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HORIZONTAL CONTROL - ENIWETOK ATOLL M.I. 1957 EXPANSION

A network of horizontal control stations was established in 1949-50 to cover the eastern portion of the Atoll. It consisted of a primary net of second order triangulation stations, supplemental with third order stations at locations of lesser importance. Standard procedures of the U.S. Coast and Geodetic Survey were carefully followed in executing the survey. Expansion surveys were completed in 1951, 1952, 1955 and in 1957 to establish additional stations and replace stations destroyed by test operations. The network now encompasses the Atoll and includes sixteen stations to second order specifications and eleven to third order accuracy.

Some features of two previous surveys were utilized in the scheme. A third order survey had been completed in 1944 by the USS Bowditch to control hydrographic mapping of the Atoll. This was followed in 1947-48 by a second order scheme of limited area by the U.S. Coast and Geodetic Survey. As the distribution of the existing stations of these surveys did not meet project requirements, and one end station of the base line had been destroyed, a substantially new and stronger scheme was necessary which could be expanded as required.

A base line for the net extended from station RUNIT on site YVONNE to a new station NORTH BASE #2 at the north end of the island. Station RUNIT was common to both the USS Bowditch and the USC & GS surveys. The base line was established to standard

REPOSITORY NATIONAL ARCHIVES
PACIFIC SOUTHWEST REGION

COLLECTION RG 326 ATOMIC ENERGY COMMISSION

(1)

BOX NO. 199679 (#1089) A16429 326-65AG170

ENIWETOK 1957

FOLDER HORIZONTAL CONTROL HOLMES & NARVER JIS NO.5

procedures of the U.S. Coast and Geodetic Survey for second order base line measurement. The computed probable error of total measurement of the line was one part in 648,000. The allowable maximum probable error for second order base line measurement is one part in 500,000.

The geographic position of station RUNIT as determined by the USC & GS survey was adopted as the origin of geographic position. The azimuth values of this survey for the line, station RUNIT to station SAND were adopted as the origin of geodetic azimuth. The probable accuracy of the adopted values for position and azimuth are not known, but it was considered that the accuracy was consistent with project requirements at the time, and the expense of further refinement could not be justified.

The computed closing error of the survey before adjustment was determined as approximately one part in 25,000. An additional check was obtained in 1952 by inclusion of a first order traverse in the FLORA-GENE area. This indicated a closing error of approximately one part in 70,000 before adjustment of the adjacent quadrangle. In order that the values of a station would remain the same independent of the direction of computation through the net, an adjustment was applied to the triangulation figures. This consisted of a side equation adjustment which resulted in slight changes in the values previously reported.

A plane grid was established in 1952 which was common to the entire Atoll, and from which the inter-relation of structures and areas, and their positions could be specified by plane coordinates.

Due to the limited area, the slight additional refinement obtained by computing a Transverse Mercator Grid would not have been practical.

The origin of plane coordinates, N 100,000, E 100,000, was taken at station CORAL and the basis of bearings was a true meridian through this station as computed through the adjusted figures from the line, station RUNIT to station SAND.

The 1957 expansion survey included establishing new second order stations on sites YVONNE, SALLY and GENF and third order stations on sites GLENN, HENRY, JAMES and KEITH. The triangle closure to include station LANTANA on site GLENN exceeds the allowable closure limits. However, the triangulation towers were damaged by a storm before re-observing could be accomplished. As an evaluation of the observing results indicated the values to be within a tolerance of one part in 5,000, it was decided to defer the re-observing until such time as more precise values are required for the station.

PLANE COORDINATES

LOCATION ENHETPK 24241.01
PROJECTION PLANE GRID

1957 EXPENDITURE (PAC.)
JOB NO. 942 SHEET OF

	STATIONS	BEARING	DISTANCE	LATITUDE	DEPARTURE	COORDINATES		
						NORTH	EAST	
1	CORRAL TO	N75-37-35.7E	2566.501			100,222.00	100,000.00	1
2	NORTH	N24-26-49.7E	33,832.02			106,208.00	124,284.06	2
3	SACKET	N12-33-52.4E	33,525.88			129,914.72	113,592.61	3
4	RIVERVIEW #2	N30-24-46.49W	56,479.46			133,223.77	107,294.19	4
5	GRAVE					148,207.87	21,408.56	5
6								6
7	NORTH TO	S34-51-12.16E	2072.82			106,208.00	124,284.06	7
8	RUNNIT	N26-40-41.30W	14,988.65			99,835.30	128,897.50	8
9	PURBARI					119,601.00	117,554.50	9
10								10
11	SACKET TO	S21-00-49.16E	11,048.50			123,914.73	113,592.61	11
12	PURBARI	N45-18-16.24W	2896.03			119,601.00	117,554.50	12
13	RIVERVIEW #2					132,722.77	107,294.19	13
14								14
15	GRAVE TO	S24-31-22.64E	15,665.65			148,207.87	71,408.56	15
16	ENHETPK					144,277.92	26,506.00	16
17	ENHETPK	S23-13-02.14W	22,974.16			157,921.44	52,252.20	17
18								18
19								19
20								20
21								21
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PLANE CO-ORDINATES

LOCATION Eniwetok Atoll MI
PROJECTION Ivy Grid

1957 Expansion Survey
JOB NO. 942 SHEET 1 OF 3

STATIONS	BEARING	DISTANCE	COORDINATES	
			LATITUDE	DEPARTURE
1				
2 Alice to				
3 Gail	N62-13-02.25E	20,974.16		
4 Engebi	N80-33-30.19E	34,116.16		
5 Coral	S50-27-08.84E	61,143.84		
6				
7 Coral to				
8 Alice	N50-27-08.84W	61,143.84		
9 Gail	N30-24-46.49W	56,479.46		
10 Engebi	N16-51-32.35W	46,527.59		
11 Rujuoru-2	N12-33-58.64E	33,525.88		
12 Sally	N24-26-09.74E	32,858.02		
13 Piiraai	N41-50-50.54E	26,312.73		
14 North	N75-39-35.75E	25,065.01		
15 Runit	S89-10-25.88E	28,900.50		
16 Lantana *	S16-04-06.30W	71,964.78		
17 Henry *	S23-42-54.10W	72,587.18		
18 James *	S31-44-31.30W	72,550.89		
19 Keith *	S35-47-46.50W	72,819.62		
20 Rigili-2	S67-27-45.60W	73,416.85		
21				
22 Gail to				
23 Engebi	S74-31-28.65E	15,665.65		
24 Coral	S30-24-46.49E	56,479.46		
25 Alice	S62-13-02.25W	20,974.16		
26				

*** Third Order Station**

PLANE CO-ORDINATES

LOCATION Eniwetok Atoll MI

1957 Expansion Survey

PROJECTION Ivy GridJOB NO. 942 SHEET 2 OF 3

STATIONS	BEARING	DISTANCE	LATITUDE	DEPARTURE	COORDINATES	
					NORTH	EAST
1						
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PLANE CO-ORDINATES

LOCATION Eniwetok Atoll MI
PROJECTION Ivy Grid

1957 Expansion Survey

JOB NO. 942 SHEET 3 OF 3

STATIONS	BEARING	DISTANCE	LATITUDE	DEPARTURE	COORDINATES	
					NORTH	EAST
1						
2					106,208.00	124,284.06
3	S34-51-12.16E	8,072.82			99,583.30	128,897.50
4	S75-39-35.75W	25,065.01			100,000.00	100,000.00
5	N26-40-41.30W	14,988.65			119,601.00	117,554.50
6						
7					99,583.30	128,897.50
8	N89-10-25.88W	28,900.50			100,000.00	100,000.00
9	N34-51-12.16W	8,072.82			106,208.00	124,284.06
10	N29-32-16.78W	23,008.02			119,601.00	117,554.50
11						
12					30,846.75	80,081.23
13	N49-25-24.70W	63,053.07			71,860.40	32,190.00
14	N16-04-06.30E	71,964.78			100,000.00	100,000.00
15						
16					33,542.29	70,806.31
17	N45-13-19.50W	54,401.26			71,860.40	32,190.00
18	N23-42-54.10E	72,587.18			100,000.00	100,000.00
19						
20					38,300.88	61,831.30
21	N41-27-08.70W	44,775.53			71,860.40	32,190.00
22	N31-44-31.30E	72,550.89			100,000.00	100,000.00
23						
24					40,935.85	57,407.47
25	N39-11-44.10W	39,902.99			71,860.40	32,190.00
26	N35-47-46.50E	72,819.62			100,000.00	100,000.00

GEOGRAPHIC POSITIONS

LOCATION Eniwetok Atoll Second
DATUM Eniwetok Astronomic 1944 JOB NO. 942 ORDER TRIANGULATION
SHEET 1 OF 4

STATION	LATITUDE LONGITUDE	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE		
					LOG. METERS	METERS	FEET
Alice	11-38-46.347N	242-11-26.72	62-12-04.45	Gail	3.8057004	6,392.937	20,974.16
	162-09-16.507E	260-31-54.61	80-33-03.03	Engebi	4.0169759	10,398.626	34,116.16
		309-31-15.76	129-32-51.11	Coral	4.2703685	18,636.680	61,143.84
Coral	11-32-20.254N	129-32-51.11	309-31-15.76	Alice	4.2703685	18,636.680	61,143.84
	162-17-10.944E	149-35-13.46	329-34-15.57	Gail	4.2359063	17,214.974	56,479.46
		163-08-27.60	343-08-00.30	Engebi	4.1517264	14,181.638	46,527.59
		192-33-58.52	12-34-13.27	Rujoru-2	4.0093960	10,218.709	33,525.88
		204-26-09.62	24-26-37.09	Sally	4.0006573	10,015.145	32,858.02
		221-50-50.42	41-51-25.86	Piiraa1	3.9041817	8,020.136	26,312.73
		255-39-35.63	75-40-24.54	North	3.8830837	7,639.830	25,065.01
		270-49-34.00	90-50-32.20	Runit	3.9449212	8,808.890	28,900.50
		16-04-05.81	196-03-36.06	Lantana	4.3411358	21,934.909	71,964.78
		23-42-54.10	203-41-55.83	Henry	4.3448758	22,124.617	72,587.18
		31-44-31.30	211-43-15.08	James	4.3446586	22,113.556	72,550.89
		35-47-46.50	215-46-21.43	Keith	4.3462642	22,195.465	72,819.62
		67-27-45.60	247-25-29.60	Rigili-2	4.3498116	22,377.501	73,416.85
Gail	11-40-23.398N	285-27-33.34	105-28-04.08	Engebi	3.6789643	4,774.900	15,665.65
	162-12-23.207E	329-34-15.57	149-35-13.46	Coral	4.2359063	17,214.974	56,479.46
		62-12-04.45	242-11-26.72	Alice	3.8057004	6,392.937	20,974.16
Engebi	11-39-41.964N	343-08-00.30	163-08-27.60	Coral	4.1517264	14,181.638	46,527.59
	162-14-55.151E	80-33-03.03	260-31-51.61	Alice	4.0169759	10,398.626	34,116.16
		105-28-04.08	285-27-33.34	Gail	3.6789643	4,774.900	15,665.65

GEOGRAPHIC POSITIONS

LOCATION Eniwetok Atoll

Second

ORDER TRIANGULATION

DATUM Eniwetok Astronomic 1944JOB NO. 942SHEET 2 OF 4

STATION	LATITUDE LONGITUDE	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE	
					LOG METERS	FEET
Rujoru-2	11-37-44.863N 162-18-24.339E	294-01-58.55 321-58-52.12	114-02-11.32 141-59-12.91	Sally Piiraa1	3.3226150 3.7056121	2,101.914 5,077.058
		12-34-13.27	192-33-58.52	Coral	4.0093960	10,218.709
Sally	11-37-17.000N 162-19-27.711E	338-59-38.16 24-26-37.09	158-59-46.19 204-26-09.62	Piiraa1 Coral	3.5273179 4.0006573	3,367.590 10,015.145
		114-02-11.32	294-01-58.55	Rujoru-2	3.3226150	2,101.914
Piiraa1	11-35-34.682N 162-20-07.557E	330-28-18.47 333-19-53.98	150-28-41.37 153-20-07.53	Runit North	3.8458951 3.6597784	7,012.859 4,568.550
		41-51-25.86	221-50-50.42	Coral	3.9041817	8,020.136
		141-59-12.91	321-58-52.12	Rujoru-2	3.7056121	5,077.058
		158-59-46.19	338-59-38.16	Sally	3.5273179	3,367.590
North	11-33-21.810N 162-21-15.230E	325-09-36.63 75-40-24.54	145-09-45.94 255-39-35.63	Runit Coral	3.3910410 3.8830837	2,460.600 7,639.830
		153-20-07.53	333-19-53.98	Piiraa1	3.6597784	4,568.550
Runit	11-32-16.080N 162-22-01.621E	90-50-32.20 145-09-45.94	270-49-34.00 325-09-36.63	Coral North	3.9449212 3.3910410	8,808.890 2,460.600
		150-28-41.37	330-28-18.47	Piiraa1	3.8458951	7,012.859
Lantana	11-20-54.223 162-13-50.718	130-33-54.57 196-03-36.06	310-32-19.30 16-04-05.81	Rigili-2 Coral	4.2837221 4.3411358	19,218.614 21,934.909
						63,053.07 71,964.78

Third Order Station

GEOGRAPHIC POSITIONS

LOCATION Eniwetok AtollDATUM Eniwetok Astronomic 1944Second ORDER TRIANGULATION
JOB NO. 942 SHEET 3 OF 4

STATION	LATITUDE LONGITUDE	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE		
					LOG. METERS	METERS	FEET
Henry ?	11-21-20.941N	134-45-41.79	314-44-24.93	Rigili-2	4.2196248	16,581.537	54,401.26
	162-12-17.475E	203-41-55.83	23-42-54.10	Coral	4.3448758	22,124.617	72,587.18
James ?	11-22-08.118N	138-31-34.71	318-30-35.67	Rigili-2	4.1350566	13,647.609	44,775.53
	162-10-47.238E	211-43-15.08	31-44-31.30	Coral	4.3446586	22,113.556	72,550.89
Keith ?	11-22-34.240N	140-46-50.49	320-46-00.23	Rigili-2	4.0850213	12,162.456	39,902.99
	162-10-02.755E	215-46-21.43	35-47-46.50	Coral	4.3462642	22,195.465	72,819.62
Aitsu ?	11-37-59.151N						
	162-17-42.440E						
Aniyaani	11-28-19.253N						
	162-23-58.730E						
Bokon	11-38-22.046N						
	162-16-35.139E						
Eniwetok	11-21-51.469N						
	162-21-14.730E						
Islet	11-30-43.856N						
	162-22-52.543E						
Ivy	11-24-29.334N						
	162-22-37.224E						
Third Order Station							

STATION	LATITUDE LONGITUDE	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE	
					LOG. METERS	FEET
Japtan	11-25-41.449N 162-23-11.664E					
Lilac	11-25-38.264N 162-22-22.842E					
Mack	11-32-57.854 162-14-54.033					
Muzin	11-39-20.189N 162-15-10.227E					
Ruchi	11-38-26.544N 162-10-50.892E					
Sand	11-30-18.986N 162-23-06.870E					
Yeiri	11-38-07.928N 162-17-16.650E					

Third Order Station

TRAVERSE LOCATIONS OF STATIONS

CALC. BY LSH

DATE 12-14-57

NORTH, SALLY, RUGRUE, GAIL JOB NO. 942

CHKD. BY ERG

DATE 12-26-57

F. B. REF.

SHEET NO. 1 OF 1

STATION	BEARING	DISTANCE	COSINE	SINE	LATITUDE	DEPARTURE	CO-ORDINATES	
							NORTH	EAST
1								
2	N 75-39-35.75 E	25.065.01	24767663	96884277	+6208.03	+24,284.05	100,000.00	100,000.00
3	N 24-36-07.74 E	32,858.02	91042364	41367716	+29,914.72	+13,592.61	106,208.02	124,284.05
4	N 12-35-58.69 E	33,535.88	97604494	21756901	+32,722.77	+7,294.19	129,914.72	113,592.61
5	N 33-24-46.49 W	56,179.46	86239958	50632816	+48,707.86	-28,591.49	132,722.77	107,294.19
6	GAIL						148,707.86	71,408.50
7								
8	NORTH TO							
9	PIIRAAI							
10								
11								
12	SALLY TO							
13	PIIRAAI							
14	RUGRUE							
15								
16	GAIL TO							
17	ENGINEER							
18	ALICE							
19								
20	PIIRAAI TO							
21	RUGRUE-2							
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SECOND ORDER TRIANGULATION

JOB NO. 942 LOCATION ENIWETOK ATOLL "

FIRST ANGLE OF TRIANGLE 45-26-58.93

1

SECOND ORDER TRIANGULATION

RIGHT ANGLE OF TRIANGLE 78-32-14.72

15

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION SECOND ORDER TRIANGULATION

COMPUTED BY	DATE	JOB NO.	LOCATION	ENHANCEMENT
2	12-12-57	942	LOCATION	ENHANCEMENT
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HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION SECOND ORDER TRIANGULATION

COMPUTED BY LSH DATE 12-11-57 JOB NO. 942 LOCATION ENIWETOK, ATOLAN

STATION	TO	BEARING	DISTANCE	COORDINATES	BEARING	DISTANCE	COORDINATES
RUNIT	3	CORAL	102	RUNIT	270° 49'	34.00	
			8		- 48 58	43.58	
RUNIT	101	PIIRAAI	101	PIIRAAI	221 50	50.42	
					+ 0 35.41		
PIIRAAI	103	CORAL	103	CORAL	180 00	00.00	
					41 51	25.86	

FIRST ANGLE OF TRIANGLE 71-23-07.39

STATION	TO	BEARING	DISTANCE	COORDINATES	BEARING	DISTANCE	COORDINATES
RUNIT	11	32	20.254	3	CORAL	162 17	10.944
PIIRAAI	11	35	34.682	1	PIIRAAI	162 20	07.551

STATION	TO	BEARING	DISTANCE	COORDINATES	BEARING	DISTANCE	COORDINATES
RUNIT	11	32	20.254	3	CORAL	162 17	10.944
PIIRAAI	11	35	34.682	1	PIIRAAI	162 20	07.551

STATION	TO	BEARING	DISTANCE	COORDINATES	BEARING	DISTANCE	COORDINATES
RUNIT	11	32	20.254	3	CORAL	162 17	10.944
PIIRAAI	11	35	34.682	1	PIIRAAI	162 20	07.551

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS
LOS ANGELES, CALIFORNIA

JOB No. 776

SHEET 2 OF 2

BY LSH DATE 9-11-57

TITLE LOCATION A STA. RUNDRI-2, SALLY

26,312.73
sin 45-26-58.9

sin 117-08-20.3
32,858.024

sin 17-24-40.8
11,048.501

32,858.024
sin 78-32-14.7

sin 11-52-11.1
6896.030

sin 89-35-34.2
33,525.878

26,312.73
sin 50-35-21.1

sin 29-16-51.9
16,656.978

sin 100-07-47.0
33,525.893

16,656.978
sin 135-02-33.1

sin 27-56-52.6
11,048.521

sin 17-00-33.3
6896.018

COMPUTATION OF TRIANGLES

 CALC. BY LSH DATE 12-11-57
 CHKD. BY E.R.G. DATE 12-20-57

 JOB NO. 942
 LOCATION ENIWETOK ATOLL

STATION	OBSERVED ANGLE	CORR - N	SPHERICAL		PLANE ANGLE AND DISTANCE	LOGARITHM
			ANGLE	EXCESS		
2-3					8,020.136	3.9041817
1 SALLY	45-27-00.6		58.93	0.03	26-58.90	
2 PIIRAAI	117-08-22.0		20.33	0.03	20.30	
3 CORAL	17-24-40.9		40.80	0.00	40.80	
1-3	63.5					
1-2						
2-3					10,015.145	4.006573
1 RVJCRU-2	78-32-15.3		14.72	0.02	14.70	
2 SALLY	89-35-33.1		34.23	0.03	34.20	
3 CORAL	11-52-12.8		11.10	0.00	11.10	
1-3	-01.2					
1-2						
2-3					8,020.136	3.9041817
1 RVJCRU-2	50-35-20.6		21.15	0.05	21.1	
2 PIIRAAI	100-07-49.3		47.05	0.05	47.0	
3 CORAL	29-16-53.7		51.90	0.00	51.9	
1-3	63.6					
1-2						
2-3						
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HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

COMPUTED BY LSH DATE 12-14-57.

JOB NO. 942

LOCATION

ENIWEJOK, ATOLL

COMPUTED BY	DATE	12-14-51	"	"	JOB NO.	LOCATION	"	"
2	103				3	102		
3dL	8	+			3dL	8		
2	101				3	101		
2	ENGEBI	80	33	03.03				
Δα		-	01	08.41				
		180	00	00.0		180	00	00.0
α'	1	ALICE	102	ENGEBI	260	31	54.61	
						103		

FIRST ANGLE OF TRIANGLE

[illegible]

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

COMPUTED BY L. S. H. DATE 12-2-57

JOB NO. <u>942</u>		LOCATION <u>BIKINI ATOLL</u>	
α	2	ENGEBI to 3 CORAL	8
β	2	ENGEBI to 1 GAIL	8
Δ	2	ENGEBI to 1 GAIL	8
α'	1	GAIL to 2 ENGEBI	8
β'	1	GAIL to 3 CORAL	8
Δ'	1	GAIL to 3 CORAL	8

FIRST ANGLE OF TRIANGLE 44-06-42.23

LOGARITHMS		VALUES IN SECONDS	
α	11 39 41.964	ENGEBI	162 14 55.151
β	11 40 23.398	GAIL	162 12 23.207
Δ	11 40 23.398	GAIL	162 12 23.207
α'	11 39 41.964	ENGEBI	162 14 55.151
β'	11 40 23.398	GAIL	162 12 23.207
Δ'	11 40 23.398	GAIL	162 12 23.207
α''	11 39 41.964	ENGEBI	162 14 55.151
β''	11 40 23.398	GAIL	162 12 23.207
Δ''	11 40 23.398	GAIL	162 12 23.207
α'''	11 39 41.964	ENGEBI	162 14 55.151
β'''	11 40 23.398	GAIL	162 12 23.207
Δ'''	11 40 23.398	GAIL	162 12 23.207

	OBS. *	GEO. COND.			a+b *	TRIG. COND	
		S = 360	b/c = c/a				
a	13-33-13.8	13.3	14.0	36.49*	14.14	14.14	
b	20-02-23.0	22.5	22.2		22.35	22.35	
c	48-59-20.6	20.2	19.9	20.97*	20.97	20.97	
d	18-20-28.2	27.7	27.0		26.89	27.94+	
e	92-37-51.9	51.5	50.9		50.29	48.74-	
f	44-06-40.3	39.8	40.0		40.61	42.16+	
g	24-55-02.3	01.8	02.1		02.71	01.16-	
h	97-25-03.4	03.2	02.9	02.54*	02.54	02.54	

TRIG. EQ = ALICE-CORAL, $\sin C + d, \sin f$ * = Fixed 25,
 ANGERS-CORAL, $\sin g + h, \sin e = 1$

109.	61,143.84	4.7863527		46.527.59	4.6677106	
109.51m	67-19-47.36	7.9650788	88+	122-20-0325	9.9268244	13.3
"	44-06-40.61	9.8426430	21.7+	92-27-50.29	9.9995420	1.0
		4.5940745	305	37	4.5940770	14.3
		25/448 = 0.56			745	30.5
		0.56 x 276 = 155			25	44.8

61,143.84	(92274172)	(34266857)
51m 92-37-4874	51m 67-19-4891	51m 20-02-22.35
(99894652)	56.479.463	20.974.125-
46.527.59	(84494122)	(234.36047)
51m 44-06-42.16	51m 122-20-0370	51m 13-33-14.14
(646255957)	56.479.474	15,645.643

COMPUTATION OF TRIANGLES

CALC. BY LSH DATE 12-11-57JOB NO. 942CHKD. BY E.R.G. DATE 12-20-57LOCATION ENIWETOK ATOLL

STATION	OBSERVED ANGLE	CORR - N	SPHERICAL		PLANE ANGLE AND DISTANCE	LOGARITHM
			ANGLE	EXCESS		
2-3					4,181.638	4.1517264
1 GAIL	44-06-40.3		42.23	0.07	42.16	
2 ENGEBI	122-20-05.9		03.78	0.08	03.70	
3 CORAL	13-33-13.8		14.14	0.00	14.14	
1-3	00.0					
1-2						
2-3					18,636.680	4.2703685
1 GAIL	67-19-48.8		49.04	0.13	48.91	
2 CORAL	92-37-51.9		48.88	0.14	48.74	
3 ALICE	20-02-25.0		22.35	0.00	22.35	
1-3						
1-2						
2-3					14,181.638	4.1517264
1 ALICE	48-59-20.6		21.15	0.18	20.97	
2 ENGEBI	97-25-03.6		02.73	0.19	02.54	
3 CORAL	33-35-36.8		36.49	0.00	36.49	
1-3	01.0					
1-2						
2-3						
1						
2						
3						
1-3						
1-2						

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

COMPUTED BY LSH DATE 12-11-57

JOB NO. 942 LOCATION ENIWETOK ATOLL

	2 RUNIT	103 CORAL 8	70° + 54	50' 19	32.20" 13.74	α 3DL	3 CORAL 8	102 RUNIT	270° - 15	49' 09	34.00"
Δ ^a	L RUNIT	101 NORTH	145	09	45.94	α	3 CORAL	101 NORTH	255	39	58.37
			-		09.29	Δα			+	0	48.90
			180	00	00.0				180	00	00.0
Δ ^b	1 NORTH	102 RUNIT	325	09	36.63	α'	1 NORTH	103 CORAL	75	40	24.54

FIRST ANGLE OF TRIANGLE 110-30-47.91

RUNIT				Values in seconds			
	λ	ϕ	$\Delta\lambda$	$\Delta\phi$	λ'	ϕ'	$\Delta\phi'$
11	32 16.080	162 22	01.621	01.621	32 20.254	162 17	10.944
+	01 05.730	-	0	46.390	01 01.556	+	04 04.286
11	33 21.810	162 21	15.230	15.230	33 21.810	162 21	15.230
NORTH				NORTH			
Logarithms				Logarithms			
	$\frac{1}{2}(\phi + \phi')$					$\frac{1}{2}(\phi + \phi')$	
	3.3910410					3.8830837	
$\cos \alpha$	9.9142258					9.3938260	
B	8.5124998					8.5124997	
	1.8177666					1.7894694	
	6.78208					7.766617	
$\sin \alpha$	9.51365					9.97251	
	0.71664					0.71669	
	7.01237					8.45537	
	3.6355					3.5789	
	1.9845					1.9845	
	5.6200					5.5634	
3d term				3d term			
	+0.0000					+0.0001	
$-\Delta\phi$				$-\Delta\phi$			
	-65.7295					-61.5556	

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

COMPUTED BY LSH DATE 12-11-57

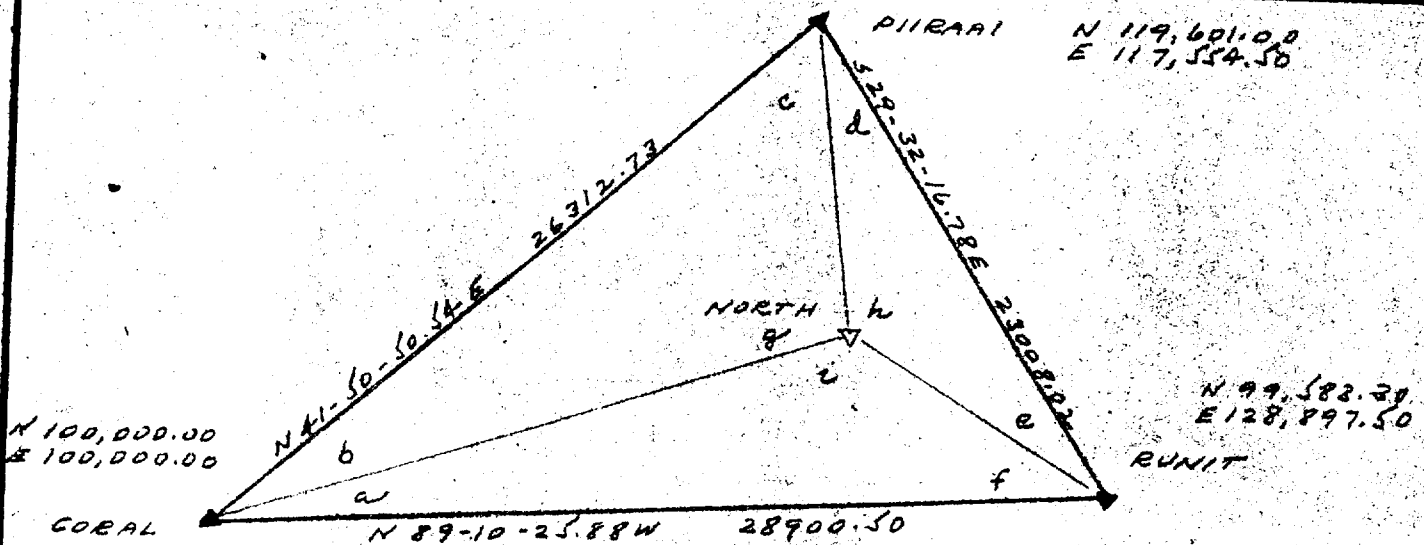
JOB NO. 942 LOCATION ENIWEETOK ATOLL

STATION	ANGLE	BEARING	COORDINATES	HEIGHT
1	101	341	102 CORAL	8
2	102	180	101 NORTH	101
3	103	153	103 PIIRAAI	103
4	104	180	104 CORAL	8
5	105	153	105 PIIRAAI	105
6	106	180	106 CORAL	8
7	107	153	107 PIIRAAI	107
8	108	180	108 CORAL	8
9	109	153	109 PIIRAAI	109
10	110	180	110 CORAL	8
11	111	153	111 PIIRAAI	111
12	112	180	112 CORAL	8
13	113	153	113 PIIRAAI	113
14	114	180	114 CORAL	8
15	115	153	115 PIIRAAI	115
16	116	180	116 CORAL	8
17	117	153	117 PIIRAAI	117
18	118	180	118 CORAL	8
19	119	153	119 PIIRAAI	119
20	120	180	120 CORAL	8
21	121	153	121 PIIRAAI	121
22	122	180	122 CORAL	8
23	123	153	123 PIIRAAI	123
24	124	180	124 CORAL	8
25	125	153	125 PIIRAAI	125
26	126	180	126 CORAL	8
27	127	153	127 PIIRAAI	127
28	128	180	128 CORAL	8
29	129	153	129 PIIRAAI	129
30	130	180	130 CORAL	8
31	131	153	131 PIIRAAI	131
32	132	180	132 CORAL	8
33	133	153	133 PIIRAAI	133
34	134	180	134 CORAL	8
35	135	153	135 PIIRAAI	135
36	136	180	136 CORAL	8
37	137	153	137 PIIRAAI	137
38	138	180	138 CORAL	8
39	139	153	139 PIIRAAI	139
40	140	180	140 CORAL	8
41	141	153	141 PIIRAAI	141
42	142	180	142 CORAL	8
43	143	153	143 PIIRAAI	143
44	144	180	144 CORAL	8
45	145	153	145 PIIRAAI	145
46	146	180	146 CORAL	8
47	147	153	147 PIIRAAI	147
48	148	180	148 CORAL	8
49	149	153	149 PIIRAAI	149
50	150	180	150 CORAL	8
51	151	153	151 PIIRAAI	151
52	152	180	152 CORAL	8
53	153	153	153 PIIRAAI	153
54	154	180	154 CORAL	8
55	155	153	155 PIIRAAI	155
56	156	180	156 CORAL	8
57	157	153	157 PIIRAAI	157
58	158	180	158 CORAL	8
59	159	153	159 PIIRAAI	159
60	160	180	160 CORAL	8
61	161	153	161 PIIRAAI	161
62	162	180	162 CORAL	8
63	163	153	163 PIIRAAI	163
64	164	180	164 CORAL	8
65	165	153	165 PIIRAAI	165
66	166	180	166 CORAL	8
67	167	153	167 PIIRAAI	167
68	168	180	168 CORAL	8
69	169	153	169 PIIRAAI	169
70	170	180	170 CORAL	8
71	171	153	171 PIIRAAI	171
72	172	180	172 CORAL	8
73	173	153	173 PIIRAAI	173
74	174	180	174 CORAL	8
75	175	153	175 PIIRAAI	175
76	176	180	176 CORAL	8
77	177	153	177 PIIRAAI	177
78	178	180	178 CORAL	8
79	179	153	179 PIIRAAI	179
80	180	180	180 CORAL	8

FIRST ANGLE OF TRIANGLE

STATION	ANGLE	BEARING	COORDINATES	HEIGHT
1	101	341	102 CORAL	8
2	102	180	101 NORTH	101
3	103	153	103 PIIRAAI	103
4	104	180	104 CORAL	8
5	105	153	105 PIIRAAI	105
6	106	180	106 CORAL	8
7	107	153	107 PIIRAAI	107
8	108	180	108 CORAL	8
9	109	153	109 PIIRAAI	109
10	110	180	110 CORAL	8
11	111	153	111 PIIRAAI	111
12	112	180	112 CORAL	8
13	113	153	113 PIIRAAI	113
14	114	180	114 CORAL	8
15	115	153	115 PIIRAAI	115
16	116	180	116 CORAL	8
17	117	153	117 PIIRAAI	117
18	118	180	118 CORAL	8
19	119	153	119 PIIRAAI	119
20	120	180	120 CORAL	8
21	121	153	121 PIIRAAI	121
22	122	180	122 CORAL	8
23	123	153	123 PIIRAAI	123
24	124	180	124 CORAL	8
25	125	153	125 PIIRAAI	125
26	126	180	126 CORAL	8
27	127	153	127 PIIRAAI	127
28	128	180	128 CORAL	8
29	129	153	129 PIIRAAI	129
30	130	180	130 CORAL	8
31	131	153	131 PIIRAAI	131
32	132	180	132 CORAL	8
33	133	153	133 PIIRAAI	133
34	134	180	134 CORAL	8
35	135	153	135 PIIRAAI	135
36	136	180	136 CORAL	8
37	137	153	137 PIIRAAI	137
38	138	180	138 CORAL	8
39	139	153	139 PIIRAAI	139
40	140	180	140 CORAL	8
41	141	153	141 PIIRAAI	141
42	142	180	142 CORAL	8
43	143	153	143 PIIRAAI	143
44	144	180	144 CORAL	8
45	145	153	145 PIIRAAI	145
46	146	180	146 CORAL	8
47	147	153	147 PIIRAAI	147
48	148	180	148 CORAL	8
49	149	153	149 PIIRAAI	149
50	150	180	150 CORAL	8
51	151	153	151 PIIRAAI	151
52	152	180	152 CORAL	8
53	153	153	153 PIIRAAI	153
54	154	180	154 CORAL	8
55	155	153	155 PIIRAAI	155
56	156	180	156 CORAL	8
57	157	153	157 PIIRAAI	157
58	158	180	158 CORAL	8
59	159	153	159 PIIRAAI	159
60	160	180	160 CORAL	8
61	161	153	161 PIIRAAI	161
62	162	180	162 CORAL	8
63	163	153	163 PIIRAAI	163
64	164	180	164 CORAL	8
65	165	153	165 PIIRAAI	165
66	166	180	166 CORAL	8
67	167	153	167 PIIRAAI	167
68	168	180	168 CORAL	8
69	169	153	169 PIIRAAI	169
70	170	180	170 CORAL	8
71	171	153	171 PIIRAAI	171
72	172	180	172 CORAL	8
73	173	153	173 PIIRAAI	173
74	174	180	174 CORAL	8
75	175	153	175 PIIRAAI	175
76	176	180	176 CORAL	8
77	177	153	177 PIIRAAI	177
78	178	180	178 CORAL	8
79	179	153	179 PIIRAAI	179
80	180	180	180 CORAL	8

TITLE LOCATION A STATION NORTH



	OBS. $\angle$	GEO. COND.		TRIG. COND.	
a	15-10-01.9 x	01.8	00.44	58.37	58.37
b	33-48-44.7	43.8	43.14	45.21	45.21
c	68-31-34.8 x	33.9	34.23	32.16	31.84
d	2-51-35.3		33.09	35.16	35.48
e	5-18-53.2 x		57.77	55.70	55.38
f	54-19-10.8	10.7	11.33	13.40	13.72
g	77-39-43.2	42.3	42.62		42.95
h	171-49-29.2		29.14		29.14
i	110-30-47.6	47.5	48.23		47.91

$$\frac{\sin a, \sin c, \sin e}{\sin b, \sin d, \sin f} = 1$$

* = Fixed $\angle$ s.

Log Sin. 15-10-00.44	9.4176871	77.6	33-48-43.14	9.7454412	31.4
68-31-34.23	9.9687560	8.3	2-51-33.09	8.6979745	421.7
5-18-57.77	8.9668429	226.6	54-19-11.33	9.9097086	15.1
	8.3532860	312.5		8.3531243	468.2
	1243				312.5
	1617				280.7
					1617 / 780.7 = 2.07

$$\frac{\text{Coral} - \text{Piiraa}, \sin c, \sin i}{\text{Coral} - \text{Runit}, \sin f, \sin g} = 1$$

Log 26312.73	4.4201659	28900.50	4.4609053		
" Sin. 68-31-32.16	9.9687543	8.3	54-19-13.40	9.9097117	15.1
" " 110-30-48.23	9.9715496	7.9	77-39-42.63	9.9898517	4.6
	4.3604698	15.2		4.3604687	19.7
	687				15.2
	11				11 / 34.9 = 0.32

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS
LOS ANGELES, CALIFORNIA

JOB No. 942

SHEET 2 OF 2

BY LSH DATE 9-6-57

TITLE LOCATION A STATION NORTH

26312.73
Sta 77-39-42.95

Sin 68-31-31.84
25,065.024

Sin 33-48-45.21
14,988.629

28900.50
Sta 110-30-47.91

Sin 54-19-13.72
25,064.977

Sin 15-09-58.37
8072.842

COMPUTATION OF TRIANGLES

CALC. BY LSH DATE 12-11-57JOB NO. 942CHKD. BY ERG DATE 12-20-57LOCATION ENIWEETOK ATOL

STATION	OBSERVED ANGLE	CORR - N	SPHERICAL		PLANE ANGLE AND DISTANCE	LOGARITHM
			ANGLE	EXCESS		
2-3					8,808.890	3.9449212
1 NORTH	110-30-47.6		47.94	0.03	47.91	
2 RUNIT	54-19-10.8		13.74	0.02	13.72	
3 CORAL	15-10-01.9		58.37	0.00	58.37	
1-3	00.3					
1-2						
2-3					8,020.136	3.9041817
1 NORTH	77-39-43.2		42.99	0.04	42.95	
2 CORAL	33-48-44.7		45.21	0.00	45.21	
3 PIIRAAI	68-31-54.8		31.88	0.04	31.84	
1-3	02.7					
1-2						
2-3					8,808.890	3.9449212
1 PIIRAAI	71-23-10.1		07.39	0.07	07.32	
2 RUNIT	59-38-04.0		09.17	0.07	09.10	
3 CORAL	48-58-46.6		43.58	0.00	43.58	
1-3	00.7					
1-2						
2-3						
1						
2						
3						
1-3						
1-2						

CALC. BY CSH

DATE 11-57

TRAVERSE

LOCATION OF

CHKD. BY ERQ

DATE 12-26-57

F. B. REF.

STA. LANTANA, KEITH, JAMES, HENRY JOB NO. 942

SHEET NO. 1 OF 1

STATION	BEARING	DISTANCE	COSINE	SINE	LATITUDE	DEPARTURE	CO-ORDINATES	
							NORTH	EAST
1								
2	EIGLI-2 TO							
3	CORAL	N 62° 27' 45" E 73.416.85	38328535	92362999	+28,139.62	+67,810.00	71,860.40	32,190.00
4	KEITH	S 39° 11' 44" E 39.902.99	77999320	63196957	-30,924.55	+25,277.48	100,000.00	100,000.00
5	JAMES	S 41° 27' 08" E 44.775.53	74950576	66199782	-33,559.52	+29,641.30	40,935.85	57,407.47
6	HENRY	S 45° 13' 12" E 54.401.26	70436267	70984227	-38,318.11	+38,616.31	38,300.88	61,831.30
7	LANTANA	S 49° 25' 24" E 63.053.07	65046238	75953848	-41,013.65	+47,891.23	33,542.29	70,806.31
8							30,846.75	80,081.23
9	CORAL TO							
10	KEITH	S 35° 47' 46" E 72.819.62	51110210	58490459	-59,064.15	-92,592.53	100,000.00	100,000.00
11	JAMES	S 31° 44' 31" E 72.550.89	55042543	52609560	-61,699.12	-38,168.70	40,935.85	57,407.47
12	HENRY	S 23° 42' 54" E 72.587.18	91555713	40218722	-66,957.71	-29,193.69	38,300.88	61,831.30
13	LANTANA	S 16° 04' 06" E 71.964.78	96093187	27678500	-69,153.25	-19,918.77	33,542.29	70,806.31
14							30,846.75	80,081.23
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								

POSITION COMPUTATION

JOB NO. 942

ENIWEETOK ATOLL

LANTANA		102 RIGILI-2		130 33 54.52		FIRST ANGLE OF TRIANGLE		65-29-31.49		"		"		"		"	
27	40.8832	RIGILI-2	λ	162	05 49.036	ϕ	11	32	20.254	3	CORAL	λ	162	17	10.944		
11	27	40.8832	RIGILI-2	$\Delta\lambda$	08	01.683	$\Delta\phi$	-	11	26.031		$\Delta\lambda$	-	03	20.226		
					+							λ'	162	13	50.718		

ANGLE OF TRIANGLE 65-29-31.49

[illegible]

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

COMPUTED BY LSH DATE 12-15-57

DATE 12-15-57 .

JOB NO. 942

LOCATION

717011

[illegible]

FIRST ANGLE OF TRIANGLE 74-59-30.94

11 27 40.8832 RIGILI-2		162 05 49.036		11 32 20.2543 CORAL		162 17 10.944	
162 +		04 13.720		09 46.013		07 08.190	
162 10 02.154		10 02.154		11 22 34.241		162 10 02.754	
11 22 34.240 KEITH				11 22 34.241 KEITH			
Logarithms				Logarithms			
Values in seconds				Values in seconds			
4.0850213				4.3462642			
7.9590648				9.9090755			
8.5125021				8.5124997			
2.4865582				2.7678394			
8.17004				8.69253			
9.60209				9.53417			
0.71367				0.71669			
8.45580				8.94339			
4.9732				5.5357			
1.9817				1.9845			
6.9549				7.5202			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			
3d term 10.0009				3d term 10.0033			
-Δφ 306.6428				-Δφ 506.0126			
1st term 306.6113				1st term 585.9215			
2d term 10.0506				2d term 10.0878			

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION SECOND ORDER TRIANGULATION

COMPUTED BY	DATE	JOB NO.	LOCATION	ENVIRONMENT	ATOLL
2 RIGILI-2	103 CORAL	247°	25'	29.60	"
242	8	+ 71	05	06.07	3dL
2 RIGILI-2	101 JAMES	318	30	35.67	"
Δα		+		59.02	Δα
		180	00	00.0	180
1 JAMES	102 RIGILI-2	138	31	34.69	"
	103 CORAL	211	43	15.42	28

FIRST ANGLE OF TRIANGLE 73-11-40.37

[illegible]

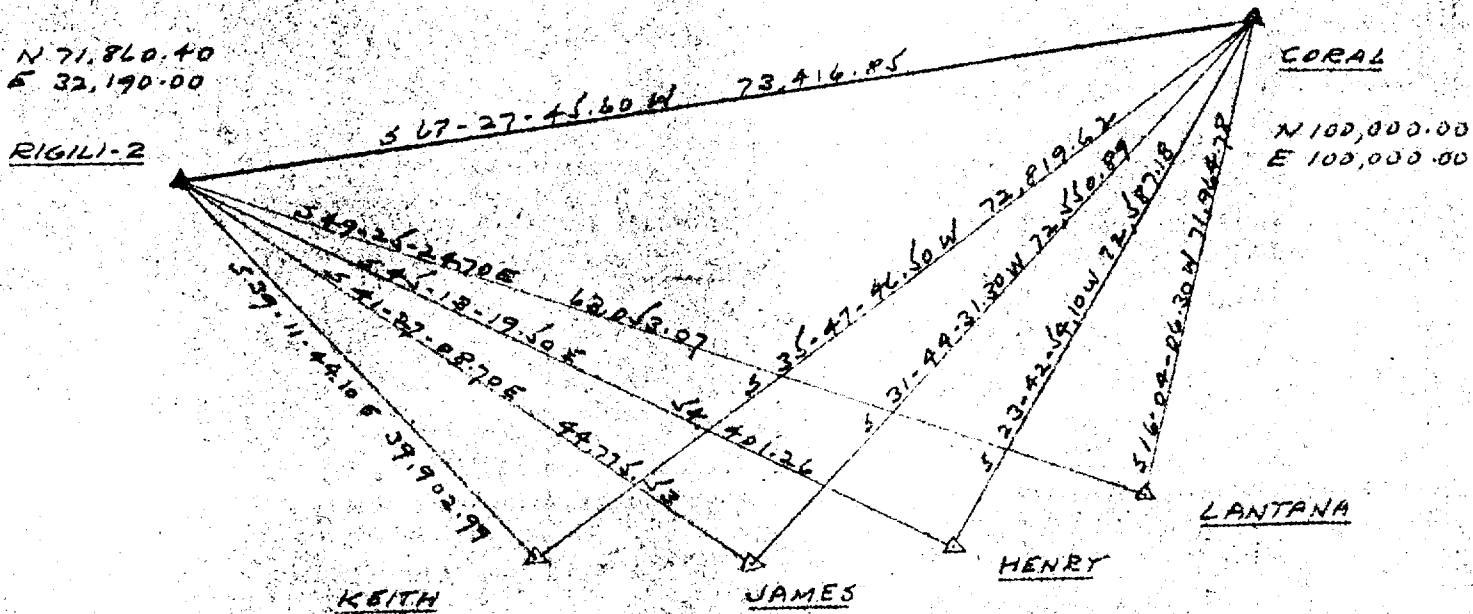
HOLMES & N
ENGINEERS-CO

POSITION COMPUTATION SE

COMPUTED BY		DATE					
L5H		12-15-57					
2	RIGILI-2	103	CORAL	247°	25'	29.60	"
		8		+ 67	18	55.33	3d
2	RIGILI-2	101	HENRY	314	44	24.93	"
				+ 01	16.84		Δ
				180	00	00.0	
				134	45	41.79	"

FIRST ANGLE OF TRIANGLE 68-56-14.04

LOGARITHMS	VALUES IN SECONDS	LOGARITHMS	VALUES IN SECONDS
11 27 40.833 RIGILI-2	162 05 49.036		
Δφ - 06 19.942	Δλ + 06 28.441		
11 21 20.941 HENRY	162 12 17.475		
4.2196248			
2.8475073			
8.5125021			
2.5796342	1st term 379.8493		
8.43925			
9.70289			
0.71367			
8.55581	2d term +0.0717		
5.1593			
1.9817			
7.1410	3d term +0.0014		
	-Δφ + 379.9424		



HENRY	68-56-14.8	13.6	KEITH	74-59-31.9	30.6
CORAL	43-44-52.6	51.5	CORAL	31-40-00.4	39.9.1
RIGILI-2	67-18-54.9	54.9	RIGILI-2	73-20-31.6	30.3
	13.4			03.9	
JAMES	73-11-41.5	40.0	LANTANA	65-29-34.0	31.0
CORAL	35-43-15.7	14.3	CORAL	51-23-42.4	39.3
RIGILI-2	71-05-07.1	02.7	RIGILI-2	63-06-52.8	49.7
	04.3			(09.2)	

KEITH	73,416.85	Sin 31-39-59.10	Sin 73-20-30.30
	Sin 74-59-30.60	39,902.987	72,819.620
JAMES	73,416.85	Sin 35-43-14.30	Sin 71-05-05.70
	Sin 73-11-40.00	44,775.528	72,550.886
HENRY	73,416.85	Sin 43-44-51.50	Sin 67-18-54.90
	Sin 68-56-13.60	54,401.263	72,587.182
LANTANA	73,416.85	Sin 51-23-39.3	Sin 63-06-49.7
	Sin 65-29-31.0	63,053.069	71,964.781

COMPUTATION OF TRIANGLES

 CALC. BY LSH DATE 12-11-57
 CHKD. BY E.R.Q. DATE 12-20-57

 JOB NO. 942
 LOCATION ENIWETOK ATOLL

STATION	OBSERVED ANGLE	CORR - N	SPHERICAL		PLANE ANGLE AND DISTANCE	LOGARITHM
			ANGLE	EXCESS		
2-3					22,377.501	4.3498116
1 LANTANA	65-29-34.0		31.49	0.49	31.0	
2 RIGILI-2	51-23-42.4		39.79	0.49	39.3	
3 CORAL	63-06-52.8		49.70	0.00	49.7	
1-3						
1-2						
2-3					22,377.501	4.3498116
1 HENRY	68-56-14.8		14.04	0.44	13.60	
2 RIGILI-2	67-18-56.0		55.33	0.43	54.90	
3 CORAL	43-44-52.6		51.50	0.00	51.50	
1-3	03.4					
1-2						
2-3					22,377.501	4.3498116
1 JAMES	73-11-41.5		40.37	0.37	40.00	
2 RIGILI-2	71-05-07.1		06.07	0.37	05.70	
3 CORAL	35-43-15.7		14.30	0.00	14.30	
1-3	04.3					
1-2						
2-3					22,377.501	4.3498116
1 KEITH	74-59-31.9		30.94	0.34	30.60	
2 RIGILI-2	73-20-31.6		30.63	0.33	30.30	
3 CORAL	31-40-00.4		59.10	0.00	39-59.10	
1-3	03.9					
1-2						

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HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS
JOB 942

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION GAIL SITE Gene
CHIEF OF PARTY H. M. Johnson Teiteiripucchi Island
DESCRIBED BY W. Creasman MARKED BY H.M.J. Eniwetok Atoll
FIELD BOOK NO PAGE DATE 5/14/57 Marshall Islands

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		ELEVATION
	DISTANCE	DIRECTION	
	FEET METERS		
Gail			4.52
Elgin	---	00-00-00	---
Buck #1	164.04	32-27-24	8.15
Buck #2	328.07	32-27-24	9.23

ELEVATION OF MARK 4.52

DETAILED DESCRIPTION OF STATION

This station was established as a second order triangulation station in the Atoll Control Net by the Holmes & Narver 1957 Replacement Survey to replace triangulation Station GENE which was destroyed during Operation Redwing.

This station is located approximately at the center of the island and 125 feet from the lagoon high tide line.

The station mark is a standard H & N brass cap set in a concrete filled 55 gallon drum encasing the top of a 10" H-pile. It is stamped "Gail - H & N - 1957." The mark is 6" below the ground surface.

This station is the western end of the "Gene-Helen-Irene" first order traverse.

Bucks #1 and #2 are 4"x4" posts set in concrete with a punched aluminum strip fastened to the top. The Strips are stamped with the buck number.

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EXEMPT FROM JULY 18, 1994
EXEMPT FROM DECLASSIFICATION TO
GRADE 2 (SECRET)

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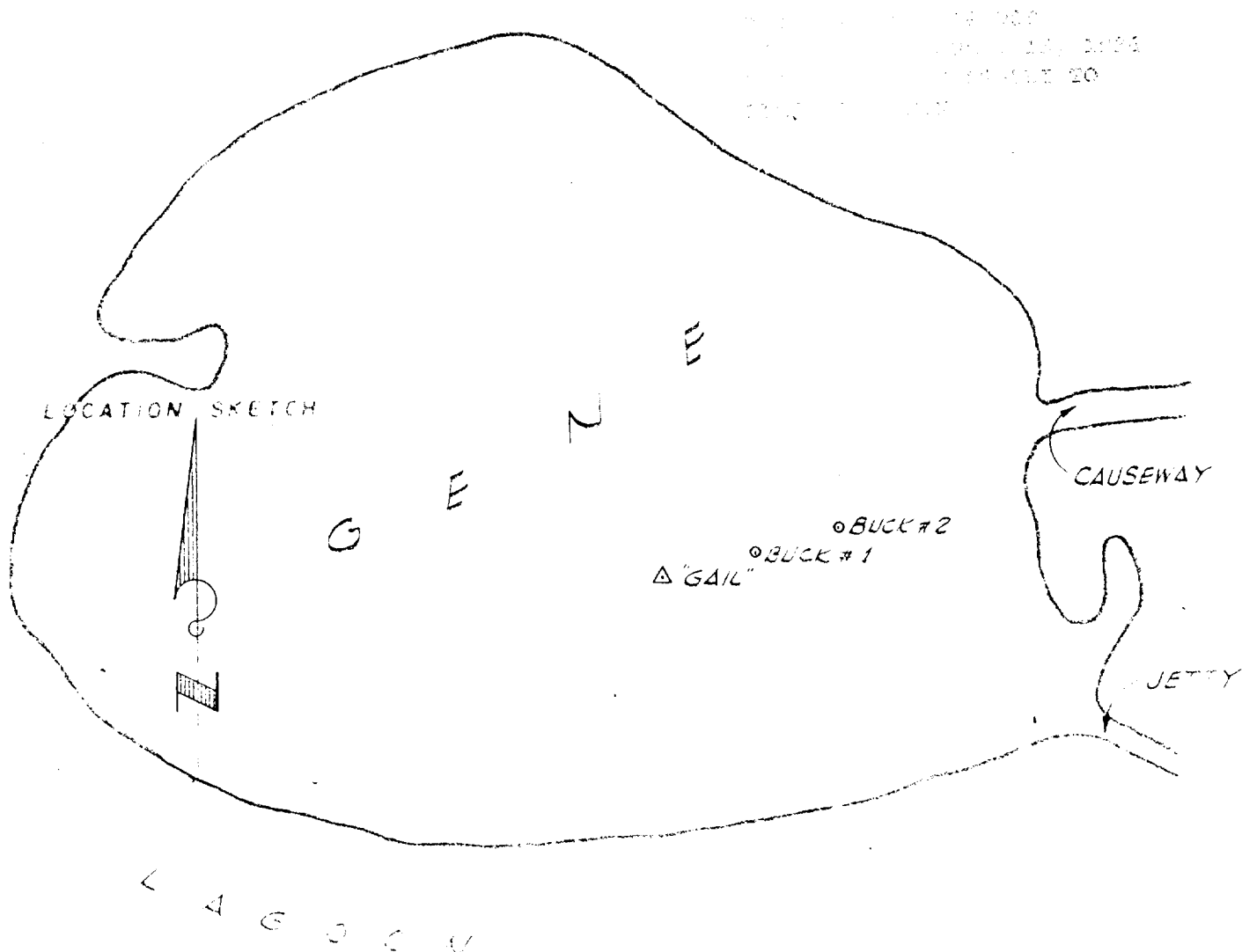
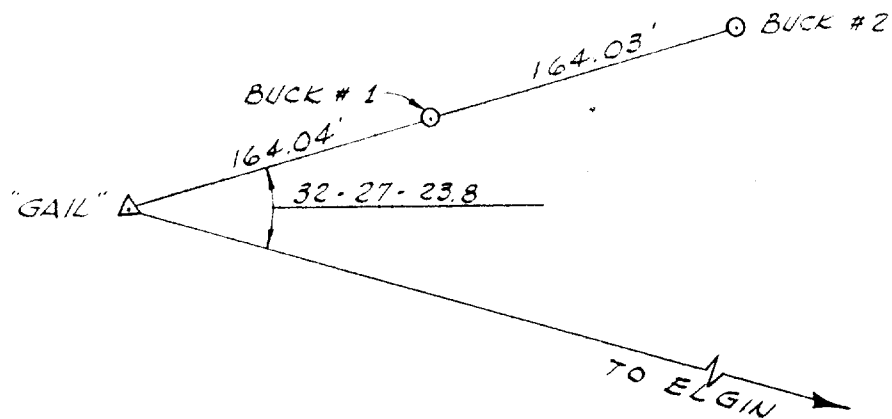
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PAGE 2-DESCRIPTION OF TRIANGULATION STATION

STATION Gail

SITE Gene, Teiteiripucchi Is, Eniwetok Atoll, M.I.

DETAILED DESCRIPTION OF STATION (CONT'D)



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HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS
JOB 942

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION HENRY SITE HENRY
CHIEF OF PARTY F. A. Axtell Mui Island
DESCRIBED BY W. Creasman MARKED BY F. A. A. Eniwetok Atoll.
FIELD BOOK NO PAGE DATE June 1957 Marshall Islands

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		ELEVATION
	DISTANCE FEET METERS	DIRECTION	
Henry			6.54
Rigili #2	--- ---	00-00-00	---
P.I. #1	147.35 ---	275-20-33	7.72
P.I. #9	560.33 ---	142-49-13	11.64

ELEVATION OF MARK 6.54

DETAILED DESCRIPTION OF STATION

This station was established as a third order triangulation station in the Atoll Control Net by the Holmes & Narver 1957 Expansion Survey

This station is located on the north east portion of the island approximately 50 feet south of the lagoon high tide line.

The station mark is a standard H & N brass cap set in concrete 1 foot below the ground surface. It is stamped "Henry - H & N - 1957."

P.I.'s #1 and #9 are 1"x3" flats marked with stake tacks. The flats are driven flush with the ground surface. They are P.I.'s in the Island topographic control traverse.

REPRODUCED FROM THE HOLDINGS OF THE NATIONAL ARCHIVES
PACIFIC SOUTHWEST REGION
DATE 10/15/1994
BY SP-6 JLM/STW TO

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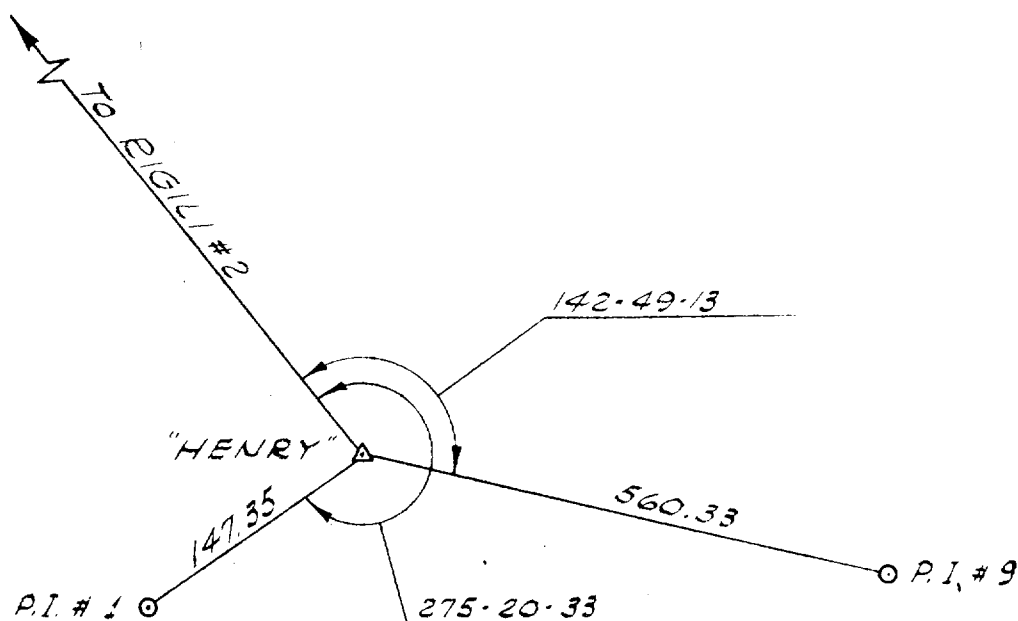
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PAGE 2 - DESCRIPTION OF TRIANGULATION STATION

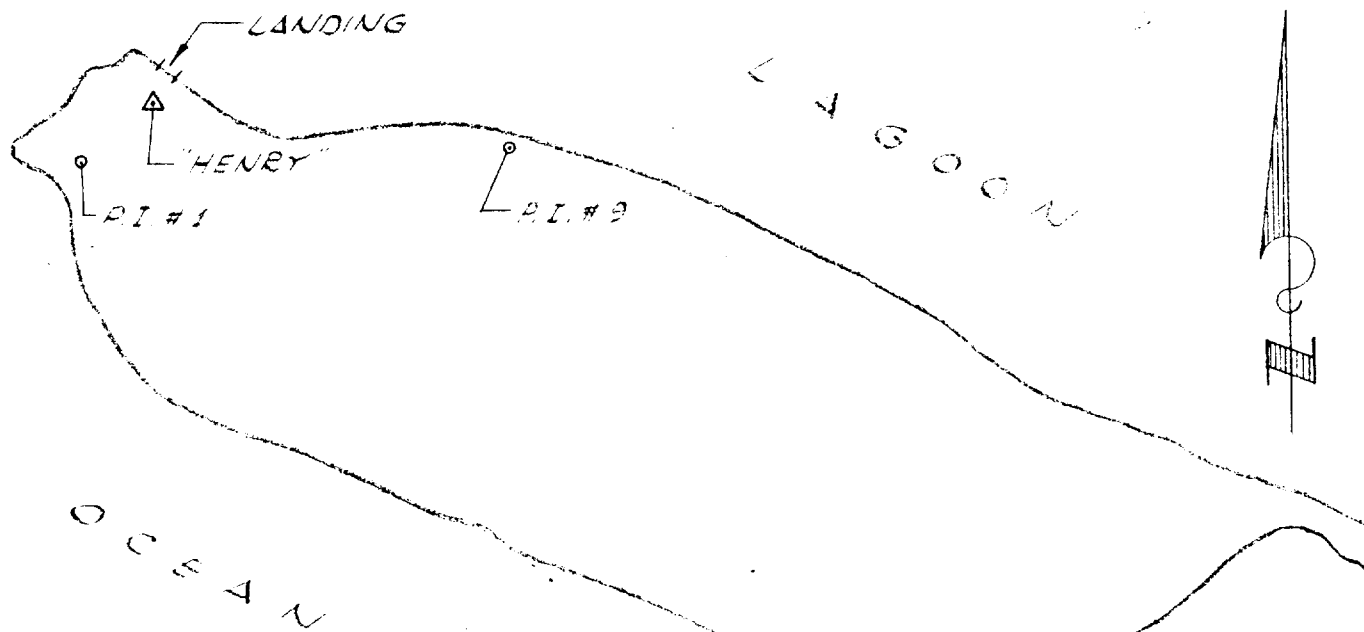
STATION Henry

SITE Henry, Mui Island, Eniwetok Atoll, M.I.

DETAILED DESCRIPTION OF STATION CONT'D



LOCATION SKETCH



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HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS
JOB 942

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: JAMES
CHIEF OF PARTY: F. A. Axtell
DESCRIBED BY: W. Creasman MARKED BY: F.A.A.
FIELD BOOK NO. PAGE: DATE: June 1957
SITE: JAMES
Rabaion Island
Eniwetok Atoll
Marshall Islands

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		ELEVATION
	DISTANCE	DIRECTION	
	FEET	METERS	
James			6.76
Rig111 #2	---	---	---
P.I. #1	197.26	---	7.18
P.I. #8	117.10	---	---

ELEVATION OF MARK: 6.76

DETAILED DESCRIPTION OF STATION

This station was established as a third order triangulation station in the Atoll Control Net by the Holmes & Narver 1957 Expansion Survey.

This station is located on the north east portion of the island approximately 30 feet from the lagoon high tide line.

The station mark is a standard H & N brass cap set in concrete flush with the ground. It is stamped "James - H & N - 1957."

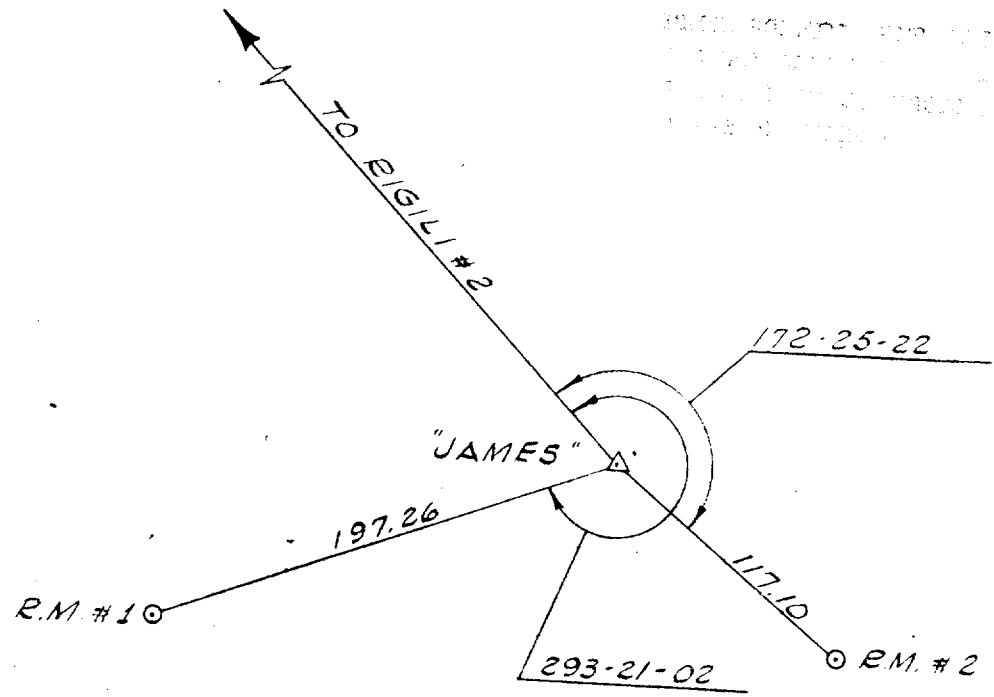
P.I.'s #1 and #8 are 1"x3" flats marked with stake tacks. The flats are driven flush with the ground surface. They are P.I.'s in the Island topographic control traverse.

DECLASSIFIED SEP 2003
REVIEWED BY: [illegible] 1-94
TECHNICAL CENTER [illegible]
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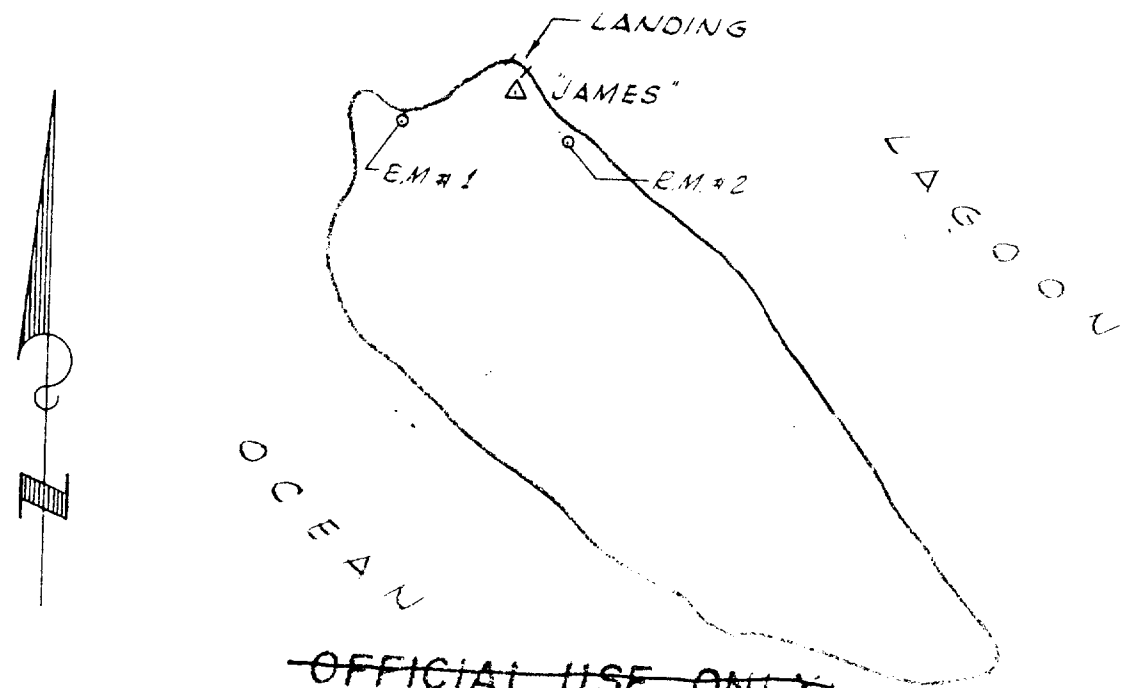
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Pacific Southwest Region

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PAGE 2-DESCRIPTION OF TRIANGULATION STATION
STATION JAMES SITE James, Rapaion Island, Eniwetok Atoll, M.I.
DETAILED DESCRIPTION OF STATION (CONT'D)



LOCATION SKETCH



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HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS
JOB 942

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION JUNK

SITE IRWIN

CHIEF OF PARTY H. C. Dalton

Pokon Island

DESCRIBED BY W. Creasman MARKED BY H.C.D.

Eniwetok Atoll

FIELD BOOK NO. PAGE

DATE 8/10/57

Marshall Islands

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		ELEVATION
	DISTANCE	DIRECTION	
	FEET	METERS	
Junk			
Henry	2544.54		6.54
P.I. #3	103.99		8.36
P.I. #4	197.03		8.66

ELEVATION OF MARK:

DETAILED DESCRIPTION OF STATION.

This station was established as a third order Traverse Station in the Atoll control net by traverse from Triangulation Station Henry as a part of the Holmes & Narver 1957 Expansion Survey.

This station is located approximately 355 feet from the east end of the island and 45 feet from the lagoon high tide line.

The station mark is a standard Holmes & Narver brass disc set in concrete 1 foot below the ground surface. It is stamped "Junk - H & N - 1957."

P.I. #3 is a 1"x3" flat marked with a stake tack driven flush with the ground surface.

P.I. #4 is a 2"x2" stake marked with a stake tack driven flush with the ground surface.

P.I.'s #3 & #4 are both P.I.'s in the Island topographic control traverse.

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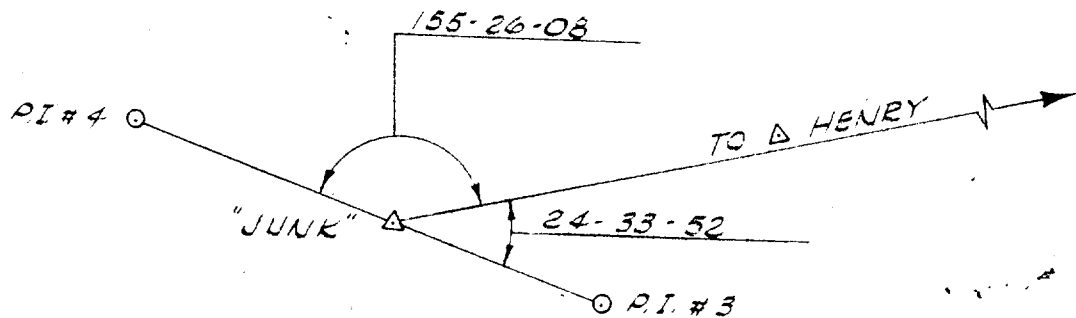
PAGE 2-DESCRIPTION OF TRIANGULATION STATION

STATION JUNK

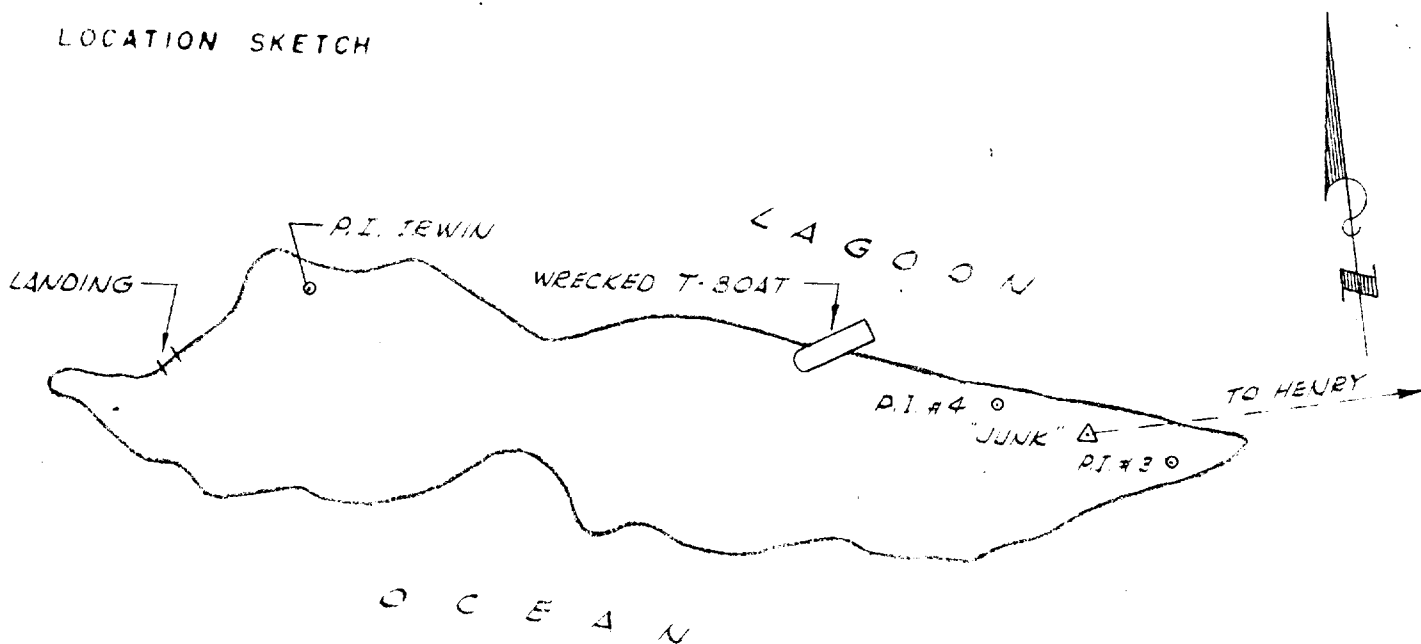
SITE Irwin, Fokon Island, Eniwetok Atoll, M.I.

DETAILED DESCRIPTION OF STATION (CONT'D)

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
BY MR. ANTON MINISWALLI TO
RENAME S. NIXON



LOCATION SKETCH



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HOLMES & NARVER, INC
ENGINEERS - CONSTRUCTORS
JOB 942/

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION. KEITH

SITE KEITH

CHIEF OF PARTY F. A. Axtell

Giriinien Island

DESCRIBED BY W. Creasman MARKED BY F.A.A.

Eniwetok Atoll

FIELD BOOK NO.

PAGE

DATE June 1957

Marshall Islands

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		ELEVATION
	DISTANCE	DIRECTION	
	FEET	METERS	
Keith			8.69
Rigili #2	—	—	—
P.I. #1	203.61		8.04
P.I. #9	605.25		10.82
		00-00-00	
		334-37-49	
		167-11-39	

ELEVATION OF MARK 8.69

DETAILED DESCRIPTION OF STATION.

This station was established as a third order triangulation station in the Atoll Control Net by the Holmes & Narver 1957 Expansion Survey.

This station is located on the north portion of the island, approximately 40 feet from the lagoon high tide line.

The station mark is a standard H & N brass cap set in concrete 1 foot below the ground surface. It is stamped #Keith - H & N - 1957."

P.I.'s #1 and #9 are 1"x3" flats marked with stake tacks. The flats are driven flush with the ground surface. They are P.I.'s in the Island topographic control traverse.

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GPO : 1991 : 500-000-000-000
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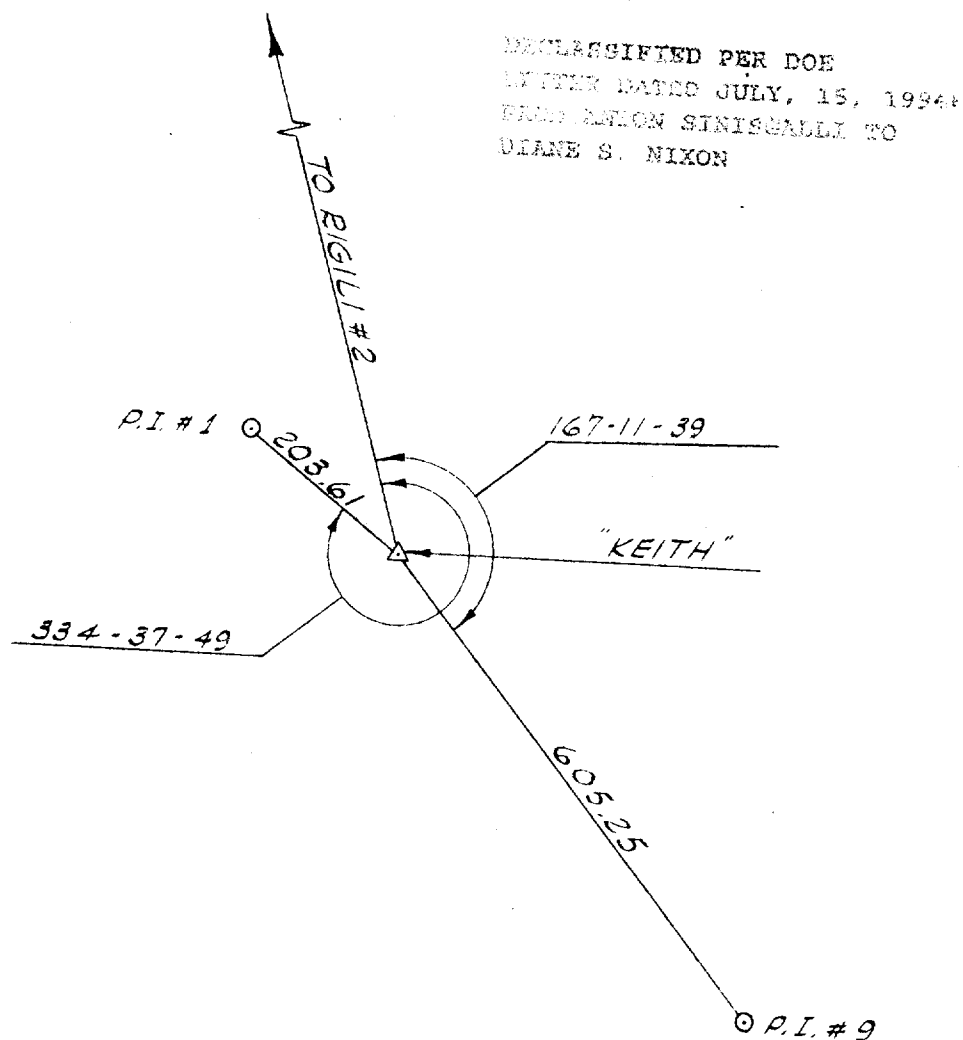
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PAGE 2-DESCRIPTION OF TRIANGULATION STATION

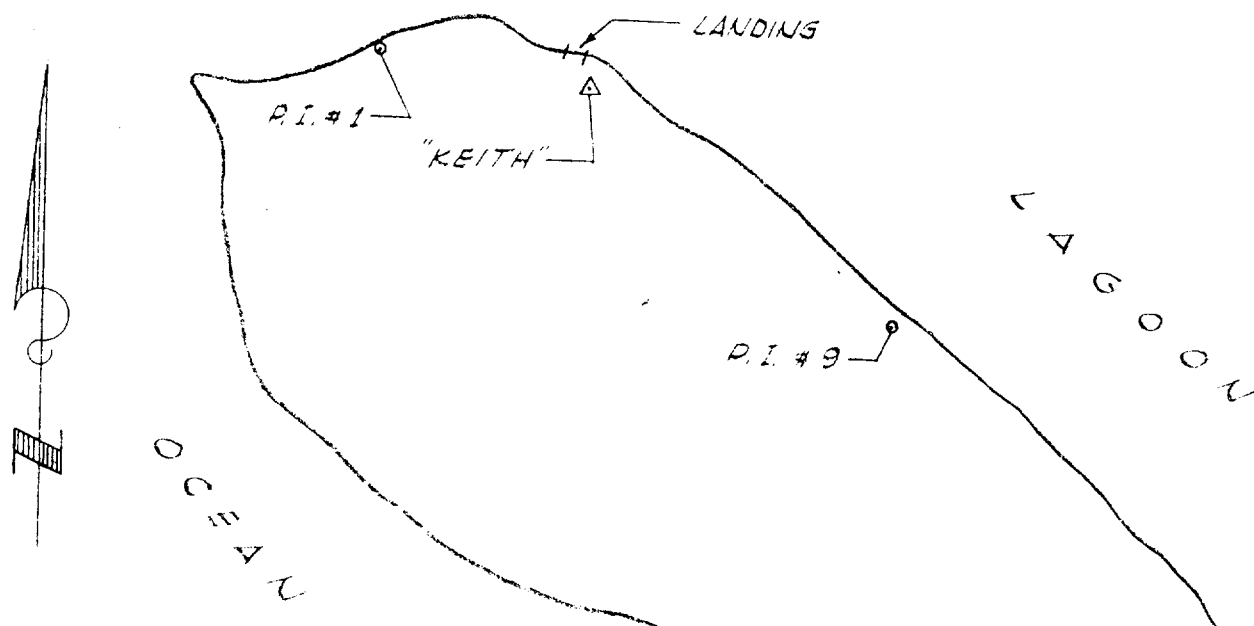
STATION KEITH

SITE: Keith, Girinien Island, Eniwetok Atoll, M.I.

DETAILED DESCRIPTION OF STATION (CONT'D)



LOCATION SKETCH:



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HOLMES & NARVER, INC
ENGINEERS - CONSTRUCTORS
JOB 942

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION NORTH SITE YVONNE
CHIEF OF PARTY H.M. Johnson Runit Island
DESCRIBED BY W. Creasman MARKED BY H.M.J. Eniwetok Atoll
FIELD BOOK NO PAGE DATE 5/10/57 Marshall Islands

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		ELEVATION
	DISTANCE FEET METERS	DIRECTION	
North			5.44
Coral	----	00-00-00	----
R.M. #1	164.03	114-37-05	10.59
R.M. #2	3658.29	114-37-05	13.62

ELEVATION OF MARK 5.44.

DETAILED DESCRIPTION OF STATION

This station was established as a Second Order Triangulation Station in the Atoll Control Net by the Holmes & Narver 1957 Replacement Survey to replace triangulation station Yvonne, which was disturbed during Operation Redwing.

This station is located approximately 500 feet from the north end of the island and 300 feet from the lagoon high tide line.

The station mark is a standard H & N brass cap set in a concrete filled 55 gallon drum encasing the top of a 10" H-pile. It is stamped "North - H & N - 1957." The mark is 6" below the ground surface.

This station is at the north end of the "Yvonne" first order traverse.

R.M. #1 is a 4"x4" post set in concrete with a punch-marked aluminum strip stamped "Buck #1" nailed to its top. It is a chaining buck on the "Yvonne" first order traverse.

R.M. #2 is a standard H & N brass cap set in concrete set flush with the ground surface. It is stamped "Ynez." It is flush with the surrounding ground. This R.M. is an angle point on the "Yvonne" first order traverse.

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EXPIRATION DATE: MAY 15, 1984
DECLASSIFIED TO
GRADE 2. EXEMPT

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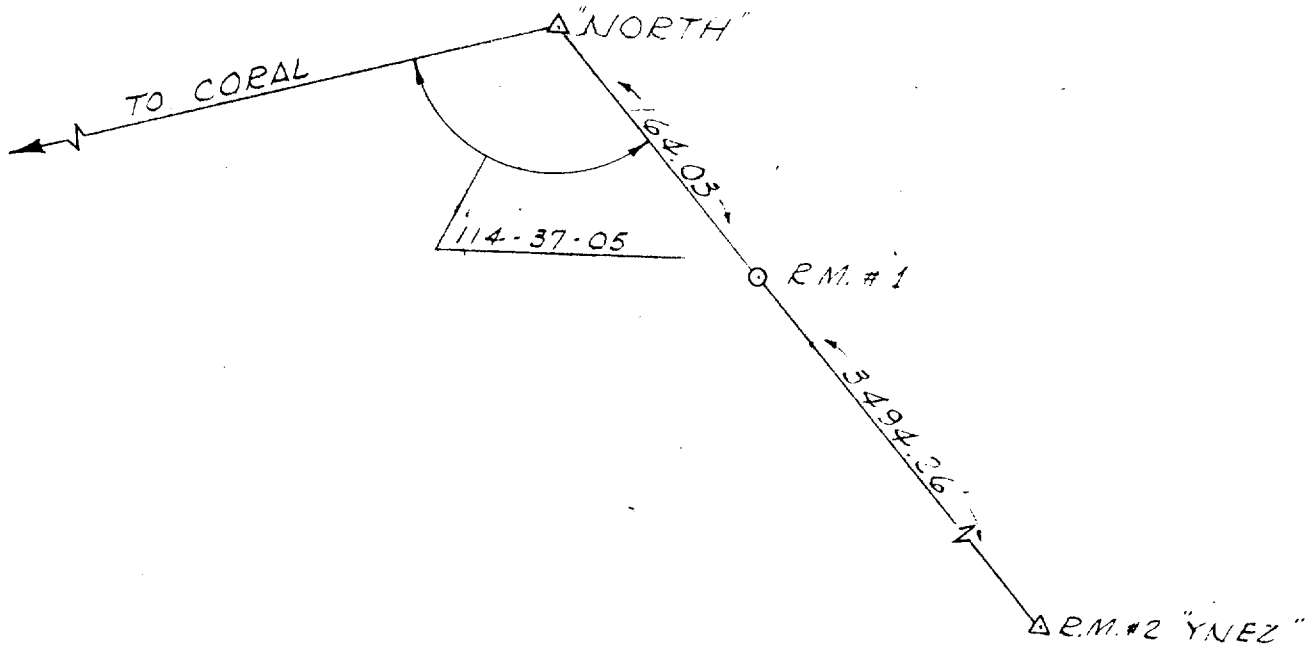
PAGE 2-DESCRIPTION OF TRIANGULATION STATION

STATION NORTH

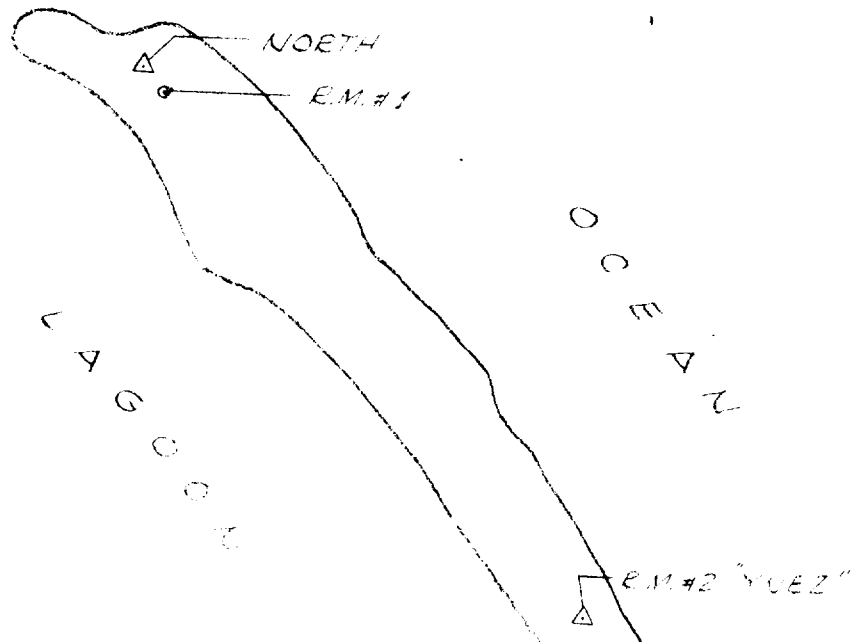
SITE Yvonne, Runit Island, Eniwetok Atoll, M.I.

DETAILED DESCRIPTION OF STATION (CONT'D)

DECLASSIFIED PER DOE
AUTHORITY DATED JULY, 15, 1994
BY SP-1000/1000/1000 TO
WILLIAM A. NIXON



LOCATION SKETCH



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HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS
JOB 942

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION SALLY SITE SALLY
CHIEF OF PARTY H. M. Johnson Aomon Island
DESCRIBED BY W. Creasman MARKED BY H.M.J. Eniwetok Atoll
FIELD BOOK NO. PAGE DATE 5/13/57 Marshall Islands

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		ELEVATION
	DISTANCE	DIRECTION	
	FEET	METERS	
Sally			9.59
Coral		00-00-00	---
Buck #41	164.04	97-30-20	12.86
Buck #30	164.05	159-46-30	12.72
Buck #29	54.00	277-31-30	13.06

ELEVATION OF MARK: 9.59

DETAILED DESCRIPTION OF STATION.

This station was established as a second order triangulation station in the Atoll Control Net by the Holmes & Narver 1957 Replacement Survey to replace triangulation station Aomon which was disturbed during Operation Redwing

This station is located on the south east portion of the island, approximately 350 feet from the lagoon high tide line.

The station mark is a standard H & N brass cap set in a concrete filled 55 gallon drum encasing the top of a 10" H-pile. It is stamped "Sally - H & N - 1957." The mark is 6" below the ground surface.

This station is a part of the "Sally" first order Traverse.

Bucks #29, 30 and 41 are 4"x4" posts set in concrete with an aluminum strip on the top with the buck number stamped on it. They are chaining bucks in the Sally First Order Traverse.

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DATE OF REPRODUCTION: 1994
BY: [illegible]
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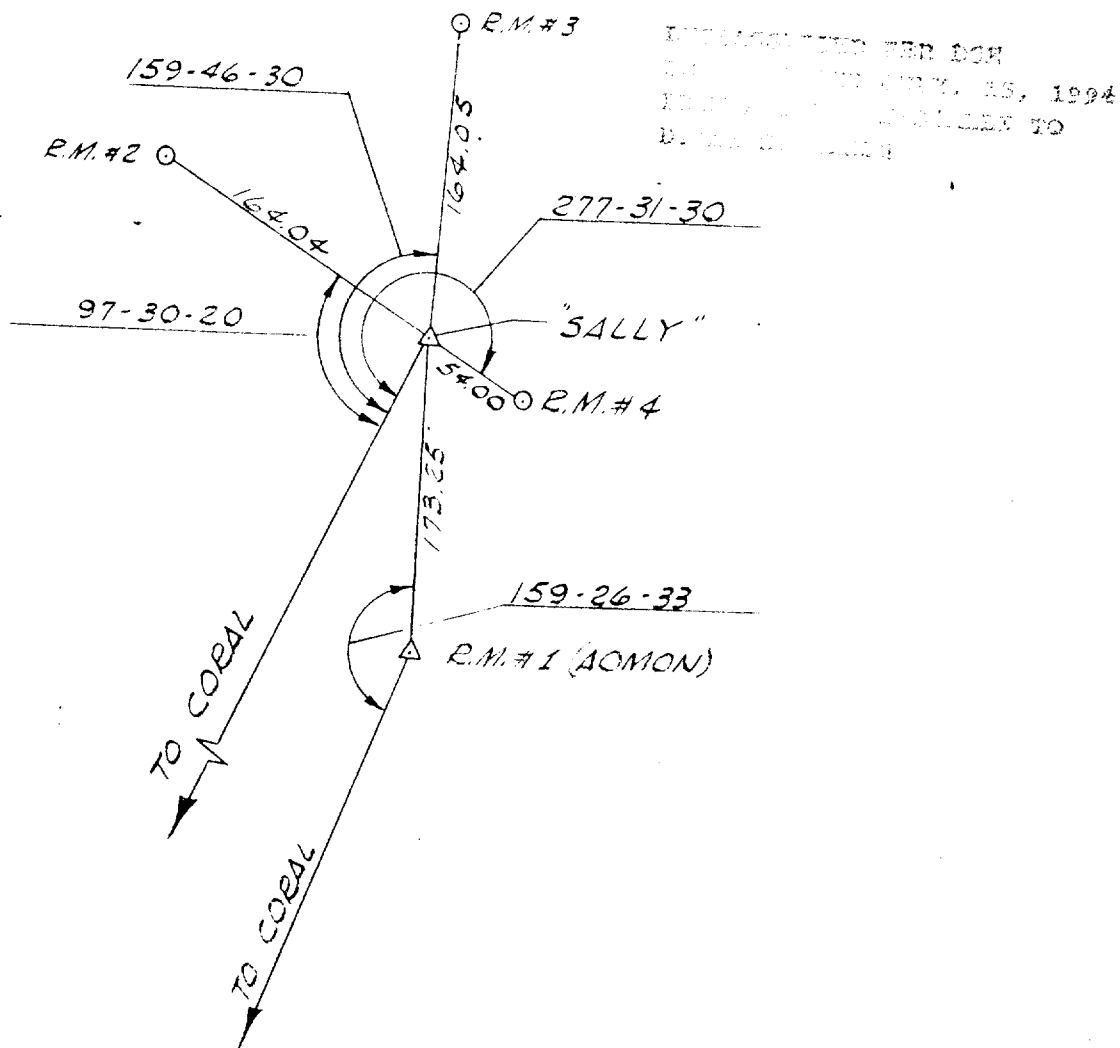
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PAGE 2-DESCRIPTION OF TRIANGULATION STATION

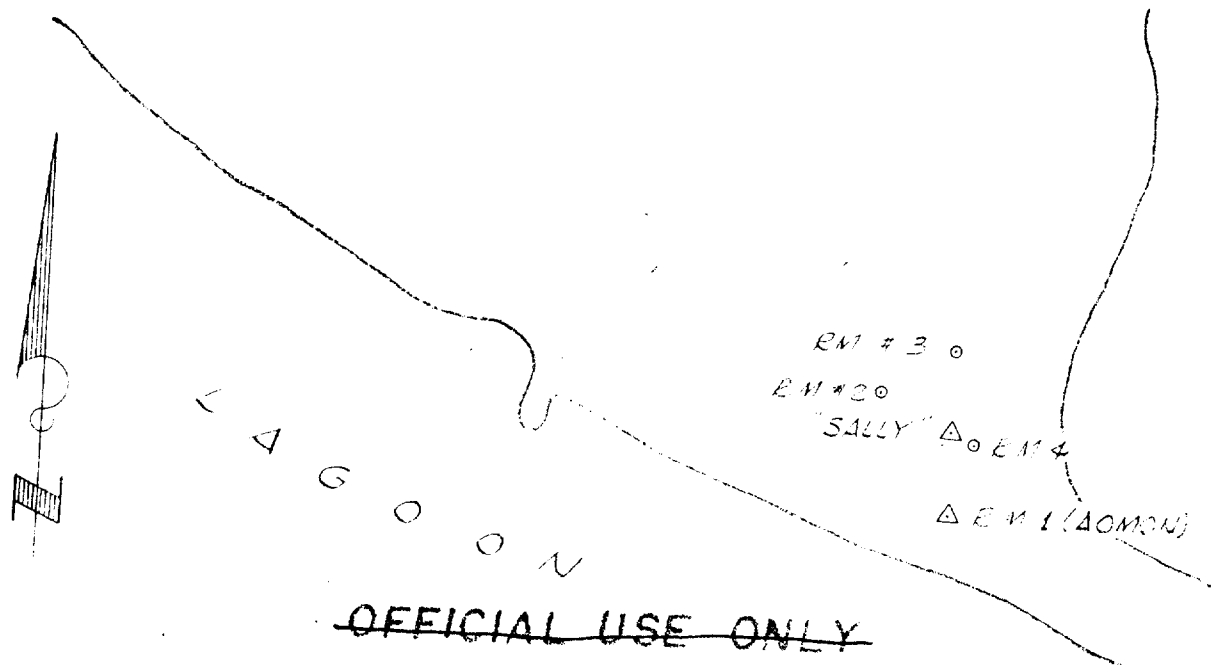
STATION Sally

SITE Sally, Aomon Island, Eniwetok Atoll, M.I.

DETAILED DESCRIPTION OF STATION (CONT'D.)



LOCATION SKETCH.



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HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS
JOB 942

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION RUJORU #2 SITE PEARL
CHIEF OF PARTY H. M. Johnson Rujoru Island
DESCRIBED BY W. Creasman MARKED BY H.M.J. Eniwetok Atoll
FIELD BOOK NO PAGE DATE May 1957 Marshall Islands

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		ELEVATION
	DISTANCE FEET METERS	DIRECTION	
Rujoru #2			10.66

ELEVATION OF MARK 10.66

DETAILED DESCRIPTION OF STATION

This station was established as a second order triangulation station in the Atoll Control Net by the Holmes and Narver 1957 Replacement Survey to replace Rujoru, which was disturbed during Operation Redwing.

The station mark is a standard H & N brass cap set in a mass of concrete encasing the top of a number of steel rebars driven to refusal. It is marked only by a center punch mark.

This station is located approximately 90 feet from the ocean high tide line and 115 feet from the easterly end of the island.

No reference marks were set at this station when it was established.

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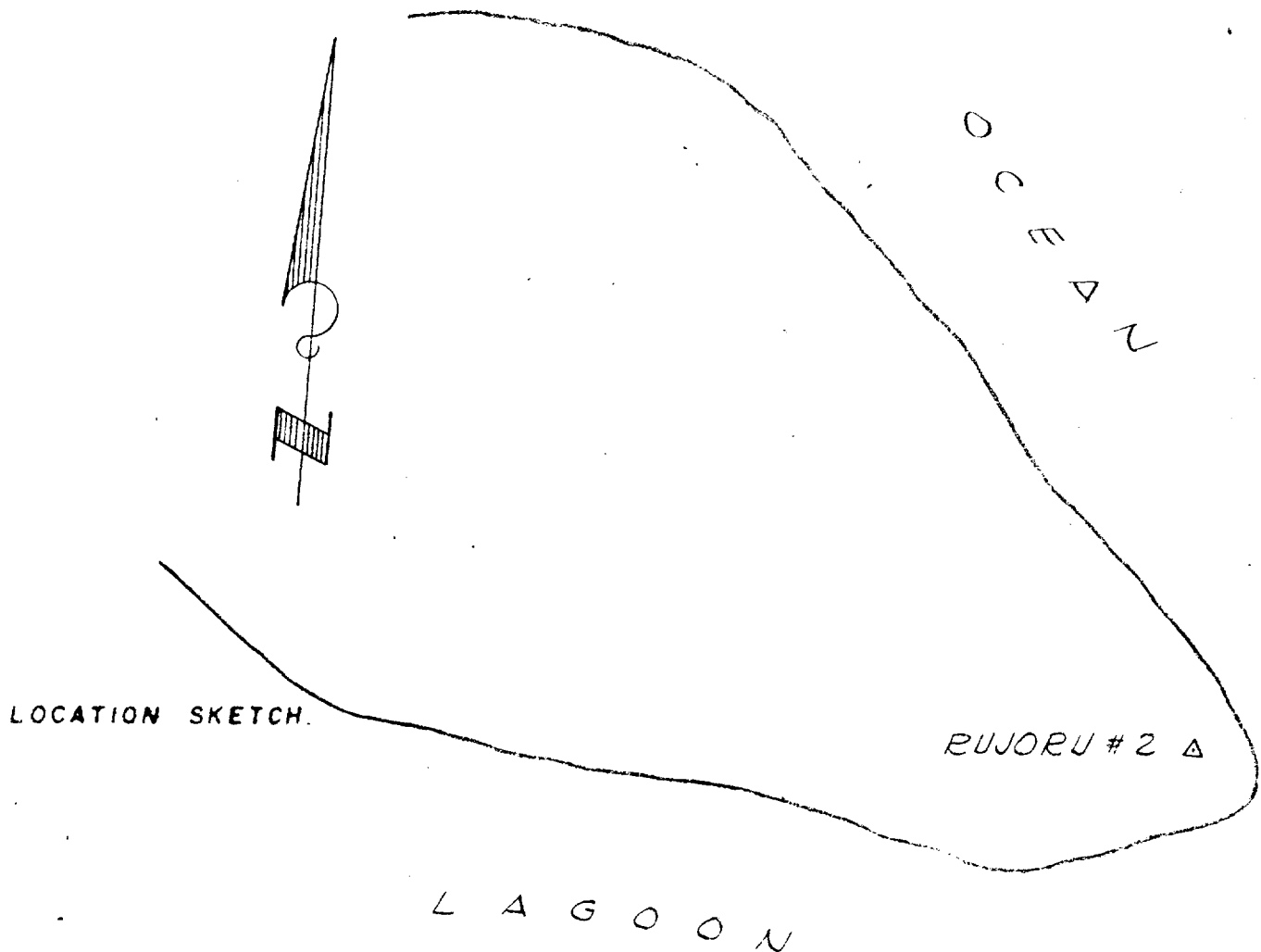
PAGE 2-DESCRIPTION OF TRIANGULATION STATION

STATION Rujoru #2

SITE Pearl, Rujoru Island, Eniwetok Atoll, M.I.

DETAILED DESCRIPTION OF STATION (CONT'D)

DECLASSIFIED PER DOE
LETTER DATED JUNE, 15, 1994
FROM ANTON SOMSCABELI TO
DIANE S. NIXON



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