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PRELIMINARY CRUISE REPORT - IGUANA EXPEDITION

George G. Shor, Jr., et al

Scripps Institution of Oceanography

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MARINE PHYSICAL LABORATORY
of the Scripps Institution of Oceanography
San Diego, California 92152

PRELIMINARY CRUISE REPORT
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George G. Shor, Jr. and Stuart M. Smith

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13 ABSTRACT

A preliminary cruise report of Expedition Iguana, 31 March 1972-11 May 1972, gives some preliminary results, list of equipment and, personnel, stations and data gathered, and track and topographic plots.

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PRELIMINARY CRUISE REPORT
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and

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INTRODUCTION

Expedition Iguana, the most distant voyage to date of the 95-foot research vessel ELLEN B. SCRIPPS, was carried out to study the geological structure of the Cocos Plate and the adjacent area lying between the East Pacific Rise, the Carnegie Ridge, and the coast of Central America. The work carried out was almost entirely geological and geophysical: two legs of the trip were a cooperative effort with the Hawaii Institute of Geophysics.

The R/V ELLEN B. SCRIPPS left San Diego on 31 March, 1972, and ran via Cape San Lucas, Mexico, and Acapulco to Guayaquil, Ecuador where it rendezvoused with the HIG ship R/V KANA KEOKI. Joint work was carried out on a route from Guayaquil to Acapulco via Puntarenas, Costa Rica. Joint work was concluded 11 May, with KANA KEOKI returning to Honolulu and ELLEN SCRIPPS returning to San Diego. The following preliminary cruise report for operations aboard the ELLEN SCRIPPS, consists of: a chronology of the cruise (with some preliminary results), a list of equipment used, lists of personnel participating, stations occupied, and data gathered, along with track and topographic plots prepared by the Geologic Data Center of SIO.

George Shor was in charge of operations on the SCRIPPS for legs one through four: Delpha McGowan was in charge of leg five. George Sutton was in charge of work aboard the R/V KANA KEOKI during the period of joint operations. Original records from each ship have been retained by the institution that gathered them, with copies of most data provided to the other institution.

CHRONOLOGY

Leg 1.

R/V ELLEN B. SCRIPPS departed from San Diego at 1920 local time on 31 March 1972. The ship ran along the coast overnight, and underway observations (bathymetry and magnetics) began at 0745 local time on 1 April, abeam of Cape Colnett. The airgun, satellite navigation, and seismic refraction systems were set up. XBTs were taken twice daily beginning 3 April for the duration of the cruise. Airgun records were obtained intermittently from 1 April to 3 April when a rod in the air compressor broke. Echo-sounding and magnetics were continuous throughout the trip after 1 April. A two-hour stop was made at Cape San Lucas on 4 April to pick up compressor repair parts, and the airgun system was then operative through 6 April when a similar breakdown again occurred. Single unreversed seismic refraction profiles were made using expendable sonobuoys on 5 and 6 April. Satellite navigation fixes were obtained intermittently, but ambient temperatures in the laboratory became so high in the daytime that the satellite receiver had to be turned off to avoid damage to the electronics.

Leg 2.

R/V ELLEN B. SCRIPPS departed Acapulco on 9 April, with a repaired air compressor and a new air conditioner for the seismic van. The track ran due south, then turned southeast for a run past Cocos Island to Guayaquil. Echo-soundings, magnetics, and airgun records were taken continuously until 17 April; observations were discontinued at the edge of the continental shelf, 13 miles off the Ecuadorian coast at Pta. Elena. Problems were present in the satellite navigation tape-punch, computer, and teletype units. Very few satellite positions were computed during this leg because of tape-punch troubles, though satellite passes were continuously received and punched on tapes for later debugging and computation. Wide-angle reflection profiles were made on 10 and 14 April using expendable SSQ-41 sonobuoys. We arrived in Guayaquil on 17 April, going in to Puerto Maritimo. Authorization (retroactive) to work in Ecuadorian waters was received upon our arrival in port.

Leg 3.

R/V ELLEN B. SCRIPPS departed Guayaquil on 21 April after having transferred explosives to R/V KANA KEOKI for use in joint two-ship refraction studies during this leg and the following leg 4. Roberto Jiminez, graduate student of the University of Guayaquil, joined the scientific party for leg 3 as official Ecuadorian observer.

On 23 April, ELLEN SCRIPPS and KANA KEOKI rendezvoused for station IGUA 3-1, a two-ship reversed refraction profile, which was run along the crest of the Carnegie Ridge. Well-defined mantle arrivals with apparently normal velocity were recorded, possibly overlain by a thin crustal layer having a velocity of 6.2 to 6.6 km/sec. The presence of a thin crust and the shallow mantle, similar to the structure found at the crest of the East Pacific Rise, suggest that the Carnegie Ridge is not a continental fragment.

On 23 and 24 April station ICUA 3-2, another two-ship reversed refraction profile with two connecting one-way profiles, was run E - NE on the north flank of the Carnegie Ridge. An approximate velocity of 7.6 km/sec was found for the mantle, overlain by a crustal layer of approximately 6.6 km/sec velocity. The mantle here has low velocity and is at shallow depth, as might be expected in an ancient spreading center (as postulated by van Andel).

A single-ship wide-angle reflection profile was made on 25 April using an expendable Aquatronics sonobuoy. The first two-ship anisotropy station, IGUA 3-3, was conducted on 26-27 April in the Panama Basin in the area of the Costa Rica rift. This station consisted of three one-way and three broadside (anisotropy) lines. Generally, a low-velocity mantle (approximately 7.7 km/sec) was found with possible anisotropy, the high velocity lying in an E - W direction.

After concluding the anisotropy station on 27 April, a single-ship wide-angle reflection profile was made by the SCRIPPS using an SSQ-41 expendable sonobuoy and small explosive charges fired every minute, recording on both the PSR and the oscillograph.

On 28 and 29 April two-ship station IGUA 3-4, consisting of two reversed and one one-way refraction lines, was run from the south flank of the Cocos Ridge up to the ridge crest. A low-velocity mantle (approximately 7.6 km/sec), not extremely deep and overlain by a normal oceanic crustal layer (velocity from 6.6 to 7.0 km/sec), was found. There appears to be a step or displacement in the top of the mantle along the profile.

After completion of the station, KANA KEOKI spent a day surveying the Cocos Ridge, while ELLEN SCRIPPS made a brief survey of the continental shelf south of Puntarenas, Costa Rica, and then entered Puntarenas on 30 April. KANA KEOKI arrived in Puntarenas 1 May and departed 2 May. The satellite navigation system on the SCRIPPS was repaired at Puntarenas, but started giving trouble again shortly after leaving port.

IGUANA Leg 4.

R/V ELLEN B. SCRIPPS departed Puntarenas on 1 May. The source of the problem with the SatNav system was finally found, about a week after leaving Puntarenas, to be a chattering microswitch that inserted randomly spaced blanks in the tape record. Fixes were salvageable, and were recomputed after completion of the trip. The SCRIPPS departed on a course to pass over the north flank of Guardian Seamount. KANA KEOKI went well south of it.

On 3 May a single-ship unreversed refraction profile was made in the area west of Guardian Seamount. Mantle was not recorded on this run. On 4 May another similar profile was made further west, in the area of the next anisotropy station, to determine cross-over distance and size of the pattern to be run. The next two-ship anisotropy station, IGUA 4-5, was run 4 through 6 May, and consisted of three reversed, four one-way, and seven broadside profiles. A high-velocity mantle (approximately 8.2 km/sec), not extremely deep, was found. Preliminary shipboard plots of part of the anisotropy data suggest a high-velocity direction NE - SW.

On 6 and 7 May a two-ship refraction station, station IGUA 4-6, using expendable sonobuoys, was made in the Guatemala Basin; it consisted of three unreversed lines. On 7 and 8 May a two-ship reversed profile, station IGUA 4-7, was run on the north flank of the Tehuantepec Ridge. The shallow, high-velocity mantle (approximately 8.4 km/sec) found, suggestive of normal oceanic structure, indicates that this ridge, like the Carnegie Ridge, is not a continental fragment.

A final anisotropy station, IGUA 4-8, was conducted on 8 through 10 May northwest of the Tehuantepec Ridge. The station consisted of four reversed, seven broadside, and six one-way refraction lines. Here the mantle was deeper than is normally found for oceanic areas, with a velocity of 8.0 to 8.2 km/sec. Possibly a small anisotropy is present, the high-velocity axis northeast-southwest.

We arrived in Acapulco on 11 May; the KANA KEOKI returned to Hawaii from here.

IGUANA Leg 5.

R/V ELLEN B. SCRIPPS departed Acapulco on 15 May for the final leg to San Diego. Problems with the airgun system, which had begun again toward the end of leg 4, recurred throughout this leg causing the reflection records to be discontinuous. Echosounding, magnetics records and SatNav positions were taken continuously; XBTs twice daily. A total of five wide-angle reflection profiles were made between 18 and 22 May using expendable sonobuoys. No refraction work was conducted. R/V ELLEN B. SCRIPPS arrived in San Diego on 22 May.

EQUIPMENT

The following list of equipment is a bit more detailed than normal, and is partly for the record; very little of it is normally carried aboard the ELLEN SCRIPPS.

Seismic Refraction System.

The seismic refraction system was set up to use signals either from cable-connected hydrophones, Navy (170 mHz) sonobuoys, or Aquatronics (80 mHz) sonobuoys. It consisted of:

Three Brush AX-58 Rochelle-salt hydrophones for cabled phones.

Three cables, with 50-foot leaders, 200-foot drops; surface lines were 1000, 2000, and 3000 feet.

Antennae for the sonobuoy system on a 60-foot telescoping mast mounted just aft of the deckhouse; a 80-mHz Aquatronics was mounted on a rotor on top of the mast, and a 170-mHz antenna was fastened to the side of the mast just below it, pointing aft.

Radio receivers for the sonobuoy system included 3 Lafayette PRO-7 receivers for the 170-mHz band, an Aquatronics two-channel, narrow-band 80-mHz receiver, and a Nems-Clark multi-band receiver.

Refraction amplifiers were two sets of MPL-built portable transistor amplifiers (one two-channel system, one three-channel). Both split the signal in three frequency bands for recording.

The recorder for the refraction system was a new ElectroTech xerographic recorder.

Time base for recording was the internal crystal-controlled timing line system of the recorder, checked with a Ulysse-Nardin spring-wound break-second chronometer and (part of the time) a separate crystal chronometer. Chronometer rate on the Ulyssee-Nardin was checked daily against WWV time signals by stop watch to the nearest 0.2 second.

The shooting circuitry included an intercom from shooting-table (on the starboard side of the stern) to the instrument lab, a shot-mark amplifier that took its signal interchangeably from the ship's 12 kHz Edo transducer or a towed special streamer, and a modulator to put the shot signal on the ship's radio.

Communications between ships were normally by means of the ship's single side-band transceiver on the bridge, with a remote control in the instrument lab.

Explosives were stored primarily in the afterhold, with booster charges in ready-boxes on the bow, and detonators in another ready-box above the wheelhouse. Main charges were primarily Towvex Extra; small charges were Nitramon S; all charges were detonated with Clover Brand time fuse, and number 6 caps.

Navigational systems

Primary navigation was by celestial and satellite; a Roach Omega receiver was aboard and was monitored but data were not worked up. Radar was used when close to land; Loran A equipment was aboard, but we were not in range of signals. The satellite system, which had just been acquired second-hand, consisted of an IT&T short-count satellite receiver, a reader-punch for paper tape, a teletype, and a PDP-8 computer. The antenna for the satellite receiver was originally mounted on the forward part of the deck house on the starboard side. At Guayaquil it was moved aft to a location on top of the hydrographic davit on the starboard side of the stern. The satellite navigation system gave trouble throughout most of the trip, producing faulty paper tapes that would not give solutions. The problem was finally cured shortly after departure from Puntarenas: it was due to a chattering micro-switch. Mispunched tapes have been corrected and positions obtained subsequent to the cruise: this problem was responsible for the late preparation of this cruise report.

Reflection Profiler System

Sound source was a 120-in^3 or 30-in^3 airgun (interchangeably: it was not possible to tow both at once). Air was supplied by a portable 64 cfm Rix compressor driven by a Perkins diesel, mounted in a steel container on deck.

The signals were detected on a hydrophone streamer consisting of 20 EVP-23 hydrophones. A 20-db preamplifier was located in the active section of the streamer.

Three amplifiers were available: a Bolt amplifier, a Huckabay HUA amplifier, and a 3-channel amplifier built by A. C. Jones. The Bolt amplifier was used most of the time for routine profiling; the other two for wide-angle reflection work.

Recording was done on two Edo-Western PSR recorders; one was equipped with a standard narrow stylus, the other with a wide stylus. The narrow stylus was used for routine underway recording, the wide stylus for both special scales for underway recording and for wide-angle sonobuoy recording. Time control for the airgun system

came from a CLOVER timing box, which triggered both recorders and the airgun, with adjustable repetition rate and adjustable sweep delay for the two recorders. The repetition rate was normally slightly longer than the sweep rate of the slower recorder.

Other Equipment

A Varian proton-precession magnetometer was operated throughout the trip. Echo-sounding was done with a Gifft GDR-T 12 kHz recorder, using the ship's bow-mounted transducer.

XBTs were taken with a Sippican SBT system, with a hand-portable launcher.

Equipment Arrangement

Because of lack of built-in laboratory and living space, the ship carried:

1) a 8' x 14' portable laboratory which contained all of the reflection and refraction recording systems, the satellite navigation system, the magnetometer, and echo-sounder (underway watches were stood in the portable lab.),
2) a steel shipping container housing the air compressor,
3) a 6' x 10' bunkhouse,
4) storage boxes for hydrophones and reflection streamers.

Additional temporary deck-mounted equipment included a shooting table, hydraulic cable-puller, davit and hydraulic winch for the airguns, and a booby-hatch for access to the hold at sea.

PORTS AND PERSONNEL (listed 13 September 1972)

Note: Time zones and minutes of latitude and longitude are listed in tenths (e.g., 10.6 is listed as 106).

1120 31 372 LGO1 B San Diego, Cal. 32 36 7 N 117 109W S IGUA01EB

1958 7 472 LGO1 E Acapulco, Mex. 16 48 7 N 99 533W S IGUA01EB

PERSONNEL

G. G. Shor MPL
A. C. Jones MPL
W. E. Keith GRD
M. Barth SRG
R. Bongard SRG
M. Henry MPL
D. McGowan MPL

0244 090472 LG02 B Acapulco, Mex. 16 487N 99 533W S IGUA02EB

1300 17 472 LG02 E Guayaquil, Ecuador 2 387S 80 361W S IGUA02EB

G. G. Shor MPL
W. E. Keith GRD
M. Barth SRG
R. Bongard SRG
M. Henry MPL
D. McGowan MPL
D. Newhouse GDC

1715 21 472 LGO3 B Guayaquil, Ecuador 2 387S 80 361W S IGUA03EB

1954 30 472 LGO3 E Puntarenas, Costa R 9 572N 84 485W S IGUA03EB

G. G. Shor MPL
W. E. Keith GRD
M. Barth SRG
R. Bongard SRG
M. Henry MPL
R. Jiminez EDR
D. McGowan MPL
D. Newhouse GDC

452 2 572 LG04 B Puntarenas, Costa R 9 572N 84 485W S IGUA04EB

1453 11 572 LG04 E Acapulco, Mex. 16 487N 99 533W S IGUA04EB

G. G. Shor MPL

W. E. Keith GRD
M. Barth SRG
R. Bongard SRG

M. Henry MPL

D. McGowan MPL

D. Newhouse GDC

2305 15 572 LG05 B Acapulco, Mex. 16 487N 99 533W S IGUA05EB

2200 22 572 LG05 E San Diego, Cal. 32 367N 117 109W S IGUA05EB

W. E. Keith GRD

R. Bongard SRG

D. McGowan MPL

*** LOG BOOKS ***

TIME GMT	DATE D.M.Y.	TIME LOC	TZ LOC	SAMP CODE	SAMPLE IDENT.	SEQ. NUM.	DISP CODE	LAT.	LONG.	CRUISE LEG-SHIP
1120	31 372			LBSC B	SCIENTIFIC LOG		GDC	32 367N	117 109W S	IGUA01EB
2200	22 572			LBSC E	SCIENTIFIC LOG		GDC	32 367N	117 109W S	IGUA05EB
1120	31 372			LBSC B	U/W WATCH LOG		GDC	32 367N	117 109W S	IGUA01EB
2200	22 572			LBSC E	U/W WATCH LOG		GDC	32 367N	117 109W S	IGUA05EB
1120	31 372			LB B	XBT LOG		GDC	32 367N	117 109W S	IGUA01EB
2200	22 572			LB E	XBT LOG		GDC	32 367N	117 109W S	IGUA05EB

UNDERWAY DATA - CURATOR T.E. CHASE 2ND FLOOR AQUARIUM (EXT.1534)

***FATHOGRAMS ***

TIME GMT	DATE D.M.Y.	TIME LOC	TZ LOC	SAMP CODE	SAMPLE IDENT.	SEQ. NUM.	DISP CODE	LAT.	LONG.	CRUISE LEG-SHIP
1545	1 472			DPRT B	GDR 12KHZ-ROLL 1		GDC	30 491N	116 324W S	IGUA01EB
1536	4 472			DPRT E	GDR 12KHZ-ROLL 1		GDC	22 539N	109 538W S	IGUA01EB
1710	4 472			DPRT B	GDR 12KHZ-ROLL 2		GDC	22 527N	109 544W S	IGUA01EB
1958	7 472			DPRT E	GDR 12KHZ-ROLL 2		GDC	16 487N	99 533W S	IGUA01EB
244	9 472			DPRT B	GDR 12KHZ-ROLL 3		GDC	16 487N	99 533W S	IGUA02EB
740	13 472			DPRT E	GDR 12KHZ-ROLL 3		GDC	7 217N	90 315W S	IGUA02EB
759	13 472			DPRT B	GDR 12KHZ-ROLL 4		GDC	7 207N	90 291W S	IGUA02EB
2135	15 472			DPRT E	GDR 12KHZ-ROLL 4		GDC	1 67N	84 95W S	IGUA02EB
2214	15 472			DPRT B	GDR 12KHZ-ROLL 5		GDC	1 27N	84 62W S	IGUA02EB
1300	17 472			DPRT E	GDR 12KHZ-ROLL 5		GDC	2 387S	80 361W S	IGUA02EB
2125	21 472			DPRT B	GDR 12KHZ-ROLL 6		GDC	2 410S	80 190W S	IGUA03EB
1003	23 472			DPRT E	GDR 12KHZ-ROLL 6		GDC	1 6S	83 30W S	IGUA03EB
1013	23 472			DPRT B	GDR 12KHZ-ROLL 7		GDC	1 5S	83 31W S	IGUA03EB
833	26 472			DPRT E	GDR 12KHZ-ROLL 7		GDC	4 355N	83 250W S	IGUA03EB
854	26 472			DPRT B	GDR 12KHZ-ROLL 8		GDC	4 357N	83 247W S	IGUA03EB
1615	29 472			DPRT E	GDR 12KHZ-ROLL 8		GDC	7 505N	84 48W S	IGUA03EB
1624	29 472			DPRT B	GDR 12KHZ-ROLL 9		GDC	7 519N	84 47W S	IGUA03EB
53	4 572			DPRT E	GDR 12KHZ-ROLL 9		GDC	9 46N	91 0W S	IGUA04EB
54	4 572			DPRT B	GDR 12KHZ-ROLL10		GDC	9 47N	90 599W S	IGUA04EB
1515	7 572			DPRT E	GDR 12KHZ-ROLL10		GDC	13 186N	97 37W S	IGUA04EB
1517	7 572			DPRT B	GDR 12KHZ-ROLL11		GDC	13 184N	97 38W S	IGUA04EB
549	11 572			DPRT E	GDR 12KHZ-ROLL11		GDC	15 266N	99 573W S	IGUA04EB
550	11 572			DPRT B	GDR 12KHZ-ROLL12		GDC	15 267N	99 573W S	IGUA04EB
1453	11 572			DPRT E	GDR 12KHZ-ROLL12		GDC	16 487N	99 533W S	IGUA04EB

TIME GMT	DATE D.M.Y.	TIME LOC	TZ LOC	SAMP CODE	SAMPLE IDENT.	SEQ. NUM.	DISP CODE	LAT.	LONG.	CRUISE LEG-SHIP
0	16 572			DPRT B	GDR 12KHZ-ROLL13		GDC	16 485N	99 576W S	IGUA05EB
233	18 572			DPRT E	GDR 12KHZ-ROLL13		GDC	20 187N	107 12W S	IGUA05EB
240	18 572			DPRT B	GDR 12KHZ-ROLL14		GDC	20 194N	107 20W S	IGUA05EB
1646	21 572			DPRT E	GDR 12KHZ-ROLL14		GDC	28 510N	115 197W S	IGUA05EB
1648	21 572			DPRT B	GDR 12KHZ-ROLL15		GDC	28 512N	115 198W S	IGUA05EB
2200	22 572			DPRT E	GDR 12KHZ-ROLL15		GDC	32 367N	117 109W S	IGUA05EB

*** SEISMIC REFLECTION PROFILES ***

TIME GMT	DATE D.M.Y.	TIME LOC	TZ LOC	SAMP CODE	SAMPLE IDENT.	SEQ. NUM.	DISP CODE	LAT.	LONG.	CRUISE LEG-SHIP
0	2 472			SPRF B	AIRGUN-RF-ROLL 1		GDC	29 402N	116 268W S	IGUA01EB
1500	2 572			SPRF E	AIRGUN-RF-ROLL 1		GDC	9 286N	85 565W S	IGUA04EB
1510	2 572			SPRF B	AIRGUN-RF-ROLL 2		GDC	9 286N	85 565W S	IGUA04EB
319	22 572			SPRF E	AIRGUN-RF-ROLL 2		GDC	30 109N	116 19W S	IGUA05EB
0	2 472			SPRS B	AIRGUN-RS-ROLL 1		GDC	29 402N	116 268W S	IGUA01EB
319	22 572			SPRS E	AIRGUN-RS-ROLL 1		GDC	30 109N	116 19W S	IGUA05EB

*** MAGNETOMETER ***

TIME GMT	DATE D.M.Y.	TIME LOC	TZ LOC	SAMP CODE	SAMPLE IDENT.	SEQ. NUM.	DISP CODE	LAT.	LONG.	CRUISE LEG-SHIP
1644	1 472			MGR B	MAGNET-ROLL 1		GDC	30 429N	116 299W S	IGUA01EB
1728	10 472			MGR E	MAGNET-ROLL 1		GDC	11 579N	97 407W S	IGUA02EB
1738	10 472			MGR B	MAGNET-ROLL 2		GDC	11 571N	97 394W S	IGUA02EB
1508	28 472			MGR E	MAGNET-ROLL 2		GDC	6 257N	83 592W S	IGUA03EB
1520	28 472			MGR B	MAGNET-ROLL 3		GDC	6 242N	84 7W S	IGUA03EB
427	19 572			MGR E	MAGNET-ROLL 3		GDC	22 354N	109 428W S	IGUA05EB
437	19 572			MGR B	MAGNET-ROLL 4		GDC	22 362N	109 440W S	IGUA05EB
2013	22 572			MGR E	MAGNET-ROLL 4		GDC	32 205N	117 52W S	IGUA05EB

*** SEISMIC REFRACTION ***

TIME GMT	DATE D.M.Y.	TIME LOC	TZ LOC	SAMP CODE	SAMPLE IDENT.	SEQ. NUM.	DISP CODE	LAT.	LONG.	CRUISE LEG-SHIP
1945	5 472			SRUR B	IGUA 2-S1		RFN 20	251N	106 460W S	IGUA01EB
2205	5 472			SRUR E	IGUA 2-S1		RFN 20	061N	106 242W S	IGUA01EB
2324	6 472			SRUR B	IGUA 2-S2		RFN 17	566N	103 004W S	IGUA01EB
27	7 472			SRUR E	IGUA 2-S2		RFN 17	523N	102 538W S	IGUA01EB
1448	22 472			SRRV B	IGUA 3-1-1+2		RFN 1	117S	82 208W S	IGUA03EB
942	23 472			SRRV E	IGUA 3-1-1+2		RFN 1	9S	83 29W S	IGUA03EB
1848	23 472			SRRV B	IGUA 3-2-1+2+3		RFN 0	252S	83 364W S	IGUA03EB
1432	24 472			SRRV E	IGUA 3-2-1+2+3		RFN 0	70N	82 332W S	IGUA03EB
745	26 472			SRAN B	IGUA 3-3-1THRU.		RFN 4	350N	83 256W S	IGUA03EB
721	28 472			SRAN E	IGUA 3-3-1THRU8		RFN 5	212N	83 377W S	IGUA03EB
1922	28 472			SRAN B	IGUA 3-4-1THRU5		RFN 6	181N	84 98W S	IGUA03EB
1602	29 472			SRAN E	IGUA 3-4-1THRU5		RFN 7	484N	84 50W S	IGUA03EB
1518	3 572			SRUR B	IGUA 4-S1		RFN 9	214N	89 454W S	IGUA04EB
1930	3 572			SRUR E	IGUA 4-S1		RFN 9	154N	90 248W S	IGUA04EB
201	4 572			SRUR B	IGUA 4-S2		RFN 8	582N	91 2W S	IGUA04EB
422	4 572			SRUR E	IGUA 4-S2		RFN 9	120N	91 159W S	IGUA04EB
958	4 572			SRAN B	IGUA 4-5-1THRU10		RFN 8	555N	91 6W S	IGUA04EB
146	6 572			SRAN E	IGUA 4-5-1THUR10		RFN 9	202N	92 355W S	IGUA04EB
2235	6 572			SRRV B	IGUA 4-6-1		RFN 11	369N	95 128W S	IGUA04EB
302	7 572			SRRV E	IGUA 4-6-1		RFN 12	97N	95 429W S	IGUA04EB
1406	7 572			SRRV B	IGUA 4-7-1,2,3		RFN 13	223N	96 583W S	IGUA04EB
154	8 572			SRRV E	IGUA 4-7-1,2,3		RFN 12	581N	97 261W S	IGUA04EB
1733	8 572			SRAN S	IGUA 4-8-1THRU11		RFN 12	454N	99 364W S	IGUA04EB
1651	10 572			SRAN E	IGUA 4-8-1THRU11		RFN 13	377N	99 584W S	IGUA04EB

BATHYTHERMOGRAPHS - CURATOR MARGARET ROBINSON (EXT.1135)

*** BATHYTHERMOGRAPH ****

TIME GMT	DATE D.M.Y.	TIME LOC	TZ LOC	SAMP CODE	SAMPLE IDENT.	SEQ. NUM.	DISP CODE	LAT.	LONG.	CRUISE LEG-SHIP
1720	3 472			BTX	XBT 1		BTS 24	530N	112 567W S	IGUA01EB
626	4 472			BTX	XBT 2		BTS 23	303N	111 102W S	IGUA01EB
607	5 472			BTX	XBT 3		BTS 21	419N	108 248W S	IGUA01EB
1804	5 472			BTX	XBT 4		BTS 20	301N	106 533W S	IGUA01EB
608	6 472			BTX	XBT 5		BTS 19	248N	105 248W S	IGUA01EB
1808	6 472			BTX	XBT 6		BTS 18	204N	103 513W S	IGUA01EB
614	7 472			BTX	XBT 7		BTS 17	331N	101 554W S	IGUA01EB
1804	7 472			BTX	XBT 8		BTS 16	521N	100 94W S	IGUA01EB

TIME GMT	DATE D.M.Y.	TIME LOC	TZ LOC	SAMP CODE	SAMPLE IDENT.	SEQ. NUM.	DISP CODE	LAT.	LONG.		CRUISE LEG-SHIP
1210	9 472			BTX	XBT 9		BTS	15 263N	99 519W	S	IGUA02EB
7	10 472			BTX	XBT 10		BTS	13 407N	99 434W	S	IGUA02EB
1215	10 472			BTX	XBT 11		BTS	12 271N	98 213W	S	IGUA02EB
19	11 472			BTX	XBT 12		BTS	11 320N	96 565W	S	IGUA02EB
1203	11 472			BTX	XBT 13		BTS	10 416N	95 243W	S	IGUA02EB
4	12 472			BTX	XBT 14		BTS	9 336N	94 94W	S	IGUA02EB
1220	12 472			BTX	XBT 15		BTS	8 419N	92 434W	S	IGUA02EB
5	13 472			BTX	XBT 16		BTS	7 498N	91 230W	S	IGUA02EB
1208	13 472			BTX	XBT 17		BTS	7 61N	89 547W	S	IGUA02EB
4	14 472			BTX	XBT 18		BTS	6 25N	88 160W	S	IGUA02EB
1215	14 472			BTX	XBT 19		BTS	4 334N	87 16W	S	IGUA02EB
133	15 472			BTX	XBT 20		BTS	3 139N	85 526W	S	IGUA02EB
1205	15 472			BTX	XBT 21		BTS	2 83N	84 575W	S	IGUA02EB
3	16 472			BTX	XBT 22		BTS	0 503N	83 550W	S	IGUA02EB
1108	16 472			BTX	XBT 23		BTS	0 230S	82 554W	S	IGUA02EB
2315	16 472			BTX	XBT 24		BTS	1 375S	81 461W	S	IGUA02EB
1205	22 472			BTX	XBT 25		P*S	1 285S	82 77W	S	IGUA03EB
10	23 472			BTX	XBT 26		BTS	1 72S	82 381W	S	IGUA03EB
1210	23 472			BTX	XBT 27		BTS	0 577S	83 48W	S	IGUA03EB
58	24 472			BTX	XBT 28		BTS	0 232S	83 367W	S	IGUA03EB
11	25 472			BTX	XBT 29		BTS	1 307N	82 526W	S	IGUA03EB
1210	25 472			BTX	XBT 30		BTS	3 170N	83 143W	S	IGUA03EB
10	26 472			BTX	XBT 31		BTS	4 325N	83 276W	S	IGUA03EB
1250	26 472			BTX	XBT 32		BTS	4 384N	83 219W	S	IGUA03EB
100	27 472			BTX	XBT 33		BTS	4 436N	83 155W	S	IGUA03EB
1210	26 472			BTX	XBT 34		BTS	4 379N	83 224W	S	IGUA03EB
17	28 472			BTX	XBT 35		BTS	4 336N	83 403W	S	IGUA03EB
1205	28 472			BTX	XBT 36		BTS	6 44N	83 435W	S	IGUA03EB
8	29 472			BTX	XBT 37		BTS	6 331N	84 95W	S	IGUA03EB
1210	29 472			BTX	XBT 38		BTS	7 117N	84 57W	S	IGUA03EB
550	30 472			BTX	XBT 39		BTS	9 2N	84 466W	S	IGUA03EB
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1210	3 572			BTX	XBT 42		BTS	9 251N	89 173W	S	IGUA04EB
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7	6 572			BTX	XBT 47		BTS	9 193N	92 355W	S	IGUA04EB
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1145	8 572			BTX	XBT 52		BTS	12 561N	98 505W	S	IGUA04EB
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1159	9 572			BTX	XBT 54		BTS	13 255N	99 282W	S	IGUA04EB
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1204	16 572			BTX	XBT 58		BTS	16 478N	101 560W	S	IGUA05EB
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1204	17 572			BTX	XBT 60		BTS	18 493N	105 160W	S	IGUA05EB
130	18 572			BTX	XBT 61		BTS	20 140N	106 564W	S	IGUA05EB
1206	18 572			BTX	XBT 62		BTS	21 147N	108 61W	S	IGUA05EB
1206	19 572			BTX	XBT 63		BTS	23 126N	110 365W	S	IGUA05EB

99 END SAMPLE INDEX

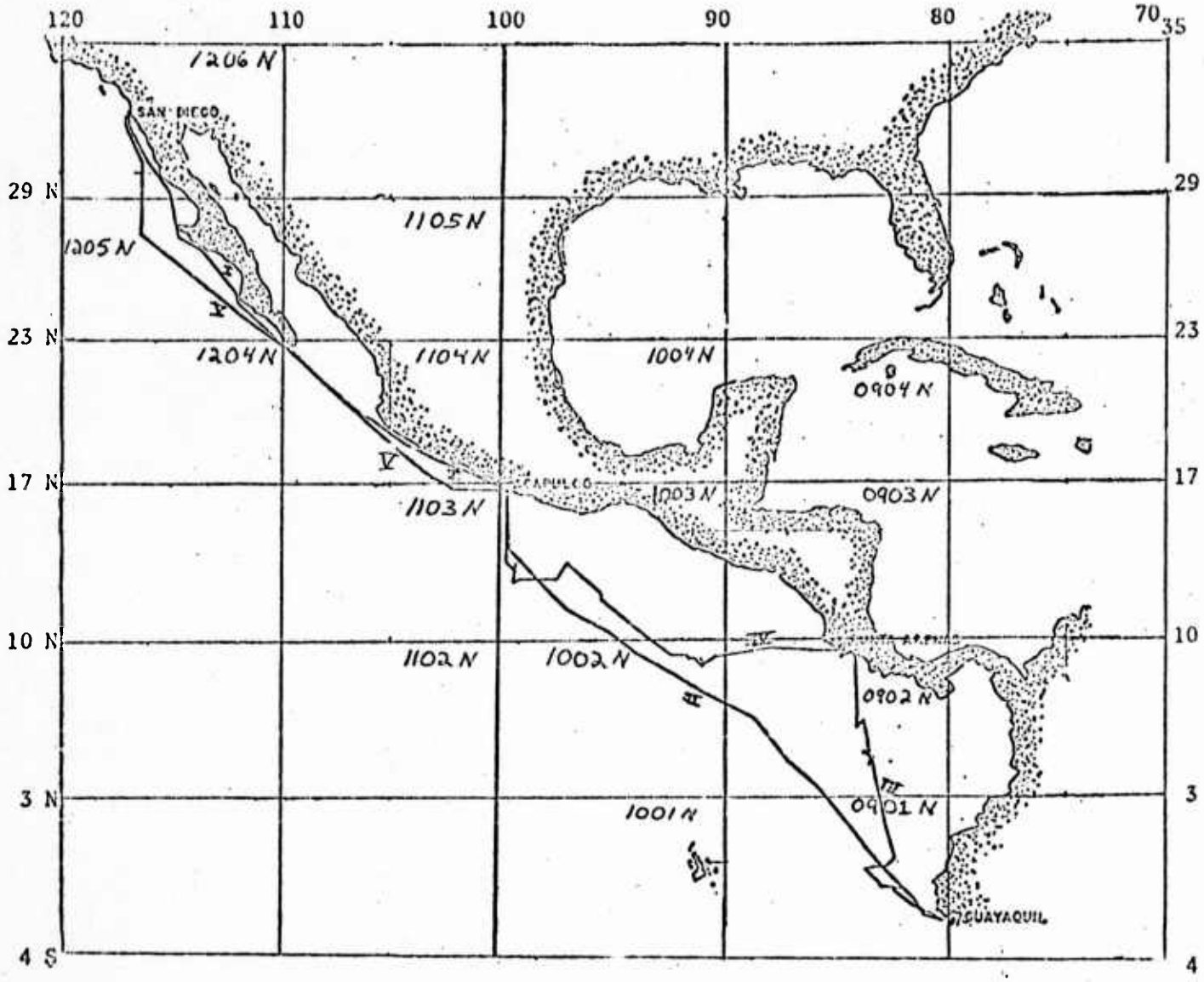
PRELIMINARY INDEX OF NAVIGATION, DEPTH, AND SUBBOTTOM PROFILER DATA

Contents:

Index Chart	gives track of cruise leg and boundaries of depth compilation plots
Track Charts	annotated with dates (day/month) and hour ticks.
Profiles	Depth vs. distance. Dates (day/month) and positions of major course changes (greater than 30 degrees) are annotated. Sections of track having subbottom profiler (airgun) records have a solid black line along the bottom of the profile. Nearly all of the track shown has magnetic data.

ACKNOWLEDGMENTS

This paper represents results in research sponsored under the Office of Naval Research and the National Science Foundation Grant GA 19703.



IGUANA EXPEDITION

LEGS 1-5

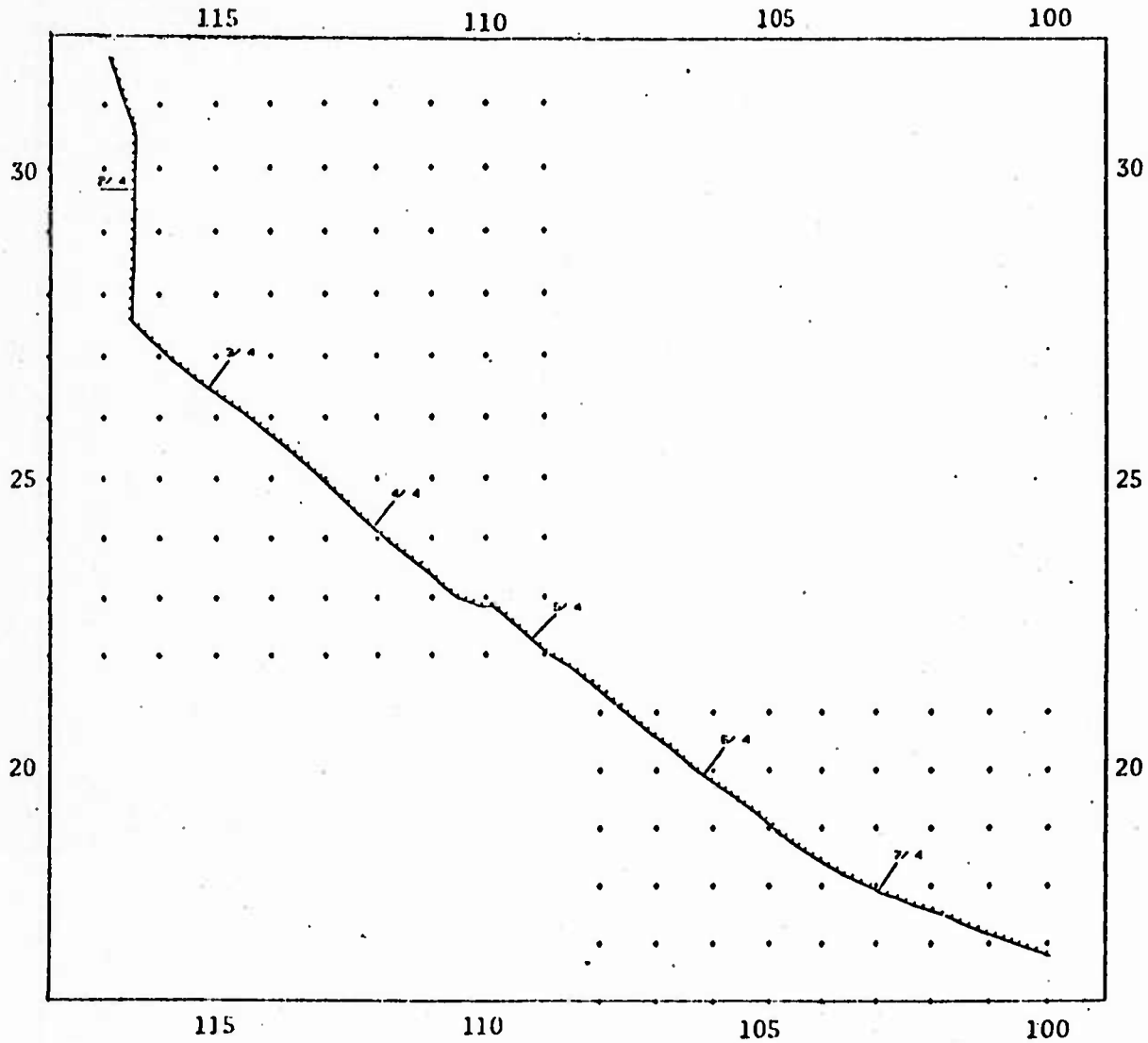
R/V E.B. SCRIPPS

CHIEF SCIENTIST- G.G.SHOR

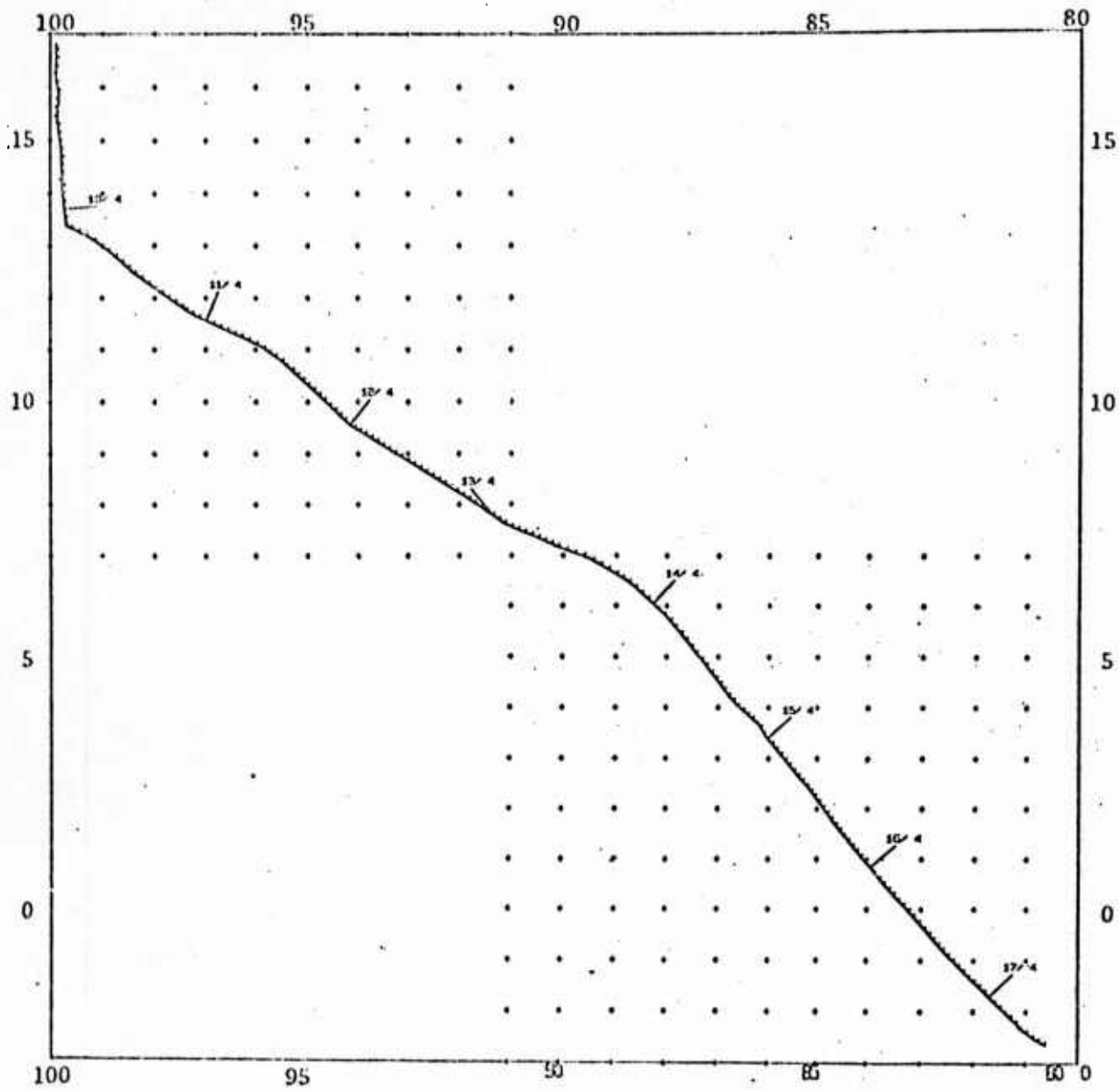
Leg 1 San Diego - Acapulco (1 April 1972 to 7 April 1972)
Leg 2 Acapulco - Guayaquil (9 April 1972 to 17 April 1972)
Leg 3 Guayaquil - Punta Arenas (21 April 1972 to 30 April 1972)
Leg 4 Punta Arenas - Acapulco (2 May 1972 to 11 May 1972)
Leg 5 Acapulco - San Diego (15 May 1972 to 22 May 1972)

TOTAL MILEAGE

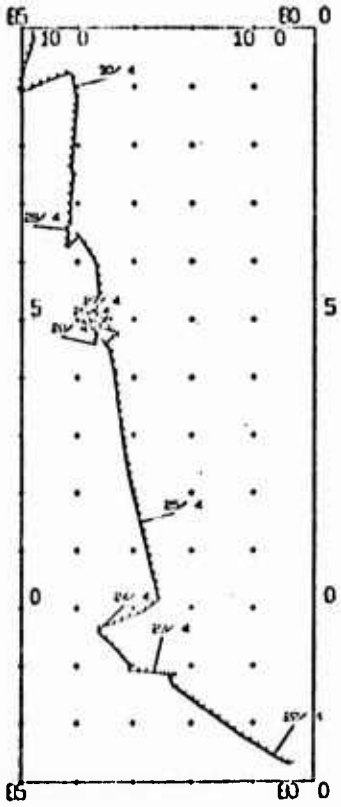
1) Cruise - 7217.5 miles
2) Bathymetry - 7070 miles
3) Magnetics - 6850 miles
4) Seismic Reflection - 4540 miles



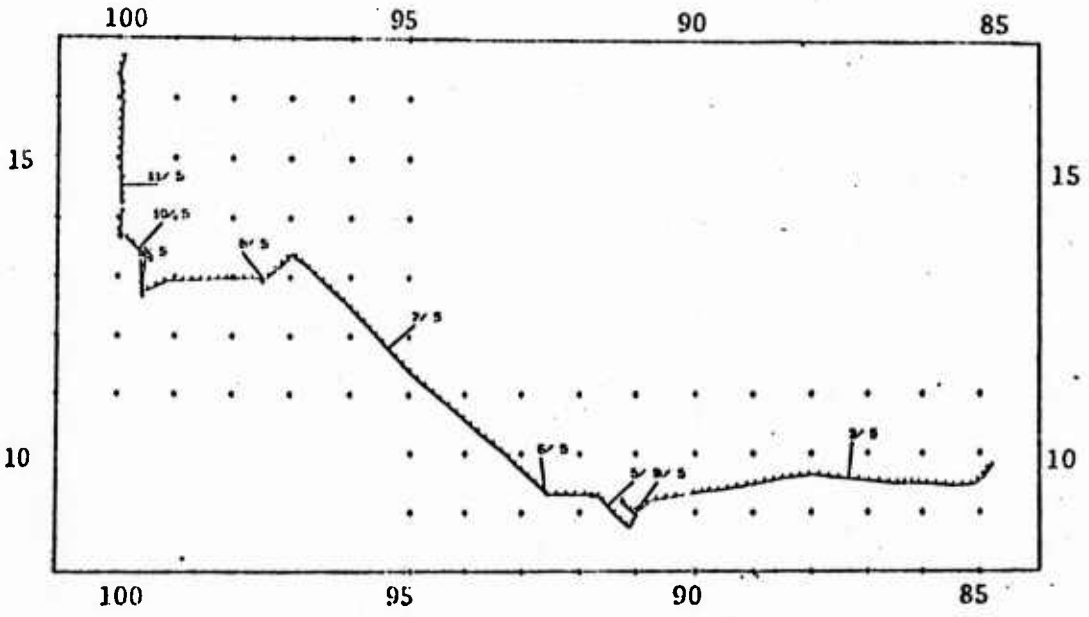
IGUANA LEG 1, track chart



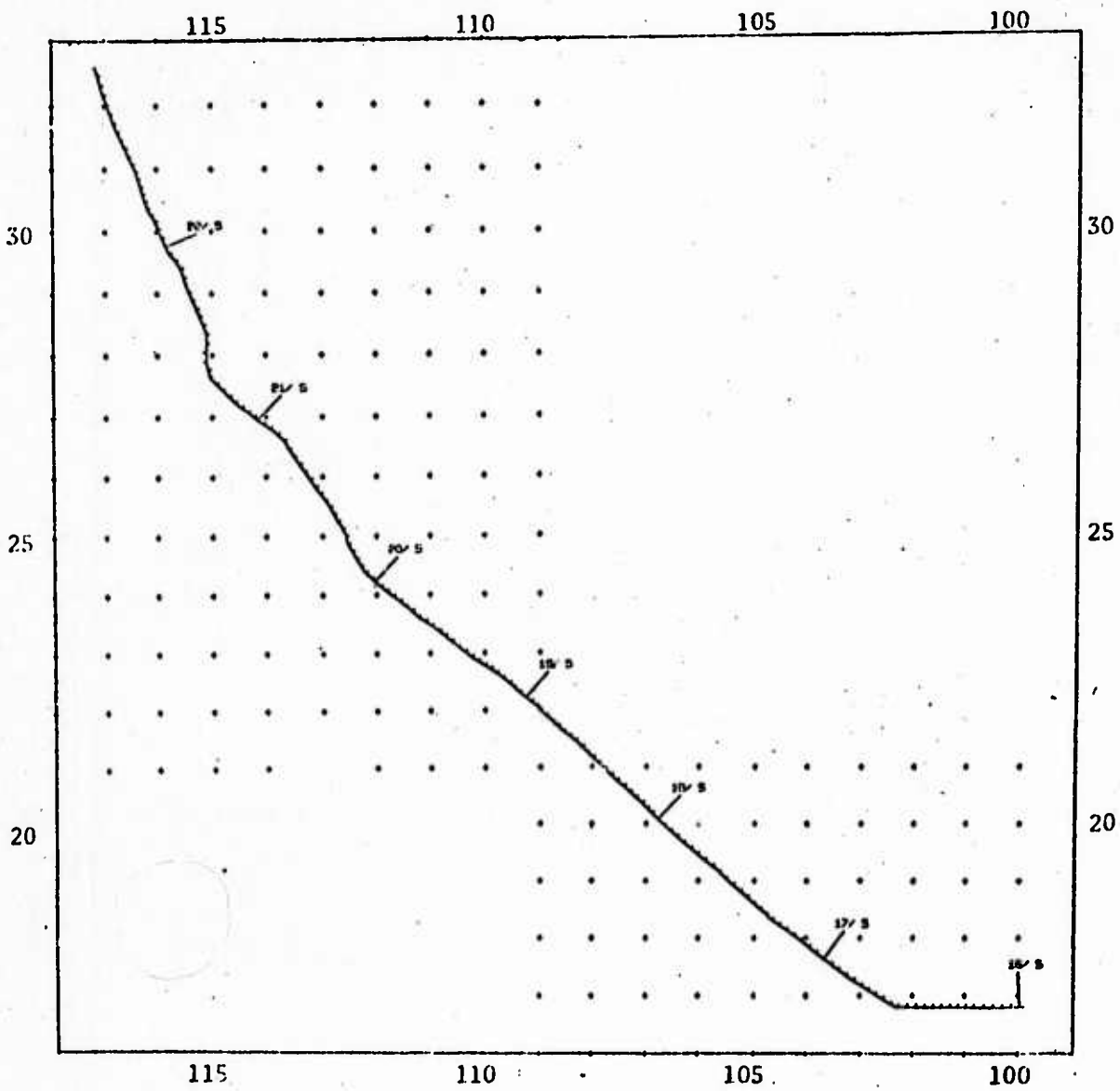
IGUANA LEG 2, track chart



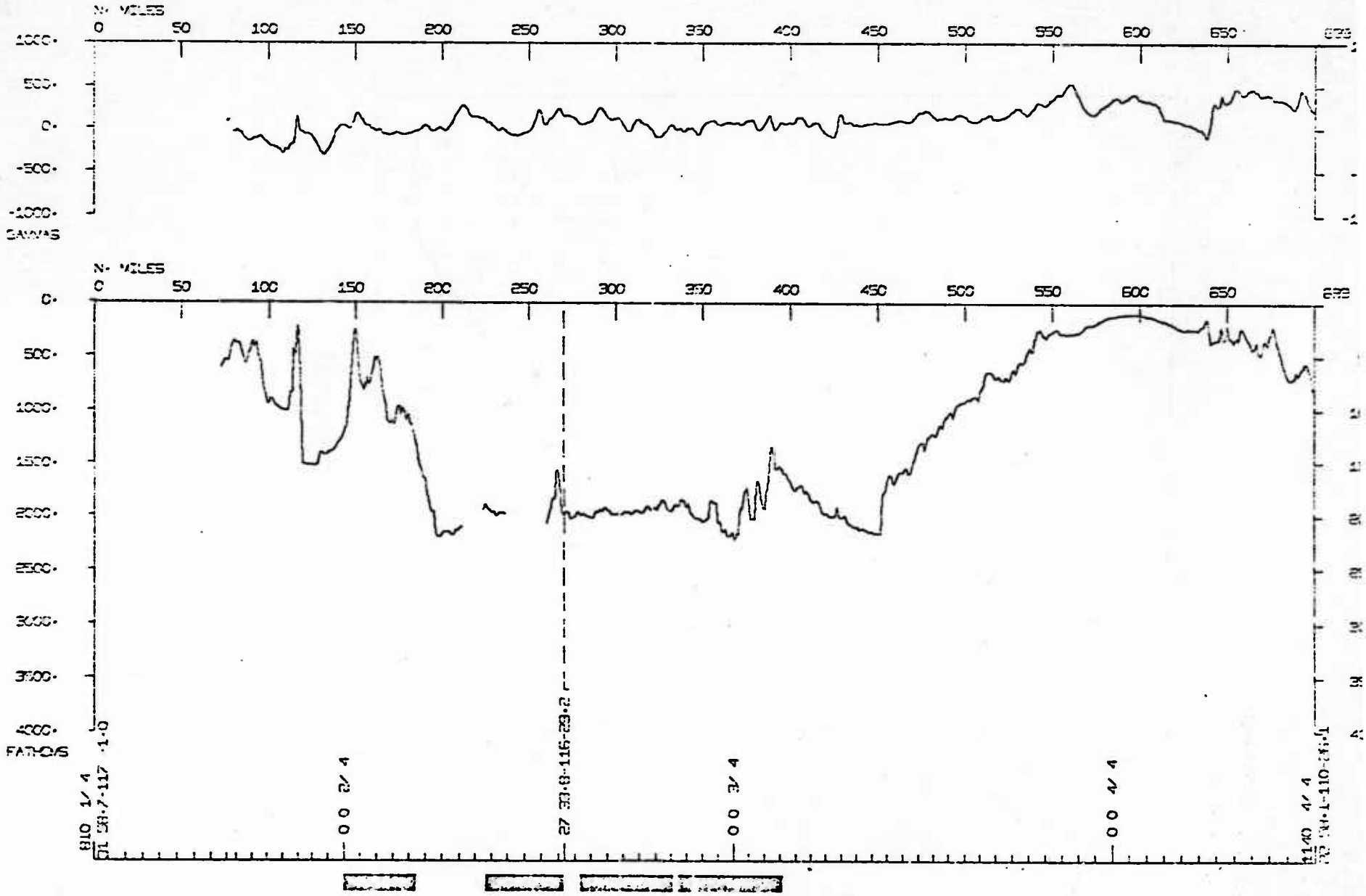
IGUANA LEG 3, track chart



IGUANA LEG 4, track chart



IGUANA LEG 5, track chart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650
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-1000
CANVAS
N. MILES
0
50
100
150
200
250
300
350
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600
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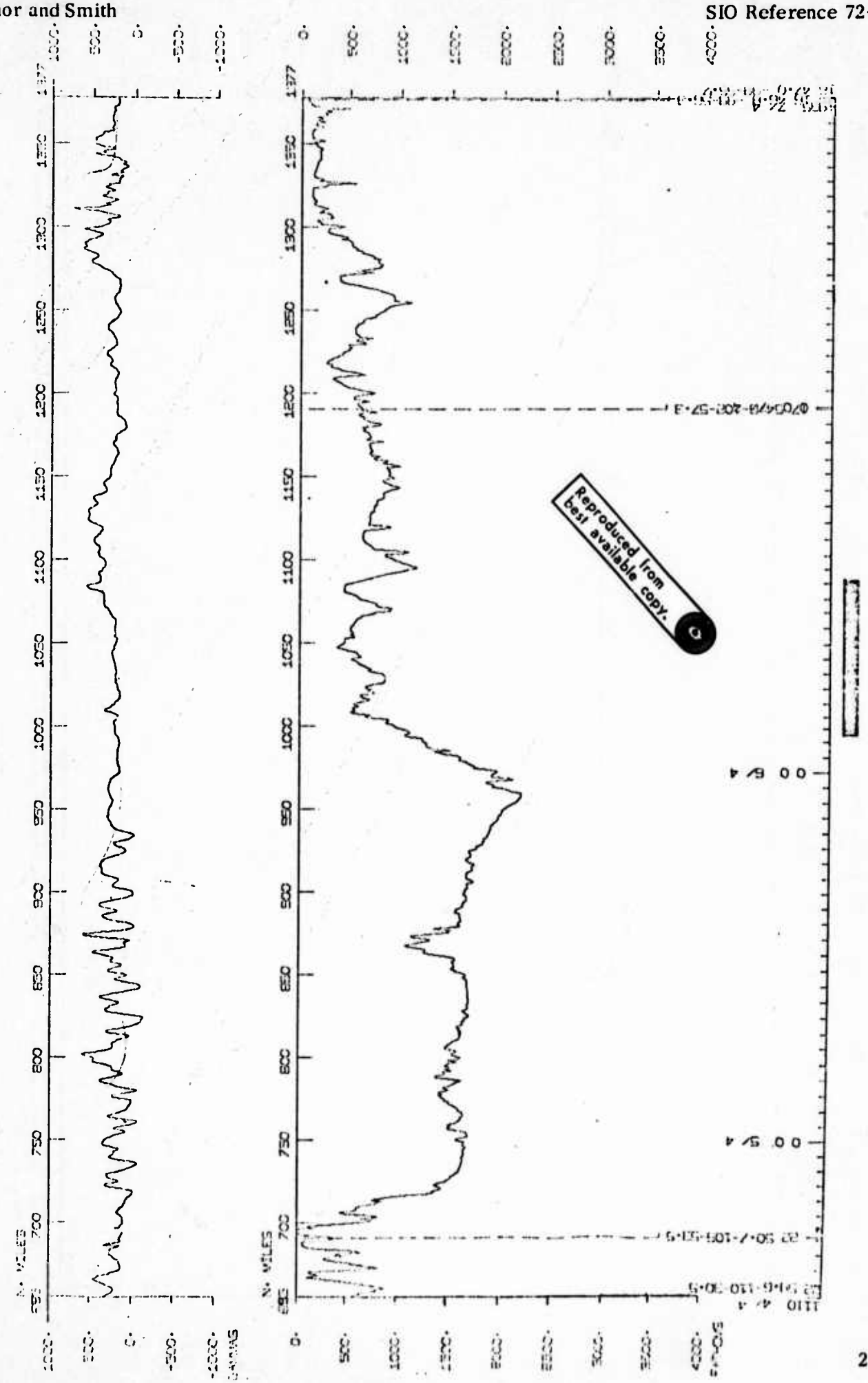
2000
2500
3000
3500
4000
FATHOMS

IGUANA LEG 1.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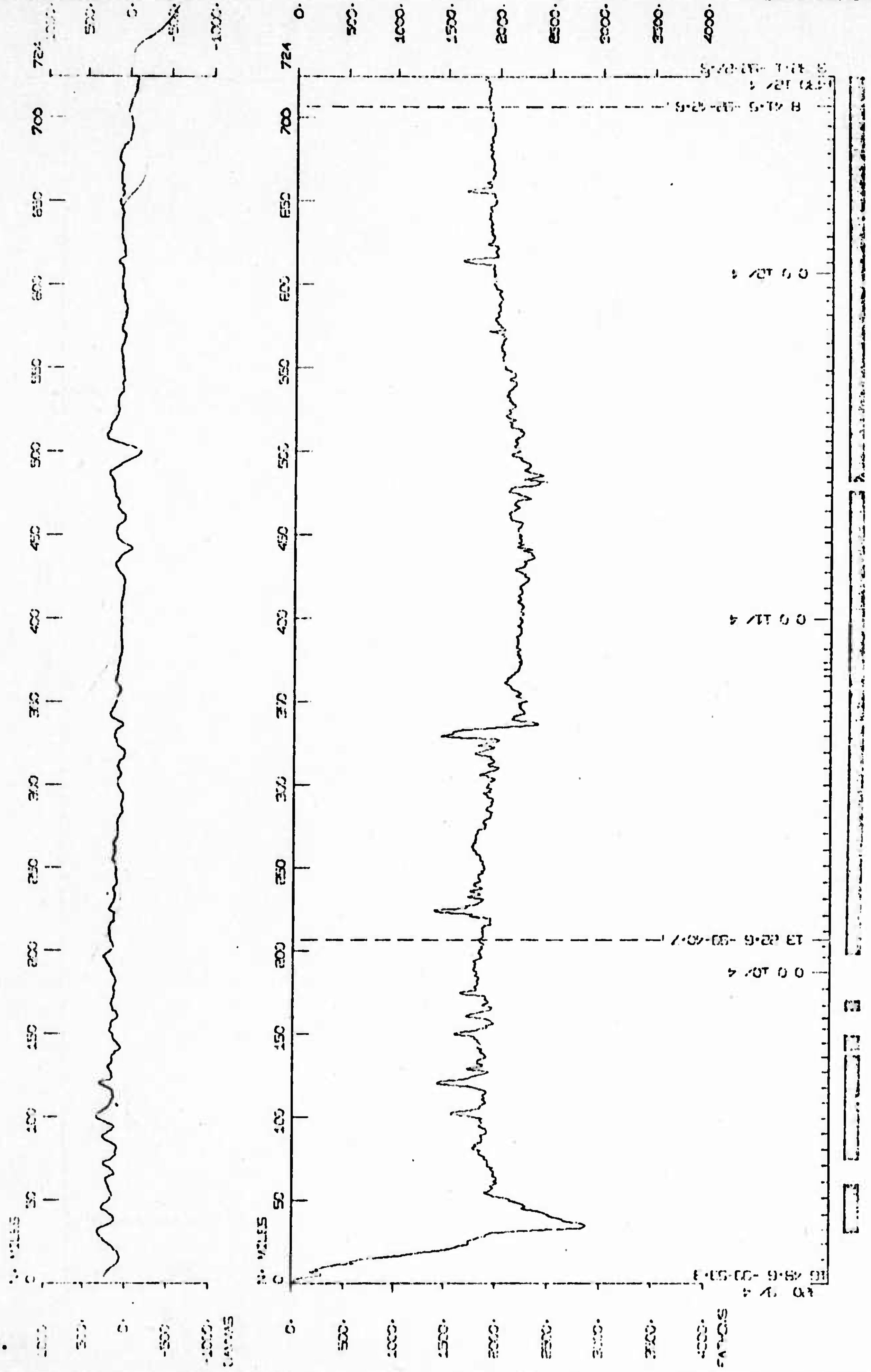
Reproduced from best available copy.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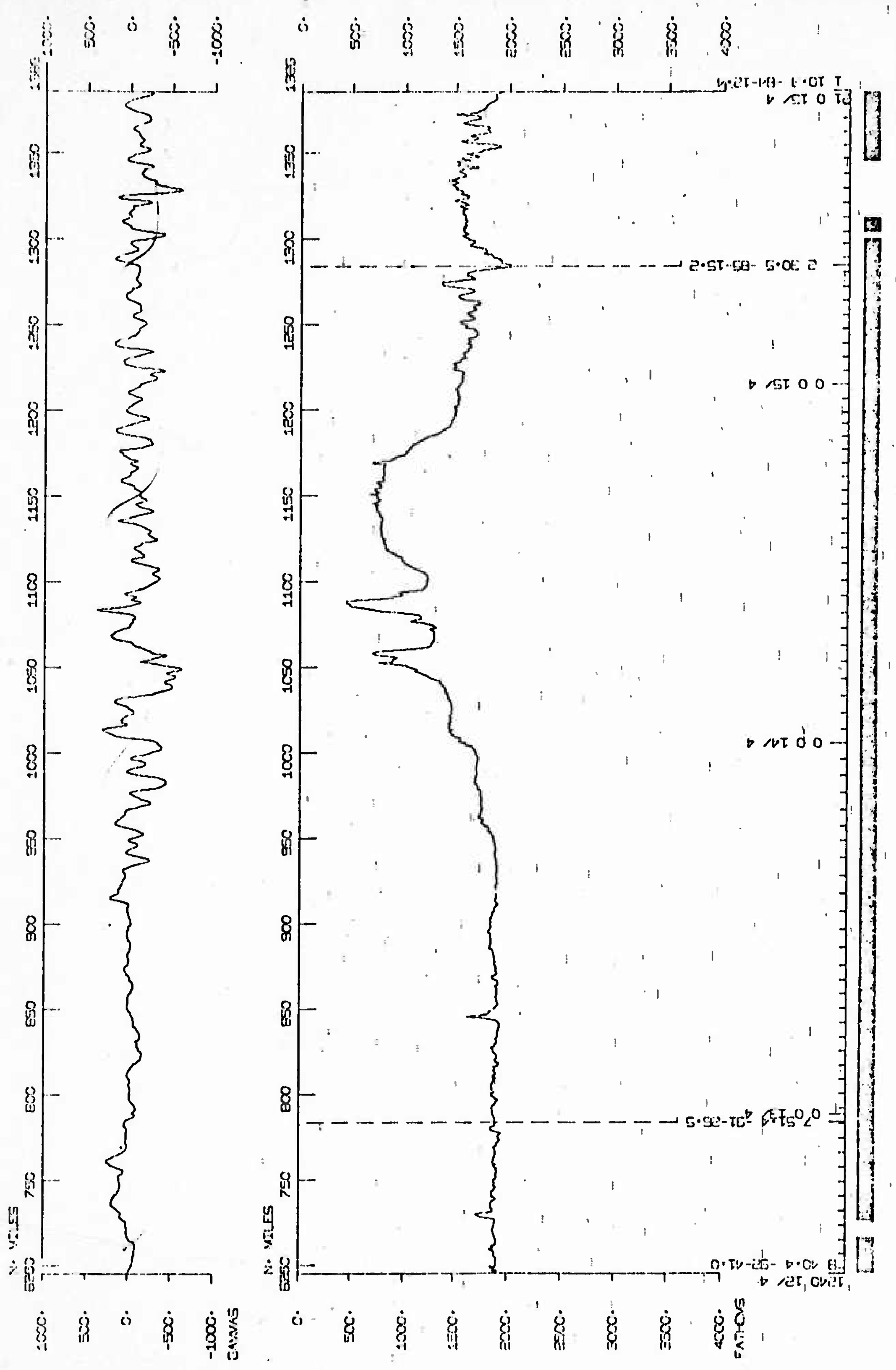
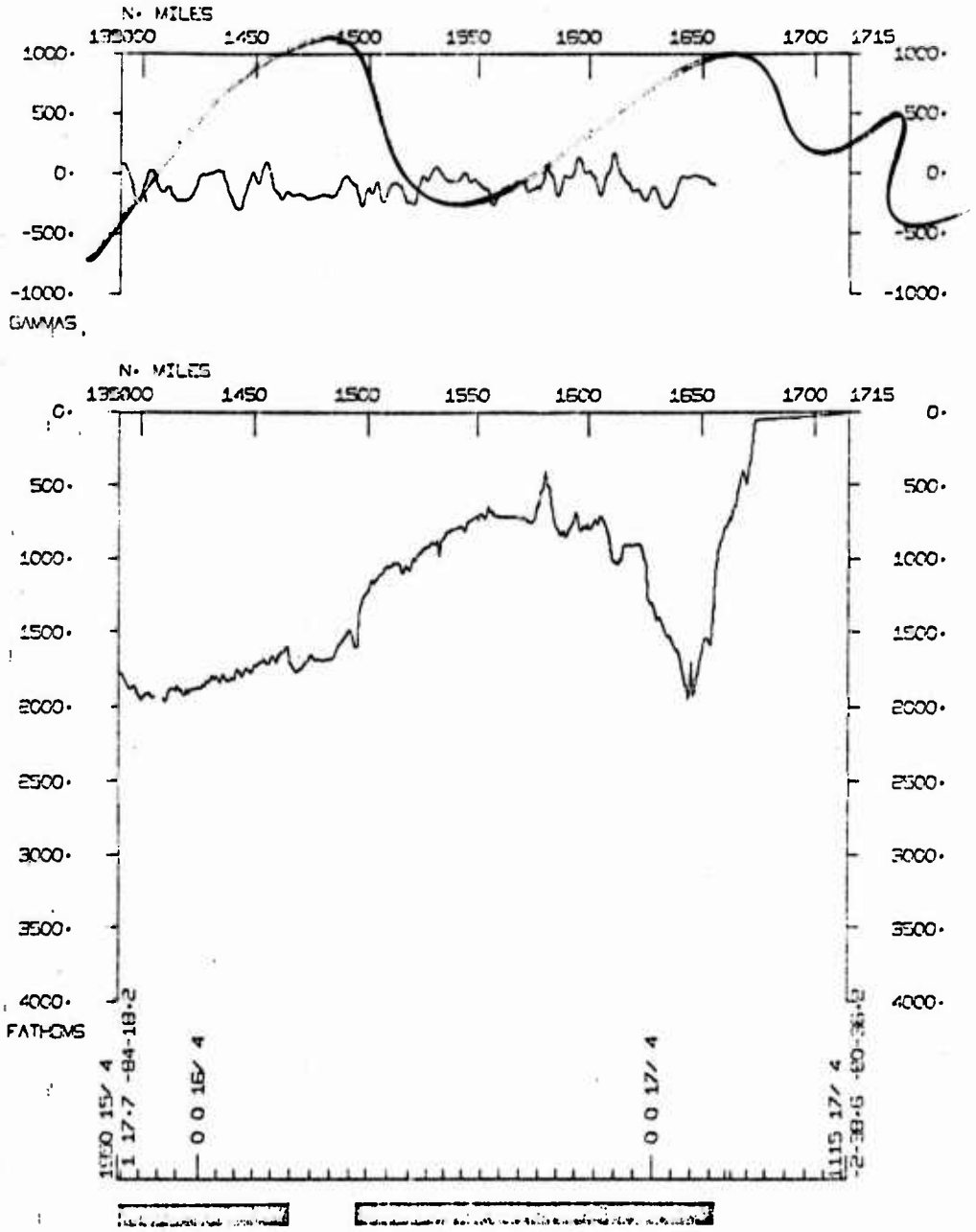
3500
4000
FATHOMS

IGUANA LEG 2


IGUANA LEG 2
N. MILES
GAMMAS
FATHOMS


N. MILES
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1500
1550
1600
1650
1700
1715
1000.
500.
0.
-500.
-1000.
GAMMAS
N. MILES
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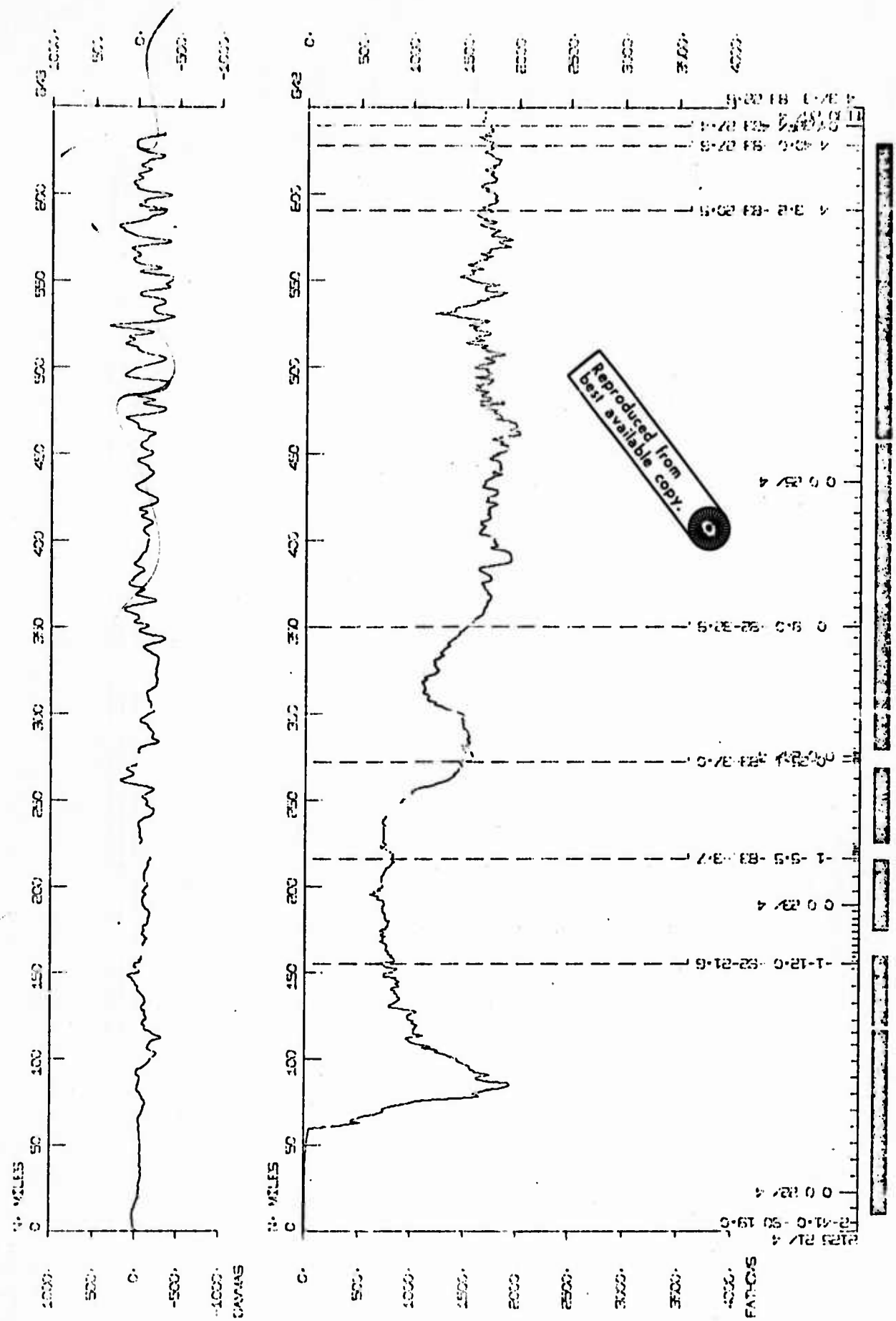
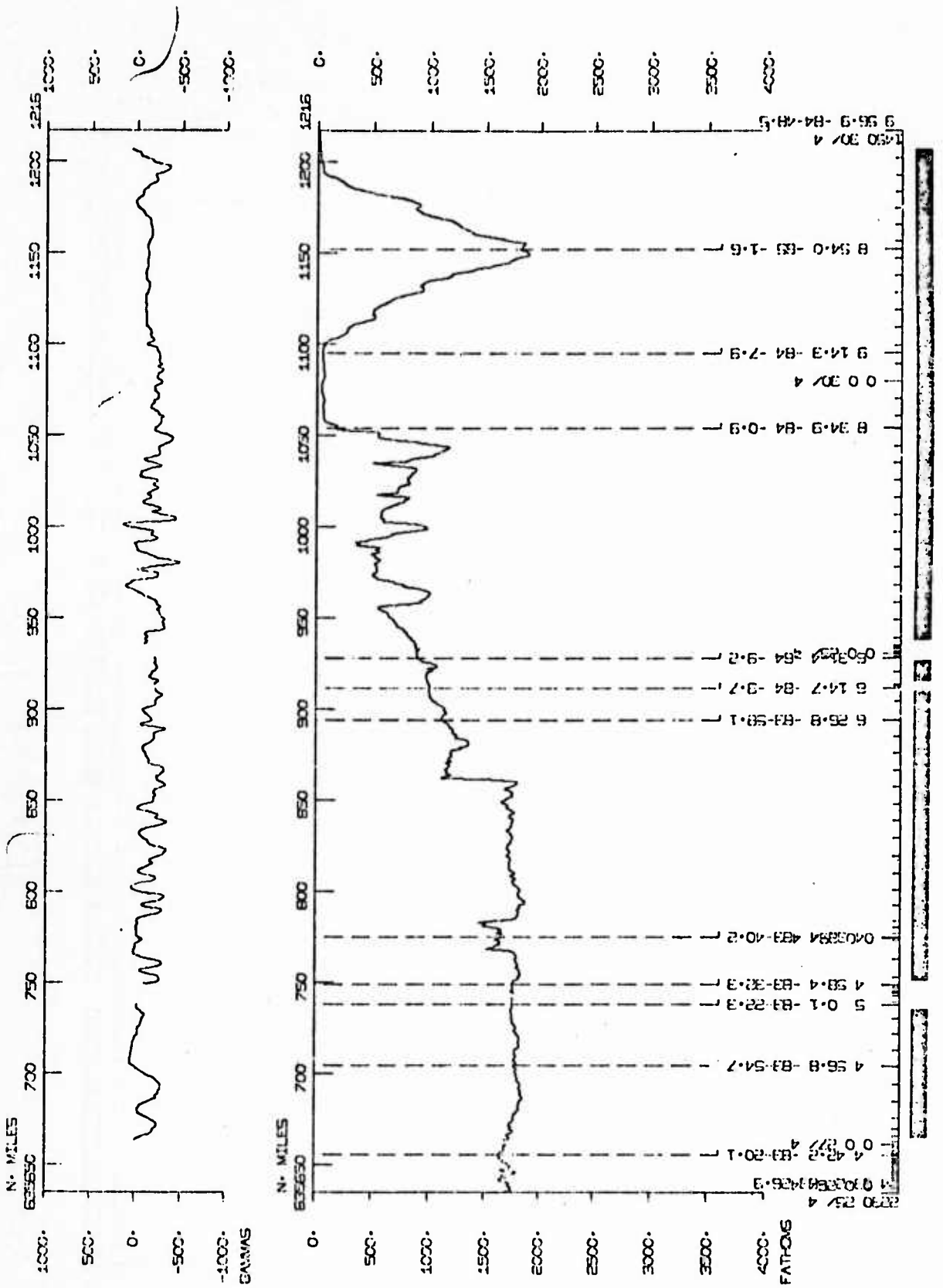
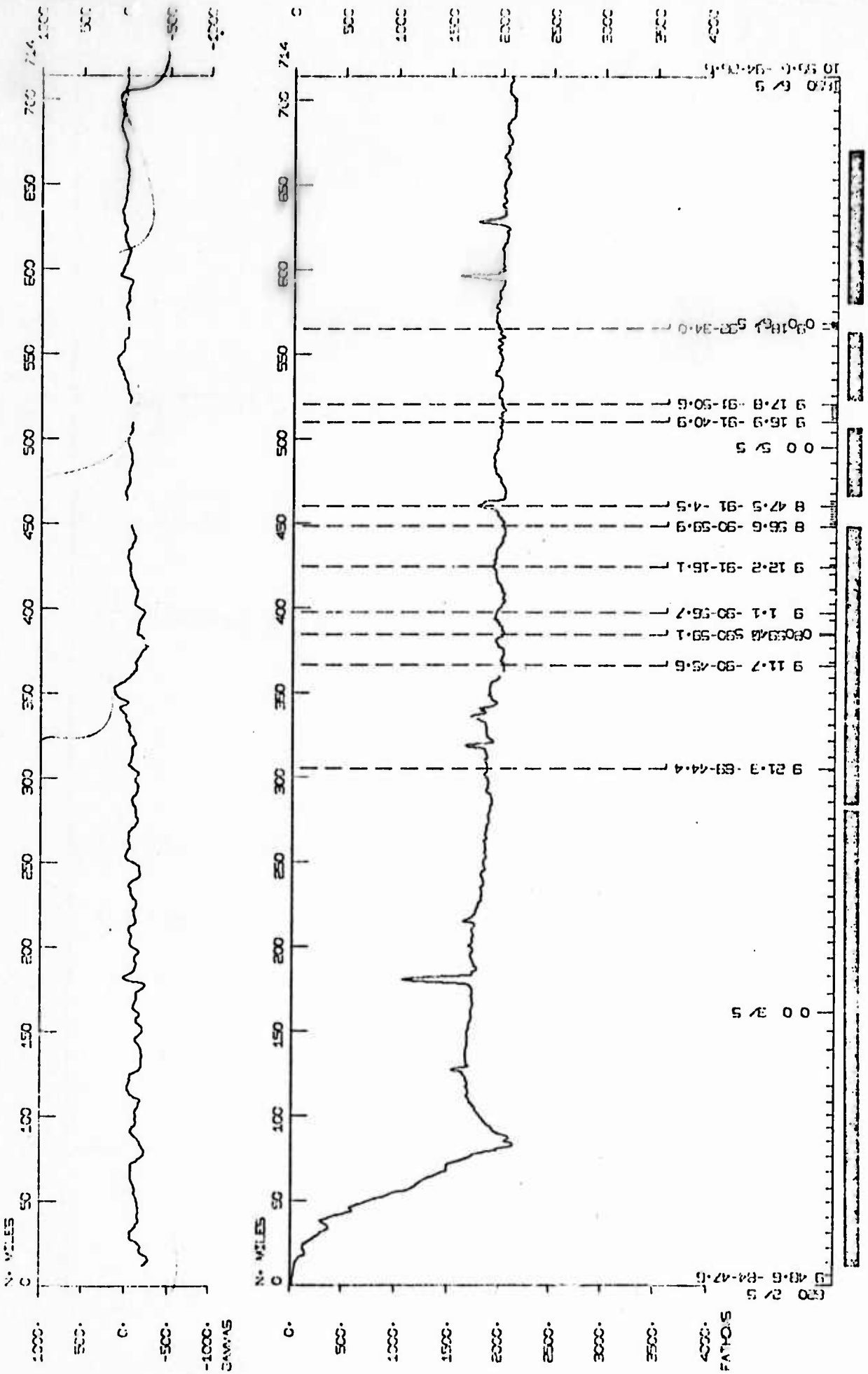
500.
1000.
1500.
2000.
2500.
3000.
3500.
4000.
FATHOMS

IGUANA LEG 2


Reproduced from best available copy.
IGUANA LEG 3
N. MILES
GAMMAS
FATHOMS


N. MILES
GAMMAS
FATHOMS
IGUANA LEG 3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GAMMAS
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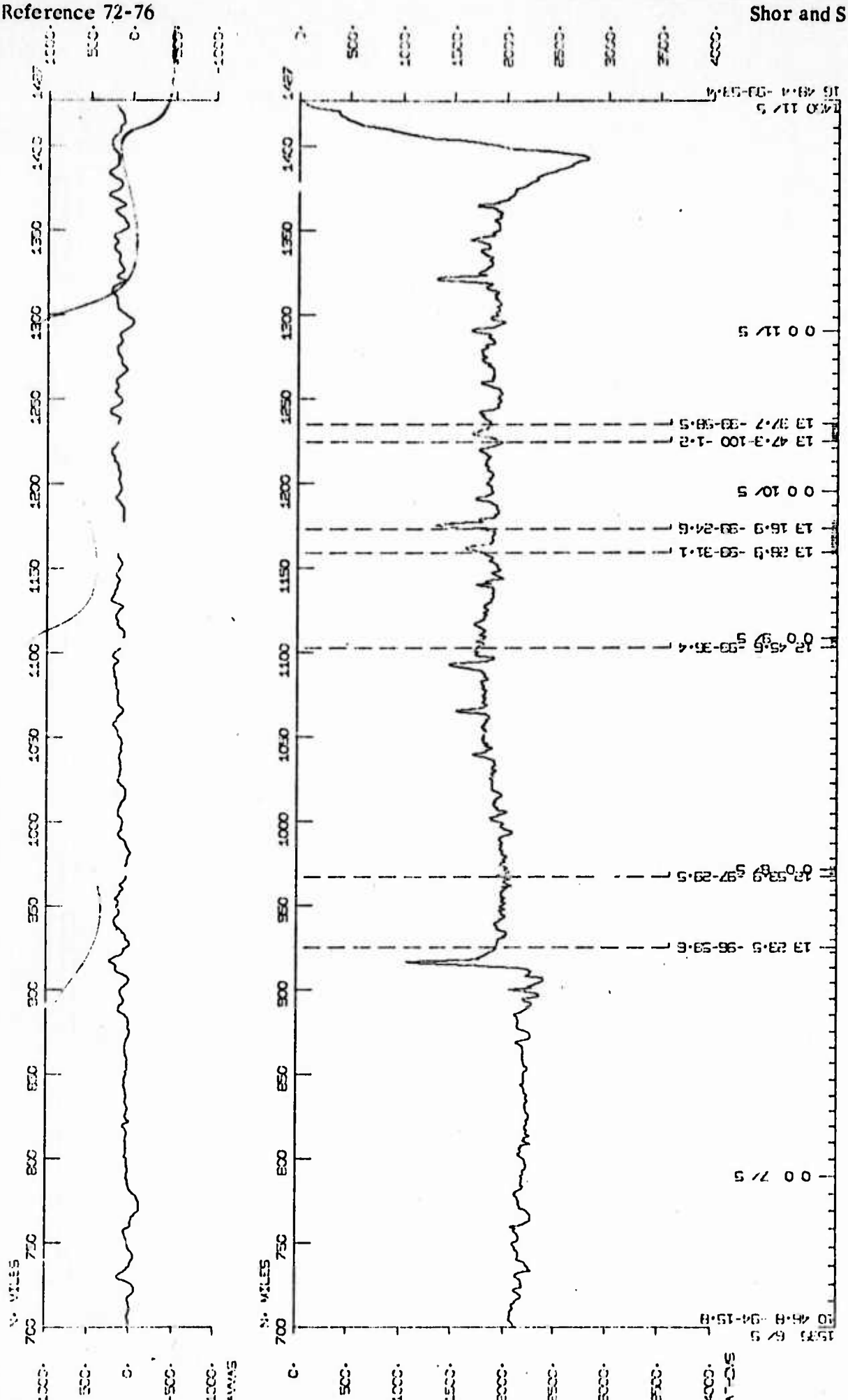

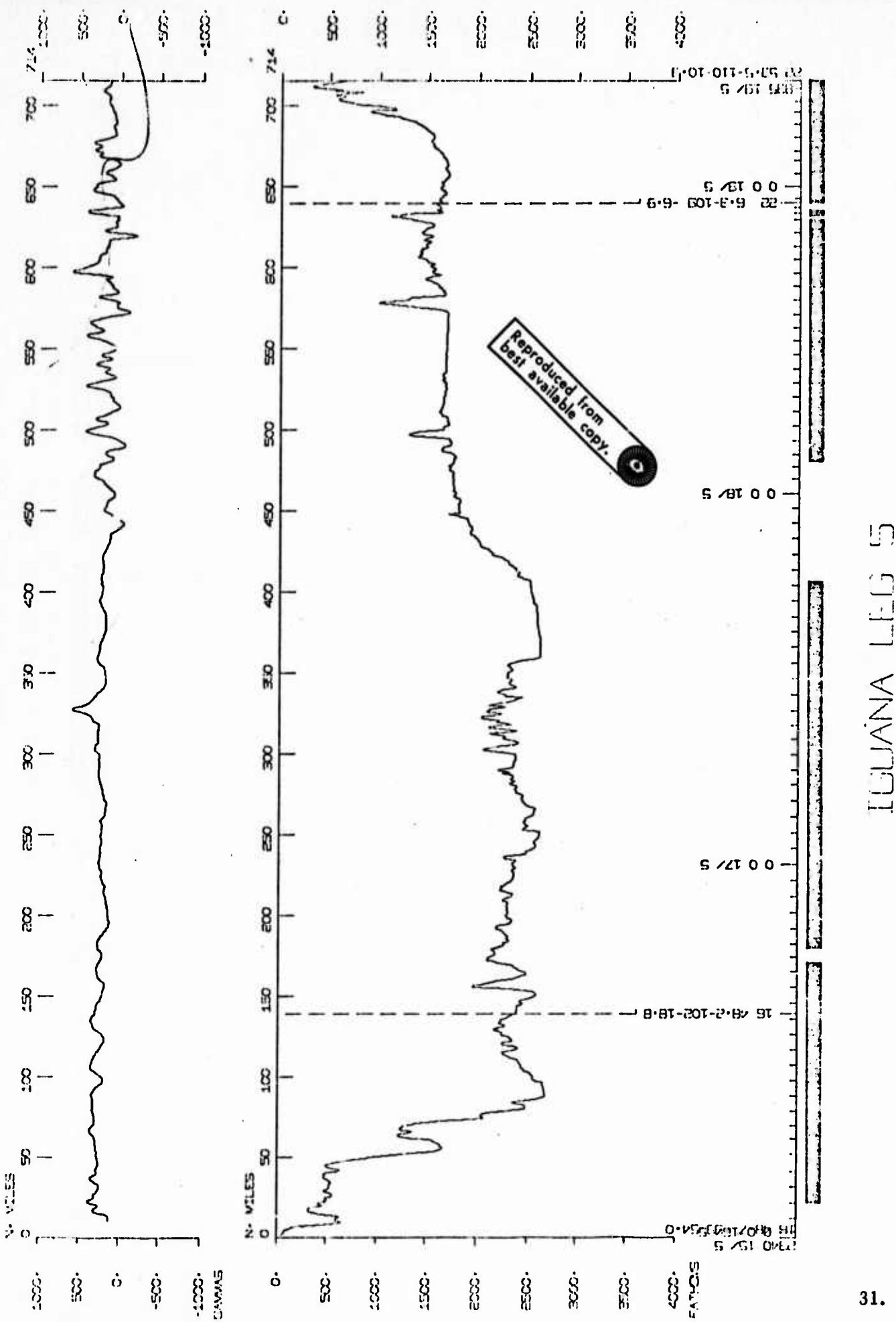

TIJUANA LEG 5

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800
850
900
950
1000
1050
1100
1150
1200
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1300
1350
1400
1432
1000.
500.
0.
-500.
-1000.
GAMMAS
N. MILES
700
750
800
850
900
950
1000
1050
1100
1150
1200
1250
1300
1350
1400
1432
0.
500.
1000.
1500.
2000.
2500.
3000.
3500.
4000.
FATHOMS
0 0 20/ S
24 54·7-112-32·4
0 0 21/ S
27 30·3-115 -1·6
0 0 22/ S

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12 December 1972

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Subj: Correction to SIO Reference 72-76

Encl: (1) Corrected pages 21 through 32 of SIO Reference 72-76, 1 October 1972, "Preliminary Cruise Report Iguana Expedition" by George G. Shor, Jr. and Stuart M. Smith, Marine Physical Laboratory of the Scripps Institution of Oceanography, University of California, San Diego.

Please remove and destroy pages 21 through 32 from SIO Reference 72-76 (distributed 10-27-72) and replace with Enclosure (1).

Christine Baldwin

Christine Baldwin

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Encl: pp. 21-32, SIO Ref 72-76

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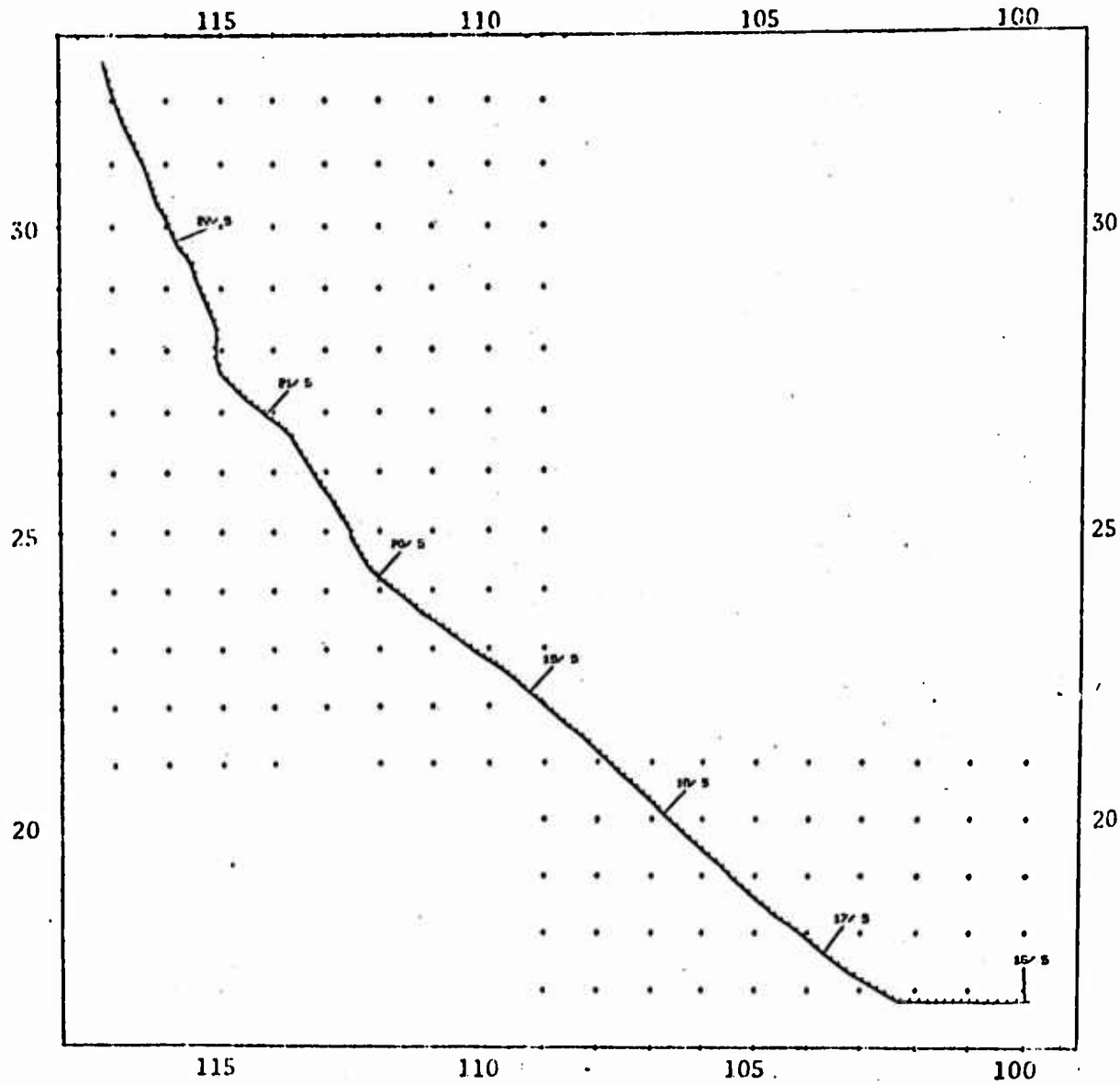
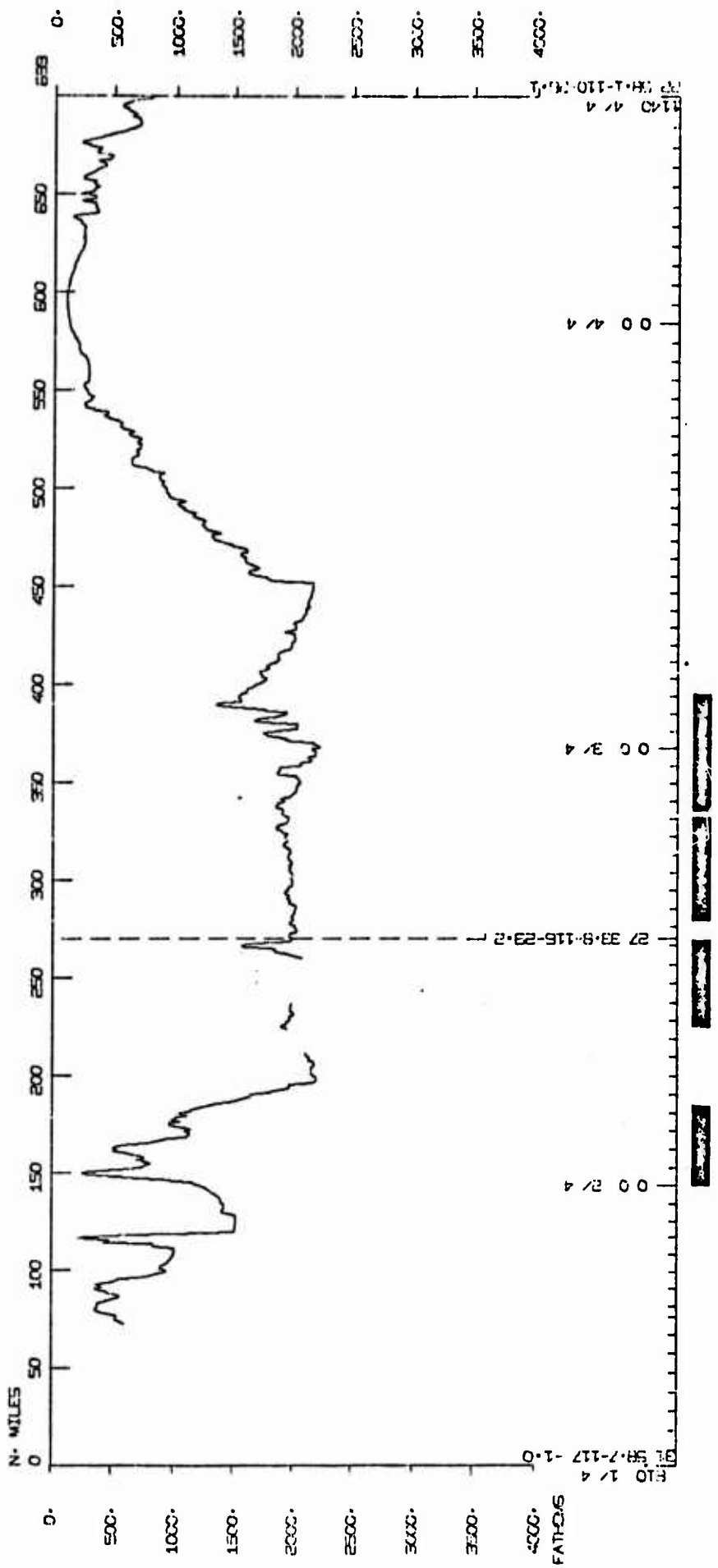


IGUANA LEG 5, track chart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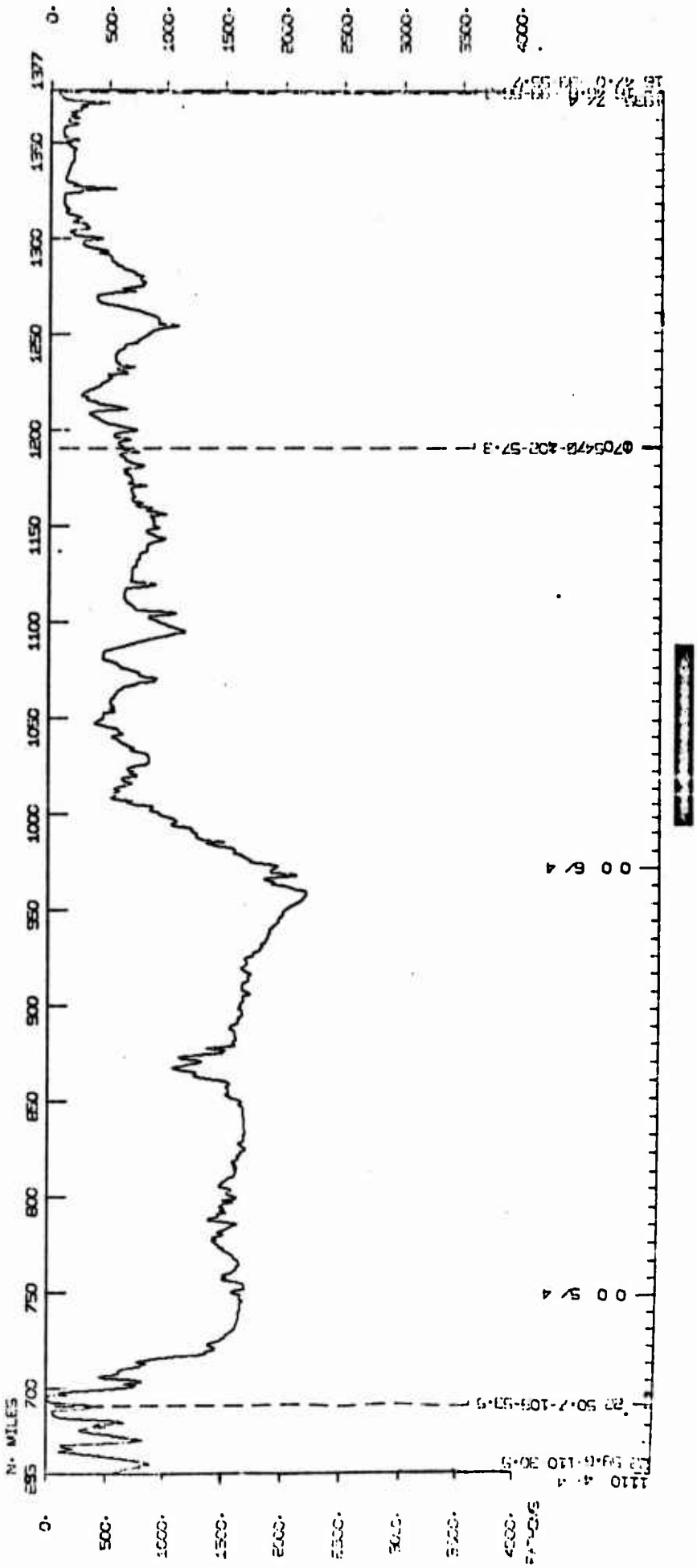
FATHOMS
IGUANA LEG 1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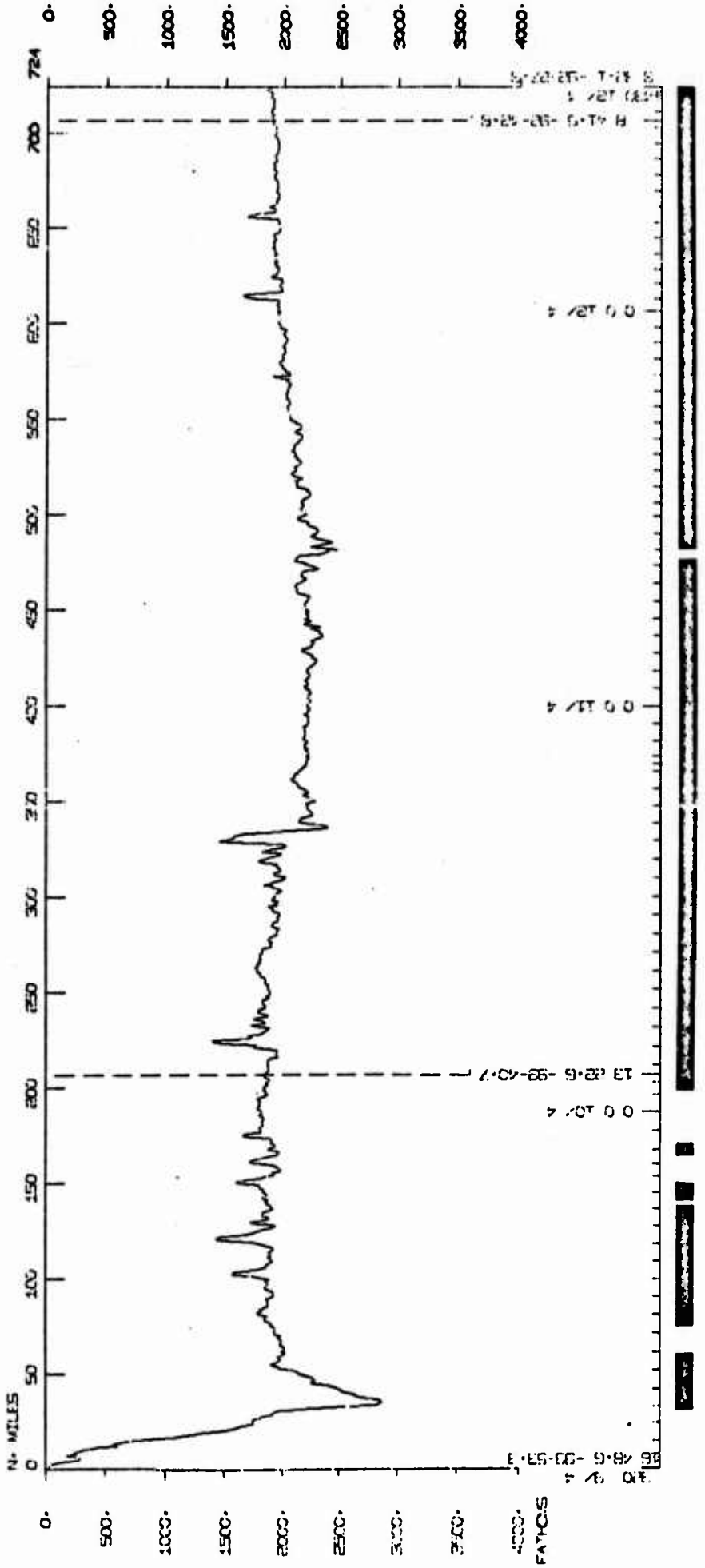
00 5/4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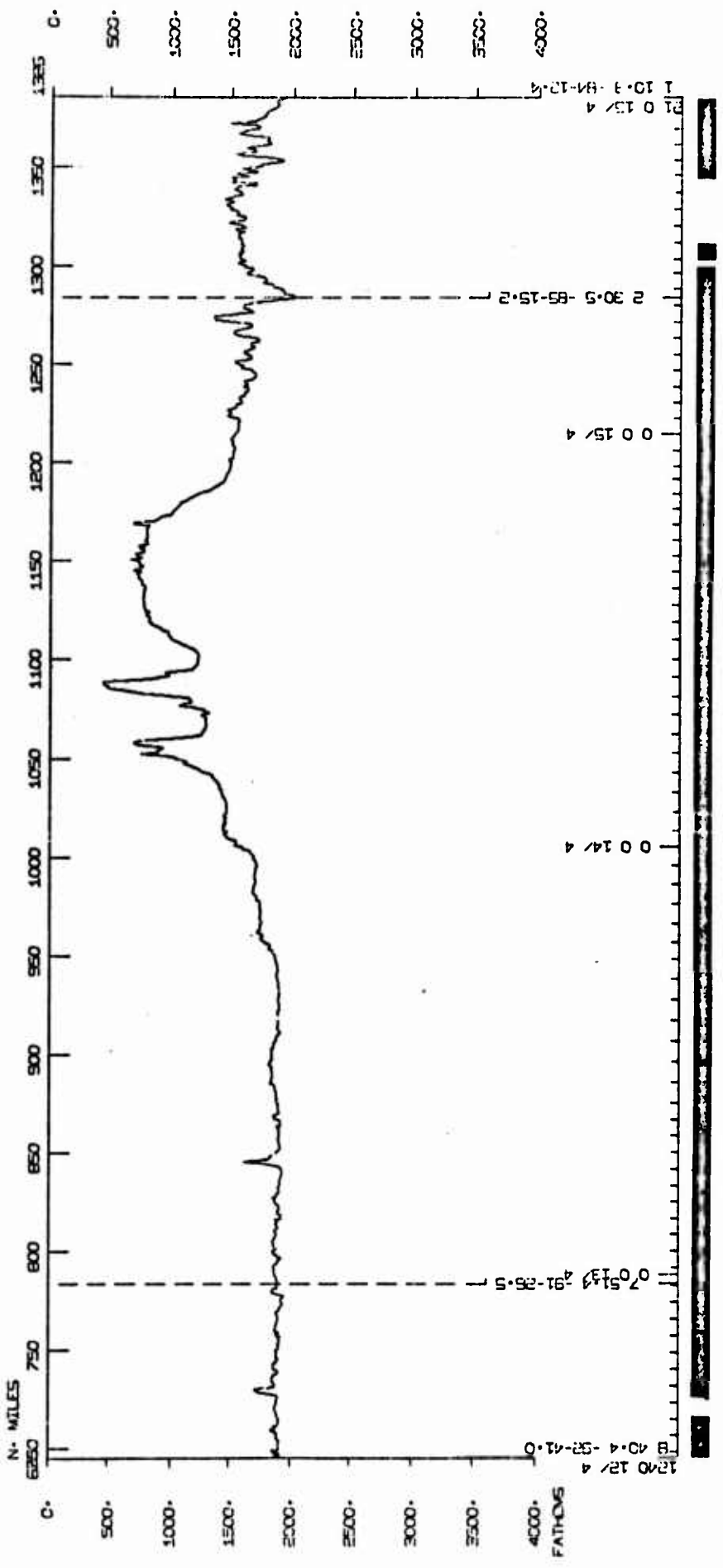
FATHOMS

IGUANA LEG 2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FATHOMS
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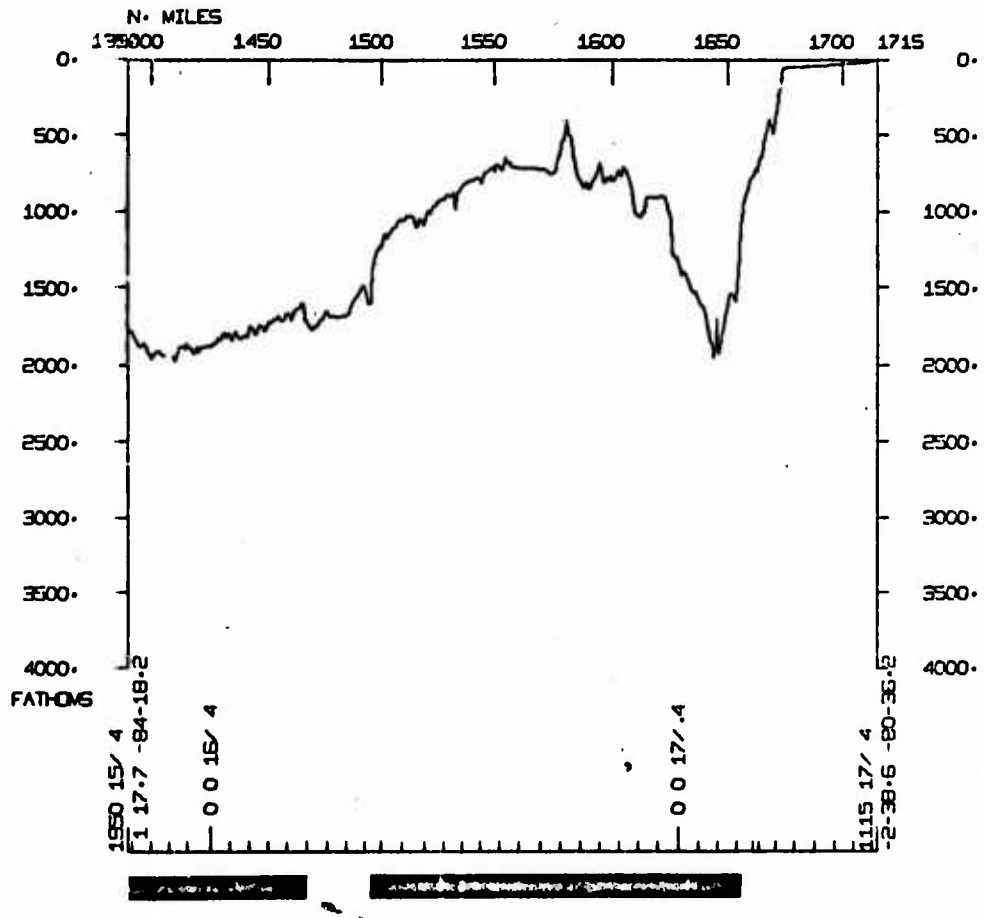
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3000.
3500.
4000.
FATHOMS
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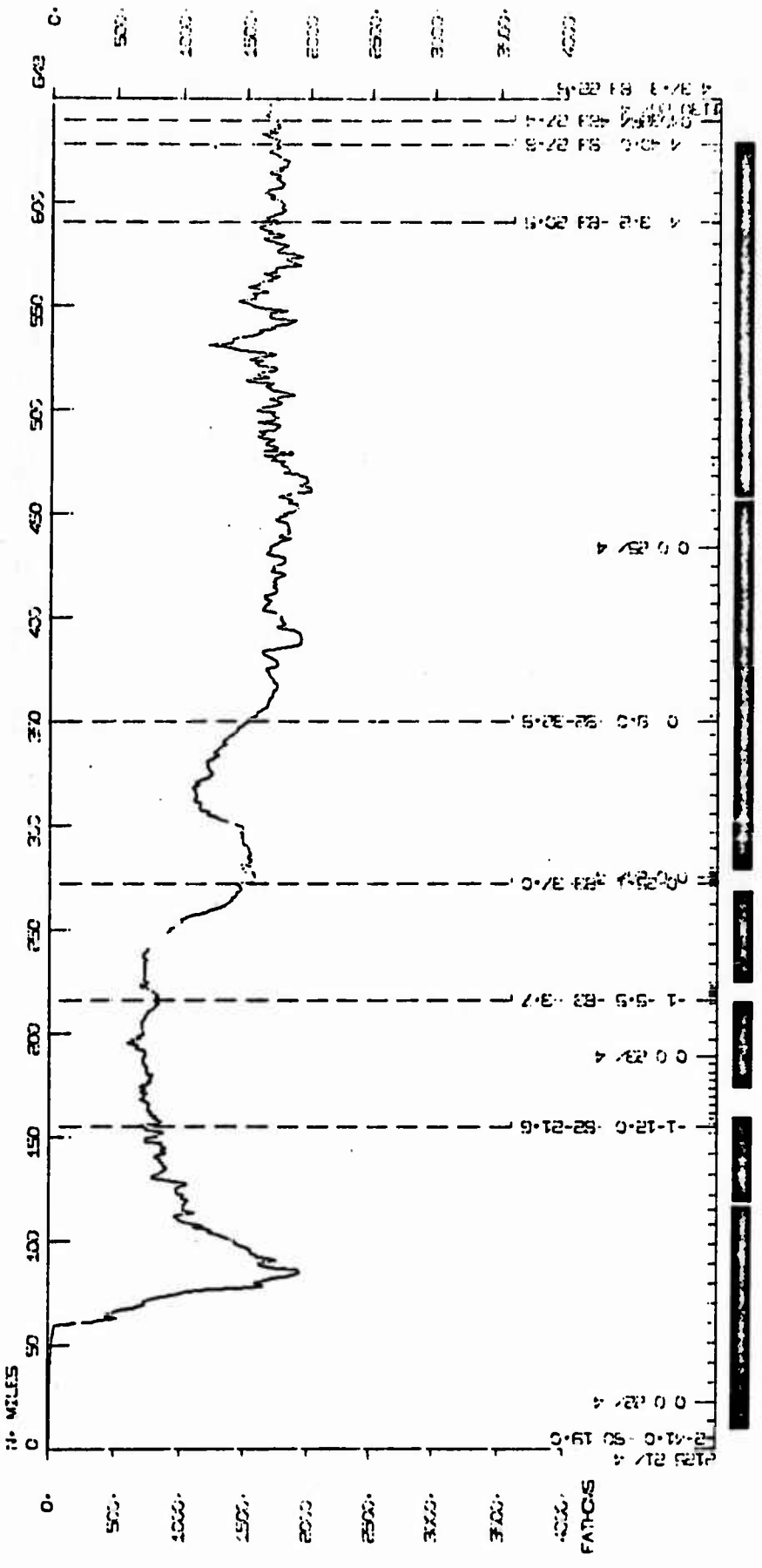
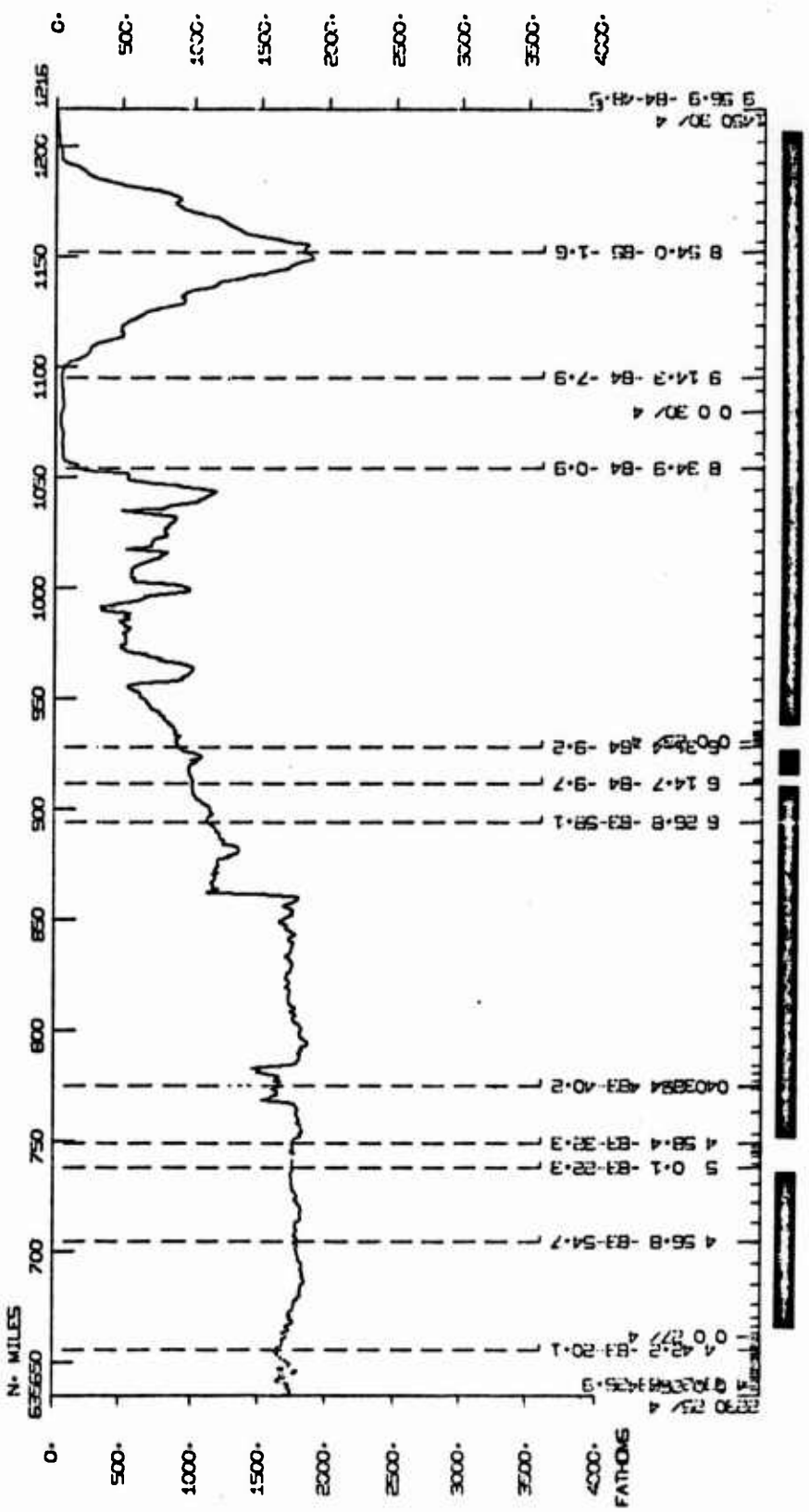
IGUANA LEG 2


IGUANA LEG 3
FATHOMS
N. MILES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FATHOMS
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1100
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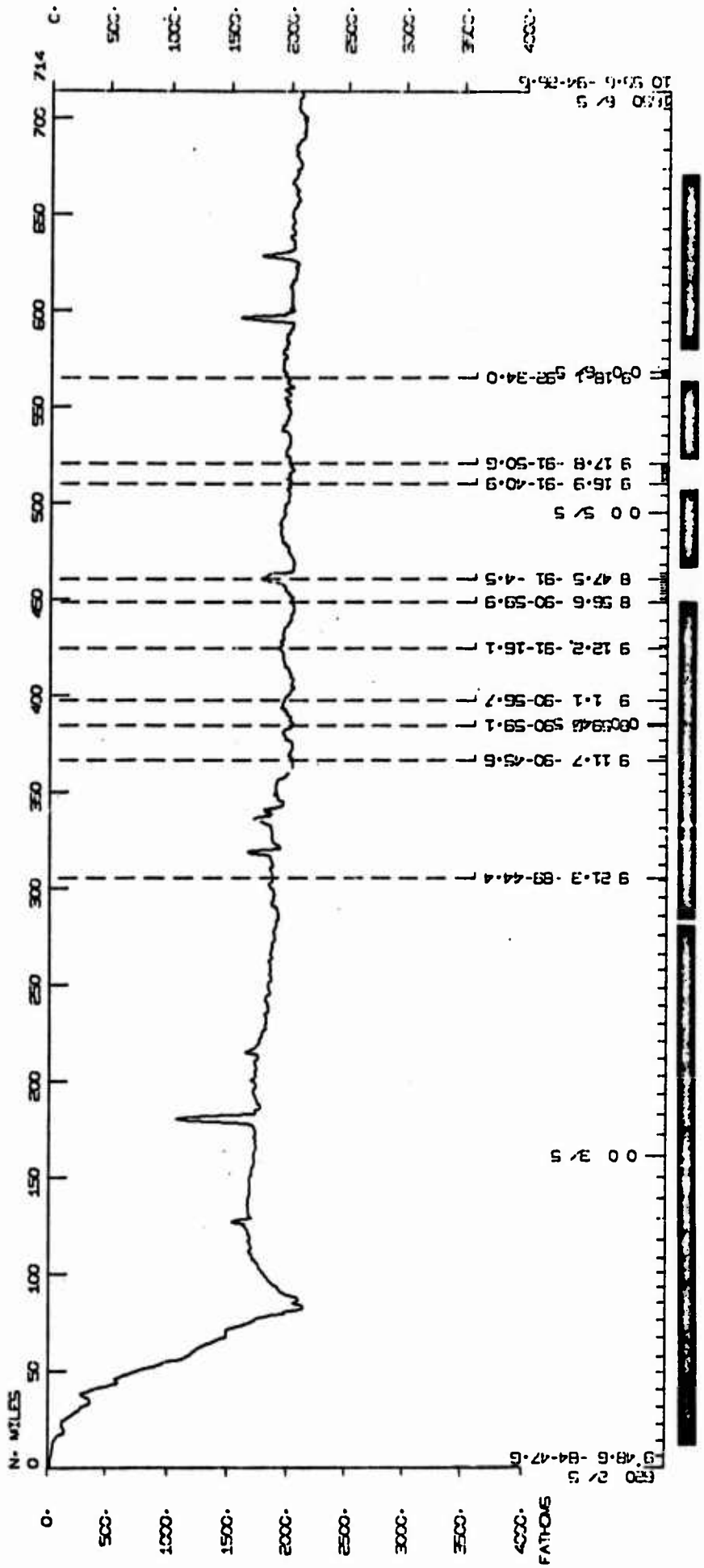
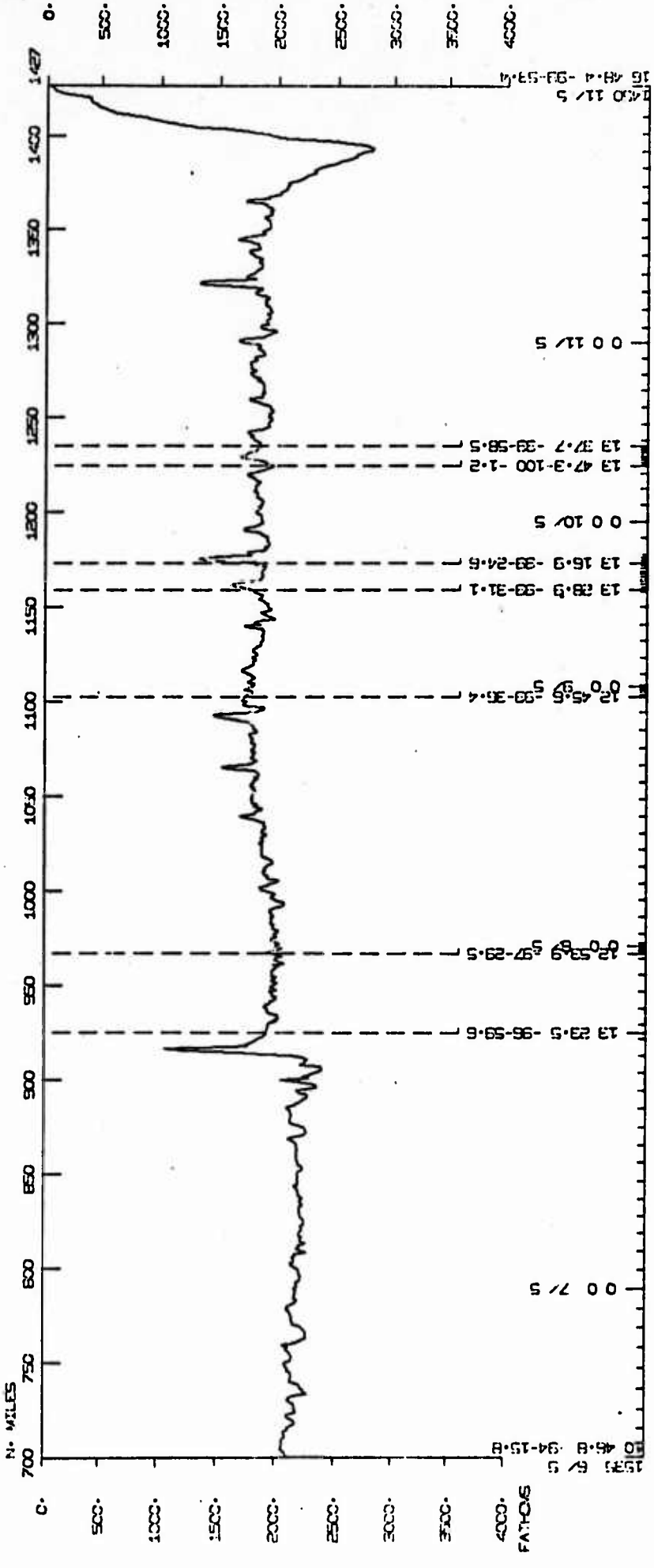
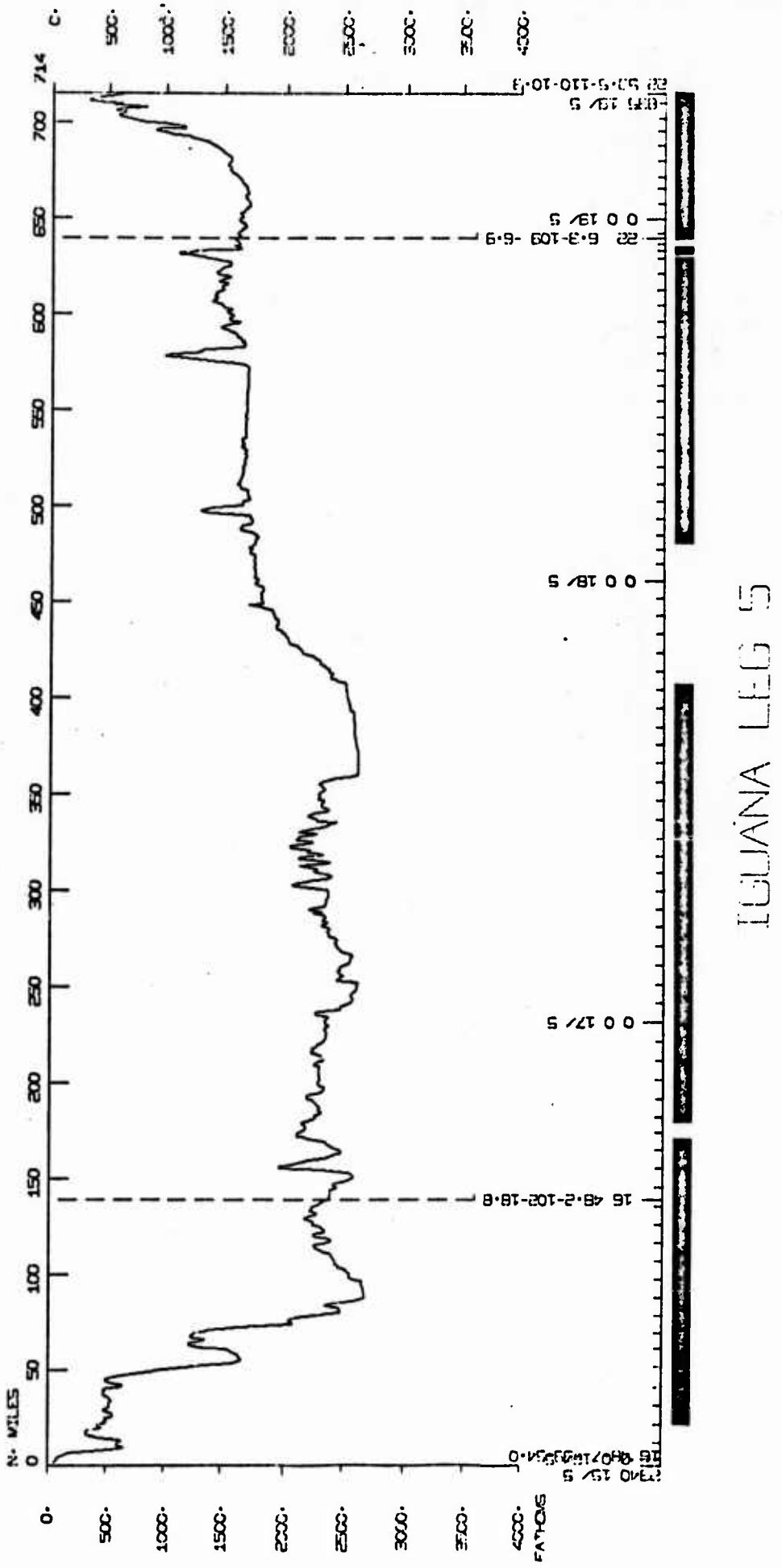
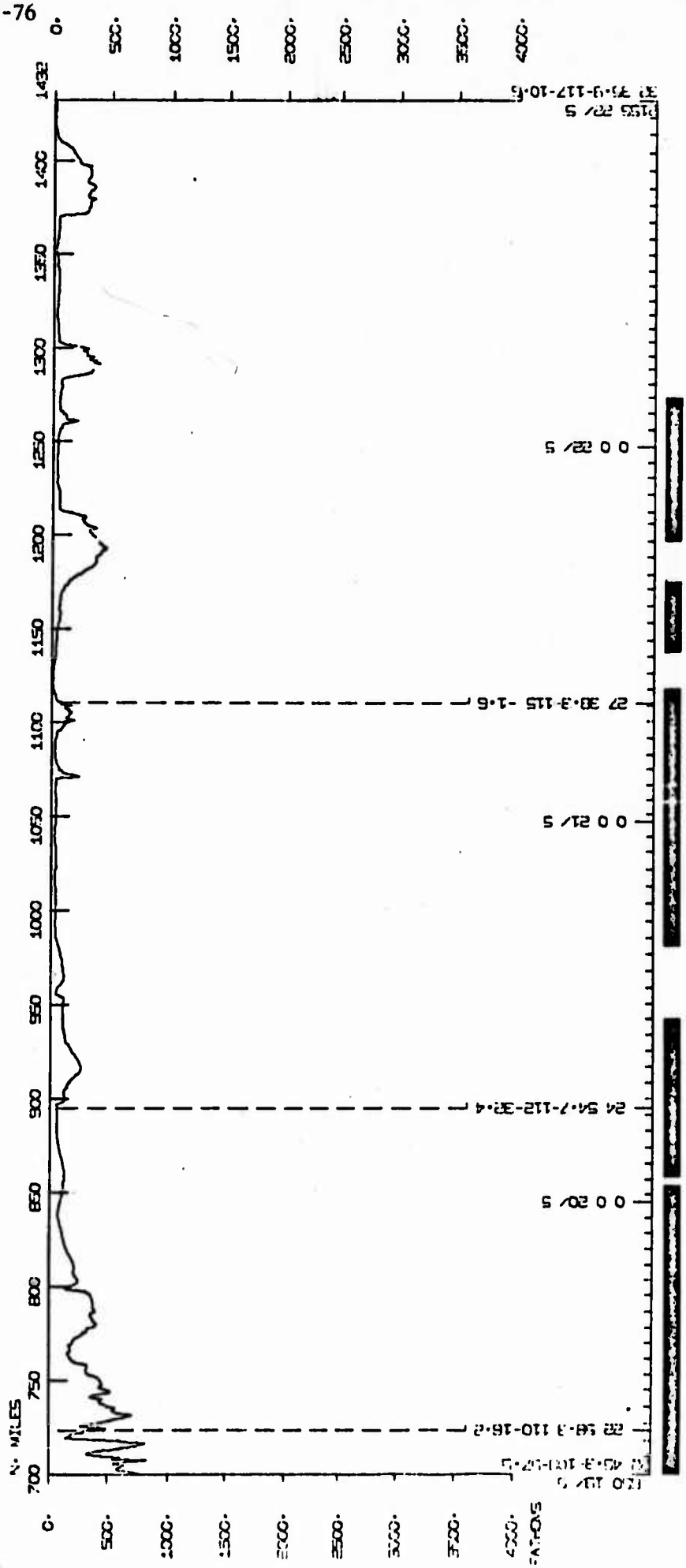
1200
1216

IGUANA LEG 3


N. MILES
FATHOMS
IGUANA LEG 4


FATHOMS
N. MILES
0
500
1000
1500
2000
2500
3000
3500
4000
700
750
800
850
900
950
1000
1050
1100
1150
1200
1250
1300
1350
1400
1427
13 23.5 -96-59.6
13 28.9 -99-31.1
13 16.9 -99-24.6
13 47.3-100 -1.2
13 37.7 -99-58.5


714
C.
500.
1000.
1500.
2000.
2500.
3000.
3500.
4000.
700
650
600
550
500
450
400
350
300
250
200
150
100
50
0
N. MILES
0.
500.
1000.
1500.
2000.
2500.
3000.
3500.
4000.
FATHOMS
0 0 18/ S
0 0 17/ S
16 48·2-102-18·8
EQUIANA LEG 5



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