

### Components of Financial Model – Glossary of Terminology

No	Item	Description	Comment	Source/Link
<b>Project Timing &amp; Phases</b>				
<p>For deep ocean polymetallic nodules (PN) exploitation to become a reality, a sound regulatory regime is required that provides for the objective assessment of a project from geological, technical, economic, financial, environmental and social standpoints prior to the issuance of a mining license. In the PN exploitation context, a feasibility study will be the process and provide the benchmarks by which a company demonstrates to the ISA, host or sponsoring countries, financiers, possible partners and others that all relevant challenges surrounding a deep ocean mining project can be overcome to develop a safe, viable and profitable mining project with sufficient revenue to contribute to the development of the common heritage of mankind. (ISA, Tech Study 11, 2013)</p>				
1	<p>Pre-Feasibility (These cash flow estimates are expected to be +/- 25% accurate with a probability of 85%).</p>	<p>Pre-feasibility studies usually include a range of options for the technical and economic aspects of a project and are used to justify continued exploration, to complete the required project permitting or to attract a joint venture partner. The overriding aim of a pre-feasibility study is to select the preferred option, also known as base case scenario, for the project development, which commonly factor in mine access, mining and processing methods</p> <p>After exploration, a contractor generally undertakes a pre-feasibility study to determine, according to its own in-house criteria, whether there is a sufficient resource and whether favorable conditions exist to justify commissioning a full feasibility study to be used to seek funding and government approval for a mining license. (ISA, Tech Study 11, 2013)</p>	<p>May be used to provide the first indications of economic viability. Commonly used as a cost effective method of evaluating alternative concepts. Also used in making bid and/or acquisition decisions and to justify additional drilling or other project investigations. Environmental Cruises, Resource Assessments, System Operational Views, Business Case development are priority tasks</p> <p>Duration 3-4 Years. Expected to be 100% Equity Financed.</p>	<p>Chapter 4:  <a href="https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf">https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf</a>   <a href="https://www.caseyresearch.com/resource-dictionary/definition/preliminary-feasibility-study-pre-feasibility-study">https://www.caseyresearch.com/resource-dictionary/definition/preliminary-feasibility-study-pre-feasibility-study</a>            AMEC Capital Cost Estimating</p>

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2	Feasibility (These estimates are expected to be +/-15% accurate with a probability of 85%)	<p>Comprehensive study of a mineral deposit in which all geological, engineering, legal, operating, economic, social, environmental and other relevant factors could reasonably serve as the basis for a final decision by a Financial Institution to finance the development of the deposit for mineral projection. Otherwise known as a “bankable” feasibility study.</p> <p>According to NI 43-101, a feasibility study is a “comprehensive study of a mineral deposit in which all geological, engineering, legal, operating, economic, social, environmental and other relevant factors are considered in sufficient detail that it could reasonably serve as the basis for a final decision by a financial institution to finance the development of the deposit for mineral production.”</p>	<p>Focused on the development of a detailed system design and equipment testing, conditional on having a regulatory framework in place.</p> <p>This kind of feasibility study is also known as a ‘bankable feasibility study’ as it includes confidence levels of reserves and resources and cost estimates that are sufficiently precise for a bank to determine whether to lend money for the project (Nethery, 2003).</p> <p>Duration: 3-4 years Expected to be 100% Equity financed.</p>	<p>Chapter 4: <a href="https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf">https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf</a> <a href="https://www.caseyresearch.com/resource-dictionary/definition/preliminary-feasibility-study-pre-feasibility-study">https://www.caseyresearch.com/resource-dictionary/definition/preliminary-feasibility-study-pre-feasibility-study</a> AMEC Capital Cost Estimating</p>
3	Construction	Once all the licenses are in place, including permitting for the processing plant, the contractor will engage financial institutions on funding the construction of the various system components.	<p>The Collection, Surface and Processing Segments production and final integration and system level test.</p> <p>Duration: 2-4 years Expected to be a mix between equity and debt financing.</p>	
<b>Project Production Data</b>				
4	Annual Tonnes of Nodules Collected 3MT	The amount of dry metric tonnes collected annually of Polymetallic Nodules from the Clarion Clipperton Zone	<p>System design, including collector width, speed, based on available mining days. Clear distinction between Dry and Wet Nodules.</p> <p>Additional variables include days available for collection, design of collector width,</p>	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>

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			speed, and nodule transportation and processing rates.	
5	Metal Ore Content (Grade)	The percentage by weight of metal ore per metric tonne for Nickel, Copper, Cobalt and Manganese. Note: The nodules represent the ore, containing minerals. Once extracted (processed) these minerals become metals.	Each License holder may either utilize published ore content or complete collected nodule assay test results. For nodules, this is measured for “dry” nodules.	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>
6	Recovery/Yield	The amount in (%) of metals that can be recovered from the available minerals in the ore.	Various processing techniques will have a different recovery (yield) rate for each metal.	
7	Operational Mine Life	The years of mine production to be included in the cash flow analyses.	As discussed in prior workshops, 25 -30 years are options.	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>
<b>Capital and Operational Expenditures</b>				
8	Collection System- CAPEX	Upon the completion of the design, development, production and testing of a prototype thru the Pre Feasibility and Feasibility Phases, the actual build out of the Collection System, including collectors and Riser and Lift System.	The total capital required will be based on the system engineering, prototype development phases of the project. ISA Exploitation Regulations will impact the Collection System capital estimates.	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>
9	Surface Vessels- CAPEX	Upon the completion of the design, development, production and testing of a prototype thru the Pre Feasibility and Feasibility Phases, the actual build out of the Surface Vessels, including the mining ship, transport bulkers, and other surface vessels to transport the polymetallic nodules to the processing plant location.	The total capital required will be based on the system engineering, prototype development phases of the project. ISA Exploitation Regulations will impact the Surface Vessels capital estimates.	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>
10	Processing Plant- CAPEX	Upon the completion of the design, development, production and testing of a processing plant prototype thru the Pre	The total capital required will be based on the system engineering, prototype development phases of the project. ISA	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>

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		Feasibility and Feasibility Phases, the system build out of a full scale processing plant for polymetallic nodules.	Exploitation Regulations will impact the processing plant capital estimates. The location of the processing plant may optimize operating expense (OPEX), and permitting requirement and timelines.	
11	Recapitalization Estimates	Each capital item will have a useful life in which a retrofit/upgrade will be required to ensure optimal usage. A percentage of the original capital estimate may be used and be part of OPEX maintenance.	The life cycle concept of operations will be updated to reflect the available mining operational days. Collector, Riser and Life System are expected to have the highest recapitalization costs.	<a href="http://www.investopedia.com/terms/c/capital-investment.asp">http://www.investopedia.com/terms/c/capital-investment.asp</a>
12	Capital Development Period of Performance	Each segment of the system will have a capital development timeline based on the prototypes completed during the Feasibility Phase.	The equity and debt financing will reflect these timelines.	
13	Collection System OPEX	The annual operating expense for the collection system, including labor, other direct costs, fuel, and maintenance. Collectors, Riser and Lift System are included.	Exploitation License may impact operating expense for the Collection System.	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>
14	Surface Vessels OPEX	The annual operating expense for the surface vessels including labor, other direct costs, fuel, and maintenance. Mining ship, Bulkers, Hi Speed, Survey and Support Vessels	Exploitation License may impact operating expense for the Surface Vessel OPEX	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>
15	Processing Plant OPEX	The annual operating expense for the processing plant, including labor, other direct costs, fuel, and maintenance. An additional power plant may be included to provide electricity.	Exploitation License may impact operating expense for the Processing Plant OPEX	<a href="http://drs.nio.org/drs/handle/2264/3943">http://drs.nio.org/drs/handle/2264/3943</a>
16	Working Capital Percent of Sales	Working capital is the amount of funds which are necessary to an organization to continue its on-	A percentage of sales may be an assumption used to derive working capital. This would	<a href="http://www.investopedia.com/ask/answers/102315/what-">http://www.investopedia.com/ask/answers/102315/what-</a>

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		going business operations, until the firm is reimbursed through payments for the goods or services it has delivered to its customers.	result in a negative cash flow early in the project.	<a href="http://www.investopedia.com/terms/w/working-capital-be-used.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186">can-working-capital-be-used.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186</a>
17	Production Phase-in Period	The period in time required to meet full production. Which measurable will trigger full production?	OPEX may be consumed at a higher percentage compared to revenues.	<a href="http://www.investopedia.com/terms/r/rampup.asp?ad=dirN&amp;qo=serpSearchTopBox&amp;qsrc=1&amp;o=40186">http://www.investopedia.com/terms/r/rampup.asp?ad=dirN&amp;qo=serpSearchTopBox&amp;qsrc=1&amp;o=40186</a>
<b>Financial Project Data</b>				
18	Equity Company Contributions (Investment)	Equity financing is the process of raising capital through the sale of shares in an enterprise. Equity financing essentially refers to the sale of an ownership interest to raise funds for business purposes.	The Pre-Feasibility and Feasibility are expected to be 100% equity funded. Construction will include equity and debt.	<a href="http://www.investopedia.com/terms/e/equityfinancing.asp">http://www.investopedia.com/terms/e/equityfinancing.asp</a> <a href="https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf">https://www.isa.org.jm/sites/default/files/files/documents/tstudy11.pdf</a>
19	Debt to Equity Ratio	The debt-equity ratio compares a company's total liabilities to its total shareholders' equity. This is a measurement of how much suppliers, lenders, creditors and obligors have committed to the company versus what the shareholders have committed.	Mining companies have historically high ratios. Recently these same mining companies have been selling assets (Mines) to reduce debt and associated interest expense.	<a href="http://www.investopedia.com/university/ratios/debt/ratio3.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186">http://www.investopedia.com/university/ratios/debt/ratio3.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186</a>
20	Financing Interest Rate	Interest rate is the amount charged, expressed as a percentage of principal, by a lender to a borrower for the use of assets. Interest rates are typically noted on an annual basis, known as the annual percentage rate (APR).	The types of loans will also determine the interest rate. For example, the processing plant may have construction type loans addressing multiple phases of the project and deferred principal payment schedule.	<a href="http://www.investopedia.com/terms/i/interestrate.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186">http://www.investopedia.com/terms/i/interestrate.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186</a>

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21	Weighted Average Cost of Capital	Weighted average cost of capital (WACC) is a calculation of a firm's cost of capital in which each category of capital is proportionately weighted.	The percentage return on investment that debt/equity holders of private corporations assume prior to investing. Also representing the opportunity cost of the capital. If this return is not achieved, the corporation is effectively losing money on the investment as the same capital could be invested in other projects.	<a href="https://index.investopedia.com/index?q=WACC&amp;qsrc=1&amp;qo=serpSearchTopBox&amp;o=40186&amp;l=&amp;ad=&amp;ap=">https://index.investopedia.com/index?q=WACC&amp;qsrc=1&amp;qo=serpSearchTopBox&amp;o=40186&amp;l=&amp;ad=&amp;ap=</a>
22	Depreciation Schedule	Depreciation is an accounting method of spreading the cost of a tangible asset over its useful life. Businesses depreciate long-term assets for both tax and accounting purposes. For tax purposes, businesses can deduct the cost of the tangible assets they purchase as business expenses; however, businesses must depreciate these assets in accordance with tax rules about how and when the deduction may be taken.	Each capital item will have an individual depreciation schedule based on the useful life. The residual value is the value of the capital item after full depreciation.	<a href="http://www.investopedia.com/terms/d/depreciation.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186">http://www.investopedia.com/terms/d/depreciation.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186</a>
23	Commodity Prices	The forecasted price of Nickel, Copper, Cobalt and Manganese per metric tonne for the next 30 years. Moving averages may be one approach for modeling.	Commodity Prices may vary depending on business model assumptions. Manganese is complex due to the variety forms in which it is sold: Electrolytic Manganese Metal (EMM), FeMn, SiMn.	London Metal Exchange Metals Bulletin, Infomine
24	Inflation	Inflation is defined as a sustained increase in the general level of prices for goods and services. It is measured as an annual percentage increase. As inflation rises, money you own buys a smaller percentage of a good or service.	The time value of money. Used in mining companies to escalate costs and revenue over time versus keeping them constant. Some economic models will have no inflation, which will keep revenue and expenses in constant year dollars.	<a href="http://www.investopedia.com/terms/i/inflation.asp">http://www.investopedia.com/terms/i/inflation.asp</a>
25	Operational Cash Flows	Operating cash flow is a measure of the amount of cash generated by a company's normal business operations. Operating cash flow	The collection of Polymetallic Nodules will require significant up front investments (negative cash flow) by the contractors who	<a href="http://www.investopedia.com/terms/o/operatingcashflow.a">http://www.investopedia.com/terms/o/operatingcashflow.a</a>

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		indicates whether a company is able to generate sufficient positive cash flow to maintain and grow its operations, or it may require external financing for capital expansion.	will model positive cash flows based on revenue generation through distribution to the various metal commodity markets.	<a href="http://www.investopedia.com/sp?ad=dirN&amp;qo=serpSearchTo&amp;pBox&amp;qsrc=1&amp;o=40186">sp?ad=dirN&amp;qo=serpSearchTo&amp;pBox&amp;qsrc=1&amp;o=40186</a>
26	Internal Rate of Return	The internal rate of return (IRR) is frequently used by corporations to compare and decide between capital projects, The IRR is the interest rate (also known as the discount rate) that will bring a series of cash flows (positive and negative) to a net present value (NPV) of zero (or to the current value of cash invested).	Defined as a percentage return based on a series of negative and positive cash flows. Typically the IRR is compared to company "Hurdle Rates", representing the minimum return a project should obtain. Exceed and the project may proceed. If the IRR equals the WACC, the NPV is zero.	<a href="http://www.investopedia.com/articles/07/internal_rate_return.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186">http://www.investopedia.com/articles/07/internal_rate_return.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186</a>
27	Net Present Value	The net present value approach is the most intuitive and accurate valuation approach to capital budgeting problems. Discounting the after-tax cash flows by the weighted average cost of capital allows managers to determine whether a project will be profitable or not. And unlike the IRR method, NPVs reveal exactly how profitable a project will be in comparison to alternatives. The NPV rule states that all projects which have a positive net present value could be accepted while those that are negative should be rejected.	The present value of project cash flows until end of project life. If \$0, then the NPV generated is equal to the WACC. Companies will review each projects IRR and NPV and will only invest in those that provide the highest return.	<a href="http://www.investopedia.com/walkthrough/corporate-finance/4/npv-irr/net-present-value.aspx?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186">http://www.investopedia.com/walkthrough/corporate-finance/4/npv-irr/net-present-value.aspx?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186</a>
28	Hurdle Rate	The IRR percentage required for an entity to invest in the opportunity. An IRR that is greater than the Hurdle Rate, will be an investment opportunity that will be assessed by a corporation. A Hurdle Rate is normally greater than the Weighted Average Cost of Capital (WACC).	A hurdle rate is the minimum rate of return on a project or investment required by a manager or investor. The hurdle rate denotes appropriate compensation for the level of risk present; riskier projects generally have higher hurdle rates than those that are deemed to be less risky.	<a href="http://www.investopedia.com/terms/h/hurdlerate.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186">http://www.investopedia.com/terms/h/hurdlerate.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186</a>

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<b>Regulatory Costs</b>				
29	Exploitation License Application Fee	A fee payable to the ISA in accordance with the Exploitation Regulations for the processing of a Plan of Work for Exploitation	The application fee for an exploitation contract will be higher than an exploration application given the ISA significant workload prior to granting the license. The value of \$1M was discussed at the previous workshop in London.	<a href="https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf">https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf</a>
30	Exploitation Annual Fees	An Annual contract administration fee as prescribed by ISA Regulations.	Methodology of calculation and amount of fee(s) under discussion, but \$100K was discussed at the previous workshop in London.	Working draft exploitation regulations, reg. 21 & 22 <a href="https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf">https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf</a>
31	Ad - Valorem Royalty Light vs Full	A royalty payable as compensation for extraction of the mineral resources, which possibly could have a lower percentage collected during the early phase of the project.	Continued discussion item from the prior workshops.	<a href="https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf">https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf</a>
32	Environmental Bond	A potential financial guarantee or security to secure compliance with environmental obligations.	Under discussion / consideration	<a href="https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf">https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf</a> Article 127
33	Environmental Liability Trust Fund	A potential general environmental liability fund to cover any liability gap for environmental damage.	Under discussion / consideration.	<a href="https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf">https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf</a> Article 127
34	Seabed Sustainability Fund	A potential fund to promote and develop Marine Scientific Research (MSR) in the Area together with capacity building / technical assistance.	Under discussion / consideration	<a href="https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf">https://www.isa.org.jm/files/documents/EN/Pubs/2016/DS-M-ConfRep.pdf</a> Article 127



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35	Sponsoring State Fiscal Regime	The sponsoring State's responsibility is to ensure the contractor's compliance with the ISA Mining Code, by means of adopting laws and administrative measures for enforcement, which have to be "no less effective" in the case of environmental protection	The fiscal aspects of sponsoring state for exploitation is not developed, but laws and administrative measures may result in monitoring tax or others.	LOSC, Part VII, Article 209
36	Corporate Tax Rate of the sponsoring State	A corporate tax is a levy placed on the profit of a firm to raise taxes. After operating earnings is calculated by deducting expenses including the cost of goods sold (COGS) and depreciation from revenues, enacted tax rates are applied to generate a legal obligation the business owes the government. Rules surrounding corporate taxation vary greatly around the world and must be voted upon and approved by the government to be enacted.	The national tax rate applied to individual contractor's profits-dependent on sponsoring State and is part of the sponsoring State's fiscal regime.	<a href="http://www.investopedia.com/terms/c/corporatetax.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186">http://www.investopedia.com/terms/c/corporatetax.asp?ad=dirN&amp;qo=investopediaSiteSearch&amp;qsrc=0&amp;o=40186</a>