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The Engineer with a Missing Finger: Risk and Value in Mining

Investment Analysis of Graphite One

Investment Analysis Background

Fundamental Research Corporation® (FRC) published an April 2014 update on Graphite One Resources, a mid-tier, junior mining firm that is in stage development hoping to reach eventual mining operations. Graphite One has completed the initial discovery and assessment stages, and is currently in assessment validation and development stages. Graphite One hopes to reach the mining operation stage and profitability not later than 2017 but perhaps earlier. Graphite One's find appears to be the largest, high-grade graphite deposit known in North America.

FRC is a leading investment research house in the Canadian mining sector, so its opinion matters greatly to resource investors and Graphite One. FRC outlined how Graphite One is fast tracking its development to operations, but it also outlined crucial risks for Graphite One and the graphite sub-sector itself. FRC assumed the mine could start with annual production 40,500 tonnes of graphite for 25 years. The cost to reach the operating stage would be \$130 million. That is a big sum for a junior mining firm. For the fiscal year ended September 30, 2012, Graphite One had \$767,511 in cash, \$672,984 in working capital and a net loss of \$6.78 million, or \$0.09 a share.

In February 2013, Graphite One raised C\$600,000 through a non-brokered private placement by issuing 4.29 million shares at a price of \$0.14 per share. Each share consisted of one common share and one share purchase warrant at an exercise price of \$0.20 per share for the first two years, and \$0.30 per share for the next three years. To keep on its fast track to production, Graphite One's capital expenditure budget for the next 12 months is \$10 million. This includes \$6 million for exploration to upgrade its graphite resource estimate from Inferred to the more detailed Measured and Indicated (M&I) category. The remaining \$4 million is for engineering studies, baseline environmental and permitting.

The initial maiden Inferred Resource Report (IRR) indicates that Graphite One has most likely the largest flake graphite deposit in the world at its Graphite Creek property. Over the next 12 months, after Graphite One advances its exploration and improved M&I resource estimate, it will file a Preliminary Economic Assessment (PEA). PEA (s) are the key document utilized by investors and government entities to assess the economic viability and enterprise value of a mine. PEA (s) require significant evaluation and verification. Canadian Securities Administrators regulate PEA (s) by the National Instrument 43-101 Standards of Disclosure for Mineral Projects ("NI 43-101") as well as IRR (s) and more detailed Feasibility Studies (FS (s)). The U. S. Federal Government (USG) has similar

requirements, but Graphite One is under Canadian sovereignty. Regardless, a successful PEA, would greatly diminish risk concerns for Graphite One investors.

FRC Base Research

A small but growing number of investment houses are tracking Graphite One's progress due to the sheer magnitude of its find. Additionally, there is potential linkage talked about in the general press that Graphite One could better supply Tesla, Ford or GM with superior high grade graphite. This graphite contains a higher percentage of large flake graphite which is needed in Li-Ion batteries and fuel cells. The richest deposits are near-surface and sourced from the U.S. itself making it cheaper than alternatives and providing lower supply chain risk. In their April 2014 assessment, FRC specifically published a solid Buy Signal and re-asserted their earlier share valuation of \$0.50 per share. FRC's assessment was positive, as Graphite One shares were selling for \$0.15. The table below compares all Canadian mid-tier junior mining firms that are in mine development in preparation for full-scale operation stage development. This comparative market data¹ allows investors to understand Graphite One's true base value and its relative market position.

Company	Location	Stage	Enterprise Value (\$,mm)	In-Situ Graphite		Grade	% Large Flake (+80 mesh)
				M&I (Mt)	Inferred (Mt)		
Zenyatta Ventures	Ontario	Resource	\$100	0.98	0.44	3.40%	59% - 94%
Focus Graphite	Quebec	PEA	\$52	1.41	0.41	14.60%	34%
Mason Graphite	Quebec	PEA	\$51	7.80	2.03	15.90%	29%
Energizer Resources	Madagascar	PEA	\$33	5.30	2.50	6.30%	48%
Northern Graphite	Ontario	FS	\$30	1.21	0.40	1.70%	77%
Graphite One	Alaska	Resource	\$22		10.35	5.50%	59% - 94%
Flinders Resources	Sweden	PEA	\$11	0.30		10.70%	40%
Average							
* Resource = 100% of M&I + 50% of Inferred							

Stage: Resource means PEA is not complete, PEA and FS described above, FS has most detail

Enterprise Value: mm means in millions

In-Situ: Mt means in millions of metric tonnes (1000 kg)

Grade: This is the percentage of graphite found in the assessed ore, either Inferred or M&I

Large Flake: This is the percentage of the graphite itself that is large flake

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Regardless of the generally positive report, Graphite One felt strongly that they were undervalued and needed a path forward to address investor concerns highlighted in the FRC report. Most troubling but unavoidable, was that FRC rated Graphite One's Share Risk at 5 (Highly Speculative) which directly impacts investor confidence. FRC's proprietary Share Risk Scale is shown below:

¹ Rajeev, Siddharth (2014). Graphite One Resources – Reports Strong Resource Growth. Fundamental Research Corporation, Full article available at: www.researchfrc.com

Fundamental Research Corp. Risk Rating Scale:

1 (Low Risk) - The company operates in an industry where it has a strong position (monopoly, high market share) or operates in a regulated industry. The future outlook is stable or positive for the industry. The company generates positive free cash flow and has a history of profitability. The capital structure is conservative with little or no debt.

2 (Below Average Risk) - The company operates in an industry where the fundamentals and outlook are positive. The industry and company are relatively less sensitive to systematic risk than companies with a Risk Rating of 3. The company has a history of profitability and has demonstrated its ability to generate positive free cash flows (though current free cash flow may be negative due to capital investment). The company's capital structure is conservative with little to modest use of debt.

3 (Average Risk) - The company operates in an industry, possibly cyclical with ave. sensitivity to systematic risk. Profits and cash flow are sensitive to economic factors although the company has demonstrated ability to generate positive earnings and cash flow. Debt use is in line with industry averages with sufficient coverage ratios.

4 (Speculative) - The company has little or no history of generating earnings or cash flow. Debt use is higher. These companies may be in start-up mode or in a turnaround situation. These companies should be considered speculative.

5 (Highly Speculative) - The company has no history of generating earnings or cash flow possibly operating in a new industry with new, unproven products. Products may be at the development stage, testing, or seeking regulatory approval. These companies may run into liquidity issues, and may rely on external funding. These stocks are considered highly speculative.

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Both of the key Graphite One Principals: Anthony Huston, the President/CEO and Dean Besserer, the VP of Exploration agreed that FRC was strictly accurate as to their rating scale in evaluating Graphite One. However, they were both extremely confident of their process and activities to move forward and felt the FRC scale did not reflect potential investor risk that could be mitigated. They pondered how to showcase their proactive plan to investors. Anthony Huston specifically thought, "How do I get rock solid analysis to answer investors that we have a workable risk strategy in place and that their investments are in good hands?" Dean Besserer who was focusing on continuing validation and valuation of the ore had a laser focus to push on the Preliminary Economic Assessment, which is the next key milestone. He was thinking, "How do I properly showcase our real value versus the risk realities moving on to operations?"

While this was going on, an investor who is a Risk Manager, Stan Rappaport was reviewing the FRC report to determine if he wanted to deepen his own Graphite One stock commitment. Stan also had some investor friends that were counting on his analysis for expanding their own portfolios. Stan had some ideas on how to build a fuller picture of Graphite One's position while providing a more flexible plan. He knew he could create factual investor analysis that would go beyond where investment houses typically stop. Stan thought, "I need to know more and I need to get to know Anthony and Dean"

Graphite One Resources – The Background and Story²

Gold in Alaska? How about Graphite?

² Data in this section is sourced from interviews and unpublished notes from the Executive Team at Graphite One Resources® May 2014. Contact information at: www.graphiteoneresources.com

Graphite One, originally known as Cedar Creek Gold, was focused on gold. Specifically, they were hoping to find their own “Klondike gold strike” in Alaska’s Seward Peninsula back in 2006. Alaska is beyond vast in both resources and size. To say that it has a stark grandeur and a haunting romantic beauty is a stupendous understatement. Its sheer size, coupled with its amazing vistas, remoteness and harshness, demands flexibility from those that want to extract its bountiful, but hidden resources. But for the patient, Alaska surprises and rewards in unexpected and interesting ways. In 2011, Graphite One was investigating a gold property, but became aware of something much more promising than gold -- graphite.

Graphite prices were starting to catch fire after being in the doldrums since the 1990’s. While Anthony and Dean were searching for gold they met a local geologist, Jim Schmidt. Jim mentioned a forgotten vast deposit of flake graphite, also on the Seward Peninsula of Alaska where they were. Jim had studied numerous Alaskan properties while he was surface mapping and sampling for the US Geological Survey from the 1970’s to 1990’s. When Anthony and Dean asked if he knew of anything special, Jim immediately talked about Graphite Creek and its potential. Jim believed it was world class and ripe for investment.

During World War One, graphite was mined from the Graphite Creek property to fill critical military needs. At the time, graphite was found to be a superior lubricant for all industrial applications. The mine was worked hard and fast to support the war to end all wars. After the war ended in 1917, demand for graphite and its prices fell markedly so the property was largely ignored. Besides the Chinese heavily moved into graphite mining, so it seemed there was no reason to remember Graphite Creek. What keyed Jim’s memory of the graphite lode was that he met an older, affable engineer who knew the property well. The engineer was a great storyteller and had quite the story of losing a finger in the mine during the war years. That story really stuck in Jim’s mind, so he was able to recall it and the mine’s value to relate to the team when he met them. Additionally, Jim also knew the Tweet family who owned the Graphite Creek property and held the mining rights. Later, Jim was able to introduce Anthony and Dean to the amazing Tweet clan.

In 1899, then 23-year-old Nicholas Tweet set out from Minnesota to Nome, Alaska when that gold-rush settlement consisted only of tents, a saloon built of driftwood and a lone log cabin. Tweet prospered by exploiting the rich deposits of gold that were then strewn along the beaches of Cape Nome. He created the family firm N.B. Tweet and Sons, which has operated placer gold mines on the Seward Peninsula for over 110 years. The Tweet family search for gold also turned up property with indications of lots of graphite and claims were filed for Graphite Creek.

The Tweet family is all-American and proudly Alaskan, with significant extended family relations. After Jim’s introduction to the Tweet family, Anthony successfully led a very careful effort to work with all the Tweet clan cousins and to ensure that Graphite One’s plans meshed well and respected the Tweet’s American values and their Alaskan heritage. After finalizing the deal with the Tweet family, Anthony and Dean were able to expand the potential graphite deposits by partnering with entrepreneurs who owned claims adjacent to Graphite Creek. This effectively doubled the expected graphite ore reserves. Anthony remarked: “before we purchased this property, we took a year of due diligence to understand the graphite market, not only with what’s going on today, but also with what’s going to happen over the next five to ten years.”

Graphite – Better Than Gold

Finally, after extensive due diligence completed in March 2012, Graphite One changed its focus from a slower, more deliberate approach to a fast track development of Graphite Creek. This would start mine operations two years earlier than originally planned. Anthony, Dean and their fellow board members recognized that they could become a better supplier to green conscious, U.S. based manufacturer's that were worried about shifting and lessening supplies from China.

Graphite One started exploration on the property in spring 2012, with an airborne time-domain magnetic and electromagnetic geophysical survey. This was followed by surface sampling totaling 591 rock grab samples and 32 channel samples and an 18-hole diamond drill program. Dean used the data to produce a maiden resource estimate. The potential enormous size of the resource sent a shock wave through much of the graphite industry. After all, current annual production is only about 1.1 million tonnes of graphite and small changes in supply or demand can trigger volatile price reactions. "Being involved in a project like ours that has the high ability to be scalable means that we can start off a little smaller," said Anthony. "Our capital expenditures won't be as large, and we'll be able to grow with the market. The ore is close to the surface and partially exposed; it is also rich ore containing 13.5% flake graphite. This rich inferred graphite resource exceeds one million tonnes. This could become the starting place for an open pit mine which would be extremely profitable. Afterwards, production could go faster or slower depending on existing market conditions."

The total Graphite Creek acquisition has provided Graphite One a 100% controlling interest in the Graphite Creek property which currently consists of 129 claims covering 6,799 hectares. Graphite One originally committed to paying the Tweet family trust \$4.25 million by March 2014 and that payment which is now complete. The agreement also allows the 5% production royalty to be reduced to 3% on payment of \$2 million for each 1% cut. Graphite One also agreed to spend \$1.5 million on exploration over a three-year period. That was no problem and to date, the company has spent more than \$4.5 million. This was partly to fund an aerial survey in which a helicopter picked up electromagnetic evidence strongly suggesting that the strike length extends for 18 km. Besides size, the data on quality is also good news. Mineralization at the Graphite Creek Property is characterized by premium, large-flake graphite (greater than 80 mesh) within the graphite-bearing schist deposits. Large flake graphite is the most desirable for green technologies and absolutely required for lithium ion batteries or hydrogen fuel cells. The high grade graphite on the surface should mean lower initial open pit mining costs.

Over the last few years, the price of high quality flake graphite fluctuated between US \$1,500 and US \$3,000 per tonne depending on flake size and grade. Because of the global slowdown in steel and automobiles, prices have fallen by a third, but production would still be quite profitable with projected costs of around \$800 per tonne.

Graphite One - Going Forward

Acquiring Investor Support in 2014 and 2015

So how will Graphite One raise the funds necessary to advance this project and open a mine?

British Geological Survey				
Risk list 2012 — Current supply risk index for chemical elements or element groups which are of economic value				
Element or element group	Symbol	Relative supply risk index	Leading producer	Top reserve holder
rare earth elements	REE	9.5	China	China
tungsten	W	9.5	China	China
antimony	Sb	9.0	China	China
bismuth	Bi	9.0	China	China
molybdenum	Mo	8.6	China	China
strontium	Sr	8.6	China	China
mercury	Hg	8.6	China	Mexico
barium	Ba	8.1	China	China
carbon (graphite)	C	8.1	China	China
beryllium	Be	8.1	USA	Unknown

Starting from the human equation, Graphite One’s executive team is extraordinary. Among themselves, over the past 10 years, they have raised \$250 million for various projects and Graphite Creek is a very exciting property. Anthony explained, “We don’t need \$130 million in cash to move forward. You roughly need 15% to 20% (\$19.5 to \$26 million) and the rest could be financed by institutions or other sources.” A stronger stock position in the market based on risk mitigation means that 1) Graphite One can raise more funds with fewer shares and 2) bank and institutional loans become easier to get along with lower interest. Interestingly, the Alaska State government has helped other mid-market juniors in the mining and energy industries. Alaska just recently funded Ucore Rare Metals with \$145M from a bond issue. A strengthened position would make it easier to access a similar large and reasonable loan from the state.

Short-term requirements are less. To get to pre-feasibility study with the goal of releasing it in the first quarter of 2014 is roughly \$10 million. Roughly another \$3 million is needed to complete pre-production. Once there, Graphite should have increased credibility to raise an additional \$15 to \$20 million venture capital so it could then finance the rest of the \$130 million from financial institutions. Anthony verified this and continued, “We are open to exploring many financing alternatives. We have not gone down this road but there could be assistance from the U.S. or Alaska’s state government. President Obama is trying to create more green energy manufacturing jobs at home and the U.S. has deemed graphite as ‘a supply critical mineral’.” This is a consistent view across all borders. Graphite shortages will impact all markets. Graphite has a long history of general usage due to its lubrication versatility and ability to resist extreme temperatures. New usage of graphite in electronics, battery technologies and a host of other high-tech electrical applications are fueling a surge in demand. See Appendix A for a complete graphite and graphene uses.

The British Geological Survey conducts an annual supply risk survey.³ Graphite was not on the list at all in 2011, but has vaulted into the Top 10, currently at number 9 in the latest released list from 2012. See the table to the right. Note: Low Risk = 1 and Very High Risk = 10 relative to a stable supply. The impending supply shortage is partially a result of the above mentioned new applications for graphite. The remainder is due to China’s growth for internal graphite consumption and government consolidation of

³ The 2012 British Geographical Survey, NERC© 2012. Source: www.bgs.ac.uk/mineralsuk/statistics/riskList.html

the mines. Anthony continued discussing financing and the impending supply volatility, “Financing could come from institutions or the end users themselves. Obtaining a certain guaranteed amount every year of a strategic mineral in short supply should appeal to companies whose growth and product quality is dependent on graphite. Green technology companies need a stable quality flake graphite supply in what can be a chaotic market. At this stage anything can happen. We believe that in a time of impending scarcity a credible mining explorer claiming to have what may be the world’s largest flake graphite deposit with a sizable amount of it exposed at a surface will not remain lonely.” Stan also discovered that a more basic driver might impact expanded graphite usage. Ford recently introduced new battery technology to trim weight and improve automotive efficiency. The two Ford and Panasonic companies showed off a new dual-battery system that combines lithium-ion with lead-acid batteries to extend the life of lead-acid batteries in cars with start-stop engines. Ford currently incorporates the start-stop engines in 70% of its cars. Other auto manufacturers are also considering. Even if only a small amount of graphite per dual-battery is required, the total graphite demand increase is meaningful.⁴ However, this still left Stan wondering when exactly when this would push graphite demand even higher. Could it be as soon as 2015 or as late as 2018?

The Injection of Business Risk Analytics to Up the Game

Graphite One’s Executive Team doesn’t want to miss the chance to properly showcase their opportunity and reduce investor risk. Investors are by nature an aggressive, show me my return now, lot of people. Additionally, they want to understand what exactly their investment or share risk specifically is! How understandable that risk is, or perhaps more importantly, how the company is addressing its risks, determines both how much and how generous the resulting investment and its terms become.

Enter Stage Right ... Business Analytics and Risk Management

In April 2014, Graphite One teamed with Decision Optimal LLP® (DO), a Michigan-based Industrial and Systems Engineering partnership that specializes in decision and risk analysis. Anthony Huston wanted to better understand their relative market placement and what they could do to not only improve that position, but to also better answer investor risk questions. Stan Rappaport, a senior partner at DO was able to talk to Anthony and Dean about the need for analytical decision analysis and risk management with mitigation. This discussion and planning is on-going and will continue through 2015. Anthony and Dean both related that although they could generally answer questions to investors on their planning, they didn’t have all of the analytics to support their decisions nor a resource to send investors that had specific risk concerns. Stan and his partners created a business flyer that is currently being handed out to investors wanting to better understand Graphite One’s industry position and its risk profile.

Mid-market junior mining firms, who are fundamentally start-up firms, do not have large investment firms to help create a true floor stock price with support. Generally, their stock is penny stock sold “over-the-counter” and is subject to even more fickle investor whims. The net result is that all start-up companies have a huge uphill climb to raise capital. Regardless of their upside potential, their stock is naturally viewed as high risk.

⁴ Epstein, Peter (2014). All Signs Point to a Strong Graphite Market. InvestorINTEL, June 25, 2014 posting. Full article available at: <http://investorintel.com/graphite-graphene-intel/signs-pointing-strong-graphite-market/>

Exacerbating this, is the simple fact that very few investment houses offer professional positions on emerging companies until revenue and stability are proven. Until multiple large investment houses follow a stock, it is very difficult to create a floor value which could be used for investor stock evaluation. Wild rumors can and do cause their stock prices to wildly fluctuate. Graphite One has taken the necessary steps to navigate this initial volatile phase. They are successfully communicating to the market a clear plan that is reported upon regularly. Better business analytics with risk management and risk mitigation planning can provide earlier investor confidence, i.e. a stock price floor, by answering the investor questions analytically and thoroughly.

Base Graphite One Evaluation

Stan's approach utilized FRC's core data while adding some data to conduct two Multi-Attribute Value Assessments of the Canadian graphite mid-market. The first was for the beginning of 2014 (Pre-Risk Mitigation) and the second was a prognostication forward to 2015 (Post-Risk Mitigation). Stan added a more sophisticated variance structure to compare Inferred vs. M&I ore values and added two additional metrics: Regulatory Ease for Supply and Location – Distance to Market which are important since Graphite One will be a U.S. based supplier and have some natural advantages not considered in FRC's analysis. Most importantly, DO assessed and then conducted a basic risk mitigation plan for each identified FRC individual risk. DO considered not just the cost dimension, but also the schedule and technical dimensions to better define Graphite One's share value pre and post 2014 mitigation activities. Simplistic Enterprise Share Risk scores such as that used by FRC, are bad for two reasons: 1) they mask the individual risks themselves and 2) they give no understanding as to what the enterprise is doing to address the actual risks. This process of identifying risks, categorizing them to technical, cost and schedule dimensions and then doing mitigation planning and mitigation execution is very smart, productive business.

Risk Analysis

Dean and Stan jointly reviewed the individual risks identified by FRC and are developing strategies to mitigate those risks. The risk management plan covering all of these risks and any modifications will be released later in 2014.

The following is the Risk List that Stan reviewed with Sid Rajeev, FRC's analyst to help prioritize the risks from an investor's POV and worked with Dean to create an initial mitigation plan and estimation Graphite One's true current and future relative value graphite mid-market junior mining enterprises. The high level risk identification, impact and mitigation planning is shown below:

1. **Risk:** Location Decision for Alaska's new Deep Water Port

Impact: The physical location of the port itself has dramatic impact on cost and schedule. Movement of ore by sea is a Rough Order of Magnitude (ROM) easier and cheaper than rail which is a ROM easier and cheaper than truck. Each location considered in the U.S. Coast Guard study had different cost, schedule and technical feasibility profiles for Graphite One.

Mitigation: The United States Government Study recently approved the optimal location for Graphite One. Ore can be sealifted at the mine location itself.

Residual Risk: If the port development is delayed, Graphite One will have to initially move graphite ore via truck to other medium lift seaports in the region. The leading mitigation idea is to use ice roads during the winter to the seaports and wait for the spring ice breakup. A backup plan is being developed.

2. **Risk:** Ore In-situ Verification

Impact: Ore in-situ verification is the foundation to verify enterprise book value which is also a leading investor metric. Total ore quantity discovered in the in-situ analysis may fluctuate significantly going from Inferred to M&I. Physical positioning and quantity of the ore itself with the actual ore richness percentage directly impact extraction cost. The technical requirements to extract the ore and dispose of the leavings derived from the in-situ analysis governs the immediate and long term schedules for all ore extraction.

Mitigation (1): Additional drill testing has been planned. This will move ore valuation from Inferred to the more thorough M&I valuation category in Q3 2014 and will verify or modify current operational planning.

Mitigation (2): Completion of the PEA follows drill testing and provides the actual economic assessment that the investors are demanding. This is due for completion in Q1 2015.

3. **Risk:** Large Flake and Grade Percentage Analysis

Impact: Large Flake graphite is required for battery and fuel cell applications and command a premium price. Similarly, higher grade percentage of graphite in the ore itself dramatically reduces cost. Fluctuations up and down on graphite grade percentage in the ore and large flake content percentage of graphite itself directly impacts Graphite One's enterprise value and its operational breakeven point.

Mitigation: Identical risk mitigation as Risk #2. The grade and large flake percentage estimation analysis will be done concurrently with the in-situ drilling tests and analysis.

4. **Risk:** Completion of Governmental Documentation

Impact: The Preliminary Economic Assessment (PEA) is required by Canadian regulation and there are similar U.S. concurrent analyses. Although the ore valuations are currently on time, any delay in their completion will directly impact the PEA completion schedule in Q1 2015 and any other Canadian or U.S. regulatory paperwork requirements. Furthermore, any delay would directly impact investor funding and enterprise valuation.

Mitigation: Conduct project planning and management to keep the PEA on track. If necessary, conduct contingency planning while executing the PEA plan itself. Proactive steps are being made to keep investors, government agencies and contractors apprised as to where Graphite One is on a weekly basis.

All of these risk mitigation elements directly address the current investor base concerns of the enterprise's detailed risks itself, and not the macro abstract share risk identified by FRC. It is accepted that with completion of these mitigation activities, Graphite One will be in an improved position. These activities

are a requirement for every mid-market junior mining firm to complete its stage development to successful mining operations. Each mine of course, has its unique characteristics, but the overall process is generally well understood.

By evaluating each risk individually, Stan was able to support Dean and Anthony to create a visually clear and more analytical evaluation of Graphite One's relative value in the field of graphite mid-market opportunities and to also show a quantifiable path forward that is understandable to sophisticated investors. Furthermore, by correctly showing risk probabilistically in the value analysis, Stan was able to properly show the real value of the current Inferred ore in-situ quantities, ore grade percentage and large flake percentage. The mitigation activities are themselves now mapped directly to improving Graphite One's enterprise valuation.

Graphite One Valuation

Metric Descriptions

The following is a list of the metrics used to analyze the true value of Graphite One before and after it conducts its enterprise maturation efforts during 2014 – 2015 and its risk mitigation strategy.

1. Location – Distance to Market. This is an added metric to represent transportation costs associated with moving the ore itself.
2. Regulatory Ease for Supply. This is an added metric that represents the progress that each mining enterprise must do to pass U.S. regulations. This is particularly important with the EPA and U.S. corporations, given the current need for companies to move to a greener, sustainable supply chain.
3. Enterprise Value (in \$M USD). This metric was transferred directly from the FRC analysis. The enterprise value is based on current value of the company and profit/costs associated with extraction of proven/M&I ore.
4. Stage Maturity. This metric was transferred directly from the FRC analysis. Stage Maturity generally represents how mature the mining opportunity is relative to potential commencement of mining operations.
5. Grade. This metric was transferred directly from the FRC analysis. This is the percentage of graphite found in the assessed ore, either Inferred or M&I. Since the average grade is less variable, Stan chose to keep this metric discrete.
6. Large Flake %. This is the percentage of the graphite itself that is large flake and is a modified metric. Stan chose to only apply variance to the enterprises that were not Stage Mature to the PEA level.
7. Share Risk. This metric was transferred directly from the FRC analysis.
8. In-Situ Levels: in millions of metric tonnes (1000 kg). Stan modified this metric by adding variability (uncertainty) to the Inferred values but did not decrease the mean values of the Inferred as FRC chose to do.

Graphite One Valuation (April 2014 – Before Risk Reduction)

This data synopsis table⁵ below shows the initial valuation of Graphite One utilizing the quantified data sourced from the FRC analysis. The data was modified with two additional metrics important to U.S. investors not considered by FRC: Location – Distance to Market and Regulatory Ease for Supply. Stan believed that these two metrics could have significant impact to supply chain decision makers at say a GM or a Tesla/Solar City. See the metric descriptions in the next paragraph.

Also, Stan replaced the individual in-situ and large flake discrete datum with probability distributions to represent the risk uncertainties. Stan had his doubts and was concerned that the real weighting may be different. Sensitivity analysis of the results will be important to consider.

The mean of the distributions are equal to each replaced individual datum from the earlier FRC table. Probabilistic data is colored in yellow. All of this data is shown in detail in Appendix B. It includes the total data, the individual utility values for each datum, the probability distributions where needed and the weighting schema for each metric.

Metric Weights (%)	7.50%	22.50%	6.67%	13.33%	4.44%	11.11%	10.00%	24.45%
Measured Values	Location - Distance	Regulatory Ease For Supply	Enterprise Value	Stage Maturity	Grade	Large Flake %	Share Risk	In Situ Graphite
1 - Zenyatta Ventures	400	High Ease - NAFTA	100	Resource	3.4	76.8	5	1.4
2 - Focus Graphite	800	High Ease - NAFTA	52	PEA Complete	14.6	34.0	3	1.8
3 - Mason Graphite	800	High Ease - NAFTA	51	PEA Complete	15.9	29.0	3	9.8
4 - Energizer Resources	10000	Low Ease - Third World complications	33	PEA Complete	6.3	48.0	5	7.8
5 - Northern Graphite	400	High Ease - NAFTA	30	FS	1.7	77.0	2	1.6
6 - Graphite One	4000	High Ease - US based	22	Resource	5.5	76.8	5	10.4
7 - Flinders Resources	7000	Medium Ease - Known supply to	11	PEA Complete	10.7	40.0	4	0.3

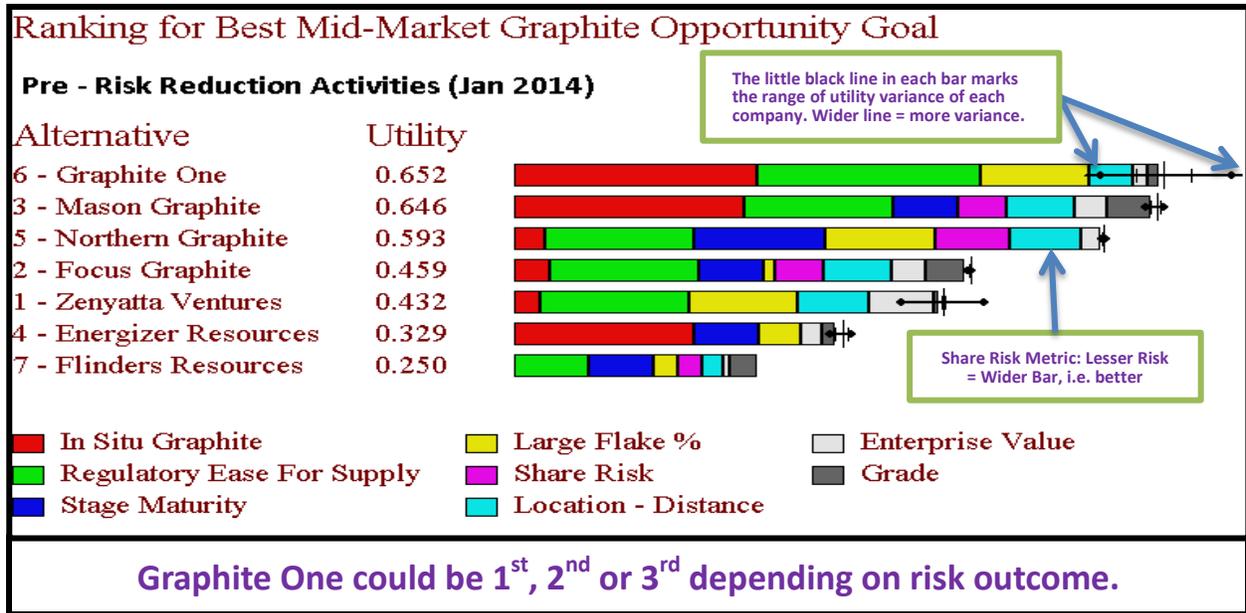
May 2014 *Decision Optimal LLP*

Stan believed that a U.S. investor's perspective will focus on how much graphite is there (In Situ value) and can the mine get approved (Regulatory Ease) as the top 2 metrics so his weighting scheme reflects that logic. Conceptually, the investor questions reflected in this schema is 1) How much do I have? 2) How attractive to (or easy to deal with) Tesla, GM or Ford (for example) are these mid-market junior mining firms? Graphite quality, market costs, value maturity and risks are clearly important but are secondary to the investor. Obviously, opinion differences on how to weight the metrics will change the results.

The chart below is the visual result from multi-attribute utility analysis of the data above. The key take away points are highlighted. Stan believed that the results correctly revealed two key facts. Graphite One which was not as mature as a number of the other mid-market enterprises scored less well in stage maturity, share risk and enterprise value. However, in regards to the actual real value of the potential

⁵ Both the core data and the Decision Optimal scoring data and analyses are open source and usable without need for approval. The weighting schema is also open source but the Decision Optimal process is proprietary. Contact Decision Optimal at info@decisionoptimal.com for specific information requests. The data in Appendix B is sufficient to conduct sensitivity analysis.

mine itself, Graphite One has a tremendous advantage over its competition. Stan believes that given proper attention to its risk picture and with an aggressive approach to completing the PEA itself, Graphite One has natural advantages that can't be taken away. Stan pondered and thought what would Graphite One's position be relative to its competition in 2015?



May 2014 *Decision Optimal LLP*

Graphite One Expected Future Valuation (April 2015 – After PEA Completion)

The following is the modified, post risk mitigation utility analysis that Stan created to model Graphite One's position if they fully execute their risk mitigation and most importantly the PEA itself.

Stan modeled the in-situ and large flake numbers as probabilistic instead of discrete numbers just as in the pre-risk reduction model above. The improved distributions shown in page 2 of Appendix B reflect the mitigation of Risks 2 and 3. Specifically, Stan assumes that as Graphite One completes its 2014 ore search its ore claims will become more proofed and by extension less risky. This is key for completion of the PEA. With the PEA complete, Stan hopes that this will improve the investor perception of the share risk itself. Risk 4 is addressed with a Stage Maturity datum improvement for Graphite One and Stan believes that Risk 4 is highly correlated with Risks 2 and 3. Thus, Stan modified the Share Risk assuming that the Share Risk value for Graphite One will significantly improve if the ore verification and PEA completion verifies Graphite One's current inferred ore valuation.

The entire team assumes that significant, solid investment will come from completing the risk mitigation process. Stan hopes that his forecast is close to what the 2015 reality will become. In particular, he's planning on conducting sensitivity analysis on both the pre and post models to see how robust his findings are. Stan kept the weighting schema remained the same for apples to apples comparison between the two models.

Metric Weights (%)	7.50%	22.50%	6.67%	13.33%	4.44%	11.11%	10.00%	24.45%
Measured Values	Location - Distance	Regulatory Ease For Supply	Enterprise Value	Stage Maturity	Grade	Large Flake %	Share Risk	In Situ Graphite
1 - Zenyatta Ventures	400	High Ease - NAFTA	100	Resource	3.4	76.8	5	1.4
2 - Focus Graphite	800	High Ease - NAFTA	52	PEA Complete	14.6	34.0	3	1.8
3 - Mason Graphite	800	High Ease - NAFTA	51	PEA Complete	15.9	29.0	3	9.8
4 - Energizer Resources	10000	Low Ease - Third World complications	33	PEA Complete	6.3	48.0	5	7.8
5 - Northern Graphite	400	High Ease - NAFTA	30	FS	1.7	77.0	2	1.6
6 - Graphite One	4000	High Ease - US based	22	PEA Complete	5.5	76.8	3	10.5
7 - Flinders Resources	7000	Medium Ease - Known supply to	11	PEA Complete	10.7	40.0	4	0.3

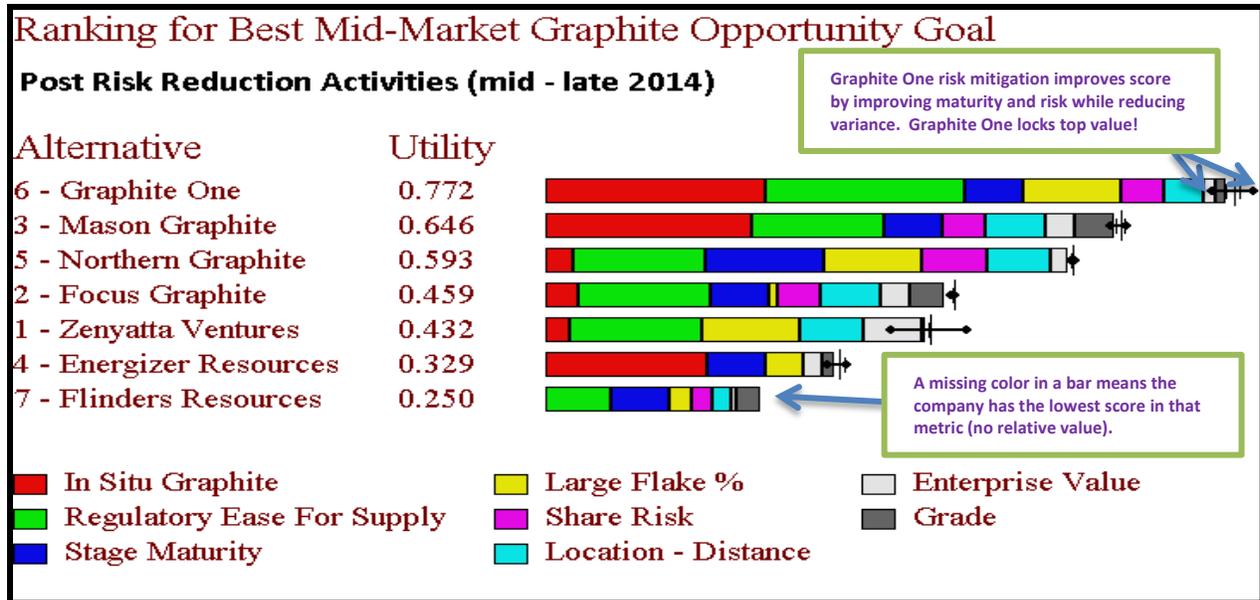
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Given that the team completes its mitigation activities, the following utility assessment of the graphite mid-market should apply. Caveat: each of the other mid-market players may of course be conducting their own improvements.

Key take aways from the analysis include that Graphite One's position improves not only in the reduction of uncertainty which is expected, but that its position relative to other enterprises improves. Normally risk reduction only takes away uncertainty. But for Stan it appeared that the risk reduction directly targets investor concerns. Stan suspects that the models metrics are highly correlated from ore validation to investor acceptance and belief that Graphite One is a great investment. This is the early investors hope for a Klondike and the willingness to lose a finger to get it. However only time will tell.

Stan's current bottom line assumptions are:

1. Graphite One already had a significantly larger ore base to start from and all it needs to conduct is process improvement and finish steps to prepare for mining production.
2. Graphite One's high grade ore placement, closer to the surface, gives it an insurmountable advantage compared to the competition.
3. Natural supporting market factors such as location, location, location and a friendly state government significantly enhances its leadership position.
4. The other firms have the same issues and have less graphite of generally poorer quality levels to overcome.
5. Graphite One's stock value is artificially suppressed. This will start to disappear as Graphite One completes its risk mitigation which will directly improve its investor perception.



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Teaching Case Study Questions

1. So how will Graphite One raise the funds necessary to advance this project and open a mine?
2. When should Graphite One plan on graphite demand pushing higher due to new battery demands?
Could it be as soon as 2015 or as late as 2018?
3. Is it fair to include the enterprise value metric or is there a better cost accounting metric available to use?
4. Is Stan correct in his assumption to keep the average grade metric discreet?
5. Is FRC's 50% discount approach to treating Inferred ore a better, more conservative metric than making it probabilistic?
6. Should Stage Mature mining enterprises have variance applied to their Large Flake % metric?
7. Given that sea, rail and truck costs are dramatically different, is the distance to market metric too simplistic?
8. What would be your case be to ignore the "Regulatory Ease for Supply" metric?
9. What are other weighting options besides Stan's first guess? How would you modify his weighting schema?
10. Are there any metrics missing that should be included? One of the concerns that Stan and his partners had was the simple fact that some of the risks were serial. Should a decision tree of the stages and their risks be created to estimate a better ROI?
11. Dean, Anthony and Stan decided to keep the Share Risk metric even though it does not represent the enterprise risks accurately. Would you get rid of it?
12. Stage Maturity: Resource means PEA is not complete, PEA and FS described above, FS has most detail. Although, this metric is somewhat qualitative, it accurately represents maturity. If you would replace it, what would you replace it with and why?
13. Why does Graphite One's absolute score increase if this is primarily a risk reduction effort? By definition a risk can be assumed without conducting mitigation. What if Graphite One wanted to save

the money associated with risk analysis, mitigation and management? What factors would preclude Graphite One from doing that?

Appendix A – Graphite 101⁶

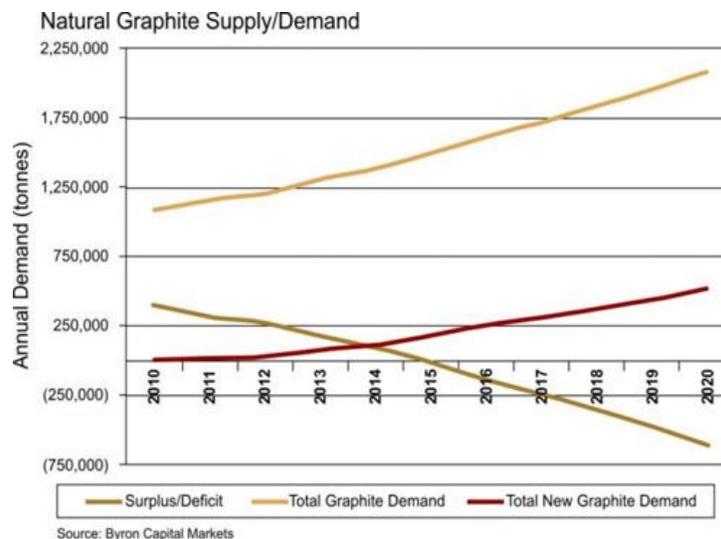
This appendix is added for familiarization to non-graphite specialists:

- Graphite business uses
- General financial and commodity statistics for graphite
- Major factors that are currently driving the graphite market.

The Wonder Mineral

Carbon (C) is the 6th most common universal element coming in three allotropes: diamonds, coal, and graphite. Graphite (Cg) is an excellent heat and electrical conductor and has the highest strength and stiffness of any natural material. It maintains these characteristics to temperatures beyond 3,600°. It is also extraordinarily light and is the best industrial natural lubricant.

There are three types of graphite found naturally: flake, lump, and amorphous. Flake graphite commands a premium due to its versatility and relative rareness: larger flake graphite costs more than smaller flake even when equal in purity.



Global Graphite Supply & Demand

- Annual demand is \$12 Billion (USD)
 - 40% of graphite supply is flake
 - 60% of graphite supply is amorphous
- Natural Graphite consumption has increased from 600 K tonnes in 2000 to 1.1 M tonnes in 2011
 - Global graphite reserves are around 71 M tonnes
 - Flake graphite production is approximately 400 K tonnes per year

⁶ All data in this section is open sourced from Wikipedia® 2014 and Byron Capital Markets® 2012. All graphs are sourced from Byron Capital Markets® 2012. More detail can be found at: www.graphiteoneresources.com

- BRIC (Brazil, Russia, India, China) and other emerging market demand has grown annually at 5% from 2000 to 2010 and contribute to the generally rising price of graphite today
- China produces over 70% of the world's graphite or about 800 K tonnes per year
 - Mainly low-carbon, low-value powder or small flake
 - Declining production/exports and increasing costs
 - Emphasis on value-added processing
 - Export taxes, VAT, and export licenses imposed

Graphite & Green Energy Technology

Pebble Bed Nuclear Reactor

- No meltdown by design
- Lower capital and operating costs
- More efficient with the use of heat and fuel
- A 1GW Reactor needs 3K tonnes of graphite for start-up and 1K tonnes annually

Lithium-Ion Batteries

- Smaller, lighter and more powerful than traditional batteries
- Li-Ion battery demand for graphite in the next 5 to 7 years will consume more graphite than is produced in total today
- Used in all types of electric vehicles with 10 - 20x more graphite than lithium used
- Only flake graphite is conducive to making Li-Ion batteries

Fuel Cells

- 80 kg of graphite is used in the average fuel cell vehicle
- Fortune 500 companies are targeting fuel cell markets for non-transportation uses

Graphite Prices

- Prices have almost tripled since 2005 due to:
 - Industrialization of BRIC (Brazil, Russia, India, China)
 - Strong demand from traditional steel and automotive markets
 - Increasing demand as China's production and exports decline
- Graphite price appreciation is largely a function of the commodity super cycle and the industrialization of emerging economies as new, high growth applications are beginning to have an impact on demand and consumption
- Graphite prices are also a function of flake size and purity with large flake (+80 mesh), 94% carbon varieties commanding premium pricing.
- US\$ per tonne (94 - 97% Carbon):
 - Large Flake - \$2,500 - 3,000 (+80 mesh)
 - Medium Flake - \$2,200 - 2,500 (+100-80 mesh)
 - Fine Flake - \$2,000 - 2,400 (-100 mesh)
- Graphite must still be considered an overlooked and undervalued commodity in the context of the current super cycle

Quotes

"Proton Exchange Membrane technology requires large amounts of graphite, and is the most likely technology to be developed for use in light vehicles, buildings, and smaller applications." - U.S. DOE

"Large-scale fuel-cell applications are being developed that could consume as much graphite as all other uses combined" - USGS, 2009

"As battery manufacturers grow with the burgeoning automotive lithium battery industry, these manufacturers will need a stable supply of raw materials. Increasingly, they are looking for graphite outside of China. Today, there is annual demand for roughly 1.1 million tonnes of natural graphite ... but 960,000 tonnes of that capacity comes from China. This leaves customers largely dependent on China as a source of supply." - Byron Capital Markets®, 2012

Appendix B – Data on risk management impact and weights

All Model Values – Pre Risk Reduction

Metric Weights (%)	7.50%	22.50%	6.67%	13.33%	4.44%	11.11%	10.00%	24.45%
Measured Values	Location - Distance	Regulatory Ease For Supply	Enterprise Value	Stage Maturity	Grade	Large Flake %	Share Risk	In Situ Graphite
1 - Zenyatta Ventures	400	High Ease - NAFTA	100	Resource	3.4	76.8	5	1.4
2 - Focus Graphite	800	High Ease - NAFTA	52	PEA Complete	14.6	34.0	3	1.8
3 - Mason Graphite	800	High Ease - NAFTA	51	PEA Complete	15.9	29.0	3	9.8
4 - Energizer Resources	10000	Low Ease - Third World complications	33	PEA Complete	6.3	48.0	5	7.8
5 - Northern Graphite	400	High Ease - NAFTA	30	FS	1.7	77.0	2	1.6
6 - Graphite One	4000	High Ease - US based	22	Resource	5.5	76.8	5	10.4
7 - Flinders Resources	7000	Medium Ease - Known supply to	11	PEA Complete	10.7	40.0	4	0.3

SUF Values	Location - Distance	Regulatory Ease For Supply	Enterprise Value	Stage Maturity	Grade	Large Flake %	Share Risk	In Situ Graphite
1 - Zenyatta Ventures	1.00	0.67	1.00	0.00	0.12	0.74	0.00	0.09
2 - Focus Graphite	0.96	0.67	0.46	0.50	0.91	0.08	0.50	0.13
3 - Mason Graphite	0.96	0.67	0.45	0.50	1.00	0.00	0.50	0.79
4 - Energizer Resources	0.00	0.00	0.25	0.50	0.32	0.29	0.00	0.62
5 - Northern Graphite	1.00	0.67	0.21	1.00	0.00	0.74	0.75	0.11
6 - Graphite One	0.63	1.00	0.12	0.00	0.27	0.74	0.00	0.83
7 - Flinders Resources	0.31	0.33	0.00	0.50	0.63	0.17	0.25	0.00

Probabalistic Numbers	Measure	Distribution Type	Values			Legend - Name, Measure, Range		
1 - Zenyatta Ventures	Large Flake %	3 Point	59.0	77.0	94.0	Loc. - Dis. (to market)	Miles	0 to 10000
1 - Zenyatta Ventures	In Situ Graphite	Uniform	1.3		1.5	Reg Ease for Supply	Qualitative	Low to High
2 - Focus Graphite	In Situ Graphite	Uniform	1.7		1.9	Enterprise Value	\$M (USD)	0 to 100
3 - Mason Graphite	In Situ Graphite	Uniform	9.4		10.2	Stage Maturity	Qualitative	Res, PEA, FS
4 - Energizer Resources	In Situ Graphite	Uniform	7.3		8.3	Grade	Percentage	1.7% to 14.6%
5 - Northern Graphite	In Situ Graphite	Uniform	1.5		1.7	Large Flake %	Percentage	29% to 77%
6 - Graphite One	Large Flake %	3 Point	59.0	77.0	94.0	Share Risk	Qualitative	1 to 5
6 - Graphite One	In Situ Graphite	Uniform	8.3		12.4	In-Situ Graphite	M tonnes	.3 to 10.35

All Model Values – Post Risk Reduction

Metric Weights (%)	7.50%	22.50%	6.67%	13.33%	4.44%	11.11%	10.00%	24.45%
Measured Values	Location - Distance	Regulatory Ease For Supply	Enterprise Value	Stage Maturity	Grade	Large Flake %	Share Risk	In Situ Graphite
1 - Zenyatta Ventures	400	High Ease - NAFTA	100	Resource	3.4	76.8	5	1.4
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SUF Values	Location - Distance	Regulatory Ease For Supply	Enterprise Value	Stage Maturity	Grade	Large Flake %	Share Risk	In Situ Graphite
1 - Zenyatta Ventures	1.00	0.67	1.00	0.00	0.12	0.74	0.00	0.10
2 - Focus Graphite	0.96	0.67	0.46	0.50	0.91	0.08	0.50	0.14
3 - Mason Graphite	0.96	0.67	0.45	0.50	1.00	0.00	0.50	0.89
4 - Energizer Resources	0.00	0.00	0.25	0.50	0.32	0.29	0.00	0.70
5 - Northern Graphite	1.00	0.67	0.21	1.00	0.00	0.74	0.75	0.12
6 - Graphite One	0.63	1.00	0.12	0.50	0.27	0.74	0.50	0.95
7 - Flinders Resources	0.31	0.33	0.00	0.50	0.63	0.17	0.25	0.00
Probabalistic Numbers	Measure	Distribution Type	Values			Legend - Name, Measure, Range		
1 - Zenyatta Ventures	Large Flake %	3 Point	59.0	77.0	94.0	Loc. - Dis. (to market)	Miles	0 to 10000
1 - Zenyatta Ventures	In Situ Graphite	Uniform	1.3		1.5	Reg Ease for Supply	Qualitative	Low to High
2 - Focus Graphite	In Situ Graphite	Uniform	1.7		1.9	Enterprise Value	\$M (USD)	0 to 100
3 - Mason Graphite	In Situ Graphite	Uniform	9.4		10.2	Stage Maturity	Qualitative	Res, PEA, FS
4 - Energizer Resources	In Situ Graphite	Uniform	7.3		8.3	Grade	Percentage	1.7% to 14.6%
5 - Northern Graphite	In Situ Graphite	Uniform	1.5		1.7	Large Flake %	Percentage	29% to 77%
6 - Graphite One	Large Flake %	3 Point	69.0	77.0	84.0	Share Risk	Qualitative	1 to 5
6 - Graphite One	In Situ Graphite	Uniform	10.0		11.0	In-Situ Graphite	M tonnes	.3 to 10.35

Notes

1. SUF Values are all relative from 0 to 1 where the lowest measured score is truly the lowest acceptable value. Thus, the lowest measured value is transformed to a SUF value of 0 and the highest measured value is transformed to a SUF value of 1.
2. For Probability Distributions - SUF values of 0 and 1 are transformed from the lowest and highest measured distribution limits to keep total utility between 0 and 1.0. Since the SUF values shown are transformed from the mean measured values, it is very possible that there may not be a shown SUF value of 0 or 1 in the table. For example, Graphite One has the best In-Situ Graphite score, but is only showing 0.953271. In this case, the SUF value of 1 was transformed from 11 M tonnes (the upper limit of its probability distribution).

