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GOVERNMENT SUBSIDISED EXPLORATION FOR OPAL AT ANDAMOOKA AND COOBER PEDY

Paper presented at Seventh Australian Geological Conference, Macquarie University - Sydney, N.S.W. 27-31 August 1984.

GEOLOGICAL SURVEY

by

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GOVERNMENT SUBSIDISED EXPLORATION FOR OPAL AT ANDAMOOKA AND COOBER PEDY

Paper presented at Seventh Australian Geological Conference, Macquarie University - Sydney, N.S.W. 27-31 August 1984.

ABSTRACT

South Australia produces about 75% of the world's precious opal from Coober Pedy, Mintabie and Andamooka.

Recent geological investigations began at Andamooka in 1975 and culminated in subsidised exploration during May - September 1976 when 65 shafts were sunk and 399.5 m of drives were developed along the opal level. Payment to participating miners totalled $6 018.30. The opal level was intersected in 54 shafts and was well developed in 39 of those shafts. Opal, mainly potch or dead matrix, was reported in 15 of the 54 shafts and the new fields of Stans Hill and Yarloo West were established.

Geological investigations at Coober Pedy restarted in 1980 with a study of Fourteen Mile and Seventeen Mile fields. Preliminary mapping of the Precious Stones Field began in June 1981 followed by subsidised exploration in August-October 1981 when 221 shafts were drilled. Subsidy payment totalled $30 280.20.

Precious opal or potch was reported in 11 shafts and follow up work resulted in a major new field, Southern Cross, and a smaller field, 2 km east of Browns Folly.

Understanding of the relationship between opal and the weathered profile has increased and 34 shafts encountered a type of weathered profile highly prospective for opal.

The limits of opal-bearing ground have been established at Andamooka and particularly favourable areas have been designated. In contrast, investigations continue at the more complex and extensive Coober Pedy fields. Nonetheless, large areas prospective for opal and significantly, areas with low potential for opal have been located.

INTRODUCTION

The following paper was presented by J.G. Olliver at Symposium A1 - Gemstones on Monday 27 August 1984. The abstract has been published by Geological Society of Australia (Olliver & Barnes, 1984).

This report is being submitted for possible publication by Australian Gemmologist.

Slides illustrating the talk have been reproduced herein as coloured prints. One set of 35 mm transparencies is held by Mineral Resources Branch with a duplicate set filed in Technical Information Branch.

TEXT OF PAPER

Andamooka Introduction

Since discovery in 1930, the value of opal produced each year from Andamooka has been slightly less and occasionally greater than from Coober Pedy (Barnes and Townsend, 1982).

This meant that the population of the two towns was comparable.

That was until 1970.

Since then Coober Pedy (Plate 2) has grown to about 5 000 people. In contrast, Andamooka (Plate 3) has shrunk to less than 500 people with a resultant drastic drop in opal production. Andamooka sought help from the S.A. Government to remedy this situation.

Geological Investigations

In 1975, the Department began geological investigations for the first time since 1958 with detailed mapping over the proclaimed Precious Stones Field of 270 square km (Carr et al., 1979).

This involved logging and levelling of shafts (Plate 4) and bulldozer cuts at regular intervals across the workings (Plate 5) and all openings away from the fields.

Subsidised Program

Following negotiations with the progress association and several public meetings, a scheme was devised to encourage miners to test geologically suitable ground away from existing fields.

The holder of a current Precious Stones Prospecting Permit selected a site and pegged a Precious Stones Claim in the normal manner.

The site was approved by a geologist.

An agreement was signed.

The site had to be more than 200 m from existing fields and any other shafts which had reached the opal level. The site had to be on Cretaceous Marree Subgroup rocks above the opal level and the opal level had to be within reach of mining equipment from 3 m as in Plate 6 to about 20 m below the surface.

The miner was required to sink a shaft to the level and then drive horizontally for at least 12 m. Driving is essential to evaluate the level. Most miners are reluctant to drive even the most promising level unless precious opal is present. He was paid $6/m for the shaft (later increased to $10/m) and $3/m for the drive.

$7 000 was approved for payment.

Half the shafts were sunk by Calweld drill (Plate 7) as here on Subsidised Shaft 6. The remainder were sunk by hand.

Here's the first subsidised shaft being collared (Plate 8). A jackpick and compressor were used and usually mullock is hauled to surface by Yorke Hoist (Plate 9). And a few old timers even used the hand winch (Plate 10).

Results

The scheme operated from 3 May to 3 September 1976 (Carr et al., 1979) and was administered from this temporary office (Plate 11).

65 shafts were completed, total depth was 617.3 m, deepest was 23.3 m, average 9.5 m.

Drives totalled 399.5 m.

Payment totalled $6 018.30.

The opal level was intersected in 54 shafts and was well developed in 39 of them.

Some form of opal, mainly potch or dead matrix was reported in 15 of these 39 shafts.

And in Shaft 17 - payable opal was found in the drives (Plate 12) despite the miner initially refusing to drive. He had to, to get his subsidy. The entire hill was pegged in the first week of June (Plate 13) and by November 1976 (Plate 14), the new field of Stans Hill was the most active at Andamooka. At least $0.5 million dollars worth of opal was found.

A lesser success was Yarloo West which was established after precious opal including a painted lady was found on a slide in Shaft 49.

Coober Pedy Introduction

As soon as subsidised mining began at Andamooka, Coober Pedy agitated for a similar scheme. This was resisted at first by Government because opal mining at coober Pedy was booming (Plate 15).

After a break of 10 years, geological investigations restarted at Coober Pedy in 1977 with a study of 14 Mile and 17 Mile fields for an M.Sc thesis at Adelaide University (Plate 16).

Lobbying for Government aid intensified in 1980-1981 when opal miners began to experience economic problems owing to the depressed price for rough opal coupled with increased cost of fuel, explosives, and living in an isolated region.

Subsidised Program

Contrary to geological advice, the Minister of Mines and Energy approved subsidised exploration at a public meeting in May 1981. Preliminary geological mapping began in June 1981 with logging and levelling of open cuts and shafts (Plate 17).

The task was bigger and more complex than Andamooka as Coober Pedy Precious Stones Field is 4 700 square km or 17 times larger than Andamooka. There were also many more workings and

drillholes (Plate 18). There are also many levels and no apparent stratigraphic control like Andamooka. And the host rock - weathered Cretaceous shale can be as much as 50 m thick.

The target is what the miner calls 'Good Sandstone'. Good Sandstone is white brittle porous silty claystone of low specific gravity with well developed tubules (Plate 19). It is the rock in which almost all Coober Pedy opal is found.

The scheme was finalised after meetings with the miners committee and the inevitable public meetings (Plate 20). $30 000 was allocated for payment to miners.

Subsidy was at $8/m for shafts but unlike Andamooka, there were no requirement to drive. The miners were strongly against compulsory driving. In fact, some miners only look at the material in the Calweld bucket. If there is no trace of opal, then they don't even go down the shaft. Our problem was to select the level out of several that should be driven. Only Calweld or similar large diameter drills were used.

There were 29 such rigs in Coober Pedy compared to only 2 in Andamooka in 1976.

Shafts had to be more than 1 km from existing fields and had to be sited in geologically favourable ground.

Here's Subsidised Shaft 1 in progress 15 km west of town and 4 km from the nearest field (Plate 21).

No other miner was allowed a subsidised shaft within 300 m but a follow up shaft was permitted nearby for the same miner if indications were promising.

A claim was pegged as usual, the site approved by a geologist and an agreement was signed.

Results

The scheme operated from 31 August until funds were exhausted and closed on 27 October 1981 (Scott and Robertson, 1983).

All shafts were logged geologically (Plate 22) and the collar levelled - even if the miner didn't go down the shaft, the geologist did.

221 shafts were completed (Plate 23).

The deepest was 27.1 m.

Total depth was 3 782 m. Average of 17 m was much deeper than for Andamooka.

Payment totalled $30 280.20.

65 shafts were in good sandstone (shown in yellow on Plate 23) and 11 of these reported opal (shown in red).

Note Southern Cross in south centre and Browns Folly at top left. Some subsidised shafts are south of Plate 23.

Large areas of good sandstone were outlined as shown by the red and yellow dots.

As well, areas were outlined that were unfavourable for opal the so called blue ground - hard, silicified, brittle clinkery rock particularly south of Olympic that many miners were keen to test.

Opal Discoveries

The scheme appeared to be a failure at the end of the program in October 1981. Then, in early 1982, a miner checked Subsidised Shaft 85, was encouraged and drilled a new shaft alongside. He then drove the level and Southern Cross field was born (Plate 24). Several million dollars worth of opal has been mined to date and Southern Cross was the second most active field during 1982 and 1983 (Plate 25).

There was also a minor flurry and some small parcels found near Browns Folly in the north (Plate 23) where 8 subsidised shafts encountered good sandstone with opal in 3 of them.

For both schemes

- a geological team was on site (Plate 26)
- an office was set up next to the Department regional office to administer the scheme
- large maps were on display as here at Coober Pedy showing location of shafts and tables with depth to opal level etc. which were updated daily (Plate 27).

Of course, there were many problems - some caused by Government red tape e.g. the 3 page legal agreement in triplicate required 27 signatures for each shaft. Sometimes, signing the forms (Plate 28) took longer than drilling the shaft.

These programs have confirmed that there is a lot of opal at Andamooka and Coober Pedy still to be found by that incredible character - the opal miner.

I quote from Barrie O'Leary - Australian geologist who has specialised in the study of opal.

'What other multi-million dollar enterprise is solely dependant for its entire supplies solely from rough men digging holes in the ground spurred on by

hope

witchcraft (Plate 29)

or alcohol'

I believe that the subsidised exploration programs have

- increased hope
- decreased witchcraft, and
- kept alcohol at the right level (Plate 30).

Thereby ensuring that South Australia remains THE OPAL STATE (Plate 31 and Barnes and Townsend, 1982).

JGO/LCB:DP

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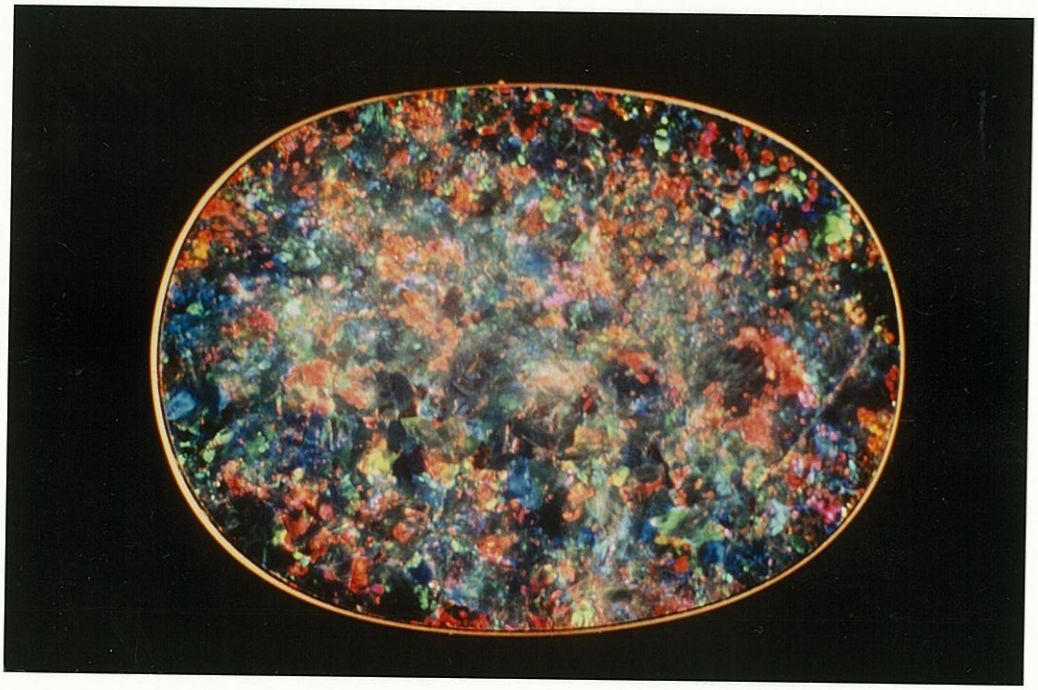

PLATE 1 - Opal doublet (slide 22970)

SLIDE 2 - Coober Pedy - aerial view October 1983. Hotel-motel complex at right of street T-junction. S.A. Department of Mines and Energy Office at lower far right. (slide 24721)

SLIDE 3 - Andamooka - view south August 1982. (slide 24722)

PLATE 4 - Geological mapping, Andamooka 1976. 'Slide' in southern wall near base of Subsidised Shaft 49, Yarloo West. The steep fault displaces 'opal level' verticall by 1.2 m. White 'kopi' on hanging wall and brown 'mud' on footwall. (slide 24723)

PLATE 5 - Andamooka - aerial view 1982. View to southeast towards town with Teatree Flat field in foreground. (slide 24724)

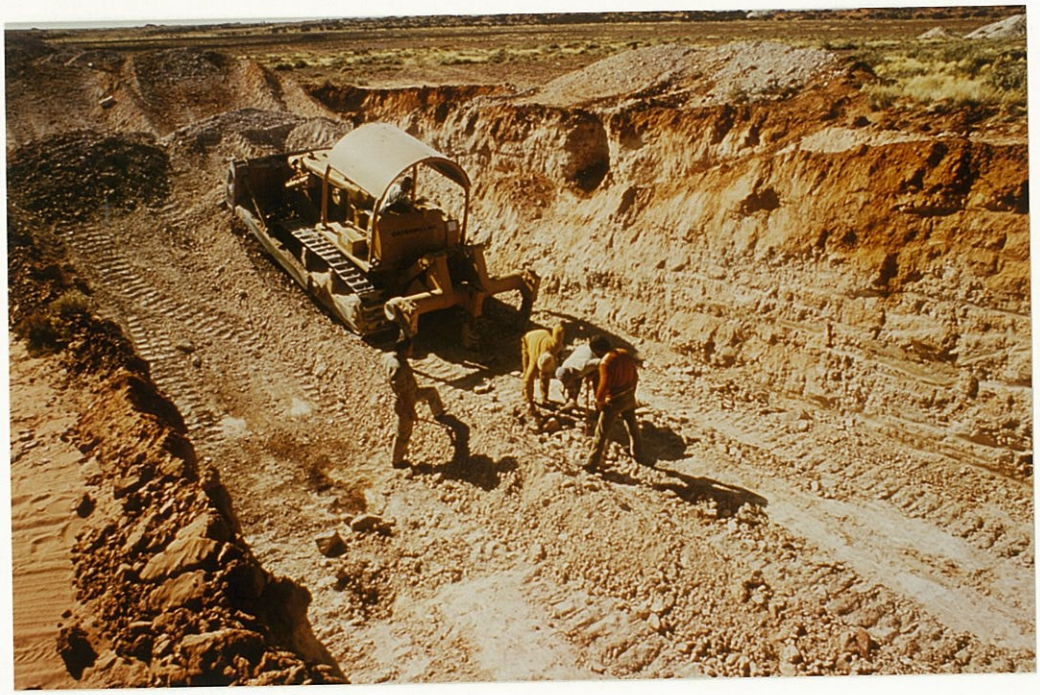

PLATE 6 - Bulldozing, Andamooka 1976, 'opal level' at 3.5 m below surface being checked by miners adjacent to Subsidised Shaft 5. (slide 13755)

PLATE 7 - Calweld drill, Andamooka 1976. White 'kopi' being inspected for signs of 'opal level' at Subsidised Shaft 6. (slide 13756)

PLATE 8 - Collaring Subsidised Shaft 2, Andamooka May 1976. The first shaft to be started in the exploration program. Jackpick and compressor being used. (slide 13770)

PLATE 9 - Yorke hoist, Subsidised Shaft 49, Andamooka July 1976.

PLATE 10 - Hand windlass, Subsidised Shaft 33, Andamooka July 1976. (slide 13754)

PLATE 11 - Temporary office, Andamooka 1976. Caravan in front of regional office with plans and tables showing progress of subsidised shafts. (slide 13768)

PLATE 12 - Driving opal level, Subsidised Shaft 17, Andamooka June 1976. 'Opal level' marked by boulders at contact of white 'kopi' above and dark 'mud' below. (slide 13772)

PLATE 13 - Stans Hill, Andamooka July 1976. The most active field at Andamooka after discovery of precious opal in the drives from Subsidised Shaft 17. (slide 24725)

PLATE 14 Stans Hill, Andamooka November 1976. Similar view to Plate 13. (slide 24726).

PLATE 15 Hans Peak, Coober Pedy 1977. High level of activity with dust clouds from operating blowers. (slide 15056).

PLATE 16 Geological mapping, 14 Mile Coober Pedy, 1977. (slide 24727)

PLATE 17 Geological mapping, 14 Mile Coober Pedy, June 1981. (slide 24728).

PLATE 18 Coober Pedy - aerial view 1979. Intensively drilled area on the edge of Olympic field. (slide 15055)

PLATE 19 Tubules in 'sandstone', 17 Mile Coober Pedy, June 1982. (slide 24729)

PLATE 20 Public meeting, Coober Pedy August 1981. Government subsidised scheme being outlined to opal miners in Coober Pedy Community Hall. (slide 24730)

PLATE 21 Calweld drill, Subsidised Shaft 1 Coober Pedy, August 1981. (slide 24731)

PLATE 22 Mapping Subsidised Shaft 98 Coober Pedy, October 1981. Lightweight hand windlass used to lower geologist down Calweld shaft. (slide 24732)

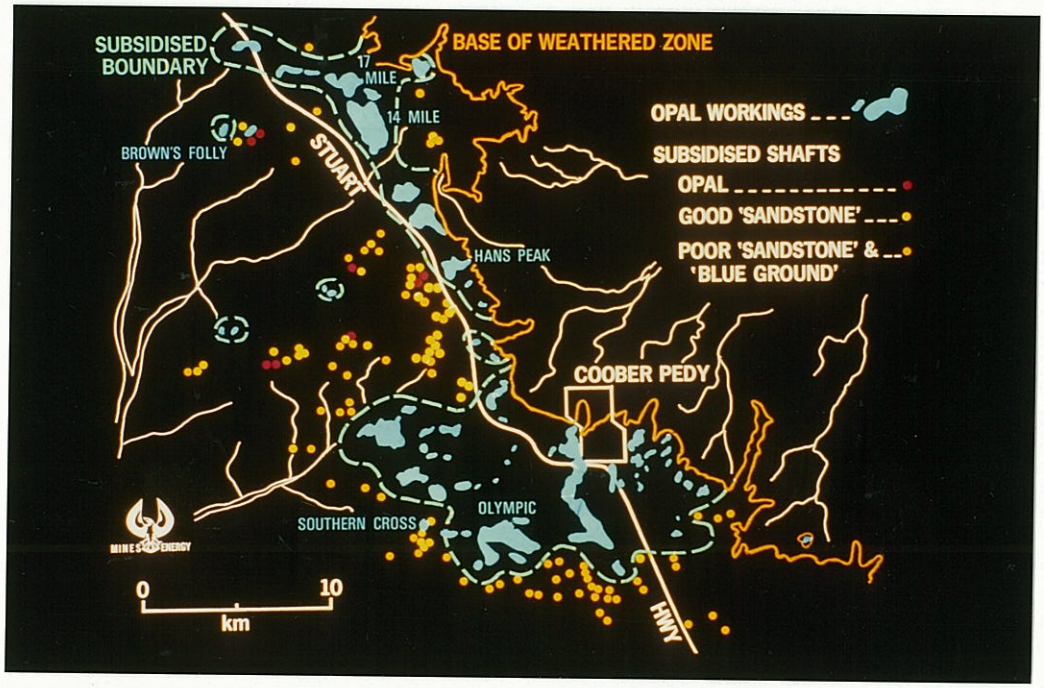

PLATE 23 Simplified plan - subsidised shafts Coober Pedy. (slide 24733)

PLATE 24 Southern Cross Coober Pedy, June 1982. Flurry of activity followed discovery of opal near Subsidised Shaft 85. (slide 24734)

PLATE 25 Southern Cross Coober Pedy, June 1984. Similar view to Plate 24. Southern Cross was the second most active field at Coober Pedy in 1982 and 1983. (slide 24735)

PLATE 26 Mapping Shaft CP117 - Southern Cross Coober Pedy, June 1982. (slide 24736)

PLATE 27 Temporary office, Coober Pedy 1981. Caravan in Departmental compound next to regional office at left with plans and tables showing progress of subsidised shafts. (slide 24737)

PLATE 28 Signing agreement for Subsidised Shaft 1, Coober Pedy, August 1981. (slide 24738)

PLATE 29 Divining Coober Pedy, August 1981. Opal miner selecting site for Subsidised Shaft 1 using 'the wires'. (slide 24739)

PLATE 30 Ettamogah Pub, White Dam Andamooka, September 1976. Departmental party being farewelled by Bill McDougal (licensee) second from right at completion of subsidised program. (slide 24740)

PLATE 31 High quality solids of crystal opal, Andamooka, August 1982. (slide 24741)