VULCAN ENERGY RESOURCES
Zero Carbon Lithium®

Updated Ortenau Indicated and Inferred Lithium-Brine Resource & Zero Carbon Lithium® Project JORC Resource

Highlights:

- Following the acquisition and interpretation of seismic and well data, announcing an updated and reclassified Ortenau Indicated JORC Resource Estimation of 2.06 Mt contained Lithium Carbonate Equivalent (LCE) at a grade of 181 mg/l Li.
- This represents a 131% increase in the total Upper Rhine Valley Project (URVP) JORC Indicated Resource Estimate. Importantly, 23% of Vulcan's total URVP lithium-brine (Li-brine) Resource is now in the Indicated category.
- The Indicated Resource portion of Ortenau – along with Taro – is being integrated into Vulcan's Pre-Feasibility Study (PFS), which is approaching completion.
- Ortenau Inferred JORC Resource Estimation revised to 10.80 Mt contained LCE at a grade of 181 mg/l Li and the updated total URVP Inferred and Indicated Resources are now 15.85 Mt LCE at a grade of 181 mg/l Li, the largest in Europe.
- Large resource size is significant in that it gives Vulcan the potential to become a major supplier of Zero Carbon Lithium® chemicals into the EU market, leveraging the recently announced regulations to set CO_2 limits for lithium-ion battery production in Europe.

Vulcan Managing Director, Dr. Francis Wedin, commented: *"As with Taro, at Ortenau we have used newly acquired and reinterpreted seismic data to advance the 3-D geological model, and well data to advance fault zone hydro-dynamics, allowing us to upgrade a significant portion of the Ortenau Resource to the "Indicated" category. This higher confidence resource area will form an important part of our PFS. This further validates our strategy to become a supplier of Vulcan's unique Zero Carbon Lithium® hydroxide to the European battery electric vehicle market. The European Commission regulations announced last week, setting limits on CO_2 footprints for lithium-ion battery production in Europe places Vulcan in the prime position to be a lithium supplier of choice for the European market. With the majority of the PFS work*

ASX Release
15 December 2020
ASX: VUL
FRA: 6KO

Highlights

Aiming to be the world's first **Zero Carbon Lithium®** producer.

Large, lithium-rich geothermal brine project, in the Upper Rhine Valley of Germany.

Europe's **largest** JORC-compliant lithium resource.

Located at the heart of the EU Li-ion battery industry.

Fast-track development of project under way towards production.

Corporate Directory

Managing Director
Dr Francis Wedin

Chairman
Gavin Rezos

Executive Director
Dr Horst Kreuter

Non-Executive Director
Ranya Alkadamani

CFO-Company Secretary
Robert Ierace

Fast Facts

Issued Capital: 78,401,194
Market Cap (@2.63c): $206m

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completed, we expect final review to be concluded by January, so we look forward to an exciting start for shareholders in 2021."

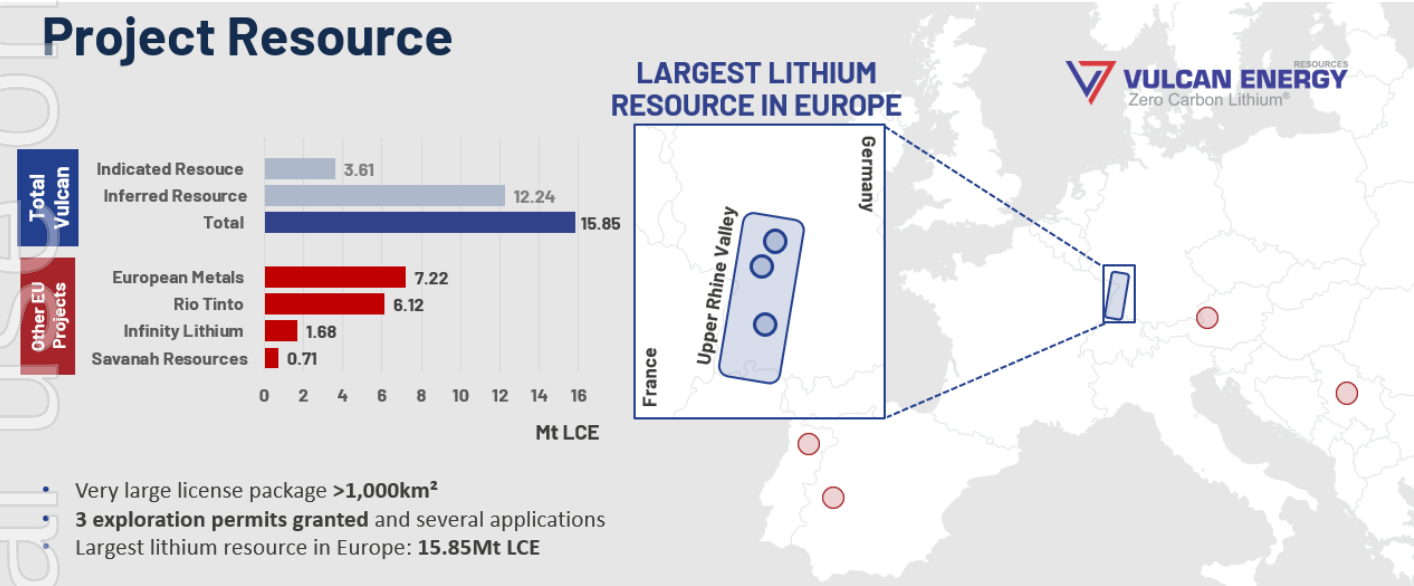


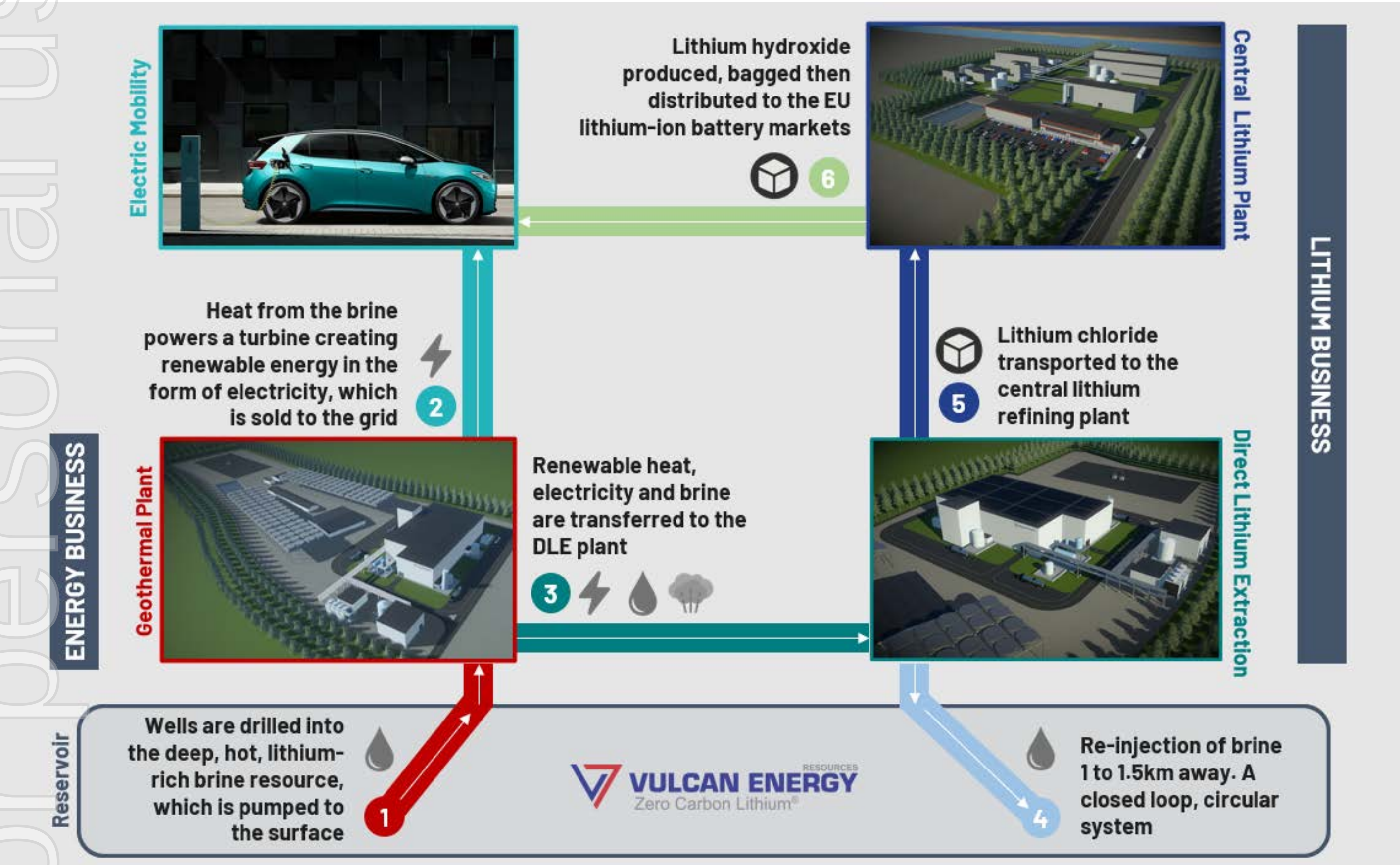
Figure 1: Vulcan's URVP Li-Brine Resource area in Europe. Mineral resources are not mineral reserves and do not have demonstrated economic viability. Sources for other company data, which are at varying stages of development: ASX:EMH 10/2020 presentation, ASX:RIO: 12/2020 release, ASX: INF: 06/2020 presentation, AIM:SAV: 11/2020 presentation.

Recent activities by the Company (https://v-er.com/investor-centre/):

- European Commission Regulation on batteries & CO_2 footprint.
- Taro updated and increased JORC Resource.
- Taro license grant and increased global Mineral Resource Estimate.
- Appointment of lithium, chemistry & automotive experts to the Executive Team.
- Excellent recoveries of over 90% from lithium extraction test work on Upper Rhine Valley brine.
- Securing EU backing support package into the Vulcan Zero Carbon Lithium® project.

About Vulcan

Vulcan Energy Resources is aiming to become the world's first Zero Carbon Lithium® producer, by producing a battery-quality lithium hydroxide chemical product with net zero carbon footprint from its combined geothermal and lithium resource, which is Europe's largest lithium resource, in the Upper Rhine Valley of Germany. Vulcan will use its unique Zero Carbon Lithium® process to produce both renewable geothermal energy, and lithium hydroxide, from the same deep brine source. In doing so, Vulcan will address lithium's EU market requirements by reducing the high carbon and water footprint of production, and total reliance on imports, mostly from China. Vulcan aims to supply the lithium-ion battery and electric vehicle market in Europe, which is the fastest growing in the world. Vulcan has a resource which can satisfy Europe's needs for the electric vehicle transition, from a zero-carbon source, for many years to come.



Vulcan is pleased to announce updated Indicated and Inferred Li-brine Resource Estimations, for its Ortenau License in the Vulcan Zero Carbon Lithium® Project area in the Upper Rhine Valley. In conjunction with this, Vulcan has re-totalled the collective Mineral Resource estimations for their URVP area within the Zero Carbon Lithium® Project.

The Ortenau Exploration License is held 100% by Vulcan's subsidiary, Vulcan Energy Resources Europe Pty Ltd. The now disclosed and updated JORC Indicated Mineral Resource Estimation at Ortenau is 2.06 Mt contained LCE in the Buntsandstein Group fault zone domain at a grade of 181 mg/l Li. The updated Inferred Mineral Resource

Estimation at Ortenau is 10.80 Mt contained LCE in the remaining Buntsandstein Group domain at a grade of 181 mg/l Li.

With the addition of the updated Ortenau Li-brine mineral resources, Vulcan's total, combined URVP resource is now estimated at 15.85 Mt LCE at a grade of 181 mg/l Li (Indicated & Inferred Resources), the largest JORC lithium resource in Europe, and with further growth potential. The Ortenau project is in the process of being integrated into the PFS at the Vulcan Zero Carbon Lithium® Project.

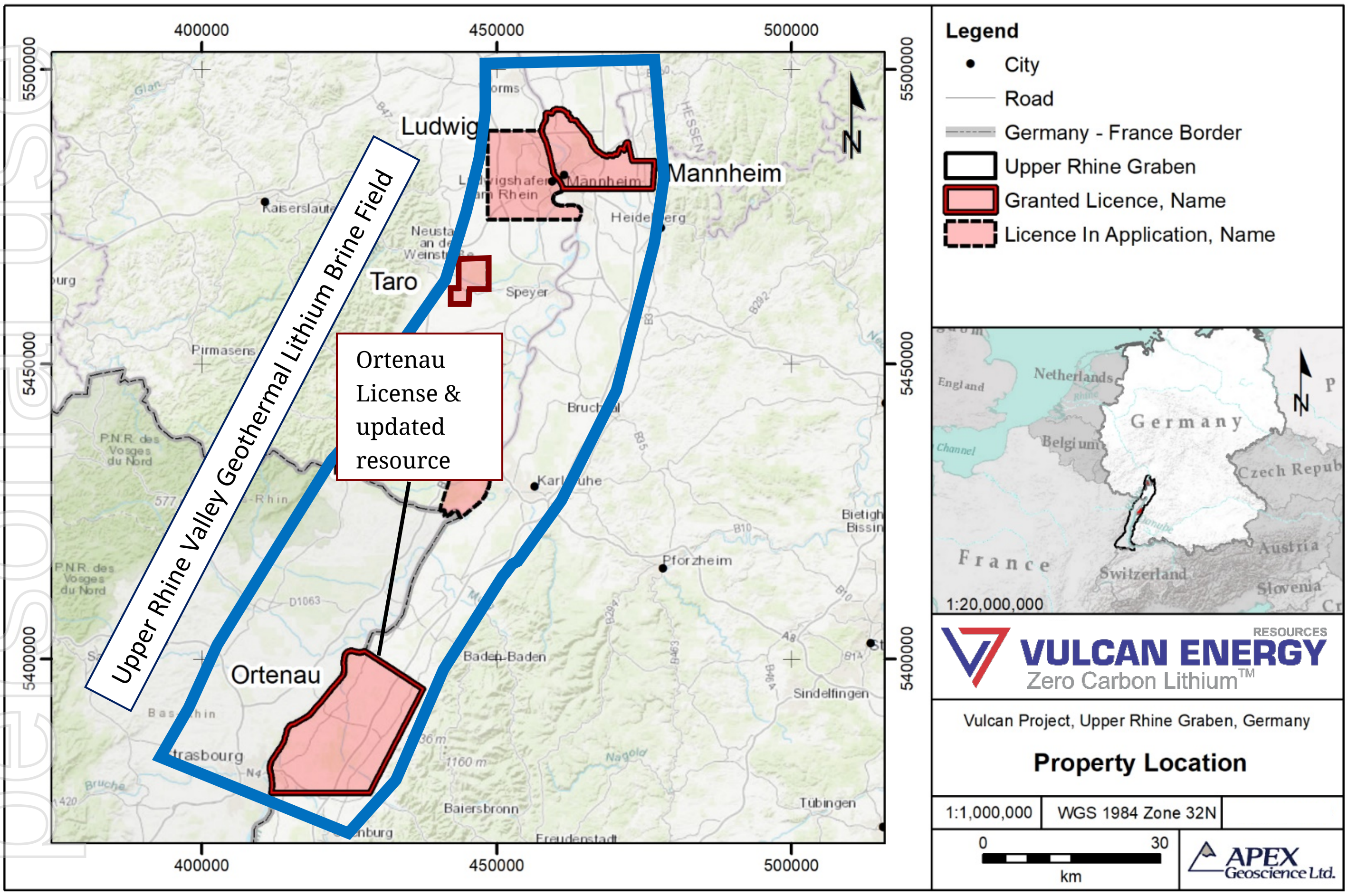


Figure 2: Ortenau License area, Vulcan Zero Carbon Lithium™ Project

Summary of Resource Estimate and Reporting Criteria

As per ASX Listing Rule 5.8 and the JORC 2012 reporting guidelines, a summary of the material information used to estimate the updated Ortenau Mineral Resource is detailed below (for more detail please refer to Table 1, Sections 1 to 3 in Appendix 3).

Property Location and Description

The Vulcan Lithium Project is comprised of multiple license areas within the Upper Rhine Valley area of southwest Germany. It is strategically located at the heart of the European auto and lithium-ion battery manufacturing industry. Vulcan has acquired exploration rights through direct application to the state mining authorities or earn-in agreements. Vulcan holds two licenses, Mannheim and Ortenau, with 100% ownership.

Vulcan has an earn-in agreement with a local company, Global Geothermal Holding UG (GGH), which holds one granted license (Taro)[1], and an MoU earn-in agreement with a geothermal operator (Geothermal MoU Area[2]). In addition, Vulcan has two in-application license areas, designated Ludwig and Heßbach (formerly Rheinaue), through its agreement with GGH.

Up to now, Ortenau was classified as an Inferred Resource[3], and with the acquisition and interpretation of new 2-D seismic and well data and improvement in the subsurface geological model and understanding of fault zone hydrodynamics, Vulcan is now disclosing an updated and reclassified Ortenau Licence Indicated and Inferred Li-brine Resource Estimate. Vulcan currently holds 100% interest in this license. Vulcan's URVP resource area, which is being re-totalled in this News Release, consists of the updated Ortenau Indicated and Inferred Resource Estimate together with two other licences with previously announced mineral resources in the URVP (12 November 2020).

Geology and geological interpretation

The Vulcan Property is located within the Upper Rhine Graben (URG) of southwestern Germany, which is characterized as a roughly azimuth 020° orientated Cenozoic graben that is composed of Permian to Tertiary sedimentary rocks with minor Tertiary volcanism and Quaternary surficial deposits.

The focus of Vulcan's geothermal lithium brine project in the Upper Rhine Valley is on aquifers associated with the Permocarboniferous Rotliegend Group sandstone and the Lower Triassic Buntsandstein Group sandstone, collectively the 'Permo-Triassic strata'. The Permo-Triassic strata underly all 6 Vulcan Property licenses and are characterized as a laterally heterogeneous sandstone unit within a structurally complex rift basin.

The Permocarboniferous Rotliegend Group formed during several URG rift phases with the lower Rotliegend comprised of fluvial-dominated Carboniferous and Permian sedimentary rocks. Subsequent compression of the Variscan Orogen was accompanied by volcanism and marks the end of the syn-rift phase and transition from fluvial-dominated to alluvial and eolian depositional environments.

The Lower Triassic Buntsandstein Group is subdivided into the Lower, Middle and Upper Buntsandstein subgroups as defined by distinct progradational (x2) and retrogradational fluvial sedimentary cycles. The Buntsandstein Group aquifer domain is defined as a confined sandstone aquifer that occurs between the fine grained Upper Buntsandstein Group (Rötton, Plattensandstein) and the fine-grained base of the Lower Buntsandstein.

The Buntsandstein Group aquifer is the focus of the updated Ortenau Licence resource estimations.

Brine aquifers within the Rotliegend Group and Buntsandstein Group may have some degree of hydrogeological communication. This is particularly evident in zones with a high degree of faulting and fracturing in which fluid brine can flow throughout the Permo-Triassic strata and can also penetrate the underlying faulted, fractured

[1] ASX announcement 10 July 2019
[2] ASX announcement 21 November 2019
[3] ASX announcement 4 December 2019

and altered granitic basement. These fault/fracture zones can contain hot brine and high fluid flow rates, and therefore, represent prime target areas for geothermal exploration.

Historical and Vulcan-conducted geochemical analysis of the aquifer brine from the Permo-Triassic strata shows the brine has elevated levels of lithium. Because recent German Government policy emphasizes decarbonisation and promotes the development of renewable sources, Vulcan is focused on extracting lithium from the deep-seated aquifers as a co-product of geothermal power production within the Upper Rhine Graben. That is, the geothermal wells have created access points to acquire deep, geothermally heated, lithium-enriched brine associated with the Permo-Triassic aquifers sitting on top of the crystalline basement.

Exploration Summary 2019-2020

Vulcan conducted a 2019 data compilation and brine sampling program that consisted of: 1) a geological compilation and subsurface review of the Permo-Triassic stratigraphy; 2) an assessment of the hydrogeological conditions underlying the Vulcan Property; and 3) collecting and analysing Permo-Triassic brine samples from the geothermal plant operating at the Geothermal MoU area or Property-neighbouring geothermal wells to verify the historical Li-brine geochemical results.

The average lithium content from brine collected by Vulcan from 6 geothermal wells located throughout the Upper Rhine Graben and proximal to the Ortenau and Taro licences was 181 mg/L Li (n=13 total metal analyses by ICP-OES). In addition, a detailed assessment of Permo-Triassic aquifer brine at the Geothermal MoU Area production well yielded 181 mg/L Li (n=23 analyses), which is identical to the regional Li-brine value[4]. These brine geochemical results demonstrate that the Permo-Triassic brine in the Upper Rhine Graben has a homogeneous lithium chemical composition in the vicinity of the Ortenau licence.

During 2020, Vulcan acquired the use of 15 existing 2-D seismic line datasets at the Ortenau Licence to formulate an advanced and robust 3-D geological model of the Buntsandstein Group strata, and structural fault zones underlying the licence. The revised geological model provides a higher level of confidence in the spatial location and orientation of the Buntsandstein surfaces and fault zones at Ortenau in comparison to the previous modelling that used Upper Rhine Graben regionally scaled subsurface information from GeORG[5]. Historical well data from within Vulcan's license was used to assist with, and validate, the seismic data interpretation. Vulcan also acquired detailed lithological and downhole geophysical information from a nearby geothermal well, which is located approximately 81 km north of the Ortenau Licence and produces brine from the same geological target unit that underlies Ortenau (Buntsandstein Group). These data were used to model fault/fracture zones and perform hydrogeological characterization measurements and calculations to gain better knowledge and validate increased porosity, permeability, and fluid flow within URG Permo-Triassic hosted fault zones. It is the opinion of the author (CP) that the Exploration data, and other data compiled and interpreted, has been sufficiently validated to the best of the author's ability. In addition, the author attests that the data were utilized by the appropriate personnel in a fashion that extracts the best possible 3-D geological model and hydrogeological characterization of the Buntsandstein Group aquifer underlying the Ortenau Licence.

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[4] See ASX announcement 2 December 2019

[5] See ASX announcement 2 December 2019

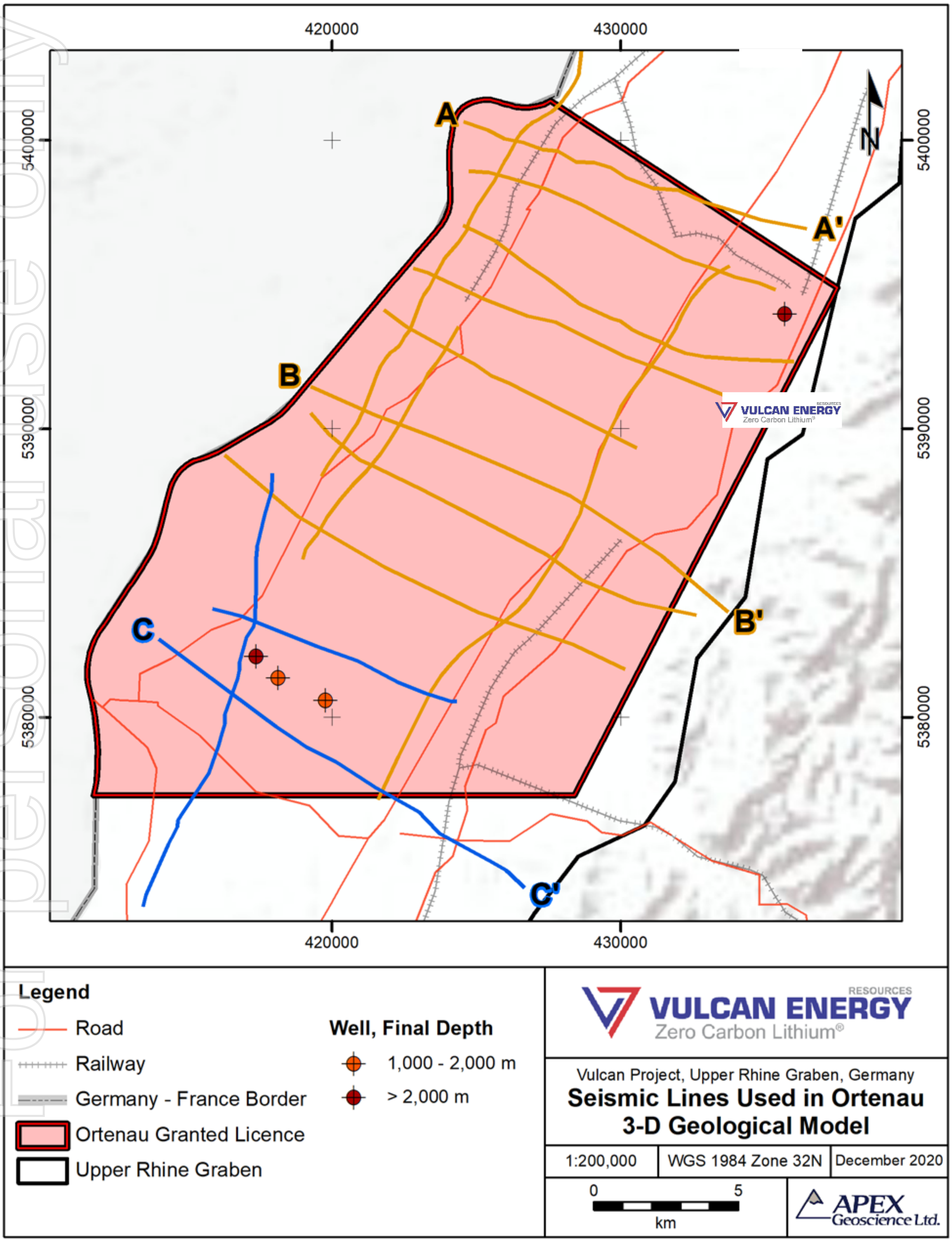

Figure 3: Summary of exploration data in the Ortenau license (Interreg IV Project GeORG).

Estimation Methodology, Cut-off Grades & Classification Criteria

The technical report referred to in this news release focuses on the updated Ortenau license lithium-brine Mineral Resource estimations, which were conducted in consideration of, and in accordance with, JORC (2012). Statistical analysis, three-dimensional (3-D) modelling and resource estimation was prepared by Mr. Black, M.Sc. P. Geo. of APEX. The modelling and estimation work were performed in direct collaboration and supervision of Mr. Eccles, M.Sc. P. Geol. who reviewed all work and takes responsibility for the Ortenau License Li-brine Resource estimations. The workflow implemented for the calculation of the Ortenau Li-brine resource estimations was completed using the commercial mine planning software MicroMine (v. 20.5).

Critical steps in the determination of this updated Ortenau license Li-Brine Resource Estimates include: 1) definition of the geometry of the Buntsandstein Group (at Ortenau) and fault zones based on newly acquired 2-D seismic data; 2) volume of the Permo-Triassic aquifer domains; 3) hydrogeological characterization of the specific yield, or in the case of the confined aquifer, the average effective porosity; 4) calculating the total volume of in situ brine; and 5) determination of the concentration of lithium within the brine and at the Ortenau license.

The 3-D geological model for the Ortenau license is based on stratigraphic and fault zone interpretation of existing 2-D seismic profiles that was acquired by Vulcan during 2020 specifically for the purpose of revising the original Ortenau geological model toward reclassification of the mineral resource. Four subsurface stratigraphic horizons were correlated throughout the Ortenau Licence including the top surface of the Buntsandstein Group. The base of the Buntsandstein Group could not be clearly identified because the boundary between Buntsandstein and Permian strata overlying the crystalline basement do not exhibit a distinct lithological change in the seismic profiles. To construct the base Buntsandstein surface, the CP used an average Buntsandstein Group thickness of 375 m based on published thickness data from throughout the URG and verified the base contact using GeORG cross-sectional information. A total of 24 faults were interpreted in the Ortenau license and are utilized in this updated resource estimation process. The fault zones were picked only where they could be positively identified in the seismic lines and the faults were correlated in consideration of their offset, dip angle and depth.

The detailed geological model developed for the Ortenau license enabled the author to consider the Li-brine resource potential associated within the Buntsandstein Group domain and the Buntsandstein Group fault zone domain, which penetrates through the Buntsandstein Group strata. The domains were differentiated because a pertinent conclusion of this study is that fault zone bounded reservoirs in porous host rocks can form double porosity systems, where matrix porosity associated with the host rock and fracture porosity associated with the fault zone contribute to the overall storage capacity of the fault-channeled reservoir.

This contention was supported through Vulcan acquisition of detailed lithological and downhole geophysical logs from a nearby geothermal well, which is located approximately 81 km north of the Ortenau license. The work concluded that the fault zone documented within the logged core contains an additional 'fracture porosity' of 3.1% beyond the 'matrix porosity' of the host rock surrounding the fault zone.

Based on these interpretations, 2 separate geological domains were wireframed for the Ortenau License resource model and estimations, and include: 1) Buntsandstein Group domain, and 2) Buntsandstein Group fault zone domain, which includes 24 fault zones whose activity levels, dimensions and widths were interpreted from the seismic profiles and their displacement measurements.

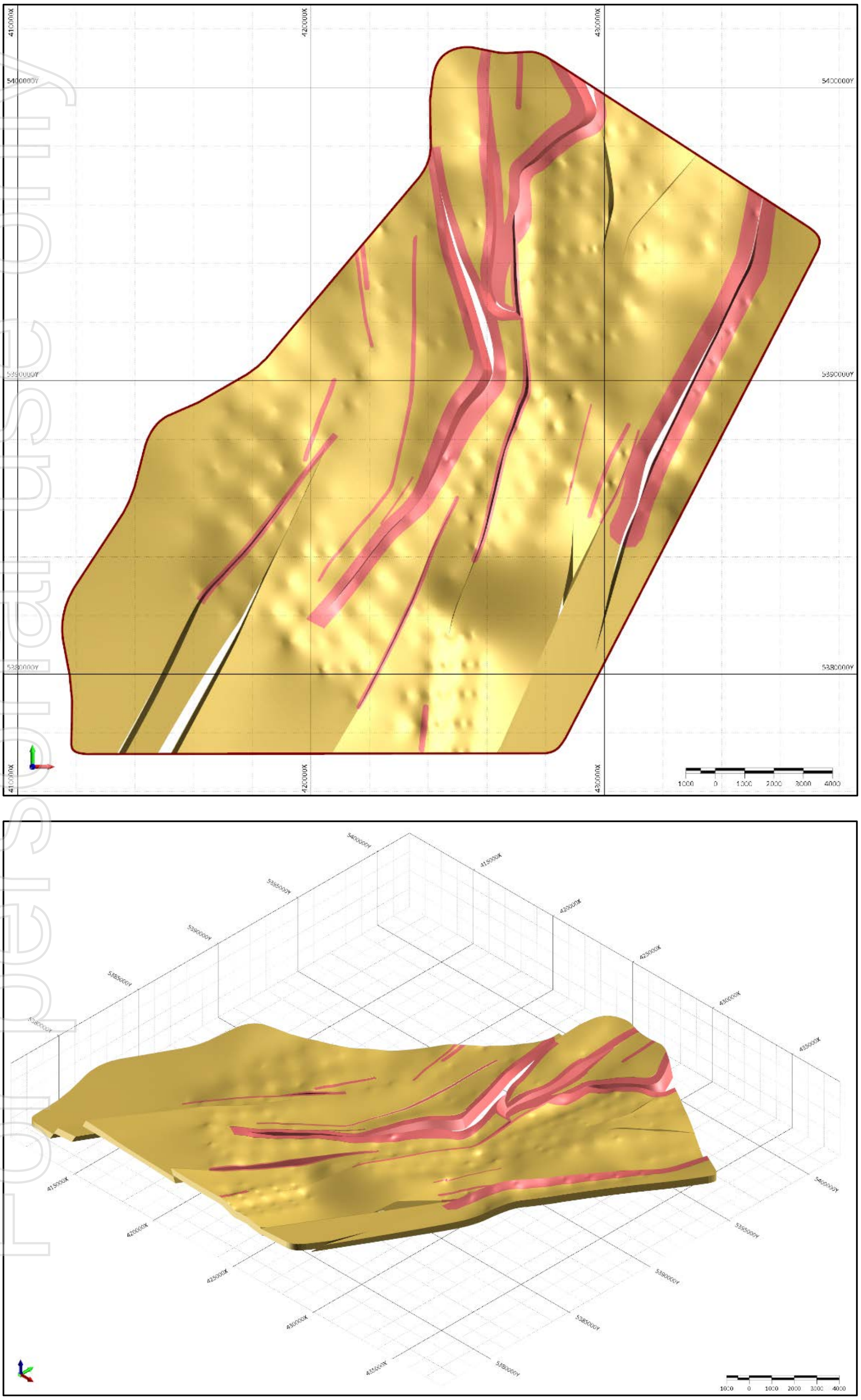

Figure 4: 3D resource model of Ortenau resource, showing areas of Indicated category (pink; Buntsandstein Group fault zone domain) and Inferred category (gold; all remaining Buntsandstein Group outside of the fault zones)

The 3-D wireframes created in MicroMine for each of the 2 geological domains at Ortenau are represented as closed solid polygons. Accordingly, the volume of rock, or the aquifer volume, within each wireframe can be calculated. The aquifer volume underlying the Ortenau license is summarized as a total Buntsandstein Group domain aquifer volume of 117.97 km^3 and a total Buntsandstein Group fault zone domain aquifer volume of 17.00 km^3.

The aquifer volume is multiplied by average porosity times the percentage of brine assumed within the pore space to calculate the brine volume. A fault core and damage zone porosity of 12.6% was used for the fault domain within the Buntsandstein Group aquifer. Regional mean matrix porosity of 9.5% was used for the Buntsandstein Group aquifers. The brine volume underlying the Ortenau license is summarized as a total Buntsandstein Group domain brine volume of 11.21 km^3 and a total Buntsandstein Group fault zone domain brine volume of 2.14 km^3.

Vulcan has conducted URG-wide Li-brine assaying in addition to detailed lithium assaying in the Geothermal MoU Area[6] [7]. Both sets of analytical work yield the identical average lithium value of 181 mg/L Li. This value is representative of the Buntsandstein Group aquifer brine underlying the URG and was used in the resource modelling process at Ortenau.

A lower cutoff of 100 mg/L Li is used in this Li-brine resource estimation. It is the opinion of the author that this cutoff is acceptable because: 1) confined aquifer deposits traditionally have lower concentrations of lithium (in comparison to unconfined lithium-brine salar and hard rock lithium deposits), and 2) numerous commercial, academia and independent laboratories are now commercialising rapid lithium extraction techniques using low lithium concentration source brine.

The resource estimation presented in the technical report referred to in this news release is presented as a total (or global value), and was estimated using the following relation in consideration of the Permo-Triassic aquifer domains at Vulcan's licenses, or resource areas:

Lithium Resource = Total Volume of the Brine-Bearing Aquifer X Average Porosity X Average Concentration of Lithium in the Brine.

In the updated Ortenau License Li-brine Resource estimations, the CP has classified 1 sub-domain, the Buntsandstein Group fault zone domain, as an Indicated Resource. The Indicated Resource area represents a 12.6% portion of the overall Ortenau license.

Pertinent points to support an Indicated Resource classification at the Ortenau license include: 1) a greater level of confidence in the subsurface geological model because of Vulcan's acquisition of detailed seismic data, 2) acquisition of a detailed downhole geophysical dataset to analyze the hydrogeological characteristics of a fracture zone within a geothermal well, and 3) knowledge of Vulcan's commissioned DLE adsorption mineral processing test work and results.

[6] See ASX announcement 2 December 2019

[7] See ASX announcement 20 January 2020

Mineral resources are not mineral reserves and do not have demonstrated economic viability. There is no guarantee that all or any part of the mineral resource will be converted into a mineral reserve.

With respect to Indicated Mineral Resources, the updated Ortenau Licence Li-brine Indicated Resource estimation predicts 388,000 tonnes of elemental lithium within the Buntsandstein Group fault zone domain (Table 1). The total lithium carbonate equivalent (LCE) for the Buntsandstein Group fault zone domain is 2,064,000 tonnes LCE.

Table 1: Vulcan's updated Ortenau Licence Li-brine Indicated Resource estimation within the Buntsandstein Group fault zone domain.

Reporting parameter	Buntsandstein Group Fault Zone Domain
Aquifer volume (km^3)	17.001
Brine volume (km^3)	2.142
Average lithium concentration (mg/L)	181
Average effective porosity	12.600
Total elemental Li resource (tonnes)	388,000
Total LCE (tonnes)	2,064,000

Note 1: Mineral resources are not mineral reserves and do not have demonstrated economic viability. Note 2: The weights are reported in metric tonnes (1,000 kg or 2,204.6 lbs). Numbers may not add up due to rounding of the resource values percentages (rounded to the nearest 1,000 unit). Note 3: The volume and weights are estimated at the average porosities cited in the table and assumes brine occupies 100% of the pore space. Note 4: The Vulcan Li-brine Project estimation was completed and reported using a lower cutoff of 100 mg/L Li. Note 5: To describe the resource in terms of industry standard, a conversion factor of 5.323 is used to convert elemental Li to Li2CO3, or Lithium Carbonate Equivalent (LCE).

The Ortenau Licence updated Inferred Resource includes the remaining Buntsandstein Group resource area that is not within the Indicated Resource fault zone domain. The Inferred Resource domain encompasses 87.4% of the Ortenau Licence. The updated Ortenau Inferred Resource estimation is presented in Table 2 and predicts 2,029,000 tonnes of elemental lithium within the Buntsandstein Group domain, or 10,798,000 tonnes LCE.

Mineral resources are not mineral reserves and do not have demonstrated economic viability. While it would be reasonable to expect that most of the Inferred Mineral Resources would upgrade to Indicated Mineral Resources with continued exploration, due to the uncertainly of Inferred Mineral it should not be assumed that such upgrading will always occur. There is no direct link from an Inferred Mineral Resource to any category of Ore Reserves.

Table 2: Vulcan's updated Ortenau Licence Li-brine Inferred Resource estimation within the Buntsandstein Group aquifer (i.e., all remaining resources outside of the Buntsandstein Group fault zone domain).

Reporting parameter	**Buntsandstein Group Domain**
Aquifer volume (km^3)	117.974
Brine volume (km^3)	11.208
Average lithium concentration (mg/L)	181
Average effective porosity	9.500
Total elemental Li resource (tonnes)	2,029,000
Total LCE (tonnes)	10,798,000

Note 1: Mineral resources are not mineral reserves and do not have demonstrated economic viability. Note 2: The weights are reported in metric tonnes (1,000 kg or 2,204.6 lbs). Numbers may not add up due to rounding of the resource values percentages (rounded to the nearest 1,000 unit). Note 3: The 'Total' volume and weights are estimated at the average porosities cited in the table and assumes brine occupies 100% of the pore space. Note 4: The Vulcan Li-brine Project estimation was completed and reported using a lower cutoff of 100 mg/L Li. Note 5: To describe the resource in terms of industry standard, a conversion factor of 5.323 is used to convert elemental Li to Li_2CO_3, or Lithium Carbonate Equivalent (LCE).

Vulcan Energy Resources
Zero Carbon Lithium®

Combined Upper Rhine Valley Project Li-Brine Resources

Vulcan's combined URVP Li-brine resources are now estimated to contain 15.85 Mt LCE at a grade of 181 mg/l Li (Indicated & Inferred; 90% of which is in the Inferred Resource category (Table 3).

Table 3: Vulcan's combined Li-brine resources at the Upper Rhine Valley Project. URVP Inferred and Indicated mineral resource estimates, other than Ortenau, were reported in ASX announcements released on 4 December 2019, and 20 January 2020.

URVP Resources	Aquifer Volume (km^3)	Brine Volume (km^3)	Avg. Li Conc. (mg/l Li)	Avg. Porosity (%)	Contained Elemental Li Resource Tonnes	Contained LCE Million Tonnes
Updated Ortenau Inferred Resource estimation	117.974	11.208	181	9.50	2,029,000	10.80
Updated Ortenau Indicated Resource estimation	17.001	2.142	181	12.60	388,000	2.06
Updated Taro Inferred Resource estimations	15.924	1.497	181	9.5 (Bunt) 9.0 (Rot)	271,000	1.44
Updated Taro Indicated Resource estimations	8.419	0.861	181	12.6 (BFZ) 9.5 (BHRE) 12.1(RFZ) 9.0 (RHRE)	156,000	0.83
Previously disclosed URVP Indicated Resource estimate (Geothermal MoU area)	8.322	0.749	181	9.00 (P-T)	136,000	0.72
Total URVP Indicated and Inferred Resource	**167.64**	**16.457**	**181**	/	**2,980,000**	**15.85**

Note 1: Mineral resources are not mineral reserves and do not have demonstrated economic viability. Note 2: The weights are reported in metric tonnes (1,000 kg or 2,204.6 lbs). Numbers may not add up due to rounding of the resource values percentages (rounded to the nearest 1,000 unit). Note 3: The total volume and weights are estimated at the average porosities cited in the table. Taro resource abbreviations: Bunt – Buntsandstein Group; Rot – Rotliegend Group; P-T – Permo-Triassic; BFZ – Buntsandstein fault zone; BHRE - Buntsandstein host rock envelope; RFZ – Rotliegend fault zone; RHRE – Rotliegend host rock envelope. Note 4: The Vulcan Li-brine Project estimation was completed and reported using a lower cutoff of 100 mg/L Li. Note 5: In order to describe the resource in terms of industry standard, a conversion factor of 5.323 is used to convert elemental Li to Li_2CO_3, or Lithium Carbonate Equivalent (LCE).

Extraction and Metallurgical Methods and Parameters

Vulcan has completed a positive Scoping Study over its lithium brine project in the Upper Rhine Valley (refer to ASX announcement 21 February 2020), and since completed successful bench-scale lithium extraction test work (refer to ASX announcement 4 August 2020) which resulted in >90% lithium recoveries. A generalized process flowsheet of Vulcan's model to derive zero-carbon lithium ($LiOH•H2O$) from the Vulcan Property and the Buntsandstein Group aquifer was presented in the Scoping Study.

The process flowsheet has three main components: 1) a brine conditioning process to remove deleterious metals/elements is implemented as it enters the Direct Lithium Extraction (DLE) Plant. 2) The DLE plant removes lithium from the brine while leaving behind most impurities. The brine is sent back to the geothermal plant and re-injected into the geothermal reservoir. A new beneficiated lithium stream with significantly higher Li concentration is formed for further processing. 3) A series of chemical operations convert the lithium stream into battery quality lithium hydroxide using conventional processes that have been previously demonstrated at commercial scale. Most of the used water is recycled with no toxic waste produced and no gases are emitted. Heat and power from the geothermal plant circuit are not affected. No fossil fuels are burned during lithium hydroxide processing, thereby eliminating direct carbon emissions.

Risks and Uncertainties

Vulcan's Lithium Brine Project represents an early-stage exploration project. At present, Vulcan has yet to drill a geothermal well at the Ortenau Licence and there are no operating wells that tap Buntsandstein Group aquifer brine in the license area. Accordingly, one uncertainty relates to the lack of current access to deep-seated subsurface brine within the boundaries of the Ortenau Licence. This has led to several assumptions in the resource estimation process including Li brine concentration and average porosity of the resource domains. In deep geothermal brine projects in the URG, exploration is typically conducted with seismic data acquisition and interpretation, with the first well drilled as the first production well. Because brine cannot currently be sampled from the Buntsandstein Group aquifer underlying the Ortenau licence, the CP relied on geochemical data associated with Vulcan's 2019 URG brine sampling that included, off-licence, but proximal geothermal well locations. In the CP's experience, confined aquifers in sedimentary basins can have massive spatial extent and with homogeneous to semi-homogeneous lithium-in-brine concentrations. So, it is the CP's opinion that the Li-brine content of neighbouring wells are a good proxy of lithium in the Permo-Triassic aquifer domains within the URG. There are, however, always local chemical variations due to numerous geological factors.

There is a significant amount of effective porosity measurements on Buntsandstein and Rotliegend drill cores, however, none of the wells were collared within the boundaries of the Ortenau licence. Consequently, the Ortenau resource estimation processes assume average Buntsandstein Group matrix and fracture porosities. It is possible that the porosity of any given resource domain is higher, or lower, than the values used because porosity and permeability can be variable in most shoreface depositional settings, particularly those that contain diagenetic and secondary cements. For the Ortenau Licence Li-brine resources, the author has attempted to utilize reasonable and conservative porosity values to define the resource domains and in the resource calculations. Future work at Ortenau should be planned to include drilling the first production well, to confirm the porosity and Li brine concentration assumptions used.

There is risk and uncertainty associated with exploring for and exploiting fault zones as geothermal and Li-brine reservoirs. For example,

- The resource evaluation in this news release has wireframed 'all' faults within the Permo-Triassic strata underlying the Ortenau Licence into fault zone domains. The reader should be aware that the reality of any geothermal exploration program is that only a portion, or portions, of the fault zones will be targeted with a production well(s) at the Ortenau Licence. It is possible that additional wells are drilled to expand the production zone, but it is unlikely that this would sequester Li-brine from all the fault zone domains modelled at Ortenau.

- The architecture of a fault at depth is difficult to predict due to the heterogeneous nature of sedimentary rocks and the complexity of any fault zone. For example, the fault zone could have a single damage zone or a fault core with damage zones on either side and/or the damage zone could be anisotropic. Again, the design of the production-injection wells could resolve fluid flow issues, but this could prompt additional resources to maximize production from any given fault zone.

- Numeric reservoir modelling studies in public literature have shown that localized high porosity/permeability can lead to channelling effects such that the geothermal reservoir potentially becomes restricted to only occurring within the fault zone. Thus, the exploitation of fault zones can constitute a trade-off between high permeability and reduced reservoir volumes.

Zero Carbon Lithium®

For and on behalf of the Board

Robert Ierace

Chief Financial Officer - Company Secretary

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Competent Person Statement:

The technical information that forms the basis for this News Release has been prepared and reviewed by Mr. Roy Eccles P. Geol. and Mr. Steven Nicholls MAIG, who are both full time employees of APEX Geoscience Ltd. and deemed to be both a 'Competent Person'. Both Mr. Eccles and Mr. Nicholls have sufficient experience relevant to the style of mineralization and type of deposit under consideration and to the activity which they are undertaking to qualify as Competent Person as defined in the 2012 Edition of the Australian Code for the Reporting of Exploration Results, Mineral Resources, and Ore Reserves (JORC Code). Mr. Eccles and Mr. Nicholls consent to the disclosure of the technical information as they relate to the mineral resource information in this News Release in the form and context in which it appears.

JORC Code 2012 Table 1. Section 1: Sampling Techniques and Data.

Author note: The JORC Table 1 presented in this Technical report focuses only on the updated Ortenau Licence Li-brine Indicated and Inferred Resource estimations.

To review JORC Table 1's associated with: 1) Indicated Resource estimation for the Geothermal MoU Area, 2) Indicated and Inferred Resource estimations for Taro, and 3) Exploration Targets for Mannheim and Ludwig, the reader is directed to the following Vulcan ASX News Releases:

- Vulcan Energy Resources Limited (2019a): Substantial lithium brine exploration target identified at the Vulcan Lithium Project in Europe; New release dated 20 August 2019, 25 p.
- Vulcan Energy Resources Limited (2019b): Largest JORC lithium resource in Europe; New release dated 4 December 2019, 44 p
- Vulcan Energy Resources Limited (2020c): Maiden indicated lithium-brine resource, Vulcan Zero Carbon Lithium Project; ASX New release dated 20 January 2020, 52 p.
- Vulcan Energy Resources Limited (2020d): Updated Taro Indicated and Inferred Lithium-Brine Resource & Increased Zero Carbon Lithium Project JORC Resource; ASX New release dated 12 November 2020, 39 p.

Criteria	JORC Code Explanation	Commentary
Sampling techniques	• Nature and quality of sampling (eg cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as down hole gamma sondes, or handheld XRF instruments, etc). These examples should not be taken as limiting the broad meaning of sampling.	• In the Upper Rhine Graben (URG), Germany, O&G exploration is focused dominantly on Triassic-aged reservoirs. In contrast, geothermal wells access hot brine from Permocarboniferous Rotliegend Group and Lower Triassic Buntsandstein Group (collectively, Permo-Triassic) sandstone aquifers/reservoirs overlying the basement. These geothermal wells, however, are limited in the URG. Consequently, Vulcan brine sampling programs were limited to collecting Permo-Triassic brine samples from: o 4 different geothermal wells located throughout the URG (and in the vicinity of Vulcan's Ortenau Licence) to verify historically reported lithium concentrations. o the Geothermal Plant production well in the Geothermal MoU Area. • Brine can be sampled at the well head, (the hot side of the production circuit) or after the heat exchanger (the cold side of the geothermal production circuit) prior to reinjection of the brine back down into the aquifer. Brine samples taken at the well head require a cooling mechanism (e.g., brine flows through a

	• Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used. • Aspects of the determination of mineralisation that are Material to the Public Report. • In cases where 'industry standard' work has been done this would be relatively simple (eg 'reverse circulation drilling was used to obtain 1 m samples from which 3 kg was pulverised to produce a 30 g charge for fire assay'). In other cases more explanation may be required, such as where there is coarse gold that has inherent sampling problems. Unusual commodities or mineralisation types (eg submarine nodules) may warrant disclosure of detailed information.	tube immersed in ice) and a mobile degasser unit to reduce CO_2. No special equipment is required on the cold side of the production circuit. • The brine samples were collected by Geothermal Engineering GmbH as commissioned by Vulcan. • The CP collected independent brine samples at the Geothermal MoU Area the results of which confirm the lithium-enriched brine mineralization, the Vulcan sampling program analytical results and historical lithium-in-brine analytical results. • The CP has reviewed the techniques of the regional brine sampling and the Geothermal MoU Area brine sampling programs and found the sampling was conducted using reasonable techniques in the field of brine assaying and there are no significant issues or inconsistencies that would cause one to question the validity of the sampling technique used by Vulcan. • QA-QC work as part of the sampling program included Sample Blanks (deionized water with no lithium) and Sample Standards (a laboratory prepared brine standard that assimilates hypersaline brine with a fixed value of lithium). The Blanks and Standards were randomly inserted into the sample stream. • Vulcan and Geothermal Engineering GmbH maintained chain of custody of the brine samples from the geothermal well sample point to the respective laboratories in Germany (University of Karlsruhe and University of Heidelberg). In addition, 4 brine samples collected by Geothermal Engineering GmbH were couriered to the CP in Edmonton, Alberta Canada for analysis at a commercial Canadian Laboratory (AGAT Laboratories and Bureau Veritas Laboratory [formerly Maxxam Analytical]). The CP-collected brine samples were also analyzed at the 2 Canadian laboratories. • The Vulcan- and CP site inspection-collected samples verified the Geothermal MoU Area and historical lithium analytical results and confirmed the Permo-Triassic brine in the URG is enriched in lithium. • The average analytical results of brine from the 4 regional wells were identical to the average results from the Geothermal MoU Area, 181 mg/L Li. This result is an indication of the homogeneous lithium concentration of Permo-Triassic aquifer brine in the sampled portions of the URG (and in the vicinity of Vulcan's Taro, Ortenau and the Geothermal MoU Area.)
Drilling techniques	• Drill type (eg core, reverse circulation, open-hole	• Vulcan has yet to conduct any drilling at the project and is reliant on existing geothermal wells outside of the Ortenau Licence to access brine.

	hammer, rotary air blast, auger, Bangka, sonic, etc) and details (eg core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).	• With respect to drilling information for the Geothermal MoU Area, please refer to the Table 1 information provided in Vulcan's ASX announcement dated 20 January 2020.
Drill sample recovery	• Method of recording and assessing core and chip sample recoveries and results assessed. • Measures taken to maximise sample recovery and ensure representative nature of the samples. • Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.	• Vulcan has yet to conduct any drilling and/or drill core sampling at the project and is reliant on existing geothermal outside of the Ortenau Licence wells to access brine. • Regional geothermal wells and the Geothermal MoU Area samples were recovered directly from the flowing brine stream within the geothermal facility brine circuit. • The brine sample collection method and sample collection documentation are in accordance with reasonable Li-brine sampling expectations and Li-brine industry standards. • There are 2 historical geothermal wells, or petroleum wells, drilled by companies other than Vulcan that extend deep enough to penetrate Permo-Triassic strata within the Ortenau Licence. The two historical wells were drilled in the southern and northeastern portions of the Ortenau Property, respectively. With respect to brine analytical results, these wells are discussed in more detail in Section 2, Other Substantive Exploration Data.
Logging	• Whether core and chip samples have been geologically and geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining	• Vulcan has yet to conduct any drilling at the Ortenau Licence. • During 2020, Vulcan commissioned Geothermal Engineering GmbH to reinterpret existing 2-D seismic data in the Ortenau Licence area. This interpretation benefited from a review of historical well logs from two wells. These well logs were created by companies other than Vulcan but benefited the understanding of the subsurface strata underlying Ortenau. That is, the historical well logs helped to orientate the seismic line profiles and confirm

	studies and metallurgical studies. • Whether logging is qualitative or quantitative in nature. Core (or costean, channel, etc) photography. • The total length and percentage of the relevant intersections logged.	and validate key stratigraphic marker horizons including the Buntsandstein surface and fault zones that are critical to the Ortenau Licence resource estimation process. • During 2020, Vulcan acquired detailed lithological and downhole geophysical measurements from a geothermal well which is located approximately 81 km north of the Ortenau Licence and penetrated through Permo-Triassic strata; the same strata being assessed by Vulcan. Wireline logging runs were performed in the open hole section from 3,155 m MD to approximately 3,294 MD and included: FMI-GR (resistivity image, caliper), DSI-GPIT-PPS-GR (sonic, caliper), LDS-GR (density, photo electric factor), and UBI-GR (acoustic image). The downhole information provided both qualitative (e.g., litho-logs) and quantitative information such as porosity and permeability measurements. These data were used to study and assess the hydrogeological characteristics and variations between, for example, host rock matrix porosity and fault zone fracture porosity. • In addition, the project benefited from oil and gas, and geothermal, log data and seismic profile data that has been compiled into 3-D national geothermal information systems. This work was conducted by state geological surveys and coalitions of German Government and academic working groups and include data and interpretations from geophysical seismic sections and more than 30,000 oil and gas wells, geothermal, thermal, mineral water and mining well boreholes in the Vulcan Project area and URG.
Sub-sampling techniques and sample preparation	• If core, whether cut or sawn and whether quarter, half or all core taken. • If non-core, whether riffled, tube sampled, rotary split, etc and whether sampled wet or dry. • For all sample types, the nature, quality and appropriateness of the sample preparation technique.	• With respect to the Vulcan 2019 brine sampling programs, 3 aliquots of brine were collected at each sample point for various analytical work that included: o anion chemistry; o trace metal ICP-OES; and o dissolved metal ICP-OES. • Brine was collected from the hot and cold circuit sample points to gain an understanding of whether the geothermal plant cycle has any influence on the lithium concentration as the brine cycles through the plant. • The QA-QC protocol included the random insertion of a sample blank (composed of ionized water with no lithium) and a standard sample (a laboratory created Li-brine standard). • The Sample Blanks and Standard Samples were inserted into the sample stream at each sample site.

	• Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples. • Measures taken to ensure that the sampling is representative of the in-situ material collected, including for instance results for field duplicate/second-half sampling. • Whether sample sizes are appropriate to the grain size of the material being sampled.	• In addition, duplicate samples were collected at each sample site and the duplicate sample geochemical analyses was conducted at numerous laboratories that included independent University and commercially accredited laboratories. All labs had experience with analyzing lithium in brine. • The sample sizes were appropriate for industry standard brine assay testing. • The brine was collected from perforation points within the geothermal production well. The perforation point at each well sampled was assessed using log data and it was confirmed that the wells were producing from Permo-Triassic reservoirs. Accordingly, the CP can confirm that the brine sample is representative of the brine being drawn from depths associated with the Permo-Triassic aquifer. The Permo-Triassic aquifer is the focus of Vulcan's Li-brine exploration and the resource estimation work conducted at the Ortenau Licence.
Quality of assay data and laboratory tests	• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total. • For geophysical tools, spectrometers, handheld XRF instruments, etc, the parameters used in determining the analysis including instrument make and model, reading times, calibrations factors applied and	• The same brine sample collection, sample handling, analytical techniques, and QA-QC protocols were used for the regional well sampling and the Geothermal MoU Area well sampling programs. • Site Inspection: Data verification procedures applied by the CP were performed to confirm the Li-brine mineralization at the Geothermal MoU Area. A Permo-Triassic brine sample collected by the CP during the site inspection was split and analyzed at 2 separate commercial labs in Edmonton, Alberta Canada (AGAT Laboratory and Bureau Veritas Laboratory). The analytical result of the CP collected samples contained a mean value of 180 mg/L Li substantiating lithium-enriched brine in deep URG aquifer. • As per Vulcan's QA/QC, the Company commissioned the University of Alberta to prepare a laboratory prepared Sample Standard by adding a measured amount of elemental lithium to a hypersaline brine concoction. • A sample blank (composed of ionized water with no lithium) and a standard sample (a laboratory created Li-brine standard) were inserted into the sample stream at each sample site. • The resulting data – as they pertain to the Sample Blank and Standard Sample samples – were excellent and show the analytical data were performed with high precision. The results

	their derivation, etc. • Nature of quality control procedures adopted (eg standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie lack of bias) and precision have been established.	helped the CP deem the data acceptable for the purpose of estimating a mineral resource. • The lithium content (and trace elements) of the brine samples were analyzed by inductively coupled plasma optical emission spectrometry (ICP-OES), which is a standard analytical technique and industry standard for the measurement of lithium-in-brine. • A split of Vulcan's 2019 samples was sent by courier to APEX and analyzed at AGAT Laboratories in Edmonton, AB Canada. A comparison of the analytical results between the 3 laboratories yields RSD% values of between 1.3% and 9.6%. • It is concluded that there is very good data quality of Vulcan 2019 Li-brine analytical results between the 3 independent labs.
Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel. • The use of twinned holes. • Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. • Discuss any adjustment to assay data.	• Vulcan has yet to conduct any drilling or core sampling at the project, and hence, there are no twinned hole information to report. • Data verification procedures applied by the CP were performed on key data components as they pertain to the mineral resource estimation. • Analytical brine data were prepared by independent and third-party universities and or accredited commercial laboratories. • Data verification procedures applied by the CP were performed to confirm the Li-brine mineralization within the Permo-Triassic aquifer. For example, a Permo-Triassic brine sample collected by the CP during the site inspection was split and analyzed at 2 separate commercial labs in Edmonton, Alberta Canada (AGAT Laboratory and Bureau Veritas Laboratory). The analytical result contained a mean value of 180 mg/L Li substantiating lithium-enriched brine in deep URG aquifer. The analytical result is nearly identical to the average analytical results of the regional well sampling and Geothermal MoU Area well sampling (181 mg/L Li). • Accordingly, no adjustments to the assay data were made, or necessary. The analytical results, and the QA-QC measures adopted by Vulcan were satisfactory and the original laboratory data were used in the resource estimation process. • The author has reviewed all geotechnical and geochemical data and found no significant issues or inconsistencies that would cause one to question the validity of the historical Li-brine geochemical data – and Vulcan's 2019 brine geochemical results – to verify that the Permo-Triassic aquifer is consistently enriched in lithium in the deep-seated strata and aquifer underlying the URG.

		• Based on the CP's experience of measuring lithium in large subsurface, near basement, aquifers – it is commonplace for the reservoirs to have homogenous Li-brine contents, and therefore, the CP is confident to apply an average Li-brine value of 181 mg/L Li to the Permo-Triassic strata underlying Vulcan's Ortenau Licence.
Location of data points	• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation. • Specification of the grid system used. • Quality and adequacy of topographic control.	• Vulcan has yet to conduct any drilling or core sampling at the project. • The regional brine samples were collected from established geothermal wells (owned by geothermal companies other than Vulcan). • Brine the Geothermal MoU Area was collected from production well at the plant, as detailed in the ASX announcement on 20/01/20. • The grid system used is UTM WGS84 zone 32N. • The surface Digital Elevation Model used in the three-dimensional model was acquired from JPL's Shuttle Radar Topography Mission (SRTM) dataset; the 1 arc-second gridded topography product provides a nominal 30 m ground coverage.
Data spacing and distribution	• Data spacing for reporting of Exploration Results. • Whether the data spacing, and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.	• Vulcan has yet to conduct any drilling, core sampling or brine sampling at the project. • With respect to the subsurface data, a subsurface interpreted 3-D geological model was used to outline the Permo-Triassic aquifer and fault domains underlying the Ortenau Licence. This was done through the reinterpretation of existing 2-D seismic data that was purchased in 2020 by Vulcan. The seismic data included: o The usage of twelve 2-D seismic lines were acquired and consist of 8 northwest to southeast orientated lines with 4 perpendicular southwest to northeast tie lines. The total length of the 12 survey lines is 166.0 km. This length includes the whole length of line 7719 (24.8 km), but only the 15.6 km of the line were acquired (i.e., the portion of the line that is in the Ortenau Licence). The surveys were conducted between 1975 and 1978. o The usage of three 2-D seismic lines were acquired and consist of 2 northwest to southeast orientated lines with 1 perpendicular southwest to northeast tie line. The total length of the 3 survey lines is 47.7 km. The surveys were conducted in either 1979 (x2 lines) or 1983 (1 line).

	• Whether sample compositing has been applied.	• The orientation of the Permo-Triassic strata is generally flat-lying and continuous in the Licence concessions. As the strata are situated within the URG, high-angle faults have created a complex horst and graben structural environment; having said this, the Permo-Triassic strata maintain their lateral continuity despite being juxtapositioned by rift events. • While locally there is minor faulting and slight offsets, the horizontal continuity of the Permo-Triassic sandstone units is tremendously uniform. This statement is supported by knowledge that the Permo-Triassic strata has been mapped for approximately 250 km along the north-northeast strike length of the entire Upper Rhine Graben. • With respect to brine sampling, and using the Geothermal MoU Area as an example, the brine samples were collected from a well that had 2 separate perforation windows to collect the brine, which is then pumped to the surface for geothermal power processing. The perforation windows are 356 m and 147 m thick. Because the sampled product is a brine in liquid-form and pressurized with CO_2, the affect would mean the brine is sampled from a relatively large Permo-Triassic aquifer domain underlying the area. I.e., a representative sample of the overall Permo-Triassic aquifer/reservoir. • With respect to Li-brine concentration, the brine analytical results from both the regional well sampling and detailed sampling at the Geothermal MoU Area is identical with average values of 181 mg/L Li. In addition, these values are comparable to historical and proprietary lithium concentrations that were compiled from throughout the URG. The combination of Vulcan-sampled and historically sampled and analyzed brine shows a homogenous Li-brine in the Permo-Triassic aquifer brine in the vicinity of Vulcan's licences, including the Ortenau Licence. • With respect to spacing between sample points, there were no Li-brine samples collected within the boundaries of the Ortenau Licence. The closest wells include the Geothermal MoU Area (44 km north of Ortenau), Landau (50 km north of Ortenau) and Brühl (81 km north of Ortenau) wells. • With respect to the 2020 acquired 2-D seismic lines and development of an enhanced 3-D geological model, the seismic data and ensuing model covers 100% of the Ortenau Licence. The distance between the seismic lines ranges from 800 m to 6 km.
Orientation of data in relation to	• Whether the orientation of sampling achieves unbiased sampling of possible	• Vulcan has yet to conduct any drilling and/or core sampling at the project. • The geothermal wells investigated are highly deviated wells intended to angle into fault zones that enable zones of high fluid

geological structure	structures and the extent to which this is known, considering the deposit type. • If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.	flow. At the Geothermal MoU Area, for example, the perforation windows (356 m and 147 m thick) indiscriminately sample Permo-Triassic brine in the liquid form within a large-scale aquifer. Based on the overall dimensions of the Permo-Triassic aquifer and consistent analytical results, no sample bias is expected. • The 3-D geological model utilized 17 2-D seismic profile lines that were acquired by Vulcan specifically for the purpose of improving the 3-D geological model. In the seismic interpretation, 4 formation horizons were selected based on the uniqueness of the marker horizons within the seismic profiles. • The base of the Buntsandstein Group could not be clearly identified because the boundary between Buntsandstein and Permian strata overlying the crystalline basement do not exhibit a distinct lithological change in the seismic profiles. To construct the base Buntsandstein surface, Geothermal Engineering GmbH used an average Buntsandstein Group thickness of 375 m based on published thickness data from throughout the Upper Rhine Graben. • Because it is not possible to confidently observe laterally continuous reflector bands below the top of the Buntsandstein Group, it was not possible to map the Rotliegend Group, and therefore, the Permocarboniferous strata are not modelled in this Ortenau Licence resource estimation. • The 4 marker horizons were validated against litho-logs from the acquired well data drilled in the south and northeast portions of the Ortenau Licence area. It is concluded that there is good agreement between the reinterpreted seismic line data and the in-situ stratigraphy throughout the Ortenau Licence and that these data are reasonable and reliable for designing a 3-D geological resource model. • Fault zones were delineated in the seismic software, OpendTect, in which the Geothermal Engineering GmbH picked fault zone only where they could be positively identified in the seismic lines and the faults were correlated in consideration of their offset, dip angle and depth. A total of 24 faults were interpreted for the entire Ortenau Licence area. These faults were interpreted to penetrate downwards through the Buntsandstein Group strata at the Ortenau Licence and is therefore used to develop the 3-D geological model for use in the resource estimation process. • In the opinion of the CP, the revised Ortenau 3-D geological model using the acquired seismic data provided a higher level of confidence in the spatial location and orientation of the Buntsandstein surfaces and fault zones.

		• Detailed studies of nearby well geothermal data acquired by Vulcan in 2020 helped to understand the hydrogeological characteristics of the fault/fracture zones within the Permo-Triassic strata. The structurally complex fault damage zone typically represents conduits for localised high fluid flow of mineralised brine, due to higher fracture abundancy and high fracture connectivity. The study showed that the fault zone documented within the core contains an additional fracture porosity of 3.1% (i.e., beyond the mean fracture porosity of the Middle Buntsandstein Group). This value is a conservative evaluation of the fracture porosity as distinct fracture corridors within the fault damage zone can have fracture porosity's increased by a factor of >10%.
Sample security	• The measures taken to ensure sample security.	• Vulcan's 2019 brine sampling program was conducted by Dr. Kraml of GeoThermal Engineering GmbH. Dr. Kraml collected the samples and maintained their chain of custody from sample site to delivery of the samples to the University of Karlsruhe and University of Heidelberg for analytical work. In addition, Dr. Kraml couriered brine samples to APEX for analytical work at the Canadian Laboratories; during transport, chain of custody was maintained from Dr. Kraml to the courier to the CP and to the laboratory. • The CP collected 2 Geothermal MoU Area brine samples. The only time the samples were out of the possession of the CP is during the flight from Frankfurt to Edmonton (in a locked travel bag). The samples were delivered to Canadian independent and commercial laboratories by the CP.
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	• An audit, or review, of the updated Ortenau resource estimation has not been completed by an external party to Vulcan. However, a CP that is independent of Vulcan and the Vulcan Property has been involved with all aspects of the project. • The CP assisted with, and reviewed, the adequacy of Vulcan's sample collection, sample preparation, security, analytical procedures, QA-QC protocol, and conducted a site inspection of the Vulcan Property. • In addition, the author coordinated discussion and meetings involving methodologies and interpretation resulting from the exploration work to define the geometry and hydrogeological characterization of the Permo-Triassic aquifer that form the basis of the resource model.

JORC Code 2012 Table 1. Section 2: Reporting of Exploration Results.

<table>
<tr><th>Criteria</th><th>JORC Code Explanation</th><th>Commentary</th></tr>
<tr><td>Mineral tenement and land tenure status</td><td>Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.
The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.</td><td>The Vulcan Project is comprised of 6 separate and non-contiguous Exploration and Exploitation Licences that encompass a total land position of 80,519 hectares within the URG of southwest Germany that include:
Three granted Exploration Licences: Ortenau, Taro, and Mannheim.
Two in-application Exploration Licences: Hesbach (Rheinaue) and Ludwig.
A single Exploitation Licence: Geothermal MoU Area.
The Ortenau Licence, which is the subject of this JORC Table, is 37,360 hectares and is centered at approximately: UTM 421900 m Easting, 5384900 m Northing, Zone 32N, WGS84.
Vulcan was granted 100% of the Ortenau Exploration Licence by the Baden-Württemberg government office, which is managed by the Freiburg State Office, Council for Geology, Raw Materials and Mining.
An Exploration Licence shall accord the holder the exclusive right to:
Explore for the geothermal resources specified in the licence.
To extract and acquire ownership in the resources that must be stripped or released during planned explorations.
To erect and operate facilities that are required for exploring the resources and for carrying out related activities.
Vulcan's Ortenau Exploration licence terminates April 30, 2021, at which time renewed exploration and/or application for Exploitation Licences are required. There is always some risk or an uncertainty that government regulations and policies could change between now and future applications. If required, Vulcan can request an Exploitation Licence at Ortenau, which would grant Vulcan the exclusive right to geothermal resources from</td></tr>
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		brine. The application requires advanced modelling of the aquifer production and injection wells. • Any future geothermal brine production would require an operating plan and planning approval procedure that complies with the *Act on the Assessment of Environmental Impacts.* • In the URG, increased anthropogenic activity such as hydraulic fracking, gas extraction and enhanced geothermal systems can potentially lead to induced seismicity. Seismic risk can be mitigated by: • Performing regularly actual seismic monitoring, particularly before the implementation of stimulation work; • Ceasing to stimulate the reservoir, or • By reducing production flow rates when seismicity occurs during the operational phase.
Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	• The Upper Rhine Graben is being actively investigated for its geothermal potential by multiple companies (other than Vulcan). • A summary of historical brine geochemical analytical results (n=43 analyses) was evaluated. This includes historical analysis from the Buntsandstein Group aquifer (n=6) and Rotliegend Group-basement aquifer (n=11), which yield 158.1 mg/L and 157.7 mg/L Li. The historical data are presented in referred journal manuscripts and the CP has verified that the analytical protocols were standard in the field of brine analysis and conducted at university-based and/or accredited laboratories. The historical geochemical information was used as background information and were not used as part of the resource estimation process. • GeotIS and GeORG are essentially digital geological atlases with emphasis on geothermal energy, and offer extensive compilations of well data, seismic profiles, information, and 3-D stratigraphic content with emphasis on deep stratigraphy and aquifers in Germany. The raw data – such as seismic data – are not available (as they are owned by the respective energy companies), and hence the data/profiles have been collated and interpreted into the representative geo-dataset information systems. These data were evaluated and used to construct the 3-D geological model used in the resource evaluations. • The Ortenau Licence 3-D Modelling was improved beyond the GeoORG subsurface information through Vulcan's 2020 acquisition of 2-D seismic profile lines that were acquired by Vulcan specifically for the purpose of improving the 3-D geological model. The seismic information and subsequent 3-D

		geological models were reinterpreted by Geothermal Engineering GmbH as part of Vulcan's 2020 exploration work. • Any artefacts within the model were revised by APEX Geoscience Ltd., under the supervision of the CP, in advance of resource modelling work. • Detailed studies of Brühl geothermal well data, which is located 81 km north of the Ortenau Licence and was drilled in 2013, were interpreted by Vulcan in 2020 to understand the hydrogeological characteristics of the fault/fracture zones within the Permo-Triassic strata. The dataset included detailed litho-logs and downhole wireline log information that included FMI-GR (resistivity image, caliper), DSI-GPIT-PPS-GR (sonic, caliper), LDS-GR (density, photo electric factor), and UBI-GR (acoustic image). Vulcan commissioned GeoThermal Engineering GmbH to describe and characterize this nearby well data, and more specifically, the Buntsandstein Group's pore space and micro-fractures to develop comparative models for the Permo-Triassic strata underlying the Ortenau Licence.
Geology	• Deposit type, geological setting and style of mineralisation.	• The potential lithium mineralization is situated within confined, subsurface aquifers associated with the Lower Triassic Buntsandstein Group sandstone aquifer situated within the URG at depths of between 2,165 and 4,004 m below surface. • The Permo-Triassic strata are comprised predominantly of terrigenous sand facies deposited in arid to semi-arid conditions in fluvial, sandflat, lacustrine and eolian sedimentary environments. • The various facies exert controls on the porosity (1% to 27%) and permeability (<1 to >100 mD) of the sandstone sub-units. Within the Permo-Triassic strata, porosity, permeability, and fluid flow rates are dependent on the fault, fracture and micro-fracture zones that are targeted by geothermal companies in the Upper Rhine Graben. • Lithium mineralization occurs in the brine that is occupying the Permo-Triassic aquifer pore space. • With respect to deposit model, the lithium chemical signature of the brine is believed to be controlled by fluid-rock geochemical interactions. With increasing depth, total dissolved solids (TDS) increase in NaCl-dominated brine. Lithium enrichment associated with these deep brines is believed to be related to interaction with crystalline basement fluids and/or dissolution of micaceous materials at higher temperatures. • The Ortenau License geological model benefits from the reinterpretation of existing 2-D seismic data acquired in 2020 by Vulcan. The seismic reinterpretation mapped, in detail, 4

		formation horizons based on the uniqueness of the marker horizons within the seismic profiles. Faults were interpreted by detected as the doubling of a reflector (thrust fault) or as missing reflector (normal fault). A total of 24 faults penetrating through the Buntsandstein Group strata were interpreted for the entire project area. The reinterpreted stratigraphic horizons and faults were used to develop the 3-D geological model for use in the Ortenau resource estimation process. • In the opinion of the CP, the revised geological model using the seismic data provided a higher level of confidence in the spatial location and orientation of the Buntsandstein Group surfaces and fault zones. • The structurally complex fault damage zone typically represents conduits for localised high fluid flow of mineralised brine, due to higher fracture abundancy and high fracture connectivity. The study showed that the fault zone documented within the nearby well core contains an additional fracture porosity of 3.1% (i.e., beyond the mean fracture porosity of the Middle Buntsandstein Group). This value is a conservative evaluation of the fracture porosity as distinct fracture corridors within the fault damage zone can have fracture porosity's increased by a factor of >10%.
Drill hole Information	• A summary of all information material to the understanding of the exploration results including a tabulation of the following information for all Material drill holes: o easting and northing of the drill hole collar o elevation or RL (Reduced Level –	• Vulcan has yet to conduct any drilling and/or core sampling at the Ortenau Licence. • There are 2 historical geothermal wells, or petroleum wells, drilled by companies other than Vulcan that extend deep enough to penetrate Permo-Triassic strata within the Ortenau Licence. The two wells were drilled in the southern and northeastern portions of the Ortenau Property, respectively. With respect to brine analytical results, these wells are discussed in more detail in Section 2, Other Substantive Exploration Data. • It is possible that Vulcan will drill a future well at the Ortenau Licence, at which time, Vulcan may consider the drill program and drillhole information as material for the Company and Vulcan project and disclose the results. • The location and well descriptions of wells that were used to assess the lithium concentration of the brine within Permo-Triassic aquifers within the URG is available in Vulcan's ASX news release dated 20 January 2020.

	elevation above sea level in metres) of the drill hole collar o dip and azimuth of the hole o down hole length and interception depth o hole length. • If the exclusion of this information is justified on the basis that the information is not Material and this exclusion does not detract from the understanding of the report, the Competent Person should clearly explain why this is the case.	
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques,	• Vulcan has yet to conduct any drilling and/or sampling and is reliant on existing geothermal wells operated by companies other than Vulcan to acquire brine samples for analysis.

	maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated. • Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. • The assumptions used for any reporting of metal equivalent values should be clearly stated.	• The brine geochemical data presented represent raw laboratory values. I.e., no weighting average or truncation techniques were applied to the data. • The brine samples represent a liquid medium (and not a solid); hence there are no formal data aggregation methods, and the analytical data is representative of the Permo-Triassic aquifer at any given space and time. • Elemental lithium within the updated Ortenau Licence Li-brine resource estimations were converted to Lithium Carbonate Equivalent ("LCE" using a conversion factor of 5.323 to convert Li to Li_2CO_3); reporting lithium values in LCE units is a standard industry practice.
Relationship between mineralisation widths and intercept lengths	• These relationships are particularly important in the reporting of Exploration Results. • If the geometry of the mineralisation with respect to the drill hole	• Vulcan has yet to conduct any drilling and/or sampling at the Ortenau Licence and is therefore reliant on existing regional URG geothermal wells operated by companies other than Vulcan to acquire brine samples for analysis. • With respect to the geothermal well data used, all engineering aspects of the wells are documented. Hence, the CP has a good indication of the true vertical depths of the perforation windows used to sample and pump liquid brine from Permo-Triassic aquifers to the Earth's surface for geothermal power generation. • As mineralization being sought is related to liquid brine within a confined aquifer, intercept widths are a moot point as the well

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	angle is known, its nature should be reported. • If it is not known and only the down hole lengths are reported, there should be a clear statement to this effect (eg 'down hole length, true width not known').	perforation points would essentially gather mineralized brine from the aquifer at large assuming the pumping rate is sufficient enough to orchestrate drawdown of the brine being sampled.
Diagrams	• Appropriate maps and sections (with scales) and tabulations of intercepts should be included for any significant discovery being reported These should include, but not be limited to a plan view of drill hole collar locations and appropriate sectional views.	• The associated News Release captures critical figures that were used in the updated Ortenau Licence resource estimations. • All map images include scale and direction information such that the reader can properly orientate the information being portrayed.
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading	• Comprehensive reporting of all Exploration Results is presented in the associated News Release and in an accompanying Technical Report. • There are no outlier analytical results in the geochemical dataset used to evaluate the lithium concentration of Permo-Triassic aquifer brine. The Li-brine values are homogenous in the vicinity of Vulcan's resource licences: Ortenau, Geothermal MoU area and Taro licenses. • There are fewer wells to sample in the Ludwig and Mannheim licence areas, and therefore, these licences remain Exploration Targets.

	reporting of Exploration Results.	
Other substantive exploration data	• Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.	• A substantive amount of historical data was used to investigate and define the hydrogeological characterization of the Permo-Triassic aquifers. These included over 1,800 and 1,000 Buntsandstein Group and Rotliegend Group porosity and permeability measurements. • Historical geochemical data were used to assess the lithium concentration of Permo-Triassic aquifer brine. A total of 43 historical brine analysis records were compiled. These historical data were verified by Vulcan during their 2019 brine sampling campaigns and it is the opinion of the CP that: o The Permo-Triassic aquifer has homogeneous concentrations of lithium in the vicinity of the Ortenau, Taro, and Geothermal MoU Area licences. o The verification of historical geochemical results produced a geochemical dataset that is reliable and sufficient for use in the resource estimation presented in this Technical Report. • During 2020, Vulcan commissioned Geothermal Engineering GmbH to: 1) review the acquired seismic information and nearby well data, 2) to conduct hydrogeological characterization studies specific to URG Permo-Triassic fault/fracture zones, and 3) make inferences on potential geothermal well (and Li-brine) production scenarios and their influence on fluid flow within and adjacent to fault/fracture zones. The CP has reviewed a series internal reports (n=4) and found them to factually prepared by persons holding post-secondary degrees with an abundance of experience and knowledge in the URG and geothermal exploration and exploitation within the URG. This work helped the CP to substantiate and justify the resource estimation domains and wireframes created as part of the updated Ortenau Licence Li-brine resource estimation process. • Two geothermal, or O&G wells, were historical drilled by companies other than Vulcan within the boundaries of the Ortenau Licence. o K 1 was drilled through a Tertiary fault zone located approximately 1,000 m above the Buntsandstein Group prior to the hole's termination 14 m into the upper Buntsandstein Group. The K 1 well was not productive and is now abandoned or plugged. No Buntsandstein brine analysis, or porosity and permeability measures, were taken at K 1 (historically or by Vulcan).

		o The B 1 well penetrated through Permo-Triassic strata and 2 brine samples were historically collected through perforation points located at the end of the well within the crystalline basement as reported by Sanjuan et al., (2016). Significantly, basement-derived brine from the B 1 well has significantly lower Li (average 41.1 mg/L; n=2 analysis) in comparison to the average Permo-Triassic brine documented by Vulcan (181 mg/L Li). The CP has reviewed this discrepancy and found that the B 1 borehole was originally intended to intersect granite; however, the well was drilled into the Omerskopf para- and ortho-gneisses. The resulting brine chemistry is significantly different in comparison to Permo-Triassic brine and/or fractured granite basement domains at the Landau, Insheim, Rittershoffen Soultz, Landau, and Cronenbourg geothermal wells. It is concluded that the lithium concentration of 41 mg/L Li in the B 1 brine sample is in equilibrium with cooler brine with high TDS, Ca, Na, Cl, and Mg, and decreasing Li:Na ratios, and is representative – at least at B-1 – of a brine sample was collected from fluid along subvertical fractures in the gneiss. Any future exploration conducted by Vulcan would target Permo-Triassic strata overlying fractured granite basement terranes.
Further work	• The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling). • Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not	• A further exploration program at the Ortenau Licence is recommended, including 1) acquisition of all appropriate permits and licenses to drill a geothermal well at the Ortenau Licence, 2) a drill program to drill a test production geothermal well, 3) collection of brine assay samples from the well to verify lithium concentrations, 4) addressing modifying factors toward a Feasibility Study technical report, and 5) preparation of a Feasibility Study technical report.

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	commercially sensitive.	

JORC Code 2012 Table 1. Section 3: Estimation and Reporting of Mineral Resources		
Criteria	JORC Code Explanation	Commentary
Database integrity	• Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes. • Data validation procedures used.	• The review of third-party, government and/or compiled data was conducted by the CP who – to the best of his knowledge – can confirm the data was generated with proper procedures, has been accurately transcribed from the original source and is suitable for use in the updated Ortenau resource estimation. • The CP was able to verify the lithium content in Permo-Triassic brine from the MoU Area geothermal well during a September 2019 site inspection. • The CP was involved in designing the brine sampling and analytical protocol and can verify that the brine samples were collected and analyzed using standard industry practice. QA-QC protocol included Blank samples and Standard samples and the analysis was conducted by multiple independent laboratories. The Li-brine concentration results had a high level of precision of reproducibility (see Vulcan's ASX News Releases dated 4 December 2019 and 20 January 2020). • Lastly, based on authors previous experience and research of confined lithium-brine deposits, and sampling and analytical protocols, the CP is satisfied to include these data in resource modelling, evaluation and estimations as part of Vulcan's updated Ortenau Licence lithium-brine resource estimations. • With respect to the 3-D geological model, the newly acquired existing 2-D seismic data were reviewed by GeoThermal Engineering GmbH on behalf of Vulcan. The reinterpretation included picking distinct seismic reflectors marker horizons for stratigraphic surface picks (including the top of the Buntsandstein Group), and a review and measuring of the vertical displacement of the faulted strata. • Once the stratigraphic surfaces and fault zones were picked, dxf files of the 3-D surfaces/faults were reformatted in MicroMine by APEX Geoscience Ltd. Under the direction of the CP, discrepancies, or artefacts, in the picked surfaces and/or

		fault zones were evaluated against the original seismic data and then corrected. • The 3-D model was then evaluated by the CP for final error checking and validation. In addition to visual checks, APEX validated the model be entering log data from the historical wells into MicroMine along with 3 seismic profile lines (from the north, central and south parts of the Ortenau Licence). • In the opinion of the CP, the Ortenau Licence 3-D subsurface geological model represented a significantly improved geological model in comparison to the previous geological model, which was constructed using the regional URG GeORG cross-sectional data. • Lastly, fault hydrodynamic studies on well log and downhole geophysical measurements from the logged historical well which is in the URG and 81 km north of the Ortenau Licence, enabled the CP to validate the enhancement of porosity and permeability within URG fault zones. • It is the opinion of the CP/QP that the database integrity represented reasonable and valid contributions to conducting mineral resource estimation processes and the author is satisfied to include these data in updated resource modelling, evaluation and estimations at the Ortenau Licence. • For a summary of the lithium analytical results used in the resource estimation, please see ASX announcements dating 4 December 2019 and 20 August 2020.
Site visits	• Comment on any site visits undertaken by the Competent Person and the outcome of those visits. • If no site visits have been undertaken indicate why this is the case.	• The CP conducted a site inspection of the Vulcan Property on September 17, 2019. • The site inspection visited 3 of the 6 Vulcan project licences and included a meeting and tour of the Geothermal MoU Area. • The site inspection of the Vulcan Property observed the existing infrastructure at/near the Property licences, including primary and secondary road networks that make the licences accessible and with ease of access to the electrical power grid. • At the Geothermal MoU Area, the CP collected two brine samples and delivered them to the independent and accredited laboratories in Edmonton, Alberta. Both labs routinely process high TDS brine and perform trace element analysis for lithium. The results (mean of 180 mg/L Li) validated lithium-enrichment of the Permo-Triassic aquifer brine.
Geological interpretation	• Confidence in (or conversely, the	• The addition, and reinterpretation, of existing 2-D seismic data significantly increased the CP's confidence level in the

	uncertainty of) the geological interpretation of the mineral deposit. • Nature of the data used and of any assumptions made. • The effect, if any, of alternative interpretations on Mineral Resource estimation. • The use of geology in guiding and controlling Mineral Resource estimation. • The factors affecting continuity both of grade and geology.	subsurface 3-D geological model. Previously – the Ortenau geological model utilized regional URG subsurface sectional data acquired from GeORG (see Vulcan's ASX announcement dated 4 December 2019). • The interpreted seismic data enabled the CP to create detailed Buntsandstein Group surface, which provided higher confidence in wireframing the Buntsandstein Group domain, and in the calculation of aquifer volume and brine volume for the resource estimation process. The 2-D seismic profiles covered 100% of the Ortenau Licence. • Using the seismic profiles, 4 subsurface stratigraphic horizons were correlated throughout the Ortenau Licence with confidence including the top surface of the Buntsandstein Group. The 4 marker horizons were validated against litho-logs from wells drilled in the southern and northern portions of the Ortenau Licence area. • The base of the Buntsandstein Group could not be clearly identified because the boundary between Buntsandstein and Permian strata overlying the crystalline basement do not exhibit a distinct lithological change in the seismic profiles. To construct the base Buntsandstein surface, the CP used an average Buntsandstein Group thickness of 375 m based on published thickness data from throughout the URG and verified the base contact using GeORG cross-sectional information. • In addition, the fault/fracture zones were distinguished in the seismic profiles, and therefore, the nature and positioning of the fault zones in the 3-D geological model were created with a higher level of confidence. The vertical displacement of the fault zones on the seismic profiles enabled the CP to define the activity level of the fault zone: Of the 24 faults, 20 were interpreted to be active. The fault zones were picked only where they could be positively identified in the seismic lines and the faults were correlated in consideration of their offset, dip angle and depth. • The vertical displacement of the fault zone on the seismic profiles was also used to make calculated inferences on the horizontal width of the fault zone in the geological model, which defines the Buntsandstein Group fault zone domain in the resource modelling. • Interpretation of a detailed downhole geophysical dataset from the Brühl well enabled the CP to analyze and verify the hydrogeological characteristics, including average fracture porosity and permeability, within URG fault/fracture zones.

		• Vulcan's 2019 Li-brine sampling and analytical program verified the historical lithium in URG Permo-Triassic brine. The resulting analytical data also provided confidence in the homogeneous lithium concentration of the Permo-Triassic brine in the vicinity of the Ortenau Licence. • The CP used an abundance of regional porosity information to develop a conservative average host rock matrix porosity value that was used in the resource calculation.
Dimensions	• The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.	• The geometry of the Buntsandstein Group strata at the Ortenau Property has a gentle south-east dip. The top and base surface elevations of the Buntsandstein Group under the Ortenau Licence is from -2,222 to -2,586 m below sea level with an average thickness of 373 m. • In the 3-D geological model, the Buntsandstein Group encompasses 100% of the Ortenau Licence. • The Ortenau Exploration Licence is 373.60 square kilometres (37,360 hectares) in size and is centered at approximately: UTM 421900 m Easting, 5384900 m Northing (Zone 32N WGS84). • The Ortenau Licence is spatially orientated in a northeast-trending direction with the licence corners measuring 19.7 km and 28.7 km (elongated southwest-northeast direction) and 11.9 km and 16.6 km (width-wise corner orientated west-northwest to east-southeast and east-west, respectively).
Estimation and modelling techniques	• The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters and maximum distance of extrapolation from data points. If a computer assisted estimation method was chosen include a	• This is an updated Li-brine resource estimate for the Ortenau Licence at the Vulcan Property. • The workflow implemented for the calculation of the Vulcan lithium-brine resource estimations was completed using: the commercial mine planning software MicroMine (v. 20.5). • The resource is calculated using a volumetric approach. Critical steps in the determination of the updated Ortenau lithium-brine resources include: • Definition of the geology, geometry and volume of the subsurface Buntsandstein Group domain aquifers underlying the Ortenau Licence. • Hydrogeological characterization and an historical compilation and assessment of mean porosity within the URG Permo-Triassic strata.

	- description of computer software and parameters used. - The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data. - The assumptions made regarding recovery of by-products. - Estimation of deleterious elements or other non-grade variables of economic significance (eg sulphur for acid mine drainage characterisation). - In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed. - Any assumptions behind modelling of selective mining units.	- Determination of the concentration of lithium in the Permo-Triassic brine aquifers based on Vulcan's brine sampling programs. - Demonstration of reasonable prospects of eventual economic extraction are justified. - Estimate the in-situ lithium resources of Buntsandstein Group brine underlying the Ortenau Licence using the equation: *Lithium Resource = Total Volume of the Brine-Bearing Aquifer X Average Effective Porosity X Average Concentration of Lithium in the Brine.* - A previous maiden Ortenau Licence Li-brine Inferred Resource estimation was prepared by the CP on November 26, 2019 (see Vulcan ASX announcement dated 4 December 2020). The 2019 resource estimation used regional URG GeoORG subsurface to create the geological model and calculate the aquifer and brine volumes. - During 2020, Vulcan reinterpreted 2-D seismic data and detailed lithological and downhole wireline log data from the Brühl well, which is located approximately 81 km north of the Ortenau License but penetrates the same Buntsandstein unit of interest. - The detailed seismic data and downhole data enabled the CP to develop a robust 3-D geological model and understand the hydrogeological characteristics of fault zones within the Permo-Triassic strata. Accordingly, the CP has updated Vulcan's lithium-brine resource estimations for the Ortenau Licence. The current resource estimations replace and supersede the November 26, 2019 Ortenau resource report. - The only element being estimated is lithium, and consideration of deleterious elements is beyond the scope of this early-stage project and resource estimate (i.e., is dependent on mineral processing and lithium recovery flowsheets). - During 2020, Vulcan commissioned 3 independent laboratories, or chemical engineering consulting companies, to perform Direct Lithium Extraction adsorption test work on Upper Rhine Graben Permo-Triassic brine to produce lithium chloride concentrates that can be processed into battery chemicals. The analytical results verified the principles of brine pre-treatment techniques and Direct Lithium Extraction operations with initial findings of greater than 90% LiCl

	• Any assumptions about correlation between variables. • Description of how the geological interpretation was used to control the resource estimates. • Discussion of basis for using or not using grade cutting or capping. • The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.	recovery from the geothermal brine. Vulcan experimentally demonstrated the removal of transition metals and silica that are expected to be incompatible with common adsorption media. • Two separate geological domains were wireframed for the updated Ortenau Licence resource model and estimations, and include: 1) Buntsandstein Group, and 2) 24 fault zones within the Buntsandstein Group strata. • The Buntsandstein Group domain is represented by the upper and lower surfaces within the 3-D model. • The dimensions of the fault zone domain correlate with the seismic data, in which: o The displacement of the fault zone in the seismic profiles determined whether the fault was 'active' or 'inactive' o The minimum and maximum vertical displacement of the fault was measured, and the total displacement was multiplied by a coefficient factor of 1.3 to determine the width of the fault zone in the geological model. The value, 1.3, represents the average ratio of vertical to horizontal displacement in measured outcrop sections in the URG. o Hence, the fault zone domains in the resource estimation are believed to be a reasonable representation of any given fault. • The extent of Buntsandstein Group and Buntsandstein Group fault zone resource domain wireframes were clipped to the boundary of the Ortenau Licence. The wireframes were created by constructing 2-D strings of each wireframe by using the top and bottom of the Buntsandstein stratigraphy and/or observed and calculated width of the fault zone. The 2-D strings were then connected to create a solid 3-D wireframes. • The volume of the Buntsandstein aquifer domain underlying the Ortenau Licence was calculated using the 3-D wireframes created in MicroMine. The aquifer volume underlying the Ortenau Licence is summarized as a total Buntsandstein Group domain aquifer volume of 117.97 km^3 and a total Buntsandstein Group fault zone domain aquifer volume of 17.00 km^3. • A brine volume was calculated by multiplying the aquifer volume (in m^3) times the average porosity times the

		- percentage of brine assumed within the pore space (100% as there is no oil within the Permo-Triassic samples collected by Vulcan and CO_2 gas is in its dissolved state at reservoir pressures). - A regional mean matrix porosity of 9.5% was used for the Buntsandstein Group aquifer. A fracture porosity value of 3.1% was added for the fault zone domain such that a fault zone porosity of 12.6% was assigned for the fault domain within the Buntsandstein Group aquifer. In the CP's opinion, the porosity values are conservative. - The brine volume underlying the Ortenau Licence is summarized as a total Buntsandstein Group domain brine volume of 11.21 km^3 and a total Buntsandstein Group fault zone domain brine volume of 2.14 km^3. - The average lithium-in-brine concentration used in the resource estimations is 181 mg/L Li and is based on the average of 23 samples that were analyzed by trace metal ICP-OES analysis at 3 independent laboratories. - No top cuts or capping upper limits have been applied, or are deemed to be necessary, as confined Li-brine deposits typically do not exhibit the same extreme values as precious metal deposits (and this statement is applicable to the Permo-Triassic aquifer Li-brine data in this study). - The lithium resource estimate is then calculated using the equation expressed in this table cell above. - The 3-D geological model, aquifer and brine volume calculations and resource estimations were checked and validated by the CP.
Moisture	- Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.	- Not applicable. The lithium resource is a brine-hosted resource.
Cut-off parameters	- The basis of the adopted cut-off grade(s) or quality parameters applied.	- A lower cutoff of 100 mg/L Li is used in this Li-brine resource estimation. It is the opinion of the author that this cutoff is acceptable because: 1) confined aquifer deposits traditionally have lower concentrations of lithium (in comparison to unconfined lithium-brine salar and hard rock lithium deposits), and 2) numerous commercial projects are

		developing direct lithium extraction methods using low lithium concentration source brine.
Mining factors or assumptions	• Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential mining methods, but the assumptions made regarding mining methods and parameters when estimating Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the mining assumptions made.	• It is the author's opinion that geothermal facilities and Li-brine extraction operations are a good fit co-production opportunity. • The Li-brine extraction pilot plant (or commercial operation) could be situated after the heat exchanger, and therefore would not influence the main purpose of the geothermal plant. • Assuming the lithium extraction process causes minimal compositional change to the brine (which has been preliminary shown in the geochemical data assessed in this Technical Report), the lithium-removed brine could return to the subsurface aquifer via the reinjection well. Hence it is assumed both companies (geothermal and lithium) are extracting their own commodity of interest with virtually no interference between the two processes. • It is also assumed that Vulcan could drill their own wells at the Vulcan Property's licences. The 3-D geological models completed for each licence shows there is a high degree of faulting with potential for high fluid flow in the Permo-Triassic strata underlying all of the Vulcan Property licences.
Metallurgical factors or assumptions	• The basis for assumptions or predictions regarding metallurgical amenability. It is	• Confined aquifer Li-brine deposits traditionally have lower concentrations of lithium in comparison to unconfined Li-brine salars and hard rock lithium deposits. In addition, the aquifer deposits typically occur in areas where solar evaporation is not an option. Consequently, several laboratories (commercial, academia, independent) are

	always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider potential metallurgical methods, but the assumptions regarding metallurgical treatment processes and parameters made when reporting Mineral Resources may not always be rigorous. Where this is the case, this should be reported with an explanation of the basis of the metallurgical assumptions made.	attempting to develop modern technology that will beneficiate and recover the Li-brine from these types of deposits in real time. The developers are aware that the technology must incorporate lower source concentrations of lithium and are therefore testing Li-brine at low lithium concentrations. Accordingly, there are several laboratories that are experimenting with rapid lithium extraction techniques and/or conduct test work on low lithium source brine, including starting source levels of approximately 50 mg/L Li. • It is the opinion of the CP that the extraction of lithium from confined brine aquifers has advanced in the last 2-3 years such that the technology is commercially viable. For example, Standard Lithium Ltd. has successfully advanced their LiSTR Direct Lithium Extraction Technology through the bench scale and pilot stages and is proceeding to industrial demonstration scale. • During 2020, Vulcan conducted initial bench-scale mineral processing test work on URG Permo-Triassic brine. The analytical results verified the principles of brine pre-treatment techniques and Direct Lithium Extraction operations with initial findings of greater than 90% LiCl recovery from the geothermal brine. Vulcan has also experimentally demonstrated the removal of transition metals and silica that are expected to be incompatible with common adsorption media.
Environmental factors or assumptions	• Assumptions made regarding possible waste and process residue disposal options. It is always necessary as part of the process of determining reasonable prospects for eventual economic extraction to consider the potential	• Recent Government policy emphasizes conservation and hence promotes development of renewable sources, such as solar, wind, biomass, water, and geothermal power. It the supposition of the CP that green energy opportunities such as Li-brine projects will be viewed favourably by the German Government. • The CP relies completely on statements provided by Vulcan that a geothermal Exploration Licence in the region of the mining authority of Rheinland-Pfalz grants the user exclusivity to co-produce lithium from the brine, should a permission to extract lithium be requested. This statement is reportedly reiterated from discussion between Vulcan and the mining authorities. • In the URG, increased anthropogenic activity such as hydraulic fracking, gas extraction and enhanced geothermal systems can

	environmental impacts of the mining and processing operation. While at this stage the determination of potential environmental impacts, particularly for a greenfields project, may not always be well advanced, the status of early consideration of these potential environmental impacts should be reported. Where these aspects have not been considered this should be reported with an explanation of the environmental assumptions made.	potentially lead to induced seismicity. Seismic risk can be mitigated by: • Performing regularly actual seismic monitoring, particularly before the implementation of stimulation works, • Ceasing to stimulate the reservoir, or • By reducing production flow rates when seismicity occurs during the operational phase.
Bulk density	• Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples. • The bulk density for bulk material must have been	• Bulk density is not applicable, or necessary to be applied, to the liquid, brine-hosted resource. • The lithium resource was calculated using the volume of the brine bearing aquifer, the average effective porosity, the percentage of brine in the pore space and the average concentration of lithium in the brine.

	measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.	
Audits or reviews.	• The results of any audits or reviews of Mineral Resource estimates.	• Vulcan's Li-Brine Project is an early stage exploration project. No audits have been conducted on the resource estimations calculated at the Vulcan Li-Brine Project.
Classification	• The basis for the classification of the Mineral Resources into varying confidence categories. • Whether appropriate account has been taken of all relevant factors (ie relative confidence in tonnage/grade estimations, reliability of input data, confidence in continuity of geology and metal values, quality, quantity and distribution of the data). • • Whether the result appropriately reflects the Competent	• The Vulcan Ortenau Licence Li-brine project has reasonable prospects for eventual economic extraction based on aquifer geometry, delineation of fault zones using re-interpreted seismic data, brine volume, brine composition, hydrogeological characterization, porosity, fluid flow, and advancement of the Company's Direct Lithium Extraction technology. • This lithium-brine Technical Report has been prepared by a multi-disciplinary team that include geologists, hydrogeologists, geothermal specialists, and chemical engineers with relevant experience in the Permo-Triassic brine geology/hydrogeology and Li-brine processing. There is collective agreement that the Vulcan lithium-brine project has reasonable prospects for eventual economic extraction, and the author, Mr. Eccles P. Geol. takes responsibility for this statement. • The updated Ortenau Licence Li-brine resource estimations are classified as Indicated and Inferred Resources. • Pertinent points to support an Indicated Resource classification at the Ortenau Licence include: 1) a greater level of confidence in the subsurface geological model because of Vulcan's acquisition of detailed seismic data, 2) acquisition of a detailed downhole geophysical dataset to analyze the hydrogeological characteristics of a fracture zone within a geothermal well, and 3) knowledge of Vulcan's commissioned DLE absorption mineral processing test work and results. • The Indicated Resource represents a 12.6% portion of the overall Ortenau Licence.

	Person's view of the deposit.	• The Ortenau Licence updated Inferred Resource includes all Buntsandstein Group resource area that is not within the Indicated Resource fault zone domain.
Discussion of relative accuracy/ confidence	• Where appropriate a statement of the relative accuracy and confidence level in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors that could affect the relative accuracy and confidence of the estimate. • The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation	• In the opinion of the CP, the updated Ortenau Licence Li-brine Indicated and Inferred Resource estimations reasonably reflect the Li-brine resource of the modelled Buntsandstein Group aquifer at the Ortenau Licence. • The CP is adequately confident in the continuity of geology, depiction of the fault zones, volume of the Buntsandstein Group aquifer domain, lithium concentration and reliability of quality, quantity, and distribution of the input data. • As the resource is calculated using a volumetric approach, any changes to the 3-D model, the Buntsandstein Group and fault zone wireframes, lithium concentration and/or the porosity will affect the calculated resource estimate. • Risks and uncertainties as they pertain to the Li-brine resource estimations include: o Brine access and supply security. Vulcan is either reliant on current geothermal producers to obtain a continual source of brine or must drill their own wells. o Risks and uncertainties associated with exploration. Because there are no wells producing brine from the Buntsandstein Group or Permo-Triassic strata at the Ortenau Licence, exploration will play a major role in determining the viability of this project. As exploration continues, it will reduce the inherent risks and increase the probability of success. o The resource evaluation in this Technical Report has wireframed 'all' faults within the Buntsandstein Group strata underlying the Ortenau Licence into fault zone and host rock envelope domains. The reader should be aware that the reality of any geothermal exploration program is that only a portion, or portions, of the fault zones will be targeted with a production well(s) at the Ortenau Licence. It is possible that additional wells are drilled to expand the production zone but its unlikely that this would sequester Li-brine from all the fault zones modelled in this resource evaluation. o Localized high permeabilities can lead to channelling effects such that the geothermal reservoir potentially becomes restricted to only occurring within the fault zone. Thus, the exploitation of fault zones can

	should include assumptions made and the procedures used. • These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	constitute a trade-off between high permeability and reduced reservoir volumes.