

# 9015

Diag. Cht. No. 4115.

FORM C&GS-504

U.S. DEPARTMENT OF COMMERCE  
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
COAST AND GEODETIC SURVEY

## DESCRIPTIVE REPORT

Type of Survey HYDROGRAPHIC

Field No. AR-40-1-69 Office No. H-9015

### LOCALITY

State HAWAII

~~Island of~~

General locality Hawaii Island - W. Coast

Locality off Kawaihae Bay  
~~West Coast Hawaii Island~~

1969

CHIEF OF PARTY

Ronald L. Newsom, Cdr., USESSA

LIBRARY & ARCHIVES

DATE DEC 3 1973

USCOMM-DC 37022-P66

*Charts 4115*

*4187 Exam For NM CDF - 4/2/74*

*4140 - Exam For NM CDF 4/2/74*

*4179 Exam For NM CDF 4/2/74*

*4182 - E Frey*

*4001 - Exam For NM CDF 4/2/74*

9015

GEOGRAPHIC NAMES

H-9015

Name on Survey	Source of Name											
	A	B	C	D	E	F	G	H	K			
	ON CHART NO.	ON PREVIOUS SURVEY NO.	ON U.S. QUADRANGLE MAPS	FROM LOCAL INFORMATION	ON LOCAL MAPS	P.O. GUIDE OR MAP	GRAND MCNALLY ATLAS	U.S. LIGHT LIST				
												1
												2
												3
												4
												5
												6
												7
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												23
												24
												25

*DJK/ab*  
*4/17/84*

HYDROGRAPHIC TITLE SHEET

H-9015

INSTRUCTIONS - The Hydrographic Sheet should be accompanied by this form, filled in as completely as possible, when the sheet is forwarded to the Office.

FIELD NO.

AR-40-1-69

State HAWAII

General locality Hawaii Island - W. Coast

Locality Off Kawaihae Bay  
~~West Coast Hawaii Island~~

Scale 1:40,000 Date of survey 14 March - 19 March 1969

Instructions dated 31 Oct. 12 Nov. 1968, 29 Jan. 1969 Project No. OPR-419 Hawaii Island

Vessel USC&GSS MCARTHUR

Chief of party Ronald L. Newsom, Cdr., USESSA

Surveyed by R.L. Newsom, R.C. Husted, J.C. Albright, R.A. Ganse, T.C. Howell III

Soundings taken by echo sounder, ~~transducer type~~ DE-723 #931; UQN, EDO Model 185 #161 w/PFR #010

Graphic record scaled by Ship's Personnel

Graphic record checked by Ship's Personnel

Positions verified Stanley H. Otsubo

Automated plot by PMC-Gerber Digital Plotter

Soundings ~~verified~~ verified by Stanley H. Otsubo

Soundings in fathoms ~~feet~~ at ~~MHW~~ MLLW

REMARKS: This survey was accomplished using only the USC&GSS MCARTHUR.

Applied to stds 4/4/74  
CAB

MAUI ISLAND

KAHOOLAWE

AR 80-1-69  
H-9016

AR 10-8-68  
H-9019

AR 10-8-68  
H-9017

AR 10-8-68  
H-9018

AR 40-1-69  
H-9015

HAWAII ISLAND

OPR - 419

West Coast HAWAII Island

Descriptive Report  
To Accompany  
Hydrographic Survey H-9015 (AR 40-1-69)

USC&GSS McARTHUR  
Ronald L. Newsom, CDR, USESSA

1969  
Scale: 1:40,000

A. PROJECT

Hydrography on this boatsheet was accomplished in accordance with Project Instructions OPR-419, West Coast of Hawaii Island, Hawaii, dated 31 October 1968 (CFS2 4060/02) and with changes No. 1 and No. 2 thereto dated 12 November 1968 and 29 January 1969 respectively.

B. AREA SURVEYED

The area surveyed is located off the western coast of Hawaii Island, extending from Latitude 19°45'N to 20°09' on the north and westward from the junction with the 1:10,000 scale boatsheets to Longitude 156°09'W, and covers an area of 282 square miles.

The survey junctions with the following contemporary surveys:

H-9016 (AR 80-1-69)  
H-9017 (AR 10-6-68)  
H-9018 (AR 10-7-68)  
H-9019 (AR 10-8-68)

This survey overlaps the following prior surveys of the area:

<u>Registry No.</u>	<u>Scale</u>	<u>Date</u>
H-4957	1:80,000	1929
H-5052	1:80,000	12/28-1/29

The survey was performed between 14-19 March 1969.

C. SOUNDING VESSELS

All hydrography on this boatsheet was accomplished by the USC&GSS McARTHUR.

D. SOUNDING EQUIPMENT

Soundings for this boatsheet were obtained using a DE 723 Survey Fathometer, Serial #931 in depths less than 100 fathoms and a UQN, EDO Model #185, Serial #161 Depth Recorder Indicator with a Precision Fathometer Recorder Model 193, Serial #010 (operated in the 400 fathom normal mode) in depths greater than 100 fathoms.

Use of the DE 723 is indicated on the boatsheet by blue position numbers and use of the EDO by the red position numbers. Velocity corrections were obtained to 109 fathoms from a Nansen Cast taken off the West Coast of Hawaii Island on 19 March 1969. In depths greater than 109 fathoms, velocity corrections were obtained from "Tables of the Velocity of Sound and of Depth Corrections for Echo Soundings in Hawaiian Waters", Applied Oceanography Series No. 5, University of Hawaii, by John C. Belshe, September 1967. The fathometer initial was set at 0.0 fathoms on the EDO at all times. The initial on the DE 723 was set at 2.0 fathoms from position 601 (time 00:35:00, 17 March) through time 12:09:15, 17 March (between positions 730 and 731), when it was changed to 0.0 fathoms. The initial remained at zero throughout the rest of the survey. A mean transducer draft of 1.8 fathoms was determined for the Ship. No settlement, squat or phase corrections were necessary. Tide reducers were obtained from actual 1969 tide records of the portable automatic tide gage at Kawaihae Harbor, Hawaii Island.

?  
 Watch  
 This change!

E. SMOOTH SHEET

The smooth sheet is to be plotted at the Electronic Data Processing Division, Pacific Marine Center, using the following punched tapes:

<u>Data</u>	<u>Format</u>
Velocity Correctors	Velocity Tape (Type 2)
Tide Correctors	Tide Tape
Smoothed Raw Data	Dual Indicator-Smooth data tape
Data Corrections	Dual Indicator, Corrector Tape
Transducer Draft/Initial Difference	TC/TI Tape

F. CONTROL

Range-range Hi-Fix, frequency 1799.6 Khz, was used for control of this entire survey. Two shore stations were established, one by occupying tri-station CAST on Hawaii Island (designated R<sub>1</sub>-red) and one by occupying tri-station HANAMANIOA POINT LIGHTHOUSE, on Maui Island (designated R<sub>2</sub>-green). The data pertaining to these two Hi-Fix stations accompanies the basic field records. Hi-Fix calibrations were performed on a 1:10,000 scale Mylar Sheet once or twice daily using three point sextant fixes to existing triangulation stations. The Hi-Fix held its calibration very well.

All lines run on this boatsheet were done so by following an ard 0.50 lane off of the desired whole lane (see Plotting Abstracts). This procedure facilitated a more efficient use of the sawtooth recorder, producing a trace that was centered on the recorder paper. Corrections for lane jumps (due to electrical interference or electronic malfunction) were logged with the calibration corrections into a separate corrector tape. The Hi-Fix equipment performed extremely well and the control on this survey is considered to be excellent.

G. SHORELINE

None

H. CROSSLINES

899 nautical miles of hydrography was run on this boatsheet, of which 85.6 nautical miles was crossline. This amounted to 9.5% of the total. There were no discrepancies at crossings.

I. JUNCTIONS

Good agreement between this boatsheet and its junctions with H-9016, H-9018 and H-9019 was indicated with no discrepancies. H-9017,

J. COMPARISON WITH PRIOR SURVEYS

There were no pre-survey review items applicable to this boatsheet. Two prior surveys were undertaken in the area of this sheet. Both H-4957 (1929, scale 1:80,000) and H-5052 (1928 - 1929, scale 1:80,000) showed only fair agreement in soundings with this survey. The discrepancies were, however, acceptable due to the variation in accuracy of control experienced in the last forty years.

K. COMPARISON WITH THE CHART

This boatsheet was compared with C&GS Chart #1140, scale 1:80,000 3rd. Edition, January 24, 1966, showing a good correspondence between the two. There were only a few soundings that indicated discrepancies but their magnitude was sufficiently small to be discounted at a scale of 1:40,000.

L. ADEQUACY OF SURVEY

This survey is complete and adequate to supercede prior surveys of the area for charting.

M. AIDS TO NAVIGATION

None

N. STATISTICS

McARTHUR

Nautical miles sndg. lines	899.0
No. of Positions	1126
Bottom samples	13
Total square miles	282.0

O. MISCELLANEOUS

All tapes were logged in the dual indicator format using a HUL  
Logger, serial number 63-117 (BCD code) and a Friden Flexowriter  
model SFD.

P. RECOMMENDATIONS

It is recommended that an endless tape be made up for 24 hr/day  
Hi-Fix work, which will type out all information required at the  
beginning of each day, merely by hitting the read button on the  
Flexowriter. This is a great help as there is much that needs  
to be done in the way of changing records at the end of a day  
of Hi-Fix and little time to do it in.

Q. REFERENCES TO REPORTS

None

Submitted by:

*Robert C. Husted Jr.*  
Robert C. Husted Jr.  
ENS, USESSA

APPROVED AND FORWARDED:

*John C. Albright*  
LTJG, USESSA  
for Ronald L. Newsom, CDR, USESSA  
Commanding Officer, USC&GSS McARTHUR

Enclosures: Tide Note  
Abstract of Corrections to Echo Soundings (Table &  
Curve)  
Abstract of Hi-Fix Corrections  
Abstract of Position Numbers  
List of Basic Field Records  
Approval Sheet



TIDE NOTE  
TO ACCOMPANY  
H-9015 (AE 40-1-69)

Tide Station	Kawaihae Harbor Hawaii Island, Hawaii Lat. 20°02'18"N Long. 155°49'51"W
Plane of Reference	MLLW-1.8ft. on 1969 staff
Time Meridian	150°W
Time Correction	None
Height Correction	None
Time of Coverage	Entire Survey
Area of Coverage	Entire Survey

TIDE NOTE FOR HYDROGRAPHIC SHEET

August 7, 1969

~~NAUTICAL INFORMATION CENTER~~ Pacific Marine Center

Plane of reference approved   
~~NAUTICAL INFORMATION CENTER~~ for

HYDROGRAPHIC SHEETS 9015, 9017, 9018, 9019

Locality: West coast of Hawaii Island

~~Start Date~~ Year: 1968-69

Plane of reference is mean lower low water

Tide Station Used (Form C&GS-681):

Kawaihae

Height of Mean High Water above Plane of Reference is as follows:

1.4 feet

Remarks

*J. M. Symons*  
Chief, Tides and Currents Branch

GEOGRAPHIC NAMES

Survey No. H-9015

Name on Survey	A	B	C	D	E	F	G	H	K	
HAWAII ISLAND										1
PACIFIC OCEAN										2
KAWAIHAE BAY										3
										4
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										26
										27

Approved by  
 Charles E. Harrington  
 Staff Geographer  
 18 April 1974

INVERSE POSITION COMPUTATION

$$s_1 \sin \left( \alpha + \frac{\Delta\alpha}{2} \right) = \frac{\Delta\lambda_1 \cos \phi_m}{A_m}$$

$$s_1 \cos \left( \alpha + \frac{\Delta\alpha}{2} \right) = \frac{-\Delta\phi_1 \cos \frac{\Delta\lambda}{2}}{B_m}$$

$$-\Delta\alpha = \Delta\lambda \sin \phi_m \sec \frac{\Delta\phi}{2} + F(\Delta\lambda)^2$$

In which  $\log \Delta\lambda_1 = \log (\lambda' - \lambda)$  - correction for arc to sin\*;  $\log \Delta\phi_1 = \log (\phi' - \phi)$  - correction for arc to sin\*; and  $\log s = \log s_1 +$  correction for arc to sin\*.

		NAME OF STATION			
1. $\phi$	20° 11' 41.498	Cast	$\lambda$	155° 53' 51.563	✓
2. $\phi'$	20 35 10.976	Hanamanioa	$\lambda'$	156 24 53.467	✓
$\Delta\phi (= \phi' - \phi)$	23 29.478	✓	$\Delta\lambda (= \lambda' - \lambda)$	31 01.904	✓
$\frac{\Delta\phi}{2}$	11 44.739	✓	$\frac{\Delta\lambda}{2}$	15 30.952	✓
$\phi_m (= \phi + \frac{\Delta\phi}{2})$	20 23 26.237	✓			
$\Delta\phi$ (secs.)	1409.478	✓	$\Delta\lambda$ (secs.)	1861.904	✓
$\log \Delta\phi$	3.1490583	✓	$\log \Delta\lambda$	3.2699573	✓
cor. arc - sin	- 8	✓	cor. arc - sin	- 15	✓
$\log \Delta\phi_1$	3.1490575	✓	$\log \Delta\lambda_1$	3.2699558	✓
$\log \cos \frac{\Delta\lambda}{2}$	9.9999956	✓	$\log \cos \phi_m$	9.9718967	✓
$\text{colog } B_m$	1.4878594	✓	$\text{colog } A_m$	1.4904519	✓
$\log  s_1 \cos(\alpha + \frac{\Delta\alpha}{2}) $	4.6869125	✓ (opposite in sign to $\Delta\phi$ )	$\log  s_1 \sin(\alpha + \frac{\Delta\alpha}{2}) $	4.7323044	✓
			$\log  s_1 \cos(\alpha + \frac{\Delta\alpha}{2}) $	4.6869125	✓
$\log \Delta\lambda$	3.2699573	$3 \log \Delta\lambda$ 9.810	$\log \tan(\alpha + \frac{\Delta\alpha}{2})$	0.0953919	✓
$\log \sin \phi_m$	9.5411014	$\log F$ 7.778	$\alpha + \frac{\Delta\alpha}{2}$	137° 52' 13.84	✓
$\log \sec \frac{\Delta\phi}{2}$	0.0000025	$\log b$ 7.588	$\log \sin(\alpha + \frac{\Delta\alpha}{2})$	<del>9.8709970</del> 9.8919844	✓
$\log a$	2.8110612		$\log \cos(\alpha + \frac{\Delta\alpha}{2})$	<del>9.8256051</del> 9.7965925	✓
a	647.23	✓	$\log s_1$	<del>4.8613074</del> 4.8403200	✓
b	0.004	✓	cor. arc - sin	+ 21	✓
$-\Delta\alpha$ (secs.)	647.23	✓	$\log s$	<del>4.8613097</del> 4.8403220	✓
$\frac{\Delta\alpha}{2}$	323.61	✓			
$\alpha + \frac{\Delta\alpha}{2}$	141° 52' 13.84	✓			
$\alpha$ (1 to 2)	138° 04' 42.30	141° 19' 56.95			
$\Delta\alpha$	-10 47.283				
	180				
$\alpha'$ (2 to 1)	317 53 56.08	321° 09' 09.28			✓

NOTE.—For  $\log s$  up to 4.0 and for  $\Delta\phi$  or  $\Delta\lambda$  (or both) up to 3', omit all terms below the heavy line except those printed (in whole or in part) in heavy type or those underscored, if using logarithms to 7 decimal places.

✓ by JCA

Table of arc-sin corrections for inverse position computations

$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$	$\log s_1$	Arc-sin correction in units of seventh decimal of logarithms	$\log \Delta\phi$ or $\log \Delta\lambda$
4.177	1	2.686	5.223	124	3.732	5.525	497	4.034
4.327	2	2.836	5.234	130	3.743	5.530	508	4.039
4.415	3	2.924	5.243	136	3.752	5.534	519	4.043
4.473	4	2.987	5.253	142	3.762	5.539	530	4.048
4.526	5	3.035	5.260	147	3.769	5.543	541	4.052
4.566	6	3.075	5.269	153	3.778	5.548	553	4.057
4.599	7	3.108	5.279	160	3.788	5.553	565	4.062
4.628	8	3.137	5.287	166	3.796	5.557	577	4.066
4.654	9	3.163	5.294	172	3.803	5.561	588	4.070
4.677	10	3.186	5.303	179	3.812	5.566	600	4.075
4.697	11	3.206	5.311	186	3.820	5.570	613	4.079
4.716	12	3.225	5.318	192	3.827	5.575	625	4.084
4.734	13	3.243	5.326	199	3.835	5.579	637	4.088
4.750	14	3.259	5.334	206	3.843	5.583	650	4.092
4.765	15	3.274	5.341	213	3.850	5.587	663	4.096
4.779	16	3.288	5.349	221	3.858	5.591	674	4.100
4.792	17	3.301	5.356	228	3.865	5.595	687	4.104
4.804	18	3.313	5.363	236	3.872	5.600	702	4.109
4.827	20	3.336	5.369	243	3.878	5.604	716	4.113
4.857	23	3.366	5.376	251	3.885	5.608	729	4.117
4.876	25	3.385	5.383	259	3.892	5.612	743	4.121
4.892	27	3.401	5.390	267	3.899	5.616	757	4.125
4.915	30	3.424	5.396	275	3.905	5.620	771	4.129
4.936	33	3.445	5.403	284	3.912	5.624	785	4.133
4.955	36	3.464	5.409	292	3.918	5.628	800	4.137
4.972	39	3.481	5.415	300	3.924	5.632	814	4.141
4.988	42	3.497	5.422	309	3.931	5.636	829	4.145
5.003	45	3.512	5.428	318	3.937	5.640	845	4.149
5.017	48	3.526	5.434	327	3.943	5.644	861	4.153
5.035	52	3.544	5.440	336	3.949	5.648	877	4.157
5.051	56	3.560	5.446	345	3.955	5.652	893	4.161
5.062	59	3.571	5.451	354	3.960	5.656	909	4.165
5.076	63	3.585	5.457	364	3.966	5.660	925	4.169
5.090	67	3.599	5.462	373	3.971	5.663	941	4.172
5.102	71	3.611	5.468	383	3.977	5.667	957	4.176
5.114	75	3.623	5.473	392	3.982	5.671	973	4.180
5.128	80	3.637	5.479	402	3.988	5.674	989	4.183
5.139	84	3.648	5.484	412	3.993	5.678	1005	4.187
5.151	89	3.660	5.489	422	3.998			
5.163	94	3.672	5.495	433	4.004			
5.172	98	3.681	5.500	443	4.009			
5.183	103	3.692	5.505	453	4.014			
5.193	108	3.702	5.510	464	4.019			
5.205	114	3.714	5.515	474	4.024			
5.214	119	3.723	5.520	486	4.029			

ABSTRACT OF HI-FIX CORRECTIONS  
 TO ACCOMPANY H-9015 (AR 40-1-69)

Date	Time	Correction, R1	Correction, R2
14 March	1330	-0.78 Lane	-0.41 Lane
15 March	1235	-0.80	-0.40

Secure Hi-Fix Equipment

15 March	1400	-0.24	-0.77
16 March	1705	-0.06	-0.64
17 March	1830	-0.20	-0.63
18 March	1630	-0.13	-0.64
19 March	1620	-0.05	-0.50

The Hi-Fix equipment was calibrated on the above dates by simultaneously observing a three-point sextant fix with check angle and reading the Hi-Fix dials. The sextant fix was plotted on a 1:10,000 scale Mylar sheet and the pattern I and II values were scaled from the sheet and compared with the observed readings to determine the above corrections. A minimum of three fixes was observed for each calibration.

Abstract of Position Numbers  
H-9015 (AR 40-1-69)

<u>Vessel</u>	<u>Day</u>	<u>Date</u>	<u>Julian Day</u>	<u>Positions</u>
McARTHUR	A	14 Mar. 1969	073	0001-0100
	B	15 Mar. 1969	074	0101-0339
	C	16 Mar. 1969	075	0340-0600
	D	17 Mar. 1969	076	0601-0847
	E	18 Mar. 1969	077	0848-1067
	F	19 Mar. 1969	078	1068-1126

List of Basic Field Records  
To Accompany  
H-9015 (AR 40-1-69)

1 Mylar Calibration Sheet  
1 Boatsheet  
3 Envelopes, DE 723 Fathograms  
3 Envelopes, PFR Fathograms  
2 Boxes with 8 Sawtooth Recorder Records Pos. #1-1126  
6 Envelopes of Raw Data Tapes and Printouts Pos. #1-1126  
7 Envelopes of Smoothed Raw Data Printout and Punched Tapes  
Pos. #1-1126  
1 Envelope with 134 of PFR Sounding Logs.  
1 Envelope with 49 Form-817 Plotting Abstract Electric Control  
1 Corrector Tape and 1 Page Printout  
1 Velocity Tape and 2 Pages Printout  
1 TC/T1 Tape and 1 Page Printout  
1 Tide Tape and 2 Pages of Printout  
1 Form 733M Oceanographic Log Sheet - M  
2 Form #1 Parameters for Digital Computing Polyconic Projection  
(boatsheet and calibration sheet)  
1 Folder Containing Hi-Fix Calibrations (11 pages)  
1 Form #3 Computer Parameters for Electronically Controlled Surveys  
1 Form #662 Inverse Position Computation  
1 Form #733A, Oceanographic Log Sheet-A with 1 page of Curve and  
two pages of Computation (mailed with records of H-9016)  
1 Envelope DE 723 phase comparisons



Approval Sheet for  
H-9015 (AR 40-1-69)

Field work on this survey was accomplished under my general supervision. Frequent inspections of the field data and boatsheet were made by me as the survey progressed. The sounding records have been inspected by me and are approved. This survey is complete and adequate and is hereby approved.

*John C. Albright*  
LTJG, USESSA

*13 October 1968*

*for* Ronald L. Newsom  
CDR, USESSA  
Commanding Officer  
USC&GSS McARTHUR

**HYDROGRAPHIC SURVEY STATISTICS**  
HYDROGRAPHIC SURVEY NO. H-9015

RECORDS ACCOMPANYING SURVEY: To be completed when survey is registered.

RECORD DESCRIPTION	AMOUNT	RECORD DESCRIPTION	AMOUNT
SMOOTH SHEET & PNO	1	BOAT SHEETS	1
DESCRIPTIVE REPORT	1	OVERLAYS	4

DESCRIPTION	DEPTH RECORDS	HORIZ. CONT. RECORDS	PRINTOUTS	TAPE ROLLS	PUNCHED CARDS	ABSTRACTS/SOURCE DOCUMENTS
ENVELOPES	* 3					
CAHIERS	1		*			
VOLUMES	---	---				
BOXES			1 & Misc. Data			

T-SHEET PRINTS (List) **NONE**

SPECIAL REPORTS (List)

**OFFICE PROCESSING ACTIVITIES**  
The following statistics will be submitted with the cartographer's report on the survey

PROCESSING ACTIVITY	AMOUNTS			
	PRE-VERIFICATION	VERIFICATION	REVIEW	TOTALS
POSITIONS ON SHEET				
POSITIONS CHECKED		1124		
POSITIONS REVISED		1		
DEPTH SOUNDINGS REVISED		98		
DEPTH SOUNDINGS ERRONEOUSLY SPACED		---		
SIGNALS ERRONEOUSLY PLOTTED OR TRANSFERRED		---		
	TIME (MANHOURS)			
TOPOGRAPHIC DETAILS				
JUNCTIONS		14		
VERIFICATION OF SOUNDINGS FROM GRAPHIC RECORDS		60		
SPECIAL ADJUSTMENTS		13		
ALL OTHER WORK		3		
<b>TOTALS</b>		<b>98</b>		
PRE-VERIFICATION BY	BEGINNING DATE		ENDING DATE	
VERIFICATION BY <i>Stanley H. Otsubo</i> Stanley H. Otsubo	BEGINNING DATE April 11, 1973		ENDING DATE November 12, 1973	
REVIEW BY	BEGINNING DATE		ENDING DATE	

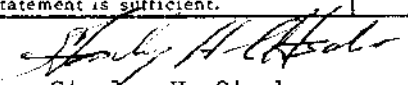
VERIFIER'S REPORT  
HYDROGRAPHIC SURVEY, H 9015

**INSTRUCTIONS** - This form serves to identify items of a checklist in verification together with items which are separately reported to the Reviewer. The form is not to be forwarded to the Reviewer. A report, which is prepared for the Reviewer, should identify items by number and letter and will be filed in the Descriptive Report until the survey is reviewed.

**CL - Check List Items:** should be checked as having been completed during the verification processes.

**R - Report Item:** This column refers to those items reported to the reviewer and is used to indicate the items discussed.

Part I - DESCRIPTIVE REPORT	CL	R	Part III - JUNCTIONS (Continued)	CL	R	
<p><b>Note:</b> The verifier should first read the Descriptive Report for general information and problems.</p> <p>1. The Descriptive Report was consulted, paragraphs checked if found satisfactory, and notations were made in soft black pencil regarding action taken. Remarks Required: -- None</p>	X		<p>10. Junctions with contemporary surveys were satisfactory except as follows: Remarks Required: -- Consider conditions after adjustments have been made; note adjustments made. Make special notes of Butt junctions and areas which are SUPERSEDED.</p>	X		
<p>2. Soundings originating with the survey and mentioned in the Descriptive Report have been verified and checked in soft black pencil, including latitude and longitude, together with position identification. Remarks Required: -- None</p>	X		<p><b>Part IV - VOLUMES</b> 11. All items affecting the plotting of the survey which are entered in the remarks columns of the sounding records were noted and check marked. In all cases appropriate action was taken and exceptions noted in the volumes. Remarks Required: -- None</p>	X		
<p>3. All reference to survey sheets mentioned in the Descriptive Report should include registry number and year. Remarks Required: -- None</p>	X		<p>12. Condition of sounding records was satisfactory except as follows: Remarks Required: -- Mention deficiencies in completeness of notes or actions for the following: (a) rocks (b) line turns (c) position values of beginning and ending of lines (d) bar check or velocity correctors (e) time recording (f) notes or markings on fathograms (g) was reduction of soundings accurately done? (h) was scanning accurate? (i) were peaks at uneven intervals missed? (j) were stamps completed? (k) references to adjacent features</p>			
<p><b>Part II - SHORELINE AND SIGNALS</b> 4. Source of shoreline signals Remarks Required: -- List all surveys a. Give earliest and latest dates of photographs b. Field inspection date c. Field Edit date d. Reviewed-Unreviewed</p>		X				
<p>5. The transfer of contemporary topographic information was carefully examined and reconciled with the hydrography. Remarks Required: -- Discuss remaining differences.</p>	X				X	
<p>6. The plotting of all triangulation stations, topographic stations and hydrographic signals has been checked and noted in processing stamp No. 42 on the smooth sheet. Remarks Required: -- None</p>	X					
<p>7. Objects on which signals are located and which fall outside of the high-water line have been described on the sheet. Remarks Required: -- List those signals still unidentified.</p>	X		<p><b>Part V - PROTRACTING</b> 13. All positions verified instrumentally were check marked in color in the sounding records, and verifier initialed the processing stamp. Remarks Required: -- None</p>	X		
<p><b>Part III - JUNCTIONS</b> <b>Note:</b> Make a cursory comparison preliminary to inking soundings in area of overlap. 8. All junctions of contemporary or overlapping sheets were transferred in colored ink and overlapping curves were made identical. Remarks Required: -- None</p>		X	<p>14. The protracting and plotting of all unsatisfactory crossings were verified. Remarks Required: -- None</p>	X		
<p>9. The notation in slanted lettering "JOINS H---- (19 )" was added in colored ink for all verified contemporary adjoining or overlapping sheets. Those not verified are shown in pencil. Remarks Required: -- None</p>	X		<p>15. All detached positions locating critical soundings, rocks, buoys, breakers, obstructions, kelp, etc., were verified and the position numbers are legible. Remarks Required: -- None</p>	X		

Part V - PROTRACTING (Continued)	CL	R	Part VIII - AIDS TO NAVIGATION	CL	R
16. The protracting was satisfactory except as follows: Remarks Required: -- Refers to protracting in general except for specific faults repeated often, or faults in control information, which required considerable replotting or adjustments.	X		26. All fixed aids located together with those on the contemporary topographic sheets, have been shown on the survey. Remarks Required: -- Conflicts of any nature listed.	X	
17. The protractor has been checked within the last three months. Remarks Required: -- Date of check, type of protractor and number.	X		27. All floating aids listed in the Descriptive Report should be verified and checked in soft black pencil, including latitude and longitude and position identification. Remarks Required: -- None	X	
<b>Part VI - SOUNDINGS</b>			<b>Part IX - BOATSHEET</b>		
18. All soundings are clear and legible, and critical soundings are a little larger than adjacent soundings. Remarks Required: -- None	X		28. The boat sheet was constantly compared with the smooth sheet with reference to notes, position of sounding lines and supplemental information. Remarks Required: -- None	X	
19. Sounding line crossings were satisfactory except as follows: Remarks Required: -- Discuss adjustments.	X		29. Heights of rocks awash were correctly reduced and compared with topographic information. Remarks Required: -- Note excessive conflicts with topographic information.	X	
20. The spacing of soundings as recorded in the records was closely followed; Remarks Required: -- None	X		<b>Part X - GENERAL</b>		
21. The scanning, reduction, spacing, plotting of questionable soundings have been verified. Remarks Required: -- None	X		30. All information on the sheet is shown in accordance with figures 82 and 83 in the Hydrographic Manual (Pub. 20-2). Remarks Required: -- None	X	
22. The smooth plotting of soundings was satisfactory except as follows: Remarks Required: -- Refer to legibility, errors in spacing, and errors in numbers - but not to errors in scanning.	X		31. Unnecessary pencil notes have been removed from the sheet. Remarks Required: -- None	X	
<b>Part VII - CURVES</b>			32. Degree, minute values and symbols have been checked; also electronic distance arcs have been properly identified and checked on the smooth sheet. Remarks Required: -- None	X	
23. The depth curves have been inspected before inking. Remarks Required: -- By whom was the penciled curves inspected.		X	33. The bottom characteristics are adequately shown. Remarks Required: -- None	X	
24. The low-water line and delineation of shoal areas have been properly shown in accordance with the following: a. From T-Sheet in dotted black lines b. From soundings in orange c. Approximate position of sketched curve is dashed orange d. Approximate position of shoal area not sounded in black dashed Remarks Required: -- None	X		<b>Part XI - NOTES TO THE REVIEWER</b>		
25. Depth curves were satisfactory except as follows: (This statement should not refer to the manner in which the curves were drawn). Remarks Required: -- Indicate areas where curves could not be drawn completely because of lack of soundings. For some inshore areas a general statement is sufficient.	X		34. Unresolved discrepancies and questionable soundings.	X	
			35. Notation of discrepancies with photogrammetric survey inserted in report of unreviewed photogrammetric survey or on copy.	X	
			36. Supplemental information.	X	
Verified by  Stanley H. Otsubo			Date		

VERIFIER'S REPORT

H-9015

This sheet was constructed and plotted at Pacific Marine Center, Seattle, Washington. Information relating to this will be noted under the heading by the number and letter as on the Verifier's Report, C&GS Form 946A.

PART II SHORELINE AND SIGNALS

Shoreline Manuscripts were not required for this offshore sheet.

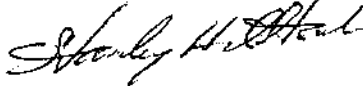
PART III JUNCTIONS

Due to the differing phases of verification between this survey and H-9016 (1970), AR-80-1-69, H-9017 (1960), H-9018 (1968), H-9019 (1969), H-9131 (1970), H-9132 (1970) and H-9237 (1971), junctional verification was not attempted. Good agreement was made with sheet H-9129 (1970).

PART VII CURVES

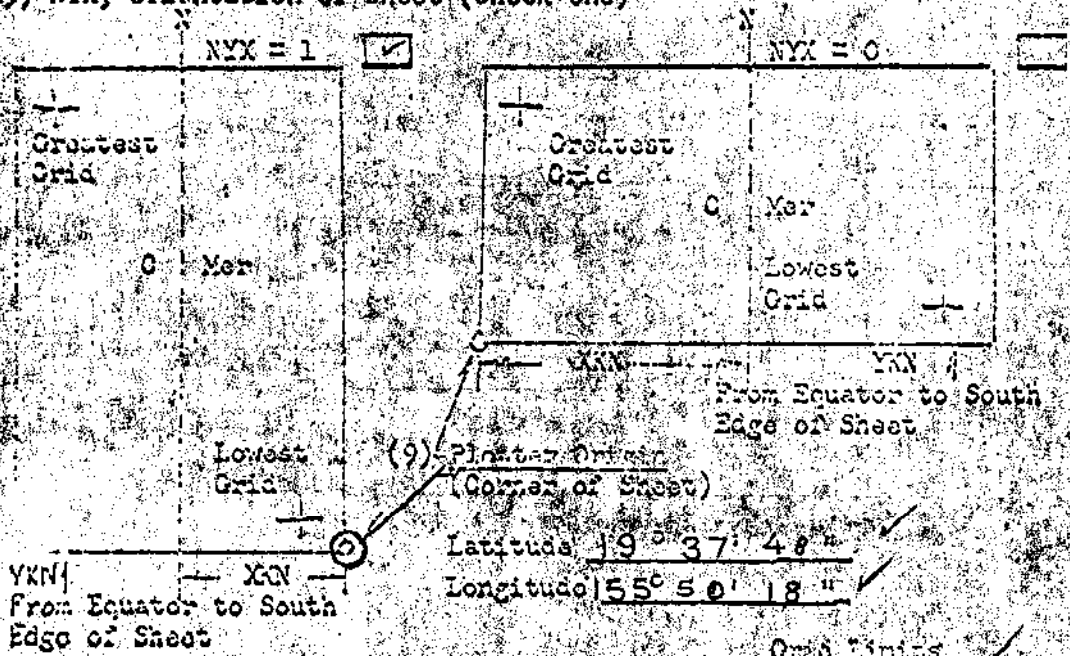
The depth curves were inspected by Richard Lynn, Cartographic Technician.

Respectfully submitted,



Stanley H. Otsubo  
Cartographic Technician

- (1) Project No. OPR-419
- (2) H No. \_\_\_\_\_
- (3) Field No. AG-0307B
- (4) Requested by PROJECTS, P.M.
- (5) Ship or Office McARTHUR
- (6) Date Required A.S.A.P.
- (7) Visual  Ft. (0) or Fathoms (1)  (8) Electronic  (fill out form #2)
- (10)  $XYX$  (SP 3) Distance from  $XYR$  to East Edge ( $XYX = 1$ ) or West Edge ( $XYX = 0$ ) 16,957.0 Meters
- (11)  $YXN$  (SP 21) Distance from Equator to South Edge of Sheet 2,174,277.0 Meters
- (12) Central Meridian 156° 00' 00"
- (13) Survey Scale 1:40,000
- (14) Size of Sheet (Check one) 35x50  42x60
- (15)  $XYX$ , Orientation of sheet (Check one)



(9) Point or Object (Corner of Sheet)  
 Latitude 19° 37' 48"  
 Longitude 155° 50' 18"

- Grid Limits
- (16) Greatest Latitude 20° 10' 00" (Projection Line Interval Page 4)
  - (17) Lowest Latitude 19° 38' 00" (Hydro Manual)
  - (18) Difference 0° 32' 00" (19) 02" 00"
  - (21) Greatest Longitude 156° 10' 00" (20) 16  NS
  - (22) Lowest Longitude 155° 52' 00" (24) 02' 00"
  - (23) Difference 0° 18' 00" (25) 189  NS

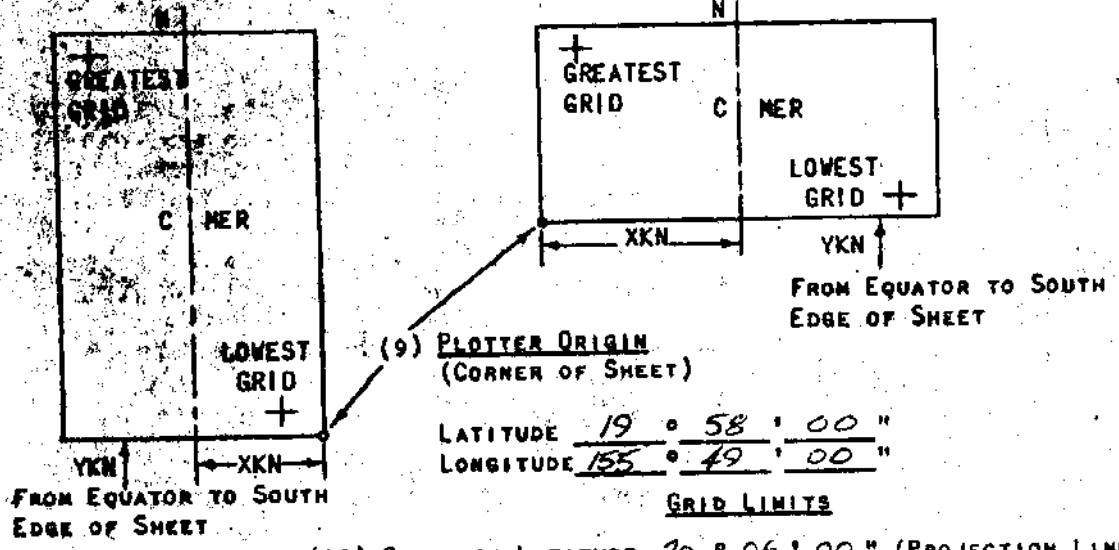
Comp. by: G.L.F.  
 by: \_\_\_\_\_

FORM # 1

Fig. 15

**PARAMETERS FOR DIGITAL COMPUTING  
POLYCONIC PROJECTION**

- (1) PROJECT No. OPR-419
- (2) H No. \_\_\_\_\_
- (3) FIELD No. Calibration Sheet
- (4) REQUESTED BY R. L. Newsom
- (5) SHIP OR OFFICE McARTHUR
- (6) DATE REQUIRED 6 March 1969
- (7) VISUAL  for AG
- (8) ELECTRONIC  (FILL OUT FORM #3)
- (10) XKN (SP 5) DISTANCE FROM CHER TO EAST EDGE (NYX = 1)  
OR WEST EDGE (NYX = 0). 4361.2 METERS
- (11) YKN (SP 241) DISTANCE FROM EQUATOR TO SOUTH EDGE  
OF SHEET. 2,208,544.717 METERS
- (12) CENTRAL MERIDIAN 155° 51' 30"
- (13) SURVEY SCALE 1: 10,000
- (14) SIZE OF SHEET (CHECK ONE) 36x54  42x60  OTHER 36x60
- (15) NYX, ORIENTATION OF SHEET (CHECK ONE)  
NYX = 1  NYX = 0



LIST G.P. OF ALL STATIONS TO BE PLOTTED ON THIS PROJECTION ON THE BACK OF THIS FORM. (DEG., MIN., SECONDS)

- GRID LIMITS**
- (16) GREATEST LATITUDE 20° 06' 00" (PROJECTION LINE INTERVAL, PAGE 4)
  - (17) LOWEST LATITUDE 19° 58' 30" (HYDRO MANUAL)
  - (18) DIFFERENCE 0° 07' 30"
  - (19) 0° 30"
  - (20) 15 YSN
  - (21) GREATEST LONGITUDE 155° 54' 00"
  - (22) LOWEST LONGITUDE 155° 49' 30"
  - (23) DIFFERENCE 0° 04' 30"
  - (24) 0° 30"
  - (25) 9 XSN

COMPUTER PARAMETERS FOR ELECTRONICALLY CONTROLLED SURVEYS

(RANGE - RANGE)

(1) PROJECT No. OPR-419 (2) H- No. H-9015 (3) FIELD No. AG 1:40,000  
(4) TYPE OF CONTROL: SHORAN, RAYDIST,  HI-FIX, RADAR  
FREQUENCY (FOR CONVERSION OF RAYDIST OR HI-FIX LANES TO METERS) 1799.600 KH

(5) RANGE ONE (R1) LATITUDE 20 ° 11 ' 41.498"  
STATION NAME Cast LONGITUDE 155 ° 53 ' 51.563"

(6) RANGE TWO (R2) LATITUDE 20 ° 35 ' 10.976"  
STATION NAME Hanaminioa LONGITUDE 156 ° 24 ' 53.467"  
Bint Lighthouse

(7) AZIMUTH FROM R1 TO R2 (from south) 141 ° 19 ' 56.45"

(8) BASELINE LENGTH IN METERS 69,234.43 M.

(9) LOCATION OF SURVEY WITH RESPECT TO ELECTRONIC BASELINE: CHECK ONE  
(TO DETERMINE: IMAGINE AN OBSERVER STANDING AT R1 AND LOOKING DIRECTLY  
AT R2 — IF THE SURVEY AREA IS TO THE OBSERVER'S LEFT THEN A IS  
NEGATIVE; IF THE SURVEY AREA IS TO THE OBSERVER'S RIGHT THEN A IS  
POSITIVE.)

-A (MINUS)  +A (PLUS)

(10) IF SHORAN CORRECTIONS ARE APPLIED BY THE EQUATION,  $K(X) + C = D$ ,  
WHERE X IS SHORAN DISTANCE AND D IS TRUE DISTANCE, ENTER THE CONSTANT  
COEFFICIENTS OF THE EQUATIONS HERE:

K(R1) \_\_\_\_\_, C(R1) \_\_\_\_\_, K(R2) \_\_\_\_\_, C(R2) \_\_\_\_\_

(11) NUMBER OF VELOCITY TABLES TO BE USED:  
NONE,  ONE, MORE THAN ONE.

(12)  THIS FORM IS SUBMITTED ONLY AS AN AID IN PREPARING A BOAT  
SHEET PROJECTION.

THIS FORM APPLIES TO ALL DATA ON THIS SURVEY.

\_\_\_\_\_ THIS FORM APPLIES TO PART OF THE DATA ON THIS SURVEY -

TIME AND DATE LIMITATIONS: FROM \_\_\_\_\_ TO \_\_\_\_\_

POSITION NUMBER LIMITATIONS: FROM \_\_\_\_\_ TO \_\_\_\_\_

THIS IS FORM #3 SHEET # 1 / \_\_\_\_\_ OF 1 / \_\_\_\_\_ SHEETS FOR THIS SURVEY.

(13) OTHER REMARKS:



ABSTRACT OF VELOCITY CORRECTIONS H-9015 (AR 40-1-69)

VELOCITY TAPE TYPE NO. 2

All depths and corrections are in fathoms. These corrections apply to all soundings of the survey.

000032 00 0000 0001 000 0 000000 000000  
 000052 00 0001  
 000071 00 0002  
 000092 00 0003  
 000113 00 0004  
 000133 00 0005  
 000154 00 0006  
 000175 00 0007  
 000199 00 0008  
 000222 00 0009  
 000242 00 0010  
 000264 00 0011  
 000286 00 0012  
 000306 00 0013  
 000327 00 0014  
 000348 00 0015  
 000369 00 0016  
 000393 00 0017  
 000416 00 0018  
 000437 00 0019  
 000458 00 0020  
 000479 00 0021  
 000500 00 0022  
 000521 00 0023  
 000546 00 0024  
 000568 00 0025  
 000591 00 0026  
 000616 00 0027  
 000638 00 0028  
 000659 00 0029  
 000680 00 0030  
 000702 00 0031  
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 000748 00 0033  
 000771 00 0034  
 000797 00 0035  
 000821 00 0036  
 000846 00 0037  
 000868 00 0038  
 000891 00 0039  
 000916 00 0040  
 000942 00 0041  
 000966 00 0042  
 000995 00 0043  
 001020 00 0044  
 001048 00 0045  
 001220 00 0050  
 001400 00 0055  
 001750 00 0060  
 002250 00 0070  
 002850 00 0080  
 003600 00 0090  
 004380 00 0100  
 005160 00 0110  
 005900 00 0120  
 006700 00 0130

235000 00 1000  
012600 00 1001 0000 078 0 000000 000000  
030000 00 1002  
054000 00 1003  
071500 00 1002  
082000 00 1001  
125000 00 1000  
140000 00 1001  
151000 00 1002  
165000 00 1003

Place of Reference Approved  
Edwin P. Hines Section  
Date 8-5-69

USC&GSS MCARTHUR  
 OPR 419, HAWAII-ISLAND  
 AR 40-1-69 (H9015)  
 TIME MERIDIAN - 150 W  
 KAWAIHAE HARBOR TIDE STATION, HAWAII ISLAND--1969  
 TIDE CORRECTIONS IN FATHOMS

11-12-69

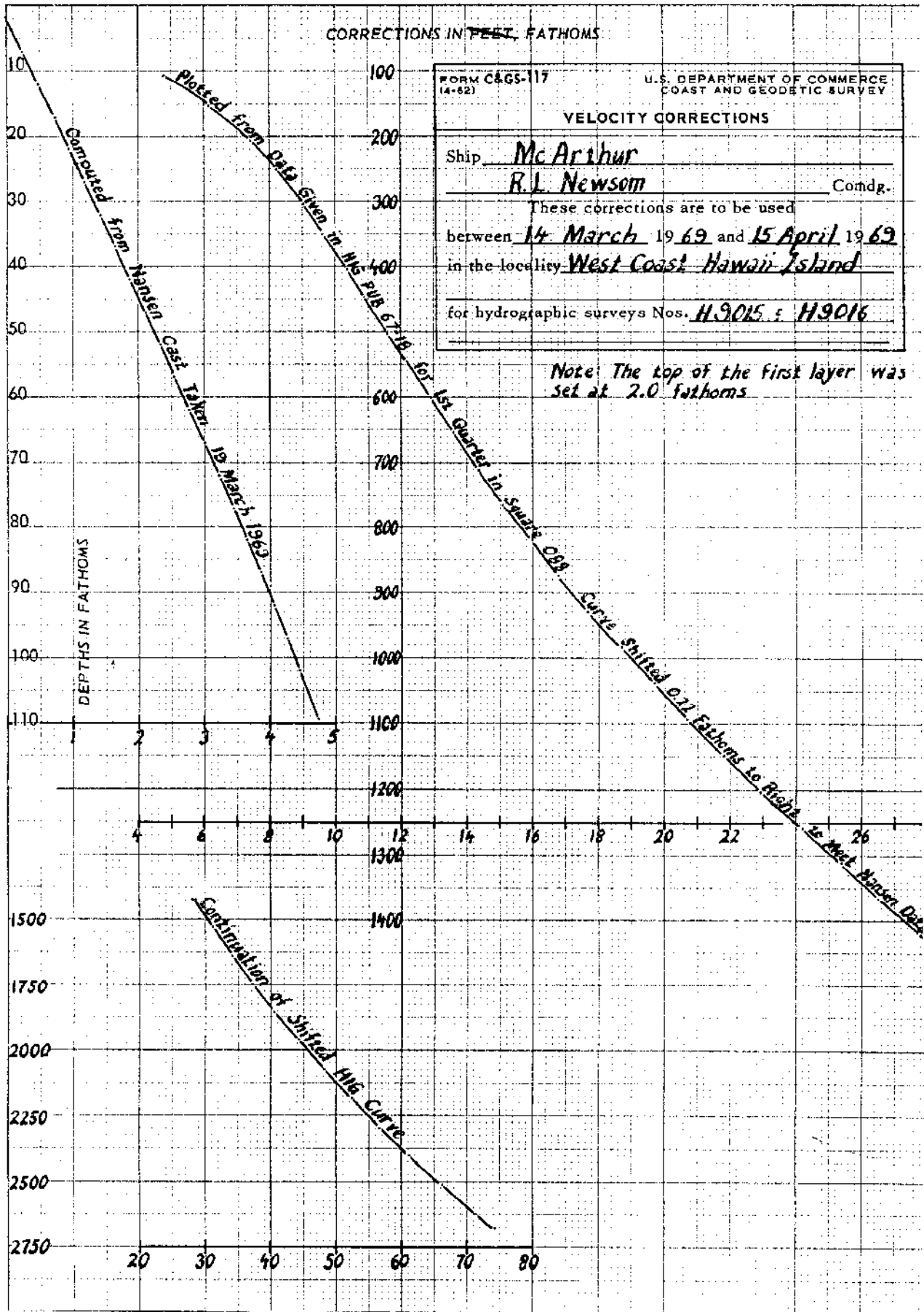
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203000	00	1000					
215000	00	1001					
230000	00	1002					
002000	00	1003	0000	074	0	000000	000000
035500	00	1004					
051000	00	1003					
061000	00	1002					
073000	00	1001					
105000	00	1000					
123500	00	1001					
162700	00	1002					
184500	00	1001					
213600	00	1000					
231000	00	1001					
001700	00	1002	0000	075	0	000000	000000
013600	00	1003					
041000	00	1004					
052500	00	1003					
062500	00	1002					
074000	00	1001					
111500	00	1000					
124500	00	1001					
171000	00	1002					
190000	00	1001					
223500	00	1000					
000000	00	1001	0000	076	0	000000	000000
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023000	00	1003					
044500	00	1004					
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165000	00	1003					
184000	00	1002					
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234600	00	1000					
005500	00	1001	0000	077	0	000000	000000
021000	00	1002					
055000	00	1003					
070000	00	1002					
081000	00	1001					
120000	00	1000					
132000	00	1001					
144700	00	1002					
180000	00	1003					
192500	00	1002					
210000	00	1001					

007950 00 0140  
009200 00 0160  
010300 00 0180  
011350 00 0200  
012250 00 0220  
013200 00 0240  
014100 00 0260  
014700 00 0280  
015400 00 0300  
016150 00 0320  
016900 00 0340  
017600 00 0360  
018250 00 0380  
018900 00 0400  
019450 00 0420  
020000 00 0440  
020600 00 0460  
021100 00 0480  
021650 00 0500  
022150 00 0520  
022650 00 0540  
023150 00 0560  
023650 00 0580  
024150 00 0600  
024550 00 0620  
025050 00 0640  
025450 00 0660  
025850 00 0680  
026300 00 0700  
026750 00 0720

000032 00 0000 0001 000 0 000000 000000  
000052 00 0001  
000071 00 0002  
000092 00 0003  
000113 00 0004  
000133 00 0005  
000154 00 0006  
000175 00 0007  
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000222 00 0009  
000242 00 0010  
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000306 00 0013  
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000868 00 0038  
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000942 00 0041  
000966 00 0042  
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001020 00 0044

001048 00 0045  
001220 00 0050  
001400 00 0055  
001750 00 0060  
002250 00 0070  
002850 00 0080  
003600 00 0090  
004380 00 0100  
005160 00 0110  
005900 00 0120  
006700 00 0130  
007950 00 0140  
009200 00 0160  
010300 00 0180  
011350 00 0200  
012250 00 0220  
013200 00 0240  
014100 00 0260  
014700 00 0280  
015400 00 0300  
016150 00 0320  
016900 00 0340  
017600 00 0360  
018250 00 0380  
018900 00 0400  
019450 00 0420  
020000 00 0440  
020600 00 0460  
021100 00 0480  
021650 00 0500  
022150 00 0520  
022650 00 0540  
023150 00 0560  
023650 00 0580  
024150 00 0600  
024550 00 0620  
025050 00 0640  
025450 00 0660  
025850 00 0680  
026300 00 0700  
026750 00 0720

(Set 1 inch equal 4 fathoms for deep water and 1 inch equal 0.4 fathom for shoal)



OCEANOGRAPHIC LOG SHEET - M  
BOTTOM SEDIMENT DATA

U.S. DEPARTMENT OF COMMERCE  
COAST AND GEODETIC SURVEY

VESSEL	PROJ. NO.	YEAR	DEPTH OF FATHOMS	WEIGHT OF SAMPLER	AP. PROX. POSITION	LENGTH OF CORE	COLOR OF SEDIMENT	FIELD DESCRIPTION	REMARKS (Unusual conditions, cohesiveness, dented outter, stat. no., type of bottom relief, i.e., slope, plain, disposition, etc.)	OBS. INT.	
											SAMPLE POSITION
SERIAL NO.	DATE	LATITUDE	LONGITUDE	DEPTH	WEIGHT OF SAMPLER	AP. PROX. POSITION	LENGTH OF CORE	COLOR OF SEDIMENT	FIELD DESCRIPTION	REMARKS	OBS. INT.
1067	E <sup>day</sup> 18 May '69	20°05.0' N	155°56.5' W	230	75 lb	Surface	N/A	N/A	crs br S	Not enough to keep	
1068	F <sup>day</sup> 19 Mar '69	20°02.0' N	156°01.6' W	353	"	"	"	"	stk br M		
1069	F <sup>day</sup> 19 Mar '69	19°58.7' N	156°05.6' W	430	"	"	"	"	BE S, brk Sh, sm G.		
1070	F <sup>day</sup> 19 Mar '69	19°53.0' N	156°05.2' W	212	"	"	"	"	fine br S	Not enough to keep	
1071	F <sup>day</sup> 19 Mar '69	"	"	63	"	"	"	"	fine br S	Not enough to keep	
1072	F <sup>day</sup> 19 Mar '69	19°50.2' N	156°06.9' W	200	"	"	"	"	fine br S	Not enough to keep	
1073	F <sup>day</sup> 19 Mar '69	19°47.2' N	156°05.7' W	63	"	"	"	"	crs br S	Not enough to keep	
1121	"	19°55.4' N	155°58.9' W	126	"	"	"	"	fine wh S brk Co	Not enough to keep	
1122	"	19°55.5' N	156°01.5' W	206	"	"	"	"	fine wh S brk Sh	Not enough to keep	
1123	"	19°59.0' N	155°57.4' W	212	"	"	"	"	fine br S	Not enough to keep	
1124	"	19°58.7' N	155°57.6' W	72	"	"	"	"	fine br S, crs br S, brk Co	Not enough to keep	
1125	"	20°01.0' N	155°52.7' W	135	"	"	"	"	brk Sh, brk Co	Not enough to keep	
1126	"	20°07.2' N	155°55.8' W	105	"	"	"	"	crs br S	Not enough to keep	

Bottom Sampling Ends  
DAY ENDS  
AR-40-1-69 COMPLETE.



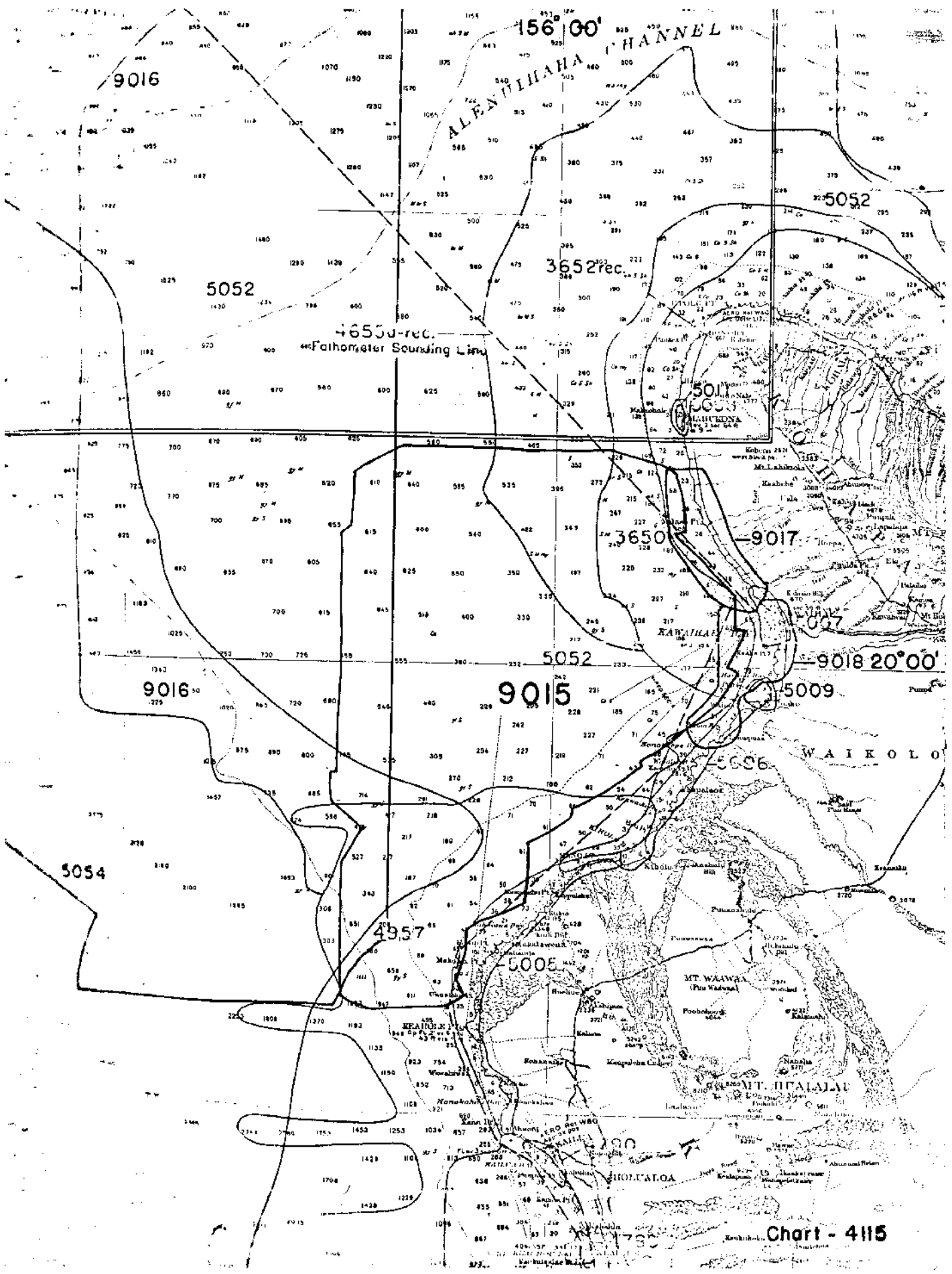
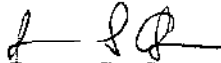


Chart - 4115

APPROVAL SHEET

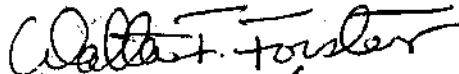
The smooth sheet has been inspected, is complete, and meets the requirements of the General Instructions for automated surveys and the Hydrographic Manual. (Note: All exceptions are listed in the Verifier's Report)

Examined and approved,



James S. Green  
Supervisory Cartographic Technician

Approved and forwarded,



Walter F. Forster, LCDR, NOAA  
Chief, Processing Division  
Pacific Marine Center

## NAUTICAL CHART DIVISION

## RECORD OF APPLICATION TO CHARTS

FILE WITH DESCRIPTIVE REPORT OF SURVEY NO. H-9015 (Category I)

## INSTRUCTIONS

A basic hydrographic or topographic survey supersedes all information of like nature on the uncorrected chart.

1. Letter all information.

2. In "Remarks" column cross out words that do not apply.

3. Give reasons for deviations, if any, from recommendations made under "Comparison with Charts" in the Review.

CHART	DATE	CARTOGRAPHER	REMARKS
4102	4/2/74	E. Frey	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam'd for critical corr's only (at prod stage of chart) No corr's
4140	4/17/74	Forbes	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam'd for critical changes - before
4001	9/25/74	T. Alexander	Full Part Before After Verification Review Inspection Signed Via Drawing No. Examined for critical corr's only thru chrt. 4140. No corrections.
4179	9/16/75	HAUSMAN	Full Part Before After Verification Review Inspection Signed Via Drawing No. Exam for Crit Corr No Corr
4167	2/9/77	KAPIS	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. FINAL application of CLASS I survey
4140	2/15/77	M.J. Friese	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. Revised 100-500, 1000 and 2000 fms curves, added numerous sds and some bottom characteristics
Reviewed	2/28/77	D.J. Kumm	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. Revised 100 and 1000 fms curves, added numerous sds. App'd thru 4140
4115	2/22/77	O.S. Forba	<del>Full Part Before After Verification Review Inspection Signed Via</del> Drawing No. Revised 100 and 1000 fms curves, added numerous sds. App'd thru 4140
4116	1/30/78	M.J. Friese	Full Part Before After Verification Review Inspection Signed Via Drawing No. Consider fully app'd CLASS I hydro in conjunction with chrt'd sds - final app'l
4001	2/5/80	M. Sager	Full Part Before After Verification Review Inspection Signed Via Drawing No. 12 Thru chart 4115 - No corrections Final application - Cat I Hydro
540	2/21/80	M. Sager	Full Part Before After Verification Review Inspection Signed Via Drawing No. 12 Thru chart 4115 - No Corr. Final appl. CAT I HYDRO
19004 (4102)	3/28/80	O. Stambel	Cat. I. Consider fully applied thru 19320 (4115)