VULCAN ENERGY RESOURCES
Zero Carbon Lithium®

High grade lithium, low impurity results from Vulcan's 2021 Upper Rhine Valley bulk brine sampling

Highlights:

- Vulcan has collected a bulk (10,000 litre) brine sample from a recently drilled geothermal well in the Upper Rhine Valley within 6km of Vulcan's Ortenau Resource and license area.
- The bulk brine sample returned a high grade of 214 mg/L Li (n=1 analysis) and will be used in Direct Lithium Extraction (DLE) piloting test work.
- Vulcan now has brine data stretching back to 1980 showing remarkably consistent Li values in Upper Rhine Valley brine.
- Within Ortenau, Vulcan currently has an Inferred and Indicated JORC Resource Estimation of 12.86 Mt contained Lithium Carbonate Equivalent (LCE) at a grade of 181 mg/L Li, and Vulcan's total Upper Rhine Valley Project has Inferred and Indicated Resources of 15.85 Mt contained LCE at a grade of 181 mg/L Li of which 23% is in the Indicated category[1], the largest lithium resource in Europe.
- The brine analysis also showed exceptionally low impurities (inc. Si, Mn, Fe) relative to other high-lithium geothermal brines worldwide, important for DLE performance.
- New data will be incorporated into Vulcan's resource estimation update work later in the year, as part of Definitive Feasibility Study (DFS) work for the Vulcan Zero Carbon Lithium® project.

Vulcan Managing Director, Dr. Francis Wedin, commented: *"It is encouraging to observe high grade lithium, with exceptionally low impurities, in geothermal brine analysis such as this from our sampling efforts in the URVP. The low impurities are important as this increases the effectiveness of our DLE techniques. Results of this nature will be combined with seismic and historical drilling data, which will be used by our expert in-house geological team for production study work towards the Definitive Feasibility Study. This data collection and analysis is an important part of our strategy to become a major supplier of our unique Zero Carbon Lithium to the European battery electric vehicle market."*

[1] Refer ASX announcement 15/12/2020

ASX Release
10 March 2021
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: 107,464,256
Market Cap (@$5.59): $600m

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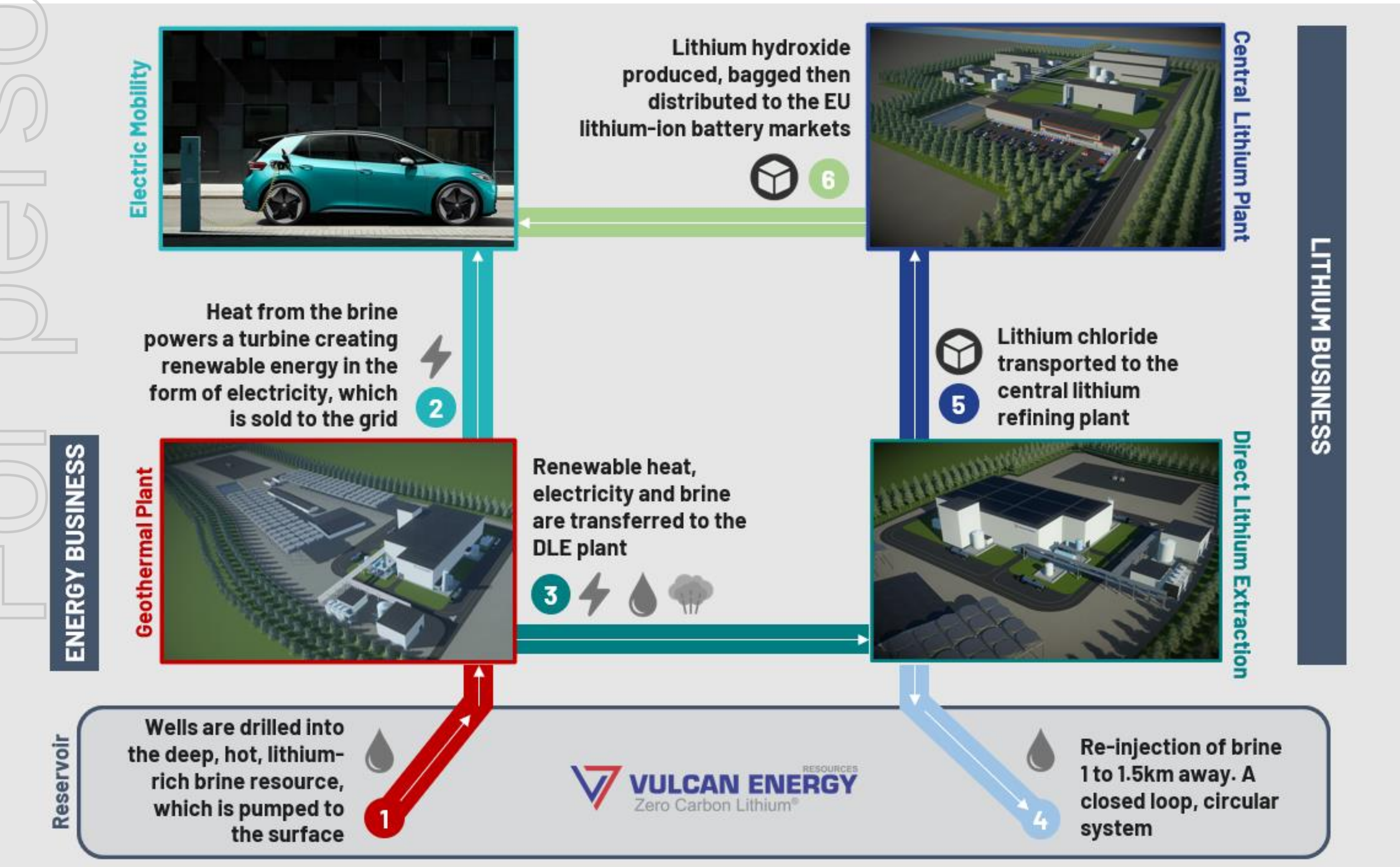
Recent activities by the Company (https://v-er.com/investor-centre/):

- Agreement with DuPont to advance Direct Lithium Extraction.
- Acquisition of world-class geothermal sub-surface development team.
- $120 million placement endorses Vulcan Zero Carbon Lithium®.
- COO appointment and Vulcan joins lithium ISO committee.
- Positive Pre-Feasibility Study.
- German legislation embraces geothermal energy.
- European Commission Regulation on batteries & CO_2 footprint.
- Appointment of lithium, chemistry and automotive experts to the Executive Team.

About Vulcan

Vulcan Energy 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, net zero carbon process to produce both renewable geothermal energy, and lithium hydroxide, from the same deep brine source. In doing so, Vulcan will address lithium's EU market requirements by reducing the high carbon and water footprint of production, and total reliance on imports, mostly from China. Vulcan aims to supply the lithium-ion battery and electric vehicle market in Europe, which is the fastest growing in the world. Vulcan has a resource which can satisfy Europe's needs for the electric vehicle transition, from a zero-carbon source, for many years to come.



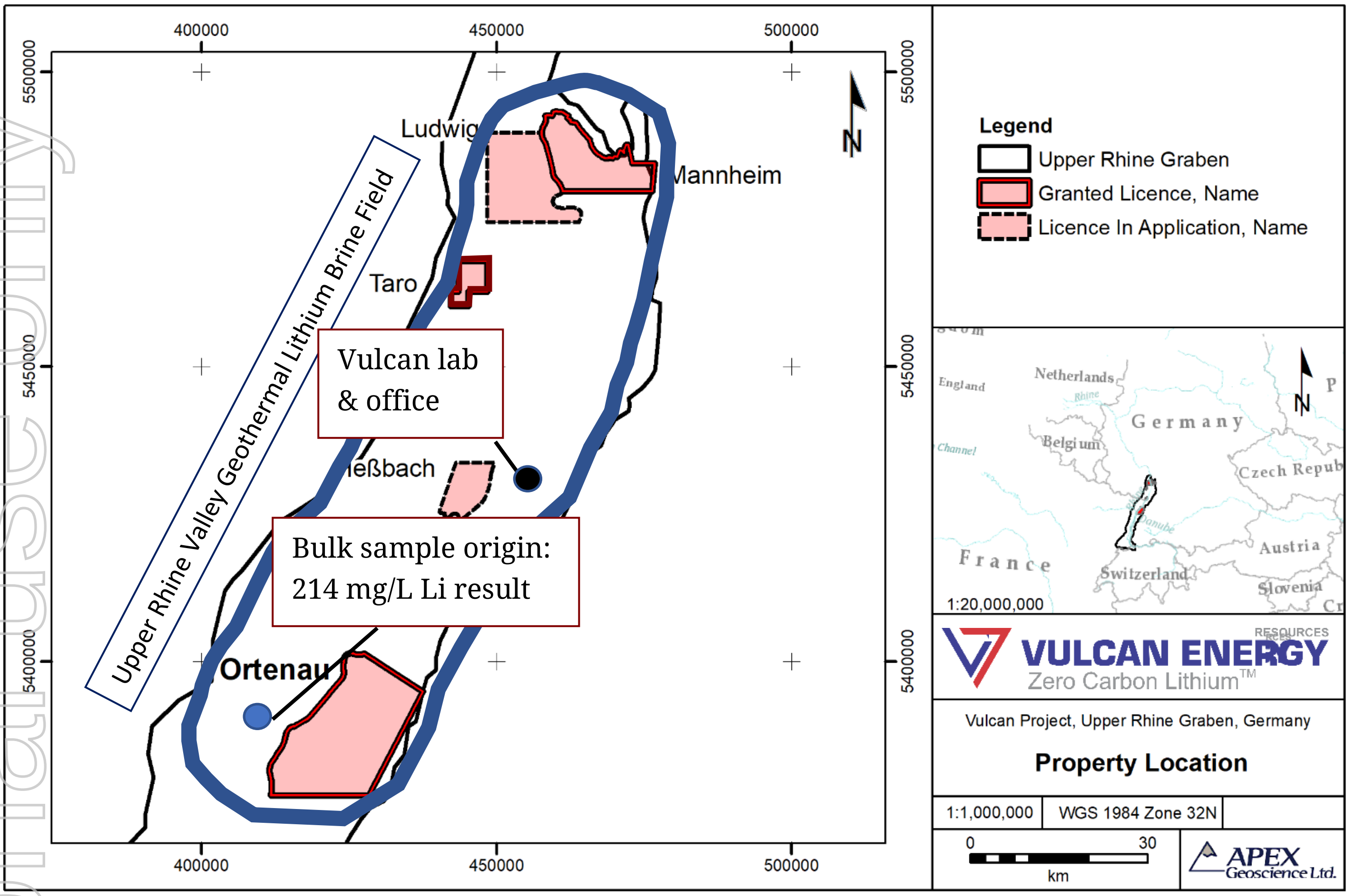


Figure 1: Vulcan Zero Carbon Lithium® Project area and location of 2021 bulk brine sample.

Sampling & Analysis

Vulcan Energy Resources Ltd. ("Vulcan", "VUL", "the Company") is pleased to announce the results from its January 2021 regional geothermal well bulk brine sampling and analysis in the Upper Rhine Valley. Approval to analyse the brine was acquired by Vulcan from the geothermal well operator. The spatial location of the well in relation to the Ortenau Licence is presented in Figure 1. Photos of the sample location is presented in Figure 2. A description of the sample numbers, well location, and sampling point is presented in Tables 1-4.

At surface, the sampled well is situated proximal to (5.6 km east) of Vulcan's Ortenau license area. In this instance, the well was sampled because of the lack of accessible wells that penetrate deep-seated Buntsandstein Group-Basement brine-saturated aquifers underlying Vulcan's licenses. Based on the knowledge that: 1) deep-basin Upper Rhine Graben (URG) brine is lithium-enriched as per historical documentation; and 2) confined aquifers in a graben system can have massive spatial extent with homogeneous to semi-homogeneous lithium-in-brine concentrations, it is assumed that the Li-brine content of neighbouring wells are a good proxy of the lithium content in aquifers underlying the URG and the Vulcan project licenses.

Vulcan's project licenses were also applied for on the basis that indicative fault zones from historical seismic data indicate areas of potential high brine flow rate, which combined with high brine lithium grade and geothermal temperatures are the combined ingredients that Vulcan believes is necessary for a commercial geothermal plus lithium extraction project.

Total metal ICP-OES and ICP-MS results are presented in Table 4, observations of which are presented as follows:

- Lithium values of the newly sampled brine were higher than those used in Vulcan's Ortenau resource calculation, albeit generally in line with geochemical expectations because the brine target horizon at the sampled well is deeper and therefore hotter, which may correlate with a higher grade.
- The sampled well pumps brine from a perforation point that is within the crystalline basement underlying the Buntsandstein Group sandstone. Fault zones propagating from the basement into the Buntsandstein would induce some degree of hydrogeological communication between the two units. The high lithium grades associated with granitic basement-hosted brine underlying the Buntsandstein Group sandstone, supports the "multi-reservoir" model. Because the Ortenau Licence Li-brine resource was focused on the Buntsandstein Group, this conclusion may suggest there is a larger reservoir volume associated with basement fault zones that could contribute to upside for Vulcan's resource.
- Very low impurity levels (including Si, Mn, Zn, Fe) relative to other geothermal brines with high lithium grades where DLE is being developed, such as Salton Sea in California. This is important as it should continue to benefit the performance and advancement of Vulcan's DLE process.

Sample origin: The brine fluid sampled was produced from a ca. 5 km (total vertical depth/TVD) deep production well that penetrated into the crystalline basement (granitoid rock) at a geothermal plant in France 5.6 km to the northwest of the western boundary of Vulcan's license area Ortenau.

Sampling: A total brine sample of 10,000 litres was collected from the well into ten 1,000-litre Intermediate Bulk Containers (IBC) containers, supervised by Dr. Michael Kraml of Geothermal Engineering GmbH (GeoT), which were trucked to Vulcan's locked storage facility in Karlsruhe, Germany. One of the IBCs was then sub-sampled, with two 10 litre samples for laboratory geochemical assay test work. One 10 litre sub-sample was taken by Dr. Michael Kraml to the Karlsruhe Institute of Technology (KIT) laboratory. The other 10 litre sub-sample was taken by SGS laboratories to provide an umpire assay check.

The naturally outflowing fluid (dynamic conditions) with a brine temperature of ca. 200 °C was cooled down to ca. 40 °C using a counterflow cooler. The cooling process was conducted at the well site to avoid significant steam loss during the brine collection process. A rain cover was used to avoid dilution of the brine with rainwater. The end of the brine sample collection tube was placed as deep as possible into the IBC to reduce the contact of the outflowing brine with oxygen and degassing of CO_2 during sampling.

Sample treatment included: 1) the sample for cations was filtered (0.45 µm) and stabilized with concentrated supra-pure HNO3 (pH < 2) to prevent the formation of metal precipitates, and 2) the anion sample was stored at 4 °C prior to analysis to prevent bacterial growth. On-site parameters were measured with calibrated pH and EC probes (SenTix® 980 and TetraCon® 925) connected to a WTW 3430 multimetre in static mode using an untreated sample.

Geochemical analyses: The routine water and trace element analyses were conducted for major cations, anions and trace elements by KIT using a Varian 715ES, Methrom Compact IC 930 and iCAP RQ, Thermo Fisher, respectively. With respect to quality assurance-quality control, duplicate samples, sample standards and sample blanks were not inserted randomly into the sample stream at the time of the brine sampling. However, Certified Reference Material (CRM-LGC6020 and CRM-TMDW) and deionized water for calibration and determination of the bank contribution were inserted into the analytical sample stream by the laboratory as part of routine test work and yielded good analytical precision.

The analytical methods used were as follows: DIN EN ISO 17294-2: 2016-07: inductively coupled plasma mass spectrometry (ICP-MS), DIN EN ISO 11885: 2009-09, DIN EN ISO 10304-1: 2009-07: inductively coupled plasma optical emission spectrometry (ICP-OES). The KIT laboratory successfully participated in Vulcan's international round robin test for lithium brine analysis in 2019 that included a artificially prepared high-saline lithium-brine standard comparable in the concentrations of the solutes to natural Upper Rhine Graben brines.

The analytical result of a single assay from the bulk brine sample collected by Vulcan yielded 214 mg/L Li. This value validates historical geochemical results of lithium-enriched brine from this locale in the URG. The value of 214 mg/L Li is higher in comparison to the historical brine geochemical work of Sanjuan et al. (2020) who suggested representative Li-brine values of 149-162 mg/L Li measured during the start-up of this well such that the brine could have been mixed with other fluids during final preparation of the well. An umpire sample of the bulk brine collected by Vulcan and analysed at a check lab using a diluted ICP-OES technique yielded 250 mg/L Li; while Vulcan prefers the 214 mg/L Li value from their primary lab (KIT), the check lab does support the high lithium values in Buntsandstein Group-Basement aquifers at this well site.

As with the historical Buntsandstein Group-Basement chemical compositions reported by Sanjuan et al. (2020), the brine sample is characterized by a significantly lower Ca and Sr concentration compared to other URG fluids. This unique feature of the brine sample is most likely due to aragonite formation ($CaCO_3$ with high Sr content) during CO_2 degassing of the ascending fluid i.e., not representative for a fluid taken from the circulating fluid with a pressure maintained above the bubble point. The interpretation is supported by the high pH resulting from CO_2 removal and the fact that it was not possible to take a gas sample. Despite the uniqueness of the brine chemistry, the sample yielded high lithium and positive values of other key multi-elements relevant to lithium recovery.

Figure 2: Photos of the geothermal well bulk brine sampling site and 1,000-litre bulk brine storage container.

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Table 1: Comparison of Vulcan's January 2021 Upper Rhine Valley sample result analysed at KIT (n=1), compared to Salton Sea brine results (n=unknown) as recorded in publicly available literature (https://gdr.openei.org/submissions/499 for all multi-element results except silica; US Patent 4429535 for pre-flash silica values). Salton Sea values adjusted by the density 1.25 -> from mg/kg to mg/l.

		Upper Rhine Valley Brine	Salton Sea Brine		URV vs SS
Salts (Cations)	**Analyte**	**Value**	**Value**	**Units**	**%**
Lithium: Source of revenue	**Li**	214	213	mg/l	+1%
	Na	22,231	59,600	mg/l	-63%
	K	4,878	18,126	mg/l	-73%
	Rb	30.0	-	mg/l	
	Cs	16.0	-	mg/l	
	Mg	99	54	mg/l	+83%
	Ca	5,195	31,714	mg/l	-84%
	Sr	276	475	mg/l	-42%
	Ba	14.4	139	mg/l	-90%
Anions					
	Cl	60,567	145,000	mg/l	-58%
	SO4	172	127	mg/l	+35%
	F	4.7	24	mg/l	-81%
	Br	288	-	mg/l	
Metals (Cations)					
Requires additional purification step if high	**B**	47	401	mg/l	-88%
	Be	0.0207	0.2	mg/l	-91%
Can negatively affect DLE if high	**Si**	67.2	550	mg/l	-88%
Can negatively affect DLE if high	**As**	20.3	8.8	mg/l	+131%
Can negatively affect DLE if high	**Mn**	24.5	1,563	mg/l	-98%
Can negatively affect DLE if high	**Fe**	37.4	664	mg/l	-94%
Can negatively affect DLE if high	**Zn**	5.2	492	mg/l	-99%
	Pb	0.156	108	mg/l	-100%
Can negatively affect DLE if high	**Al**	0.014	16	mg/l	-100%
	Ni	0.188	0.5	mg/l	-61%
Can negatively affect DLE if high	**Co**	0.015	8	mg/l	-100%
	Sb	0.717	6.5	mg/l	-89%
	Ti	<0.1	-	mg/l	
	V	0.165	0.6	mg/l	-71%
	Cr	0.181	2	mg/l	-89%
	Cd	0.0205	3	mg/l	-99%
	Mo	0.0124	8	mg/l	-100%
	Tl	0.328	2	mg/l	-86%
pH		5.828	4.9	-	

Table 2: Vulcan's January 2021 brine parameters recorded during sample collection.

On-site parameter	Unit	Result	POR/LOD*	Method	by
Color		colorless		sensorially	MK
Odor		no special smell		sensorially	MK
Turbidity		transparent		sensorially	MK
Water temperature	°C	≈10	1	deduced from room temperature	MK
pH (@ 25°C)		5.828	0.001	pH probe (SenTix® 980, WTW)	MK
Electric conductivity (@ 25°C)	mS/cm	142.8	0.1	EC probe (TetraCon® 925, WTW)	MK
Sulfide	mg/L	<<LOD§	5	test paper (Macherey-Nagel)	MK

* POR = precision of reading; LOD = limit of detection; § no H2S odor (detected by most sensitive organoleptic means) indicates the absence of dissolved sulfide

Table 3: UTM coordinates of the well sampling site that was recorded at the midpoint between the production and reinjection wells. The coordinates were measured using a handheld GPS. Wells are deviated at depth and the well deviation surveys/profiles is not known.

	Easting (m)	Northing (m)	Zone	Datum	Tot. Vertical Depth
Sampling site	409706	5390596	32U	WGS84	5,408m

Table 4: Vulcan's 01/2021 brine sample analytical results from KIT with minimum limits of detection and method.

Lab parameter	Unit	Value	LOD	Method	Lab
Cl	mg/l	60567	0.010	DIN EN ISO 10304-1: 2009-07	KIT
SO_4	mg/l	172	0.009	DIN EN ISO 10304-1: 2009-07	KIT
NO_3	mg/l	<LOD	0.019	DIN EN ISO 10304-1: 2009-07	KIT
PO_4	mg/l	<LOD	0.043	DIN EN ISO 10304-1: 2009-07	KIT
Br	mg/l	288	0.016	DIN EN ISO 10304-1: 2009-07	KIT
F	mg/l	4.68	0.012	DIN EN ISO 10304-1: 2009-07	KIT
Ca	mg/l	5195	0.003	DIN EN ISO 11885: 2009-09	KIT
Mg	mg/l	99.3	0.002	DIN EN ISO 11885: 2009-09	KIT
Na	mg/l	22231	0.003	DIN EN ISO 11885: 2009-09	KIT
K	mg/l	4878	0.009	DIN EN ISO 11885: 2009-09	KIT
Si	mg/l	67.2	0.005	DIN EN ISO 11885: 2009-09	KIT
SiO_2	mg/l	144		calculated	KIT
Li	mg/l	214	0.00008	DIN EN ISO 17294-2: 2016-07	KIT
B	mg/l	46.8	0.0007	DIN EN ISO 17294-2: 2016-07	KIT
Fe, total	mg/l	37.4	0.00011	DIN EN ISO 17294-2: 2016-07	KIT
Mn	mg/l	24.5	0.00003	DIN EN ISO 17294-2: 2016-07	KIT
As	mg/l	20.3	0.00003	DIN EN ISO 17294-2: 2016-07	KIT
Rb	mg/l	30.0	0.00002	DIN EN ISO 17294-2: 2016-07	KIT
Cs	mg/l	16.0	0.000004	DIN EN ISO 17294-2: 2016-07	KIT
Ba	mg/l	14.4	0.00003	DIN EN ISO 17294-2: 2016-07	KIT
Sr	mg/l	276	0.00004	DIN EN ISO 17294-2: 2016-07	KIT
Zn	mg/l	5.17	0.00053	DIN EN ISO 17294-2: 2016-07	KIT
Al	µg/l	13.8	0.12	DIN EN ISO 17294-2: 2016-07	KIT
Sb	µg/l	71.7	0.02	DIN EN ISO 17294-2: 2016-07	KIT
Be	µg/l	20.7	0.02	DIN EN ISO 17294-2: 2016-07	KIT
Pb	µg/l	156	0.01	DIN EN ISO 17294-2: 2016-07	KIT
Cd	µg/l	20.5	0.0002	DIN EN ISO 17294-2: 2016-07	KIT
Cr	µg/l	1.81	0.002	DIN EN ISO 17294-2: 2016-07	KIT
Co	µg/l	1.48	0.0002	DIN EN ISO 17294-2: 2016-07	KIT
Cu	µg/l	6.72	0.04	DIN EN ISO 17294-2: 2016-07	KIT
Ga	µg/l	0.86	0.0005	DIN EN ISO 17294-2: 2016-07	KIT
Mo	µg/l	12.4	0.02	DIN EN ISO 17294-2: 2016-07	KIT
Ni	µg/l	1.88	0.01	DIN EN ISO 17294-2: 2016-07	KIT
Ti	µg/l	<LOD	0.06	DIN EN ISO 17294-2: 2016-07	KIT
Tl	µg/l	328	0.003	DIN EN ISO 17294-2: 2016-07	KIT
U	µg/l	<LOD	0.0002	DIN EN ISO 17294-2: 2016-07	KIT
V	µg/l	1.65	0.002	DIN EN ISO 17294-2: 2016-07	KIT
Y	µg/l	2.22	0.0002	DIN EN ISO 17294-2: 2016-07	KIT

For and on behalf of the Board

Robert Ierace

Chief Financial Officer - Company Secretary

For further information visit www.v-er.com

Disclaimer

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Competent Person Statement:

The information in this report that relates to Mineral Resources is extracted from the ASX announcement made by Vulcan on the 15 December 2020, which is available on www.v-er.com. The information in this presentation that relates to the Pre-Feasibility Study for the Vulcan Lithium Project is extracted from the ASX announcement "Positive Pre-Feasibility Study", released on the 15th of January 2021 which is available on www.v-er.com. The Company confirms that it is not aware of any new information or data that materially affects the information included in the original market announcements and that all material assumptions and technical parameters underpinning the estimates in the relevant market announcements continue to apply and have not materially changed. The Company confirms that the form and context in which the Competent Person's findings are presented have not been materially modified from the original market announcements.

The technical information that forms the basis for the Exploration Results in this News Release has been reviewed and approved by Mr. Roy Eccles P. Geol., who is a full time employee of APEX Geoscience Ltd. and deemed to be a 'Competent Person'. Mr. Eccles has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity which he is 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 consents to the disclosure of technical 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.

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 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.	• In December 2020, Vulcan collected bulk (10,000 litres) brine samples from a geothermal well in the Upper Rhine Graben area located 5.6 km west of Vulcan's Ortenau Licence to verify lithium concentrations of the multi-reservoir aquifer (Buntsandstein Group-Basement). • Brine samples were collected from the brine, which was pumped to surface from depths of approximately 5 km, and was circulating through the geothermal production circuit. • The sample method and sampling documentation are in accordance with reasonable sampling expectations and Li-brine industry standards. • Sample Blank (deionized water with no lithium) and Sample Standard (laboratory prepared brine standard) were inserted into the sample stream by the KIT laboratory. • Collectively, a total of ten Intermediate Bulk Containers (IBC) of brine were collected from the site and transported to Vulcan's storage site for direct ex, from which one sample was taken to be analysed by the laboratory. • Vulcan and GeoT maintained chain of custody of the brine samples from the geothermal well sample point to the respective laboratories in Germany (KIT) and the archival storage site. • The CP has reviewed the techniques 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.
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 used an existing geothermal well to access and collect the brine described in this News Release and the Company has yet to conduct any drilling to date.

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 used an existing geothermal well to access the brine mentioned in this report and the Company has yet to conduct any drilling to date.
Logging	• Whether core and chip samples have been geologically and 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.	• No drilling was conducted by Vulcan. Vulcan has used an existing geothermal well to access brine mentioned in this report. Hence, no logging was conducted. However, the Company has extensive logging and seismic data from elsewhere in the Upper Rhine Valley which provides a good understanding of the Buntsandstein Group-Basement geology being discussed in this News Release. • In addition, Vulcan benefits from the data compiled in national geothermal information systems. This work was conducted by state geological surveys and coalitions of government and academic working groups and include data and interpretations from more than 30,000 oil and gas wells, geothermal, thermal, mineral water and mining well boreholes in the Vulcan Project area and Upper Rhine Graben.
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	• In December 2020, Vulcan collected brine samples from a geothermal well in the Upper Rhine Graben area to verify lithium concentrations of the multi-reservoir aquifer. Sample Blanks (n=1; deionized water with no lithium) and Sample Standards (n=1; Certified Reference Material obtained from KIT)

	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 sampling. • Whether sample sizes are appropriate to the grain size of the material being sampled.	were inserted into the sample stream. An aliquot of brine was for analytical work that includes: anion chemistry; trace metal ICP-OES; and dissolved metal ICP-OES. The bulk brine sample was collected from the hot side (production side) of the plant. • Vulcan maintained chain of custody through GeoT, (which Vulcan recently agreed to purchase 100% of) of the brine samples from the geothermal well sample point to an archival site located in Karlsruhe, Germany, and from there to the laboratory in Germany (KIT).
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.	• 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, which yielded results within acceptable limits. • The brine was transported to Karlsruhe Institute of Technology (KIT) and the chain of custody was maintained by GeoT. • The lithium content (and trace elements) of the brine samples were analyzed by inductively coupled plasma optical emission spectrometry (ICP-OES), using Varian 715ES and iCAP RQ, Thermo Fisher spectrometers. • The analytical methodology is a standard analytical technique and industry standard for the measurement of lithium-in-brine. • In addition, the laboratory (KIT) participated in a round robin test conducted by Vulcan during its 2019 exploration campaign, and the KIT laboratory had good precision and accuracy. • QAQC test work associated with the brine sample collection and ensuing analytical work did not include random inserts of duplicate samples, sample standards or sample blanks that were unknown to the laboratory. Rather, the only QAQC work includes sample standards and sample blanks inserted by the laboratory as part of routine analytical protocols designed by the lab. The results of the laboratory QAQC work yielded good analytical precision.

Verification of sampling and assaying	• The verification of significant intersections by either independent or alternative company personnel. • The use of twinned holes. • Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) protocols. • Discuss any adjustment to assay data.	• Vulcan has yet to conduct any drilling or core sampling at the project and the brine sample was accessed and collected from a well drilled by another company focused on geothermal energy. • Data verification procedures applied to the resulting laboratory data by the CP were performed on key data components as they pertain to the information presented in this Technical Report. • No adjustments were made, or necessary, to the original laboratory data. • The lithium value of 214 mg/l Li is from analytical work conducted on a single brine sample at Vulcan's primary laboratory (KIT). • In comparison to historical brine geochemical data, the KIT analytical results confirm lithium-enriched brine at this locale albeit at higher levels of lithium: 214 mg/L Li (Vulcan) versus representative values of 149-162 mg/L Li (Sanjuan et al., 2016). • An umpire sample of the 2021 bulk brine sample was sent to a second 'check' laboratory and yielded a lithium grade of 250 mg/L Li using a diluted ICP-OES technique. The check lab analytical procedure is better suited to groundwater than geothermal brine and chemical differences (e.g., sulfate) are evident between the check lab and the KIT analysis. Nevertheless, the check lab does provide some supporting evidence for elevated lithium in the brine – as documented in Vulcan's primary lab at KIT. • The CP has reviewed all geochemical data and found no significant issues or inconsistencies that would cause one to question the validity of the geochemical data to verify that the multi-reservoir aquifer in the Upper Rhine Valley is consistently enriched in lithium in the deep-seated strata and aquifer underlying the URG and the Vulcan licences.
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 and the brine was sample was taken from a well drilled by another party. Brine samples were collected from an established geothermal well (owned by a geothermal company other than Vulcan). The collar locations of the geothermal well is presented in the News Release. • The grid system used is UTM WGS84 zone 32N. • The surface Digital Elevation Model used was acquired from JPL's Shuttle Radar Topography Mission (SRTM) dataset; the 1 arc-second gridded topography product provides a nominal 30 m ground coverage.

Data spacing and distribution	• Data spacing for reporting of Exploration Results. • Whether the data spacing, and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied. • Whether sample compositing has been applied.	• Vulcan has yet to conduct any drilling and/or core sampling at the project and the brine was sample was taken from a well drilled by another party. • Geochemical data has been compiled by Vulcan from throughout the Upper Rhine Valley in wells with highly variable spatial locations. Spacing between wells varied from proximal locations (<1 km) to up to 32 km apart. • At surface, some of the geothermal wells sampled are situated outside Vulcan's individual Property licences. In this instance, the wells were sampled because there currently are no wells that penetrate deep-seated brine-saturated aquifers underlying the Property, except for Vulcan's Geothermal MoU area. Based on the knowledge that: 1) deep-basin URG brine is lithium-enriched as per historical documentation; and 2) confined aquifers in graben systems can have massive spatial extent with homogeneous to semi-homogeneous lithium-in-brine concentrations, it is assumed that the Li-brine content of neighbouring wells are a good proxy of the lithium content in multi-reservoir aquifers underlying the URG and the Vulcan Property.
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 and the brine was sample was taken from a well drilled by another party. • The geothermal well sampled is deviated at depth to best intersect areas faulting and high fluid flow. While Vulcan has received information that the sampled well intersects the granitic basement, the exact deviation of the well is not known.
Sample security	• The measures taken to ensure sample security.	• Vulcan's 2021 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 locked sample storage in Karlsruhe, to delivery of the samples to the University of Karlsruhe for analytical work. • The samples were transported by truck to the archival storage site, and from there to the lab via car.
Audits or reviews	• The results of any audits or reviews of sampling techniques and data.	• During 2019, the CP assisted with, and reviewed, the adequacy of Vulcan's sample collection, sample preparation, security, analytical procedures, QA-QC protocol, and has conducted a site inspection of the Vulcan License Area on September 17, 2019. • In addition, the CP coordinated discussion and meetings involving methodologies and interpretation resulting from the exploration work to define the geometry and hydrogeological characterization of the

		aquifer. • The CP was not involved with Vulcan's brine sampling during 2021.

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:
		  • Three granted Exploration Licences: Ortenau, Taro, and Mannheim.
		  • Two in-application Exploration Licences: Heßbach (Rheinaue) and Ludwig.
		  • A single Exploitation Licence: Geothermal MoU Area.
		• The Ortenau Licence, which is the subject of this JORC Table given its proximity to the brine sample analysed, is 37,360 hectares and is centered at approximately: UTM 421900 m Easting, 5384900 m Northing, Zone 32N, WGS84. The well sampled was located at 409706 m Easting, 5390596 Northing, Zone 32N, WGS84 and is located approximately 5.6 km west of the Ortenau Licence.
		• Vulcan was granted 100% of the Ortenau Exploration Licence by the Baden-Württemberg government office, which is managed by the Freiburg State Office, Council for Geology, Raw Materials and Mining.
		• An Exploration Licence shall accord the holder the exclusive right to:
		  • Explore for the geothermal resources specified in the licence.
		  • To extract and acquire ownership in the resources that must be stripped or released during planned explorations.
		  • To erect and operate facilities that are required for

		exploring the resources and for carrying out related activities.
		• Vulcan's Ortenau Exploration licence terminates April 30, 2021, at which time renewed exploration and/or application for Exploitation Licences are required. Renewal is currently under way. There is always some risk or an uncertainty that government regulations and policies could change between now and future applications. If required, Vulcan can request an Exploitation Licence at Ortenau, which would grant Vulcan the exclusive right to geothermal resources from brine. The application requires advanced modelling of the aquifer production and injection wells.
		• Any future geothermal brine production would require an operating plan and planning approval procedure that complies with the *Act on the Assessment of Environmental Impacts.*
		• In the URG, increased anthropogenic activity such as hydraulic fracking, gas extraction and enhanced geothermal systems can potentially lead to induced seismicity. Seismic risk can be mitigated by:
		  ○ Performing regularly actual seismic monitoring, particularly before the implementation of stimulation work;
		  ○ Ceasing to stimulate the reservoir, or
		  ○ By reducing production flow rates when seismicity occurs during the operational phase.

Exploration done by other parties	• Acknowledgment and appraisal of exploration by other parties.	• The Upper Rhine Graben is being actively investigated for its geothermal potential by multiple companies (other than Vulcan).
		
		• A summary of historical brine geochemical analytical results (n=43 analyses) has been evaluated, in addition to Vulcan's 2019-2021 exploration work. This includes historical analysis from the Buntsandstein Group aquifer (n=6) and Rotliegend Group-basement aquifer (n=11), which yield 158.1 mg/L and 157.7 mg/L Li. The historical data are presented in referred journal manuscripts and the CP has verified that the analytical protocols were standard in the field of brine analysis and conducted at university-based and/or accredited laboratories. The historical geochemical information was used as background information and were not used as part of the resource estimation process.
		
		• GeotIS and GeORG are essentially digital geological atlases with emphasis on geothermal energy, and offer extensive compilations of well data, seismic profiles, information, and 3-D stratigraphic content with emphasis on deep stratigraphy and aquifers in Germany. The raw data – such as seismic data – are not available (as they are owned by the respective energy companies), and hence the data/profiles have been collated and interpreted into the representative geo-dataset information systems. These data were evaluated and used to construct the 3-D geological model used in the resource evaluations.
		
		  • The Ortenau Licence 3-D Modelling was improved beyond the GeoORG subsurface information through Vulcan's 2020 acquisition of 2-D seismic profile lines that were acquired by Vulcan specifically for the purpose of improving the 3-D geological model. The seismic information and subsequent 3-D geological models were reinterpreted by Geothermal Engineering GmbH as part of Vulcan's 2020 exploration work.
		
		  • Any artefacts within the Ortenau 3-D geological model were revised by APEX Geoscience Ltd., under the supervision of the CP, in advance of resource modelling work. Detailed studies of geothermal well data, which is located 81 km north of the Ortenau Licence and drilled in 2013, were interpreted by Vulcan in 2020 to understand the hydrogeological characteristics of the fault/fracture zones within the Permo-Triassic strata. The dataset

		included detailed litho-logs and downhole wireline log information that included FMI-GR (resistivity image, caliper), DSI-GPIT-PPS-GR (sonic, caliper), LDS-GR (density, photo electric factor), and UBI-GR (acoustic image). Vulcan commissioned GeoThermal Engineering GmbH to describe and characterize this nearby well data, and more specifically, the Buntsandstein Group's pore space and micro-fractures to develop comparative models for the Permo-Triassic strata underlying the Ortenau Licence.
Geology	• Deposit type, geological setting and style of mineralisation.	• The potential lithium mineralization at Ortenau is situated within confined, subsurface aquifers associated with the Lower Triassic Buntsandstein Group sandstone aquifer situated within the URG at depths of between 2,165 and 4,004 m below surface. The lithium mineralisation is also considered to be "multi-reservoir", and likely extends into lower, granitic basement units at Ortenau (especially in zones with known faulting). • The analytical results presented in the News Release were collected from brine that is extracted from well perforation points located within the granitic basement 5 km east of the Ortenau Licence and at 5 km depth. • A lithium result of 214 mg/L Li in the brine collected as part of Vulcan's 2021 sampling program supports and verifies historical brine geochemical reporting (167-168 mg/L Li; n=18 analyses of Buntsandstein Group-Basement brine) and the brine results from Vulcan's 2019 sampling program (181 mg/L Li; n=24 analyses). • Historical brine analysis from the same well tested by Vulcan yielded 149-162 mg/L Li (Sanjuan et al., 2020).

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: ○ easting and northing of the drill hole collar ○ elevation or RL (Reduced Level – elevation above sea level in metres) of the drill hole collar ○ dip and azimuth of the hole ○ down hole length and interception depth ○ 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 Ortenau Licence. The analysis conducted was taken from an off-property well located approximately 4.6km west of the Ortenau Licence. • There are 2 historical geothermal wells, or petroleum wells, drilled by companies other than Vulcan that extend deep enough to penetrate Permo-Triassic strata within the Ortenau Licence. The two wells were drilled in the southern and northeastern portions of the Ortenau Property, respectively. With respect to brine analytical results, these wells are discussed in more detail in Section 2, Other Substantive Exploration Data. • It is possible that Vulcan will drill a future well at the Ortenau Licence, at which time, Vulcan may consider the drill program and drillhole information as material for the Company and Vulcan project and disclose the results. • The location and well descriptions of wells that were used to assess the lithium concentration of the brine within Permo-Triassic aquifers within the URG is available in Vulcan's ASX News Release dated 20 January 2020.
Data aggregation methods	• In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg cutting of high grades) and cut-off grades are usually Material and should be stated. • Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low-grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail. • The assumptions used for any reporting of metal equivalent values should be clearly stated.	• 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 solid); hence there are no formal data aggregation methods, and the analytical data is representative of the multi-reservoir aquifer at any given space and time. • Elemental lithium within the 2020 Ortenau Licence Li-brine resource estimations were converted to Lithium Carbonate Equivalent ("LCE" using a conversion factor of 5.323 to convert Li to Li_2CO_3); reporting lithium values in LCE units is a standard industry practice.

Relationship between mineralisation widths and intercept lengths	• These relationships are particularly important in the reporting of Exploration Results. • If the geometry of the mineralisation with respect to the drill hole 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 at the Ortenau Licence and is therefore reliant on existing regional URG geothermal wells operated by companies other than Vulcan to acquire brine samples for geochemical analysis. • As mineralization being explored for is related to liquid brine within a confined aquifer, intercept widths are 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 appropriate sectional views.	• The associated News Release captures critical figures and tables associated with the new geochemical results. • All map images include scale and direction information such that the reader can properly orientate the information being portrayed.
Balanced reporting	• Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.	• Exploration result reporting is presented in the associated News Release. • There have been no outlier analytical results in the geochemical dataset used to evaluate the lithium concentration of aquifer brine in the vicinity of Vulcan's project areas. The Li-brine values are relatively homogenous in the vicinity of Vulcan's resource licences: Ortenau, Geothermal MoU area and Taro licenses.
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 URG aquifers. These included over 1,800 porosity and permeability measurements. • Historical geochemical data were used to assess the lithium concentration of URG 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: • The URG aquifer has homogeneous concentrations of lithium in the vicinity of the Ortenau, Taro, and Geothermal MoU Area licences.

		• 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 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 of internal reports (n=4) and found them to factually prepared by persons holding post-secondary degrees with an abundance of experience and knowledge in the URG and geothermal exploration and exploitation within the URG. This work helped the CP to substantiate and justify the geological model and assumptions used in the recent data collection and analysis. • Two geothermal, or O&G wells, were historical drilled by companies other than Vulcan within the boundaries of the Ortenau Licence. • The K 1 well was drilled through a Tertiary fault zone located approximately 1,000 m above the Buntsandstein Group prior to the hole's termination 14 m into the upper Buntsandstein Group. The K 1 well was not productive and is now abandoned or plugged. No Buntsandstein brine analysis, or porosity and permeability measures, were taken at K 1 (historically or by Vulcan). • The B 1 well penetrated through Permo-Triassic strata and 2 brine samples were historically collected through perforation points located at the end of the well within the crystalline basement as reported by Sanjuan et al., (2016). Significantly, basement-derived brine from the B 1 well has significantly lower Li (average 41.1 mg/L; n=2 analysis) in comparison to the average Permo-Triassic brine documented by Vulcan (181 mg/L Li). The CP has reviewed this discrepancy and found that the B 1 borehole was originally intended to intersect granite; however, the well was drilled into the Omerskopf para- and ortho-gneisses. The resulting brine chemistry is significantly different in comparison to Permo-Triassic brine and/or fractured granite

		basement domains at the other geothermal wells. It is concluded that the lithium concentration of 41 mg/L Li in the B 1 brine sample is in equilibrium with cooler brine with high TDS, Ca, Na, Cl, and Mg, and decreasing Li:Na ratios, and is representative – at least at B-1 – of a brine sample was collected from fluid along subvertical fractures in the gneiss. Any future exploration conducted by Vulcan would target Permo-Triassic strata overlying fractured granite basement terranes, in a multi-reservoir model.
Further work	• The nature and scale of planned further work (eg tests for lateral extensions or depth extensions or large-scale step-out drilling). Diagrams clearly highlighting the areas of possible extensions, including the main geological interpretations and future drilling areas, provided this information is not commercially sensitive.	• Additional geochemical assay work should be conducted on brine from the bulk sample to substantiate the value of 214 mg/L Li, which is high in comparison to historical work at the same well. This will be conducted as part of Vulcan's lithium recovery piloting test work on the brine. • A further exploration program at the Ortenau Licence is recommended, including 1) acquisition of all appropriate permits and licenses to drill a geothermal well at the Ortenau Licence, 2) a drill program to drill a test production geothermal well, 3) collection of brine assay samples from the well to verify lithium concentrations, 4) addressing modifying factors toward a Feasibility Study technical report, and 5) preparation of a Feasibility Study technical report. • Acquisition of existing or new seismic profiles for detailed geological interpretation, including fault zone delineation to depict zones of high fluid flow; mineral processing test work on brine from the Vulcan License Area; Technical Reporting including a potential economic scoping study.