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EL 527

LAKE GAIRDNER

PROGRESS AND FINAL REPORTS TO LICENCE SURRENDER FOR THE PERIOD 12/9/79 TO JANUARY 1980

Submitted by
Commonwealth Aluminium Corp. Ltd
1980

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PRIMARY INDUSTRIES AND RESOURCES SA

CONTENTS ENVELOPE 3732

TENEMENT: EXPLORATION LICENCE NO. 527

TENEMENT HOLDER: COMMONWEALTH ALUMINIUM CORPORATION

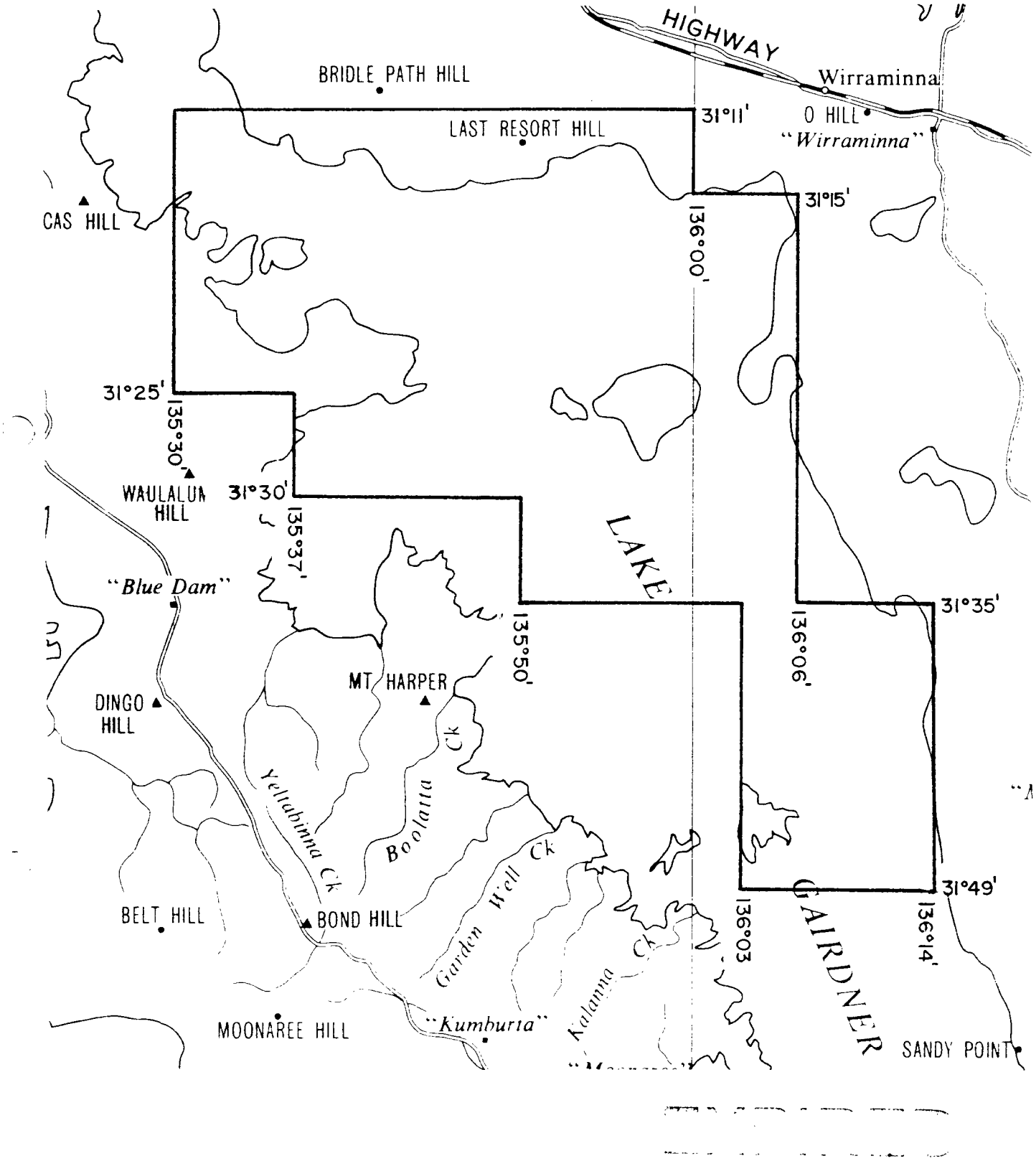
REPORTS:

WHITE A.H. 1980
E.L. 527
Lake Gairdner, Quarterly
Report (January) Quarter and Final report (pgs. 3-6)
Statement of Expenditure E.L. 527
Lake Gairdner

Plans:

- Location Map. (pg. 5)
- Commonwealth Aluminium Corporation Limited
  Exploration Department drilling log. (3732-1)

SCHEDULE A



SCALE 1:500,000

KILOMETRES 10 0 10 20 30 40 50 KILOMETRES

APPLICANT: COMMONWEALTH ALUMINIUM CORPORATION LTD.

DM: 231/79 AREA: 2515 square kilometres

1:250000 PLANS: GAIRDNER

LOCALITY: LAKE GAIRDNER AREA — 80 km S W of WOOMERA

DATE GRANTED: 12-9-79 DATE EXPIRED: 11-9-80 EL No: 527

COMALCO

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COMMONWEALTH ALUMINIUM CORPORATION LIMITED

Incorporated in Queensland

Registered Address: 1 Scotland Road, Mile End, S.A. 5031
Mailing Address: P.O. Box 20, Plympton, S.A. 5038

The Director General
SA Department of Mines & Energy
PO Box 151
EASTWOOD
5063

31.3.80

Dear Sir:

Re: E.L. 527, Lake Gairdner, Quarterly Report (January Quarter) and Final Report.

The application for EL 527 was made on 15.3.79 to allow our exploration department to test for the presence of sodium carbonate minerals in the shallow Tertiary and Recent sediments underlying Lake Gairdner. As an isolated inland drainage basin, surrounded by the acid igneous rocks of the Gawler Craton, it is considered that the dispersion of evaporative salts in ground water would be minimized, thus enhancing the chances of trona accumulation . Given the high sodium and potassium contents of the surrounding igneous rocks, solution weathering during internal drainage could provide the necessary soluble constituents needed for trona accumulation.

To test for the presence of massive trona, a programme of repetetive drilling through the Tertiary and Recent sediments was proposed and detailed in the application for this EL. At this stage the potential of these sediments remains untested due to continuing difficulty in gaining access to the lake surface.

An initial reconnaissance of the lake surface in April, 1979, staged from Moonaree on the southern lake margin, found the lake to contain up to 20 cm of brine, and the surface so saturated as to be in-

accessible, even to tracked vehicles. The condition of the lake surface was again reviewed in December, 1979, during a field reconnaissance from Wirrawinna Homestead. A shallow section of Recent sediments was sampled by auger near Last Resort Hill on the northern lake surface. The section was composed of a brine-saturated, red-brown clay composed of minor illite and a variety of mixed-layer clays (including vermiculite, chlorite and kaolin), with variable amounts of fine quartz sand. The log of this section is attached as an appendix. On drying, the interstitial solutions precipitated only halite and minor amounts of gypsum. The lack of dolomite or calcite as cement suggests a general paucity of soluble carbonate species in the ground water at this site.

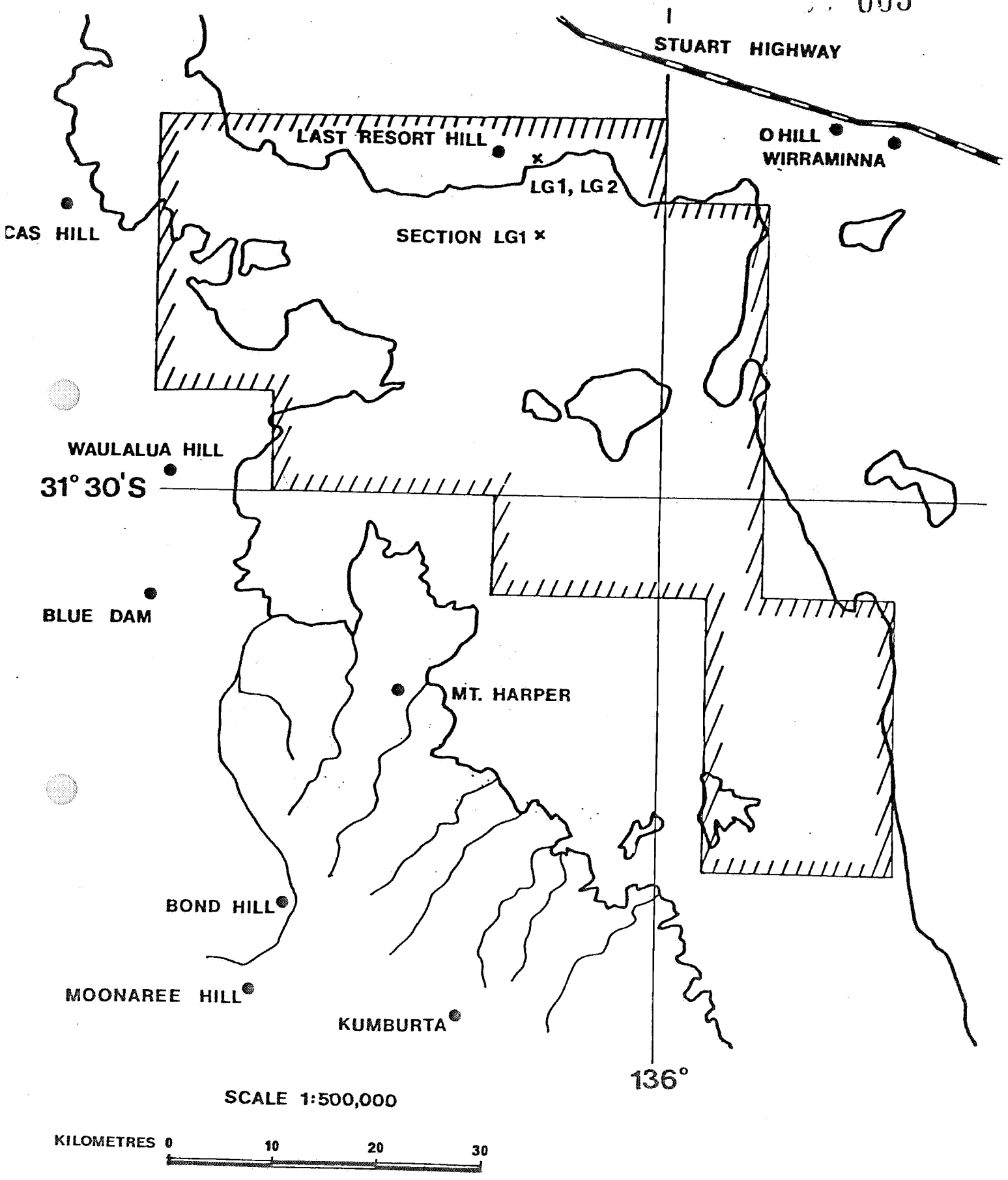
At the time of sampling the lake contained a 10 cm deep surface pond of brine which migrated across the surface depending on wind direction. Its presence made the bearing capacity of the lake surface unpredictable and with experience gained during drilling operations on Lake Frome, it is considered that an early 1980 start to drilling is unrealistic. For this reason we feel obliged to apply for surrender of EL 527 since we are unable to carry out what we feel to be an effective exploration of the area.

Yours faithfully,
COMMONWEALTH ALUMINIUM CORPORATION LIMITED

Dr. A.H. White
Exploration Manager

Encl. Appendix I.
Figure I.

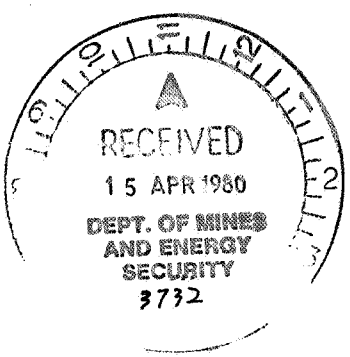
AHW:JW


STUART HIGHWAY
LAST RESORT HILL
LG1, LG2
O HILL
WIRRAMINNA
CAS HILL
SECTION LG1
WAULALUA HILL
31° 30'S
BLUE DAM
MT. HARPER
BOND HILL
MOONAREE HILL
KUMBURTA
136°
SCALE 1:500,000
KILOMETRES 0 10 20 30

STATEMENT OF EXPENDITURE

EL 527 - Lake Gairdner

Geologists' salaries	$ 2040.00
Field assistants' salaries	1120.00
Supplies	1120.00
Vehicle mileage	260.00
Drafting	160.00
Administration	470.00
	$ 5170.00



Appendix 1.

3732-1

COMMONWEALTH ALUMINIUM CORPORATION LIMITED
EXPLORATION DEPARTMENT
DRILLING LOG

Project: EL 527 LAKE GAIRDNER. Date: 13/11/79 19

Hole No. Location. Angle Azimuth Collar R. L. Drilling Method. Coring by hand auger

Logged by D. Lock. Drilled by A.N. White & D. Lock. Total Depth. 2.6 meters.

From	To	Advanced	Recovered	Sample No	Description	Assay
Surface salt sample				LG-A.	Lake surface is covered by a 5cm. layer of friable salt crust, often containing compression features developed from crystal expansion.	XRD analysis: halite (major) illite and a chloritic or vermiculitic clay in minor proportions.
0	0.30 meters.			LG, H1/0-20 LG, H1/20-25 LG, H1/25-30	A dark brown clay containing small pieces of organic carbon. Traces of degraded unicellular red algae present. Quartz content increases to 5% v/v at a depth of 0.3 ms. Grains are angular but rounded, size range 0.5 – 1.0 mm.	XRD, Sample LG, H1/0-20. : Halite, quartz, illite and a mixed-layer clay.
0.30	0.90			LG, H1/30-55. LG, H1/55-65 LG, H1/65-80 LG H1/80-85 LG H1/85-90.	A light-brown clay containing small pieces of organic carbon. The ~~matt~~ clay is mottled with ~~contains~~ small grey-black reducing spots which ~~may~~ contain small voids filled with framboidal pyrite. Clay-filled worm burrows present. Ostracod tests present. Rounded & pitted quartz grains present (< 5% v/v), size range 0.5 – 2.0 mm.	XRD, Sample LG, H1/55-65 Halite, quartz, illite and a mixed-layer clay. Minor gypsum.
0.90	1.10 ~~EOS~~			LG, H1/90-95 LG, H1/95-100 LG, H1/100-105	A dark brown clay containing 5% v/v quartz as angular and rounded grains, size 0.5 – 2.0 mm. Small black reducing spots are confined to compacted	

Copies to: Project Geologist, Originator, Exploration Manager.

3732-1(2)

COMMONWEALTH ALUMINIUM CORPORATION LIMITED
EXPLORATION DEPARTMENT
DRILLING LOG

Project: Date: 19

Hole No. Location. Angle Azimuth Collar R. L. Drilling Method.

Logged by Drilled by Total Depth.

From	To	Advanced	Recovered	Sample No	Description	Assay
				LG, HI/105-110	worm burrows. Ostracod tests, plant fibre and degraded unicellular red algae present.	XRD, Sample LG, HI/100-105: Halite, illite, mixed-layer clay (possibly kaolin) and minor quartz.
1·10	1·70			LG, HI/110-120	Light brown-red clay containing thin layers of	
				LG, HI/120-125	increased quartz content (up to 20% v/v). Grains are	
				LG, HI/125-130	rounded and finely pitted & although the grains in	
				LG, HI/130-135	each unit are well sorted, they ~~vary~~ vary in size	
					(unit to unit) from 0·5-5·0 mm. Feldspar grains,	
					red ostracod tests and plant fibre appear at the	
					base of this unit.	
1·70	~~1·75~~ 1·95			LG HI/170-175	Light brown-white mottled clay containing occasional	XRD, Sample LG, HI/170-175.
					quartz grains. White mottling is not carbonate (acid	Halite, quartz and a
					test).	mixed-layer clay. Minor
						illite content.
~~1·75~~ 1·95						
~~1·95~~	2·30			LG, HI/195-200	A red-brown fine quartz sand. Quartz grains are	
				LG HI/200-210	rounded and pitted & vary in size from 0·1-2 mm	
				LG HI/230	(poorly sorted). A white clay content increases to	

Copies to: Project Geologist, Originator, Exploration Manager.

3732-1 (3)

COMMONWEALTH ALUMINIUM CORPORATION LIMITED
EXPLORATION DEPARTMENT
DRILLING LOG

Project: Date: 19

Hole No. Location. Angle Azimuth Collar R. L. Drilling Method.

Logged by Drilled by Total Depth.

From	To	Advanced	Recovered	Sample No	Description	Assay
					40% v/v at the 2.3 metre level. Feldspar content varies but generally increases to 20% v/v at this level, as rounded red grains <·5 mm in size. The unit is characterized by a feldspar content and the presence of plant and algal fibre, including seed pods. The bright red iron staining and a mottled appearance suggests a fluctuating water table (quite probably saline) and an oxidizing upper vadose zone.	
2·30	2·60			LG, HI/260.	A mottled red-brown to white sandy clay. Grains make up 40% v/v of sample, ave 1 poorly sorted, rounded + pitted, ranging in size from 0·1 to 3 mm. Feldspar content as 10% of sample. No vegetable fibre present.	XRD: Sample LG, HI/260. Quartz, illite and a mixed-layer clay as major content. Minor halite present.

Copies to: Project Geologist, Originator, Exploration Manager.