SOQ-12211

GEOPHYSICAL SERVICE INC - FINAL REPORT - SOCIETE QUEBECOISE D'INITIATIVES PETROLIERES - 1980/12/04 TO 1981/01/03 - ANTICOSTI ISLAND - REPORT #12211

FINAL REPORT

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1980 12 04 TO 1981 01 03

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I. INTRODUCTION

A marine seismic survey for Société Québécoise D'Initiatives Pétrolières was conducted by Geophysical Service Inc, Party 2935, offshore Anticosti Island. The M/S Arctic Explorer collected a total of 84.100 kilometres of seismic reflection data during the period 1980 12 04 through 1981 01 03.

All seismic data were forwarded to GSI's computer center in Calgary for processing. All navigation data were post-processed and mapped by this center's navigation department.

II. EQUIPMENT

A. Vessel

The M/S Arctic Explorer, a Canadian flag vessel of 49.6 metres length and 990.87 gross registered tons, was engaged in the single vessel operation.

For vessel details and crew list, please refer to Appendices A-1, A-2 and A-3.

B. Recording Instruments

A Texas Instruments DFS V* floating point recording system was utilized to record 72 trace data at a 2 millisecond sample rate for 5 seconds on 1/2" tape (format SEG-B: phase encoded) with a 1600 bpi packing density. Standard tests were carried out regularly, but no problems were encountered.

Recording instrument details are given in Appendix A-4.

C. Streamer

A 3600 metre Texas Instruments streamer, composed of 72 sections - each containing 30 acceleration cancelling hydrophones - was towed at a mean depth of between 12.2 and 13.7 metres.

Streamer failure was the major cause of downtime during this project. Freezing conditions rendered the cable skin brittle and susceptible to puncture by ice, frequently resulting in leaky traces. The cable was also

* TI Trademark

subjected to great stress during repeated handling in adverse conditions, causing numerous electrical failures. Ice destroyed the tailbuoy and several Syntron cable levellers. Heavy swells and the strong currents of the region also made ballasting extremely difficult.

Streamer details and diagram are included in Appendices A-5 and A-6.

D. Source

A tuned airgun array of 65.54 litre capacity, comprised of 35 active airguns with various characteristics towed on two buoy-supported strings was used to generate seismic energy at a 25 metre interval. Compressed air at an operating pressure of approximately 13.8 MPa was supplied by four Chicago Pneumatic PB44-300 and two Sullair compressors.

The compressors were responsible for one major incident of downtime when they froze solidly and had to be thawed out. Otherwise the Tiger* controlled airgun system presented few problems.

An array description and diagram may be found in Appendices A-7 and A-8.

E. Survey

An Argo DM-54 radio-positioning system (operated by Offshore Navigation Canada Limited) was interfaced to the R-980B computer of the Texas Instruments CMS II* integrated satellite/doppler sonar system, and functioned as the primary navigation unit. Baseline crossing and extensions were carried out to check system calibration. Navigational problems were not responsible for any downtime on this project.

Survey description and post-plot parameters are listed in Appendices A-9 and A-10.

III. OPERATIONS

The project commenced on 1980 12 04 at 13:00 local time, when the M.S. Arctic Explorer entered the port of St. Anthony, Newfoundland in order to await the construction of a new streamer. This having been completed at 19:15 on 12 07, the vessel weighed anchor and set a course for the prospect area.

* GSI Trademark

Upon arrival at 13:00 on 12 09, adverse weather conditions delayed the laying of the cable until 07:50 on 12 10. An attempt at ballasting was aborted when weather conditions again worsened, and a course was set for Sept Iles in order to obtain new transducers and receive a technician by helicopter. However, it was discovered upon arrival at 19:30 on 12 12, that the compressor system was frozen. The necessary thawing was completed at 03:00 on 12 14, whereupon the vessel departed for the prospect area, laying and ballasting the cable en route.

On 12 15 at 06:00, the vessel arrived back in the area of operations, but the weather once more intervened, only occasionally permitting attempts to lay and ballast the cable and to repair leaky traces. The vessel departed from the prospect area on 12 20 at 09:45, arriving at Gaspé, Quebec at 13:00. Here a crew change and repairs to the radar system were effected before the vessel left port at 14:45 on 12 23. Baseline crossings were performed en route to the area of operations, but were somewhat impeded by ice and skywave interference.

The trailing equipment was laid again on 12 24 at 14:45, however adverse weather conditions prevailed with only brief intervals of respite. During these periods, attempts were made to ballast the streamer and to repair leaky traces, as well as to deal with a minor generator problem. On 12 28, shipping activity necessitated a temporary relocation of the vessel. During the next few days streamer difficulties persisted, while a minor incident of mechanical failure in the airgun system also arose. Operations were suspended when inclement weather conditions forced the vessel to depart for sheltered waters.

At 14:31 on 1981 01 01, the Explorer set a course for the prospect area, laying the cable en route. Upon arrival at 01:00 of 01 02, the airguns were lowered into the water, and at 02:20 shooting commenced on Line 80-321, followed by Line 80-348. However due to persisting streamer problems, the decision was made on 01 02 to abandon the Anticosti Island project until more favourable conditions prevailed. The vessel departed the prospect area at 21:00, arriving in Sydney, Nova Scotia on 01 03 at 19:45, thus terminating activities for the Société Québécoise d'Initiatives Pétrolières.

IV. STATISTICS

Streamer Failure	229.34	31.6%
Weather	195.66	26.9%
Travel/Supply	104.00	14.3%
Streamer Ballasting	67.25	9.3%
Vessel Failure	50.75	7.0%
Airgun Failure	33.50	4.6%
Gun/Streamer Handling	19.00	2.6%
Navigation Calibration	11.75	1.6%
Recording	8.51	1.2%
Line Change	1.67	0.2%
Other	5.32	0.7%
	726.75	100.0%

IV. PRODUCTION STATISTICS

Total Kilometres	84.100
Total Hours	726.75
Recording Hours	8.51
Line Change Hours	1.67
Km/Total Hours	0.12
Km/Recording Hours	9.88
Km/Recording & L.C. Hours	8.26
Km/Total Day	2.78
Km/Recording Day	237.18
Km/Recording & L.C. Day	198.27

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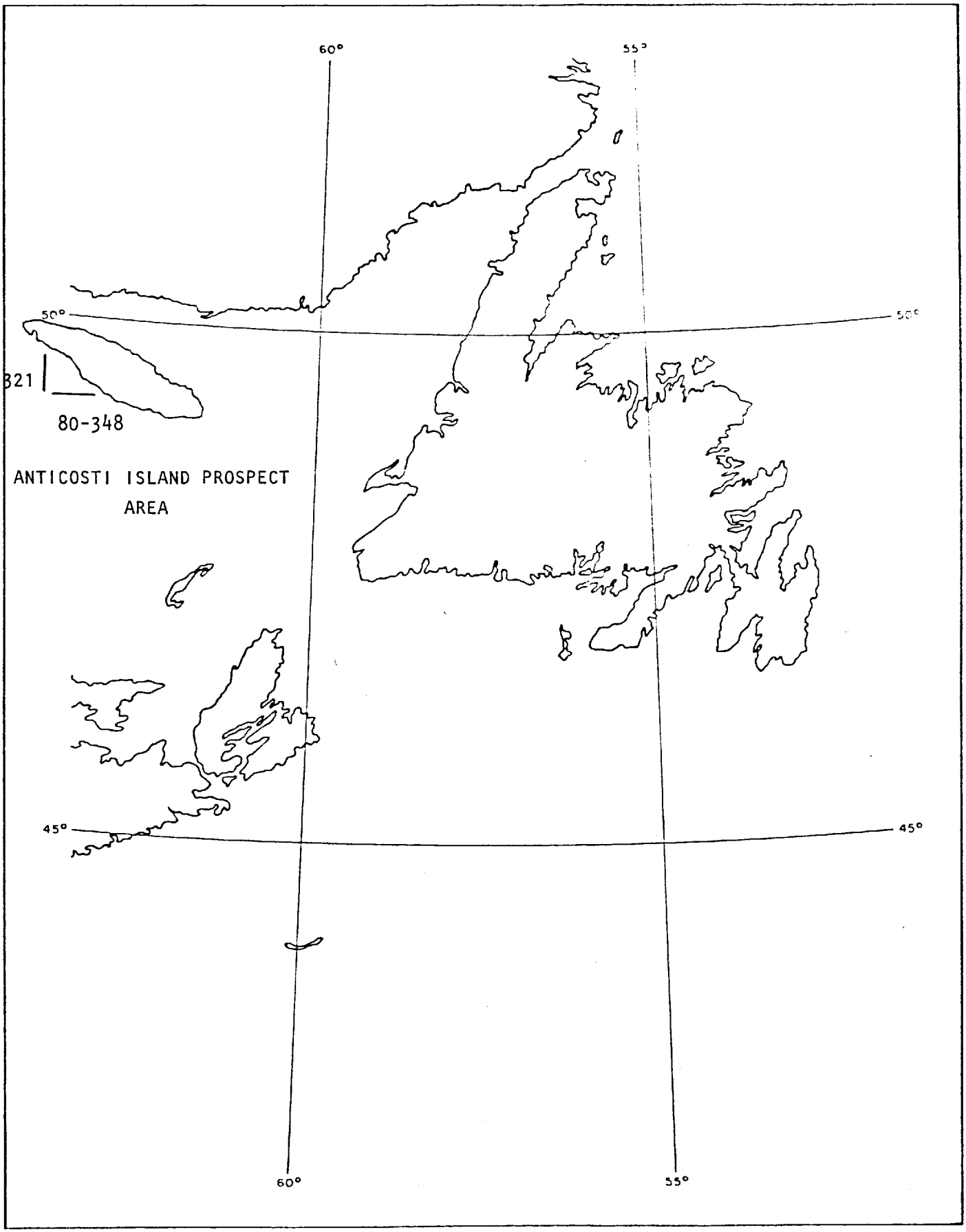
Total Pops	3364.
Pops/Total Hours	4.63
Pops/Recording Hours	395.30
Pops/Recording & L.C. Hours	330.45
Pops/Total Day	111.09
Pops/Recording Day	9487.19
Pops/Recording & L.C. Day	7930.84

IV. TIME AND PRODUCTION STATISTICS
M.S. ARCTIC EXPLORER - ANTICOSTI ISLAND
1980 12 04 TO 1981 01 03

Date	Line	S.P. Rge.	Good SPs	Km.	Rec.	Line Chge.	Travel/ Supply	Nav. Cal.	Str. Bllst.	G/S Hand.	Down Time	TOTAL
1980 12 04											11.00STR	11.00
05											24.00STR	24.00
06											24.00STR	24.00
07							4.75				19.25STR	24.00
08							24.00					24.00
09							13.00				11.00WX	24.00
10									16.50		7.50WX	24.00
11									9.00		4.00WX 11.00STR	24.00
12											19.50STR 4.50A/G	24.00
13											24.00A/G	24.00
14									21.00		3.00A/G	24.00
15									6.00		18.00WX	24.00

Date	Line	S.P. Rge.	Good SPs	Km.	Rec.	Line Chge.	Travel/ Supply	Nav. Cal.	Str. Bllst.	G/S Hand.	Down Time	TOTAL
16											16.00WX	
										3.00		
											5.00WX	24.00
17											7.50WX	
											16.50STR	24.00
18											1.17STR	
											6.83WX	
											15.00STR	
											1.00WX	24.00
19											8.00WX	
									9.50			
											6.50WX	24.00
20											8.00WX	
											1.75STR	
							14.25S					24.00
21							13.00S					
											11.00VESS	24.00
22											24.00VESS	24.00
23											14.75VESS	
							9.25T					24.00
24							3.00T					
								11.75				
											9.25STR	24.00
25									5.25			
											1.00VESS	
											3.00STR	
											14.75WX	24.00

Date	Line	S.P. Rge.	Good SPs	Km.	Rec.	Line Chge.	Travel/ Supply	Nav. Cal.	Str. Bllst.	G/S Hand.	Down Time	TOTAL
26											24.00WX	24.00
27											9.00WX 15.00STR	24.00
28											10.33STR 1.00TH 12.67STR	24.00
29											24.00STR	24.00
30											10.00STR 2.00A/G 1.92STR 10.08WX	24.00
31											24.00WX	24.00
1981 01 01										9.50S	14.50WX	24.00
02										1.00S 1.00G	0.32OTH	
	80-321	1-1842	1842	46.050	4.68	1.67						
	80-345	1-1522	1522	38.050	3.83					0.83G 3.67S		
							3.00				4.00TH	24.00
03							19.75					19.75
TOTALS			3364	84.100	8.51	1.67	104.00	11.75	67.25	19.00	514.57	726.75


60°
55°
50°
50°
80-321
80-348
ANTICOSTI ISLAND PROSPECT
AREA
45°
45°
60°
55°

Geophysical Service Inc. wishes to take this opportunity to thank the Societe Quebecoise D'Initiatives Petrolieres for their co-operation in the conduct of this survey.

Respectfully submitted,

John W. Clink
Arctic Marine Exploration Manager

JWC/amc

APPENDIX A - 1
M S ARCTIC EXPLORER

I. VESSEL

Owner	Carino Company Ltd. St. John's Newfoundland.
Year Built	1974
Shipyard	P Hoivolds Me,, Versted A S Kristiansand S, Norway
Country of Registry	Canada
Registration Number	345866
Classification	Det Norske Veritas 1A1 Ice Breaker
Home Port	St. John's, Newfoundland
Trade	Arctic Research Vessel
Tonnage	Gross 2806 m^3 (990.87 tons) Net 1824 m^3 (644.1 tons)
Length	49.6 m
Beam	11.5 m
Depth	8.6 m
Draught, medium	4.8 m
Type of Hull	Sealer (moulded steel)
Engine	Mak Diesel 9M452 AK
Power	1.64 MW
Normal Speed	6.2 m/s (12 knots)
Fuel Capacity	220 m^3
Potable Water Supply	Fresh water generator 3 tonnes per 24 hour capacity 130m^3
Accomodation	34
Ship's Crew (#)	8
Technical Personnel	25

II AUXILIARY EQUIPMENT

Generators (AC)	Deutz BF 6M 716 2 at 140 kW

III NAVIGATIONAL EQUIPMENT

Radio Equipment	VHF: SRA 62 Channel 20 Channel AM Scanti 400 W, 46 Channel SSB
Call Sign	VGFD
Gyro Auto Pilot	Anschutz
Radar	2 Decca 1216 and 916
Fathometer	Simrad EA

IV SEISMIC EQUIPMENT

Control System	CMS II
Recording System	DFS V
Streamer	96 trace - universal length
Airguns	65.54 litre - Mod II Pnu Con
Compressors	4 - PB44/300 Chicago Pneumatic
	2 - Sullair

V SAFETY EQUIPMENT

Fire Containment	Foam Deluge and Auxiliary Pump System
	Engine Room CO_2
	Smoke Diving Equipment
	Firesuits
	Extinguishers
Flotation	Life Rings
	Life/Work Vests and Survival Coats
	Life Jackets with Lights & Whistles
	Runabout with Engine
	Life Rafts
Signal	Life Raft Emergency Radio
	Pyrotechnics (Distress Signals)
	Aldis Signal Lamp
General	First Aid Equipment
	Line Thrower
	Lifeline Tether Harnesses
	Smoke Alarms
	Resuscitator

APPENDIX A - 2
CREW DESCRIPTION

SHORE-BASED PERSONNEL

1 Boat Manager

1 Administrator

ON-BOARD SEISMIC PERSONNEL

1 Party Manager

2 Junior Geophysicists

5 Instrument Engineer Trainees

6 Airgun Mechanics

2 Survey Operators

VESSEL CREW

1 Ship's Captain

1 First Mate

1 First Engineer

1 Cook

APPENDIX A - 3
PERSONNEL

Boat Manager	L. Buckmaster	(U.S.)
Administrator	M. Teal	(U.K.)
Party Manager	J. Cunkleman	(U.S.)
Junior Geophysicists	L. Beal	(CDN.)
	G. Strachan	(CDN.)
Instrument Engineer Trainees	T. Sutherland	(CDN.)
	K. Piercey	(CDN.)
	E. Hann	(CDN.)
	R. Locke	(CDN.)
	P. LeBlanc	(CDN.)
Airgun Mechanics	W. Johnson	(CDN.)
	B. MacInnes	(CDN.)
	J. Snow	(CDN.)
	P. Davies	(CDN.-NFLD.)
	J. Irwin	(CDN.)
	L. Ash	(CDN.-NFLD.)
Survey Operators	D. Hoyle	(CDN.)
	T. Morrow	(CDN.)

Vessel

Captain	J. Hargraves	(CDN.)
First Mate	R. Pike	(CDN.)

APPENDIX A - 4
INSTRUMENT DETAILS

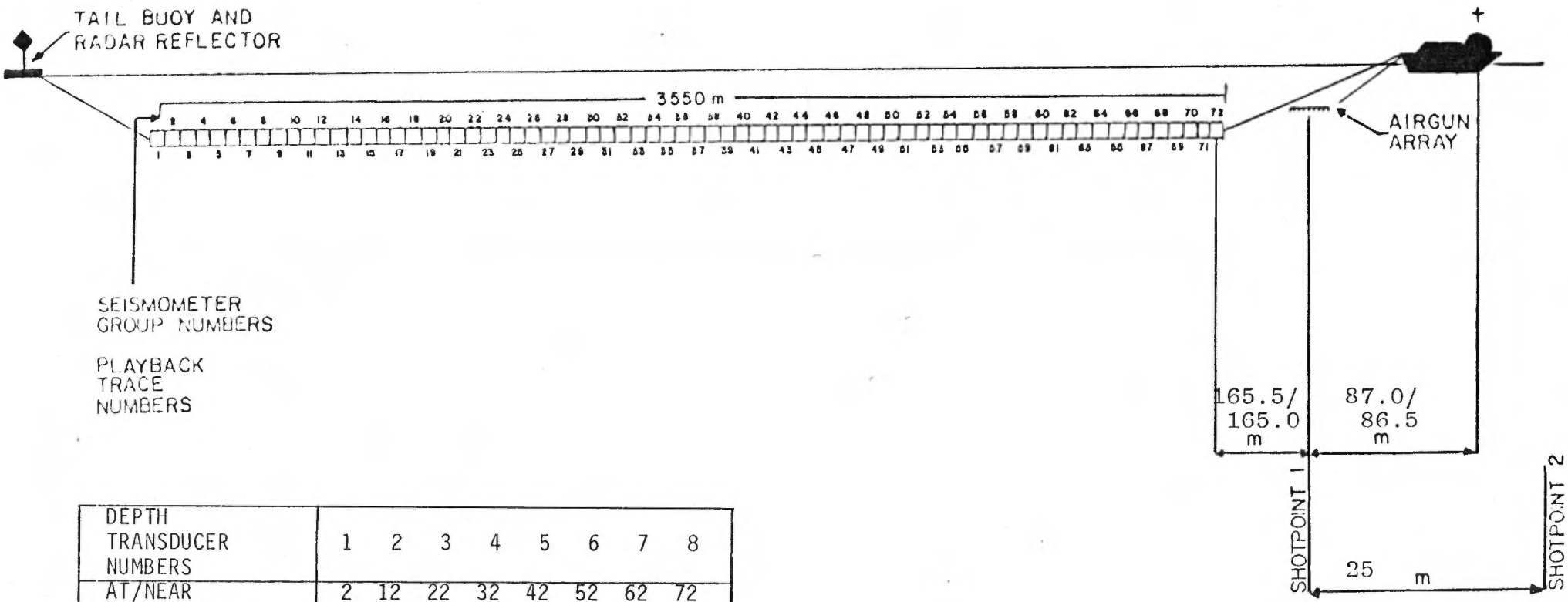
Recording System	
Type	DFS V
Serial No.	224945
Transports	
Header No.	495
Make and Model	DFS V 10"
Number in Use	2
Number of Tracks	9
Format	
Type	SEG-B
Packing Density	1600 bpi
Tape Speed	79.38 ips
Recording Method	one system
Sample Period	2ms
Record Length	5s
Gain Control Mode	AGC
Gain Constant	36 dB
Final Gain	84 dB
Dynamic Range	84 dB
Filters	Hi-Cut: 128 Hz @ 72 dB/oct Lo-Cut: 8 Hz @ 18 dB/oct
Camera	SIE ERC-10
Polarity	
Camera	Negative
Tape	Negative

APPENDIX A - 5
CABLE DETAILS

Length (center to center)	3550 m
Number of Groups	72
Group Length	50 m
Number of Extender Sections	-
Extender Section Length	-
Number of Live Sections	72
Live Section Length	50 m
Number of Geophones/Group	30
Geophone Interval	1.66 m
Geophone Type	TI-ACH
Stretch Section Length	50 m
Total Length of Nylon Stretch Sections	200 m
Stretch Factor	10%
Locations of Depth Transducers	On diagram
Source of Water Breaks	As above
Location of Depth Controllers	On Diagram
Type of Depth Controllers	Syntron Cable Levellers
Locations and Details of Auxiliary Section if used	N/A

APPENDIX A - 6

DIAGRAM OF 3600m STREAMER
72 GROUP



DEPTH TRANSDUCER NUMBERS	1	2	3	4	5	6	7	8
AT/NEAR SEIS GROUP NUMBERS	2	12	22	32	42	52	62	72
	3	13	23	33	43	53	63	S

DEPTH CONTROLLERS AT SEIS GROUP NUMBERS				
	2/3	12/13	22/23	32/33
	42/43	52/53	62/63	72/S

DEAD SECTION IN FRONT OF GROUP 48	
NYLON STRETCH	4 x 50m
PIG SECTIONS	-

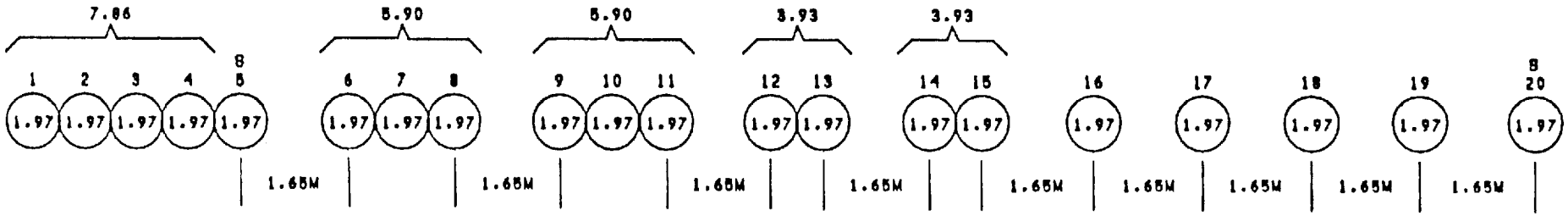
APPENDIX A - 7
AIRGUNS

Total Volume in Use	65.54 L
Total Spare Volume	9.01 L
Operating Depth	9 m
Timing Controller	
Type	TIGER
Serial No.	18
Firing Delay	51.2 ms
Compressors	
Type	Sullair
No. in Use	2
Type	PB44-300
No. in Use	4
Distance from Antenna to Array Center	
Port	87.0 m
Starboard	86.5 m
Distance from Stern to Array Center	
Port	55.5 m
Starboard	55.0 m
Distance from Array Center to Near Group Center (Offset)	
Port	165.5 m
Starboard	165.0 m

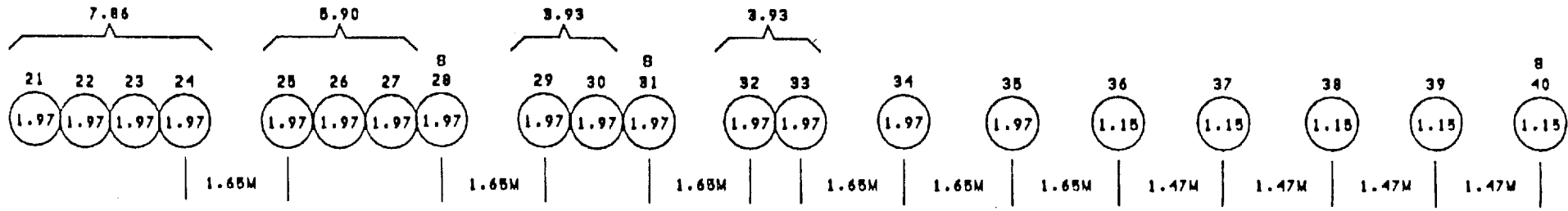
APPENDIX A-8

EAST COAST 65 LITRE AIRGUN ARRAY

STARBOARD STRING (20 GUNS,19.43M)



PORT STRING (20 GUNS,19.91M)



NOTES:

1. GUN SIZE IN LITRES
2. GUN SPACING IN METRES
   CENTERLINE-TO-CENTERLINE SPACING
   OF ALL COALESCED GUNS IS 0.46 M
3. SPARE GUNS DENOTED BY 'S'
4. ALL GUNS ARE MOD II PC

ARRAY COMPOSITION

2 X 7.86 3 X 5.90 4 X 3.93 6 X 1.97 4 X 1.15	65.54 ACTIVE
1 X 1.97 1 X 1.15	9.01 SPARE

APPENDIX A - 9
SURVEY

Primary System	
Type	Argo DM-54
Survey Company	Offshore Navigation (Canada) Limited
Op. Frequency	1640 kHz
Antenna Height (from Sea Level)	18 m
Antenna Location (from Stern)	31.5 m
Secondary System	
Type	Loran C
Survey Company	Offshore Navigation (Canada) Limited
Antenna Height	3 m
Antenna Location	28.2 m
Coverage	7200%
Shotpoint Interval (1 x pop interval)	25 m
Auxiliary Equipment	Track Plotter Stripchart
Primary Calibration Points Used	Baseline Crossings and Extensions. Satellite updates.

APPENDIX A - 10
POST PLOT PARAMETERS

Spheroid	Clarke 1866
Datum	NAD 1927
Projection	UTM
Central Meridian	63^{o} W
Map Scale	1:50 000
Position Plotted	Airguns
Shotpoint Plot Interval	Every 10
Shotpoint Label Interval	Every 100

FATHOMETER

Manufacturer	Simrad
Model	EA
Conversion Velocity	1500 m/s
Operating Frequency	38 kHz
Is instrument corrected for draft	Yes
Last Check Date and Port	St. John's, Newfoundland 1980 09 25

SINGLE TRACE PROFILER

Manufacturer	EPC
Model	4600
Serial No.	270
Source	Trace 71
Record Length	5 s
Hi filter and slope	128 Hz @ 72 dB/oct
Lo filter and slope	8 Hz @ 18 dB/oct
Gain Mode	AGC