCES

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28 DATE AND SIGNATURE PAGE

This report titled "Technical Report on the Perkoa Mine, Burkina Faso" and dated April 12, 2018, was prepared and signed by the following authors:

Signed and Sealed *"Torben Jensen"*

Dated at Toronto, ON
April 12, 2018

Torben Jensen, P.Eng.
Principal Mining Engineer

Signed and Sealed *"Ian T. Blakley"*

Dated at London, UK
April 12, 2018

Ian T. Blakley, P.Geo., EuroGeol
Principal Geologist

Signed and Sealed *"Tracey Jacquemin"*

Dated at Johannesburg, SA
April 12, 2018

Tracey Jacquemin, Pr.Sci.Nat.
Corporate Manager, HSEC
Trevali Mining Corporation

Signed and Sealed *"Avakash A. Patel"*

Dated at Toronto, ON
April 12, 2018

Avakash A. Patel, P.Eng.
Vice President, Metallurgy, and Principal Metallurgist

29 CERTIFICATE OF QUALIFIED PERSON

TORBEN JENSEN, P.ENG.

I, Torben Jensen, P.Eng., as an author of this report entitled “Technical Report on the Perkoa Mine, Burkina Faso” prepared for Trevali Mining Corporation and dated April 12, 2018, do hereby certify that:

1. I am a Principal Mining Engineer with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.

2. I am a graduate of South Dakota School of Mines and Technology in 1978 with a B.Sc. degree in Mining Engineering.

3. I am registered as a Professional Engineer in the Province of Ontario (Reg. #90286881). I have worked as a mining engineer for a total of 40 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Preparation of NI 43-101 Technical Reports, feasibility studies, and due diligence reviews for a wide range of commodities including gold, silver, nickel, lead, zinc, uranium, coal, asbestos, potash, copper, and diamonds.
   - Vice President Corporate Development with a Canadian gold mining company, responsible for the evaluation of investment opportunities.
   - Vice President Engineering with a Canadian base metal mining company, responsible for preparation of feasibility studies related to property acquisitions and development, engineering design of underground and open pit projects, short and long range mine planning, capital and operating cost estimation for budgets, and permitting.
   - Manager of Engineering with a Canadian based mining company, responsible for the reopening of a former nickel mine.
   - Chief Mining Engineer with a Canadian-based coal company, responsible for mine contracting, short and long range mine planning, budget preparations, scheduling, project management, feasibility studies related to property acquisitions, open pit and underground engineering design, underground construction design, costing, and supervision.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Perkoa mine from January 15 to January 18, 2018.

6. I am responsible for Sections 15, 16, 18, 19, 21, and 22 of this Technical Report and share responsibility for Sections 1, 24, 25, 26, and 27 of this Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Sections 15, 16, 18, 19, 21, and 22 of this Technical Report for which I am responsible, and Sections 1, 24, 25, 26, and 27 of this Technical Report for which I share responsibility, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 12th day of April, 2018

Signed and Sealed *"Torben Jensen"*

Torben Jensen, P.Eng.

IAN T. BLAKLEY, P.GEO., EURGEOL

I, Ian T. Blakley, P.Geo., P.Geo., EurGeol, as an author of this report entitled “Technical Report on the Perkoa Mine, Burkina Faso” prepared for Trevali Mining Corporation and dated April 12, 2018, do hereby certify that:

1. I am a Principal Geologist and Vice-President and General Manager of RPA UK Ltd. of One Fetter Lane, Suite 311, London, UK EC4A 1BR.

2. I am a graduate of the University of Waterloo, Waterloo, Ontario, Canada, in 1984 with a Bachelor of Science degree in Honours Co-operative Applied Earth Sciences/Geology Option.

3. I am registered as a Professional Geoscientist in the Province of Ontario (Reg. #1446). I am also a member of the European Federation of Geologists (No. 1480) as well as a Professional Geologist (No. 271) associated with the Institute of Geologists of Ireland. I have worked as a Geologist for a total of 35 years since my graduation. My relevant experience for the purpose of the Technical Report is:
    - Review and reporting, including Mineral Resource estimation, as a geological consultant on numerous exploration and mining projects around the world for due diligence and regulatory requirements.
    - Vice-President – Exploration with a Canadian private company exploring and developing world-class gold assets in northeastern Kazakhstan.
    - Chief Geologist with a major Canadian mining company responsible for the management of geological exploration, resource definition and production.
    - Senior Mines Exploration Geologist for new capital underground mining projects including exploration and definition drilling, resource definition, infrastructure positioning, production and reconciliation.
    - Exploration Geologist responsible for sampling and mapping programs at gold and base metal properties in Canada.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I visited the Perkoa mine from January 15 to January 18, 2018.

6. I am responsible for Sections 2 to 12, 14, and 23 of this Technical Report and share responsibility for Sections 1, 24, 25, 26, and 27 of this Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Sections 2 to 12, 14, and 23 of this Technical Report for which I am responsible, and Sections 1, 24, 25, 26, and 27 of this Technical Report for which I share responsibility, contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 12th day of April, 2018

Signed and Sealed *"Ian T. Blakley"*

Ian T. Blakley, P. Geo., EurGeol

TRACEY JACQUEMIN, PR.SCI.NAT

I, Tracey Jacquemin, Pr.Sci.Nat 400163/12, as an author of this report entitled “Technical Report on the Perkoa Mine, Burkina Faso” prepared for Trevali Mining Corporation and dated April 12, 2018 do hereby certify that:

1. I am Corporate Manager, HSEC with Trevali Mining Corporation at 1400 - 1199 West Hastings Street, Vancouver, BC Canada, V6E 3T5.

2. I am a graduate of University of the Witwatersrand, Johannesburg, South Africa in 2004 with a Bachelor of Science Degree with Honours (BSc Hons.) Ecology, Environment and Conservation Biology

3. I am registered as a Professional Environmental Scientist in the Republic of South Africa (Pr.Sci.Nat 400163/12). I have worked as an Environmental Scientist for a total of 12 years since my graduation. My relevant experience for the purpose of the Technical Report is:
    - Four years of consulting experience in Sub-Sahara Africa including but not limited to Environmental project management, contract management, due diligences, Environmental Impact Assessments, Basic Assessments, Water Use Licence Applications and Waste Licence Applications Permitting in terms of the South African Legislative Framework, Environmental Compliance Assessments and Auditing, Environmental Management System Development and Implementation and Environmental Control Officer work.
    - Environmental Manager for an Underground Mining Project
    - Environmental Project Manager / Environmental Assessment Practitioner for a South African Mine.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I last visited the Perkoa mine from March 15 to 17, 2018.

6. I am responsible for Section 20 of the Technical Report and share responsibility for Sections 1, 24, 25, 26, and 27 of this Technical Report.

7. I am not independent of the Issuer applying the test set out in Section 1.5 of NI 43-101 as I am an employee of the Issuer.

8. I have had prior involvement with the property that is the subject of the Technical Report as an author of a Technical Report entitled “Technical Report on the Perkoa Mine, Burkina Faso” prepared for Trevali Mining Corporation with an effective date of December 31, 2016. I have been involved with the Perkoa mine, subject of the Technical Report, since October 2017 in my capacity as Corporate Manager, HSEC.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, Section 20 of this Technical Report for which I am responsible and Sections 1, 24, 25, 26, and 27 of this Technical Report for which I share responsibility, contain all scientific

and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 12th day of April, 2018

Signed and Sealed *"Tracey Jacquemin"*

Tracey Jacquemin, Pr.Sci.Nat 400163/12

AVAKASH A. PATEL, P.ENG.

I, Avakash A. Patel, P.Eng., as an author of this report entitled "Technical Report on the Perkoa Mine, Burkina Faso" prepared for Trevali Mining Corporation and dated April 12, 2018 do hereby certify that:

1. I am Vice President, Metallurgy and Principal Metallurgist with Roscoe Postle Associates Inc. of Suite 501, 55 University Ave Toronto, ON, M5J 2H7.

2. I am a graduate of the University of Regina, Saskatchewan in 1996 with a B.A.Sc. in Regional Environmental Systems Engineering (Civil/Chemical).

3. I am registered as a Professional Engineer in the Province of Ontario (Reg. #90513565) and in the Province of British Columbia (Reg. #31860). I have worked as a metallurgical engineer for a total of 21 years since my graduation. My relevant experience for the purpose of the Technical Report is:
   - Reviews and reports as a metallurgical consultant on numerous mining operations and projects for due diligence and regulatory requirements.
   - Senior positions at numerous base metal and precious metal operations, and consulting companies responsible for general management, project management, and process design.
   - Sr. Corporate Manager – Metallurgy and Mineral Processing with a major Canadian mining company and a junior Canadian mining company.
   - Manager of Engineering/Processing Engineering with two large international Engineering companies responsible for designing, planning, and execution for multiple complex mining projects.

4. I have read the definition of "qualified person" set out in National Instrument 43-101 (NI 43-101) and certify that by reason of my education, affiliation with a professional association (as defined in NI 43-101) and past relevant work experience, I fulfill the requirements to be a "qualified person" for the purposes of NI 43-101.

5. I did not visit the Perkoa Mine.

6. I am responsible for Sections 13 and 17 and parts of Sections 1, 25, and 26 of the Technical Report.

7. I am independent of the Issuer applying the test set out in Section 1.5 of NI 43-101.

8. I have had no prior involvement with the property that is the subject of the Technical Report.

9. I have read NI 43-101, and the Technical Report has been prepared in compliance with NI 43-101 and Form 43-101F1.

10. At the effective date of the Technical Report, to the best of my knowledge, information, and belief, the Technical Report contains Sections 13 and 17 and Sections 1, 25, and 26 for which I am responsible contain all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.

Dated this 12th day of April, 2018

Signed and Sealed *"Avakash A. Patel"*

Avakash A. Patel, P.Eng.