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# Annual Report EL 9978
# Wonarah, NT
## For the Period ending 29 September 2003

Frew River SF53-03, Avon Downs SE53-04,
Alroy SE53-15, Ranken SE53-16
Northern Territory

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|---|---|
| Tenement Holder: | AKD Limited |
| Date: | October 2003 |
| Author: | Z A Sas |
| Distribution: | Dept of Business, Industry and Resource Development – Northern Territory<br>AKD Limited, Perth |

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## 1. SUMMARY

EL 9978 forms part of AKD's Wonarah phosphate project, located on the Barkly Highway 260km east of Tennant Creek in the Northern Territory, Australia.

The Wonarah phosphate project was until recently a joint venture between Rio Tinto and AKD Limited. Rio Tinto was the manager and operator of the JV and from March 1999 to December 2000 spent AUD$2.5 million on exploration.

Drilling by Rio Tinto in 2000 delineated an Inferred Resource of 115Mt @ 22% $P_2O_5$ for the Wonarah phosphate deposit. After further drilling in 2001, the resource was recalculated to **72Mt @ 23% $P_2O_5$** (at a cut-off grade of 15% $P_2O_5$). Drill intercepts as high as 37% $P_2O_5$ have been recorded.

The known phosphate resource does not lie within EL 9978 and the only indications of phosphate mineralisation are low-grade drill hole intercepts identified by IMC in the 1970's.

During this reporting period, AKD completed a review of the Wonarah data base and the economic studies undertaken by Rio Tinto and actively sought the participation of a new joint venture to replace Rio Tinto. Several major companies have been approached and a number are reviewing the data.

## 2. TENURE

AKD Limited is the beneficial owner of 100% interest in EL 9978 which is held in the name of Rare Earths & Minerals Pty Ltd and Pilbara Chemical Corporation NL. The tenement is held beneficially for and on behalf of AKD Limited through an agreement between the parties which is registered with the Department in the Northern Territory.

The underlying land tenure for the Wonarah phosphate project is NT freehold and is held by the Arruwurra Aboriginal Corporation for which Rio Tinto, on behalf of the AKD joint venture, negotiated an exploration agreement in August 2000.

Exploration licence 9978 was granted on the 30 September 2002 for a period of 6 years. The area of the EL 9978 totals 259km$^2$ (81 blocks) and the total exploration commitment for 2002/2003 as designated by the NT Government is AUD$12,000.

The tenement schedule for Wonarah is as follows:-

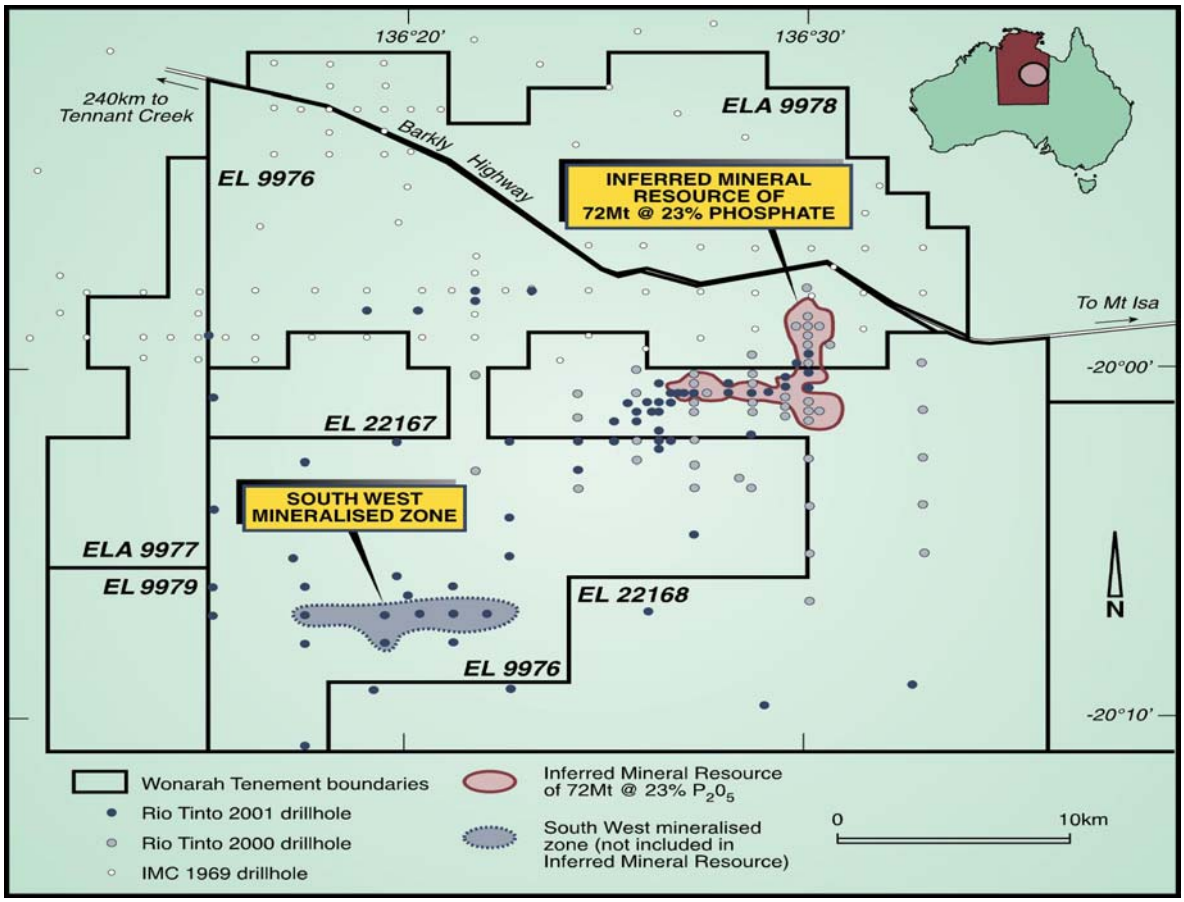
**WONARAH TENEMENT SCHEDULE AS AT JULY 2003**

| TENEMENT NUMBER | REGISTERED HOLDER | GRANT DATE | EXPIRY DATE | CURRENT AREA | RENTAL AMOUNT | EXPENDITURE COMMITMENT |
|---|---|---|---|---|---|---|
| EL 9978 | Rare Earths & Minerals Pty Ltd & Pilbara Chemical Corporation NL | 30-Sep-02 | 29-Sep-08 | 81 | $810 | $12,000 |

## 3. GEOLOGICAL SETTING

The Wonarah tenements are located in the central western Georgina Basin, a large late Proterozoic to early Palaeozoic basin extending across much of eastern Northern Territory and northwest Queensland. The tenements straddle the northeast-southwest trending Alexandria-Wonarah Basement High, an early Cambrian structural ridge separating the Brunette and Undilla Sub-basins.

Basement in this area are Mesoproterozoic sediments and volcanics overlain by Early Cambrian Peaker Piker volcanics. The volcanics are tholeiitic in composition, and comprise amygdaloidal and porphyritic basalts and dolerite. The volcanics cover an east northeast trending basement high throughout the central and western part of the tenement area, and occur beneath thin transported cover in the western tenement area.




The basement high is flanked by onlapping dolomitic rocks equivalent to the Thorntonia Limestone, and overlain by dolostone, mudstone, and phosphorite of the lower Middle Cambrian Upper Gum Ridge Formation, and mudstone, siltstone, and dolostone of the Middle Cambrian Wonarah Beds.

Phosphorite units namely the “chert breccia phosphate” (**CBX**) and the “mudstone phosphorite” (**MPH**) are hosted in the Upper Gum Ridge Formation, herein referred to as the Wonarah phosphorite horizon. The Peaker Piker Volcanics and Thorntonia Limestone are collectively referred to as basement.

Mudstone phosphorite (**MPH**) comprises yellow and pink mudstone phosphorite with trace chert. This unit is generally high grade, averaging 23% $P_2O_5$, with some beds containing up to 40.8% $P_2O_5$. The phosphorite is soft, friable, and often unconsolidated. Minor porcellaneous phosphorite has been intersected.

Chert breccia phosphorite (**CBX**) comprises brecciated dark grey phosphatic chert with a yellow and pink mudstone phosphorite matrix. Grades in the inferred resource area vary from very low (1% $P_2O_5$) to medium-grade (15% $P_2O_5$), with rare high-grade mudstone interbeds up to 34% $P_2O_5$.

The sequence onlaps and gently dips away from the basement high with a wedge shaped geometry in section. The chert breccia phosphorite (**CBX**) is laterally extensive, 1 – 12 m thick (averages 4 m). The mudstone phosphorite is 1 – 8 m thick (averages 4 m).

Phosphorite (Upper Gum Ridge Formation) outcrops at Arruwurra in the southwest of the Wonarah project area area, over a strike of ~2 km, but is recessive and covered by aeolian sand. Rock chip samples assayed >30% $P_2O_5$ with <5% $Al_2O_3$+$Fe_2O_3$. Phosphatic rock types encountered include mudstone phosphorite, phosphatic coquinite and dolostone, and phoscrete breccia. Dolomitic rocks also outcrop at Arruwurra and may represent an up-faulted block of Thorntonia Limestone or a carbonate back complex that interdigitates with the phosphorite. The Wonarah Beds outcrop in the north central part of the project area, but elsewhere are intensely weathered and covered by stabilised Cenozoic aeolian sand sheets and longitudinal dunes.

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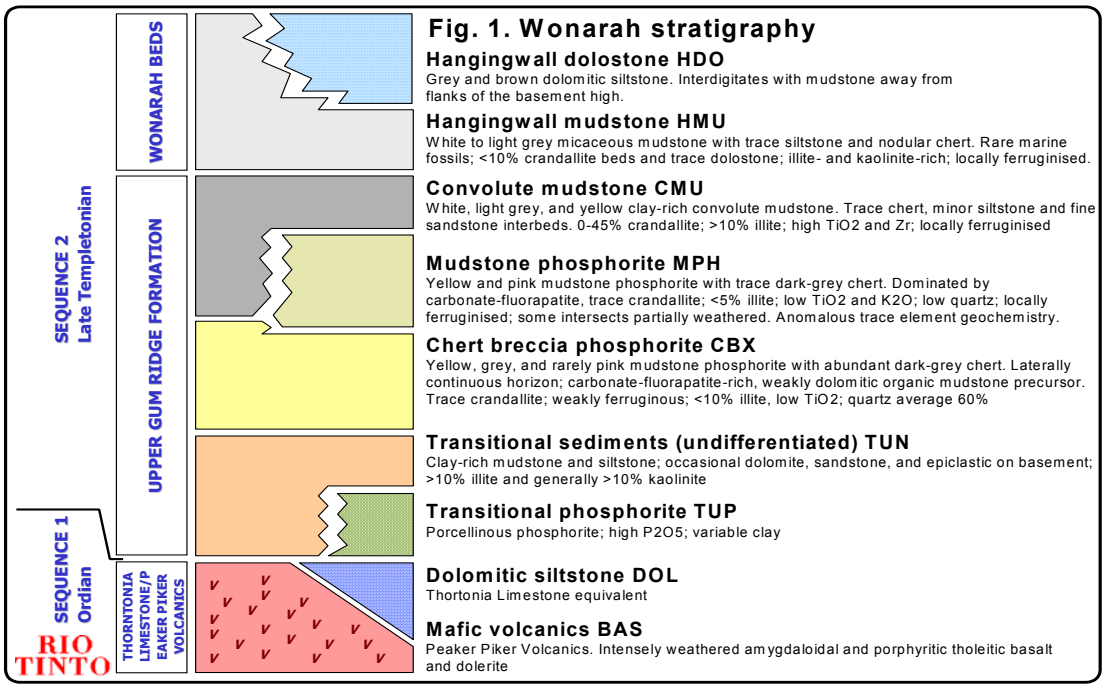



Figure 1: Wonarah Stratigraphy

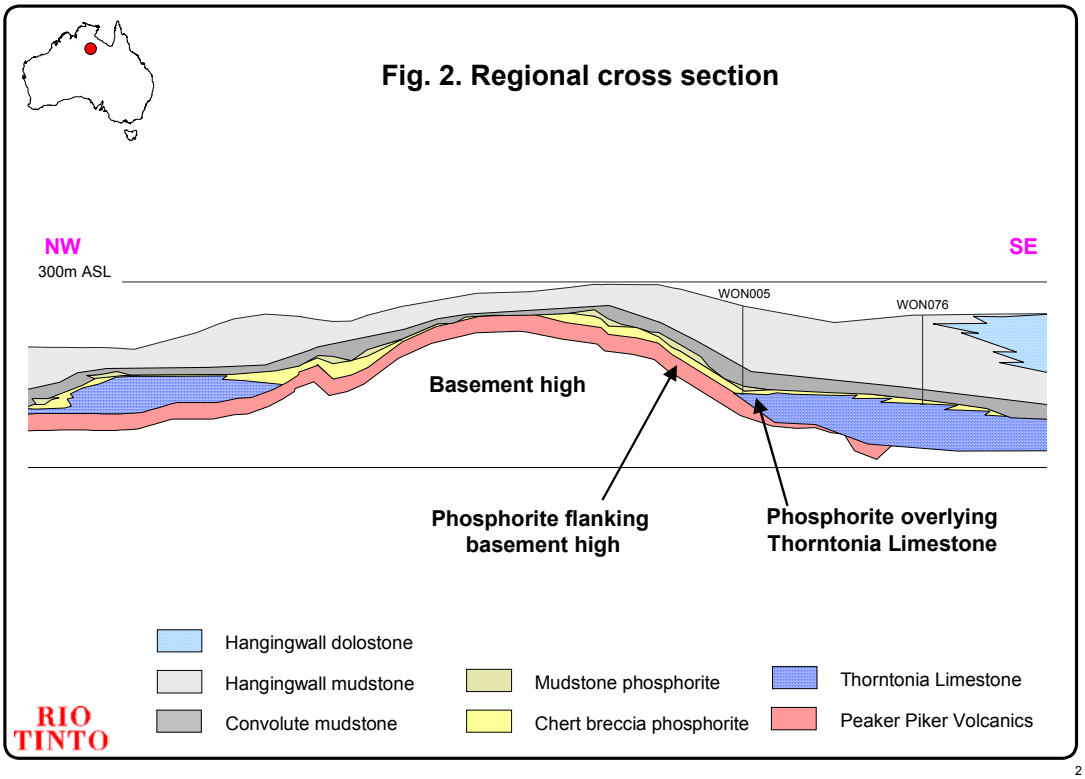



Figure 2: Diagrammatic Regional Cross Section

# 4. PREVIOUS EXPLORATION

## 4.1 IMC

The Wonarah phosphate deposit was identified in 1967 by the US industrial minerals and chemicals group, IMC Development Corporation ("IMC").

Between 1967 and 1970 IMC undertook regional mapping, geophysical, drilling and testwork activities over the Wonarah project area, including EL 9978. In the period to March 1970, IMC drilled 294 non core holes totalling 11,660m in the region, and delineated a phosphate resource at Wonarah of 669 million short tons of 15.73% $P_2O_5$ (using a 10% $P_2O_5$ cut-off) including 532 million short tones at 16.74% $P_2O_5$ (using a 14% $P_2O_5$ cut-off) and 307 million short tons at 18.98% $P_2O_5$ (using a 18% $P_2O_5$ cut-off).

The global resource at Wonarah identified by IMC totalled 1,955 Mt @ 14.4% $P_2O_5$. Beneficiation tests on some of the drill hole samples confirmed that a high grade phosphate product could be obtained from the Wonarah deposit. Impurities within the phosphate with the exception of insoluble are low, with $Fe_2O_3$ averaging 0.72% and $Al_2O_3$ averaging 1.44%.

## 4.2 CRAE

During 1983-1984, CRA Exploration Pty Ltd ("CRAE") carried out an exploration program for phosphate in an area immediately to the south of the Wonarah deposit. CRAE completed a low level (80m) aeromagnetic survey at 1km line spacings which suggested potential for phosphorite at 20-30m depth. Although tracks and drilling grids were prepared, CRAE withdrew from the project due to low prevailing world phosphate prices and the lack of infrastructure at the time in central Australia.

## 5. WORK COMPLETED BY RIO TINTO (1999 – 2002)

Rio Tinto entered into a joint venture with AKD Limited over the Wonarah phosphate project in March 1999. Rio Tinto had an 80% interest in the project up to December 2002 having spent a total of $2.5 million in exploration. AKD's 20% interest was free carried through to a decision to mine or by the expenditure of $10m whichever came earlier. Rio Tinto withdrew from the JV on 4 December 2002.

During the period March 1999 to December 2002, Rio Tinto carried out a comprehensive exploration program at Wonarah which included negotiations with the local aboriginal community, followed by ground gravity surveys, mapping and rock-chip sampling programs and the drilling of 136 holes for a total of 7,248m. This consisted of mainly RC drilling. However, diamond drilling attributed to 296m of the total.

No drilling was undertaken by Rio Tinto on the area contained within EL 9978.

Resource modeling was then undertaken by Rio Tinto in 2001/2002 using JORC-compliant procedures. The drilling by Rio Tinto in 2000 delineated an Inferred Resource of 115Mt @ 22% $P_2O_5$ for the Wonarah phosphate deposit. After further drilling in 2001, the resource was recalculated to **72Mt @ 23% $P_2O_5$** (at a cut-off grade of 15% $P_2O_5$). Drill intercepts as high as 37% $P_2O_5$ have been recorded.

The known phosphate resource does not lie within EL 9978 and the only indications of phosphate mineralisation are low-grade drill hole intercepts identified by IMC in the 1970's.

In 2002, Rio Tinto undertook a reverse economic study of the Wonarah phosphate deposit. Rio Tinto reported that the Wonarah phosphate deposit was NPV negative based on various development scenarios for the existing high-grade resource at Wonarah using current, historically low, DAP fertiliser prices and exchange rates. However, should DAP fertiliser prices improve substantially from current historical lows, the economics will change.

## 6. WORK COMPLETED BY AKD – YEAR ENDING SEPTEMBER 2003

Following the withdrawal of joint venture partner Rio Tinto in November 2002, AKD Limited became the benefical owner of 100% of the Wonarah Phosphate Project tenements including, EL 9978, and consequently took over the role of Manager of the project.

Since the withdrawal of Rio Tinto, AKD has actively sought the participation of a new joint venture partner to replace Rio Tinto. Several major companies have been approached and a number are reviewing the data.

During the first half of 2003, AKD carried out a review of the Wonarah technical data base and undertook an internal assessment of the 2002 Reverse Economics study by Rio Tinto.

AKD concluded that:

- Potential exists in the south-west of the project area to increase the volume and grade of the inferred resource of 72Mt@23%$P_2O_5$ through the drilling of the outcropping and potentially shallower, high-grade phosphorite at Arruwurra.

- The economics of Wonarah has changed significantly since the withdrawal of Rio Tinto in November 2002 with the substantial rise in DAP prices. Spot DAP prices peaked at US$207/t in June 2003 and WMC averaged US$182/t for the June 2003 Quarter.

- The infrastructural dynamics of the project has improved with the completion of the Darwin – Alice Springs railway and the commencement of the pre-feasibility study of a new proposed railway from Mt Isa to Tennant Creek which would follow the Barkly Highway and cut directly through the Wonarah project area and join the Darwin – Alice Srings railway.

- A reduction of the $1 billion capital cost for Wonarah as estimated by Rio Tinto through the amalgamation of infrastructure and development costs of other similar sized resource projects in the Northern Territory region would provide a positive start for improving the NPV at Wonarah.

- Metallurgical beneficiation and upgrade of the Wonarah ore to acceptable high grades (>30% $P_2O_5$) is an important factor not only with regard to project economics but also in determining the eventual high-value fertiliser product at Wonarah. Resolving the metallurgical issues for the Wonarah ore is a priority for the economic viability of the project.

## 7. EXPENDITURE STATEMENT

Annual expenditure for EL 9978 to 29 September, 2003 was $4,290.

## 8. CONCLUSIONS AND RECOMMENDATIONS

The Wonarah phosphate deposit currently contains a resource of 72Mt @ 23% $P_2O_5$. However, to date, no significant phosphate mineralisation has been recognized with EL 9978.

Further investigation of the potential of EL 9978 and the other Wonarah tenements is warranted to enable the size of the resource to be increased.

On a positive note, AKD considers the economics of Wonarah to be improving especially with the development of the new infrastructure components in the region and an increase in global DAP prices.

.AKD Limited is the 100% owner of the Wonarah phosphate deposit and is actively seeking J.V. partners to continue development of this project in conjunction with the support of the Northern Territory Government.