

# Feasibility Study Confirms Low Cost, Long Life Nickel Project at Araguaia

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LONDON, Oct. 29, 2018 - [Horizonte Minerals Plc](#), (AIM/TSX: HZM) ('Horizonte' or 'the Company') the nickel development company focused in Brazil, is pleased to publish the results of the Feasibility Study ('FS' or the 'Study') for the Araguaia Ferronickel Project ('Araguaia', or 'the Project') in Brazil's Pará State.

The Study confirms Araguaia as a Tier 1 project with a large high-grade scalable resource, a long mine life and a low-cost source of ferronickel for the stainless-steel industry.

Araguaia's FS design allows for future construction of a second Rotary Kiln Electric Furnace ('RKEF') process line, with potential to double Araguaia's production capacity from 14,500 tpa nickel up to 29,000 tpa nickel.

Compelling economic and technical results from the Study are expected to support project financing, offtake agreements and future development milestones.

Araguaia's rapid timeline to production should position it to take advantage of the forecast growth in the nickel market over the short to medium-term.

## Highlights:

- Initial 28-year mine life generates cash flows after taxation of US\$1.6 billion with sufficient Mineral Resources to extend beyond 28 years;
- Estimated post-tax Net Present Value<sup>1</sup> ('NPV') of US\$401 million<sup>2</sup> and Internal Rate of Return ('IRR') of 20.1%;
- Upon development the Project is expected to produce an average of 14,500 tonnes of nickel contained within approximately 52,000 tonnes ferronickel per annum, utilising the proven RKEF technology currently used at over 40 mines around the world;
- The base case FS economics assume a flat nickel price of US\$14,000 per tonne ('/t') for the entire 28-year mine life based on Wood Mackenzie's short-term forecast;
- C1 (Brook Hunt) cash cost of US\$3.72 per pound ('/lb') of nickel (US\$8,193/t), making Araguaia a low-cost producer;
- Using the consensus mid-term nickel price of US\$16,800/t, the post-tax NPV increases to US\$740 million with an IRR of 28.1%, reflecting the significant leverage that the Project returns have to any future increase in nickel prices;
- Capital cost estimate of US\$443 million (AACE class 3), including US\$65.3 million of contingencies equating to 17.2% of total capex budget;
- The process plant has been designed to allow for a Stage 2 expansion with the addition of a second (RKEF) process line in the future after the first line is fully commissioned, providing flexibility to double the nickel output. A Preliminary Economic Assessment ('PEA') study is underway for this Stage 2 expansion, expected to be published in late 2018;

- Araguaia is set to deliver significant socio-economic benefits for communities in the Pará state, including over 1,000 direct jobs in the construction phase, and around 500 jobs during operation, as well as additional economic and social development programs;
- The outlook for the nickel market is robust, with demand growing at around 5% over the next three to five years from both the traditional stainless-steel sector as well as new demand from growth in the electric vehicle battery market; and,
- The Company has successfully obtained the Preliminary Environmental Licence and water permit for full-scale operation at Araguaia and is on track to obtain its Construction Licence in Q1 2019.

A version of the announcement containing images and diagrams is available on our website at [www.horizonteminerals.com](http://www.horizonteminerals.com)

Horizonte CEO, Jeremy Martin, commented:

*&ldquo;I am delighted to deliver the Feasibility Study for the Araguaia ferronickel project. The Study represents the most significant milestone in the Company&rsquo;s development to date. From initial discovery by Horizonte combined with the acquisitions from Teck and Glencore, this is the culmination of a long journey and one that not many companies successfully achieve. Horizonte owns one of the largest undeveloped ferro-nickel projects in the world, in a mining friendly jurisdiction, with good infrastructure and a compelling set of economics as defined in today&rsquo;s FS.*

*&ldquo;The FS shows that Araguaia can be a significant low-cost supplier of nickel in the form of high-grade ferronickel to the stainless-steel industry, over the initial 28-year mine life the operation generates cash flows after taxation of US\$1.6 billion, delivers an IRR of over 20% and sits on the lower half of the global cost curve.*

*&ldquo;The completion of the FS has taken longer to complete than originally forecast. The schedule change was to ensure that the quality of the engineering and other deliverables were to a high standard, and to include the option, within the design, to add a second line that would double the capacity to 29,000 tonnes per year of nickel.*

*&ldquo;With the completion of the FS the priority now is to secure project funding and to advance the early works packages. The Project is unleveraged and is in a strong position with no agreed offtake, royalty or nickel streams, giving maximum value and flexibility going into the financing process.*

*&ldquo;The nickel market fundamentals are positive for the short to long term, driven by robust demand from stainless steel growth and strong electric vehicle (EV) penetration rates. Physical LME metal inventories continue to be drawn down to levels not seen in the last five years. This combined with a lack of new major projects scheduled to come online in the short term, means that this is an opportune time to develop Araguaia.*

*&ldquo;I would like to thank the entire Araguaia feasibility study team, who have worked extremely hard to deliver this high-quality study. Horizonte is entering a new and exciting phase of its journey from explorer to developer, with the potential to create substantial value for all stakeholders as highlighted from the results today. I look forward to providing further updates to the market on progress, at both our flagship Araguaia ferro-nickel project and on the Vermelho nickel-cobalt project.&rdquo;*

*Figure 1: 3D image of the proposed RKEF plant at the Araguaia Ferronickel Project*

*(please see image in the full version of the the announcement at [www.horizonteminerals.com](http://www.horizonteminerals.com))*

Analyst conference call and presentation

Horizonte will host an analyst conference call and presentation today, 29 October 2018, at 10:00 GMT.

Participants can access the call by dialling one of the following numbers below approximately 10 minutes prior to the start of the call.

UK Toll-Free Number: 08082370030

UK Toll Number: +44 (0)2031394830

PIN: 75301112#

The presentation will be available for download from the Company's website [www.horizonteminerals.com](http://www.horizonteminerals.com) or by clicking on the link below:

<http://www.anywhereconference.com?UserAudioMode=DATA&Name=&Conference=131699934&PIN=75301112>

A recording of the conference call will subsequently be available on the Company's website.

## Araguaia Feasibility Study Detailed Information

### Section 1 - Project Summary

The wholly owned Araguaia Project is located in the south-east of the Brazilian state of Pará, approximately 760 km south of the state capital Belém.

The Project comprises an open pit nickel laterite mining operation that mines 27.5 million tonnes ('Mt') Mineral Reserve of a 119 Mt Mineral Resource to produce 52,000 tonnes of ferronickel ('FeNi') (containing 14,500 tonnes of nickel) per year, for the 28-year mine life. The metallurgical process comprises a single line RKEF to extract FeNi from the laterite ore. The RKEF plant and project infrastructure will be constructed over a 31-month period. After an initial ramp-up period, the plant will reach full capacity of approximately 900,000 tonnes of dry ore feed per year. The FeNi product will be transported by road to the port of Vila do Conde for sale to overseas customers.

The process plant, mining, infrastructure and utilities engineering has been developed to support capital and operating cost estimates to the Association for the Advancement of Cost Engineering ('AAC&rsquo;) class 3 standard. This means that capital and operating costs estimates have a combined accuracy of -10%+15%. The capital and operating costs are as of Q3 2018.

The results of the FS demonstrate that Araguaia shows compelling economics as highlighted in Table 1, below.

*Table 1: Key Feasibility Study Project Economic Indicators (post taxation)*

Item	Unit	Nickel price basis (US\$/t Ni)		
		Base (14,000)	CIBC (16,800)	Wood Mackenzie (26,450)
Net cash flow	US\$m	1,572	2,582	6,060
NPV <sub>8</sub>	US\$m	401	740	1,906
IRR	%	20.1	28.1	50.4
Breakeven (NPV <sub>8</sub> ) Ni price	US\$/t	10,766	10,766	10,766
C1 Cost (Brook Hunt)	US\$/t Ni	8,193	8,193	8,193
Production year payback	years	4.2	3.3	1.8
LOM Ni recovered	kt	426	426	426

LOM Fe recovered	kt	995	995	995
Average Ni production at 0.9 Mt/a ore <sup>3</sup>	kt/a	14.5	14.5	14.5
Average Fe production at 0.9 Mt/a ore	kt/a	32	32	32
Total revenue	US\$M	5,970	7,164	11,449
Total costs	US\$M	3,811	3,995	4,657
Operating cash flow	US\$M	2,159	3,169	6,792
Capital intensity &ndash; Initial capex/t nickel	US\$/t Ni	1,041	1,041	1,041

The model assumes 100% equity, providing scope for increased returns with the ability to leverage using commercial or other debt. The base case was developed using a flat nickel price of US\$14,000/t Ni in line with Wood Mackenzie's (WM) short term forecast. Two other cases were prepared; one using a market consensus price of US\$16,800/t Ni and the other used WM's long term forecast of US\$26,450/t Ni. These two additional price forecasts represent upside scenarios.

As shown in Table 1 (above), for the base case the project has a 4.2-year payback period with cumulative gross revenues of US\$5,970 million. The economic analysis indicates a post-tax NPV of US\$401 million and an IRR of 20.1% using the base case forecast of US\$14,000/t Ni, this increases to US\$1,906 million and 50.4% when using the long-term price forecast by WM of US\$26,450/t Ni.

## Section 2 &ndash; Resources / Reserves and Mining

Snowden Mining Industry Consultants completed the mining engineering along with mining capital, operating cost estimates and resource estimation for the Project. Snowden is a global mining consulting and training business with leading skills and technologies in mining engineering, mine optimisation, and resource estimation.

### Mineral Resources

The Project has two principal mining centres; Araguaia Nickel South (ANS) and Araguaia Nickel North (ANN). ANS hosts seven deposits: Pequizeiro, Baiao, Pequizeiro West, Jacutinga, Vila Oito East, Vila Oito West and Vila Oito, while ANN hosts the Vale do Sonhos deposit.

A number of phases of diamond drilling has been completed across the Project commencing in 2010. Drilling at ANS has been undertaken by Horizonte and Teck, with drilling at ANN by Xstrata/Glencore. The Company has been active on the ANS project since the initial discovery in 2010, when it successfully completed the acquisition and integration of the Teck and Xstrata project areas, it has been the sole project operator since 2015. A total of 75,250 metres (m) of diamond drilling has been completed across 2,627 holes for the Project.

Mineral Resource estimates for the deposits under consideration for the FS are shown in Table 2. The Measured Mineral Resource is estimated at 18 Mt at a grade of 1.44% Ni using a cut-off grade of 0.90% Ni. The Indicated Mineral Resource is 101 Mt at a grade of 1.25% Ni. This gives a combined Mineral Resource of 119 Mt at a grade of 1.27% Ni for Measured and Indicated Mineral Resources at a cut-off grade of 0.90% Ni (inclusive of Mineral Reserves). A further 13 Mt at a grade of 1.19% Ni (at a cut-off grade of 0.90% Ni) is defined as an Inferred Mineral Resource.

Table 2: Mineral Resources for ANS and ANN as of February 2017 by material type (0.90% Ni cut-off)

Araguaia Category	Material type	Tonnage (kt)	Bulk density (t/m <sup>3</sup> )	Contained							
				Ni metal (kt)	Ni (%)	Co (%)	Fe (%)	MgO (%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	Cr <sub>2</sub> O <sub>3</sub> (%)
Subtotal Measured	Limonite	1,232	1.39	15	1.20	0.15	37.43	2.00	17.15	11.07	2.98
	Transition	6,645	1.26	116	1.75	0.07	18.89	10.20	42.06	6.59	1.29
	Saprolite	10,291	1.40	130	1.27	0.03	12.03	24.08	41.24	3.95	0.87
Total Measured	All	18,168	1.35	261	1.44	0.05	16.26	17.51	39.91	5.40	1.17

		Limonite	19,244	1.39	216	1.12	0.12	36.22	2.40	20.46	9.61	2.65
Subtotal	Indicated	Transition	30,917	1.20	439	1.42	0.07	21.38	11.26	38.95	5.37	1.51
		Saprolite	51,008	1.31	610	1.18	0.03	11.83	25.79	40.59	3.16	0.85
Total	Indicated	All	101,169	1.30	1,264	1.25	0.06	19.39	16.90	36.26	5.06	1.39
Total	Measured + Indicated	All	119,337	1.30	1,525	1.27	0.06	18.91	16.99	36.81	5.11	1.36
		Limonite	2,751	1.37	30	1.08	0.10	34.92	3.04	22.84	9.23	2.50
Subtotal	Inferred	Transition	4,771	1.20	62	1.30	0.07	21.23	11.04	39.09	5.62	1.40
		Saprolite	5,398	1.35	62	1.15	0.03	11.80	24.36	41.81	3.69	0.82
Total	Inferred	All	12,920	1.30	154	1.19	0.06	20.21	14.90	36.77	5.58	1.39

#### Notes:

1. Mineral Resources are not Mineral Reserves and do not have demonstrated economic viability. All figures are rounded to reflect the relative accuracy of the estimate and have been used to derive subtotals, totals and weighted averages. Such rounding consequently introduces a small margin of error. Where these occur, Snowden does not consider them to be material.
2. Mineral Resources are reported inclusive of Mineral Reserves.
3. The reporting standard adopted for the reporting of the Mineral Resource estimate uses the terminology, definitions and guidelines given in the CIM Standards on Mineral Resources and Mineral Reserves (May 2014) as required by NI 43-101.
4. Snowden completed a site inspection of the deposit by Mr Andy Ross FAusIMM, an appropriate "Independent Qualified Person" as such term is defined in NI 43-101.
5. kt = thousand tonnes (metric).

#### Mineral Reserves

The Mineral Reserve was estimated by Snowden in accordance with the CIM (2010) and JORC (2012) guidelines.

All economic Indicated Mineral Resources within the pit designs were classified as Probable Mineral Reserves and all Measured Mineral Resources at Pequizeiro (ANS) were classified as Proven Mineral Reserves (this classification was tested and supported by the trial mining program completed in this pit in 2017). Measured Mineral Resources at Vale dos Sonhos (ANN) were classified as Probable Mineral Reserves. A summary is provided in Table 3. The Mineral Reserve of 27.2 Mt gives mine life of 28 years based on the annual ore throughput to the RKEF plant of 900,000 t/a.

Table 3: Open Pit Mineral Reserves reported at October 2018

Category	Ore (Mt)	Ni (%)	Fe (%)	SiO <sub>2</sub> :MgO	Al <sub>2</sub> O <sub>3</sub> (%)
Proven	7.33	1.72	16.01	3.01	6.00
Probable	19.96	1.68	17.57	2.36	4.56
Total	27.29	1.69	17.15	2.52	4.94

#### Notes

1. Mt &ndash; million dry metric tonnes.
2. Cut-off used was 1.4% Ni.
3. Dilution was modelled as part of re-blocking, ore losses applied are 8%.
3. The reporting standard adopted for the reporting of the Mineral Reserve estimate uses the terminology, definitions and guidelines given in the CIM Standards on Mineral Resources and Mineral Reserves (May 2014) as required by NI 43-101.
4. Snowden completed a site inspection on three occasions between March 2016 and May 2017 by Mr Frank Blanchfield FAusIMM, an appropriate &ldquo;Independent Qualified Person&rdquo; as such term is defined in NI 43-101.

#### Mining

The deposits will be mined via conventional open pit truck and shovel techniques using contractors. No blasting will be necessary. Reverse circulation (&lsquo;RC&rsquo;) grade control drilling will be completed at a 10 m x 10 m spacing well ahead of mining. This combined with the use of visual control of the limonite and transition boundary, face sampling, stockpile sampling and ore feed sampling, supports a comprehensive mine-to-mill strategy that is designed to maintain consistent feed to the process plant.

Waste will be stored in external dumps near the pits. Ore will be transported to stockpile hubs near each deposit. Sheeting (using ferricrete won from the overburden) will be required to support trafficability in and around the mine during the wet season. Depending on plant demand, ore will be hauled from hub stockpiles or directly from the pits to the run of mine (&lsquo;ROM&rsquo;) at the RKEF process facility. Stockpiles on the ROM will be sheeted and classified according to ore type and chemistry for blending.

The resource model was converted to a mining model to reflect the mining method and incorporated anticipated mining dilution and loss. The model was re-blocked to 6.25 m x 6.25 m x 2 m, with a 300 mm &ldquo;skin&rdquo; of transition (directly beneath the limonite boundary) treated as loss.

The pits were optimised to target the highest-grade material giving a mine life of approximately 28 years. This resulted in a cut-off grade of 1.4% Ni being applied. The pits were then optimised using Whittle 4X to determine a shell to use for design.

The annual mining rate peaks at 3.5 Mt/annum between production years two and seven before dropping down to 3.0 Mt/annum for the remainder of the Project.

The mine supplies high nickel grades in the early mine life, reaching 2% in production year 2. The Ni grade is above 1.8% for the majority of the first 10 years of production and reduces to average approximately 1.6% Ni for the remaining mine life.

### Section 3 &ndash; Processing

The process plant design, along with capital and operating cost estimates were completed by Ausenco Engineering Canada Inc (&lsquo;Ausenco&rsquo;). Ausenco is a global diversified engineering, construction and project management company providing consulting, project delivery and asset management solutions to the resources, energy and infrastructure sectors.

The Project will utilise a single RKEF processing line from ore receipts through to shooting of the FeNi product, Figure 2.

The RKEF process is proven and used successfully in over 40 nickel laterite plants around the world and was deemed appropriate for the Project based on the extensive metallurgical testwork and the pilot plant campaigns completed on the ore.

The key steps in the RKEF flowsheet are (Figure 2);

- ROM ore, at an average moisture content of 34%, is first blended to meet metallurgical processing requirements, then transported to the primary crushing stage. Here the ore is sized using two stages of crushing to match the requirements of the subsequent steps. A mineral sizer with a 200 mm gap is used for primary sizing, while a mineral sizer with a 50 mm gap is used for the final stage;
- The ore is then homogenised, partially dried and agglomerated to an average moisture content of 18% in a rotary dryer (4.5 m diameter x 40 m long) and fired with pulverized coal;
- The dried agglomerated ore is then fed to the rotary kiln with the addition of reductant coal. In the kiln, the ore is completely dried, calcined to remove chemically-combined moisture, and the iron and nickel oxides are partially pre-reduced. Kiln dust is recycled to the process at the primary crushing stage ahead of the dryer/agglomerator;
- Calcine from the kiln is then transferred to the electric furnace where further reduction of the nickel and iron occurs, melting and separation of the metal and slag occurs at high temperature. Slag is tapped at a temperature of around 1,575°C, while FeNi metal is tapped at a temperature of close to 1,500°C;
- After tapping, the melt is transferred by ladle to the refining stage. The final FeNi product containing 30% Ni is shotted with water, screened, dried and stockpiled prior to dispatch to the port on trucks where it either bagged or loaded bulk into sea containers for shipping to customers; and,

- The electric furnace slag is granulated and transferred to the slag repository by truck.

*Figure 2: ANP process flow diagram showing the RKEF steps*

*(please see image in the full version of the the announcement at [www.horizonteminerals.com](http://www.horizonteminerals.com))*

#### Section 4 – Financial Evaluation

##### Capital Cost

The estimate is based on the AACE class 3 with an accuracy range between -10% and +15% of the final project cost (excluding contingency) with a base date of October 2018. All amounts expressed are in US dollars unless otherwise stated.

The capital costs estimate (‘capex’) includes all the direct and indirect costs, local taxes and duties and appropriate contingencies for the facilities required to bring the Project into production, including the process plant, power line, water pipelines and associated infrastructure as defined by the FS. The estimate is based on an Engineering Procurement and Construction Management (‘EPCM’) implementation approach and the Project contracting strategy.

The total estimated initial (pre-production) capital cost for the project is US\$443.1 million (after tax, including growth and contingency, excluding escalation). A summary of the capex is shown in Table 4.

*Table 4: Summary of capex*

WBS #	Area	US\$'000
1000	Mine	6,003
3000	Ore Preparation	38,731
4000	Pyrometallurgy	137,518
5000	Material Supply	21,413
6000	Utilities and Infrastructure	106,918
7000	Buildings	9,095
8000	Indirect Costs	82,409
	Contingency	40,989
Total Costs		443,076

The direct costs in Table 4 include supply, shipping and site installation. The total contingency carried in the capex is US\$41.0 million, which combined with the US\$24.3 million growth allowance provides a total provision of US\$65.3 million. This combined sum represents 17.2% of the total capex (excluding growth and contingency).

##### Operational costs

The mining and operating cost estimate (‘opex’) was calculated for an operation producing 14,500 t Ni per annum and is set out as an annual total and US\$/t Ni in Table 5 (below), calculated as an average over the Life of Mine (‘LOM’). The operating costs cover the mine, process plant, ore preparation, social and environmental, royalties and general and administrative overheads. The main contributors of the overall operating costs are power, coal, labour and mining costs, with additional consumables and other indirect costs, including G&A.

*Table 5: Summary of opex*

Description	Cost/annum (US\$) US\$/t nickel	
Process Plant		
Directs		
Power	\$32,114,355	\$2,410
Coal	\$21,591,099	\$1,620
Other directs	\$17,965,039	\$1,348
Labour	\$7,831,286	\$588
Subtotal &ndash; Direct costs	\$79,501,779	\$5,966
Indirects	\$10,285,640	\$772
Mining costs	\$21,112,173	\$1,584
Total costs	\$110,889,592	\$8,322

### Summary Economics

The financial model developed assumes 100% equity. The base case was developed using a flat nickel price of US\$14,000/t Ni. Two other cases were prepared; one using a market consensus price of US\$16,800/t Ni and the other used the WM long term forecast of US\$26,450/t Ni. These two additional price forecasts represent upside scenarios.

As shown in Table 1, the post taxation model for the base case at the ANP has a 4.2-year payback period with cumulative gross revenues of US\$5,970 million. The economic analysis indicates a post-tax NPV of US\$401million and an IRR of 20.1% using the base case forecast of US\$14,000/t Ni which increases to US\$1,906 million and 50.4% when using the long-term price forecast by WM of US\$26,450/t Ni. Table 6 shows the pre-taxation results.

Table 6: Project economic performance (pre-taxation)

Item	Unit	Nickel price basis (US\$/t Ni)		
		Base (14,000)	CIBC (16,800)	Wood Mackenzie (26,450)
Net cash flow	US\$M	1,834	3,208	7,313
NPV <sub>8</sub>	US\$M	456	840	2,219
IRR	%	21.2	29.9	55.3
Breakeven (NPV <sub>8</sub> ) Ni price	US\$/t	10,672	10,672	10,672
C1 Cost (Brook Hunt)	US\$/t Ni	8,193	8,193	8,193
Production year payback	years	4.0	3.0	0.75
Total costs	US\$M	4,137	4,137	4,137
Operating cash flow	US\$M	2,421	3,616	7,901

### Sensitivity Analysis

The sensitivity analysis demonstrates how the NPV<sub>8</sub> is affected by changes to one variable while holding the other variables constant. The results of the sensitivity analysis are presented in Table 7 and Figure 3. The breakeven (&lsquo;B&rsquo;) indicates the change in the variable that will bring the project NPV<sub>8</sub> to US\$0.000 if all other variables remain unchanged. For example, if the grade of Ni reduces by 23.7% the Project will break even on NPV<sub>8</sub>.

Table 7: Sensitivity table for the Base Case (US\$14,000/t) NPV<sub>8</sub>, after taxation

	-20%	-10%	-5%	0%	5%	10%	20%	B/E <sup>4</sup>
Grade Ni	65	234	317	401	483	566	731	-23.7%
Recovery Ni	65	234	317	401	483	566	731	-23.7%
Price Ni	56	230	315	401	485	570	740	-23.1%
Pre-production capital	469	435	418	401	383	366	331	110.2%

Production capital	403	402	401	401	400	399	397	-
Mining cost	436	418	409	401	391	383	365	222.6%
Processing cost	531	466	433	401	367	335	269	59.8%
US\$/BRL FX rate	222	321	363	401	434	465	519	-35.4%
Electricity price	447	424	412	401	389	377	353	167.2%
Discount factor	524	458	428	401	374	349	304	151.3%
Overhead cost	414	407	404	401	397	393	386	-

Figure 3: Sensitivity to NPV<sub>8</sub> for changes in various key inputs

(please see image in the full version of the the announcement at [www.horizonteminerals.com](http://www.horizonteminerals.com))

The sensitivity analysis shows that the Project is more sensitive to nickel price, nickel recovery and grade than it is to either opex or capex.

## Section 5 – Market Review and Nickel Pricing

A market study was provided by WM, a global natural resource research and consulting company, with speciality in the nickel industry. WM’s findings are summarised below.

World nickel demand is forecast to increase by 3.6% in 2018, to 2.26 Mt before slowing to a compound annual growth rate of 2.1% a year, reaching 2.61 Mt in 2025. Growth over the long term is slightly stronger, at 2.5% a year, to 3.35 Mt in 2035, due to increasing uptake by the battery segment (for electric vehicles). Over this period, primary nickel uptake in stainless will account for 50–70% of total demand, rising from 1.54 Mt in 2018 to 1.66 Mt in 2025, and 1.77 Mt in 2035.

Thus, with an outlook for nickel of structural shortage, deepening deficits and falling stocks, nickel prices are expected to continue to increase above their recently established range of US\$12,500/t to US\$15,000/t (US\$5.90 to US\$6.80/lb). A near term forecast for the purposes of the FS is therefore, US\$14,000/t (US\$6.35/lb). For comparison, WM’s long-term incentive price currently stands at about US\$26,450/t (US\$12.00/lb).

The composition of ANP FeNi30 is comparable to existing FeNi30 being produced. Consequently, there is no impediment (based on the elemental breakdown provided) to the proposed FeNi30 product being acceptable to the stainless steel market.

World stainless steel production increased by 12 Mt between 2012 and 2017, mostly in China and to a lesser extent across the rest of Asia. Forecast production in 2018 is 50.8 Mt, up 4.5% on 2017. This upward trend is likely to continue over the mid-term, before slowing after 2025. As future growth in stainless production is expected to continue, the demand for FeNi (including FeNi30) should also increase. Consequently, WM forecasts long term FeNi production to be 450,000–460,000 a year, compared with 433,000 in 2018. This suggests there could be a need for the development of new FeNi projects in the future.

## Section 6 – Community and Environment

The FS sets out key environmental and social risks and impacts and how the Company plans to minimise, manage and mitigate them and then monitor performance. This will be primarily achieved through a system of Environmental Control Plans, to be implemented before, during and after construction to meet Brazilian and international standards.

The Company is working with Environmental Resource Management (‘ERM’), a global leader in this field, together with local Brazilian groups: Integratio Mediação Social e Sustentabilidade (social and land) and DBO Environmental Engineering (fauna) for the FS environmental and social work streams and the project permitting work for the Construction Licence (Licença de Instalação (‘LI’)). All work has been undertaken to IFC Performance Standards, 1, 2 and 5 and Brazilian CONAMA (environmental)

legislation.

The groups have conducted a number of new studies in 2017 and 2018 together with ongoing programs, these included:

- Environmental Control Plans - elaboration and detailing of socio-environmental programs;
- Inventories of fauna and flora;
- Air dispersion modelling;
- Hydrogeological modelling and water balance;
- Visits by physical, biological and social analysts to site; and,
- Air, noise and water monitoring – ongoing as part of base line data build up into the construction and operational phase.

ANP will generate approximately 500 direct and indirect jobs in the south-eastern rural area of Pará State, over the 28 years of operations. The majority of these workers during the operational phase will reside locally. The peak construction workforce is expected to reach over 1,000.

Community contributions are expected to total over US\$700 million during the LOM, including:

- Over US\$400 million in company taxes; and,
- Over US\$280 million in employee and contractor wages.

## Section 7 – Next Steps

Subject to Horizonte’s Board of Directors’ approvals, completion of project financing, approval of the Construction Licence (‘LI’) and overall nickel market conditions, the Company will continue to advance the Project towards construction, the key development milestones will be split into two phases, with the next six to eight months focussed on Phase 1.

### Phase 1

- Completion of any outstanding metallurgical test work;
- Completion of basic engineering and move to detailed design engineering;
- Early works site preparation; and,
- Commence negotiations with EPCM or EPC providers.

### Phase 2

- Completion of detailed design;
- Specification, vendor selection, and contracts for all mechanical packages; and,
- Completion of EPCM or EPC activities scheduled to deliver the project based on a 31 month schedule.

### Report Filing

A technical report on this FS, prepared in accordance with the NI 43-101 reporting requirements, will be filed on SEDAR at [www.sedar.com](http://www.sedar.com) and at [www.horizonteminerals.com](http://www.horizonteminerals.com) within forty-five (45) days of the date of this news release.

## Qualified Persons

Mr Frank Blanchfield, B.Eng, FAusIMM, Principal Consultant, Snowden Mining Industry Consultants Pty Ltd;

Mr Andrew Ross, BSc (Hons), MSc, FAusIMM, Principal Consultant, Snowden Mining Industry Consultants Pty Ltd;

Mr Francis Roger Billington, BSc (Hons), P.Geo. (APGO), Consultant;

Dr Nicholas Barcza, BSc (Eng.), MSc (Eng.), PhD, Pr.Eng. (ECSA), HLFSAIMM, Metallurgical Engineering Consultant; and;

Mr. David Haughton, B. Sc, MIMM, C Eng, Senior Process Engineer on behalf of Ausenco Canada Inc,

are the Qualified Persons under NI 43-101, and have reviewed, approved and verified the technical content of this press release, related to their area of expertise, and HZM has verified other technical content.

For further information visit [www.horizonteminerals.com](http://www.horizonteminerals.com) or contact:

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About Horizonte Minerals:

[Horizonte Minerals Plc](#) is an AIM and TSX-listed nickel development company focused in Brazil. The Company is developing the Araguaia project, as the next major ferronickel mine in Brazil, and the Vermelho nickel-cobalt project, with the aim of being able to supply nickel and cobalt to the EV battery market. Both projects are 100% owned.

Horizonte shareholders include: [Teck Resources Ltd.](#), Canaccord Genuity Group, JP Morgan, Lombard Odier Asset Management (Europe) Limited, City Financial, Richard Griffiths and Glencore.

## Glossary of technical terms

AACE	Association for the Advancement of Cost Engineering
AACE Class 3	+10% +15% accuracy
Agglomerated	Made into small lumps
Al <sub>2</sub> O <sub>3</sub>	Aluminium Oxide
ANN	Araguaia Nickel North (the Northern deposit)
ANS	Araguaia Nickel South (the Southern deposits)
C1	C1 cash cost as defined by Brook Hunt

Calcine	Output from the kiln which is ore that is reduced by heating in the presence of oxygen
Capex	Capital cost
Co	Cobalt
Cut-off grade	Lowest grade of mineralisation material considered economic, used in the calculation of Mineral Resources
Cr <sub>2</sub> O <sub>3</sub>	Chromium Oxide
Dilution	Waste or low-grade material accidentally mined with the ore
EPC	Engineering Procurement and Construction
EPCM	Engineering Procurement and Construction Management
EV	Electric Vehicles
Fe	Iron
FeNi30	Ferronickel with 30% Nickel and 70% Iron
Ferronickel or FeNi	An alloy that contains approximately 30% nickel and 70% iron and is the produced by the reduction of laterite ore
HZM, Horizonte or the Company	<a href="#">Horizonte Minerals Plc</a>
IFC	International Finance Corporation
IRR	Internal Rate of Return
Kt	Thousand Tonnes (metric)
LME	London Metal Exchange
LOM	Life of mine
Loss	Ore that is unintentionally left behind or mined as waste
MgO	Magnesium Oxide
MT	Million Tonnes (metric)
Ni	Nickel
NPV8	Net present value at an 8% discount rate
Opex	Operating cost
Ore	A naturally occurring solid material from which a metal or valuable mineral can be extracted
PEA	Preliminary Economic Assessment
Reverse Circulation Drilling	A rock drilling system that circulates drill cuttings through the centre of the drill rod so that they can be collected and assayed without contamination
RKEF	Rotating Kiln Electric Furnace is the process by which nickel laterite ore is reduced and the metal is separated from the slag to produce ferronickel
ROM	Run of mine stockpile
Shotted	Formation of small pellets from molten material
SiO <sub>2</sub>	Silicon Dioxide
Tpa	Tonnes (metric) per annum
US\$	United States Dollar
WM	Wood Mackenzie
Mineral Reserves	Mineral Reserves are sub-divided into 2 categories. The highest level of Reserves or confidence is the 'Proven' category and the lower level of confidence of the Reserves category. Reserves are distinguished from resources as all of the technical and economic factors have been applied and the estimated grade and tonnage of the resources should closely approximate the results of mining. The guidelines state "Mineral Reserves are inclusive of the diluting material and are calculated as the quantity of ore that is expected to be mined in conjunction with the Mineral Reserve and delivered to the treatment plant or refinery". The guidelines also state that, "The term 'Mineral Reserve' need not necessarily signify that the necessary permits are in place or operative or that all government approvals have been received. It does not mean that there are no reasonable expectations of such approvals."

Proven Mineral Reserves	A 'Proven Mineral Reserve' is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction is justified.
Probable Mineral Reserves	A 'Probable Mineral Reserve' is the economically mineable part of an Indicated and Inferred Mineral Resource demonstrated by a least a Preliminary Feasibility Study. This study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified.
Minerals Resource	Mineral Resources are sub-divided into 3 categories depending on the geological confidence level with the most confidence is the 'Measured' category. The next level of confidence is the 'Indicated' category and the lowest level, or the resource with the least confidence, is the 'Inferred' category.
Indicated Mineral Resource	An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough for geological and grade continuity to be assumed.
Measured Mineral Resource	An 'Measured Mineral Resource' is that part of a Mineral resource for which quantity, quality, densities, shape and physical characteristics are so well established that they can be estimated with a high level of confidence sufficient to allow the appropriate application of technical and economic parameters for production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced widely enough to confirm both geological and grade continuity.
Inferred Mineral Resource	An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade can be estimated on the basis of geological evidence and limited sampling and reasonable inferences to verify, geological and grade continuity. The estimate is based on limited information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.

#### CAUTIONARY STATEMENT REGARDING FORWARD LOOKING INFORMATION

Except for statements of historical fact relating to the Company, certain information contained in this press release constitutes "forward-looking information" under Canadian securities legislation. Forward-looking information includes, but is not limited to, the ability of the Company to complete the Acquisition as described herein, statements with respect to the potential of the Company's current or future property mineral projects; the success of exploration and mining activities; cost and timing of future exploration, production and development; the estimation of mineral resources and reserves and the ability of the Company to achieve its goals in respect of growing its mineral resources; the ability of the Company to complete the Placing as described herein, and the realization of mineral resource and reserve estimates. Generally, forward-looking information can be identified by the use of forward-looking terminology such as "plans", "expects" or "does not expect", "is expected", "budget", "scheduled", "estimates", "forecasts", "intends", "anticipates" or "does not anticipate", or "believes", or variations of such words and phrases or statements that certain actions, events or results "may", "could", "would", "might" or "will be taken", "occur" or "be achieved". Forward-looking information is based on the reasonable assumptions, estimates, analysis and opinions of management made in light of its experience and its perception of trends, current conditions and expected developments, as well as other factors that management believes to be relevant and reasonable in the circumstances at the date that such statements are made, and are inherently subject to known and unknown risks, uncertainties and other factors that may cause the actual results, level of activity, performance or achievements of the Company to be materially different from those expressed or implied by such forward-looking information, including but not limited to risks related to: the inability of the Company to complete the Acquisition as described herein, exploration and mining risks, competition from competitors with greater capital; the Company's lack of experience with respect to development-stage mining operations; fluctuations in metal prices; uninsured risks; environmental and other regulatory requirements; exploration, mining and other licences; the Company's future payment obligations; potential disputes with respect to the Company's title to, and the area of, its mining concessions; the Company's dependence on its ability to obtain sufficient financing in the future; the Company's dependence on its relationships with third parties; the Company's joint ventures; the potential of currency fluctuations and political or economic instability in countries in which the Company operates; currency exchange fluctuations; the Company's ability to manage its growth effectively; the trading market for the ordinary shares of the Company; uncertainty with respect to the Company's plans to continue to develop its operations and new projects; the Company's dependence on key personnel;

possible conflicts of interest of directors and officers of the Company, the inability of the Company to complete the Placing on the terms as described herein, and various risks associated with the legal and regulatory framework within which the Company operates. Although management of the Company has attempted to identify important factors that could cause actual results to differ materially from those contained in forward-looking information, there may be other factors that cause results not to be as anticipated, estimated or intended. There can be no assurance that such statements will prove to be accurate, as actual results and future events could differ materially from those anticipated in such statements.

<sup>1</sup> NPV calculated using 8% discount rate

<sup>2</sup> USD/BRL 1/3.5 exchange rate applied for life-of-mine

<sup>3</sup> Average over initial 28 years of processing

<sup>4</sup> The breakeven change for the variable if all other variables remain unchanged. For example, if the grade of Ni reduces by 23.7% the Project will break even on NPV<sub>8</sub>.

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