

*Wellfeld
2/9-1
Survey Feb*

SURVEY REPORT

FOR

AMOCO NORWAY OIL COMPANY

REFERENCE 2/9-1/1263

DATED 16TH OCTOBER - 4TH

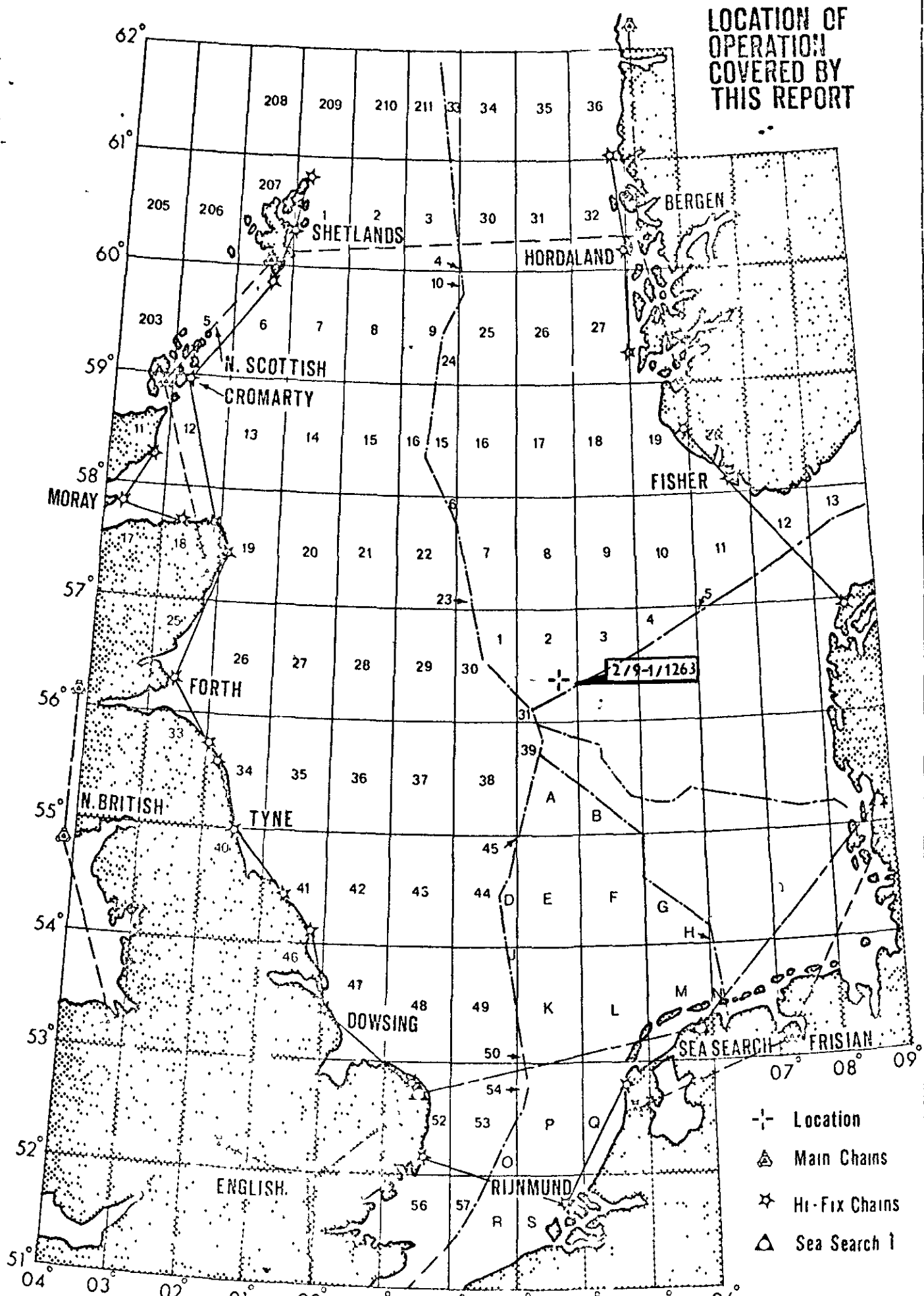
NOVEMBER 1972

SURVEY REPORT

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LOCATION OF OPERATION COVERED BY THIS REPORT



- ⊕ Location
- △ Main Chains
- ☆ Hi-Fix Chains
- △ Sea Search 1

U.K.

1	2	3	4	5
6	7	8	9	10
11	12	13	14	15
16	17	18	19	20
21	22	23	24	25
26	27	28	29	30

Dutch

1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18

Norwegian

1	2	3
4	5	6
7	8	9
10	11	12

Sub-Division Of Blocks



DECCA SURVEY LTD.,
 Main Cross Road,
 Gt. Yarmouth,
 Norfolk
 ☎ 57210/7/8/9

A B S T R A C T

The survey vessel 'Decca Pilot' sailed from Great Yarmouth for the Amoco Norway location 2/9-1 at 0700 on the 16th October, 1972.

Sailing instructions were received from Amoco to proceed and carry out a sounding and sonar survey prior to the rig 'Zapata Explorer' moving onto location.

This survey was completed by 1430 on the 17th and findings were as follows.

Sounding Survey

All depths within the square kilometre surveyed were found to be 221 feet (67.4 metres) reduced to Lowest Astronomical Tide.

Sonar Survey

The sonar trace revealed a flat featureless sea-bed within the area surveyed. There were no obstructions

The survey vessel then stood by to await the arrival of the 'Zapata Explorer'.

The rig moved on to location on the 31st October, and a final fix taken on the 1st November gave a position of:-

Latitude: $56^{\circ} 22' 11.9''$ North

Longitude: $03^{\circ} 39' 59.8''$ East

being 272 metres, 274° (T) from the intended location.

Contd/.....

'Decca Pilot' was released at 2340 on the 2nd November, and set course for Great Yarmouth where she arrived at 0330 on the 4th November.

2/.....

1. REQUIREMENTS

Requirements for this survey were laid out in a telex dated 2nd October, 1972, and sent by Mr. E. Sigurdson of Amoco Norway Oil Company to Decca Survey Limited, Great Yarmouth. They were as follows:-

1. To lay a pattern of five buoys centred on location:-

Latitude: $56^{\circ} 22' 11.326''$ North

Longitude: $03^{\circ} 40' 15.622''$ East

2. To survey an area of one square kilometre centred on the above location with side scan sonar and echo sounder.
3. To assist the drilling rig 'Zapata Explorer' on to the above location and fix her final position.

2. LOCATION COMPUTATIONS

The location is based on Shot Point 12, line 71-7, shot by Seismic Engineering on the 7th April, 1972.

From the observed Fisher Hi-Fix readings of:-

Pattern 1 442.20

Pattern 11 770.65

and using no layback, the following geographical position has been computed:-

Latitude: $56^{\circ} 22' 11.326''$ North

Longitude: $03^{\circ} 40' 15.622''$ East

From the above the following Decca co-ordinates were computed:-

	Pattern 1/Red	Pattern 11/Green	Purple
Fisher Hi-Fix	442.140	770.590	
C-O Errors	- 0.06	-0.06	

contd/.....

	Pattern 1/Red	Pattern 11/Green	Purple
Sea Search 1	A20.066	G47.237	
C-O Errors	+0.02	+ 0.05	
Main Chain 9B	D23.672	H43.990	D51.087
C-O Errors	- 0.08	- 0.02	- 0.10
Main Chain 7B	A21.728	B36.396	J59.192
C-O Errors	- 0.08	-0.12	- 0.19
Main Chain OE	A01.773	E34.287	G58.490
C-O Errors	+ 0.32	nil	- 0.18

3. FINAL POSITION OF DERRICK

The final position of the derrick was:-

Latitude: $56^{\circ} 22' 11.9''$ North

Longitude: $03^{\circ} 39' 59.8''$ East

This position was 272 metres on a bearing of $274^{\circ}(T)$ from the intended location.

The rig heading was $283^{\circ}(T)$

The computation of this position from corrected observed Fisher Hi-Fix readings of:-

Patt 1 442.58

Patt 11 770.02

has been carried out to additional decimal places as follows:-

Latitude: $56^{\circ} 22' 11.882''$ North

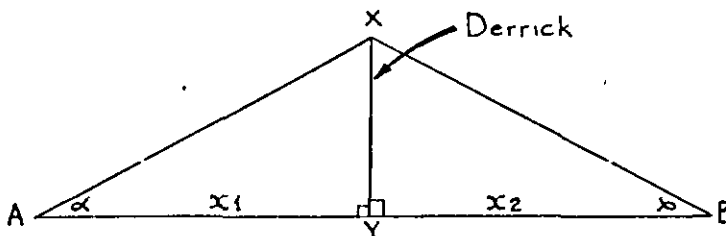
Longitude: $03^{\circ} 39' 59.771''$ East

and these latter figures should be used if the position is to be used as the basis for any subsequent calculations.

4. METHOD OF FIXING THE DERRICK

The large metallic structure of a rig or platform causes the phase difference measurements of the Decca receivers to be upset by re-radiation if the aerials associated with the receivers are brought within 1500 feet of the structure. Thus it is not possible to fix the derrick of a rig accurately by placing the survey ship alongside. A method of fixing has therefore been evolved which does not necessitate the survey vessel approaching the rig within 1500 feet.

This method depends on right angled triangles being congruent if one side and one other angle are equal. It is shown in diagram form below. Two fixes A and B are shown, taken on opposite sides of the derrick, when the two angles, α , subtended between the top of the derrick and the horizon are equal. Thus, two right angled congruent triangles are formed, XYA and XYB, each having one side common, and one angle equal. It can be seen that the distances x_1 , and x_2 must also be equal.



The survey ship is steamed towards the derrick from four directions spaced apart by 90° , either by steaming on compass courses or on transits of the rig's legs if the rig is of a regular configuration. On each 'run in' towards the derrick the ship's position, as given by the Decca readings, is noted three times, when the vertical angle between the derrick head and the horizon reaches each of three chosen values. The three angles are chosen so that the sum of the errors caused by re-radiation and inaccurate observing are minimal. Re-radiation errors are possible when the survey ship is within 1500 feet of the rig, whilst observing errors increase with distance from the rig. From experience these angles are between 4 and 8 degrees, which give distances from the derrick of between 2500 and 1500 feet.

Thus 3 sets of 4 positions which theoretically are equidistant from the derrick are obtained. These 12 positions are plotted on a large scale chart and equal arcs are then struck from the four inner, centre and outer positions, the radii being chosen so that the arcs intersect as near to one position as possible. This latter position is that of the derrick, the co-ordinates of which can be read off the chart.

On the accompanying chart the arcs struck from the 12 fix positions have been omitted for clarity. Instead 3 circles have been drawn centred on the accepted position of the derrick, each circle having a radius equal to the mean ship/derrick distance when each angle was taken. Thus the distance of each fix from its associated circle is a measure of its accuracy as compared with the three others at that distance from the derrick, and the sum of the differences between each fix and the relevant circle is a measure of the accuracy of the fix of the derrick.

At night or in poor visibility when the horizon cannot be distinguished clearly a good approximation of the derrick's position can be obtained by the following method. The survey ship is steamed in a complete circle around the rig and not less than 1500 feet from it. The receivers on board are read each time that adjacent pairs of legs come in line. These fixes are then plotted and are joined in such a way that the resulting lines show the outline of the rig. The derrick can then be plotted by estimation. This method has been found to be not so accurate as the one previously described, because of the insensitivity of the transits.

The barge heading can be obtained from either of these methods, provided that the barge is of a regular configuration, by lining a protractor along the line joining the fixes taken ahead and astern of the barge. Alternatively, the survey ship's magnetic compass may be used.

For this operation sextant angles of 4° , 5° and 6° were used.

5. DEPTH SURVEY

a) Depth Sounding Equipment

The survey was undertaken with an Atlas type AN 6014 straight line recording survey echo sounder.

Prior to commencing the depth survey, a sea water temperature of 11.6°C and a salinity value of 34.80 parts per thousand were interpolated for the location from North Sea charts showing the average monthly values for the two factors.

Using the values obtained in conjunction with a graph supplied by the manufacturers, the echo sounder motor speed was set corresponding to a speed of propagation of 1495 metres per second.

The transmission line was set at 2.6 metres to compensate for the depth of the transducer below the water line.

The motor speed and transmission line settings were checked on completion of each line of depth sounding.

b) Depth Sounding

Lines of soundings were taken at 100 metre intervals along Fisher Hi-Fix pattern 1.

The ship's position was fixed at $\frac{1}{4}$ lane intervals of Fisher Hi-Fix pattern 2.

c) Description of Sea bed

The whole area within the square kilometre surveyed was found to be extremely flat and featureless. All depths were 221 feet (67.4 metres) reduced to Lowest Astronomical Tide.

6. TIDAL INFORMATION

All soundings have been reduced to Lowest Astronomical Tide from predictions contained in the Admiralty Tide Tables, European Waters, Volume 1.

The predicted heights and times for high and low water for the Standard Port of Aberdeen were related to the location by means of Co-Tidal chart No. 2, a time difference of + 01 hours 33 minutes being applied to the predicted times, and heights multiplied by a factor of 0.17.

The following heights for the location have been computed:-

L. A. T.	0.00 feet	0.00 metres
M. L. W. S.	0.03 feet	0.01 metres
M. L. W. N.	0.89 feet	0.27 metres
M. L.	1.41 feet	0.43 metres
M. H. W. N.	1.90 feet	0.58 metres
M. H. W. S.	2.33 feet	0.71 metres
H. A. T.	2.69 feet	0.82 metres

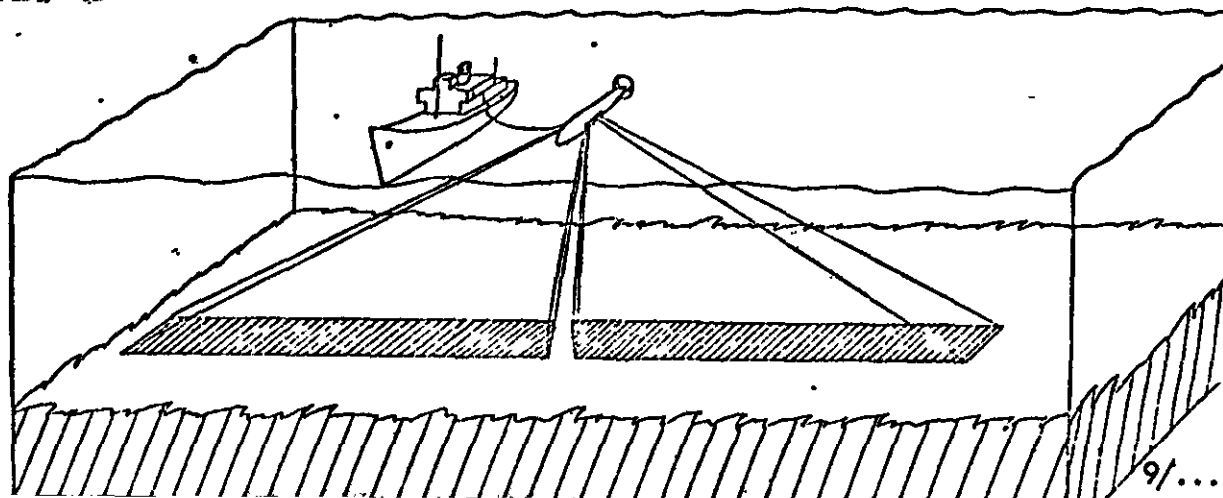
7. E. G. & G. SONAR

a) This instrument has been designed to give the Surveyor a picture of the sea bed to either side of the survey vessel and to enable him to identify, measure and position bottom details of interest, e.g. wrecks, telephone cables, rocks, pipelines, changes in bottom composition.

This result is achieved by transmitting short pulses of ultrasonic energy through the water at right angles to the ship's track and then recording reflected signals. These will be weak in the event of little bottom detail and lead to light printing on the record, i.e. flat bottom composed of soft sand. Bottom irregularities will lead to darker printing particularly where the pulses strike hard or dense objects, i.e. rocks, clay, hard packed sand, pipelines etc., and large objects proud of the sea bed will cause dark marking followed by an acoustic (white) shadow.

To obtain the best compromise between range and resolution a pulse length of 0.1 m/sec and a frequency of 110 KHz are used and this enables small objects such as sand ripples and pipelines as small as 4" diameter to be recorded up to a maximum range of 1000 feet either side of the vessel.

To help achieve this range Time Variable Gain is used in the recorder to increase amplification of the relatively weaker signals from greater distances. Of the three ranges available (250 feet, 500 feet or 1000 feet either side) the most convenient range for site surveys, tracking pipelines and pipeline engineering surveys is the 500 feet range, which from past experience has proved to give adequate range coupled with good resolution and bottom detail.



Schematic drawing of side looking sonar

b) SONAR SURVEY RESULTS

The sonar survey was undertaken in conjunction with the sounding survey.

Lines were spaced 200 metres apart and the instrument operated on the 500 foot (152 metres) range to ensure complete coverage of the area surveyed.

The sonar trace revealed a flat featureless sea bed. There were no obstructions.

A full report will be forwarded by E. G. & G. Geophysical Ltd.

8. POSITION FIXING SYSTEMS

Fisher Hi-Fix was used as the primary positioning system with Sea Search 1 and Main Chains 9B and 7B as back up systems.

The following data applied to Fisher Hi-Fix at the location:-

Lane Widths	Pattern 1	535 metres
	Pattern 2	280 metres
Angle of Cut		24°

Positioning systems were initially set up at known readings of the Ocean Viking's anchor buoys in block 2/7 and lanes were carried to the location. At the location Fisher Hi-Fix and comparison readings of back up positioning systems were taken and passed to Great Yarmouth for computer checking confirming that Fisher Hi-Fix was set to the correct whole lanes.

9. BUOYS

During this survey operation a total of 18 buoys were laid.

On the 17th October the buoy pattern was laid as follows:-

1. 1 Location buoy
2. 1 Buoy 300' East of location
3. 1 Buoy 900' North of location
4. 1 Buoy 900' South of location
5. 1 Buoy 4500' West of location

plus a reference buoy. All buoys were laid with flashing white lights and flags on mooring wires of 240' in 223' of water. Of the above No.5 was carried away and Nos. 2,3 and 4 were recovered on the 25th October having been damaged and moved off station due to adverse weather conditions.

On the 25th October, three buoys were laid to mark the positions of 2/5-1, 2/5-2 and 2/5-3, having flags only and with mooring wires of 270 feet. These buoys were not recovered during the dates of this survey.

On the 31st October, a total of five buoys were laid, these being Nos. 2,3,4 and 5 of the buoy pattern and a reference buoy. The location buoy still being in the correct position from the 17th October was left and only its' light changed.

Following the events of the 1st November, a further four buoys were laid on the 2nd November on the instructions of 'Zapata Explorer', they were as follows:-

1. Original Location buoy relaid
6. 1 Buoy 50 metres East of the 'Zapata Explorer's position.
7. 1 Buoy 75 metres East of the 'Zapata Explorer's position
8. 1 Buoy 450 feet North of the original location

contd/.....

The above buoys were laid with flags, flashing white lights and 240 feet mooring wires.

A total of 9 buoys were recovered on completion of the survey.

10. CHARTS

The following charts accompany this report and are all on a scale scale of 1 : 10,000:-

Chart 1 of 4	Showing the location, the final position of the Derrick and the ships position during fixes.
Chart 2 of 4	Showing the location and drop positions of the marker buoys.
Chart 3 of 4	Showing the location and water depth in feet reduced to L. A. T.
Chart 4 of 4	Showing the location, ships track during fixes and the area covered by sonar.

11. PERSONNEL

The undermentioned personnel were engaged on the survey:-

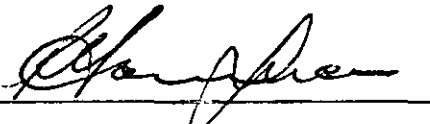
Sounding and Sonar	R.C. Youngman	Surveyor in Charge
	J. Douglas	Surveyor
	A. Docherty	Engineer
	P. Harrington	E. G. & G. Sonar Operator
	D. Smith	E. G. & G. Sonar Operator
Rig Fix	J. Albon	Surveyor in Charge
	J. Douglas	Surveyor
	S. Latham	Engineer

12. SUMMARY OF EVENTS

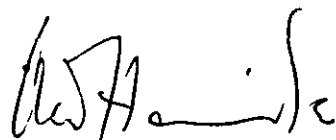
<u>DATE</u>	<u>TIME</u>	<u>EVENT</u>
16.10.72	0730-	
17.10.72	0700	Steam from Great Yarmouth to Ocean Viking
	0700-1000	Lane count to 2/9-1
	1000-1150	Sounding and Sonar
	1150-1430	Sounding and comparison readings
	1430-1600	Laid 5 buoys and 1 reference buoy
	1600-	
19.10.72	1900	Hove to near location
19.10.72	1900-	
20.10.72	2130	Steam to Great Yarmouth
20.10.72	2130-	
22.10.72	1300	Standby in Great Yarmouth
22.10.72	1300-	
23.10.72	0200	Steam from Great Yarmouth to Bridlington Bay
23.10.72	0200-	
24.10.72	1330	Sheltering in Bridlington Bay
24.10.72	1330-	
25.10.72	0700	Steam to location 2/9-1
25.10.72	0700-1500	Set up systems. Laid 3 buoys on 2/5-1 2/5-2 and 2/5-3 wellheads, recovered 3 damaged buoys on 2/9-1
25.10.72	1500-	
27.10.72	1200	Hove to near location
27.10.72	1200-	
28.10.72	0800	Steam to Newcastle
28.10.72	0800-	
29.10.72	1600	Alongside in Newcastle
29.10.72	1600-	
31.10.72	0600	Steam to location 2/9-1 (adverse weather)
31.10.72	0600-1045	Set up systems. Checked location buoy
	1045-1142	Relaid buoys 2, 3, 4 and 5
	1142-2330	Standing by location assisting 'Zapata Explorer' onto location

contd/.....

<u>DATE</u>	<u>TIME</u>	<u>EVENT</u>
31.10.72	2330-	
1.11.72	0645	Hove to near location
1.11.72	0645-0705	Transit fix no. 1
	0705-0730	Transit fix no. 2
	0730-0920	Sextant fix no. 1
	0920-1115	Hove to near location
	1115-1140	Sextant fix no. 2
	1140-1230	Hove to near location
	1230-1315	Sextant fix no. 3
1.11.72	1315-	
2.11.72	0710	Hove to near location
2.11.72	0710	Set up Hi-Fix
	0840-1030	Laid 4 buoys on rigs instructions
	1030-1130	Recovered one buoy
	1130-1145	Laid one buoy
	1145-1200	Checked buoy pattern
	1200-1315	Hove to near location
	1315-1335	Recovered one buoy
	1335-2130	Hove to near location
	2130-2340	Recovered buoy pattern. Released from rig
2.11.72	2340-	
3.11.72	0030	Recovered ref. buoy
3.11.72	0030-	
4.11.72	0330	Steam to Great Yarmouth



R.C. YOUNGMAN - SURVEYOR IN CHARGE



CHIEF SURVEYOR - N. S. A.

15th November, 1972.

A. C-O ERRORS

Fixed (Computed minus Observed) errors to be applied to the observed readings to adjust them to a value comparable with the theoretical computed readings. These fixed errors are determined normally by inter-chain Decca chain analysis, or, inshore, by establishing the ship's position independently. In areas where no C-O readings have been obtained then a best estimated value of the C-O error is used.

B. UNCORRECTED OBSERVED

Observed readings with no fixed C-O (corrected minus observed) errors applied. Quoted, as read, to two decimal places.

C. CORRECTED OBSERVED

Observed readings with C-O errors applied (sign of correction as quoted), and normally used to convert an observed reading into a value from which a geographical position or other Decca chains can be computed.

D. COMPUTED

Theoretical Decca chain reading derived from a position (normally geographicals) using the basic chain parameters. Always quoted to three decimal places of a lane, although the third decimal place is not normally significant.

E. ESTIMATED OBSERVED

A computed reading with minus C-O errors applied (opposite signs to those quoted) to provide the best readings that would be observed in the field.

SUMMARY OF LANE CHECKS				CUSTOMER <i>AMOCO NORWAY</i>				REF <i>2/9-1/1263</i>				Sheet No <i>1</i>										
TIME	DATE	SERIAL NO/ LOCATION	SURVEY CHAIN				SURVEY CHAIN				MAIN CHAIN											
							<i>SAN SEARCH</i>				<i>98</i>											
			Patt 1	Patt 2	Patt 1	Patt 2	RED	GREEN	PURPLE	RED	GREEN	PURPLE										
<i>0800</i>	<i>17/10/72</i>	<i>OCEAN VIKING NO 6 ANCHOR BUOY</i>	<i>501</i>	<i>41</i>	<i>682</i>	<i>19</i>																
		<i>PREVIOUS</i>	<i>501</i>	<i>37</i>	<i>682</i>	<i>29</i>																
<i>0805</i>	<i>17/10/72</i>	<i>OCEAN VIKING NO 5 ANCHOR BUOY</i>	<i>501</i>	<i>82</i>	<i>681</i>	<i>23</i>																
		<i>PREVIOUS</i>	<i>501</i>	<i>84</i>	<i>681</i>	<i>20</i>																
<i>1240</i>	<i>17/10/72</i>	<i>COMPARISON READINGS</i>	<i>442</i>	<i>19</i>	<i>770</i>	<i>65</i>	<i>A 20</i>	<i>03</i>	<i>9 47</i>	<i>22</i>	<i>D 23</i>	<i>76</i>	<i>H 43</i>	<i>94</i>	<i>C 51</i>	<i>27</i>	<i>A 21</i>	<i>80</i>	<i>B 36</i>	<i>54</i>	<i>J 59</i>	<i>62</i>
<i>1240</i>	<i>17/10/72</i>	<i>DROP POS'N LOCATION BY</i>	<i>442</i>	<i>19</i>	<i>770</i>	<i>65</i>	<i>A 20</i>	<i>03</i>	<i>9 47</i>	<i>22</i>	<i>D 23</i>	<i>76</i>	<i>H 43</i>	<i>94</i>	<i>C 51</i>	<i>27</i>	<i>A 21</i>	<i>80</i>	<i>B 36</i>	<i>54</i>	<i>J 59</i>	<i>62</i>
<i>1445</i>		<i>DROP POS'N NO 2 BUOY</i>	<i>442</i>	<i>06</i>	<i>770</i>	<i>84</i>																
<i>1500</i>		<i>DROP POS'N NO 3 BUOY</i>	<i>442</i>	<i>46</i>	<i>769</i>	<i>80</i>																
<i>1505</i>		<i>DROP POS'N NO 4 BUOY</i>	<i>441</i>	<i>33</i>	<i>771</i>	<i>49</i>																
<i>1515</i>		<i>DROP POS'N NO 5 BUOY</i>	<i>444</i>	<i>31</i>	<i>768</i>	<i>06</i>																
<i>1545</i>		<i>DROP POS'N REF BUOY</i>	<i>443</i>	<i>00</i>	<i>772</i>	<i>00</i>																
<i>0825</i>	<i>25/10/72</i>	<i>OCEAN VIKING NO 6 BUOY</i>	<i>501</i>	<i>40</i>	<i>682</i>	<i>15</i>																
<i>0827</i>	<i>25/10/72</i>	<i>OCEAN VIKING NO 5 BUOY</i>	<i>501</i>	<i>84</i>	<i>681</i>	<i>20</i>																
<i>1126</i>	<i>25/10/72</i>	<i>DROP POS'N BUOY ON 2/5-3.</i>	<i>492</i>	<i>41</i>	<i>668</i>	<i>72</i>																
<i>1205</i>	<i>25/10/72</i>	<i>DROP POS'N BUOY ON 2/5-2.</i>	<i>506</i>	<i>34</i>	<i>645</i>	<i>12</i>																
<i>1225</i>	<i>25/10/72</i>	<i>DROP POS'N BUOY ON 2/5-1.</i>	<i>508</i>	<i>84</i>	<i>643</i>	<i>91</i>																
<i>1427</i>	<i>25/10/72</i>	<i>COMPARISON READINGS</i>	<i>442</i>	<i>18</i>	<i>770</i>	<i>72</i>	<i>A 19</i>	<i>98</i>	<i>9 47</i>	<i>22</i>	<i>D 23</i>	<i>76</i>	<i>H 44</i>	<i>02</i>	<i>D 51</i>	<i>38</i>	<i>A 21</i>	<i>62</i>	<i>B 36</i>	<i>50</i>	<i>T 59</i>	<i>44</i>

ALL THESE BUOYS WERE AN ADDITIONAL REQUIREMENT GIVEN VERBALLY BY ZAPATA BUOYER.

SUMMARY OF LANE CHECKS

CUSTOMER *AMOCO NORWAY*

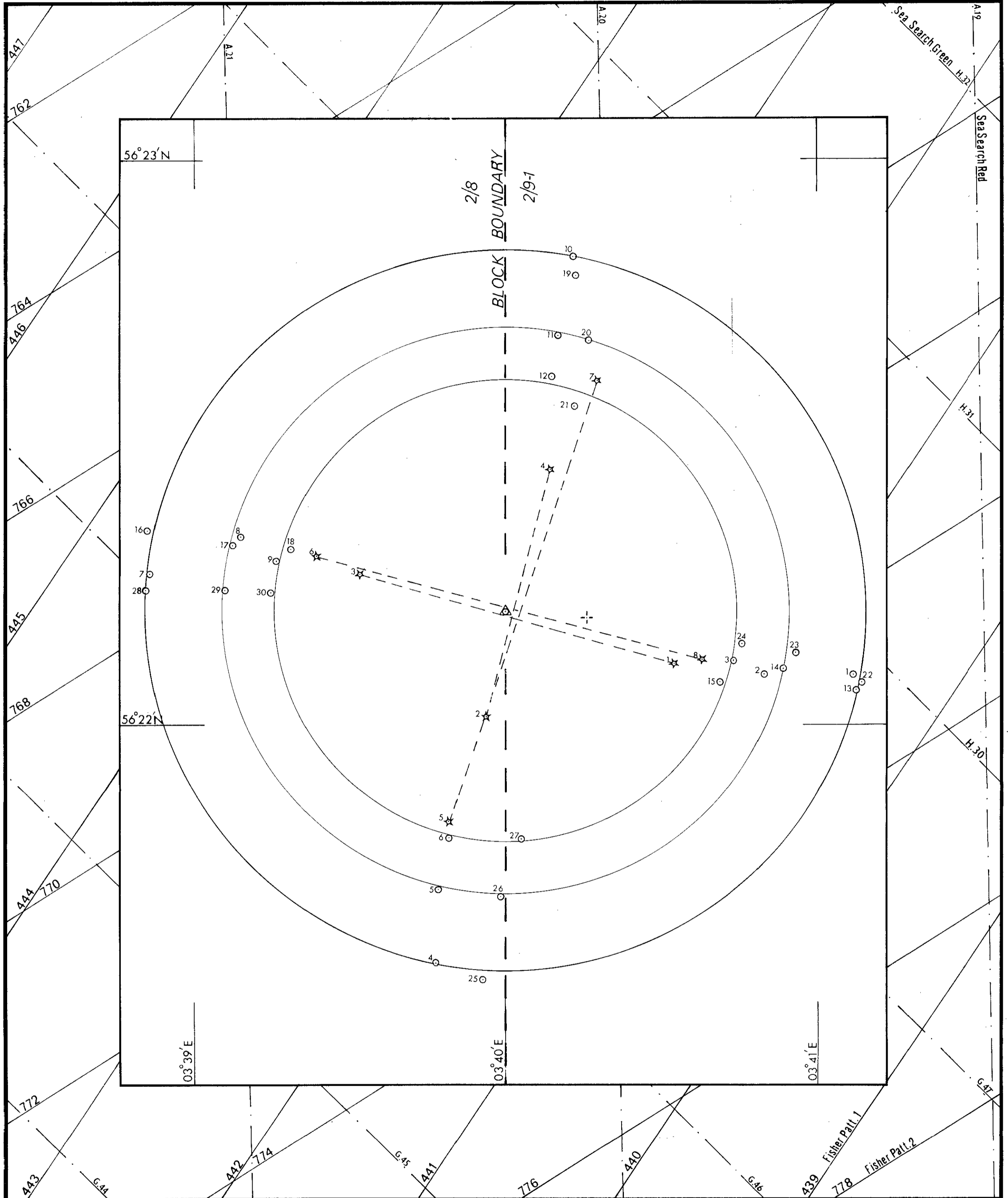
REF *2/0-1/1263*

Sheet No
6

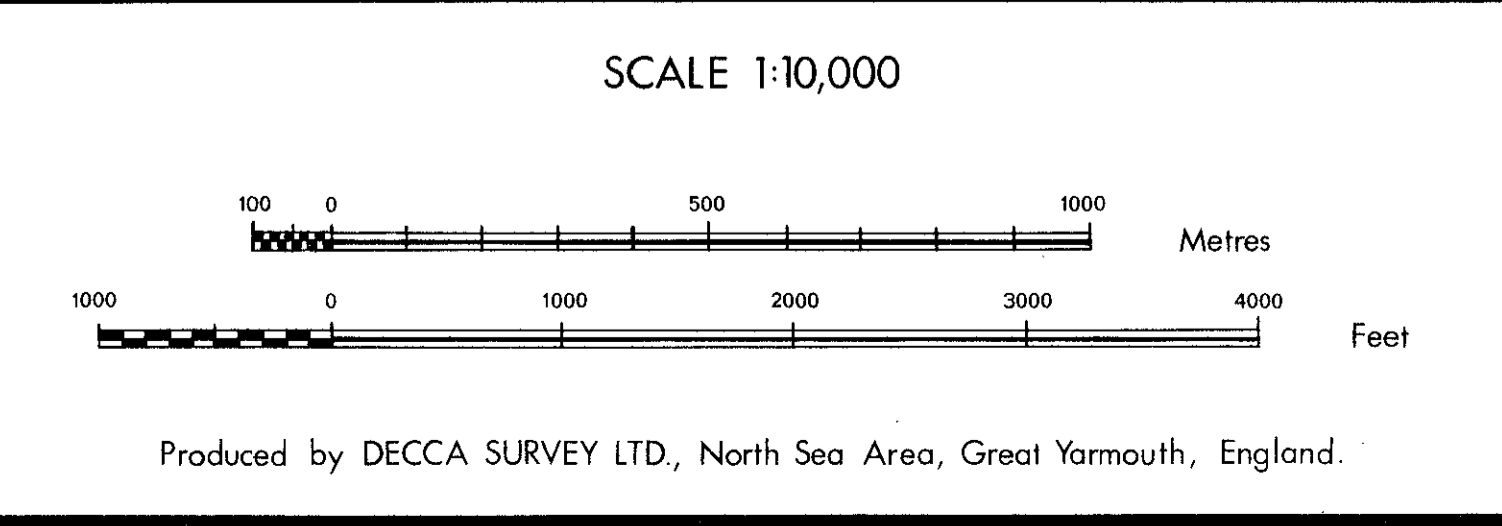
TIME	DATE	SERIAL NO/ LOCATION	SURVEY CHAIN		SURVEY CHAIN		MAIN CHAIN			MAIN CHAIN			
			<i>FISHER</i>		<i>SEA SEARCH</i>		<i>SB</i>			<i>7B</i>			
			Patt 1	Patt 2	Patt 1	Patt 2	RED	GREEN	PURPLE	RED	GREEN	PURPLE	
<i>0840</i>	<i>2/11/72</i>	<i>DROP POS'N No 6 Buoy</i>	<i>442</i>	<i>53</i>	<i>770</i>	<i>22</i>							
<i>0855</i>		<i>DROP POS'N No 7 Buoy</i>	<i>442</i>	<i>56</i>	<i>770</i>	<i>18</i>							
<i>0915</i>		<i>RE LAY LOCATION BUOY</i>	<i>442</i>	<i>22</i>	<i>770</i>	<i>65</i>	<i>ALL THESE BUOYS WERE AN ADDITIONAL REQUIREMENT GIVEN VERBALLY BY SWATH EXPLORER</i>						
<i>1145</i>		<i>DROP POS'N No 8 Buoy</i>	<i>442</i>	<i>35</i>	<i>770</i>	<i>22</i>							
<i>1500</i>	<i>2/11/72</i>	<i>CHECK SYSTEM REF BUOY</i>	<i>442</i>	<i>60</i>	<i>771</i>	<i>87</i>							



AMOCO NORWAY



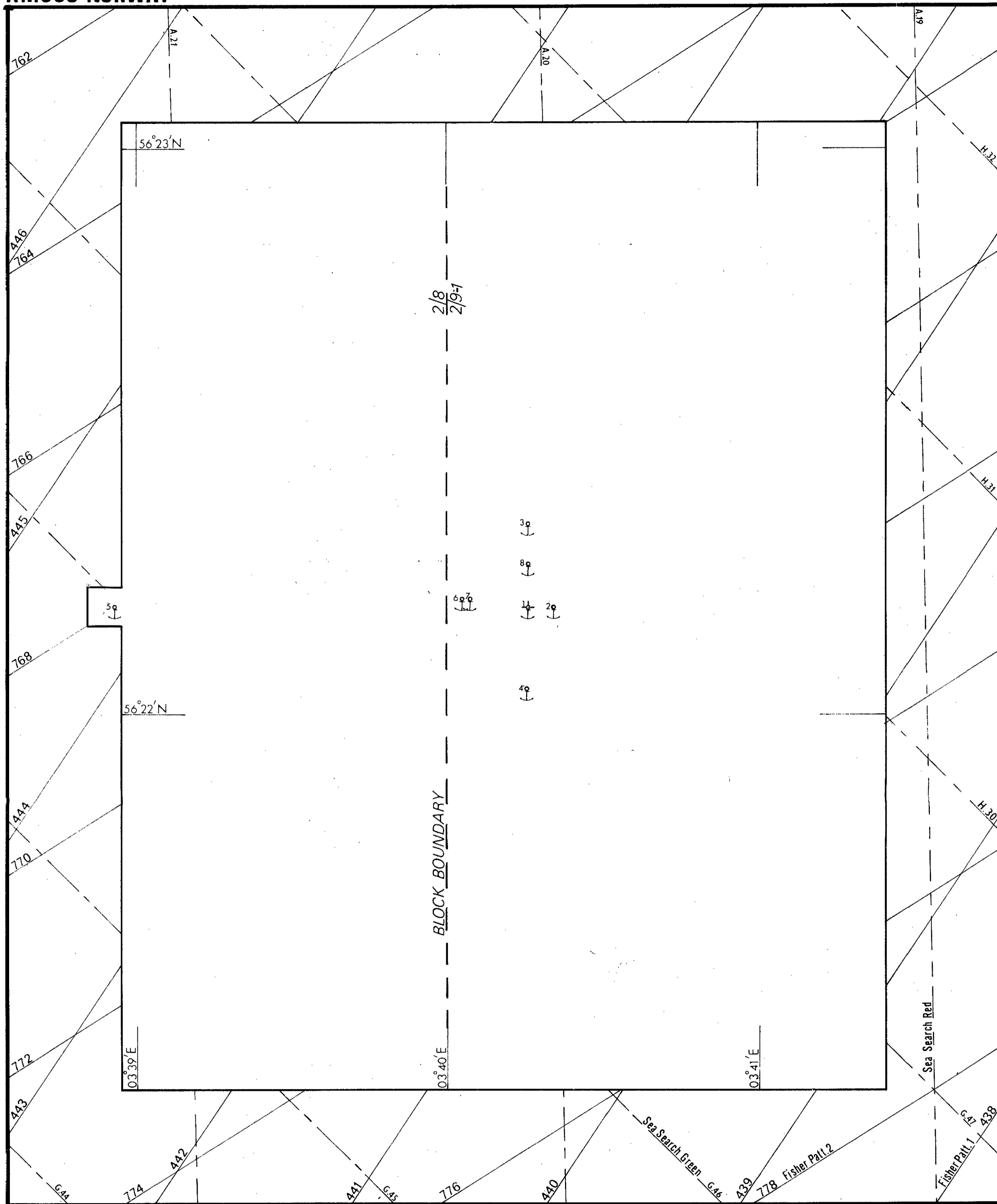
LEGEND	
+	Location
$2\star$	Ships Position During Transit Fixes
$2\circ$	Ships Position During Final Fixes
\triangle	Final Position of Derrick
\diagup	Fisher Hi-Fix
\diagdown	Sea Search



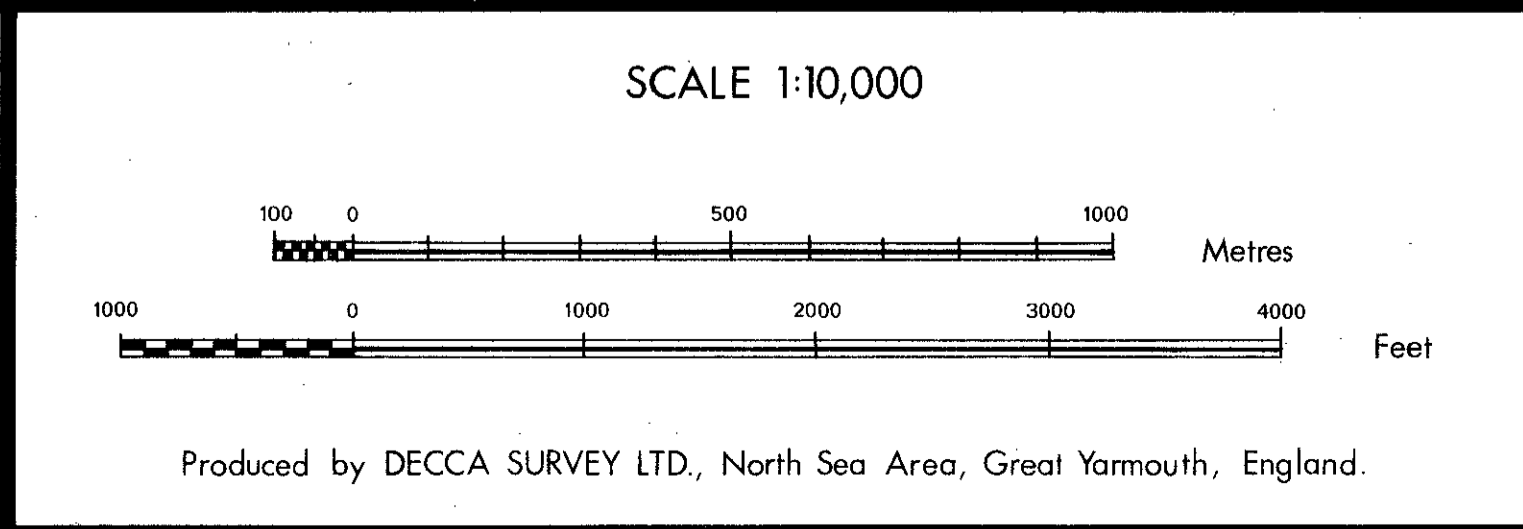
AMOCO NORWAY <small>RIG MOVE</small>	
ZAPATA EXPLORER	
Reference N ^o	2/9-1/1263
Date of Operation	17/10-2/11/72
Chart N ^o	1 of 4
Drawn by	JADouglas
Checked by	Rhynfro
Surveyor I/C.	J. Allen
Approved by	Blonafilda



AMOCO NORWAY



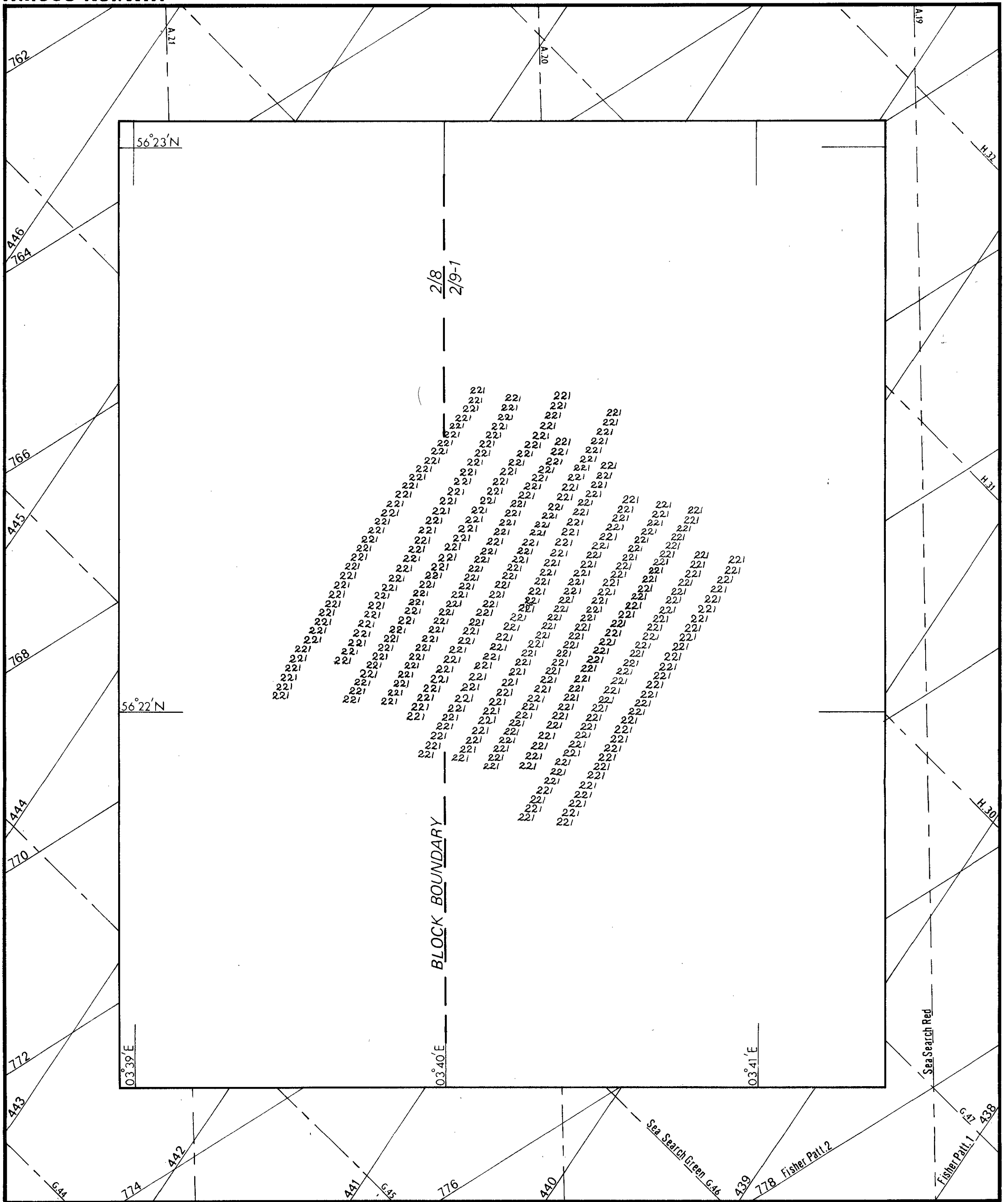
LEGEND	
	Location
	Drop Position of Marker Buoys
	Sea Search 1
	Fisher Hi Fix



AMOCO NORWAY Buoy Pattern	
Reference N ^o	2/9-1/1263
Date of Operation	17/10-2/11/72
Chart N ^o	2 of 4
Drawn by	J.A. Douglas
Checked by	R. Ferguson
Surveyor I/C.	J. Allen
Approved by	<i>[Signature]</i>



AMOCO NORWAY



LEGEND	
	Location
	Soundings in Metres Reduced to Lowest Astronomical Tide
	Sea Search 1
	Fisher Hi-Fix

SCALE 1:10,000

Metres

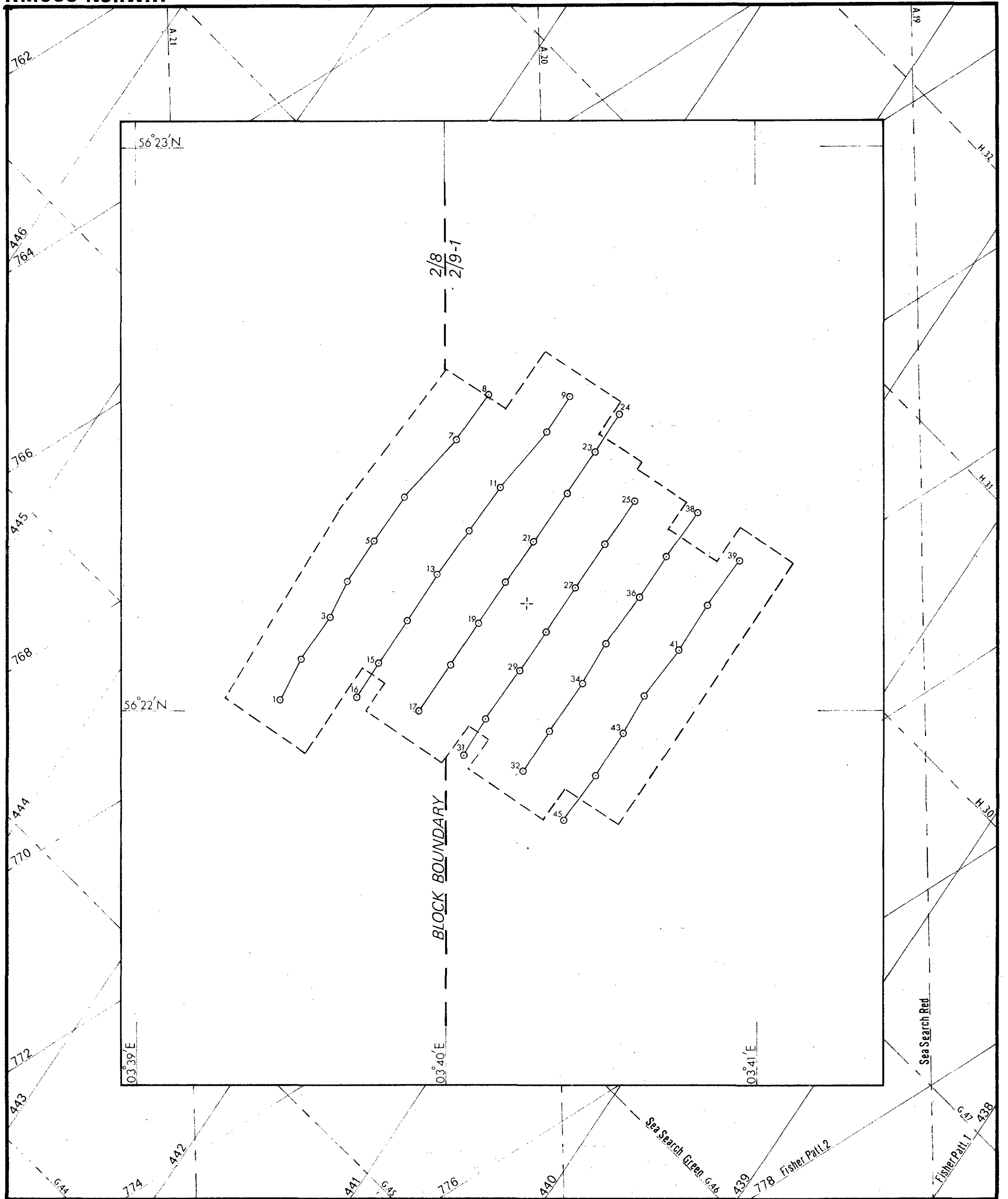
Feet

Produced by DECCA SURVEY LTD., North Sea Area, Great Yarmouth, England.

AMOCO NORWAY	
Soundings	
Reference N ^o	2/9-1/263
Date of Operation	17/10-2/11/72
Chart N ^o	3 of 4
Drawn by	J.A. Douglas
Checked by	J. Albon
Surveyor I/C.	G. Youngman
Approved by	W. Mansfield



AMOCO NORWAY



LEGEND	
+	Location
○—○	Ships Track During Sonar Runs
—	Sea Search 1
- - -	Fisher Hi Fix

SCALE 1:10,000

Metres

Feet

Produced by DECCA SURVEY LTD., North Sea Area, Great Yarmouth, England.

AMOCO NORWAY Sidescan-Sonar	
Reference N ^o	2/9-1/1263
Date of Operation	17/10-2/11/72
Chart N ^o	4 of 4
Drawn by	<i>S.A. Douglas</i>
Checked by	<i>G. Allen</i>
Surveyor I/C.	<i>R. Langman</i>
Approved by	<i>B. Anderson</i>

2/a - 1 location

Port	M	Sfb	bow	
17		17	(28)	ft. - X'
(26)		(26)	9	165 ft east.
17		17	9	500 ft west of X
Preload	18	17	17	— — — —

1st fix $56^{\circ} 22' 12.20''$ N } 265m from
 $03^{\circ} 40' 00.22''$ E } orig loc.
4m e of b. line

2nd Fix $56^{\circ} 22' 11.88''$ N } 273m from
 $03^{\circ} 39' 59.77''$ E } orig loc
4m W of bound
line

3rd Fix $56^{\circ} 22' 11.88''$ N } Same as
 $03 39' 59.77''$ E } 2