The information contained within this announcement is deemed to constitute inside information as stipulated under the Market Abuse Regulation ("MAR") (EU) No. 596/2014, as incorporated into UK law by the European Union (Withdrawal) Act 2018. Upon the publication of this announcement, this inside information is now considered to be in the public domain.

25 May 2021

Beowulf Mining plc

("Beowulf" or the "Company")

Kallak Iron Ore Project - Mineral Resource Estimate and Exploration Target Upgrade

Beowulf (AIM: BEM; Spotlight: BEO), the mineral exploration and development company, announces the results of a Mineral Resource Estimate ("MRE") Upgrade for the Kallak Iron Ore Project ("Kallak" or the "Project") prepared by Baker Geological Services Ltd ("BGS").

Highlights:

- An additional 19 million tonnes ("Mt") of iron ore equating to a 12.5% increase in the resource.
- Measured and Indicated Mineral Resource of 132 Mt grading 27.8% iron ("Fe").
- Inferred Mineral Resource of 39 Mt grading 27.1% Fe.
- Three distinct areas of elevated copper ("Cu") and gold ("Au") mineralisation have been identified in drilling, running the length of the Project area, with elevated assay intersections predominantly lying on the boundaries of the iron mineralisation.

  Copper grades reach up to 1.6%, although this was the maximum possible Cu value using the assay method employed at the time.

  Gold grades reach up to 0.75 g/t from testwork completed in April 2021 on those pulp samples where the Cu assay was more than 0.1%.

  In total, 30 samples were sent for gold assay with only five samples being below detection limit.

BGS has prepared a Technical Report which serves as an independent report prepared by the Competent Person ("CP") as defined by the Pan-European Reserves and Resources Reporting Committee ("PERC") Standard for Reporting of Exploration Results, Mineral Resources and Mineral Reserves. PERC sets out minimum standards, recommendations and guidelines for Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves in Europe.

PERC is a member of CRIRSCO, the Committee for Mineral Reserves International Reporting Standards, and the PERC Reporting Standard is fully aligned with the CRIRSCO Reporting Template.

All work undertaken in the generation of the MRE is summarised in the PERC Table 1 Checklist found later in this announcement.

The definitions of Measured, Indicated and Inferred Resources, as well as Reserves, as used in this report, conform to the definitions and guidelines of the PERC Reporting Standard, 2017.

Comparison to Previous 2014 MRE

The previous Geovista 2014 MRE reported an Indicated Mineral Resource of 118 Mt at 27.5% Fe and an Inferred Mineral Resource of 33.8 Mt at 26.2% Fe. This compares to the BGS 2021 MRE, a combined Measured and Indicated Mineral Resource of 132 Mt at 27.8% Fe and an Inferred Mineral Resource of 39 Mt at 27.1% Fe.

This equates to an increase of 19 Mt in the upgrade reported herein for approximately the same Fe grade. The quantity of Inferred Resource is approximately the same and the upgrade includes a portion of the resource declared in the Measured category. This was considered appropriate due to recent Davis Tube testwork increasing the knowledge of the project's mineralisation styles.

Geovista also undertook a pit optimisation exercise to report the final Mineral Resource Statement for Kallak and it is likely that the difference in assumptions may account for the overall tonnage difference between the 2014 and 2021 MREs.

Kurt Budge, Chief Executive Officer of Beowulf, commented:

"I am delighted with the results of this upgraded Mineral Resource Estimate and the doubling of the Exploration Target, which clearly demonstrate the potential for a mine at Kallak to supply high-quality iron ore over several decades for fossil-free steel production in Sweden.

"While we wait for UNESCO to return its comments to the Government, there have been significant developments in Norrbotten.

"In February, H2 Green Steel ("H2GS") announced plans to establish a large-scale steel production facility based on a fossil-free manufacturing process to be located in the Boden-Luleå region of Norrbotten. Production will begin in 2024 and by 2030 H2GS will have a production capacity of five million tonnes of high-quality steel.

"In March SSAB, LKAB and Vattenfall took a new, decisive leap forward in their work to make fossil-free steel for the global market. With industrialization of the technology being developed through HYBRIT to be sited in Gällivare, where the world's first production plant for fossil-free sponge iron – from feedstock to steel – is being planned by LKAB.

"Kallak is ideally positioned with respect to both these projects and can similarly leverage renewable power to ensure the integrity of a fossil-free supply chain.

"With the recent arrival of a new Governor in Norrbotten, the Company believes that the County Administrative Board ("CAB") has an obligation to review its November 2017 position on Kallak.

"Beowulf maintains that the CAB's 2017 statement is invalid and is further discredited given the fundamental shift in understanding about the Climate Emergency, and the need for more mines to produce the metal required for the transition to a Green Economy.

"Permitting downstream fossil-free steel production in the absence of permitting upstream raw material supply is non-sensical.

"In its assessment of Kallak, the CAB failed to properly consider the financial health of Jokkmokk Municipality, finding that reindeer herding was a better use of the land at Kallak. Over the last two years, Jokkmokks Kommun has been forced to cut its budget by SEK 28 million. The Municipality desperately needs the economic stimulus, investment, jobs and taxes that Kallak will deliver

""Kallak will bring billions of SEK in investment and hundreds of jobs to Jokkmokk. All stakeholders will benefit and all interests will be safeguarded.

"The Company continues to engage with politicians in Norrbotten and Stockholm and last week's webinar 'Hållbar Gruvnäring' (Sustainable Mining) brought together politicians from across the political spectrum and key stakeholders to discuss the need for more mines in Sweden.

"Parliamentary questions continue to be put to Minister Baylan about the Kallak process, which he often refers to as being complex. The Kallak case is not complex.

"The first exploration licence was granted in 2006 by the Mining Inspectorate, part of the SGU, a Government Office. The Company has been permitted to invest over SEK 80 million and, with this upgraded MRE, defined a potential global iron ore resource of up to 389 million tonnes from which we have produced a market leading 71.5% iron concentrate.

"In late 2014, the Company addressed concerns raised by the CAB at the time and, in July 2015, the CAB stated that Kallak has a positive economic case. In October 2015, the Mining Inspectorate recommended to the Government that the Concession be awarded.

"The direction of travel is irrefutable, as is the Climate Emergency, the transition to a Green Economy, and the need for more metal from more sustainable mines. Kallak is part of this future.

"I look forward to providing further updates in due course."

Background to the MRE

Baker Geological Services Ltd was requested by Beowulf to undertake a MRE and Exploration Target ("ET") generation on Kallak.

The Kallak deposit is considered an advanced exploration project. No mining has taken place at the Project except for the collection of a bulk sample from trenches.

The Kallak deposit and iron mineralisation in the area has been known to exist since the 1940's. They were first investigated by the Swedish Geological Survey ("SGU") during 1948, with seven diamond drillholes completed. The SGU returned and investigated the area again in the early 1970's, then with six new drillholes. Comprehensive ground geophysical surveys were carried out in connection to these two campaigns.

Historical exploration led to the establishment of a Mineral Resource reported in November 2014. This was compiled by Geovista AB, titled "Kallak North and South Mineral Resource update". Between 2010 and 2015 the company also completed various technical studies comprising a conceptual study, environmental impact assessment, metallurgical studies and logistical studies to guide the future development of the Project.

In completing the updated MRE reported herein, geology and mineralisation models have been created with full suite XRF grades (Fe, SiO_2, Al_2O_3, P, Mn, S, CaO, MgO, TiO_2 and K_2O) being estimated into the mineralisation model. In addition to the XRF assay grades, Loss on Ignition ("LOI"), FeO by Titration and Magnetic Susceptibility data has been estimated into the mineralisation model. FeO and Magnetic Susceptibility data, along with the XRF grades have been used extensively to verify the mineralogical components of the model, this being the most significant change to the updated Mineral Resource model. Density testwork has been completed to allow a tonnage estimate and Quality Assurance Quality Control programmes have been sufficient to verify the quality of data used in the MRE. The model created includes Measured, Indicated and Inferred Mineral Resources.

BGS has prepared a Technical Report which serves as an independent report prepared by the Competent Person as defined by the Pan-European Reserves and Resources Reporting Committee Standard for Reporting of Exploration Results, Mineral Resources and Mineral Reserves. PERC sets out minimum standards, recommendations and guidelines for Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves in Europe.

PERC is a member of CRIRSCO, the Committee for Mineral Reserves International Reporting Standards, and the PERC Reporting Standard is fully aligned with the CRIRSCO Reporting Template.

All work undertaken in the generation of the MRE is summarised in the PERC Table 1 Checklist found later in this announcement.

The definitions of Measured, Indicated and Inferred Resources, as well as Reserves, as used in this report, conform to the definitions and guidelines of the PERC Reporting Standard, 2017.

The data used for the MRE, including drillhole databases and topographic surveys, was provided by Beowulf.

BGS has been unable to undertake a site visit to the Project due to the COVID-19 global pandemic. A site visit will be undertaken when possible. BGS was supplied with a comprehensive core photograph library and has discussed the Project in detail with Company Personnel and external consultants. In addition, the Project was visited by Dr Bo Arvidson of Bo Arvidson Consulting LLC in October 2020 and in 2013. Dr Arvidson is a Mineral Processing Engineer with over 50 years industry experience and is considered a Competent Person in his field. Dr Arvidson has a long history with the Project and visited in October 2020 to assist in the selection of core for ongoing metallurgical testwork. Dr Arvidson visited the core storage facilities during this recent trip, met company personnel and inspected core to perform streak tests to assess the iron oxide mineralogy. BGS has relied on the opinion of Dr Arvidson in terms of the Project's integrity.

MRE

To determine the final MRE, the model has been subjected to an optimisation exercises to determine the proportion of the material defined that has a reasonable prospect of economic extraction via open pit mining methods.

No cut-off grade has been applied to the final MRE due to the general lack of grade sensitivity.

This represents the material considered by BGS to have reasonable prospects for eventual economic extraction potential.

The statements have been classified by Competent Person, Howard Baker (FAusIMM(CP)) in accordance with the PERC Standard 2017. It has an effective date of 9 May 2021. Mineral Resources that are not Mineral Reserves have no demonstrated economic viability. BGS and Beowulf are not aware of any factors (environmental, permitting, legal, title, taxation, socio-economic, marketing, political, or other relevant factors) that have materially affected the MRE.

The quantity and grade of reported Inferred Mineral Resources in this estimation are uncertain in nature and there has been insufficient exploration to define these Inferred Mineral Resources as an Indicated or Measured Mineral Resource; and it is uncertain if further exploration will result in upgrading them to an Indicated or Measured Mineral Resource category.

BGS notes that the Mineral Resource has a reasonable prospect for eventual economic extraction but are not considered Mineral Reserves. Mineral Reserves are estimates of the tonnage and grade or quality of material contained in a Mineral Resource that can be economically mined and processed. To be considered a Mineral Reserve, modifying factors must be applied to the MRE as part of the preparation of a prefeasibility study ("PFS") or a feasibility study ("FS") as outlined in the PERC Standard. The estimated amount of saleable material contained in the final product must demonstrate a positive Net Present Value ("NPV") using an appropriate discount rate and must demonstrate that eventual extraction could be reasonably justified. The major categories of modifying factors include Mining; Processing; Metallurgical; Environmental; Location and infrastructure; Market factors; Legal (including land tenure and third-party ownership); Economic; Social, and Governmental.

Table ES-1: Mineral Resource Statement for the Kallak Project at a 0% Fe cut-off grade

Deposit	Classification	Million	Density	Fe	FeO	SiO_2	Al_2O_3	P	S

		Tonnes	(g/cm^{E})	(%)	(%)	(%)	(%)	(%)	(%)
Kallak North	Measured	16	3.5	33.6	10.5	43.4	2.9	0.04	0.002
	Indicated	95	3.3	27.0	7.1	49.8	4.5	0.03	0.002
	Sub-Total	**111**	**3.3**	**28.0**	**7.6**	**48.9**	**4.3**	**0.03**	**0.002**
	Inferred	25	3.4	28.3	7.8	48.1	4.2	0.04	0.002
Kallak South North	Measured								
	Indicated	21	3.3	26.9	7.2	49.3	4.9	0.04	0.003
	Sub-Total	**21**	**3.3**	**26.9**	**7.2**	**49.3**	**4.9**	**0.04**	**0.003**
	Inferred	6	3.2	23.4	6.5	50.1	6.6	0.05	0.004
Kallak South South	Measured								
	Indicated								
	Sub-Total								
	Inferred	8	3.3	26.1	12.0	50.1	5.2	0.05	0.009
Total	Measured	16	3.5	33.6	10.5	43.4	2.9	0.04	0.002
	Indicated	116	3.3	27.0	7.1	49.7	4.6	0.03	0.002
	Sub-Total	**132**	**3.3**	**27.8**	**7.5**	**48.9**	**4.4**	**0.03**	**0.002**
	Inferred	39	3.3	27.1	8.5	48.8	4.8	0.04	0.004

Notes:

(1) Mineral Resources, which are not Mineral Reserves, have no demonstrated economic viability.

(2) The effective date of the Mineral Resource is 9 May 2021.

(3) The Open Pit Mineral Resource Estimate was constrained within lithological and grade-based solids and within an optimised pit shell defined by the following assumptions; base case metal price of USD130 / tonne for a 65% Fe concentrate; Fe recovery of 71% at Kallak North, 86% at Kallak South North and 94% at Kallak South South; Fe concentrate grades of 68% at Kallak North, 70% at Kallak South North and 69% at Kallak South South; Processing costs of USD6.8 / t wet; Selling cost of USD21.0 / t wet concentrate; Mining cost of Ore of USD3.3 / t, mining cost of waste of USD3.0 / t and an incremental mining cost per 10 m bench of USD0.05 / t; Wall angles of 30° within the overburden and 47.5° in the fresh rock.

(4) Mineral Resources have been classified according to the PERC Standards 2017, by Howard Baker (FAusIMM(CP)), an independent Competent Person as defined in the PERC Standard 2017.

In total, BGS has derived a Measured and Indicated Mineral Resource of 132 Mt grading 27.8% Fe, 7.5% FeO, 48.9% SiO_2, 4.4% Al_2O_3, 0.03% P and 0.002% S.

BGS has also defined an Inferred Mineral Resource of 39 Mt grading 27.1% Fe, 8.5% FeO, 48.8% SiO_2, 4.8% Al_2O_3, 0.04% P and 0.004% S.

The pit optimisation undertaken shows a strip ratio of 1 ore tonne for every 1.22 waste tonne.

Exploration Targets

In addition to the MRE, BGS has updated the Exploration Target for the Project with inclusion of the Parkijaure permit area.

At Kallak North, material has been modelled below the currently classified resource. This material is unclassified at present but represents a valid target for future exploration. Based on the geological model created, along with the grades seen in Kallak North, BGS has reported an Exploration Target of between 3 Mt and 7.5 Mt grading between 20% Fe to 30% Fe. The potential quantity and grade are

conceptual in nature as there has been insufficient exploration to estimate a Mineral Resource; and that it is uncertain if further exploration will result in the estimation of a Mineral Resource.

In the Kallak Permit area, a 'Gap' exists between Kallak South North and Kallak South South and represents a prospective untested mineralisation target. BGS estimated an approximate tonnage and grade of material lying between Kallak South North and Kallak South South. A simple wireframe was generated to allow for an approximate volume of mineralised material to be estimated with the thickness and orientation of this wireframe being based on the continuation of the mineralised units modelled at Kallak South North and Kallak South South along with the geophysical signature observed. Two drillholes exist in this area; both are shallow and did not intercept any mineralisation of material width or grade, although the southern drillhole, KAL10044, within the gap, did encounter some of reported Cu / Au mineralisation. Given the geophysical signature within the gap and the overall synform structure proposed, it is possible that the iron bearing lithologies lie below the two drillhole completed within this area.

Based on the wireframe created, along with the grades seen in Kallak South North and Kallak South South, BGS report an Exploration Target of between 25 Mt and 75 Mt grading between 20% Fe to 30% Fe. The potential quantity and grade are conceptual in nature as there has been insufficient exploration to estimate a Mineral Resource; and that it is uncertain if further exploration will result in the estimation of a Mineral Resource.

In the Parkijaure Permit area, mapping, sampling, geophysical surveys and SGU historical drilling within proximity to the Beowulf Permits has indicated the presence of further iron mineralisation and an extension to the mineralisation observed in the Kallak Permits.

Limited outcrop exists within the Parkijaure area and in general, the magnetic anomaly data is less intense than in the Kallak permit area. This is possibly a factor of the deeper glacial till material in the southern permits or potentially a more disseminated style of mineralisation.

BGS assessed all available data from the Parkijaure Permit and created simple trace lines along the magnetic anomalies considered strong enough to be related to significant iron mineralisation within the Parkijaure Permit.

Based on the trace lines created, having a total strike length of 4.5 km, limiting the depth of mineralisation to 200 m and the width of mineralisation to 30 m, BGS has reported an Exploration Target of between 45 Mt and 135 Mt grading between 20% Fe to 30% Fe. The potential quantity and grade are conceptual in nature as there has been insufficient exploration to estimate a Mineral Resource; and that it is uncertain if further exploration will result in the estimation of a Mineral Resource.

In total, BGS has reported an Exploration Target of between 73 Mt and 218 Mt grading between 20% Fe to 30% Fe. The potential quantity and grade are conceptual in nature as there has been insufficient exploration to estimate a Mineral Resource; and that it is uncertain if further exploration will result in the estimation of a Mineral Resource.

Competent Person ("CP")

Mr Howard Baker of BGS is a resource geologist with 25 years' experience covering multiple commodities from early-stage exploration through to definitive feasibility studies. Mr Baker is the Managing Director of BGS and previously worked for the International Mining Consultancy, SRK Consulting (UK) Ltd ("SRK") where he was employed for eight years as a Principal Consultant and Practise Leader. In his time at SRK, he focussed on the management of Mineral Resource Estimates with a strong focus on technical quality management and compliancy to international reporting codes. In addition, he played a key role in advising on suitable exploration protocols and drill programmes and effectively assisted clients in the development of numerous large-scale projects. Prior to his time at SRK, Mr Baker lived and worked in Australia, working for Rio Tinto, BHP Billiton, Iluka Resources and Anaconda Nickel.

Mr Baker was educated in the United Kingdom, being a dual British and Australian citizen. He is a Chartered professional fellow (#224239) of the Australasian Institute of Mining and Metallurgy.

Mr Baker has extensive global experience in the geology and Mineral Resource Estimation of iron ore projects and also worked as a mine geologist and specialist resource geologist in the iron ore Pilbara district of Western Australia.

Mr Baker has reviewed the technical information included in this announcement and approves the disclosure of technical information in the form and context in which it appears, in his capacity as a CP as required under the AIM rules.

Enquiries:

Beowulf Mining plc

Kurt Budge, Chief Executive Officer Tel: +44 (0) 20 7583 8304

SP Angel (Nominated Adviser & Broker)

Ewan Leggat / Stuart Gledhill / Adam Cowl Tel: +44 (0) 20 3470 0470

Blytheweigh (Financial PR & IR)

Tim Blythe / Megan Ray Tel: +44 (0) 20 7138 3204

Cautionary Statement

Statements and assumptions made in this document with respect to the Company's current plans, estimates, strategies and beliefs, and other statements that are not historical facts, are forward-looking statements about the future performance of Beowulf. Forward-looking statements include, but are not limited to, those using words such as "may", "might", "seeks", "expects", "anticipates", "estimates", "believes", "projects", "plans", strategy", "forecast" and similar expressions. These statements reflect management's expectations and assumptions in light of currently available information. They are subject to a number of risks and uncertainties, including, but not limited to , (i) changes in the economic, regulatory and political environments in the countries where Beowulf operates; (ii) changes relating to the geological information available in respect of the various projects undertaken; (iii) Beowulf's continued ability to secure enough financing to carry on its operations as a going concern; (iv) the success of its potential joint ventures and alliances, if any; (v) metal prices, particularly as regards iron ore. In the light of the many risks and uncertainties surrounding any mineral project at an early stage of its development, the actual results could differ materially from those presented and forecast in this document. Beowulf assumes no unconditional obligation to immediately update any such statements and/or forecast.

About Beowulf Mining plc

Beowulf Mining plc ("Beowulf" or the "Company") is an exploration and development company, listed on the AIM market of the London Stock Exchange and the Spotlight Exchange in Sweden.

Beowulf’s purpose to be a responsible and innovative company that creates value for our shareholders, wider society and the environment, through sustainably producing critical raw materials, which includes iron ore, graphite and base metals, needed for the transition to a Green Economy and to address the Climate Emergency.

The Company's asset portfolio is diversified by commodity, geography and the development stage of its various projects.

The Company's most advanced project is the Kallak iron ore asset in northern Sweden. A potential 389 million tonne resource which can produce a 'market leading' concentrate of 71.5% iron content and is a potential source of supply for fossil-free steel production in Sweden for decades to come.

Fennoscandian Resources (“Fennoscandian”), a wholly-owned subsidiary, is pursuing a strategy to develop a resource and production base of graphite that can provide security of supply and contribute to Finland's ambitions of achieving battery manufacturing self-sufficiency, focusing on both natural flake graphite production and a Circular Economy/recycling strategy to produce high-value graphite products. The Company is also developing its knowledge in processing and manufacturing value-added graphite products, including anode material for lithium-ion batteries.

Since Fennoscandian was acquired by Beowulf in January 2016, the Company has invested approximately €2.2 million in graphite exploration, resource development, metallurgical testwork and the assessment of market applications for graphite supplied from its Aitolampi project, including lithium-ion battery applications.

Fennoscandian has recently signed a Memorandum of Understanding ("MoU") with Epsilon Advance Materials Limited ("EAMPL"). The MoU enables Fennoscandian to build its downstream capability, collaborating with a strong and innovative technology/processing partner, and for EAMPL to firmly establish itself in Finland, as a market-entry point for supplying pre-cursor anode material into Europe. The MoU addresses the development of a strategic processing hub for both natural flake and recycled graphite to be located in Finland.

In addition, a Scoping Study contract for the Aitolampi graphite project has been awarded to AFRY Finland Oy. The purpose of the Scoping Study is to verify the robustness of the work completed by Fennoscandian, and to provide a roadmap for the next project development stage, most likely a Pre-feasibility Study. The output of the Scoping Study will enable Fennoscandian to share information on the Aitolampi project and communicate with the local community and other important stakeholders.

In Kosovo, the Company owns approximately 48.4% of Vardar Minerals ("Vardar"), which is focus on exploration in the Tethyan Belt, a major orogenic metallogenic province for gold and base metals. Vardar is delivering exciting results for its Mitrovica licence which has several exploration targets, including lead, zinc, copper and gold. It also has the Viti licence which is showing potential for copper-gold porphyry mineralisation. With Beowulf's support, Vardar is focused on making a discovery.

Kallak is the foundation asset of the Company, but with Vardar and Fennoscandian, the Company has many opportunities to grow, each business area displaying strong prospects.

PERC Table 1

Notes

The following extracts are taken from the PERC Reporting Standard 2017 regarding the PERC Table 1 checklist and its use in the declaration of a Mineral Resource.

Table 1 is a check list and guideline to which those preparing reports on Exploration Results, Mineral Resources and Mineral Reserves should refer. The check list is not prescriptive and, as always, relevance and materiality are overriding principles which determine what information should be publicly reported.

Table 1, included at the end of the Standard, supplies an outline of items that should be considered when evaluating a minerals project. The importance of each item will vary with the specific project and it is recognised that, for some projects, other items may be relevant which are not included on the list.

Table 1 should be considered as a guide to facilitate a reasoned and balanced approach to reporting. However, many decisions, such as the classification of material as a Mineral Resource or a Mineral Reserve, remain a matter of professional judgement based on knowledge, experience, and industry practices.

Public disclosure is required of those items in Table 1 most likely to affect the accuracy of estimates made in the report. The authors of reports should both identify and evaluate these important factors in their reports.

The compilation, assessment, and Public Reporting of Table 1 must be undertaken for (i) the first-time declaration of Exploration Results, a Mineral Resource or a Mineral Reserve, and (ii) in instances where these items have materially changed from when they were last Publicly Reported for significant projects.

In the context of complying with the principles of the PERC Standard, the Competent Person should consider all of the items in the relevant sections of Table 1 on an 'if not, why not' basis within the supporting documentation. The Competent Person should complete an overall assessment of the relative importance of the Table 1 items in terms of their possible impact on the future development of the mineral project and the results of this assessment should be presented in the Public Report.

As this is the first-time declaration of Mineral Resources using the PERC standard, BGS has compiled Table 1 and is included in the following section. BGS considers all items referenced in Table 1 to have been fully disclosed within the technical report.

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Table 1 Part 1 - General			
Purpose of Report	*(i) The report includes a title page and Table of Contents, including figures and tables.* *(ii) The report has been prepared for Beowulf Mining PLC and is intended as a full evaluation of the Mineral Resource Potential of the Kallak Iron Ore Project under licence to Beowulf. The effective date of the report is 9 May 2021 and no further work is outstanding to complete this update to the Mineral Resource model.* *(iii)The report is considered PERC compliant.*		
Project Outline	*Baker Geological Services Ltd ("BGS") has been requested by Beowulf Mining PLC ("Beowulf" hereinafter also referred to as the "Company" or the "Client") to undertake a Mineral Resource Estimate ("MRE") and Exploration Target ("ET") generation on the Kallak Iron Ore Project (the "Project") located in Sweden.*		
History	*The Kallak deposit and iron mineralisation in the area has been known to exist since the 1940's. They were first investigated by the Swedish Geological Survey (SGU) during 1948, with seven diamond drillholes completed. SGU returned and investigated the area again in the early 1970's, then with six new drillholes. Comprehensive ground geophysical surveys were carried out in connection to these two campaigns.* *Historical exploration led to the establishment of a Mineral Resource reported in November 2014. This was compiled by Geovista AB, titled "Kallak North and South Mineral Resource update". Between 2010 and 2015 the company also completed various technical studies comprising a conceptual study, environmental impact assessment, metallurgical studies and logistical studies to guide the future development of the project.*		
Key Plan, Maps and Diagrams	*All maps have been provided with appropriate scale bars, compass directions and annotations and legends where required.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Project Location and Description	*The Project is in the Jokkmokk municipality, north of the Arctic Circle, approximately 40 km west of Jokkmokk city centre and 80 km southwest of the major iron ore mining centre of Malmberget in the County of Norrbotten, northern Sweden. LKAB's Kiruna iron ore mine, the world's second largest underground mine, is located approximately 120 km to the northeast. The exploration permits are centred on latitude 66°47'N and longitude 19°08'E.* *Maps have been produced showing exploration and exploitation rights of Beowulf along with tables showing licence name, ID, area and expiration date.*		
Topography and Climate	*The Project area comprises forested, low hilly ground close to a main paved road between Kvikkjokk and Jokkmokk. The principal land use is forestry, with the majority of the ground area being owned by a large local forestry company. Regional vegetation is generally comprised of mature pine, birch and spruce trees. The ground elevation varies between 300m and 450m above sea level in an area of undulating forested or logged ground forming a peninsula surrounded by Lake Parkijaure. The highest point is the Råvvåive hill at 481m located in the southeast part of the project area.* *Climatic conditions are typical of northern Sweden with temperate summers and cold winters. The summer months between June and August see temperatures ranging between 10°C and 25°C, in winter (November-April) the temperatures drop to between -5°C and -30°C. The annual rainfall for the area is approximately 530mm, ranging 72mm to 189mm per month, and falling as snow in winter. Snow covers the area for 183 days of the year attaining a thickness ranging from 0.6m to 1.2m in March.*		
Geology	*The Project is located within the Svecofennian shield, consisting of metamorphic, sedimentary, and volcanic rocks that are commonly between 1,900Mya and 1,870Mya. The area around Kallak, and the villages of Björkholmen and Randijaur, is dominated by mafic to intermediate volcanics and metavolcanics as well as gabbro, diorite and ultramafic rocks and their metamorphic equivalents. The bedrock of the area is thus predominantly mafic.* *The iron formations at Kallak are outcropping and consist of banded iron oxides interlayered with quartz, feldspar and some hornblende. The dominant host rock is a grey, altered volcanic unit.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
	The deposits occur in a north-south oriented trend of altered sediments and felsic volcanic rocks of early Proterozoic age within granitic gneisses. The deposits are up to 300 m wide at surface outcrop and are located on topographically high ground. *The iron-oxide mineralisation at the Project is associated with highly deformed and banded quartz-feldspar metamorphic units. These have been termed banded iron formations ("BIF") thought to have been created through typical volcano sedimentary processes. More recently, alternative descriptions have been given by the SGU (Claeson & Antal Lundin, 2020), most notably that the host lithology is termed a garnet-bearing quartz trachyte, formed in a stratiform-stratabound volcanogenic setting, possibly during subaerial processes. As part of the Mineral Resource Estimate, external consultants re-logged over 1,000 m of core. The main lithologies logged (and modelled) are, Schists (Biotite and Muscovite rich), Banded Iron Formations, Calcitic Marbles, Dolomitic Marbles, Amphibolite and Tillite.*		
Mineralogy	*Historically, Kallak has been reported to contain the iron oxides Haematite and Magnetite. Recent studies undertaken as part of this update show that Maghemite is also believed to be contained within the iron oxide mineral assemblage. This was identified through an assessment of the logged lithology (designated HIF or MIF depending on the haematite or magnetite dominance), assay data, the magnetic susceptibility, FeO and Satmagan data, all of which provide an indication as to the mineralogy. Additionally, streak tests were carried out on sections of drill core where streaks of red through brown and black were observed, suggesting a transitional iron oxide mineral assemblage.* *The project area also contains zones of elevated copper ("Cu") and gold ("Au") mineralisation. Three distinct areas have been identified through drilling activities by Beowulf, running the length of the Project area with the elevated assay intersections predominantly lying on the boundaries of the iron mineralisation. Cu grades reach up to 1.6%, although this was the maximum possible Cu value using the assay method employed at the time. Au grades reach up to 0.75 g/t from testwork completed in April 2021 on those pulp samples where the Cu assay was more than 0.1%. In total, 30 samples were sent for Au assay with only five samples being below detection limit.* *The structure is also believed to control the mineralisation in places.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Mineral rights and land ownership	*All exploration and exploitation permits are described within the report with appropriate maps and tables.*		
Legal Aspects and Tenure	*A description of the Swedish mining industry, the mining tenure and the licensing agreements are described within the report.*		
Licences and Permits	*The status of licences and permits is given in the report.*		
Personal introduction into projects and verification of the data	*BGS has been unable to undertake a site visit to the Project due to the COVID-19 global pandemic. A site visit will be undertaken when possible. BGS was supplied with a comprehensive core photograph library and has discussed the Project in detail with Company Personnel and external consultants. In addition, the Project was visited by Dr Bo Arvidson of Bo Arvidson Consulting LLC in October 2020 and in 2013. Dr Arvidson is a Mineral Processing Engineer with over 50 years industry experience and is considered a Competent Person in his field. Dr Arvidson has a long history with the Project and visited in October 2020 to assist in the selection of core for ongoing metallurgical testwork. Dr Arvidson visited the core storage facilities during this recent trip, met company personnel and inspected core to perform streak tests to assess the iron oxide mineralogy. BGS has relied on the opinion of Dr Arvidson in terms of the Projects integrity.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Table 1 Part 2 - Sampling Techniques and Data			
Type(s) of sampling	*In total, including extensions, 151 diamond drillholes have been completed for a total of 31,814 m. 132 drillholes have been completed by Beowulf with the remainder by SGU.* *Beowulf commenced exploration in 2010 in the Kallak permit areas. Initial drilling in 2010 targeted Kallak North and the northern portion of Kallak South. Drilling in 2011 then progressed into the southern end of Kallak South. Follow-up campaigns in 2012 and 2013 then focussed on the higher-grade areas of KN and KSN. The last campaign in 2014 aimed to infill-drill all three areas to between 100 m by 100 m to 50 m by 50 m to allow for consistently spaced data to be generated for use in Mineral Resource estimation.* *Assaying of drill core samples has used accredited laboratories with standard XRF analysis being used. Analysis for FeO and Satmagan along with magnetic susceptibility measurements of drill core and pulp samples has taken place.* *Suitable density testwork has been completed on drill samples to allow a grade against density regression curve to be applied to the resource model.* *Quality assurance / quality control programmes have been completed by Beowulf with the use of blanks, standards, and duplicates. No material biases have been identified.* *All drill holes have been plotted on maps to illustrate the quantity of data available.*		
Drilling techniques	*All drilling has been by diamond coring.* *Core recovery has been recorded by Beowulf during the geotechnical logging. In total, 4,605 core recovery measurements have been recorded across the 2010, 2013 and 2014 drill programmes.* *The average core recovery recorded is 99.5%. BGS acknowledges that core recovery values below 90% do exist however these are considered minimal with most of these are lying outside of the mineralised bodies. A review of the drill core photographs also confirms that recovery within the mineralised zones is high and as such BGS considers that no bias exists in relation to the recovery.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Drill sample recovery	*BGS does not consider the sample recovery to be a risk to the project.*		
Logging	*Prior to 2013, after extracting from the core barrel, the core was briefly logged with a handheld magnetic susceptibility meter directly in the field to provide a basis for later geological logging and sampling. The core boxes were transported from the Kallak site to the ALS Global ("ALS") laboratory facilities in Piteå (approximately 230 km along asphalt roads), where the core was logged geologically by JIMAB staff.* *Pre-2013, logging often did not adhere strictly to lithological contacts, but was often aligned to core box intervals. This has led to issues with sampling of mixed lithology types, which in turn affected the statistically distinct geochemical populations. This issue was identified in 2013 and was the catalyst to update the logging protocols.* *A review of logging protocols was conducted, following identification of the issue identified in 2013 , by Micon International Ltd ("Micon"), and updated documentation was put in place for all logging to ensure international best practices were in place. The review indicated that previous procedures were not being adhered to by all drillers, technicians and geologists and that there were gaps in the data collection. The following changes were thereby made to address the highlighted issues:* *• Core handling issues at the drill rig were resolved.* *• Daily progress reports from rig technicians.* *• Additional checks of drilling and core quality at the rigs, including checking for imperial and metric measurement mix-ups.* *• Geotechnical logging protocols set-up, including core recovery and RQD indices.* *• Increasing the frequency of magnetic susceptibility measurements to every 50 cm.* *• Updated cross-sections, plans and database provided to the geological modelling team on a fortnightly basis.* *• Logging adhered strictly to lithological contacts and not core box intervals.* *• Geological logging codes updated. This included increasing the level of detail to allow for a more detailed assessment of grade variability.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
	• Undertaking frequent structural orientation measurements using laser scanning device, and *• Construction of own core logging facilities in Jokkmokk, approximately 50 km from the project.* *Updated Protocols were adopted for all 2013 and 2014 holes. After construction in late 2013, all logging was undertaken in JIMAB's own facilities in Jokkmokk. The core boxes were transported by the drillers on a daily basis from the drill site to the secure facilities. The core boxes were then, after geotechnical, lithological and structural logging, shipped on sealed pallets by courier to ALS in Piteå for cutting and further processing of selected samples.* *In the logging facilities, the depth intervals of the drillers were checked, and every meter was marked out on the core boxes. The geotechnical features were logged to verify depth marks, number of fractures and RQD. Magnetic susceptibility was measured on a 50 cm intervals basis in mineralised sections and 1 m intervals outside of mineralisation. Lithology sections was set not to be shorter than 1 m, nor longer than 15 m. Assay sections do not overlap lithological contacts.* *In 2016, a total of 54 holes were re-logged to ensure consistency between drilling campaigns. BGS was supplied with a database including the re-logged material.* *Structural logging has taken place at the Project for 23 of the drillholes completed.* *After the sample mark-up is completed, the boxes were photographed. Photos were taken both dry and wet from a mounted camera, 1 m above the core.* *BGS was supplied with the full core photograph database which was used as a validation tool throughout the modelling exercise. The core photographs are high resolution, taken dry and wet.*		
Other sampling techniques	*BGS is not aware of any other sampling techniques that effect the generation of the Mineral Resource Estimate.*		
Sub-sampling techniques and sample preparation	*All core samples are split, crushed and pulverised by ALS Piteå, Sweden.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Assay data and laboratory investigation	*After core-cutting, the samples are then crushed to sub 2 mm, split into coarse sample and coarse reject material, then pulverised to sub 75 microns. A 30g sub-split of the pulverised material is used for subsequent assaying (XRF and FeO analysis) and 3 g for pycnometry density measurements (where applicable).* *As part of their standard preparation package, ALS implement quality control checks on the crushing and pulverising to ensure that the grain size requirements have been met. Following pulverisation, samples are securely shipped to ALS Loughrea in Ireland for assaying in batches containing boxes of 30 g samples in paper packets.* *All 2010 to 2014 samples were assayed for major oxide and element geochemistry by XRF with either of ALS methods XRF11b (2010 and 2011 samples) or XRF21b (2012 to 2014 samples).* *LOI is measured using thermogravimetry at 1,000ºC (ALS code GRA05).* *In addition to XRF (+LOI), for pre-2013 samples, a small number of samples were analysed with ALS method Fe- VOL05, which gives the contents of Ferrous iron, Fe2+. This method allows for the relative proportions of magnetite to haematite to be calculated, since ferrous iron only occurs in magnetite (formula can be written as either Fe3O4 or FeO.Fe2O3) and not in haematite (formula Fe2O3). For the post-2013 campaigns, Fe-VOL05 has been conducted for every sample.* *In addition to the XRF and magnetic susceptibility measurements, the Company also conducted Satmagan measurements on 224 samples throughout Kallak North in 2013.* *A total of 22,778 magnetic susceptibility readings were recorded between 1948 (SGU) and 2014 to assist with logging and sample selection. The readings have been used to assist with geological modelling but have not been used in the grade estimation.* *Beowulf has recently completed a magnetic susceptibility study using existing pulp samples. This was undertaken to assess the correlation between assay Fe%, FeO% and magnetic susceptibility and subsequently used for mineralogical studies. In total, 7,713 pulp magnetic susceptibility readings were taken. Three readings were taken for each pulp with an average value being calculated.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Verification of results	*BGS was supplied with a database from Beowulf, who, with the assistance of CSA Global were responsible for compiling all new and historical data into a single database. BGS and Beowulf discussed the database at various stages of the MRE with amendments being required as the data was verified.* *Drillhole data at Beowulf is stored in an Access database.* *Overall, the data was found to be in good condition with only minor errors and corrections being required.* *BGS has also been given access to a comprehensive core photo library which was used throughout the MRE to verify intersection intervals and material types.* *After a review of the available data and through the studies completed by Beowulf and BGS in verifying the data, BGS is confident that the quality of the data provided by Beowulf is suitable for use in the production of a Mineral Resource Estimate.* *Additionally, core was inspected by Independent Consultant, Dr Bo Arvidson in 2020.*		
Data location	*Collar co-ordinates, as well as starting azimuth, for Company drillholes have been surveyed with high-resolution RTK-GPS surveying equipment, allowing for centimetre scale accuracy. The deviation from planned locations is generally small, typically within 1 m to 2 m, the azimuth has varied in some areas up to 10º to 15º at the most. 11 holes have been surveyed using low-resolution handheld GPS devices, as they have not been clearly marked in the field. It is recommended by that all collars are surveyed using RTK-GPS for all future exploration.* *For the Beowulf drilling, down-hole surveys have been conducted on 3 m intervals using Deviflex and IS-Gyro instruments depending on the drilling contractor. No issues with the surveys have been identified.*		
Data density and distribution	*Due to the amount of drilling across the Project, the risks associated with the geological interpretation have been mitigated to allow continuous iron formation units to be modelled. The quantity of drilling data does decrease to the south although continuous iron formations are still possible to model in areas of sparser data.* *KN shows greater degrees of geological complexity at present, possibly due to the greater level of exploration focus and data available.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
	Based on the work undertaken and the statistical validation steps carried out, BGS is confident that the geological models created honours the understanding of the local scale geology and grade distribution as accurately as possible given the data made available		
Reporting Archives	*BGS was supplied with a database from Beowulf , who with the assistance of CSA Global were responsible for compiling all new and historical data into a single database.*		
Audits or reviews	*As previously mentioned, a review of logging protocols was conducted by Micon in 2013 with all recommendations taken on board.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Table 1 Part 3 - Reporting of Exploration Results			
Exploration work carried out by other parties	*The Project was first investigated by the Swedish Geological Survey (SGU) during 1948, with seven diamond drillholes completed. SGU returned and investigated the area again in the early 1970's, then with six new drillholes. Comprehensive ground geophysical surveys were carried out in connection to these two campaigns.* *The geophysical data was analysed by Geovista in 2011 and 2012 (Mattsson, 2011 and Mattsson, 2012).*		
Data compositing (aggregation) methods.	*Data compositing is undertaken to reduce the inherent variability that exists within the population and to generate samples more appropriate to the scale of the mining operation envisaged. It is also necessary for the estimation process, as all samples are assumed to be of equal weighting and should therefore be of equal length.* *The estimation process assumes an equivalent weighting per composite. It is therefore necessary to discard or ignore remnant composites that are generated in the downhole compositing process to avoid a bias in the estimation. However, based on the results of a composite length analysis on each domain during the parameter selection stage, it was decided to use all samples, meaning no shorter lengths were discarded. Edge samples below a set value of 0.5 m were included in the previous sample down the hole.* *Due to the low variance of the Fe data, being the primary driver for the modelling process, it is also the opinion of BGS that all deposits are insensitive to variations in the composite length and the treatment of smaller sample lengths.* *The composite length was chosen using the Fe assay with the same length applied to all analytes. Kallak North, a soft boundary was selected due to the gradational contact between the units in both the magnetic and haematitic zones*		
Relationship between mineralisation widths and intercept lengths	*The sample length within the raw drillhole database was assessed within the modelled iron formation units. The results show that the average sample length across all formations is 1.9 m with a minimum of 0.01 m and a maximum length of 10.8 m.* *In general, the spread of sample length is considered typical and each domain was considered on its own merits in terms of composite length selected.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Diagrams	*Maps, plans and sections are given within the report to show the data distribution across all deposits.*		
Balanced reporting	*Due to the amount of data, summary statistics of the modelled domains is given and discussed in detail.*		
Other substantive exploration data	*Discussion is provided regarding the historic mapping of the area as well as the metallurgical testwork completed in addition to the exploration drilling and geochemical analysis completed.*		
Further work	*BGS believes that there is significant resource potential within the licence areas and has declared Exploration Targets accordingly that warrant further exploration. Additional alteration studies to assess the Cu/Au potential that is external to the iron mineralisation is warranted as well as within the iron formations to assess the project iron oxide distribution. Additional Davis Tube testwork is also considered of use to assess the concentrate grade potential from across all targets.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Table 1 Part 4 - Estimation and Reporting of Mineral Resources and Mineral Reserves			
Database integrity	*BGS was supplied with a database from Beowulf, who, with the assistance of CSA Global were responsible for compiling all new and historical data into a single database. BGS and Beowulf discussed the database at various stages of the MRE with amendments being required as the data was verified.* *Drillhole data at Beowulf is stored in an Access database.* *Overall, the data was found to be in good condition with only minor errors and corrections being required.* *BGS has also been given access to a comprehensive core photo library which was used throughout the MRE to verify intersection intervals and material types.* *After a review of the available data and through the studies completed by Beowulf and BGS in verifying the data, BGS is confident that the quality of the data provided by Beowulf is suitable for use in the production of a Mineral Resource Estimate.*		
Geological interpretation	*BGS was supplied with a drillhole database for the Project which was used to generate new wireframe models for the dominant iron formations and host geological units. These files were then used as boundaries to create internal iron formations (based on mineralogy and grade boundaries) and internal waste units.* *The modelling was undertaken in Leapfrog software and used a combination of assay grade, magnetic susceptibility, and logged lithology. In general, an approximate Fe cut-off of 15% was used to guide the contact of the iron formation with adjacent units.* *Additional domains were created within each of the deposits based on statistical and geological observations, namely the relationship between Fe and SiO2 along with the magnetic susceptibility and logging to differentiate between magnetite dominant and haematite dominant domains. Transitional mineralogy has also been identified from the FeO to Fe / Pulp Magnetic Susceptibility relationship.* *All domains created were statistically validated during the modelling process to ensure valid domains were created.* *At Kallak North, the domains have been created:* • *Magnetic – Low Grade, internal to synform (IFMN_KN_MAGH_LG)* • *Magnetic – Medium Grade, internal to synform (IFMN_KN_MAGH_MG)* • *Magnetic – High Grade, internal to synform (IFMN_KN_MAGH_HG)* • *Magnetic - External to synform (IFMN_KN2_HG and IFMN_KN3_HG)* • *Haematite, non-magnetic – Low grade <31% Fe (IFMN_KN_HEM)*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
	• *Haematite, non-magnetic – Medium Grade 31% to 43% Fe (IFMN_KN_HEM_GT_31)* • *Haematite, non-magnetic – High Grade >43% Fe (IFMN_KN_HEM_GT_43)* • *Internal waste (IFMN_KN_INT1)* *At Kallak North, a contact analysis study was completed that shows a transitional grade contact between the mineralised units. As such, a soft boundary has been used in the grade estimation at Kallak North.* *At Kallak South North, the domains have been created:* • *Magnetic – IFMN_KSN1 to IFMN_KSN6 (not including KSN4)* • *Magnetic – IFMN_KSN1_HG and IFMN_KSN2_HG* • *Haematite – IFMN_KSN_HEM1 and KSN4* • *Internal waste within IFMN_KSN1 (IFMN_KSN1_INT1 to INT3)* • *Internal waste within IFMN_KSN2 (IFMN_KSN2_INT1 to INT3)* *At Kallak South South, the domains have been created:* • *IFMN_KSS1 to IFMN_KSS8* • *IFMN_KSS3_LG* • *IFMN_KSS4_HG* • *IFMN_KSS5_HG* • *Internal waste within IFMN_KSS2 (IFMN_KSS2_INT1)*		
Estimation and modelling techniques	*The MRE was completed in Leapfrog Software with additional statistical studies completed in Supervisor.* *The estimation process assumes an equivalent weighting per composite. It is therefore necessary to discard or ignore remnant composites that are generated in the downhole compositing process to avoid a bias in the estimation. However, based on the results of a composite length analysis on each domain during the parameter selection stage, it was decided to use all samples, meaning no shorter lengths were discarded. Edge samples below a set value of 0.5 m were included in the previous sample down the hole.* *Due to the low variance of the Fe data, being the primary driver for the modelling process, it is also the opinion of BGS that all deposits are insensitive to variations in the composite length and the treatment of smaller sample lengths.* *Various composite lengths were selected with the composite length chosen using the Fe assay with the same length applied to all analytes. At Kallak North, a soft boundary was selected due to the gradational contact between the modelled zones.* *The composite files were used in a geostatistical study that enabled Ordinary Kriging ("OK") to be used as the main interpolation method. This was*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
	supplemented with an Inverse Distance Weighting algorithm to estimate grade for some of the domains with less sample support. *The results of the variography were utilised to determine the most appropriate search parameters used in the grade estimate.* *The interpolation used an elliptical search following the predominant dip and dip direction of the geological zones with a variable orientation used within zones of variable dip and dip direction.* *For each domain where variography was possible, variography was completed on all assay fields being estimated into the block model, these being Fe, FeO, SiO2, Al2O3, P, Mn, S, CaO, MgO, TiO2, K2O, LOI and Pulp Magnetic Susceptibility.* *BGS created downhole variograms to fix the nugget followed by directional variograms.* *In most cases, the variograms produced showed reasonable structure, allowing reliable variogram models to be produced. The nugget and ranges are easily generated, providing an appropriate level of confidence in terms of both the short scale and longer-range grade continuity.* *Density was applied to the mineralised zones using a regression-based formula.* *The interpolated block model was validated through visual checks and a comparison of the mean input composite and output model grades. BGS is confident that the interpolated block grades are a reasonable reflection of the available sample data.*		
Metal equivalents or other combined representation of multiple components	*No metal equivalents are used.*		
Cut-off grades or parameters	*BGS used an approximate 15% Fe cut-off to generate the mineralised units at Beowulf . No cut-off grade has been applied to the final Mineral Resource Statement due to the lack of grade sensitivity.*		
Tonnage Factor/In-situ Bulk Density	*As a result of the density testwork, BGS utilised a regression curve for the assignment of density to the iron formation units. The regression formula used is:* *Density = 0.0002x2 + 0.02x +2.6272 (where x is Fe%)* *The density and tonnage estimate is considered robust although further density testwork should be implemented with further exploration.*		
Mining factors or assumptions	*To determine the final Mineral Resource Statement, the model has been subjected to an optimisation exercises to determine the proportion of the*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
	material defined that has a reasonable prospect of economic extraction via an open pit mining method. The following assumptions have been made during the optimisation process: *Base case metal price of USD130 / tonne for a 65% Fe concentrate.* *Fe recovery of 71% at Kallak North, 86% at Kallak South North and 94% at Kallak South South.* *Fe concentrate grades of 68% at Kallak North, 70% at Kallak South North and 69% at Kallak South South.* *Processing costs of USD6.8 / t wet* *Selling cost of USD21.0 / t wet concentrate.* *Mining cost of Ore of USD3.3 / t, mining cost of waste of USD3.0 / t and an incremental mining cost per 10 m bench of USD0.05 / t.* *Wall angles of 30° within the overburden and 47.5° in the fresh rock.*		
Metallurgical factors or assumptions	*In late 2013, approximately 500t of material, from the test mining sampling programme completed on a defined area of the Kallak North deposit in summer 2013, was transported to a test facility in Outokumpu City, owned by GTK. The main portion of the material was a general composite bulk sample, representing all the test mined sections at Kallak North in proportion to their respective occurrence.* *Approximately 60t of the general composite bulk sample were tested during a two-week pilot campaign, primarily focusing on establishing recovery and product quality parameters for the magnetite content. Average iron content for the submitted sample was 29.5%. The proportion of magnetite to haematite in the sample was approximately 3.4:1.* *The magnetite beneficiation circuit was conventional and straightforward, consisting of rod milling with rougher-scavenger cobbing low-intensity magnetic separation ("LIMS") preconcentration, followed by ball mill re-grinding together with six cleaner LIMS stages to achieve the final magnetite product. The grade and recovery levels were excellent. The amount of dry magnetite concentrate produced for downstream testwork was approximately 2.7t, grading at 69.4%Fe at a magnetite recovery of approximately 95%. Average silica content in the final product was 3.9% and the levels of sulphur and phosphorous were insignificant, being below 0.01%. The end product fineness was 80% passing 25 microns.* *The secondary objective, to produce a concentrate of the haematite content, was successful in respect of the quality aspect. A sample of 0.36t of dry haematite iron concentrate was produced, at an average grade of 66.6%Fe, containing 3.3% silica, 0.08% phosphorous and less than 0.02% sulphur. The fineness was 80% passing 175 microns. Several different flow sheet options were tested in order to maximise the haematite recovery, without fully reaching optimised levels. The best beneficiation result was achieved using a combination of spiral separators, supported by High- Gradient Intensity Magnetic Separator ("HGIMS"), recovery remained at below 30%. The short testwork programme did not enable optimisation of the haematite beneficiation*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
	section. Process mineralogy studies proved that the haematite losses were mostly occurring in the very fine particle sizes. *In 2015, a testwork programme was carried out with the assumption that a high-grade magnetite concentrate could be produced through the application of reverse flotation, and that the results would prove the suitability of the Kallak North magnetite concentrate for use in Direct Reduction Iron facilities and as chemical grade raw material.* *Excellent concentrate grades were obtained with over 71% Fe from the magnetite material in addition to a high-grade hematite concentrate, over 68% Fe.* *In 2021, 106 samples were selected for Davis Tube Testwork. The samples were selected across the range of FeO and Pulp Magnetic Susceptibility vales and was undertaken to assess the potential concentrate grade from samples of differing FeO and magnetic susceptibility ratios.* *All samples were pulverised to 45 microns for the testwork.* *The results showed, the Fe concentrate grade averages 69%, being 68% at Kallak North and increasing to 70% and 69% at Kallak South North and Kallak South South. The mass recovery increases to the south from 38% at Kallak North to 45% and 48% at Kallak South North and Kallak South South. Fe recovery also increases to the south from 71% at Kallak North and 86% and 94% at Kallak South North and Kallak South South. This indicates that the iron bearing domains are less transitional and dominated by a purer magnetite phase of mineralisation to the south of the project area. In addition, there is no haematite mineralisation modelled at Kallak South South potentially suggesting a lower strain environment that has resulted in limited alteration of the magnetite to haematite.* *It should be noted that less samples have been analysed at Kallak South North and Kallak South South compared to Kallak North and the results may be skewed by the quantum of data available.*		
Mineral Resource estimate for conversion to Mineral Reserves			*No Reserves are currently being declared*
Cost and revenue factors.			*No Reserves are currently being declared*
Market assessment.			*No Reserves are currently being declared*

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Others		*All resources reported are within the licence boundaries.*	
Classification	*To classify the Project, the following key indicators were used:* • *Geological complexity* • *Quality and quantity of data used in the estimation* • *QAQC data* • *Density Data* • *Results of the geostatistical analysis, namely the Variography and QKNA results, and* • *Quality of the estimated block model* *Due to the amount of drilling across the Project, the risks associated with the geological interpretation have been mitigated to allow continuous iron formation units to be modelled. The quantity of drilling data does decrease to the south although continuous iron formations are still possible to model in areas of sparser data.* *Kallak North shows greater degrees of geological complexity at present, possibly due to the greater level of exploration focus and data available.* *The complexity of the Project is not in reality related to the continuity of the iron formation units, rather the complexity in the material types within each formation. Complex interactions of magnetic and nonmagnetic mineral phases exist with more haematitic material being associated with fold hinges and other structural features. At Kallak North, grade decreases to towards the centre of the interpreted synform and increases to the south where the haematite material is located along the fold hinge. Poddy internal zones of low grade / waste material also exist within Kallak North that are hard to model due to the poddy nature, being aplite and pegmatite intrusive material.* *At Kallak South North, where it is assumed that a continuation of the synform exists, structural logging and a lack of data on a fold hinge does not confirm this interpretation. Minor units / pods of haematite material also exist.* *Kallak South South contains the least amount of data and a simple set of iron formation lenses has been created.* *The mineralogy within the magnetic domains is also variable with tests suggesting that transitional phases of magnetite and maghemite exist. This is demonstrated through the relationship between Fe and FeO / Magnetic Susceptibility and further highlighted in the streak tests and Davis Tube Testwork carried out. The Davis Tube Testwork does however show that a high-grade concentrate can be produced from all magnetic phases of material.* *There is also a general lack of consensus regarding the geological model and deposit type for the Project with two model types being proposed. More recently, SGU suggest that the Project could be a stratiform-stratabound type*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
	that formed in a volcanogenic setting whereas previous interpretations suggest a sedimentary/volcanic ore or a chert-bearing banded iron formation. *Overall, BGS does however consider the geological risk to be low with the distribution of the iron bearing lithologies being well constrained by drilling and the testwork carried out showing that a high-grade concentrate is attainable from the Project.* *The QAQC testwork implemented as part of the exploration shows that no significant bias exists and that the data provided is suitable for use in the MRE.* *The data used in the geostatistical analysis resulted in suitably reliable downhole variograms for all zones where variography was carried out with robust directional variograms being created.* *BGS employed numerous validation techniques and is confident that the estimated block grades are a reasonable reflection of the input sample data.* *The Project has been classified as containing Measured, Indicated and Inferred Mineral Resources. Measured Mineral Resources have only been applied at Kallak North. Kallak South South has been limited to Inferred Mineral Resources only due to the limited sample data and simplistic geological interpretation.* *The following guidelines were used to classify the estimate.* *Measured Mineral Resource have been assigned based on the following criteria:* • *The upper portions of Kallak North with the greatest concentration of drilling.* • *Where the Fe search volume = 1.* • *With a slope of regression greater than 0.8.* • *With an average number of samples greater then / equal to 8.* *Indicated Mineral Resource at Kallak North and Kallak South North have been assigned based on the following criteria:* • *Where the search volume = 1* *Inferred Mineral Resource have been assigned to zones with a low sample count and in zones of geological uncertainty.*		
Audits or reviews	*No Independent audits or reviews of the Mineral Resource estimate has taken place although BGS comments that the results are in-line with historical estimates completed in 2013 and 2014 by Geovista.*		
Discussion of relative accuracy/confidence	*The Mineral Resource has been classified following the PERC 2017 standard and based on the definitions of Measured, Indicated and Inferred Mineral Resources.*		

ASSESSMENT CRITERIA	EXPLORATION RESULTS	MINERAL RESOURCES	MINERAL RESERVES
Schematic description of the principles for reporting of Mineral Resource and Mineral Reserve	*Multiple schematics showing the classified resource models are included in the report.*		

Glossary

Resource terminology

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

Inferred Mineral Resource - An Inferred Mineral Resource is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity. An Inferred Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that most of the Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration. The 'Inferred' category is intended to cover situations where a mineral concentration or occurrence has been identified and limited measurements and sampling have been completed, but where the data are insufficient to allow the geological and/or grade or quality continuity to be confidently interpreted. Due to the uncertainty which may be attached to some Inferred Mineral Resources, it cannot be assumed, but normally would be expected, that a major part of an Inferred Mineral Resource will be upgraded to an Indicated or Measured Mineral Resource as a result of continued exploration. Confidence in the estimate is usually not sufficient to allow the appropriate application of technical and economic parameters or to enable a reliable evaluation of economic viability. For this reason, there is no direct link from an Inferred Resource to any category of Mineral Reserves.

Indicated Mineral Resource - An Indicated Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation. An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve. An Indicated Mineral Resource requires that the nature, quality, amount and distribution of data are such as to allow the Competent Person to confidently interpret the geological framework and to assume geological continuity of mineralisation, with sampling at a pattern and spacing appropriate to the geological characteristics and complexity of mineralisation. Confidence in the estimate is sufficient to allow the application of technical and economic parameters, and to enable an evaluation of economic viability. 'Grade or quality' is to be interpreted broadly, to include all relevant chemical and mineralogical characteristics.

Measured Mineral Resource - A Measured Mineral Resource is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration,

sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation. A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proved Mineral Reserve or to a Probable Mineral Reserve. The occurrence of mineral(s) of economic interest may be classified as a Measured Mineral Resource when the nature, quality, amount and distribution of data are such as to leave no reasonable doubt, in the opinion of the Competent Person determining the Mineral Resource, that the tonnage, mineralogy, and grade or quality can be estimated to within close limits, and that any variation from the estimate would be unlikely to significantly affect potential economic viability. Confidence in the estimate is sufficient to allow the appropriate application of technical and economic parameters and to enable an evaluation of economic viability with a high level of confidence.

Other terms

Alumina - An oxide of aluminium, Al_2O_3; the mineral corundum; an important constituent of clay minerals. In iron ore this is normally considered a deleterious element.

Aplite - A light-coloured igneous rock characterized by a fine-grained saccharoidal (i.e., aplitic) texture.

Azimuth - Direction of a horizontal line as measured on an imaginary horizontal circle, the horizontal direction reckoned clockwise from the meridian plane of the observer, expressed as the angular distance between the vertical plane passing through the point of observation and the poles of the Earth and the vertical plane passing through the observer and the object under observation.

Banded iron formation - Iron formation that shows marked banding, generally of iron-rich minerals and chert or fine-grained quartz.

Bi-modal population - Having or occurring with two modes. Statistics: a branch of applied mathematics concerned with the collection and interpretation of quantitative data and the use of probability theory to estimate population parameters.

Block modelling The process of generating a three-dimensional model of a mineral deposit where individual parent blocks are equally sized and ascribed certain physical properties and qualities (tonnage, density, volume, grade etc.).

Box and whisker - A graphic way to display the median, quartiles, and extremes of a data set on a number line to show the distribution of the data.

Certified reference materials - Controls or standards used to check the quality and metrological traceability of products, to validate analytical measurement methods, or for the calibration of instruments. A certified reference material is a particular form of measurement standard.

Collar - The mouth or opening of a borehole or the process of starting to drill a borehole.

Competent Person - A minerals industry professional who is a Member or Fellow of The Australasian Institute of Mining and Metallurgy, or of the Australian Institute of Geoscientists, or of a 'Recognised Professional Organisation', as included in a list available on the JORC and ASX websites. These organisations have enforceable disciplinary processes including the powers to suspend or expel a member.

Composite sample - The procedure by which the values of adjacent samples from boreholes are combined so that the value of the longer down-hole intervals can be assessed. The grade of each new interval is calculated on the basis of the weighted average of the original sample grades. These are usually weighted by length and possibly by specific gravity and core recovery.

Core - The long cylindrical piece of rock, about an inch in diameter, brought to surface by diamond drilling.

Core recovery - The amount of the drilled rock withdrawn as core in core drilling, generally expressed as a percentage of the total length of the interval cored.

Cut-off-Grade - The lowest grade of mineralized material that qualifies as ore in a given deposit; rock of the lowest assay included in an ore estimate.

Davis Tube Testwork - Is a laboratory test designed to separate small samples of strongly magnetic ores into strongly magnetic and weakly magnetic fractions. It has become a standard laboratory equipment used for the assessment of the separability of magnetic ores by low-intensity magnetic separators.

Deleterious elements - Minerals or elements present in ore and/or concentrates which are considered to reduce the VIU of iron ore, typically, silica, phosphorous, alumina.

Dip - The angle of a slope, vein, rock stratum, or borehole is measured from the horizontal plane downward.

Domaining - The process whereby geological zones/units are domained into discrete areas for further analysis.

Drillhole - Technically, a circular hole drilled by forces applied percussively; loosely and commonly, the name applies to a circular hole drilled in any manner.

Drill rig - A drill machine, complete with all tools and accessory equipment needed to drill boreholes.

Exploration - The search for coal, mineral, or ore by (1) geological surveys; (2) geophysical prospecting (may be ground, aerial, or both); (3) boreholes and trial pits; or (4) surface or underground headings, drifts, or tunnels. Exploration aims at locating the presence of economic deposits and establishing their nature, shape, and grade, and the investigation may be divided into (1) preliminary and (2) final.

Exploration Target - A statement or estimate of the exploration potential of a mineral deposit in a defined geological setting where the statement or estimate, quoted as a range of tonnes and a range of grade (or quality), relates to mineralisation for which there has been insufficient exploration to estimate a Mineral Resource.

Fold - A curve or bend of a planar structure such as rock strata, bedding planes, foliation, or cleavage. A fold is usually a product of deformation, although its definition is descriptive and not genetic and may include primary structures

Foliation - Repetitive layering in metamorphic rocks.

Gangue - The valueless minerals in an ore; that part of an ore that is not economically desirable but cannot be avoided in mining. It is separated from the ore minerals during concentration.

Geochemical analysis - The process through which scientists discover and unravel the chemical compounds that make up the earth, its atmosphere, and its seas.

Geochemistry - The study of the relative and absolute abundances of the elements and their nuclides (isotopes) in the Earth; the distribution and migration of the individual elements or suites of elements in the various parts of the Earth (the atmosphere, hydrosphere, lithosphere, etc.), and in minerals and rocks, and also the study of principles governing this distribution and migration. Geochemistry may be defined very broadly to include all parts of geology that involve chemical changes, or it may be focused more narrowly on the distribution of the elements.

Geophysical anomalies - Area where geophysical properties (e.g. radiometric, magnetic, electromagnetic, gravity) differ from surrounding areas and which may be the result of mineralisation.

Geophysical survey - The exploration of an area in which geophysical properties and relationships unique to the area are mapped by one or more geophysical methods.

Geostatistics - A methodology for the analysis of spatially correlated data. The characteristic feature is the use of variograms or related techniques to quantify and model the spatial correlation structure. Also includes the various techniques such as kriging, which utilize spatial correlation models.

Goethite - A dark or yellowish-brown mineral consisting of hydrated iron oxide, occurring typically as masses of fibrous crystals.

Grade - The relative quantity or the percentage of ore-mineral or metal content in an orebody.

Haematite - A reddish-black mineral consisting of ferric oxide and an important ore of iron ore.

Hinge - The locus of maximum curvature or bending in a folded surface, usually a line.

Iron - A strong, hard magnetic silvery-grey metal, the chemical element of atomic number 26, much used as a material for construction and manufacturing, especially in the form of steel.

Iron ore pellets - The product of an agglomeration process that mixes very fine pellet feed with a binder (e.g. a slurry of bentonite), with the mixture rolled into “green” balls. The product is then fired on a grate or in a kiln to produce the final indurated product, consisting of “balls” with about 8mm to 20mm. Similar to lump, pellets can be charged directly into a blast furnace or into a direct reduction plant. Pellets tend to have the highest value-in-use characteristics, and hence have generally commanded the highest pricing premium.

Kriging - In the estimation of Mineral Resources by geostatistical methods, the use of a weighted, moving-average approach both to account for the estimated values of spatially distributed variables, and also to assess the probable error associated with the estimates.

Loss on Ignition - A test used in inorganic analytical chemistry, particularly in the analysis of minerals. It consists of strongly heating a sample of the material at a specified temperature, allowing volatile substances to escape, until its mass ceases to change.

Magnetite - An isometric mineral, 8[$FeOFe_2O_3$]; spinel group; forms series with jacobsite and with magnesioferrite; crystallizes in octahedra; metallic; black; strongly ferrimagnetic; an accessory mineral in many igneous rocks; a common detrital mineral; a major mineral in banded iron formations and magmatic iron deposits; an ore of iron.

Martite - Haematite resulting from oxidation and re-crystallisation of magnetite.

Mass Yield - The amount of material (concentrate) derived from the processing of mined ore expressed as a percentage of ore delivered to the processing plant and

Micron - A unit of length equal to one millionth of a metre, used in many technological and scientific fields.

Nugget Theoretically, at zero separation distance (lag = 0), the semivariogram value is 0. However, at an infinitesimally small separation distance, the semivariogram often exhibits a nugget effect, which is some value greater than 0. For example, if the semivariogram model intercepts the y-axis at 2, then the nugget is 2.

Open Pit - A mine that is entirely on surface. Also referred to as open-cut or open-cast mine.

Optimisation analysis - Determining the optimum ultimate pit of a mine is the base of mine planning. The optimum ultimate pit of a mine is defined as the "pit shell contour", which is the result of extracting the volume of material that provides the total maximum profit while satisfying the operational requirements of safe wall slopes.

Ordinary Kriging - Geostatistical estimation is a two-stage process: (i) studying the gathered data to establish the predictability of values from place to place in the study area; this study results in a graph known as a semi-variogram which models the difference between a value at one location and the value at another location according to the distance and direction between them; (ii) estimating values at those locations which

have not been sampled. This process is known as kriging. The basic technique ordinary kriging uses a weighted average of neighbouring samples to estimate the unknown value at a given location. Weights are optimized using the semi-variogram model, the location of the samples and all the relevant inter-relationships between known and unknown values. The technique also provides a standard error which may be used to quantify confidence levels.

Ore - A naturally occurring solid material from which a metal or valuable mineral can be extracted profitably.

Overburden - Designates material of any nature, consolidated or unconsolidated, that overlies a deposit of useful materials, ores, or coal--esp. those deposits that are mined from the surface by open cuts.

Overall slope angle - The angle between the lowest toe and the highest crest inclusive of any haul roads.

Oxide - Term used to define geological unit which has been subject to oxidation and weathering.

Pegmatites - An exceptionally coarse-grained igneous rock, with interlocking crystals, usually found as irregular dikes, lenses, or veins, esp. at the margins of batholiths.

Phosphorous - A non-metallic element of the nitrogen group. Symbol, P. Never found free in nature but is widely distributed in combination with minerals. In iron and steel making Phosphorous has four major effects on iron: increased hardness and strength, lower solidus temperature, increased fluidity, and cold shortness.

Pycnometry - A standard vessel often provided with a thermometer for measuring and comparing the densities or specific gravities of liquids or solids.

Quality Assurance and Quality Control - The combination of quality assurance, the process or set of processes used to measure and assure the quality of a product, and quality control, the process of ensuring products and services meet consumer expectations.

Quartz - A hard mineral consisting of silica, found widely in igneous and metamorphic rocks and typically occurring as colourless or white hexagonal prisms.

Recovery - A measure of the efficiency of the extraction of saleable products from the initial ore expressed as a percentage.

Satmagan measurements - An inexpensive test which accurately measures the amount of magnetite in a sample. Systematic analysis of an ore body can determine if there is a direct relationship between the predicted mass of magnetic concentrate (Satmagan) versus the actual mass of concentrate from a variety of DTR tests.

Search ellipse - The volume which defines how far out to search for data to support a particular kriged estimate.

Scatterplot - A type of plot or mathematical diagram using Cartesian coordinates to display values for typically two variables for a set of data.

Sheath fold - Strongly non-cylindrical structures, which are often associated with shear zones.

Silica - The chemically resistant dioxide of silicon, SiO_2. An industrial term for certain

Skarn - Name for the metamorphic rocks surrounding an igneous intrusive where it comes in contact with a limestone or dolostone formation.

Slag - Material from the iron blast furnace, resulting from the fusion of fluxstone with coke ash and the siliceous and aluminous impurities remaining after separation of iron from the ore. Slag is also produced in steelmaking. Formerly a solid waste, slag is now utilized for various purposes, chiefly in construction.

Specific gravity - The weight of a substance compared with the weight of an equal volume of pure water at 4 degrees C. Specific gravity is numerically equal to density given in grams per cubic centimetre or millilitre.

Standard deviation - The square root of the variance. A measure of dispersion of a set of data from its mean.

Stripping ratio - The volume of overburden (or waste material) required to be handled in order to extract some tonnage of ore. For example, a 3:1 stripping ratio means that mining one tonne of ore will require mining three tonnes of waste rock.

Sulphide - A mineral compound characterized by the linkage of sulphur with a metal or semimetal; e.g., galena, PbS, or pyrite, FeS_2.

Sulphur - The chemical element of atomic number 16, a yellow combustible non-metal. that occurs widely in nature, especially in volcanic deposits, minerals, natural gas, and petroleum. It is used to make gunpowder and fertilizer, to vulcanize rubber, and to produce sulfuric acid.

Syncline - A trough or fold of stratified rock in which the strata slope upwards from the axis.

Synform - A fold whose limbs close downward in strata for which the stratigraphic sequence is unknown.

Titanium - A silvery-grey or iron-grey, metallic element. Symbol, Ti. Found in nature only in combined form; occurs chiefly in ilmenite ($FeTiO_3$), and in rutile and titanite. Used as an alloying agent with aluminium, molybdenum, manganese, iron, and other metals. Used in aircraft and missiles and has potential for use in desalination plants.

Trench - In geological exploration, a narrow, shallow ditch cut across a mineral deposit to obtain samples or to observe character.

Validation - A process whereby the accuracy of estimates is validated typically against known points in resource estimation.

Variance - The mean square deviation of the variable around the average value. It reflects the dispersion of the empirical values around its mean.

Variogram - A plot of the variance (one-half the mean squared difference) of paired sample measurements as a function of the distance (and optionally of the direction) between samples. Typically, all possible sample pairs are examined, and grouped into classes (lags) of approx. equal distance and direction. Variograms provide a means of quantifying the commonly observed relationship that samples close together will tend to have more similar values than samples far apart.

Variogram range - The range is the distance after which the variogram levels off. The physical meaning of the range is that pairs of points that are this distance or greater apart are not spatially correlated. The sill is the total variance contribution, or the maximum variability between pairs of points.

Vein - An epigenetic mineral filling of a fault or other fracture in a host rock, in tabular or sheetlike form, often with associated replacement of the host rock; a mineral deposit of this form and origin.

Volcanic - Characteristic of, pertaining to, situated in or upon, formed in, or derived from volcanoes.

Waste - The part of an ore deposit that is too low in grade to be of economic value at the time of mining, but which may be stored separately for possible treatment later or alternatively contains no economic minerals and must be mined in order to expose the mineralised material of economic interest.

Wireframe - A method of three-dimensional subsurface mapping commonly employed for the preparation of digital elevation models in surveying, hydrology, geology, and mining.

X-Ray Fluorescence - A non-destructive analytical technique used to determine the elemental composition of materials. XRF analysers determine the chemistry of a sample by measuring the fluorescent (or secondary) X-ray emitted from a sample when it is excited by a primary X-ray source.