

**Annual Report
to 26th March 2020**

**EL30/2014
Blackwater Rivulet**

Tasmanian Advanced Minerals Pty Ltd

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ABSTRACT

- This report covers the fifth year of exploration, during which samples from previous exploration campaigns were analysed after undergoing new preparation techniques to remove magnetic and heavy liquid techniques.
- QEMSCAN testing of the impurities were conducted to understand the nature of the impurities and the theoretical extent to which they can be removed in commercial scale processing.

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Figure 1 Location Plan

1. INTRODUCTION

EL 30/2014, Blackwater Rivulet, is held by Tasmanian Advanced Minerals Pty Ltd (TAM). It is located approximately 40km south-southwest of Smithton (refer to the Location Map below). The Licence was granted on 26 March 2015, and this is the fifth annual report for the period up to the 26 March 2020 anniversary date.

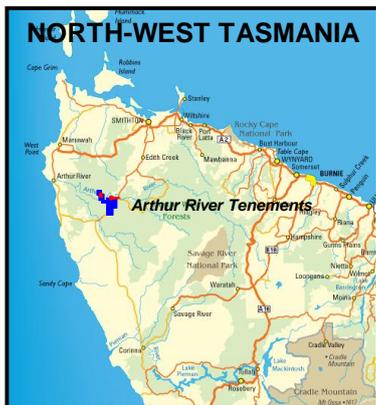
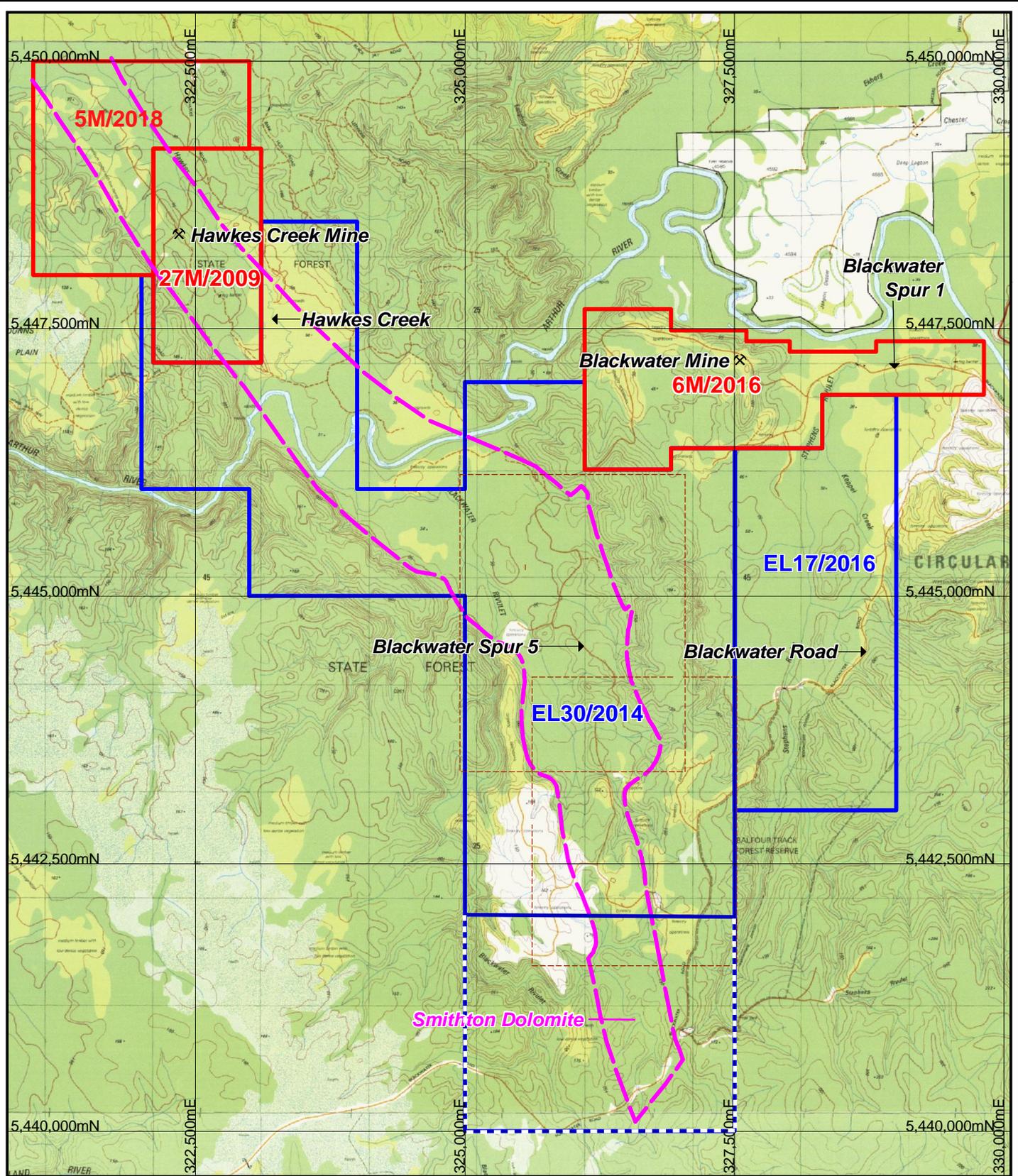
Location Map: North-West Tasmania



TAM is actively mining high purity silica from three locations in Tasmania, from one near Corinna, and from two areas near the Arthur River in northwest Tasmania, Blackwater (6M/2016) and Hawkes Creek (27M/2009). EL30/2014 is in the vicinity of Blackwater Rivulet, and the north-western and north-eastern boundaries of the licence adjoin Hawkes Creek and Blackwater leases respectively (refer to Figure 1). Silica deposits on this licence lie on the same line of strike as those in 27M/2009 and 5M/2018.

The company has several exploration licences. Exploration is being undertaken to increase resource available for processing at TAM's Wynyard factory.

Datum used in this report is GDA94.



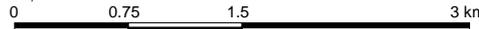
LEGEND

 Geological boundary inferred from MRT's Sumac 1:25,000 map

TASMANIAN ADVANCED MINERALS P/L
ARTHUR RIVER TENEMENTS AT 01.06.17

ML 27M/2009 and EL 15/2009 - HAWKES CREEK
ML 6M/2016 - BLACKWATER
EL 30/2014 - BLACKWATER RIVULET
EL 17/2016 STEPHENS RIVULET
LOCATION PLAN

| | | | |
|---------------------------------------|--------------------------|----------------------|-----------------------------|
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|--|---------------------------------|-----------|
| Scale: 1:50,000 | Projection: MGA Zone 55 (GDA94) | Figure No |
|  | | 1 |

N. J. Turner, Geologist

2. REVIEW OF PREVIOUS WORK

This licence's first year work consisted of test pitting in various locations along the line of strike in the dolomite band (indicated in Figure 1) between 5,444,000N and 5,442,000N (Stuart, 2016).

Work in the second year involved test pitting and auger drilling in five localities in a 4 km interval extending from Spur 5 in the south, northwards along the eastern part of the belt of Smithton Dolomite in a search for silica flour beneath superficial Tertiary gravel. No silica flour was found. (Turner 2017).

Drilling and test pitting in the area referred to as 'Little Hill' (Turner 2017) indicated and estimated resource of 135,000 tonnes of silica.

No on-ground work was conducted during the reporting year to March 2018.

Between April 9 and April 11 2018 two bulk samples of 500t each were extracted for processing trials at Wynyard.

3. EXPLORATION COMPLETED DURING THE REPORTING PERIOD

An overwhelming majority of TAM's silica is used to produce glass for LCD and OLED displays. Titanium impurities can be problematic in display glass as a crystal nucleation agent. Micro-crystals in display glass interfere with light transmittance of the glass and lessen its flexural strength. Therefore it is important to keep titanium impurities below a certain level in silica for display glass.

The physical characteristics of impurities, such as magnetic susceptibility and specific gravity, can determine if the impurities can be removed by commercial scale processing.

No on-ground exploration was undertaken during the reporting period.

TAM engaged UTAS to investigate the nature of titanium impurities using SEM. The investigation found 2 main types of titanium impurities present:

- Titanium oxide which can form complex intergrowths with both silica and other impurities.
- Areas of the matrix hosted by TiO₂ and/or SiO₂. In some cases TiO₂ is embedded in the matrix.

TAM engaged a contracting laboratory, Mineral Technologies, to undertake laboratory scale test work to investigate titanium impurity removal techniques including attrition, heavy liquid separation, magnetic separation and hot acid leaching. Unfortunately, the testing procedure was not robust and the results were inconclusive.

TAM re-analysed 150 samples from previous exploration campaigns in 2015 and 2017. For the 2019 analyses, the sample preparation included extra steps of magnetic treatment and/or heavy liquid treatment to remove impurities. The non-magnetic impurities, and the light impurities which are close in specific gravity to silica are difficult to remove in TAM's factory process. These light, non-magnetic impurities were retained for identification of the minerals.

TAM engaged LightDeepEarth Pty Ltd to conduct QEMSCAN testing on the retained titanium impurities. Beside further investigating the mineral nature of the titanium impurities, QEMSCAN can provide quantitative insight into the extent of the various impurity types.

4. DISCUSSION OF RESULTS

Discussion of TAM's laboratory results, and the LightDeepEarth investigations are presented in Appendix 1 to this report.

5. CONCLUSIONS

The research conducted during this reporting period provided good insight into the nature and proportion of the various titanium impurity types present not only in the EL30/2014 deposits, but in the silica from some of TAM's other tenements. It has demonstrated that commercially viable deposits are present on the licence. Further processing investigation is required to optimise recovery through impurity removal.

6. ENVIRONMENT

Nil required.

EXPENDITURE

Expenditure for the period April 2019 to March 2020 is listed below.

| | |
|--------------------------|----------|
| Geochemistry | \$15,002 |
| Other | \$2,918 |
| Administration/Reporting | \$438 |
| | |
| Total Costs | \$18,357 |

REFERENCES

Turner, N.J. 2017 EL30/2014 Blackwater Rivulet Report to 26th March, 2017.
Stuart, C.C., Rademeyer, M.C. EL30/2014 Blackwater Rivulet Report to 26th March, 2019.

EL30-2014 TiO₂ removal test work

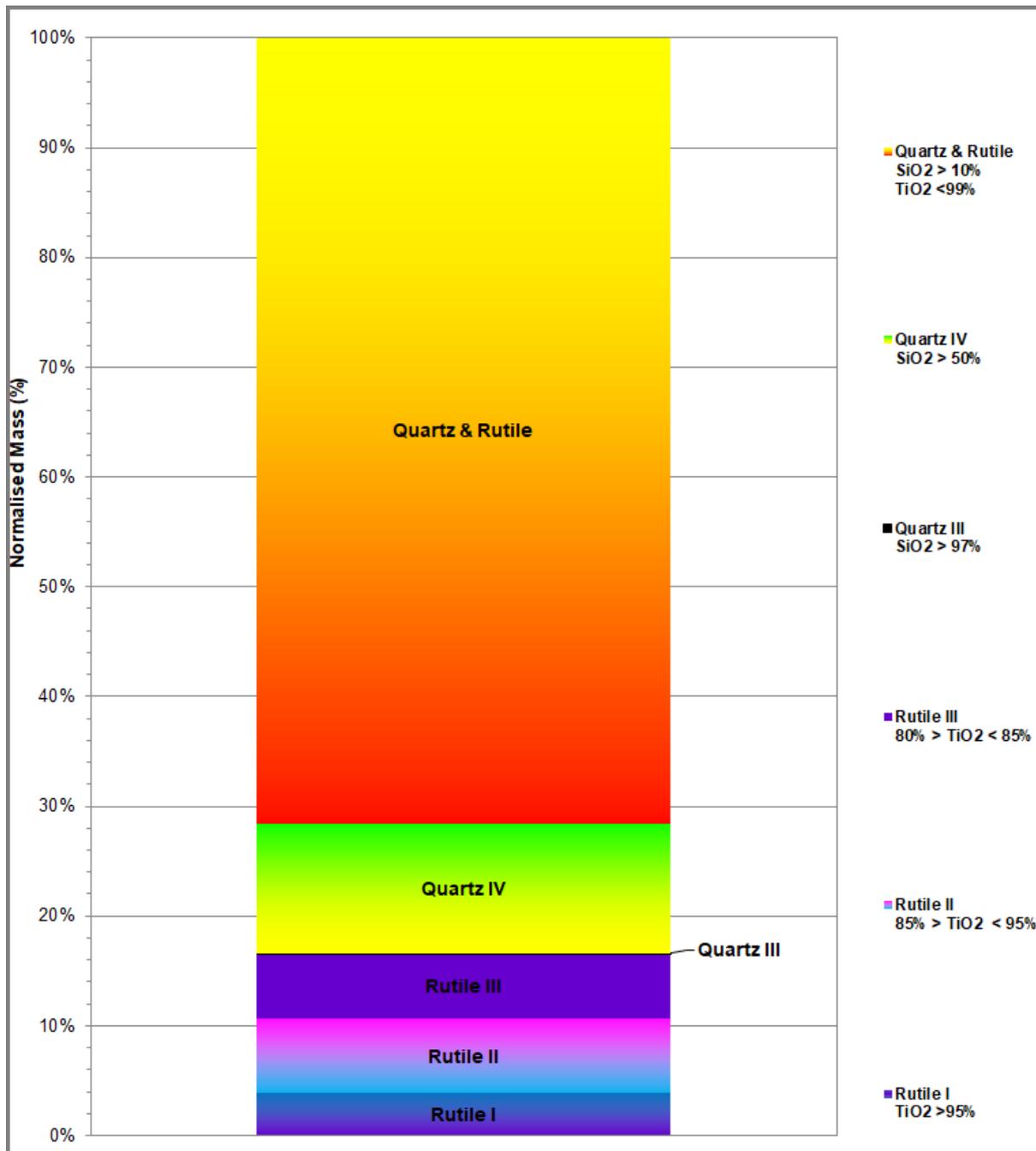
TAM's Titanium challenge is two-fold. Firstly, the 45/250µm portion of the material of certain areas are elevated and approximately 85% of TAM's final product is in this size fraction. Secondly, the finer size fractions are extremely high in Titanium and other impurities. It has been established that TAM's silica contains three different forms of Titanium impurities:

- Individual TiO₂ particles (such as rutile)
- TiO₂ impurities on the surface of the silica
- TiO₂ impurities in the silica crystal matrix

The surface impurities and the impurities in the crystal matrix cannot be removed. Heavy liquid work done by TAM's laboratory has shown significant reduction in the Titanium concentration in the 45/250µm size fraction and it proves that in theory, heavy minerals such as rutile can be separated from the silica by gravity separation.

| Sample | Fe ₂ O ₃ | TiO ₂ | Cr |
|-------------------------------------|--------------------------------|------------------|------------|
| ATP 15-01 1m - <i>before h(l)</i> | 48 | 497 | 15.5 |
| ATP 15-01 1m - <i>after h(l)</i> | 33 | 91 | 1.2 |
| % removed | 33% | 82% | 92% |
| ATP 15-18 4.4m - <i>before h(l)</i> | 74 | 2092 | 1.9 |
| ATP 15-18 4.4m - <i>after h(l)</i> | 59 | 234 | 1.3 |
| % removed | 21% | 89% | 30% |
| ATP 15-36 1.5m - <i>before h(l)</i> | 60 | 1067 | 2.3 |
| ATP 15-36 1.5m - <i>after h(l)</i> | 52 | 131 | 1.4 |
| % removed | 14% | 88% | 37% |

Material from the exploration area was sent for QEMscan analysis and results support this theory. As can be seen from the graph below, a large part of the impurities consists of various forms of rutile. It must be noted that magnetic impurities were removed from the sample with a strong magnet before analysis but no heavy liquid work was done on this sample.



Blackwater 5 – ATP 15.36 1.5m QEMscan results

Currently on the market are MG12 spiral separators which features 12 turns - TAM's current spirals are MG4 (4 turns). The MG12 is highly efficient in separating impurities and it has a higher feed capacity. TAM will send high Titanium material for testing on the MG12 spirals.

Laboratory testing on material from TAM's active mines has indicated that most of the impurities are in the -45µm size fraction of the material. The -45µm impurities will report to the Fines portion of

TAM's product and approximately 15% of all TAM's product is in the -45µm size fraction. Further testing has indicated that the -25µm portion is extremely high in Titanium and other impurities. TAM believes that it is possible to remove this size fraction and laboratory testing has proven to be very promising.

| Sample | Fe₂O₃ | TiO₂ | Cr |
|---------------|------------------------------------|------------------------|-----------|
| Knob 45/250µm | 49 | 115 | 11.8 |
| Knob 25/45µm | 44 | 137 | 3.3 |
| Knob -45µm | 98 | 573 | 9.1 |
| Knob -25µm | 140 | 910 | 12.6 |

The factory will be conducting testing in the future by using hydro-cyclones to remove the -25µm size fraction.