

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT.BK.NO. 87/102
THE OPAL INDUSTRY IN S.A.
REPORT NO. 9. THE 1986 SURVEY
OF MINING EQUIPMENT AND ESTIMATED
VALUE OF OPAL PRODUCTION.

GEOLOGICAL SURVEY

by

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DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

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THE OPAL INDUSTRY IN SOUTH AUSTRALIA REPORT NO. 9
THE 1986 SURVEY OF MINING EQUIPMENT AND
CALCULATION OF VALUE OF OPAL PRODUCED.

SUMMARY

The following trends emerged from the 1986 South Australian Opal Field Surveys.

- an increase of \$5.38 million in production from the 1985 production representing an increase of 16.09%
- again a significant increase in Mintabie production of \$4.31 million representing a 27.7% increase
- a slight increase in Coober Pedy Production of \$0.9 million representing a 5.97% increase
- a slight increase in Andamooka production of \$0.17 million representing a 6.07% increase
- a large increase in the average number of precious stones claims (PSC) of 248 representing a 25.3% increase
- an increase in the estimated number of miners of 75 representing 9.2%
- an upward trend in all aspects of mining, investment and production.

Table 1 summarises the survey results for 1986 compared with 1985. Table II lists the major equipment surveyed as a guide to mining activity.

TABLE 1

THE OPAL INDUSTRY IN SOUTH AUSTRALIA
1986 COMPARED WITH 1985

Registered P.S.C.s (Av.)	1985	1986
Andamooka	152	170
Coober Pedy	536	576
Mintabie	294	484
	<u>982</u>	<u>1230</u>
Capital Investment (Av. \$ million)		
Andamooka	\$ 3.603	\$ 4.526
Coober Pedy	\$ 13.706	\$ 14.118
Mintabie	\$ 9.349	\$ 13.034
	<u>\$ 26.658</u>	<u>\$ 31.678</u>
Operating Costs (Av. \$ million)		
Andamooka	\$ 0.857	\$.961
Coober Pedy	\$ 3.054	\$ 3.454
Mintabie	\$ 1.807	\$ 2.513
	<u>\$ 5.718</u>	<u>\$ 6.928</u>
Number of Miners (Av.)		
Andamooka	65	65
Coober Pedy	445	445
Mintabie	295	370
	<u>805</u>	<u>880</u>
Estimated Value of Production (\$ million)		
Andamooka	\$ 2.80	\$ 2.97
Coober Pedy	\$ 15.07	\$ 15.97
Mintabie	\$ 15.56	\$ 19.87
	<u>\$ 33.43</u>	<u>\$ 38.81</u>

TABLE II

MAJOR EQUIPMENT

	ANDAMOOKA		COOBER PEDY		MINTABIE	
Bulldozers	1985	1986	1985	1986	1985	1986
D8-D9	6	2	8	10	20	31
D7-smaller	11	19	7	9	6	3
Blowers	5	5	158	176	17	12
Backhoes	6	5	14	20	1	1
Tunnelling Machine	-	1	46	38	-	-
Noodling Machine	4	6	15	24	3	3
Drills						
Calweld	2	2	30	32	4	1
Investigator	-	1	11	10	10	19
Yorke Hoise	15	16	20	30	10	18
Self Dumpers	14	10	7	10	-	3

Note: All bulldozers and drill rigs have been counted but 50% of remaining equipment in town area is discounted.

INTRODUCTION

Surveys of all mining equipment on opal fields in South Australia began in 1978 and have been conducted twice annually in an attempt to estimate:

- value of rough opal produced
- level of mining activity
- population movements

Previous surveys are reported as follows:

<u>YEAR</u>	<u>REFERENCE</u>
1978	Crettenden et al., (1982)
1979	Crettenden and Flintoft (1983)
1980	Atterton and Barnes (1984)
1981	Barnes and Atterton, (1984a)
1982	Barnes and Wildy (1984a)
1983	Wildy and Barnes (1985)
1984	Wildy and Barnes (1985)
1985	Townsend and Wildy (1986)

PROCEDURE

The following Departmental officers conducted equipment surveys during 1985.

JUNE

ANDAMOOKA

- L.C. Barnes (Principal Geologist, Mineral Resources)
- O. Chalmers (Ex Curator of Minerals and Gemstones - Australian Museum, Sydney)
- I. Kimber (Area Officer)

COOBER PEDY

- D.C. Scott (Senior Geologist, Mineral Resources)
- I.J. Townsend (Senior Geologist, Mineral Development & Economics)
- R. Slater (Area Officer)

MINTABIE

- L.C. Barnes (Principal Geologist, Mineral Resources)
- O. Chalmers (Ex Curator of Minerals and Gemstones - Australian Museum, Sydney)

OCTOBER

ANDAMOOKA

I. Kimber (Area Officer)

MINTABIE AND COOBER PEDY

I.J. Townsend (Senior Geologist, Mineral Development & Economics)

P.P. Crettenden (Field Assistant)

R.J. Noble (Technical Officer)

Assistance was provided by Area Officers I. Kimber (Andamooka), S. Smart, R. Slater and P. Jones (Coober Pedy) and S. Sigler (Mintabie).

RESULTS OF THE 1986 SURVEY

Detailed results of the equipment counts are tabulated in Appendix A.

Capital Investment

Unit costs of mining equipment are shown in Appendix B. Total capital investment in mining equipment at each centre is shown in Table III.

TABLE III
CAPITAL INVESTMENT 1986 (\$ million)

	<u>JUNE</u>	<u>SEPTEMBER</u>	<u>AVERAGE</u>
ANDAMOOKA	3.575	5.478	4.526
COOBER PEDY	14 675	13.561	14.118
MINTABIE	<u>11.311</u>	<u>14.756</u>	<u>13.034</u>
	29.561	33.795	31.678

The average value of investment in equipment observed is \$31.68 million an increase of \$5.02 million from 1985 following a marked increase at Mintabie and smaller increases at Andamooka and Coober Pedy.

Annual operating costs

Total annual operating costs of mining equipment are derived by multiplying annual operating costs of each unit (Appendix B) by numbers recorded. A summary is shown in Table IV.

TABLE IV
ANNUAL OPERATING COSTS 1986 (\$ million)

	<u>JUNE</u>	<u>SEPTEMBER</u>	<u>AVERAGE</u>
Andamooka	.737	1.184	.961
Coober Pedy	3.314	3.595	3.454
Mintabie	<u>2.146</u>	<u>2.880</u>	<u>2.513</u>
	6.197	7.659	6.928

The increase from \$5.72 million to \$6.93 million illustrates an overall equipment increase as unit operating costs used previously were maintained.

Large Diameter Prospecting Drills

The total for all fields was 35, 32 being at Coober Pedy, 2 at Andamooka and 1 at Mintabie, one less than in 1985.

MINING ACTIVITY

During 1986 the total number of registered PSC's over all fields increased from 982 to 1230 (Table 1, Fig. 3) due to a large increase of 190 at Mintabie, and minor increases of 40 at Coober Pedy and 18 at Andamooka. Andamooka and Coober Pedy show little change in the number of active miners whereas Mintabie shows a significant increase of 75 active miners, a 25% increase.

Andamooka

The average number of registered PSC's increased from 152 in 1985 to 170 in 1986 conforming with the overall upward trend.

Coober Pedy

PSC's were registered on 42 of the Fields showing a slight increase from 1985.

The following fields showed the most activity:

- . Zorba: Opal was discovered near the west side of the new Stuart Highway in June 1986 and registered claims jumped from 42 in June at the time of the first survey to 180 in September compared with 54 and 58 during the 1985 surveys. This large increase was obviously at the expense of other fields.

- Olympic field is always popular increasing from 57 registered claims in June up to 70 in September approximately the same as in 1985.
- Southern Cross declined from 66 PSC's in June to 52 in September.
- Fourteen and Seventeen Mile fields declined from 41 to 31 and 42 to 38 respectively but still remain popular fields, Zorba claiming 10-11 claims from each field.
- Hans Peak down from 51 PSC's in 1985 to 35 and 33 but did not alter greatly during the year.
- East Pacific suffered the Zorba rush declining from 34 to 16 in September along with Emu 35 to 28 and Lennon 15 to 11.
- Greek Gully also declined from 39 to 31 but averaged the same as 1985 (35).
- Kenda Flat (18) declined to 11 PSC's in September as did many of the smaller or less popular fields.
- Halley's Comet (24) showed promise after a strike between surveys but many claims were not worked and claim numbers declined towards the end of the year.
- Many of the Fields close to town maintained approximately 5-10 claims each, declining slightly in the second half of the year because of the Zorba rush.

Mintabie has shown an upward trend since 1982 in production, equipment, miners and PSC's. There were 294 PSC's in 1985 and an average of 484 in 1986, an increase of 65%. Production for the second time surpassed that of Coober Pedy.

Stuart Creek

Two PSC's were registered at Stuart Creek during 1986 but production, and equipment is incorporated in Andamooka statistics.

Other Fields

Longins Bank, Sarda Bluff and Vesuvius each had 1 PSC registered during 1986 but statistics are included under Mintabie.

PRODUCTION

The formula used for estimating opal production is as used previously.

$$\text{Annual Production (\$)} = KX + Y + 0.1Z$$

X = number of miners

Y = annual operating costs

Z = capital investment

K = a constant based on the cost of living and a 'bonanza' factor for each field.

Andamooka K = 24 400

Coober Pedy K = 23 400

Mintabie K = 43 400

These figures have not been changed for a number of years.

Based on the figures relating to the formula from Appendix B the estimated opal production for 1985 is summarised in Table V.

TABLE V
ESTIMATED VALUE OF PRODUCTION 1986 (\$ million)
SOUTH AUSTRALIAN PREVIOUS STONES FIELDS

	No of Miners (Av.)		Production Values (\$ million)		
	<u>JUNE</u>	<u>SEPT.</u>	<u>JUNE</u>	<u>SEPT.</u>	<u>AVERAGE</u>
ANDAMOOKA	60	70	2.53	3.40*	2.97
COOBER PEDY	450	460	15.76	16.17	15.97
MINTABIE	340	400	18.03	21.72	19.87
	<u>850</u>	<u>930</u>	<u>36.32</u>	<u>41.29</u>	<u>\$38.81</u>

* Andamooka September figures include production from Stuart Creek.

Estimated total production from the three main opal mining centres during 1986 was \$38.81 million, an increase of \$5.38 million from 1985. This was due mainly to the increase in production from Mintabie where estimated production rose from \$15.6 million in 1985 to \$19.9 million in 1986. Andamooka increased slightly from \$2.8 million (1985) to nearly \$3 million (1986) while Coober Pedy increased from \$15 million (1985) to nearly \$16 million (1986) reversing its decline over the previous two years.

COMMENT

Estimates indicate an increase in production resulting from a significant increase in production from Mintabie, a moderate increase in production from Coober Pedy and a slight increase in production from Andamooka.

Mintabie production which was estimated at \$0.5 million more than Coober Pedy in 1985 and more than \$4 million in 1986 places it as the largest current opal producer in the world.

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APPEDIX A
MINING EQUIPMENT FOR ALL PRECIOUS STONES FIELDS

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ANDAMOOKA OPAL FIELD EQUIPMENT COUNT AT JUNE 1986

TABLE A1

EQUIPMENT	BLACK- BOY	BLACK- BOY EXTENSION	BOUNDARY RIDER	BUZA	CHRIST- MAS HILL	FOUR NATIONS	GERMAN GULLY	GUN GULLY	HARD HILL	HALLION HILL	HORSE PADDOCK	JUBILEE	KOSKAS
BACKHOE													
BLOWER		1									1		
BOGGER													
BUCKET ELEVATOR													
BULLDOZER													
D9								1					
D8								1					
D7								1					
D6							1	1					
D4													
COMPRESSOR													
100CFM											1		
180CFM							1				3		
350CFM													
DRILLING RIGS													
CALWELD													
INVESTIGATOR													
SMALL AUGER													
ROTARY													
CRANE													
EXCAVATOR													
GENERATOR													
SMALL/MED											1		
LARGE											1		
LOADER-FRONT END													
NOODLING MACHINE							1						
SCRAPER													
SELF DUMPER											1		
TUNNELING MACHINE													
WINCH-AIR/ELECTRIC											1		
WINCH-HAND	1				1								
YORKE HOIST						1	2				3		
REG. PSC	2	1	1			1	13	8			9		
AT 10/7/86													

A24

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Bondus

ANDAMOOKA DPAL FIELD EQUIPMENT COUNT AT JUNE 1986

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TABLE A2

EQUIPMENT	LUNATIC HILL	STANS HILL	STEVENS GULLY	TEA TRIANGLE TREE FLAT	WHITE DAM	YARLOO	YARLOO EXTENSION	YARLOO SOUTH	YARLOO WEST	TOWN AREA	AMENDED TOWN AREA	TOTAL
BACKHOE	1		1							2	1	3
BLOWER				1						2	1	4
BOGGER											0	0
BUCKET ELEVATOR											0	0
BULLDOZER												
D9					1					1	1	2
D8					1						0	1
D7			1		1					2	1	5
D6				1	1					1	1	5
D4					4		1				0	5
COMPRESSOR												
100CFM	3				2					1	1	7
180CFM					1					1	1	6
350CFM	1										0	1
DRILLING RIGS												
CALWELD										3	3	3
INVESTIGATOR											0	0
SMALL AUGER											0	0
ROTARY											0	0
CRANE											0	0
EXCAVATOR	1				1						0	2
GENERATOR												
SMALL/MED	1			1	3						0	6
LARGE											0	1
LOADER-FRONT END					3					1	1	4
WOODLING MACHINE				1	3						0	5
SCRAPER										1	1	1
SELF DUMPER	5			2	1						0	9
TUNNELING MACHINE											0	0
WINCH-AIR/ELECTRIC				1							0	2
WINCH-HAND			1	1	1						0	5
YORKE HOIST	2			2							0	10
REG. PSC	20		8	30	5	60		1				
AT 10/7/86												0

AA 11.

COOPER PEDY OPAL FIELD EQUIPMENT COUNT AT JUNE 86

TABLE A3

EQUIPMENT	ALLEN RISE	BENITOS FOLLY	BLACK FLAG	BLACK POINT	BROWNS FOLLY	CRATER	COMPANY	DEADMAN DUGOUT	DEADMAN GULLY	DEADHORSE GULLY	DIGGERS GULLY	DINGO	DORA GULLY	EAST PACIFIC	EMU FLAT	FLAT (BIG FLAT)	FOURTEEN MILE	FRANKS FOLLY	GERAGHTY HILL
BACKHOE																			
BLOWER				1									1	11	4	2	8		2
BIGGER															2		1		
BUCKET ELEVATOR															2		1		
BULLDOZER																			
D9																			
D8																	1		
D7																			
D6																			
D4																			
COMPRESSOR															1				
100CFM																			
180CFM														1	1				2
350CFM														3					
DRILLING RIGS														1					1
CALWELD																			
INVESTIGATOR																			
SMALL AUGER															1				1
ROTARY																			1
CRANE																			
EXCAVATOR																			
GENERATOR			1																
SMALL/MED															2	3	2	8	4
LARGE															1	3	1		
LOADER-FRONT END																			
WOODING MACHINE															2		1		1
SCRAPER														1	2				1
SELF DUMPER																			3
TUNNELING MACHINE														2	1		1		
WINCH-AIR/ELECTRIC														2	1	1	4		1
WINCH-HAND																			
YORKE HOIST														1			3		
REG. PSC																			
AT			8	6	10		5			3	1	1	1	34	35	16	41		6

T44

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COOPER PEDY OPAL FIELD EQUIPMENT COUNT AT JUNE 86

TABLE A4

EQUIPMENT	GERMAN GULLY	GERMAN VALLEY	GREEK GULLY	HANS PEAK	HELLENIC HILL	JASPER GULLY	JOHN DEERE	JUNGLE	KENDA FLAT	KIMBA	LARKINS FOLLY	LENNON	OPAL VALLEY	OLD FOUR MILE	OLYMPIC	TEAL WATER HOLE	PERFETTO	PIPING LANE	POTCH GULLY	PROSPECT
BACKHOE		1		1			1						1						1	
BLOWER		2	15	5					3		4	9			12		1		1	
BOGGER			1						1			3			3				1	
BUCKET ELEVATOR			1						1			3			3					
BULLDOZER																				
D9				1																
D8																				
D7																				
D6																			1	
D4			1																	
COMPRESSOR																				
100CFM			1						1			1			4					
180CFM			1	1	1				1		1	3			1				1	
350CFM												1							1	
DRILLING RIGS																				
CALWELD																				
INVESTIGATOR																				
SMALL AUGER												1								
ROTARY																				
CRANE											1									
EXCAVATOR																				
GENERATOR																				
SMALL/MED		1	10	3							1	2			7				8	
LARGE									2		1	3			4					
LOADER-FRONT END									1			1			2					
NOODLING MACHINE				3					1						2				2	
SCRAPER			1												2					
SELF DUMPER												1			3					
TUNNELING MACHINE			2								1	2			2					
WINCH-AIR/ELECTRIC			2	2					3		2	5			5					
WINCH-HAND																				
YORKE HOIST			1									2			3				2	
REG. PSC																				
AT	2	2	39	35				2	18		12	15	4		57		1		12	7

U1

AN 44

COOPER PEDY OPAL FIELD EQUIPMENT COUNT AT JUNE 86

TABLE A5

EQUIPMENT	ROCK HILL BORE	RUSSELL FOLLY	RYAN HILL	SADDLE SEVENTEEN MILE	SHELL PATCH	SOUTH PACIFIC	SOUTH'N CROSS	TEE VALLEY	TREVOR SWAMP	TURKEY TWO JAYS RIDGE	UNKNOWN	VENUS	VINO	WILLOW	ZORBA	TOWN & HOPEFUL HILLS	AMENDED TOWN	TOTAL
BACKHOE				2												13	7	14
BLOWER				17			15									74	37	159
BOGGER															9	2	1	12
BUCKET ELEVATOR																13	7	18
BULLDOZER																	0	0
D9					2			1								4	2	7
D8		1														5	3	4
D7																	0	1
D6							1							1		2	1	3
D4																2	1	3
COMPRESSOR																2	1	3
100CFM							2									14	7	17
180CFM				1			1									33	17	33
350CFM															1	12	6	9
DRILLING RIGS																		
CALWELD																31	31	31
INVESTIGATOR																11	13	13
SMALL AUGER																10	12	12
ROTARY																	0	0
CRANE																6	3	4
EXCAVATOR																	0	1
GENERATOR																		
SMALL/MED				3	2		2									28	14	72
LARGE				3			4									15	8	34
LOADER-FRONT END				2			2							1	3	17	9	21
NOODLING MACHINE				3												5	3	19
SCRAPER														1			0	1
SELF DUMPER																6	3	10
TUNNELING MACHINE				3			3									10	5	24
WINCH-AIR/ELECTRIC				4			2								2	26	13	50
WINCH-HAND															3		0	0
YORKE HOIST					3											10	5	20
REG. PSC																		
AT	1	4	1	1	47	11	2	66	3		2				42			553

A B1

B H 44

MINTABIE, STUART CREEK AND MINOR FIELDS EQUIPMENT COUNT AT JUNE 86

TABLE A6

EQUIPMENT	MINTABIE CRYSTAL VALLEY	MINTABIE GOOSE GULLY	MINTABIE GRASSHOPPER RIDGE	MINTABIE GUS'S	MINTABIE JOEY HILL	MINTABIE OLD FIELD	TOTAL	STUART CREEK	ENGLAND HILL	LAMBINA	LONGIN BANK	OULDURRA HILL	SARDA BLUFF	VESUVIUS	WELBOURN HILL	TOTAL STUART CK & MINOR FIELDS
BLOWER	2					11	13									0
BOGGER							0									0
BUCKET ELEVATOR							0									0
BULLDOZER																0
D9	10			1		15	26									0
D8						1	1									0
D7	1						1									0
D6							0									0
D4						2	2									0
COMPRESSOR																0
100CFM	2					5	7									0
180CFM	6					3	9									0
350CFM							0									0
DRILLING RIGS																0
CALWELD						1	1									0
INVESTIGATOR	5	2		2		6	15									0
SMALL AUGER						1	1									0
ROTARY	1						1									0
CRANE							0									0
EXCAVATOR							0									0
GENERATOR																0
SMALL/MED						1	1									0
LARGE							0									0
LOADER-FRONT END	1					1	2									0
NOODLING MACHINE						2	2									0
SCRAPER						3	3									0
SELF DUMPER	1					1	2									0
TUNNELING MACHINE							0									0
WINCH-AIR/ELECTR	1					1	2									0
WINCH-HAND							0									0
YORKE HOIST	4					12	16									0
REG. PSC																
AT 10/07/86	150	18		25		222	415	2			1		1	1		5

A1

TABLE A7

ANDAMOOKA OPAL FIELD EQUIPMENT COUNT AT OCT 1986

EQUIPMENT	BLACK- BOY	BLACK- BOY EXTENSION	BOUNDARY RIDER	BUZA	CHRIST- MAS HILL	FOUR NATIONS	GERMAN GULLY	GUN GULLY	HARD HILL	HALLION HILL	HORSE PADDOCK	JUBILEE	KOSKAS
BACKHOE	1			1									
BLOWER										2			
BOGGER													
BUCKET ELEVATOR										1			
BULLDOZER													
D9													
D8													
D7					1							1	
D6								2		1			
D4													
COMPRESSOR													
100CFM							1	1		3			
180CFM						1	2			1			
350CFM	2									1			
DRILLING RIGS													
CALWELD													
INVESTIGATOR													
SMALL AUGER													
ROTARY													
CRANE													
EXCAVATOR													
GENERATOR													
SMALL/MED													
LARGE							1			1			
LOADER-FRONT END							1						
NOODLING MACHINE			1				1						
SCRAPER													
SELF DUMPER							2	1					
TUNNELING MACHINE										1			
WINCH-AIR/ELECTRIC										2			
WINCH-HAND	2				1			1		4			
YORKE HOIST	1					2	3			4			
REG. PSC													
AT 10/7/86		2	1	1		1	15	11	1	10	2		

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TABLE A8

ANDAMOOKA OPAL FIELD EQUIPMENT COUNT AT OCT 1986

EQUIPMENT	LUNATIC HILL	STANS HILL	STEVENS GULLY	TEA TRIANGLE TREE FLAT	WHITE DAM	YARLOO	YARLOO EXTENSION	YARLOO SOUTH	YARLOO WEST	TOWN AREA	AMENDED TOWN AREA	TOTAL
BACKHOE	1		1		2					2	1	7
BLOWER				2						4	2	6
BOGGER											0	0
BUCKET ELEVATOR	2									4	2	5
BULLDOZER											0	0
D9				1	1						0	2
D8	1			1						2	1	3
D7			1							1	1	4
D6				3	3					2	1	10
D4					6					5	3	9
COMPRESSOR											0	0
100CFM	3		1	4							0	13
180CFM	2									10	5	11
350CFM											0	3
DRILLING RIGS											0	0
CALWELD				1						1	1	2
INVESTIGATOR										1	1	1
SMALL AUGER										2	1	1
ROTARY											0	0
CRANE										1	1	1
EXCAVATOR	1									1	1	2
GENERATOR											0	0
SMALL/MED	4			5							0	9
LARGE				1							0	3
LOADER-FRONT END				1	2						0	4
NOODLING MACHINE				1	2					2	1	6
SCRAPER										1	1	1
SELF DUMPER	4			2						4	2	11
TUNNELING MACHINE										1	1	2
WINCH-AIR/ELECTRIC											0	2
WINCH-HAND				2			2				0	12
YORKE HOIST	3		2	7							0	22
REG. PSC												
AT 10/7/86	16		6	35	5	70	2	1				179

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COOBER PEDY EQUIPMENT COUNT AS AT SEPT 1986

TABLE A9

EQUIPMENT	ALLEN RISE	BENITOS FOLLY	BLACK FLAG	BLACK POINT	BROWNS FOLLY	CRATER	COMPANY	DEADMAN DUGOUT	DEADMAN GULLY	DEADHORSE GULLY	DIGGERS GULLY	DINGO	DORA GULLY	EAST PACIFIC	EMU FLAT	FLAT (BIG FLAT)	FOURTEEN MILE	FRANKS FOLLY	GERAGHTY HILL
BACKHOE							1						1		1		4		
BLOWER													4	3	3				3
BOGGER																			
BUCKET ELEVATOR															2				
BULLDOZER																			
D9																			
D8	1						1										1		
D7			1			1													
D6				1															
D4																			
COMPRESSOR																			
100CFM															1				
180CFM														3					
350CFM															2				
DRILLING RIGS																			
CALWELD																			
INVESTIGATOR															1				
SMALL AUGER			1																1
ROTARY																			
CRANE																			
EXCAVATOR																	1		
GENERATOR																			
SMALL/MED													1		4		1		
LARGE															2		1		2
LOADER-FRONT END																	1		3
NOODLING MACHINE																	1		2
SCRAPER																			
SELF DUMPER																			3
TUNNELING MACHINE													3		1		1		1
WINCH-AIR/ELECTRIC													2	2	2				
WINCH-HAND																			
YORKE HOIST														1					1
REG. PSC																			
AT	2		3	5	5	1	3			3	1		2	16	28	13	31		10

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COOPER PEDY EQUIPMENT COUNT AS AT SEPT 1986

TABLE A10

EQUIPMENT	GERMAN GULLY	GERMAN VALLEY	GREEK GULLY	HALLEY'S COMET	HANS PEAK	HELLENIC HILL	JUNGLE	JUPITER	KENDA FLAT	KIMBA	LARKINS FOLLY	LENNON	OPAL VALLEY	OLD FOUR MILE	OLYMPIC	TEAL WATER HOLE	PERFETTO	PIPING LANE	POTCH GULLY	PROSPECT
BACKHOE					1		1				1		1		1				1	1
BLOWER	2		10		6	1	1		4		2	3			15				1	
BOGGER															6					
BUCKET ELEVATOR	1		1												1					
BULLDOZER																				
D9																				
D8																				
D7																				2
D6						1													1	1
D4			1																1	
COMPRESSOR																				
100CFM	1							1	2			1			2					1
180CFM			6		1			1	1										2	1
350CFM											1									1
DRILLING RIGS															1					
CALWELD																				
INVESTIGATOR																				
SMALL AUGER	1														1					1
ROTARY										1										1
CRANE																				
EXCAVATOR																				
GENERATOR														1						
SMALL/MED	6	2	11		2			2	1											
LARGE						1					1				3				1	
LOADER-FRONT END			1												8				2	
NOODLING MACHINE			1						1		1				3				1	
SCRAPER															3				3	
SELF DUMPER																				
TUNNELING MACHINE			2			1						1			3					
WINCH-AIR/ELECTRIC			5			1		2	3						9					
WINCH-HAND															5					
YORKE HOIST	1		6					1				2			3					1
REG. PSC																				
AT	2	5	31	24	33	2	3	5	11	2	11	11	7		72		2		11	12

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COOPER PEDY EQUIPMENT COUNT AS AT SEPT 1986

TABLE AII

EQUIPMENT	ROCK HILL BORE	RUSSO FOLLY	RYAN HILL	SADDLE SEVENTEEN MILE	SHELL PATCH	SOUTH PACIFIC	SOUTH'N CROSS	TEE VALLEY	TREVOR SWAMP	TURKEY TWO JAYS RIDGE	UNKNOWN	VENUS	VINO	WILLOW	ZORBA	TOWN& HOPEFUL HILLS	AMENDED TOWN	TOTAL
BACKHOE		1		1											2	15	8	26
BLOWER		2	2	13		1	10								40	132	66	192
BOGGER							1								5	12	6	18
BUCKET ELEVATOR							1								3	9	5	14
BULLDOZER																	0	0
D9																	1	1
D8																	4	2
D7																	3	2
D6																	3	2
D4																	3	2
COMPRESSOR																	0	1
100CFM				1													0	0
180CFM			2				1								1	11	6	17
350CFM			1												9	27	14	41
DRILLING RIGS															1	6	3	9
CALWELD																	0	0
INVESTIGATOR							2									30	15	17
SMALL AUGER															1	4	2	6
ROTARY																5	3	8
CRANE																	0	0
EXCAVATOR																	0	0
GENERATOR																1	1	3
SMALL/MED		1	4	3													0	0
LARGE				3	1		4							1	3	46	23	69
LOADER-FRONT END				5			3								11	36	18	54
NOODLING MACHINE		1	1	4			1							1		20	10	30
SCRAPER														1		19	10	29
SELF DUMPER																	0	0
TUNNELING MACHINE				3			5									7	4	11
WINCH-AIR/ELECTRIC			3				2								11	30	15	51
WINCH-HAND															10	37	19	57
YORKE HOIST					3		1										0	0
															6	26	13	39
REG. PSC																		
AT		6	1	1	38	7	2	52	1						180			655

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TABLE A12

MINTABIE, STUART CREEK AND MINOR FIELDS EQUIPMENT COUNT AT SEPT 1986

EQUIPMENT	MINTABIE CRYSTAL VALLEY	MINTABIE GOOSE GULLY	MINTABIE GRASSHOPPER RIDGE	MINTABIE GUS'S	MINTABIE JOEY HILL	MINTABIE OLD FIELD	MINTABIE TOWN	TOTAL	STUART CREEK	ENGLAND HILL	LAMBINA	LONGIN BANK	OLD BURRA HILL	SARDA BLUFF	VESUVIUS	WELBOURN HILL	TOTAL STUART CK & MINOR FIELDS
BACKHOE						1	1	2									0
BLOWER		2				6	2	10									0
BOGGER								0									0
BUCKET ELEVATOR								0									0
BULLDOZER								0									0
D9	5	2		3		13	3	26									0
D8	2					5	1	8									0
D7						2		2									0
D6								0									0
D4								0									0
COMPRESSOR								0									0
100CFM						4	8	12									0
180CFM	1			1		10	9	21									0
350CFM	1					3	4	8									0
DRILLING RIGS								0									0
CALWELD						1		1									0
INVESTIGATOR	7	6		2		1	7	23									0
SMALL AUGER		1				4	3	8									0
ROTARY	1							1									0
CRANE								0									0
EXCAVATOR								0									0
GENERATOR								0									0
SMALL/MED	4	1				21	70	96									0
LARGE						4	12	16									0
LOADER-FRONT END	1					2	3	6									0
WOODLING MACHINE						1	2	3									0
SCRAPER	2						6	8									0
SELF DUMPER	1					1	1	3									0
TUNNELING MACHINE								0									0
WINCH-AIR/ELECTRIC		1					1	2									0
WINCH-HAND								0									0
YORKE HOIST	6	1				13		20									0
REG. PSC																	
AT 23/09/86	209	73		51	1	213		547	1			1		1	1		4

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APPENDIX B
UNIT COST, UNIT RUNNING COSTS, TOTAL CAPITAL INVESTMENT
AND TOTAL ANNUAL OPERATING COST AND PRODUCTION
FOR ALL PRECIOUS STONES FIELDS

OPERATING AND CAPITAL COSTS AT JUNE 86

TABLE B1

EQUIPMENT	UNIT COST	OPERATING COST UNIT/YEAR	COOPER PEDY UNITS	COOPER PEDY TOTAL CAPITAL COST	COOPER PEDY TOTAL RUNNING COST	ANDAMOOKA UNITS	ANDAMOOKA TOTAL CAPITAL COST	ANDAMOOKA TOTAL RUNNING COST	MINTABIE UNITS	MINTABIE TOTAL CAPITAL COST	MINTABIE TOTAL RUNNING COST	MINOR FIELDS UNITS	MINOR FIELDS TOTAL CAPITAL COST	MINOR FIELDS TOTAL RUNNING COST	TOTAL UNITS	TOTAL CAPITAL COST	TOTAL RUNNING COST
BACKHOE	30000	5830	13.5	405000	78705	3.0	90000	17490	0.0	0	0						
BLOWER	12000	9000	159.0	1908000	1431000	4.0	48000	36000	13.0	156000	117000				16.5	495000	96195
BOGGER	4000	200	12.0	48000	2400	0.0	0	0	0.0	0	0				176.0	2112000	1584000
BUCKET ELEVATOR	8500	500	17.5	148750	8750	0.0	0	0	0.0	0	0				12.0	48000	2400
BULLDOZER			0.0			0.0	0	0	0.0	0	0				17.5	148750	8750
D9	350000	64440	7.0	2450000	451080	1.5	525000	96660	26.0	9100000	1675440				34.5	12075000	2223180
D8	245000	48170	3.5	857500	168595	1.0	245000	48170	1.0	245000	48170				5.5	1347500	264935
D7	160000	32980	1.0	160000	32980	5.0	800000	164900	1.0	160000	32980				7.0	1120000	230860
D6	100000	23040	3.0	300000	69120	4.5	450000	103680	0.0	0	0				7.5	750000	172800
D4	55000	18720	3.0	165000	56160	5.0	275000	93600	2.0	110000	37440				10.0	550000	187200
COMPRESSOR																	
100CFM	13000	1420	17.0	221000	24140	6.5	84500	9230	7.0	91000	9940				30.5	396500	43310
180CFM	14000	2840	32.5	455000	92300	5.5	77000	15620	9.0	126000	25560				47.0	658000	133480
350CFM	24000	4260	9.0	216000	38340	1.0	24000	4260	0.0	0	0				10.0	240000	42600
DRILLING RIGS																	
CALWELD	150000	9200	31.0	4650000	285200	3.0	450000	27600	1.0	150000	9200				35.0	5250000	322000
INVESTIGATOR	45000	6400	13.0	585000	83200	0.0	0	0	15.0	675000	96000				28.0	1260000	179200
SMALL AUGER	5000	4400	12.0	60000	52800	0.0	0	0	1.0	5000	4400				13.0	65000	57200
ROTARY	100000	9000	0.0	0	0	0.0	0	0	1.0	100000	9000				1.0	100000	9000
CRANE	10000	1000	4.0	40000	4000	0.0	0	0	0.0	0	0				4.0	40000	4000
EXCAVATOR	138000	32980	1.0	138000	32980	2.0	276000	65960	0.0	0	0				3.0	414000	98940
GENERATOR																	
SMALL/MED	800	720	72.0	57600	51840	6.0	4800	4320	1.0	800	720				79.0	63200	56880
LARGE	8000	4220	33.5	268000	141370	1.0	8000	4220	0.0	0	0				34.5	276000	145590
LOADER-FRONT END	30000	5830	20.5	615000	119515	3.5	105000	20405	2.0	60000	11660				26.0	780000	151580
WOODLING MACHINE	8000	1000	18.5	148000	18500	5.0	40000	5000	2.0	16000	2000				25.5	204000	25500
SCRAPER	100000	19440	1.0	100000	19440	0.5	50000	9720	3.0	300000	58320				4.5	450000	87480
SELF DUMPER	1500	720	10.0	15000	7200	9.0	13500	6480	2.0	3000	1440				21.0	31500	15120
TUNNELING MACHINE	25000	1500	24.0	600000	36000	0.0	0	0	0.0	0	0				24.0	600000	36000
WINCH-AIR/ELECTRIC	1000		50.0	50000	0	2.0	2000	0	2.0	2000	0				54.0	54000	0
WINCH-HAND	100		0.0	0	0	5.0	500	0	0.0	0	0				5.0	500	0
YORKE HOIST	700	400	20.0	14000	8000	10.0	7000	4000	16.0	11200	6400				46.0	32200	18400
TOTAL				14674850	3313615		3575300	737315		11311000	2145670					29561150	6196600

TOTAL CAPITAL COST ALL FIELDS:
TOTAL RUNNING COST ALL FIELDS:

29561150
6196600

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OPERATING AND CAPITAL COSTS AT SEPT-OCT 1986

TABLE B2

EQUIPMENT	UNIT COST	OPERATING COST UNIT/YEAR	COOPER PEDY UNITS	COOPER PEDY TOTAL CAPITAL COST	COOPER PEDY TOTAL RUNNING COST	ANDAMOOKA UNITS	ANDAMOOKA TOTAL CAPITAL COST	ANDAMOOKA TOTAL RUNNING COST	MINTABIE UNITS	MINTABIE TOTAL CAPITAL COST	MINTABIE TOTAL RUNNING COST	MINOR FIELDS UNITS	MINOR TOTAL CAPITAL COST	MINOR TOTAL RUNNING COST	TOTAL UNITS	TOTAL CAPITAL COST	TOTAL RUNNING COST
BACKHOE	30000	5830	25.5	765000	148665	7.0	210000	40810	2.0	60000	11660		0	0	34.5	1035000	201135
BLOWER	12000	9000	192.0	2304000	1728000	6.0	72000	54000	10.0	120000	90000		0	0	208.0	2496000	1872000
BOGGER	4000	200	18.0	72000	3600	0.0	0	0	0.0	0	0		0	0	18.0	72000	3600
BUCKET ELEVATOR	8500	500	13.5	114750	6750	5.0	42500	2500	0.0	0	0		0	0	18.5	157250	9250
BULLDOZER			0.0			0.0			0.0				0	0			
D9	350000	64440	0.5	175000	32220	2.0	700000	128880	26.0	9100000	1675440	1.0	350000	64440	29.5	10325000	1900980
D8	245000	48170	7.0	1715000	337190	3.0	735000	144510	8.0	1960000	385360		0	0	18.0	4410000	867060
D7	160000	32980	4.5	720000	148410	3.5	560000	115430	2.0	320000	65960	1.0	160000	32980	11.0	1760000	362780
D6	100000	23040	4.5	450000	103680	10.0	1000000	230400	0.0	0	0		0	0	14.5	1450000	334080
D4	55000	18720	1.0	55000	18720	8.5	467500	159120	0.0	0	0		0	0	9.5	522500	177840
COMPRESSOR			0.0			0.0			0.0				0	0			
100CFM	13000	1420	16.5	214500	23430	13.0	169000	18460	12.0	156000	17040		0	0	41.5	539500	58930
180CFM	14000	2840	40.5	567000	115020	11.0	154000	31240	21.0	294000	59640		0	0	72.5	1015000	205900
350CFM	24000	4260	9.0	216000	38340	3.0	72000	12780	8.0	192000	34080		0	0	20.0	480000	85200
DRILLING RIGS			0.0			0.0			0.0				0	0			
CALWELD	150000	9200	17.0	2550000	156400	1.5	225000	13800	1.0	150000	9200		0	0	19.5	2925000	179400
INVESTIGATOR	45000	6400	6.0	270000	38400	0.5	22500	3200	23.0	1035000	147200		0	0	29.5	1327500	188800
SMALL AUGER	5000	4400	7.5	37500	33000	1.0	5000	4400	8.0	40000	35200		0	0	16.5	82500	72600
ROTARY	100000	9000	0.0	0	0	0.0	0	0	1.0	100000	9000		0	0	1.0	100000	9000
CRANE	10000	1000	0.0	0	0	0.5	5000	500	0.0	0	0		0	0	0.5	5000	500
EXCAVATOR	138000	32980	2.5	345000	82450	1.5	207000	49470	0.0	0	0		0	0	4.0	552000	131920
GENERATOR			0.0			0.0			0.0				0	0			
SMALL/MED	800	720	69.0	55200	49680	9.0	7200	6480	96.0	76800	69120		0	0	174.0	139200	125280
LARGE	8000	4220	54.0	432000	227880	3.0	24000	12660	16.0	128000	67520		0	0	73.0	584000	308060
LOADER-FRONT END	30000	5830	30.0	900000	174900	4.0	120000	23320	6.0	180000	34980		0	0	40.0	1200000	233200
WOODING MACHINE	8000	1000	28.5	228000	28500	6.0	48000	6000	3.0	24000	3000		0	0	37.5	300000	37500
SCRAPER	100000	19440	0.0	0	0	0.5	50000	9720	8.0	800000	155520		0	0	8.5	850000	165240
SELF DUMPER	1500	720	10.5	15750	7560	11.0	16500	7920	3.0	4500	2160		0	0	24.5	36750	17640
TUNNELING MACHINE	25000	1500	51.0	1275000	76500	1.5	37500	2250	0.0	0	0		0	0	52.5	1312500	78750
WINCH-AIR/ELECTRIC	1000		56.5	56500	0	2.0	2000	0	2.0	2000	0		0	0	60.5	60500	0
WINCH-HAND	100		0.0	0	0	12.0	1200	0	0.0	0	0		0	0	12.0	1200	0
YORKE HOIST	700	400	39.0	27300	15600	22.0	15400	8800	20.0	14000	8000		0	0	81.0	56700	32400
TOTAL				13560500	3594895		4968300	1086650		14756300	2880080		510000	97420		33795100	7659045

TOTAL CAPITAL COST ALL FIELDS: **
TOTAL RUNNING COST ALL FIELDS: **

33795100
7659045

V45

OPAL PRODUCTION --- 1986

TABLE B3

	COOBER PEDY	ANDAMOOKA	MINTABIE	MINDR FIELDS	TOTAL
NUMBER OF MINERS					
JUNE	450	60	340	0	850
SEPT/OCT	460	70	400	0	930
CAPITAL INVESTMENT					
JUNE	14,674,850	3,575,300	11,311,000	0	29,561,150
SEPT/OCT	13,560,500	4,968,300	14,756,300	510,000	33,795,100 ✓
RUNNING COSTS					
JUNE	3,313,615	737,315	2,145,670	0	6,196,600
SEPT/OCT	3,594,895	1,086,650	2,880,080	97,420	7,659,045
CONSTANT	24,400	23,900	43,400	23,900	
PRODUCTION					
JUNE	15,761,100	2,528,845	18,032,770	0	36,322,715
SEPT/OCT	16,174,945	3,256,480	21,715,710	148,420	41,295,555
AVERAGE NO. OF MINERS 1986	455	65	370	0	890
AVERAGE CAPITAL INVESTMENT 1986	14,117,675	4,271,800	13,033,650	255,000	31,678,125
AVERAGE RUNNING COSTS 1986	3,454,255	911,983	2,512,875	48,710	6,927,823
ANNUAL PRODUCTION 1986	15,968,023	2,892,663	19,874,240	74,210	38,809,135

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APPENDIX C

LOCATION OF OPAL FIELDS, GRAPHICAL REPRESENTATION OF
REGISTERED PRECIOUS STONES CLAIMS, CAPITAL INVESTMENT,
NUMBER OF OPAL MINERS AND OPAL PRODUCTION

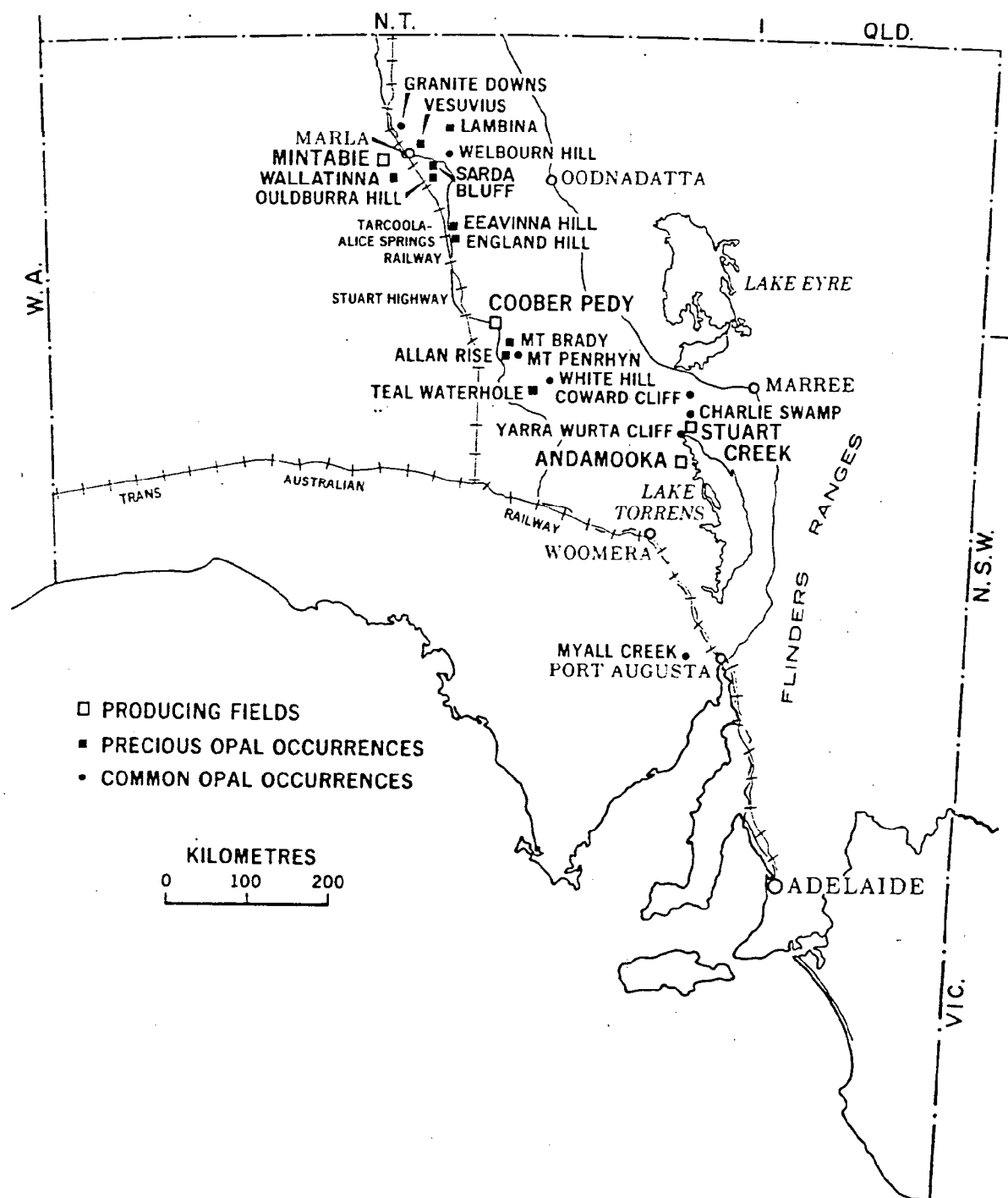


Fig. 1

		DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	SCALE: 1:7400 000
COMPILED: L.C.B.			DATE 12-9-79
DRN:	CKD	OPAL OCCURRENCES IN SOUTH AUSTRALIA	PLAN NUMBER
EA			S14248

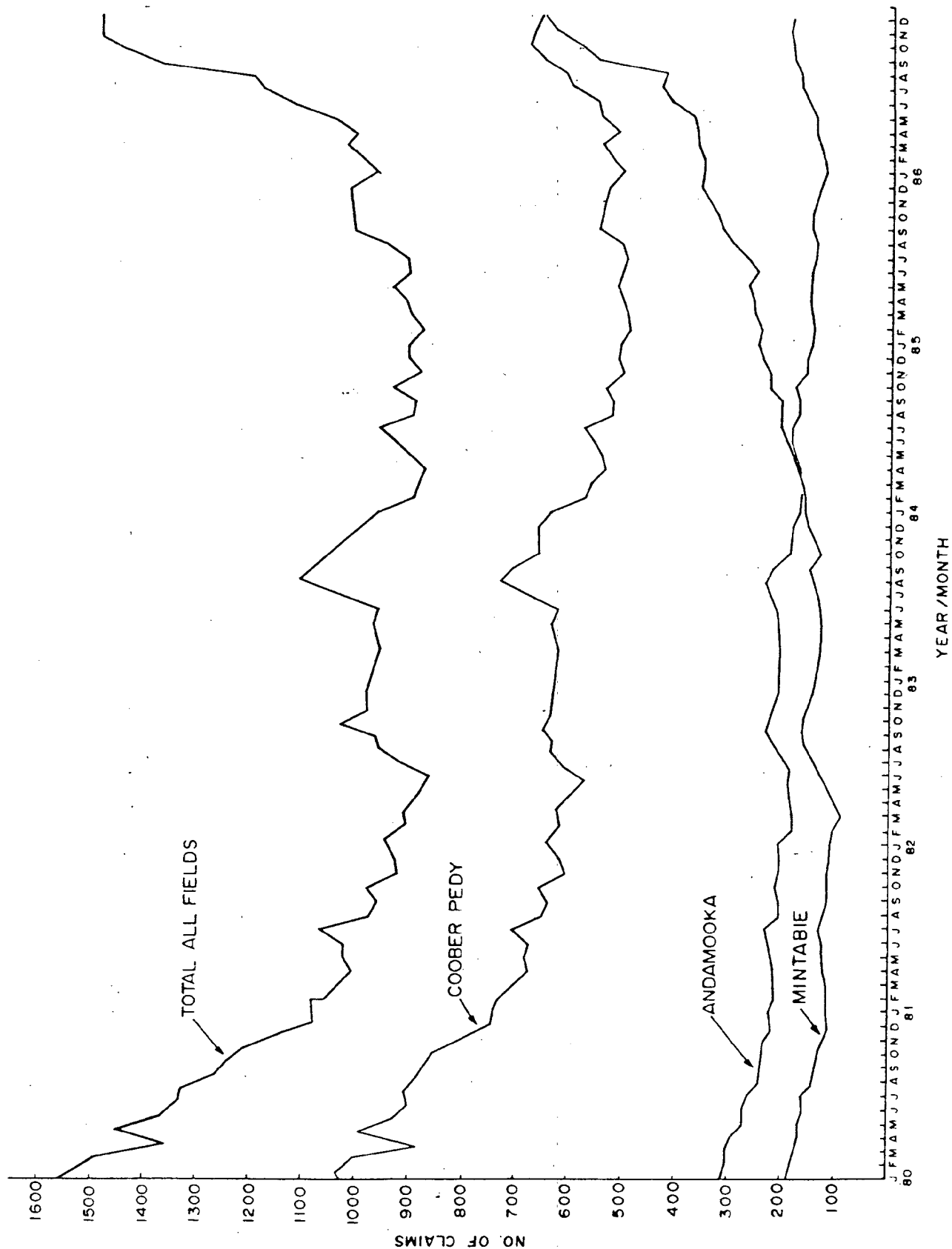


FIG. 3



DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

SOUTH AUSTRALIAN PRECIOUS STONES FIELDS
NUMBER OF REGISTERED PRECIOUS STONES CLAIMS 1980 - 1987

COMPILED
M.W.F.

6-8-86
C.D.O. DATE

DRAWN
L.V.W.

SCALE As shown

DATE
5-8-86
CHECKED

PLAN NUMBER
S18815

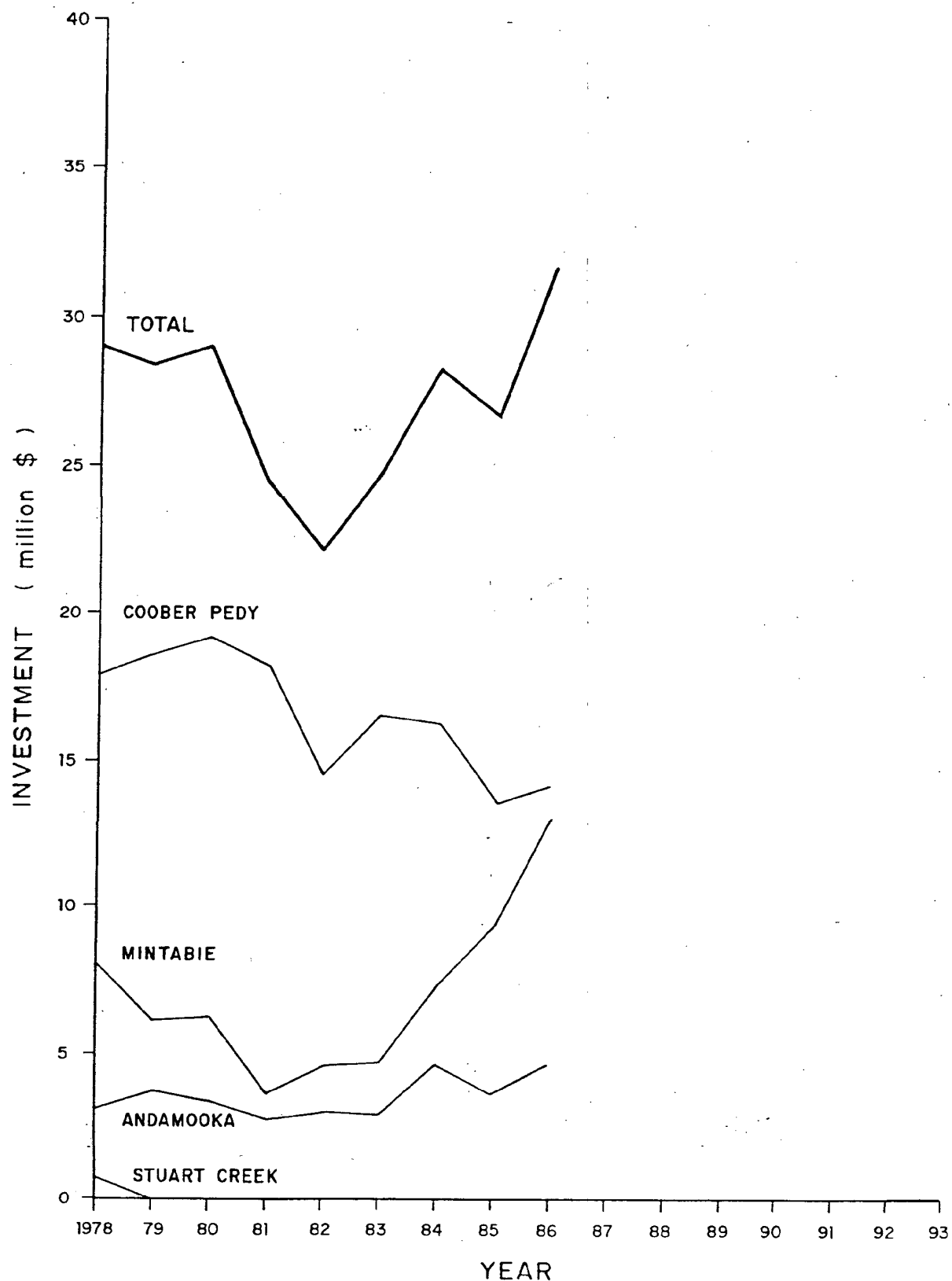



Figure 4

	DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA		COMPILED I. J.T.	<i>ur</i> C.D.O.	7.8.87 DATE
	SOUTH AUSTRALIAN PRECIOUS STONES FIELDS CAPITAL INVESTMENT 1978 - 1987		DRAWN M.R.	SCALE	
			DATE Aug. '87	PLAN NUMBER	
			CHECKED	S 19436	

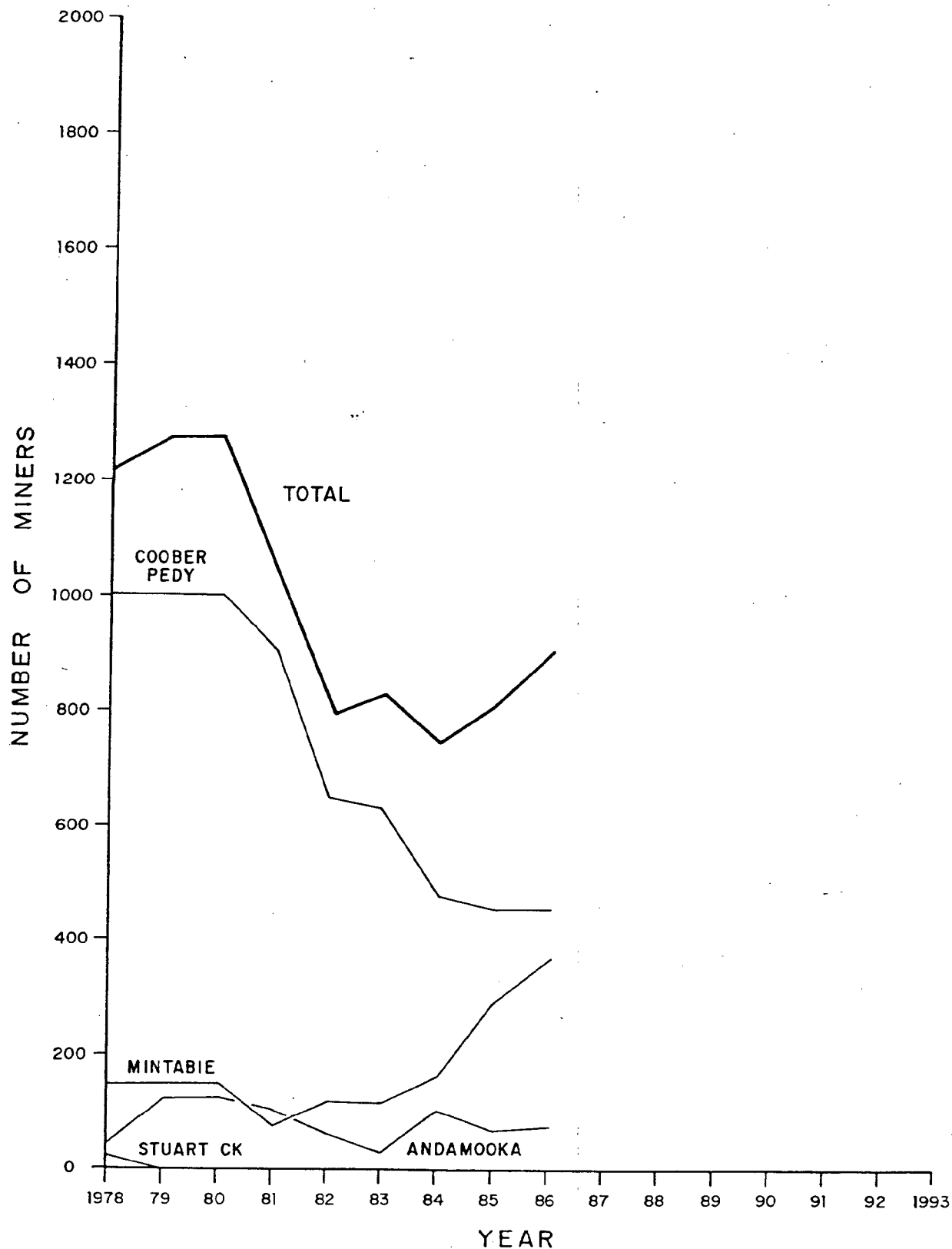



Figure..... 5

 DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA	COMPILED I. J. T.	<i>ur</i> 7. 8. 87 C.D.O. DATE
	DRAWN M.R.	SCALE
	DATE Aug '87	PLAN NUMBER
	CHECKED	S 19437

SOUTH AUSTRALIAN PRECIOUS STONES FIELDS
NUMBER OF MINERS 1978 - 1987

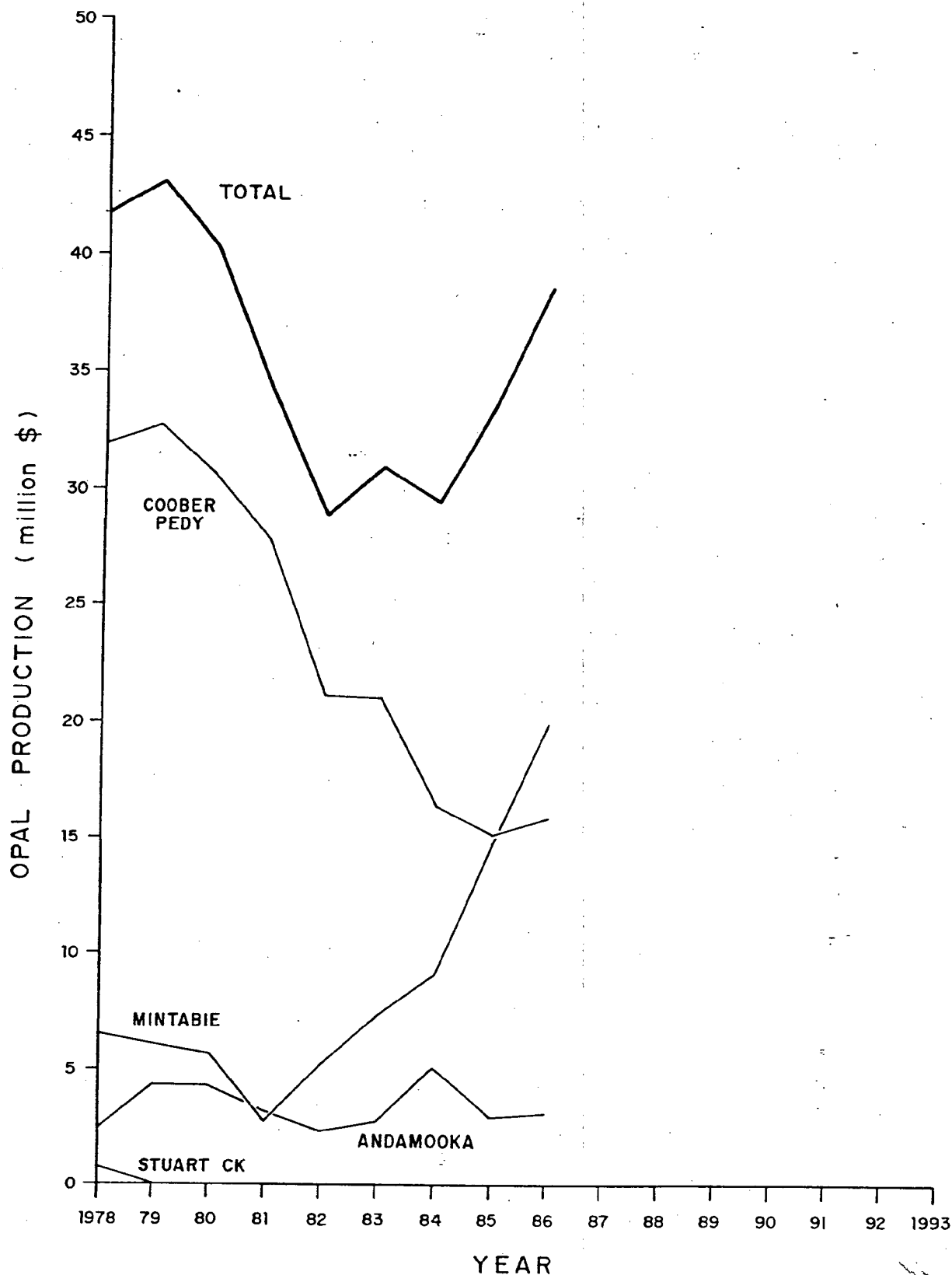


Figure 6

**DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA**

SOUTH AUSTRALIAN PRECIOUS STONES FIELDS

OPAL PRODUCTION 1978 - 1987

COMPILED
I.J.T.

MR 7-8-87
C.D.O. DATE

DRAWN
M.R.

SCALE

DATE
Aug '87
CHECKED

PLAN NUMBER

S 19438