

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

REPT. BK. NO. 89/42
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THE OPAL INDUSTRY IN SOUTH
AUSTRALIA REPORT NO. 11 THE
1988 SURVEY OF MINING EQUIPMENT
AND CALCULATION OF VALUE OF OPAL
PRODUCED

GEOLOGICAL SURVEY

by

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&

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THE 1988 SURVEY OF MINING EQUIPMENT AND
CALCULATION OF VALUE OF OPAL PRODUCED

SUMMARY

The following trends emerged from the 1988 South Australian Opal Field Surveys:

- an increase of 13.5 million in production to 63.5 million from the 1987 figure representing an increase of 27%
- again a significant increase in Mintabie production of \$10.8 million representing a 38.2% increase
- an increase in Coober Pedy Production of \$3.0 million representing a 16.3% increase
- an decrease in Andamooka production of \$.2 million representing an 8.5% decrease
- an increase in the average number of precious stones claims (PSC) of 475 representing a 25% increase
- an increase in the estimated number of miners of 350 representing 30%
- an overall upward trend in all aspects of mining, investment and production.

Table I summarises the survey results for 1988 compared with 1987. Table II lists the major equipment surveyed as a guide to mining activity.

TABLE 1

THE OPAL INDUSTRY IN SOUTH AUSTRALIA
1988 COMPARED WITH 1987

	<u>1987</u>	<u>1988</u>
Registered P.S.C.s (Av.)		
Andamooka	236	266
Coober Pedy	744	1,032
Mintabie	<u>906</u>	<u>1,063</u>
	1,886	2,361
Capital Investment (Av. \$ million)		
Andamooka	\$ 4.7	\$ 3.6
Coober Pedy	\$ 15.7	\$ 18.0
Mintabie	<u>\$ 19.6</u>	<u>\$ 18.6</u>
	\$ 40.0	\$ 39.2
Operating Costs (Av. \$ million)		
Andamooka	\$ 1.0	\$.8
Coober Pedy	\$ 3.7	\$ 3.5
Mintabie	<u>\$ 3.7</u>	<u>\$ 3.5</u>
	\$ 8.4	\$ 8.5
Number of Miners (Av.)		
Andamooka	83	88
Coober Pedy	535	625
Mintabie	<u>520</u>	<u>775</u>
	1,138	1,488
Estimated Value of Production (\$ million)		
Andamooka	\$ 3.5	\$ 3.2
Coober Pedy	\$ 18.3	\$ 21.3
Mintabie	<u>\$ 28.2</u>	<u>\$ 39.0</u>
	\$ 50.0	\$ 63.5

TABLE II
MAJOR EQUIPMENT

	ANDAMOOKA		COOBER PEDY		MINTABIE	
	1987	1988	1987	1988	1987	1988
Bulldozer						
D10	-	-	-	-	1	1
D8-D9	5	4	10	16	41	39
D7-smaller	18	10	13	14	3	2
Blowers	4	5	174	182	18	19
Backhoes	7	8	18	18	6	3
Tunnelling Machine	1	1	48	44	0	0
Noodling Machine	8	9	30	42	3	1
Drills						
Calweld	1	1	28	23	2	2
Investigator	0	0	6	8	28	28
Yorke Hoist	15	12	14	15	22	15
Self Dumpers	14	10	7	4	3	1

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:

TABLE III
REFERENCES TO PREVIOUS REPORTS

<u>YEAR</u>	<u>AUTHORS</u>	<u>REPT. NO</u>	<u>UNPUBLISHED R/B</u>	<u>PUBLISHED REFERENCE</u>
1978	Crettenden et al.,	1	+ RB79/111	*MRR 151 (1982)
1979	Crettenden and Flintoft	2	RB80/50	MRR 152 (1983)
1980	Atterton and Barnes	3	RB81/73	MRR 153 (1984)
1981	Barnes and Atterton	4	RB82/75)	Barnes, Wildy and Attenton)
1982	Barnes and Wildy	5	RB83/48)	MRR 154 (1984)
1983	Wildy and Barnes	6	RB84/88	MRR 155 (1985)
1984	Wildy and Barnes	7	RB85/43)	Townsend, Wildy, Barnes
1985	Townsend and Wildy	8	RB86/63)	& Crettenden (1988)
1986	Townsend and Crettenden	9	RB87/102)	MRR 156
1987	Townsend and Flintoft	10	RB88/86	

*MRR = Mineral Resources Review.

+RB = Report Book

PROCEDURE

The following Departmental officers conducted equipment surveys during 1988.

JULY

ANDAMOOKA

I J Townsend (Senior Geologist, Mineral Resources)

M W Flintoft (Technical Assistant, Mineral Resources)

COOBER PEDY

C M Horn (Principal Geologist, Mineral Resources)

I J Townsend (Senior Geologist, Mineral Resources)

M W Flintoft (Technical Assistant, Mineral Resources)

MINTABIE

C M Horn (Principal Geological, Mineral Resources)
I J Townsend (Senior Geologist, Mineral Resources)
M W Flintoft (Technical Assistant, Mineral Resources)

OCTOBER

ANDAMOOKA

R S Robertson (Senior Geologist, Mineral Resources)
J T Valentine (Senior Geologist, Mineral Resources)

COOBER PEDY

R S Robertson (Senior Geologist, Mineral Resources)
J T Valentine (Senior Geologist, Mineral Resources)

MINTABIE

R S Robertson (Senior Geologist, Mineral Resources)
J T Valentine (Senior Geologist, Mineral Resources)

RESULTS OF THE 1988 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 IV.

TABLE IV
CAPITAL INVESTMENT 1988 (\$ million)

	<u>JULY</u>	<u>OCTOBER</u>	<u>AVERAGE</u>
ANDAMOOKA	4.3	2.8	3.5
COOBER PEDY	16.9	18.9	17.9
MINTABIE	18.5	18.6	18.6

The average value of investment in equipment observed is \$40 million the same as in 1987. There is a slight decrease at Mintabie and Andamooka with a \$2 m increase at Coober Pedy, suggesting some equipment has simply been relocated at 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 V.

TABLE V
ANNUAL OPERATING COSTS 1988 (\$ million)

	<u>JULY</u>	<u>OCTOBER</u>	<u>AVERAGE</u>
Andamooka	0.9	0.6	0.7
Coober Pedy	3.9	4.5	4.2
Mintabie	<u>3.5</u>	<u>3.5</u>	<u>3.5</u>
	8.3	8.6	8.4

The amount of \$8.4 million is the same as the previous year.

Large Diameter Prospecting Drills

The total for all fields was 27, 24 being at Coober Pedy, 1 at Andamooka and 2 at Mintabie, 4 less than in 1987.

MINING ACTIVITY

During 1988 the total number of registered PSC's over all fields increased from 1886 to 2361 (Table 1, Fig.) due to a large increase of 288 at Coober Pedy, and increases of 157 at Mintabie and 30 at Andamooka. Andamooka (+5 miners) and Coober Pedy (+90 miners) show little change in the number of active miners whereas Mintabie shows a significant increase of 255 active miners, a 49% increase.

Andamooka

The average number of registered PSC's increased from 236 in 1987 to 266 in 1988 conforming with the overall upward trend.

Coober Pedy

1032 PSC's were registered on 42 Fields showing a substantial increase (33.3%) from 1987 (774).

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 1986. This field reached 210 in August

1987, and increased gradually in 1988 to a maximum of 380 an increase of 170.

- . Olympic field is always popular remaining between 90-110 claims during 1988.
- . Southern Cross decreased from 17 PCS's in July to 11 in December.
- . Fourteen and Seventeen Mile fields decreased from 75 to 64 and 50 to 41 respectively but still remain popular fields.
- . Hans Peak is down slightly from 32 PSC's in 1987 to 23 in October 1988.
- . East Pacific increased from 29 in July to 52 in October. Emu remained at 21.
- . Greek Gully remained at 36-37 the same as its peak in 1987.
- . Kenda Flat stabilised at 10 PSC's in 1988.
- . Gerahty Hill (30-36) has increased substantially from October 1987 (12) but being renowned for producing good opal, will always be a good standby field.

Mintabie

Has shown an upward trend since 1982 in production, equipment, miners and PSC's. There were 906 PSC's in 1987 and an average of 1063 in 1988, an increase of 17%. Estimated production for the fourth time surpassed that of Coober Pedy.

Stuart Creek

One PSC was registered at Stuart Creek during 1988. All equipment and production is included in Andamooka estimates.

Other Fields

Longins Bank, Sarda Bluff and England Hill each had 1 registered claim during 1988. Equipment is allocated to Mintabie in the case of Longins Bank and Sarda Bluff whereas England Hill is included in Coober Pedy Fields.

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 1988 is summarised in Table VI.

TABLE VI

ESTIMATED VALUE OF PRODUCTION 1988 (\$ million)
SOUTH AUSTRALIAN PRECIOUS STONES FIELDS

	No of Miners (Av.)		Production Values (\$ million)		<u>AVERAGE</u>
	<u>JULY</u>	<u>OCT.</u>	<u>JULY</u>	<u>OCT.</u>	
ANDAMOOKA	80	96	3.2	3.1	3.2
COOBER PEDY	600	650	20.2	22.2	21.3
MINTABIE	750	800	37.9	65.5	63.5
	<u>1430</u>	<u>1546</u>	<u>61.4</u>	<u>65.5</u>	<u>63.5</u>

Estimated total production from the three main opal mining centres during 1988 was \$63.5 million, an increase of 13.5 million from 1987. This was due mainly to an increase in opal prices and the increase in production from Mintabie where estimated production rose from \$28 million in 1987 to \$39 million in 1988. Andamooka decreased slightly from \$3.5 million (1987) to \$3.2 million (1988) while Coober Pedy increased from \$18.3 million (1987) to \$21.3 million (1988) and continues its increase over the previous 4 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 only a slight decrease in production from Andamooka.

Mintabie production which was estimated at \$10 million more than Coober Pedy in 1987 to nearly \$18 million in 1988 places it as the largest current opal produced in the world.

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APPENDIX A
MINING EQUIPMENT FOR ALL PRECIOUS STONES FIELDS

ANDAMOOKA OPAL FIELD EQUIPMENT COUNT AT JULY 1988

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					2			1			
BOBCAT	1												
BOGGER													
BUCKET ELEVATOR													
BULLDOZER													
D10													
D9													
D8													
D7							1						
D6													
D4													
COMPRESSOR													
100CFM							1			3			
180CFM													
350CFM										1			
DRILLING RIGS													
CALWELD													
INVESTIGATOR													
SMALL AUGER													
ROTARY													
CRANE													
EXCAVATOR													
GENERATOR													
SMALL/MED	2						3						
LARGE							1						
LOADER-FRONT END		1											
NOODLING MACHINE		1											
SCRAPER													
SELF DUMPER							1			2			
TUNNELING MACHINE													
WINCH-AIR/ELECTRIC													
WINCH-HAND	2						1			1			
YORKE HOIST		1	1							4			
REG. PSC													
AT 2/8/88	11	6	2			1	17	36	1	21	1		1

ANDAMOOKA OPAL FIELD EQUIPMENT COUNT AT JULY 1988

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				2					8	4	7
BLOWER				2								6
BOBCAT												1
BOGGER												0
BUCKET ELEVATOR	2			1								3
BULLDOZER												
D10												0
D9										2	1	1
D8	1			1	1					1	1	4
D7				2	1					1	1	5
D6										2	1	1
D4					2					3	2	4
COMPRESSOR												
100CFM	1									23	12	17
180CFM				1	1					9	5	7
350CFM												1
DRILLING RIGS												
CALWELD										1	1	1
INVESTIGATOR												0
SMALL AUGER										4	2	2
ROTARY												0
CRANE												0
EXCAVATOR	1									4	2	3
GENERATOR												
SMALL/MED	3			2	1	3				7	4	18
LARGE				2		3				3	2	8
LOADER-FRONT END				1		2				8	4	8
NOODLING MACHINE				2		3				5	3	9
SCRAPER					1					1	1	2
SELF DUMPER	3				1					5	3	10
TUNNELING MACHINE				1								1
WINCH-AIR/ELECTRIC										1	1	1
WINCH-HAND				2						2	1	7
YORKE HOIST	2	1	2	3						2	1	15
REG. PSC												
AT 2/8/88	16	1	11	55	4	68	2	3				257

COOPER PEDY EQUIPMENT COUNT AS AT JULY 1988

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 FOURTEEN (BIG MILE FLAT)	FRANKS FOLLY	GERAGHTY HILL
BACKHOE																		
BLOWER														2	4	2		2
BOBCAT																		1
BOGGER														2	3			
BUCKET ELEVATOR														2	3			
BULLDOZER																		
D10																		
D9																		
D8													1		1			
D7													1					1
D6																		
D4																		
COMPRESSOR																		
100CFM																		1
180CFM														1				1
350CFM															1			1
DRILLING RIGS																		
CALWELD															1			1
INVESTIGATOR															1			
SMALL AUGER																		
ROTARY																		
CRANE																		
EXCAVATOR																		
GENERATOR																		
SMALL/MED.					2								1		2			6
LARGE			1										1	3	1			
LOADER-FRONT END													1		1			7
NOODLING MACHINE													1		1			7
SCRAPER																		
SELF DUMPER																		
TUNNELING MACHINE														3	1			1
WINCH-AIR/ELECTRIC															4			
WINCH-HAND																		
YORKE HOIST																		
REG. PSC																		
AT 2/8/88	1	3	4	16		1	2	2		12	5		10	29	21	19	64	36

COOPER PEDY EQUIPMENT COUNT AS AT JULY 1988



TABLE A4

EQUIPMENT	GERMAN GULLY	GERMAN VALLEY	GREEK HALLEY'S GULLY COMET	HANS HELLENIC PEAK 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						2				1	1
BLOWER	1	2	7	4			4		5	3			22				1	1
BOBCAT																		
BOGGER																		
BUCKET ELEVATOR		1															1	
BULLDOZER																		
D10																		
D9		1																
D8	1	2		1			1										2	
D7	1																	
D6																		1
D4																		
COMPRESSOR																		
100CFM			5				2						2					
180CFM			1						1				1					2
350CFM				3														
DRILLING RIGS																		
CALWELD			1										3					
INVESTIGATOR																		1
SMALL AUGER																		
ROTARY																		
CRANE																		
EXCAVATOR																		
GENERATOR											1							
SMALL/MED	4	1	2		2				1				9				6	1
LARGE		2	6	4					2				5					
LOADER-FRONT END	1		5	4					2		1		7				1	
NOODLING MACHINE			5	4	1				1				6				2	
SCRAPER																	1	
SELF DUMPER										1			1					
TUNNELING MACHINE	1	2	2						1				7					
WINCH-AIR/ELECTRIC			1				2		1				5					1
WINCH-HAND																		
YORKE HOIST													4					1
REG. PSC																		
AT 2/8/88	13	4	36	32	2	9	4	10	16	5	12		106	2			61	11

COOPER PEDY EQUIPMENT COUNT JULY 1988

TABLE A5

EQUIPMENT	ROCK HILL BORE	RUSO 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	24	12	20
BLOWER				6	1		3			1		1			73	45	23	168
BOBCAT																	0	1
BOGGER				1											4		0	10
BUCKET ELEVATOR				1											4	5	3	15
BULLDOZER																		
D10																	0	0
D9																2	1	3
D8				1												2	1	11
D7													1			5	3	7
D6															1	3	2	5
D4															1		0	2
COMPRESSOR																		
100CFM				1			1					1			2	23	12	27
180CFM												1			7	26	13	28
350CFM				1												6	3	10
DRILLING RIGS																		
CALWELD																17	17	23
INVESTIGATOR															1	5	3	6
SMALL AUGER																6	3	4
ROTARY																2	1	1
CRANE																	0	0
EXCAVATOR																	0	1
GENERATOR																		
SMALL/MED				2		1	1					3			6	6	3	56
LARGE		1		8	2										8	22	11	58
LOADER-FRONT END		1		1	1		3								5	12	6	49
NOODLING MACHINE		1		1	1	1	2								4	4	2	42
SCRAPER				1													0	2
SELF DUMPER																	0	3
TUNNELING MACHINE				3			1								9	16	8	39
WINCH-AIR/ELECTRIC				2			1					2			8	12	6	33
WINCH-HAND																		
YORKE HOIST				1								2			1	3	2	11
REG. PSC																		
AT 2/8/88		8	5	11	50	7	15	17	2	6			2		379			1051

MINTABIE,STUART CREEK AND MINOR FIELDS EQUIPMENT COUNT AT JULY 1988

TABLE A6

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	OULDURRA HILL	SARDA BLUFF	VESUVIUS	WELBOURN HILL	TOTAL STUART CK & MINOR FIELDS
BACKHOE							3	3									
BLOWER	5		4			7	5	21									
BOBCAT	1		5			8	1	15									
BOGGER			1					1									
BUCKET ELEVATOR								0									
BULLDOZER																	
D10							1	1									
D9	5	2				15	8	30									
D8	3			1		1	3	8									
D7							1	1									
D6							2	2									
D4							1	1									
COMPRESSOR																	
100CFM	3	1				5	14	23									
180CFM	5					8	1	14									
350CFM	2					5	2	9									
DRILLING RIGS																	
CALWELD						2		2									
INVESTIGATOR	14	1	1			5	8	29									
SMALL AUGER							1	1									
ROTARY						1	3	4									
CRANE								0									
EXCAVATOR	1							1									
GENERATOR																	
SMALL/MED	3	2	3			11	90	109									
LARGE						3	1	4									
LOADER-FRONT END	1		1				1	3									
NOODLING MACHINE						1		1									
SCRAPER	1		3			4	4	12									
SELF DUMPER	4	1	2			1		8									
TUNNELING MACHINE								0									
WINCH-AIR/ELECTR	1							1									
WINCH-HAND																	
YORKE MOIST	6		4			8		18									
REG. PSC AT 2/8/88	454	65	120	120	3	305		1067		1		1		1			3

EQUIPMENT	BLACK- BOY	BLACK- BOY EXTENSION	BOUNDARY RIDER	BUZA	CHRIST- MAS HILL	FOUR NATIONS	GERMAN GULLY	GUN GULLY	HARD HILL	HALFWAY	MALLION HILL	HORSE PADDOCK	JUBILEE	KOSKAS
BACKHOE														
BLOWER												2		
BOBCAT														
BOGGER														
BUCKET ELEVATOR														
BULLDOZER														
D10														
D9														
D8														
D7			1											
D6								1						
D4														
COMPRESSOR														
100CFM	1													
180CFM		1				1						3		
350CFM												1		
DRILLING RIGS														
CALWELD														
INVESTIGATOR														
SMALL AUGER														
ROTARY														
CRANE														
EXCAVATOR														
GENERATOR														
SMALL/MED							1							
LARGE			1											
LOADER-FRONT END			1											
NOODLING MACHINE			1				2					1		
SCRAPER														
SELF DUMPER							1					3		
TUNNELING MACHINE														
WINCH-AIR/ELECTRIC								1						
WINCH-HAND					1									
YORKE HOIST	1	1				1						2		
REG. PSC														
AT 7/11/88	18	5	4			2	18	38		1	19	1		1

ANDAMOOKA OPAL FIELD EQUIPMENT COUNT AT OCT 1988

TABLE A8

EQUIPMENT	LUNATIC NEW HILL 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					11	6	8
BLOWER				1					1		0	4
BOBCAT										3	3	3
BOGGER												
BUCKET ELEVATOR												
BULLDOZER												
D10												
D9					1					1	1	2
D8											0	0
D7					1					4	2	4
D6					1						0	2
D4				1	1					1	1	3
COMPRESSOR												
100CFM					1						0	2
180CFM	1				1				1	14	7	15
350CFM					1					6	3	5
DRILLING RIGS												
CALWELD										1	1	1
INVESTIGATOR											0	0
SMALL AUGER										2	1	1
ROTARY											0	0
CRANE											0	0
EXCAVATOR											0	0
GENERATOR												
SMALL/MED					2						0	5
LARGE				1							0	4
LOADER-FRONT END					2					3	2	5
NOODLING MACHINE					2					3	2	8
SCRAPER											0	0
SELF DUMPER	3				2					1	1	10
TUNNELING MACHINE				1							0	1
WINCH-AIR/ELECTRIC				1							0	2
WINCH-HAND				3	1						0	5
YORKE HOIST			1	3							0	9
REG. PSC												
AT 7/11/88	17	1	13	55	8	70	1	3				275

COOPER PEDY EQUIPMENT COUNT AS AT OCT 1988

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		
BLOWER									2						6	3	2	3	4
BOBCAT																			
BOGGER																1			
BUCKET ELEVATOR															4				
BULLDOZER																			
D10																			
D9			1										1				1		
D8	1		2												1				1
D7				1															
D6															1	1			
D4																			
COMPRESSOR																			
100CFM																			
180CFM														3	1	1			2
350CFM																2			
DRILLING RIGS																			
CALWELQ																			
INVESTIGATOR																			1
SMALL AUGER				1													1		1
ROTARY																			
CRANE																			
EXCAVATOR																	1		1
GENERATOR																			
SMALL/MED																			
LARGE														3	2	1	1		
LOADER-FRONT END			1										3		2	1	8		5
NOODLING MACHINE			1										3		1		8		4
SCRAPER																			
SELF DUMPER																			1
TUNNELING MACHINE														3	2		1		
WINCH-AIR/ELECTRIC														3	2				1
WINCH-HAND													1						
YORKE HOIST						1				1					1		1		1
REG. PSC																			
AT 7/11/88	3	2	12	18		1	3	3		13	9		9	52	21	11	75		30

COOPER PEDY EQUIPMENT COUNT AS AT OCT 1988

TABLE A10

EQUIPMENT	GERMAN GULLY	GERMAN VALLEY	GREEK GULLY	HALLEY'S COMET	HANS PEAK	HELLENIC HILL	HOPEFUL MILLS	JUNGLE	JUPITER	KENDA FLAT	KIMBA	LARKINS FOLLY	LENNON	OPAL VALLEY	OLYMPIC	TEAL WATER HOLE	PERFETTO	PIPING LANE	POTCH GULLY	PROSPECT
BACKHOE			1					1		1			1							
BLOWER			7		2		1			3		3	3		24				2	
BOBCAT																				
BOGGER															1					
BUCKET ELEVATOR							1								1					
BULLDOZER																				
D10																				
D9																				
D8																			1	
D7		1																	3	
D6																				
D4									1										1	
COMPRESSOR																				
100CFM															1					
180CFM		1	1		1							1			3				1	
350CFM									1						2					1
DRILLING RIGS																				
CALWELD			1												2					
INVESTIGATOR								1				1								
SMALL AUGER																				
ROTARY																				
CRANE																				
EXCAVATOR													1	1					1	
GENERATOR																				
SMALL/MED															2					
LARGE		1	1				1		1	1					5				1	
LOADER-FRONT END			2				1					2		1	5				1	
NOODLING MACHINE			2					1				1			2				1	
SCRAPER																				
SELF DUMPER									1						1					
TUNNELING MACHINE		1	1				1			1			1		5				1	
WINCH-AIR/ELECTRIC			1							1		1	1		10					
WINCH-HAND									1					1						
YORKE HOIST															3					1
REG. PSC																				
AT 7/11/88	17	2	37		23	2	1	11	5	10	1	16	7	8	95				41	9

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	16	8	16
BLOWER		1	1	1	1	1	3			1		2			88	55	28	196
BOBCAT						1									4		0	5
BOGGER															4		0	6
BUCKET ELEVATOR				1												6	3	10
BULLDOZER																		
D10																	0	0
D9				1												3	2	6
D8		1		1	1											3	2	11
D7													1			3	2	8
D6																2	1	3
D4															2		0	4
COMPRESSOR																		
100CFM				1												3	2	4
180CFM		2										1			6	41	21	45
350CFM															2	2	1	9
DRILLING RIGS																		
CALWELD		1				1						3			9	5	5	22
INVESTIGATOR															1	10	5	9
SMALL AUGER				1												7	4	8
ROTARY																	0	0
CRANE																	0	0
EXCAVATOR																	0	5
GENERATOR																		
SMALL/RED		1										1			6	4	2	12
LARGE				1	2					1		1			23	9	5	51
LOADER-FRONT END				1	3	3	3								7	24	12	61
NOODLING MACHINE		1		2	3	3	1								3	8	4	41
SCRAPER		1														1	1	2
SELF DUMPER																3	2	5
TUNNELING MACHINE				1	2		1			1		1			22	5	3	48
WINCH-AIR/ELECTRIC		1		2						2					15	2	1	41
WINCH-HAND																		
YORKE HOIST					3					1		2			2	1	1	18
REG. PSC																		
AT 7/11/88		11	1	10	41	8	11	11	2	7		1	1		362			1013

MINTABIE, STUART CREEK AND MINOR FIELDS EQUIPMENT COUNT AT OCT 1988

TABLE A12

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	OULDURRA HILL	SARDA BLUFF	VESUVIUS	WELBOURN HILL	TOTAL STUART CK & MINOR FIELDS
BACKHOE							2	2									
BLOWER	5			1		5	5	16									
BOBCAT	1			1		2	4	15									
BOGGER				1				1									
BUCKET ELEVATOR								0									
BULLDOZER																	
D10	1							1									
D9	11	2	3	2		8	9	35									
D8	2					1	2	5									
D7								0									
D6								0									
D4			1					1									
COMPRESSOR							1										
100CFM						1	4	5									
180CFM	11		1			7	15	34									
350CFM				1		4	3	8									
DRILLING RIGS																	
CALWELD	1					1		2									
INVESTIGATOR	10	2		6		4	6	28									
SMALL AUGER							5	5									
ROTARY								0									
CRANE								0									
EXCAVATOR	1							1									
GENERATOR																	
SMALL/MED	1	1				1	3	106									
LARGE				1				4									
LOADER-FRONT END							2	2									
NOODLING MACHINE								0									
SCRAPER	1		2			1	8	12									
SELF DUMPER	3	1	1			1		6									
TUNNELING MACHINE								0									
WINCH-AIR/ELECTRIC								0									
WINCH-HAND																	
YORKE HOIST	2		2	2		6		12									
REG. PSC																	
AT 7/11/88	457	56	114	131	2	296		1056				1		1			2

APPENDIX B

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

OPERATING AND CAPITAL COSTS AT JULY 1988

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	20	600000	116600	7	210000	40810	3	90000	17490		0	0	30	900,000	174,900
BLOWER	12000	9000	168	2016000	1512000	6	72000	54000	21	252000	189000		0	0	195	2,340,000	1,755,000
BOBCAT	15000	3360	1	15000	3360	1	15000	3360	15	225000	50400		0	0		255,000	57,120
BOGGER	4000	200	10	40000	2000	0	0	0	1	4000	200		0	0	11	44,000	2,200
BUCKET ELEVATOR	8500	500	15	127500	7500	3	25500	1500	0	0	0		0	0	18	153,000	9,000
BULLDOZER																	
D10	800000	96000	0	0	0	0	0	0	1	800000	96000		0	0		800,000	96,000
D9	350000	64440	3	1050000	193320	1	350000	64440	30	1050000	1933200		0	0	34	11,900,000	2,190,960
D8	245000	48170	11	2695000	529870	4	980000	192680	8	1960000	385360		0	0	23	5,635,000	1,107,910
D7	160000	32980	7	1120000	230860	5	800000	164900	1	160000	32980		0	0	13	2,080,000	428,740
D6	100000	23040	5	500000	115200	1	100000	23040	2	200000	46080		0	0	8	800,000	184,320
D4	55000	18720	2	110000	37440	4	220000	74880	1	55000	18720		0	0	7	385,000	131,040
COMPRESSOR																	
100CFM	13000	1420	27	351000	38340	17	221000	24140	23	299000	32660		0	0	67	871,000	95,160
180CFM	14000	2840	28	392000	79520	7	98000	19880	14	196000	39760		0	0	49	686,000	139,160
350CFM	24000	4260	10	240000	42600	1	24000	4260	9	216000	38340		0	0	20	480,000	85,200
DRILLING RIGS																	
CALWELD	150000	9200	24	3600000	220800	1	150000	9200	2	300000	18400		0	0	27	4,050,000	248,400
INVESTIGATOR	45000	6400	6	270000	38400	0	0	0	29	1305000	185600		0	0	35	1,575,000	224,000
SMALL AUGER	5000	4400	4	20000	17600	2	10000	8800	1	5000	4400		0	0	7	35,000	30,800
ROTARY	100000	9000	1	100000	9000	0	0	0	4	400000	36000		0	0	5	500,000	45,000
CRANE	10000	1000	0	0	0	0	0	0	0	0	0		0	0	0	0	0
EXCAVATOR	138000	32980	1	138000	32980	3	414000	98940	1	138000	32980		0	0	5	690,000	164,900
GENERATOR																	
SMALL/MED	800	720	56	44800	40320	18	14400	12960	109	87200	78480		0	0	183	146,400	131,760
LARGE	8000	4220	58	464000	244760	8	64000	33760	4	32000	16880		0	0	70	560,000	295,400
LOADER-FRONT END	30000	5830	49	1470000	285670	8	240000	46640	3	90000	17490		0	0	60	1,800,000	349,800
NOODLING MACHINE	8000	1000	42	336000	42000	9	72000	9000	1	8000	1000		0	0	52	416,000	52,000
SCRAPER	100000	19440	2	200000	38880	2	200000	38880	12	1200000	233280		0	0	16	1,600,000	311,040
SELF DUMPER	1500	720	3	4500	2160	10	15000	7200	8	12000	5760		0	0	21	31,500	15,120
TUNNELING MACHINE	25000	1500	39	975000	58500	1	25000	1500	0	0	0		0	0	40	1,000,000	60,000
WINCH-AIR/ELECTRIC	1000		33	33000	0	1	1000	0	1	1000	0		0	0	35	35,000	0
WINCH-HAND	100		0	0	0	7	700	0		0	0		0	0	7	700	0
YORKE HOIST	700	400	11	7700	4400	15	10500	6000	18	12600	7200		0	0	44	30,800	17,600
TOTAL				16919500	3944080		4332100	940770		18547800	3517660		0	0		39,799,400	8,402,510

TOTAL CAPITAL COST ALL FIELDS: \$39,799,400
 TOTAL RUNNING COST ALL FIELDS: \$8,402,510

OPERATING AND CAPITAL COSTS AT OCTOBER 1988

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 FIELDS TOTAL CAPITAL COST	MINOR FIELDS TOTAL RUNNING COST	TOTAL UNITS	TOTAL CAPITAL COST	TOTAL RUNNING COST
BACKHOE	30000	5830	16	480000	93280	8	240000	46640	2	60000	11660			0	26	780,000	151,580
BLOWER	12000	9000	196	2352000	1764000	4	48000	36000	16	192000	144000			0	216	2,592,000	1,944,000
BOBCAT	15000	3360	5	75000	16800	3	45000	10080	15	225000	50400			0		345,000	77,280
BOGGER	4000	200	6	24000	1200		0	0	1	4000	200			0	7	28,000	1,400
BUCKET ELEVATOR	8500	500	10	85000	5000		0	0		0	0			0	10	85,000	5,000
BULLDOZER																	
D10	800000	96000		0	0		0	0	1	800000	96000			0		800,000	96,000
D9	350000	64440	6	2100000	386640	2	700000	128880	35	12250000	2255400			0	43	15,050,000	2,770,920
D8	245000	48170	11	2695000	529870	0	0	0	5	1225000	240850			0	16	3,920,000	770,720
D7	160000	32980	8	1280000	263840	4	640000	131920		0	0			0	12	1,920,000	395,760
D6	100000	23040	3	300000	69120	2	200000	46080		0	0			0	5	500,000	115,200
D4	55000	18720	4	220000	74880	3	165000	56160	1	55000	18720			0	8	440,000	149,760
COMPRESSOR																	
100CFM	13000	1420	4	52000	5680	2	26000	2840	5	65000	7100			0	11	143,000	15,620
180CFM	14000	2840	45	630000	127800	15	210000	42600	34	476000	96560			0	94	1,316,000	266,960
350CFM	24000	4260	9	216000	38340	5	120000	21300	8	192000	34080			0	22	528,000	93,720
DRILLING RIGS																	
CALWELD	150000	9200	22	3300000	202400	1	150000	9200	2	300000	18400			0	25	3,750,000	230,000
INVESTIGATOR	45000	6400	9	405000	57600		0	0	28	1260000	179200			0	37	1,665,000	236,800
SMALL AUGER	5000	4400	8	40000	35200	1	5000	4400	5	25000	22000			0	14	70,000	61,600
ROTARY	100000	9000		0	0		0	0		0	0			0	0	0	0
CRANE	10000	1000		0	0		0	0		0	0			0	0	0	0
EXCAVATOR	138000	32980	5	690000	164900		0	0	1	138000	32980			0	6	828,000	197,880
GENERATOR																	
SMALL/MED	800	720	12	9600	8640	5	4000	3600	106	84800	76320			0	123	98,400	88,560
LARGE	8000	4220	51	408000	215220	4	32000	16880	4	32000	16880			0	59	472,000	248,980
LOADER-FRONT END	30000	5830	61	1830000	355630	5	150000	29150	2	60000	11660			0	68	2,040,000	396,440
NOODLING MACHINE	8000	1000	41	328000	41000	8	64000	8000		0	0			0	49	392,000	49,000
SCRAPER	100000	19440	2	200000	38880		0	0	12	1200000	233280			0	14	1,400,000	272,160
SELF DUMPER	1500	720	5	7500	3600	10	15000	7200	6	9000	4320			0	21	31,500	15,120
TUNNELING MACHINE	25000	1500	48	1200000	72000	1	25000	1500		0	0			0	49	1,225,000	73,500
WINCH-AIR/ELECTRIC	1000		41	41000	0	2	2000	0		0	0			0	43	43,000	0
WINCH-HAND	100			0	0	5	500	0		0	0			0	5	500	0
YORKE HOIST	700	400	18	12600	7200	9	6300	3600	12	8400	4800			0	39	27,300	15,600
TOTAL				18980700	4578720		2847800	606030		18661200	3554810			0	0	40,489,700	8,739,560

TOTAL CAPITAL COST ALL FIELDS: \$40,489,700

TOTAL RUNNING COST ALL FIELDS: \$8,739,560

OPAL PRODUCTION --- 1988

TABLE B3

	COOBER PEDY	ANDAMOOKA	MINTABIE	MINOR FIELDS	TOTAL
NUMBER OF MINERS					
JULY	600	80	750	0	1,430
OCTOBER	650	96	800	0	1,546
CAPITAL INVESTMENT					
JULY	16,919,500	4,332,100	18,547,800		39,799,400
OCT	18,980,700	2,847,800	18,661,200		40,489,700
RUNNING COSTS					
JULY	3,944,080	940,770	3,517,660		8,402,510
OCT	4,578,720	606,030	3,554,810		8,739,560
CONSTANT	24,400	23,900	43,400	23,900	
PRODUCTION JULY	20,276,030	3,285,980	37,922,440	0	61,484,450
PRODUCTION OCT	22,336,790	3,185,210	40,140,930		65,662,930
AVERAGE NO. OF MINERS 1988	625	88	775	0	1,488
AVERAGE CAPITAL INVESTMENT 1988	17,950,100	3,589,950	18,604,500	0	40,144,550
AVERAGE RUNNING COSTS 1988	4,261,400	773,400	3,536,235	0	8,571,035
ANNUAL PRODUCTION 1988	21,306,410	3,235,595	39,031,685	0	63,573,690
AVERAGE NO. OF PSC'S 1988	1,032	266	1,063	0	2,361

APPENDIX C

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

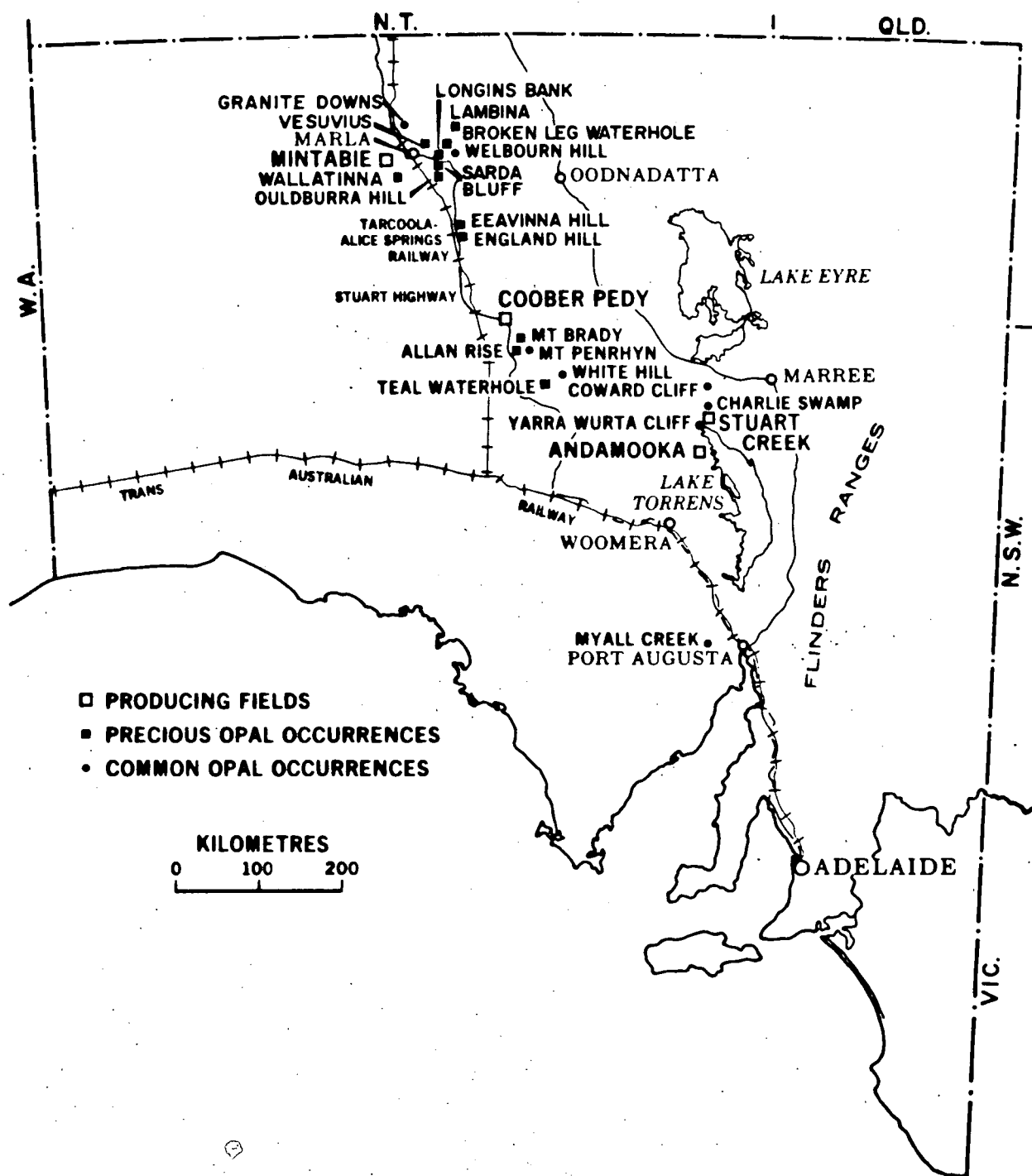


Fig. 1

DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA		SCALE: 1:7400 000
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DRN:	CKD:	PLAN NUMBER S20849
OPAL OCCURRENCES IN SOUTH AUSTRALIA		

SOUTH AUSTRALIAN PRECIOUS STONES FIELDS NUMBER OF REGISTERED PRECIOUS STONES CLAIMS 1974-1980



DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

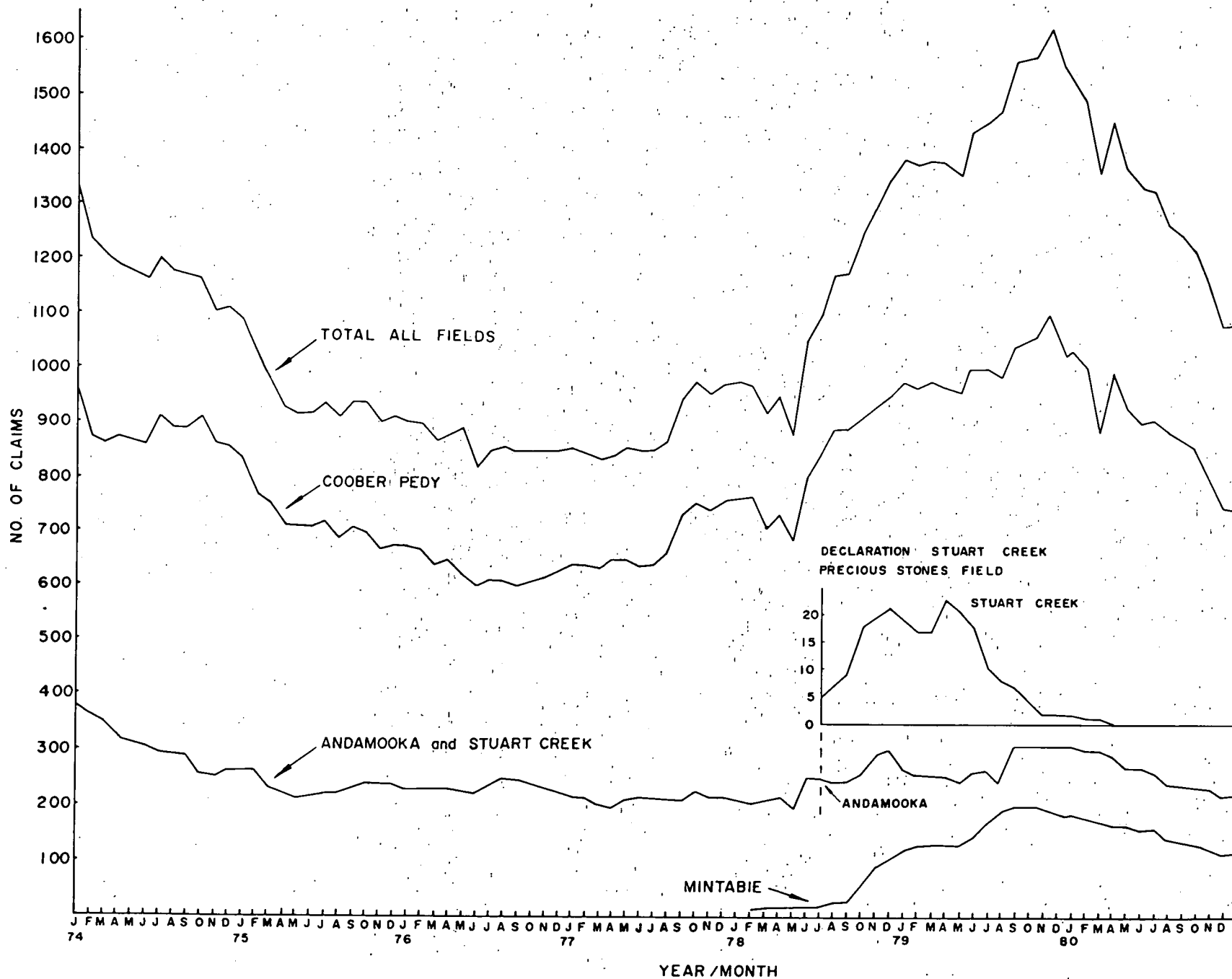


FIG. 2

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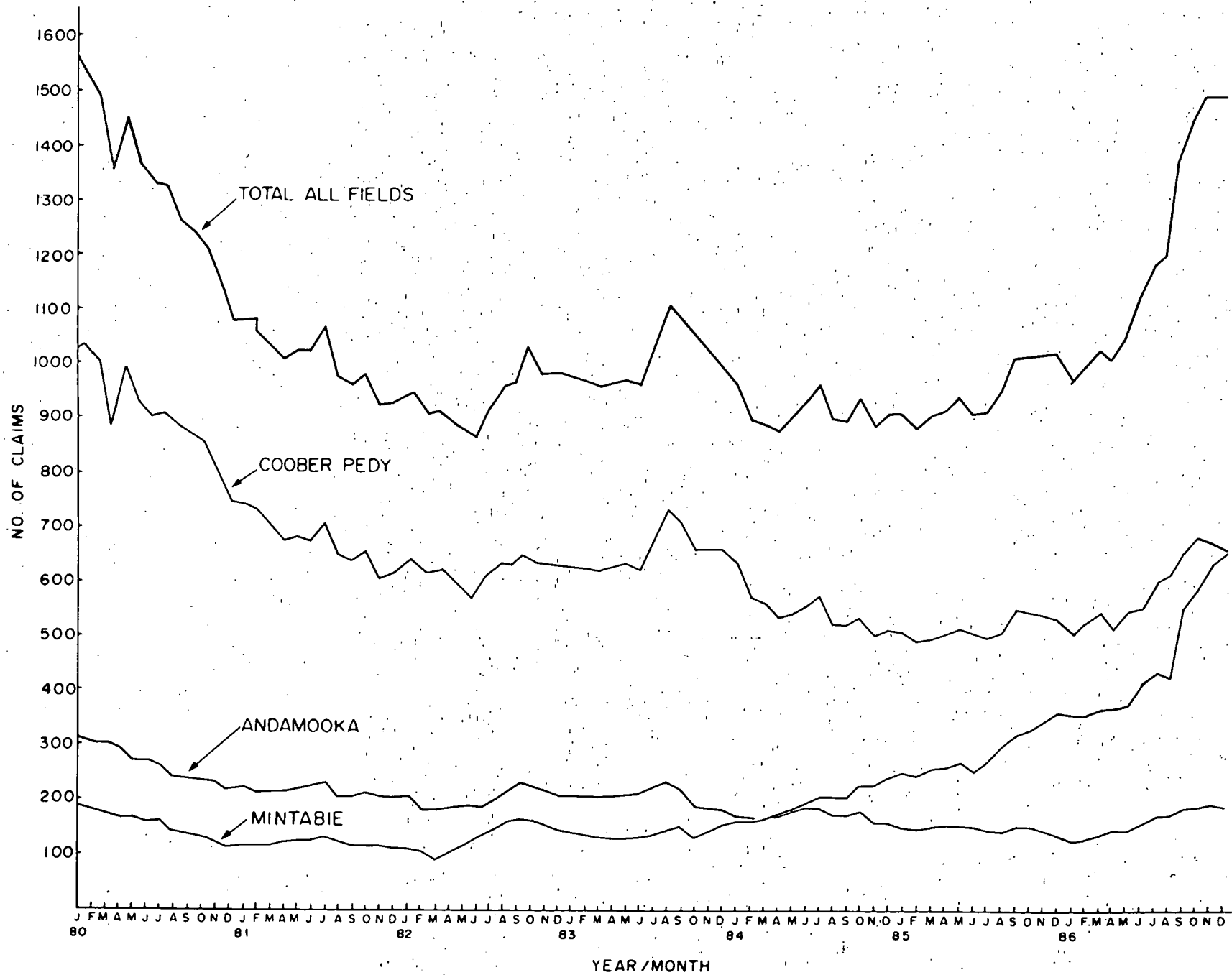
PLAN NUMBER
S 20773

SOUTH AUSTRALIAN PRECIOUS STONES FIELDS NUMBER OF REGISTERED PRECIOUS STONES CLAIMS 1980 - 1986

DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

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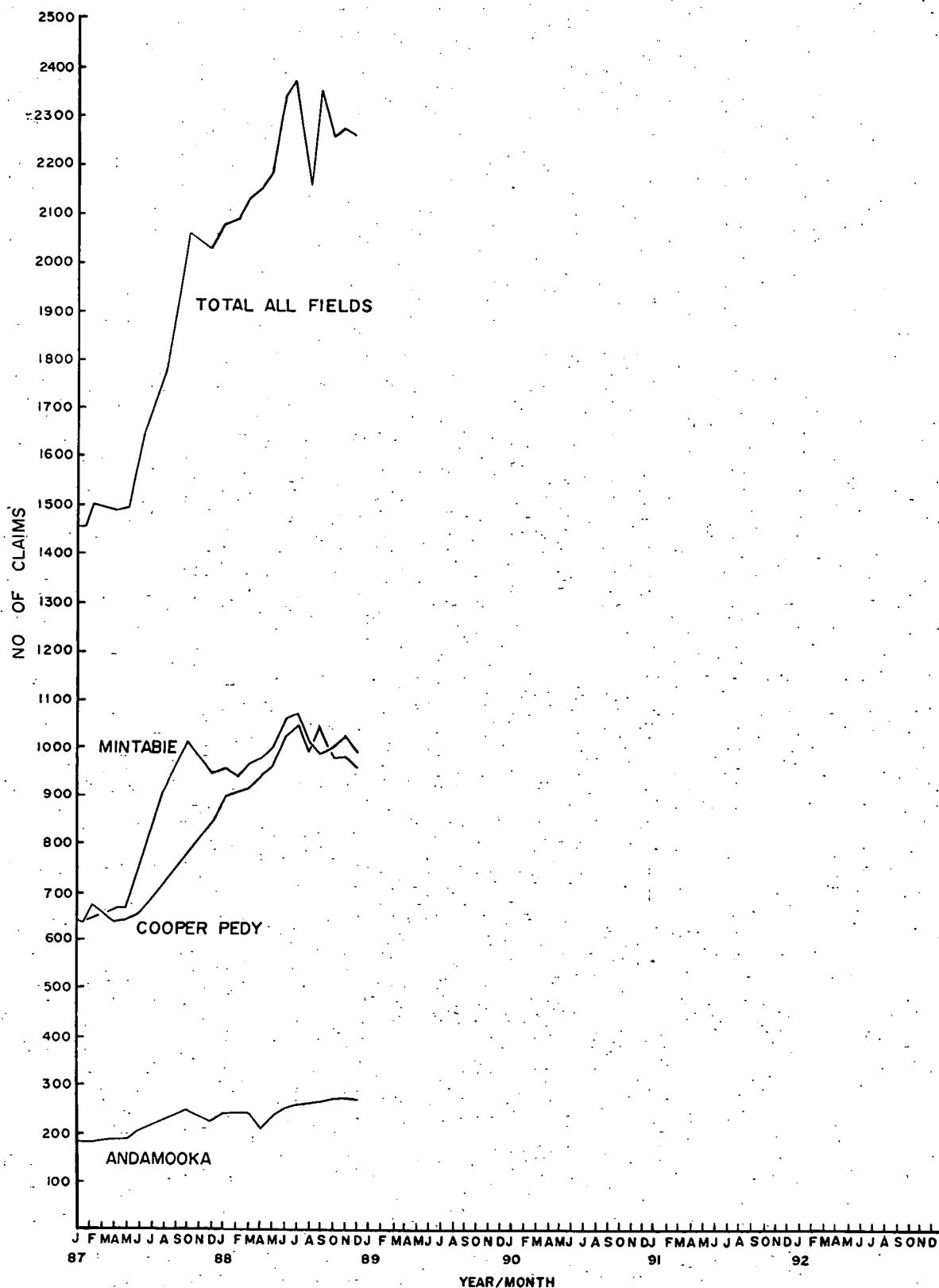


FIG. 4



DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

SOUTH AUSTRALIAN PRECIOUS STONES FIELDS
NUMBER OF PRECIOUS STONES CLAIMS 1987-1988

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C.D.O. DATE

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D.S.L

SCALE

DATE
May 89

PLAN NUMBER

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S20775

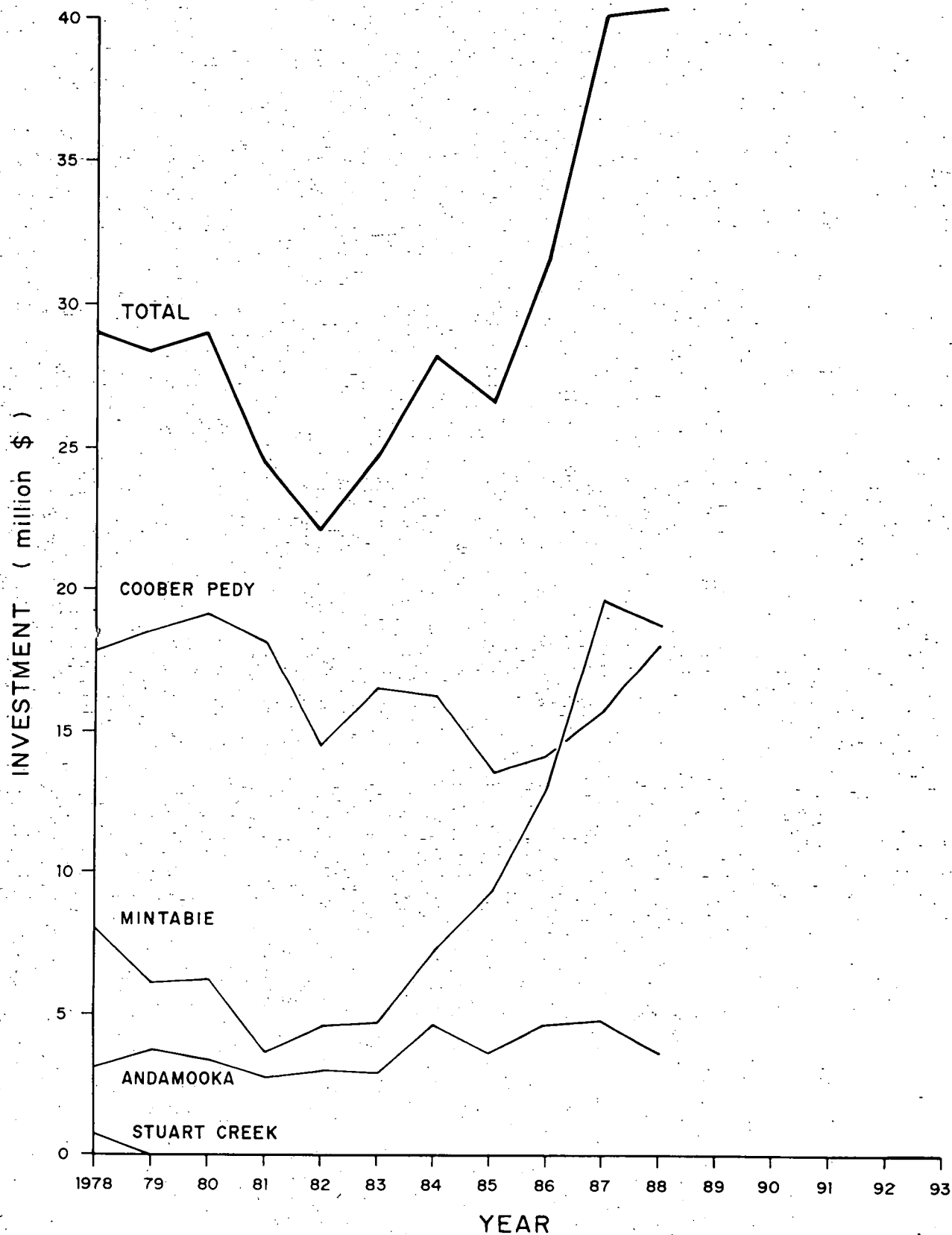



Figure 5

 <p>DEPARTMENT OF MINES AND ENERGY SOUTH AUSTRALIA</p> <p>SOUTH AUSTRALIAN PRECIOUS STONES FIELDS CAPITAL INVESTMENT 1978 - 1988</p>	COMPILED M.W.F.	<i>WC</i> 26.8.88 C.D.O. DATE
	DRAWN M.R.	SCALE
	DATE May 89	PLAN NUMBER
	CHECKED	S 20776

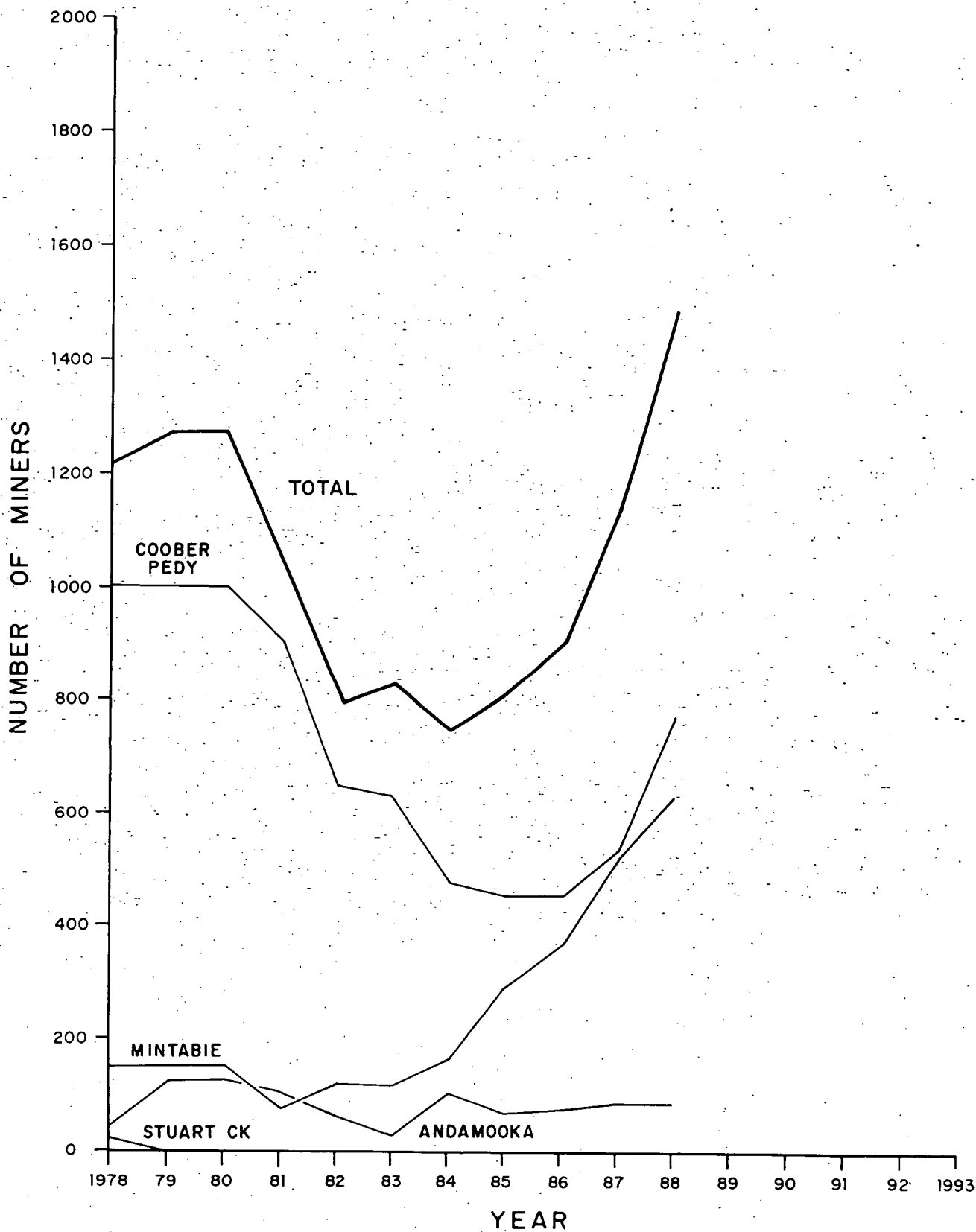


Figure 6



**DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA**

**SOUTH AUSTRALIAN PRECIOUS STONES FIELDS
NUMBER OF MINERS 1978 - 1988**

COMPILED
M.W.F

WRC 26.8.88
C.D.O. DATE

DRAWN
M.R.

SCALE

DATE
MAY 89
CHECKED.

PLAN NUMBER
S 20777

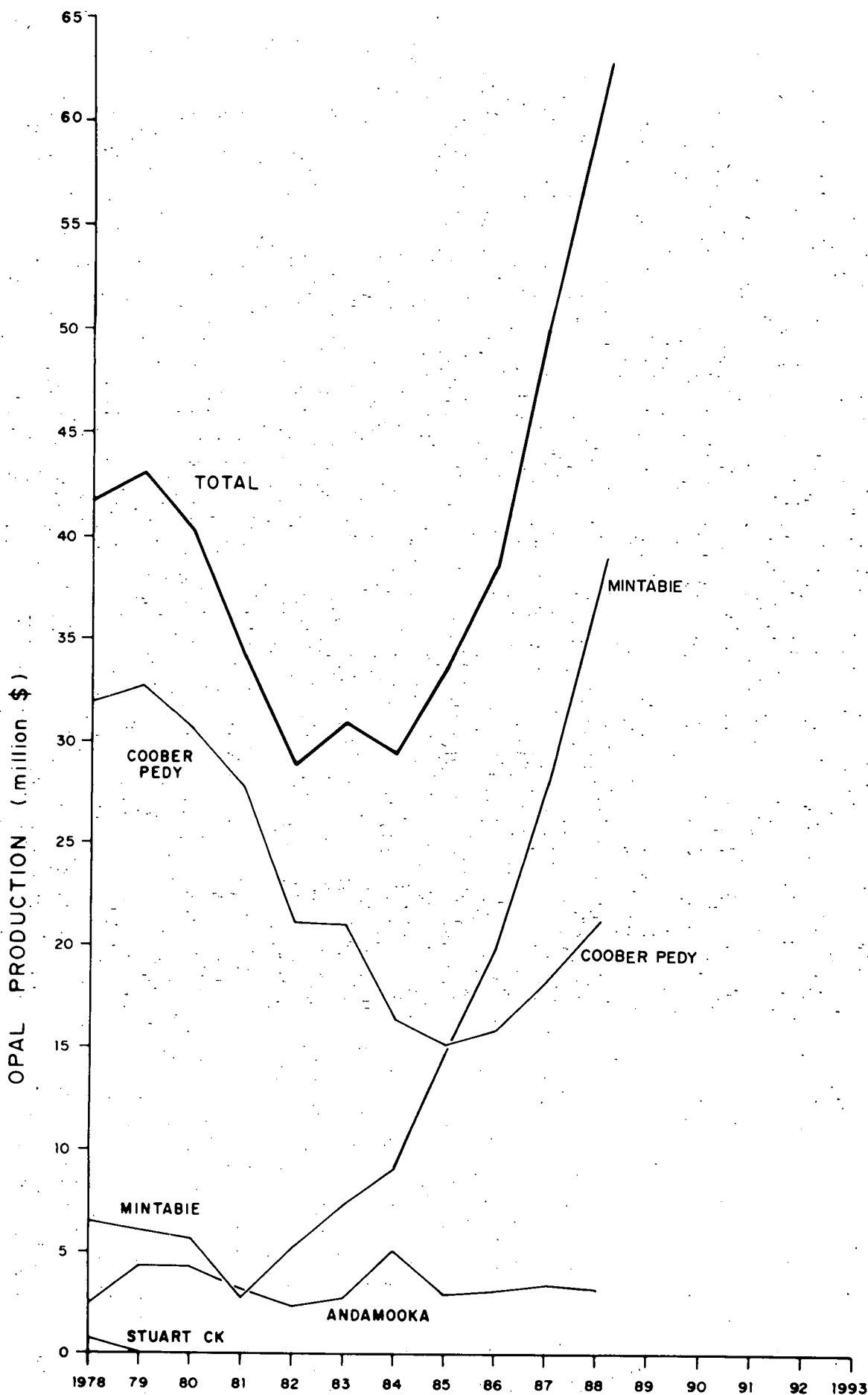


FIG. 7



DEPARTMENT OF MINES AND ENERGY
SOUTH AUSTRALIA

SOUTH AUSTRALIAN PRECIOUS STONES FIELDS
OPAL PRODUCTION 1978 - 1988

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M.W.F.

C.R.O. DATE

DRAWN

SCALE

DATE
May 89
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PLAN NUMBER
S 20778