VULCAN ENERGY RESOURCES
Zero Carbon Lithium®

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

Highlights:

- Following the acquisition and interpretation of seismic and well data, announcing an updated and reclassified Taro Indicated JORC Resource Estimation of 0.83 Mt contained Lithium Carbonate Equivalent (LCE) at a grade of 181 mg/l Li.
- Updated Taro Inferred JORC Resource Estimation revised upward to 1.44 Mt contained LCE at a grade of 181 mg/l Li.
- Vulcan's Upper Rhine Valley Project (URVP) Li-brine resource is now estimated to collectively contain 16.19 Mt LCE at a grade of 181 mg/l Li (Indicated & Inferred; 90% of which is in the Inferred Resource category), the largest JORC lithium resource in Europe.
- Vulcan aims to use its project to produce the lowest CO_2-eq. footprint lithium hydroxide for electric vehicles in the world[1], from its unique Zero Carbon Lithium™ Project in the Upper Rhine Valley.
- Large resource size is significant in that it gives Vulcan the potential to become a major supplier of lithium chemicals into the EU market.
- The Indicated Resource portion of Taro is being integrated into Vulcan's Pre-Feasibility Study (PFS).

Vulcan Managing Director, Dr. Francis Wedin, commented: *"Using our recently acquired seismic data to advance the 3-D geological model, and well data to advance fault zone hydro-dynamics, we're pleased to have upgraded a significant portion of the Taro Resource to the "Indicated" category, and to have increased the size of the Taro Inferred Resource. This higher confidence resource area is being integrated into our PFS, which is on schedule for completion. This is in line with our strategy to become a supplier of our unique Zero Carbon Lithium® hydroxide to the European battery electric vehicle market."*

[1] https://www.jadecove.com/research/finalfrontier

ASX Release
12 November 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: 73,707,918
Market Cap (@1.66c): $122m

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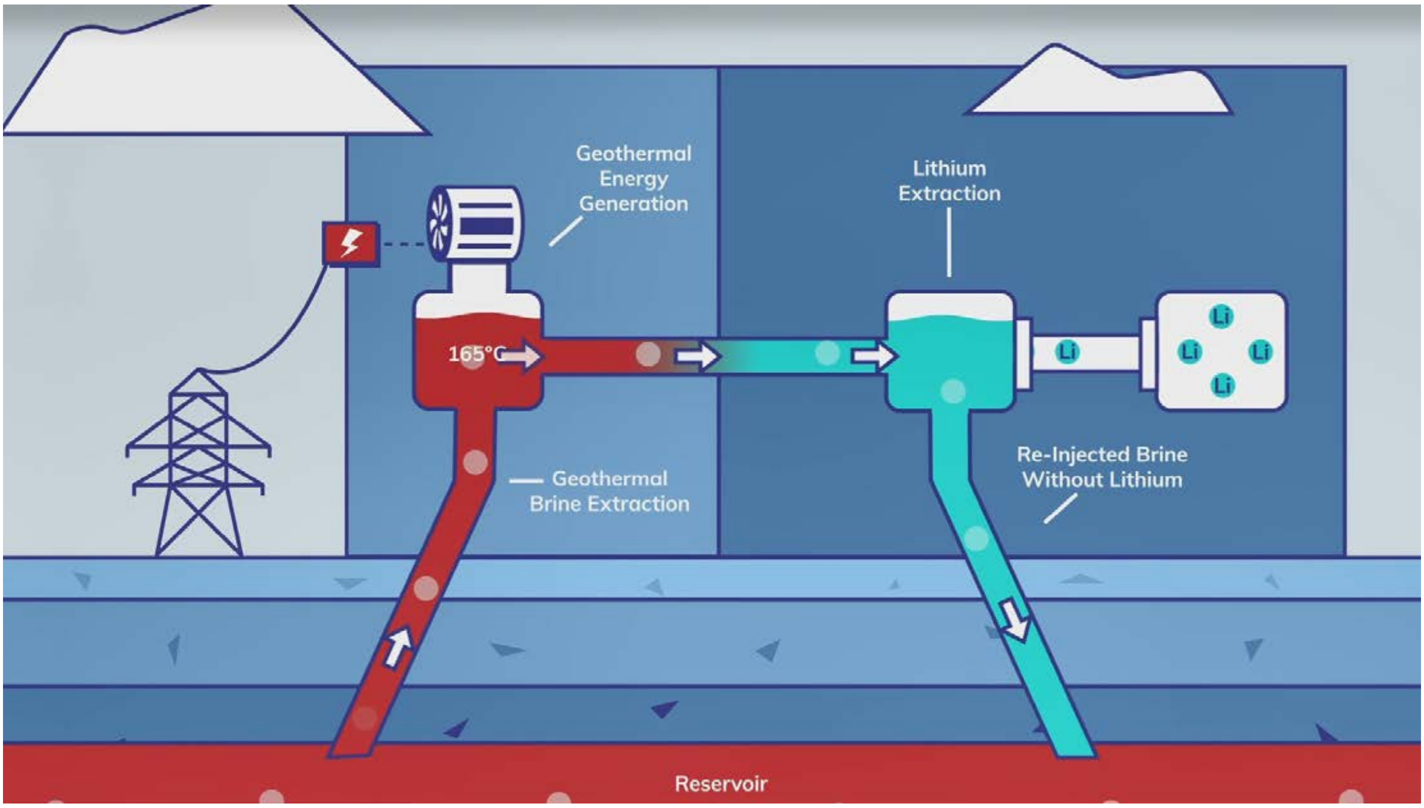
Recent activities by the Company (https://v-er.com/investor-centre/asx-announcements/):

- Appointment of former Tesla director Jochen Rudat to Business Development team.
- Taro license grant and increased global Mineral Resource Estimate.
- Appointment of lithium industry expert Vincent Pedailles to Business Development team.
- Appointment of lithium chemistry expert Dr. Katharina Gerber to the Executive team.
- Excellent recoveries of over 90% from lithium extraction test work on Upper Rhine Valley brine.
- Securing EU backing support package, and EU-backed investment agreement into the Vulcan Zero Carbon Lithium® project.
- $4.8m institutional and ESG investor equity placement.
- Agreement to acquire 3D seismic package to accelerate project development. Commencement of lithium test work for Pre-Feasibility Study. Completion of positive Scoping Study.

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, it will fix lithium's current problems for the EU market: a very 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 lithium-brine (Li-brine) Resource Estimations, for its Taro 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 the Upper Rhine Valley Project (URVP) area within the Zero Carbon Lithium™ Project.

The Taro Exploration License has been granted to Global Geothermal Holding UG (GGH). Vulcan has an agreement with GGH to earn a 51% interest by spending €500,000 within two years of the license grant (Initial Expenditure). Vulcan has met this Initial Expenditure requirement. After the Initial Expenditure, a Joint Venture will be formed, with Vulcan owning 51% and GGH 49%. Vulcan will now spend a further €500,000 to earn a further 29% (Second Earn-In Expenditure) with two years, to take its JV interest to 80%. GGH can then elect to co-fund the project *pro rata* or be diluted by an industry-standard formula whilst Vulcan continues to develop the project. Should GGH be diluted below 5%, its share will be converted to a non-diluting 2% net royalty.

The now disclosed and updated JORC Indicated Mineral Resource Estimation at Taro is 0.83 Mt contained LCE at a grade of 181 mg/l Li. The updated Inferred Mineral Resource Estimation at Taro is 1.44 Mt contained LCE at a grade of 181 mg/l Li.

Vulcan's total, combined URVP resource is now estimated at 16.19 Mt LCE at a grade of 181 mg/l Li (Indicated & Inferred Resources; 90% of which is in the Inferred Resource category), the largest JORC lithium resource in Europe, and with further growth potential. The Taro project is in the process of being integrated into the PFS at the Vulcan Zero Carbon Lithium™ Project.

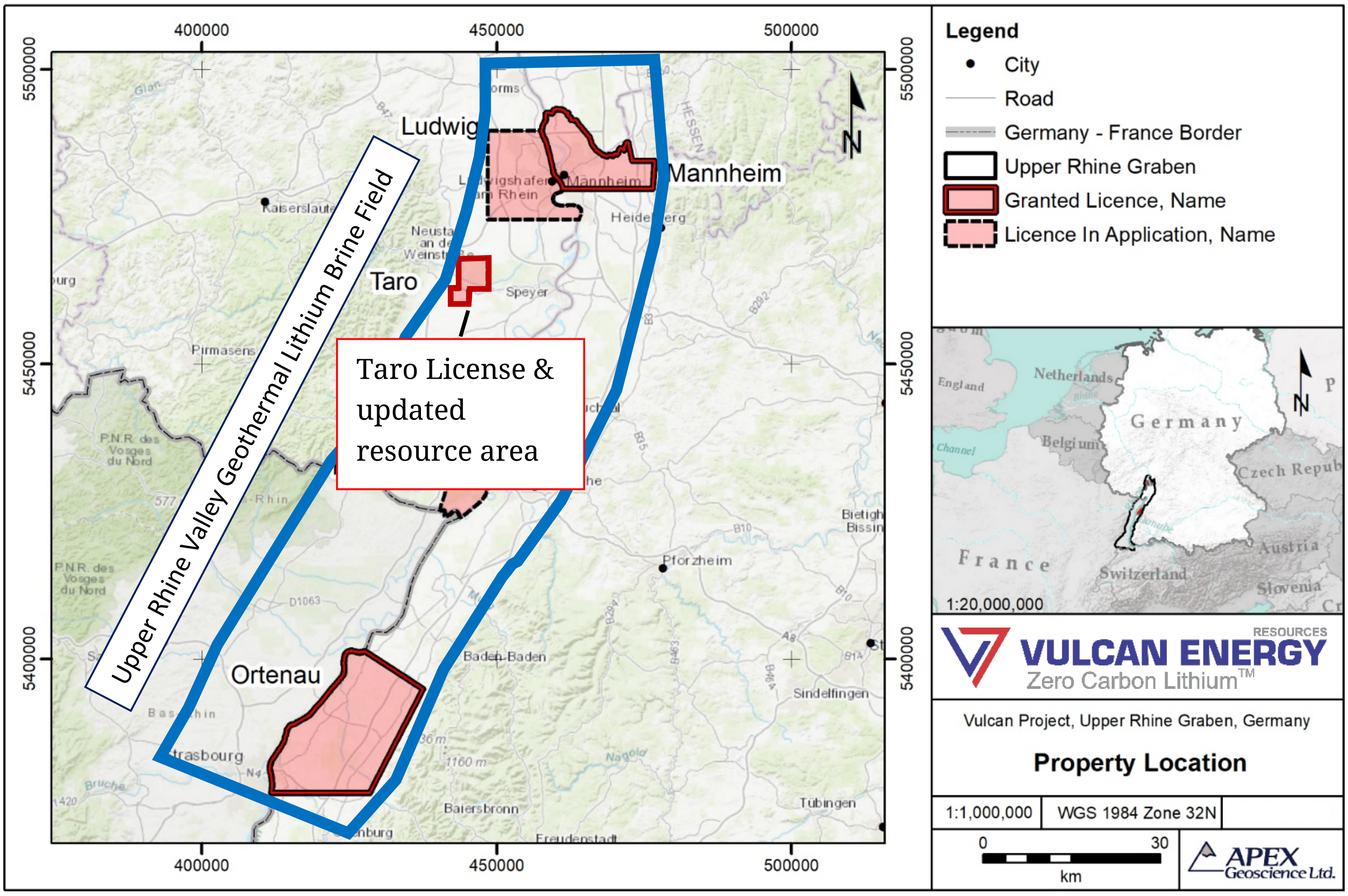


Figure 1: Taro License area, Vulcan Zero Carbon Lithium™ Project

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 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, GGH, which holds one granted license (Taro)[2], and an MoU earn-in agreement with a geothermal operator (Geothermal MoU Area[3]). In addition, Vulcan has two in-application license areas, designated Ludwig and Heßbach (formerly Rheinaue), through its agreement with GGH.

Up to now, Taro was classified as an Inferred Resource[4], and with the acquisition and interpretation of new data, Vulcan is now disclosing an updated and reclassified Taro Licence Indicated and Inferred Li-brine Resource Estimate. Vulcan currently holds 51% interest in this license and has an agreement in place to earn 80% interest. Vulcan's URVP resource area, which is being re-totalled in this News Release with the now granted Taro Exploration Licence, consists of the Taro Indicated and Inferred Resource Estimate together with two other licences with previously announced mineral resources in the URVP (Inferred Resource: 4 December 2019, and Indicated Resource: 20 January 2020).

Geology and geological interpretation

The focus of this Technical Report is on the Permo-carboniferous Rotliegend Group sandstone and the Lower Triassic Buntsandstein Group sandstone, collectively the 'Permo-Triassic strata'.

The Permo-carboniferous Rotliegend Group formed during several Upper Rhine Graben (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. Brine aquifers within the Rotliegend Group and Buntsandstein Group may have some degree of hydrogeological communication, particularly in zones with a high degree of faulting and fracturing that yield zones of high fluid flow. At present, there are no wells on the Taro Licence that are deep enough to penetrate a

[2] ASX announcement 10 July 2019
[3] ASX announcement 21 November 2019
[4] ASX announcement 31 August 2020

hydrogeological-connected fracture network that encompasses the Buntsandstein Group, its underlying Rotliegend Group sandstone, and the uppermost highly faulted, fractured and altered granitic basement. Regional URG seismic interpretations and models available at GeORG (http://maps.geopotenziale.eu/) show that the Permo-Triassic rocks underly all Vulcan Property licenses and is characterized as a laterally heterogeneous sandstone unit within a structurally complex rift basin.

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 conservation and promotes the development of renewable sources, Vulcan is focused on extracting lithium from the deep-seated aquifers via geothermal wells in the Upper Rhine Graben. These 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.

2019 Exploration Programme

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 within its MoU area and 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 Taro, Heßbach and Ortenau 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 a Geothermal MoU Areaproduction well located 14 km south of the Taro Licence yielded 181 mg/L Li (n=23 analyses), which is identical to the regional Li-brine value[5]. 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 Taro, Heßbach, and Ortenau licences.

2020 Exploration Programme

During 2020, Vulcan acquired existing 2-D and 3-D seismic data at the Taro Licence to formulate an advanced and robust 3-D geological model of the Permo-Triassic strata, and structural fault zones underlying the Taro Licence (Figures 2 and 3). The revised geological model provides a higher level of confidence in the spatial location and orientation of the Buntsandstein and Rotliegend surfaces and fault zones at Taro in comparison to the previous modelling that used URG regionally scaled subsurface information from GeORG.

[5] See ASX announcement 2 December 2019

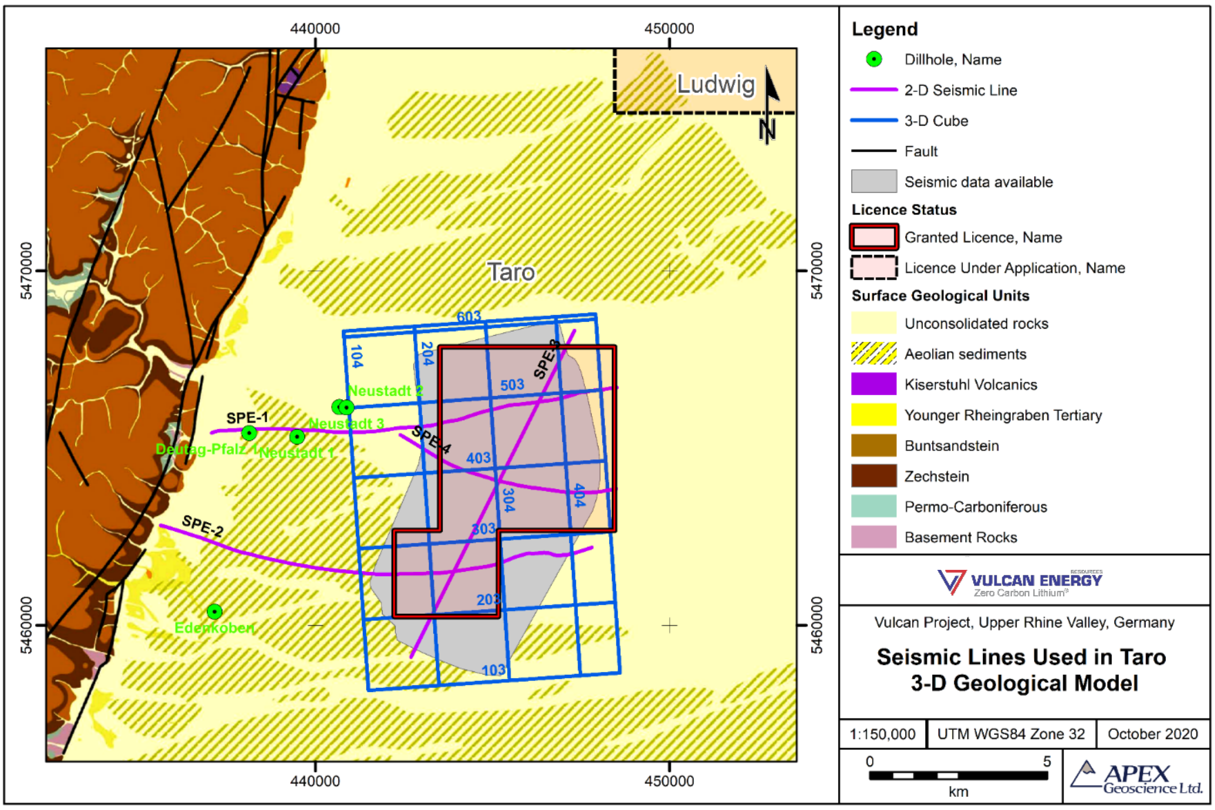


Figure 2: Summary of the existing seismic data acquired by Vulcan in 2020. The 2-D seismic line profiles are in purple and the blue rectangle represents the 3-D cube. Well heads to the west of the 3-D cube were used to validate the seismic interpretations.

Vulcan acquired detailed lithological and downhole geophysical information from a nearby geothermal well, which is located 18 km northeast of the Taro Licence. The detailed lithological and downhole wireline log 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 fault zones. It is the opinion of the author (CP) that the exploration data, and other data compiled and interpreted in this Technical Report, 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 Permo-Triassic aquifers underlying the Taro Licence. Lastly, Vulcan has completed bench-scale lithium extraction test work to recover lithium from URG Permo-Triassic brine; this information is presented later in the News Release.

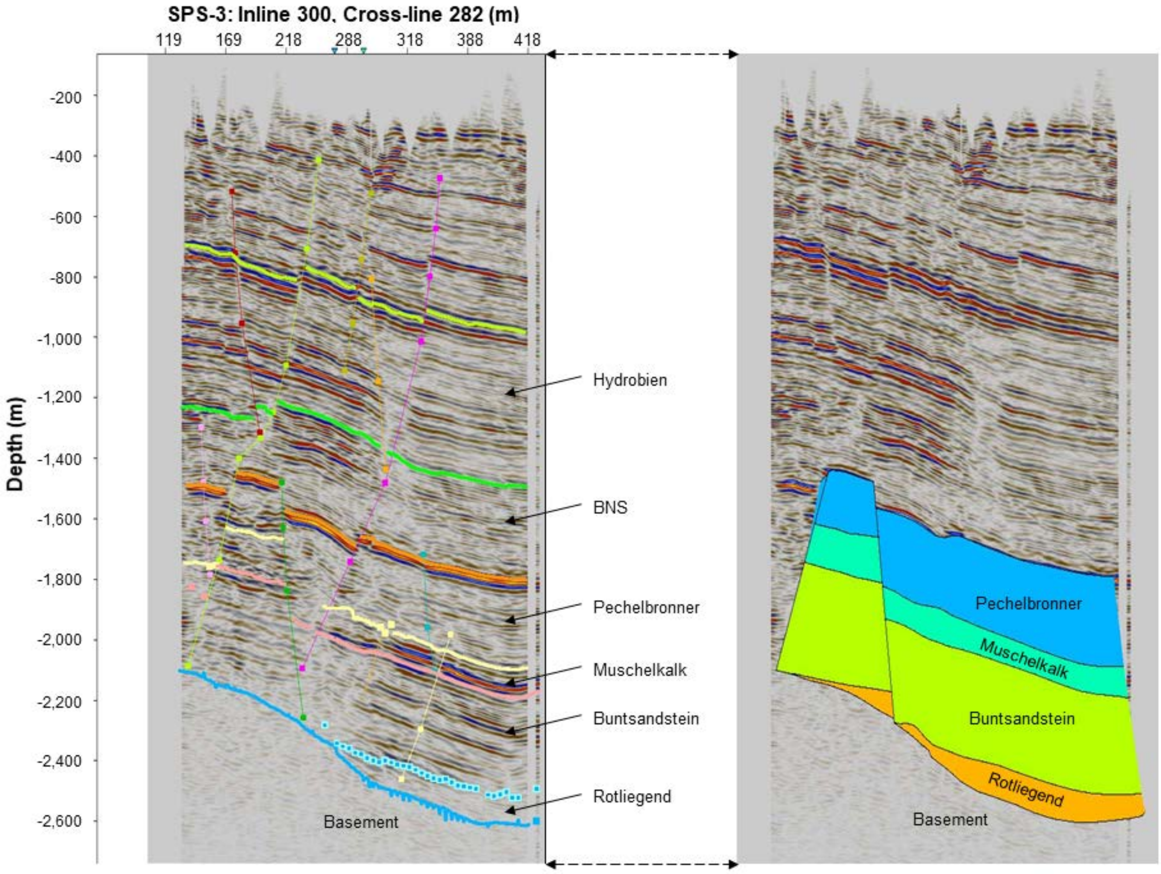


Figure 3:Example seismic profile with interpreted formation top horizons and faults.

Estimation Methodology, Cut-off Grades & Classification Criteria

This Technical Report focuses on the updated Taro 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 estimations were prepared by Mr. Black, M.Sc. P. Geo. of APEX Geoscience Ltd. (APEX). The modelling and estimation work were performed in direct collaboration and supervision of Mr. Eccles, M.Sc. P. Geol. of APEX who reviewed all work and takes responsibility for the updated resource estimations presented in this Technical Report. 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).

Critical steps in the determination of this Vulcan Li-Brine Resource Estimates include: 1) definition of the geometry of the Permo-Triassic strata (Buntsandstein Group and Rotliegend Group) and fault zones at the Taro License based on newly acquired 2-D and 3-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 Taro License.

The 3-D geological model for the Taro License is based on stratigraphic and fault zone interpretation of existing 2-D seismic profiles and a 3-D seismic cube that was acquired by Vulcan during 2020 specifically for the purpose of revising the original Taro geological model toward reclassification of the mineral resource. Formation horizons specific to the resource modelling included the top of the Buntsandstein Group, top of the underlying Rotliegend Group and the top surface of the acoustic basement. A total of 31 faults were interpreted for the entire project area, of which, 12 faults are featured in the 3-D geological model utilized as part of this updated resource estimation process.

The detailed geological model developed for the Taro License enabled the author to consider the Li-brine resource potential associated within specific fault zones penetrating through the Buntsandstein and Permo-Triassic strata. A pertinent conclusion of this study is that fault zone bounded reservoirs in porous host rocks 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 for a nearby geothermal well, which is located approximately 18 km northeast of the Taro License. The work concluded that the fault zone documented within the core contains an additional 'fracture porosity' of 3.1% beyond the 'mean porosity' of the host rock surrounding the fault zone.

Based on these interpretations, 4 separate geological domains were wireframed for the Taro License resource model and estimations, and include: 1) Buntsandstein Group, 2) Rotliegend Group, 3) 12 fault zones whose dimensions and widths were calculated from seismic profile displacement measurements, and 4) secondary fault-associated domain defined as the 'host rock envelope' polygon domain and includes an approximately 450 m side zone of host rock that occurs adjacent to the fault zone (Figure 4).

The 3-D wireframes created in MicroMine for each of the 4 geological domains at Taro 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 Taro License is summarized as:

- A total Buntsandstein Group aquifer volume of 19.95 km^3, of which, 1.94 km^3 occurs within the fault zone domain and 5.29 km^3 occurs within the host rock envelope.
- Rotliegend Group aquifer volume of 4.39 km^3, of which, 0.23 km^3 occurs within the fault zone domain and 0.97 km^3 occurs within the host rock envelope.

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% and 12.1% was used for the fault domain within the Buntsandstein and Rotliegend group aquifers, respectively (i.e., matrix porosity plus a fracture porosity of 3.1%). Regional mean matrix porosities of 9.5% and 9.0% were used for the Buntsandstein Group and Rotliegend Group aquifers, and for the secondary fault-associated domain defined as the 'host rock envelope' polygon domain. The brine volume underlying the Taro License is summarized as:

- A total Buntsandstein Group brine volume of 1.96 km^3, of which, 0.24 km^3 occurs within the fault zone domain and 0.50 km^3 occurs within the host rock envelope.
- Rotliegend Group brine volume of 0.40 km^3, of which, 0.03 km^3 occurs within the fault zone domain and 0.09 km^3 occurs within the host rock envelope.

Vulcan has conducted URG-wide Li-brine assaying in addition to detailed lithium assaying at the Geothermal MoU Area. Both sets of analytical work yield the identical average lithium value of 181 mg/L Li.

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 now developing rapid lithium extraction techniques using low lithium concentration source brine.

The resource estimation presented 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 domain at the Vulcan project licenses, or resource areas:

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

For the Taro License, the author has classified 2 sub-domains within the Buntsandstein Group and Rotliegend Group domains as Indicated Resources: 1) the fault zone domain, and 2) the host rock adjacent to the fault zones domain. The Indicated Resource area is approximately 12.9 km^2 and represents 39% of the overall Taro License. The remaining area outside of the Indicated Resource has been classified as an Inferred Resource.

Pertinent points to support an Indicated Resource classification at the Taro 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 and geological dataset, including re-logging of drill chips, 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.

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.

The Taro License Li-brine updated Indicated Resource estimations are presented in Table 1. The Indicated Resource estimations are divided into Buntsandstein Group and Rotliegend Group domains, which are further sub-divided into 2 domains: the fault zone and host rock envelope adjacent to the fault zone. The updated Taro Indicated Resource estimations for these domain areas are as follows:

1. 44,000 tonnes of elemental lithium within the Buntsandstein Group fault zone domain. The total lithium carbonate equivalent (LCE) for the fault zone domain is 235,000 tonnes LCE.

2. 91,000 tonnes of elemental lithium within the Buntsandstein Group host rock envelope domain, or 484,000 tonnes LCE.

3. 5,000 tonnes of elemental lithium within the Rotliegend Group fault zone domain, or 27,000 tonnes LCE.

4. 16,000 tonnes of elemental lithium within the Rotliegend Group host rock envelope domain, or 84,000 tonnes LCE.

The total combined Taro License Li-brine Indicated Resource estimations predict 156,000 tonnes of elemental lithium, or 830,000 tonnes of LCE, within the Buntsandstein Group and Rotliegend Group fault zone and host rock envelope domains.

Table 1: Maiden Taro Licence Indicated Li-Brine Resource estimate of lithium-bearing brine within the four modelled domains at the Taro Licence.

Reporting Parameter	Buntsandstein Group: Indicated Resource in the Fault Zone	Buntsandstein Group: Indicated Resource Host Rock Envelope	Rotliegend Group: Indicated Resource in the Fault Zone	Rotliegend Group: Indicated Resource Host Rock Envelope	Total Indicated Resource
Aquifer volume (km^3)	1.936	5.287	0.231	0.965	8.419
Brine volume (km^3)	0.244	0.502	0.028	0.087	0.861
Average Li concentration (mg/L)	181	181	181	181	181
Average porosity (%)	12.6	9.5	12.1	9.0	/
Total elemental Li resource (t)	44,000	91,000	5,000	16,000	156,000
Total LCE (t)	**235,000**	**484,000**	**27,000**	**84,000**	**830,000**

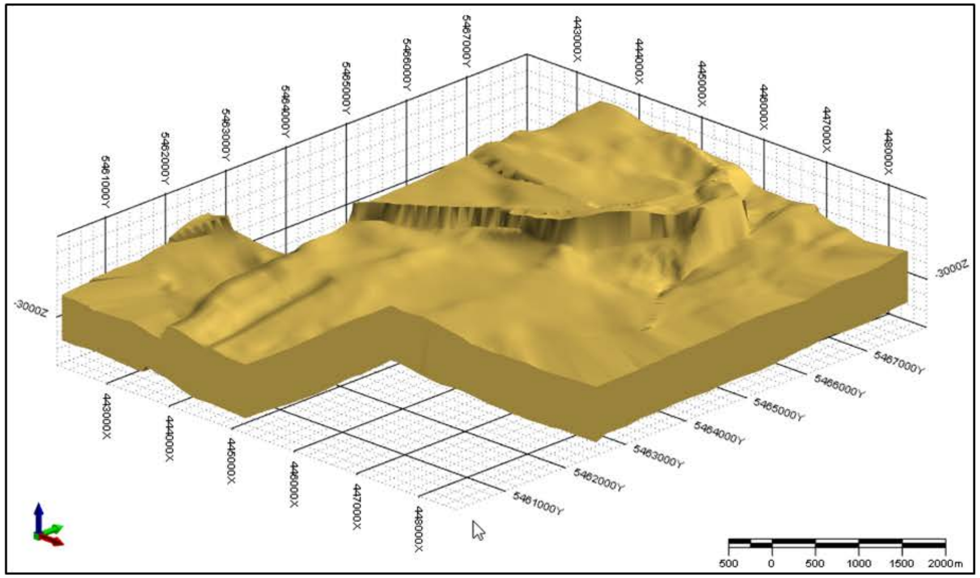
Note 1: Mineral resources are not mineral reserves and do not have demonstrated economic viability.
Note 2: The weights are reported in metric tonnes (1,000 kg or 2,204.6 lbs). Numbers may not add up due to rounding of the resource values percentages (rounded to the nearest 1,000 unit).
Note 3: The total volume and weights are estimated at the average porosities cited in the table.
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).

The Taro Licence updated Inferred Resource includes all Buntsandstein Group and Rotliegend Group resource area that is not within the Indicated Resource domains (i.e., fault zone or host rock envelope adjacent to the fault zones; or 61% of the Taro Licence). The updated Taro Inferred Resource estimations are presented in the table below, in summary:

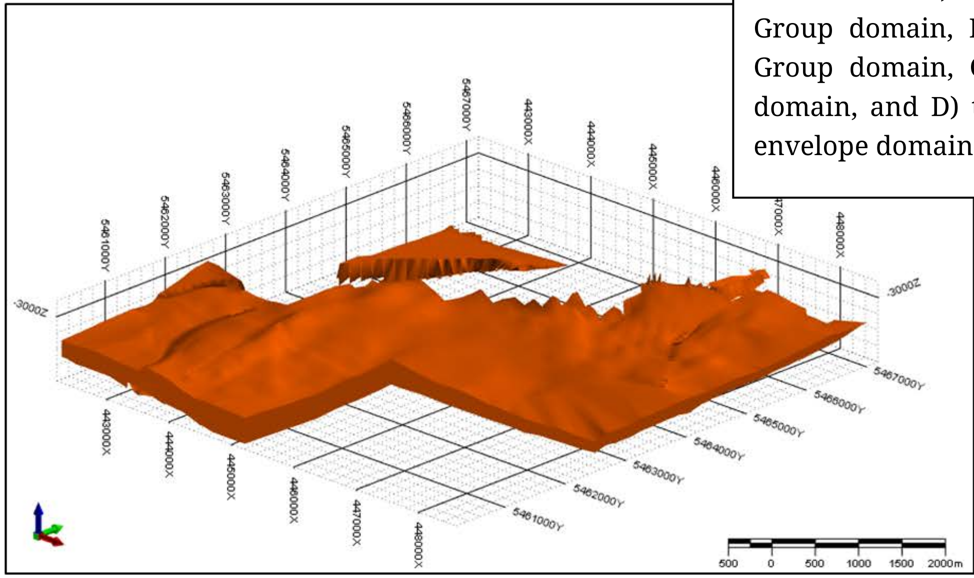
- 219,000 tonnes of elemental lithium within the Buntsandstein Group, or 1,165,000 tonnes LCE.
- 52,000 tonnes of elemental lithium within the Rotliegend Group, or 277,000 tonnes LCE (Table 2).

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.

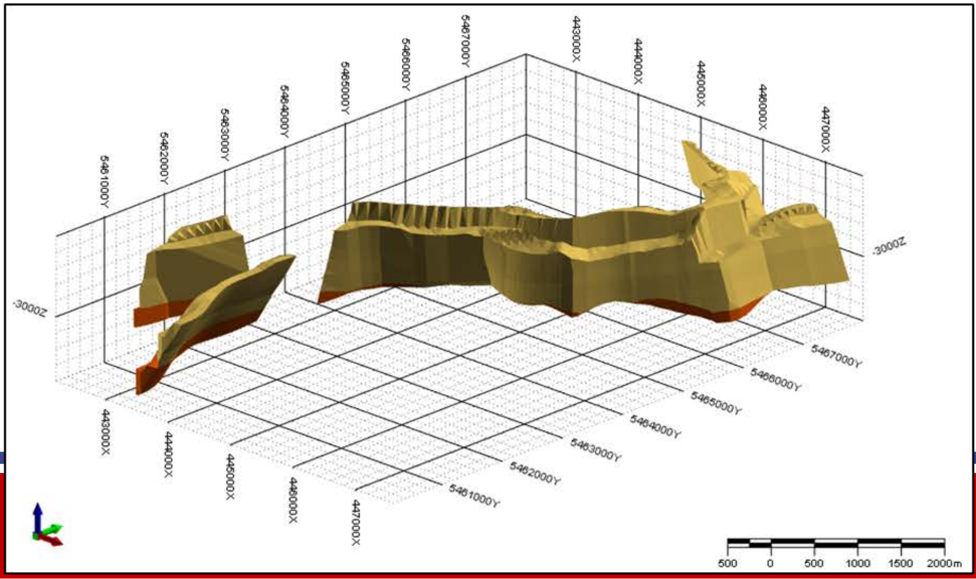
A) Buntsandstein Group domain



B) Rotliegend Group domain



C) Fault zone domain



D) Host rock envelope domain (adjacent to the fault zone)

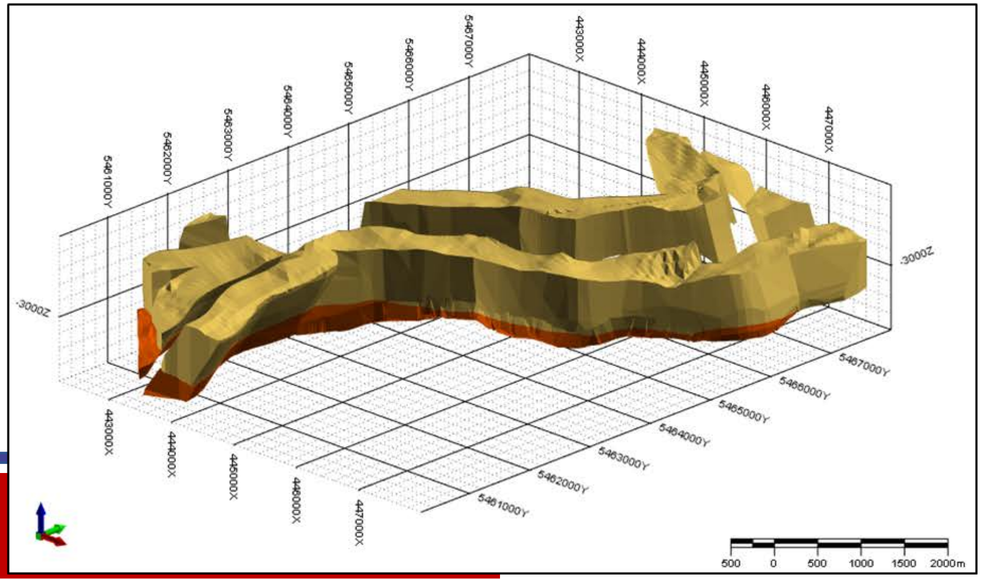


Figure 4: Selected 3-D images of the Taro Licence geological model to emphasise the 4 geological domains that were wireframed for the resource estimations: A) Buntsandstein Group domain, B) Rotliegend Group domain, C) fault zone domain, and D) the host rock envelope domain

Table 2: Vulcan's updated Taro Licence Li-brine Inferred Resource estimations within the Buntsandstein Group and Rotliegend Group aquifers.

Reporting Parameter	Buntsandstein Group	Rotliegend Group	Total Inferred Resource
Aquifer volume (km3)	12.729	3.195	15.924
Brine volume (km3)	1.209	0.288	1.497
Average Li concentration (mg/L)	181	181	181
Average porosity (%)	9.5	9.0	/
Total elemental Li resource (t)	219,000	52,000	271,000
Total LCE resource (t)	**1,165,000**	**277,000**	**1,442,000**

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.
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).

Combined Upper Rhine Valley Project Li-Brine Resources.

Vulcan's Upper Rhine Valley Project (URVP) Li-brine resource is now estimated to collectively contain 16.19 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 Taro, 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**
Previously disclosed Ortenau Inferred Resource estimate	144.489	13.726	181	9.50 (Bunt)	2,484,000	13.2
Updated Taro Inferred Resource estimations	15.924	1.497	181	9.5 (Bunt) 9.0 (Rot)	271,000	1.44
Previously disclosed URVP Indicated Resource estimate (Geothermal MoU area)	8.322	0.749	181	9.00 (P-T)	136,000	0.72
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
Total URVP Indicated and Inferred Resource	**177.154**	**16.833**	**181**	/	**3,047,000**	**16.19**

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. 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 announcement 21 February 2020), and since completed successful bench-scale lithium extraction testwork (refer 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 Formation 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. An uncertainty relates to the lack of current access to deep-seated subsurface brine within the boundaries of the Taro 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 Upper Rhine Valley, exploration is typically conducted with seismic data acquisition and interpretation, with the first drilled well being the first production well. Because brine cannot currently be sampled from the Buntsandstein and Rotliegend formation aquifers underlying the Taro licence (i.e. there are no wells that penetrate the deep-seated formations), the Competent Person relied on geochemical data associated with Vulcan's 2019 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 Buntsandstein and Rotliegend aquifer domains within the URG. There are, however, always local chemical variations due to numerous geological factors.

There was a significant amount of effective porosity measurements on Buntsandstein and Rotliegend formations from drill cores, however, none of the wells were collared within the boundaries of the Taro licence. Consequently, the resource estimation processes assumed average Buntsandstein Group and Rotliegend 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 Taro 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 Taro 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 Taro 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 test well(s) at the Taro 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 zones and host rock envelope domains modelled in this Technical Report.

- Justification for the host rock envelope domain is based on iterative production scenarios where the hydraulic gradient and brine flow direction is adjusted through the placement of production and injection wells. Spent brine that has theoretically removed all lithium is pumped down the injection wells where it forces brine within the host rock matrix porosity back toward the fault zone fracture porosity and the production well(s). In this scenario, dilution factors caused by injecting the spent brine into the hydraulic system are unknown and could influence the timeline of an operational Li-brine extraction program.

- 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 Taro Licence Li-brine Indicated and Inferred Resource estimations. To review JORC Table 1's associated with the Indicated Resource estimation for the Geothermal MoU Area, Inferred Resource estimation for Ortenau, and Exploration Targets for Mannheim, Hesbach (Rheinaue) and Ludwig, the reader is directed to the following Vulcan's 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.

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. • 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	• 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 Taro 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 take at the well head require a cooling mechanism (e.g., brine flows through a 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 QP has reviewed the techniques of the regional sampling and the Geothermal MoU Area 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

	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.	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 were couriered to the CP in Edmonton, Alberta Canada for analysis at a commercial Canadian Laboratory (AGAT 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 was 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 (i.e., in the vicinity of Vulcan's Taro, Hesbach and Ortenau licences and Geothermal MoU Area.
Drilling techniques	• Drill type (eg core, reverse circulation, open-hole 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).	• Vulcan has yet to conduct any drilling at the project and is reliant on existing geothermal wells outside of the Taro Licence to access brine. • There are no current geothermal wells, or petroleum wells that extend deep enough to access Permo-Triassic brine, within the Taro Licence. • With respect to drilling information for the Geothermal MoU Area, please refer to the Table 1 information related to ASX announcement 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 Taro Licence wells to access brine. • There are no current geothermal wells, or petroleum wells that extend deep enough to access Permo-Triassic brine, within the Taro Licence. • 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.
Logging	• Whether core and chip samples have been geologically and	• Vulcan has yet to conduct any drilling at the project and is reliant on existing geothermal wells outside the Taro Licence to access brine. Hence, no logging was

	geotechnically logged to a level of detail to support appropriate Mineral Resource estimation, mining 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.	conducted on wells within the project area. • During 2020, Vulcan acquired detailed lithological and downhole geophysical measurements from a geothermal well which is located approximately 18 km northeast of the Taro 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. • 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	• With respect to the Vulcan 2019 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. • 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

	sampling. • Whether sample sizes are appropriate to the grain size of the material being sampled.	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 Taro 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 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.	• 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 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	• 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

	primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. • Discuss any adjustment to assay data.	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 Taro 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	• Vulcan has yet to conduct any drilling and/or core sampling at the project. • With respect to the subsurface data, subsurface interpreted geological cross-sections were used to model the Permo-Triassic aquifer domains for the Vulcan resource, areas (Taro, Geothermal MoU Area, Ortenau). The origin of the data to develop the -D geological model varies between the licences as follows:

	continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. • Whether sample compositing has been applied.	o Taro Licence: During 2020, Vulcan acquired existing 2009 seismic data, which was composed of a 3-D Seismic Cube and four 2-D seismic lines. o Geothermal MoU Area, Ortenau licences: Each resource area utilized a separate set of east-west cross-section from GeORG that were spaced approximately 1 km part to create the 3-D subsurface geological model. • 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. • I.e., While locally there are minor faulting and slight offsets, the horizontal continuity of the sandstone unit is tremendous with the thickness isopach thickening in the vicinity of the Vulcan licences. This statement is supported by knowledge that the Permo-Triassic strata has been mapped for approximately 250 km along the north-northeast strike length along 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 the Taro, Geothermal MoU Area and Ortenau licences. As there are currently no wells deep enough to access Permo-Triassic brine within the Taro Licence, there has been no Li-brine concentration samples collected to date. • With respect to spacing between sample points, there are no wells within the boundaries of the Taro Licence. The closest wells include the Geothermal MoU Area (14 km south of Taro), Landau (11 km southwest) and Brühl (18 km northeast) wells. With respect to the new seismic-enhanced 3-D geological model, the model covers 82% of

		the Taro Licence. The 3-D cube seismic data covers the entire model area. The 2-D seismic profiles (n=4) include 3 approximately east-west lines and 1 approximately north-south line. The maximum distance between any of the lines is 2.7 km in the eastern part of the model area.
Orientation of data in relation to geological structure	• Whether the orientation of sampling achieves unbiased sampling of possible 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.	• 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 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 a 3-D seismic cube and 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, 7 formation horizons were selected based on the uniqueness of the marker horizons within the seismic profiles. Faults were interpreted by evaluating every tenth inline and crossline (line spacing of approximately 20 m). To interpret fault zones, the faults must have a minimum horizontal extension of 400 m or more. A total of 31 faults were interpreted for the entire project area. Of the 31 faults, 21 faults were found to penetrate through the Permo-Triassic strata at the Taro Licence, and hence used to develop the 3-D geological model for use in the 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, Rotliegend and basement 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 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 Taro 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.

Criteria	JORC Code Explanation	Commentary
Mineral tenement and land tenure status	• 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.	• 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: o Three granted Exploration Licences: Taro, Mannheim, and Ortenau. o Two in-application Exploration Licences: Hesbach (Rheinaue) and Ludwig. o A single Exploitation Licence: Geothermal MoU Area. • The Taro Licence, which is the subject of this JORC Table, is 3,268 hectares and is centered at approximately: UTM 445690 m Easting, 5464950 m Northing, Zone 32N, WGS84. • The Taro License has been granted to Global Geothermal Holding UG, with which Vulcan has agreement to earn a 51% interest by spending €500,000 within two years of the license grant (Initial Expenditure). After the Initial Expenditure, a Joint Venture will be formed, with Vulcan owning 51% and GGH 49%. Vulcan will then spend a further €500,000 to earn a further 29% (Second Earn-In Expenditure) with two years, to take its Joint Venture interest to 80%. Once Vulcan has spent the minimum amount and has taken its share to 80%, Global Geothermal Holding UG can elect to co-fund the project pro rata or be diluted by an industry-standard formula whilst Vulcan continues to develop the project. Should Global Geothermal Holding UG be diluted below 5%, its share will be converted to a non-diluting 2% net royalty. Vulcan has earned in to 51% of this license. • An Exploration Licence shall accord the holder the exclusive right to: o Explore for the geothermal resources specified in the licence. o To extract and acquire ownership in the resources that must be stripped or released during planned explorations. o To erect and operate facilities that are required for exploring the resources and for carrying out related activities. • Vulcan's Taro Exploration licence terminates April 23, 2022, 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 Taro, which would grant Vulcan the exclusive right to geothermal resources from 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 works; • 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 Taro Licence 3-D Modelling was improved beyond the GeoORG subsurface information through Vulcan's 2020 acquisition of 3-D seismic cube and 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 in advance of resource modelling work. • Detailed studies of nearby geothermal well data, which was drilled in 2013, were acquired by Vulcan in 2020 and helped 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 Taro Licence.
Geology	• Deposit type, geological setting and style of mineralisation.	• The potential lithium mineralization is situated within confined, subsurface aquifers associated with the Permocarboniferous Rotliegend Group and the Lower Triassic Buntsandstein Group (collectively, the Permo-Triassic strata) sandstone aquifers 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 Taro Licence geological model benefits from 2020 2-D and 3-D seismic data acquired by Vulcan. The seismic interpretation mapped, in detail, 7 formation horizons based on the uniqueness of the marker horizons within the seismic profiles. Faults were interpreted by evaluating every tenth inline and crossline (line spacing of approximately 20 m). To interpret fault zones, the faults must have a minimum horizontal extension of 400 m or more. A total of 31 faults were interpreted for the entire project area. Of the 31 faults, 21 faults were found to penetrate through the Permo-Triassic strata at the Taro Licence, and hence used to develop the 3-D geological model for use in the 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, Rotliegend and basement 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 – 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.	• Vulcan has yet to conduct any drilling and/or core sampling at the project. • Presently, there are no wells within the boundaries of the Taro Licence. • It is possible that Vulcan will drill a future well at the Taro 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 the ASX news release dated 20/01/20.
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high	• 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. • 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

	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.	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 Taro 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 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').	• 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. • 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 is a moot point as the well 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	• The associated News Release captures critical figures that were used in the updated Taro Licence resource estimations. • All map images include scale and direction information such that the reader can properly orientate the information being portrayed.

	appropriate sectional views.	
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 reporting of Exploration Results.	• Comprehensive reporting of all Exploration Results is presented in the News Release and in an associated 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 the Taro license, Geothermal MoU area and Ortenau license. • There are fewer wells to sample in the Ludwig and Mannheim licence areas, and therefore, these licences remain Exploration Targets.
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 Taro, Geothermal MoU Area and Ortenau 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=3) 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 Taro Licence Li-brine resource estimation process.
Further work	• The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or	• A further exploration program at the Taro Licence is recommended, including 1) acquisition of all appropriate permits and licenses to drill a geothermal well at the Taro Licence, 2) a drill program to drill a test production geothermal well, 3) collection of brine

	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 commercially sensitive.	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.

VULCAN ENERGY RESOURCES Zero Carbon Lithium®

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 Taro 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 Tables 2 and 3). • 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 Taro Licence lithium-brine resource estimations. • With respect to the 3-D geological model, the newly acquired 2-D and 3-D were reviewed by GeoThermal Engineering GmbH on behalf of Vulcan. The review included checking seismic profile reflectors that were selected for the stratigraphic picks, and a review and measuring of the vertical displacement of the faulted strata, which was very evident on the seismic profiles. Any discrepancies, or artefacts, in the picked surfaces and/or fault zones were evaluated against the original seismic data and then corrected by GeoThermal Engineering GmbH. The 3-D model was then transferred to the CP for final error checking and validation. • In the opinion of the CP, the Taro 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, the nearby well data acquired by Vulcan in 2020 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 Taro Licence. • For a summary of the lithium results used, please see ASX announcements dating 20/01/20 and 2/12/2019
Site visits	• Comment on any site visits undertaken by the Competent Person and the outcome of those visits.	• 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

	• If no site visits have been undertaken indicate why this is the case.	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 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.	• The addition of 2-D and 3-D seismic data significantly increased the CP's confidence level in the subsurface 3-D geological model. Previously – the Taro geological model utilized regional URG subsurface sectional data acquired from GeORG. The detailed seismic data enabled the CP to create very detailed Buntsandstein Group, Rotliegend Group, and basement surfaces, which provided higher confidence in the calculation of aquifer volume and brine volume for the resource estimation process. The 3-D cube and 2-D seismic profiles covered 82% of the Taro Licence. • In addition, the fault/fracture zones were easily 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 high 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 and make calculated inferences at the horizontal width of the fault zone in the geological model. • Acquisition of a detailed downhole geophysical dataset from the nearby 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 Taro 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 Permo-Triassic strata at the Taro Property has a gentle south-east dip. The top and base surface elevations of the Buntsandstein Group under the Taro Licence is from -2,125 to -3,569 m below sea level (m asl; average of -2,580 to -3,192 m asl) with an average thickness of 611 m. The top and base surface elevations of the Rotliegend Group under the Taro Licence is from -2,898 to -3,796 m asl (average of -3,324 to -3,519 m asl) with an average thickness of 196 m. In the 3-D geological model, the Buntsandstein and Rotliegend groups encompass 100% and 69% of the Taro Licence, respectively. • Taro Exploration Licence is 32.68 square kilometres (3,268 hectares) in size and is centered at approximately: UTM 445690 m Easting, 5464950 m Northing (Zone 32N WGS84). • The Taro Licence is composed of 2 contiguous squares. The larger, northeast square measures 5.0 km east-west by 5.2 km

		north-south. The smaller, southwest square measures 2.9 km east-west by 2.5 km north-south.
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 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. • Any assumptions about correlation between variables. • Description of how the geological interpretation	• This is an updated Li-brine resource estimate for the Taro 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 Taro lithium-brine resources include: ◦ Definition of the geology, geometry and volume of the subsurface Buntsandstein Group and Rotliegend Group domain aquifers underlying the Taro Licence. ◦ Hydrogeological characterization and an historical compilation and assessment of mean porosity within the URG Permo-Triassic strata. ◦ 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 Permo-Triassic brine underlying the Taro 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 Li-brine Inferred Resource estimation was prepared by the CP on November 26, 2019, and thereafter on 31 August 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 acquired 2-D and 3-D seismic data and detailed lithological and downhole wireline log data from the nearby well, which is located approximately 18 km northeast of the Taro Licence. 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 Taro Licence. The current resource estimations replace and supersede the November 26, 2019, and August 31, 2020 resources. • 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 recovery from the geothermal brine.

	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.	Vulcan experimentally demonstrated the removal of transition metals and silica that are expected to be incompatible with common adsorption media. • Four separate geological domains were wireframed for the updated Taro Licence resource model and estimations, and include: 1) Buntsandstein Group, 2) Rotliegend Group, 3) 12 fault zones, and 4) a host rock envelope spaced 450 m away from each fault zone (in both directions from the fault). • The Buntsandstein and Rotliegend domains are represented by the upper and lower surfaces from 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 dimensions of the host rock envelope domain have been allocated at 450 m on either side of the fault. Justification for this domain is based on an iterative production scenarios in which the placement of production and injection wells stimulates a hydraulic gradient that sequesters brine from the host rock matrix porosity to flow back toward the fault zone fracture porosity zone. • The extent of all 4 resource domain wireframes were clipped to the boundary of the Taro Licence. The wireframes were created by constructing 2-D strings of each wireframe by using the top and bottom of the Buntsandstein-Rotliegend stratigraphy and/or width of the fault zone and host rock envelope. The 2-D strings were then connected to create a solid 3-D wireframes. • The volume of the Permo-Triassic aquifer domain underlying the Taro Licence was calculated using the 3-D wireframes created in MicroMine. The aquifer volume underlying the Taro Licence is summarized as: o A total Buntsandstein Group aquifer volume of 19.95 km^3, of which, 1.94 km^3 occurs within the fault zone domain and 5.29 km^3 occurs within the host rock envelope. o A total Rotliegend Group aquifer volume of 4.39 km^3, of which, 0.23 km^3 occurs within the fault zone domain and 0.97 km^3 occurs within the host rock envelope. • 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). • Regional mean matrix porosities of 9.5% and 9.0% were used for the Buntsandstein Group and Rotliegend Group aquifers (including the host rock envelope domain). A fracture porosity value of 3.1% was added for the fault zone domain such that a

		fault zone porosity of 12.6% and 12.1% was assigned for the fault domain within the Buntsandstein Group and Rotliegend Group aquifers, respectively. In the CP's opinion, the porosity values are conservative. • The brine volume underlying the Taro Licence is summarized as: o A total Buntsandstein Group brine volume of 1.96 km^3, of which, 0.24 km^3 occurs within the fault zone domain and 0.50 km^3 occurs within the host rock envelope. o A total Rotliegend Group brine volume of 0.40 km^3, of which, 0.03 km^3 occurs within the fault zone domain and 0.09 km^3 occurs within the host rock envelope. • The average lithium-in-brine concentration used in the resource estimations presented in this Technical Report 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	• 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

	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.	underlying all of the Vulcan Property licences.
Metallurgical factors or assumptions	• The basis for assumptions or predictions regarding metallurgical amenability. It is 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.	• 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 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 environmental impacts of the mining and processing operation. While at this stage the determination of	• 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 potentially lead to induced seismicity. Seismic risk can be mitigated by:

	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.	• 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 measured by methods that adequately account for void spaces (vugs, porosity, etc), moisture and differences between rock and alteration zones within the deposit.	• 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.
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	• The Vulcan Taro 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

	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 Person's view of the deposit.	eventual economic extraction, and the author, Mr. Eccles P. Geol. takes responsibility for this statement. • The updated Taro Licence Li-brine resource estimations are classified as Indicated and Inferred Resources. • Pertinent points to support an Indicated Resource classification at the Taro 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 area is approximately 12.9 square kilometres and represents 39% of the overall Taro Licence. • The Taro Licence updated Inferred Resource includes all Buntsandstein Group and Rotliegend Group resource area that is not within the Indicated Resource domains (i.e., fault zone or host rock envelope adjacent to the fault zones; or 61% of the Taro Licence).
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 should include assumptions made and the procedures used.	• In the opinion of the CP, the updated Taro Licence Li-brine Indicated and Inferred Resource estimations reasonably reflect the Li-brine resource of the modelled Permo-Triassic aquifer at the Taro Licence. • The CP is adequately confident in the continuity of geology, depiction of the fault zones, volume of the Permo-Triassic 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 Permo-Triassic wireframe, 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 Taro 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 Permo-Triassic strata underlying the Taro 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 test well(s) at the Taro 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 and host rock envelope domains modelled in this Technical Report. o Justification for the host rock envelope domain is based on

	• These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.	iterative production scenarios where the hydraulic gradient and brine flow direction is adjusted through the placement of production and injection wells. In this scenario, dilution factors caused by injecting the spent brine into the hydraulic system are unknown and could influence the timeline of an operational Li-brine extraction program. 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 constitute a trade-off between high permeability and reduced reservoir volumes.