15 November 2023

ASX Market Announcements
Via e-lodgment

Production of High Purity Manganese Sulphate Monohydrate

Resource Development Group Limited (**ASX: RDG**) (**RDG** or the **Company**) is pleased to provide the following project update. Subsequent to the announcement made on 28th November 2022 (RDG AGM Investor Presentation, slide 23), and in line with the Company's objective of becoming a Battery Minerals producer, RDG has successfully produced High Purity Manganese Sulphate Monohydrate (**HPMSM**) during two independent runs during hydrometallurgical process development using ore from the Company's 100% owned Ant Hill deposit.

Battery Minerals *refers to various minerals used in rechargeable batteries including manganese.*

Highlights

- RDG have produced High Purity Manganese Sulphate Monohydrate, a Battery Mineral, on two independent occasions using unbeneficiated ore from its 100% owned Ant Hill deposit.
- Ant Hill and Sunday Hill deposits are located 360km by road from Port Hedland, in the Pilbara Region of Western Australia, a well-established and excellent mining jurisdiction.
- The HPMSM market is extremely buoyant and forecasted to experience significant growth, with demand outpacing supply.
- RDG are in discussions with vehicle and battery manufacturers interested in the supply of HPMSM from the proposed Boodarie process plant.
- RDG is aiming to construct and operate a HPMSM process plant at Boodarie, approximately 19 km from Port Hedland, creating new high-tech employment opportunities, with the final HPMSM products being exported in containers via Port Hedland Port.
- Ongoing collaborative dialogue with Traditional Owners.
- Based on the current JORC Resource, the project has an estimated life of more than 30 years.
- Tremendous synergy with the federal governments Critical Minerals Strategy and National Battery Strategy and the Western Australian government Future Battery Industry Strategy. High-level discussions held with the Northern Australia Infrastructure Facility (NAIF[1])

On Thursday 19th March 2020 (ASX announcement), the Company announced "**RDG To Acquire 100% Interest In Manganese Tenements Ant Hill and Sunday Hill From Mineral Resources Ltd".**

The Ant Hill mining lease is a remnant basinal outlier of mid-Proterozoic sediments comprising the Manganese Group, the Pinjian Chert Breccia and the Hamersley Group. The sediments form a broad NW-plunging syncline and unconformably overlie the Fortescue Group, which is locally dominated by the volcanics of the Nymerina Basalt.

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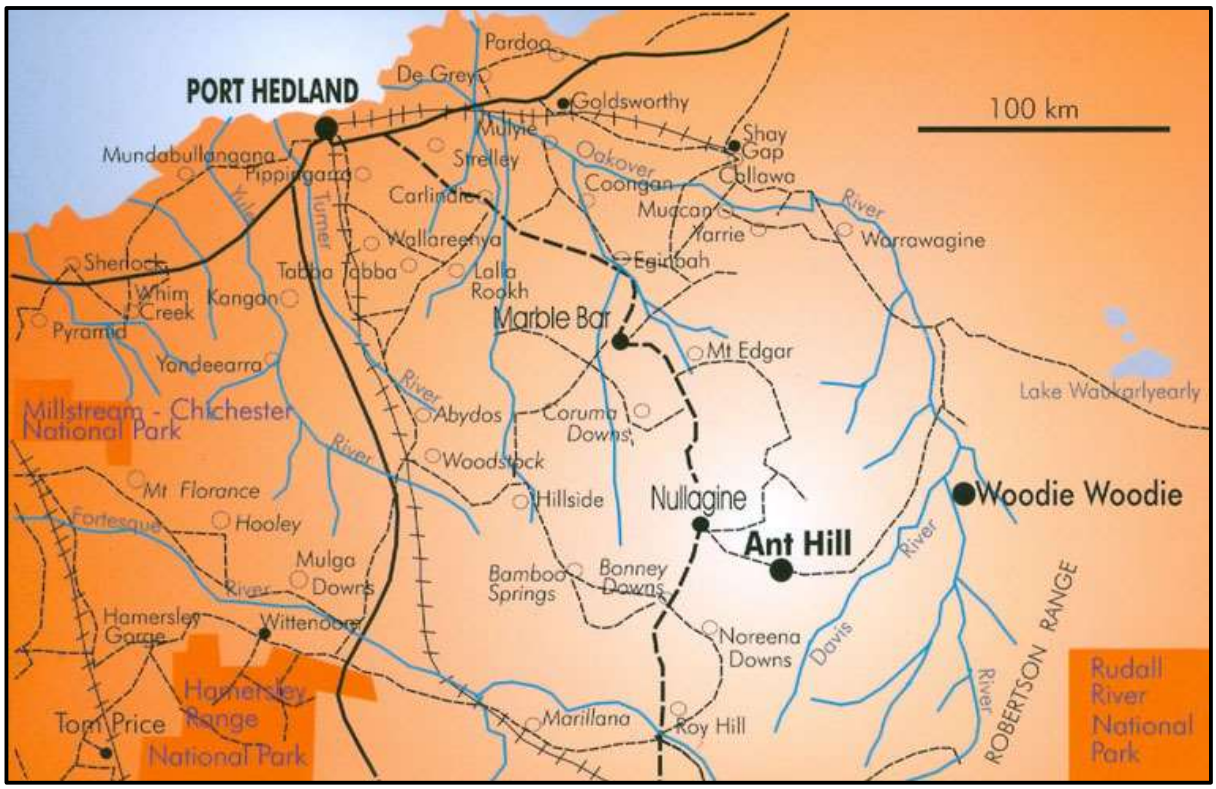
[1] NAIF is an Australian Government financier, providing loans for the development of infrastructure projects in Northern Australia and the Australian Indian Ocean Territories.

The manganese deposit occurs as a number of discrete podiform bodies of various sizes on the Ant Hill mesa. The mesa is a fault-bounded elongate feature, approximately 1.4km long and 400m wide, with a maximum topographic relief of 50m.

The Sunday Hill mining lease, which is located close to Ant Hill, is also a remnant mesa formation that rises 20 to 30 meters above the surrounding plain and has moderate to gentle slopes. The mesa is largely devoid of trees and generally covered by spinifex. The surface consists of skeletal soils to outcrop with some scree slopes and areas covered by colluvium. The geology of Sunday Hill is very similar to that of Ant Hill.

Sunday Hill is an outlier of late Precambrian Manganese and Hamersley Group sediments and covers an area of 5 x 5 square kilometres. The sediments form a broad NW plunging syncline and overlie Fortescue Group banded iron and shale units. The entire deposit is located approximately 360 km by road from Port Hedland as depicted on the below map, *Figure 1*.

Figure 1



Since acquiring the Ant Hill and Sunday Hill manganese assets, the Company with significant support from Mineral Resources Limited as advised in the ASX announcement of 19th March 2020, has progressed the project on multiple fronts, including:

- Significant progress in putting in place all of the required approvals and permits.
- Exploration JORC resource.
    - ASX announcement: RDG AGM 2022 Investor Presentation 28th November 2022
    - ASX announcement 3rd June 2021: Sunday Hill Mineral Resource Statement
- Geometallurgical assessment of the orebodies underway.
- Metallurgical test work continuing.
- Design of the pilot plant nearing finalisation.
- Mine Planning & Logistics models being developed.
- Continued positive engagement with vehicle and battery manufacturers.
- Land access, Boodarie (proposed location of future HPMSM process plant).

Metallurgical test work

The initial test work program commenced in January 2023 with an aim of producing High Purity Manganese Sulphate Monohydrate (**HPMSM**). A sample was made by combining ore-grade material from seven diamond drill holes from Ant Hill (Diamond drill hole locations shown in *Figure 2*) into a single composite.

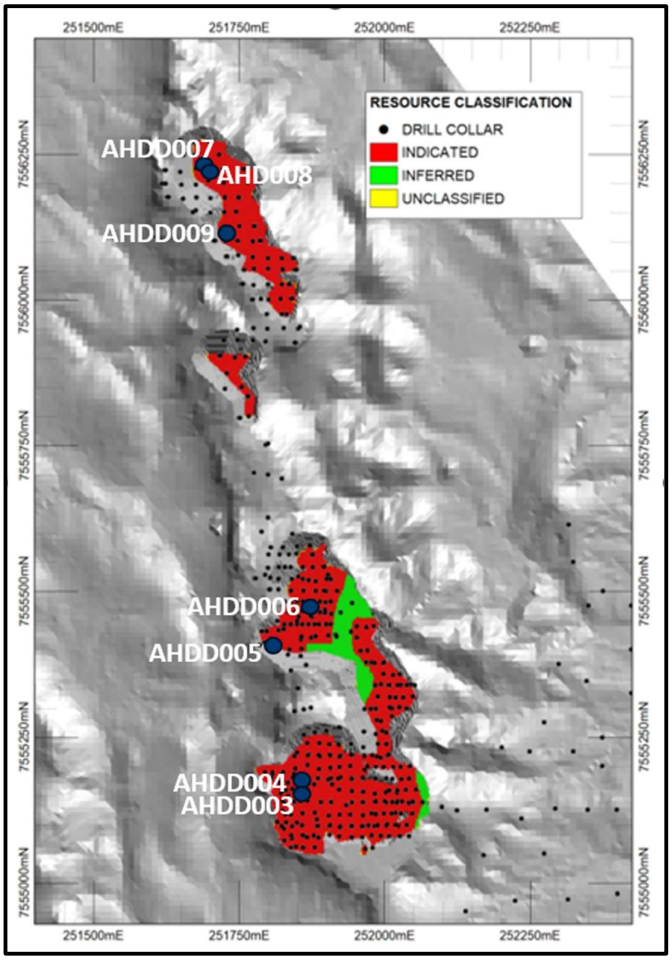


Figure 2: Ant Hill Deposit

The chemical composition of the composite is shown in *Table 1*. This composite is higher in manganese than the average of the overall deposit but is thought to better represent beneficiated ore due to the low silica grade.

Table 1: Composition of the composite used in the test work

Element	Weight %
Mn	33.7
Fe	20.5
Si	3.37
Al	2.44
K	1
Na	0.42
Co	0.11
Ca	0.1

Production of manganese sulphate

Test work was undertaken to develop a flowsheet for the production of HPMSM from Ant Hill ore. The work reported here is from the initial proof-of-concept runs with further process development underway.

The composite was ground to a nominal P_{80} of 250μm prior to leaching. A subsample of ground composite was reductively leached to produce a solution containing >100g/L Mn, <10g/L Fe, <5g/L Al, <4g/L K and <2g/L Na, all other impurities were below 1g/L. The solution contained low concentrations of both Co (>350ppm) and Cu (>250ppm). The recovery of manganese into solution has consistently been >95.0%. The leach residue consists primarily of Fe and Si.

The solution was purified using a novel multistage precipitation process to remove K, Na, Fe, Si and Al prior to initial filtration. The filtrate was then sulphided to remove the base metals, notably Co and Cu, which were filtered to produce a high-Co sulphide. A further stage of purification removed the majority of Ca and Mg which were filtered and combined with the ferrous precipitates and leach residue. These purification stages reduced the impurity metal contents to sufficiently low levels for the production of HPMSM

The purified solution was evaporated to crystallise high purity manganese sulphate which was then recovered and dried to produce a solid phase.

Table 2 shows the analyses of the HPMSM products from two independent runs using the composite in *Table 1*. The flowsheet used was largely the same, but with operational changes to each stage to optimise the different stages. After evaporation, the crystals were thermally dried at 105°C and sent for analysis.

The deliquescence of manganese sulphate monohydrate (32.8%Mn) results in it adsorbing water from the atmosphere to form the pentahydrate, (22.8%Mn) thus any delay between sampling and analysis results in a lower concentration of elements. To overcome this, the measured Mn concentration in the sample is multiplied by a factor to give 32.0%Mn, the same factor was used to scale the impurities.

Table 2. Dual analyses of the HPMSM samples produced in Runs 5 and 6. Also shown are the China Ministry of Industry and Information Technology standard[1] and Fastmarkets standard[2]

	Standards		A23827 HY16996B Run #5		A23827 HY16997B Run #6	
Element	**Chinese Ministry of Industry and Information Technology**	**Fastmarkets**	**A**	**B**	**A**	**B**
Mn, %	31.8-32.0	>32	32.00	32.00	32.00	32.00
Pb, ppm	10-15	<10	0.12	0.11	0.12	0.13
As, ppm			0.05	0.02	0.08	0.07
Cd, ppm	5-10	<5	0.04	0.02	0.04	0.02
Ca, ppm	100-200	<100	27.55	28.88	40.23	38.27
Mg, ppm	100-200	<100	169.47	172.31	38.22	35.76
Fe, ppm	10-20	<10	<1.1	<1.1	<1.1	<1.1
Zn, ppm	10-20	<10	2.73	2.76	2.85	2.86
Cu, ppm	10-20	<10	0.42	0.44	<0.02	<0.02
Na, ppm	<100	<100	91.27	90.79	47.35	45.20
Ni, ppm		<50	2.23	2.03	1.70	1.63
Co, ppm		<50	0.38	0.35	0.93	0.88
Al, ppm			<0.58	<0.58	<0.58	<0.58
Si, ppm			52.45	55.48	76.84	72.19
Cr, ppm			0.40	0.31	0.19	0.18
K, ppm	<100	<100	<8.9	<8.9	<8.9	<8.9

Notes:

1) *The test work was undertaken at ALS Metallurgy Pty Ltd; the products' analyses were made by Source Certain Operations Pty Ltd (Source Certain) and confirmed by ALS Metallurgy.*
2) *In the Chinese Standard, the upper limits of some elements, including Si, are by agreement between producer and customer.*
3) *The range of elements required by OEM varies, as does the maximum concentration of any specific element. Thus, it is meaningless to quote any specific purity, i.e. the 99.99% commonly cited, as this alone does not necessarily meet customer specifications.*

Comparison with the more stringent Fastmarkets standard shows Run HY16997B meets this standard, the previous run, HY16996B, did not only because of the level of Mg. Between the two runs the calcium and magnesium removal process was modified in Run 6, which significantly improved the removal of these elements.

[1] Chemical Industry Standard of The Peoples Republic of China: HG/T 4823-2015 – Manganese Sulphate for Battery Materials issued by: Ministry of Industry and Information Technology of PRC.
[2] https://www.fastmarkets.com/insights/launch-of-chinese-domestic-battery-grade-manganese-sulfate-price-assessment

Figure 3: Intermediate Manganese Solution during purification

Figure 4: HPMSM from Run 6

Future work

Additional process improvements are underway to reduce the impurities further. Once this test work is completed, a set of independent runs will be made to produce separate parcels of HPMSM for distribution to potential customers.

In light of the proximity to the Port Hedland hydrogen hub, testwork to assess the potential for modifying the initial stage from aqueous reduction to thermal hydrogen reduction is planned.

Beneficiation work on the lower grade ores is planned for Q4 2023 / Q1 2024.

A pilot plant which is capable of producing 40-50kg per day of HPMSM is in the final stages of design using the data obtained from the test work programme. Construction of the plant is expected to be around 16 weeks with the plant scheduled to be commissioned and operating during the Q2 of 2024. The pilot plant will allow the production of the much larger mass of HPMSM required in order to proceed to qualification with vehicle and battery manufacturers. It will also provide the engineering data necessary for the design of the full-scale plant.

The pilot plant will be fed using ore from a number of locations within the Ant Hill and Sunday Hill o7rebodies to ensure the process is sufficiently robust. Geometallurgical assessment of the orebodies is presently underway to identify the best locations for sampling the orebodies.

Resource Development Group Managing Director Andrew Ellison commented:

"Achieving the milestone of producing High Purity Manganese Sulphate Monohydrate on multiple occasions, is simply fantastic and further validates our diversification strategy and our aim to become an Australian based Battery Minerals producer."

This announcement dated 15 November 2023 is authorised for market release by the Board of Resource Development Group Ltd.

Michael Kenyon
Company Secretary

For further information, please contact Michael Kenyon on (08) 9443 2928 or at
michael.kenyon@resdevgroup.com.au.

COMPETENT PERSONS STATEMENT – Metallurgy

The information in this report relating to metallurgical test work results is based on and fairly reflects information reviewed by Dr Nicholas Welham. Dr Welham is a consultant to RDG Technologies Pty Ltd, a 100% owned subsidiary of Resource Development Group Limited. Dr Welham is involved in leading the development and optimisation of the process to produce HPMSM. Dr Welham is a Fellow of the Australian Institute of Mining and Metallurgy. Dr Welham is a qualified metallurgist and has sufficient experience which is relevant to the management and interpretation of test work activities undertaken to qualify as a Competent Person as defined in the 2012 Edition of the "Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves". Dr Welham consents to the inclusion in the ASX release of the matters based on their information in the form and context in which it appears.