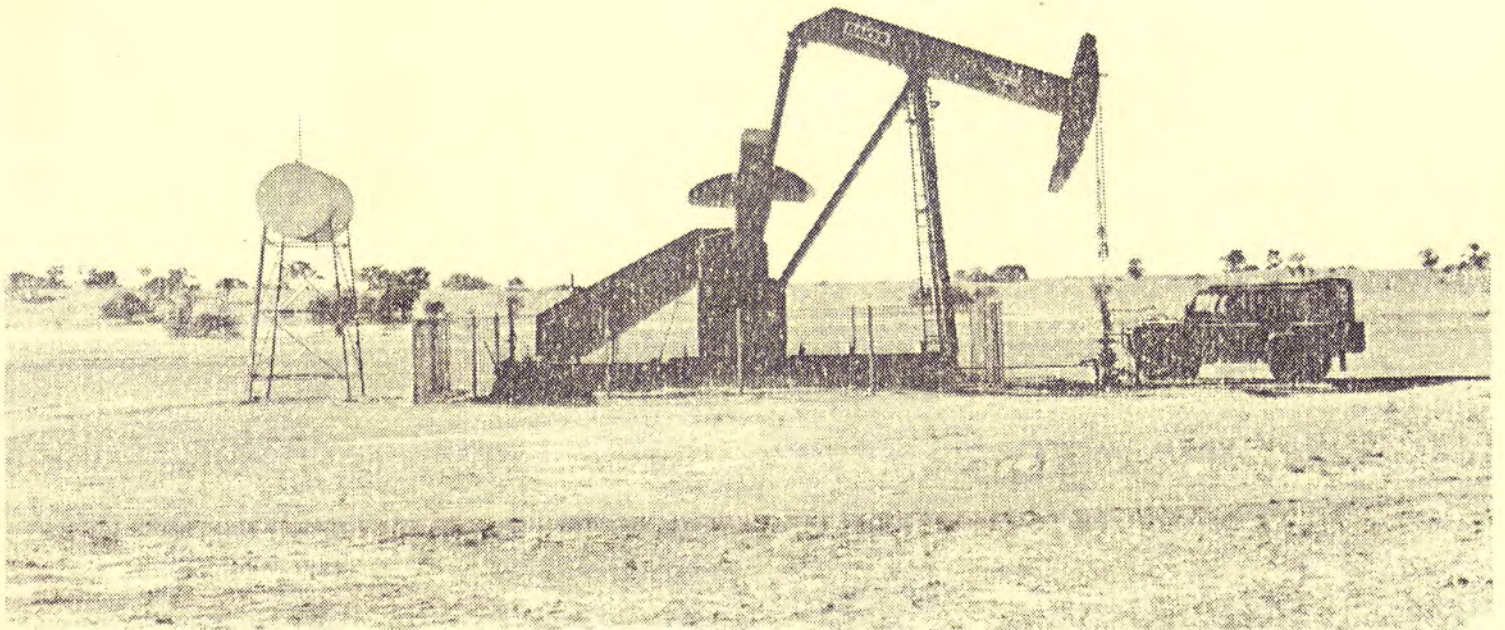


AIR SVY SQDN
SVY COMPS CELL/RECORDS



OPERATION OPAL WARRIOR 1991

FIELD COMPLETION OPERATION STRZELECKI



4th FIELD SURVEY SQUADRON



OPAL WARRIOR 91
~~116~~

OPERATION OPAL WARRIOR 91

OPERATION REPORT

A FIELD COMPLETION OPERATION

CONDUCTED IN THE

COOPER BASIN REGION

SOUTH AUSTRALIA

MAY 1991

4th FIELD SURVEY SQUADRON

DISTRIBUTION LIST

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OPERATION OPAL WARRIOR 91

OPERATION REPORT

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- B. Operation Results
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- C. Aerial Photography
Appendix
 - 1. Supplementary Photography SH 54-02 STRZELECKI
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- E. Personnel
- F. Vehicle Report

Executive Summary

1. Operation Opal Warrior 91 was conducted by 4th Field Survey Squadron in the Cooper Basin region of the far north of South Australia. The operation was conducted during the period 4 - 24 May 91.
2. The aim of Operation Opal Warrior 91 was to carry out the following field survey tasks:
 - a. Field completion of 24 x 1:50 000 maps constituting the NTMS 1:250 000 SH 54-02 STRZELECKI.
 - b. The acquisition of Photographic Interpretation Guide (PIG) photography for SG 54-14 INNAMINCKA.
3. In addition to these tasks two other opportunity tasks were to be undertaken. These are outlined in the body of the report.
4. All tasks except the acquisition of the PIG photography were successfully achieved.
5. The region is a major gas and oil producing field with an average of seven new gas or oil wells being drilled each month. The original plotting photography was flown in 1988 and as expected there had been major changes to the cultural detail since then.

OPERATION REPORT
OPERATION OPAL WARRIOR 91
MAY 91

- References:
- A. DGOP-A Tasking Directive 1/90 Survey Operations FY 90/91
 - B. Reconnaissance Report Op Opal Warrior 91 dated 27 Feb 91
 - C. LHQ AUST SIC BAK 3388/91 of 232329Z APR 91 Op Opal Warrior 91 - Svy OP ORD 4/91

Introduction.

1. Operation Opal Warrior 91 was a field completion Operation conducted in the Cooper Basin region of South Australia from 4 May 91 to 24 May 91. The Operation base was maintained at Moomba Gas Plant (Moomba) during the period 5 May to 22 May 91. All field activities were supported from this base.

Mission.

2. Det 4 Fd Svy Sqn was to carry out the following field survey tasks:

- a. Field completion of 24 x 1:50 000 maps constituting the NTMS 1:250 000 SH 54-02 STRZELECKI.
- b. The acquisition of Photographic Interpretation Guide (PIG) photography for SG 54-14 INNAMINCKA,

In addition two other opportunity tasks were to be undertaken and are outlined in the body of this report.

Area of Operations.

3. The area of operations was within the geographic limits of SH 54-02 STRZELECKI. This area is shown at Annex A.

Operation Results.

4. Det 4 Fd Svy Sqn completed the primary task of the Operation as defined in Ref A. Full Operation results are defined at Annex B.

Conduct of the Operation.

5. The Det deployed from Adelaide, by road, on 4 May 91 arriving at Moomba on 5 May 91 having covered approximately 1100 km.

6. The Operation base was located at Moomba and the Operation commenced on 6 May 91 with the deployment of four field check parties to the AO.

7. Field check packages consisted of dyelines, colour guides and a 1:100 000 composite positive primarily for navigation. During field checking, annotation onto a single dyeline proved unsatisfactory, the navigation positive was used extensively and proved successful in most areas.

8. Two AAAvn LOHs arrived at Moomba on 12 May 91 and commenced operations on 13 May 91. The LOHs were employed for field checking purposes.

9. An AAAvn Pilatus Porter aircraft, fitted with an RC10 aerial camera, arrived on 15 May 91 and commenced operations on 16 May 91.

10. The aerial camera initially presented no problems but as the Operation progressed the reliability of the camera's exposure meter steadily deteriorated. The quality of the supplementary photography varied from good and usable to poor and un-usable.

11. Most supplementary photography for the AO was acquired, additional photography is required for several areas and has been requested from South Australian Lands. The aerial photography report is attached as Annex C.

12. Fuel for aircraft and vehicles was available at Moomba. The aircraft returned to Moomba each night.

13. The sequence of events is shown at Annex D.

Administration and Logistics.

14. Personnel. The personnel involved in Operation Opal Warrior 91 are shown at Annex E.

15. Aircraft Support. The following aircraft support were used on the Operation:

- a. 2 x LOHs which flew a total of 30.4 hours from a task allocation of 50.

- b. The Pilatus Porter flew a total of 21.1 hours. The task allocation was 20. The additional hours were required for:
- (1) travel time for the aircraft between Adelaide and the AO not included in the estimate, and
 - (2) the requirement to re-fly unacceptable runs of photography.
16. Additional Porter flying hours were made available through 173 Gen Spt Sqn.
17. Vehicles. Details of the vehicles used during the Operation are as follows:
- a. 4 x LR 110 FFR from Unit resources;
 - b. 1 x truck cargo MC2 from Unit resources;
 - c. 1 x Toyota 4 x 4 rental vehicle, hired from Cooper Basin Fuel Supply located Moomba; and
 - d. 1 x bicycle from Unit resources.
18. On 12 May 91 an incident occurred involving vehicle ARN 49 169 which necessitated a formal investigation.
19. It is clear that in order to be fully prepared to field complete an area by vehicle all drivers must hold an unrestricted driving license. This Unit conducted in-house training to achieve 'restricted' licenses for all members of the Operation. To achieve unrestricted licenses was simply not possible in the time frame available.
20. A full report on vehicles is attached at Annex F.
21. POL. The usage of POL was as follows:
- a. Diesel: 3 000 l, and
 - b. Avtur : 10 500 l.
22. Stores and Equipment. All stores and equipment required for the Operation were available through Unit resources.
23. The RC10 camera was fitted to the Pilatus Porter in Adelaide. Fitting and testing was carried out by Unit personnel prior to the aircraft arrival in the AO. This significantly reduced the chance of damage to the camera during transport to the AO by vehicle.

24. Accommodation. The operations area and sleeping accommodation was in ATCO style huts, normally used by Santos contractors. The hut floor plan was in the shape of a "H" with all personnel accommodated down one side. The technical area was located in the cross bar, with a dark room constructed in the communal ablutions of the unoccupied side of the block. Two rooms were utilized as store rooms at no additional cost.

25. Catering and Resupply. All rations were supplied by the Santos catering contractor. The Travel and Subsistence account was drawn upon for payment.

26. A total of \$14 369.13 was expended for accommodation and rations. The estimate provided in Ref B was exceeded due to late notification of an increase in the number of personnel associated with the LOHs and un-scheduled visits by CAPT B. McDonald, 4 Fd Svy Sqn, as Investigating Officer and CPL Robshaw, Adelaide Logistics Battalion, a vehicle recovery mechanic.

27. Canteen. A limited canteen service was provided through the 4 Fd Svy Sqn Social Club.

28. Medical. Medical services were available from the Royal Flying Doctor Service Paramedics, located at Moomba. The facility was used twice for the treatment of minor problems.

29. Morale and Discipline. Morale was generally high throughout the Operation, although the vehicle incident lowered morale for a few days. The maintaining of high morale was aided by the availability of Santos's excellent living and recreation facilities. Conduct of individual members was good and there was no requirement for disciplinary action to be taken.

30. Finance. Expenditure for the Operation was as follows:

- | | | |
|----|------------|------------------|
| a. | F and C | \$187.00, |
| b. | T and S | \$14 369.13, and |
| c. | Petty Cash | Nil. |

31. Land Clearances. Prior to the Operation, letters were sent to the land owners in the AO requesting permission to enter onto property to complete the field check. Of the six letters sent only two replies were received, each consented to property access. During the reconnaissance a permit was obtained from the National Parks and Wildlife Service SA for entry to the Innamincka Regional Reserve.

32. Communications. Each field party carried an AN/PRC F3 radio for communication. The radio was to be used in case of emergency and to transmit the daily SITREP when parties stayed in the field overnight.

33. The radio communications were so poor that most SITREPs were passed by telephone. Further, and more importantly, this seriously effected the safety of operations as field parties could not be relied upon to be able to contact main base in the case of an emergency.

34. Rear link to 4 Fd Svy Sqn was by STD telephone available at Moomba.

Conclusions/Recommendations.

35. Conclusions/Recommendations to be made from the conduct of the Operation are:

- a. Future operations in this region should again make use of the excellent facilities and services available through Santos.
- b. A more reliable, and convenient, means of communication between an Operation base and remote survey parties be obtained.
- c. All personnel on a vehicle mounted operation need an unrestricted Military Drivers License (PH99),
- d. A qualified transport NCO or vehicle mechanic be added to manning for all Operations.

 CAPT

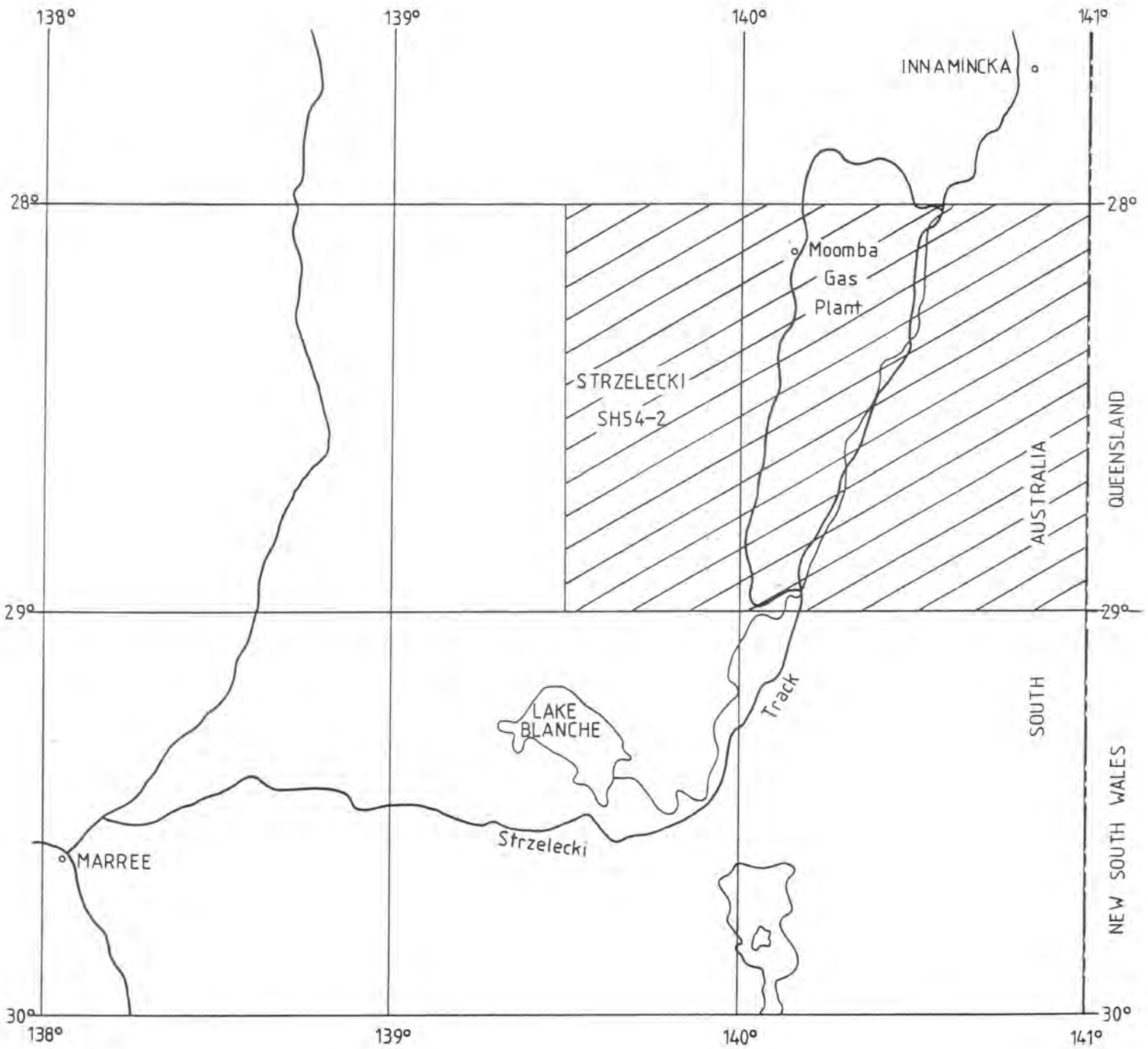
L.A. NEWTON
Major
Officer Commanding

22 Jul 91

- Annexes:
- A. Area of Operation
 - B. Operational Results
 - C. Aerial Photography Report
 - D. Sequence of Events
 - E. Personnel
 - F. Vehicle Report

AREA OF OPERATION

Shown below is the AO for Operation Opal Warrior 91.



OPERATION RESULTS

Introduction

1. Det 4 Fd Svy Sqn primary tasks were:
 - a. the field completion of 24 x 1:50 000 map sheets, and
 - b. the acquisition of Photographic Interpretation Guide (PIG) photography for SG 54-14 INNAMINCKA,
2. Additional opportunity tasks included:
 - a. acquiring 35 mm photography requested by HQ 4 MD Int Cell for use during the Commander 4 MD's brief, and
 - b. if LOH task hours permit, a re-visit to Survey Station PSM 8699.

Field Completion

3. Background. 4 Fd Svy Sqn plotted and produced field check packages for all map sheets in the A0.
4. Source Data. Source data consisted of:
 - a. 1:50 000 field check packages,
 - b. 1:250 000 NTMS topographic maps, and
 - c. mapping of various scales covering the Cooper Basin Gas and Oil Fields, provided by Santos Pty Ltd.
5. Field Check Packages. Composite film positives, of all compilation sheets for each map area were produced. Each component colour, except black, was stippled, using various densities, to avoid confusion on the field check map. The composite positive was used to produce dyeline field check maps, as well as being the master field check positive.
6. Execution. All personnel spent the first day of the Operation in area familiarisation. This enabled them to get a feel for the environment they were to work in and assess the probability of major cultural changes in the area.

7. Initially each field party was allocated two 1:100 000 areas to check. As the Operation progressed and the extensive detail changes became apparent parties had area allocations altered.

8. Ground verification was by two person vehicle mounted parties. Subsequently LOHs were used for aerial inspection to resolve any queries and to check detail in inaccessible areas. At times parties remained in the field up to four nights before returning to base camp. Application of all corrections was carried out in main base.

9. Valuable and reliable information about nomenclature and cultural development was obtained from the homesteads visited and from the Field Services, and the Maintenance Planning Departments of Santos, located at Moomba.

10. A listing of map sheets checked is at Appendix 1 to this Annex.

11. Supplementary Photography. Supplementary photography was acquired for detail that could not be positively positioned during the field check. A full report on photography is at Annex C.

12. Reports. Reports were composed for each 1:100 000 map area by the field party IC and produced before leaving the AO. These are to be included in the appropriate PD folders.

13. Sheet Names. As the Operation progressed it became increasingly apparent the sheet names for several sheets were not appropriate. The details are provided in the individual Field Completion Reports.

14. Comments. LOH task hours spent air checking the 24 map sheets was 30.4.

15. Porter task hours used to obtain supplementary photography in the AO was 21.1.

16. The area is a major producing gas and oil field. The plotting photography for the AO was flown in 1988. There has been extensive exploration and related construction in the AO since the photography was flown.

17. All field parties expressed frustration and difficulties in accurately positioning new or amended detail due to the cultural changes in the area.

18. Dyelines as field check maps are not practical for the following reasons:

- a. The paper is porous making the annotation of field check corrections, with a liquid base pen, difficult.
- b. The paper is weak and easily torn during use in the vehicle and the LOH.
- c. Line work tends to merge in cluttered areas making map reading and detail interpretation difficult.

Photographic Interpretation Guide (PIG) Photography

19. The other main task during the Operation was the acquisition of PIG photography for use during plotting of areas adjacent to the AO.

20. The air camera operator received guidelines for PIG requirements from Plotting Troop, 4 Fd Svy Sqn. Points of interest were selected and included unusual landforms, drainage patterns and lakes.

21. PIG photography was not obtained for the reasons presented in Annex C.

22. A full report of aerial photography aspects is at Annex C.

Re-visit Survey Station PMS 8699

23. Station documentation for PMS 8699, obtained during Operation Opal Warrior 88, was poor, resulting in a request to re-visit the station and re-compile all station documentation. The task was to proceed if time and aircraft task hours permitted.

24. The re-visit took place on 21 May 91, using an LOH to conduct an air search, and a Santos vehicle, from Jackson Oil Field, to ascertain distances for vehicle access to the point.

25. 3.1 LOH task hours were required to re-visit the point.

26. The following personnel were involved:

- a. LT Langley 161 Recce Sqn,
- b. SSGT Züringer 4 Fd Svy Sqn, and
- c. a Santos driver.

27. Complete documentation for the point is now held as part of 4 Fd Svy Sqn survey records.

Conclusion

28. The following technical requirements were successfully achieved:

- a. field check 24 x 1:50 000 maps,
- b. acquisition of 35mm photography for HQ 4 MD Int Cell, and
- c. re-visit and re-compile station documentation for PMS 8699.

29. The acquisition of PIG photography was not obtained, for details see Annex C.

Recommendations

30. It is recommended that:

- a. When possible the plotting, compilation and the eventual field check, be conducted as soon as possible after the plotting photography has been flown, particularly in rapidly developing area.
- b. The practice of using dyelines for field check maps be discontinued and other methods of production (ie screen printing) be used.

Appendix: 1. Map Sheets Checked

APPENDIX 1 TO
ANNEX B TO
OP OPAL WARRIOR 91
OPERATION REPORT
DATED 22 JUL 91

MAP SHEETS CHECKED

Listed below are the map sheets field completed during Operation Opal Warrior 91.

6840 1 to 4

6841 1 to 4

6940 1 to 4

6941 1 to 4

7040 1 to 4

7041 1 to 4

ANNEX C TO
OP OPAL WARRIOR 91
OP REPORT
DATED 27 JUL 91

OPERATION OPAL WARRIOR 91
AERIAL PHOTOGRAPHY REPORT

General

1. WILD RC10 camera number 1466 was used during the Operation. The camera was fitted with a SAG II lens, of focal length 88.15mm, and was mounted in a Pilatus Porter A14-705 from 173 Gen Spt Sqn. 4 Fd Svy Sqn personnel fitted and tested the camera, in Adelaide, prior to its deployment to the AO.
2. The camera had been serviced in the last year and bench tested at 4 Fd Svy Sqn prior to fitting into the aircraft.
3. The film was developed in a dark room constructed in an ablution block of an ATCO hut at main base. A B5 developing outfit and DK 50 developer were used. Minor problems occurred maintaining a constant temperature of developer, no other problems were encountered with either the film or chemicals.
4. Camera problems are detailed later in the report.
5. A total of 20 task hours were allocated for the operation. A total of 21.1 hours were used for aerial photography.

Task

6. The camera tasking involved obtaining supplementary photography to aid in the positioning of new and updated information obtained during the field verification.

Camera Problems

7. The main problems with the RC10 camera was the failure of the exposure meter after about half the tasking hours had been flown. This may have been caused by the control box mounts not being secured to the airframe allowing excessive vibration and movement during operation.

Supplementary Photography

8. Supplementary photography was flown as requested by the field completion parties. A check of clarity, area coverage and complete query logic was carried out by the camera operator and party ICs in the field to ensure the photography acquired was suitable for latter use.

9. The following problems were encountered:
 - a. Camera CES was not dispatched with the aircraft, therefore no filter selection was available, which in turn resulted in some of the photography appearing bright due to the sand glare.
 - b. Initially, the inexperience of both the pilot and the camera operator resulted in the re-flying of several runs.
10. A total of 1 280 line kilometres were flown.
11. A flight line diagram is at Appendix 1.

PIG Photography

12. PIG photography was not obtained for the following reasons:
 - a. The failure of the RC10 camera exposure controller box, resulting in the allocated aircraft task hours being used during the acquisition of supplementary photography.
 - b. The high level of water in the Cooper Creek and the surrounding area, at this time, is not normal and incorrect interpretations may result during plotting if PIGs were produced and used.
 - c. Aircraft servicing requirements prevented additional tasking hours being obtained.

Print Production

13. Bromide prints were produced at 4 Fd Svy Sqn using the KG30 contact printer. This was done prior to the negatives being forwarded to CPE for final processing. This provided a minimum time delay between the Operation and the use of the photography for the application of field check corrections.

Dispatch

14. A36s and film are to be dispatched to CPE during Aug 91.

Personnel

15. The following personnel were involved in the acquisition of supplementary photography:

- | | | | |
|----|-----|------------|-----------------|
| a. | LT | S. Stuart | 173 Gen Spt Sqn |
| b. | CPL | B. Hogan | 4 Fd Svy Sqn |
| c. | CPL | K. Hopwood | 173 Gen Spt Sqn |

Conclusions / Recommendations

16. The following recommendations are made:

- a. a spare controller box accompany camera 1466 until its next service has been completed;
- b. two camera operators, one experienced, be tasked when supplementary photography is required;
- c. when possible the camera operator fit the camera to the aircraft;
- d. all camera mounts should be fitted to the airframe;
- e. the complete CES for the camera accompany it on all Operations; and
- f. an air-conditioned environment be provided for developing photography.

Appendix:

1. Supplementary Photography - SH 54-02 STRZELECKI

1:250 000

SUPPLEMENTARY PHOTOGRAPHY OVERLAY

SH 54-2

139° 30' 28° 00'

140° 00'

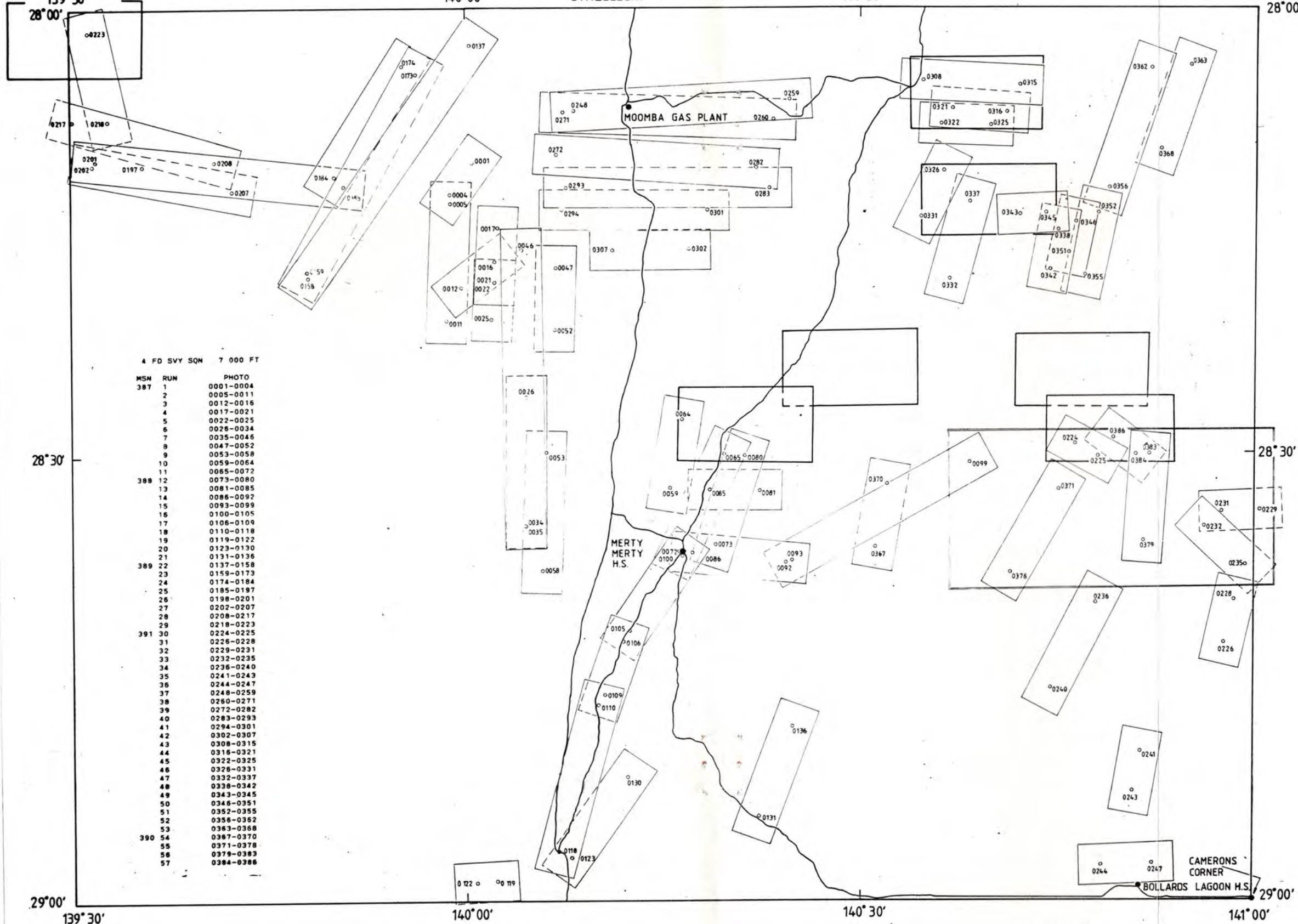
STRZELECKI

140° 30'

141° 00'

28° 00'

APPENDIX 1 TO
ANNEX C
OP OPAL WARRIOR 91
OP REPORT
DATED 2 JUL 91



4 FD SVY SQN 7 000 FT

MSH	RUN	PHOTO
387	1	0001-0004
	2	0005-0011
	3	0012-0016
	4	0017-0021
	5	0022-0025
	6	0026-0034
	7	0035-0046
	8	0047-0052
	9	0053-0058
	10	0059-0064
	11	0065-0072
388	12	0073-0080
	13	0081-0085
	14	0086-0092
	15	0093-0099
	16	0100-0105
	17	0106-0109
	18	0110-0118
	19	0119-0122
	20	0123-0130
	21	0131-0136
389	22	0137-0158
	23	0159-0173
	24	0174-0184
	25	0185-0197
	26	0198-0201
	27	0202-0207
	28	0208-0217
	29	0218-0223
391	30	0224-0225
	31	0226-0228
	32	0229-0231
	33	0232-0235
	34	0236-0240
	35	0241-0243
	36	0244-0247
	37	0248-0259
	38	0260-0271
	39	0272-0282
	40	0283-0293
	41	0294-0301
	42	0302-0307
	43	0308-0315
	44	0316-0321
	45	0322-0325
	46	0326-0331
	47	0332-0337
	48	0338-0342
	49	0343-0345
	50	0346-0351
	51	0352-0355
	52	0356-0362
	53	0363-0368
390	54	0367-0370
	55	0371-0378
	56	0379-0383
	57	0384-0386

● LARGE SCALE PHOTOGRAPHY OF AREA LOCATION
PHOTOGRAPHY FLOWN MAY 91
Note: PHOTO COVERAGE NOT TO SCALE

— SCALE 1:85 000
— SCALE 1:40 000

COMPILED BY: CPL B. HOGAN
CHECKED BY: SGT T. PURDEY
DATE: 12 JUNE 1991

SORTIE N° CPE N°

SEQUENCE OF EVENTS

1. Tabulated below is a sequence of events for Operation Opal Warrior 91.

Serial	Date	Event
(a)	(b)	(c)
1	4 May 91	Det 4 Fd Svy Sqn depart Adelaide for AO
2	5 May 91	Det 4 Fd Svy Sqn arrive Moomba
3	6 May 91	Field ckecking by ground begins
4	12 May 91	LOHs arrive Moomba
5		Landrover 49 169 rolled onto side near Merty Merty Homestead
6	13 May 91	LOH begin tasking
7		Landrover 49 169 recovered and located Moomba
8	15 May 91	Porter arrived
9	16 May 91	Porter begin tasking
10	20 May 91	All field work completed
11	21 May 91	Re-visit PMS 8699
12	22 May 91	All field check office corrections completed
13		Porter departed AO for Adelaide
14		Recovery vehicle arrives for Landrover
15		Stores packed and loaded
16	23 May 91	LOHs depart AO
17		Det 4 Fd Svy Sqn departs AO for Adelaide
18	24 May 91	Arrive Adelaide

ANNEX E TO
OP OPAL WARRIOR 91
OP REPORT
DATED 22 JUL 91

OPERATION OPAL WARRIOR 91
PERSONNEL

Members who participated in Operation Opal Warrior 91 were:

Regt No	Rank	Name	Unit
45941	WO2	I.D. Thiselton	4 Fd Svy Sqn
46523	SSGT	J.J. Zöringer	4 Fd Svy Sqn
226340	SGT	M.T. Casey	4 Fd Svy Sqn
62780	SGT	P.D. Cutcliffe	4 Fd Svy Sqn
324051	CPL	B. Hogan	4 Fd Svy Sqn
553655	CPL	T.C. Lambert	4 Fd Svy Sqn
323320	CPL	G.T. Weatherell	4 Fd Svy Sqn
F231072	SPR	W.A. McCarthy	4 Fd Svy Sqn
37807	SPR	A.G. Santo	4 Fd Svy Sqn
0137742	LEUT	P.J. Beasy (RAN)	161 Recce Sqn
557116	LT	A.J. Langley	161 Recce Sqn
232799	CPL	A. Sutcliffe	161 Recce Sqn
185446	LT	S. Stuart	173 Gen Spt Sqn
2141473	CPL	K.L. Hopwood	173 Gen Spt Sqn
65105	PTE	S.J. Bailey	173 Gen Spt Sqn

OPERATION OPAL WARRIOR 91
VEHICLE REPORT

Vehicles

1. Operation Opal Warrior 91 used the following vehicles organic to the Unit:

- a. ARN 49 169 Truck Survey Panel FFR,
- b. ARN 49 170 Truck Survey Panel FFR,
- c. ARN 49 172 Truck Survey Panel FFR,
- d. ARN 49 179 Truck Survey Panel FFR,
- e. ARN 38 898 Truck cargo MC2,
- f. 4 Fd Svy Sqn Unit bicycle.

2. All vehicles were classified task-worthy prior to departure for the AO.

Vehicle Incident ARN 49 169

3. Vehicle ARN 49 169 was involved in a roll over incident at approximately 1230 hr on Sunday 12 May 91 rendering it inoperative for the remainder of the Operation. A formal investigation into the incident was conducted by CAPT B.P. McDonald. The Investigating Officer (IO) was taken to the AO by the Porter Aircraft when deploying from Adelaide to Moomba.

Hire Vehicle

4. A vehicle was hired from Cooper Basin Fuel Service for the period 16 - 18 May 91 inclusive. The hire vehicle was a replacement for ARN 49 169 and allowed a military vehicle to be released from Operational commitments for the IO to visit the scene of the incident. The cost of hire was \$225.

Road Characteristics

5. The road characteristics for the AO varied from well maintained two lane unsealed roads to once graded seismic lines now used, sometimes, as a vehicle track.

6. A requirement of field checking is to determine if and how a road/track is to be portrayed on the published map. This is achieved by driving and classifying, by surface characteristics, all roads.

7. The completion of the task would be made safer if all personnel had un-restricted driving licenses.

General Comments

8. The roads in the AO were unsealed.

9. Consistent faults occurring in the Truck Survey Panel FFR during the Operation were:

- a. when disengaging low range and engaging high range instances occurred when the transfer case jumped into the neutral position.
- b. door locks filled with dust making opening from the outside difficult and allowing the door to open while the vehicles was in motion,
- c. bonnet release cable became increasingly difficult to use due to dusty conditions.

Recommendations

10. Recommendations to be made about vehicles requirements and operation are:

- a. all personnel have an un-restricted driving license,
- b. all vehicles used for field check operations be fitted with suitable roll-over protection bars, and
- c. a qualified transport NCO or vehicle mechanic be included in manning for all vehicle mounted Operations in order to fix the recurring minor faults with vehicles.