Cansite Surveys

Cansite Surveys Limited

017125

MULTIDISCIPLINARY GEOPHYSICAL AND HYDROGRAPHIC SURVEY OFF THE YUKON COAST

CONTRACT NO: 08SB.FP941-3-3427

SERIAL NO : 0SB84.-00167

FINAL REPORT

OCTOBER 1984

Submitted to:

INSTITUTE OF OCEAN SCIENCES
9860 WEST SAANICH ROAD
SIDNEY, BRITISH COLUMBIA
ATTENTION: MR. G. EATON

Submitted by:

K. MARK MCGLADREY, B.C.L.S., C.L.S.
for
CANSITE SURVEYS LIMITED
UNIT "L", 11 PETTIPAS DRIVE
DARTMOUTH, NOVA SCOTIA
B3B 1K1

TABLE OF CONTENTS

LIST OF TABLES

LIST OF TABLES

LIST OF FIGURES

APPENDICES

APPENDIX A - Sounding Corrections

Section 1	Introduction
Section 2	Leveling Notes, Comparison Form 105A, Bench Mark Descriptions, Tide Gauge Chart Records
Section 3	Predicted Tidal Data Received from CHS
Section 4	Tide Gauge Comparisons - correction for time and height offsets
Section 5	Daily Tidal Plots
Section 6	Bar Check Tables

Banksland Surveyor

Table 1	23 July to 04:07 GMT 30 July 84
Table 2	04:07 GMT 30 July to 17:13 GMT 4 Sept. 84
Table 3	17:13 GMT 4 Sept. to 03:11 GMT 15 Sept. 84
Table 4	03:11 GMT 15 Sept. to 15:00 GMT 2 Oct. 84

Launch

Table 5	21 Aug. to 27 Sept. 84

Section 7	Tidal Correction Table - MacKenzie Basin (Alternate Area) - Banksland
Section 8	Tidal Correction Table - Herschel Island - Banksland
Section 9	Tidal Correction Table - Herschel Island - Launch
Section 10	Bar Check Corrections

APPENDIX B - MACKENZIE BASIN

APPENDIX C - HERSCHEL ISLAND

LAUNCH "SPRINT"

INTRODUCTION

SECTION 1 Sounding Correction Printouts

SECTION 2 Survey Constants Data (SCD) File Printouts

SECTION 3 Position Printouts

Cansite Surveys Limited

APPENDIX D - HERSCHEL ISLAND

BANKSLAND SURVEYOR

Sounding Correction Printouts

28 July to 04 Sept. 84

Discs 1 to 61

Discs 2A, 3A

Cansite Surveys Limited

APPENDIX E - HERSCHEL ISLAND

BANKSLAND SURVEYOR

Sounding Correction Printouts

04 Sept. to 30 Sept. 84

Discs 62 to 106

Discs 2A, 3A

APPENDIX F - HERSCHEL ISLAND

BANKSLAND SURVEYOR

INTRODUCTION

SECTION 1 Survey Constants Data (SCD) File Printouts

SECTION 2 Position Printouts

APPENDIX G - HERSCHEL ISLAND

BANKSLAND SURVEYOR

INTRODUCTION

SECTION 1 Survey Constants Data (SCD) File Printouts

SECTION 2 Position Printouts

APPENDIX H - HERSCHEL ISLAND

BANKSLAND SURVEYOR

INTRODUCTION

SECTION 1 Survey Constants Data (SCD) File Printouts

SECTION 2 Position Printouts

APPENDIX I - PHOTOGRAPHY

SECTION 1	35 mm Photographs of Shoreline taken from helicopter flying from Herschel Island west to Demarcation Point.
SECTION 2	Negatives of Photographs
SECTION 3	1975/76 E.M.&R. Aerial Photography of Coastline - with notations regarding nature of shoreline
SECTION 4	Photo-identified Points - Photo 1 - Photo 2 - Photo 3 Aerial photographs & descriptions of points (descriptions on back of photos)

APPENDIX J - HORIZONTAL CONTROL

CONTENTS

APPENDIX K

APPENDIX L

HERSCHEL ISLAND

BANKSLAND SURVEYOR

SOUNDING ROLLS # 1 - 50

APPENDIX M

HERSCHEL ISLAND

BANKSLAND SURVEYOR

SOUNDING ROLLS # 51 - 100

APPENDIX N

HERSCHEL ISLAND

BANKSLAND SURVEYOR

SOUNDING ROLLS # 101 - 150

APPENDIX O

HERSCHEL ISLAND

SOUNDING ROLLS

BANKSLAND SURVEYOR # 151 - 166

LAUNCH # L1 - L19

APPENDIX P

MACKENZIE BASIN

BANKSLAND SURVEYOR

SOUNDING ROLLS # 1 - 27

1. INTRODUCTION

1.1 General

During July, August and September 1984, Cansite Surveys Limited carried out a hydrographic survey for the Canadian Hydrographic Service in the Herschel Island area of the Beaufort Sea. The main survey area was bounded by the 139° & 141° meridians of longitude, the 70°15' parallel of latitude and the Yukon Coast.

Cansite also provided precise navigation positioning in the same area for geophysical activities carried on by Energy, Mines and Resources. These activities included sediment sampling, geothermo probes and sonar reflection and refraction studies.

When ice conditions did not permit work to be performed in the main area, geophysical surveys were carried out in the MacKenzie Basin to the southeast of Herschel Island (see figure 1 - Survey Areas)

The purpose of this report is to summarize the technical/operational aspects of the survey and to present the data collected.

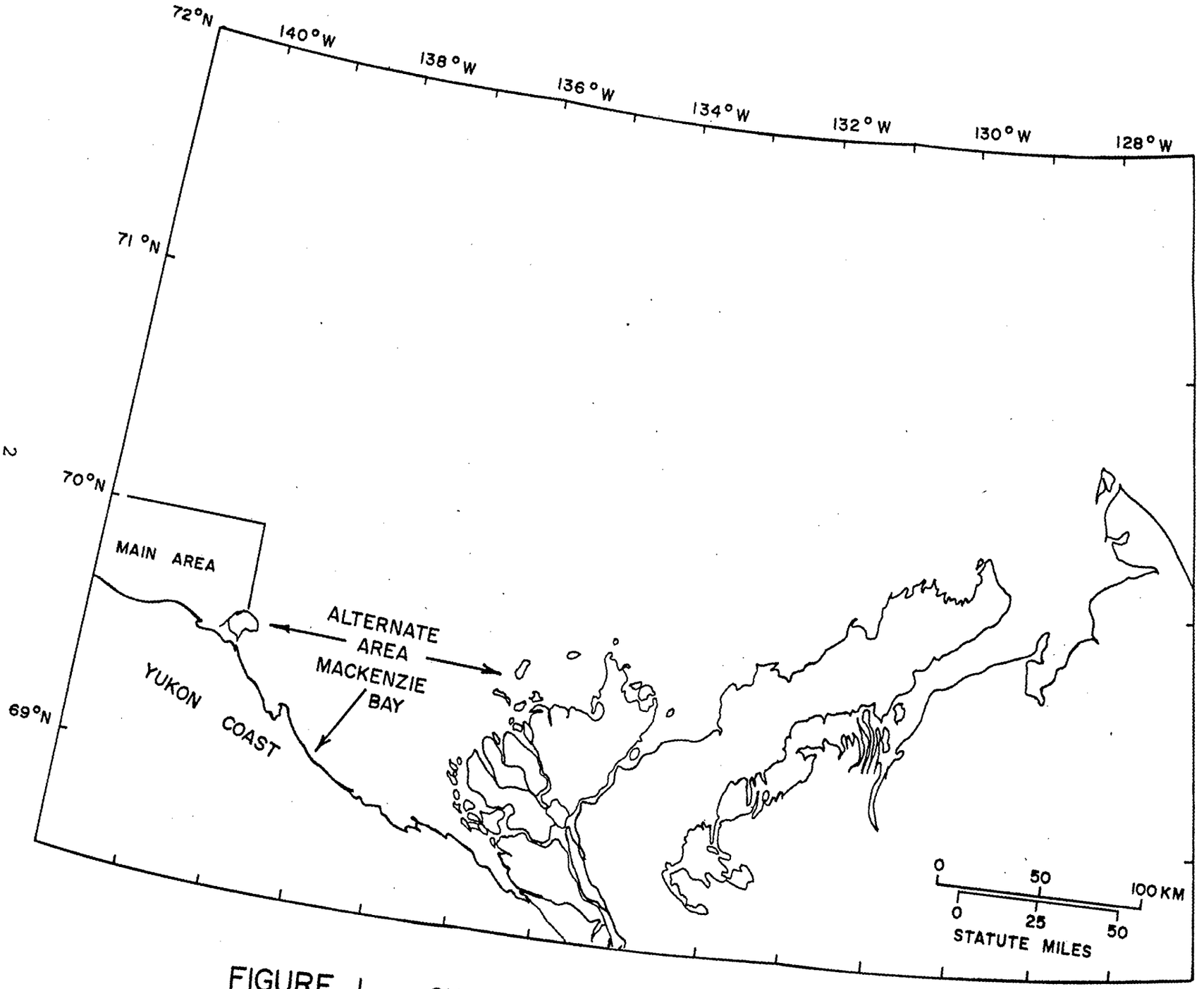


FIGURE 1 - SURVEY AREAS

1.2 Equipment

1.2.1 Navigation System

The navigation system used was a multi-integrated real time positioning package using a HP9920 computer with Interplot 200 software in combination with Cubic ARGO DM-54, Trisponder DMU-540 and the Magnavox MX1107 RS Satellite Navigator.

The following briefly describes the major components:

Cubic ARGO DM-54 was used as the primary radio positioning system. It is a medium frequency system which was chosen because it could provide accurate range coverage for the main area as well as the alternate survey areas. It was used in the range - range mode.

Trisponder DMU-540 is a high frequency short range positioning system which was used as an ARGO calibration tool, to supplement ARGO ranges to improve accuracy and as the primary navigation system on the survey launch.

The Magnavox MX1107 RS Satellite Navigator was used to provide ongoing accuracy checks and to maintain ARGO lane count. Speed and heading were input from the IP200 system to provide dead reckoning between satellite positions. The comparison between the radio navigation position and the satellite position was displayed after

each pass.

The Interplot 200 software package proved to be a versatile system. It provided real time position computations, and on-line logging of position fixes and digitized sounding data. It was also used for off-line computations such as datum conversions, traversing and postprocessing.

Through its connection to the Iscom interface, fix marks were output to all analogue recorders. It also output signals to a remote video monitor to aid the helmsman in on-line steering. The monitor provided a graphic display of the theoretical track and the vessel position relative to it.

The Interplot 200 real time position is based on the variation of co-ordinates method (least squares adjustment). Up to 15 lines of position can be combined in the weighted adjustment. The system produces, for quality control, the quality figure (standard deviation) from the residuals of the least squares fit and the configuration (geometric) accuracy. To optimize raw data for navigation and fixing purposes, a predictive filter can be used on the computed positions. Based on kalman techniques, the filter makes use of both the calculated and predicted positions and their accuracy covariance matrices

to determine a final position.

The following fix information is printed and recorded on discs at operator selected intervals:

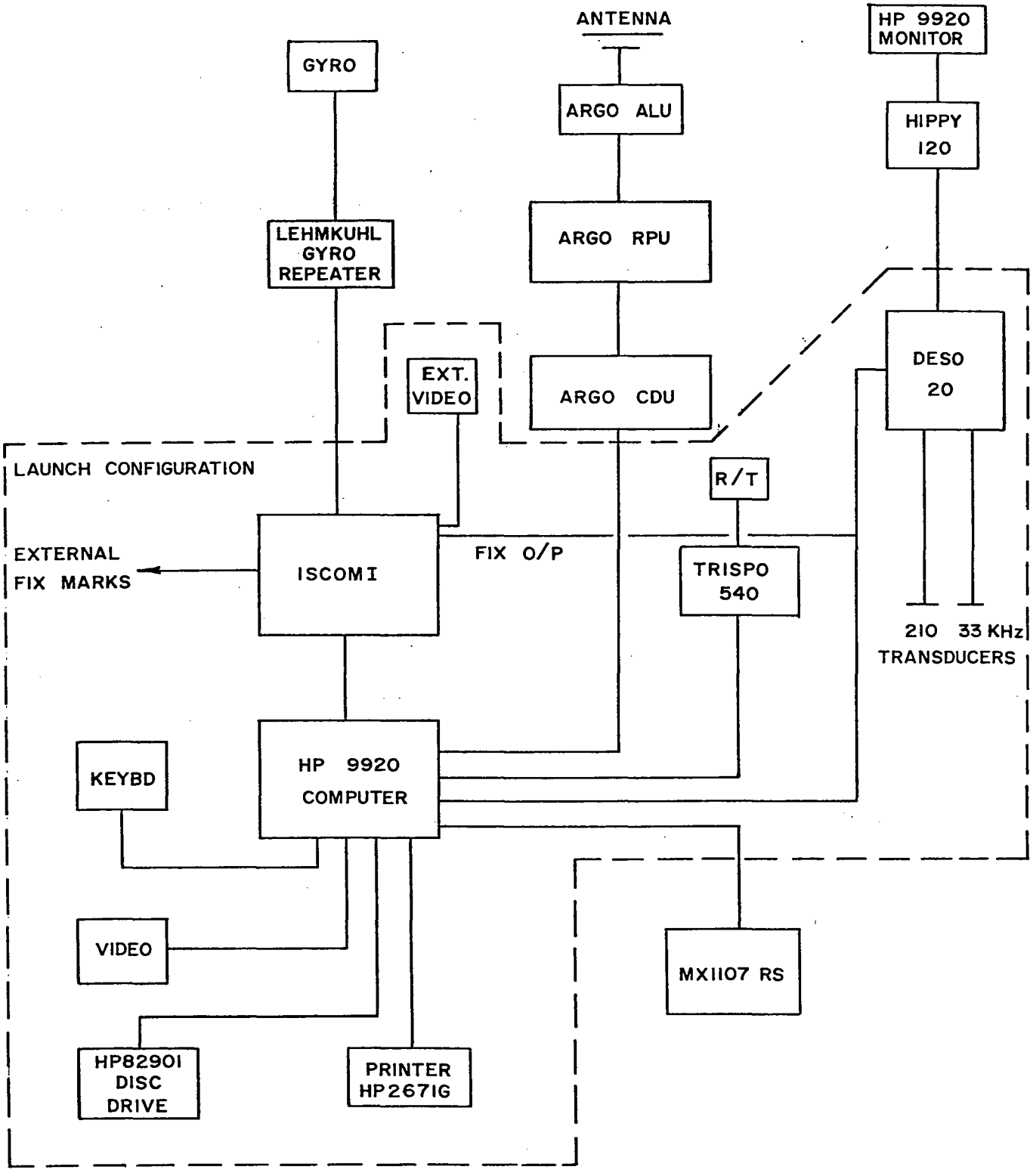
- date/time
- fix number
- survey parameter and data storage file number
- line number
- raw ranges
- antenna position
- raw and smoothed reference position (Echo Sounder transducer)
- position accuracy
- gyro reading
- fix interval along line
- offtrack distance
- digitized depth

Figure 2, presents a block diagram of the Equipment Configuration used on the primary survey vessel and the abbreviated system used on the survey launch.

FIGURE 2

EQUIPMENT CONFIGURATION ON THE M/V BANKSLAND SURVEYOR & THE SURVEY LAUNCH

NAVIGATION AND BATHYMETRIC



1.2.2 Sounding Equipment

The Atlas Deso 20 echo sounder was used throughout the project. It is a dual frequency sounder which outputs data in both analogue and digital form. It was used with both 33 & 210 Khz transducers with respective beam widths of 16° & 9°.

The Hippy 120C Heave Compensator was used to compensate for all the affects of heave, pitch and roll on the transducers. It was interfaced with the Deso 20 to ensure that all soundings were measured from an even datum. The Hippy was used in real time or analogue mode on this project, comparisons between the digital and analogue filtering are discussed in a following section.
(See Appendix 5, Hippy 120C Report)

1.3 Data Processing

The Interplot 200 software provided off-line processing and plotting programmes. These programmes were used with a HP9816 computer and HP7585A plotter to edit, correct and plot data (Figure 3 - Processing and Plotting Equipment Configuration)

The data was handled in three basic editing stages:

1. Position and depth information was stored on disc every 100 metres along the survey line. The original data disc was then copied and protected to ensure that no information was lost during the processing operations. The line profile was then displayed on the video monitor at an operator selected vertical and horizontal scale and the digitized depths were compared to the analogue records. The depths were then edited to display the shoalest sounding, all significant shallow and deep soundings as well as ensuring that the interval between plotted soundings would not exceed 500 m (0.5 cm at scale).

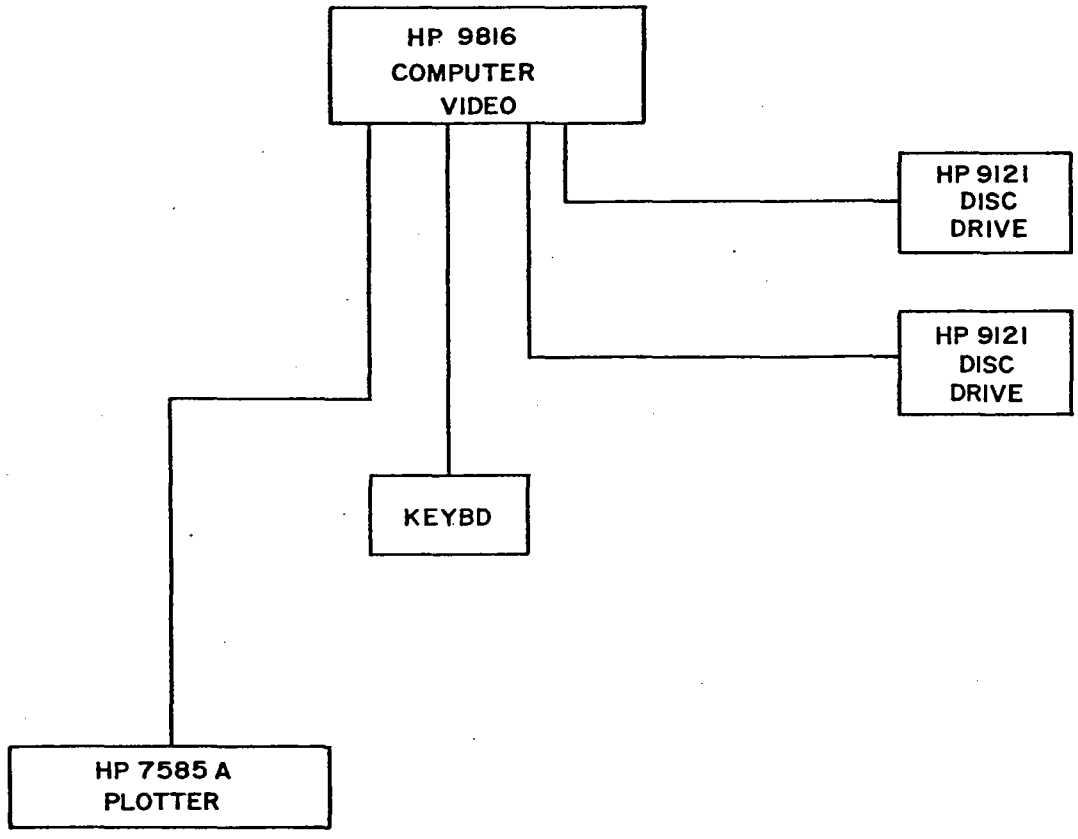
2. Track and bathymetric charts were plotted at scale (1:100,000) to verify coverage of the area surveyed. The bathymetric plots were inspected and contoured to ensure that there was sufficient information to fully and accurately portray the bathymetry of the survey area. Any inconsistencies were noted and re-examined on the analogue records, if necessary the corrections were made

to the data on disc and overlapping or redundant information was edited.

3. Tidal variation and sounder calibration data was stored on disc as the information was collected. The edited discs were then corrected for these effects. Final track and bathymetric charts were then plotted on mylar using the HP7585A plotter.

FIGURE 3

PROCESSING & PLOTTING EQUIPMENT CONFIGURATION



1.4 Co-ordinate Systems

All co-ordinates are referred to the 1927 North American Datum Co-ordinate frame using the Clarke 1866 ellipsoid parameters - (a = 6378206.4; b = 6356583.8)

The datum shift values used for the translation of co-ordinates from Broadcast Ephemeris to 1927 NAD were published in Canada Lands Offshore Surveys for Tuk Doppler.

They are: $\Delta X = +16.0$ m

$\Delta Y = -150.0$ m

$\Delta Z = -172.0$ m

For the main survey area Universal Transverse Mercator, UTM, co-ordinates are referred to Zone 7, central meridian 141° W, while surveys in the alternate area, MacKenzie Basin are referred to Zone 8, central meridian 135° W.

1.5 ARGO Chains

1.5.1 Main Survey Area

Cansite installed and maintained an ARGO Navigation Chain consisting of three stations for positioning in this area. Chain details are:

Ranging frequency	1737.0 Khz
Lane Identification frequency	1910.7 Khz
Calculated Lane Width (based on assumed propagation velocity 299670 km/sec)	86.26079 m

TABLE 1

MAIN AREA - ARGO CHAIN

Station	Code	Latitude	Longitude	UTM Northing	UTM Easting
		N	W	Zone 7	CM141°W
MON 1A	1 slave	69°38'45.584"	140°59'51.043	7726219.49	500096.59
WIND 2	2 master	69°36'47.178"	139°55'44.369	7722916.45	541638.65
ARGO A	3 slave	69°38'08.167"	139°08'01.049	7726167.23	572477.78

The co-ordinates were provided by the C.H.S.

1.5.2 Alternate Survey Area - MacKenzie Basin

An ARGO Chain jointly operated by Dome Petroleum and McElhanney was used for positioning in this area. This chain employed Cubic Westerns extended baseline option and was separated into East and West Chains. Even-numbered time slot allocation had access to the West Chain while odd-numbered time slots accessed the East Chain. Chain details are:

Ranging frequency	1762.5 Khz
Assumed propagation velocity	299670 km/sec
Calculated lane width	85.01277 m

West Chain

Demarcation Pt.	-	code 1
Esky Syledis	-	code 2
Hooper	-	code 3
Sing A-55	-	code 4

East Chain

Sex	-	code 1
Esky Syledis	-	code 2
Hooper	-	code 3
Sing A-55	-	code 4

TABLE 2

ALTERNATE AREA - ARGO CHAIN

Station	Latitude	Longitude	UTM N	UTM E
	N	W	Zone 8	CM 135° W
SEX	70°03'11.97"	130°55'12.86"	7776842.64	655237.77
DEMARKATION	69°37'56.61"	141°19'19.54"	7737400.52	254799.26
ESKY SYLEDIS	69°36'33.91"	132°56'52.92"	7723479.93	579780.72
HOOPER	69°41'15.76"	134°51'34.40"	7730877.74	505441.31
SING A-55	69°02'13.53"	137°41'33.60"	7660677.98	392515.13

Both east and west chains were used during the course of the survey.

1.6 Trisponder Stations Main Area

To provide adequate coverage, five Trisponder beacons were placed at a number of stations in the main survey area. The locations are given in Table 3.

TABLE 3

TRISPONDER STATION CO ORDINATES

Station	Latitude N	Longitude W	UTM N Zone 7	UTM E CM 141° W
MON 1A	69°38'45.58"	140°59'51.04"	7726219.48	500096.59
MON 1A offset	69°38'45.41"	140°59'49.89"	7726214.00	500109.00
Bug	69°28'41.94"	140°50'22.81"	7707529.00	506273.00
Wreck 2	69°35'35.26"	140°12'30.42"	7720523.42	530803.37
Canad 1 Ref	69°37'54.16"	140°50'37.68"	7724634.32	506067.73
WIND 2	69°36'47.18"	139°55'44.37"	7722916.45	541638.65
WIND 2 offset	69°36'47.16"	139°55'45.11"	7722915.76	541630.68
11105	69°29'36.30"	140°06'55.68"	7709454.69	534582.42
ARGO A offset	69°38'07.66"	139°08'00.07"	7726151.81	572488.87
OSCAR 2	69°26'20.87"	139°47'08.94"	7703622.97	547589.52
ARGO B	69°35'50.05"	139°46'59.38"	7721253.35	547342.82

Co-ordinates were supplied by the C.H.S. Offset stations were positioned by compass and distance ties from the established stations:

MON 1A to MON 1A offset: 13.6 m at 114° True

Wind 2 to Wind 2 offset: 8 m at 266° True

ARGO A to ARGO A offset: 19 m at 146° True

The compass bearings were corrected for 36° E declination.

1.7 Survey Vessel

The MV Banksland Surveyor operated by Northern Transportation Company Limited was used throughout the project as the primary survey vessel. It is classed 100A1 L.M.C. at Lloyds and certified as Canadian Coast Guard Home Trade 2. The 180 foot vessel provided comfortable and adequate space for the survey operations. It has a single screw with trolling speed control and a directional bow thruster. The vessel has a sponsoned after deck with space for a range of seismic gear and is equipped with a 10000 lb. winch, two HIAB cranes and a twelve foot high "A-frame". Two 24" diameter moon-pools mounted on gate valves are installed in the forward cargo hold and accessible at the forward deck. This was a useful feature as the echo sounder transducer was mounted in the forward moonpool and could be easily removed for servicing. The aft moonpool was used for deploying the bar check and measuring the vessel's draft.

Other features which make the Banksland particularly suitable for hydrographic and seismic work included:

- 5 ton HIAB on the forward deck
- 5000 psi high pressure air line from the forward geophysical workshop to the after deck
- helicopter pad
- 27 foot aluminum hull/diesel powered survey launch

- a seismic lab facing aft, a survey office and a navigation room off the wheelhouse.
- accommodation for 32

The one deficiency in the vessel is the limited fuel capacity.

1.8 Transportation

Kenn Borek Air provided fixed wing transport of equipment, fuel and personnel between Inuvik and the Bar 1 Dew Line Station at Komakuk Beach. The Polar Continental Shelf Project (PCSP) provided ongoing air support with their Bell 206B helicopter throughout the project. It aided in mobilization, ongoing maintenance and demobilization of the onshore navigation stations. The helicopter also rendezvoused with the Banksland on a weekly schedule to facilitate crew changes and supply drops.

2. MOBILIZATION

Field mobilization of the "Banksland Surveyor" and the onshore navigation stations commenced on July 10, 1984 and finished on July 22, 1984. The Cansite and E.M.&R. equipment was shipped to the Arctic prior to July 10. The electronic components were shipped to Inuvik by air and the remainder was shipped to Points North Transportation in Edmonton where it was consolidated and loaded on a truck by Cansite personnel for transport to Inuvik. Two people from Cansite and E.M.&R. consolidated the shipments in Inuvik and forwarded the Banksland Surveyor's equipment to Tuktoyuktuk by barge. The onshore navigation components, helicopter fuel and propane for the thermo-electric generators were transported by Kenn Borek Air to the Bar 1 Dew Line Site at Komakuk Beach.

The following sections describe the mobilization activities onshore and on the Banksland Surveyor from July 10 - 22, 1984.

2.1 Personnel

The following personnel were involved in the onshore navigation station and "Banksland Surveyor" mobilization.

TABLE 4

MOBILIZATION PERSONNEL

CANSITE M. McGladrey	Banksland July 10 - 22
E. Peters	Banksland July 10 - 22
D. White	Banksland July 10 - 22
K. Ferns	Banksland July 12 - 22
P. Gerritsen	Banksland July 10 - 14 Datawell Engineer - installed and checked Hippy 120C Heave Compensator
P. Roberts	Onshore mob. and survey July 10 - 19 Banksland July 20 - 22
M. Goguen	Onshore mob. and survey July 10 - 19 Banksland July 20 - 22
H. Jacobs	Received equipment in Inuvik July 6 Onshore mob. July 10 - 19, Tuk July 20 - 22
H. Zwaan	Banksland July 17 - 22 Software Support
EARTH & OCEANS L. Meagher	Banksland July 10 - 22
A. Bays	Banksland July 10 - 22

TABLE 4 (cont'd)

MOBILIZATION PERSONNEL

EARTH & OCEANS E. Mayzes	Banksland July 10 - 22
R. Edsall	Banksland July 10 - 22
E.M.&R. F. Jodrey	Assisted Jacobs in Inuvik Banksland July 10 - 22
J. Neilsen	Banksland July 11 - 17
V. Cody	Banksland 11 - 17
V. Allen	Banksland - Geothermo Activities
M. Burgess	Banksland - Geothermo Activities

Jodrey, Allen and Burgess stayed at the Polar Continental Shelf Project (PCSP) Camp during mobilization of the Banksland Surveyor.

2.2 Onshore Operations

This phase of mobilization involved the following operations:

- transportation of equipment & fuel to Komakuk Beach
- establishment of ARGO DM-54 stations at MON 1A, WIND 2, ARGO A
- calibration and establishment of Trisponder Stations at Monument 1A, Bug Ref 2, 11105 and WIND 2.
- photo identification and classification of shoreline
- survey ties to conspicuous man-made features

2.2.1 Transportation and Accommodation

Five fixed wing flights using Kenn Borek Air were needed to transport equipment, fuel and personnel to the Bar 1 Dew Line Site. The details of the flights are given in Table 5.

TABLE 5

MOBILIZATION FIXED WING AIRCRAFT USE

Date	Aircraft	Load	(lb) Weight
3 July	Caribou	25 x 100 lb propane, 8 drums Jet B Inuvik - Bar 1 - Inuvik	7780
8 July	Twin Otter	7 drums Jet B - Trisponder lumber Inuvik - Bar 1 - Inuvik	3000
11 July	Twin Otter	280 ft. Texas Tower, ARGO & generators Inuvik - Bar 1 - Inuvik	2500
11 July	Kingaire	3 people, batteries, misc. Inuvik - Bar 1 - Inuvik	2000
19 July	Twin Otter	7 drums of Jet B - Inuvik - Bar 1 8 empty drums, 3 people to Tuk 8 empty drums to Inuvik	

Polar Continental Shelf Project (PCSP) provided a 206B helicopter to support this project. Helicopter use is shown in Table 6.

TABLE 6

MOBILIZATION - PCSP HELICOPTER TIME

Helicopter Time (SMQ)		
11 July	Propane to Herschel, WIND 2, Demarc Pt., 4 cylinders to each site. 60 ft tower to Herschel, WIND 2, Demarc Pt. Ground anchors, hardware & recon by P. Roberts to all sites	4.8 hrs.
12 July	Propane slung to Bug Topo and 11105. ARGO & field boxes delivered. Some survey work.	6.3 hrs.
13 July	3 people to Herschel, back (dropped off)	1.4 hrs.
14 July	2 surveyors to WIND 2, 1 to Herschel	2.5 hrs.
15 July	Survey WIND 2, 3 people to Demarc Pt., return	3.0 hrs.
16 July	3 people to Demarc Pt. & return	1.7 hrs.
17 July	2 to WIND 2, Pt. 11105, Bug Topo & return with small globals & Trispo	2.7 hrs.
18 July	2 Surveyors to WIND 2 twice	0.7 hrs.
19 July	Return to Tuk	1.7 hrs.
	TOTAL HELICOPTER TIME	24.8 hrs.

Cansite provided Jet B fuel for the helicopter at Komakuk Beach while PCSP made fuel available from their cache at Tuk.

In Inuvik the mobilization crew stayed at the Finto Motel, while at Komakuk Beach, Cansite and the Quasar Helicopter personnel stayed at the Bar 1 Dew Line facilities.

2.2.2 Trisponder Calibration

The Trisponder Navigation System is made up of a mobile unit consisting of range console, cabling and R/T antenna, and beacons onshore. Changing consoles and cabling does not affect the calibration. Delays are caused by the beacons and R/T antennas only. The system was calibrated on a known baseline prior to deployment in the field. Calibration values are given in Table 7.

TABLE 7

TRISPONDER CALIBRATION VALUES

RT	76	78
BEACON	C-O (m)	C-O (m)
72	-865.5	-856.7
74	-823.9	-813.6
75	-837.2	-826.6
81	-836.3	-825.5
84	-875.8	-864.3
87	-842.5	-831.3

2.2.3 Survey Ties and Photo Identification

Horizontal and vertical ties to conspicuous man-made features and to photo-identifiable points were started during the mobilization operations. Poor weather conditions and limited helicopter time hampered the survey and the ties were completed later.

For details see sections 3.3.3 & 3.3.4.

2.3 Banksland Surveyor Mobilization

The following equipment was installed on the Banksland Surveyor:

Navigation & Bathymetric

- IP200 Integrated ARGO/Trisponder/Satnav navigation and positioning system. (on boat deck aft of bridge)
- Deso 20 dual frequency echo sounder and Hippy 120C Heave Compensator (Deso 20 transducer was set in forward moon pool and the Hippy was placed in the forward hold beside the moon pool)
- IP200 processing and plotting system (on boat deck aft of bridge)
- Survey drafting room (bridge deck - port side)

Geological & Geophysical

- Geothermo probe - (winch is located on the bridge deck forward of the wheelhouse, the probe is deployed on the port side using the forward HIAB and the instrumentation is in a cabin on the bridge deck)

Airgun Seismic System

- (The diesel generator and the compressor unit were installed in the workshop below the helicopter deck and plumbed into the Banksland fuel water and high pressure lines. The air-guns were towed from the stern while the streamer was towed on the starboard side immediately aft of the HIAB.)

ORE 3.5 Khz Sub Bottom Profiler

- (towed from the starboard HIAB crane)

Klien Side Scan

- (towed from the port HIAB)

Alpine Piston Corer

- (deployed from the A-frame on the stern using the Banksland 10,000 lb. winch)

Grab Sampler - Shipek

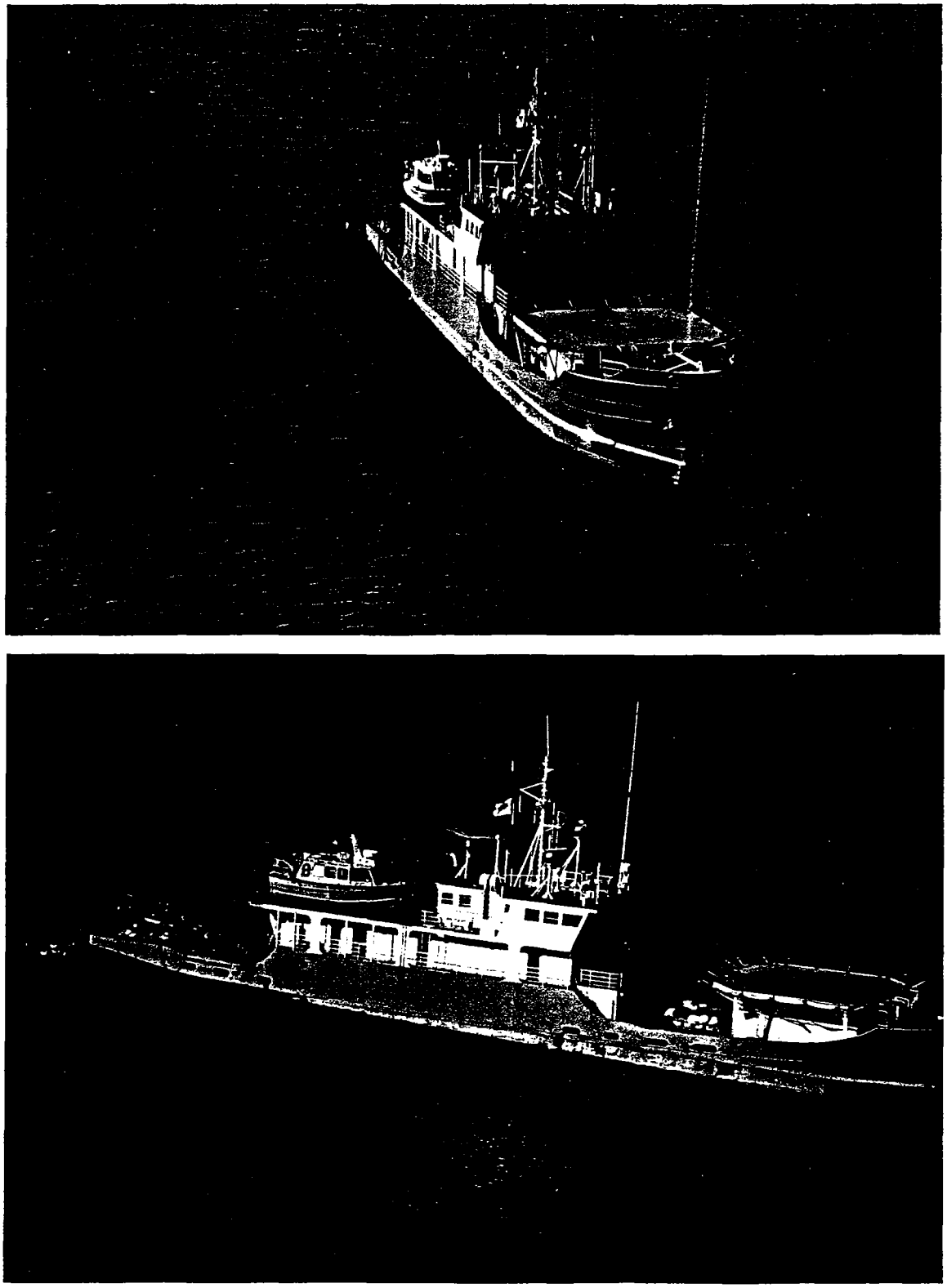
- (deployed using the forward HIAB and the geothermo winch)

Seismic Recorders and Processing

- (located in the bridge deck lab)

Figures 4 to 6 show the layout of the MV Banksland Surveyor and the location of the navigation antennae relative to the echo sounder transducer.

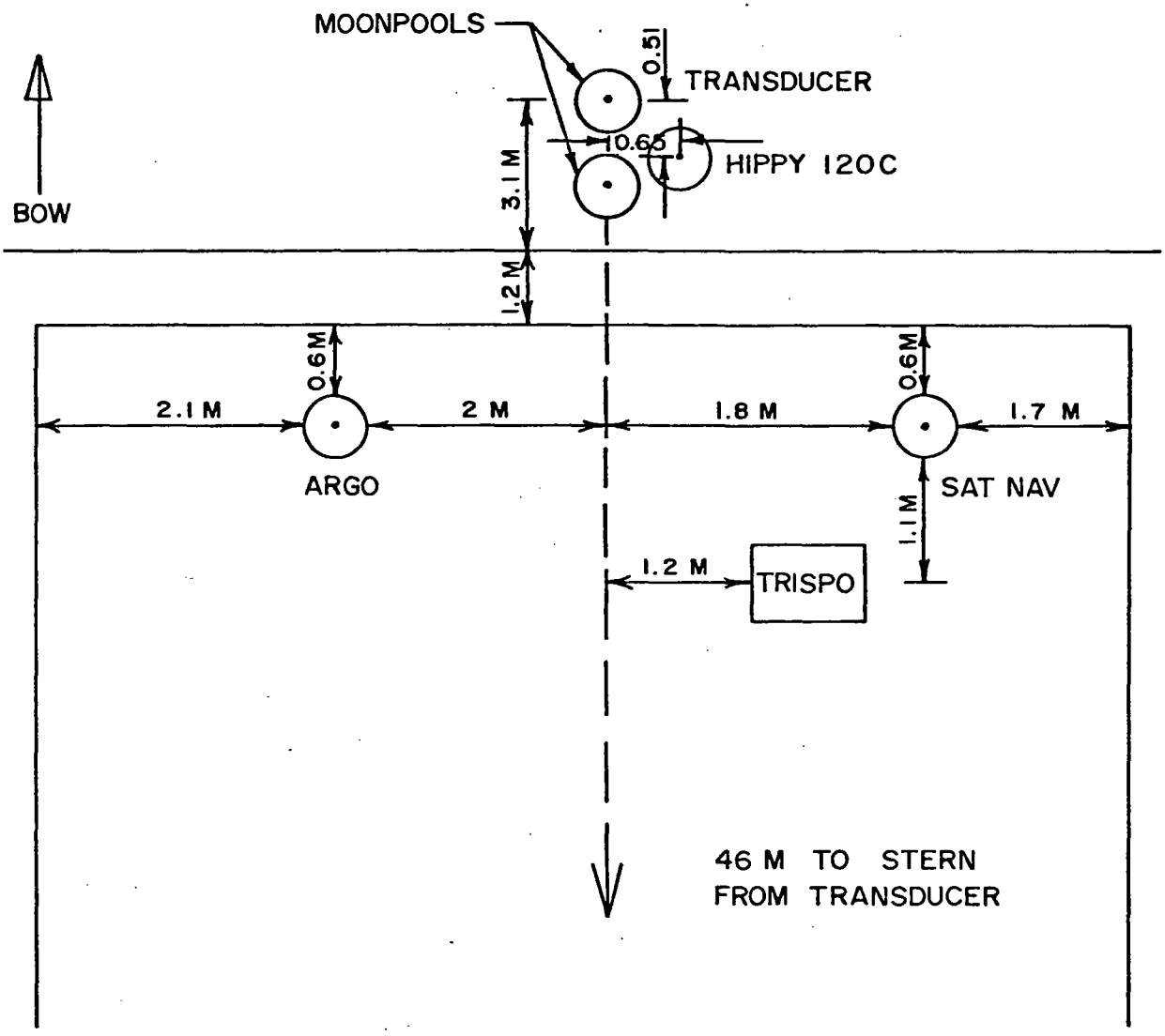
FIGURE 4



MV Banksland Surveyor

FIGURE 5

M/V BANKSLAND ANTENNA OFFSETS



OFFSETS FROM TRANSDUCER

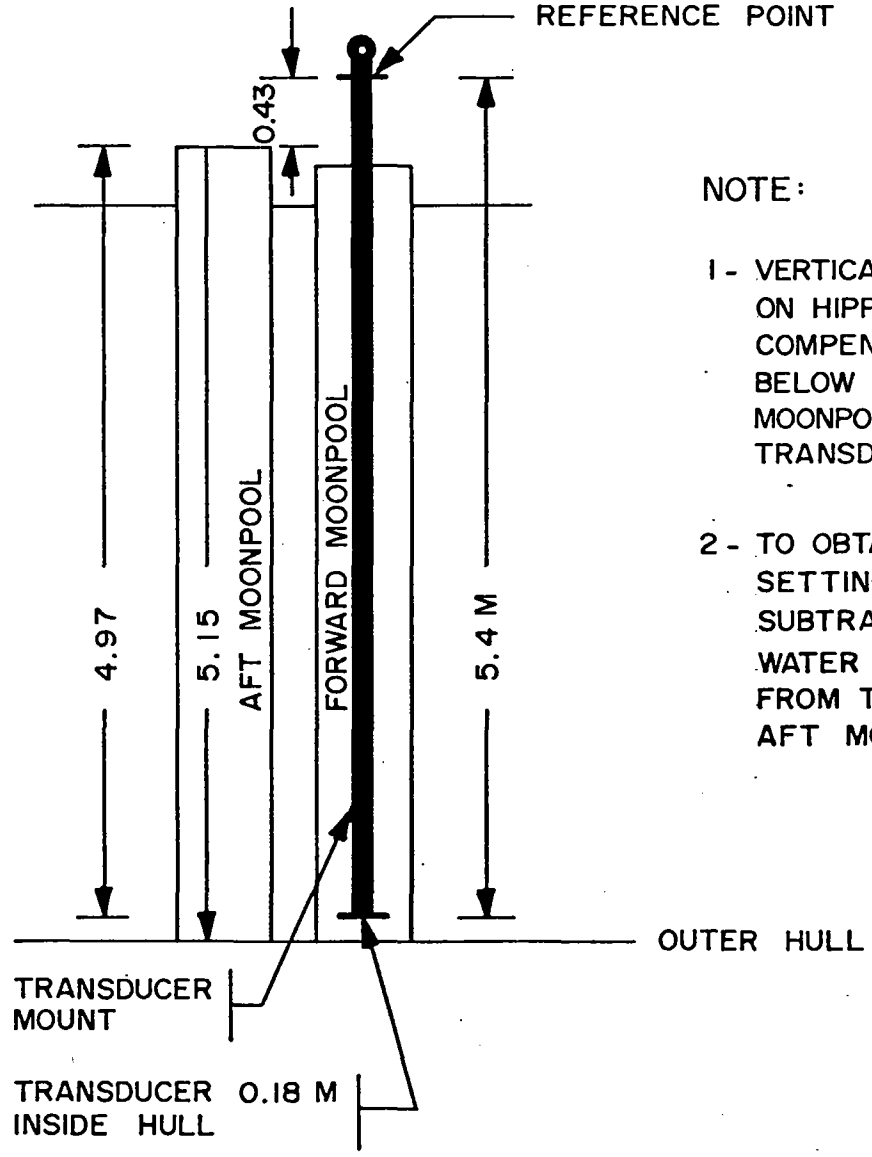
ARGO ANT. - 5 M (Y)
2 M (X)

TRISPO ANT. - 6 M (Y)
1.2M (X)

MX1107
SAT NAV ANT. - 5 M (Y)
1.8 M (X)

FIGURE 6

TRANSDUCER POSITION & DRAFT MEASUREMENT



NOTE:

1 - VERTICAL REFERENCE POINT ON HIPPY 120C HEAVE COMPENSATOR WAS 4.06 M BELOW TOP OF AFT MOONPOOL OR 0.91 M ABOVE TRANSDUCER.

2 - TO OBTAIN THE DRAFT SETTING 4.97 M WAS SUBTRACTED FROM THE WATER LEVEL MEASURED FROM THE TOP OF THE AFT MOONPOOL.

3. SURVEY OPERATIONS

3.1 Overview

This portion of the report deals with the field survey operations carried out between July 22 & October 2, 1984.

The "MV Banksland Surveyor" did not make any port calls during the period. Refueling took place at sea from the Gulf Beaufort Tanker anchored to the southeast of Herschel Island and from the "MV Johnny Hope". Whenever space was available on the helicopter during the weekly maintenance and personnel runs, food supplies were transported to the Banksland. In addition to the weekly helicopter flights the vessel was completely restocked with supplies transported to Pauline Cove by fixed wing aircraft in mid-August.

The "MV Banksland Surveyor" was used for the majority of the sounding operations and shoal examinations. The launch "Sprint" was used for the inshore soundings and some of the shoal examinations.

For a detailed description of the Survey Activities, see Appendix 1, Weekly Reports and Daily Status Reports.

3.1.1 Personnel

The following Cansite personnel were involved in the field surveys:

	Position	
K.M. McGladrey	Project Manager	July 22/84 - Oct. 2/84
K.M. Ferns	Data Post Processor	July 22/84 - Oct. 2/84
P.H. Roberts	Senior Surveyor	July 22/84 - Oct. 2/84
E.F. Peters	Surveyor/Software Support	July 22/84 - Oct. 2/84
M.C. Goguen	Surveyor	July 22/84 - Sept.19/84
D.C. White	Electronics Engineer - Banksland	July 22/84 - Aug. 29/84
H.K. Staples	Electronics Engineer - Shore Support Banksland	Aug. 6/84 - Aug. 29/84 Aug. 29/84 - Oct. 2/84
H.R. Jacobs	Shore Technician	July 22/84 - Aug. 7/84
D.W. Simon	Shore Technician	Aug. 27/84 - Oct. 2/84
J.N. Bennett	Surveyor	Sept. 14/84 - Oct. 2/84
G. Jones	Surveyor	Sept. 14/84 - Oct. 2/84

3.1.2 Corrections to Soundings

Soundings observed between July 22 and 07:10 GMT August 14, 1984 were corrected for tidal effects using predicted heights supplied by the C.H.S. for station 6525. Once the Ottboro Tide Gauge was repaired and established at Pauline Cove from B.M. Bolt, the observed tidal corrections were applied.

The soundings were recorded on a dual frequency (33 Khz & 210 Khz) Deso 20 echo sounder set to a velocity of 1435 m/sec and corrected by periodic barchecks. A Hippy 120 Heave Compensator interfaced to the echo sounder was used to compensate for the effects of vessel motion (heave, pitch and roll) on the soundings. This unit was used in analogue or real time mode during the survey.

The draft correction as measured through the moonpools was set in the Deso 20 and automatically applied to the digital and analogue sounding records.

The draft correction on the Banksland was determined and set on the Deso 20 after each refueling. The changes in draft between refuelings were recorded and also applied to the soundings as part of the tidal correction during the processing operations.

The majority of soundings were observed using the 210 khz transducer while the 33 khz transducer was only used for penetration on depths over 150 metres.

Leveling notes, barcheck data and tidal corrections applied are given in Appendix A.

3.2 MacKenzie Basin Survey - Alternate Area

During periods when ice or weather conditions did not permit work to be performed in the main area, geophysical and geological surveys were carried out in the MacKenzie Basin. Specifically, the surveys in the alternate area were carried out during the following times:

- July 22 - 25 Geophysical and coring operations.
- Aug. 26 Ice reconnaissance in main area, returned to MacKenzie Basin and resumed seismic operations until Aug. 28
- Aug. 13 - 15 Seismic operations using West ARGO chain.

3.2.1 ARGO Calibration

The ARGO navigation system was calibrated while enroute to the project area by sailing baseline crossings and extensions.

An explanation of the procedure follows:

A baseline crossing consists of sailing across the line joining two shore stations, while a baseline extension refers to sailing across the production of the line between two shore stations. If the system is calibrated, the sum of the ranges should equal the baseline length at

the crossing and on the extension the difference between the two ranges should equal the baseline length.

The vessel sails the baseline crossing noting the minimum sum of ranges and the extension noting the maximum difference of ranges.

The following formulas apply:

$\frac{\Delta - \Sigma}{2}$ = calibration value for station closest to the extension crossing

$\frac{2BL-\Sigma-\Delta}{2}$ = calibration value for station furthest from the extension crossing

Where:

Σ = minimum sum of ranges observed during the baseline crossing.

Δ = maximum difference of ranges observed during the extension crossing

2BL = two times the baseline length.

The observed crossing and extension values for the East Chain (see section 1.5.1) are given in Table 8.

TABLE 8

EAST CHAIN BASELINE CROSSING & EXTENSIONS

Date	Time GMT	Baseline + denotes crossing - denotes extension	Calculated Length Lanes	Observed Length Lanes	Difference Lanes	Location
22/07	20:40	AR2 + AR3	879.10	(Σ) 878.86	+0.24	Kugmallit Bay
23/07	01:34	AR1 + AR3	1843.68	(Σ) 1843.35	+0.33	Kugmallit Bay
23/07	03:38	AR4 - AR3	1564.64	(Δ) 1565.48	-0.84	Kugmallit Bay
23/07	08:41	AR2 - AR3	879.10	(Δ) 880.96	-1.86	Hooper Island

Notes:

1. Initial calibration values set at 0.5 lanes for each station.

2. 1 lane = 85.01277 m.

3. AR1: Sex
   AR2: Esky Syledis
   AR3: Hooper
   AR4: Sing

The calibration values were calculated:

FOR ARGO STATIONS ESKY (AR2) and HOOPER (AR3)

$$\text{Correction to Hooper} = \frac{\Delta-\Sigma}{2} = \frac{(880.96-878.86)}{2} = 1.05 \text{ lanes}$$

$$\text{Correction to Esky} = \frac{2BL-\Sigma-\Delta}{2} = \frac{(2\times879.1)-878.86-880.96}{2}$$

$$= -0.81 \text{ lanes}$$

From these values, the calibration values for the remaining stations were determined.

FOR ARGO STATION SEX (AR1)

BL	AR1 + AR2	1843.68
	$-\Sigma$ AR1 + AR3	-1843.35
		.33
- correction to AR3		-1.05 above calculation
correction to AR1		-0.72 lanes

FOR ARGO STATION SING (AR4)

BL	AR3 - AR4	1564.64
$-\Sigma$	AR4 - AR3	-1565.48
		-0.84
- correction to AR3		-1.05
correction to AR4		0.21 lanes

The final ARGO East Chain calibration values were:

	AR1	AR2	AR3	AR4
Initial calibration value	0.50	0.50	0.50	0.50
Calculated correction	-0.72	-0.81	+1.05	0.21
Calibration value lanes	0.78	0.69	0.55	0.71

After August 13, the West Chain was used which substitutes Demarcation Point ARGO for ARGO Station Sex. The calibration value for Demarcation Point was determined from a three range solution using the other ARGO stations. There was no significant change between the value for Sex and Demarcation Point, 0.78 lanes was used for ARGO code 1 (AR1) throughout the surveys.

3.2.2 Data Presentation

Data collected in this area is presented as follows:

Figure 7	Track Plot Yukon Shelf (Natsek Plain)	
Figure 8	Track Plot Herschel Basin	
Figure 9	Track Plot MacKenzie Trough	see Appendix K
Figure 10	Track Plot East MacKenzie Trough	
Table 9	MacKenzie Basin Core & Geothermo Probe Locations	
Table 10	Index of Sounding Rolls - MacKenzie Basin	
Appendix B	Depth Corrections & Position Printouts	

Sounding data was visually inspected to eliminate digitizing errors only. The corrections to soundings presented in Appendix A were applied to the depth data.

TABLE 9

MACKENZIE BASIN CORE & GEOTHERMO-PROBE LOCATIONS - AUG. 25, 1984

Station	Position (1927 NAD)			Remarks
	Geographics	UTM Co-ordinates		
		Zone 8 CM 135° W	Zone 7 CM 141° W	
1	69°28'18.76"N 128°48'45.77"W	7711452.0N 350864.0E	7708333.0N 585589.0E	core 1
1	69°28'19.32"N 138°48'46.98"W	7711470.0N 350852.0E	7708350.0N 585575.0E	geo probe 1
2	69°28'05.61"N 138°49'44.60"W	7711085.0N 350200.0E	7707903.0N 584964.0E	core 2
2	69°28'04.46"N 138°49'43.66"W	7711049.0N 350208.0E	7707868.0N 584975.0E	geo probe 2
3	69°27'43.56"N 138°51'40.02"W	7710482.0N 348904.0E	7707176.0N 583733.0E	core 3
3	69°27'42.14"N 138°51'39.50"W	7710438.0N 348907.0E	7707132.0N 583741.0E	geo probe 3
3	69°27'41.66"N 138°51'44.01"W	7710426.0N 348857.0E	7707116.0N 583692.0E	core 4
4	69°29'03.07"N 138°46'20.16"W	7712724.0N 352529.0E	7709762.0N 587121.0E	core 5
5	69°27'25.37"N 138°47'02.28"W	7709731.0N 351885.0E	7706721.0N 586773.0E	core 6
5	69°27'24.66"N 138°46'55.15"W	7709704.0N 351961.0E	7706701.0N 586851.0E	geo probe 4
6	69°26'30.64"N 138°45'00.85"W	7707957.0N 353100.0E	7705074.0N 588156.0E	core 7
7	69°25'25.57"N 138°42'56.33"W	7705862.0N 354331.0E	7703110.0N 589586.0E	core 8
8	69°23'42.98"N 138°39'47.78"W	7702565.0N 356192.0E	7700012.0N 591760.0E	core 9

* Co-ordinates are referenced to piston core or geothermo probe deployment position on vessel, not the echo sounder transducer.

TABLE 10

INDEX OF SOUNDING ROLLS - MACKENZIE BASIN

Roll #	Date Surveyed	Contents	Data Disc #	Remarks
1	23 July	lines 200, 201, 202 & bar check # 1	1	
2	23&24 July	lines 203, 204 & 205	1	
3	24 July	lines 206, 207 & 208	1	
4	24 July	line 209 & portion of 210	1	
5	24 July	portion of line 210 & bar check # 2	2	
6	25 July	bar check # 3		
7	27 July	line 221 & portion of 220	3	fixes 1 - 178
8	27 July	portion of lines 220 & 219	3	fixes 184 - 431
9	27 July	portion of 219	3	fixes 432 - 669
10	27 July	line 223, 225 & portion of 224	3	fixes 670 - 867
11	27 July	line 224	3	fixes 867 - 1118
12	27 July	line 224 & portion 226	3	fixes 1118 - 1388
13	27 July	portion of line 226 & 211	3&4	fixes 1394 - 1643
14	28 July	portion of line 211	4	fixes 1646 - 1741
15	13 August	line 230 - offtrack 4000 m	5	
16	13 August	line 230	5	
17	14 August	line 301 & portion 301.1	5	
18	14 August	portion of 301.1	5	
19	14 August	portions of 301.1 & 301.21	5	
20	14 August	portions of 301.21 & 305.1	5	

TABLE 10 continued

INDEX OF SOUNDING ROLLS - MACKENZIE BASIN (Continued)

Roll #	Date Surveyed	Contents	Data Disc #	Remarks
21	14 August	portion of 305.1 & 302.1	5	
22	15 August	portion of 302.1	5&6	
23	15 August	portion of 302.1	6	
24	15 August	portion of 302.1 & 303	6	
25	15 August	portion of 303 & offtrack 5000 m line 304	6	
26	15 August	301.1 offtrack 5000 m	6	
27	15 August	301.1 offtrack 5000 m	6	

3.2.3 Positioning Accuracy

A study was carried out to assess the accuracy of ARGO DM-54 positioning in this area.

The standard deviation of a single range may be characterized by [Thomson etal 1980, Hydrographic Surveying page 63]

$$\sigma s = (\sigma 1^2 + \sigma 2^2 + \sigma 3^2 + (\sigma 4 \times s)^2)^{\frac{1}{2}}$$

in which error sources are divided into two groups; those independent of distance measured ($\sigma 1$, $\sigma 2$ & $\sigma 3$), and those directly proportional to distance measured ($\sigma 4$).

The error sources are:

- $\sigma 1$ is due to noise and instrument error
- $\sigma 2$ is due to varying conditions at transmitter sites
- $\sigma 3$ is due to uncertainty in calibration constant.

$\sigma 4$ is due to uncertainty in propagation velocity

s is the measured distance

The standard deviation of a single ARGO range has been found to be [eg. Lockhart etal 1980, 19th Canadian Hydrographic Conference Proceedings]

$\sigma 1 \pm 1.5$ m

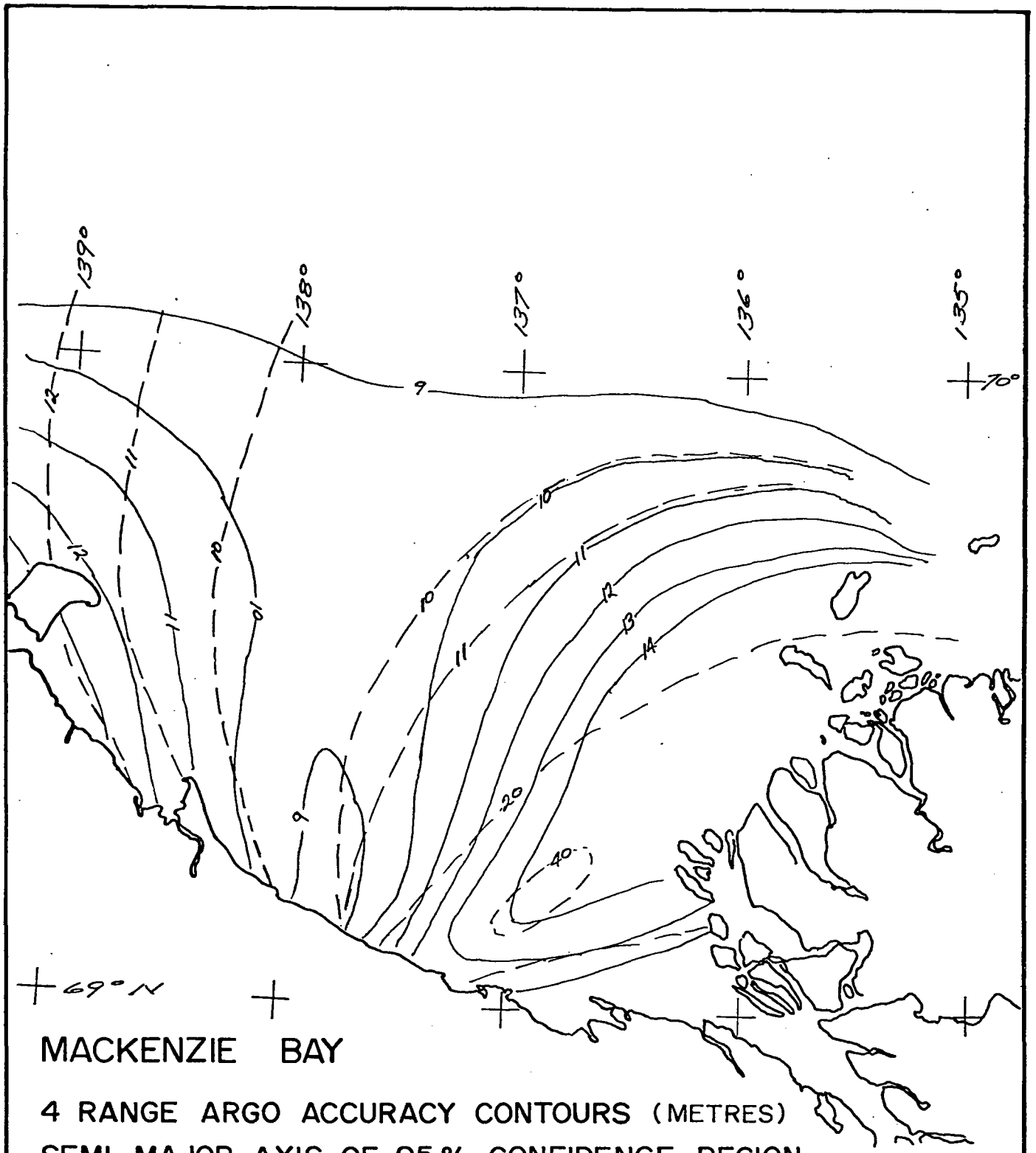
$\sigma 2 \pm 2.0$ m

$\sigma 3 \pm 3.0$ m

$\sigma 4 \pm 5$ ppm

$$\sigma \text{ ARGO} = ((3.9 \text{ m})^2 + (s \times 5 \text{ ppm})^2)^{\frac{1}{2}}$$

Using the above equations, the predicted accuracy contours (semi-major axis of 95% Confidence Region) for both East and West Chains were plotted on figure 11.



MACKENZIE BAY

4 RANGE ARGO ACCURACY CONTOURS (METRES)
SEMI-MAJOR AXIS OF 95% CONFIDENCE REGION

SCALE: 1:1,000,000

——— 10 ——— DENOTES WEST ARGO CHAIN CONTOUR

— — 10 — — DENOTES EAST ARGO CHAIN CONTOUR

FIGURE 11

3.2.4 Ongoing Accuracy Checks

The IP200 navigation package has a number of features to aid the navigator in monitoring the quality of the positioning.

The residuals of the least squares solution and the IP200 position accuracy figure are displayed after each solution. A marked change in the residual signature or the magnitude of the position accuracy figure would indicate calibration or navigator problems.

In addition to monitoring the above, to ensure that no lane loss had occurred, the navigator also kept track of the difference between observed distances to the shore stations and the distance calculated from the satellite position output by IP200 after each satellite pass.

A more detailed description of the quality control features of the IP200 package is given in section 3.3.7.

3.3 Main Survey Area

This section of the report details with the area bounded by the 139° W & 141° W meridians of longitude, the 70°15 N parallel of latitude and the Yukon Coast.

3.3.1 Navigation Calibration Banksland

The Banksland's ARGO Navigation System was calibrated when the vessel arrived in the Main Survey Area on July 26 by baseline crossing techniques.

During the course of the survey the quality of the position fixes was closely monitored (see section 3.3.7 Position Accuracy) to ensure that changing ice and weather conditions did not significantly change the propagation velocity and in turn require re-calibration. The ARGO system was re-calibrated by comparison to the Trisponder positioning system on Aug. 20/84 and Sept.19/84.

The delta range values input into the ARGO systems software via the C.D.U. are given in table 11 and the calibration calculations are given in Appendix 2.

TABLE 11

ARGO CALIBRATION VALUES

Calibration Date	MON 1A ARGO 1	WIND 2 ARGO 2	ARGO A ARGO 3
July 26/84	0.45	0.47	0.57
Aug.20/84//20:57 GMT	0.63	0.57	0.60
Sept.19/84//08:40 GMT	0.74	0.64	0.61

3.3.2 Data Presentation - Main Area

Data collected in the area is presented as follows:

- Figure 12, LINE PREPLOT - This drawing shows the position and numbering of all predefined lines stored in the IP200 LIN files.

- Appendix A - SOUNDING CORRECTIONS - contains the tidal and barcheck data collected during the survey

- Appendix C - Corrections to Soundings and Position Printouts of data collected by the Survey Launch

- Appendices D & E - Tidal & Barcheck Corrections to Soundings collected by the Banksland Surveyor

- Appendices F,G & H - Position Printouts from the Banksland Surveyor

The printouts of sounding corrections and fix positions in Appendices C,D,E,F,G & H are the edited depths shown on the Field Sheet.

- Appendix I - PHOTOGRAPHS - contains the E.M.&R. aerial photographs and 35 mm photographs of the shoreline

- Appendix J - HORIZONTAL CONTROL SUMMARY

- Appendix K - contains all figures not attached to the main report.

- Appendices L - P - ECHO SOUNDING ROLLS

- Table 12 - LOCATION & BOTTOM CHARACTERISTIC OF BOTTOM SAMPLES

- Table 13 - SHOAL EXAMINATIONS - BOTTOM CHARACTERISTICS

- Figures 13 - 19A - TRACK PLOTS 1 - 8 - These Track Plots or Boat Boards show the position of all soundings collected this season. See appendix 4 for a line and fix number index of the Track Plots.

- Figure 20 - BATHYMETRIC PLOT - CHECKLINE 5 - gives the edited soundings along the east-west checklines.

- Figure 21 - BATHYMETRIC PLOT - LAUNCH - shows the edited launch - soundings

- Figure 21A - WORK SHEET
  SHOAL EXAMINATIONS &
  BOTTOM SAMPLES

- Figure 22 - Final Field Sheet

TABLE 12

BOTTOM SAMPLES - MAIN AREA

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Geo Probe # 5	500262 E 7750585 N	69 51 52.1 N 140 59 35.5 W	
Sample 10	562489 E 7733716 N	69 42 20.9 N 139 23 08.1 W	
" 11	520065 E 7737580 N	69 44 49.6 N 140 28 50.3 W	
" 12	499975 E 7738604 N	69 45 25.4 N 141 00 02.3 W	
" 13	500239 E 7750554 N	69 51 51.1 N 140 59 37.6 W	
" 14	499979 E 7747511 N	69 50 12.9 N 141 0 02.0 W	soft grey mud (so gy M)
" 15	499905 E 7742315 N	69 47 25.2 N 141 00 08.9 W	" " " "
" 16	499966 E 7737454 N	69 44 48.3 N 141 00 03.2 W	" " " "
" 17	499962 E 7732415 N	69 42 05.6 N 141 00 03.5 W	" " " "
" 18	499987 E 7727827 N	69 39 37.5 N 141 00 01.2 W	stiff grey mud (sf gy M)
" 19	504978 E 7727536 N	69 39 27.9 N 140 52 18.1 W	soft grey mud (so gy M)

TABLE 12 continued

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Sample 20	504995 E 7732606 N	69 42 11.6 N 140 52 15.5 W	soft grey mud (so gy M)
" 21	505084 E 7737533 N	69 44 50.6 N 140 52 06.3 W	" " " "
" 22	509806 E 7737475 N	69 44 48.3 N 140 44 46.3 W	" " " "
" 23	509914 E 7732821 N	69 42 18.0 N 140 44 38.0 W	stiff grey mud (sf gy M)
" 24	509924 E 7727467 N	69 39 25.2 N 140 44 39.2 W	soft grey mud (so gy M)
" 25	515046 E 7727475 N	69 39 24.6 N 140 36 44.0 W	" " " "
" 26	515021 E 7732795 N	69 42 16.3 N 140 36 43.2 W	" " " "
" 27	515086 E 7737710 N	69 44 55.0 N 140 36 34.2 W	stiff grey mud (sf gy M)
" 28	519995 E 7737537 N	69 44 48.2 N 140 28 56.9 W	soft grey mud (so gy M)
" 29	519873 E 7732410 N	69 42 02.7 N 140 29 12.3 W	stiff grey mud (sf gy M)
" 30	520005 E 7727635 N	69 39 28.6 N 140 29 03.7 W	soft grey mud (so gy M)
" 31	524944 E 7732597 N	69 42 07.2 N 140 21 20.6 W	" " " "
" 32	525006 E 7737563 N	69 44 47.5 N 140 21 10.0 W	stiff grey mud (sf gy M)

TABLE 12 continued

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Sample 33	525045 E 7742568 N	69 47 29.0 N 140 21 01.4 W	soft grey mud (so gy M)
" 34	530167 E 7742517 N	69 47 25.5 N 140 13 03.2 W	" " " "
" 35	530037 E 7737565 N	69 44 45.7 N 140 13 21.2 W	" " " "
" 36	529885 E 7732675 N	69 42 07.9 N 140 13 41.2 W	" " " "
" 37	529820 E 7728166 N	69 39 42.4 N 140 13 52.5 W	" " " "
" 38	534870 E 7727511 N	69 39 19.0 N 140 06 04.8 W	Gravel (G)
" 39	535176 E 7732873 N	69 42 11.9 N 140 05 29.0 W	soft grey mud (so gy M)
" 40	535028 E 7737568 N	69 44 43.5 N 140 05 36.3 W	" " " "
" 41	535005 E 7742535 N	69 47 23.9 N 140 05 31.5 W	stiff grey mud (sf gy M)
" 42	535043 E 7747597 N	69 50 07.2 N 140 05 20.9 W	" " " "
" 43	539900 E 7747274 N	69 49 54.3 N 139 57 47.0 W	soft grey mud (so gy M)
" 44	540035 E 7742490 N	69 47 19.8 N 139 57 42.0 W	" " " "
" 45	539802 E 7737524 N	69 44 39.7 N 139 58 11.6 W	" " " "

TABLE 12 continued

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Sample 46	540008 E 7732353 N	69 41 52.7 N 139 58 00.6 W	soft grey mud (so gy M)
" 47	539721 E 7727780 N	69 39 25.2 N 139 58 34.4 W	fine sand (f S)
" 48	545091 E 7727704 N	69 39 19.7 N 139 50 16.3 W	" " "
" 49	544385 E 7731692 N	69 41 28.8 N 139 51 14.9 W	soft grey mud (so gy M)
" 50	550020 E 7727661 N	69 39 15.1 N 139 42 39.2 W	coarse sand (c S)
" 51	555020 E 7732545 N	69 41 49.1 N 139 34 45.0 W	soft grey mud (so gy M)
" 52	555047 E 7727561 N	69 39 08.3 N 139 34 53.2 W	stiff grey mud (sf gy M)
" 53	554986 E 7722632 N	69 36 29.2 N 139 35 09.5 W	grey sandy mud (gy S M)
" 54	559951 E 7722551 N	69 36 22.8 N 139 27 30.2 W	soft grey mud (so gy M)
" 55	560014 E 7727547 N	69 39 03.9 N 139 27 12.7 W	stiff grey mud (sf gy M)
" 56	559855 E 7732788 N	69 41 53.2 N 139 27 15.1 W	Gravel (G)
" 57	560006 E 7737488 N	69 44 24.7 N 139 26 50.0 W	stiff grey mud (sf gy M)
" 58	559992 E 7742635 N	69 47 10.8 N 139 26 39.1 W	" " " "

TABLE 12 continued

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Sample 59	564918 E 7737505 N	69 44 21.1 N 139 19 12.6 W	stiff grey clay (sf gy Cl)
" 60	564923 E 7732452 N	69 41 38.0 N 139 19 25.0 W	stiff grey mud (sf gy M)
" 61	564991 E 7727462 N	69 38 56.9 N 139 19 31.4 W	gravel (G)
" 62	564992 E 7722397 N	69 36 13.5 N 139 19 44.2 W	soft grey mud (so gy M)
" 63	570005 E 7727539 N	69 38 54.8 N 139 11 46.4 W	Gravel (G)
" 64	570027 E 7732597 N	69 41 38.0 N 139 11 30.5 W	Stiff grey mud (sf gy M)
" 65	570050 E 7737556 N	69 44 18.0 N 139 11 14.7 W	stiff grey clay (sf gy Cl)
" 66	575014 E 7737539 N	69 44 12.5 N 139 03 32.6 W	stiff grey mud (sf gy M)
" 67	576212 E 7741251 N	69 46 11.0 N 139 01 29.9 W	Gravel (G)
" 68	575000 E 7732461 N	69 41 28.7 N 139 03 48.9 W	Stiff grey mud (sf gy M)
" 69	574861 E 7727556 N	69 38 50.6 N 139 04 16.2 W	soft grey mud (so gy M)
" 70	537314 E 7735003 N	69 43 19.6 N 140 02 07.1 W	
" 71	522076 E 7734958 N	69 43 24.4 N 140 25 45.2 W	

TABLE 12 continued

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Sample 72	562348 E 7735029 N	69 43 03.4 N 139 23 17.9 W	
" 73	569191 E 7734972 N	69 42 55.4 N 139 12 41.7 W	
" 74	562448 E 7727538 N	69 39 01.6 N 139 23 27.0 W	
" 75	562438 E 7727581 N	69 39 03.0 N 139 23 27.8 W	Coarse sand (c S)
" 76	565333 E 7727521 N	69 38 58.5 N 139 18 59.6 W	
" 77	563321 E 7727519 N	69 39 00.3 N 139 22 06.1 W	Gravel (G)
" 78	564024 E 7727481 N	69 38 58.4 N 139 21 01.0 W	Coarse sand (c S)
" 79	564867 E 7727509 N	69 38 58.6 N 139 19 42.8 W	" " "
" 80	565705 E 7727503 N	69 38 57.6 N 139 18 25.1 W	Gravelly mud (G M)
" 81	566565 E 7727505 N	69 38 56.9 N 139 17 05.4 W	" " "
" 82	567307 E 7727481 N	69 38 55.5 N 139 15 56.6 W	" " "
" 83	568113 E 7727496 N	69 38 55.2 N 139 14 41.9 W	" " "
" 84	568940 E 7727498 N	69 38 54.5 N 139 13 25.3 W	" " "

TABLE 12 continued

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Sample 85	569664 E 7727417 N	69 38 51.2 N 139 12 18.3 W	Gravelly mud (G M)
" 86	570471 E 7727503 N	69 38 53.2 N 139 11 03.3 W	" " "
" 87	571292 E 7727504 N	69 38 52.4 N 139 09 47.2 W	" " "
" 88	572081 E 7727466 N	69 38 50.5 N 139 08 34.2 W	" " "
" 89	539973 E 7727395 N	69 39 12.6 N 139 58 11.6 W	
" 90	539830 E 7728574 N	69 39 50.8 N 139 58 23.0 W	
" 91	540011 E 7727841 N	69 39 27.0 N 139 58 07.4 W	
" 92	539953 E 7730006 N	69 40 36.9 N 139 58 09.4 W	
" 93	539782 E 7730642 N	69 40 57.6 N 139 58 24.2 W	Gravelly mud (G M)
" 94	539805 E 7731598 N	69 41 28.4 N 139 58 20.6 W	soft grey clay (so gy Cl)
" 95	539954 E 7732591 N	69 42 00.4 N 139 58 05.2 W	" " " "
" 96	539923 E 7733646 N	69 42 34.4 N 139 58 06.4 W	grey clay (gy Cl)
" 97	539952 E 7734607 N	69 43 05.4 N 139 58 02.2 W	" " "

TABLE 12 continued

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Sample 98	539918 E 7735539 N	69 43 35.5 N 139 58 03.9 W	grey clay (gy Cl)
" 99	538986 E 7735561 N	69 43 36.7 N 139 59 30.6 W	soft grey clay (so gy Cl)
" 100	538893 E 7734527 N	69 43 03.4 N 139 59 40.9 W	" " " "
" 101	538975 E 7733593 N	69 42 33.3 N 139 59 34.7 W	firm grey clay (sf gy Cl)
" 102	538960 E 7732623 N	69 42 01.9 N 139 59 37.6 W	soft grey clay (so gy Cl)
" 103	538883 E 7731554 N	69 41 27.5 N 139 59 46.3 W	" " " "
" 104	538884 E 7730475 N	69 40 52.7 N 139 59 47.9 W	" " " "
" 105	562602 E 7772764 N	70 03 20.8 N 139 21 19.7 W	
" 106	562669 E 7770941 N	70 02 21.9 N 139 21 18.0 W	Gravel (G)
" 107	562582 E 7771926 N	70 02 53.8 N 139 21 23.8 W	Muddy gravel (M G)
" 108	562603 E 7772830 N	70 03 23.0 N 139 21 19.5 W	soft grey clay (so gy Cl)
" 109	562546 E 7769877 N	70 01 47.7 N 139 21 32.4 W	" " " "
" 110	562592 E 7768829 N	70 01 13.9 N 139 21 30.6 W	Muddy gravel (M G)

TABLE 12 continued

Location	UTM E / N	Geographics N / W	Bottom Characteristics
Sample 111	562505 E 7767733 N	70 00 38.6 N 139 21 41.6 W	Gravel (G)
" 112	562648 E 7766834 N	70 00 09.5 N 139 21 30.4 W	Soft grey mud (so gy M)

TABLE 13

SHOAL EXAMINATIONS - BOTTOM CHARACTERISTICS

Location	Bottom Characteristics
Shoal 2	fine grey mud (f gy M)
" 3	" " " "
" 5	" " " "
" 6	" " " "
" 7	small pebbles & sand (sm P S)
" 8	sand & pebbles (S P)
" 9	fine grey mud (f gy M)
" 10	small pebbles (sm P)
" 15	" " "
" 16	gravel (G)
" 17	fine grey mud (f gy M)
" 18	" " " "
" 19	" " " "
" 25	sand & gravel (S G)
" 28 - 28.1	gravel (G)
" 29	fine grey mud (f gy M)
" 30	" " " "
" 31.1	" " " "
" 31.3	fine grey mud & small pebbles (f gy M sm P)
" 65	fine grey mud (f gy M)
" 66	" " " "

TABLE 13 continued

Location	Bottom Characteristics
Shoal 67	fine grey mud (f gy M)
" 68	" " " "
" 69	" " " "
" 70	" " " "
" 71	" " " "
" 73	" " " "
" 77	" " " "
" 78	" " " "
" 79	" " " "
" 80	" " " "
" 81	fine grey mud & rocks (f gy M Rk)
" 82	fine grey mud (f gy M)
" 83	" " " "
" 84	fine grey mud & small pebbles (f gy M sm P)
" 85	very fine gravel (v f G)
" 86	fine grey mud (f gy M)
" 87	" " " "
" 89	" " " "
" 90	" " " "
" 100	" " " "
" 101	" " " "
" 102	" " " "
" 103	" " " "
" 104	" " " "
" 105	" " " "

TABLE 13 continued

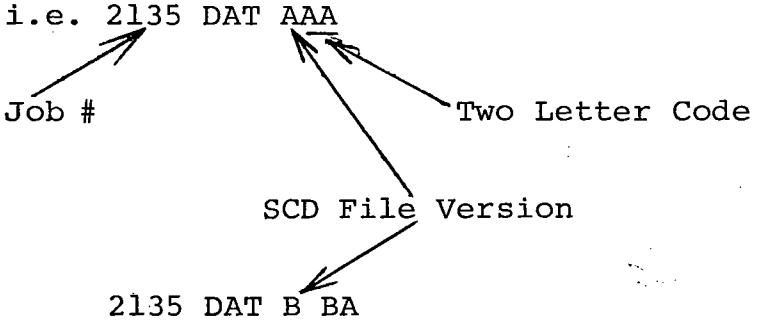
Location	Bottom Characteristics
Shoal 106	fine grey mud (f gy M)
" 107	sandy gravel (s G)
" 108	sand (S)
" 109	small gravel (sm G)
" 110	sandy gravel (s G)
" 111	sandy (S)
" 112	fine grey mud (f gy M)
" 113	silty clay (fs Cl)
" 114	gravel (G)
" 115	silty clay (fs Cl)
" 116	" " "
" 117	fine grey mud (f gy M)
" 118	silty clay (fs Cl)
" 119	gravel (G)
" 121	" "
" 122	sand (S)
" 123	fine gravel (f G)

3.3.2.1 Interplot 200 Filing System

The Interplot 200 (IP200) system files or stores data in the following manner:

- The Survey Constants Data File (SCD) contains the base data used in the position computations such as shore station co-ordinates, projection and geodetic constants, etc. SCD files are named alphabetically, the first file being A, i.e. 2135 SCD A and each time a revision is made to the SCD file, the new version is automatically renamed with the next letter.

- Position Data files (DAT) contain all position and depth data collected. The DAT files are named by the IP200 software by a two letter code and by referring to the SCD file version in use, i.e. 2135 DAT AAA



The two letter code runs from AA - AZ, BA - BZ, CA - CZ, etc.

- Line Data Files (LIN) contain co-ordinates of all predefined lines and are named by the SCD file version and a one letter code,

i.e. 2135 LIN A A

SCD File Version

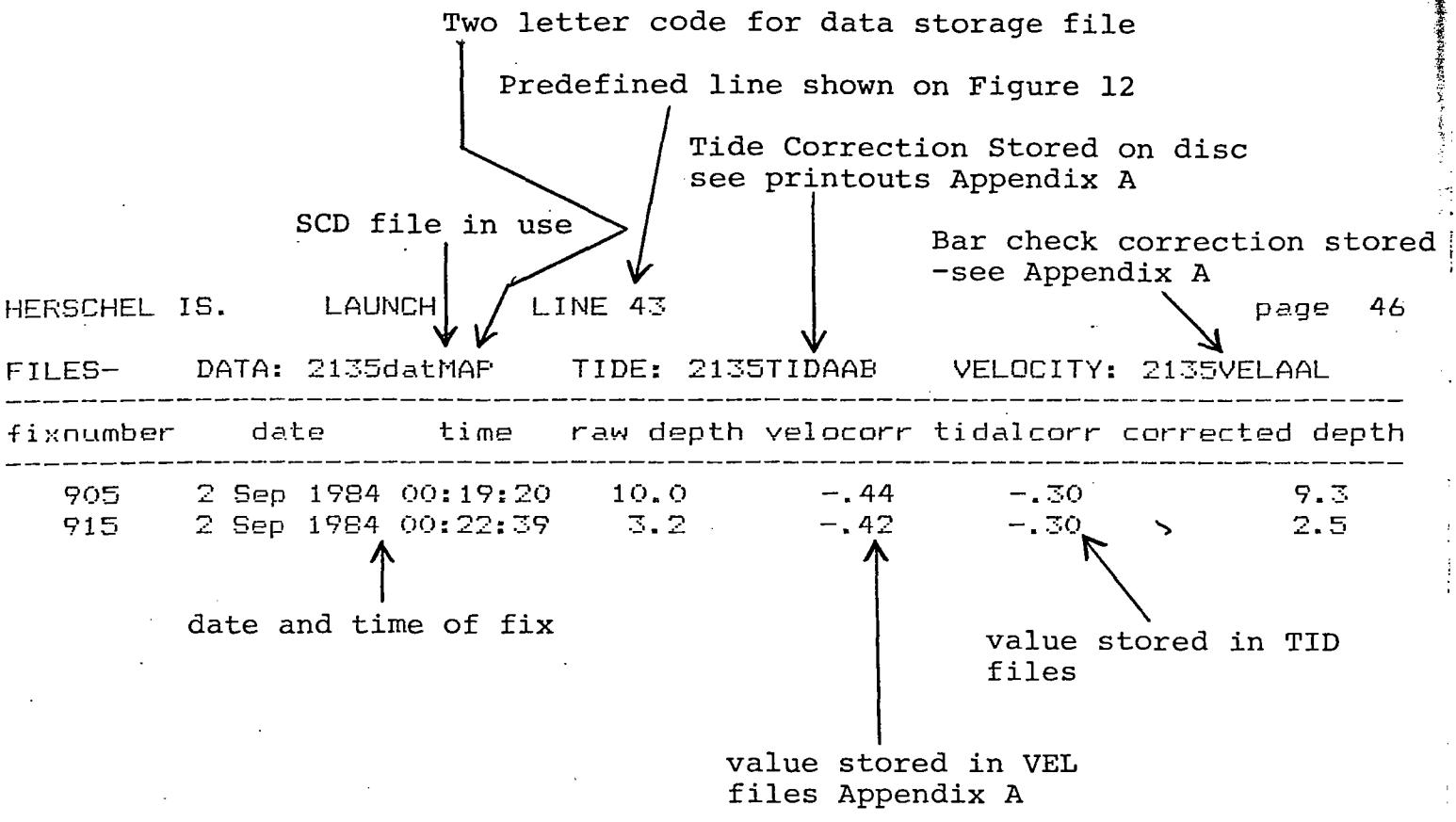
- Tidal Record Data (TID) files contain the tidal corrections to be applied to the sounding.

- Bar Check Data (VEL) files contain the bar check corrections to be applied.

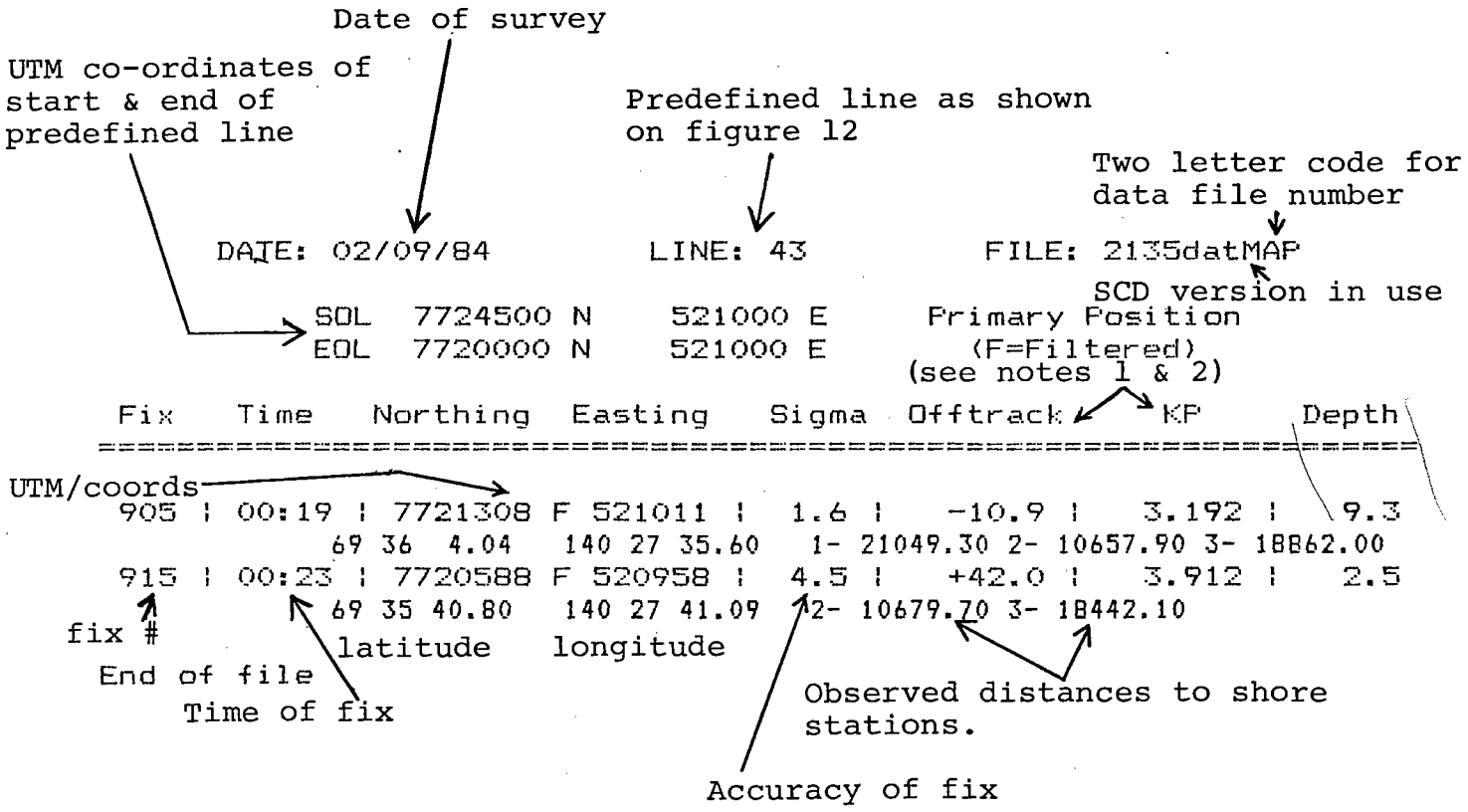
An explanation of our printout format follows on pages 69 and 70.

Note: For the Main Area not all position fixes were printed out. These printouts contain only the fixes used on the field sheet.

DEPTH CORRECTIONS PRINTOUTS



POSITION PRINTOUTS



Notes:

1. offtrack - distance in metres off the predefined line
   - denotes left of line
   + denotes right of line

2. KP - kilometre point - distance from start of predefined line in kilometres

3. depth - is the final corrected depth

4. The observed distances to shore stations - 2 - 10679.3 for example indicates a distance of 10679.3 metres to the second station stored in the SCD file which in this case it is a trisponder station in SCD file M.
   If the second station in the SCD file had been ARGO, the distance would be in lanes.

   Note: only the stations used in the position solution are printed out.

3.3.3 Onshore Surveys

Surveys were carried out this year to position the radar dome and the flashing green and white beacon at the Komakuk Beach Dewline Station. (See Appendix J for the survey field notes, sketches and computation file.)

Two day beacons at the southwesterly tip of Avadlek Spit were to be tied in during the shore station demobilization operations. However, weather conditions were poor during this time and beacons were not positioned.

3.3.4 Shoreline Plot

The shoreline was obtained from a photogrammetric plot prepared by Atlantic Air Survey Ltd. using existing 1975 & 1976 E.M.&R. 1:60000 aerial photography (see figure 23). The photograph numbers used were:

A24123; 139-141, 148-153, 199-200, 207-208, 267-268,

A24501; 79-80, 177-178,

A24502; 2-4, 74-79

The photography had been controlled by E.M.&R. (Aero-triangulation 1980 Space-M Adjustment, Tape 4) but due to a missing control point near the shoreline at 141° W, the block adjustment was considered weak in that area.

To check adjustment, three features were photo-identified in the field and tied into existing control stations. The three photo-identified points are:

PHOTO 1 - on photograph A-24502-2

PHOTO 2 - on photograph A-24502-73

PHOTO 3 - on photograph A-24502-74

(see Appendix I, Section 4 for the descriptions and the pin-pricked photographs of the points & Appendix J for the survey field notes and computations).

The co-ordinate values for this years hydrographic survey were established by a 1983 Doppler Satellite/Inertial Survey.

Before calculations were carried out to co-ordinate the photo points, the 1983 Control Station values were compared to the co-ordinate values used for the aero-block adjustment. Table 4 shows this comparison.

The shift from 1976 to the 1983 co-ordinates is 304.73° for 18.5 metres. In other words, if the shoreline plot was produced using the 1976 adjustment, it will have to be shifted 304.73°, 18.5 m to coincide with this years work.

TABLE 14

PHOTO CONTROL - COMPARE 1976 AERO TRIANGULATION TO 1983 DOPPLER INERTIAL SURVEY

Name	1976		1983		Inverse 1976 to 1983
	latitude (N)	longitude (W)	latitude (N)	longitude (W)	
CAN NO.1 528205	69°37'53.806"	140°50'36.253"	69°37'54.161"	140°50'37.667" *	305°46'58" @ 18.82
HER 708009	69°34'07.394"	138°54'49.763"			
788043	69°35'21.571"	139°07'46.883"	69°35'21.880"	139°07'48.361"	300°55'17" @ 18.63
MUD 568021	69°33'39.423"	139°33'54.774"	69°33'39.717"	139°33'56.253"	299°37'51" @ 18.43
ICE 568024	69°35'49.637"	140°30'29.953"	69°35'49.992"	140°30'31.391"	305°17'01" @ 19.05
MON NO.1 128026	69°38'48.038"	140°59'49.836"	69°38'45.584"	140°59'51.043" **	312°00'05" @ 17.51
OCEAN 568034	69°37'53.879"	140°50'37.614"			

* Co-ordinates are for a capped pipe marked Canada No. 1 Reference 1 - prior surveys have used this station and not the monument.

** 1983 co-ordinates were to a reference monument - 180°00'25" true, 87.773 metres from MON 1 (128026).

As a further check the cartesian co-ordinates for each point were calculated using the geodal height for Tuk published in surveying Canada Lands Offshore.

The mean shift from 1976 to the 1983 co-ordinates was determined to be:

$\Delta X = 2.2$

$\Delta Y = -17.9$

$\Delta Z = -3.7$

For our purposes the bearing and distance shift was considered adequate.

Due to timing and other logistical problems, traverses to the photo points were not closed. The following co-ordinate values based on the 1983 survey were determined for the photo points.

Photo 1	69°38'15.94"	N
	140°57'43.36"	W
elevation	8.71	ASL
Photo 2	69°35'47.72"	N
	140°31'24.56"	W
elevation	4.06	ASL
Photo 3	69°37'53.09"	N
	140°50'03.95"	W
elevation	2.95	ASL

These values were given to Atlantic Air Surveys to enable them to check the block adjustment before the

photo plot was made, with the instructions to be aware of any discrepancies due to blunders in an open traverse and the 18 metre shift between datums.

These discrepancies were not noticeable at the photo scale, the 1980 aero triangulation was determined to be correct and the plot was generated using the E.M.&R. values.

Two plots of the shoreline were produced by Atlantic, the first plot used elevations to depict the H.H.W.L.T. contour line, however, in the low lying areas, the scale of the photographs did not permit an accurate determination to be made. The second plot, which is shown on the field sheet, plotted the position of the waterline shown on the photographs. Field observations and position fixes along the inshore soundings confirmed that this plot accurately depicts the H.H.W.L.T. line.

3.3.5 Shoreline Description

The shoreline features shown on the field sheet were taken from information transferred from the aerial photographs onto the photogrammetric plot and from field observations recorded on the aerial photographs (Appendix I, Section 3).

3.3.6 Sailing Directions

"Sailing Directions Arctic Canada, Volume III, Third Edition 1981," were reviewed during the survey. In general, this publication describes the area accurately.

Some of the observations made during this survey were:

- The entrance to Clarence Lagoon is not well defined and may be closed or change position depending on prevailing winds and currents.
- The buildings in the SW corner of the lagoon are still intact, however, the condition of roofs and the amount of shelter they would provide in an emergency is questionable.
- The 7.3 m patch 2.5 miles offshore 15 miles ESE of Demarcation Point shown on Chart 7601 was thoroughly searched for and not located.
- The Komakuk Beach Dew Line Station (Bar 1) is operated by private industry for the U.S. Air Force. There is a gravel airstrip at the station capable of handling a Caribou Aircraft. The station does not monitor standard marine radio frequencies (VHF 16 or HF 2182) but does monitor 5295 khz, however, they will not respond to calls on that frequency.
- Gulf Oil has an Oil Tanker, the Gulf Beaufort, anchored ESE of Simpson Point. By prior arrangement with Gulf,

fuel was available from the Tanker.

- Gulf Oil used Thetis Bay as a staging area for their exploratory operations. At various periods during this season the area was busy with activities of drilling units, barges and supply vessels.
- The buildings in the Pauline Cove settlement are still in reasonably good repair. The MacKenzie family still occupies the log cabin in the settlement periodically.
- The gravel beach on the south side of Simpson Point has been cleared and was used as a landstrip by Twin Otter aircraft equipped with Tundra wheels.

In July, Cansite sent a letter to a number of the Marine operators in the Beaufort asking them for any information that would be useful in the sailing directions. To date, we have received no replies which is unfortunate because the people who are most knowledgeable of the area are the local operators. Their local knowledge and experience would benefit all end users of the revised charts and sailing directions.

3.3.7 Positioning Accuracy

A pre-analysis was performed to predict the accuracy of the positioning in the area. Also during the survey, the residuals of the position calculations along with other checks were used to ensure the continued performance of the system.

3.3.7.1 Configuration Accuracy

The configuration (geometric) accuracy is dependent upon both the shore station locations and the accuracy of the positioning system.

The ARGO chain was based on shore stations located at Monument 1A, Wind 2 and ARGO A (see Fig. 24). With the ARGO system, an error in each range of 3.9 m + 5 ppm can be expected, (see section 3.2.3)

Using these shore stations and this expected range accuracy, error ellipses over the whole survey area were computed. Then the values of the semi-major axes at a 95% confidence level were plotted to derive the accuracy contour chart, Fig. 24.

The accuracy chart shows an average configuration error of 10 to 11 metres, and increasing to 17

metres near the outer limits. Near the baselines and baseline extensions, the expected error is considerably higher, up to 100 metres in cases. In these extremes the positioning was always supplemented by adding TRISPONDER ranges into the solution also.

TRISPONDER

Several combinations of shore stations were used with this system. These were used to strengthen the ARGO chain near its baselines and also to position the launch performing close inshore work.

Using the range accuracy equation suggested earlier with ARGO, the Trisponder accuracy is derived as σ = 2m. This is broken down as:

σ_1 = electronic resolution

and σ_2 = calibration error

Being a microwave pulse matching system, Trisponder is not distance dependent.

Using σ_1 = 1.25 m (from DEL NORTE)

and σ_2 = 1.6 m, then evaluating the equation

$\sigma_s = (\sigma_1^2 + \sigma_2^2)^{\frac{1}{2}}$ yields σ_s = 2m

The error ellipses for the different Trisponder nets were generated over each of the areas where that net was used. The values of the semi-major axes at the 95% confidence level were then

plotted to form the accuracy contour chart, Fig. 25 . The different Trisponder nets are identified by their unique SCD version numbers, SCD"L" through SCD"Q" for the launch. Both Fig.25 and the launch printouts refer to the nets by this method.

3.3.7.2 On-Line Checking

Accuracy and calibration checks were performed constantly during navigation. These checks can be broken down into several methods.

1) Satellite positioning - A Magnavox 1107RS Transit Satellite receiver was integrated into the navigation package. This provided a check on both the ARGO lane count and calibration. Daily and periodic averaging of the lane differences in the positions determined by the two systems were kept. These averages show there were no laneslips and that the calibration values were correct. Excluding the period immediately prior to the re-calibration on Aug. 20, the average range differences were -0.01, -0.02, and 0.06 lanes for ARGO MON 1A, Wind 2, and ARGO A respectively. Between the storm on the 12th Aug. and the 20th Aug., changing ice conditions created average range differences of 0.17, 0.06 and 0.04 lanes.

These agree extremely well with the calibration changes of 0.18, 0.10 and 0.03 lanes that were determined independently by comparison with Trisponder positions on Aug. 20.

2) Baseline Crossings - The baseline crossings were performed periodically whenever a survey line crossed a baseline. The average "minimum sum" of the baseline crossings of MON 1A with Wind 2, of MON 1A with ARGO A, and of Wind 2 with ARGO A were 0.28, 0.27 and 0.14 lanes respectively. Those values existed before the re-calibration. After the re-calibration the values dropped to 0.01, 0.12 and 0.02 lanes up until Sept. 15.

3) Navigation Program - Supplementary on-line checks were possible with the IP200 navigation system used.

Two independent positions were simultaneously being computed and displayed to the navigator. Of the Trisponder and ARGO ranges available any combination could be used in either position. Usually one position was based solely on ARGO ranges and used for navigating.

The other position was based solely on Trisponder ranges or a combination of the two systems for a check.

Position Accuracy

A position accuracy or "standard deviation" value was derived from the residuals and the configuration accuracy. The program displayed both the "actual" position accuracy and the "expected" configuration accuracy. The configuration accuracy value was computed similar to Section 3.2.3 to produce the accuracy contours. The value displayed was the sum of the easting and northing variances from the variance covariance matrix (from a least squares adjustment). Multiplying the $\hat{a}$ - posteriori variance factor (derived from the residuals) times the configuration accuracy produces the position accuracy. Showing the configuration accuracy allows the operator to choose the best combination of ranges and alerts him when approaching baselines or baseline extensions.

Normally the $\hat{a}$-posteriori variance factor will be close to 1. This indicates the estimated

range accuracies - derived in Section 3.2.3 are correct. A value greater than 1 indicates these values should be increased. Similarly a value less than 1 shows these values are conservative and could be decreased. Comparing the position accuracies from the fix printouts to the configuration accuracies (Fig. 25) show the estimated range accuracies are valid.

FIGURE 24

MAIN AREA - 3 - RANGE ARGO ACCURACY CONTOURS
SEMI-MAJOR AXIS OF 95% CONFIDENCE REGION

- NOT TO SCALE -

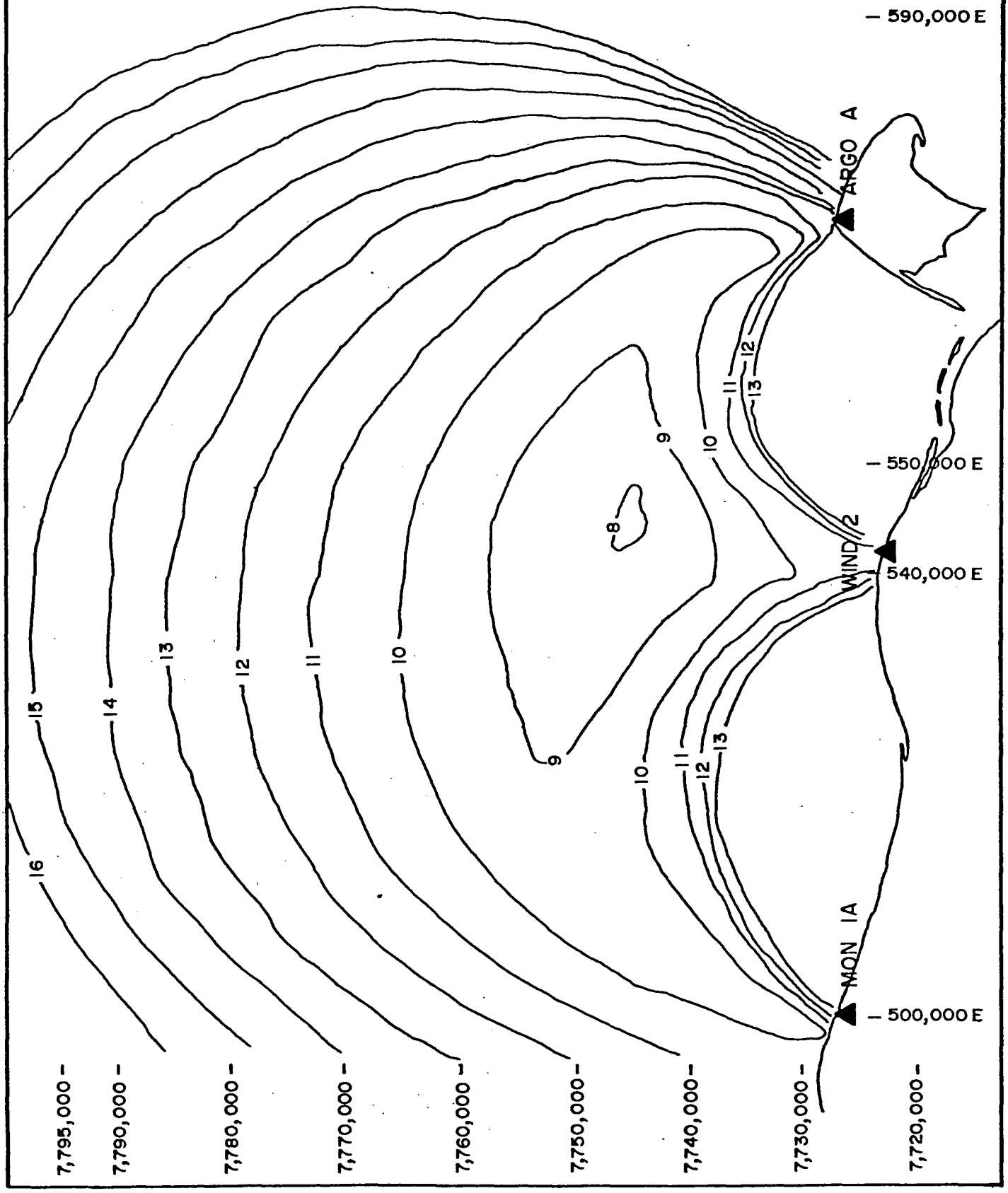
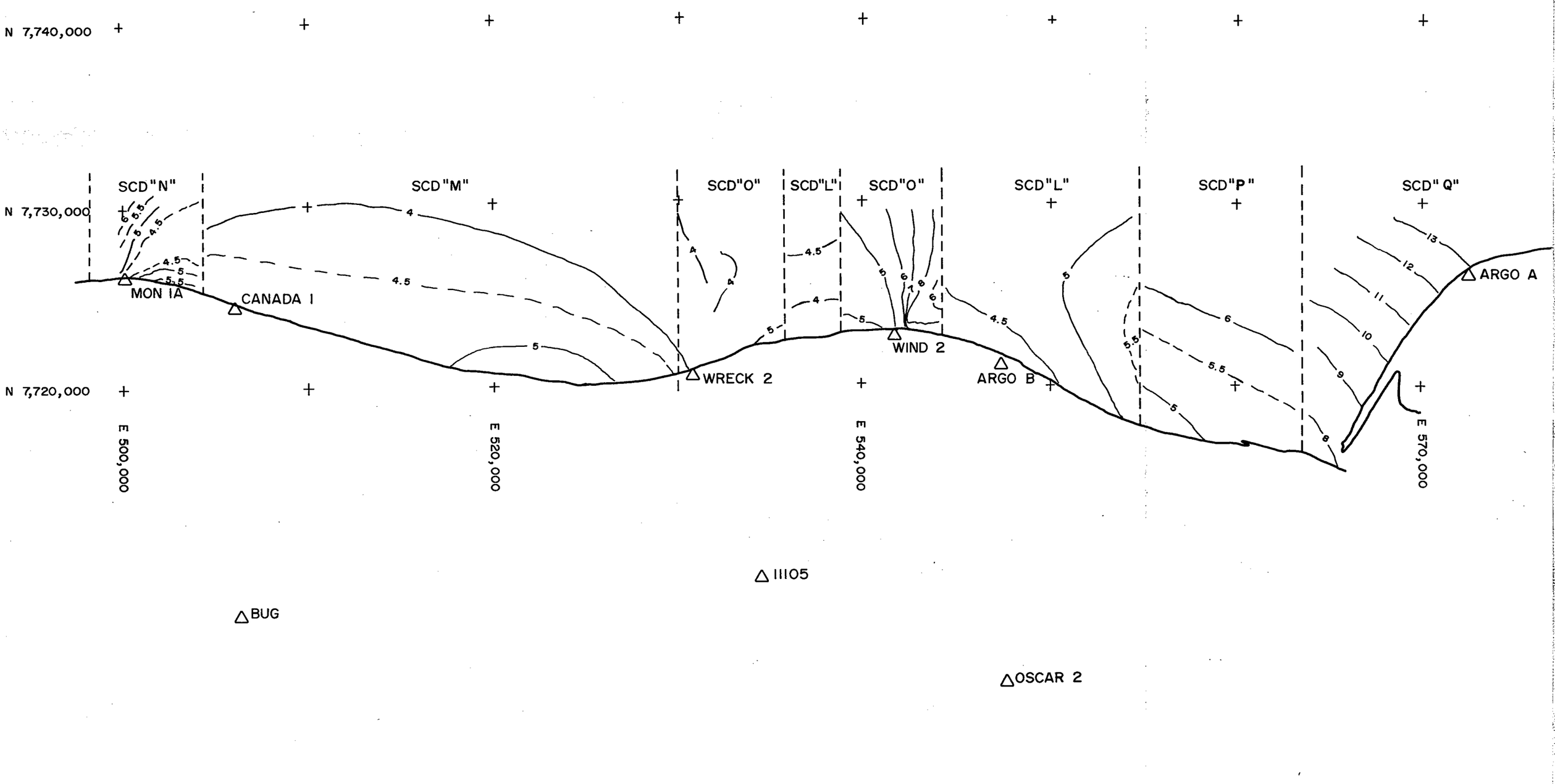


FIGURE 25 - ACCURACY CONTOURS - TRISPONDER NETWORKS

(SEMI - MAJOR AXIS OF 95% CONFIDENCE REGION)

- NOT TO SCALE -



3.4 Onshore Operations

Cansite's Onshore Support Technician was based in Tuktoyuktuk at the NTCL camp for the field survey operations. His duties included:

- mobilization and demobilization of shore station
- shore station maintenance and servicing
- chain reconfiguration as required
- daily radio communications with the Banksland

His main objective was to provide all required support to the vessel and to prevent or minimize any delays to the offshore operations.

3.4.1 Project - Aircraft Support

Tables 15 and 16 summarize the PCSP Helicopter and Fixed Wing Aircraft activities for the project.

TABLE 15

PCSP HELICOPTER USE

A/C	Date	Hrs. Flown	Purpose
SMQ	July 11	4.8	Mobilization (see sec.2.2.1 table 6)
SMQ	July 12	6.3	" " " "
SMQ	July 13	1.4	" " " "
SMQ	July 14	2.5	" " " "
SMQ	July 15	3.0	" " " "
SMQ	July 16	1.7	" " " "
SMQ	July 17	2.7	" " " "
SMQ	July 18	0.7	" " " "
SMQ	July 19	1.7	" " " "
SMQ	July 26	5.0	Routine maintenance
SMQ	July 29	4.3	E.M.&R. crew change
SMQ	Aug. 1	6.9	Routine maintenance
VTK	Aug. 5	3.5	CHS crew change
VTK	Aug. 6	4.7	Repair ARGO
IUY	Aug. 7	6.1	Repair ARGO
VTK	Aug. 8	8.6	Routine maintenance E.M.&R. crew change
VTK	Aug. 13	6.0	Repair ARGO, E.M.&R crew change
VTK	Aug. 15	6.4	Maintenance & E.M.&R. crew change
VTK	Aug. 19	8.2	Reconfigure Shore Stations
VTK	Aug. 31	8.0	Routine maintenance
SMQ	Sept. 12	3.6	Attempt crew change
IUY	Sept. 14	6.6	crew change, maintenance
IUY	Sept. 21	8.6	Repair ARGO
IUY	Sept. 29	6.0	Demobilization & onshore survey
IUY	Sept. 30	5.6	" " "
IUY	Oct. 1	8.3	" " "
IUY	Oct. 2	4.8	" " "
TOTAL		136 hours	

TABLE 16

FIXED WING AIRCRAFT USE

A/C	Date	Purpose
Twin Otter	Aug. 6	8 drums helicopter fuel
Twin Otter	Aug. 7	20 - 100 lb. bottles of propane
Twin Otter	Aug. 29	7 drums helicopter fuel - E.M.&R. crew change
Commander	Sept. 8	10 - 100 lb bottles of propane

3.4.2 Shore Station Breakdowns

Table 17 lists the onshore ARGO navigation station breakdowns.

TABLE 17

ARGO BREAKDOWNS

Station	Down GMT/Date	Up GMT/Date	Hrs. Down	Problem
MON 1A	05:55/29/07	02:32/30/07	20:45	Global supply - insufficient pwr.
ARGO A	19:45/06/08	03:10/07/08	7:25	Propane - out
MON 1A	19:13/07/08	05:20/08/08	10:07	Propane - out
ARGO A & MON 1A	20:57/11/08	01:00/14/08	52:03	Wind storm - towers down
MON 1A	07:51/21/09	19:00/21/09	11:09	Propane - out
		TOTAL	101.5	

Note: The onshore breakdowns did not significantly affect the offshore operations. During the 52 hour period between Aug. 11 & 14, the Banksland was weathered down in Pauline Cove. Less than 1 hour of survey time was lost because of onshore breakdown.

The system's reliability can be calculated as follows:

$$\text{Reliability} = \frac{(\text{operating time} - \text{breakdowns})}{\text{operating time}} \times 100\%$$

where operating time = July 22 - Oct. 1 = 72 days

or 1728 hours

$$\text{Reliability} = \frac{(1728 - 101.5)}{1728} \times 100\% = 94\%$$

The 94% reliability is below normal for an ARGO chain and does not reflect the quality of the system as none of the failures were attributed to the ARGO components.

4. SUMMARY - REPORT STATISTICS

Cansite personnel were actively involved in this survey from July 10 to Nov. 2, 1984. The specific project stages were:

Mobilization	-	July 10 - 22/84
Field Survey	-	July 22 - Oct. 2/84
Demobilization	-	Oct. 2 - Oct. 8/84
Final Report	-	Oct. 15 - Nov. 2/84

The following is a statistical breakdown of the field survey activities.

Resources

Hydrographers	-	7/512 mandays
Scientists & Geo Technicians	-	6/245 mandays
Electronics Engineers	-	2/147 mandays
Support Personnel (Ship's Crew, etc)	-	14/1008 mandays
Total Personnel	-	21/1912

Ships - 1

Launches - 1

Aircraft - 1 Bell 206B Helicopter 136 hr.
4 fixed wing flights.

Time

Total operational days	-	72
Total days field work	-	70

Total mandays in period (staff)	-	15/904
Total mandays worked (Staff)	-	15/904
Sounding	-	4/392
Shoal Examination	-	4/44
Geophysics	-	8/137
Tides & water levels	-	3/2
Collecting bottom samples	-	4/50
Horizontal control	-	2/10
Shorelining & low	-	2/2
Dataprocessing & office admin.	-	4/262
Sailing Directions	-	1/1
Photo Identification	-	2/4

Sounding (kilometres)

Ship	-	13608 km.
Launch	-	447 km.
Total	-	14055 km.
Area Sounded	-	5800 km^2

Shoals Examined

Ship	-	135
Launch	-	26
Total	-	161

Shore Control

Signals Built	-	11
Station Occupied	-	11
Number of Traverse Stations	-	3
Distance Traversed	-	3.6 km.
Number of Elevations Measured	-	4

Tide and Current Data

Recording Gauges established	-	1
Bench Marks Recovered	-	4
Bench Marks Levelled	-	4
Distance Levelled	-	0.1 km.

Oceanography

Seismic Profile Survey (Main Area)	-	820 km.
Seismic Profile Survey (Alternate Area - MacKenzie Trough - Herschel Basin)	-	600 km.
Total Seismic Profiles	-	1420 km.

Bottom Samples

Grab	-	92
Cores	-	20
Samples Retained	-	112

Miscellaneous

Shoreline Checked	-	85 km.
Shore stations established	-	3 ARGO
		10 Trisponder

4.1 Vessel Utilization

The Banksland Surveyor was under charter from July 22 to Oct. 2, 1984. During this period the vessel was operational for 1548.8 hours, on standby for 167.7 hours and non-operational for 11.5 hours. Of the 11.5 hours of breakdown, 6.9 hours were attributed to Cansite's system while the remaining 4.6 hours were vessel breakdowns.

Standby time can be broken down as follows:

- Four re-fuelings of Banksland	45.3 hours
- weather	71.1 hours
- Restocking Banksland	7.5 hours
- Injury	1.8 hours
- Travel and contract termination	42.0 hours

The operating efficiency can be calculated:

$$\text{Efficiency} = \frac{\text{operating time}}{\text{time available}} \times 100\%$$

$$= \frac{1548.8 \text{ hours}}{1728.0 \text{ hours}} \times 100\% = 89.6\%$$

4.2 Conclusion

This project was successful as evidenced by the fact that the survey was completed despite variable weather and ice conditions during the field survey period.

Cansite personnel enjoyed the opportunity of participating in this survey and appreciated the experience gained.

Credit for the success of the project must be given to the CHS, E.M.&R., PCSP and Northern Transportation personnel involved, all of whom provided a great deal of support and co-operation to Cansite.

APPENDICES

APPENDIX 1

Weekly Telex Reports

&

Daily Survey Status Reports

Note: Times are G.M.T.

Cansite Surveys Limited

Date: 18 July 1984

Telex: 884/S2135

Attn: G.H. Eaton, R.W. Sandilands
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 1

1. Period: 1 - 7 July 1984

2. Personnel:

Mark McGladrey
Bob Ireland
Hugh Jacobs
Dean White
Kathy Ferns
Eugene Peters

3. Activities:

- Miscellaneous office preparations, last minute hardware purchases.
- Transport equipment, Halifax to Edmonton, to Inuvik via truck and PWA.
- Jacobs travelled to Inuvik to receive equipment, separate for shipment to Tuk, Komakuk Beach, assisted EM&R with shipment of their equipment.
- Fuel and propane sent to Komakuk Beach by Caribou
- Contract negotiations continue with DSS, NTCL.

4. Problems: None

5. Planning - Week 2

- Personnel to travel to Inuvik, Komakuk, Tuk, to continue mobilization.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 18 July 1984

Telex: 885/S2135

Attn: G.H. Eaton, R.W. Sandilands
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 2

1. Period: 8 - 14 July 1984

2. Personnel:

T. Lockhart	Cansite Calgary	
B. Ireland	Cansite Dartmouth	
M. McGladrey	Cansite - on Banksland	Surveyor
D. White	"	"
E. Peters	"	"
K. Ferns	"	"
Meagher	E.O.R.	on Banksland Surveyor
Bays	"	"
Mays	"	"
Edsall	N.S.R.F.	on Banksland Surveyor
Neilsen	E.M.&R.	On Banksland Surveyor
Cody	"	"
Jodrey	"	- at P.S.C.P. camp
Allen	"	"
Jacobs	Cansite	- Inuvik - Komakuk
Roberts	"	"
Goguen	"	"
Gerritson	Datawell, returned 13 July	

3. Activities:

- Travel to Tuk, Komakuk
- Shore crew in Komakuk mobilizing stations, 2 ARGO, 2 stations Trisponder completed
- All materials arrived at destinations.
- Flying - 2 Otter flights, one beach 99 to transport material to Komakuk, ±10 hrs. helicopter flying

.....2

Date: 18 July 1984

Telex: 885/S2135 cont'd

3. Activities (cont'd)

- Banksland crew mobilized all navigation onboard, including geophysical and geological equipment
- Contract negotiations continue. Agreement with NTCL finalized (not signed). DSS - Cansite agreement still outstanding.

4. Problems: None

5. Planning - Week 3

- Complete mobilization, test all equipment
- Install equipment on launch
- Stability tests on Banksland Surveyor
- Finalize and sign all agreements
- Depart for site ±20 July

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 25 July 1984

Telex: 903/S2135

Attn: G. Eaton, G. Richardson
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 3

1. Period: 15 - 21 July 1984

2. Personnel:

McGladrey	Cansite	
White	"	
Peters	"	
Ferns	"	
Jacobs	"	
Roberts	"	
Goguen	"	
Zwaan	"	(arrived 17 July)
Meagher	Earth & Oceans	
Mayzes	"	
Bays	"	
Edsall	"	
Neilsen	E.M.&R.	(left Banksland 17 July)
Cody	"	" " " "
Jodrey	E.M.&R.	(staying at PSCP)
Allen	"	" "
Burgess	"	" "

3. Activities:

- Completed all onshore and vessel mobilization.

Onshore Activities:

- Established ARGO stations at MON 1A, Wind 2, and ARGO and Trisponder stations at MON 1A, Wind 2, Bug Topo & 11105
- Commenced onshore surveys and photo identification
- Total mob helicopter hours: 22.4
- Propane on site 4 x 100 lbs at each ARGO and Trispo station.
- JP4 used: 10 barrels
  (5 barrels are owed us by Quasar and there are 4 on the Banksland).

Date: 25 July 1984

Telex: 902/S2135 (cont'd)

3. Activities (cont'd):

Banksland Activities:

- Completed all equipment installation and testing 22 July
- Equipment on board includes:
  - Trisponder navigation system on launch
  - Trispo/Sat/ARGO G Nav System
  - Side Scan
  - Ore sub bottom system
  - Piston core
  - Airgun c/w generator and compressor
  - Geothermal probes
  - Raytheon 3.3
  - Deso 20 sounders
  - Hippy heave compensator
- Accepted vessel 1200 hrs 22 July.
- Vessel sailed shortly thereafter.

4. Problems:

- Some delays to onshore mob and survey caused by poor weather conditions.

5. Planning - Week 4

- Will work in MacKenzie Basin and start alternate geophysical surveys using MSEL ARGO Chain. When ice conditions permit, will commence survey in main area.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 31 July 1984

Telex: 908/S2135

Attn: G. Eaton, G. Richardson
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 4

1. Period: 22 - 28 July 1984

2. Personnel:

Banksland (Cansite):
McGladrey
White
Peters
Ferns
Roberts
Goguen
Zwaan

Banksland (Earth & Oceans):
Meagher
Mayzes
Bays
Edsall

Banksland (Energy Mines & Resources):
Hill
Jodrey
Allen
Allen
Burgess

Banksland (CHS):
Eaton

Onshore (Cansite):
Jacobs

3. Activities:

Banksland:

- Vessel under charter 12:00 hrs. local 22 July 1984
- Using MSEL/Dome ARGO chain calibrated navigation and started seismic surveys in MacKenzie Bay.

.....2

Date: 31 July 1984

Telex: 908/S2135 (cont'd)

3. Activities:

Banksland (cont'd):

- 26 July calibrated Cansite ARGO in main area. Set tide gauge, moved to alternate area (MacKenzie Bay) because of Nw'ly winds and ice. Returned to MSEL/Dome ARGO chain.
- Resumed seismic operations in MacKenzie Bay.
- At 0400 hrs 28 July back in main area - changed to Cansite ARGO - calibrated and started sounding operations.

Operational ..... 151.2 hrs.
Standby ..... 2.8 hrs.

Total ..... 154.0 hrs.

- Seismic operations MacKenzie Bay

271.39 km of line kilometers
9 cores taken

Sounding operations (main area ..... 203 km.)

Onshore:

- 23 July finishing touches to mobilization
- 25 July Banksland reported loss of transducers from main ship.
- Dispatched Medevac helicopter as per request to Arctic Kigiak.
- 26 July maintenance run on ARGO chain. No major problems.
- 28 July crew change at 2000 hrs.
- Total helicopter time ..... 5.0 hrs.

4. Problems:

Onshore:

- One generator malfunction resulted in loss of one Trispo station for a brief period. Jet in generator replaced.

.....3

Date: 31 July 1984

Telex: 908/S2135 (cont'd)

4. Problems (cont'd):

Offshore:

- Heavy ice conditions over the area is slowing operations.
- Start-up problems with software and equipment ... basically straightened out
- Eye injury to one man ... object removed by medic on Arctic Kigiak.
- Sheared off echosounder transducer on ice pack.

5. Planning - Week 5

- Crew change 29 July
- Continued operations (primarily sounding) in main area as long as ice conditions permit.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 7 August 1984

Telex: 917/S2135

Attn: G. Eaton, G. Richardson
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 5

1. Period: 29 July - 4 August 1984

2. Personnel:

Banksland (Cansite):
McGladrey
Ferns
Roberts
White
Peters
Goguen

Banksland (Earth & Oceans):
Meagher
Mayzes
Simpkin
Edsall

Banksland (Energy Mines & Resources):
Hill
Allen
Burgess (departed 0400 - 2 Aug. 1984)

Note: Jodrey and Bays left vessel 29 July
Simpkin joined vessel 29

Banksland (Canadian Hydrographic Service):
G. Eaton (Left vessel Aug. 4, 1984)

Onshore (Cansite):
Jacobs

3. Activities:

Banksland:

- Hydrographic and seismic operations in the main survey area off Herschel Island and the Yukon Coast.

.....2

Date: 7 August 1984

Telex: 917/S2135 (cont'd)

3. Activities:

Banksland (cont'd):

- Check tide gauge 1 Aug. (not operational)
- All plotting and checking of depths is up to date.

Week's Production

Date	Sounding Kms/Hrs.	Combined Kms/Hrs.	Downtime
29	332/24	---	
30	225.33/17	47.2/7	
31	81.1/9.9	129.6/11.5	2.6 hours
1	217.5/12.5	40.9/8.9	2.6 hours
2	283.9/19	52.5/5	
3	321.6/20.2	3.8	
4	346.3/22.5	46/1.5	
	1807.73/125.10	316.20/37.7	5.2 hours

Summary

Kms of sounding	1808
Kms S and S	316
Total week 5	2124
Total this area	203
" " "	2327

Hours sounding this week	125.10
Hours seismic this week	37.7
Misc	5.2
Total	168.0 hours

Onshore:

July 29: ARGO 1A down at 2045 hours July 28
- 0820 Received visit from Frank Hall of Dome to advise that ARGO 1A was down. He had received a call from Tom.

.....3

Date: 7 August 1984

Telex: 917/S2135 (cont'd)

3. Activities:

Onshore (cont'd):

July 29:
- 0840 To Polar Shelf to arrange helicopter. Eddie Chapman advised that machine was departing shortly and I could be on it.
- 0945 Returned to Polar Shelf with tools and spared to find SMQ had departed without me. Pilot had been ordered to leave without me.
- 1745 Departed in SMQ for ARGO 1. In VHF contact with boat.
- 2015 Arrived ARGO 1 and repaired (see problems)
- 2045 On Air. Checked monument on Bug Topo at boat's request.

July 30: Deso 20 housings started at same time transducers arrived.

July 31: Deso 20 housings completed.

Aug. 1 : Maintenance run. P. Roberts and E. Mayzes to beach to work on tide gauge and make phone call.

Aug. 2 : Advised Dome (Richard Sanson) that we are off their chain.

4. Problems:

Banksland:

- Ice conditions are still slowing down operations, however, there has been a marked improvement over the week and there are larger stretches of open water.
- July 29-30 - ARGO at MON 1A down at 2045 hrs (no delays to offshore operations.
- July 31 & Aug. 1 - Echo sounders 3.6 hours
- Aug. 1 - Banksland main engine down 1.6 hours.
- Tide gauge does not work.

Onshore:

- ARGO 1A down 2045 hours July 28, up again 2045 hours July 29. Problem could have been caused by low output on generator primary. This would cause the batteries to run down to the point of shut off for the ARGO. The generator has been retuned for maximum output, and to this data no further problems have been experienced.

.....4

Date: 7 August 1984

Telex: 917/S2135 (cont'd)

Helicopter Time

July 29	4.5
Aug. 1	6.9
Total	11.4 hours

Onshore - Office

Contract and 2 amendments conditionally signed and returned to manager science procurement. Conditions are that provisions be established to allow Cansite to bill for mob/demob costs incurred on behalf of EM&R, and for costs incurred for helicopter flying. Further conditions is that these matters are to be dealt with to Cansite's satisfaction within one month. This situation already has potential for project disruption, for example in requirement to resupply fuel to Komakuk.

5. Planning - Week 6

Banksland:

- Continue sounding and seismic operations in main area.
- Crew change Aug. 4, 1984
- Banksland to take on fuel Aug. 6.

Onshore:

- Crew change Aug. 4 (G. Eaton out)
- H. Staples to relieve H. Jacobs Aug. 6 or 7. H. Jacobs to return approximately Aug. 26 (from Manitoulin)
- Propane to Herschel or Komakuk (20 cylinders in Tuk)
- Maintenance run Aug. 8.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 17 August 1984

Telex: 941/S2135

Attn: G. Eaton, R. Sandilands
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 6

1. Period: 5 - 11 August 1984

2. Personnel:

Banksland (Cansite):
McGladrey
Ferns
Roberts
White
Peters
Goguen

Banksland (Earth & Oceans):
Meagher
Simpkin
Edsall
Mayzes - out on 8 Aug. 84
Collins - in on 5 Aug. 84

Banksland (Energy Mines & Resources):
Hill
Allen

Onshore (Cansite):
Jacobs - out on 7 Aug. 84
Staples - in on 6 Aug. 84

3. Activities:

Banksland:

- Hydrographic and seismic operations in main survey area long 139 to 141 off the Yukon Coast
- 7 Aug. Refueling Banksland at Gulf Beaufort in Pauline Cove. 9.9 hours standby.
- 7 Aug. Check tide gauge - nonoperational - replaced transducer but problem not believed to be solved.
- 11 Aug. Standby waiting on weather.

.....2

Date: 17 August 1984

Telex: 941/S2135 (cont'd)

3. Activities:

Banksland (cont'd):

Production this week

Sounding	1738.41 km
Sounding and seismic	313.91 km
Total this week	2052.32 km
Total this area	4379.9 km

Sounding this week	103.4 hrs.	
Combined this week	45.2 hrs.	
Downtime this week	1.5 hrs.	on vessel
Standby this week	17.9 hrs.	
Total	168 hrs.	

Onshore:

- 6 Aug. Flight to Herschel Island - ARGO down - out of propane.
- 7 Aug. Flight to Monument 1A - ARGO down - out of propane
- 8 Aug. Routine maintenance of all beacons, slinging propane, and crew change from Banksland.

4. Problems:

Banksland:

- Communication with shore
- ARGO power failures
  (no delays to offshore operations because of above)
- ice conditions

Onshore:

- 2 tegs ran out of propane after only 23 days (4 weeks expected). Combination of two factors:
  1. Propane cyls seem short
  2. Tegs burning inefficiently due to bad fuel nozzles and/or filters. Will replace and retune.
- Communication with Banksland
- Transportation. Pilots are extremely helpful, but extra requests on 6th and 7th caused excessively long hours. Thus could not check all beacons on 6th and required another heli late on the 7th from Inuvik.

Date: 17 August 1984

Telex: 941/S2135 (cont'd)

5. Planning - Week 7

- Continue sounding and seismic operations with main vessel only
- Ice recon in fixed wing
- Note: The strong NW winds on 10 and 11 Aug. will alter the ice conditions and most likely slow production.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 23 August 1984

Telex: 949/S2135

Attn: G. Eaton, R. Sandilands
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 7

1. Period: 12 - 18 August 1984

2. Personnel:

Banksland (Cansite):
McGladrey
Ferns
Roberts
White
Peters
Goguen

Banksland (Earth & Oceans):
Meagher
Simpkin
Collins
Edsall - off Aug. 15
Doucette - on Aug. 15

Banksland (Energy Mines & Resources):
Hill - off Aug. 13, returned Aug. 15
Allen

Onshore (Cansite):
Staples

3. Activities:

Banksland:

- Aug. 12 - To Pauline Cove to wait on weather. Standby 24 hours.
- Aug. 13 - Standby due to weather, engine repairs, delays in receiving permission to use an alternate ARGO chain, and food resupply. Banksland 18.1 hours. Seismic surveys in MacKenzie trough/ Herschel Basin 5.9 hours.
- Aug. 14 - Seismic surveys 16.5 hours. Standby to resupply Banksland 7.5 hours.

.....2

Date: 23 August 1984

Telex: 949/S2135 (cont'd)

3. Activities:

Banksland (cont'd):

- Aug. 15 - Seismic surveys 24 hours.
- Aug. 16 - Return to main survey area, ice reconnaissance. 4 piston cores, 1 geothermal probe.
- Aug. 17 - 39 grab samples
- Aug. 18 - 16 grab samples, 3 piston cores, and 72 km of seismic and hydrographic lines

Summary

MacKenzie Trough/Herschel Basin: Seismic surveys 332 kms.

Main area (Aug 16-18): 7 piston cores, 55 grab samples
: 72 kms seismic and hydrographic

Standby time:	49.6 hours
MacKenzie trough:	46.4 hours
Main area:	70.5 hours
Breakdown:	1.5
Total	168.0 hours

Onshore:

- Aug. 12 - Waiting on weather for helicopter flight
- Aug. 13 - Contact with Dome and GSI to get clearance to use their ARGO chain. Flight to Banksland and shore stations for equipment supply and re-erect 2 towers.
- Aug. 15 - Station maintenance and crew change to Banksland. Refuel and improve anchoring of stations.

4. Problems:

Banksland:

- A strong NW storm moved the ice pack completely over the survey project area. There has been no significant weather to noticeably move the ice from the area.

Onshore:

- Strong winds pulled anchors out of ground on 2 ARGO towers.

Date: 23 August 1984

Telex: 949/S2135 (cont'd)

4. Problems:

Onshore (cont'd):

- Now anchors have been doubled or tripled.
- Apparent lack of co-ordination in Dome/McElhanney/GSI ARGO chain in receiving permission to use a slot that conflicted with another vessels. A more concrete financial arrangement might help.

5. Planning - Week 8

- Move Trisponder stations to provide coverage of eastern inshore area and commence surveys along shoreline. Banksland will do what work she can in limited area. If unable to do launch work, will switch to Dome ARGO chain and do geophysical survey to Tarsuit.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 30 August 1984

Telex: 955/S2135

Attn: G. Eaton, R. Sandilands
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 8

1. Period: 19 - 25 August 1984

2. Personnel:

Banksland (Cansite):
McGladrey
Ferns
Roberts
White
Peters
Goguen

Banksland (Earth & Oceans):
Meagher
Simpkin
Collins
Doucette

Banksland (Energy Mines & Resources):
Hill
Allen

Onshore (Cansite):
Staples

3. Activities:

Banksland:

- Piston Coring, grab sampling, hydrographic and seismic lines in main survey area.

- Aug. 19 - 2 cores 4.3 hrs, sounding 201.8 km 19.7 hrs.
- Aug. 20 - Coring, sampling 4.6 hrs, sounding 280.5 km, 19.4 hrs.
- Aug. 21 - 2 cores, 12 grabs 6.1 hrs. sounding Banksland 187.0 km 7.9 hrs, launch 50.1 km.

.....2

Date: 30 August 1984

Telex: 955/S2135 (cont'd)

3. Activities:

Banksland (cont'd):

- Aug. 22 - Hydrographic lines 80.4 km 15 hrs.
  Combined lines 95.30 km 9 hrs.
  Launch 39.9 km.
- Aug. 23 - Hydrographic Banksland 178.4 km
  24 hrs. Launch 9 km.
- Aug. 24 - Hydrographic lines 374.6 km 24 hrs.
- Aug. 25 - 4 cores and 2 grab samples 12.9 hrs.
  Sounding lines 150.1 km 8.6 hrs, combined
  hydrographic and seismic 21.7 km 2.5 hrs.

Summary

Breakdown 0.0 hrs, stby 0.0 hrs, total operational 168 hrs.

Hydrographic lines Banksland and launch	1551.8 km.
Combined lines sounding and seismic	117.0 km.
Total km this week	1668.8 km.
Total km main area	6047.7 km.

Onshore:

- Aug. 19 - Regular maintenance, move Trisponders from
  Bug Topo to Oscar 2. From spare to Herschel,
  check tide gauge, OK.
- Aug. 25 - Standing by due to weather for helicopter
  flight to Banksland

4. Problems:

Banksland - typical Arctic ice conditions

Onshore - no outstanding problems

5. Planning - Week 9

- Refuel Banksland Aug. 26 at Gulf Beaufort

Cansite Surveys Limited

Date: 30 August 1984

Telex: 955/S2135 (cont'd)

5. Planning - Week 9 (cont'd)

- Geophysical personnel off 29th and 1 crew change for Cansite.
- Continue with soundings in main area - try to complete inshore launch work.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 5 September 1984

Telex: 960/S2135

Attn: G. Eaton, R. Sandilands
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 9

1. Period: 26 August - 1 September 1984

2. Personnel:

Banksland (Cansite)
McGladrey
Ferns
Roberts
White - off Aug. 29
Peters
Goguen
Staples - on Aug. 29

Banksland (Earth & Oceans):
Meagher - off Aug. 29
Simpkin - " " "
Collins - " " "
Doucette - " " "

Banksland (Energy Mines & Resources):
Hill - off Aug. 29
Allen - off Aug. 29

Banksland (Canadian Hydrographic Service):
Eaton - on Aug. 27

Onshore (Cansite):
Staples - off Aug. 28
Simon - on Aug. 27

3. Activities:

Banksland:

- Aug. 26 - 59.8 km sounding 9.2 hrs, weather bound 14.8 hrs
- Aug. 27 - Waiting on weather 6.2 hrs, refueling 9.2 hrs, check tide gauge, sounding 24.2 km.
- Aug. 28 - Sounding 135.6 km, 1 piston core, 7 grabs.

.....2

Date: 5 September 1984

Telex: 960/S2135 (cont'd)

3. Activities:

Banksland (cont'd):

- Aug. 29 - Crew changes by Twin Otter, soundings Banksland 157.9 km, launch blew cooling pump.
- Aug. 30 - Soundings Banksland 174.7 km.
- Aug. 31 - Operational 24 hours, total soundings 257.5 km.
- Sept. 1 - Fog in project area. Soundings by Banksland 199.8 km, by launch 22 km.

Summary

Breakdown time	21.0 hrs.
Refueling	9.2 hrs.
Operational	137.8 hrs.
Soundings for week	1091.0 km
Total for area	7142.0 km

4. Problems:

- Strong NW winds moved ice back into area.
- Lost heat pump in launch 29 Aug. - spares from Tuk onboard August 31.
- Inshore ice build up Komakuk Beach to Herschel

5. Planning - Week 10

- Try to complete inshore launch work.
- Start examinations
- Continue sounding open water with Banksland

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 13 September 1984

Telex: 975/S2135

Attn: R.W. Sandilands, G. Eaton
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 10

1. Period: 2 - 8 September 1984

2. Personnel:

Banksland (Cansite):
McGladrey
Ferns
Roberts
Peters
Goguen
Staples

Banksland (Canadian Hydrographic Service):
Eaton

Onshore (Cansite):
Simon

3. Activities:

Banksland:

- Sept. 2 - Banksland examined 2 shoals, sounded 93.6 km.
- Sept. 3 - Banksland examined 4 shoals, sounding 139.7 km.
- Sept. 4 - Banksland working in nw'ly corner of project, area sounding 300 km.
- Sept. 5 - Survey Nw'ly corner, then checkline e'ly to look for open water 279.8 km.
- Sept. 6 - Survey in Ne'ly portion of project area 352.6 km.
- Sept. 7 - Sounding 346.10 km Ese'ly winds, 25 knots 1 - 1.5 m swell.
- Sept. 8 - Banksland offshore sounding 280 km. Completed inshore lines 141 degrees w - 139 degrees 30' w.

Launch:

- Sept. 2 - Launch soundings inshore 92.4 km.

.....2

Cansite Surveys Limited

Date: 13 September 1984

Telex: 975/S2135 (cont'd)

3. Activities:

Launch (cont'd):

- Sept. 3 - Launch surveying inshore portion of lines 22.8 km.
- Sept. 8 - Launch surveying inshore lines

Summary of Banksland & Launch

Line kilometres sounding this week	1907.10
Total main area to date	9057.0

Standby	0 hours
Breakdown	0 hours
Survey	168 hours.

Onshore:

- standby at NTCL camp.

4. Problems:

Banksland: none

Onshore: usual radio traffic

5. Planning - week 11

- Refuel Banksland at Gulf Beaufort 10 Sept.
- Continue sounding operations using Banksland offshore and the launch for inshore surveys.

Regards

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 17 September 1984

Telex: 983/S2135

Attn: R.W. Sandilands
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 11

1. Period: 9 - 15 September 1984

2. Personnel:

Banksland (Cansite):
McGladrey
Ferns
Roberts
Peters
Goguen
Staples
Bennett - non chargable trainees onboard Sept. 14
Jones - " " " " " "

Banksland (Canadian Hydrographic Service):
Eaton

Onshore (Cansite):
Simon

3. Activities:

Banksland:

- Sept. 9 - Banksland Sounding 245.1 km.
- Sept. 10 - Banksland sounding 270.9 km., 17.3 hrs., to Gulf Beaufort for fuel 6.7 hrs. standby. Eaton, McGladrey ashore for telephone calls, angles at Wind 2, check tide gauge, chopper transported fuel to stations and set trisponder
- Sept. 11 - Slow progress refueling, standby time 15.5 hrs. Sounding Banksland 46.3 km.
- Sept. 12 - Sounding Banksland 323.6 km. Helicopter could not make it to area because of fog.
- Sept. 13 - Sounding Banksland 347.3 km
- Sept. 14 - Sounding Banksland 327.9 km., Hippy heave compensator repaired.
- Sept. 15 - Sounding Banksland 336.9 km.

.....2

Date: 17 September 1984

Telex: 983/S2135 (cont'd)

3. Activities:

Launch:

- Sept. 9 - Launch inshore lines 23.4 km.
- Sept. 11 - Sounding launch 37.3 km.
- Sept. 12 - Sounding launch 23.7 km.

Summary of Banksland & Launch

Operational	145.8 hrs.
Standby	22.2 hrs.
Breakdown	0.0 hrs.
Total	168.0 hrs.

Line kilometers sounding this week: 1982 km.
Line kilometers this area: 11034 km.

Onshore:

- Sept. 10 - Fly to Banksland, Mark and George ashore for phone calls and angle measurements at Wind 2, refuel 11105 Trispo, move wreck 2 Trispo to Oscar 2, refuel Wind 2, and extend Trispo ant. to 20 feet. 7.9 hrs flying.
- Sept. 12 - Neil and Gary unable to get on Banksland due to fog. About 4 hrs. flying.
- Sept. 14 - Neil and Gary to Banksland, exchange Hippy computers, repair Trispo 11105, move Wind 2 Trispo to ARGO B. About 6.2 hrs. flying.

4. Problems:

- Downtime due to Gulf's delays in refueling.

5. Planning - Week 12

- Continue sounding operations.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 26 September 1984

Telex: 996/S2135

Attn: R.W. Sandilands
Canadian Hydrographic Service

cc: Cansite Dartmouth

Subject: Herschel Island Survey 1984
Weekly Progress Report 12

1. Period: 16 - 22 September 1984

2. Personnel:

Banksland (Cansite):
McGladrey
Ferns
Roberts
Peters
Goguen - off 19 Sept. 84
Staples
Bennet
Jones

Banksland (Canadian Hydrographic Service):
Eaton

Onshore (Cansite):
Simon

3. Activities:

Banksland:

- Sept. 16 - Sounding 364.5 km.
- Sept. 17 - Sounding 371.1 km.
- Sept. 18 - Sounding 312.2 km.
- Sept. 19 - Sounding 243.1 km, stby 4 hrs, refueling from MV Johnny Hope
- Sept. 20 - Sounding 365.6 km.
- Sept. 21 - Sounding 110 km, 4 shoals
- Sept. 22 - 48 km. infill, 11 shoals

Launch:

- Sept. 21 - Inshore lines 36 km, check tide gauge, ARGO 1 down, propane, lost 0.9 hrs, survey time
- Sept. 22 - Completed inshore lines, 70 km, 1 shoal

.....2

Cansite Surveys Limited

Date: 26 September 1984

Telex: 996/S2135 (cont'd)

3. Activities (cont'd):

Summary

Standby	4	hrs.
Breakdown	0.9	hrs.
Operational	163.1	hrs.
Total	168.0	hrs.
Total sounding this week	1920.	km.
Total for area	12960	km.

Onshore:

- Goguen to Halifax Sept. 20
- Sept. 21 - Refuel Monument 1, Bug Topo, Herschel, put generator on ARGO B, make tide guage reading.

4. Problems:

- ARGO 1 down about 0300 hrs Sept. 21, on air 1300 hrs.

5. Planning - Week 13

- Banksland and launch on shoal examination and infill ice holes.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 16 October 1984

Attn: G.H. Eaton, R.W. Sandilands
Canadian Hydrographic Service

Subject: Herschel Island Survey 1984
Weekly Progress Report 13

1. Period: 23 - 29 September 1984

2. Personnel:

Banksland (Cansite):
McGladrey
Ferns
Roberts
Peters
Staples
Bennett
Jones

Banksland (Canadian Hydrographic Service):
Eaton

Onshore (Cansite):
Simon

3. Activities:

Banksland & Launch:

- Shoal examination and survey,
Ice infill on lines

Onshore:

- Helicopter into area on 29th to prepare for demob.

4. Problems:

- Weather & sea conditions.

5. Planning - Week 14

- Demobilize project

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

Date: 16 October 1984

Attn: G.H. Eaton, R.W. Sandilands
Canadian Hydrographic Service

Subject: Herschel Island Survey 1984
Weekly Progress Report 14

1. Period:

2. Personnel:

Banksland (Cansite):

McGladrey	
Ferns	- off 3 Oct.
Roberts	" " "
Peters	" " "
Staples	
Bennett	- off 3 Oct.
Jones	" " "

Onshore (Cansite):
Simon

3. Activities:

Banksland:

- VESSEL OFF CHARTER 12:00 HRS. LOCAL OCT. 2, 1984.
- Sept. 30 - Shoal examination. McGladrey & Eaton in helicopter to check shoreline plot.
- Oct. 1 - Demobilize tide gauge - vessel to Tuk - arrived at 2100 GMT.
- Oct. 2 - Demobilize vessel
- Oct. 3 - Completed vessel demob.

Onshore:

- Sept. 30 - Start to demobilize shore stations - flew shoreline with vessel crew
- Oct. 1 - Demobilize shore stations.
- Oct. 2 - Complete shore station demob - could not complete survey ties due to weather - returned to Tuk.

Regards,

CANSITE SURVEYS LIMITED

J. Tom Lockhart, Project Supervisor
K. Mark McGladrey, Project Manager

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	22 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
1400		All personnel on board Banksland:
		Cansite: Earth & Oceans: EM&R:
		M. McGladrey L. Meagher P. Hill
		K. Ferns E. Mayzes F. Jodrey
		P. Roberts A. Bays V. Allen
		D. White R. Edsall M. Burgess
		E. Peters
		M. Goquen CHS:
		H. Zwaan G. Eaton
1800		Received Notice of Readiness & signed Delivery Certificate
		(Vessel under charter)
1845		Departed Tuktoyuktuk
2110	2400	Reduced speed to check geophysical equipment & crossing ARGO
		baselines.

OPERATIONAL	10
BREAKDOWN	/
STAND BY	/
TOTAL	10 ~~24 HRS.~~
WIND	light
TEMP.	
HUMIDITY	
SEASTATE	calm

REMARKS:
Due to heavy ice conditions, we plan to start working in an alternate area in MacKenzie Bay and will use McElhanney's ARGO chain.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	23 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0400	Checking geophysical equipment and crossing ARGO baselines
0400	1300	Steaming to work site and crossing baseline extensions to complete ARGO calibration. Slow progress due to ice conditions.
1300	1450	Steaming to Tarsuit.
1600	1705	Bar checking and calibrating echo sounder.
1705	1905	Running down line # 1 looking for clear water
2032	2101	Survey line 200 4.32 km
2132	2155	Survey line 201 5.41 km
2205	2230	Survey line 202 3.44 km
2256	2315	Survey line 203 2.75 km
2325	2400	Survey line 204 5.40 km

OPERATIONAL 24	REMARKS: Line surveys - geophysical & hydrographic 21.32 km
BREAKDOWN /	
STAND BY /	
TOTAL 24 HRS.	
WIND light	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE calm	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	24 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

TIME FROM	TIME TO	OPERATIONS	SHEET .... OF ....
0000	0031	Completed line 204	5.0 km
0038	0145	Survey line 205	10.31 km
0208	0315	Survey line 206	10.56 km
0355	0454	Survey line 207	9.39 km
0522	0602	Survey line 208	6.33 km
0744	1029	Survey line 209	25.49 km
1053	1200	Survey line 210	10.60 km
1300	1400	Steamed towards Herschel Island - turned back due to ice.	
1515	1703	Bar check echo sounder	
1730	2400	Preparing for coring operations at core location # 1.	

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 24 HRS.
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

Ice conditions in the survey area are bad and slowing down operations. We are using MSEL/Dome ARGO chain. Experiencing a few equipment problems with Deso & computer (startup problems)

77.7 km. seismic surveys

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	25 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0305	At core location # 1, coring, checking with ORE and geothermo-probe.
0330	0500	At core location # 2
0555	0830	At core location # 3 - taking cores 3 & 4
0908	1127	At core location # 4 - taking core # 5
1207	1300	At core location # 5 - taking core # 6
1340	1440	At core location # 2 - doing geothermoprobe
1505	1550	At core location # 6 - taking core # 7
1611	1735	At core location # 7 - taking core # 8
1807	2015	At core location # 8 - taking core # 9
2043	2250	Bar check & repair side scan winch
2321	2400	Enroute to Gulf barge in Pauline Cove to drop off F. Jodrey
		* Echo sounders transducer was sheared off by ice and replaced with spare from launch.

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL 24	24 HRS.
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

F. Jodrey had a piece of metal in his eye and rather than take chances requested that a helicopter take him in to see a doctor. However, the medic on the Arctic Kiggiak was able to remove the sliver and Jodrey returned to the boat.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	26 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0150	Alongside Arctic Kiggiak - Jodrey receiving medical attention and picking up an ice map.
0150	0400	Proceeding to north side of Herschel Island to look at ice conditions - picking up 11105 Trisponder @ 45 km
0400		Decided that area is suitable for some survey operations - turned off MSED/Dome ARGO chain and switched on Cansite ARGO chain.
0430	1242	Crossing baselines to calibrate ARGO - write new driver for Trisponder
1250	1423	Steaming to Pauline Cove to set tide gauge. Northwesterly wind starting to blow.
1435		At anchor in Pauline Cove
1620	1800	Crew on shore setting tide gauge

OPERATIONAL	22:10
BREAKDOWN	
STAND BY	1:50
TOTAL 24	24 HRS.
WIND	NW
TEMP.	
HUMIDITY	
SEASTATE	0.5-1 m

REMARKS:

Off MSEL/Dome ARGO chain for 12 hours.

← Alongside barge

We had planned to send launch around to set the tide gauge but the captain suggested that with northwesterly's, we use the Banksland- as it turned out, it was the correct decision.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	26 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
1840		Strong northwesterlys and poor visibility - decided to return to MacKenzie Bay.
1850	1930	Tuning and regaining lane count on ARGO and preparing to start line 208 - caught streamer in propellor
2217	2319	Survey line 221 10.89 km
2320		Proceeding to line 220

OPERATIONAL	22:10
BREAKDOWN	
STAND BY	1:50
TOTAL	24 HRS.
WIND	NW 30
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

Shore stations checked by H. Jacobs

10.89 km seismic

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	27 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0320	0322	Survey line 220	26.39 km
0338	0637	Survey line 219	29.00 km
		Problems with sounder in shallow water.	
0700	0800	Working on echo sounder.	
0837	1002	Survey line 223	10.48 km
1047	1148	Survey line 225	10.51 km
1226	1512	Survey line 224	24.81 km
1844	2115	Survey line 226	31.02 km
2227	2400	Surveying line 211	
2400	0136	Survey line 211	29.29 km complete

OPERATIONAL	23
BREAKDOWN	
STAND BY	1
TOTAL	24 HRS.
WIND	NW 15
TEMP.	3° C
HUMIDITY	/
SEASTATE	0.3 m

REMARKS:

Geophysical survey 161.50 km.

Seismic survey to date MacKenzie Bay

271.39 km + 9 cores

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	28 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0136	Surveying line 211 - MacKenzie Bay
0100	0400	Steaming around to main area to look at ice conditions
0400		Switched off MSEL/Dome Chain - on to Cansite chain
0530	0800	Checking out navigation system and bar checking echo sounder. Resolved coordinate problems at Bug Topo.
0805	2400	Sounding operations
		Note: Ran portions of lines 125, 126, 129 - 141

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 24 HRS.
WIND	SE 30
TEMP.	5°
HUMIDITY	
SEASTATE	8 m

REMARKS: Surveyed ±203 km of soundings

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	29 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0354	Running sounding lines in the eastern area of the prospect.
0400	0430	Helicopter arrived 12 hours early and with only 30 minutes notice. Crew change - Zwaan, Jodrey and Bays off - Peter Simpkin onboard.
0502	0630	Resume running lines - ARGO 1 out. at 05:55
0630	0700	Power out - reset navigation & Hippy. Phoned Calgary to pass on message re: ARGO to Shore Support
0700	2400	Continue running sounding lines
		Note: Ran portions of lines 141 - 148
		Personnel on Board:
		Cansite: McGladrey, Peters, Ferns, Goguen, Roberts, White

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 24 HRS.
WIND	light
TEMP.	9°
HUMIDITY	
SEASTATE	/

REMARKS:

Ice is still slowing down the operation

Line kilometers of sounding 29 - 332 km

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	29 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

TIME FROM TO | OPERATIONS | SHEET 2 OF 2

Personnel on Board (Cont'd):

Earth & Oceans: Meagher
Mayzes
Simpkin
Edsall

EM&R: Hill
Allen
Burgess

CHS: Eaton

OPERATIONAL	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	30 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0400	Continue running sounding lines in the eastern portion of the prospect.
		NOTE: ARGO 1 back on the air - helicopter & engineer report that Global generator was not keeping up. Also confirmed that Trisponder is on Bug Ref, not Bug Topo.
0400	0446	Bar check echo sounder.
0500	1125	Running seismic and sounding line 165 - had to dodge 3 km offline to protect seismic gear from ice and will have to rerun line for soundings.
1200		Resume sounding operations at 9-10 knots.
1201	1454	Survey line 153
1500	1800	Survey line 152
1807	2044	Survey line 151
2056	2316	Survey line 150
2343		Start surveying line 170

OPERATIONAL 24	REMARKS: Total downtime ARGO (29&30) 20:45 hours.
BREAKDOWN	7 hours seismic time 47.2 km
STAND BY	17 hours survey time 225.33 km.
TOTAL 24 24 HRS.	
WIND	Note: ARGO downtime did not delay
TEMP.	the offshore operations.
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	31 July 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
)0000	0207	Survey line 170 43.8 km
)2180	0445	Survey line 171 37.3 km
)4450	0625	Geophysicists preparing for next line
)6251	1348	Survey - hydrographic & seismic line (W) 162 - 75.9 km
14551	1625	Manuevering with geophysical gear - out trying to get around ice to start the next line.
16252	2030	Survey - hydrographic & seismic line 160 - 53.7 km
20302	2125	Problems occurring with Deso 20 echo sounder and abandoned line
21252	2400	Repairing echo sounders - problems appear to be caused by power supply - lost power to ARGO and had to regain lane count.

OPERATIONAL	21.4
BREAKDOWN	2.6
STAND BY	
TOTAL	24 24 HRS.
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

Hydrographic surveys 81.1 km 4.6 hours

Combined - hydrographic & geophysical 129.6 km 11.5 hrs.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	1 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0100	Completed repairs to equipment
2190	0550	Survey - hydrographic and seismic line 159 - 40.9 km (fixed co-ordinates for trisponder station at Bug - unit is on Monument not Ref 2 as per MSEL report)
611	0803	Survey - hydrographic and seismic line # 1
829	1700	Survey lines 2, 3, 4, 5, 6, 7 153.7 km
710	2109	Survey lines 8, 9, & 10 63.8 km
130		Preparing to start new line - lost main engine
145		Bar check echo sounder
230		Chopper arrived with mail and supplies and took Percy and Ed to Pauline Cove to read tide gauge
305		Engines started.
326	2400	Survey line # 11 (hydrographic & seismic)

OPERATIONAL	21.4
BREAKDOWN	2.6
STAND BY	
TOTAL	24 HRS.
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

Vessel down 1.6 hours.
Hydrographic lines 217.5 km 12.5 hours
Combined hydrographic & seismic 40.9 km 3.5 hours.
Navigation downtime 1 hour
Note: Helicopter in area to perform regular maintenance and transport personnel to tide gauge.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	2 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0126	Running sounding & seismic line # 11 20.0 km
0135	0305	Survey line 12 25.8 km
	0250	Chopper on deck - crew back from tide gauge - Margo Burgess to Tuk.
0311	0438	Survey line 13 26.4 km
0443	0630	Survey line 14 27.9 km
0651	0810	Survey line 15 22.7 km
0822	0950	Survey line 16 25.8 km
1006	1132	Survey line 17 25.9 km
1141	1337	Survey line 18 32.4 km
1346	1537	Survey line 19 33.1 km
1542	1750	Survey line 20 35.4 km
1800	2134	Survey sounding and seismic line 21 32.5 km
2150	2330	Survey line 22 28.5 km
2339	2400	Surveying line 23

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

Note: Tide gauge does not appear to be working properly and will reduce tides using data observed at Tuk.

Hydrographic lines - 283.90 km 19 hrs.

Combined 52.5 km 5 hrs.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	3 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0124	Survey line # 23	31.1 km
0129	0341	Survey line # 24	37.9 km
0354	0627	Survey line # 25	37.9 km
0636	0846	Survey line # 26	38.3 km
0901	1107	Survey line # 27	37.8 km
1115	1353	Survey line # 28	44.8 km
1403	1713	Survey line # 29	45.4 km
1720	2005	Survey line # 30	48.4 km
2010	2047	Putting seismic gear in the water.	
2047	2400	Surveying hydrographic & seismic line # 31	

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.
WIND	WNW
TEMP.	7° C
HUMIDITY	
SEASTATE	0.5 m

REMARKS:

Hydrographic lines 321.60 km 20.2 hours

Combined lines (see 4 August) 3.8 hours.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	4 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0132	Complete hydrographic and seismic line # 31 - 46 km	
1470	0455	Survey line # 32	53.9 km
5020	0813	Survey line # 33	56.2 km
3201	1134	Survey line # 34	58.5 km
1401	1452	Survey line # 35	58.3 km
1391	1823	Survey line # 36	60.5 km
3232	2140	Survey line # 37	58.9 km
1482	2400	Surveying line 38	

		REMARKS:
OPERATIONAL	24	Hydrographic lines 346.30 km 22.5 hours
BREAKDOWN	/	Combined hydrographic & seismic 46 km 1.5 hours.
STAND BY	/	
TOTAL	24 HRS.	
WIND		DISTRIBUTION
TEMP.		
HUMIDITY		
SEASTATE		

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	6 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0040	Surveying combined line # 156
0500	0156	Line change - looking for clear water
1560	0228	Putting geophysical gear in the water and making the necessary repairs.
2290	0730	Survey hydrographic and seismic line 158 - 49.1 km
0730	1030	Changing lines to run another geophysical line - problems with ice.
0301	1537	Survey hydrographic and seismic line 126 - 51.4 km Note: fixes 334 to 433 overlap previous work
1540	1630	Sailing to fuel tanker Gulf Beaufort. They cannot accommodate us until 10-11 pm local - returning to Hydrographic Surveys
7212	2023	Survey line 127 52.42 km Note: ARGO 3 off the air at 19:45

OPERATIONAL	23.1
BREAKDOWN	
STAND BY	0.90
TOTAL	24 HRS.
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

Standby time - sailing towards Gulf Beaufort

Hydrographic lines 81.81 km 4.9 hours

Hydrographic & seismic 100.50 km 18.5 hours

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	5 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0138	Surveying line 38 67.9 km
0140	0600	Survey line 39 71.9 km
0608	1017	Survey line 40 72.7 km
1030	1703	Survey hydrographic & seismic line 41 - 62.2 km
1426	1503	Problems with main engines - off line - circling
1709	1715	Helicopter on deck - G. Eaton to Tuk
1743	2118	Survey line 42 62.4 km
2120	2220	Sailing to line 156, putting geophysical gear in the water.
2221	2253	Survey hydrographic and seismic line 156
2253	2343	Problems with brake on main engine.
2343	2400	Continue on line 156 - 13 km - stopped due to ice.

OPERATIONAL	22.5
BREAKDOWN	1.5
STAND BY	
TOTAL	24 HRS.

REMARKS:

Hydrographic lines 274.9 km 15.3 hours

Combined hydrographic & seismic 75.2 km 7.3 hours

Breakdown - Main Engine Banksland

WIND	
TEMP.	
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	6 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0040	Surveying combined line # 156
0050	0156	Line change - looking for clear water
0156	0228	Putting geophysical gear in the water and making the necessary repairs.
0229	0730	Survey hydrographic and seismic line 158 - 49.1 km
0730	1030	Changing lines to run another geophysical line - problems with ice.
1030	1537	Survey hydrographic and seismic line 126 - 51.4 km Note: fixes 334 to 433 overlap previous work
1540	1630	Sailing to fuel tanker Gulf Beaufort. They cannot accommodate us until 10-11 pm local - returning to Hydrographic Surveys
1721	2023	Survey line 127 52.42 km Note: ARGO 3 off the air at 19:45

OPERATIONAL 23.1	REMARKS: Standby time - sailing towards Gulf Beaufort
BREAKDOWN	
STAND BY 0.90	Hydrographic lines 81.81 km 4.9 hours
TOTAL 24 HRS.	Hydrographic & seismic 100.50 km 18.5 hours
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	6 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2041		Contacted Hugh @ NT. Requested helicopter ASAP - if not PSCP's then one from Inuvik
2048	2229	Survey line # 119 29.39 km
2230	2350	Putting geophysical gear in the water
2350	2400	Start geophysical line # 111

	REMARKS:
OPERATIONAL	
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	7 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0213	Survey hydrographic & seismic line # 111 22.3 km
0229	0359	Survey hydrographic line # 112 26.1 km
*		ARGO 3 (Herschel) back on the air - helicopter unable to come
		to the vessel because too many people on board.
0400	0630	Heading to Pauline Cove to take on fuel
0630	1050	Tied up alongside tanker Gulf Beaufort
		Refueling - crew to shore in skiff to check on tide gauge -
		not operational - changed transducers.
1050	1300	Steaming to survey area.
1300	1330	Bar check echo sounder and laying out geophysical gear.
1350	2044	Survey geophysical and hydrographic line 161 - 71.89 km
*	1913	ARGO 1 down - contacted Cansite Shore Support

OPERATIONAL	15
BREAKDOWN	/
STAND BY	9
TOTAL	24 HRS.
WIND	NE 10
TEMP.	4° C
HUMIDITY	
SEASTATE	0.3

REMARKS:

ARGO 3 down total of 7.25 hrs. - propane

Standby time - refuelling - 9 hours

Hydrographic lines 26.1 km 1.5 hours

Hydrographic & seismic 94.17 km 13.5 hours

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	7 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2203	2216	Survey line 43 - stopped due to poor positioning
2323		Survey line 78

OPERATIONAL	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	8 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0210	Survey line # 78 43.1 km
0215	0446	Survey line # 79 43.2 km
0456	0716	Survey line # 80 43.3 km
	0520	ARGO 1 back on the air.
0823	1316	Survey hydrographic & seismic line # 51 - 44.04 km
1340	1615	Survey line # 43 45.2 km
1620	1900	Survey line # 44 45.8 km
*		Helicopter on deck with supplies - departed with Ed Mayzes and a sick seaman.
1906	2207	Survey line # 45 53.2 km
2214		Surveying line 46

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	ESE 5
TEMP.	16°
HUMIDITY	
SEASTATE	0.2

REMARKS:

ARGO 1 was off total of 10.1 hours - propane

Hydrographic lines 273.8 km - 19.2 hours

Hydrographic and combined lines 44.04 km - 4.8 hours

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	9 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0116	Running Survey line # 46	53.3 km
0121	0415	Survey line # 47	51.1 km
0423	0709	Survey line # 48	48.9 km
0722	1029	Survey line # 49	50.2 km
1035	1329	Survey line # 50	50.9 km
1337	1641	Survey line # 52	53.7 km
1648	1957	Survey line # 53	54.8 km
1957	2334	Survey line # 54	60.4 km
2336	2400	Surveying line 55	

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.
WIND	Nly 20
TEMP.	5°
HUMIDITY	
SEASTATE	.5 - 1

REMARKS: Hydrographic lines 423.30 - 24 hours

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	10 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0300	Surveying line # 55	61.0 km
0306	0624	Survey line # 56	56.6 km
0631	0924	Survey line # 57	54.1 km
0928	1229	Survey line # 58	51.6 km
1234	1528	Survey line # 59	50.9 km
1535	1858	Survey line # 60	46.6 km
1904	2138	Survey line # 61	47.4 km
2146	2400	Surveying line 62	

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.
WIND	NNW
TEMP.	1°
~~WEATHER~~	light snow
SEASTATE	.5-1.5

REMARKS: Hydrographic lines 368.2 km - 24 hours

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	11 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0113	Surveying line 62 55.3 km
0119	0424	Survey line 63 56.8 km
		Ice and winds creating problems.
0432	0724	Survey line 64 50.2 km
0730	0830	Putting geophysical gear in the water
0834	0848	Started hydrographic and seismic line # 65. Blew airgun high pressure line.
0900	1110	Continue to survey line # 65 - 44.6 km
1117	1409	Survey line # 67 43.3 km
1418	1600	Survey line # 68 29.8 km
		Maneuvering around ice flows.
1609	1646	Survey line # 69 10.3 km
		Abandoned line because of heavy seas to the beam and ice problems.
1658	2400	Standby taking shelter in ice flows from sea conditions.
1658		AR 3 down/AR 1 down 20:57- passed message to Howard.

OPERATIONAL	16
BREAKDOWN	
STAND BY	8
TOTAL	24 HRS.
WIND	NW 40
TEMP.	1°
HUMIDITY	
SEASTATE	-1-2.5

REMARKS:

Standing by waiting on weather.

Hydrographic lines 290.3 km 14.5 hours

Seismic lines 0 km 1.5 hours

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	12 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0215	Jogging around at ice edge waiting on weather - winds increasing
0215	0503	Enroute to Pauline Cove to weather down
0503		Anchored in Pauline Cove. Wind NWW 30-35 knots.
1254		Contacted shore support. Requested permission to tune into Dome's ARGO chain - were informed that Dome has one station down.

OPERATIONAL	0
BREAKDOWN	
STAND BY	24
TOTAL	24 HRS.
WIND	NWly 30
TEMP.	0° C
HUMIDITY	snow
SEASTATE	1-2m

REMARKS: Waiting on weather.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	13 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0550	Waiting on weather and permission to use Dome Chain.
0550		Contacted shore - were informed that Dome only has time slots available on west chain, which has one station down resulting in poor geometry. Requested that GSI be contacted re use of their tower at Demarkation Point.
0600	0800	Crew on shore checking tide gauge and leveling from benchmarks. (gauge still non-operational)
0800		Contacted by shore support - we have permission to use Dome & GSI chain time slot 4
0820		Locked on to new ARGO chain.
0940		Lifted anchor in Pauline Cove and preparing to start geophysical survey.
1000	1350	Problems with ARGO - suspected time slot has been allocated to another vessel as well.

OPERATIONAL	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND NW10-30	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE 1.0-calm	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	13 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
		Contacted shore and switched to time slot 2
1440	1650	Survey geophysical line 230 (offset 4000) 18.6 km
1830	2033	Survey geophysical line 230 (mainline) 23.5 km
		Ended line to make engine repairs and to proceed to Pauline Cove to take on supplies.
		Note: 18:45 - 18:54 helicopter on deck to drop off supplies and departed to repair ARGO 1 & 3.
		19:53 - 20:30 helicopter back on deck to pick up ground anchors and personnel to assist in re-erecting to downed ARGO towers.
2139	2400	Banksland anchored in Pauline Cove to effect repairs to main engine and to pick up supplies delivered by fixed wing flights from Tuk (Beaver & Cessna on floats)

OPERATIONAL	5.9
BREAKDOWN	
STAND BY	18.1
TOTAL	24 HRS.
WIND	light
TEMP.	
HUMIDITY	
SEASTATE	calm

REMARKS:

Standby time due to weather, delays in receiving permission to use alternate ARGO Chain, engine repair and need to resupply vessel after only 3 weeks at sea. Geophysical surveys 42.10 km 5.9 hours.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA	DATE:	VESSEL:
Beaufort Sea	14 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0100	Crew onshore replacing hosing on the tide gauge transducer - unit appears to be working.
0111	0220	Helicopter on deck refueling after transporting crew to rebuild towers at ARGO 1 & 3. Phil Hill to shore.
0730		Third load of supplies from the two planes on board the Banksland. Fourth load scheduled for 13:00 was cancelled by Cansite Party Manager due to inefficiency of the NT operation.
0750		Anchor up - vessel proceeding to geophysical line.
0919	1044	Survey line # 301 15.2 km
1147	1639	Survey line # 301.1 53.3 km
1653	2040	Survey line # 301.21 39.5 km
2145	2400	Survey line # 305.1 22.3 km
		All lines were stopped short by ice.

OPERATIONAL	16.5
BREAKDOWN	
STAND BY	7.5
TOTAL	24 HRS.
WIND	Var.
TEMP.	4° C
HUMIDITY	
SEASTATE	N.1

REMARKS:

Standby time - to restock vessel with food supplies, linens and detergents as per arrangements made onshore.

Geophysical surveys 130.30 km 16.5 hours

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	14 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

TIME FROM | TO | OPERATIONS | SHEET 2 OF 2

Note: Ice conditions in Main Area observed during helicopter maintenance run.

It would be very difficult to get into the area from Pauline Cove as the area around Herschel Island looks very solid. There was a narrow strip of open water (1 - 2 miles) along the Coast which is accessible. No open water was visible beyond this strip. In light of the present weather forecasts predicting northwesterly winds, it was not considered practical or safe to resume operations in this area until ice conditions improve.

OPERATIONAL	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	15 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0200	Heading to line 302.1 - working on air guns.
0206	0705	Survey line # 302.1 51.8 km
0743	1348	Survey line # 303 63.9 km
1526	1700	Survey line # 304 offset (12000) 14.1 km
	*	Note: Helicopter on deck 16:13 - 16:25
		Phil Hill back along with Dan Doucette (NSRF/E&O) - Rod Edsall off
1839	2311	Survey line # 301.1 (offtrack) 29.7 km
2300		Geophysical gear on board heading to Main Area West of Herschel to look at ice conditions.
	*	Note: When helicopter returned to Banksland at 21:35 to pick up geophysical data - they reported a marked improvement in ice conditions over the past two days.

OPERATIONAL	24
BREAKDOWN	/
STAND BY	
TOTAL	24 HRS.
WIND	W 15
TEMP.	5°
HUMIDITY	
SEASTATE	.3

REMARKS: Geophysical surveys 159.50 km 24 hours

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	16 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0430	Enroute to west side of Herschel Island to look at the ice situation.
0430	0530	Switched from Dome ARGO Chain to Cansite Chain - regained lane count and checked calibration values.
0550	0635	Enroute to core station # 19
0635	0815	At station # 19 taking core # 10.
0815	1200	Attempted to reach core station # 9, blocked by ice, heading west to look at ice situation and try to reach station # 23
1330	1702	At station # 23, dropped anchor, took core # 11, completed bar check # 11 on echo sounder.
1820	2011	At core station # 25 taking core # 12
2030	2126	Proceeding to core station # 24 - blocked by ice - alternate site choosen as fix 55 on line # 1

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.
WIND	variable
TEMP.	6° C
HUMIDITY	
SEASTATE	calm

REMARKS:

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	16 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2126	2341	Taking core # 13 and geothermoprobe (anchored at site)

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

Ice conditions are slowing operation considerably.

Days production 4 piston cores

1 geothermoprobe

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	17 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0001	0058	Anchored at core location # 13
0058	1616	Grab sampling in open water (5-10 km strip along shoreline) samples # 14-47
1702	1711	Putting launch in the water
1721	1840	Launch out for a test run.
1842	1900	Launch secured on board Banksland.
1900	2030	Repairs to main engine and testing shaft brake.
2109	2400	Resume grab sampling - samples # 48 - 52 crossing baselines as a check on calibration.

OPERATIONAL	22.5
BREAKDOWN	1.5
STAND BY	
TOTAL	24 HRS.
WIND	SE
TEMP.	
HUMIDITY	
SEASTATE	calm

REMARKS: Days production 39 grab samples.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	18 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0745	Continue grab sampling over the southern portion of the project area - grab samples 54 - 69 (16)
0800	0900	Preparing to run hydrographic and seismic line # 163
0924	1431	Survey line # 163 - ice causing a number of problems and delays 37.8 km.
1623	1720	Taking piston core (sample # 70)
1820	2014	Taking piston core (sample # 71)
2038	2250	Survey intermediate line 162.3 during transit from core locations 34.2 km - NOTE: (up to 5.5 km offtrack due to ice)
2300	2400	Changed core location due to ice - take core (sample # 72)

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	variable
TEMP.	6° C
HUMIDITY	
SEASTATE	.2

REMARKS:

Days productions 16 grab samples - 3 piston cores

Hydrographic & seismic 72 km.

Note: A number of alternate core stations were choosen as the main stations were blocked by ice.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	19 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

TIME FROM / TO | OPERATIONS | SHEET 1 OF 3

Personnel on board "Banksland":

Cansite: McGladrey
Roberts
Ferns
Peters
White
Goguen

Earth & Oceans: Meagher
Collins
Simpkin
Doucette

EM&R: Hill
Allen

Onshore: Staples - Cansite

OPERATIONAL	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	19 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 3

TIME FROM	TIME TO	OPERATIONS	
0000	0018	Taking sample # 72 (core)	
0048	0125	Enroute to core location	
0125	0310	Take sample # 73 (core)	
0310	0340	Enroute to core station # 13, not able to get to due to ice and will run sounding lines.	
0419	0501	Survey line # 142 fix 308 - fix 423	12.3 km
0527	0641	Survey line # 137 fix 142 - fix 333	19.2 km
0651	0840	Survey line # 136 fix 124 - fix 314	19.1 km
0846	1014	Survey line # 135 fix 120 - fix 281	16.1 km
1024	1154	Survey line # 134 fix 153 - fix 310	16.7 km
1201	1245	Survey line # 133 fix 143 - fix 274	12.3 km
1251	1358	Survey line # 132 fix 1 - fix 179	17.8 km
1404	1459	Survey line # 131 fix 116 - fix 268	15.2 km
1527	1625	Survey line # 130 fix 1 - fix 199	19.8 km
1628	1712	Survey line # 129 fix 145 - fix 271	12.3 km
1738	1840	Survey line 128	

	REMARKS:
OPERATIONAL	
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND SE 15	DISTRIBUTION
TEMP. 5°	
HUMIDITY	
SEASTATE 0.5	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	19 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 3 OF 3

TIME FROM	TIME TO	OPERATIONS
1840	1910	Chopper on board to refuel and to take passengers ashore for phone calls and to assist with stations.
2134		Complete line # 128 19.5 km
2145	2231	Survey line # 125 fix 105 - fix 219 10.7 km
2237	2320	Survey line # 124 fix 1 - fix 108 10.8 km
2327	2400	Survey line # 123 fix 1 ——→
		Note: Re Helicopter use 19-20 August
		Tuk to Banksland
		Banksland - Komakuk (refuel) --- Bug
		Transport trisponder ----- Oscar
		Sling propane Bug ----- Oscar
		To Wind 2 for maintenance
		To MON 1A (via Komakuk for fuel) for maintenance
		To ARGO A to install trisponder
		To Pauline Cove to level and check tide gauge
		Return to Banksland
		Banksland to Tuk (one passenger - Nels Thomson - Captain)

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.

REMARKS:

Days production 2 piston cores 4.3 hours

Line kilometers of sounding 201.8 km 19.7 hours.

Note: Sounding lines run to ice edge

WIND	
TEMP.	
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	20 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0000	0052	Survey line 123	24.2 km
0059	0230	Survey line 122 fix # 1 - fix # 245	24.6 km
0235	0402	Survey line 121 fix # 1 - fix # 248	24.6 km
0411	0458	Survey line 124 fix # 106 - fix # 249	13.9 km
0534	0651	Survey line 120 fix # 1 - fix # 224	22.0 km
0712	0838	Survey line 119 fix # 301 - fix # 523	22.2 km
0844	1027	Survey line 118 fix # 1 - fix # 200	20.0 km
1037	1146	Survey line 117 fix # 1 - fix # 191	18.9 km
1152	1247	Survey line 116 fix # 1 - fix # 142	14.0 km
1253	1340	Survey line 115	13.2 km
1344	1410	Survey line 114	7.9 km
1415	1445	Survey line 113	8.8 km
1448	1515	Survey line 112 fix # 269 - fix # 347	7.2 km
1518	1540	Survey line 111 fix # 224 - fix # 290	6.6 km
1543	1666	Survey line 110 fix # 1 - fix # 63	6.1 km
1608	1628	Survey line 109 fix # 1 - fix # 60	5.7 km
1631	1649	Survey line 108 fix # 1 - fix # 52	5.1 km
1653	1708	Survey line 107 fix # 1 - fix # 48	4.7 km
1712	1730	Survey line 106 fix # 1 - fix # 51	4.9 km
1733		Survey line 105 fix # 1 - fix # 50	4.9 km

OPERATIONAL 24	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND NW 3	DISTRIBUTION
TEMP. 5°	
HUMIDITY	
SEASTATE calm	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	20 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS	
1733	1808	Survey line 104 fix # 1 - fix # 48	4.4 km
1813	1831	Survey line 103 fix # 2 - fix # 54	5.0 km
1835	1852	Survey line 102 fix # 1 - fix # 45	4.6 km
1855	1909	Survey line 101 fix # 1 - fix # 45	4.1 km
1914	1925	Survey line 100 fix # 1 - fix # 31	2.9 km
1930	2050	Heading to clear area to resume sampling operations.	
2110		Recalibrated ARGO using 3 trisponder ranges.	
2140	2400	Taking grab & core samples 74 to 76	

OPERATIONAL	REMARKS: Days production sounding 280.5 km 19.4 hours
BREAKDOWN	Coring 4.6 hours
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	21 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0114	At sample location # 76 working on snarled cable.
0130	0606	Taking grab samples every 800 m along line 163 between fixes 151 & 63 (samples 77 to 88)
0622	0827	Surveying an extra tie line during transit 163.1 32 km.
0914	1037	Survey line 75 22.3 km
1046	1222	Survey line 74 22.4 km
1227	1406	Survey line 73 27.7 km
1412	1609	Survey line 76 27.4 km
1630	1650	Anchored & putting launch in the water.
1655	1920	Survey line 77 28.4 km
1943	2204	Survey line 72 26.8 km
2205	2247	Proceeding to pick up launch.
2300	2330	Putting launch on board.
2330	2400	Heading to geophysical line # 81

OPERATIONAL 24	REMARKS: See 2 of 2 for launch work.
BREAKDOWN	Geophysical & Geological - 2 cores - 12 grab samples
STAND BY	6.1 hours.
TOTAL 24 HRS.	Sounding - Banksland 187.0 km 17.9 hours
WIND Fog	Launch 50.1
TEMP.	Total 237.1 km
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	21 August 84	Sprint
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
1645		Launch in water - McGladrey, Peters & White on board
		Receiving trisponder ranges from Oscar 2, 11105 and Wind 2
		Performed bar check # 1 5m = 5.3
1734	1922	Running lines 73 - 78 into shore
1922	1945	Bar check # 2 5 reads 5.49
		10 reads 10.47
		15 reads 15.51
		20 reads 20.50
1945	2246	Running lines 79, 80 & 90 - 93
2400		Launch back on board the Banksland.

OPERATIONAL	REMARKS: Production 50.1 km
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	22 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0000	0022	Putting seismic gear in the water.	
0033	0347	Survey hydrographic and seismic line # 81	34.4 km
0452	0800	Survey hydrographic and seismic line # 66	29.9 km
0823	0931	Survey line # 68	15.3 km
1021	1212	Survey line # 69	27.3 km
1212	1325	Heading inshore to drop off launch.	
1325	1511	Anchored placing launch in the water, refueling, repairing, etc.	
1601	1629	Heading back to repair launch.	
1630	1735	Completed repairs to launch - heading back to line.	
1801	2022	Survey line # 71	37.8 km
2120	2400	Survey hydrographic and seismic line # 96	31.9 km

OPERATIONAL 24	REMARKS: See 2 of 2 for launch activities.
BREAKDOWN	DAYS PRODUCTION
STAND BY	Hydrographic lines 80.4 km 15 hours
TOTAL 24 HRS.	Hydrographic & seismic lines 95.30 km 9.0 hours
WIND	Launch 39.9 km
TEMP.	Total 215.6 km
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	22 August 84	Sprint
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
1500		Launch in water - Peters & White on board
1524	1735	Surveying portions of lines 94 & 95
1545	1755	Power failure - generator overheated - returned to Banksland for repairs.
1755	2206	Surveying portions of lines 95 to 106
2206	2308	Batteries overcharging - refilled and disconnected from alternator.
2308	2323	Survey line # 107
0020		Returned to Banksland

OPERATIONAL	REMARKS: Production 39.9 km
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	23 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0012	Surveying line # 96
0015	0050	Anchored, picking up launch.
0050	0150	Enroute to line # 70
0150	0501	Survey line # 70 34.6 km
0536	0818	Survey line # 82 29.7 km
0852	1049	Survey line # 83 24.1 km
1058	1320	Survey line # 84 31.3 km
1320	1400	Anchored and putting launch in the water.
1407	1623	Survey line # 85 29.7 km
1635	1734	Survey line # 86 - 14.2 km ended line because a strong northwesterly wind 30-35 and resulting 1 - 2 m seas are causing problems on the launch.
1850	1950	Secured launch on board Banksland. Operation was hampered by poor weather conditions.
2051	2149	Continue surveying line # 86 14.8 km
2245		Survey line # 87

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.
WIND	Nil-35NW
TEMP.	
HUMIDITY	
SEASTATE	0-2 m

REMARKS:

Days production "Banksland" 178.4 km

Launch 9 km

Total 187.4 km

See 2 of 2 for launch activities.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	23 August 84	Sprint
	JOB NO.	CLIENT:

TIME FROM	TIME TO	OPERATIONS	SHEET 2 OF 2
1400	1501	Launch in the water proceeding 11 km east to start survey of line # 108	
1501	1556	Survey lines # 108 to # 110	
1600	1630	Weather conditions degrading - unable to continue survey - heading west to meet Banksland.	
1700	1705	Attempting to run before the seas for safety of Workboat passage - were not able to reach workboat passage because of possibility of broaching.	
1800	1930	In ice of ice flow	
1950		Back on board Banksland.	

	REMARKS:
OPERATIONAL	Survey 9 km.
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	24 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0030	Complete line # 87	29.9 km
0040	0215	Survey line # 88	23.9 km
0252	0407	Survey line # 89	22.0 km
0414	0541	Survey line # 90	23.9 km
0556	0725	Survey line # 91	25.3 km
0730	0844	Survey line # 92	20.0 km
0852	0959	Survey line # 93	19.7 km
1005	1111	Survey line # 94	19.6 km
1120	1228	Survey line # 95	19.5 km
1232	1328	Survey line # 97	15.8 km
1347	1435	Survey line # 98	14.8 km
1437	1603	Survey line # 99	24.7 km
1609	1737	Survey line # 100	26.2 km
1750	1941	Survey line # 101	32.0 km
1947	2138	Survey line # 102	31.6 km
2147	2317	Survey line # 103	25.7 km
2321	2400	Surveying line # 104	

OPERATIONAL	24
BREAKDOWN	/
STAND BY	/
TOTAL	24 HRS.
WIND	Wly30-Nil
TEMP.	5° C
HUMIDITY	
SEASTATE	1.5-Nil

REMARKS: Hydrographic lines 374.6 km

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	25 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0045	Continue surveying line # 104 22.0 km
0050	0150	Heading to core locations on line # 81
0217		Fix on core # 89
0423		Fix on core # 90 - Bar check # 12
0601		Fix on core # 91
0753		Fix on core # 92
0908	1231	Taking grab samples 93 to 104
1345	1515	Survey line # 105 26.4 km
1523	1638	Survey line # 106 21.9 km
1643	1814	Survey line # 107 24.3 km
1820	1954	Survey line # 108 27.8 km
1957	2137	Survey line # 109 27.7 km
2213	2400	Survey hydrographic & seismic line # 111 21.7 km

OPERATIONAL 24	REMARKS: Scheduled helicopter flight - cancelled due to heavy snow storm.
BREAKDOWN	
STAND BY	DAYS PRODUCTION
TOTAL 24 HRS.	4 piston cores/12 grab samples 12.9 hours.
WIND N'ly	Sounding 150.1 km 8.6 hours
TEMP.	Hydrographic & seismic lines 21.7 km.
HUMIDITY snow	2.5 hours.
SEASTATE 1-1.5	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	26 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0007	Complete line 111 (seismic and hydrographic)
0108	0227	Survey portion of hydrographic & seismic line # 163 fixes 379 to 530 14.6 km
0345	0509	Survey line # 110 fix 104 to 338 22.9 km
0522	0634	Survey line # 113 fix 90 to 314 22.3 km
0645		Stopped survey due to weather, 40 knot NW'ly, snow and 1 - 2 m seas.
0910		Anchored at Thetis Bay waiting on weather.

OPERATIONAL	9.2
BREAKDOWN	
STAND BY	14.8
TOTAL	24 HRS.
WIND	NW 25
TEMP.	-2° C
HUMIDITY	
SEASTATE	0.5-1

REMARKS:

Days production 59.8 km sounding

Weather bound.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	27 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0001		Anchored in Thetis Bay - weather bound.
0200		Requested permission to use Dome ARGO chain - plan to continue geophysical surveys in MacKenzie Basin.
0300		Locked on the Dome Chain - waiting for guns to be repaired - Time slot was allocated to another user - switched to an alternate time slot that was also allocated to another user.
0520		Borrowed time slot 2 from Norwetta. Banksland called into Gulf Beaufort to take on fuel.
0610	1525	Taking on fuel slowly 1200 gallons/hour. Measured draft at beginning and end of operation.
1621	1710	Onshore checking tide gauge
1710	1730	Helicopter on deck - George Eaton on board - departed with Eaton/McGladrey to do ice reconnaissance and assist with station maintenance.

OPERATIONAL	8.6
BREAKDOWN	
STAND BY	15.4
TOTAL	24 HRS.

REMARKS: Note: weather dropping noticeably during the day.

WIND	
TEMP.	
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	27 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
1800		Proceeding to main area - helicopter reports that ice conditions will permit some survey operations.
2038	2208	Survey line #112 fix 348 - fix 592 24.2 km.
2209	0010	Proceeding north to inspect ice conditions . Surveying recon line 112.1 on the way.

OPERATIONAL	8.6
BREAKDOWN	
STAND BY	15.4
TOTAL	24 HRS.
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS:

Waiting on weather 6.2 hours.

Refueling 9.2 hours.

Checked tide gauge.

Soundings 24.2 km.

G. Eaton on board.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	28 August 84	Banksland
	JOB NO. S2135	CLIENT: CRS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0015	0119	Survey line # 131 fix 269 to fix 451	18.2 km.
0124	0221	Survey line # 130 fix 272 to fix 420	14.8 km
0228	0329	Survey line # 129	13.7 km
0336	0435	Survey line # 128 Fix 206 to fix 340	13.1 km
		Note: Too much ice in area to continue surveying lines - starting geological sampling in the area.	
0540		At core station # 15 - sample # 105	
0848		At core station # 16 - no sample	
1025	1218	Taking grab samples # 106 to 112	
1220	1830	Enroute to western side of project area - blocked in by ice flows and had a great deal of difficulties getting around and locating a passage.	
1830	2010	Survey line 164.1	25.0 km
2010	2102	Survey line 162.1	13.6 km

		REMARKS:	
OPERATIONAL	24		
BREAKDOWN			
STAND BY			
TOTAL	24 HRS.		
WIND	variable		DISTRIBUTION
TEMP.			
HUMIDITY			
SEASTATE	nil		

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	28 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2102	2135	Anchored and putting launch in the water.
2143	2219	Survey line # 1 fix # 195 to fix 287 9.2 km.
2222	2259	Survey line # 2 fix # 261 to fix 357 9.4 km.
2300	0006	Survey line # 3 fix # 246 to fix 332 18.6 km.

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	variable
TEMP.	
HUMIDITY	
SEASTATE	nil

REMARKS:

Sounding 135.6 kms.

1 piston core, 7 grab samples

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	29 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0006	0120	Survey line # 4 fix # 144 to fix 339 19.4 km.
0130	0300	Anchored waiting for launch to check out Trisponder at MON 1A - Lifted launch back onboard the Banksland - Note: due to problems with Trisponder, no soundings were completed with the launch.
0313	0329	Survey line # 5 fix # 277 to fix 322 4.5 km.
0336	1148	Survey inshore portion of lines 6,7,8,9 to 20. 105.9 km. Note: Changed out trisponder on launch.
1300	1915	Anchored at Komakuk Beach for crew change. Transported all geophysical personnel ashore, picked up trisponder at Wind 2 and proceeded back to western portion of project area.
2032	2100	Anchored putting launch in the water.
2114	2134	Survey line # 21 fix # 327 to fix 384 5.7 km.

OPERATIONAL 24	REMARKS: Crew change by Twin Otter:
BREAKDOWN	Meagher - off
STAND BY	Simpkin - "
TOTAL 24 HRS.	Collins - "
WIND W'ly 10	Doucette - "
TEMP. -1° C	White - "
HUMIDITY	Staples - on
SEASTATE 0.1 m	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	29 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS	
2137	2159	Survey line # 22 fix # 287 to fix 348	5.8 km.
2200	2230	Transferred engineer to launch to try and fix engine problems.	
2232	2246	Survey line # 23 fix # 313 to fix 354	3.8 km.
2250	2307	Survey line # 24 fix # 381 to fix 428	4.6 km.
2300		Launch back on board the Banksland	
2340	2400	Survey portions of lines 25 & 26	8.2 km.

OPERATIONAL 24	REMARKS: No soundings completed with launch due to engine problems. Parts ordered from Tuk.
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	Soundings 157.9 km.
WIND W'ly	DISTRIBUTION
TEMP. -1° C	
HUMIDITY	
SEASTATE 0.2	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	30 August 93	Banksland
	JOB NO. S2135	CLIENT: CHS

TIME FROM	TIME TO	OPERATIONS	SHEET 1 OF 1
0000	1722	Surveying portions of lines 26, 27, 28, 29, 30, 31, 32, 33 34, 35, 36, 37, 38, 41, 42, 43, 48, 49, 50, 51, 52, 44, 45, 46, 47, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, & 68	174.7 km.
1749	2400	Surveying portions of lines 81, 82, 83, 114, 98 & 97	59.2 km.

		REMARKS: Soundings 233.90 km.
OPERATIONAL	24	
BREAKDOWN		
STAND BY		
TOTAL	24 HRS.	
WIND	ESE	DISTRIBUTION
TEMP.		
HUMIDITY		
SEASTATE	0.2	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	31 August 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	1115	Surveying portions of lines 98, 97, 95, 94, 93, 92, 91, 90, 89, 88, 75, 76, 77, 87 142.8 km
1115	2105	Surveying portions of lines 87, 86, 110, 114, 74, 75, 76, 77, 75, 73 84.7 km.
2109	2116	Helicopter on deck with supplies and parts for launch. Dennis will do routine maintenance and install Trisponder 814 @ MON 1A and move Oscar 2 to Wreck 2.
2129	2400	Surveying lines 72, 71 & 70 30.0 km.

OPERATIONAL 24	REMARKS: Sounding lines 257.2 km.
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND E'ly 10	DISTRIBUTION
TEMP. 6° C	
HUMIDITY	
SEASTATE 0-0.25	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	1 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0150	Surveying lines 70 & 69 37.0 km.
0200	0206	Helicopter on deck to pick up Oiler Paul Carpenter.
0231	1956	Surveying portions of lines 66, 65, 81, 82, 83, 84, 85, 1, 11 131.6 km.
1956	2046	Anchors down placing launch in the water.
2132	2400	Surveying lines 162 & 161 31.2 km.
		Note: Launch surveying inshore portions of lines 28 to 41.

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 24 HRS.
WIND	SE 20
TEMP.	
HUMIDITY	
SEASTATE	0.5-1 m

REMARKS:

Reduced running speed because of heavy fog visibility 1/8 to 1/4 mile.

Days soundings - Banksland 199.8 km

Launch 22.0

Total 221.8 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	2 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0000	0054	Survey line # 160 9.3 km.
0252	0317	Start to examine shoal # 1
0320	0400	Enroute to pick up launch.
0400	0426	Taking launch on board the Banksland.
0512	0717	Continue surveys on Shoal # 1
0718	1000	Running north to pick up open water - progress slowed by ice and fog.
1012	1103	Survey lines 14 & 15 11.6 km.
1105	1243	Proceeding south to the coast to drop off the launch.
1305		Launch in the water.
1509	1954	Survey lines 1 & 2 54.3 km.

	REMARKS:
OPERATIONAL	
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	2 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2043	2222	Examining shoal # 2
2230	2400	Heading to Wreck 2 to pick up launch.
2		
		Note: Launch Activities - 00:00 to 03:48 surveyed
		inshore portions of lines 42 to 53 inclusive.
		13:20 - 24:00 - survey lines 10 to 27 & 54 to 64
		Picked up batteries and trisponder at Wreck 2

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	W'ly light
TEMP.	-1° C
HUMIDITY	
SEASTATE	slight

REMARKS:

Days production 2 shoals examined.

Banksland	93.6 km.
Launch	92.4 km.
Total	186.0 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	3 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0020	0050	Stopped near Komakuk Beach taking launch onboard.
0323	0515	Survey line # 3 29.1 km.
0520	0540	Bar check echo sounder.
0555	1655	Surveying lines 4, 12 & 10 110.60 km.
1700	1830	Heading to the coast to drop off the launch.
1944	2400	Examination of shoals 3, 4, 5 & 6.
		Launch Activities:
		19:00 - 24:00 - Set up trisponder at Monument Canada Ref. 1 - Surveyed portion of lines 1 to 9, picked up trisponder beacons at MON 1A and Canada Ref 22.8 km.

OPERATIONAL 24	REMARKS: Sounding lines - Banksland 139.70 km.
BREAKDOWN	Launch 22.8 km
STAND BY	Total 162.5 km
TOTAL 24 HRS.	
WIND light W'ly	DISTRIBUTION
TEMP. -3° C	
HUMIDITY	
SEASTATE Nil	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	4 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0050	Enroute to pick up launch.	
0110	0235	Launch onboard Banksland enroute to Line # 9.	
0235	0315	Not able to pick up line 9 due to ice. Proceeding further north.	
0315	0557	Survey line # 13 fix 313 to fix 702	38.9 km
0613	0925	Survey line # 9 fix 290 to fix 702	41.2 km
0939	1240	Survey line # 8 fix 285 to fix 694	40.9 km
1246	1450	Survey line # 7 fix 321 to fix 693	37.2 km.
1456	1703	Survey line # 6 fix 327 to fix 695	37.9 km.
1705	1905	Survey line # 5 fix 323 to fix 682	35.9 km.
1928	2120	Survey line # 14 fix 402 to fix 728	42.6 km
2127	2255	Survey line # 11 fix 654 to fix 908	25.4 km.

OPERATIONAL 24	REMARKS: Sounding lines 300 km.
BREAKDOWN	Working in NW corner of prospect.
STAND BY	
TOTAL 24 HRS.	
WIND light NW	DISTRIBUTION
TEMP. -2° C	
HUMIDITY	
SEASTATE Nil	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	5 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0002	0020	Survey line # 4	6.9 km.
0026	0052	Survey line # 3	8.3 km.
0113	0149	Survey line # 2	11.9 km.
0157	0236	Survey line # 1	11.7 km.
0246	0310	Bar check # 14 - Note: slight difference due to Hippy being shut off.	
0355	0549	Survey line # 15 fix # 380 to fix 708	32.8 km
0613	0903	Survey line # 16 fix # 358 to fix 725	36.7 km.
0951	1307	Survey line # 17 fix # 337 to fix 714	37.3 km.
1335	1524	Survey line # 18 fix # 399 to fix 680	28.2 km.
1554	1706	Survey line # 21 fix # 385 to fix 585	20.0 km.
1721	1830	Survey line # 20 fix # 423 to fix 622	19.9 km.
1836	2012	Survey line # 19 fix # 397 to fix 655	25.8 km.
2032	2103	Survey line # 23 fix # 355 to fix 446	9.1 km.
2113	2148	Survey line # 22 fix # 349 to fix 449	10.0 km.
2208	2233	Survey line # 25 fix # 472 to fix 541	7.0 km.
2236	2302	Survey line # 26 fix # 466 to fix 537	7.0 km.

	REMARKS:	
OPERATIONAL		
BREAKDOWN		
STAND BY		
TOTAL 24 HRS.		
WIND		DISTRIBUTION
TEMP.		
HUMIDITY		
SEASTATE		

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	5 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2310	2336	Survey line # 27 fix # 462 to fix 537 7.2 km.
2338	2400	Surveying line # 157 easterly.

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	light NW
TEMP.	-1° C
HUMIDITY	
SEASTATE	nil

REMARKS:

Surveying in Nw'ly corner, then running checkline E'ly to look for open water.

Sound lines - Banksland - 279.8 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	6 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0312	Continue surveying line # 157	61.6 km.
0426	0554	Survey line # 155	26.0 km.
0608	0758	Survey line # 93	28.9 km.
0816	1015	Survey line # 94	33.9 km.
1021	1217	Survey line # 95	33.8 km.
1222	1420	Survey line # 96	36.1 km.
1437	1635	Survey line # 92	32.5 km.
1645	1831	Survey line # 91	32.5 km.
1842	2046	Survey line # 90	30.0 km.
2056	2157	Survey line # 89	18.4 km.
2202	2312	Survey line # 88	18.9 km.
2330	2400	Surveying line # 87	

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	ENE
TEMP.	1° C
HUMIDITY	
SEASTATE	0.1-0.5

REMARKS:

Note: Hippy spares on the way from Holland - expected here Sunday.

Sounding 352.6 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	7 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0001	0011	Complete line # 87	15.6 km.
0028	0132	Survey line # 86 fix # 417 to fix 585	16.7 km.
0200	0425	Survey line # 159 fix # 411 to fix 825	41.4 km.
0456	0614	Survey line # 160 fix # 580 to fix 833	25.3 km.
0628	0748	Survey line # 104 fix # 303 to fix 551	24.7 km.
0754	0931	Survey line # 103 fix # 340 to fix 591	25.1 km.
0944	1230	Survey line # 100 fix # 317 to fix 783	46.7 km.
1235	1251	Survey line # 101 fix # 389 to fix 432	4.1 km.
1254	1309	Survey line # 102 fix # 388 to fix 430	4.0 km.
1312	1433	Survey line # 103 fix # 592 to fix 795	20.3 km.
1443	1556	Survey line # 104 fix # 552 to fix 765	21.3 km.
1558	1929	Survey line # 105 fix # 355 to fix 887	53.2 km.
1954	2301	Survey line # 99 fix # 283 to fix 770	47.7 km.
2305		Survey line # 98	

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	ESE 25
TEMP.	-1° C
HUMIDITY	
SEASTATE	1-1.5m

REMARKS: Sounding lines 346.10 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	8 September	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0203	Surveying line 98 to fix # 778	45.5 km.
0227	0428	Survey line # 101 fix # 431 to fix 792	36.1 km.
0447	0752	Survey line # 102 fix # 431 to fix 759, offline at start due to ice	32.8 km.
0834	1019	Survey line # 97 fix # 325 to fix 557	23.2 km.
1052	1307	Survey line # 106 fix # 306 to fix 577	26.5 km.
1314	1454	Survey line # 107 fix # 332 to fix 615	28.3 km.
1459	1647	Survey line # 108 fix # 369 to fix 647	27.6 km.
1700	1840	Heading to Komakuk Beach to put launch in the water.	
1840	1950	Anchored - repairing generator on the launch.	
2141	2400	Survey line # 115 fix 133 to fix 509	39.4 km.
		Launch Activities:	
		20:14 - 24:00 - Set up Trisponder beacons at Wind 2 offset and Wreck 2 - surveyed inshore portion of lines 89, 88, 87 86, 85, 84, 83, 82 & 81	20.7 km.

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	E'ly 25
TEMP.	1° C
HUMIDITY	
SEASTATE	0.5-1 m

REMARKS:

Banksland 259.4 km.

Launch 20.7 km.

Total Sounding 280.11 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	9 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0216	Survey line # 116 fix # 143 to Fix 536	39.3 km.
0218	0357	Enroute to pick up launch.	
0357	0425	Anchored and taking launch onboard.	
0625	0746	Survey line # 109 Fix # 384 to fix 598	21.4 km.
0802	0937	Survey line # 110 fix # 359 to fix 590	23.1 km.
0950	1126	Survey line # 113 fix # 315 to fix 551	23.6 km.
1134	1415	Survey line # 114 fix # 552 to fix 870	31.8 km.
1428	1700	Survey line # 117 fix # 192 to fix 573	38.1 km.
1705	1941	Survey line # 118 fix # 201 to fix 566	36.5 km.
1948	2047	Survey line # 120 fix # 225 to fix 402	17.7 km.
2052	2155	Survey line # 121 fix # 249 to fix 388	13.6 km.
2203	2400	Surveying line # 122 fix 246 ----	
		Launch Activities: Surveying portions of inshore lines # 80, 79, 72, 71, 70, 69, 68, 67, 66, 65 and barcheck # 7 23.4 km.	

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	E 15
TEMP.	2° C
HUMIDITY	
SEASTATE	1.0-1.5

REMARKS:

Sounding lines 245.10 km Banksland

23.4 km Launch

Total 268.5 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	10 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0017	Complete line # 122 to fix # 639	38.9 km.
0021	0206	Survey line # 121	26.2 km.
0215	0334	Survey line # 120 fix # 403 to fix 646	24.3 km.
0349	0645	Survey line # 123 fix # 251 to fix 608	35.7 km.
0650	0822	Survey line # 124 fix # 250 to fix 528	25.8 km.
0829	1109	Survey line # 125 fix # 220 to fix 542	32.2 km.
1127	1405	Survey line # 128 fix # 341 to fix 805	46.4 km.
1409	1717	Survey line # 129 fix # 410 to fix 822	41.4 km.
1717		Proceeding to Gulf Beaufort to refuel Banksland.	
		Note: Helicopter on deck - McGladrey & Eaton	
		to shore for telephone calls, angle at Wind 2 and	
		check on tide gauge. Trisponder beacons set at Wind 2	
		and Oscar 2.	
2030		Alongside Beaufort for refueling (slow process due	
		to a number of breaks in pumping)	
2400		Eaton/McGladrey back onboard via Beaufort.	

		REMARKS:	
OPERATIONAL	17.3	Sounding - Banksland 270.9 km.	
BREAKDOWN			
STAND BY	6.7	Standby time for refueling	
TOTAL	24 HRS.		
WIND	ESE 15		DISTRIBUTION
TEMP.	2°		
HUMIDITY			
SEASTATE	1-1.5		

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	11 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0235	Alongside Beaufort taking on fuel - will have to break off to allow a Gulf Vessel to come alongside to take on fuel.
0300	0955	Anchored in Pauline Cove.
1030	1531	Alongside Gulf Beaufort taking on fuel.
1531	1800	Travelling to survey area.
1820	1910	Putting launch in the water.
1911	2030	Proceeding to line 130 - crossed baseline 1 + 3
2033	2304	Survey line 130 fix # 421 to fix 884 46.3 km.
2307	2400	Surveying line 131 - starting at fix # 452
		Launch Activities: 18:40 - 24:00 GMT
		Barcheck # 8 - survey inshore portions of lines 111 to 120 inclusive 37.3 km.

OPERATIONAL	8.5
BREAKDOWN	
STAND BY	15.5
TOTAL	24 HRS.
WIND	E 10
TEMP.	3° C
HUMIDITY	
SEASTATE	0.5

REMARKS:

Standby time for refueling 15.5 hours.

Sounding lines - Banksland 46.3 km.

Launch 37.3 km

Total 83.6 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	12 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0000	0137	Complete line 131 to fix 860	40.8 km.
0140	0240	Heading inshore to pick up launch.	
0245	0300	Taking launch onboard.	
0340	0642	Survey line 132 fix # 180 to fix 755	57.5 km.
0650	0947	Survey line 133 fix # 275 to fix 752	47.7 km.
1001	1215	Survey line 134 fix # 311 to fix 755	44.4 km.
1221	1517	Survey line 135 fix # 282 to fix 759	47.7 km.
1535	1756	Survey line 136 fix # 315 to fix 754	43.9 km.
1759	2032	Survey line 137 fix # 334 to fix 750	41.6 km.
2035	2206	Proceeding to Komakuk to meet helicopter - informed that they are not able to come any further than Shingle Point due to fog.	
2210	2330	Proceeding to line 138	

	REMARKS:
OPERATIONAL	
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	
TEMP.	
HUMIDITY	
SEASTATE	

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	12 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2337	2400	Surveying line # 138 - starting at fix # 281
		Launch Activities: (0000 - 0245 GMT)
		Surveying inshore portions of lines 121 to 126 23.7 km.
		Note: We have approximately 2500 km of soundings to complete this project. As the majority of the area to be surveyed lies well offshore, we have temporarily suspended any inshore or launch work. To take advantage of the ice free waters, the offshore portion will take priority.

OPERATIONAL 24	REMARKS: Sounding lines 323.6 km Banksland
BREAKDOWN	23.7 km Launch
STAND BY	Total 347.3 km
TOTAL 24 HRS.	
WIND E'ly light	DISTRIBUTION
TEMP. 3° C.	
HUMIDITY	
SEASTATE 0.5	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	13 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0154	Complete line # 138 at fix # 700	41.9 km.
0233	0642	Survey line # 154 fix # 1 to fix 786	78.3 km.
0710	0905	Survey line # 155 fix # 262 to fix 616	32.8 km.
0940	1109	Survey line # 68 fix # 505 to fix 780	27.5 km.
1121	1308	Survey line # 158 fix # 500 to fix 843	34.0 km.
1335	1422	Survey line # 157 fix # 606 to fix 757	15.2 km.
1430	1542	Survey line # 29 fix # 515 to fix 738	22.3 km.
1545	1653	Survey line # 30 fix # 531 to fix 737	20.7 km.
1657	1802	Survey line # 31 fix # 536 to fix 743	20.7 km.
1809	1928	Survey line # 28 fix # 484 to fix 720	23.6 km.
1947	2032	Survey line # 21 fix # 591 to fix 730	13.9 km.
2057	2131	Survey line # 20 fix # 623 to fix 728	10.5 km.
2156	2217	Survey line # 19 fix # 656 to fix 720	5.9 km.
2244	2400	Survey line # 22 fix # 450 ⟶	

OPERATIONAL 24	REMARKS: Helicopter flight cancelled because of fog in Tuk
BREAKDOWN	
STAND BY	Soundings 347.3 km.
TOTAL 24 HRS.	
WIND light - variable	DISTRIBUTION
TEMP. -3° C	
HUMIDITY	
SEASTATE Nil	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	14 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0000	0048	Complete line 22 to fix 834	38.4 km.
0051	0226	Survey line 23 fix 451 to fix 734	28.1 km.
0236	0415	Survey line 24 fix 459 to fix 755	29.6 km.
0421	0450	Survey line 25 fix 542 to fix 617	7.5 km.
0450	0540	ARGO went to standby, steamed south to regain lane count using Trisponder - changed out RPU/ CDU interconnect cable.	
0606	0707	Survey line 25 fix 618 to fix 800	28.0 km.
0734	0824	Survey line 26 fix 544 to fix 688	14.6 km.
0849	0936	Survey line 156 fix 137 to fix 285	14.8 km.
1027	1103	Survey line 26 fix 689 to fix 795	10.6 km.
1112	1228	Survey line 27 fix 538 to fix 780	24.2 km.
1248	1328	Survey line 32 fix 624 to fix 744	12.0 km.
1332	1410	Survey line 33 fix 647 to fix 769	12.2 km.
1414	1450	Survey line 34 fix 607 to fix 705	9.7 km.
1453	1525	Survey line 35 fix 649 to fix 744	9.5 km.
1528	1559	Survey line 36 fix 664 to fix 752	8.8 km.

OPERATIONAL	22.8	REMARKS:
BREAKDOWN	1.4	
STAND BY		
TOTAL	24 HRS.	
WIND	ENE light	DISTRIBUTION
TEMP.		
HUMIDITY		
SEASTATE	0.2	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	14 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
1604	1635	Survey line 37 fix 737 to fix 830 8.3 km.
1648	1819	Survey line 43 fix 489 to fix 757 26.8 km.
1823	1952	Survey line 44 fix 497 to fix 764 27.0 km.
2006	2135	Survey line 51 fix 491 to fix 769 27.8 km.
2140		Proceeding towards Komakuk to meet helicopter.
2250	2300	Helicopter onboard with Hippy 120 spares and Neil Bennett and Gary Jones. As per Ed Mayzes request, sent airguns and electronics to Tuk.
2325	2400	Lost timing on ARGO at Wind 2. Apparently Dennis was changing batteries.

OPERATIONAL	22.6
BREAKDOWN	1.4
STAND BY	
TOTAL	24 HRS.
WIND	ENE
TEMP.	
HUMIDITY	
SEASTATE	

REMARKS: Sounding 327.9 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	15 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

TIME FROM	TIME TO	OPERATIONS	
0117	0235	Survey line # 50 fix 922 to fix 1143	22.1 km.
0236	0300	Barcheck echo sounder to determine the effects of the Hippy replacement parts (very little difference in readings with unit on or off)	
0311	0421	Survey line # 49 fix # 551 to fix 756	20.5 km.
0429	0545	Survey line # 48 fix # 534 to fix 757	22.2 km.
0554	0708	Survey line # 47 fix # 549 to fix 765	21.6 km.
0723	0825	Survey line # 46 fix # 562 to fix 762	20.0 km.
0834	0937	Survey line # 45 fix # 571 to fix 762	19.1 km.
1016	1045	Survey line # 42 fix # 667 to fix 757	9.0 km.
1109	1208	Survey line # 52 fix # 585 to fix 766	18.1 km.
1217	1320	Survey line # 53 fix # 551 to fix 741	19.1 km.
1325	1421	Survey line # 54 fix # 632 to fix 806	17.3 km.
1430	1531	Survey line # 55 fix # 636 to fix 816	18.0 km.
1535	1634	Survey line # 56 fix # 587 to fix 763	18.3 km.
1638	1740	Survey line # 57 fix # 596 to fix 773	17.5 km.
1742	1852	Survey line # 58 fix # 571 to fix 772	20.1 km.
1857	2005	Survey line # 59 fix # 644 to fix 846	20.2 km.

OPERATIONAL 24	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND E'ly20-25	DISTRIBUTION
TEMP. 2° C	
HUMIDITY	
SEASTATE 1-2 m	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	15 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2009	2135	Survey line # 60 fix # 717 to fix 966 24.9 km.
2158	2334	Survey line # 61 fix # 527 to fix 818 28.9 km.
2339	2400	Survey line # 62 - starting at fix # 613
		Survey Personnel Onboard:
		Canadian Hydrographic Service
		George Eaton
		Cansite:
		Mark McGladrey
		Percy Roberts
		Kathy Ferns
		Eugene Peters
		Michel Goguen
		Howard Staples
		Neil Bennett
		Gary Jones

OPERATIONAL 24	REMARKS: Sounding 336.9 km.	
BREAKDOWN		
STAND BY		
TOTAL 24 HRS.		
WIND E'ly 20-25		DISTRIBUTION
TEMP. 2° C		
HUMIDITY		
SEASTATE 1-2 m		

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	16 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0031	Complete line # 62 to fix 764	15.1 km.
0039	0134	Survey line # 63 fix # 606 to fix 761	15.5 km.
0141	0255	Survey line # 64 fix # 504 to fix 718	21.4 km.
0301	0338	Survey line # 62 fix # 761 to fix 863	10.2 km.
0350	0402	Survey line # 66 fix # 595 to fix 629	3.2 km.
0436	0538	Survey line # 65 fix # 505 to fix 688	18.3 km.
0546	0650	Survey line # 66 fix # 629 to fix 815	18.6 km.
0721	0845	Survey line # 67 fix # 486 to fix 742	25.6 km.
0857	1016	Survey line # 69 fix # 59 to fix 735	22.6 km.
1024	1139	Survey line # 70 fix # 498 to fix 723	22.5 km.
1147	1312	Survey line # 71 fix # 476 to fix 722	24.6 km.
1318	1440	Survey line # 72 fix # 473 to fix 719	24.6 km.
1456	1635	Survey line # 73 fix # 444 to fix 736	29.2 km.
1648	1823	Survey line # 74 fix # 449 to fix 732	28.3 km.
1828	2002	Survey line # 75 fix # 548 to fix 826	27.9 km.
2010	2143	Survey line # 76 fix # 493 to fix 769	27.6 km.
2147	2326	Survey line # 77 fix # 448 to fix 742	29.3 km.
2347	2400	Survey line # 78 - starting at fix 517	

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	E'ly 25
TEMP.	0
HUMIDITY	
SEASTATE	1-1.5 m

REMARKS: Sounding 364.5 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	17 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0000	0107	Complete line # 78 at fix 762	24.5 km.
0114	0238	Survey line # 79 fix # 521 to fix 763	24.2 km.
0245	0402	Survey line # 80 fix # 501 to fix 735	23.4 km.
0408	0530	Survey line # 81 fix # 541 to fix 777	23.6 km.
0541	0658	Survey line # 82 fix # 518 to fix 755	23.7 km.
0705	0820	Survey line # 83 fix # 505 to fix 740	23.5 km.
0830	0942	Survey line # 84 fix # 489 to fix 717	22.8 km.
0948	1050	Survey line # 85 fix # 520 to fix 711	19.1 km.
1106	1219	Survey line # 86 fix # 586 to fix 814	23.0 km.
1222	1325	Survey line # 87 fix # 815 to fix 1006	19.1 km.
1331	1428	Survey line # 88 fix # 556 to fix 736	18.0 km.
1432	1530	Survey line # 89 fix # 557 to fix 734	17.7 km.
1533	1541	Survey line # 90 fix # 743 to fix 767	2.2 km.
1558	1707	Survey line # 97 fix # 558 to fix 781	22.3 km.
1710	1734	Survey line # 96 fix # 733 to fix 793	5.9 km.
1749	1811	Survey line # 95 fix # 690 to fix 772	8.2 km.
1818	1853	Survey line # 94 fix # 691 to fix 776	8.5 km.
1900	1926	Survey line # 93 fix # 692 to fix 781	8.9 km.
1931	1955	Survey line # 92 fix # 724 to fix 785	6.1 km.
2003	2016	Survey line # 91 fix # 740 to fix 787	4.7 km.

OPERATIONAL 24	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND E 20	DISTRIBUTION
TEMP. 1°	
HUMIDITY Fog	
SEASTATE 1-1.5	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	17 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2020	2043	Survey line # 90 Fix # 768 to fix 823 5.5 km.
2108	2140	Survey line # 98 fix # 779 to fix 857 7.8 km.
2152	2158	Survey line # 99 fix # 771 to fix 787 1.6 km.
2204	2237	Survey line # 100 fix # 788 to fix 912 12.4 km.
2245	2344	Survey line # 102 fix # 756 to fix 900 14.4 km.
2354	2400	Start surveying line # 99 at fix # 788

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	SE 25
TEMP.	+1°
HUMIDITY	fog
SEASTATE	1.5-2

REMARKS: Sounding 371.10 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	18 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS	
0000	0007	Complete line # 99	4.2 km.
0018	0024	Survey line # 101 fix # 793 to fix 815	2.2 km.
0046	0214	Survey line # 106 fix # 578 to fix 796	21.8 km.
0225	0322	Survey line # 107 fix # 616 to fix 810	19.4 km.
0331	0447	Survey line # 108 fix # 648 to fix 814	19.3 km.
0519	0638	Survey line # 109 fix # 599 to fix 863	26.3 km.
0643	0830	Survey line # 110 fix # 591 to fix 856	26.5 km.
0902	1044	Survey line # 111 fix # 512 to fix 853	34.1 km.
1052	1304	Survey line # 112 fix # 593 to fix 925	33.3 km.
1321	1443	Survey line # 113 fix # 552 to fix 836	28.4 km.
1450	1642	Survey line # 114 fix # 871 to fix 1159	28.8 km.
1659	1813	Survey line # 115 fix # 527 to fix 763	23.6 km.
1828	2000	Survey line # 116 fix # 537 to fix 771	23.0 km.
2009	2116	Survey line # 117 fix # 574 to fix 787	21.3 km.
2120	2400	Surveying line 139 - starting at fix # 304	

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	E'ly 20
TEMP.	1°
HUMIDITY	
SEASTATE	1.0

REMARKS: Sounding 312.2 km.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	19 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0000	0023	Complete line # 139 to fix 695	38.8 km.
0030	0250	Proceeding to west side of Herschel Island to meet "MV Johnny Hope" to take on fuel - crossed ARGO baselines on the way in.	
0300	0700	Alongside vessel taking on fuel - measure Banksland change in draft - crew to shore to start surveying beacons on the sand spit.	
0700		Crossed baselines.	
0840		Recalibrated ARGO using Trisponder ranges.	
0904	1101	Survey line # 140 fix # 308 to fix 686	37.2 km.
1141	1252	Survey line # 118 fix # 567 to fix 764	19.7 km.
1313	1423	Survey line # 119 fix # 524 to fix 761	23.7 km.
1427	1515	Survey line # 120 fix # 647 to fix 786	13.9 km.
1525	1600	Survey line # 121 fix # 653 to fix 771	11.8 km.
1606	1649	Survey line # 122 fix # 640 to fix 765	12.5 km.

	REMARKS:	DISTRIBUTION
OPERATIONAL		
BREAKDOWN		
STAND BY		
TOTAL 24 HRS.		
WIND NE'ly		
TEMP. 1°		
HUMIDITY fog		
SEASTATE		

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	19 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS	
1707	1734	Survey line # 123 fix # 609 to fix 766	15.7 km.
1759	1918	Survey line # 124 fix # 767 to fix 1001	23.6 km.
1926		Survey line # 125 fix # 543 to fix 773	23.0 km.
2040	2130	Barcheck # 16 of echo sounder	
2153	2310	Survey line # 126 fix # 522 to fix 754	23.2 km.
2320	2400	Surveying line # 127 - start from fix # 526	

OPERATIONAL	20
BREAKDOWN	
STAND BY	4
TOTAL	24 HRS.
WIND	NW 10
TEMP.	0
HUMIDITY	
SEASTATE	0.5

REMARKS:

Sounding 243.10 km.

Standby time refueling Banksland at MV Johnny Hope.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	20 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0037	Survey line # 127 to fix # 761 23.3 km.
0042	0116	Survey line # 128 fix # 806 to fix 903 9.4 km.
0121	0153	Survey line # 129 fix # 823 to fix 915 9.2 km.
0156		Survey portions of lines 130, 131, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 157, 152, 153, & 156 323.7 km.

OPERATIONAL 24	REMARKS: Sounding 365.6 km.
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND variable	DISTRIBUTION
TEMP. 0	
HUMIDITY	
SEASTATE calm	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	21 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0000	0301	Survey remainder of line 156	51.5 km.
0344	0428	Survey line # 155 fix # 617 to fix 748	13.1 km.
0501	0518	Survey line # 101 fix # 816 to fix 867	5.1 km.
0638	0657	Survey line # 155 fix # 749 to fix 801	5.2 km.
0751	0755	Start line # 165 - ARGO 1 (Mon 1A) down	
0850	0909	Survey infill lines 150, 149, 148, 147 &145	31.2 km.
1210	1405	Heading south to drop off launch.	
1415		Contacted Dennis in Tuk - re: ARGO	
1520		Anchor up proceeding to first shoal.	
1600	1728	Examine shoal # 7 & leadline.	
1729	1835	Examine shoal # 8 & leadline.	
1915	2035	Running line @ 200 m o/s over shoal # 9	
2050	2130	Examine shoal # 9	

OPERATIONAL	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	21 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2150	2230	Survey infill on line # 129
2300		Helicopter on deck - McGladrey to tide gauge.
2305	2400	Examining shoal # 10
		*Launch - working on inshore lines 35.5 km.

OPERATIONAL	23.1
BREAKDOWN	0.9
STAND BY	
TOTAL	24 HRS.
WIND	SE'ly 15
TEMP.	0
HUMIDITY	fog (partial)
SEASTATE	calm

REMARKS:

Banksland sounding 110.2 km

14 shoal investigations.

Launch on inshore lines 35.5 km.

Check tide gauge -

Breakdown - survey time lost 0.9 hours.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	22 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS	
0015		Complete examine of shoal # 10	
0030		Launch onboard - helicopter dropped off McGladrey	
0055	0203	Examine shoal # 11	
0215	0321	Examine shoal # 12	
0354	0417	Survey line # 150 fix 718 to fix 772	3.2 km.
0440	0602	Examine shoal # 13	
0626	0657	Survey line # 171 fix # 373 to fix 465	9.1 km.
0740	0837	Examine shoal # 14	
0900	0957	Examine shoal # 15	
1029	1038	Survey line # 128 fix # 904 to fix 930	2.6 km.
1056	1108	Survey line # 125 fix # 775 to fix 811	3.6 km.
1130	1245	Examine shoal # 16	

OPERATIONAL 24	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND variable	DISTRIBUTION
TEMP. -1°	
HUMIDITY	
SEASTATE nil	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	22 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
1245	1340	Proceeding inshore to drop off launch.
1420		Launch off
1540	1616	Examine shoal # 17
1627	1737	Examine shoal # 18
1750	1810	Survey infill line 112 fix 926 to fix 987 6.1 km.
1827	1949	Examine shoal # 19
2004	2022	Looking for shoal # 20 no shoal!
2038	2052	Survey line # 102 fix # 901 to fix 944 4.3 km.
2117	2220	Examine shoal # 21
2234	2351	Survey ice infill gaps in lines 107, 105 &104 14.2 km.
		Launch: completed inshore lines as far as possible around Herschel Island + 1 shoal # 100

OPERATIONAL	REMARKS: Banksland 47.5 km of infill lines and 11 shoals
BREAKDOWN	
STAND BY	Launch 69.9 km. of sounding and 1 shoal
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	23 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 2

TIME FROM	TIME TO	OPERATIONS
0001		Proceeding in to shore to pick up launch.
0055	0105	Taking launch onboard.
0128	0643	Surveying infill on lines 116, 96, 89, 85, 84, 80, 79, 77 & 76 — 53.4 km.
0701	0941	Surveying four lines over shoal # 22 — 34.1 km.
1014	1410	Surveying infill on lines 41, 33, 28, 11 & 4 — 28.4 km.
1455		Dropping off the launch.
1521	1844	Surveying portions of lines # 3, 1, 2 & 35 — 8.2 km.
1900	2000	Examine shoal # 23
2004	2247	Examine shoal # 24 - running line over ridge - locating peaks on two shoals.

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	E'ly 10
TEMP.	1° C
HUMIDITY	
SEASTATE	0.5

REMARKS:

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	23 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 2 OF 2

TIME FROM	TIME TO	OPERATIONS
2250	2400	Proceeding south to pick up launch
		Launch: Surveyed 7 shoals - had problems with Trisponder ranges on a number of the positions.

OPERATIONAL	REMARKS: Launch - 6 shoals	
BREAKDOWN		
STAND BY	Banksland 174.1 km & 3 shoals.	
TOTAL 24 HRS.		
WIND		DISTRIBUTION
TEMP.		
HUMIDITY		
SEASTATE		

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	24 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0040		Taking launch onboard.
0135	0245	Examine shoal # 25
0255	0415	Examine shoal # 26
0430	0530	Examine shoal # 27
0605	0700	Examine shoal # 28
0730	0830	Examine shoal # 29
0854	0955	Examine shoal # 30
1115	1311	Examine shoals 31, 31.1 ---- 31.3
1458	1555	Examine shoal # 32
1625	1730	Examine shoal # 33
1740	1815	Examine shoal # 34
2016	2100	Examine shoal # 35
2105	2241	Examine shoal # 36
2249	2352	Examine shoal # 37

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	E'ly 25
TEMP.	-1° C
HUMIDITY	
SEASTATE	2-2.5m

REMARKS: Examined 14 shoals - operations slowed down because of strong winds and 2 - 2.5 m swell.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	25 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	1530	Examine shoals # 38 to # 49
1542	1648	Survey infill line # 18
1716	1950	Examine shoals 50 & 51
2002	2013	Survey infill line # 10 fix 713 to fix 749
2028	2400	Examine shoals # 52 to # 54

OPERATIONAL 24	REMARKS: Shoal examinations and ice infill lines
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND ESE15-20	DISTRIBUTION
TEMP. -2° C	
HUMIDITY	
SEASTATE 1 m	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	26 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0330	Examine shoals # 54 to # 57
0346	0426	Survey line # 18 fix # 762 to fix 884
0503	0530	Survey line # 38 fix # 922 to fix 972
0600	0808	Examine shoals # 58 - 60
0839	0853	Survey line # 39
0906	1445	Examine shoals # 61 - # 65
1450	1615	Dropping off launch.
1641	1709	Survey line # 5
1721	1735	Survey line # 4 fix # 793 to fix 834
1825	2400	Examine shoals 66 - 70
		Launch Activities: Examine shoals # 107 to 114

OPERATIONAL 24	REMARKS: Shoal examinations & ice infill
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND variable	DISTRIBUTION
TEMP. 0	
HUMIDITY	
SEASTATE nil	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	27 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0001	0102	Examine shoal 70.1
0105	0142	Picking up launch.
0200	1433	Examine shoals 71 - 79
1435	1537	Dropping off the launch.
1556	2400	Examine shoals 80 - 86
		Launch Activities:
		Examine shoals 115 to 125

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	WNW light
TEMP.	1°
HUMIDITY	
SEASTATE	calm

REMARKS: Banksland & Launch shoal examinations.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	28 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0115	Examine shoal # 86
0120	0240	Picking up launch.
0320	0546	Examine shoals 87 & 88
0618	0701	Survey infill lines 74 & 73
0715	0942	Examine shoals 89 & 90
0958	1014	Survey line # 66 fix 815 to fix 863
1036	1330	Survey shoals 91 & 92
1348	1407	Survey line # 69 fix # 736 to fix 790
1436	2100	Examine shoals # 93 - 97
2110	2400	Survey lines 81, 86 & 90 - Examine shoal # 98

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	NW 20
TEMP.	+1° C
HUMIDITY	
SEASTATE	1-1.5

REMARKS: Infill lines and shoal examinations

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	29 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	0041	Examine shoal # 99 - note changed shoal numbering to avoid mixup with launch numbering.
0104	0822	Examine shoals 200 to 207
0900	0930	Survey line # 62
1000	1514	Examine shoals # 208 to 211
1618	2400	Examine shoals # 211 to 216

OPERATIONAL 24	REMARKS: Shoal examination and ice infill lines.
BREAKDOWN	
STAND BY	Helicopter to area to start demobilization.
TOTAL 24 HRS.	
WIND E'ly20-25	DISTRIBUTION
TEMP. -3° C	
HUMIDITY	
SEASTATE 1-1.5	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	30 September 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0000	1546	Examine shoals # 217 to 230
1800		Anchored southwest of Herschel Island waiting for helicopter.
1921		Heading to Pauline Cove to find shelter.
2240		Anchored in Pauline Cove.
2302		Helicopter on deck - McGladrey & Eaton off to check shoreline plot.

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	ESE 35
TEMP.	-4°
HUMIDITY	
SEASTATE	2-2.5

REMARKS: Shoal Examinations.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	1 October 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
0100	0140	McGladrey & Eaton taking down tide gauge.
0150		Helicopter on deck. McGladrey & Eaton onboard - Bennett to shore to assist demobilizing station and to complete onshore surveys.
0210		Banksland enroute to Tuk.
2100		Vessel arrived in Tuk.

OPERATIONAL	24
BREAKDOWN	
STAND BY	
TOTAL	24 HRS.
WIND	E 20
TEMP.	
HUMIDITY	
SEASTATE	1-1.5

REMARKS:

Enroute to Tuk

Shore crew demobilizing shore stations.

DISTRIBUTION

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	2 October 84	Banksland
	JOB NO. S2135	CLIENT: CHS

TIME FROM	TIME TO	OPERATIONS — SHEET 1 OF 1
		Demobilize vessel.
		Ferns travelling south
		Roberts " "
		Jones " "
		Peters " "
		Shore crew could not complete onshore surveys due to weather
		and returning to Tuk.

OPERATIONAL	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

Cansite Surveys Limited

DAILY SURVEY STATUS REPORT

AREA:	DATE:	VESSEL:
Beaufort Sea	3 October 84	Banksland
	JOB NO. S2135	CLIENT: CHS

SHEET 1 OF 1

TIME FROM	TIME TO	OPERATIONS
		Completed demobilization of Banksland - all equipment loaded onto last barge. Scheduled out of Tuk.

OPERATIONAL	REMARKS:
BREAKDOWN	
STAND BY	
TOTAL 24 HRS.	
WIND	DISTRIBUTION
TEMP.	
HUMIDITY	
SEASTATE	

NAME: K. Mark McGladrey

APPENDIX 2

MAIN AREA

BANKSLAND ARGO CALIBRATION DETAILS

July 26, 1984 Calibration

Initial calibration values of ARGO 1: 0.60 lanes, ARGO 2: 0.57 lanes and ARGO 3: 0.54 lanes were determined by comparing the ARGO position to a two range Trisponder position. The final values were derived from baseline crossing and extension techniques as described in section 3.2.1.

The baseline crossing and extension values were displayed on the ARGO CDU and were output graphically by the IP200 software. Figures 1, 2 & 3 give the results of the ARGO 1 - ARGO 3 baseline crossing. Figures 4 & 5 give the ARGO 1 - ARGO 2 baseline crossing. Figures 6 & 7 give the ARGO 1 - ARGO 2 extension crossing and figures 8 & 9 give the ARGO 2 - ARGO 3 baseline crossing data as output by the navigation system.

This data was meaned and used for the following calculations.

Baseline + denotes crossing - denotes extension	Calculated Length (metres)	Observed Length (lanes)	Difference (metres)
AR1 + AR3	72408.6	Σ72418.9	-10.3
AR1 + AR2	41689.6	Σ41711.1	-21.5
AR1 - AR2	41689.6	Δ41693.3	- 3.7
AR2 + AR3	31021.1	Σ31024.4	- 3.3
Note: 1 lane = 86.26079 metres			

For ARGO 1 & ARGO 2

Correction to ARGO 2 (WIND 2)

$$\frac{\Delta - \Sigma}{2} = \frac{41693.3 - 41711.1}{2} = -8.90 \text{ m}$$

$$= -0.10 \text{ lanes}$$

Correction to ARGO 1 (MON 1A)

$$\frac{2BL - \Sigma - \Delta}{2} = \frac{2(41689.6) - 41711.1 - 41693.3}{2}$$

$$= -12.6 \text{ metres} = -0.15 \text{ lanes}$$

Using the above values, the calibration value for ARGO 3 (ARGO A) can be derived.

Σ ARGO 1 + ARGO 3	=	72418.9 metres
+ correction to ARGO 1		- 12.6
		70406.30 m
- baseline ARGO 1 to 3		70408.6 m
correction to ARGO 3		2.30 m. or 0.03 lanes

As a check, the above values were applied to the ARGO 2 - ARGO 3 baseline crossing.

Σ observed	31024.4	m
+ correction to ARGO 3	+ 2.3	m
+ correction to ARGO 2	- 8.9	m
corrected baseline length	31017.8	m
actual baseline length	31021.1	m
difference	3.30	m

the new ARGO calibration values were:

	ARGO 1	ARGO 2	ARGO 3
delta ranges at start	0.60	0.57	0.54
differences calculated	-0.15	-0.10	+0.03
values set in ARGO	0.45	0.47	0.57

Aug. 20/84 & Sept. 19/84 Calibration

These calibrations were carried out while the vessel was stationary. A minimum of 15 ARGO/Trisponder positions were observed and the ARGO position was compared to the Trisponder position. The differences between the two positions were applied to the delta range values in the ARGO software via the C.D.U.

FIGURE 1

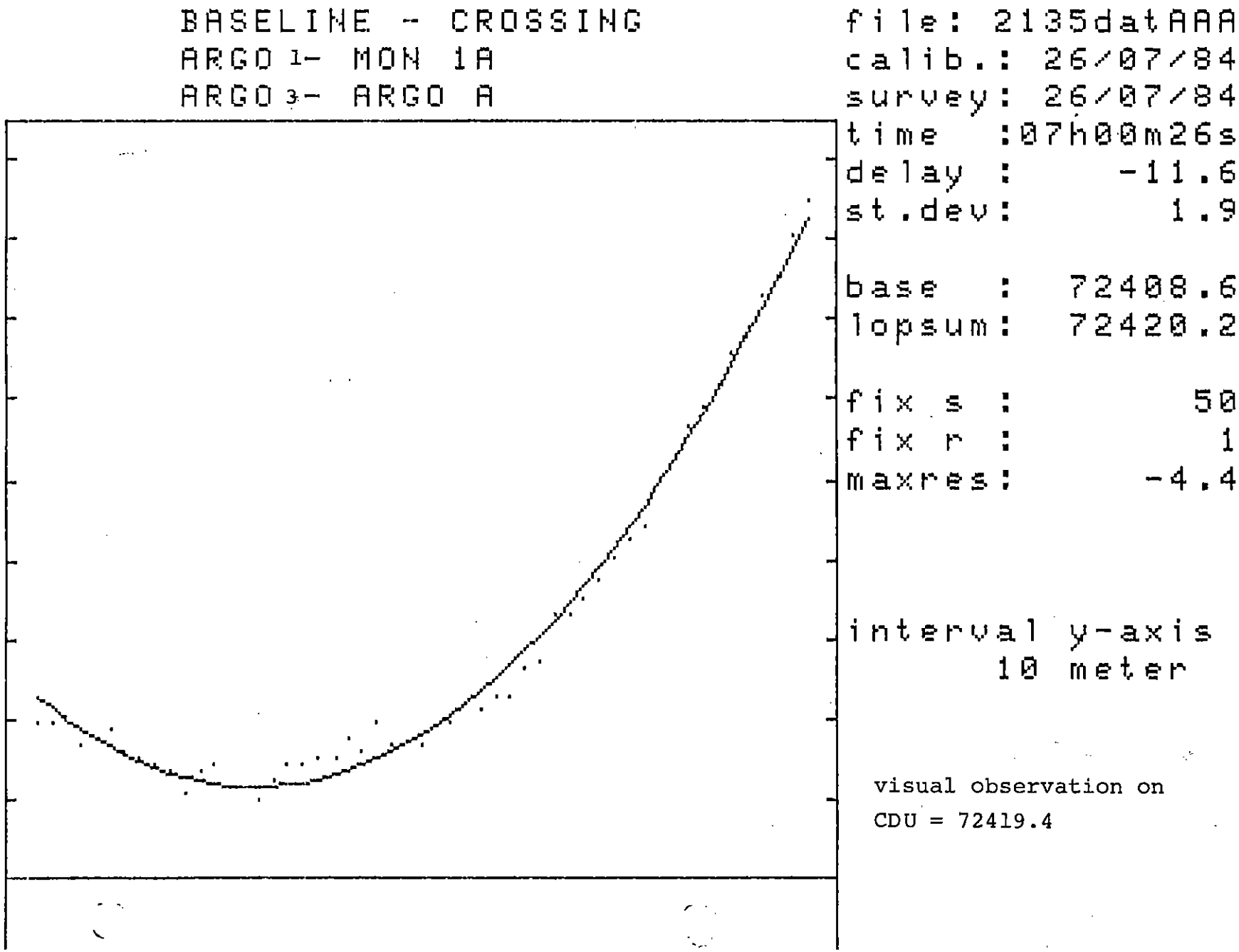

BASELINE - CROSSING
ARGO 1- MON 1A
ARGO 3- ARGO A
file: 2135datAAA
calib.: 26/07/84
survey: 26/07/84
time :07h00m26s
delay : -11.6
st.dev: 1.9
base : 72408.6
lopsum: 72420.2
fix s : 50
fix r : 1
maxres: -4.4
interval y-axis
10 meter
visual observation on
CDU = 72419.4

FIGURE 2

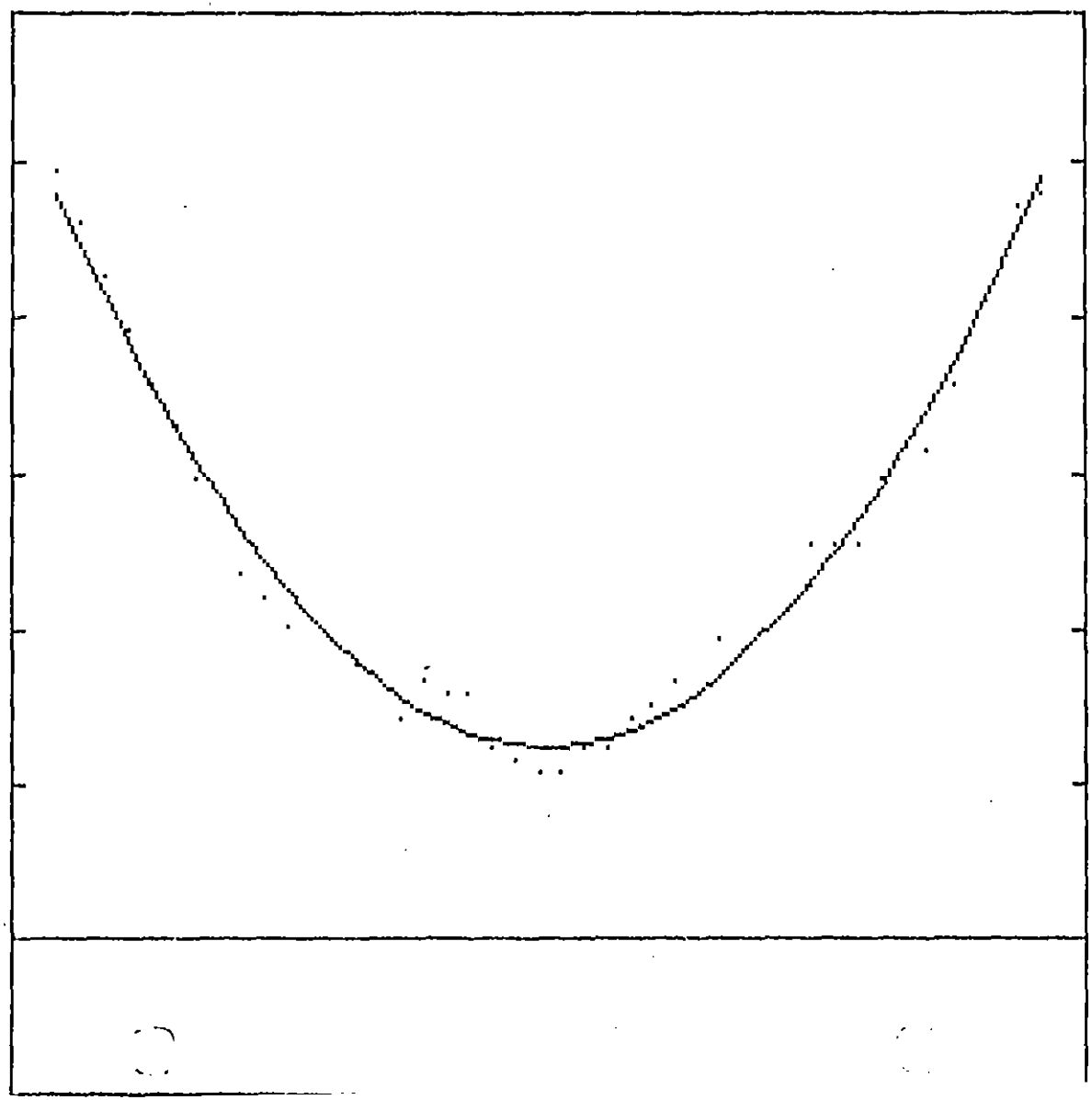

BASELINE - CROSSING
ARGO1- MON 1A
ARGO3- ARGO A
file: 2135datAAB
calib.: 26/07/84
survey: 26/07/84
time :07h30m17s
delay : -12.5
st.dev: 1.5
base : 72408.6
lopsum: 72421.1
fix s : 39
fix r : 3
maxres: 2.7
interval y-axis
10 meter
visual observation on
CDU = 72419.38

FIGURE 3

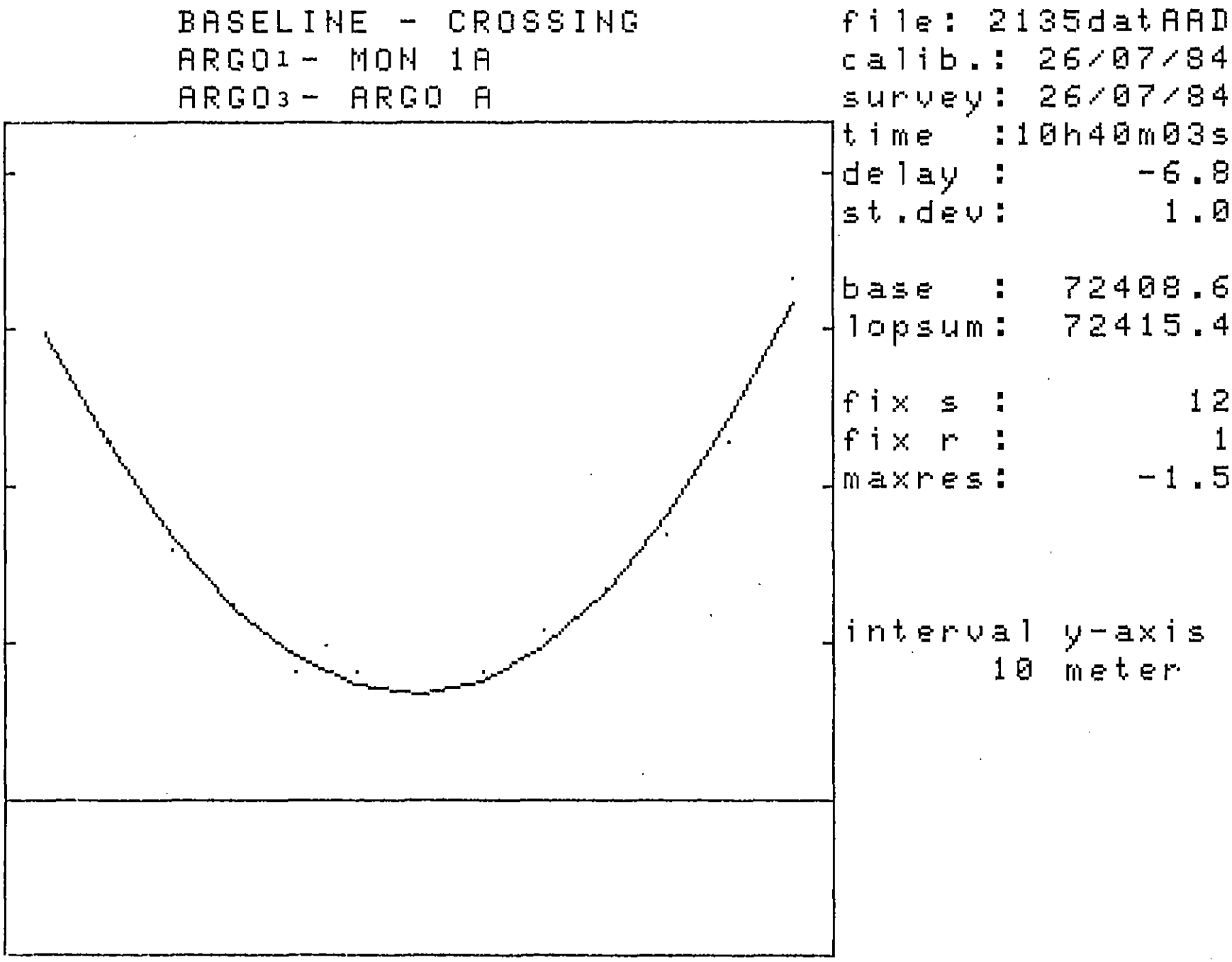

BASELINE - CROSSING
ARGO1 - MON 1A
ARGO3 - ARGO A
file: 2135datAAD
calib.: 26/07/84
survey: 26/07/84
time :10h40m03s
delay : -6.8
st.dev: 1.0
base : 72408.6
lopsum: 72415.4
fix s : 12
fix r : 1
maxres: -1.5
interval y-axis
10 meter

FIGURE 4

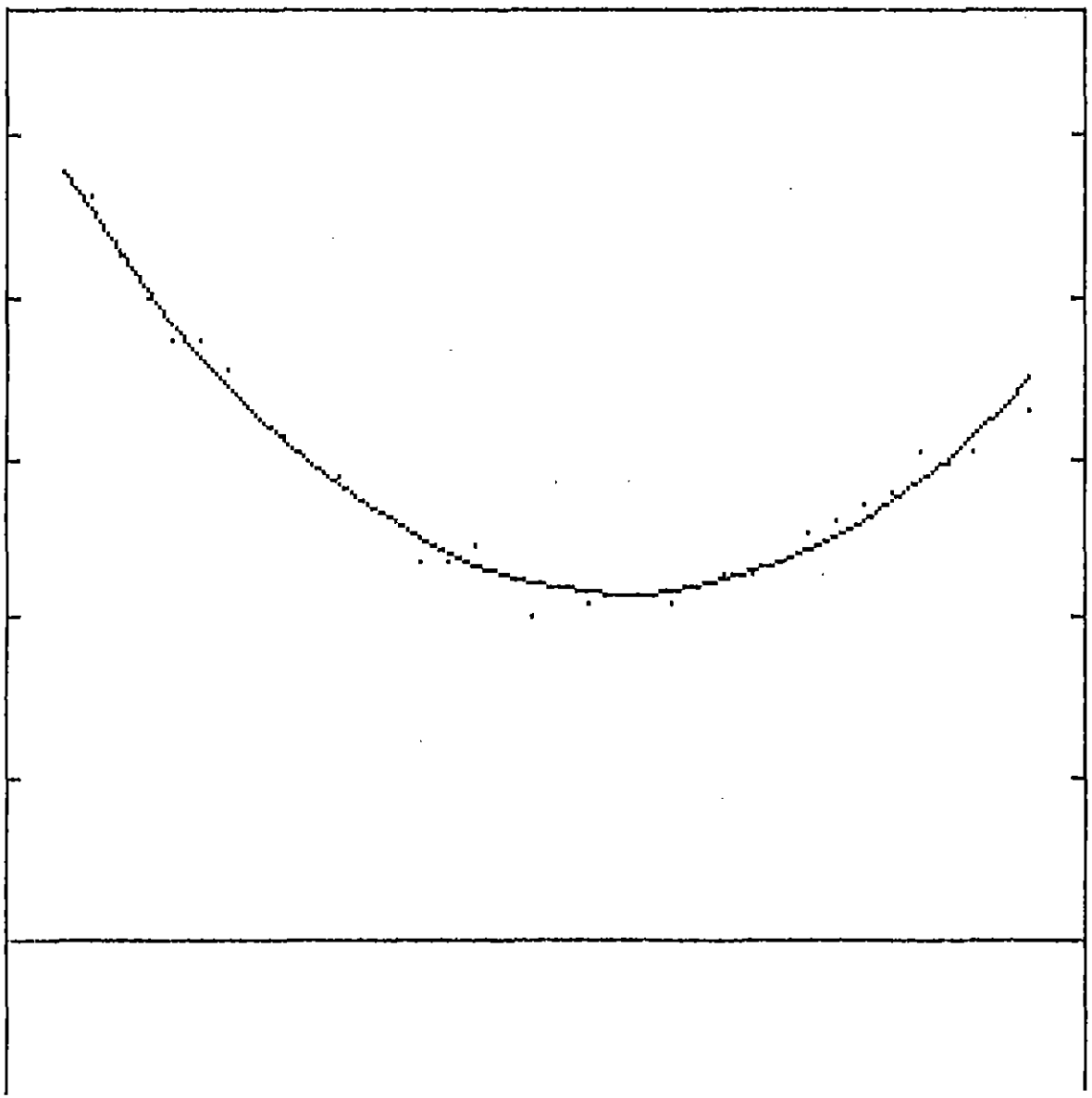

BASELINE - CROSSING
ARGO1- MON 1A
ARGO2- WIND 2
file: 2135datAAA
calib.: 26/07/84
survey: 26/07/84
time :07h11m06s
delay : -21.5
st.dev: 1.0
base : 41689.6
lopsum: 41711.0
fix s : 30
fix r : 6
maxres: 2.1
interval y-axis
10 meter

FIGURE 5

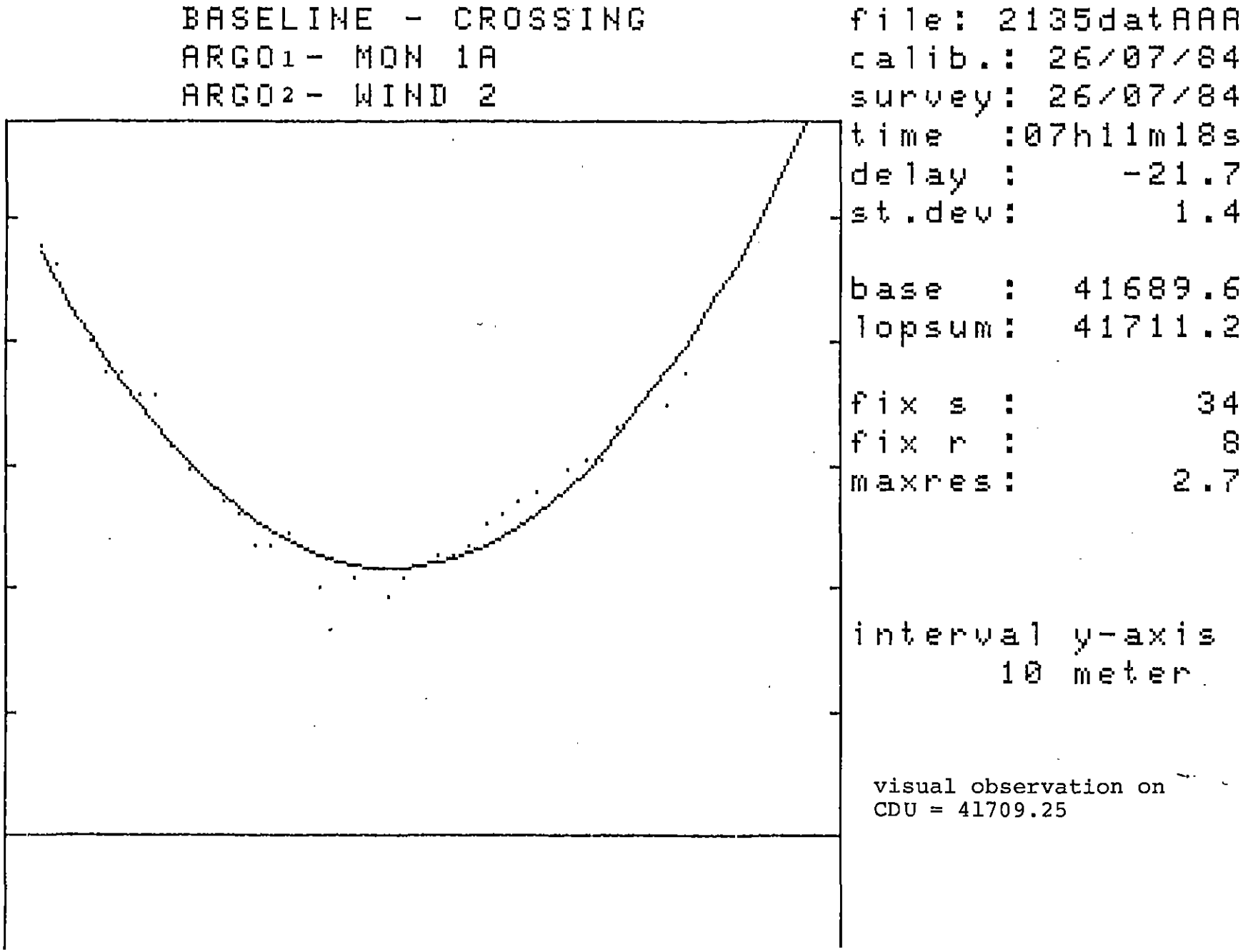

BASELINE - CROSSING
ARGO1- MON 1A
ARGO2- WIND 2
file: 2135datAAA
calib.: 26/07/84
survey: 26/07/84
time :07h11m18s
delay : -21.7
st.dev: 1.4
base : 41689.6
lopsum: 41711.2
fix s : 34
fix r : 8
maxres: 2.7
interval y-axis
10 meter
visual observation on
CDU = 41709.25

FIGURE 6

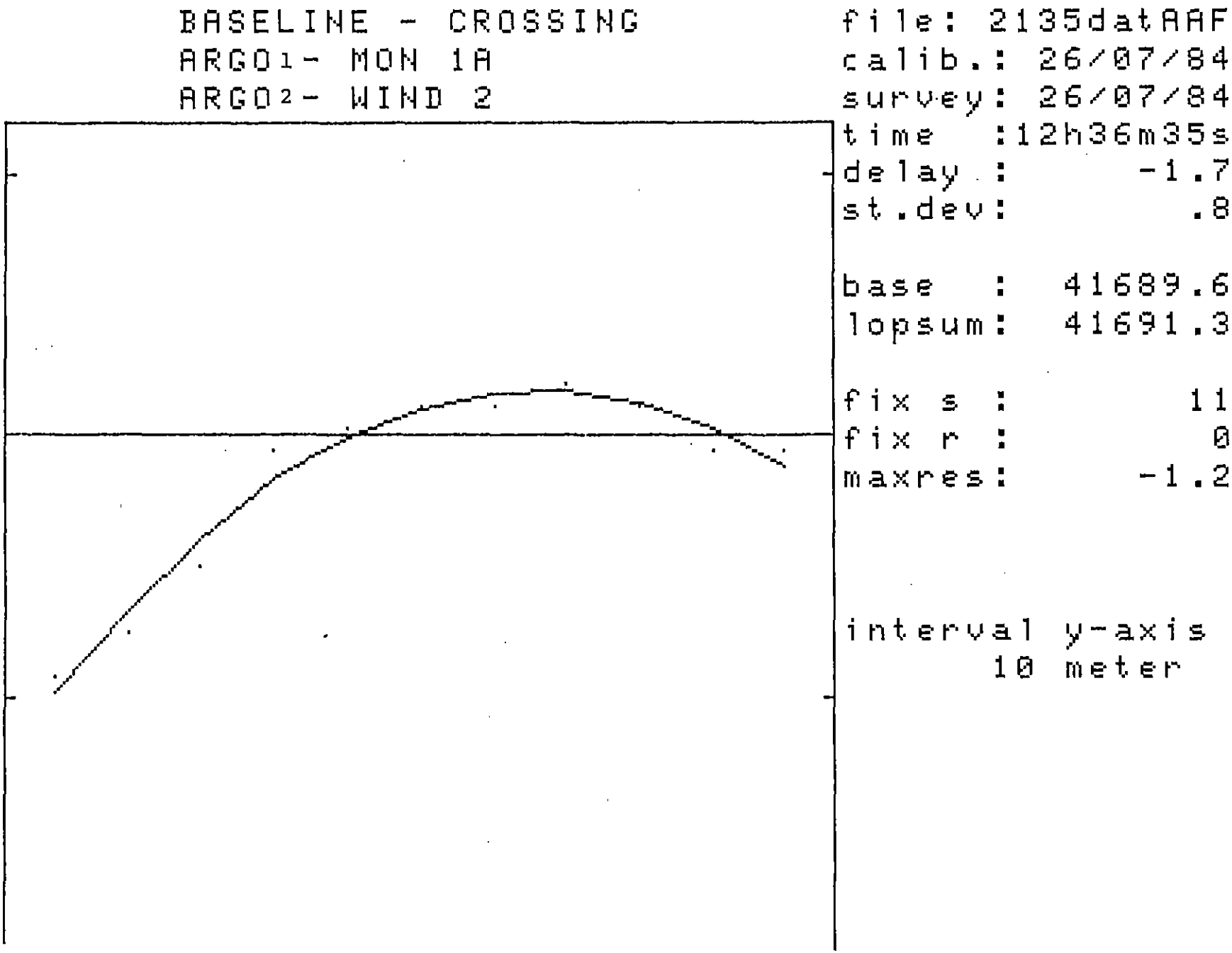

BASELINE - CROSSING
ARGO1- MON 1A
ARGO2- WIND 2
file: 2135datAAF
calib.: 26/07/84
survey: 26/07/84
time :12h36m35s
delay : -1.7
st.dev: .8
base : 41689.6
lopsum: 41691.3
fix s : 11
fix r : 0
maxres: -1.2
interval y-axis
10 meter

FIGURE 7

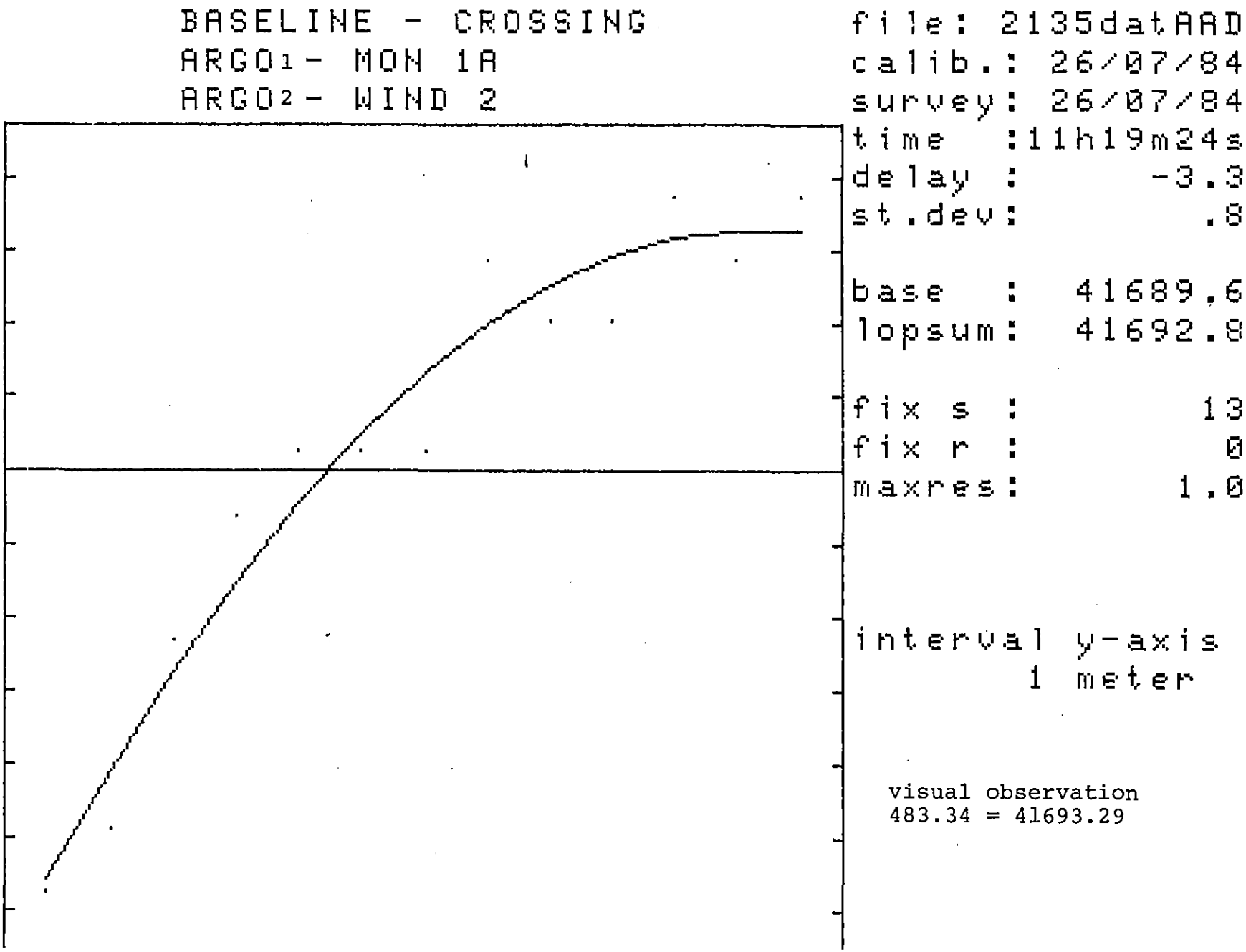

BASELINE - CROSSING
ARGO1 - MON 1A
ARGO2 - WIND 2
file: 2135datAAD
calib.: 26/07/84
survey: 26/07/84
time :11h19m24s
delay : -3.3
st.dev: .8
base : 41689.6
lopsum: 41692.8
fix s : 13
fix r : 0
maxres: 1.0
interval y-axis
1 meter
visual observation
483.34 = 41693.29

FIGURE 8

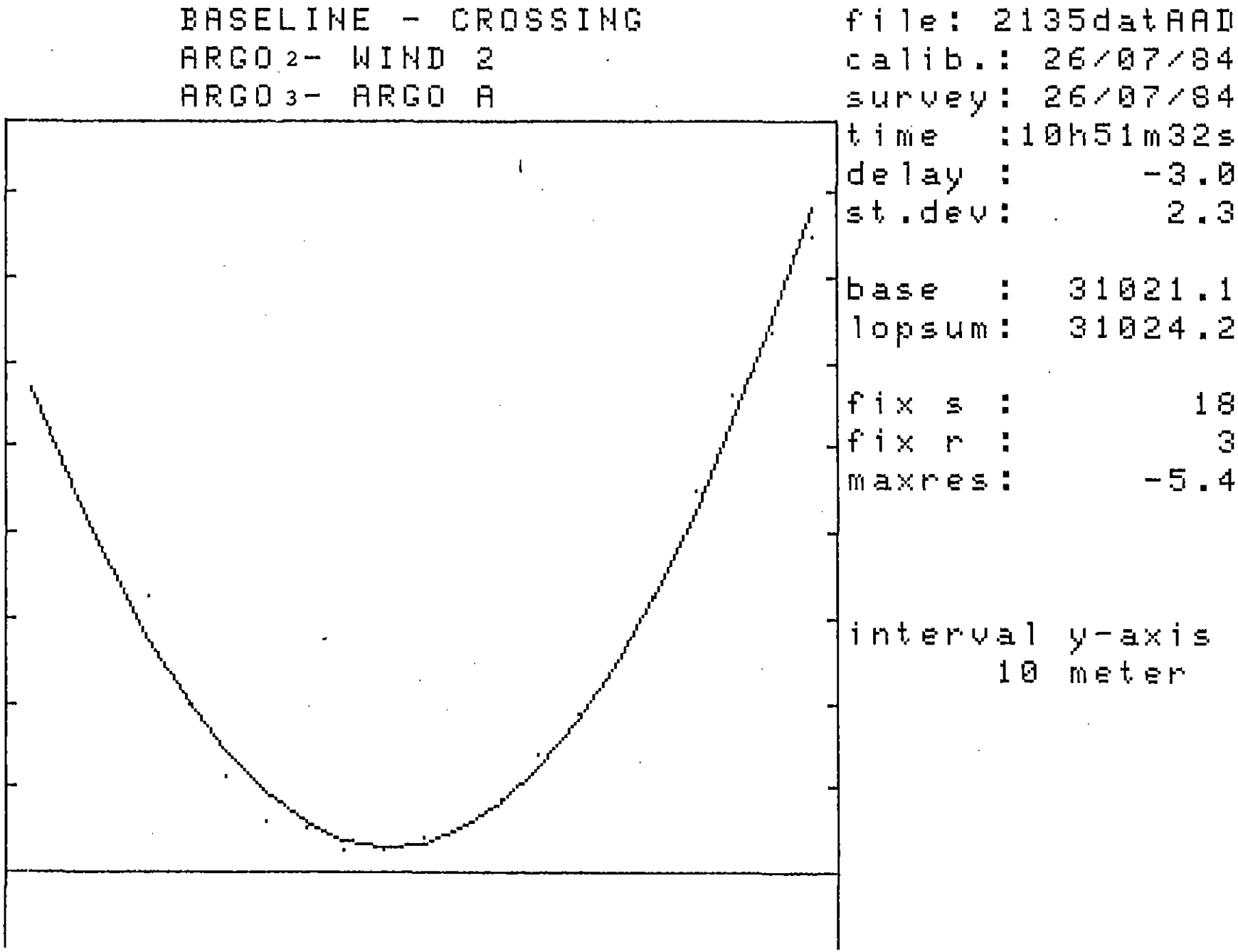
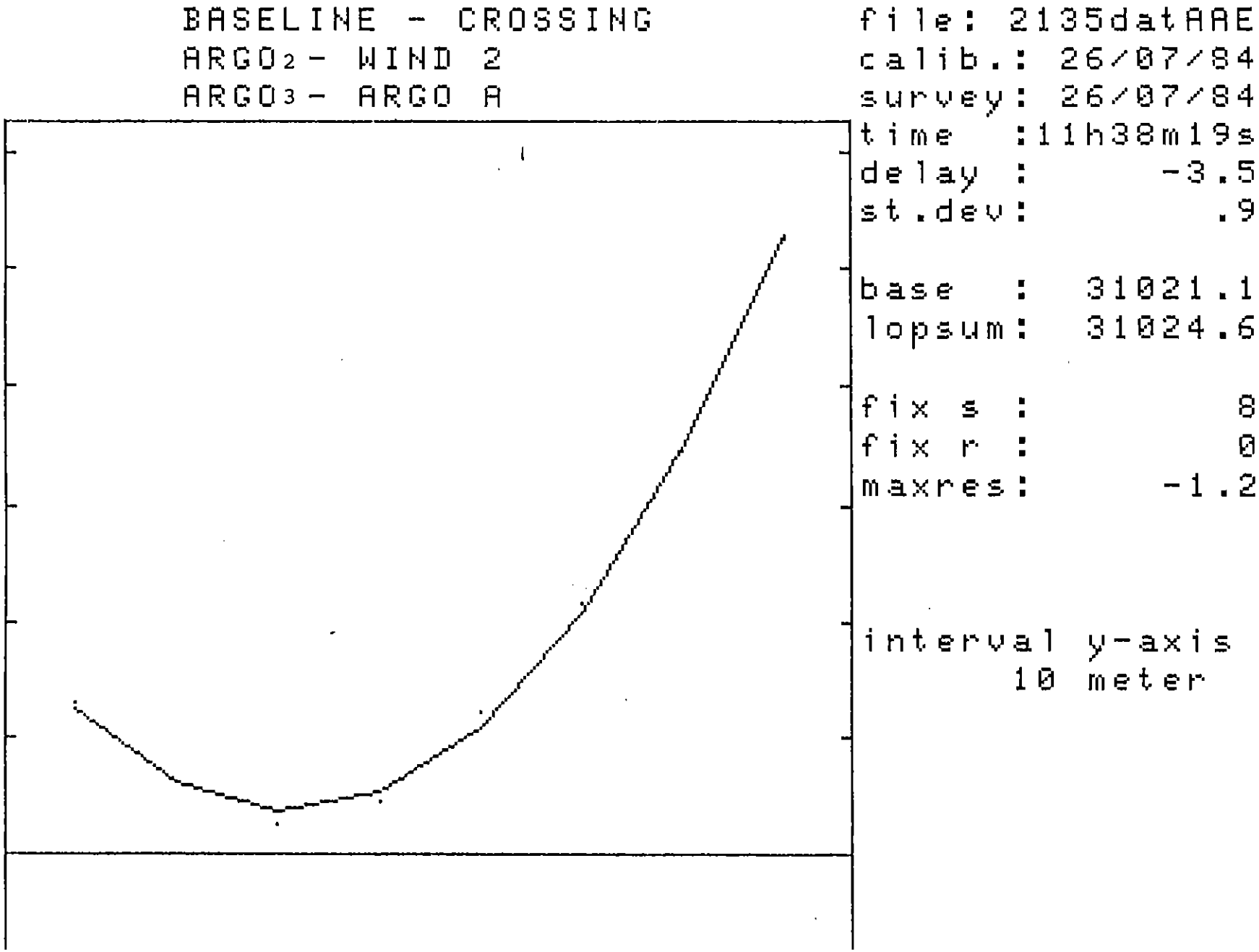

BASELINE - CROSSING
ARGO 2- WIND 2
ARGO 3- ARGO A
file: 2135datAAD
calib.: 26/07/84
survey: 26/07/84
time :10h51m32s
delay : -3.0
st.dev: 2.3
base : 31021.1
lopsum: 31024.2
fix s : 18
fix r : 3
maxres: -5.4
interval y-axis
10 meter

FIGURE 9


BASELINE - CROSSING
ARGO2 - WIND 2
ARGO3 - ARGO A
file: 2135datAAE
calib.: 26/07/84
survey: 26/07/84
time :11h38m19s
delay : -3.5
st.dev: .9
base : 31021.1
lopsum: 31024.6
fix s : 8
fix r : 0
maxres: -1.2
interval y-axis
10 meter

APPENDIX 3

LINE INDEX MAIN AREA

Containing: - Sounding Roll Number

- Date Surveyed

- Disc Number on which Data is Recorded

Notes: - L denotes Launch Survey

- Fix numbers are enclosed in brackets

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
1	18(1-194)	01/08	9
	85(195-287)	28/08	50
	96(288-588)	02/09	58
	151(708-997)	23/09	102(708-761), 103(762-997)
L	9(589-613)	03/09	5
2	19(1-260)	01/08	9
	85(261-357)	28/08	50
	96(358-603)	02/09	58(358-383), 59(384-603)
	102(604-657)	05/09	62
	152(724-817)	23/09	103
	103(660-817)	05/09	
L	9(604-627)	03/09	5
3	19(1-145)	01/08	9
	86(146-332)	28/08	50
	97(333-624)	03/09	59
	102(625-707)	05/09	62
	151(708-761)	23/09	102
	152(762-810)	23/09	103
L	9(625-653)	03/09	5
4	19(1-143)	01/08	9
	86(144-339)	29/08	50
	98(340-601)	03/09	59
	102(651-720)	05/09	62
	151(721-792)	23/09	102
	158(793-834)	26/09	104
	(793-814)		105
	(818-834)		
L	9(643-669)	03/09	5
5	19(1-276)	01/08	9
	86(277-322)	29/08	50
	102(323-682)	04/09	61(323-666), 62(667-682)
	158(711-743)	26/09	104
L	9(323-359)	03/09	5

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
6	19(1-263) 86(264-326) 101(327-673), 102(675-695)	01/08 29/08 04/09	9 50 61
L	9(327-354)	03/09	5
7	20(1-264) 86(265-320) 101(321-693)	01/08 29/08 04/09	10 50 61
L	9(321-346)	03/09	5
8	20(1-226) 86(227-284) 101(285-694)	01/08 29/08 04/09	10 50 60(285-447), 61(448-694)
L	9(286-316)	03/09	5
9	20(1-213) 86(214-289) 100(290-702)	01/08 29/08 04/09	10 50 60
L	9(290-315)	03/09	5
10	20(1-202) 86(203-277) 99(278-712) 156(713-749)	01/08 29/08 03/09 25/09	10 50 59(278-396), 60(397-712) 104
L	8(278-308)	02/09	3

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
11	21(1-203) 86(204-260) 94(261-653) 151(909-953)	01/08 29/08 01/09 23/09	10(1-183), 11(185-203) 51 57(261-339), 58(340-653) 102
L	8(261-296)	02/09	3
12	21(1-259) 86(260-319) 98(320-704)	02/08 29/08 03/09	11 51 59
L	8(320-352)	02/09	3
13	22(1-265) 86(266-313) 100(313-702)	02/08 29/08 04/09	11 51 60
L	8(353-377)	02/09	3
14	22(1-295) 86(296-347) 95(348-401)	02/08 29/08 02/09	11 51 58
L	8(348-373)	02/09	3
15	22(1-227) 86(228-315) 96(316-379) 103(380-708)	02/08 29/08 02/09 05/09	11 51 58 62
L	8(316-338)	02/09	3

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
16	22(1-259) 87(260-357) 103(358-725)	02/08 29/08 05/09	11 51 63
L	8(358-384)	02/09	3
17	22(1-115), 23(121-260) 87(260-336) 104(337-714)	02/08 29/08 05/09	12 51 63
L	8(337-363)	02/09	3
18	23(1-325) 87(326-398) 104(399-680) 156(684-761)	02/08 29/08 05/09 25/09	12 51 63 & 3A(581-680) 104
L	8(399-427)	02/09	3
19	23(1-332) 87(333-396) 105(397-655) 125(656-720)	02/08 29/08 05/09 13/09	12 51 64 81
L	8(397-425)	02/09	3
20	23(1-355) 87(356-422) 105(423-622) 125(623-728)	02/08 29/08 05/09 13/09	12 51 64 81
L	8(423-450)	02/09	3

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
21	24(1-242), 25(248-326)	02/08	12 13
	87(327-384)	29/08	51(327-384)
	104(385-585)	05/09	64
	125(591-730)	13/09	81
L	8(384-407)	02/09	3
22	25(1-286)	02/08	13
	87(287-348)	29/08	51
	105(349-449)	05/09	64
	125(450-725), 126(728-834)	13/09	81
L	8(348-374)	02/09	3
23	25(1-312)	02/08	13
	87(313-354)	29/08	51(313-354)
	105(355-446)	05/09	64
	126(451-734)	14/09	81
L	8(354-381)	02/09	3
24	25(1-241), 26(247-380)	03/08	13
	87(381-428)	29/08	51
	126(459-755)	14/09	81(459-606), 82(607-755)
L	8(428-458)	02/09	3
25	26(1-407)	03/08	13(1-88), 14(107-407)
	87(408-440)	29/08	51
	105(472-541)	05/09	64
	126(542-800)	14/09	82
L	8(440-471)	02/09	3

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
26	26(1-385)	03/08	14
	87(386-437)	29/08	51
	105(466-541)	05/09	64
	126(542-688)	14/09	82
L	8(437-466)	02/09	3
27	26(1-320), 27(325-379)	03/08	14
	87(380-441)	30/08	51
	105(462-537)	05/09	64
	127(538-780)	14/09	82
L	8(441-461)	02/09	3
28	27(1-449)	03/08	14(1-262), 15(263-449)
	87(450-483)	30/08	51
	125(484-720)	13/09	80(484-523), 81(524-720)
	151(721-782)	23/09	102
L	6(450-481)	01/09	3
29	27(1-464)	03/08	15
	87(465-514)	30/08	51(465-514)
	124(515-738)	13/09	80
L	6465-482)	01/09	3
30	27(1-177), 28(181-484)	03/08	15
	87(485-530)	30/08	52
	125(531-737)	13/09	80
L	6(484-498)	01/09	3

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
31	28(1-191), 29(194-461)	03/08	15(10197), 16(198-461)
	87(462-535)	30/08	52
	125(536-743	13/09	80
L	6(462-477)	01/09	3
32	29(1-143), 30(147-540)	04/08	16
	88(541-623)	30/08	52
	127(624-744)	14/09	82
L	6(541-556)	01/09	3
33	30(1-563)	04/08	16(1-535), 17(536-563)
	88(564-646)	30/08	52
	127(647-769)	14/09	82
	151(770-827)	23/09	102
L	6(556-580)	01/09	3
34	30(1-305), 31(310-582)	04/08	17
	88(583-653)	30/08	52
	127(607-705)	14/09	82(607-620), 83(621-705)
L	6(583-606)	01/09	3
35	31(1-583),	04/08	17
	88(584-648)	30/08	52
	127(649-744)	14/09	83
L	6(901-914)	01/09	3

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
36	31(1-416), 32(419-595)	04/08	17(1-143), 18(144-595)
	88(596-663)	30/08	52
	127(664-752)	14/09	83
L	6(901-917)	01/09	3
37	32(1-589)	04/08	2A
	88(664-736)	30/08	52
	127(737-830)	14/09	83
L	6(901-920)	01/09	3
38	32(1-400), 33(405-680)	04/08	18(1-295), 19(296-680)
	88(681-756)	30/08	52
L	7(901-921)	01/09	3
39	33(1-720)	05/08	19
L	7(901-927)	01/09	3
40	33(1-160), 34(166-728)	05/08	19(1-231), 20(234-728)
L	7(901-918)	01/09	3

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
41	34(1-232), 35(237-513), 36(518-637)	05/08	20
	88(638-730)	30/08	52
	151(922-974)	23/09	102
L	7(901-921)	01/09	3
42	36(1-563), 37(565-626)	05/08	20(1-204), 21(205-626)
	88(627-666)	30/08	52
	129(667-757)	15/09	84
L	7(901-921)	02/09	3
43	47(1-455), 50(1-41)	07/08	23 25
	88(456-488)	30/08	52
	127(489-605), 128(608-757)	14/09	83
L	7(901-915)	02/09	3
44	50(1-459)	08/08	25
	89(460-493)	30/08	52(460-493)
	128(494-764)	14/09	83
L	7(901-914)	02/09	3
45	50(1-315), 51(317-533)	08/08	25(1-302), 26(303-533)
	89(534-570)	30/08	52
	129(571-762)	15/09	84
L	7(901-915)	02/09	3

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
46	51(1-534) 89(535-561) 129(562-762)	08/08 30/08 15/09	26 53 84
L	7(901-925)	02/09	3
47	51(1-445), 52(449-514) 89(515-548) 129(549-765)	09/08 30/08 15/09	26 53 84
L	7(901-927)	02/09	3
48	52(1-492) 88(494-533) 129(534-757)	09/08 30/08 15/09	26(1-56), 27(57-492) 52 84
L	7(901-926)	02/09	3
49	52(1-507) 88(508-550) 128(551-756)	09/08 30/08 15/09	27 52 84
L	7(901-922)	02/09	3
50	53(1-510) 88(511-551) 128(922-1143)	09/08 30/08 15/09	27(1-394), 28(395-510) 52 83(922-1061), 84(1065-1143)
L	7(901-921)	02/09	3

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
51	48(1-443) 88(444-490) 128(491-769)	08/08 30/08 14/09	24(1-324), 25(325-443) 52 83
L	7(901-914)	02/09	3
52	53(1-539) 88(540-584) 129(585-766)	09/08 30/08 15/09	28 52(540-584) 84(585-698), 85(699-766)
L	7(901-912)		
53	53(1-211), 54(215-549) 130(551-741)	09/08 30/08 15/09	28 85
L	7(901-922)	02/09	3
54	54(1-605) 130(632-806)	09/08 15/09	28(1-130), 29(131-605) 85
L	8(606-632)	02/09	4
55	54(1-280), 55(284-613) 130(636-816)	09/08 15/09	29 85
L	8(614-635)	02/09	4

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
56	55(1-567) 130(587-763)	10/08 15/09	29(1-248), 30(249-567) 85
L	8(568-586)	02/09	4
57	55(1-330), 56(333-542) 89(543-577) 130(596-773)	10/08 30/08 15/09	30 53 85
L	8(578-595)	02/09	4
58	56(1-520) 89(521-553) 130(571-772)	10/08 30/08 15/09	30(1-476), 31(477-520) 53 85
L	8(555-570)	02/09	4
59	56(1-494), 57(497-512) 89(554-625) 131(644-846)	10/08 30/08 15/09	31 53 85(644=794), 86(795-846)
L	8(626-643)	02/09	4
60	57(1-496) 89(626-692) 131(777-966)	10/08 30/08 15/09	31 53 86
L	8(693-716)	02/09	4

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
61	57(1-475)	10/08	31(1-280), 32(281-475)
	89(476-510)	30/08	53
	131(527-818)	15/09	86
L	8(511-526)	02/09	4
62	57(1-141)	10/08	32
	58(142-555)		
	89(556-594)	30/08	53
	131(613-764)	15/09	86
	132(761-863)	16/09	86
	163(864-959)	29/09	105
L	8(595-612)	02/09	4
63	58(1-569)	11/08	32
	89(570-600)	30/08	53
	131(606-761)	16/09	86
L	8(570-605)	02/09	4
64	59(1-503)	11/08	32(1-15), 33(16-503)
	89(504-540)	30/08	53
	131(504-580), 132(583-718)	16/09	86
L	8(541-570)	02/09	4
65	59(1-449)	11/08	33
	89(450-503)	30/08	53
	93(504-760)	01/09	56(504-528), 57(529-760)
	132(505-688)	16/09	86(505-571), 87(572-688)

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
66	72(1-130),	22/08	41
	73(132-301)		
	89(302-355)	30/08	53
	93(356-594)	01/09	56
	132(629-815)	16/09	87
	161(816-863)	28/09	105
67	59(1-144)	11/08	33(1-399), 34(400-434)
	60(147-434)		
	89(435-485)	30/08	53
	132(486-742)	16/09	87
68	60(1-299)	11/08	34
	73(300-455)	22/08	41(300-371), 42(372-455)
	89(456-504)	30/08	53
	124(505-780)	13/09	79(505-630), 80(631-780)
69	60(1-104)	11/08	34
	73(1-230)	22/08	42
	74(233-284)		
	92(285-414)	01/09	56
	93(417-508)		
	132(509-735)	16/09	87
	161(736-790)	28/09	105
70	75(1-349)	23/08	42(1-256), 43(257-349)
	92(350-497)	31/08	56
	133(498-723)	16/09	87

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
71	74(1-379) 92(380-475) 133(476-722)	22/08 31/08 16/09	42 56 87
72	70(1-55), 71(58-261) 92(262-472) 133(473-719)	21/08 31/08 16/09	41 56 87(473-538), 88(539-719)
73	70(1-277) 92(278-443) 133(444-736) 161(737-787)	21/08 31/08 16/09 28/09	40 56 88 105
L	2(278-310)	21/08	1
74	69(1-229) 91(230-320), 92(322-448) 133(449-572), 134(574-732) 161(733-764)	21/08 31/08 16/09 28/09	40 55 88 105
L	2(230-254)	21/08	1
75	69(1-226) 92(391-494) 92(500-547) 134(548-826) 91(260-390)	21/08 31/08 31/08 16/09 31/08	40 55 55(500-519), 56(520-547) 88 55
L	2(227-259)	21/08	1

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
76	70(1-275)	21/08	40(1-215), 41(216-275)
	92(385-492)	31/08	55
	91(304-384)	31/08	55
	134(493-769)	16/09	88
	151(770-826)	23/09	102
L	2(276-303)	21/08	1
77	70(1-285)	21/08	41
	92(389-448)	31/08	55
	91(286-388)	31/08	55
	151(852-950)	23/09	102
L	2(1-33)	21/08	1
78	47(1-441)	07/08	23(1-250), 24(299-441)
	Manual Fixes 255-295		
	150(763-851)	23/09	102
L	2(442-516)	21/08	1
79	47(1-433)	08/08	24
	135(521-763)	17/09	90
	150(764-797)	23/09	102
L	(434-520)		
80	48(1-434)	08/08	24
	135(501-735)	17/09	90
	150(736-774)	23/09	102
L	(435-501)		

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
81	71(1-203), 72(205-348) 89(349-419) 93(420-540) 135(541-777) 162(778-834)	22/08 30/08 01/09 17/09 28/09	41 53 57 90 105
82	75(1-250), 76(252-300) 89(301-377) 93(378-517) 135(518-755)	23/08 30/08 01/09 17/09	43 53 57 90
83	76(1-242) 89(243-334) 93(335-505) 135(505-635), 136(636-740)	23/08 30/08 01/09 17/09	43 53 57 90, 91
84	76(1-314) 94(315-488) 136(489-717) 150(718-759)	23/08 01/09 17/09 23/09	43 57 91 102
85	76(1-298) 94(299-519) 136(520-711) 150(712-766)	23/08 01/09 17/09 23/09	43 57 91 102

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
86	77(1-301)	23/08	43(1-80), 44(81-301)
	91(302-416)	31/08	55
	108(417-481), 109(483-585)	07/09	67
	136(586-814)	17/84	91
	162(815-881)	28/09	105
87	77(1-300)	23/08	44
	91(301-386)	31/08	55
	108(387-546)	06/09	67
	136(815-1006)	17/09	91
88	77(1-240)	24/08	44
	91(241-370)	31/08	54(241-356), 55(357-370)
	108(371-555)	06/09	67
	136(556-736)	17/09	91
89	77(1-222)	24/08	44
	91(223-366)	31/08	54
	108(367-556)	06/09	67
	136(557-676), 137(679-734)	17/09	91
	150(736-774)	23/09	102
90	78(1-310)	24/08	44
	90(311-442)	31/08	54
	108(443-743)	06/09	66(443-501), 67(502-743)
	137(743-767)	17/09	91(743-757), 92(758-767)
	137(768-823)	17/09	92
	162(824-877)	28/09	105
L	2(1-67)	21/08	1

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
91	78(57-310) 90(311-413) 107(414-739) 137(740-787)	24/08 31/08 06/09 17/09	44(57-158), 45(160-310) 54 66 92
L	2(1-55)	21/08	1
92	78(58-258) 90(259-397) 107(398-723) 137(724-785)	24/08 31/08 06/09 17/09	45 54 66 92
L	2(1-57)	21/08	1
93	78(49-246) 90(247-401) 106(402-691) 137(692-781)	24/08 31/08 06/09 17/09	45 54 65 92
L	2(1-48)	21/08	1
94	78(44-240) 90(241-340) 106(351-590), 107(593-690) 137(691-776)	24/08 31/08 06/09 17/09	45 54 65 92
L	3(1-43)	22/08	1
95	79(31-227) 90(227-351) 107(351-689) 137(690-772)	24/08 31/08 06/09 17/09	45 54 65(351-429), 66(430-689) 92
L	3(1-30)	22/08	1

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
96	74(43-264), 75(266-370)	22/08	42(43-370)
	107(371-732)	06/09	66
	137(733-793)	17/09	92
	150(794-864)	23/09	102
L	3(1-42)	22/08	1
97	79(37-199)	24/08	45
	90(200-324)	30/08	53(200-214), 54(215-324)
	113(325-557)	08/09	70(375-391), 71(392-557)
	137(558-781)	17/09	92
L	3(1-31)	22/08	1
98	79(39-183)	24/08	45
	90(184-322)	30/08	53(184-322)
	137(779-857)	17/09	92
	111(323-404), 112(406-778)	07/09	70
L	4(1-38)	22/08	1
99	79(35-282)	24/08	45(35-105), 46(106-282)
	111(283-770)	07/09	69(283-652), 70(653-770)
L	4(1-34)	22/08	1
100	79(54-230)	24/08	46(54-316)
	69(1-31)	20/08	40(1-31)
	137(788-912)	17/09	92
	110(317-783)	07/09	
L	4(32-53)	22/08	1

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
101	80(68-388)	24/08	46
	69(1-45)	20/08	39
	110(389-432)	07/09	68
	112(431-792)	08/09	70
L	4(46-67)	22/08	1
102	80(73-387)	24/08	46
	68(1-47)	20/08	39
	110(390-430)	07/09	68(388-421), 69(422-430)
	112(431-709), 113(711-759)	08/09	70
	150(901-944)	22/09	101
L	4(48-72)	22/08	1
103	80(81-339)	24/08	46(81-336), 47(337-339)
	68(2-54)	20/08	39(2-54)
	109(340-475), 110(478-591)	07/09	68
	110(592-795)	07/09	69
L	4(55-80)	22/08	1
104	80(81=302)	24/08	47
	68(1-48)	20/08	39
	109(303-551)	07/09	68
	110(552-765)	07/09	69
	150(766-810)	22/09	101
L	4(49-80)	22/08	1
105	81(86-354)	25/08	47
	68(40-50)	20/08	39
	111(355-887)	07/09	69
	150(888-948)	22/09	101
L	4(52-85)	22/08	1

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC(S)
106	81(86-305) 68(1-51) 113(306-577)	25/08 20/08 08/09	47 39 71
L	4(52-85)	22/08	1
107	81(86-331) 68(15-48) 113(332-615) 150(810-849)	25/08 20/08 08/09 22/09	47 39 71 101
L	4(50-85)	22/08	2
108	82(90-316) 68(1-52) 114(369-647)	25/08 20/08 08/09	47 39 71
L	5(53-89)	23/08	2
109	82(102-383) 68(1-60) 114(384-475), 115(478-598)	25/08 20/08 09/09	47(102-157), 48(161-383) 39 72
L	5(61-101)	23/08	2
110	68(1-19) 91(339-358) 115(359-590)	20/08 31/08 09/09	39 55 72
L	5(64-103)	23/08	2

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
111	82(291-463),	25/08	48
	83(465-511)		
	44(1-223),	06/08	22
	68(224-290)	20/08	39
	139(512-853)		
L	12(900-934)	11/09	7
112	44(1-268)	07/08	23
	68(269-347)	20/08	39
	84(348-592)	28/08	49
L	12(900-931)	11/09	7
113	68(1-89)	20/08	39(1-89)
	115(315-551)	09/09	72
	139(552-836)	18/09	94
	83(90-314)	26/08	48
L	12(900-935)	11/09	7
114	68(1-78)	20/08	39
	90(81-170)	30/08	53
	91(171-234)	31/08	55
	115(552-870)	09/09	72(552-739), 73(740-870)
	139(871-1019)	18/09	94
	140(1021-1159)		
L	12(900-940)	11/09	7
115	68(1-132)	20/08	39
	114(133-526)	08/09	71(133-463), 72(464-526)
	140(527-763)	18/09	94
L	12(900-943)	11/09	7

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
116	67(1-142) 114(143-536) 140(537-771) 150(772-794)	20/08 08/09 18/09 23/09	39 72 94(537-722), 95(723-771) 102
L	12(900-946)	11/09	7
117	67(1-191) 116(192-573) 140(574-787)	20/08 09/09 18/09	39 73 95
L	12(900-935)	11/09	7
118	67(1-200) 116(201-566) 141(567-764)	20/08 09/09 19/09	38 73 95
L	12(900-941)	11/09	7
119	67(301-523) 141(524-761) 43(1-300)	20/08 19/09	38 95(524-621), 96(622-761)
L	12(900-942)	11/09	7
120	67(1-224) 116(225-402) 117(403-646) 141(647-786)	20/08 09/09 10/09 19/09	38 73 74 96
L	13(900-936)	11/09	7

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
121	43(1-300)	06/08	22
	66(1-248)	20/08	38
	116(249-351)	09/09	73
	117(354-388)	09/09	73
	117(390-652)	10/09	74
	142(653-771)	19/09	96
L	13(900-934)	12/09	7
122	66(1-245)	20/08	38
	117(246-639)	09/09	73(246-377)
			74(378-639)
	142(640-765)	19/09	96
L	13(900-936)	12/09	7
123	66(1-246)	19/08	37(1-114), 38(115-246)
	117(251-360)	10/09	74
	118(362-608)	10/09	74
	142(609-766)	19/09	96
L	13(900-944)	12/09	7
124	66(1-108)	19/08	37(1-109), 38(106-249)
	66(106-249)	20/08	
	118(250-455)	10/09	74
	(456-528)	10/09	75
	142(767-1001)	19/09	96
L	13(900-949)	12/09	7
125	1(1-104)	29/07	1
	66(105-219)	19/08	37
	118(220-542)	10/09	75
	142(543-773)	19/09	96
L	13(900-940)	12/09	7

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
	39(2-145),	06/08	21(2-274), 22(275-510)
	40(149-401)		
	41(406-521)		1
126	1(1-105)	29/07	
	143(522-754)	19/09	96(522-697), 97(698-754)
L	14(941-958)	21/09	8
L	13(900-940)	12/09	7
	42(1-526)	06/08	22
127	143(526-761)	19/09	97
L	14(945-950)	21/09	8
L	14(900-938)	21/09	8
	65(1-205)	19/08	36(1-22), 37(23-205)
	85(206-304)	28/08	49
128	118(341-438)	10/09	75
	119(441-805)	10/09	75
	143(806-903)	20/09	97
L	14(900-947)	21/09	8
	1(1-144)	29/07	1
	65(145-260)	19/08	36
	84(272-409)	28/08	49
129	119(410-822)	10/09	75
	143(823-915)	20/09	97
	148(916-1039)	21/09	100
L	14(900-940)	21/09	8
	65(1-199)	19/08	36
	84(272-420)	28/08	49
	120(421-884)	11/09	75(421-476), 76(477-884)
130	143(884-993)	20/09	97
L	14(900-942)	21/09	8

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
131	1(1-115) 65(116-252) 84(269-451) 120(452-860) 143(861-967)	29/07 19/08 20/08 11/09 20/09	1 36 49 76 97
L	14(900-951)	21/09	8
132	65(1-179) 120(180-574), 121(576-755)	19/08 12/05	36 76(180-698), 77(699-755)
133	2(1-142) 64(143-263) 121(275-752)	29/07 19/08 12/09	1 36 77
134	2(1-152) 64(162-310) 121(311-755)	29/07 19/08 12/09	1 36 77
135	2(1-119) 64(120-270) 121(282-444), 122(446-759)	29/07 19/08 12/09	1 36 77(282-634), 78(635-759)

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
136	2(1-123) 64(134-314) 122(315-754)	29/07 19/08 12/09	1 36 78
137	2(1-141) 63(142-245) 64(251-333) 122(334-750)	29/07 19/08 12/09	1 35(142-333) 78
138	2(1-276) 123(281-700)	29/07 12/09	1(1-170), 2(171-280) 78
139	3(1-301) 140(304-635) 141(637-695)	29/07 18/09 19/09	2 95 95
140	3(1-307) 141(308-696)	29/07 19/09	2 95

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
141	3(1-375) 143(376-620) 144(637-702)	29/07 20/09 20/09	2 97 97
142	4(1-307) 63(308-423) 144(422-722)	28/07 19/08 20/09	2(1-242), 3(243 -307) 35 98
143	4(1-465) 144(466-718)	29/07 20/09	3 98
144	4(1-272), 5(276-416) 144(414-669) -	29/07 20/09	3 98
145	5(1-473) 144(474-670)	29/07 20/09	3(1-388), 4(389-473) 98

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
146	5(1-459) 145(459-676)	29/07 20/09	4 98
147	6(1-492) 145(493-671)	29/07 20/09	4 98
148	6(1-501) 145(502-686)	29/07 20/09	4(1-298), 5(299-501) 98
149	7(1-505) 145(507-674)	30/07 20/09	5 98(507-537), 99(538-674)
150	10(1-213), 11(216-398) 145(399-655)	30/07 20/07	6(1-107), 7(108-398) 99

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
151	10(1-425) 145(426-674)	30/07 20/09	6 99
152	10(1-472) 146(473-681)	30/07 20/09	6 99
153	9(1-477) 146(478-682)	30/07 20/09	5(1-148), 6(149-477) 99
154	123(1-786)	13/09	79
155	106(1-261) 123(262-380), 124(387-616) 147(617-748) 147(749-801)	06/09 13/09 21/09 21/09	65 79 100 100

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
156	37(1-136) 126(137-227), 127(230-285)	05/08 14/09	21 82
157	106(1-605) 124(606-757) 146(758-811)	05/09 13/09 20/09	64(1-244), 65(245-605) 80 99
158	37(1-105), 38(113-380), 39(388-500) 124(500-843)	06/08 13/09	21 80
159	17(1-307), 18(311-410) 109(411-825)	01/08 07/09	8(1-124), 9(125-410) 67(411-797), 68(799-825)
160	14(2-148), 15(152-550), 95(487-579) 109(580-833)	31/07 02/09 07/09	8 58 68

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
161	44(1-82), 45(85-378), 46(381-725) 95(726-842)	07/08 01/09	23 58
162	12(1-275), 13(279-578) 14(583-767) 94(768-858)	31/07 01/09	7(1-231), 8(232-767) 58
163 L	62(1-378) 83(379-530) 7(901-949)	18/08 26/08 02/09	35 48 3
164.1	85(1-255)	28/08	49, 50
164.2	85(1-139)	28/08	50
165	7(1-259), 8(262-374), 9(377-478)	30/07	5

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
166	Geophysical Not run.		
167	Geophysical Not run.		
168	Geophysical Not run.		
169	Geophysical Not run. -		
170	11(1-438)	30/07	7

Cansite Surveys Limited

LINE #	SOUNDING ROLL (S)	DATE	DISC (S)
171	11(1-372)	31/07	7

Cansite Surveys Limited

LINE # (LAUNCH)	OFFSET FROM 200	SOUNDING ROLL (S)	DATE	DISC (S)
200.4	+ 3000	14(1-22)	21/09	8
200.3	+ 2500	14(2-19)	21/09	8
200.2	+ 2000	14(1-22)	21/09	8
200.1	+ 1500	14(1-25)	21/09	8
200.5	+ 1000	15(1-27)	22/09	9
200.6	+ 500	15(1-29)	22/09	9
200	0	15(1-29)	22/09	9
200.7	- 500	15(1-27)	22/09	9
200.8	- 1000	15(1-33)	22/09	9
200.9	- 1500	15(1-36)	22/09	9
200A	- 2000	15(1-33)	22/09	9
200B	- 2500	15(1-31)	22/09	9
200C	- 3000	15(1-21)	22/09	9
200D	- 3500	15(1-21)	22/09	9
200E	--4000	15(1-21)	22/09	9
200F	- 4500	15(1-29)	22/09	9
200G	- 5000	15(1-27)	22/09	9
200H	- 5500	15(1-30)	22/09	9
200I	- 6000	15(1-37)	22/09	9

LINE # (LAUNCH)	OFFSET FROM 200	SOUNDING ROLL (S)	DATE	DISC (S)
200J	- 6500	15(1-42)	22/09	9
200K	- 7000	15(1-45)	22/09	9
200L	- 7500	15(1-43)	22/09	9
200M	- 8000	15(1-57)	22/09	9
200N	- 8500	15(1-46)	22/09	9
200O	- 9000	15(1-32)	22/09	9
200P	- 9500	15(1-34)	22/09	9
200Q	-10,000	15(1-36)	22/09	9

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
1	95	02/09	58	EAD - EAJ
2	96	02/09	59	EAP - EAQ
3	99	05/09	60	EAW
4	99	05/09	60	EAX
5	99	05/09	60	EAY - EAZ
6	100	05/09	60	EBA
7	147	21/09	100	GBW - GBY
8	147	21/09	100	GBZ - GCB
9	148	21/09	100	GCC - GCG
10	148	21/09	100	GCI - GCJ
11	148	21/09	100	GCK - GCL
12	148	21/09 22/09	100 101	GCM GCN
13	149	22/09	101	GCP - GCQ
14	149	22/09	101	GCS - GCT
15	149	22/09	101	GCU - GCV

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
16	149	22/09	101	GCY
17	149	22/09	101	GCZ - GDA
18	149	22/09	101	GDB - GDC
19	150	22/09	101	GDE - GDH
21	150	22/09	101	GDJ - GDK
22.1	151	23/09	102	GDY
22.2	151	23/09	102	GDZ
22.3	151	23/09	102	GEA
22.4	151	23/09	102	GEB
23	152	23/09	103	GEM - GEN
24	152	23/09	103	GEO - GEQ
24.1	152	23/09	103	GER
25	152	24/09	104	GES
26	152	24/09	104	GET - GEU
27	153	24/09	104	GEV - GEW
28	153	24/09	104	GEX

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
28.1	153	24/09	104	GEY
29	153	24/09	104	GEZ
30	153	24/09	104	GFA
31.1	153	24/09	104	GFA
31.3	153	24/09	104	GFD
32	154	24/09	104	GFF - GFG
33	154	24/09	104	GFH - GFI
34	154	24/09	104	GFJ
35	154	24/09	104	GFK - GFL
36	154	24/09	104	GFM - GFN
37	154	24/09	104	GFO - GFP
38	154	25/09	104	GFQ
39	154	25/09	104	GFR
40	154	25/09	104	GFT
41.1	155	25/09	104	GFU - GFV
42	155	25/09	104	GFX

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
43	155	25/09	104	GFY
43.1	155	25/09	104	GFZ
44	155	25/09	104	GGA - GGB
44.1	155	25/09	104	GGC
45	155	25/09	104	GGD - GGE
46	155	25/09	104	GGF - GGG
47	156	25/09	104	GGI
48	156	25/09	104	GGJ - GGK
49	156	25/09	104	GGL - GGM
50	156	25/09	104	GGP
50.1	156	25/09	104	GGQ - GGR
51	156	25/09	104	GGS
52	156	25/09	104	GGU - GGV
53	156	25/09	104	GGW - GGX
54	157	25/09	104	GGY
55	157	25/09	104	GHC

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
56	157	25/09	104	GHD - GHE
57	157	25/09	104	GHF
58	157	25/09	104	GHI
59	157	25/09	104	GHJ
60	157	25/09	104	GHK
61	157	25/09	104	GHM
62	157	25/09	104	GHN
63	158	25/09	104	GHO
64	158	26/09	104	GHP
65	158	26/09	104	GHQ - GHR
66	158	26/09	105	GHV - GHW
67	158	26/09	105	GHX - GHZ
68	158	26/09	105	GIA - GIB
69	158	26/09	105	GIC - GIE
70	158	26/09	105	GIF - GIG
71	159	27/09	105	GIH - GII

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
72	159	27/09	105	GIJ
73	159	27/09	105	GIK
74	159	27/09	105	GIL
75	159	27/09	105	GIM - GIN
76	159	27/09	105	GIO
77	159	27/09	105	GIP
78	159	27/09	105	GIR
79	159 & 160	27/09	105	GIS - GIT
80	160	27/09	105	GIV - GIW
81	160	27/09	105	GIX - GIY
82	160	27/09	105	GIZ
83	160	27/09	105	GJA - GJB
84	160	27/09	105	GJC - GJD
85	160	27/09	105	GJE - GJF
86	160	27/09	105	GJG - GJH
87	160 & 161	28/09	105	GJI - GJJ

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
88	161	28/09	105	GJK
91	161	28/09	105	GJS - GJU
92	161	28/09	105	GJV - GJX
93	161	28/09	105	GJZ - GKC
93.1	162	28/09	105	GKD - GKE
94	162	28/09	105	GKF - GKG
95	162	28/09	105	GKH - GKI
96	162	28/09	105	GKJ - GKK
98	162	28/09	105	GKO
99	162	29/09	105	GKP - GKQ
200.1	162	29/09	105	GKR
200.2	162	29/09	105	GKS
201	163	29/09	105	GKT
202	163	29/09	105	GKU
203	163	29/09	105	GKV
204	163	29/09	105	GKW

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
205	163	29/09	105	GKX
206.1	163	29/09	105	GKY
206.2	163	29/09	105	GKZ
206.3	163	29/09	105	GLA
207	163	29/09	105	GLB
208	163	29/09	106	GLD - GLG
208.1	163	29/09	106	GLF
209	163	29/09	106	GLH - GLI
210	164	29/09	106	GLJ - GLK
211	164	29/09	106	GLM - GLN
212	164	29/09	106	GLO
213	164	29/09	106	GLP - GLQ
214	164	29/09	106	GLR
215	164	29/09	106	GLS
216	164	29/09	106	GLT
217	164	29/09	106	GLU

Banksland - Shoal Exams

Shoal #	Sounding Roll	Date	Disc(s)	File #
218	164	29/09	106	GLV - GLW
219	165	29/09	106	GLX
220	165	29/09	106	GLY
221	165	29/09	106	GLZ
222	165	29/09	106	GMA
223	165	30/09	106	GMB - GMC
224	165	30/09	106	GMD
225	165	30/09	106	GME
226	165	30/09	106	GMF
227	165	30/09	106	GMG
228	165	30/09	106	GMH
229	165	30/09	106	GMI
230	165	30/09	106	GMJ

Launch - Shoal Examinations

Shoal #	Sounding Roll	Date	Disc(s)	File #
100	L15	22/09	9	QBL
101	L16	23/09	10	QBM
102	L16	23/09	10	QBN
103	L16	23/09	10	QBO
104	L16	23/09	10	QBP
105	L16	23/09	10	QBQ - QBT
106	L16	23/09	10	QBU - QBX
107	L17	26/09	11	RAA
108	L17	26/09	11	RAB - RAC
109	L17	26/09	11	RAD
110	L17	26/09	11	RAE - RAF
111	L17	26/09	11	RAG
112	L17	26/09	11	RAH
113	L17	26/09	11	RAI
114	L17	27/09	11	RAG
115	L18	27/09	11	RAK

Launch - Shoal Examinations

Shoal #	Sounding Roll	Date	Disc(s)	File #
116	L18	27/09	11	RAL
117	L19	27/09	11	RAM
118	L19	27/09	11	RAN - RAO
119	L19	27/09	11	RAP
120	L19	27/09	11	RAQ
121	L19	27/09	11	RAR
122	L19	27/09	11	RAS
123	L19	27/09	11	RAT - RAU
124	L19	28/09	11	RAV
125	L19	28/09	11	RAW

APPENDIX 4

BOAT BOARD INDEX

Cansite Surveys Limited

BOAT BOARD INDEX

TRACK PLOT # 1

Line	Fix Nos.	File(s)
125N	1 - 104	AAH
126S	1 - 105	AAI
129N	1 - 144	AAJ
131S	1 - 115	AAK
133N	1 - 142	AAL
135S	1 - 119	AAM
134N	1 - 152	AAN
136S	1 - 123	AAO
137N	1 - 141	AAP
138S	1 - 280	AAQ, AAR
139N	1 - 303	AAS
140S	1 - 307	AAT
141N	1 - 375	AAU
142S	1 - 307	AAV, AAW
143N	1 - 465	AAX, AAY
144S	1 - 415	AAZ
145N	1 - 473	ABA, ABB
146S	1 - 459	ABC
147N	1 - 492	ABD
148	1 - 501	ABE, ABF
149N	1 - 505	ABG
165S	1 - 478	ABH

TRACK PLOT # 1 (cont'd)

Line	Fix Nos.	File(s)
153N	1 - 477	ABI, ABJ
152S	1 - 472	ABK
151N	1 - 425	ABL
150S	1 - 398	ABM, ABN
170N	1 - 438	ABO
171S	1 - 372	ABP, ABQ
1S	1 - 194	ABX
2N	1 - 260	ABY
3S	1 - 145	ABZ
4N	1 - 143	ACA
5S	1 - 276	ACB
6N	1 - 263	ACC, ACD
7S	1 - 264	ACE
8N	1 - 226	ACF

Cansite Surveys Limited

TRACK PLOT # 2

Line	Fix Nos.	File(s)
9S	1 - 213	ACG
10N	1 - 202	ACH
11S	1 - 203	ACI, ACJ
12N	1 - 259	ACK
13S	1 - 265	ACL
14N	1 - 280	ACM
15S	1 - 227	ACN
16N	1 - 259	ACO
17S	1 - 260	ACQ
18N	1 - 325	ACR
19S	1 - 332	ACS
20N	1 - 355	ACT
21S	1 - 326	ACU, ACV
22N	1 - 286	ACW
23S	1 - 312	ACX
24N	1 - 380	ACY
25S	1 - 40	ACZ, ADB
26N	1 - 384	ADC
27S	1 - 379	ADD
28N	1 - 449	ADE, ADF
29S	1 - 463	ADG, ADH
30N	1 - 484	ADI
32N	1 - 540	ADL
34N	1 - 582	ADO

TRACK PLOT # 2 (cont'd)

Line	Fix Nos.	File(s)
35S	1 - 583	ADP
36N	1 - 595	ADR
39S	1 - 720	ADV
40N	1 - 728	ADW, ADX
42N	1 - 626	ADZ, AEA
126S	2 - 521	AEE, AEF
127	1 - 526	AEG
119	1 - 300	AEH
111	1 - 223	AEJ
112	1 - 268	AEK
78	1 - 441	AEN, AEO
79	1 - 433	AEP
80	1 - 434	AEQ
51S	1 - 443	AER, AES
43N	1 - 455	AET
44S	1 - 459	AEU
45N	1 - 533	AEV, AEW
46S	1 - 534	AEX
47N	1 - 514	AEY
48S	1 - 492	AEZ, AFA
49N	1 - 507	AFB
50S	1 - 510	AFC, AFD
52N	1 - 539	AFE
54N	1 - 605	AFG, AFH

TRACK PLOT # 2 (cont'd)

Line	Fix Nos.	File(s)
55S	1 - 613	AFI
56	1 - 567	AFJ, AFK
57	1 - 542	AFL
58	1 - 520	AFM, AFN
59S	1 - 512	AFO
60N	1 - 496	AFP, AFQ
61S	1 - 475	AFR, AFS
63S	1 - 569	AFU
64N	1 - 503	AFV, AFW
67N	1 - 434	AFZ
68S	1 - 299	AGA
142S	308 - 423	AGT
137N	142 - 333	AGU
135N	120 - 281	AGW
134S	153 - 310	AGX
133N	143 - 274	AGY
132S	1 - 179	AGZ
131N	116 - 268	AHA
130S	1 - 199	AHB
129N	145 - 271	AHC
128S	1 - 205	AHD, AHE
124S	1 - 109	AHG
123N	1 - 246	AHH, AHI
121N	1 - 248	AHK

TRACK PLOT # 2 (cont'd)

Line	Fix Nos.	File(s)
118N	1 - 200	BAD
115S	1 - 132	BAG
114N	1 - 78	BAH
113S	1 - 89	BAI
110N	1 - 63	BAL
109S	1 - 60	BAM
108N	1 - 52	BAN
107S	1 - 48	BAO
106N	1 - 51	BAP
104N	1 - 48	BAR
103S	2 - 54	BAS
105S	1 - 50	BAQ
102N	1 - 47	BAT
101S	1 - 45	BAU
100N	1 - 31	BAV
75	1 - 226	BBB
73	1 - 277	BBD
76	1 - 215	BBE
77N	1 - 285	BBG
72S	1 - 261	BBH
69	1 - 284	BBM
71N	1 - 379	BBN
82S	1 - 300	BBR
83N	1 - 242	BBS

TRACK PLOT # 2 (cont'd)

Line	Fix Nos.	File(s)
84S	1 - 314	BBT
85N	1 - 298	BBU
86S	1 - 147	BBV, BBW
87S	1 - 300	BBY
88N	1 - 240	BBZ
89S	1 - 222	BCA
90N	68 - 310	BCB
91S	57 - 310	BCC, BCD
92N	58 - 258	BCE
93S	49 - 246	BCF
94N	44 - 240	BCG
95S	31 - 227	BCH
97N	37 - 199	BCI
98S	39 - 183	BCJ
99N	35 - 282	BCK, BCL

Cansite Surveys Limited

TRACK PLOT # 3 LAUNCH

Line	Fix Nos.	File(s)
73S	278 - 310	LAA
74N	230 - 254	LAB
75S	227 - 259	LAC
76N	276 - 303	LAD
77S	1 - 33	LAE
78N	442 - 516	LAF
90S	1 - 67	LAI
91N	1 - 55	LAJ
92S	1 - 57	LAK
93N	1 - 48	LAL
94S	1 - 43	LAM
95N	1 - 30	LAO
96S	1 - 42	LAP
97N	1 - 31	LAQ
98S	1 - 38	LAR
99N	1 - 34	LAS
100S	32 - 53	LAT
101N	46 - 67	LAU
102S	48 - 72	LAV
103N	55 - 80	LAW
104S	49 - 80	LAX
105N	52 - 85	LAY
106S	52 - 85	LAZ
107N	50 - 85	LBA

TRACK PLOT # 3 (cont'd)

Line	Fix Nos.	File(s)
108N	53 - 89	LBB
109S	61 - 101	LBC
110N	64 - 103	LBD
28S	450 - 481	MAA
29N	465 - 482	MAB
30S	484 - 498	MAC
31N	462 - 477	MAD
32S	541 - 556	MAE
33N	556 - 580	MAF
34S	583 - 606	MAG
35N	901 - 914	MAH
36S	901 - 917	MAI
37N	901 - 920	MAJ
38S	901 - 921	MAK
39N	901 - 927	MAL
40S	901 - 918	MAM
41N	901 - 921	MAN
42S	901 - 921	MAO
43S	901 - 915	MAP
44S	901 - 914	MAQ
45S	901 - 915	MAR
46S	901 - 925	MAS
47N	901 - 927	MAT

TRACK PLOT # 3 (cont'd)

Line	Fix Nos.	File(s)
48S	901 - 926	MAU
49S	901 - 922	MAV
50S	901 - 921	MAW
51S	902 - 914	MAX
52S	901 - 912	MAY
53S	901 - 922	MAZ
10S	278 - 308	MBC
11N	261 - 296	MBD
12S	320 - 352	MBE
13N	353 - 377	MBF
14S	348 - 373	MBG
15N	316 - 338	MBH
16S	358 - 384	MBI
17N	341 - 363	MBK
18S	399 - 427	MBL
19N	397 - 425	MBM
20S	423 - 450	MBN
21N	384 - 407	MBO
22S	348 - 374	MBP
23N	354 - 381	MBQ
24S	428 - 458	MBR
25N	440 - 471	MBS
26S	437 - 466	MBT

TRACK PLOT # 3 (cont'd)

Line	Fix Nos.	File(s)
27N	441 - 461	MBU
54N	606 - 632	MBV
55S	614 - 635	MBW
56N	568 - 586	MBX
57S	578 - 595	MBY
58N	555 - 570	MBZ
59S	626 - 643	MCA
60N	693 - 716	MCB
61S	511 - 526	MCC
62N	595 - 612	MCD
63S	570 - 605	MCE
64N	541 - 570	MCF
9S	290 - 315	NAA
8N	286 - 316	NAC
7S	321 - 346	NAD
6N	327 - 354	NAE
5S	323 - 359	NAF
4N	643 - 669	NAG
3S	625 - 653	NAH
2N	604 - 627	NAI
1S	589 - 613	NAJ
89N	557 - 579	OAA
88S	556 - 578	OAB
87N	548 - 568	OAC

TRACK PLOT # 3 (cont'd)

Line	Fix Nos.	File(s)
86S	586 - 616	OAD
85N	520 - 547	OAE
84S	489 - 527	OAF
83N	506 - 520	OAG
82S	518 - 540	OAH
81N	540 - 565	OAJ
80S	502 - 528	OAK
79N	521 - 548	OAL
72S	473 - 499	OAM
71N	476 - 504	OAN
70S	498 - 527	OAO
69N	509 - 535	OAP
68S	505 - 530	OAQ
67N	486 - 502	OAR
66S	595 - 614	OAS
65N	761 - 776	OAT
111S	900 - 934	PAA
112N	900 - 931	PAB
113S	900 - 935	PAC
114N	900 - 940	PAD
115S	900 - 943	PAE
116N	900 - 925	
	933 - 946	PAF
117S	900 - 935	PAG

TRACK PLOT # 3 (cont'd)

Line	Fix Nos.	File(s)
118N	900 - 941	PAH
119S	900 - 942	PAI
120N	900 - 936	PAJ
121S	900 - 934	PAK
122N	900 - 936	PAL
123S	900 - 944	PAM
124N	900 - 949	PAN
125S	900 - 940	PAO
126N	900 - 940	PAP
126S	941 - 958	QAA
127N	900 - 938	QAB
127S	945 - 950	QAC
128S	900 - 947	QAD
129N	900 - 940	QAE
130S	900 - 942	QAF
131N	900 - 951	QAG
200.1	1 - 25	QAJ
200.2	1 - 22	QAK
200.3	2 - 19	QAM
200.4	1 - 22	QAN
200.5	1 - 27	QAO
200.6	1 - 29	QAP
200	1 - 29	QAQ
200.7	1 - 27	QAR

TRACK PLOT # 3 (cont'd)

Line	Fix Nos.	File(s)
200.8	1 - 33	QAS
200.9	1 - 36	QAT
200A	1 - 33	QAU
200B	1 - 31	QAV
200C	1 - 21	QAW
200D	1 - 21	QAX
200E	1 - 21	QAY
200F	1 - 29	QAZ
200G	1 - 27	QBA
200H	1 - 30	QBB
200I	1 - 37	QBC
200J	1 - 42	QBD
200K	1 - 45	QBE
200L	1 - 43	QBF
200M	1 - 57	QBG
200N	1 - 46	QBH
200O	1 - 32	QBI
200P	1 - 34	QBJ
200Q	1 - 36	QBK

Cansite Surveys Limited

TRACK PLOT # 4

Line	Fix Nos.	File(s)
62N	1 - 555	AFT
65S	1 - 449	AFX
53S	1 - 549	AFF
38N	1 - 680	ADT, ADU
31S	1 - 461	ADJ, ADK
33S	1 - 563	ADM, ADN
37S	1 - 589	ADS
125N	105 - 219	AHF
122S	1 - 245	AHJ
136S	124 - 314	AGV
120N	1 - 224	BAB
119S	301 - 523	BAC
112N	269 - 347	BAJ
111S	224 - 290	BAK
116N	1 - 142	BAF
74	1 - 229	BBC
76S	216 - 275	BBF
81	1 - 348	BBI
66	1 - 301	BBJ
68	300 - 455	BBK, BBL
96S	43 - 370	BBO
70N	1 - 349	BBP, BBQ
86N	148 - 301	BBX
101N	68 - 388	BCN

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
103N	81 - 339	BCP, BCQ
104S	81 - 302	BCR
106S	86 - 305	BCZ
108S	90 - 368	BDB
110N	104 - 338	BDG
113S	90 - 314	BDH
1	195 - 287	CAI
2	261 - 357	CAJ
3	146 - 332	CAK
5	277 - 322	CAM
7	265 - 320	CAO
8	227 - 284	CAP
9	214 - 289	CAQ
10	203 - 277	CAR
11	204 - 260	CAS
12	260 - 319	CAT
13	266 - 313	DAA
14	296 - 347	DAB
15	228 - 315	DAC
16	260 - 357	DAD
17	260 - 336	DAE
18	326 - 398	DAF
19	333 - 396	DAG
20	356 - 422	DAH

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
21	327 - 384	DAI
22	287 - 348	DAJ
23	313 - 354	DAK
24	381 - 428	DAL
25	408 - 440	DAM
26	386 - 437	DAN
27	380 - 441	DAO
28	450 - 483	DAP
29	465 - 514	DAQ
30	485 - 530	DAR
32	541 - 623	DAT
34	583 - 653	DAV
35	584 - 648	DAW
36	596 - 663	DAX
41	638 - 730	DBA
42	627 - 666	DBB
43	456 - 488	DBC
48	494 - 533	DBD
49	508 - 550	DBE
50	511 - 551	DBF
51	444 - 490	DBG
52	540 - 584	DBH
44	460 - 493	DBI
45	534 - 570	DBJ

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
46	535 - 561	DBK
47	515 - 548	DBL
57	543 - 577	DBM
58	521 - 553	DBN
59	554 - 625	DBO
60	626 - 692	DBP
61	476 - 510	DBQ
63	570 - 600	DBS
64	504 - 540	DBT
67	435 - 485	DBW
82	301 - 377	DBZ
83	243 - 334	DCA
98	184 - 322	DCC
97	200 - 324	DCD, DCE, DCF
95	227 - 351	DCG
94	241 - 350	DCH
93	247 - 401	DCI
92	259 - 397	DCJ
91	311 - 413	DCK
90	311 - 442	DCL
89	223 - 366	DCM
88	241 - 370	DCN, DCO
75	260 - 390	DCP
77	286 - 388	DCR

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
87	301 - 386	DCS
75	500 - 519	DDA
73	278 - 443	DDC
72	262 - 472	DDD
71	380 - 475	DDE
70	350 - 497	DDF
69	285 - 508	DDG
83	335 - 505	DDM
84	315 - 488	DDN
85	299 - 519	DDO
11	261 - 653	DDQ
1	288 - 588	EAM
3	333 - 624	EAR
4	340 - 630	EAS
12	320 - 704	EAT
10	278 - 712	EAU, EAV
13	313 - 702	EBB
8	285 - 694	EBD, EBE
7	321 - 693	EBF
6	327 - 695	EBG
5	323 - 666	EBH
14	402 - 728	EBJ
15	380 - 708	EBP
16	358 - 725	EBQ

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
17	337 - 714	EBS
18	581 - 680	EBT
21	385 - 585	EBU
20	423 - 622	EBV
19	397 - 655	EBW
23	355 - 446	EBX
25	472 - 541	EBZ
26	466 - 541	ECA
27	462 - 537	ECB
100	317 - 783	ECX
102	388 - 421	ECZ, EDA
104	552 - 765	EDC
101	431 - 792	EDH
107	332 - 615	EDM
115	143 - 536	EDQ
109	384 - 598	EDR
110	359 - 590	EDS
114	552 - 870	EDU, EDV
121S	249 - 388	EDZ
122N	246 - 639	EEA, EEB
120	403 - 646	EED
123	251 - 608	EEE
124	250 - 528	EEF, EEG
128	341 - 805	EEI

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
129	410 - 822	EEJ
130	421 - 476	FAA, FAB
131	452 - 860	FAC
132	180 - 755	FAD, FAE
133	275 - 752	FAF
134	311 - 755	FAG
135	282 - 759	FAH, FAI
137	334 - 750	FAK
138	281 - 700	FAL, FAM
29	515 - 738	FAT
30	531 - 737	FAU
28	484 - 720	FAX
22	450 - 834	FBB
24	459 - 755	FBD, FBE
32	624 - 744	FBL
34	607 - 705	FBN, FBO
35	649 - 744	FBP
36	664 - 752	FBQ
43	489 - 757	FBS
44	494 - 764	FBT
51	491 - 769	FBU
50	922 - 1143	FBV, FBW
49	551 - 756	FBX

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
48	534 - 757	FBY
47	549 - 765	FBZ
46	562 - 762	FCA
45	571 - 762	FCB
42	667 - 757	FCC
52	585 - 766	FCD, FCE
53	551 - 741	FCF
54	632 - 806	FCG
55	636 - 816	FCH
56	587 - 763	FCI
57	596 - 773	FCJ
58	571 - 772	FCK
59	644 - 846	FCL, FCM
60	717 - 966	FCN
61	527 - 818	FCO
63	606 - 761	FCQ
64	504 - 718	FCR
65	505 - 688	FCU, FCV
66	629 - 815	FCW
67	486 - 742	FCX
74	449 - 732	FDE
78N	517 - 762	FDJ
79	521 - 763	FDK

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
80	501 - 735	FDL
81	541 - 777	FDM
82	518 - 755	FDN
86	586 - 814	FDS, FDT
97	558 - 781	FDZ
96	733 - 793	FEA
95N	690 - 772	FEB
94	691 - 776	FEC
93	692 - 781	FED
92	724 - 785	FEE
91	740 - 787	FEF
90	768 - 823	FEG
98	779 - 857	FEH
99	788 - 830	FEL
106	578 - 729	FEN, FEO
111	512 - 853	FET
112	593 - 925	FEU
113	552 - 836	FEV
116	537 - 771	FEY, FEZ
117	574 - 787	FFA
139	304 - 695	FFB
140	308 - 686	GAA
125N	543 - 773	GAJ

TRACK PLOT # 4 (cont'd)

Line	Fix Nos.	File(s)
126	522 - 754	GAL
127	526 - 761	GAM
141	376 - 702	GAR, GAS
142	424 - 722	GAT, GAU
143	466 - 718	GAV
144	414 - 669	GAW
145	474 - 670	GAX
146	459 - 676	GAY
147	493 - 671	GAZ
148	502 - 686	GBA
149	507 - 674	GBB, GBC
150	399 - 655	GBD
151S	426 - 674	GBE
152N	473 - 681	GBG
153S	478 - 682	GBH
150	657 - 717	GBP
149	675 - 731	GBQ
148	687 - 818	GBR
147	672 - 742	GBS
145	671 - 694	GBT
171	373 - 465	GCR

Cansite Surveys Limited

TRACK PLOT # 5

Line	Fix Nos.	File(s)
102S	73 - 387	BCO
100S	54 - 316	BCM
105N	86 - 354	BCY
107N	86 - 331	BDA
109N	158 - 383	BDD
111S	291 - 511	BDE
112	348 - 592	BDI
4	144 - 339	CAL
6	264 - 326	CAN
31	462 - 535	DAS
33	564 - 646	DAU
37	664 - 736	DAY
38	681 - 756	DAZ
62	556 - 594	DBR
65	450 - 503	DBU
66	302 - 355	DBV
68	456 - 504	DBX
81S	349 - 419	DBY
114	1 - 170	DCB
86	302 - 416	DCT
110	339 - 358	DCU
74	230 - 448	DCW
75.1	391 - 494	DCX
	520 - 547	DDB

TRACK PLOT # 5 (cont'd)

Line	Fix Nos.	File(s)
76.1	385 - 492	DCY
77.1	389 - 448	DCZ
66	356 - 594	DDH
65	504 - 760	DDI, DDJ
81	420 - 540	DDK
82	378 - 517	DDL
14	348 - 401	EAK
15	316 - 379	EAL
2	358 - 603	EAO
9	290 - 702	EBC
11	654 - 908	EBK
4.1	651 - 720	EBL
3	625 - 707	EBM
2	604 - 723	EBN
1	589 - 707	EBO
18	399 - 580	EBT
93	402 - 691	ECF
94	351 - 690	ECG
95	352 - 689	ECI
96	371 - 732	ECJ
92	398 - 723	ECK
91	414 - 739	ECL
90	443 - 743	ECN

TRACK PLOT # 5 (cont'd)

Line	Fix Nos.	File(s)
89	367 - 556	ECO
88	371 - 555	ECP
87	387 - 546	ECQ
86	417 - 585	ECR
104	303 - 551	ECV
103	340 - 591	ECW
	592 - 795	EDB
101	389 - 432	ECY
105	355 - 887	EDD
99	283 - 770	EDE, EDF
98	323 - 778	EDG
102	431 - 759	EDI
97	325 - 557	EDJ, EDK
106	306 - 577	EDL
108	369 - 647	EDN
116	143 - 536	EDQ
113	315 - 551	EDT
117	192 - 573	EDW
118	201 - 566	EDX
120	225 - 402	EDY
121	390 - 652	EEC
125	220 - 542	EEH
136	315 - 754	FAJ
68	505 - 780	FAP, FAQ

TRACK PLOT # 5 (cont'd)

Line	Fix Nos.	File(s)
31	536 - 743	FAV
21	591 - 730	FAY
20	623 - 728	FAZ
19	656 - 720	FBA
23	451 - 734	FBC
25	542 - 800	FBF, FBG
26	542 - 688	FBH
	689 - 795	FBJ
27	538 - 780	FBK
33	647 - 769	FBM
37	737 - 830	FBR
53	551 - 741	FCF
62	613 - 764	FCP
69	509 - 735	FCY
70	498 - 723	FCZ
71	476 - 722	FDA
72	473 - 719	FDB, FDC
73	444 - 736	FDD
75S	548 - 826	FDF
76N	493 - 769	FDG
77S	448 - 742	FDH, FDI
83	505 - 740	FDO, FDP
84	489 - 717	FDQ
85	520 - 711	FDR

TRACK PLOT # 5 (cont'd)

Line	Fix Nos.	File(s)
87	815 - 1006	FDU
88	556 - 736	FDV
89	557 - 734	FDW
90	743 - 767	FDX, FDY
99	771 - 787	FEI
100	788 - 912	FEJ
102	756 - 900	FEK
101	793 - 815	FEM
107	616 - 810	FEP
108	648 - 841	FEQ
109	599 - 863	FER
110	591 - 856	FES
114	871 - 1159	FEW
115	527 - 563	FEX
118	567 - 764	GAB
119	524 - 761	GAC, GAD
120	647 - 786	GAE
121	653 - 771	GAF
122	640 - 765	GAG
123N	609 - 766	GAH
124S	767 - 1001	GAI
128	806 - 903	GAN
129	823 - 915	GAO
130	884 - 993	GAP

TRACK PLOT # 5 (cont'd)

Line	Fix Nos.	File(s)
131	861 - 967	GAQ
101	816 - 867	GBM
129	916 - 1039	GCH
150S	718 - 772	GCO
128	904 - 930	GCW
125	775 - 811	GCX
112	926 - 987	GDD
102	901 - 944	GDI
107	810 - 849	GDL
105	888 - 948	GDM
104	769 - 810	GDN
116	772 - 794	GDO
96	794 - 864	GDP
89	736 - 774	GDQ
85	712 - 766	GDR
84	718 - 759	GDS
80	736 - 774	GDT
79	764 - 797	GDU
78	763 - 851	GDV
77	852 - 950	GDW
76	770 - 826	GDX
41	922 - 974	GEC
33	770 - 827	GED
28	721 - 782	GEE

TRACK PLOT # 5 (cont'd)

Line	Fix Nos.	File(s)
11	909 - 953	GEF
4	721 - 792	GEG
3	708 - 761	GEH
1	708 - 997	GEI, GEJ
2	724 - 817	GEK
3	762 - 810	GEL
37	831 - 921	GFW
21	731 - 849	GGH
10	713 - 749	GGT
18	762 - 884	GHG
38	926 - 972	GHH
39	928 - 972	GHL
4	793 - 834	GHT, GHU
74	733 - 764	GJL
73	737 - 787	GJM
66	816 - 863	GJR
69	736 - 790	GJY
81	778 - 834	GKL
86	815 - 881	GKM
90	824 - 877	GKN
62	864 - 959	GLC

TRACK PLOT # 5 (cont'd)

Line	Fix Nos.	File(s)
Launch Lines		
200.1	1 - 25	QAJ
200.2	1 - 22	QAK
200.3	2 - 19	QAM
200.4	1 - 22	QAN
200.5	1 - 27	QAO
200.6	1 - 29	QAP
200	1 - 29	QAQ
200.7	1 - 27	QAR
200.8	1 - 33	QAS
200.9	1 - 36	QAT
200A	1 - 33	QAU
200B	1 - 31	QAV
200C	1 - 21	QAW
200D	1 - 21	QAX
200E	1 - 21	QAY
200F	1 - 29	QAZ
200G	1 - 27	QBA
200H	1 - 30	QBB
200I	1 - 37	QBC
200J	1 - 42	QBD
200K	1 - 45	QBE
200L	1 - 43	QBF

TRACK PLOT # 5 (cont'd)

Line	Fix Nos.	File(s)
Launch Lines		
200M	1 - 57	QBG
200N	1 - 46	QBH
200O	1 - 32	QBI
200P	1 - 34	QBJ
200Q	1 - 36	QBK

Cansite Surveys Limited

TRACK PLOT # 6

Line	Fix Nos.	File(s)
163E	379 - 530	BDF
164.1	1 - 255	CAF, CAG
160	487 - 579	EAC
	580 - 833	ECU
101	793 - 815	FEM
161	726 - 842	EAB
162	768 - 858	EAA
155	1 - 261	ECE
	262 - 616	FAO
157	245 - 605	ECD
	606 - 757	FAS
159	411 - 825	ECS, ECT
158	500 - 843	FAR
156	137 - 285	FBI
	286 - 500	GBI
	661 - 810	GBK
49	551 - 756	FBX
4.2	721 - 792	GEG
2	726 - 817	GEK
18	762 - 884	GHG

Cansite Surveys Limited

TRACK PLOT # 7

Line	Fix Nos.	File(s)
155	617 - 748	GBL
	749 - 801	GBN
157	758 - 811	GBF
4	793 - 834	GHT, GHU
156	1 - 135	
	501 - 660	GBJ
154	1 - 786	FAN
102	431 - 759	EDI
157	1 - 244	ECC
162	1 - 767	ABR, ABS
160E	2 - 486	ABT
159	1 - 410	ABV, ABW
156	1 - 136	AEB, AEC
158	1 - 500	AED
161	1 - 725	AEL
163	1 - 378	AGM
164	1 - 139	CAH
163	901 - 949	MBA

Cansite Surveys Limited

TRACK PLOT # 8

Line	Fix Nos.	File(s)
18	762 - 884	GHG
18.1	684 - 761	GCO
41S	1 - 637	ADY

Cansite Surveys Limited

APPENDIX 5

HIPPY 120C HEAVE

COMPENSATOR REPORT

by

Howard Staples

Appendix 5 - Hippy 120C Heave, Roll, and Pitch Sensor

INTRODUCTION

The Datawell Hippy 120C is a heave, roll, and pitch sensor used for the compensation of such errors in hydrographic survey data. During the Herschel Island survey the Hippy 120C is used for real time compensation in an Atlas Deso20 and it is also used with an HP9816 computer for test purposes. Due to the lack of a controlled test situation, there is no means to determine the exact accuracy of the indicated heave, but this discussion considers the practical aspects of using the Hippy and shows that it worked substantially well. For the accurate and scientific test results the NOAA technical report entitled "Characterization Tests of Datawell Hippy 120C Vessel Motion Sensor" is recommended.

Description of Hippy 120

The core of the Hippy120 is a stabilized platform suspended in oil which essentially remains vertical as the ship and rest of the Hippy rotate around it. Since magnetic fields are generated along the pitch and roll axes, pick-up coils on this platform develop a voltage proportional to the pitch and roll respectively. Also, an accelerometer on the platform gives a signal which is, for the most part, only due to vertical accelerations. This is integrated twice to produce the heave. A T.I. 9900 microcomputer processes this pitch, roll, and acceleration information, handles data input/output to a terminal or interface, and controls a digital to analog converter for output of analog signals. The six analog outputs are:

1) an analog filtered heave, which is the signal used for real-time heave compensation.

2) a digitally filtered heave which, in certain characteristics, is better than the analog filter, but is delayed by 77.2 sec. so is not available in real-time.

3) pitch, which is proportional to the sine of the angle and is positive if the rear of the ship is lifted.

4) roll, which is proportional to the sine of the angle and positive if the port side is lifted.

5) acceleration, which is not directly useful for survey applications.

6) error heave, which is a measure of the heave that is below the frequency range of the other heave signals and, therefore, can indicate errors in the other heave signals. This also is not real-time but delayed by 86.3 sec.

These six signals are also available in digital ASCII format from serial RS232 or RS422 ports. Generally, the RS422 is preferrable due to greater noise immunity and longer distance capability.

Communication with the Hippy is versatile with various methods available. First, there are single character commands which mostly request the presently available data. For instance, an ASCII "D" will be responded immediately with the digitally filtered heave of exactly 77.2 seconds ago. There are also label commands which, when sent with a number label, will cause the Hippy to make available after 77.2 sec. the digitally filtered heave of the time of the command. There are also T-commands which program the Hippy for various operating modes. They can determine the data format, the message delay, an auto-repeat if desired, the offsets, the baud rate, etc. The O-command is a useful single character command for which the response is programmable by certain T-commands.

Externally, the Hippy120 is a large aluminum can at 660 mm maximum diameter and 840 mm maximum height. It weighs 120 kgs and is powered by 10-30 Vdc.

Possible Errors in the Hippy

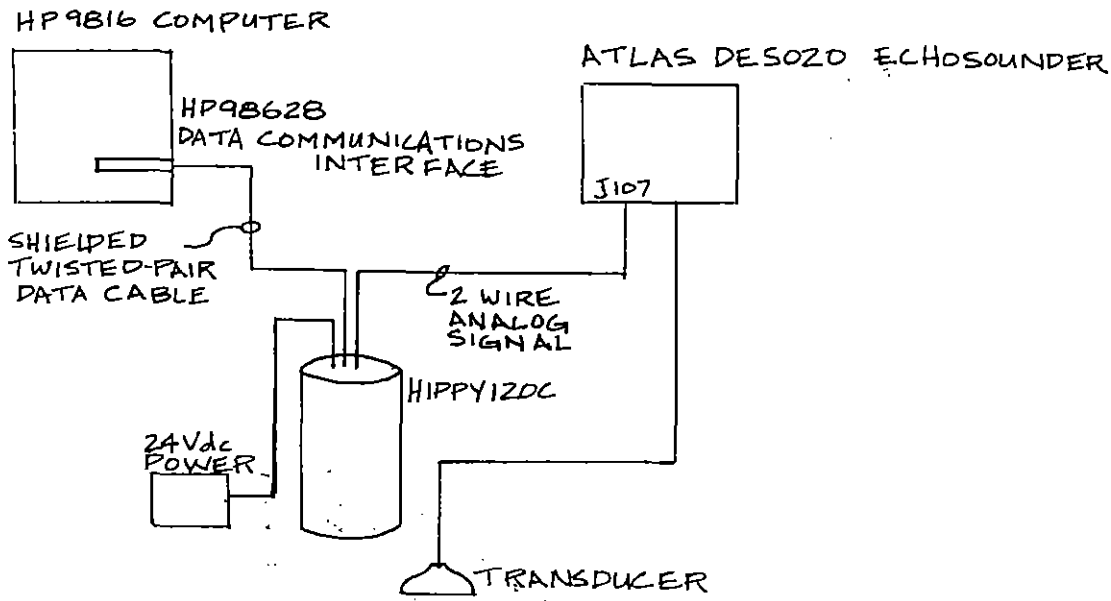
The platform is used, in effect, as a pendulum in order to stabilize it. Being immersed in oil, it has a long period of 120 sec which entails that any movement with a period of 60 sec. or greater will tend to excite the pendulum. These very low frequencies must be filtered out by appropriate high pass filtering. As mentioned, two types of filters are used. The analog filter is specified to be accurate to within 3.5% in the range of 0.067 to 1.0 Hz. Test results(1) show that for frequencies of 0.02 to 0.067 Hz the gain is greater than 1 and up to a maximum of 6. This means that if the Hippy is heaved with a frequency in this range, the output would indicate an amplitude up to six times greater than the actual amplitude. Thus, heaves at such low frequencies can cause errors in this analog filter output. The digital filter is specified to be accurate to within 3% in the range of 0.033 to 0.5 Hz and 13% for 0.5 to 1.0 Hz. All lower frequencies are attenuated. This is essentially the characteristics desired in a filter, the only trouble being its 77.2 sec. delay.

The error heave is the heave in the range of 0.016 to 0.033 Hz. It is uncommon to get such low frequency heave, but not impossible so this signal can be considered as an error in the digital heave since the digital filter does not cover this range.

Another error that can be seen in the Hippy is that of pendulum angle caused by horizontal accelerations. If the device is first level and stationary then it accelerates forward, the pendulum will swing back due to inertia. This offset angle will be shown directly by the pitch output if there is no other pitch present. A second effect of this offset is that a component of the vertical acceleration will be lost and a component of the horizontal accelerations will be perceived by the accelerometer as being vertical. This error is considered in terms of a quick turn of 180 degrees and thus is called turn around false output. For the analog filter the error is specified to be $4v^2$ where v is the shipspeed in m/sec and the false heave is in cm. The digital filter takes care of most of this error such that its turn around false output is $0.24v^2$.

(1) "Characterization Tests of Datawell Hippy 120C Vessel Motion Sensor - N.O.A.A. Technical Report OTES-8"; Pryor,Donald; U.S. Department of Commerce, National Oceanic and Atmospheric Administration, Ocean Technology and Engineering Services; Rockville, Maryland; May, 1982.

Equipment Set-up



The M.V. Banksland Surveyor is a fairly large hydrographic vessel at 54.9m length and 8.3m beam. The echosounder transducers are mounted somewhat forward of midships and the Hippy mounted as close as possible to them. Since the heave at the transducer is somewhat different from the heave at the sensor, the offsets must be determined and entered into the Hippy in order for it to compensate. With the transducer taken as origin, the X-axis to starboard, the Y-axis forward, and the Z-axis upwards the offsets are found to be x = 65cm, y = -51cm, and z = 91cm. These are entered once and do not change until re-entered or the Hippy is turned off (see Figure 7 - Section 2.2).

The echosounder used is an Atlas Deso20 and the analog output of the analog filtered heave is connected to its jack J107 for heave compensation inside the Deso20.

The RS422 data port is connected through a HP98628 Data Communications Interface to a HP9816 computer. This is used almost completely for test purposes with the only action that affects the real-time compensation being the necessary act of entering the offsets.

Programs have been written on an HP9816 that interrogate the Hippy over a specified test period using a variety of commands, but the method which turned out to be the simplest and also the most versatile was to program the Hippy for auto-repeat. By programming the repeat interval to be an even fraction of 77.2 sec, the program can later align the digitally filtered data to the analog filtered data simply by shifting the approprate number of samples. In other words, if the repeat rate is 0.2 sec. the

analog filter data will correspond to the digital filter data of 386 samples later (386 x 0.2 sec = 77.2 sec).

Often in these tests the analog filtering is compared to the digital. This has the obvious shortcoming of comparing the Hippy to itself rather than an absolute reference. However, in this set-up, there is no absolute reference available. Thus, by judging the specifications as well as other test results, the digital filtering is presumed to be much more accurate than the analog. As a result, these tests do not prove the acccuracy of the Hippy, but do show that it worked substantially well and indicate certain problems that can occur and solutions to them.

The final version of the test program would preform essentially the following functions: initialize the data com interface; program the Hippy for auto-repeat; receive the analog filtered, digitally filtered, pitch, and roll data over a specified time period; adjust the digital to line up in time with the analog and determine the difference; plot various and/or all combinations of this data; and finally store the data on disc for later recall.

Practical Problems Encountered

The physical size of the Hippy is a factor which must be reckoned with. In this job it does not pose a serious problem since it is lifted on and off the vessel by a crane. It does, however, restrict the use of this device on smaller vessels. Other than the normal care required for handling electronic devices, care must also be taken in not spinning the Hippy in any way since that can cause damage to the internal suspension of the platform. For instance, it cannot be rolled.

Care must also be taken during installation that, when the vessel is properly ballasted and level, then the Hippy is also level and oriented properly. The results show that the Hippy had an offset pitch of about 3 degrees. This has not been changed because there is no easy reference while at sea and also it is not considered a serious problem.

The Hippy also cannot be exposed to less than -5 degrees Celsius for extended periods. This poses a problem in transporting from a fairly remote area of the Canadian Arctic. It is, however, well insulated and it will lose its heat with a 72 hr time constant. Thus, before an extended cold journey, it can be well warmed and further insulated by being wrapping in foam.

A problem that has been encountered during programming is occassional glitches appearring in the data. The problem is more frequent when sending commands to the Hippy, in that the Hippy does not recognize them. This seems to be a combination of using a very long data line as well as using a high baud rate of 9600. Using a baud rate of 4800 helps this considerably, but not completely. Using an even lower baud rate slows down the program, so to get around the command problem the echo mode is used. With this, the Hippy responds with the command that it received. If the response does not agree with the sent command then it is sent again. This solves the command problem and the data glitches are infrequent and can be ignored.

Results

The various graphical results are cataloged by date and time at the end of this section. Note that the analog filtered heave is abbreviated "analog" and likewise for "digital", but this is not to be confused with the analog outputs of the Hippy. Tests have been run on various days with different sea conditions and assorted vessel maneuvers. In all cases there is a good agreement between the analog and digitally filtered heave for the higher frequency heaves. There are cases where the signals are apart, but even in these cases, all rapid fluctuations in heave show up in both signals. This is to be expected, since most heave is in the range of 0.067 to 1.0 Hz where both filters are reasonably accurate. Particularily if there is not a turn, the signals can be hard to distinguish since they are plotted on the same axis.

There are some cases where a definite low frequency shows up in the analog minus digital. Most noticeable of this is the test of 30 Sep / 22:22:38. At this time the effect of being sheltered in Pauline Cove as well as being anchored caused a low amplitude and very low frequency heave (approximately 0.022 Hz). At this frequency the analog filter is amplifying the signal and the digital is attenuating it. It is expected that the true signal is somewhere between the two plots. Thus, it is difficult to determine the error, but the maximum difference between the two plots is 24 cm. This is an interesting though unusual and non-surveying situation.

In 25 Sep / 00:05:34 and 30 Sep / 01:03:15 there are also low frequencies appearing clearly in the difference. These are each at a frequency of about 0.033 Hz. At this frequency the digital filter is fairly true but the analog applies a large gain. Thus this error is expected to be in the analog filtered heave only. The maximum difference of both of these plots is 13 cm. Since it is considered as an error in the analog filter, it is expected to be in the real time heave compensation as well.

It is also interesting to see the effect of travelling against or with the wind. This is most noticeable on 30 Sep / 01:33:11 when the Banksland is initially running into a 35 kt. wind, but turns 180 degrees to run with it. There is a much higher frequency heave into the wind due to the vessel meeting the waves faster. There is likewise a doppler shift to a lower frequency when travelling with the wind. This indicates how a low frequency heave can be experienced even though the waves themselves do not have that frequency. In this case, it is hard to differentiate the error due to turn around false output and the error due to low frequency heave, but the maximum difference after the turn is about 17cm.

In the same plot one can also notice the effect on pitch and roll. Into the wind there is more pitch than roll, but broadside to it there is considerable roll as can be expected.

There is also seen a correlation between pitch and heave. This is most noticeable in cases where there is a lot of pitch such as 25 Sep / 00:48:22 and 30 Sep / 01:03:15. The pitch seems

to be the complete opposite of the heave. This indicates the importance of having the transducer mounted as close as possible to center of gravity of the vessel. In this case the transducer is somewhat forward of midships so when the vessel rotates forward about center (a positive pitch), then the transducer has a negative heave. Right at the center the heave should be independent of pitch. Of course this is a factor only controllable at the design of the survey vessel.

Another effect that can be seen by looking at the analog minus digital is the turn around false output. Three tests of Oct 1 put the Banksland through sharp turns with full rudder and full bowthruster. Due to the limits of the navigation system such abrupt turns can not be done between survey lines, so these are a worse case than any other tests. The turns were 90, 180, and 360 degrees. Vessel speed is typically 7 kts. at the start and 5.5 kts. at the end. Seas were moderate with less than one meter waves. In every case the analog minus digital is seen to be rather erratic during the turn with errors of up to 12 cm. Upon finishing the turn the difference falls negative to at most -20 cm. and then swings to as large of a positive value. It settles down after at most 80 sec. from finishing turn.

It is also useful to notice what happens to the roll and pitch signals as shown in 1 Oct / 19:36:58. The roll increases by almost 10 degrees which is mostly a true signal since the vessel did swing to starboard for the port turn. The change in the pitch however, must be due to the offset of the platform from vertical due to the horizontal acceleration of turning. This is the platform tilt that causes the turn around false heave. It seems to have settled down by 50 sec. from the end of the turn.

According to specification, the turn around false heave in cm. is $4v^2$ where v is ships speed in m/sec. Taking a speed of six knots (3.1 m/sec), this works out to a false heave of 38 cm. For the digital filter it is $0.24v^2$ or 2.3 cm. The actual error of 20 cm. is less than specified. This is likely due to the fact that the Banksland is a large and slow turning vessel so that, even at its very fastest, the Hippy has time to adjust during the turn. The important consideration is the time required for the Hippy to settle down after a turn because the survey situation is usually turning at 180 degrees or less and then starting a survey line. Considering that the Banksland does not normally turn as sharply as this, the 80 sec. settling down time is considered a safe margin. Of course, every vessel turns and travels at different speeds so other applications may require larger margins.

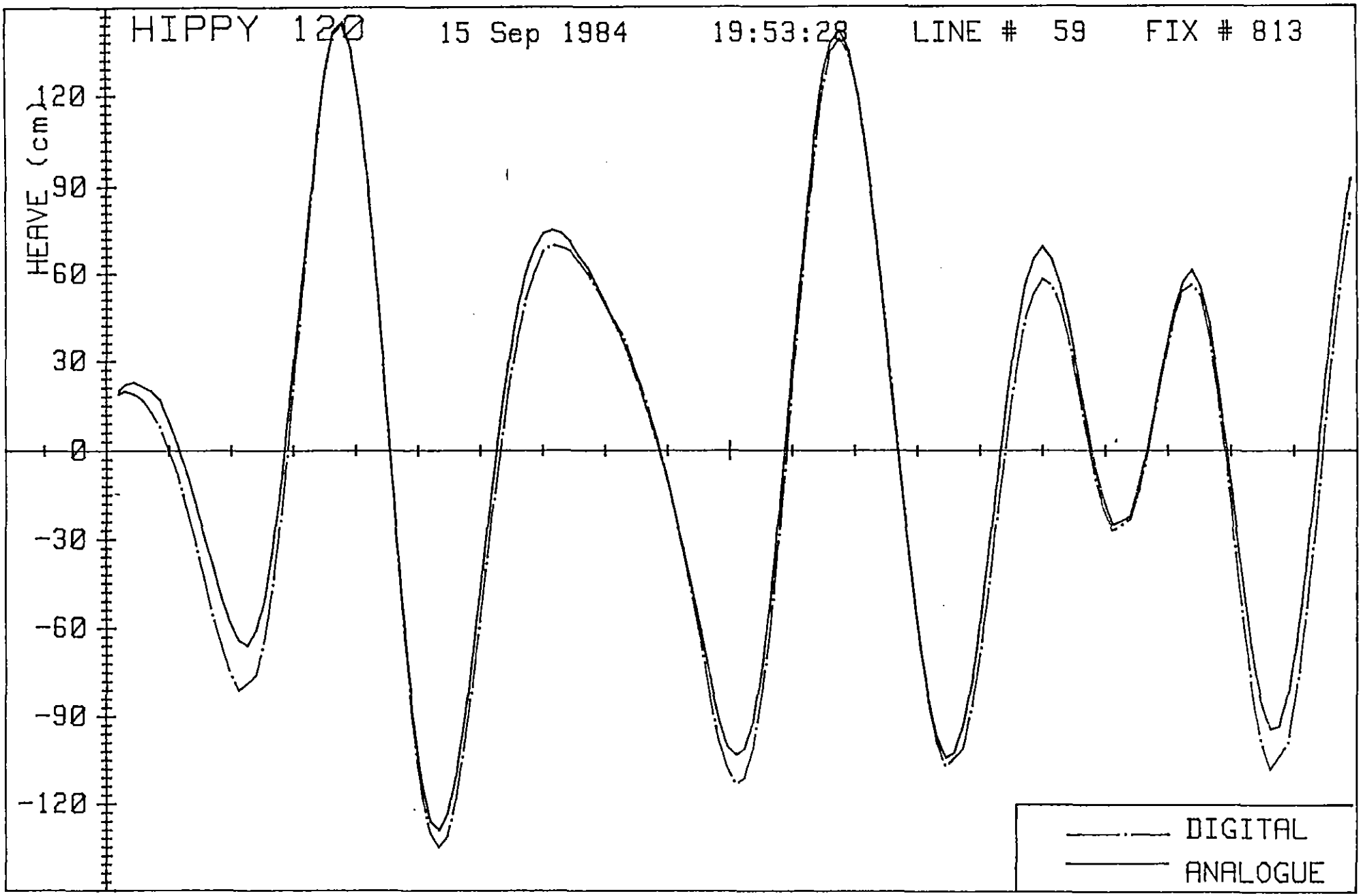
As mentioned, there is no physical check on the accuracy of the Hippy, but as close as one can come to this is during a bar check where the vessel is stationary and the echo to the bar is constant regardles of heave. In this situation, the compensation into the Deso20 causes the echo of the bar to appear with the heave of the boat as determined by the Hippy. The heave can be physically observed in the moonpool. This observation has been done on Sep 14 and the actual heave and the Hippy both indicated roughly a 0.5 m. heave with a period of 6 sec.

Another verification is to compare the analog form of the analog filtered heave in the echosounder to the digital form received by the HP9816. This is done in 1 Oct / 04:41:25 (see also the Deso20 record). Scaling between the highest point and the lowest point on record and plot gives 2.75 m. and 2.74 m. respectively, which is really stating it more accurately than can be properly determined by scale.

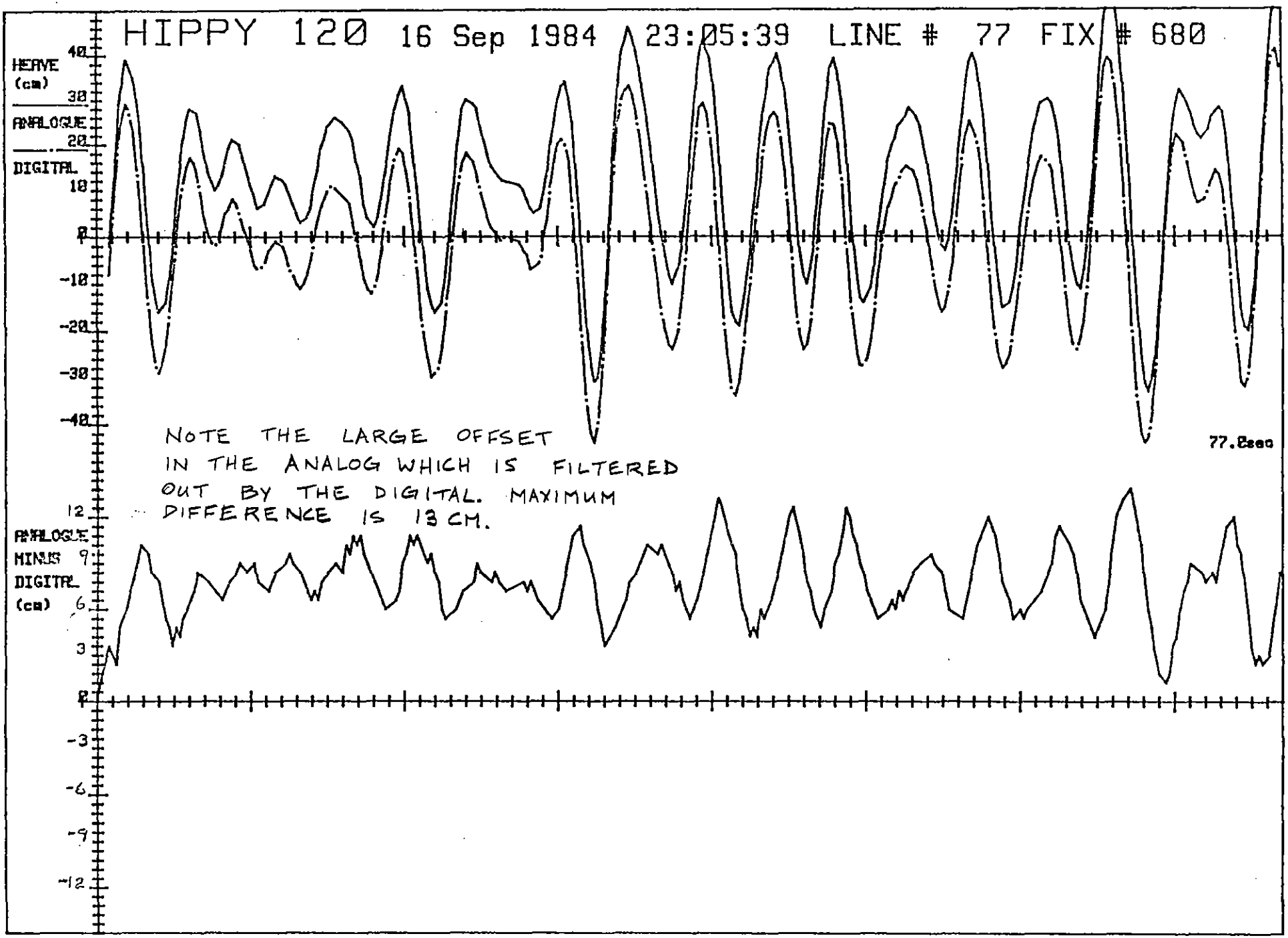
Though there is no conclusive check on the accuracy of the Hippy, it is quite obvious that it prevents a significant amount of expensive stand-by time, when the heave is otherwise too much to survey. The largest error that is found while running in a straight line is 12 to 13 cm. The largest difference that is observed in all tests is 42 cm. which occurred in 30 Sep / 05:58:39. This error is due both to turn around effect and to low frequncy heave. In tests where there is very little true heave and most of the error is due to turn around false output, the largest difference is 20 cm. in 1 Oct / 19:36:58. While anchored, a large difference of 22 cm. due to low frequency heave is seen.

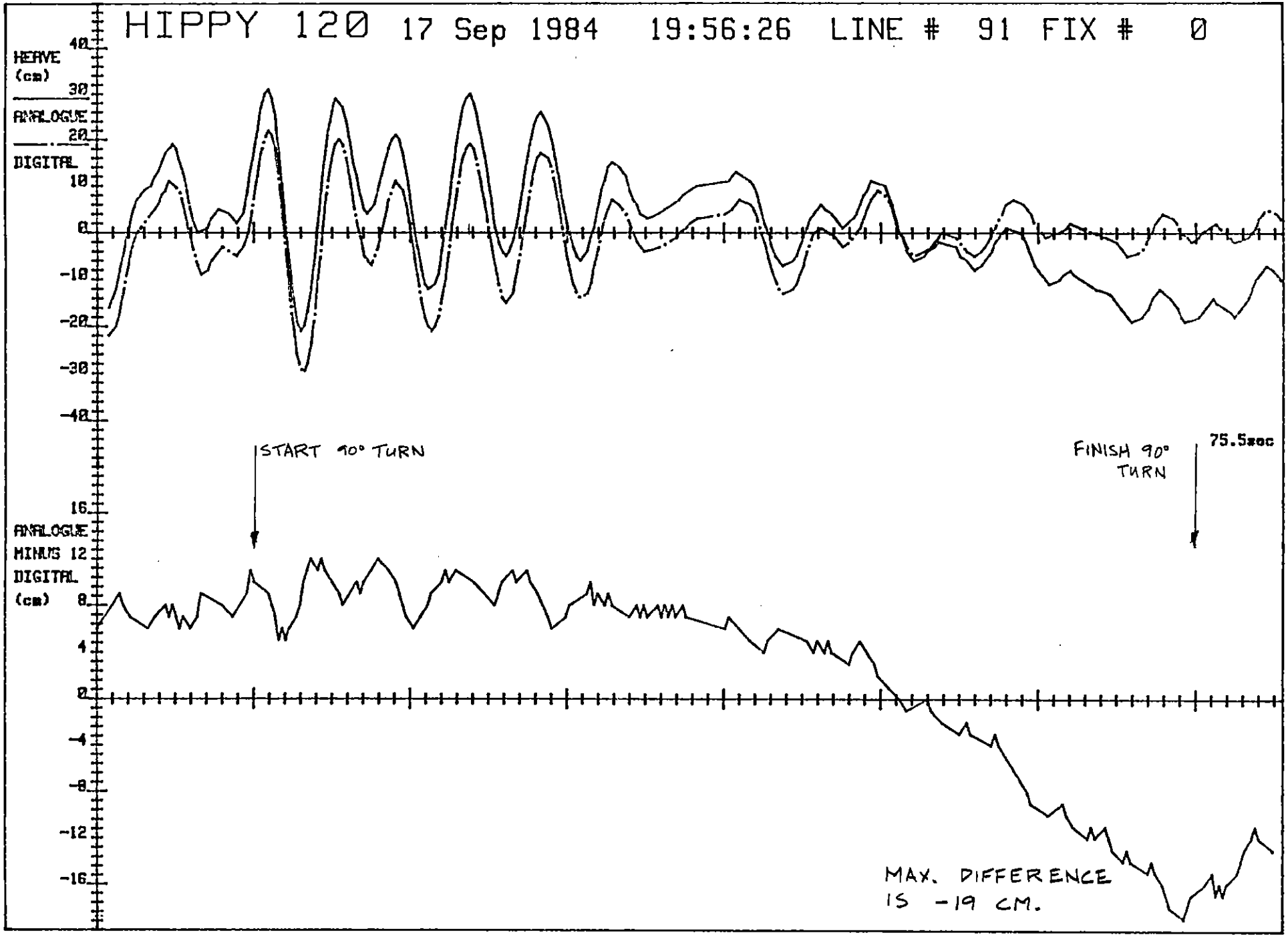
List of Test Plots

Page	Date	Time
11	15 Sep	19:53:28
12	16 Sep	23:05:39
13	17 Sep	19:56:26
14	24 Sep	21:47:15
15	24 Sep	23:24:02
16	25 Sep	00:05:34
17	25 Sep	00:48:22
18	30 Sep	01:03:15
19	30 Sep	01:33:11
20	30 Sep	03:41:08
21	30 Sep	04:42:03
22	30 Sep	05:58:39
23	30 Sep	05:58:39
24	30 Sep	07:07:50
25	30 Sep	08:10:59
26	30 Sep	22:22:38
27	1 Oct	04:41:25
28	Deso20 record corresponding to previous plot.	
29	1 Oct	19:08:07
30	1 Oct	19:16:47
31	1 Oct	19:36:58


HIPPY 120
15 Sep 1984
19:53:28
LINE # 59
FIX # 813
HEAVE (cm)
120
90
60
30
0
-30
-60
-90
-120
DIGITAL
ANALOGUE

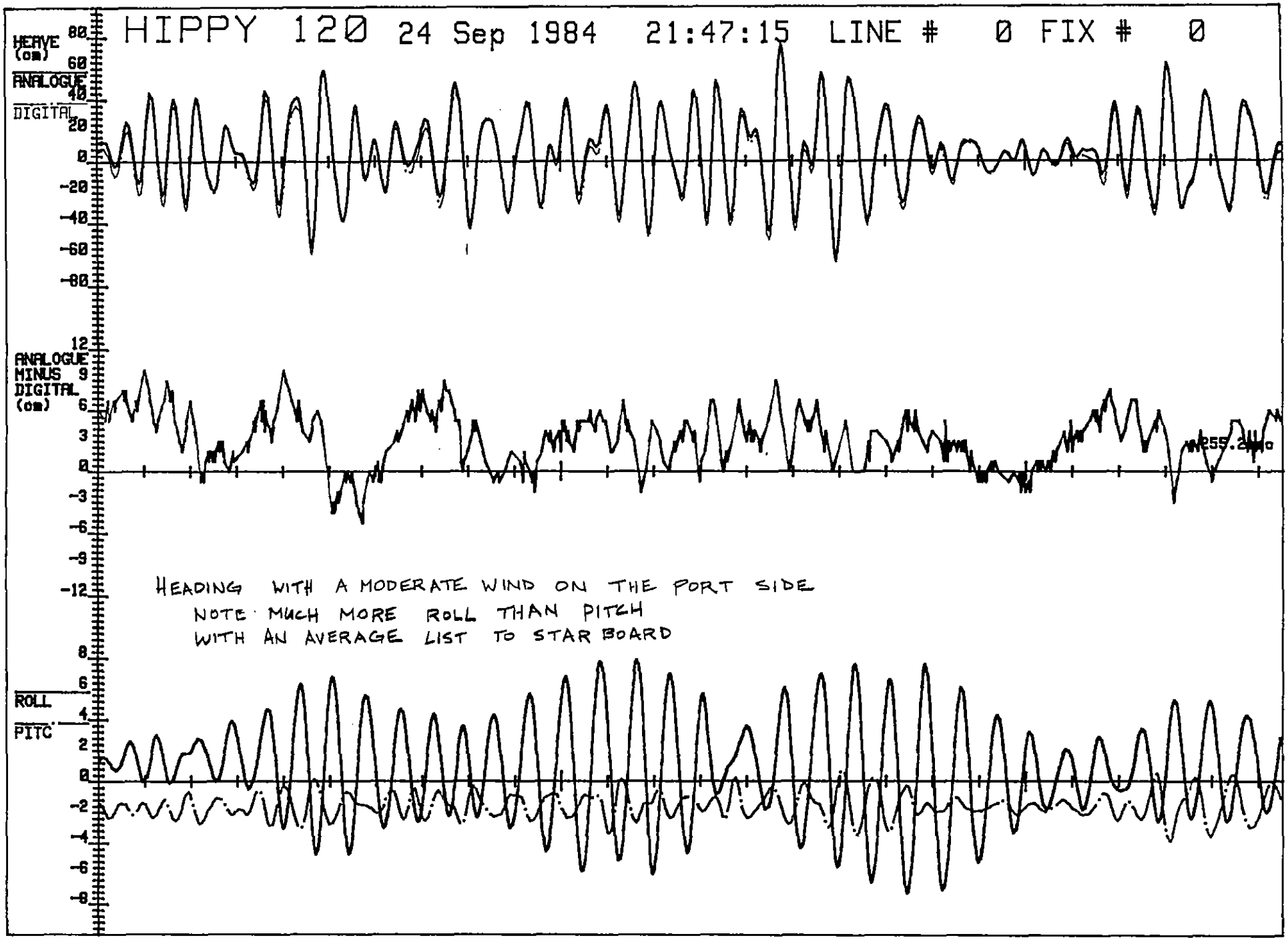
HEWLETT PACKARD

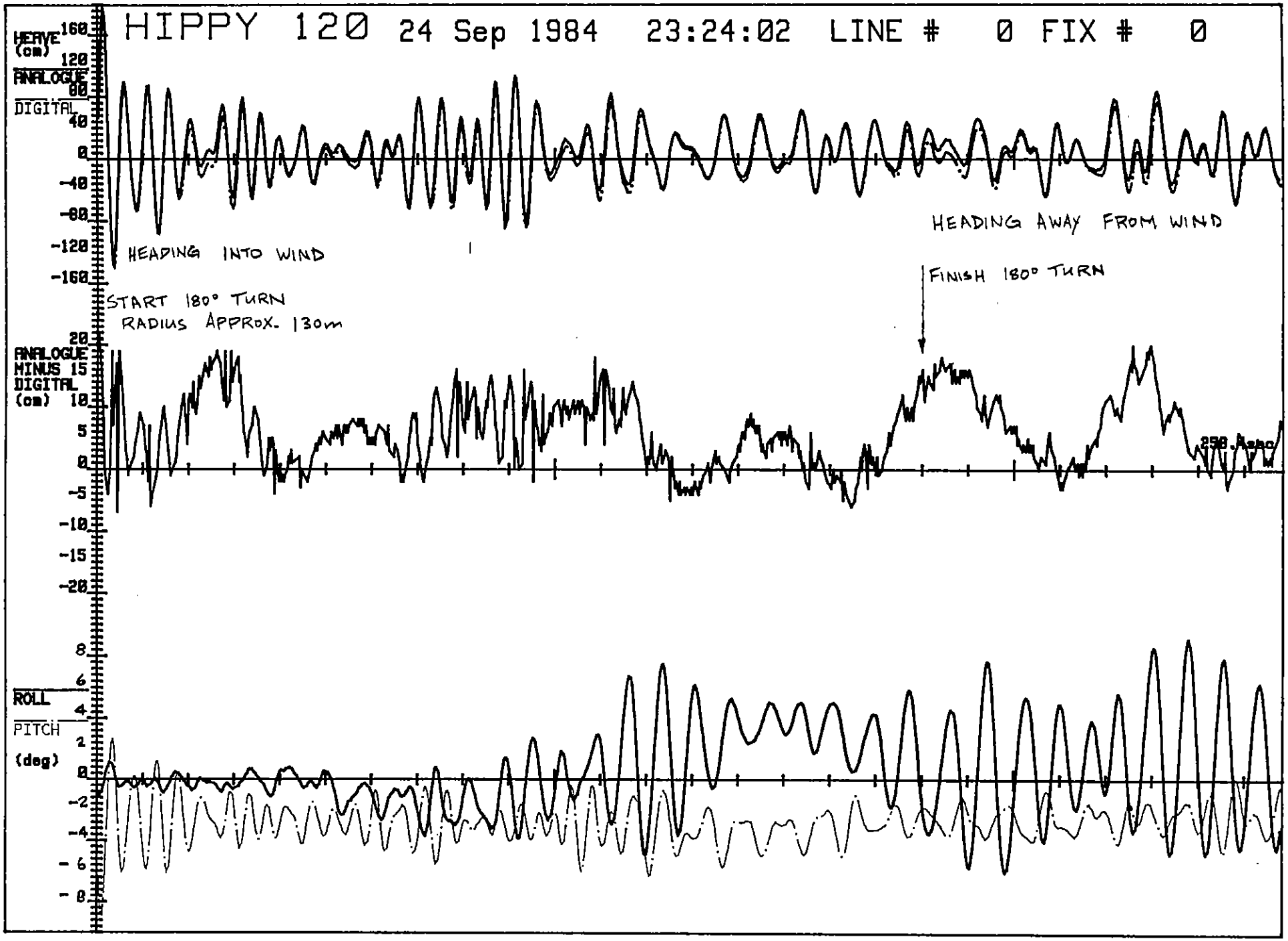


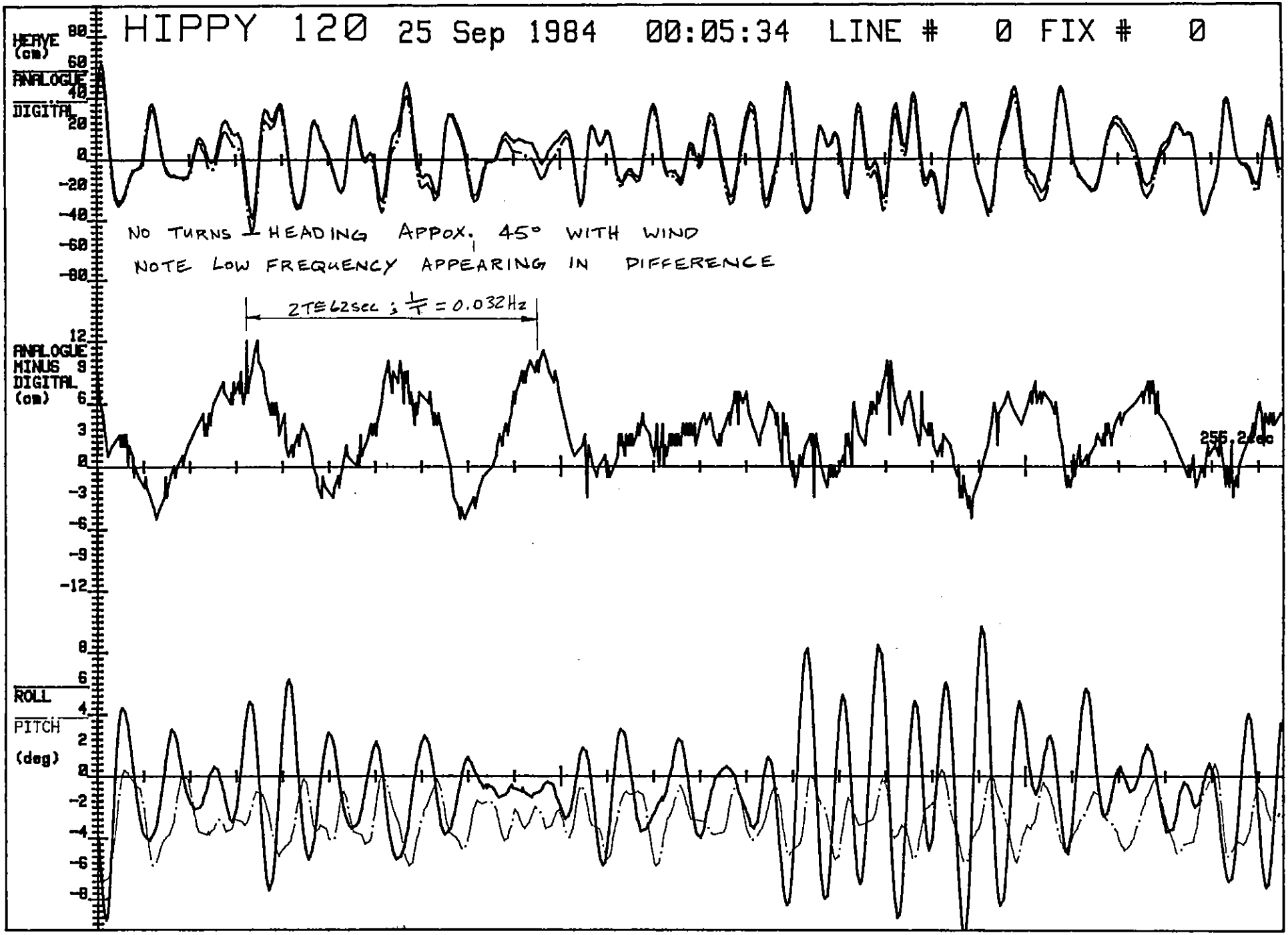

HIPPY 120 17 Sep 1984 19:56:26 LINE # 91 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
40
30
20
10
0
-10
-20
-30
-40
START 90° TURN
FINISH 90° TURN
75.5sec
ANALOGUE MINUS DIGITAL (cm)
16
12
8
4
0
-4
-8
-12
-16
MAX. DIFFERENCE IS -19 CM.

no data stored

HEWLETT PACKARD

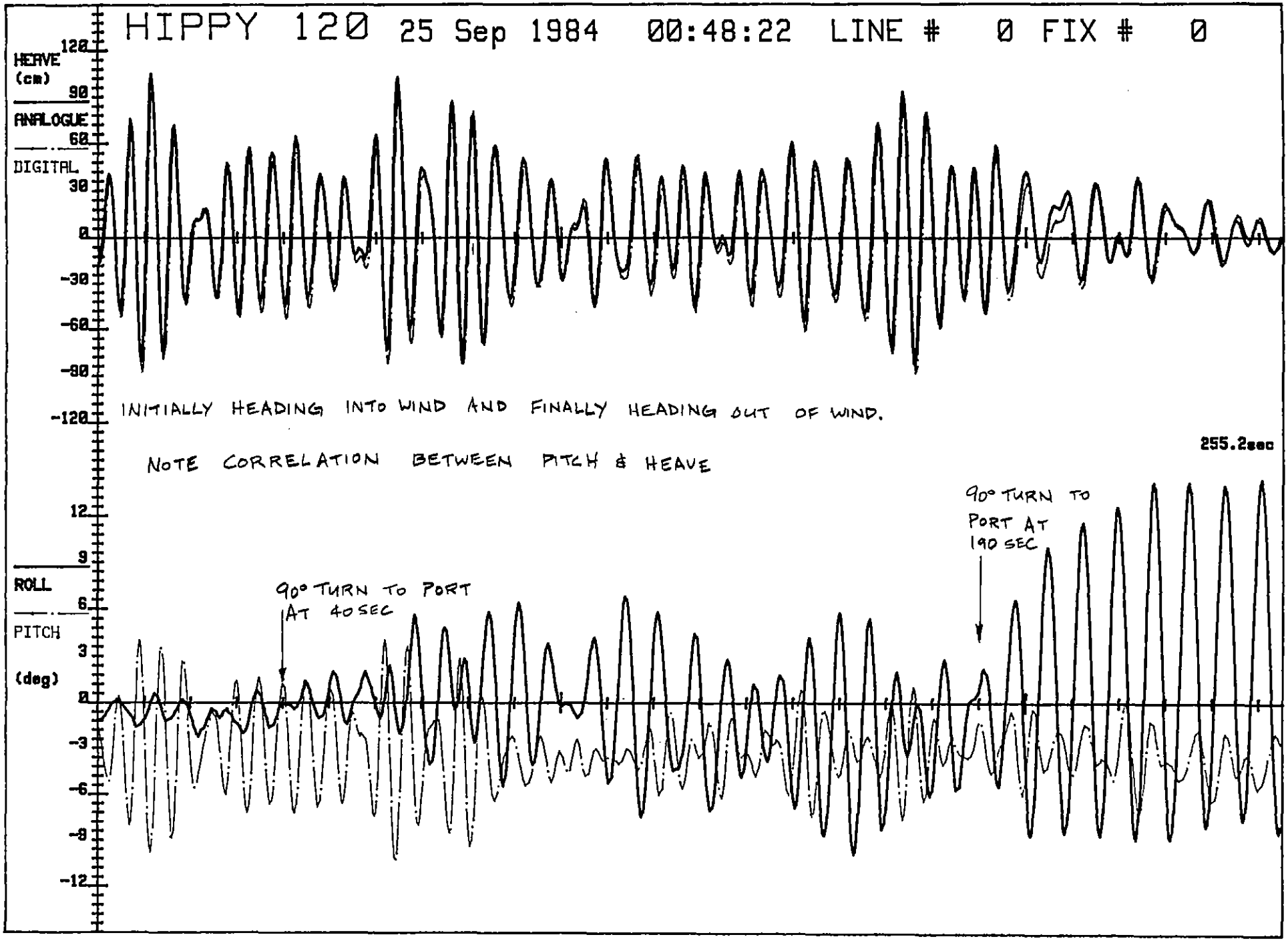


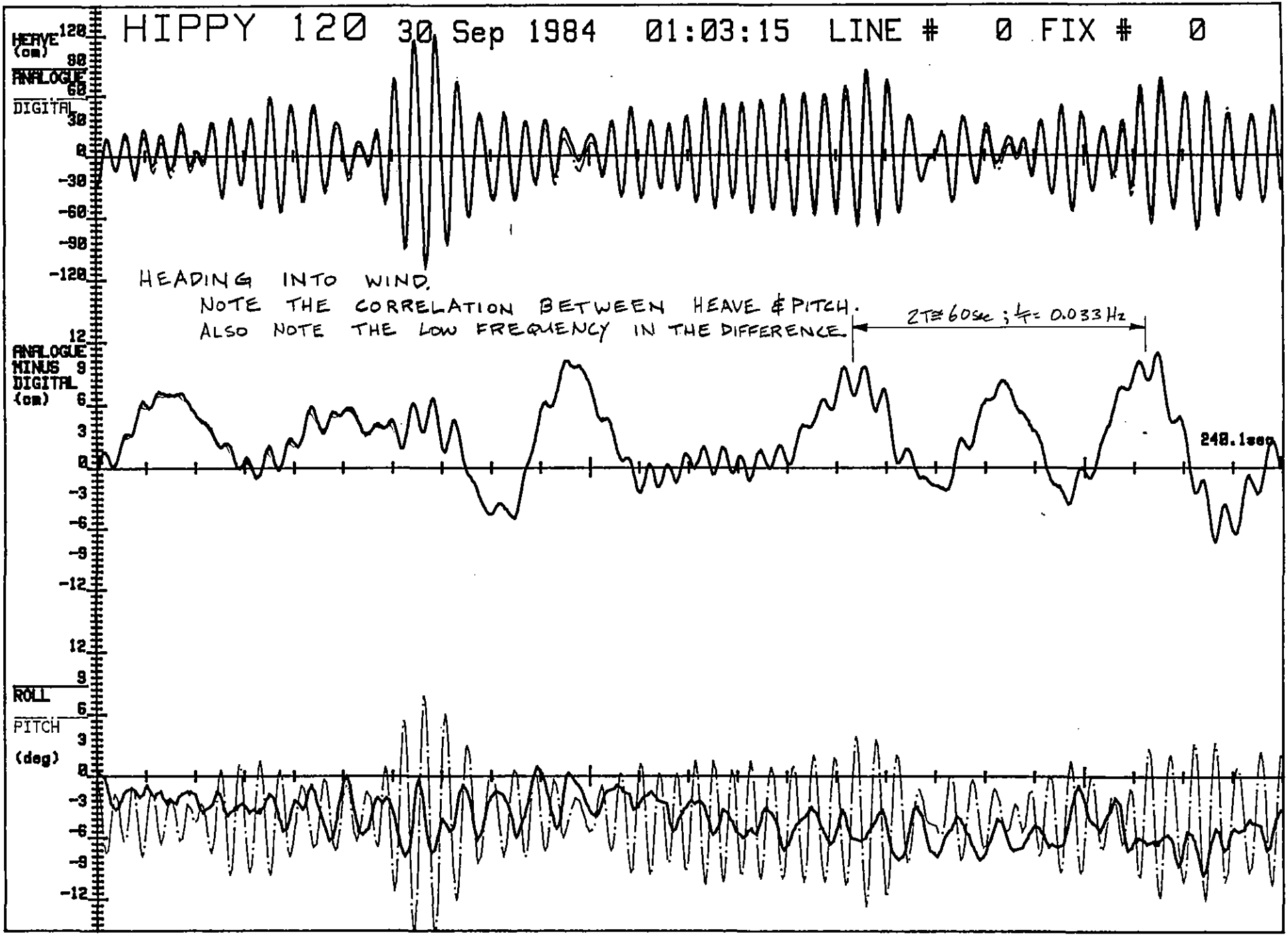

HIPPY 120 24 Sep 1984 23:24:02 LINE # 0 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
160
120
80
40
0
-40
-80
-120
-160
HEADING INTO WIND
HEADING AWAY FROM WIND
START 180° TURN
RADIUS APPROX. 130m
FINISH 180° TURN
ANALOGUE MINUS 15 DIGITAL (cm)
20
10
5
0
-5
-10
-15
-20
ROLL
PITCH
(deg)
8
6
4
2
0
-2
-4
-6
-8



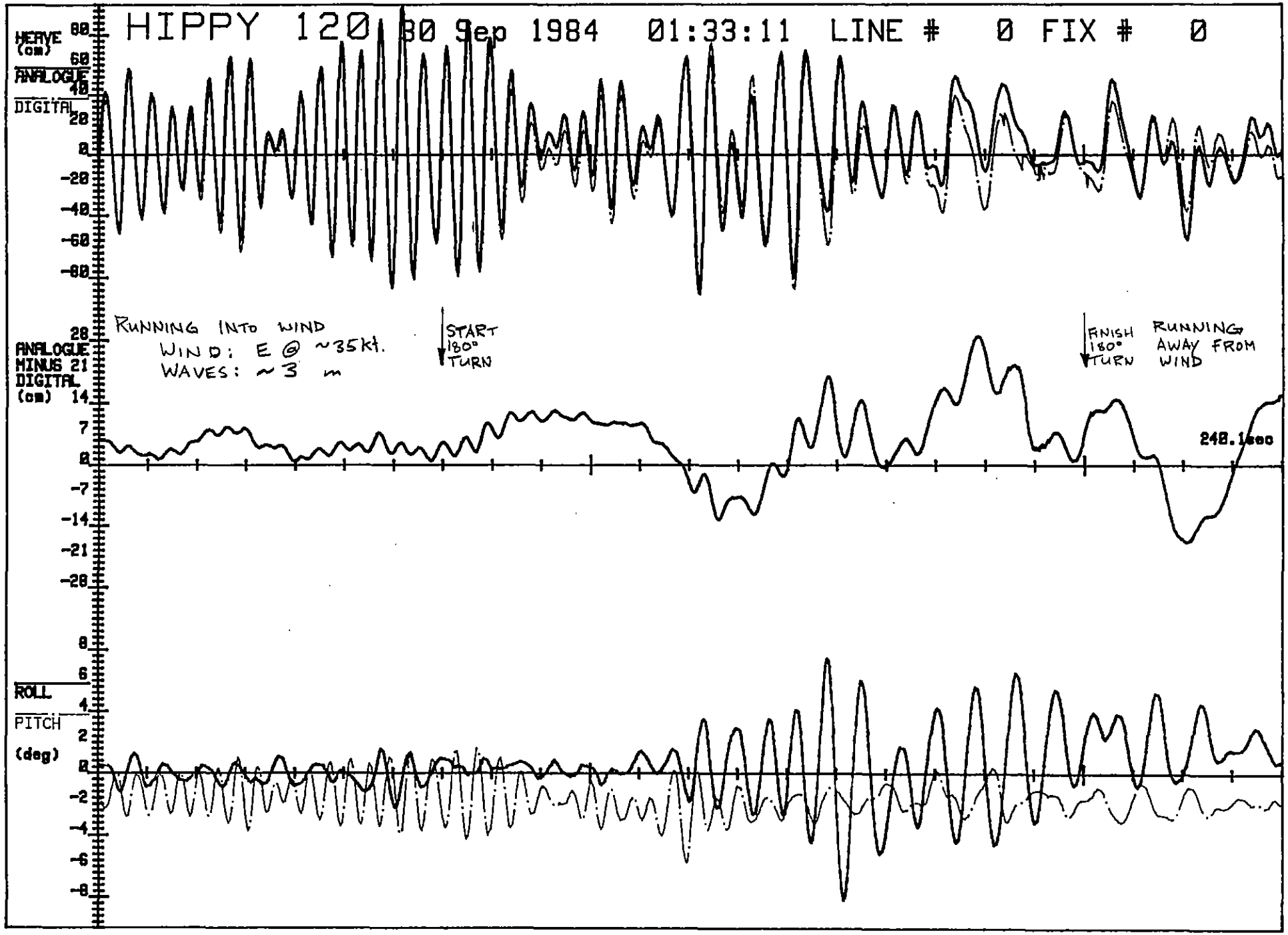
25C

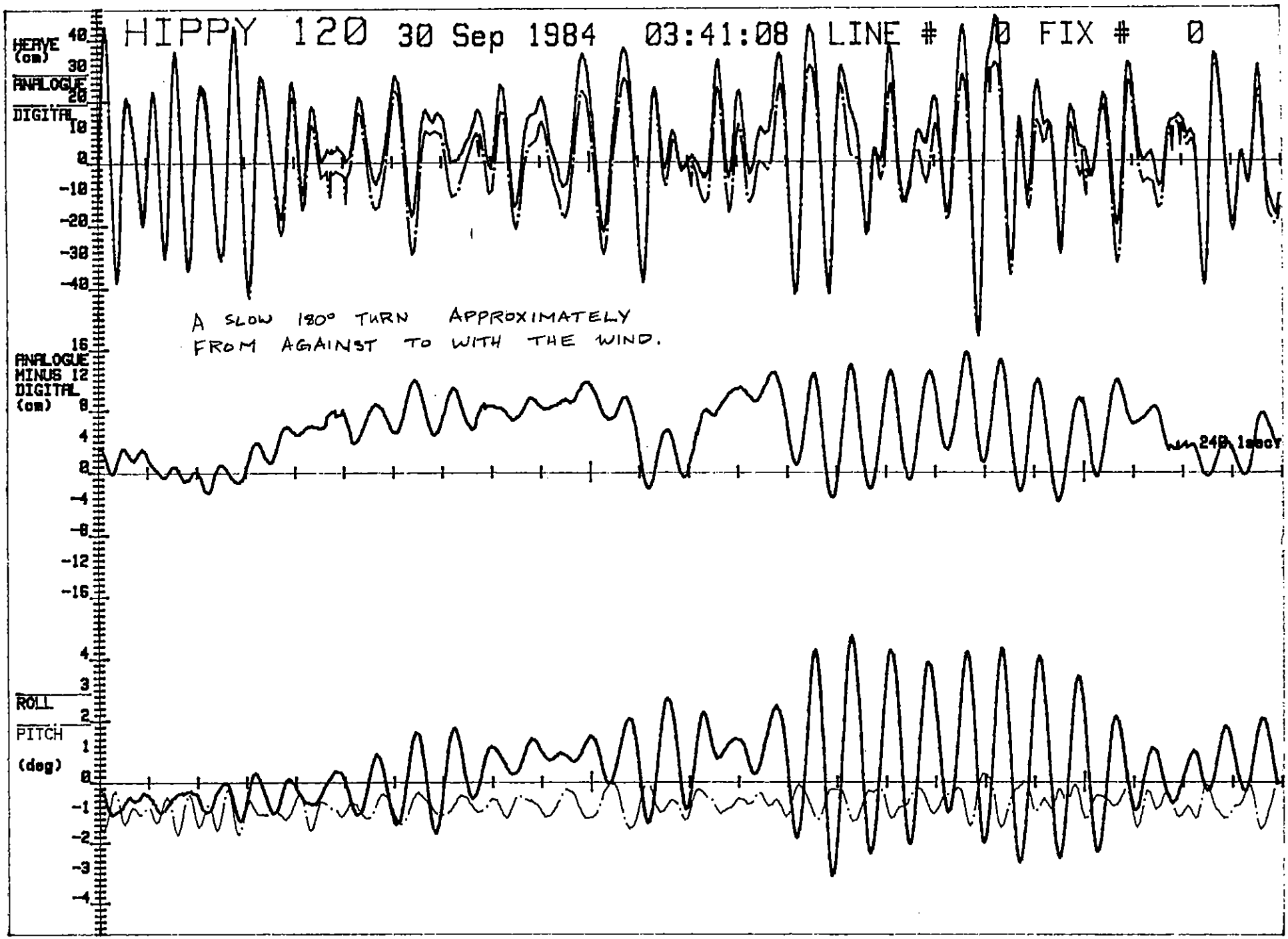
HEWLETT PACKARD

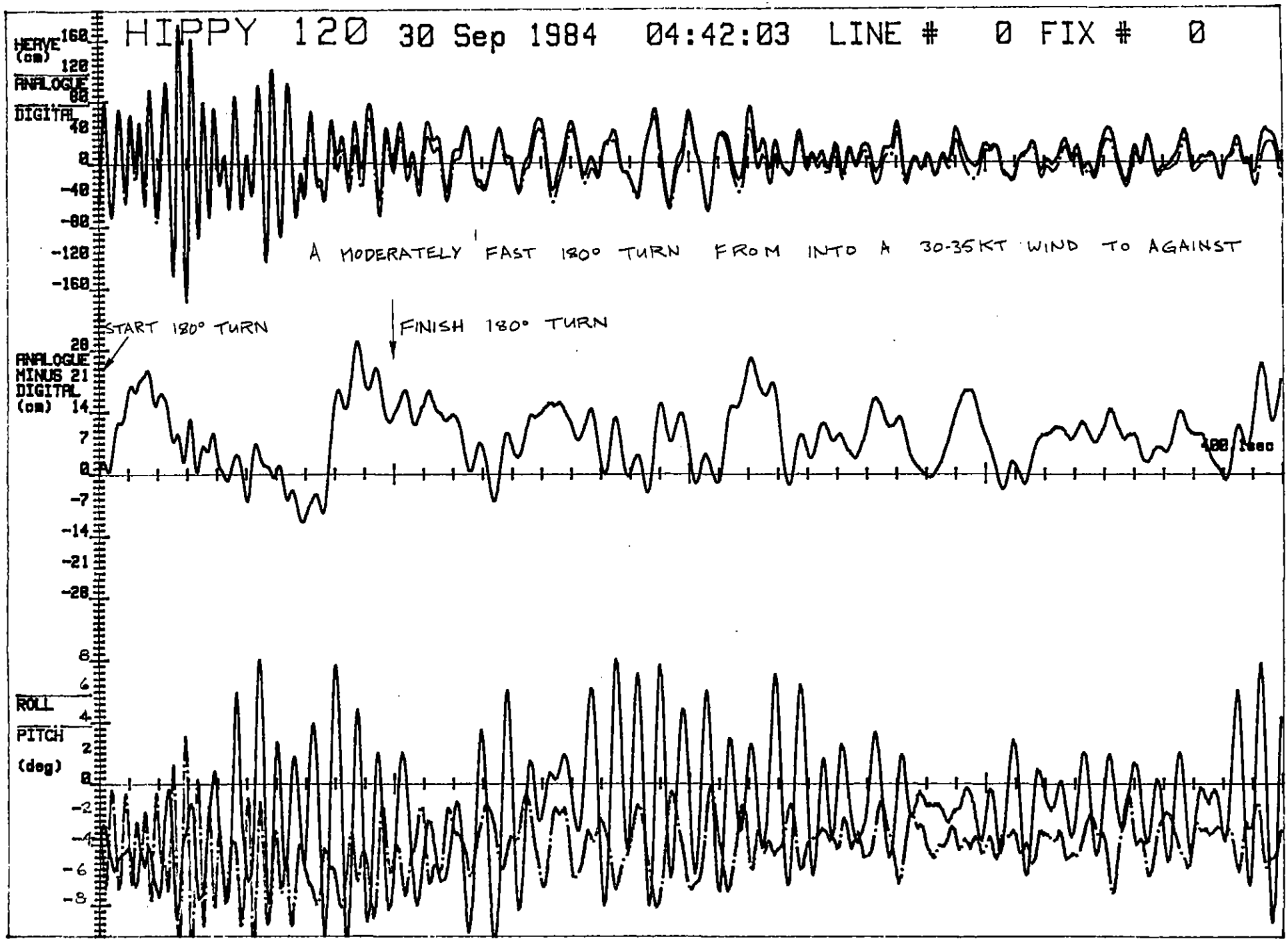



HIPPY 120 30 Sep 1984 01:03:15 LINE # 0 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
120
90
60
30
0
-30
-60
-90
-120
HEADING INTO WIND.
NOTE THE CORRELATION BETWEEN HEAVE & PITCH.
ALSO NOTE THE LOW FREQUENCY IN THE DIFFERENCE.
2T = 60sec ; f = 0.033 Hz
ANALOGUE MINUS DIGITAL (cm)
12
9
6
3
0
-3
-6
-9
-12
248.1sec
ROLL
PITCH
(deg)
12
9
6
3
0
-3
-6
-9
-12

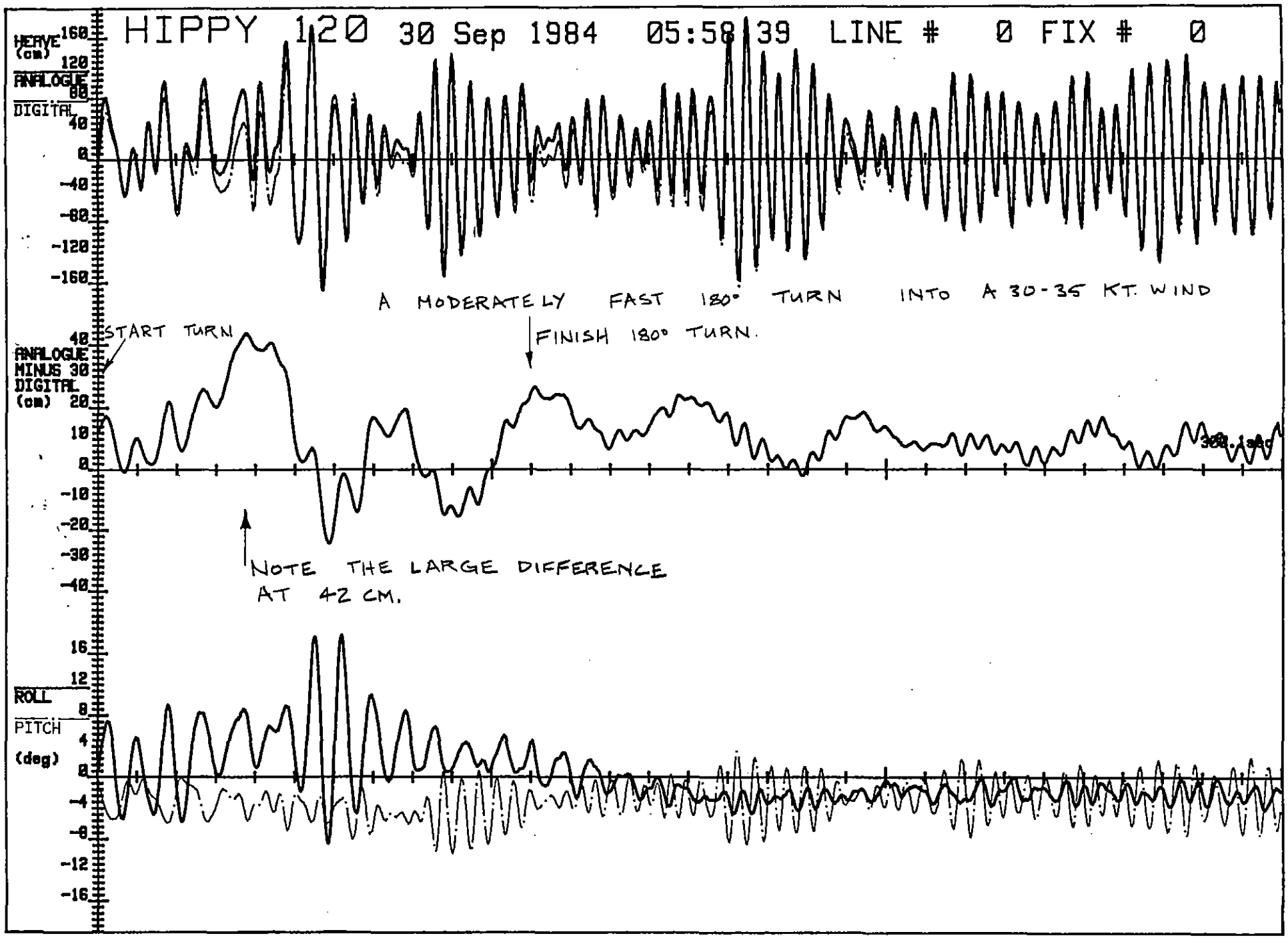
30B


HIPPY 120 30 Sep 1984 01:33:11 LINE # 0 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
80
60
40
20
0
-20
-40
-60
-80
RUNNING INTO WIND
WIND: E @ ~35kt.
WAVES: ~3 m
START 180° TURN
FINISH 180° TURN
RUNNING AWAY FROM WIND
ANALOGUE MINUS DIGITAL (cm)
28
21
14
7
0
-7
-14
-21
-28
248.1000
ROLL
PITCH
(deg)
8
6
4
2
0
-2
-4
-6
-8

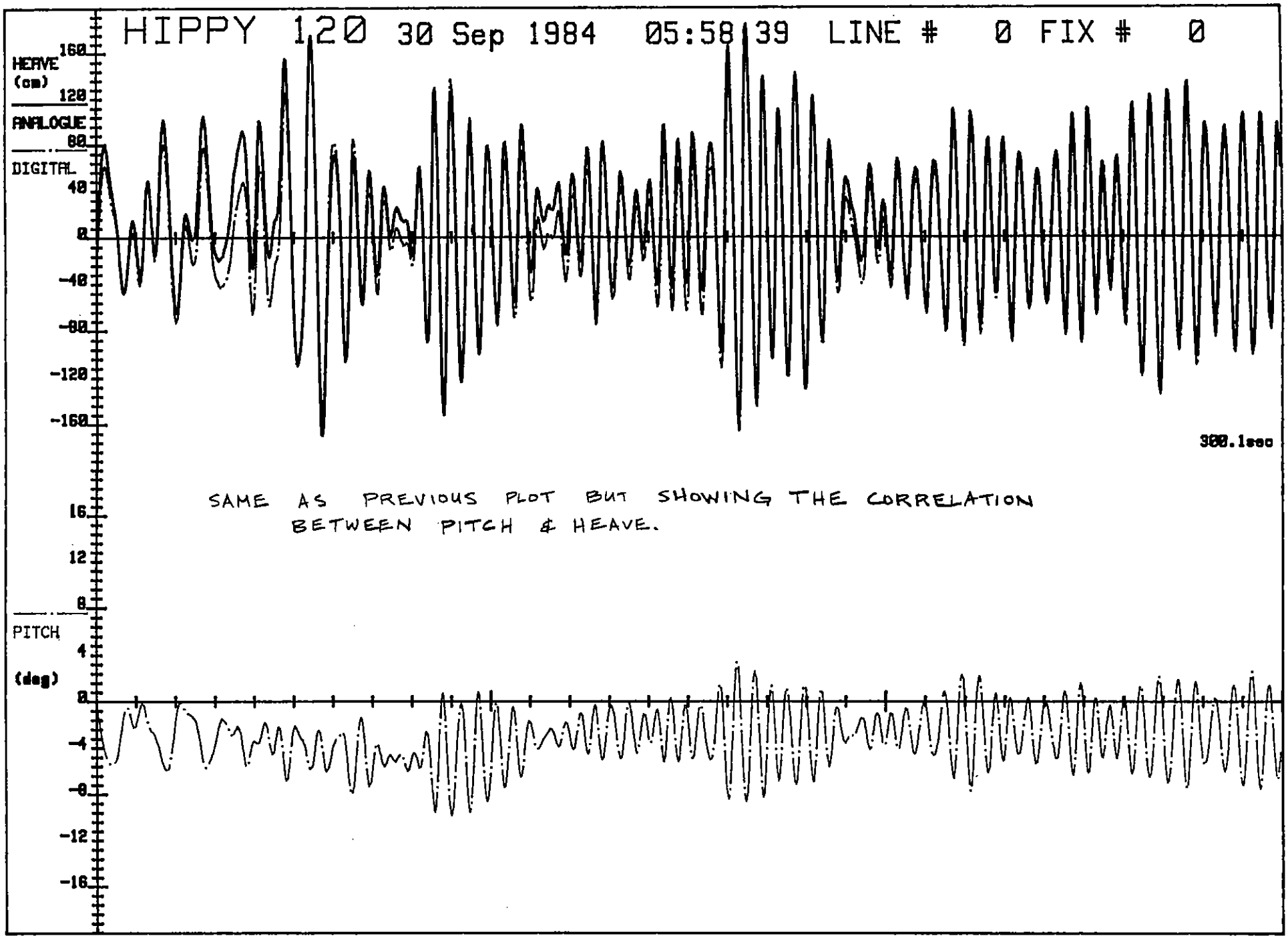

HIPPY 120 30 Sep 1984 03:41:08 LINE # 0 FIX # 0
HERVE (cm)
ANALOGUE
DIGITAL
40
30
20
10
0
-10
-20
-30
-40
A SLOW 180° TURN APPROXIMATELY
FROM AGAINST TO WITH THE WIND.
ANALOGUE MINUS 12 DIGITAL (cm)
16
8
4
0
-4
-8
-12
-16
ROLL
PITCH
(deg)
4
3
2
1
0
-1
-2
-3
-4


HIPPY 120 30 Sep 1984 04:42:03 LINE # 0 FIX # 0
HERVE (cm)
ANALOGUE
DIGITAL
160
120
80
40
0
-40
-80
-120
-160
A MODERATELY FAST 180° TURN FROM INTO A 30-35KT WIND TO AGAINST
START 180° TURN
FINISH 180° TURN
ANALOGUE MINUS 21 DIGITAL (cm)
28
14
7
0
-7
-14
-21
-28
100 sec
ROLL
PITCH
(deg)
8
6
4
2
0
-2
-4
-6
-8

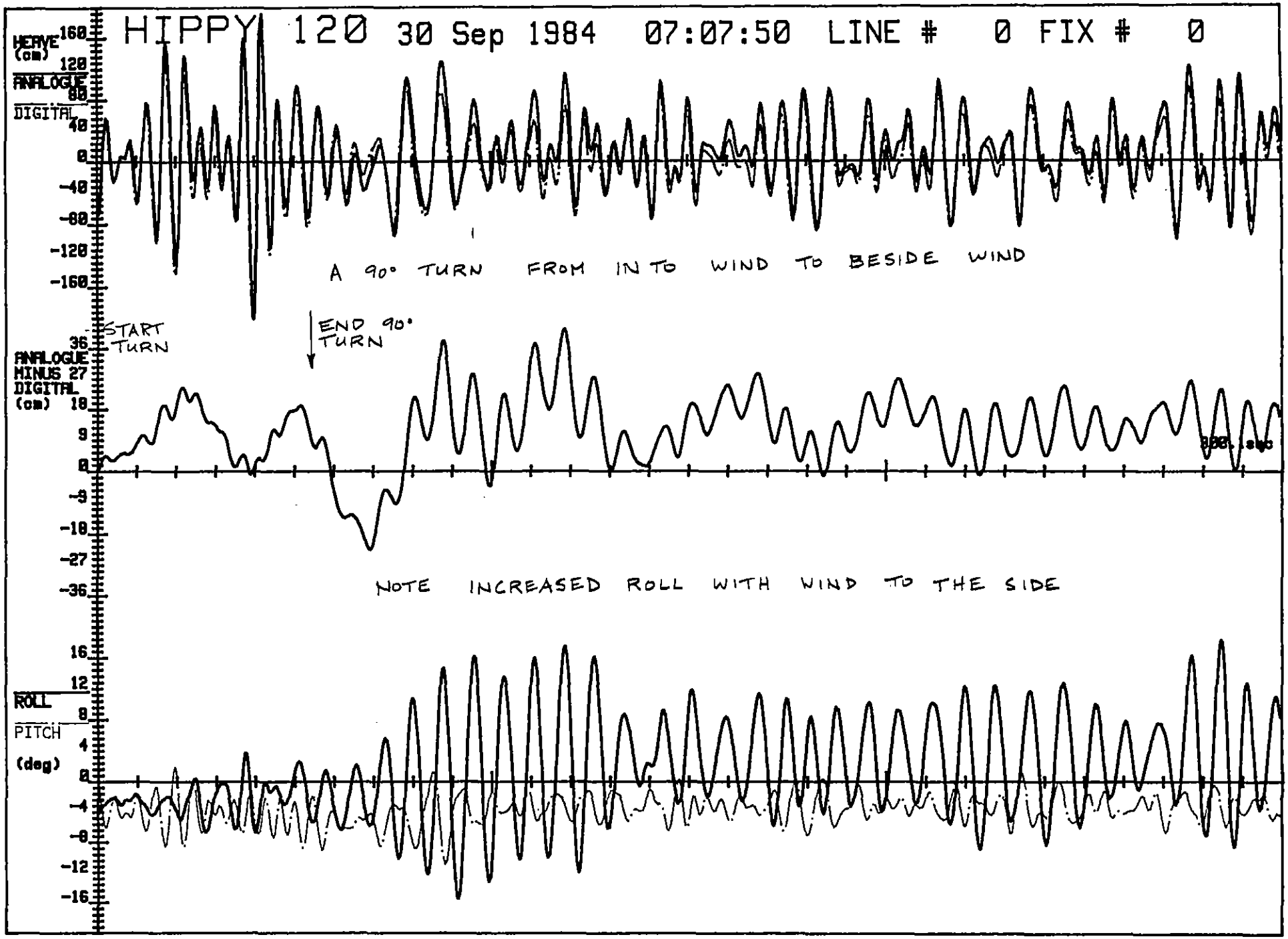
30E


HIPPY 120 30 Sep 1984 05:58:39 LINE # 0 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
160
120
80
40
0
-40
-80
-120
-160
A MODERATELY FAST 180° TURN INTO A 30-35 KT. WIND
START TURN
FINISH 180° TURN.
ANALOGUE MINUS DIGITAL (cm)
40
30
20
10
0
-10
-20
-30
-40
NOTE THE LARGE DIFFERENCE AT 42 CM.
ROLL
PITCH
(deg)
16
12
8
4
0
-4
-8
-12
-16

30E

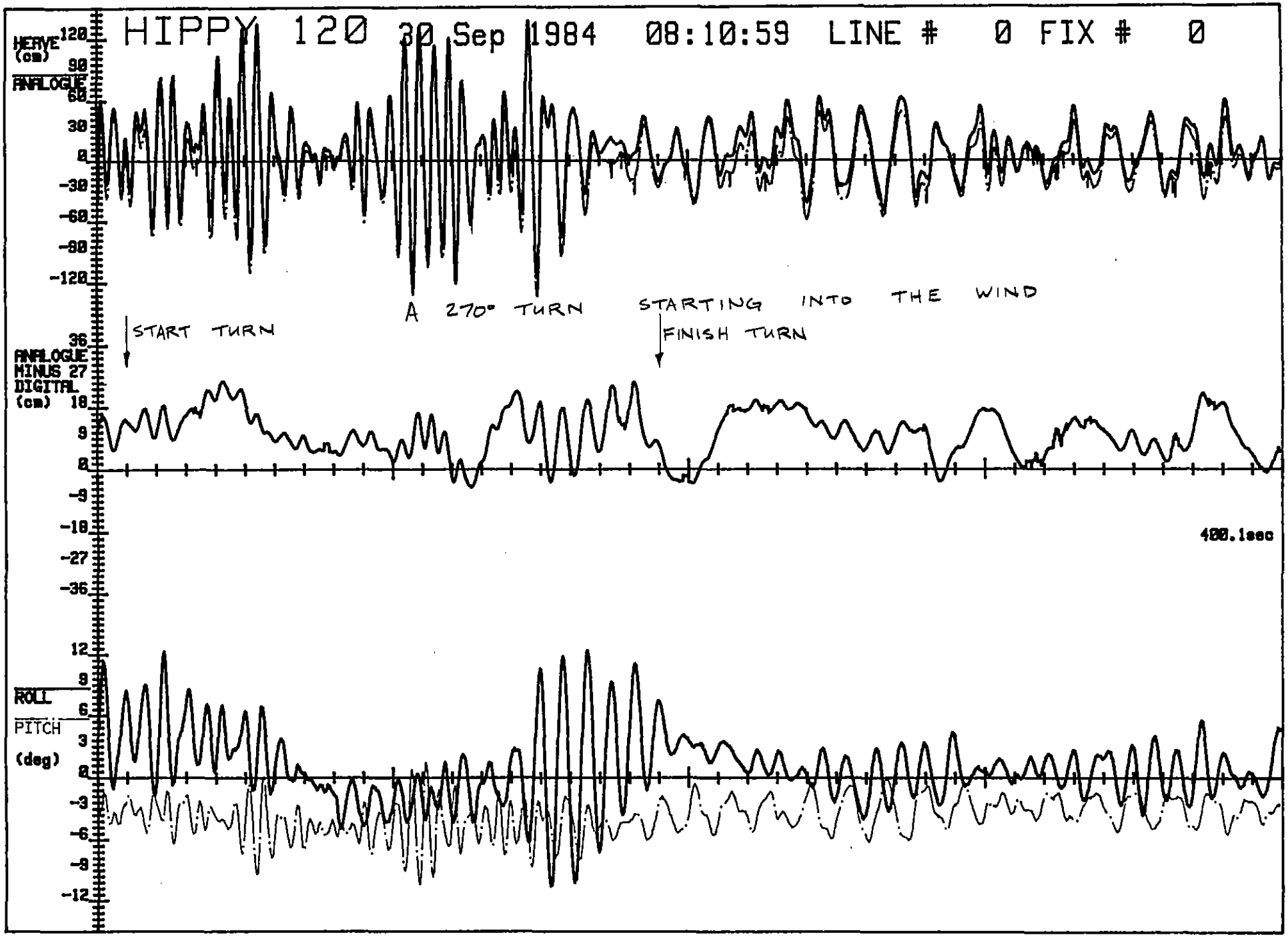

HIPPY 120 30 Sep 1984 05:58:39 LINE # 0 FIX # 0
HEAVE (cm)
160
120
ANALOGUE
80
DIGITAL
40
0
-40
-80
-120
-160
300.1sec
SAME AS PREVIOUS PLOT BUT SHOWING THE CORRELATION BETWEEN PITCH & HEAVE.
16
12
8
PITCH
(deg)
4
0
-4
-8
-12
-16

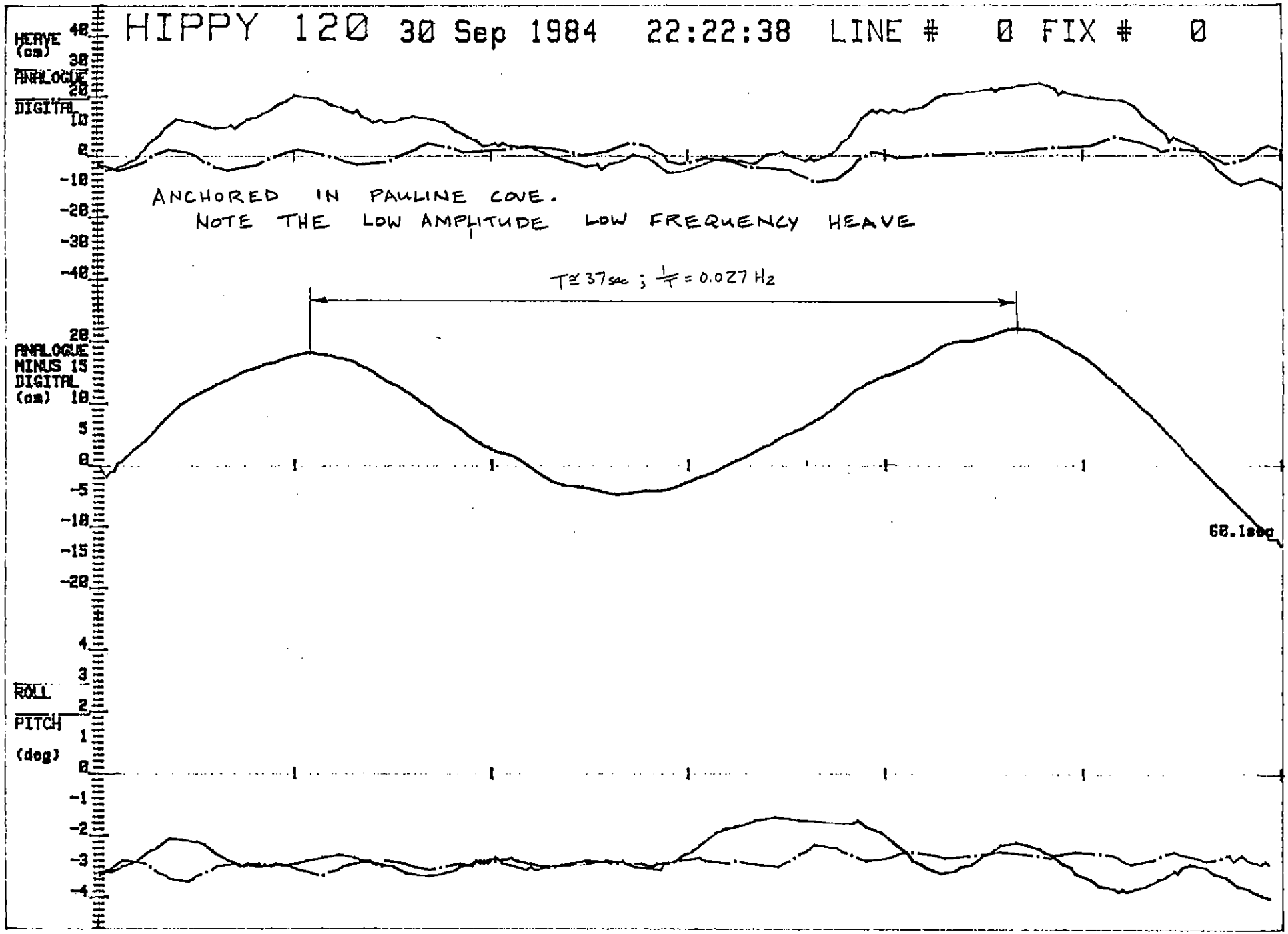
30 F

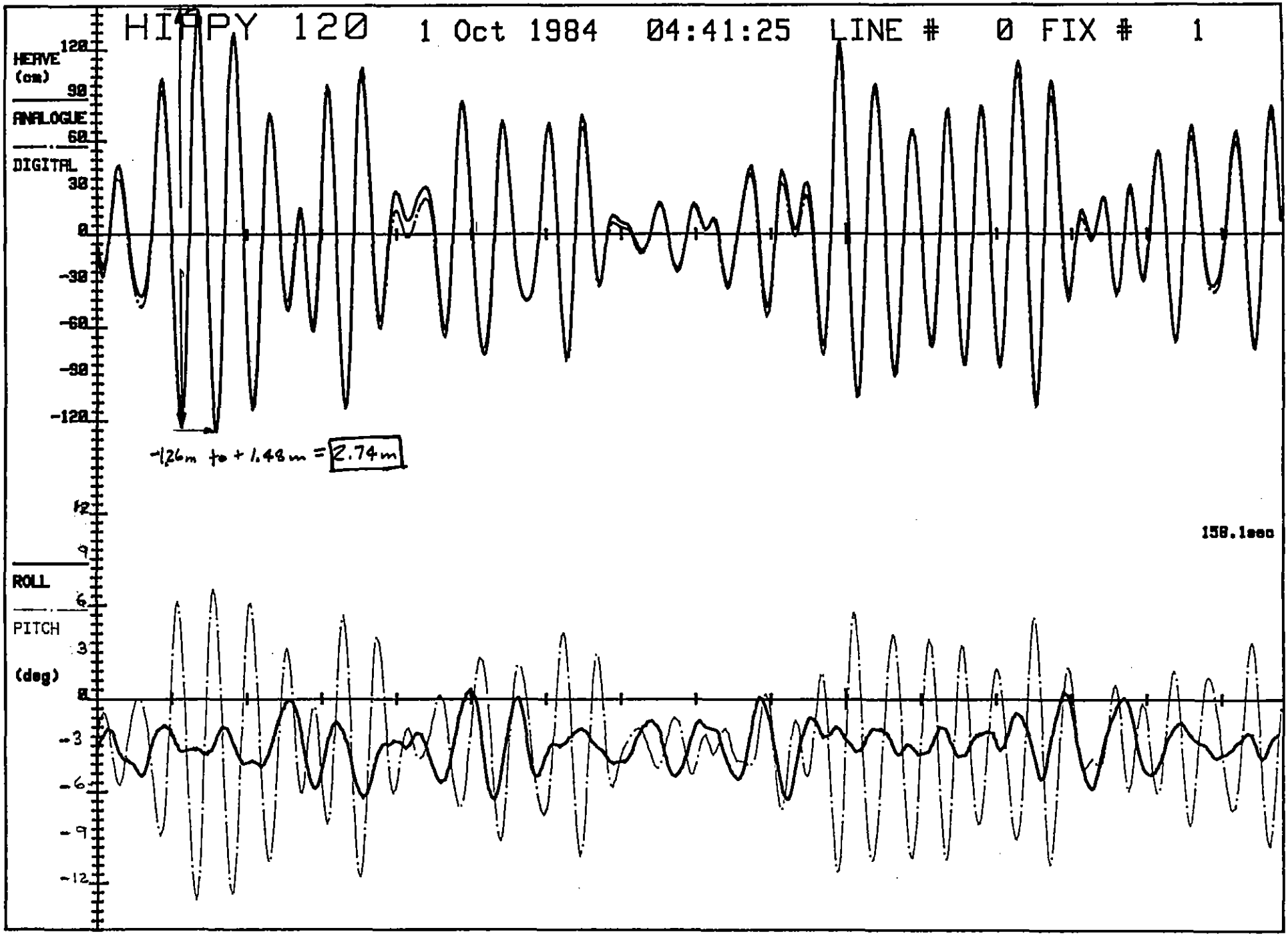

HIPPY 120 30 Sep 1984 07:07:50 LINE # 0 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
160
120
80
40
0
-40
-80
-120
-160
A 90° TURN FROM IN TO WIND TO BESIDE WIND
START TURN
END 90° TURN
ANALOGUE MINUS 27 DIGITAL (cm)
36
18
9
0
-9
-18
-27
-36
NOTE INCREASED ROLL WITH WIND TO THE SIDE
ROLL
PITCH
(deg)
16
12
8
4
0
-4
-8
-12
-16

30G

HEWLETT PACKARD




HIPPY 120 30 Sep 1984 22:22:38 LINE # 0 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
ANCHORED IN PAULINE COVE.
NOTE THE LOW AMPLITUDE LOW FREQUENCY HEAVE
T≅37sec ; 1/T = 0.027 Hz
ANALOGUE MINUS 15
DIGITAL (cm)
68.1sec
ROLL
PITCH
(deg)


HIPPY 120 1 Oct 1984 04:41:25 LINE # 0 FIX # 1
HEAVE (cm)
ANALOGUE
DIGITAL
120
90
60
30
0
-30
-60
-90
-120
-1.26m to +1.48m = 2.74m
158.1sec
ROLL
PITCH
(deg)
6
3
0
-3
-6
-9
-12

HIPPY TEST OCT 1, 1984

PAPER SPEED 1:2000

SCALE: 0.1m or 1mm = 0.5m

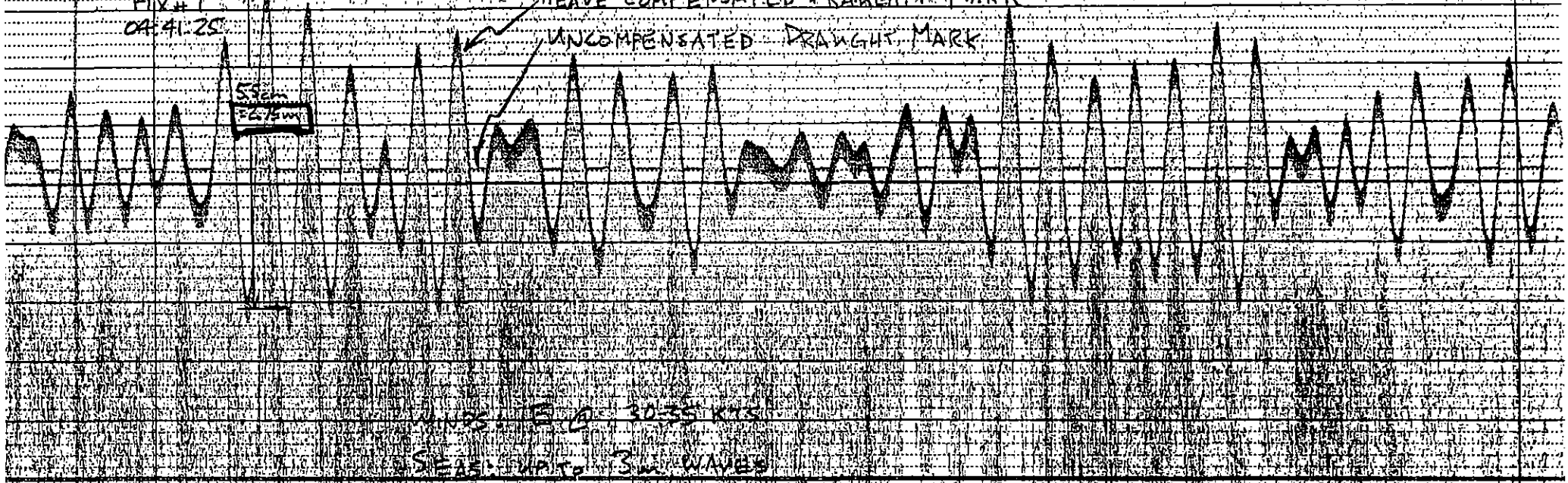
FIX #1
04:41.25

HEAVE COMPENSATED DRAUGHT MARK

UNCOMPENSATED DRAUGHT MARK

FIX #

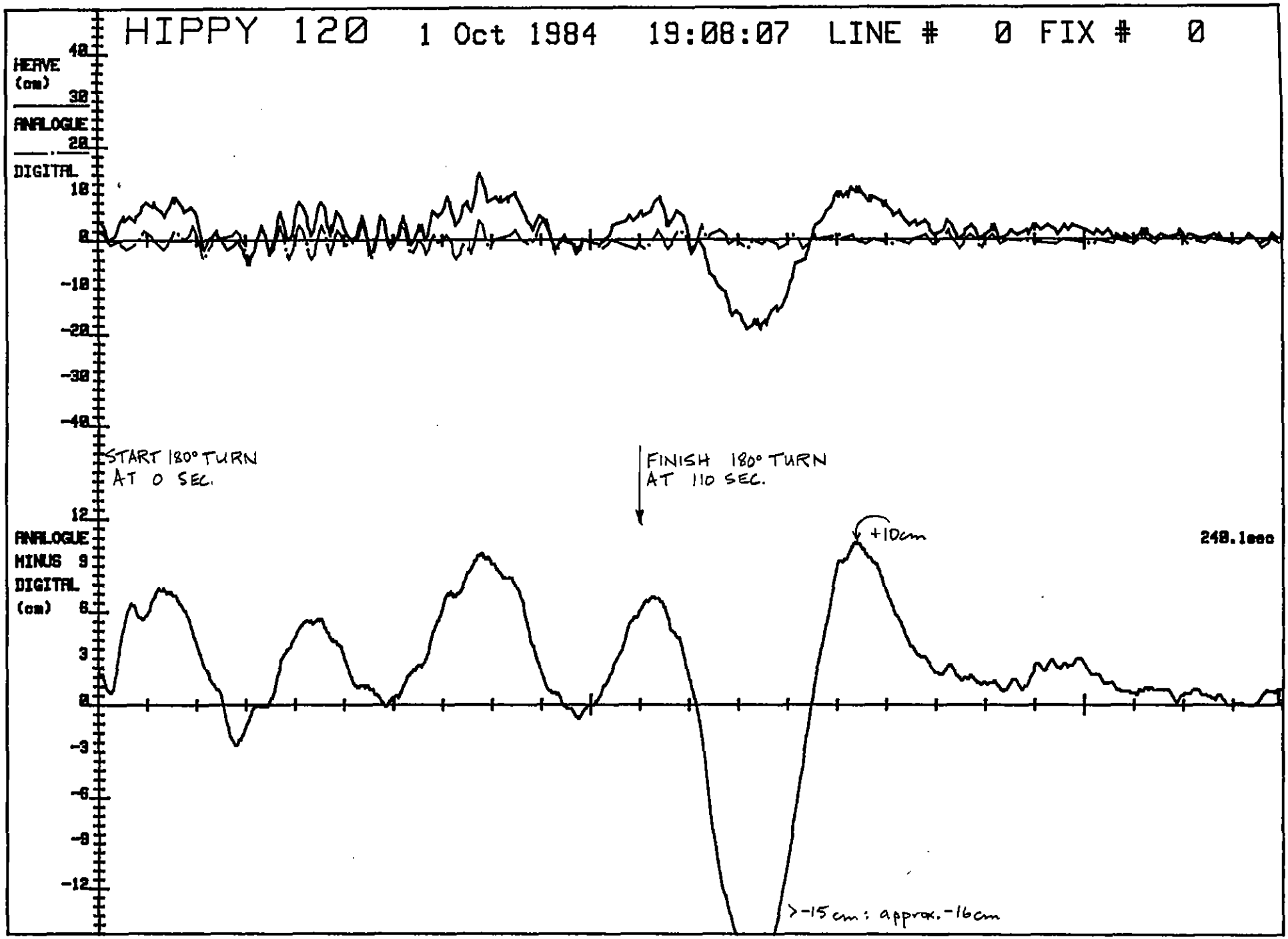
5.5cm = 2.75m

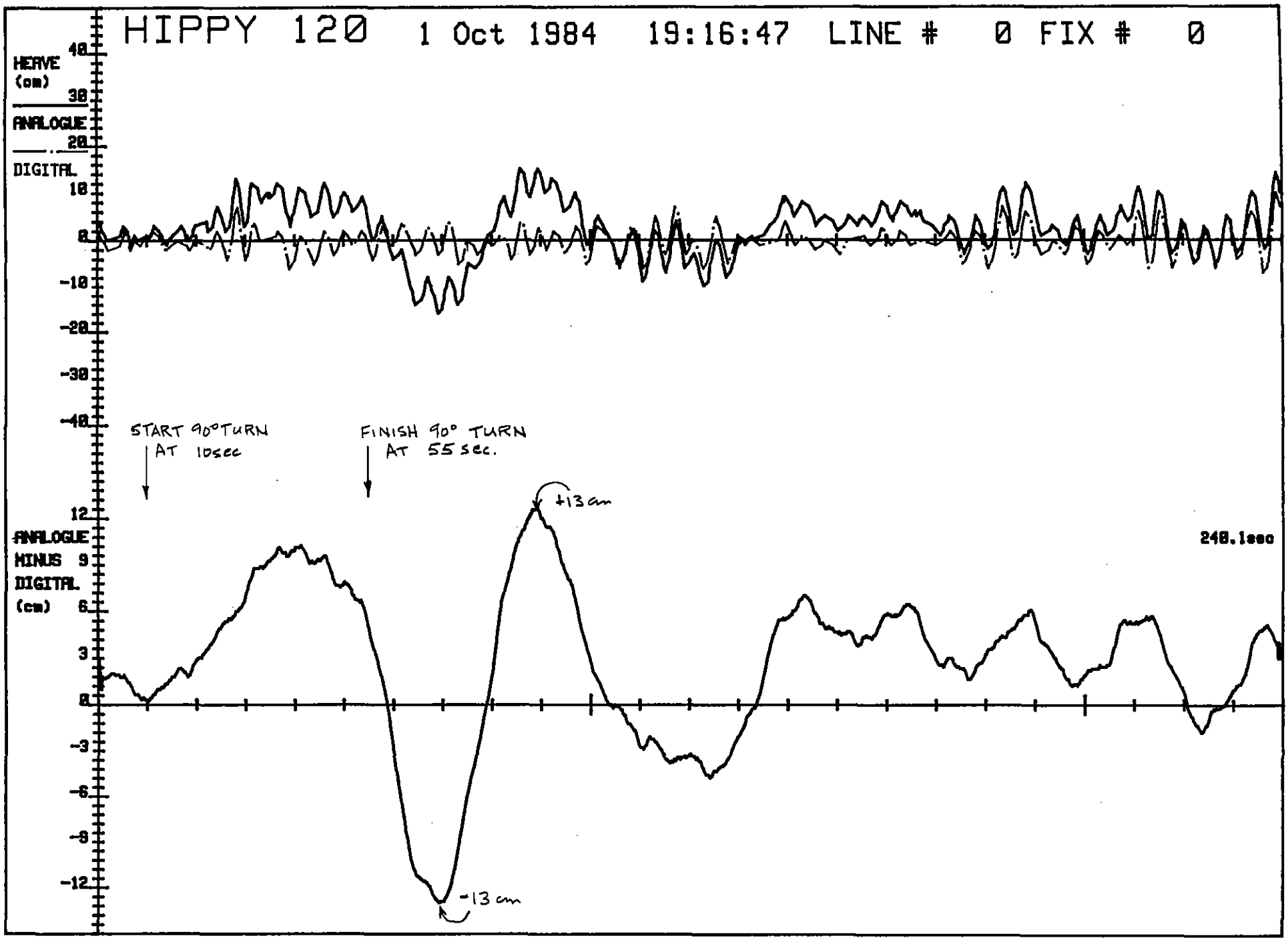


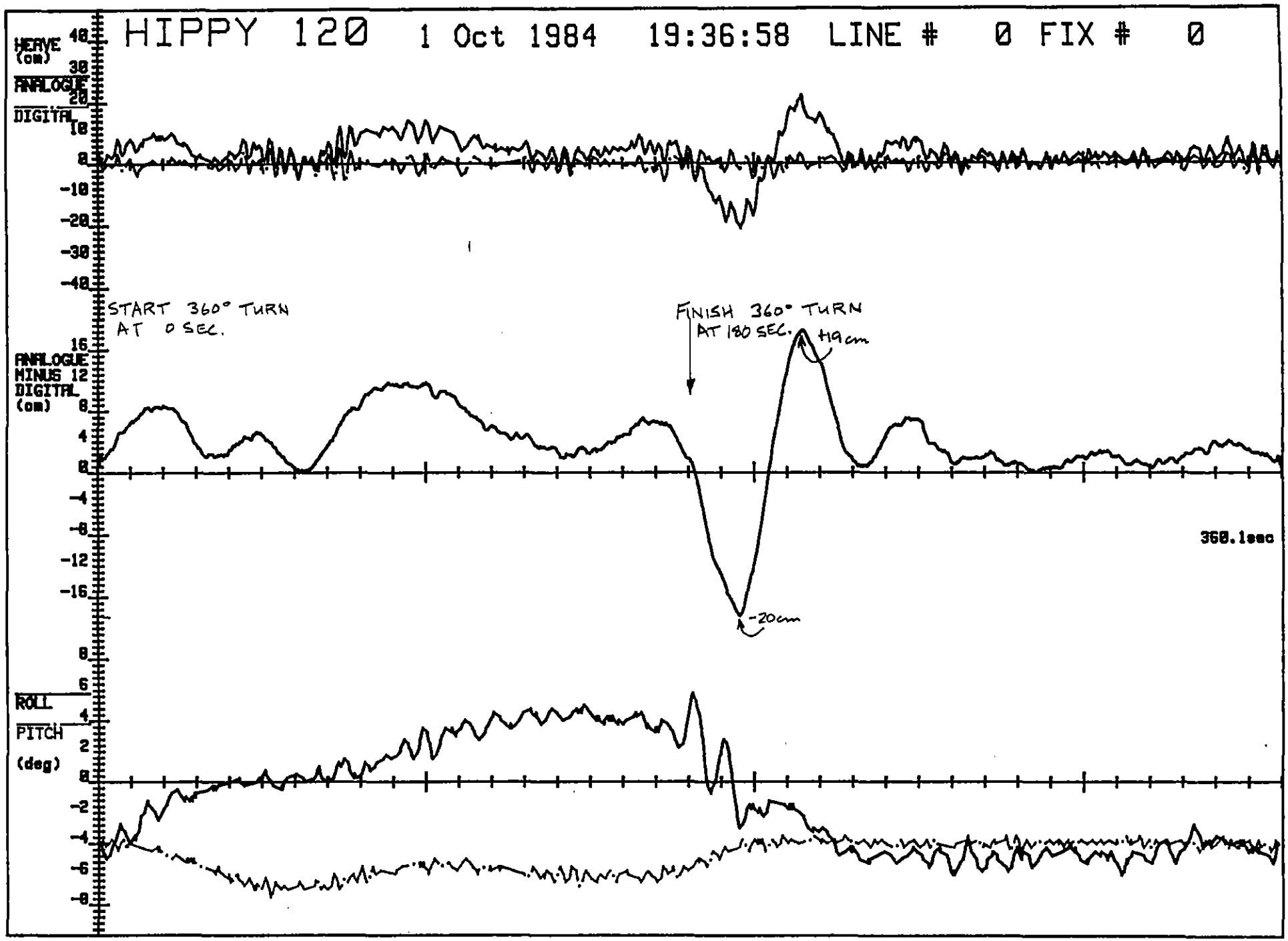
WINDS: E @ 30-35 KTS

SEAS: UP TO 3m WAVES

VESSEL HEADING ENE


HIPPY 120 1 Oct 1984 19:08:07 LINE # 0 FIX # 0
HERVE (cm)
ANALOGUE
DIGITAL
48
38
28
18
8
-18
-28
-38
-48
START 180° TURN AT 0 SEC.
FINISH 180° TURN AT 110 SEC.
12
ANALOGUE MINUS DIGITAL (cm)
9
6
3
0
-3
-6
-9
-12
+10cm
248.1sec
>-15 cm : approx. -16cm


HIPPY 120 1 Oct 1984 19:16:47 LINE # 0 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
40
30
20
10
0
-10
-20
-30
-40
START 90° TURN AT 10sec
FINISH 90° TURN AT 55 sec.
+13 cm
-13 cm
ANALOGUE MINUS DIGITAL (cm)
12
9
6
3
0
-3
-6
-9
-12
240.1sec


HIPPY 120 1 Oct 1984 19:36:58 LINE # 0 FIX # 0
HEAVE (cm)
ANALOGUE
DIGITAL
START 360° TURN AT 0 SEC.
FINISH 360° TURN AT 180 SEC.
+19cm
-20cm
ANALOGUE MINUS 12 DIGITAL (cm)
360.1sec
ROLL
PITCH
(deg)

Other Possible Use of the Hippy

A possible program that would use the digitally filtered heave in semi-real-time is proposed. This program would use the auto-repeat capability and continuously obtain the pitch, roll, and heave data. It would remember this for at least 77.2 sec. and also remember the time when fixes are taken. At the time of a fix it would interrogate the echosounder and when the Hippy data is available, it would interpolate to determine the heave, roll, and pitch at the time of the fix. This method would, in fact, require a second, on-line computer which is the main disadvantage. This computer would handle the Hippy and echosounder as well as log this data, so it would have the extra advantage of speeding up the main navigation program. It could also correct for the slant range due to roll and pitch. The desirability of this correction is a matter of judgement because a transducer transmission has a certain beam-width and if the pitch and roll is within this beam, the echo could be assumed to be coming from the vertical. The reflection probably comes from the closest object detected in the beam, but if there is a large roll angle it would have to be assumed as the center of the beam. The error due to roll or pitch is also proportional to the depth, so this is a factor in deciding to use it.

Since the main factor limiting the use of the Hippy120 on smaller boats is its size, consideration might be given to the Hippy40. This is a smaller version at 410 mm. maximum diameter, 554 mm. maximum height, and 36 kg. weight. It does not have a microprocessor so digital communication is not available. Since it uses a pendulum with a 40 sec. period, it is expected to have more problem with low frequencies.

Conclusions

The two problems of low frequency heave and turn around false output have been witnessed. By theory the digitally filtered heave is much more accurate than the analog, so a rough estimate of the error in the real time heave is available by comparing the two. The largest witnessed discrepancy between the two is 24 cm. which occurred with the Banksland at anchor. The turn around false output is avoided by allowing 80 sec. settling time after a turn. The Hippy worked substantially well and has allowed surveying at times when excessive heave would otherwise prevent it. Also, a scheme for using the digitally filtered heave, pitch, and roll for compensation is proposed.

Cansite Surveys Ltd.

Halifax

Suite 212, Duke Street Tower
Halifax, Nova Scotia
Canada B3J 1N9

Telephone: 902-423-9314
Telex: 019-21594

Calgary

≠ 710, Bow Valley Square 3
255-5th Avenue S.W.
Calgary, Alberta
Canada T2P 3G6

Telephone: 403-234-9979
Telex: 038-22035