Mineral Resources Tasmania

Laboratory Report

LJN2019-131

MINERALOGICAL ANALYSES, WESTWOOD QUARRY

An unpublished Mineral Resources Tasmania Report for:

Rare Earth CMT Laboratories

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Mineral Resources Tasmania
Department of State Growth

Tasmanian Government

SUMMARY

The samples contained mostly clinopyroxene, plagioclase, smectite, and anorthoclase, with minor to trace apatite, zeolites, kaolinite and ilmenite. G409298 contained significantly more smectite than G409297. The samples contain no detectable fibrous to asbestiform minerals but did contain very minor free silica (quartz). The quartz content is too low to be a potential respirable hazard

In summary the samples are probably of no environmental hazard.

INTRODUCTION

Two samples of crushed aggregate were submitted for mineralogical analysis with details shown in Table 1. The main issues are to determine potential natural hazards, including the quantity of free silica and the presence of asbestos.

Table 1: Sample details.

MRT Reg No.	Field No.	Location	Sample Description
G409297	L19/986a #1	Westwood Quarry, Biralee	Crushed agg (basalt?)
G409298	L19/986b #2	Westwood Quarry, Biralee	Crushed agg (basalt?)

SAMPLE PREPARATION

The samples were split into representative subsamples and examined by stereomicroscopy and polarised light microscopy, and analysed for mineralogy. Analyses were done by XRD (X-Ray diffraction), in the Mineral Resources Tasmania (MRT) laboratories, Rosny.

SAMPLE DESCRIPTION

Sample G409297 (L19/986a #1) contains poorly sorted, coarse crushed, black to greyish brown, angular basaltic aggregate up to about 12mm diameter, plus ~10% clayey, sand to silt-sized material (Fig. 1). The rock fragments are mostly thinly coated by the pale brown, silty, clayey material. Quartz was not detected visually.

Figure 1: Crushed aggregate as received. Sample G409297. FOV: about 90 mm.

Sample G409298 (L19/986b #2) contains poorly sorted, coarse crushed, medium brown, clayey, rounded to angular basaltic aggregate up to about 10mm diameter, plus sand, silt and clay-sized material (Fig. 2). About half of the basaltic aggregate has decomposed by weathering to soft, clayey, coarsely mottled grey-brown

material. Even the harder particles appear variably weathered. Quartz was not detected visually.

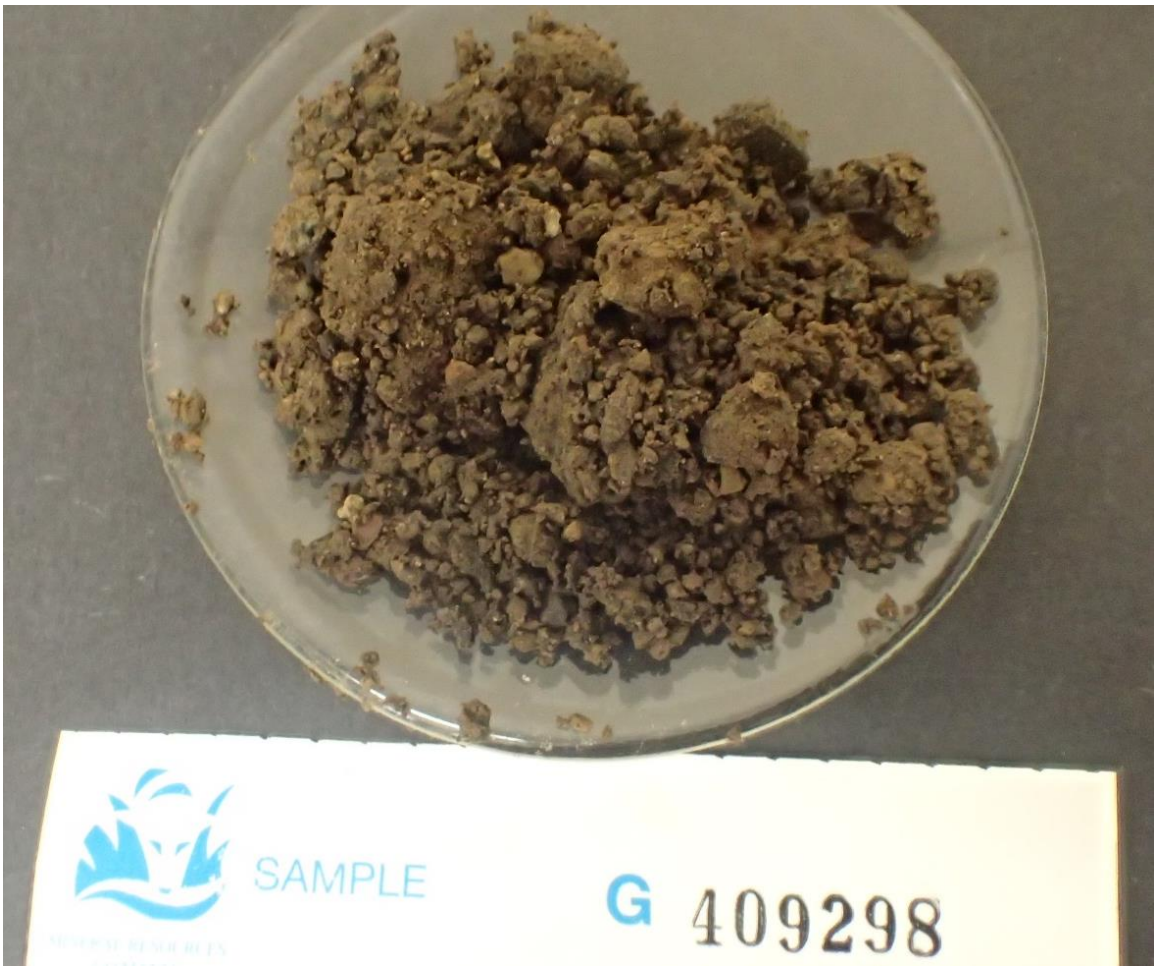

Figure 2: Crushed aggregate as received. Sample G409298. FOV: about 90 mm.

XRD ANALYSES

The samples were prepared, examined and analysed in the MRT laboratories, Rosny Park, Tasmania. They were run on a Rigaku Miniflex 600 X-Ray Diffractometer system: a 600W generator 150mm goniometer with a Cu tube; 40kV/15mA, sample spinner and a Scintillation counter (SC) with Be window, -3º to 145º 2Ø scanning range and 2º - 145º 2Ø measuring range, with a scanning speed

of 0.01 to 100º/min, a graphite counter monochromator and a Kß Ni- filter. The analysis software used is the PDXL2 using the ICCD database.

The results are shown in Appendix 1, and summarised in Table 2. These indicate mostly clinopyroxene, plagioclase, smectite, and anorthoclase, with minor to trace apatite, zeolites, kaolinite and ilmenite. Forsterite was present in G409297, with potentially minor quartz at <0.5%. G409298 contained significantly more smectite and trace amounts of quartz ~2%. The zeolites include chabazite and analcime.

Table 2: XRD Summary

Phase name	MRT Reg No.	
	G409297	G409298
Plagioclase	22(±8)	9(±3)
Clinopyroxene	29(±8)	14(±5)
Smectite	16(±5)	66(±10)
Forsterite	11(±4)	?
Anorthoclase	9(±3)	5(±2)
Apatite	4(±2)	1(±1)
Analcime	3(±2)	<1
Chabazite	2(±1)	2(±1)
Kaolinite	2(±1)	1(±1)
Ilmenite	2(±1)	1(±1)
Quartz	?	2(±1)

FIBRE EXAMINATION

The samples were all prepared and examined by low to high power plain and polarised light in the MRT laboratories, Rosny Park, Tasmania. This examination revealed that they contain no detectable asbestiform material. Sample G409297 is mostly relatively hard and non-friable rock fragments, but also contains a sizable proportion of dust. Sample G409298 is a mixture of relatively hard and non-friable rock fragments, with a large amount of soft, friable, silty sandy clay.

Table 3: Microscopic Examination

MRT Reg. No.	*Observation*
G409297	**No detectable asbestos**
G409298	**No detectable asbestos**

CONCLUSIONS AND DISCUSSION

Both samples appear to be crushed basaltic aggregates. G409297 is relatively fresh, with very minor dust, and G409298 contains roughly equal parts of rock and clay. The samples contain no detectable fibrous to asbestiform minerals. The samples contain very minor free silica (quartz). This quartz can be an issue for causing silicosis from dusts if this material is dry crushed, but the quartz content is too low to be a potential respirable hazard.

Base metals were not tested but are normally very low in basalts except for minor Cr and Ni.

In summary the samples are probably of no environmental hazard.

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T Coyte

SENIOR TECHNICAL OFFICER

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This and other data collected in MRT laboratories may enter the MRT databases but every attempt will be made to ensure it remains closed file and not be available externally, unless at your request.

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Appendix 1: Laboratory Report: XRD Analyses

Client: Rare Earth CMT labs
Sample Source: Westwood Quarry
MRT Job Number: LJN2019-131
Analysis: Approximate Mineralogy
Method: X-Ray Diffraction
Analyst: T Coyte
Lab Manager: R Bottrill
Date: 23/12/2019

Analysis Results – G409297

General information

Analysis date	17/12/2019	XRD	Rigaku Miniflex 600
Job Number	LJN2019-131		
Sample ID	G409297	Operator:	T.Coyte

Comment: Original RIR Method,. Sample treated with warm HCl leach Major peaks for-Kaolinite, Apatite, Forsterite, Smectite, Zeolites - all destroyed

Analysis results

Phase name	Content (%)	Formula
Plagioclase	22(±8)	$(Ca,Na)(Si,Al)_4O_8$
Clinopyroxene	29(±8)	$Ca(Mg,Fe)Si_2O_6$
Smectite	16(±5)	$(Mg_2Al)(Si_3Al)O_{10}(OH)_24H_2O$
Forsterite	11(±4)	Mg_2SiO_4
Anorthoclase	9(±3)	$(Na,K)AlSi_3O_8$
Apatite	4(±2)	$Ca_5(PO_4)_3F$
Analcime	3(±2)	$Na(AlSi_2O_6)H_2O$
Chabazite	2(±1)	$Ca_2Al_4Si_8O_{24}12H_2O$
Kaolinite-1A	2(±1)	$Al_2Si_2O_5(OH)_4$
Ilmenite	2(±1)	$FeTiO_3$

Peak overlap may interfere with identifications and quantitative calculations.

Amorphous minerals and minerals present in trace amounts may not be detected.

*Possible Quartz present <0.5%

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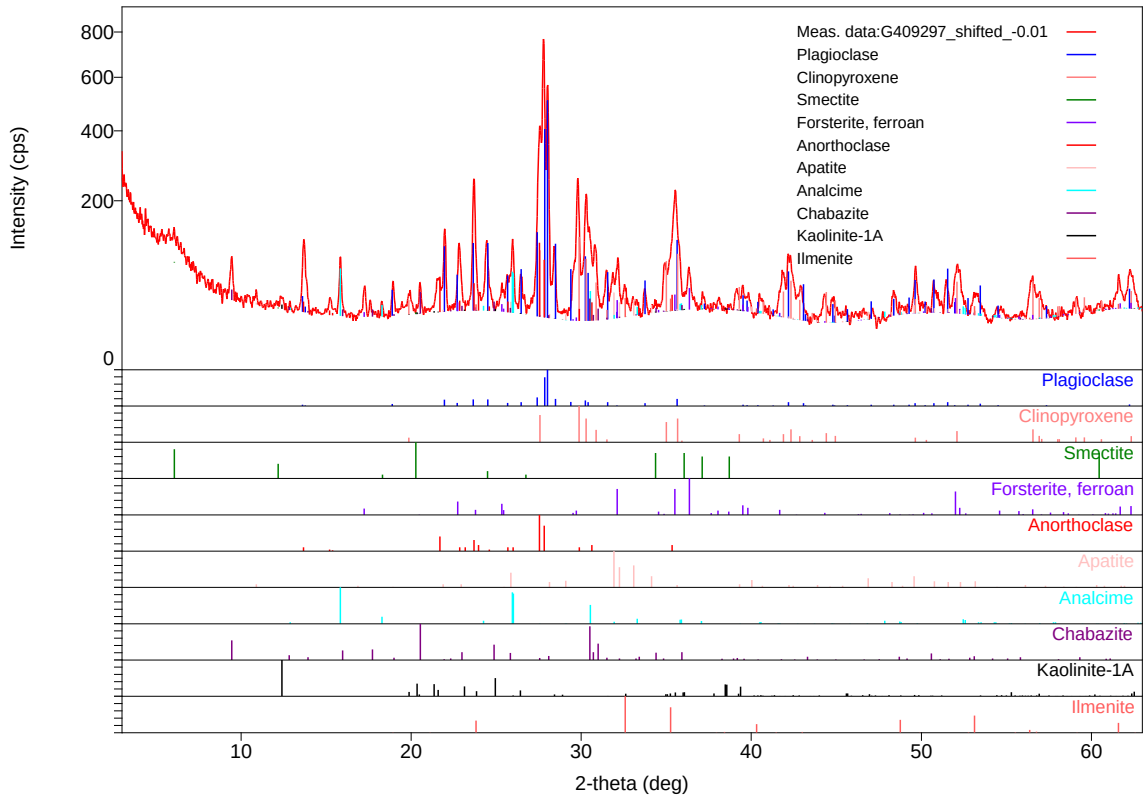
Phase data pattern



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Analysis Results – G409298

General information

Analysis date	23/12/2019	XRD	Rigaku Miniflex 600
Job Number	LJN2019-131		
Sample ID	G409298	Operator:	T.Coyte

Comment: Original RIR Method. Sample treated with warm HCl leach Major peaks for-Kaolinite, Apatite, Smectite, Zeolites - all destroyed.

Analysis results

Phase name	Content (%)	Formula
Smectite	66(±10)	variable
Clinopyroxene	14(±5)	$Ca(Mg,Fe)Si_2O_6$
Plagioclase	9(±3)	$(Ca,Na)(Si,Al)_4O_8$
Anorthoclase	5(±2)	$(Na,K)AlSi_3O_8$
Chabazite-Ca	2(±1)	$Ca_2Al_4Si_8O_{24}12H_2O$
Quartz	2(±1)	SiO_2
Kaolinite-1A	1(±1)	$Al_2Si_2O_5(OH)_4$
Apatite	1(±1)	$Ca_5(PO_4)_3F$
Ilmenite	1(±1)	$FeTiO_3$
Analcime	<1	$Na(AlSi_2O_6)H_2O$

Peak overlap may interfere with identifications and quantitative calculations.

Amorphous minerals and minerals present in trace amounts may not be detected.

*Peak at 1.503Å not fully accounted for possibly Ulvospinel?

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Phase data pattern