Rio Tinto Alcan – Alcan Gove Mine Operations

MLN 955 “Gove” Annual report for the period 30/05/2013 to 29/05/2014

Title Holders: Swiss Aluminium Australia Limited 70%, Gove Aluminium Limited 30%

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Contents page

1. Abstract 4
2. Copyright 4
3. Introduction 4
   3.1 Background 4
   3.2 Location and access 5
   3.3 Climate 6
   3.4 Topography and vegetation 6
   3.5 Project history 6
   3.6 Gove mineral lease 7
4 Geology 8
   4.1 Regional geology 8
   4.3 Local geology 10
   4.3 Exploration history 13
      4.3.1 Specific gravity / bulk density 15
      4.3.2 Data management 15
5 Activities report (1 June 2013 to 31 May 2014) 16
   5.1 Exploration index map 16
   5.2 LiDAR aerial survey 16
   5.3 Drilling programme 2013 17
      5.3.1 Permitting 17
      5.3.2 Clearing 17
      5.3.3 Drilling plan 17
      5.3.4 Drill methodology 18
      5.3.5 Drill sampling and logging 19
      5.3.6 Drillhole coding 20
      5.3.7 Drill sample analyses 20
      5.3.8 Umpire check analysis 21
      5.3.9 Drilling statistics 21
      5.3.10 Drilling results 21
      5.3.11 Common drilling problems 21
         Sample recovery 21
         Contamination from the cyclone 22
         Oversize samples in un-cemented lithologies 22
         Contamination from drillhole collar collapse 22
         Contamination, duplication and loss on re-entering drillhole 23
         Comment 23
   5.4 Mineral Resource and Ore Reserves 23
      5.4.1 Mineral Resources 23
      5.4.2 Ore Reserves 31 December 2013 24
      5.4.3 Mine production 25

5.4.4 Ore Reserves 30 June 2014 25
6 Exploration Expenditure 26
6.1 Anniversary Period 26
7 Conclusions and recommendations 27
7.1 Conclusions 27
7.2 Recommendations 27
7.3 Proposed future work and expenditure 27
Grade control drilling 27
8 Bibliography 29

Table 4.1 Drillholes and metres completed by year 14
Table 4.2 Bauxite bulk densities 15
Table 5.1 Summary drilling table 17
Table 5.2 Element analysis 20
Table 5.3 Mineral Resource for Gove deposit as at 31 December 2013 24
Table 5.4 Mineral Resources (exclusive of reserves) at 31 December 2013 and 30 June 2014 24
Table 5.5 Reserve statement (to SEC standard) – 31 December 2013 25
Table 5.6 1 January 2014 to 30 June 2014 estimated Ore Reserve depletion based on pit outlines 25
Table 5.7 Ore Reserves at 30 June 2014 25
Table 6.1 Exploration expenditure 26
Table 7.1 Activity details for the next reporting period 27

Figure 3.1 MLN 955 Location. Source: Snowden Mining Industry Consultants 5
Figure 3.2 Aerial photograph of Gove peninsular. Source: Rio Tinto Alcan 6
Figure 4.1 Schematic cross section of bauxite deposit on main Gove plateau. Source: Ferenczi, 2001, (after Lillehagen 1979) 9
Figure 4.2 Simplified geology of Gove bauxite deposits. Source: Ferenczi, 2001, (modified from Somm 1975, Rawlings et al 1997) 10
Figure 4.3 Gove Peninsular Geology. Source: Rio Tinto Alcan 11
Figure 4.4 Gove bauxite areas. Source: Rio Tinto Alcan 11
Figure 4.5 Generalised schematic profile of the bauxite plateau. Source: Ferenczi, 2001 (modified from Grubb 1970, Somm 1975) 12
Figure 4.6 Drill collar plan 2004 to 2013. Source: Snowden 14
Figure 5.1 Exploration index map 16
Figure 5.2 Drillhole location plan - 2013 drilling 18
Figure 5.3 Tractor mounted vacuum drill rig and support vehicles. Source: Rio Tinto Alcan 19
Figure 7.1 Planned future grade control drilling. Source: RTA – Gove operations 28

1. Abstract

During the anniversary period 30 May 2013 to 29 May 2014, Rio Tinto Alcan mined approximately 7.5 million dry tonnes of bauxite at the Gove mining operation. An aerial light detection and ranging (LiDAR) topographic survey was completed in June 2013 for the Gove peninsular. Grade control drilling was undertaken on the main plateau. The 2013 drilling was designed to infill 200 m^2 spaced holes to 50 m^2 spaced drilling. A total of 2,152 grade control vacuum drillholes for 7,693.5 m and 30,594 samples were completed. The 2013 Mineral Resource and Ore Reserve estimates were completed during the period by Snowden Mining Industry Consultants (Snowden 2014a and 2014b) and included approximately 80 % of the 2013 drillholes.

The derivation of the Mineral Resource from the total unconstrained Mineral Inventory is a total Inferred, Indicated and Measured classification of 194.9 Mt at 49.7 % Al_2O_3 and 5.6 % SiO_2. The Mineral Inventory includes resources in "exclusion zones" that are currently not mineable due to environmental and infrastructure reasons, but could be mineable in the future. The Mineral Resource was calculated with no block grade cut-off, but within a bauxite thickness envelope of at least 1 m inside a plateau edge buffer of 25 m. Although no cut-off has been applied to the model blocks, a mineralised bauxite envelope with a threshold of < 12.0 % SiO_2 and > 40.0 % Al_2O_3 was applied.

The Ore Reserves estimated from the Mineral Resources are 150.1 Mt at 49.3 % Al_2O_3 and 6.0 % SiO_2.

2. Copyright

3. Introduction

3.1 Background

Rio Tinto Alcan mines bauxite at the Gove mining operation as part of a group of bauxite mines, alumina refineries and smelter operations throughout Australia and New Zealand. The Gove operation includes a bauxite mine, steam power station, residue disposal area, port and ship loading facilities. Since the 2013 Gove Annual Report, the Gove alumina refinery has been shut down due to low commodity prices and high operational costs. Approximately 2.7 million tonnes per annum (Mtpa) of bauxite was exported from Gove in 2013/14.

This report describes the exploration activity at Gove Mining Lease MLN 955 for the reporting period from 1 June 2013 to 31 May 2014.

3.2 Location and access

The Gove Operations bauxite mine is located 650 km east of Darwin near the company township of Nhulunbuy in East Arnhem Land, Northern Territory, Australia. Access by road to Nhulunbuy is via the Central Arnhem Road which leaves the Stuart Highway 52 km south of Katherine. The first 30 km are sealed and then the rest is a gravel road. The Central Arnhem Road is 682 km long, plus the 52 km from Katherine to the turnoff. Travellers require a permit as the road runs across many Yolngu Clan lands.

The town of Nhulunbuy, built at the time of construction of the Gove Operations, has a current population of around 4,200 people. Nhulunbuy is a regional centre for North East Arnhem Land. The Nhulunbuy Corporation acts as a local government authority for the town. About 1,500 Aboriginal people (Yolngu) reside in the Gove area, including Yirrkala and 22 homeland communities. Thirteen major clans exist in the area, each with traditional homeland centres outside the Yirrkala settlement.

The Gove airport is located 13 km from the town centre of Nhulunbuy. Qantas and AirNorth have a daily flight to Gove from Cairns and Darwin.

The entire site is covered by Special Mining Lease 11, with MLN 955 covering only the mining operation (Figure 3-1).

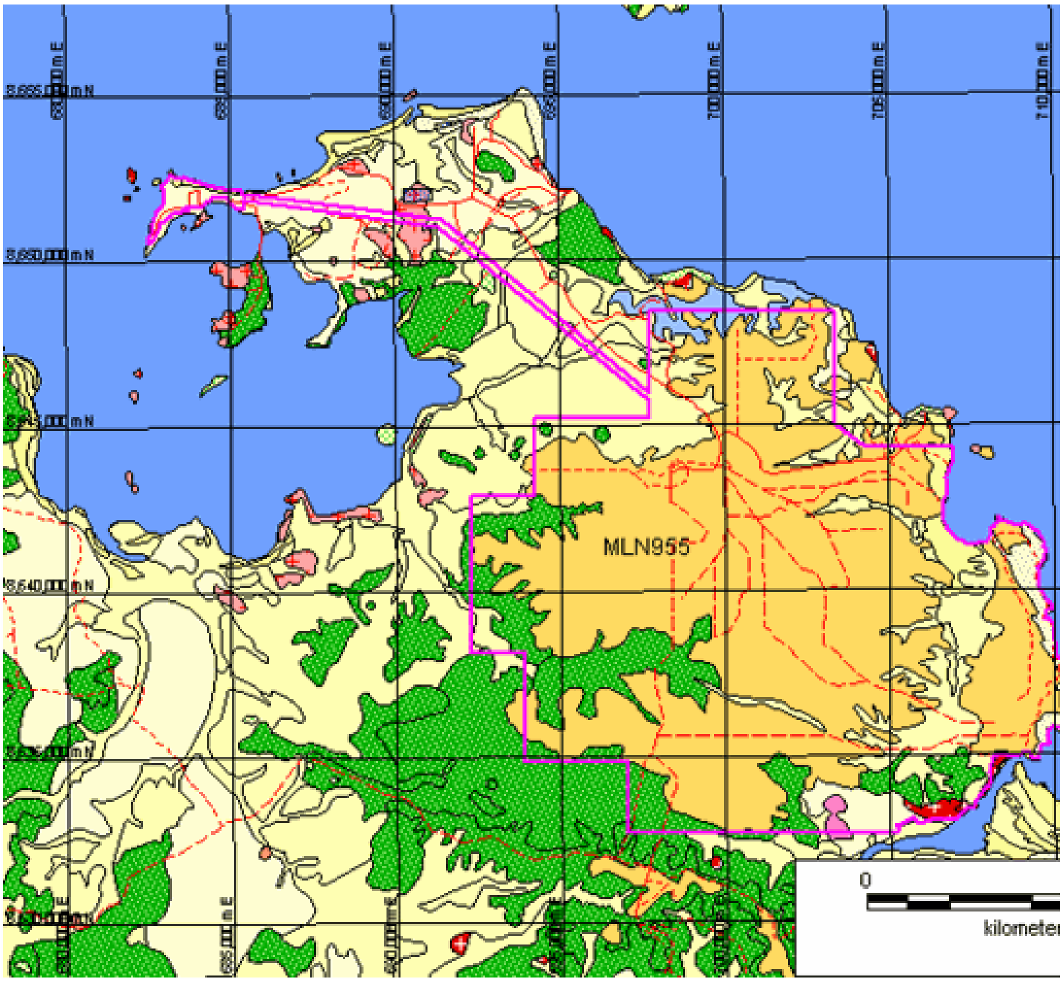

Figure 3-1 MLN 955 Location. Source: Snowden Mining Industry Consultants

Figure 3-2 shows an aerial photograph of Gove peninsular showing the current mine open pits and the lease area.

Figure 3-2 Aerial photograph of Gove peninsular. Source: Rio Tinto Alcan

3.3 Climate

Situated just 12 degrees south of the equator, the Gove peninsula has a monsoonal climate. The tropical area has two distinct seasons, the dry season from May to October, and the wet season from November to April. During the dry season, temperatures range from 15°C to 18°C at night to 28°C to 30°C during the day. There is virtually no rainfall, clear blue skies and cool ocean breezes. The wet season brings the monsoon weather with hot and humid days ranging from 31°C to 35°C, warm nights and electrical storms. There can be cyclonic activity during this time. Humidity is high and rainfall averages between 100 mm to 300 mm per month with an annual rainfall around 1,100 mm.

3.4 Topography and vegetation

The land is characterised by a mixture of savannah woodland, wetlands and patches of monsoon forest and rocky escarpment. The Gove plateau is a flat to undulating peneplain where the bauxite has been formed.

3.5 Project history

In 1952, the Bureau of Mineral Resources (BMR: now Geoscience Australia) conducted a brief investigation of the Gove bauxite deposit. In 1955, New Guinea Resources conducted a more comprehensive investigation which included approximately 132 hand auger holes over the SML 1 area (now covered by MLN 955). SML 1 was granted in 1958 to the Commonwealth Aluminium Corporation Ltd (Comalco) and a further 175 holes were drilled.

SML 1 was then transferred to British Aluminium. Gove Bauxite Corporation Ltd was granted leases SML 2, 3 and 4 (now part of MLN 955) in 1961 which surrounded SML No 1. SML's 2, 3 and 4 were then transferred to Gove Mining and Industrial Corporation ("GOMINCO") which carried out a two year drilling program (between 1962 and 1964).

In 1965, North Australian Bauxite and Alumina Company Ltd (Nabalco), a Swiss company, explored the bauxite deposits at Gove and in 1968 proposed a $1.5 billion bauxite-alumina project that was approved by the Federal Government. The project involved the establishment of a 6 Mtpa open cut mine, an 8.7 km ore conveyor system, an alumina refinery, a modern town (Nhulunbuy) and a port. Mining commenced in 1971 and the alumina plant was commissioned in 1972.

In 2000, Alcan acquired Algroup (Alusuisse Group Ltd.), merging the companies to become Alcan Inc. Alcan acquired Nabalco in 2003 which was in turn acquired by Rio Tinto in 2007. Rio Tinto Alcan (RTA)'s total alumina production capacity increased almost threefold, from 3.2 million tonnes per annum in 2006 to 8.3 million tonnes at the end of 2007.

In October 2011 Rio Tinto put 13 aluminium businesses up for sale, including refineries and smelters in Australia and Europe. A group of seven assets continue to be managed within the RTA unit until they are sold, including alumina plants and a refinery in France and Germany, the Sebree smelter in the US and a smelter and power station in Britain. Interests in six other assets in Australia and New Zealand were transferred to a new unit, called Pacific Aluminium, including the Gove bauxite mine and alumina refinery and several smelters.

In 2014, the Gove alumina refinery was closed down, and the Pacific Aluminium unit reverted back to Rio Tinto Alcan.

The bauxite ore body at Gove has been mined since 1971, and it's estimated mine life lasts until 2032. Annual bauxite production averages around 8.5 million tonnes per annum (Mtpa) over the duration of the life of mine (LOM) Plan.

3.6 Gove mineral lease

RTA's right to operate the mining and (now shut) refinery operation in Gove is enshrined within Mining (Gove Peninsula Nabalco Agreement) Ordinance 1968, Mining Ordinance 1939 - 1967, Special Mineral Lease 11 (SML11) which is broken into three parts;

- Part I (the mining operation), MLN 995.
- Part II (the conveyor infrastructure between the mine and refinery).
- Part III (the refinery, stockpiles and associated supporting infrastructure).

The coordinates denoting the exact location of the lease boundaries can be found in *The Schedule* of the lease agreement. SML11 had an original term of 42 years from the lease agreement (concluding on 29 May 2011), application was made and approved in 2011 to renew for a further period of 42 years until 29 May 2053. SML11 Part I is also known as Mineral Lease No. 995 (MLN 995).

In addition there are 11 Special Purpose Leases (SPL) covering the ship loader, Nhulunbuy Township and in particular the red mud pond disposal;

- SPL 213, 217, 249, 253 and 277 (refinery and port).
- SPL 215 and 403 (residue disposal).
- SPL 214, 250 and 251 (town and associated infrastructure).

RTA's right to dispose of the red mud waste product from the alumina refinery is enshrined within Mining (Gove Peninsula Nabalco Agreement) Ordinance, Special Purposes Lease Ordinance, Southern Red Mud Disposal Area, Special Purpose Lease No. 403. The coordinates denoting the exact location of the Special Purpose Lease No. 403 (SPL403) boundaries can be found in the survey plot at the end of the lease agreement. SPL403 has an original term of 42 years from the lease agreement (concluding on the 29 May 2011). There are no roll-over provisions within the lease agreement. RTA formed a lease renewals team within the Community Affairs department, which was responsible for all negotiations with the Northern Territory government and aboriginal representative bodies in renewing SPL403. Renewal of this lease was successfully achieved in 2011.

4. Geology

4.1 Regional geology

The regional geology of the Gove Peninsular is described by Ferenczi (2001) as follows.

Basement rocks in the area form part of the Arnhem Inlier, comprising Palaeoproterozoic, ca 1,870 million years (Ma) pelitic, calcsilicate, psammitic and mafic gneiss, and migmatite and garnetiferous leucogranite of the Bradshaw Complex (Rawlings et al 1997). Diamond drilling (Dodson 1967) and geological mapping indicate that there is a 100 m – 200 m thick succession of gently dipping, Lower Cretaceous sandstone and claystone (Yirrkala Formation) unconformably overlying the Bradshaw Complex.

Beneath the laterite profile at Gove, the Yirrkala Formation consists mainly of friable, kaolinised, fluvial arkosic sandstone and quartzose sandstone that is interbedded with minor claystone. The claystone contains lignitic coal partings (Dodson 1967), which have yielded a Late Albian (ca 100 Ma) microflora (Evans 1967). Beneath the laterite at Rocky Point, weathered shale of the Yirrkala Formation dips at 20º to the north-northeast.

Bauxite deposits at Gove occur as a weathering product of Cretaceous marine sediments which overlie Proterozoic basement rocks of the Arnhem Inlier. Uplift, weathering, and erosion of the sediments, as well as formation of the bauxite, took place during the Tertiary, but exact timing and detail of events remains uncertain. Marine reworking of weathered products is likely to have taken place, possibly more than once.

Detailed origin of the bauxite lithotypes remains a matter of debate. Pisolitic textures are dominant, with variable cementation. However, variably cemented coarser nodule horizons are also common. Some deeper bauxite, as well as underlying laterite, contain abundant interconnected solution cavities, which may have been created geochemically and/or biologically (associated with root channels). Modern day root channel structures and infill, in the upper part of the bauxite, are common. Gibbsite is the major ore mineral, with boehmite being of lesser significance.

Figure 4-1 shows a schematic cross section of the bauxite deposit on main Gove plateau.

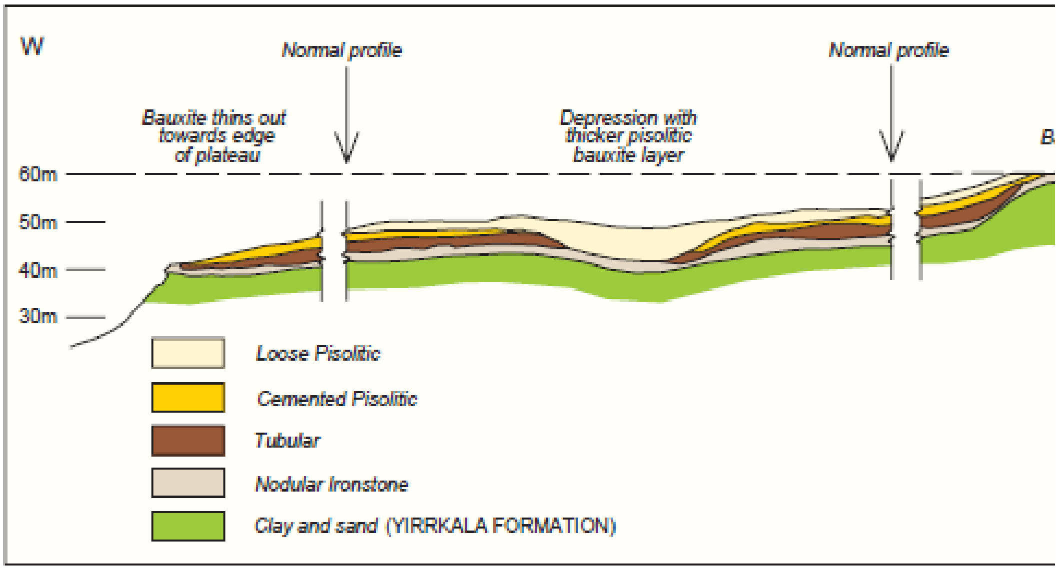

Figure 4-1 Schematic cross section of bauxite deposit on main Gove plateau. Source: Ferenczi, 2001, (after Lillehagen 1979)

Figure 4-2 shows a simplified geological map of the Gove bauxite deposits.

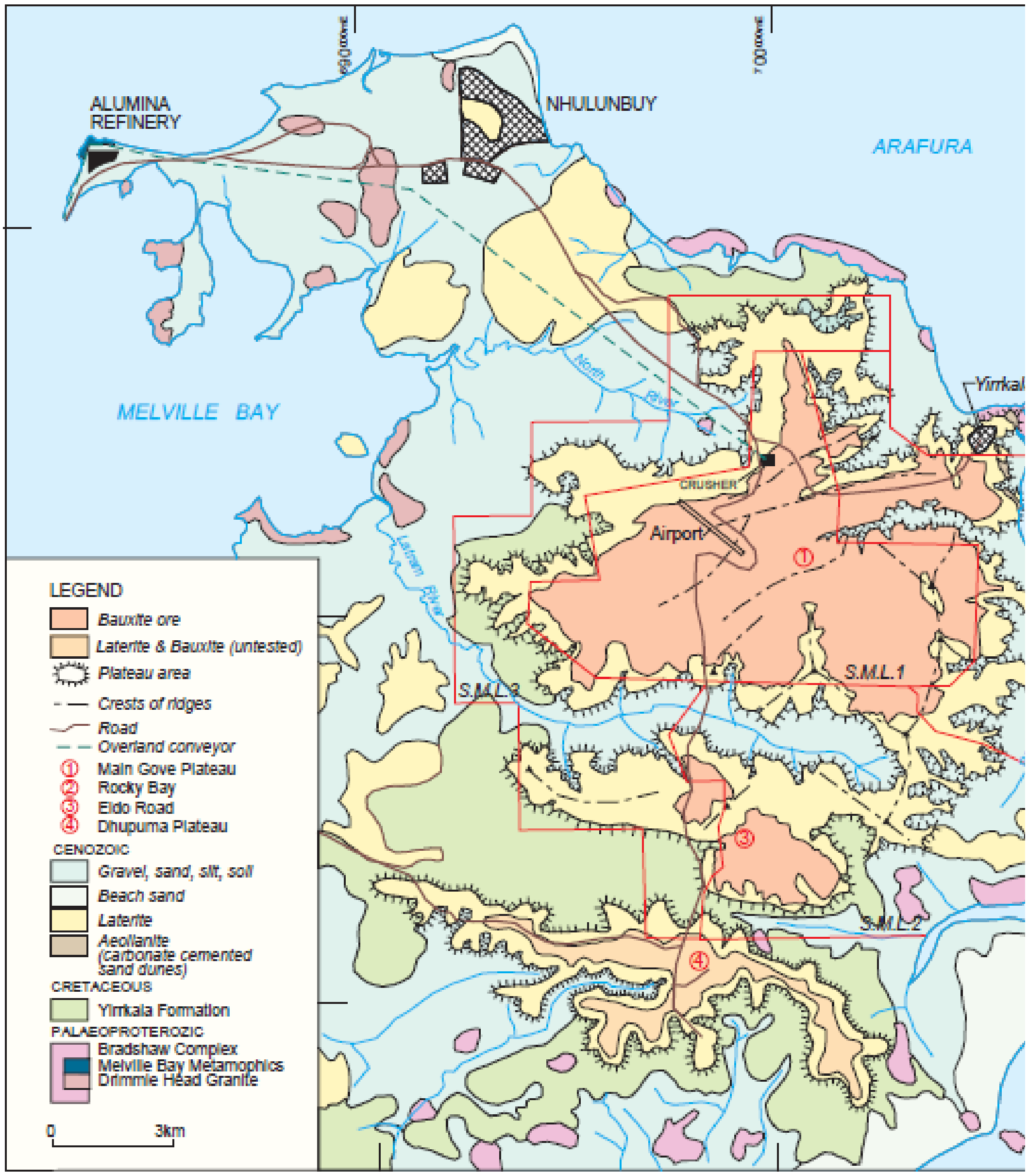

Figure 4-2 Simplified geology of Gove bauxite deposits. Source: Ferenczi, 2001, (modified from Somm 1975, Rawlings et al 1997)

4.3 Local geology

Bauxite occurs on top of a gently undulating plateau at approximately 30 m to 70 m above sea level, over an area measuring approximately 20 km east-west by 15 km north-south. The plateau has been variably dissected by erosion into three main plateau areas. Main Gove Plateau is the largest contiguous bauxite area, whilst Rocky Bay and Eldo are two adjacent smaller bauxite areas. The present day extent of the bauxite probably represents a small proportion of what was originally present.

Figure 4-3 is a geological map of the Gove Peninsular. The Gove bauxite plateau is surrounded by Tertiary laterites sitting on Cretaceous rocks and more recent sediments and alluvium. The map also shows the lease boundary of MLN 955, the Nhulunbuy town and the Central Arnhem Road.

Figure 4-3 Gove Peninsular Geology. Source: Rio Tinto Alcan

Figure 4-4 shows the laterite plateau with the three bauxite areas:

1. Main Gove Plateau where the main bauxite deposits occur.
2. Rocky Bay.
3. Eldo.

The map also shows the lease boundary of MLN 955 and the overland conveyor to the plant site.

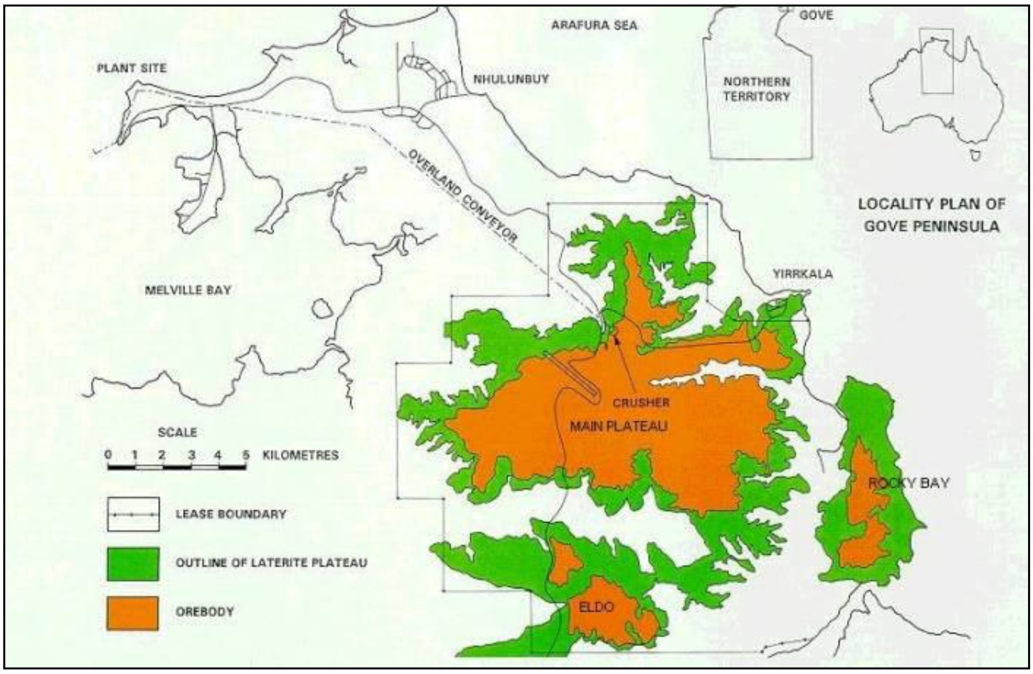

Figure 4-4 Gove bauxite areas. Source: Rio Tinto Alcan

The Gove bauxite deposits extend over an area measuring approximately 20 km east-west by 15 km north-south. Bauxite thickness varies from 1.1 m to 10.0 m and averages 3.5 m. Overburden thickness varies from 0 m to 8.5 m and averages 0.6 m.

The bauxite horizon is typically 3 m to 4 m in thickness. It comprises several distinct layers in either a dominantly cemented (“hard”) profile, or a dominantly poorly cemented to un-cemented (loose or soft) profile. The latter tends to be thicker and occupies hollows in the plateau surface, and is often considered to be a proximal erosion / deposition product of the “hard” profile bauxite. Figure 4-5 shows a generalised schematic profile of the bauxite plateau. The typical bauxite horizon consists of the following lithologies (from surface down):

- Overburden (OB).
- Loose Pisolite (LP).
- Cemented Soft (CS).
- Cemented Hard (CH).
- Tubular (TUB).
- Nodular (NOD).
- Laterite (LAT).

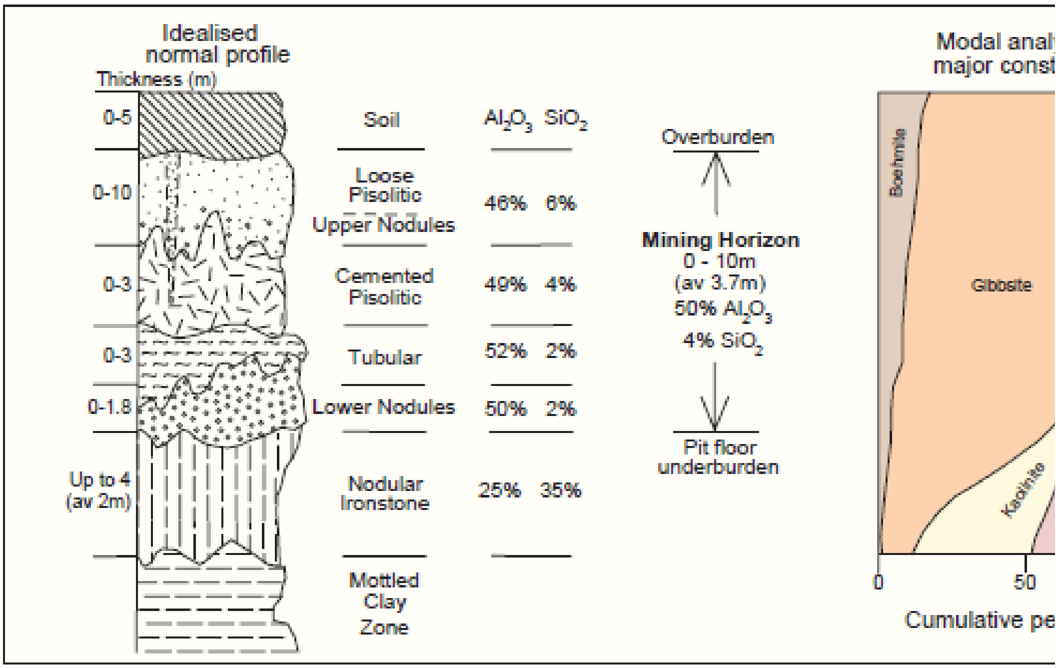

Figure 4-5 Generalised schematic profile of the bauxite plateau. Source: Ferenczi, 2001 (modified from Grubb 1970, Somm 1975)

The bauxite profile generally consists of footwall vuggy laterite, overlain by nodular bauxite, overlain by extremely vuggy “tubular” bauxite overlain by strongly cemented pisolitic bauxite, overlain by weakly cemented pisolitic bauxite, overlain by a thin loose pisolite layer, overlain by a thin overburden layer being a mix of loose pisolites and topsoil.

4.3 Exploration history

The overall extent of the bauxite deposit is known, but accurate resource definition drilling for mine planning and production during the remaining life of mine (LoM) is on-going. Drilling has occurred on three elevated plateau areas referred to as Main Plateau, Rocky Bay Plateau, and Eldo Plateau.

Grade control drilling was commenced in 1969, using vacuum drill methods with an Edson drill rig. In 1990, Hans Werner began using an updated Edson vacuum drill rig for grade control. In 2002, geological supervision of the drill rig commenced.

Various methods were used for the collection and sampling of drillhole data prior to 2004. A range of individual sample lengths were collected from 0.25 m to full bauxite profile composites. Standard 0.25 m sample interval was adopted in 2004. Drilling was carried out on various drill spacing pre-2004 with 50 m x 50 m, 50 m x 100 m, 100 m x 100 m, 200 m x 100 m and 200 m x 200 m spacing used. Chemical analysis of drill samples from holes drilled pre-2004 were carried out at the Gove Refinery laboratory.

Prior to 2005, drilling was completed internally by Alcan (and owners Nabalco prior to 2003). Grade control drilling was completed in-house using auger drill methods, on the Fox “Mobile” B-40L rig, Pacific Model 250/20 “Pengo” rig, “Gemco” rig.

During 2004 several improvements were made, including:

- Introduction of digital field logging.
- Introduction of Snowden database management system.
- Collection of sample duplicates and insertion of field standards.
- Implementation of 0.25 m length sampling.

An extensive drilling program commenced in 2005 employing a geologist capturing lithology data directly into an electronic Toughbook laptop. Attempts were made to twin some pre-2004 holes and re-interpret the downhole data to validate the data for inclusion in resource modelling but too many variables were encountered and it was decided to replace all pre-2004 drilling. This resulted in the re-drilling, sampling, logging, Quality Assurance and Quality Control (QAQC) and analysis procedures for the bauxite deposits initiated by Snowden. As the new data has become available it has replaced the old (pre 2004) drilling data.

In 2005 an experienced external drilling contractor (Yearlong Contracting) was engaged by RTA until 2008 and the quantity of drilling increased considerably from 2005 to 2008. No drilling occurred in 2009 or 2010. Drilling recommenced in 2011 and is discussed in Snowden (2012). Table 4.1 is a table showing the number of previous exploration drillholes. In 2013, Snowden was commissioned to manage and execute an infill drilling program designed to infill the areas on the Main Plateau that were defined by 200 m by 200 m drilling. The 2013 drilling program was performed on 50 m by 50 m grid.

Table 4.1 Drillholes and metres completed by year

Year	Holes	Metres
2003 and prior	14,039	60,627.7
2004	1,111	3,731.0
2005	4,096	15,670.6
2006	3,728	19,488.8
2007	3,391	12,527.0
2008	3,529	15,177.0
2009	0	0
2010	0	0
2011	1,890	9,460.3
2012	0	0
2013	2,152	7,693.5
Total	**33,963**	**144,375.9**

Note the total number of holes reported in the 2012 annual report in the corresponding table reported holes utilised in the resource estimation. Table 4.1 above reports all drillholes. The existing table is taken directly from the primary database and is valid.

Figure 4-6 displays a drillhole collar plan for holes drilled between 2004 and 2013.

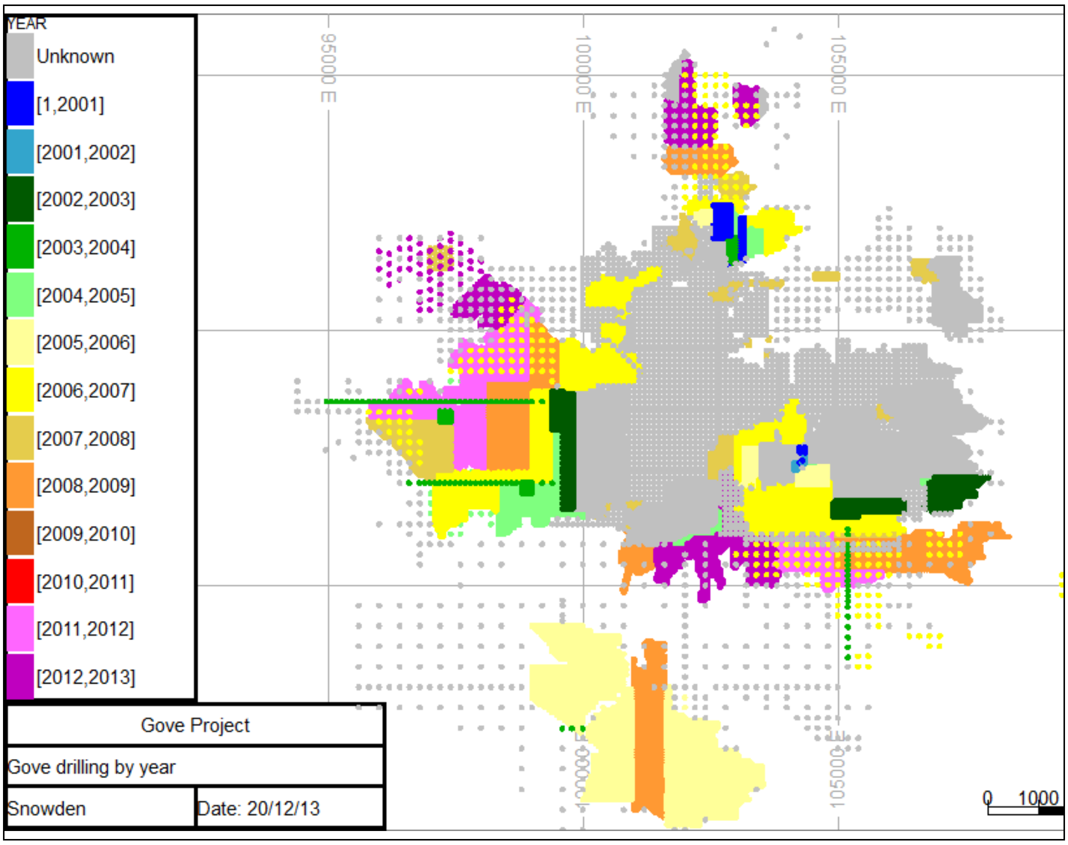

Figure 4-6 Drill collar plan 2004 to 2013. Source: Snowden

4.3.1 Specific gravity / bulk density

Density data has been collected over four sampling programs in 2002, 2003, 2006 and 2008/9. Samples were collected for most of the lithologies represented on the Main Plateau, Rocky Bay Plateau and Eldo Plateau. The only exceptions are measurement of bulk density values for loose pisolites (LP) in Rocky Bay. The work has shown that each lithology displays a different level of bulk density variability and subtle to distinct differences in mean values. The mean bulk density from this work is assigned to each lithology within each plateau in the resource model and grade control model.

No new density information has been collected since 2009 so the density values currently used in the Mineral Resource estimate have not changed. The density values used in the 2011 Mineral Resource statement are shown in Table 4.2. A typographical error in the report for the 2008/9 density program resulted in an incorrect density value being used for the Nodular lithology at Eldo. A value of 1.53 was used instead of 1.63 resulting in a conservative tonnage estimate at Eldo.

Table 4.2 Bauxite bulk densities

Lithology	Main Plateau Bulk Density (t/m^3)	Rocky Bay Bulk Density (t/m^3)	Eldo Bulk Density (t/m^3)
Overburden (OB)	1.22	1.28	1.24
Loose Pisolites (LP)	1.52	1.52*	1.56
Cemented Soft (CS)	1.72	1.85	2.14
Cemented Hard (CH)	1.82	1.89	1.82
Tubular (TUB)	1.72	1.84	1.74
Nodular (NOD)	1.52	1.65	1.63
Laterite (LAT)	1.83	1.78	1.70

**Value derived from Main Plateau*

Source: Rio Tinto Alcan

4.3.2 Data management

Prior to 2004, the Gove digital database was maintained and validated by MineMap. Snowden commenced management of the borehole database for RTA Gove in 2004. Snowden introduced the process where all digital logging and assay data is sent to Snowden's Brisbane office for compiling, validation and storing in a SQL database utilising acQuire as the database model. The acQuire database stores all logging and assay information, including QAQC data. Validation of the logging data and assay data is undertaken as the data is imported into the database, and the database is validated on a regular basis during the drilling programs.

From 2009 - 2012, the database was stored and managed by RTA in Brisbane. In 2012, Snowden were again contracted to manage the exploration database.

5. Activities report (30 May 2013 to 29 May 2014)

5.1 Exploration index map

The exploration index map shows the location of activities completed during the reporting period (

Figure 5-1).

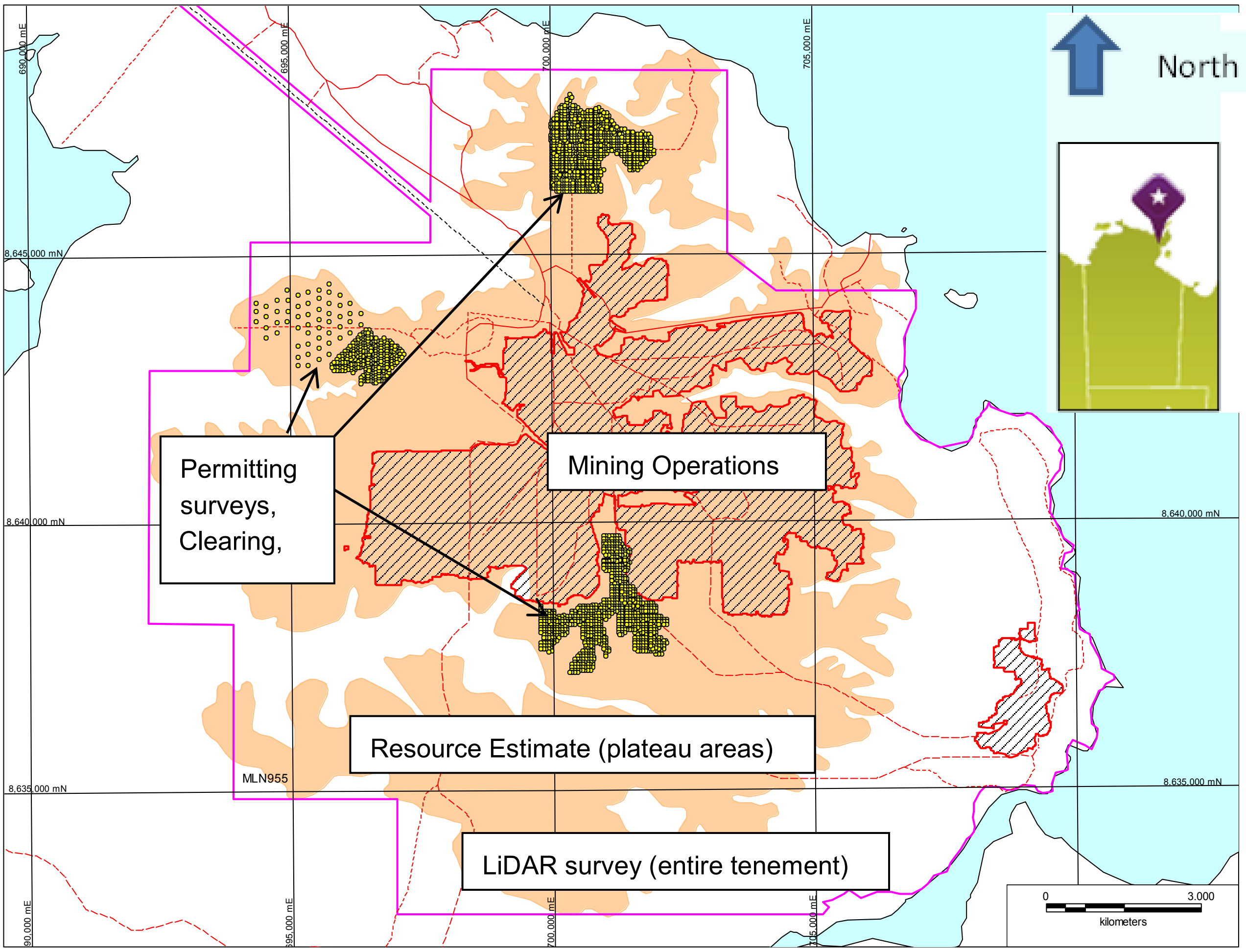

Figure 5-1 Exploration index map

5.2 LiDAR aerial survey

AAM Pty Limited conducted an airborne LiDAR survey over the Gove Operations Bauxite Mine and surrounding region from 19 June - 22 June 2013. The survey has a vertical accuracy of approximately 0.60 m.

The 2013 LiDAR survey has had more rigorous control and testing and is now believed to provide a better global estimate of collar locations and topography and was used as the surface against which all collars were “pressed”, in the resource estimate. Hole collars in disturbed / mined out areas had the 2012 collar elevations maintained.

5.3 Drilling programme 2013

5.3.1 Permitting

The land disturbance permitting process in Gove requires an application to the Aboriginal Areas Protection Authority (AAPA) for an Authority Certificate. The AAPA is established under the Northern Territory Aboriginal Sacred Sites Act 1989. The AAPA is responsible for maintaining a register of sacred sites and with the guidance of traditional custodians issue Authority Certificates with conditions where required. This is followed by flora and fauna surveys to ensure that no endangered/threatened species will be impacted by the work, and if they are, an exclusion zone is put around them. This is followed by a controlled burn to assist surveys and drillhole layout.

A Cultural Heritage Survey is undertaken to ensure there is no impact to archaeological or cultural sites. A cultural heritage clearance is provided which includes exclusion zones where required. This is followed by a vegetation clearance permit, so that drill lanes can be cleared for the start of the drill season.

Permitting was completed both before and throughout the 2013 drilling season. All areas that were planned to be drilled were permitted.

5.3.2 Clearing

A total of 261 km of drill lanes were cleared in the reporting period. Of this, 102 km was cleared in preparation for the 2014-2015 period drilling program.

5.3.3 Drilling plan

In the anniversary period during 2013, a grade control drilling program was conducted in areas of the site that are scheduled to be potentially mined in the next five to ten year period. The drilling was planned to be conducted in three separate areas.

Drilling was carried out on a 50 m by 50 m grid to achieve more accurate grade estimation which complimented the information, based on a 200 m by 200 m spaced exploration holes.

The personnel directly involved in the 2013 drilling program included:

- Rod Carlson (Snowden Consultant) – Drill Program Manager.
- Ben Higgs (Contract Geologist) – Drill Program Logging Geologist.
- Natalie Loxton (RTA) – Relief Logging Geologist.
- George Winaulin (RTA) – Site representative.

In 2013, RTA commissioned Yearlong Contracting to complete drilling on the Main Plateau. Figure 5-2 shows a map that outlines the areas that were drilled in 2013. Table 5.1 summarises the drilling completed in 2013.

Table 5.1 Summary drilling table

Hole Type	Hole Number Range	No of Holes	Total Metres
Vacuum	AG17302 – AG19811	2,152	7,693.5
Grand Total	**-**	**2,152**	**7,693.5**

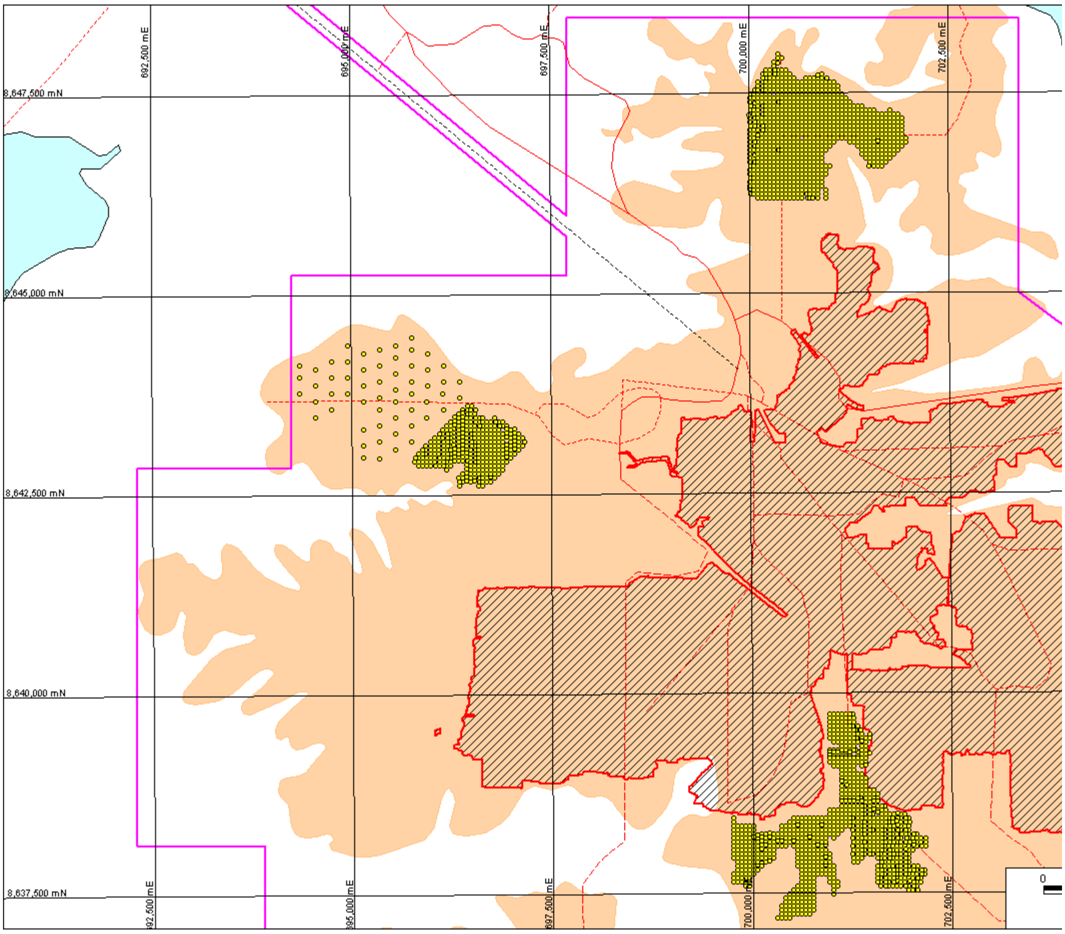

Figure 5-2 Drillhole location plan - 2013 drilling

Drilling is usually scheduled to be completed during the dry season (July to November inclusive), and in 2013 was undertaken from 30 August to 14 October. Three drill cycles were planned of 19 days duration each, with one rostered day off scheduled in the middle of the 19 days. Each shift took place during the day and was 12 hours in duration.

Yearlong Contracting provided a vacuum drill rig which was mounted onto the back of a tractor. The rig uses 1.8 m hollow (single walled) rods with a tungsten carbide blade-bit at the drilling face. Blade bit diameters of 42 mm and 48 mm are used, the former generally being kept for loose or poorly cemented ground. Lithologies encountered in drilling bauxite are easily fragmented or disaggregated by the blade bits used, which are rarely replaced.

The first rod plus blade bit has an effective drill length of 1.4 m, including allowance for the regular starting height above ground level (determined by jack-leg elevation and evenness of ground surface).

5.3.4 Drill methodology

Figure 5-3 is a photograph of the tractor mounted vacuum drill rig and support vehicles. The vacuum drilling method is cheap and versatile but can lead to bias in the samples. Vertical holes are drilled on a standard 50 m x 50 m or 200 m x 200 m grid with approximately 0.7 kg weight samples collected every 0.25 m down the hole.

Figure 5-3 Tractor mounted vacuum drill rig and support vehicles. Source: Rio Tinto Alcan

5.3.5 Drill sampling and logging

All samples obtained since 2004 have been taken at intervals of 0.25 m downhole from the top of the hole. No sample splitting occurs in the field and the typical sample size returned to the laboratory weighs 0.7 Kg. Samples are collected in cloth bags. An oven proof bar code tag is stored with the sample and bar code reader used to directly assign a unique number identifying that sample in the Toughbook. Samples are transferred to a shipping container at the end of each day ready for transport to the Ultratrace Laboratories in Perth.

Field standards are inserted at every one in a hundred frequency and a field duplicate is split using a sample riffle splitter in the field also at a one in a hundred frequency. Standard reference material was sourced from Geostats Pty Ltd in Perth and Gove bauxite reject material was used to generate the standard sample material.

For each 0.25 m interval a geologist logs the drill chips to delineate lithology for use in the mineral resource estimation. Lithological data is captured directly in acQuire logging software on an electronic Toughbook laptop.

5.3.6 Drillhole coding

The drillhole samples are coded with the following codes prior to use in the resource estimation and block modelling process:

- Overburden OB = 1.
- Loose Pisolite LP = 2.
- Cemented Soft CS = 3.
- Cemented Hard CH = 4.
- Tubular TUB = 5.
- Nodular NOD = 6.
- Laterite LAT = 7.

Plateau areas are also coded with a number:

- Main Plateau = 1.
- Rocky Bay Plateau = 2.
- Eldo Plateau = 3.

5.3.7 Drill sample analyses

Each 0.25 m sample is sent for analysis at Bureau Veritas' Ultratrace Laboratories in Perth, Western Australia for robotic sample preparation producing a pulp with 90 % passing 75 µm, the pulp is then fused with 12:22 lithium borate flux followed by XRF determination for Al_2O_3, SiO_2, Fe_2O_3, TiO_2 and LOI by robotic Thermo-gravimetric Analysis (1000°C) as well as a suite of minor oxides. A total of 30,594 primary samples were submitted to Ultratrace in 76 batches.

Table 5.2 shows the element analysis (XRF fused bead) and detection limits.

Table 5.2 Element analysis

Element %	Detection Limit	Method
SiO_2	0.01 %	XRF Fused bead
Al_2O_3	0.01 %	XRF Fused bead
Fe_2O_3	0.01 %	XRF Fused bead
TiO_2	0.01 %	XRF Fused bead
CaO	0.01 %	XRF Fused bead
Cr_2O_3	0.001 %	XRF Fused bead
K_2O	0.01 %	XRF Fused bead
MgO	0.01 %	XRF Fused bead
P_2O_5	0.001 %	XRF Fused bead
SO_3	0.001 %	XRF Fused bead
ZrO_2	0.01 %	XRF Fused bead
V_2O_5	10 ppm	XRF Fused bead
BaO	0.01 %	XRF Fused bead
MnO	0.01 %	XRF Fused bead
LOI (1000°C)		Thermo Gravimetric Analysis

Source: Rio Tinto Alcan

5.3.8 Umpire check analysis

A single batch of 915 samples was sent to SGS Perth for analysis (the same suite of analysis as in the primary batches). Results indicated excellent precision and accuracy from the primary lab against the umpire checks.

5.3.9 Drilling statistics

The total number of holes completed was 2,152, with 7,693.5 m drilled at an average depth of 3.6 m. A total of 30,954 samples were submitted for analysis (29,965 primary samples, 296 field split duplicates, and 333 standards). A complete set of drillhole data including collar location, elevation, geological codes and assay results has been prepared in the appropriate format for digital submissions.

5.3.10 Drilling results

The majority of holes drilled intersected bauxite. The top of the hole normally contains uneconomic overburden and topsoil. The bottom of the hole normally contains increasing quantities of clay with higher silica content. A software program has been designed to calculate the top and bottom of the economic grade bauxite based on alumina and silica grades. These ore grade intersections are then used for grade control mine planning.

5.3.11 Common drilling problems

There are a number of problems which affect the drilling and sampling of the bauxite. These problems create situations in which sample quality and hence sample assay data can be compromised, through sample loss, sample contamination or sample bias.

Sample recovery

With the sampling interval of 0.25 m and a typical density of 1.7 t/m^3, the 48 mm diameter bit should produce a 0.77 kg sample, and the 42 mm bit should produce a 0.59 kg sample. RTA geologists noted that the actual sample weight varies because:

- As the bit rotates and the rod string vibrates, actual hole diameter will be slightly larger than the bit size.
- The exact 0.25 m interval may be slightly under or over drilled at each end.
- There is significant natural void space (particularly in Tubular and Laterite lithologies), and hence a reduction of physical sample volume in the drillhole.
- The presence of significant natural void space may result in loss of drill cuttings to the surrounding formation (although the vacuum suction should tend to counteract this problem).
- In loose, un-cemented lithologies (particularly Loose Pisolites or Nodules), vacuum suction will tend to draw in additional freely running sample material from the ground surrounding the drillhole.
- Bulk density varies within and between lithologies.
- Moisture content will vary with depth, lithology, and season.
- There is loss of small amounts of damp or clayey fines when they stick to the inside of the rods, hose, or cyclone.
- Blockages in the rods and hose affect the continuity and volume of sample flow.
- Material may collapse into the hole, which would normally be from the collar at surface, where ground disturbance by clearing or movement of heavy machinery may have completely disaggregated the surface layer.

In practice, freely running pisolites commonly result in up to 200 % sample recovery, whilst Tubular ore or Laterite with well-developed vertical tubes may exhibit as little as 25 % sample recovery. When blockages occur in the sample flow and drilling continuity is lost, sample sizes may be more severely affected.

Contamination from the cyclone

As each hole is drilled, surfaces in the cyclone commonly become caked with sticky/damp fines. At the completion of each hole the cyclone needs to be thoroughly cleaned out to remove this material. If it is not cleaned out, lumps of caked material may fall into samples from the next hole, causing cross-hole contamination. This results in a risk of contamination, particularly if ore is diluted by low grade material or poor quality ore is upgraded by contamination from good quality ore.

Oversize samples in un-cemented lithologies

In loose, un-cemented lithologies (overburden, loose pisolites, and un-cemented nodules), vacuum suction will automatically draw in additional material from around the drillhole. This cannot be avoided in freely running material, but the use of a smaller bit helps (42 mm instead of 48 mm). As long as a steady and relatively fast drilling rate is maintained over each sample interval, then additional material will be minimised and is likely to be drawn in evenly over the length of the sample.

A further measure is to minimise the pause time between flask re-attachment (after the previous sample is tipped out) and re-commencing drilling penetration. This ensures that extra material drawn in at the sample changeover point is not excessive.

Contamination from drillhole collar collapse

If the drillhole collar is sited in loose overburden or loose pisolites, particularly where these have been disturbed by the dozer clearing the drill line, material around the collar can collapse into the hole as it is being drilled, thus contaminating deeper samples as they are drilled. This becomes particularly serious if overburden is the source of contamination, as it can be very high in silica. Minor amounts of overburden contaminating deeper ore samples can falsely increase the silica grade of the ore, thus creating a high level risk for data quality.

A number of measures have been adopted to avoid this situation:

1. The driller will avoid collar locations with obvious loose material when siting each drillhole, and if necessary, the hole can be drilled just off the edge of the cleared line where the ground has not been disturbed (fine rootlets usually bind the overburden in undisturbed areas).
2. It is often possible to manually sweep away loose material around the drillhole collar.
3. When significant collar collapse occurs (usually while drilling the first metre or so of hole), it is normal procedure for the driller to pull the rods at end of a sample interval, re-enter hole to suck up the collapse material, discard this material, and then continue drilling as before.

When collar collapse is severe, and material keeps falling into the hole another hole is re-drilled nearby, where the collar can be sited in more stable material.

Contamination, duplication and loss on re-entering drillhole

It is not unusual for clay or damp fines to stick to the inside of the rods and restrict sample flow. Sometimes such build up will completely block sample flow, particularly when large nodules are intersected immediately after clayey pisolites. The driller commonly hammers the rods to dislodge such blockages by vibration, and this is usually sufficient to fix the problem. However, serious blockages require the rods and bit to be pulled out of the hole and cleaned out with a small auger that fits inside the rods. Hot rods (heated on a special mounting at the rig motor exhaust) are also used to minimise sticking of fines/clays to the inside of the rods.

Re-entering the hole then requires continuation of drilling/sampling from where the blockage occurred. Depth errors can therefore be made at this point in loose lithologies (in hard lithologies it is easy to identify the floor of the drillhole).

Comment

The vacuum drilling method is considered to be a cheap and fairly reliable method of obtaining a representative bauxite sample providing due care and attention is paid to sample contamination.

5.4 Mineral Resource and Ore Reserves

5.4.1 Mineral Resources

Snowden completed an update of the Mineral Resource in late 2013 / early 2014 (Snowden, 2014a) to incorporate the grade control drilling completed in 2013 (with a data cut-off as at 31 October 2013 thereby excluding a total of 389 holes of the total 2,152 holes).

The grade control drillhole database was filtered to extract all raw bauxite samples based on less than 12 % silica and over 40 % alumina. Composites were created from the raw data to provide a single grade value for each element within each lithology (OB, LP, CS, CH, TUB, NOD and LAT) in a given drillhole.

The derivation of the Mineral Resource from the total unconstrained Mineral Inventory is a total Inferred, Indicated and Measured classification of 194.9 Mt at 49.7 % Al_2O_3 and 5.6 % SiO_2 (Table 5.3). The Mineral Inventory includes resources in “Exclusion Zones” that are currently not mineable due to environmental and infrastructure reasons, but could be mineable in the future. The Mineral Resource was calculated with no block grade cut-off, but within a bauxite thickness envelope of at least 1 m inside a plateau edge buffer of 25 m. Although no cut-off has been applied to the model blocks, a mineralized bauxite envelope with a threshold of < 12.0 % SiO_2 and > 40.0 % Al_2O_3 was applied.

Table 5.3 Mineral Resource for Gove deposit as at 31 December 2013

Confidence Classification	Tonnes (Mt)	Al_2O_3 (%)	SiO_2 (%)	TiO_2 (%)	Fe_2O_3 (%)	LOI (%)	Density (t/m^3)
Mineral Inventory							
Measured	159.2	49.7	5.6	2.9	15.7	25.3	1.74
Indicated	53.5	49.5	6.2	2.8	15.8	25.0	1.75
Inferred	6.6	50.1	7.3	2.6	14.5	24.8	1.76
Total	**219.3**	**49.6**	**5.8**	**2.9**	**15.7**	**25.2**	**1.74**
Blocks Excluded outside of Mineral Lease							
Measured	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Indicated	0.8	49.5	6.5	2.7	15.5	25.0	1.78
Inferred	0.5	51.7	8.2	2.5	12.4	24.5	1.75
Total	**1.2**	**50.3**	**7.1**	**2.7**	**14.4**	**24.8**	**1.76**
Blocks Excluded inside of Mineral Lease with thickness < 1 m							
Measured	5.6	47.8	8.1	2.5	16.4	24.4	1.68
Indicated	9.0	48.4	8.0	2.5	15.8	24.5	1.77
Inferred	1.9	49.3	8.1	2.6	14.5	24.7	1.76
Total	**16.5**	**48.3**	**8.0**	**2.5**	**15.9**	**24.5**	**1.74**
Blocks Excluded inside of Mineral Lease with thickness > 1 m within 25 m of plateau edge							
Measured	1.1	49.9	5.1	2.9	15.6	25.7	1.79
Indicated	3.9	50.6	5.0	2.9	14.9	25.9	1.76
Inferred	1.2	50.3	6.5	2.6	14.9	25.0	1.78
Total	**6.2**	**50.4**	**5.3**	**2.8**	**15.0**	**25.7**	**1.77**
Mineral Resource (According to guidelines of JORC 2012)							
Measured	152.2	49.8	5.5	3.0	15.7	25.3	1.73
Indicated	39.8	49.6	5.8	2.9	15.9	25.0	1.75
Inferred	2.9	50.3	7.1	2.5	14.7	24.7	1.75
Total	**194.9**	**49.7**	**5.6**	**2.9**	**15.7**	**25.2**	**1.73**

Table 5.4 shows the estimated Mineral Resource at 31 December 2012 (exclusive of Reserves).

Table 5.4 Mineral Resources (exclusive of reserves) at 31 December 2013 and 30 June 2014

Class	Mdpt	% Al_2O_3	%SiO_2	%Fe_2O_3	%TiO_2	% LOI	% Recovery
Measured	13.82	49.45	6.19	15.47	2.80	25.33	100
Indicated	31.20	49.65	5.80	15.94	2.85	25.02	100
Inferred	2.94	50.27	7.05	14.70	2.54	24.70	100
Total	**47.97**	**49.63**	**5.99**	**15.73**	**2.81**	**25.09**	**100**

5.4.2 Ore Reserves 31 December 2013

The 2013 Ore Reserve estimate, completed as at 31 December 2013, is included in Table 5.5 (Snowden, 2014b). It is reported to Securities and Exchange Commission (SEC) standards as at 31 December 2013 for the three bauxite areas.

Table 5.5 Reserve statement (to SEC standard) – 31 December 2013

Plateau	Classification	Bauxite (Mt)	Al_2O_3 Grade (%)	SiO_2 Grade (%)
Main Plateau	Proven	94.4	49.24	5.68
	Probable	6.7	48.92	6.40
Rocky Bay	Proven	7.3	48.37	6.30
	Probable	1.0	49.45	6.93
Eldo	Proven	39.7	49.72	6.43
	Probable	1.1	49.29	8.17
Total	Proven	141.4	49.33	5.92
	Probable	8.7	49.02	6.67
	TOTAL	**150.1**	**49.31**	**5.96**

5.4.3 Mine production

Mine production from 1 July 2013 to 30 June 2014, totalled 7.5 million dry product tonnes (Mdpt) of bauxite (crushed and stacked).

5.4.4 Ore Reserves 30 June 2014

The Ore Reserves as at 30 June 2014 were calculated using the Ore Reserve (Snowden, 2014b) as at 31 December 2013, depleted for production between December 2013 and June 2014. The estimate of depletion is based on pit outline strings provided by Rio Tinto Alcan. The pit outline strings as at November 2013 were used for the December 2013 Ore Reserve. This is due to the pit outline strings representing the limit of bulldozer ripping, that is nominally one month ahead of actual digging (production), and so is representative of the position of production as at 31 December 2013. Similarly the end of May 2014 pit outline string is used to represent the position of production as at 30 June 2014.

Table 5.6 1 January 2014 to 30 June 2014 estimated Ore Reserve depletion based on pit outlines

Class	Mdpt	% Al_2O_3	%SiO_2
Proven*	3.7	49.8	5.5
Probable	0	0	0
Total	**3.7**	**49.8**	**5.5**

** – Proven is a SEC Ore Reserve category*

Table 5.7 shows the Gove Ore Reserves at 30 June 2014, estimated by depletion.

Table 5.7 Ore Reserves at 30 June 2014

Class	Mdpt	% Al2O3	%SiO2
Proven*	137.7	49.3	5.9
Probable	8.7	49.0	6.7
Total	**146.4**	**49.3**	**6.0**

** – Proven is a SEC Ore Reserve category*

6. Exploration Expenditure

6.1 Anniversary Period

Table 6.1 shows the exploration expenditure for the anniversary period.

Table 6.1 Exploration expenditure

Admissible Expenditure	Specify the work undertaken	$AU Claimed
Geological Activities and Prospecting	A contract geologist was attached to the contract drilling company conducting the grade control drilling with cost.	
Geochemical Activities	Analysis work (30,594 primary analyses and 915 umpire checks) was conducted by an external laboratory to analyse all geological samples collected.	593,649
Geophysical and Remote Sensing Activities	NA	0
Drilling	2,152 vacuum drillholes, 7,693.5 m, 30,594 samples.	239,982
Bulk Sampling and Earthworks	261 line km of bull dozer clearing of drill lanes (costs absorbed in mine operations).	193,140
Rehabilitation	No rehabilitation work was carried during this drilling programme.	0
Prefeasibility inc. Metallurgical and Environmental	NA	
Office Studies	Geological resource and reserve work undertaken by a contractor conducted during this period and Budget preparation for 2013 drilling program.	198,848
Overheads (not to exceed 15 % of the sum of A to H above)	Diesel cost, drill supplies and motor vehicle expenses.	52,730
(Preliminary Exploration – Yr 1)		
Total Expenditure Claimed		**1,278,349**

7. Conclusions and recommendations

7.1 Conclusions

During the tenement anniversary period 30 May 2013 to 29 May 2014, RTA mined approximately 7.5 million dry tonnes of bauxite at the Gove mining operation. Snowden managed an infill drill program of Snowden undertook an update of the Mineral Resource and Ore Reserve estimate during the reporting period.

7.2 Recommendations

It is recommended that grade control drilling be completed in the areas that are planned to be mined in the next five years. This will assist mine planning and mine scheduling ensuring that consistent bauxite grades are mined and blended.

7.3 Proposed future work and expenditure

Table 7.1 shows the planned activity and proposed expenditure for the next reporting period (2014 to 2015).

Table 7.1 Activity details for the next reporting period

Admissible Expenditure	Specify the work to be undertaken	$AU Proposed
A. Geological Activities and Prospecting	NIL	0
B. Geochemical Activities	Sample Analysis	867,228
C. Geophysical and Remote Sensing Activities	NIL	0
D. Drilling	Resource drilling	307,100
E. Bulk Sampling and Earthworks	NIL	0
F. Rehabilitation	NIL	0
G. Prefeasibility inc. Metallurgical and Environmental	NIL	0
H. Office Studies	Resource estimation, and database maintenance	205,000
I. Overheads (not to exceed 15 % of the sum of A to H)	Office admin, vehicles, travel etc	157,733
J. Covenant for next reporting period	NIL	0

Grade control drilling

Figure 7-1 is a map of the bauxite plateau showing the areas that planned to be drilled in 2014. All areas are covered by AAPA permits.

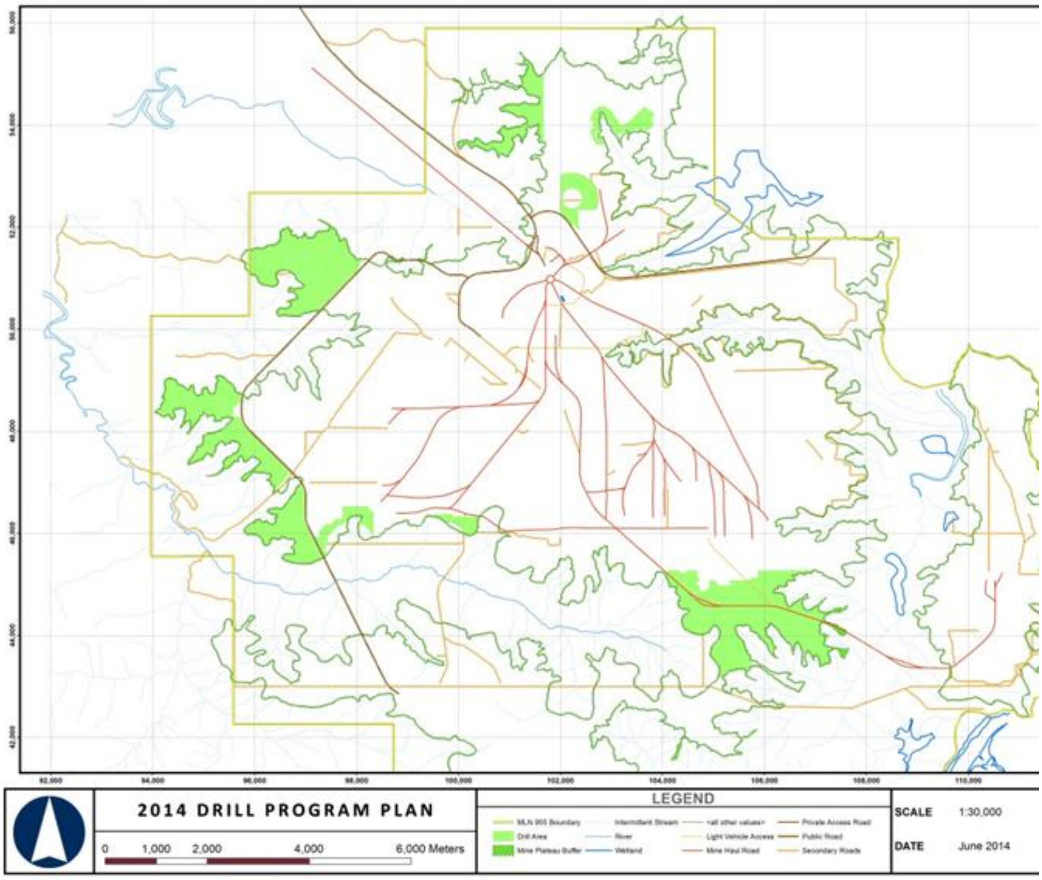

Figure 7-1 Planned future grade control drilling. Source: RTA – Gove operations

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