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 Holmes & Narver, Inc. ✓
 3 Engineers - Constructors ✓
 1949-50 HORIZONTAL CONTROL SURVEY
 ENIWETOK ATOLL, MARSHALL ISLANDS

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 REFERENCE DATED JULY, 15, 1994
 BY SA ANTON SINIBELLI TO
 DEANE S. REESCH
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HORIZONTAL CONTROL SURVEY
ENIWEOK ATOLL
MARSHALL ISLANDS
1949-50

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1949-50 HORIZONTAL CONTROL SURVEY
FOLDER ENIWEOK ATOLL MARSHALL ISLANDS B2-9

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DATE 10/15/1994
BY SP-6 J. M. HARRIS
DEPT. OF ENERGY

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REF ID: A66666
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BY: DAVID S. WALKER

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A scheme of second order triangulation composed of check figures was executed from a second order base line on Runit Island. The scheme extends northward to Bogallua Island and southward to Eniwetok Island. The survey was for the purpose of coordinating local surveys on project islands and to establish distances and azimuths between certain installations.

Standard procedure and specifications of the U.S. Coast and Geodetic Survey for second order triangulation was the criteria for this survey. The geometry of the scheme was checked by the Los Angeles Office of that organization before field work started and the results of observing the scheme were checked as to procedure in January of this year.

The scheme was so executed that it can be expanded to include the complete atoll and where possible the permanency of station locations was considered. All station markers on project islands were referenced. Referencing of the two stations in the lagoon and on the sand spits south of Runit Were not practical.

Two previous surveys have been made of the eastern portions of the atoll. As stated in the reconnaissance report of January 7, 1949 these surveys were not readily adapted to the requirements of this project and were necessarily reoccupied to expand the present scheme.

The U.S.S. BOWDITCH SURVEY made in 1944 was of third order accuracy and covered the eastern portion of the atoll from Igurin to Bogumbogó. The apparent purpose was hydrographic charts of the atoll. It included a base line on Runit Island and control points on eleven other islands, also a station in the lagoon in the vicinity of the existing station, Coral. The geographical position of station North Base on Runit Island and the azimuth of the base line between stations North Base and South Base were determined by astronomical observations. As most of the stations on this survey were not on project islands and the reoccupation of its stations would have been necessary in any case for system expansion the values found in the U.S.S. Bowditch Survey were not incorporated into the present survey, except that the Joint Task Force Seven Survey determination of the latitude and longitude of station Runit was based on the original geographical position of station North

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A copy of the Report of the Engineer, Joint Task Force Seven, Part 2 was made available to us and has been of great assistance in planning and executing this survey.

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Base as established by this survey. Also, the azimuth of the line North Base-Sand was accepted.

The JOINT TASK FORCE SEVEN SURVEY made in 1947-48 and covering the eastern portion of the lagoon from Aniyaanii to Engebi, consisted of a limited scheme with stations on Engebi, Aoman, Runit and Aniyaanii and station Coral in the lagoon.

The scheme was stated to be of first order accuracy and first order procedure was used. However, the base expansion figure was not consistent with specifications of the U.S. Coast and Geodetic Survey and it was only because of the limited extent of the scheme that it could be considered of a high order of accuracy.

Of the seven stations included in this survey, station Graflex on Aoman Island had been destroyed and the station on Aniyaanii was of little value in expanding the scheme. To establish a new station on Aoman for the present survey required reoccupying three of the five remaining stations. It thus was apparent that the expanded requirements of the present survey involved re-establishment of a complete triangulation network.

Station South Base of the U.S.S. Bowditch Survey was not recovered and a new station "Runit" was established at the south end of the island. The line North Base-Runit became the base line of this survey.

The geographical position of station North Base and the azimuth of the line North Base-Sand as established by the U.S.S. Bowditch Survey were accepted and became the origin of position and azimuth. Although the original azimuth observations were made from station North Base to station South Base an examination of the corrections obtained for the angle in the U.S.S. Bowditch triangulations showed that but little accuracy would be lost by accepting the azimuth of the line from station North Base to station Sand as the basis of azimuths for the survey. Therefore it was considered that reobservation for azimuth was not justified.

The line North Base-Runit was measured to first order accuracy and the azimuth of the line was computed from its relation to the line N. Base-Sand.

Calculations involved in establishing the azimuth of this new base line

are shown for reference purposes.

Location of Control Points

To meet the requirements of the present project, a horizontal net has been established consisting of fifteen stations, including five stations of the Joint Task Force Seven Survey. Two of these five were original stations of the U.S.S. Bowditch Survey, and an additional station of that survey on Eniwetok is also included. Stations are located so that all project islands are tied in directly to the scheme or can be tied in by local triangulation. A new station in the lagoon off the south end of Runit Island was established to strengthen the base expansion quadrangle.

Where practical, stations have been given the name of the island on which they are located. This was done to simplify reference to these stations. Some of the U.S.S. Bowditch and Joint Task Force Seven stations have been renamed and reference to this is made in the station recovery notes. The stations of the survey and location are as follows:

- BOGA ----- Bogallua Island
- Teiteir ----- Teiteiripucchi Island
- Engebi ----- Engebi Island
- Bokon ----- Bokonaarappu Island
- Aomon ----- Aomon Island
- Piiraa'i ----- Piiraa'i Island
- North Base -- Runit Island
- Runit ----- Runit Island
- Coral ----- In lagoon
- Pinnacle ---- In lagoon
- Photo ----- Photo tower in lagoon
- Islet ----- First sand island south of Runit
- Sand ----- Third sand island south of Runit
- Aniyaanii --- Aniyaanii Island
- Parry ----- Parry Island
- Eniwetok ---- Eniwetok Island

The islands of Muzinbearikku, Kirinian and Aaraaubiru will be tied in by local triangulation. Japtan is not included in present control requirements but can be tied in by the same method if desired.

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Geographic Position and Azimuth

In the interests of economy and because we concurred with the Joint Task Force Seven Survey that little accuracy would be lost, it was our intention to accept the geographical position of station North Base and the azimuth of the new base line as the origin of position and azimuth for the present survey. Also the length of the base line would be accepted.

In observing for the present survey the base expansion quadrangle was observed last due to the necessity of constructing the new station, Finnacle, in the lagoon. The results obtained indicated that the present location of the marker was eccentric to the position from which the Task Force Seven observations were taken and could not be accepted as the point of origin of the present survey. A computed difference of approximately four tenths of a foot in a northeasterly direction was found. This difference may have been caused by physical displacement of the monument.

The Los Angeles office of the U.S.C. & G.S. concurred in the conclusion that station North Base could not be accepted as being in its true position, also in the decision to measure the line from the present position of station North Base to station Runit to establish a base line for the present survey. The geographical position of station Runit and the azimuth of the line from station Runit to station Coral would be accepted for position and azimuth as the limited extent of the adjustments involved would not appreciably effect the accuracy requirements of this project.

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Field Procedure

A reconnaissance of all locations involved was made and markers set for the triangulation stations. Actual observing on this survey started in October, 1949.

The observing party consisted of an observer, recorder and a varying number of light tenders. The party was quartered on an L.C.T. which moved to convenient points in the lagoon as required. An L.C.M. and a DUKW were used for transportation to the stations, and when practical, planes were used between the islands having landing strips.

Four Bilby steel towers were available for the survey and were moved to new stations as the survey progressed. Where low towers could be used they were constructed of wood. The towers were adequately braced and little vibration was experienced. All observing was at night using lights for targets. A Wild T-2 theodolite was used for observing and found to be very satisfactory. Some difficulty was experienced with the exterior lighting probably due to moisture. Station lights were constructed from U.S. Navy battle lamps by installing a reostat. This made it possible to dim the lights to correct intensity and they made a satisfactory target.

Continuous inter-station communications were considered necessary due to the remote location of the stations. This was realized by using U.S. Army Type 619 portable radios. Considerable time was saved by this means of communication as the light intensity could be adjusted instantly and changes in plans could be transmitted to all personnel involved. This was often necessary due to weather conditions.

The observing was done at a period of the year when considerable rain and high wind velocity was experienced. Some time was lost due to weather both in being unable to get to the stations and poor visibility while occupying the stations.

Water transportation was adequate but necessarily slow and the personnel were usually away from the base of operations fourteen to sixteen hours.

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Travel after dark in the lagoon was considered dangerous and the personnel were distributed before dark and picked up after sunrise in the morning.

Observing procedure consisted of adjusting the intensity of the station lights to the minimum which could be observed thereby obtaining a small target considering the distance involved. This was done as early in the evening as sufficient darkness was obtained and from one to three sets of six positions each were observed. Due to weather it was sometimes only possible to complete one satisfactory set in an evening. From two to five hours were spent in observing. When results obtained were within the specifications of the U.S. Coast and Geodetic Survey no attempt was made to obtain further refinement.

The strength of figures obtained for the net was an RI of 74.4 with a maximum of 130 allowed.

A maximum triangle closure of 2.5 seconds and an average closure of 1.3 seconds was obtained with the maximum of 8 seconds for one triangle and 3 seconds for the average closure allowed by specifications.

The RUNIT BASE LINE is a broken base consisting of four sections connecting the two stations, North Base and Runit. This was necessary due to the configuration of the island. Traverse Station Runit of the Joint Task Force Seven Survey is an angle point in this traverse and was also included in the former traverse.

Standard procedure of the U.S. Coast and Geodetic Survey for second order base line measurement was used. Angles were measured with the Wild T-2 theodolite and the measurement was made with three Lovar tapes using thermometers and stretcher apparatus of an approved type. The calibration certificates of these tapes are included in the record of the survey.

Stakes were set at fifty meter intervals for chaining points and the tapes were alternated so that in completing the forward and backward measurement all three tapes were used in each direction.

Due to the velocity of the wind at this period of the year it was necessary to use a wind break in order to obtain accurate results. This consisted of a thirty

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six inch strip of canvas approximately fifty five meters long which was held parallel to the line as each measurement was made.

The computed probable error of the total measurement is 1 part in 648,000.

The allowable maximum probable error is one part in 500,000.

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FROM AIDES TO PRESIDENT TO
REAGAN S. NIXON

GEOGRAPHIC POSITIONS

LOCALITY ENIWETOK ATOLL MARSHALL ISLANDS DATUM ENIWETOK ASTRONOMIC 1944 SECOND ORDER TRIANGULATION

STATION	LATITUDE AND LONGITUDE	SECONDS IN METERS	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE		
						LOGARITHM METERS	METERS	FEET
Pinnacle	11-31-26.010 N 162-19-45.307 E		109-36-57.6	289-56-26.8	Coral	3.6959722	4965.61	16291.3
			215-25-32.5	35-55-51.4	North Base	3.6455679	4421.48	14506.1
			249-34-07.5	69-24-34.8	Runit	3.6442259	4407.84	14461.4
			282-51-12.0	102-51-49.4	Islet	3.7649177	5819.93	19094.2
Aoman	11-37-15.282 N 162-19-27.584 E		336-29-53.3	156-30-13.8	North Base	3.8906165	7773.50	25503.6
			24-32-57.2	204-32-29.8	Coral	3.9984988	9965.49	32695.1
			46-21-59.5	226-21-04.6	Photo	4.0588211	11450.40	37566.9
			111-26-41.6	291-26-06.9	Bokon	3.7491203	5612.03	18412.1
			118-38-58.3	298-38-01.3	Engebi	3.9732497	9402.64	30848.5
Engebi	11-39-41.964 N 162-14-55.152 E		298-38-01.3	118-38-56.3	Aoman	3.9732497	9402.64	30848.5
			343-08-00.5	163-08-27.9	Coral	4.1517262	14181.63	46527.6
			0-09-02.6	180-09-02.4	Photo	4.0937487	12409.34	40713.0
			80-45-22.3	260-44-14.1	Boga	4.0156166	10366.13	34009.5
			103-29-31.7	283-29-00.1	Teiteir	3.6867231	4860.97	15948.0
Boga	11-38-47.715 N 162-09-17.366 E		260-44-14.1	80-45-22.3	Engebi	4.0156166	10366.13	34009.5
			309-40-17.6	129-41-52.8	Coral	4.2705251	18643.40	61165.9
			316-28-20.9	136-29-28.6	Photo	4.1706707	14813.95	48602.1
Teiteir	11-40-18.863 N 162-12-19.086 E		283-29-00.1	103-29-31.7	Engebi	3.6867231	4860.97	15948.0
			328-58-32.4	148-59-31.2	Coral	4.2344911	17158.96	56295.7
Bokon	11-38-22.046 N 162-16-35.138 E		291-26-06.9	111-26-41.6	Aoman	3.7491203	5612.03	18412.1
			354-25-31.8	174-25-39.0	Coral	4.0480178	11169.09	36643.9

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LOCALITY ENIWETOK ATOLL MARSHALL ISLANDS DATUM ENIWETOK ASTRONOMIC 1944 SECOND ORDER TRIANGULATION

STATION	LATITUDE AND LONGITUDE	SECONDS IN METERS	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE		
						LOGARITHM METERS	METERS	FEET
North Base	11-33-23.267N 162-21-09.893E		322-47-25.7	142-47-36.1	Runit	3.4136308	2591.9749	8503.84
			327-56-56.1	147-57-19.5	Sand	3.8247895	6680.20	21916.6
			35-25-51.4	215-25-34.5	Pinnacle	3.6455679	4421.48	14506.1
			75-02-07.9	255-01-20.1	Coral	3.8747533	7494.68	24588.8
			156-30-13.8	336-29-53.3	Aoman	3.8906165	7773.50	25503.6
			154-55-56.7	334-55-44.2	Piiraai	3.6491067	4457.66	14624.8
Runit	11-32-16.080N 162-22-01.621E		331-25-38.2	151-25-48.3	Islet	3.5087376	3226.54	10585.7
			69-34-34.8	249-34-07.5	Pinnacle	3.6442259	4407.84	14461.4
			142-47-36.1	322-47-25.7	North Base	3.4136308	2591.9749	8503.84
Coral	11-32-20.254N 162-17-10.944E		255-01-20.1	75-02-07.9	North Base	3.8747533	7494.68	24588.8
			289-02-53.4	109-04-04.5	Sand	4.0573318	11411.21	37438.3
			289-36-26.8	109-36-57.6	Pinnacle	3.6959722	4965.61	16291.3
			300-55-07.4	120-56-28.8	Aniyaanii	4.1585639	14406.68	47265.9
			324-04-06.6	144-05-13.0	Parry	4.2360560	17220.90	56498.9
			339-03-46.6	159-04-35.0	Eniwetok	4.3156495	20684.66	67862.9
			129-41-52.8	309-40-17.6	Boga	4.2705251	18643.40	61165.9
			148-59-31.2	328-58-32.4	Teiteir	4.2344911	17158.96	56295.7
			163-08-27.9	343-08-00.5	Engebi	4.1517262	14181.63	46527.6
			174-25-39.0	354-25-31.8	Bakon	4.0480178	11169.09	36643.9
			204-32-29.8	24-32-57.2	Aoman	3.9984988	9965.49	32695.1
			221-50-49.3	41-51-24.7	Piiraai	3.9041724	8019.96	26312.2

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LOCALITY ENIWETOK ATOLL MARSHALL ISLANDS DATUM ENIWETOK ASTRONOMIC 1944 SECOND ORDER TRIANGULATION

STATION	LATITUDE AND LONGITUDE	SECONDS IN METERS	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE		
						LOGARITHM METERS	METERS	FEET
Pinnacle	11-31-26.010 N 162-19-45.307 E		109-36-57.6	289-36-26.8	Coral	3.6959722	4965.61	16291.3
			215-25-32.5	35-25-51.4	North Base	3.6455679	4421.48	14506.1
			249-34-07.5	69-34-34.8	Runit	3.6442259	4407.84	14461.4
			282-51-12.0	102-51-49.4	Islet	3.7649177	5819.93	19094.2
Aoman	11-37-15.282 N 162-19-27.584 E		336-29-53.3	156-30-13.8	North Base	3.8906165	7773.50	25503.6
			24-32-57.2	204-32-29.8	Coral	3.9984988	9965.49	32695.1
			46-21-59.5	226-21-04.6	Photo	4.0588211	11450.40	37566.9
			111-26-41.6	291-26-06.9	Bokon	3.7491203	5612.03	18412.1
Engebi	11-39-41.964 N 162-14-55.152 E		118-38-56.3	298-38-01.3	Engebi	3.9732497	9402.64	30848.5
			298-38-01.3	118-38-56.3	Aoman	3.9732497	9402.64	30848.5
			343-08-00.5	163-08-27.9	Coral	4.1517262	14181.63	46527.6
			0-09-02.6	180-09-02.4	Photo	4.0937487	12409.34	40713.0
Boga	11-38-47.715 N 162-09-17.366 E		80-45-22.3	260-44-14.1	Boga	4.0156166	10366.13	34009.5
			103-29-31.7	283-29-00.1	Teiteir	3.6867231	4860.97	15948.0
			260-44-14.1	80-45-22.3	Engebi	4.0156166	10366.13	34009.5
			309-40-17.6	129-41-52.8	Coral	4.2705251	18643.40	61165.9
Teiteir	11-40-18.863 N 162-12-19.086 E		316-28-20.9	136-29-28.6	Photo	4.1706707	14813.95	48602.1
			283-29-00.1	103-29-31.7	Engebi	3.6867231	4860.97	15948.0
			328-58-32.4	148-59-31.2	Coral	4.2344911	17158.96	56295.7
Bokon	11-38-22.046 N 162-16-35.138 E		291-26-06.9	111-26-41.6	Aoman	3.7491203	5612.03	18412.1
			354-25-31.8	174-25-39.0	Coral	4.0480178	11169.09	36643.9

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STATION	LATITUDE AND LONGITUDE	SECONDS IN METERS	AZIMUTH	BACK AZIMUTH	TO STATION	DISTANCE		
						LOGARITHM METERS	METERS	FEET
Piiraa	11-35-34.679 N		334-55-44.2	154-55-56.7	North Base	3.6491067	4457.66	14624.8
	162-20-07.552 E		41-51-24.7	221-50-49.3	Coral	3.9041724	8019.96	26312.2
Islet	11-30-43.856 N		102-51-49.4	282-51-12.0	Pinnacle	3.7649177	5819.93	19094.2
	162-22-52.644 E		151-25-48.3	331-25-38.2	Runit	3.5087376	3226.54	10585.7
Sand	11-30-18.985 N		3-49-52.1	183-49-47.6	Parry	4.0104080	10242.55	33604.1
	162-23-06.870 E		109-04-04.5	289-02-53.4	Coral	4.0573318	11411.21	37438.3
			147-57-19.5	327-56-56.1	North Base	3.8247895	6680.20	21916.6
Parry	11-24-46.372 N		144-05-13.0	324-04-06.6	Coral	4.2360560	17220.90	56498.9
	162-22-44.294 E		183-49-47.6	3-49-52.1	Sand	4.0104080	10242.55	33604.1
			199-01-47.4	19-02-02.2	Aniyaanii	3.8400459	6919.04	22700.2
			26-48-35.5	206-48-17.8	Eniwetok	3.7796823	6021.19	19754.5
Aniyaanii	11-28-19.252 N		120-56-28.8	300-55-07.4	Coral	4.1585639	14406.68	47265.9
	162-23-58.729 E		19-02-02.2	199-01-47.4	Parry	3.8400459	6919.04	22700.2
Eniwetok	11-21-51.465 N		159-04-35.0	339-03-46.6	Coral	4.3156485	20684.66	67862.9
	162-21-14.725 E		206-48-17.8	26-48-35.5	Parry	3.7796823	6021.19	19754.5
Photo	11-32-58.091 N		136-29-28.6	316-28-20.9	Boga	4.1706707	14813.95	48602.1
	162-14-54.074 E		180-09-02.4	0-09-02.6	Engebi	4.0937487	12409.34	40713.0
			226-21-04.6	46-21-59.5	Aoman	4.0588211	11450.40	37566.9

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LOCALITY ENIWETOK ATOLL MARSHALL ISLANDS DATUM ENIWETOK ASTRONOMIC 1944 SECOND ORDER TRIANGULATION

STATION	LATITUDE AND LONGITUDE	SECONDS IN METERS	AZIMUTH	BACK AZIMUTH	TC STATION	DISTANCE		
						LOGARITHM METERS	METERS	FEET
Piirai	11-35-34.679N		334-55-24.2	154-55-56.7	North Base	3.6491067	4457.66	14624.8
	162-20-07.552E		41-51-27.7	221-50-49.3	Coral	3.9041724	8019.96	26312.2
Islet	11-30-43.856N		102-51-49.4	282-51-12.0	Pinnacle	3.7649177	5819.93	19094.2
	162-22-52.644E		151-25-48.3	331-55-38.2	Runit	3.5087376	3226.54	10585.7
Sand	11-30-18.985N		3-49-52.7	183-49-47.6	Parry	4.0104080	10242.55	33604.1
	162-23-06.870E		109-04-04.5	289-02-53.4	Coral	4.0573318	11411.21	37438.3
			147-57-19.5	327-56-56.1	North Base	3.8247895	6680.20	21916.6
Parry	11-24-46.372N		144-05-13.0	324-04-06.6	Coral	4.2360560	17220.90	56498.9
	162-22-44.294E		183-49-47.6	3-49-52.1	Sand	4.0104080	10242.55	33604.1
			199-01-47.4	19-02-02.2	Aniyaanii	3.8400459	6919.04	22700.2
			26-48-35.5	206-48-17.8	Eniwetok	3.7796823	6021.19	19754.5
Aniyaanii	11-28-19.252N		120-56-28.8	300-55-07.4	Coral	4.1585639	14406.68	47265.9
	162-23-58.729E		19-02-02.2	199-01-47.4	Parry	3.8400459	6919.04	22700.2
Eniwetok	11-21-51.465N		159-04-35.0	339-03-46.6	Coral	4.3156485	20684.66	67862.9
	162-21-14.725E		206-48-17.8	26-48-35.5	Parry	3.7796823	6021.19	19754.5
Photo	11-32-58.091N		136-29-28.6	316-28-20.9	Baga	4.1706707	14813.95	48602.1
	162-14-54.074E		180-09-02.4	0-09-02.6	Engebi	4.0937487	12409.34	40713.0
			226-21-04.6	46-21-59.5	Aoman	4.0588211	11450.40	37566.9

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LIST OF DIRECTIONS

STATION ANIYAANII (Kodak)

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPC

CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	EGG. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Parry	0° 00' 00.00"			0° 00' 00.00"	
Coral	101-54-26.6	-			
R.M. No. I 17.495 M	214-55-42.6	-			
Photo Tower 21.425 M	304-50-46.2	-			
R.M. No. 2 33.778 M	326-01-28.6	-			

No eccentricity of lights or instrument at this station

Observations made from a 16 foot wood tower

Reference marks were established by the Joint Task Force Seven Survey

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ON 07-09-2004 BY SP-10/DA
DATE 07-09-2004 BY SP-10/DA
PAGE 18

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LIST OF DIRECTIONS

STATION BOGA

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPC

CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Coral	0° 00' 00.00"			0° 00' 00.00"	
Photo	6-48-04.0	-			
R.M. No. I 59.015 M	94-53-50.0	-			
R.M. No. 2 36.576 M	154-54-00.0	-			
Teiteir	293-21-24.7	-			
Engebi	311-03-56.3	-			

No eccentricity of lights or instrument at this station

Observations made from 40 foot steel tower

Reference marks are bronze disks in concrete blocks

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 EXECUTIVE ORDER 11652, 1994
 BY SP-6 BT/STP/STW/STW/STW/STW
 DIANE S. MURPHY

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LIST OF DIRECTIONS

STATION BOKON

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPC

CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Aomon	0° 00' 00.00"			0° 00' 00.00"	
Coral	62-59-24.7	-			
R.M. No. 1 15.240 M	207-24-12.2	-			
R.M. No. 2 15.240 M	279-24-12.2	-			

No eccentricity of lights or instrument at this station
 Observations made from a 15 foot wood tower
 Reference marks are bronze disks in concrete blocks

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 1954

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LIST OF DIRECTIONS

STATION CORAL DATE 3/17/50
 CHIEF OF PARTY LSH COMPUTED BY LSH
 OBSERVER FPC CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	EGG. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
N. Base	0° 00' 00.00"			0° 00' 00.00"	
Runit	15-48-14.6	-			
Sand	34-01-32.5	-			
Pinnaole	34-35-07.2	-			
Aniyaani	45-53-47.1	-			
Parry	69-02-46.3	-			
Eniwetok	84-03-20.2	-54.0			02-26.2
Boga	234-40-33.4	-			
Teiteir	253-58-12.8	-			
Engebi	268-07-08.7	-			
Bokon	279-24-19.4	-			
Aomon	309-31-10.1	-			
Piiraai	326-49-29.3	-			

No eccentricity of lights or instrument at this station

Observations made from a 14 foot wood tower set on existing circular concrete cell

No reference marks set

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 AUTHORITY: 51 CFR 101-11.6
 DATE: 08-01-2001

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LIST OF DIRECTIONS

STATION ENGEBI (Elgin)

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPC

CHECKED BY FPC

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Coral	0° 00' 00.00"			0° 00' 00.00"	
Photo	17-01-02.5	-			
Boga	97-37-22.0	-			
Teiteir	120-21-30.3	-			
R.M. No. 1 15.240 M	105-11-10.0	-			
R.M. No. 2 15.240 M	195-11-10.0	-			
Aomon	315-30-01.4	-			
N. Base	322-39-45.3	-			

No eccentricity of lights or instrument at this station

Observations made from 40 foot steel tower

Reference marks are bronze disks in concrete blocks

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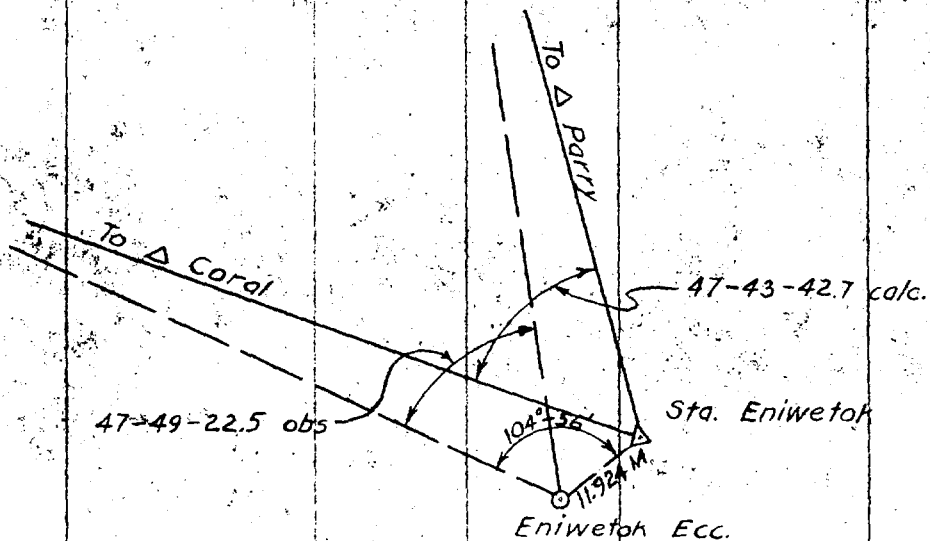
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LIST OF DIRECTIONS

STATION ENIWETOK (Privilege) DATE 3/17/50
 CHIEF OF PARTY LSH COMPUTED BY LSH
 OBSERVER FPC CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Coral	0° 00' 00.00"			0° 00' 00.00"	
Parry	47-49-22.5	05'-39.8"			43-42.7
R.M. No. 1 11.924 M	62-46-17.4	-			
R.M. No. 2 11.924 M	332-46-17.4	-			



Observations taken from eccentric station

Light was eccentric for observation from Coral
 Light was at true station for observation from Parry
 Observation was made from a 40 foot steel tower
 Reference marks are bronze disks in concrete blocks

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 BRUCE S. NELSON

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LIST OF DIRECTIONS

STATION ISLET DATE 3/17/50
 CHIEF OF PARTY LSH COMPUTED BY LSH
 OBSERVER FRG CHECKED BY LHP

OBSERVED STATION	OBSERVED DIRECTION	EGG. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Coral	0° 00' 00.00"			0° 00' 00.00"	
Runit	48-33-58.9				
<p>No eccentricity of lights or instrument at this station Observations made from 11 foot wood tower No reference monuments set</p>					
<p>DECLASSIFIED PER E.O. 11652 DATED JULY 16, 1994 BY: DAVID S. STANLEY TO DEANE S. GELON</p>					

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STATION NORTH BASE

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPC

CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Coral	0° 00' 00.00"			0° 00' 00.00"	
Engebi	60-40-51.5	-			
Piiraai	79-53-48.5	-			
Aomon	81-28-05.5	-			
R.M. No. 3 45.686 M	101-59-20.0	-			
Runit	247-45-17.2	-			
Sand	252-54-49.1	-			
R.M. No. I 31.992 M	267-33-20.0	-			
Parry	274-44-59.7	-			
Pinnacle	320-23-43.0	-			
R.M. No. 2 25.233 M	340-35-50.0	-			
No eccentricity of lights or instrument at this station					
Observations made from 40 foot steel tower					
Reference marks are bronze disks set in reef ledge					

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DATE 15 JULY 1994
BY SP-6 JTB/DAW/DAW
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LIST OF DIRECTIONS

STATION PARRY

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPC

CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	EGG. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Coral	0° 00' 00.00"			0° 00' 00.00"	
N. Base	25-42-13.5	-			
Sand	39-44-35.3	-			
R.M. No. 1 15.246 M	46-34-25.4	-			
Aniyaani	54-56-34.4	-			
R.M. No. 2 15.224 M	181-37-20.6	-			
Eniwetok	242-43-22.6	-			

No eccentricity of lights or instrument at this station

Observations made from 25 foot wood tripod in existing steel tower

Reference marks are bronze disks in concrete blocks

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 EXECUTIVE ORDER 11652 JULY 14, 1994
 AUTHORITY DERIVED FROM
 32 CFR 1.101

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LIST OF DIRECTIONS

STATION PIIRAAT

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPC

CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
N. Base	0° 00' 00.00"			0° 00' 00.00"	
R.M. No. 2 22.860 M	0-31-55.0	-			
Coral	66-55-40.3	-			
R.M. No. I 22.860 M	270-31-55.0	-			

No eccentricity of lights or instrument at this station

Observations taken from 16 foot wood tower

Reference marks are bronze disks in concrete blocks

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LIST OF DIRECTIONS

STATION PINNACLE DATE 3/17/50
 CHIEF OF PARTY LSH COMPUTED BY LSH
 OBSERVER FPC CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR ZERO INITIAL	ADJ. DIR
Coral	105-48-37.3	-		105-48-37.3	
N. Base	139-57-10.4	-		139-57-10.4	
Runit	173-14-14.9	-		173-14-14.9	

No eccentricity of lights or instrument at this station

Observations made from a steel tripod 10 feet above tide level

No reference marks set at this station

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LIST OF DIRECTIONS

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STATION RUNIT DATE 3/17/50
 CHIEF OF PARTY LSH COMPUTED BY LSH
 OBSERVER FPC CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
N. Base	0° 00' 00.00"			0° 00' 00.00"	
R.M. No. I 15.520 M	8-37-19.4	-			
R.M. No. 2 14.650 M	107-02-33.4	-			
Islet	188-38-01.9	-			
Pinnacle	286-46-58.5	-			
Coral	308-02-56.2	-			

No eccentricity of lights or instrument at this station

Observations made from 20 foot wood tower

Reference marks shown were established by the Joint Task Force Seven Survey

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LIST OF DIRECTIONS

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STATION SAND DATE 3/17/90
 CHIEF OF PARTY LSH COMPUTED BY LSH
 OBSERVER FPC CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC RED.	SEA LEVEL RED.	CORRECTED D.R. ZERO INITIAL	ADJ DIR.
Parry	0° 00' 00.00"			0° 00' 00.00"	
Coral	105-14-13.1	-			
N. Base	144-07-27.3	-			

No eccentricity of lights or instrument at this station

Observations made from 15 foot wood tower

No reference marks set at this station

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LIST OF DIRECTIONS

STATION TEITEIR DATE 3/17/50
 CHIEF OF PARTY LSH COMPUTED BY LSH
 OBSERVER FPC CHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Coral	0° 00' 00.00"			0° 00' 00.00"	
Boga	94-03-47.5	-			
R.M. No. 1 15.240M	125-23-00.0	-			
R.M. No. 2 15.240M	215-23-00.0	-			
Engebi	314-30-28.4	-			

No eccentricity of lights or instrument at this station
 Observations made from 40 foot steel tower
 Reference marks are bronze disks in concrete block

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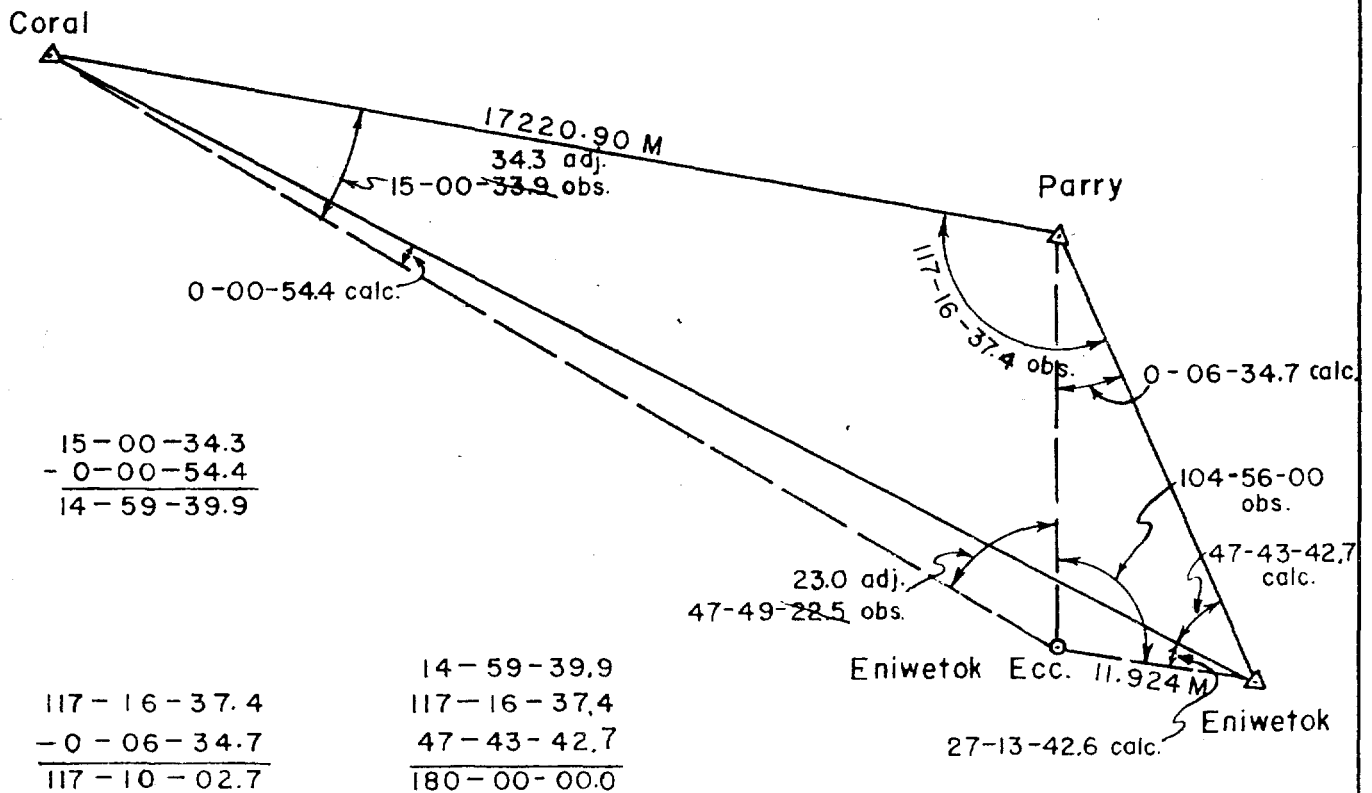
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Eccentric Station - ENIWETOK

Log. d = 1.07642
 colog Sin 1" = $\frac{5.31443}{6.39085}$

d = 39.12 Ft. = 11.924 M.

	a	Log. Sin a	Log s Meters	Log($\frac{\text{Sin } a}{s}$)	Log. red. in seconds	Reduction = C
Parry	255-04	9.98508	3.77967	6.20541	2.59626	394.7"
Coral	207-15	9.66075	4.31566	5.34509	1.73594	54.4"



15-00-34.3
 - 0-00-54.4
 14-59-39.9

117-16-37.4
 - 0-06-34.7
 117-10-02.7

14-59-39.9
 117-16-37.4
 47-43-42.7
 180-00-00.0

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ABSTRACT OF DIRECTIONS

STATION *Aniyaanii* COMPUTED BY *L.S.H.* DATE *12-14-49*
 OBSERVER *F.P.C.* CHECKED BY *W.E.H.* INST. *Wild T-2*

POSITION	STATIONS OBSERVED	
	<i>Parry</i>	<i>Coral</i>
	INITIAL <i>0.00</i>	<i>101°-54'</i>
1	<i>0.00"</i>	<i>27.0</i>
2	<i>0.00"</i>	<i>29.5</i>
3	<i>0.00"</i>	<i>24.1</i>
4	<i>0.00"</i>	<i>26.1</i>
5	<i>0.00"</i>	<i>29.3</i>
6	<i>0.00"</i>	<i>23.4</i>
7	<i>0.00"</i>	
8	<i>0.00"</i>	
	SUM	<i>159.4</i>
	MEAN	<i>26.6</i>
	CORR. FOR ECC.	
	DIRECTION	<i>26.6</i>

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
 LETTER DATED JULY, 15, 1994
 FROM ANTHON SINIGALLI TO
 DIANE S. NIXON

STATION AOMAN COMPUTED BY L.S.H. DATE Nov. 16, 1949
 OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED			
	<i>Coral</i>	<i>Bokon</i>	<i>Engebi</i>	<i>North Base</i>
INITIAL	0 00	86°-53'	94°-05'	311°-56'
1	0 00	45.4	59.6	58.2
2	0 00	47.8	59.8	56.6
3	0 00	41.3	56.2	54.5
4	0 00	42.0	00.0	57.7
5	0 00	48.4	59.2	58.6
6	0 00	39.5	56.1	53.1
7	0 00			
8	0 00			
SUM		264.4	350.9	338.7
MEAN		44.1	58.5	56.4
CORR FOR ECC.				
DIRECTION		44.1	58.5	56.4

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTHONY PENNACELLI TO
DIANE S. NIXON

STATION AOMAN COMPUTED BY L.S.H. DATE NOV 29, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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POSITION	STATIONS OBSERVED	
	Coral	Photo
	INITIAL 0-00	21°-49'
1	0.00"	02.1
2	0.00"	02.2
3	0.00'	03.2
4	0.00	02.6
5	0.00	05.4
6	0.00	01.4
7	0.00	
8	0.00	
	SUM	16.9
	MEAN	02.8
	CORR FOR ECC.	
	DIRECTION	02.8

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
 LETTER DATED JULY, 15, 1994
 FROM ANTON SINTISCALLI TO
 DEANE S. NIXON

STATION BOGA COMPUTED BY L.S.H. DATE Nov. 18, 1949
 OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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POSITION	STATIONS OBSERVED		
	<i>Coral</i>	<i>Teiteir</i>	<i>Engebi</i>
	INITIAL 0°-00'	293°-21'	311°-03'
1	0.00"	25.0	59.0
2	0.00"	25.9	57.1
3	0.00"	24.0	54.7
4	0.00"	23.2	54.5
5	0.00"	26.2	58.9
6	0.00"	23.8	53.7
7	0.00"		
8	0.00"		
	SUM	148.1	337.9
	MEAN	24.7	56.3
	CORR. FOR ECC.		
	DIRECTION	24.7	56.3

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
ORDER DATED JULY, 15, 1994
FROM LITTON SIMONELLI TO
DIANE B. KIRBY

STATION *BOGA* COMPUTED BY *L.S.H.* DATE *Oct 31, 1949*
OBSERVER *F.P.C.* CHECKED BY *W.E.H.* INST *Wild T-2*

POSITION	STATIONS OBSERVED	
	<i>Engebi</i>	<i>Photo</i>
	INITIAL	
	<i>0.00</i>	<i>55°-44'</i>
<i>1</i>	<i>0.00</i>	<i>09.3</i>
<i>2</i>	<i>0.00</i>	<i>10.6</i>
<i>3</i>	<i>0.00</i>	<i>04.7</i>
<i>4</i>	<i>0.00</i>	<i>07.2</i>
<i>5</i>	<i>0.00</i>	<i>11.5</i>
<i>6</i>	<i>0.00</i>	<i>02.7</i>
<i>7</i>	<i>0.00</i>	
<i>8</i>	<i>0.00</i>	
	SUM	<i>46.0</i>
	MEAN	<i>07.7</i>
	CORR. FOR ECC	
	DIRECTION	<i>07.7</i>

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HOLMES & NARVER ENGINEERS JOB NO 640

ABSTRACT OF DIRECTIONS DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM AMER SINKASALLI TO
DIANE S. NIXON

STATION BOKON COMPUTED BY L.S.H. DATE Nov. 22, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED	
	Aoman	Coral
	INITIAL 0.00'	62°-59'
1	0.00"	26.2
2	0.00"	25.3
3	0.00"	25.7
4	0.00"	23.1
5	0.00"	23.9
6	0.00"	24.1
7	0.00"	
8	0.00"	
	SUM	148.3
	MEAN	24.7
	CORR. FOR ECC.	
	DIRECTION	24.7

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SINESCALI TO
DIANE S. NIXON

STATION CORAL COMPUTED BY L.S.H. DATE Nov. 21, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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POSITION	STATIONS OBSERVED						
	North Base	Boga	Teiteir	Engebi	Bokon	Aoman	Piirgai
	INITIAL 0°-00'	234°-40'	253°-58'	268°-07'	279°-24'	309°-31'	326°-49'
1	0.00"	30.5	13.4	10.4	19.3	12.4	31.0
2	0.00"	33.5	11.5	07.4	23.5	09.1	27.5
3	0.00"	33.4	10.5	06.7	16.3	08.6	28.4
4	0.00"	34.6	15.8	11.0	18.7	10.0	28.6
5	0.00"	35.0	14.2	10.1	21.8	11.2	29.8
6	0.00"	33.2	11.3	06.9	16.9	09.4	30.3
7	0.00"						
8	0.00"						
	SUM	200.2	76.7	52.5	116.5	60.7	175.6
	MEAN	33.4	12.8	08.7	19.4	10.1	29.3
	CORR. FOR ECC.						
	DIRECTION	33.4	12.8	08.7	19.4	10.1	29.3

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SIMONELLI TO
DIANE S. NIXON

STATION CORAL COMPUTED BY L.S.H. DATE Dec. 5, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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POSITION	STATIONS OBSERVED				
	North Base	Runit	Sand	Pinnacle	Parry
	INITIAL 0°-00'	15°-48'	34°-01'	34°-35'	69°-02'
1	0.00"	15.0	31.2	09.7	45.1
2	0.00"	14.3	34.6	07.6	48.8
3	0.00"	16.9	32.5	07.1	47.0
4	0.00"	13.5	30.9	07.8	46.9
5	0.00"	13.1	34.6	07.3	46.3
6	0.00"	14.8	31.4	04.0	43.7
7	0.00"				
8	0.00"				
	SUM	87.6	195.2	43.5	277.8
	MEAN	14.6	32.5	07.2	46.3
	CORR. FOR ECC.				
	DIRECTION	14.6	32.5	07.2	46.3

ABSTRACT OF DIRECTIONS

DECLASSIFIED BY DOR
RETRAC DATA UNIT, IS, 1994
FROM ANTON SIMONELLI TO
DIANE S. NIXON

STATION CORAL COMPUTED BY L.S.H. DATE Dec. 14, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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Pacific Southwest Region

POSITION	STATIONS OBSERVED					
	Parry	Aniyaanii				
	INITIAL 0°-00'	336°-51'				
1	0.00"	00.4				
2	0.00"	00.0				
3	0.00"	02.0				
4	0.00"	00.7				
5	0.00"	00.9				
6	0.00"	00.9				
7	0.00"					
8	0.00"					
	SUM	04.9				
	MEAN	00.8				
	CORR FOR ECC.					
	DIRECTION	00.8				

ABSTRACT OF DIRECTIONS RECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SIRISCALLI TO
DENISE S. HIXON

STATION CORAL COMPUTED BY L.S.H. DATE Dec. 22, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

Reproduced from the holdings of the National Archives
Pacific Southwest Region

POSITION	STATIONS OBSERVED					
	Parry	Eniwetok				
	INITIAL 0°-00'	15°-00'				
1	0.00"	34.5				
2	0.00"	34.6				
3	0.00"	34.5				
4	0.00"	32.6				
5	0.00"	34.6				
6	0.00"	32.7				
7	0.00"					
8	0.00"					
	SUM	203.5				
	MEAN	33.9				
	CORR. FOR ECC.	- 54.0"				
	DIRECTION	14°-59'-39.9"				

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANZONI SUBMITTAL TO
DEANE S. NIXON

STATION ENGEBI COMPUTED BY L.S.H. DATE Nov. 17, 1949

OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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Pacific Southwest Region

POSITION	STATIONS OBSERVED			
	Coral	Teiteir	Aoman	North Base
	INITIAL 0°-00'	120°-21'	315°-30'	332°-33'
1	0.00"	31.8	03.4	44.3
2	0.00"	32.6	01.0	48.3
3	0.00"	28.6	00.7	44.0
4	0.00"	30.0	00.0	43.8
5	0.00"	30.8	02.8	48.4
6	0.00"	28.0	00.2	43.2
7	0.00"			
8	0.00"			
	SUM	181.8	08.1	272.0
	MEAN	30.3	01.4 01.35	45.3
	CORR. FOR ECC.			
	DIRECTION	30.3	01.4	45.3

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ERIC ROY GINTARAS TO
DENISE S. STAN

STATION ENGEBI COMPUTED BY L.S.H. DATE NOV. 28, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED				
	Coral	Photo	Boga		
	INITIAL 0-00	17°-01'	97°-37'		
1	0.00"	01.6	24.0		
2	0.00"	01.2	21.6		
3	0.00"	03.9	21.2		
4	0.00"	02.7	24.7		
5	0.00"	05.0	22.1		
6	0.00"	00.8	18.2		
7	0.00"				
8	0.00"				
	SUM	15.2	131.8		
	MEAN	02.5	22.0		
	CORR. FOR ECC.				
	DIRECTION	02.5	22.0		

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ABSTRACT OF DIRECTIONS
DECLASSIFIED PER DOE
 E.O. 13526 JULY, 15, 1994
 FROM ANTON SINISCALLO TO
 DEANE S. NYEON

STATION ENIWETOK COMPUTED BY L.S.H. DATE Dec 19, 1949
 OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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 of the Pacific Southwest Region

POSITION	STATIONS OBSERVED					
	<i>Coral</i>	<i>Parry</i>				
	INITIAL 0°-00'	47°-49'				
1	0.00"	20.2				
2	0.00"	20.3				
3	0.00"	24.6				
4	0.00"	20.4				
5	0.00"	22.2				
6	0.00"	27.0				
7	0.00"					
8	0.00"					
	SUM	134.7				
	MEAN	22.5				
	CORR. FOR ECC.	- 5'-40.3"				
	DIRECTION	47°-43'-42.2"				

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM DANNON CORRECALLI TO
DEANE S. NIXON

STATION ISLET COMPUTED BY L.S.H. DATE Dec. 11, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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Pacific Southwest Region

POSITION	STATIONS OBSERVED					
	<i>Pinnacle</i>	<i>Runit</i>				
	INITIAL 0°-00'	48°-33'				
1	0.00"	59.5				
2	0.00"	01.9				
3	0.00"	55.5				
4	0.00"	59.0				
5	0.00"	01.5				
6	0.00"	56.2				
7	0.00"					
8	0.00"					
	SUM	353.6				
	MEAN	58.9				
	CORR. FOR ECC.					
	DIRECTION	58.9				

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
 EXECUTIVE ORDER JULY, 15, 1994
 FROM CATEGORY 2 TO
 CATEGORY 1 BY
 DEANS S. NIXON

STATION NORTH BASE COMPUTED BY L.S.H. DATE Dec. 3, 1949
 OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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 of the Pacific Southwest Region

POSITION	STATIONS OBSERVED				
	Coral	Engebi	Runit	Pinnacle	
	INITIAL 0°-00'	60°-40'	247°-45'	320°-23'	
1	0.00"	55.2	20.8	47.2	
2	0.00"	48.5	16.0	42.8	
3	0.00"	52.3	17.6	38.8	
4	0.00"	51.9	17.6	42.4	
5	0.00"	51.4	15.8	47.6	
6	0.00"	49.9	15.1	38.9	
7	0.00"				
8	0.00"				
	SUM	309.2	102.9	257.7	
	MEAN	51.5	17.2 17.15	43.0 42.95	
	CORR. FOR ECC.				
	DIRECTION	51.5	17.2	43.0	

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTHON SINIBGALLI TO
DIANE S. NIXON

STATION NORTH BASE COMPUTED BY L.S.H. DATE Oct. 28, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED			
	Coral	Aomon	Sand	Parry
	INITIAL 0°-00'	81°-28'	252°-54'	274°-44'
1	0.00"	08.8	51.0	03.5
2	0.00"	04.8	50.2	59.2
3	0.00"	04.6	46.7	58.3
4	0.00"	05.6	49.2	00.3
5	0.00"	04.4	50.7	00.3
6	0.00"	04.5	47.1	56.4
7	0.00"			
8	0.00"			
	SUM	32.7	294.9	358.0
	MEAN	05.5 05.45	49.1	59.7
	CORR. FOR ECC.			
	DIRECTION	05.5	49.1	59.7

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SINISGALLI TO
DIANE S. NIXON

STATION NORTH BASE COMPUTED BY L.S.H. DATE Nov. 30, 1949

OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED				
	Coral	Pitraqi			
	INITIAL 0°-00'	79°-53'			
1	0.00"	47.2			
2	0.00"	49.8			
3	0.00"	46.1			
4	0.00"	49.0			
5	0.00"	50.2			
6	0.00"	48.5			
7	0.00"				
8	0.00"				
	SUM	290.8			
	MEAN	48.5			
	CORR. FOR ECC.				
	DIRECTION	48.5			

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ABSTRACT OF DIRECTIONS

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

STATION PARRY COMPUTED BY L.S.H. DATE Dec. 13, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED				
	Coral	North Base	Sand	Aniyaanii	Eniwetok
	INITIAL 0°-00'	25°-42'	39°-44'	54°-56'	242°-43'
1	0.00"	16.0 18.6	35.7	36.0	23.0
2	0.00"	14.0	35.8	32.1	24.3
3	0.00"	15.2	34.7	37.1	25.3
4	0.00"	10.6	33.9	35.5	18.9
5	0.00"	10.7	35.6	31.5	19.2
6	0.00"	14.8	35.9	34.0	24.9
7	0.00"				
8	0.00"				
	SUM	81.3 83.9	211.6	206.2	135.6
	MEAN	13.5 14.0	35.3	34.4	22.6
	CORR. FOR ECC.				
	DIRECTION	13.5	35.3	34.4	

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
EXEMPT UNDER JULY, 15, 1994
FROM ACTION SINCE CALL TO
DIANE S. NISON

STATION PINNACLE COMPUTED BY L.S.H. DATE Dec. 2, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED			
	<i>Coral</i>	<i>North Base</i>	<i>Runit</i>	<i>Islet</i>
	INITIAL 0°-00'	105°-48'	139°-57'	173°-14'
1	0.00"	36.6	12.8	13.7
2	0.00"	39.7	10.3	18.1
3	0.00"	37.8	11.1	12.1
4	0.00"	35.5	13.1	16.1
5	0.00"	37.4	08.6	18.2
6	0.00"	36.6	06.5	11.5
7	0.00"			
8	0.00"			
	SUM	223.6	62.4	89.7
	MEAN	37.3	10.4	14.95
	CORR. FOR ECC.			
	DIRECTION	37.3	10.4	14.9

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ACTION SPONTANEOUSLY TO
DIANE S. NELSON

STATION PIIRAAI COMPUTED BY L.S.H. DATE Nov. 20, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED	
	North Base	Coral
	INITIAL 0° 00'	66°-55'
1	0.00"	44.5
2	0.00"	39.1
3	0.00"	39.9
4	0.00"	41.9
5	0.00"	37.8
6	0.00"	38.8
7	0.00"	
8	0.00"	
	SUM	242.0
	MEAN	40.3
	CORR. FOR ECC.	
	DIRECTION	40.3

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ABSTRACT OF DIRECTIONS

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

STATION RUNIT COMPUTED BY L.S.H. DATE Dec. 4, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED			
	North Base	Islet	Pinnacle	Coral
	INITIAL 0°-00'	188°-38'	286°-46'	308°-02'
1	0.00"	03.6	03.6	57.3
2	0.00"	02.3	59.5	00.3
3	0.00"	59.8	54.2	53.9
4	0.00"	01.8	59.3	54.1
5	0.00"	03.0	57.6	59.5
6	0.00"	00.9	57.0	52.3
7	0.00"			
8	0.00"			
	SUM	371.4	351.2	337.4
	MEAN	01.9	58.5	56.2
	CORR. FOR ECC.			
	DIRECTION	01.9	58.5	56.2

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ARJON CIRCULARI TO
DIANE S. NELSON

STATION SAND COMPUTED BY L.S.H. DATE Dec. 6, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED					
	Parry	Coral	North Base			
	INITIAL 0°-00'	105°-14'	144°-07'			
1	0.00"	13.1	30.6			
2	0.00"	16.9	25.2			
3	0.00"	08.7	25.0			
4	0.00"	12.5	30.7			
5	0.00"	16.3	26.6			
6	0.00"	11.4	25.9			
7	0.00"					
8	0.00"					
	SUM	78.9	164.0			
	MEAN	13.15	27.3			
	CORR. FOR ECC.					
	DIRECTION	13.1	27.3			

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
REGULATORY DIVISION, JULY, 15, 1994
FROM LINDA SINISGALLI TO
DIANE S. NIXON

STATION TEITEIR COMPUTED BY L.S.H. DATE Nov. 27, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

POSITION	STATIONS OBSERVED					
	Coral	Boga	Engebi			
	INITIAL 0°-00'	94°-03'	314°-30'			
1	0.00"	48.0	31.3			
2	0.00"	50.3	26.9			
3	0.00"	47.5	31.1			
4	0.00"	46.0	24.6 23.2			
5	0.00"	44.4 50.5	29.3			
6	0.00"	48.9	27.3			
7	0.00"					
8	0.00"					
	SUM	285.1	170.5			
	MEAN	47.5	28.4			
	CORR. FOR ECC.					
	DIRECTION	47.5	28.4			

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TRIANGLE COMPUTATIONS

REVISED FOR DON
MAY 15, 1994
BY ESCALIER 20
DILLON & TUNON

COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOE
 LETTER DATED JULY, 15, 1994
 FROM MIYON BENSICALLI TO
 DIANE S. NIXON

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE March 7, 1950

STATION	OBSERVED ANGLE	CORR-N	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3					2591.9749	3.4136308
1 Pinnacle	34-08-33.1	-0.1	33.0	-0.0	33.0	0.2508413
2 North Base	72-38-25.8	-0.1	25.7	-0.0	25.7	9.9797538
3 Runit	73-13- <u>01.5</u> 00.4	<u>-0.2</u> 0.4	01.3	<u>-0.0</u> 0.0	01.3	9.9810958
1-3						3.6442259
1-2						3.6455679
2-3						3.6455679
1 Coral	34-35-07.2	-0.5	06.7	-0.0	06.7	0.2459339
2 North Base	39-36-17.0	-0.5	16.5	-0.0	16.5	9.8044704
3 Pinnacle	105-48- <u>37.3</u> 01.5	<u>-0.4</u> -1.4	36.9	<u>-0.1</u> -0.1	36.8	9.9832515
1-3						3.6959722
1-2						3.8747533
2-3						3.4136308
1 Coral	15-48-14.6	-0.4	14.2	-0.0	14.2	0.5648783
2 North Base	112-14-42.8	-0.4	42.4	-0.0	42.4	9.9664106
3 Runit	51-57- <u>03.8</u> 01.2	<u>-0.4</u> -1.2	03.4	<u>-0.0</u> 0.0	03.4	9.8962414
1-3						3.9449197
1-2						3.8747505
2-3						3.9449197
1 Pinnacle	139-57-10.4	-0.3	10.1	-0.0	10.1	0.1915065
2 Coral	18-46-52.6	-0.2	52.4	-0.0	52.4	9.5077958
3 Runit	21-15- <u>57.7</u> 0.7	<u>-0.2</u> -0.7	57.5	<u>-0.0</u> 0.0	57.5	9.5595450
1-3						3.6442220
1-2						3.6959712

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COMPUTATION OF TRIANGLES

RECORDED PER DOE
DELETED DATED JULY, 15, 1994
FROM ANTON SINISCALI TO
DIERKE S. NIXON

COMPUTED BY L. S. H. CHECKED BY L. M. P. DATE March 7, 1950

STATION	OBSERVED ANGLE	CORR-N	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						3.8747533
1 Aoman	48-03-03.6	+ 0.3	03.9	- 0.0	03.9	0.1285782
2 North Base	81-28-05.5	+ 0.4	05.9	- 0.1	05.8	9.9951673
3 Coral	50-28-49.9	+ 0.4	50.3	- 0.0	50.3	9.8872850
	59.0	+ 1.1		- 0.1		
1-3						3.9984988
1-2						3.8906165
2-3						3.9984988
1 Engebi	44-29-58.6	+ 0.6	59.2	- 0.1	59.1	0.1543401
2 Aoman	94-05-58.5	+ 0.6	59.1	- 0.1	59.0	9.9988873
3 Coral	41-24-01.4	+ 0.5	01.9	- 0.0	01.9	9.8204108
	58.5	+ 1.7		- 0.2		
1-3						4.1517262
1-2						3.9732497
2-3						3.8747533
1 Engebi	27-26-14.7	+ 0.9	15.6	- 0.1	15.5	0.3365036
2 North Base	60-40-51.5	+ 0.9	52.4	- 0.1	52.3	9.9404709
3 Coral	91-52-51.3	+ 1.0	52.3	- 0.1	52.2	9.9997659
	57.5	+ 2.8		- 0.3		
1-3						4.1517278
1-2						4.2110228
2-3						4.2110228
1 Aoman	142-09-02.1	+ 0.1	02.2	- 0.1	02.1	0.2121229
2 North Base	20-47-14.0	± 0.0	14.0	- 0.0	14.0	9.5501041
3 Engebi	17-03-43.9	± 0.0	43.9	- 0.0	43.9	9.4674744
	00.0	+ 0.1		- 0.1		
1-3						3.9732498
1-2						3.8906201

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COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOE
 LETTER DATED JULY, 15, 1994
 FROM AFRON BENEGALI TO
 DIANE S. NIXON

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE March 7, 1950

STATION	OBSERVED ANGLE	CORR-N	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						4.1517262
1 Boga	48-56-03.7	-0.2	03.5	-0.1	03.4	0.1226537
2 Engebi	97-37-22.0	-0.2	21.8	-0.2	21.6	9.9961452
3 Coral	33-26- <u>35.3</u>	<u>-0.2</u>	35.1	<u>-0.1</u>	35.0	9.7412367
	<u>01.0</u>	<u>-0.6</u>		<u>-0.4</u>		
1-3						4.2705251
1-2						4.0156166
2-3						4.1517262
1 Teiteir	45-29-31.6	+0.7	32.3	-0.0	32.3	0.1468152
2 Engebi	120-21-30.3	+0.9	31.2	-0.1	31.1	9.9359497
3 Coral	14-08- <u>55.9</u>	<u>+0.8</u>	56.7	<u>-0.1</u>	56.6	9.3881817
	<u>57.8</u>	<u>+2.4</u>		<u>-0.2</u>		
1-3						4.2344911
1-2						3.6867231
2-3						4.2344911
1 Boga	66-38-35.3	-0.6	34.7	-0.1	34.6	0.0371327
2 Teiteir	94-03-47.5	-0.7	46.8	-0.1	46.7	9.9989072
3 Coral	19-17- <u>39.4</u>	<u>-0.6</u>	38.8	<u>-0.1</u>	38.7	9.5190623
	<u>02.2</u>	<u>-1.9</u>		<u>-0.3</u>		
1-3						4.2705310
1-2						3.7906861
2-3						4.0156166
1 Teiteir	139-33-19.1	+0.4	19.5	0.0	19.5	0.1879479
2 Engebi	22-44-08.3	+0.3	08.6	0.0	08.6	9.5871283
3 Boga	17-42- <u>31.6</u>	<u>+0.3</u>	31.9	<u>0.0</u>	31.9	9.4831312
	<u>59.0</u>	<u>+1.0</u>		<u>0.0</u>		
1-3						3.7906928
1-2						3.6866957

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COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOE
 EXECUTIVE ORDER 11652, JULY 15, 1994
 FROM ENERGY SERVICES TO
 DERRICK S. NIXON

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE March 8, 1950

STATION	OBSERVED ANGLE	CORR-N	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						3.8747533
1 Sand	38-53-14.2	+ 0.8	15.0	- 0.0	15.0	0.2021834
2 Coral	34-01-32.5	+ 0.8	33.3	- 0.0	33.3	9.7478528
3 North Base	107-05-10.9	+ 0.9	11.8	- 0.1	11.7	9.9803951
	57.6	+ 2.5		- 0.1		
1-3						3.8247895
1-2						4.0573318
2-3						4.0573318
1 Parry	39-44-35.3	- 0.6	34.7	- 0.1	34.6	0.1942652
2 Coral	35-01-13.8	- 0.6	13.2	- 0.1	13.1	9.7588110
3 Sand	105-14-13.1	- 0.7	12.4	- 0.1	12.3	9.9844590
	02.2	- 1.9		- 0.3		
1-3						4.0104080
1-2						4.2360560
2-3						3.8747533
1 Parry	25-42-13.5	+ 0.1	13.6	- 0.1	13.5	0.3627925
2 Coral	69-02-46.3	+ 0.1	46.4	- 0.1	46.3	9.9702860
3 North Base	85-15-00.3	+ 0.0	00.3	- 0.1	00.2	9.9985058
	00.1	+ 0.2		- 0.3		
1-3						4.2078318
1-2						4.2360516
2-3						4.2078318
1 Sand	144-07-27.3	+ 0.2	27.5	- 0.1	27.4	0.2320808
2 Parry	14-02-21.8	+ 0.1	21.9	- 0.0	21.9	9.3848717
3 North Base	21-50-10.6	+ 0.1	10.7	- 0.0	10.7	9.5704917
	59.7	+ 0.4		- 0.1		
1-3						3.8247843
1-2						4.0104043

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COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOE
LETTER DATED ONLY, 15, 1994
FROM ANTON SERRICELLI TO
DIANE S. NIXON

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE March 10, 1950

STATION	OBSERVED ANGLE	CORR-N	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						3.9984988
1 <i>Bokon</i>	62-59-24.7	+ 0.2	24.9	- 0.0	24.9	0.0501568
2 <i>Aoman</i>	86-53-44.1	+ 0.3	44.4	- 0.1	44.3	9.9993622
3 <i>Coral</i>	30-06- <u>50.7</u> 59.5	+ <u>0.1</u> + 0.6	50.8	- <u>0.0</u> - 0.1	50.8	9.7004647
1-3						4.0480178
1-2						3.7491203
2-3						3.8747533
1 <i>Piiraqi</i>	66-55-40.3	+ 0.2	40.5	- 0.0	40.5	0.0362062
2 <i>North Base</i>	79-53-48.5	+ 0.3	48.8	- 0.1	48.7	9.9932129
3 <i>Coral</i>	33-10- <u>30.7</u> 59.5	+ <u>0.1</u> + 0.6	30.8	- <u>0.0</u> - 0.1	30.8	9.7381472
1-3						3.9041724
1-2						3.6491067
2-3						3.6442259
1 <i>Islet</i>	48-33-58.9	0.0	58.9	0.0	58.9	0.1250993
2 <i>Pinnacle</i>	33-17-04.5	0.0	04.5	0.0	04.5	9.7394124
3 <i>Runit</i>	98-08- <u>56.6</u> 00.0	<u>0.0</u> 0.0	56.6	<u>0.0</u> 0.0	56.6	9.9955925
1-3						3.5087376
1-2						3.7649177
2-3						4.2360559
1 <i>Aniyaanii</i>	101-54-26.6	- 0.0	26.6	- 0.1	26.5	0.0094470
2 <i>Parry</i>	54-56-34.4	- 0.0	34.4	- 0.1	34.3	9.9130610
3 <i>Coral</i>	23-08- <u>59.2</u> 00.2	- <u>0.0</u> - 0.0	59.2	- <u>0.0</u> - 0.2	59.2	9.5945430
1-3						4.1585639
1-2						3.8400459

Bokon

Piiraqi

Islet

Aniyaanii

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COMPUTATION OF TRIANGLES

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE March 11, 1950

STATION	OBSERVED ANGLE	CORR-N	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						4.2360560
1 Eniwetok	47-43-42.2	+ 0.6	42.8	^{0.1} +0	42.7	0.1307881
2 Coral	14-59-39.5	+ ^{0.4} 0.5	^{39.9} 40.0	- 0.0	39.9	9.4128382
3 Parry	117-16-37.4	+ <u>0.1</u>	37.5	^{0.1} +0	37.4	9.9488044
1-3	<u>59.1</u>	+ <u>1.2</u>		- 2.0		3.7796823
1-2						4.3156485
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						

Eniwetok

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COMPUTATION OF TRIANGLES

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STATION	OBSERVED ANGLE	CORR-N	SPHERICAL ANGLE	SPHERICAL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						3.9732498
1 Photo	46-12-03.1	- 0.9	02.2	- 0.1	02.1	0.1416029
2 Engebi	61-31-01.2	+ 0.1	01.3	- 0.1	01.2	9.9439685
3 Aoman	72-16-55.7	+ 1.1	56.8	- 0.1	56.7	9.9788961
1-3	00.0	+ 0.3		- 0.3		4.0588211
1-2						4.0937487
2-3						4.0156166
1 Photo	43-39-32.7	+ 1.1	33.8	- 0.1	33.7	0.1609184
2 Boga	55-44-07.7	- 0.9	06.8	- 0.1	06.7	9.9172136
3 Engebi	80-36-19.6	+ 0.1	19.7	- 0.1	19.6	9.9941357
1-3	00.0	+ 0.3		- 0.3		4.0937486
1-2						4.1706707
2-3						
1						
2						
3						
1-3						
1-2						
2-3						
1						
2						
3						
1-3						
1-2						

Photo

Photo

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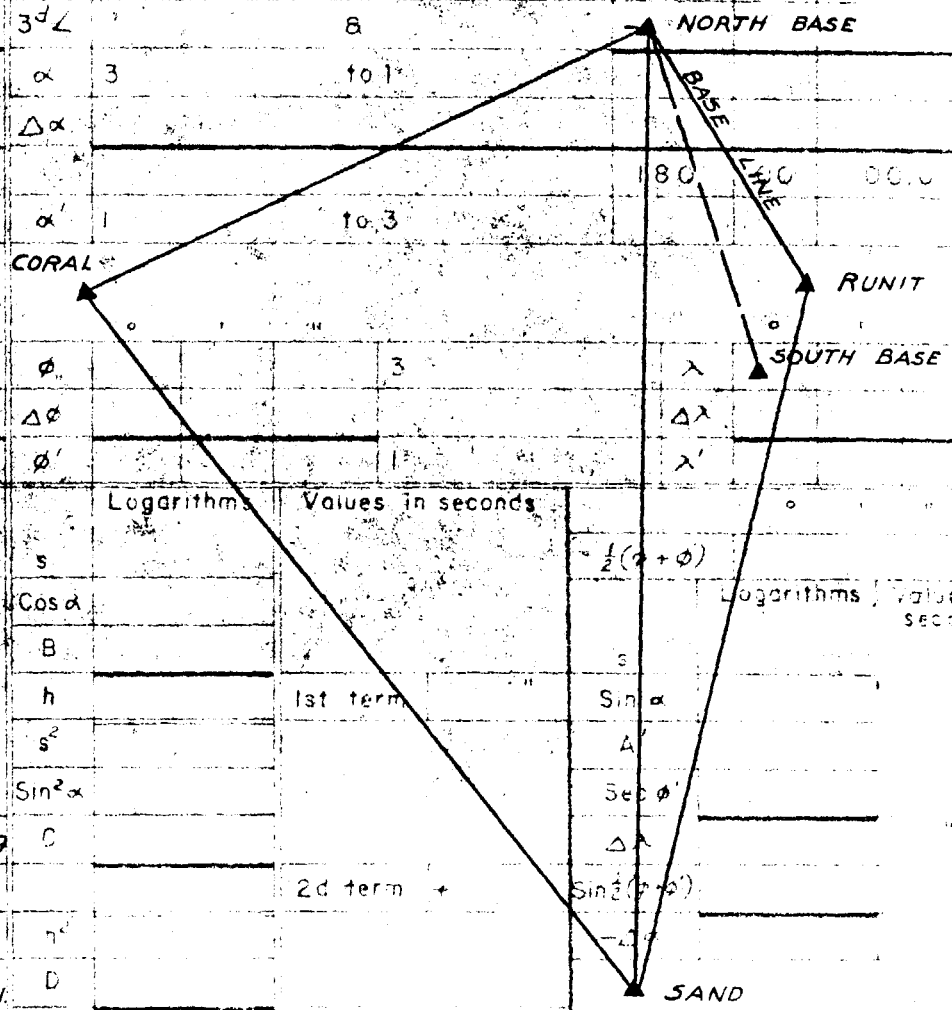
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HOLMES & NARVER ENGINEERS JOB N2 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2	103				α	3	to 2	
	8	+			$3^d \angle$		8	
North Base to Sand		327	56	52.40	α	3	to 1	
			+00	23.38	$\Delta \alpha$			
		180	00	00.0				
Sand to North Base		147	57	15.78	α'	1	to 3	



FIRST ANGLE OF TRIANGLE

11	33	23.265	North Base	λ	162	21	09.890	ϕ		3	λ	
		-3	04.284	$\Delta \lambda$		+1	56.983	$\Delta \phi$			$\Delta \lambda$	
11	30	18.981	Sand	λ'	162	23	06.873	ϕ'			λ'	

Logarithms	Values in seconds		Logarithms	Values in seconds	Logarithms	Values in seconds	
3.8247980		$\frac{1}{2}(\phi + \phi')$	11	31	51.123	$\frac{1}{2}(\lambda + \lambda')$	
9.9281739		Logarithms		Values in seconds		Logarithms	Values in seconds
8.5124992		s	3.8247980		B		
2.2654711	1st term + 184.2770	Sin α	9.7248412		h	1st term	
7.6495960		A'	8.5096676		s ²		
9.4496824		Sec ϕ'	0.0088155		Sin ² α		
0.71736		$\Delta \lambda$	2.0681223	+116.9829	C		
7.8166384	2d term + 0.0066	Sin ² $(\phi + \phi')$	9.3008037		2d term +		
4.5309422		$-\Delta \phi$	1.3689260	-23.3834	n'		
1.9851		NOTE: Position of North Base U.S.N. 1944 and azimuth of North Base U.S.N. to Sand U.S.N. has been held fixed in these computations.				D	
6.5160422	3d term + 0.0003				3d term +		
	$-\Delta \phi$	+184.2839			$-\Delta \phi$		

Check computation of Task Force Seven Survey

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

2 North Base to 3 Sand	327	56	52.40	α	3 Sand to 2 North Base	147	57	15.78
8	+107	05	20.48	$3^d L$	8	-38	53	11.73
2 North Base to 1 Coral	75	02	12.88	α	3 Sand to 1 Coral	109	04	04.05
		-00	47.84	$\Delta\alpha$			-01	11.10
	180	00	00.0			180	00	00.0
1 Coral to 2 North Base	255	01	25.04	α'	1 Coral to 3 Sand	289	02	52.95

FIRST ANGLE OF TRIANGLE

11 33 23.265 2 North Base	λ	162	21	09.890	ϕ	11 30 18.981 3 Sand	λ	162	23	06.873
-1 03.010	$\Delta\lambda$		-3	58.959	$\Delta\phi$	+2 01.274	$\Delta\lambda$		-5	55.942
11 32 20.255 1 Coral	λ'	162	17	10.931	ϕ'	11 32 20.255 1 Coral	λ'	162	17	10.931

Logarithms	Values in seconds			Logarithms	Values in seconds			
3.8747701		$\frac{1}{2}(\phi + \phi')$	11 -32-51.760	s	4.0573516	$\frac{1}{2}(\phi + \phi')$	11 -31-19.618	
9.4119507		Logarithms	Values in seconds	Cos α	9.5141314	Logarithms	Values in seconds	
8.5124992		s	3.8747701	B	8.5125007	s	4.0573516	
1.7992200	1st term +62.9825	Sin α	9.9850186	h	2.0839837	1st term -121.3342	Sin α	9.9754928
7.7495402		A'	8.5096676	s ²	8.1147032		A'	8.5096677
9.9700372		Sec ϕ'	0.0088675	Sin ² α	9.9509856		Sec ϕ'	0.0088675
0.7173600		$\Delta\lambda$	2.3783238 -238.9592	C	0.7153800		$\Delta\lambda$	2.5513796 -355.9444
8.4369374	2d term + 0.0274	Sin $\frac{1}{2}(\phi + \phi')$	9.3014290		8.7810688	2d term + 0.0604	Sin $\frac{1}{2}(\phi + \phi')$	9.3004785
3.5984400		$-\Delta\alpha$	1.6797528 +47.836	n'	4.1679674		$-\Delta\alpha$	1.8518581 + 71.098
1.9850000				D	1.9833000			
5.5834400	3d term + 0.0000				6.1512674	3d term + 0.0001		
	$-\Delta\phi$ +63.0099					$-\Delta\phi$ -121.2737		

Check computation of Task Force Seven Survey

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 JULY 15, 1994
 FROM AMICH SINISCALLI TO

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HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Coral	to 3 North Base	255	01	25.04	α	3 North Base	to 2 Coral	75	02	12.88
	8	+ 15	48	09.52	$3^d L$		8	-112	14	55.77
Coral	to 1 Runit	270	49	34.56	α	3 North Base	to 1 Runit	322	47	17.11
		+ 0	58.14		$\Delta \alpha$			+ 0		10.36
		180	00	00.0				180	00	00.0
Runit	to 2 Coral	90	50	32.70	α'	Runit	to 3 North Base	142	47	27.4 ₆

FIRST ANGLE OF TRIANGLE

11	32	20.255	2 Coral	λ	162	17	10.931	ϕ	11	33	23.265	3 North Base	λ	162	21	09.890
		- 0	04.175	$\Delta \lambda$		+ 4	50.690	$\Delta \phi$			- 1	07.185	$\Delta \lambda$		+ 0	51.731
11	32	16.080	Runit	λ'	162	22	01.621	ϕ'	11	32	16.080	Runit	λ'	162	22	01.621

Logarithms	Values in seconds		Logarithms	Values in seconds	Logarithms	Values in seconds	
3.9449421		$\frac{1}{2}(\phi + \phi')$	11-32-18.17	s	3.4136298	$\frac{1}{2}(\phi + \phi')$	11-32-49.67
8.1589826		Logarithms	Values in seconds	cos α	9.9011336	Logarithms	Values in seconds
8.5124997		s	3.9449421	B	8.5124992	s	3.4136298
0.6164244	1st term +4.1345	Sin α	9.9999548	b	1.8272626	1st term	+67.1835
7.88988		Δ'	8.5096677	s^2	6.82726	Δ'	8.5096676
9.99991		Sec ϕ'	0.0088657	m^2	9.56317	Sec ϕ'	0.0088660
0.71669		$\Delta \lambda$	2.4634303 +290.6900	C	0.71800	$\Delta \lambda$	1.7137498 +51.7309
8.60648	1st term + 0.0404	$\frac{1}{2}(\phi + \phi')$	9.3010828		7.10843	2d term	+ 0.0013
1.23285		$-\Delta \alpha$	1.7645131 -58.145	c^2	3.65453	$-\Delta \alpha$	1.0151573 -10.355
1.98450				D	1.98510		
3.21735	3d term + 0.0000				5.63963	3d term	+ 0.0000
	$-\Delta \phi$	+4.1749				$-\Delta \phi$	+67.1848

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GEOGRAPHIC POSITION COMPUTATIONS

HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Runit	to 3 Coral	90	50	32.7	α	3	to 2			
		+51	57	03.4	3Δ		8			
2 Runit	to North Base	142	47	36.1	α	3	to 1			
			-	10.4	$\Delta\alpha$					
		180	00	00.0				180	00	00.0
North Base	to 2 Runit	322	47	25.7	α'		to 3			

FIRST ANGLE OF TRIANGLE

11 32	16.080	2 Runit	λ	162	22	01.621	ϕ			3	λ		
	+ 1	07.187	$\Delta\lambda$			- 51.728	$\Delta\phi$				$\Delta\lambda$		
11 33	23.267	North Base	λ'	162	21	09.893	ϕ'				λ'		

Logarithms		Values in seconds				Logarithms		Values in seconds			
s	3.4136308			$\frac{1}{2}(\phi+\phi')$	11-32	-49.675	s			$\frac{1}{2}(\phi+\phi')$	
Cos α	9.9011639			Logarithms		Values in seconds	Cos α			Logarithms	Values in seconds
B	8.5125002			s	3.4136308		B				
h	1.8272949	1st term	-67.1885	Sin α	9.7815338		h		1st term		Sin α
s^2	6.82726			A'	8.5096678		s^2				A'
$\sin^2 \alpha$	9.56307			Sec ϕ'	0.0088946		$\sin^2 \alpha$				Sec ϕ'
C	0.71656			$\Delta\lambda$	1.7137270	-51.728	C				$\Delta\lambda$
	7.10689	2d term	+ .0013	$\sin^2(\phi-\phi')$	9.3014076				2d term	+	$\sin^2(\phi-\phi')$
	3.6546			$-\Delta\alpha$	1.0151043	+10.355	h^2				$-\Delta\alpha$
	1.9845						D				
	5.6391	3d term	+ .0000						3d term	+	
		$-\Delta\phi$	-67.1872						$-\Delta\phi$		

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 North Base to 3 Runit	322	47	25.7	α	3 Runit to 2 North Base	142	47	36.1
B	+ 72	38	25.7	3^{rd}	B	- 73	13	01.3
North Base to 1 Pinnacle	35	25	51.4	α	3 Runit to 1 Pinnacle	69	34	34.8
			- 16.9	Δx				- 27.3
Pinnacle to 2 North Base	180	00	00.0		Pinnacle to 3 Runit	180	00	00.0
	215	25	34.5	α		249	34	07.5

FIRST ANGLE OF TRIANGLE 34 - 08 - 33.0

// 33 23.267 North Base	λ	162	21	09.893	ϕ	// 32 16.080 3 Runit	λ	162	22	01.621
- 1 57.257	$\Delta \lambda$		- 1	24.586	$\Delta \phi$	- 0 50.070	$\Delta \lambda$		- 2	16.314
// 31 26.010 Pinnacle	λ'	162	19	45.307	ϕ'	// 31 26.010 Pinnacle	λ'	162	19	45.307

Logarithms	Values in seconds	$\frac{1}{2}(\phi + \phi')$	// - 32 - 29.638	Logarithms	Values in seconds	$\frac{1}{2}(\phi + \phi')$	// - 31 - 51.045	
3.6455679				3.6442259				
9.9110599		Logarithms	Values in seconds	9.5427746		Logarithms	Values in seconds	
8.5124992		s	3.6455679	B	8.5124998	s	3.6442259	
2.0691270	1st term +117.2538	Sin α	9.7632192	h	1.6995003	1st term +50.0611	Sin α	9.9718035
7.29114		A'	8.5096676	s ²	7.28845		A'	8.5096678
9.52644		Sec ϕ'	0.0088442	Sin ² α	9.94361		Sec ϕ'	0.0088442
0.71736		$\Delta \lambda$	1.9272989 - 84.586	C	0.71664		$\Delta \lambda$	2.1345414 - 136.314
7.53494	2d term + .0034	Sin ² ϕ'	9.3005820		7.94860	2d term + .0089	Sin ² ϕ'	9.3008029
4.1382		- $\Delta \phi$	1.2278809 + 16.900	h ²	3.3990		- $\Delta \phi$	1.4353443 + 27.258
1.9847				D	1.9845			
6.1229	3d term + .0001				5.3835	3d term + .0000		
	- $\Delta \phi$					- $\Delta \phi$		+50.0700

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 North Base to 3 Pinnacle	35	25	51.4	α	3 Pinnacle to 2 North Base	215	25	34.5
B	+39	36	16.5	$3^d L$	B	-105	49	36.9
North Base to 1 Coral	75	02	07.9	α	3 Pinnacle to 1 Coral	109	36	57.6
		-	47.8	$\Delta\alpha$			-	30.8
	180	00	00.0			180	00	00.0
Coral to 2 North Base	255	01	20.1	α	Coral to 3 Pinnacle	289	36	26.8

FIRST ANGLE OF TRIANGLE 34 - 35 - 06.7

11 33 23.267 2 North Base	λ	162	21	09.893	ϕ	11 31 26.010 3 Pinnacle	λ	162	19	45.307
- 1 03.013	$\Delta\lambda$		-3	58.949	$\Delta\phi$	+ 54.244	$\Delta\lambda$		-2	34.363
11 32 20.254 Coral	λ	162	17	10.944	ϕ	11 32 20.254 Coral	λ	162	17	10.944

Logarithms	Values in seconds			Logarithms	Values in seconds		
3.8747533		$\frac{1}{2}(\phi + \phi')$	11 - 32 - 51.760	3.6959722		$\frac{1}{2}(\phi + \phi')$	11 - 31 - 23.132
Cos α 9.4119899		Logarithms	Values in seconds	Cos α 9.5259702		Logarithms	Values in seconds
B 8.5124996		s	3.8747533	B 8.5125006		s	3.6959722
b 1.7992428	1st term +62.9858	Sin α	9.9850158	b 1.7344430	1st term -54.2555	Sin α	9.9740342
a ² 7.74951		A'	8.5096676	s ² 7.39194		A'	8.5096679
Sin ² α 9.97003		Sec ϕ	0.0088685	Sin ² α 9.94807		Sec ϕ	0.0088685
c 0.71736		$\Delta\lambda$	2.3783052 -238.949	c 0.71610		$\Delta\lambda$	2.1885428 -154.363
8.43690	2d term + .0273	Sin $\frac{1}{2}(\phi + \phi')$	9.3014290	8.05611	2d term + .0114	Sin $\frac{1}{2}(\phi + \phi')$	9.3005148
3.5985		$-\Delta\alpha$	1.6797342 +47.834	h ² 3.4689		$-\Delta\alpha$	1.4890576 +30.765
1.9851				D 1.9839			
5.5836	3d term + .0000			5.4528	3d term + .0000		
	$-\Delta\phi$ +63.0126				$-\Delta\phi$ -54.2441		

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 North Base to 3 Coral	75	02	07.9	α	3 Coral to 2 North Base	255	01	20.1
B	+ 81	28	05.9	$3^d L$	B	- 50	28	50.3
2 North Base to 1 Aoman	156	30	13.8	α	3 Coral to 1 Aoman	204	32	29.8
			- 20.6	$\Delta \alpha$				+ 27.4
	180	00	00.0			180	00	00.0
1 Aoman to 2 North Base	336	29	53.8	α	1 Aoman to 3 Coral	24	32	57.2

FIRST ANGLE OF TRIANGLE 48-03-03.9

11	33	23.267	2 North Base	λ	162	21	09.893	ϕ	11	32	20.254	3 Coral	λ	162	17	10.944
$\Delta \phi$	+ 3	52.015		$\Delta \lambda$		- 1	42.309	$\Delta \phi$	+ 4	55.028			$\Delta \lambda$	+ 2	16.641	
11	37	15.282	Aoman	λ	162	19	27.584	ϕ'	11	37	15.282	Aoman	λ'	162	19	27.584

Logarithms				Values in seconds				Logarithms				Values in seconds			
s	3.8906165			$\frac{1}{2}(\phi + \phi')$	11	35	19.275	s	3.9984988			$\frac{1}{2}(\phi + \phi')$	11	34	47.768
Cos α	9.9624104			Logarithms		Values in seconds		Cos α	9.9588790			Logarithms		Values in seconds	
B	8.5124992			s	3.8906165			B	8.5124997			s	3.9984988		
h	2.3655261	1st term	-232.0204	Sin α	9.6006329			h	2.4698775	1st term	-295.0377	Sin α	9.6184184		
s ²	7.78123			A'	8.5096676			s ²	7.99700			A'	8.5096678		
sin ² α	9.20127			Sec ϕ'	0.0089948			sin ² α	9.23684			Sec ϕ'	0.0089948		
C	0.71736			$\Delta \lambda$	2.0099118	-102.3085		C	0.71669			$\Delta \lambda$	2.1355798	+136.6402	
	7.69986	2d term	+ .0050	Sin $\frac{1}{2}(\phi + \phi')$	9.3029465				7.95053	2d term	+ .0089	Sin $\frac{1}{2}(\phi + \phi')$	9.3026229		
	4.7311			$-\Delta \alpha$	1.3128583	+ 20.552			4.9398			$-\Delta \alpha$	1.4382027	- 27.429	
	1.9851								1.9845						
	6.7162	3d term	+ .0005						6.9243	3d term	+ .0008				
		$-\Delta \phi$	-232.0149							$-\Delta \phi$	-295.0280				

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HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

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α	2 Aoman	to 3 Coral	24	32	57.2	α	3 Coral	to 2 Aoman	204	32	29.8
β		B	+ 94	05	59.1	β		B	- 41	24	01.9
α	2 Aoman	to 1 Engebi	118	38	56.3	α	3 Coral	to 1 Engebi	163	08	27.9
β					- 55.0	β					- 27.3
α			180	00	00.0	α			180	00	00.0
α	1 Engebi	to 2 Aoman	298	38	01.3	α	1 Engebi	to 3 Coral	343	08	00.5

FIRST ANGLE OF TRIANGLE 44 - 29 - 59.2

ϕ	11	37	15.282	2 Aoman	λ	162	19	27.584	ϕ	11	32	20.254	3 Coral	λ	162	17	10.944		
$\Delta\phi$			+ 2	26.682	$\Delta\lambda$			- 4	32.432	$\Delta\phi$			+ 7	21.710	$\Delta\lambda$		- 2	15.792	
ϕ'	11	39	41.964	Engebi	λ'	162	14	55.152	ϕ'	11	39	41.964	Engebi	λ'	162	14	55.152		
Logarithms				Values in seconds				Logarithms				Values in seconds							
s	3.9732497			$\frac{1}{2}(\phi+\phi')$	11 - 38 - 28.623			s	4.1517262			$\frac{1}{2}(\phi+\phi')$	11 - 36 - 01.109						
$\cos\alpha$	9.6807361			Logarithms	Values in seconds			$\cos\alpha$	9.9809219			Logarithms	Values in seconds						
B	8.5124972			s	3.9732497			B	8.5124997			s	4.1517262						
h	2.1664830			1st term	-146.7179			h	2.6451478			1st term	-441.7207						
	7.94650			A'	8.5096669			s^2	8.30345			A'	8.5096678						
$\sin^2\alpha$	9.88657			Sec ϕ	0.0090584			$\sin^2\alpha$	8.92484			Sec ϕ	0.0090584						
C	0.71984			$\Delta\lambda$	2.4352585			-272.4322	C	0.71669			$\Delta\lambda$	2.1328744			-135.7927		
	8.55291			2d term	+ .0357			$\sin(\phi+\phi')$	9.3048860				7.94498			2d term	+ .0088		
$\Delta\phi$	4.3330			$-\Delta\alpha$	1.7401445			+ 54.972	h^2	5.2903			$-\Delta\alpha$	1.4362502			+ 27.306		
D	1.9875								D	1.9845									
	6.3205			3d term	+ .0002					7.2748			3d term	+ .0019					
	$-\Delta\phi$			-146.6820						$-\Delta\phi$			-441.7100						

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Engebi to 3 Coral	343 08 00.5	α	3 Coral to 2 Engebi	163 08 27.9
B	+ 97 37 21.8	$3^d L$	B	-33 26 35.1
2 Engebi to 1 Boga	80 45 22.3	α	3 Coral to 1 Boga	129 41 52.8
	-1 08.2	$\Delta \alpha$		-1 35.2
Boga to Engebi	180 00 00.0	α	Boga to 3 Coral	180 00 00.0
	260 44 14.1	α		309 40 17.6

FIRST ANGLE OF TRIANGLE 48-56-03.5

11 39 41.964 2 Engebi	λ 162 14 55.152	ϕ 11 32 20.254 3 Coral	λ 162 17 10.944
- 54.250	$\Delta \lambda$ -5 37.786	$\Delta \phi$ +6 27.461	$\Delta \lambda$ -7 53.579
11 38 47.714 1 Boga	λ 162 09 17.366	ϕ 11 38 47.715 1 Boga	λ 162 09 17.365

Logarithms	Values in seconds		Logarithms	Values in seconds		Logarithms	Values in seconds
4.0156166		$\frac{1}{2}(\phi + \phi')$	4.2705251		$\frac{1}{2}(\phi + \phi')$	11 - 35 - 33.984	
9.2058438		Logarithms	9.8053248		Logarithms		
8.5124960		Values in seconds	8.5124997		Values in seconds		
1.7339564	1st term + 54.1948	Sin α	2.5883496	1st term - 387.5695	Sin α	9.8861645	
8.03123		A	8.54105		A	8.5096678	
9.98865		Sec ϕ	9.77233		Sec ϕ	0.0090348	
0.72139		$\Delta \lambda$	0.71669		$\Delta \lambda$	2.6753922 - 473.578	
8.74127	2d term + .0551	Sin $\frac{1}{2}(\phi + \phi')$	9.03007	2d term + .1072	Sin $\frac{1}{2}(\phi + \phi')$	9.3030975	
3.4679		$-\Delta \alpha$	5.1767		$-\Delta \alpha$	1.9784897 + 95.168	
1.9888			1.9845				
5.4567	3d term + .0000		7.1612	3d term + .0016			
	$-\Delta \phi$ + 54.2499			$-\Delta \phi$ - 387.4607			

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Engebi	to 3 Coral	343	08	00.5	α	3 Coral	to 2 Engebi	163	08	27.9
	B	+120	21	31.2	$3\alpha/2$	B		-14	08	56.7
2 Engebi	to 1 Teiteir	103	29	31.7	α	3 Coral	to 1 Teiteir	148	59	31.2
				-31.6	$\Delta\alpha$					-58.7
		180	00	00.0				180	00	00.0
1 Teiteir	to 2 Engebi	283	29	00.1	α'	1 Teiteir	to 3 Coral	328	58	32.5
										4

FIRST ANGLE OF TRIANGLE 45-29-32.3

11 39 41.964	2 Engebi	λ	162	14	55.152	ϕ	11 32 20.254	3 Coral	λ	162	17	10.944
+ 36.899		$\Delta\lambda$			-2 36.066	$\Delta\phi$	+ 7 58.609		$\Delta\lambda$			-4 51.859
11 40 18.863	1 Teiteir	λ'	162	12	19.086	ϕ'	11 40 18.863	1 Teiteir	λ'	162	12	19.085

Logarithms	Values in seconds			Logarithms	Values in seconds		
3.6867231		$\frac{1}{2}(\phi+\phi')$	11-40-00.414	4.2344911		$\frac{1}{2}(\phi+\phi')$	11-36-19.564
9.3679370		Logarithms	Values in seconds	9.9330291		Logarithms	Values in seconds
8.5124960		s	3.6867231	B	8.5124997	s	4.2344911
1.5671561	1st term -36.9110	Sin α	9.9878430	h	2.6800199	1st term	-478.6520
7.37345		A	8.5096665	s ²	8.46898	A	8.5096678
9.97569		Sec ϕ	0.0090744	Sin ² α	9.42388	Sec ϕ	0.0090744
0.72139		$\Delta\lambda$	2.1933070 -156.0655	C	0.71669	$\Delta\lambda$	2.4651735 -291.8592
8.07053	2d term + .0118	Sin $\frac{1}{2}(\phi+\phi')$	9.3058231		8.60955	2d term	+ .0407
3.1343		$-\Delta\phi$	1.4991301 +31.559	h ²	5.3600	Sin $\frac{1}{2}(\phi+\phi')$	9.3035650
1.9888				D	1.9845	$-\Delta\alpha$	1.7687385 +58.714
5.1231	3d term + .0000				7.3445	3d term	+ .0022
	$-\Delta\phi$					$-\Delta\phi$	-478.6091

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Coral	to 3 North Base	255	01	20.1	*	3 North Base to 2 Coral	75	02	07.9
		+ 34	01	33.3	3 ^d L		-107	05	11.8
2 Coral	to 1 Sand	289	02	53.4	α	3 North Base to 1 Sand	327	56	56.1
		+ 1	11.1		Δα			+	23.4
		180	00	00.0			180	00	00.0
Sand	to 2 Coral	109	04	04.5	α'	Sand to 3 North Base	147	57	19.5

FIRST ANGLE OF TRIANGLE 38-53-15.0

11	32	20.254	2 Coral	λ	162	17	10.944	φ	11	33	23.267	3 North Base	λ	162	21	09.893	
Δφ	- 2	01.269		Δλ		+ 5	55.926	Δφ		- 3	04.282		Δλ		+ 1	56.977	
φ'	11	30	18.985	Sand	λ'	162	23	06.870	φ'	11	30	18.985	Sand	λ'	162	23	06.870

Logarithms		Values in seconds		Logarithms		Values in seconds	
s	4.0573318	$\frac{1}{2}(\phi + \phi')$ 11-31-19.620		s	3.8247895	$\frac{1}{2}(\phi + \phi')$ 11-31-51.126	
Cos α	9.5137013	Logarithms	Values in seconds	Cos α	9.9281783	Logarithms	Values in seconds
B	8.5124997	s	4.0573318	B	8.5124992	s	3.8247895
h	2.0835328	1st term	+121.2084	h	2.2654670	1st term	+184.2753
s ²	8.11466	Sin α	9.9755442	s ²	7.64958	Sin α	9.7248287
sin ² α	9.95109	A'	8.5096677	sin ² α	9.44966	A'	8.5096676
C	0.71669	Sec φ'	0.0088155	C	0.71733	Sec φ'	0.0088155
	8.78244	Δλ	2.5513592 +355.9256		7.81657	Δλ	2.0681013 +116.9772
	4.1671	2d term	+ .0606		4.5309	2d term	+ .0066
	1.9845	Sin $\frac{1}{2}(\phi + \phi')$	9.3004785		1.9851	Sin $\frac{1}{2}(\phi + \phi')$	9.3008037
	6.1516	-Δα	1.8518377 -71.095		6.5160	-Δα	1.3689050 -23.385
		3d term	+ .0001			3d term	+ .0003
		- Δφ	+121.2691			- Δφ	+184.2822

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Coral	to 3 Sand	289 02 53.4	α	3 Sand	to 2 Coral	109 04 04.5	
B		+ 35 01 13.2	$3^d L$	B		-105 14 12.4	
2 Coral	to 1 Parry	324 04 06.6	α	3 Sand	to 1 Parry	3 49 52.1	
		+ 1 06.3	$\Delta \alpha$			- 04.5	
		180 00 00.0				180 00 00.0	
1 Parry	to 2 Coral	144 05 19.0	α	1 Parry	to 3 Sand	183 49 47.6	
FIRST ANGLE OF TRIANGLE: 39-44-34.6							
11 32 20.254	2 Coral	λ 162 17 10.944	ϕ	11 30 18.985	3 Sand	λ 162 23 06.870	
$\Delta \phi$ -7 33.882		$\Delta \lambda$ -5 33.350	$\Delta \phi$	-5 32.613		$\Delta \lambda$ - 22.575	
ϕ 11 24 46.372	1 Parry	λ 162 22 44.294	ϕ	11 24 46.372	1 Parry	λ 162 22 44.294	
Logarithms	Values in seconds			Logarithms	Values in seconds		
s 4.2360560		$\frac{1}{2}(\phi + \phi')$	11 - 28 - 33.313	s 4.0104080		$\frac{1}{2}(\phi + \phi')$	11 - 27 - 32.610
Cos α 9.9083344		Logarithms	Values in seconds	Cos α 9.9990284		Logarithms	Values in seconds
B 8.5124997		s 4.2360560		B 8.5125007		s 4.0104080	
h 2.6568901	1st term +453.8267	Sin α 9.7685032		h 2.5219371	1st term +332.6114	Sin α 8.8248816	
s^2 8.47211		A' 8.5096677		s^2 8.02082		A' 8.5096681	
Sin $^2 \alpha$ 9.53701		Sec ϕ 0.0086735		Sin $^2 \alpha$ 7.64976		Sec ϕ 0.0086735	
C 0.71669		$\Delta \lambda$ 2.5229009	-333.3503	C 0.71538		$\Delta \lambda$ 1.3536312	-22.5750
8.72581	2d term + .0532	Sin $\frac{1}{2}(\phi + \phi')$	9.2987573	6.38596	2d term + .0002	Sin $\frac{1}{2}(\phi + \phi')$	9.2981279
h 2 5.3138		$-\Delta \alpha$ 1.8216582	-66.322	h 2 5.0439		$-\Delta \alpha$ 0.6517591	+ 4.485
D 1.9845				D 1.9832			
7.2983	3d term + .0020			7.0271	3d term + .0011		
$-\Delta \phi$	+453.8819			$-\Delta \phi$	+332.6127		

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Parry to 3 Coral	144 05 13.0	α	3 Coral to 2 Parry	324 04 06.6
8	+ 54 56 34.4	$3^d \angle$	8	- 23 08 59.2
2 Parry to 1 Aniyaanii	199 01 47.4	α	3 Coral to 1 Aniyaanii	300 55 07.4
	+ 14.8	$\Delta \alpha$		+ 1 21.3
	180 00 00.0			180 00 00.0
Aniyaanii to 2 Parry	19 02 02.2	α	Aniyaanii to 3 Coral	120 56 28.7

FIRST ANGLE OF TRIANGLE 101-54-26.6

11 24 46.372 2 Parry	λ	162 22 44.294	ϕ	11 32 20.254 3 Coral	λ	162 17 10.944
+ 3 32.880	$\Delta \lambda$	+ 1 14.435	$\Delta \phi$	- 4 01.002	$\Delta \lambda$	+ 6 47.785
11 28 19.252 Aniyaanii	λ	162 23 58.729	ϕ	11 28 19.252 Aniyaanii	λ	162 23 58.729

Logarithms	Values in seconds		Logarithms	Values in seconds	Logarithms	Values in seconds	
3.8400459		$\frac{1}{2}(\phi + \phi')$	11-26-32.812	s	4.1585639	$\frac{1}{2}(\phi + \phi')$	11-30-19.753
9.9755921		Logarithms	Values in seconds	Cos α	9.7108123	Logarithms	Values in seconds
8.5125035		s	3.8400459	B	8.5124997	s	4.1585639
2.3281415	1st term -212.8832	Sin α	9.5132981	h	2.3818759	1st term	+240.9217
7.68009		A'	8.5096690	s ²	8.31713	A'	8.5096677
9.02655		Sec ϕ'	0.0087642	Sin ² α	9.86687	Sec ϕ'	0.0087642
0.71179		$\Delta \lambda$	1.8717772 +74.4350	C	0.71669	$\Delta \lambda$	2.6104310 +407.7849
7.41843	2d term + .0026	Sin $\frac{1}{2}(\phi + \phi')$	9.2975056		8.90069	2d term	+ .0796
4.6563		$-\Delta \alpha$	1.1692828 -14.767	n ²	4.7638	$-\Delta \alpha$	1.9102907 -81.338
1.9800				D	1.9845		
6.6363	3d term + .0004				6.7483	3d term	+ .0006
	$-\Delta \phi$	-212.8802				$-\Delta \phi$	+241.0019

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Coral	to 3 Parry	324	04	06.6	α	3 Parry	to 2 Coral	144	05	13.0
	B	+ 14	59	40.0	$3^d L$		B	-117	16	37.5
2 Coral	to 1 Eniwetok	339	03	46.6	α	3 Parry	to 1 Eniwetok	26	48	35.5
			+ 48.4		$\Delta\alpha$				-	17.7
		180	00	00.0				180	00	00.0
1 Eniwetok	to 2 Coral	159	04	35.0	α	1 Eniwetok	to 3 Parry	206	48	17.8

FIRST ANGLE OF TRIANGLE 47-43-42.8

11	32	20.254	2 Coral	λ	162	17	10.944	ϕ	11	24	46.372	3 Parry	λ	162	22	44.294	
	-10	28.789		$\Delta\lambda$	+ 4	03.781		$\Delta\phi$		- 2	54.907		$\Delta\lambda$	- 1	29.569		
	11	21	51.465	Eniwetok	λ	162	21	14.725	ϕ	11	21	51.465	Eniwetok	λ	162	21	14.725

Logarithms		Values in seconds				Logarithms		Values in seconds				
s	4.3156485			$\frac{1}{2}(\phi + \phi')$	11-27-05.860	s	3.7796823			$\frac{1}{2}(\phi + \phi')$	11-23-18.919	
ss	9.9703346			Logarithms	Values in seconds	Cos α	9.9506122			Logarithms	Values in seconds	
s	8.5124997			s	4.3156485	B	8.5125035			s	3.7796823	
h	2.7984828	1st term	+628.7570	Sin α	9.5530842	h	2.2427980	1st term	+174.9033	Sin α	9.6542065	
ss	8.63130			A	8.5096677	s ²	7.55936			A	8.5096690	
s	9.10617			Sec ϕ'	0.0085993	Sin ² α	9.30844			Sec ϕ'	0.0085993	
ss	0.71669			$\Delta\lambda$	2.3869997	+243.7810	C	0.71179		$\Delta\lambda$	1.9521571	-89.5689
ss	8.45416	2d term	+ .0286	Sin $\frac{1}{2}(\phi + \phi')$	9.2978492			7.57959	2d term	+ .0038	Sin $\frac{1}{2}(\phi + \phi')$	9.2954837
ss	5.5970			$-\Delta\alpha$	1.6848489	- 48.400	n ²	4.4856		$-\Delta\alpha$	1.2476408	+17.686
ss	1.9845						D	1.9800				
ss	7.5815	3d term	+ .0038					6.4656	3d term	+ .0003		
		$-\Delta\phi$	+628.7894						$-\Delta\phi$	+174.9074		

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Pinnacle to 3 Runit	249	34	07.5	α	3 Runit to 2 Pinnacle	69	34	34.8
8	+ 33	17	04.5	3α	8	- 98	08	56.6
2 Pinnacle to 1 Islet	282	51	12.0	α	3 Runit to 1 Islet	331	25	38.2
			+ 37.4	$\Delta\alpha$				+ 10.2
180	00	00.0			180	00	00.0	
1 Islet to 2 Pinnacle	102	51	49.4	α	1 Islet to 3 Runit	151	25	48.4
								3

FIRST ANGLE OF TRIANGLE 48 - 33 - 58.9

11 31 26.010 2 Pinnacle	λ	162	19	45.307	ϕ	11 32 16.080 3 Runit	λ	162	22	01.621
- 42.154	$\Delta\lambda$		+ 33	07.237	$\Delta\phi$	- 1 32.224	$\Delta\lambda$		+ 50.922	
11 30 43.856 1 Islet	λ	162	22	52.544	ϕ	11 30 43.856 1 Islet	λ	162	22	52.544

Logarithms	Values in seconds	1st		Logarithms	Values in seconds	2nd	
3.7649177		$\frac{1}{2}(\phi + \phi')$	11 - 31 - 04.933	3.5087376		$\frac{1}{2}(\phi + \phi')$	11 - 31 - 29.968
9.3472444		Logarithms	Values in seconds	3.5087376		Logarithms	Values in seconds
8.5125002		s	3.7649177	8.5124998		s	3.5087376
1.6246623	1st term + 42.1369	$\sin \alpha$	9.9889791	1.9648361	1st term + 92.2224	$\sin \alpha$	9.6796766
7.52984		A	8.5096679	7.01748		A	8.5096677
9.97796		Sec ϕ	0.0088261	$\sin^2 \alpha$	9.35935	Sec ϕ	0.0088261
0.71610		$\Delta\lambda$	2.2723908 + 187.2366	C	0.71664	$\Delta\lambda$	1.7069080 + 50.9223
8.22390	2d term + .0167	$\sin \frac{1}{2}(\phi + \phi')$	9.3003268		7.09347	2d term + .0012	$\sin \frac{1}{2}(\phi + \phi')$
3.2493		$-\Delta\alpha$	1.5727176 - 37.387	h^2	3.9397	$-\Delta\alpha$	1.0074934 - 10.174
1.9840				D	1.9845		
5.2233	3d term + .0000				5.9242	3d term + .0000	
	$-\Delta\phi$ + 42.1536					$-\Delta\phi$ - 92.2236	

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 North Base to 3 Coral	75	02	07.9	α	3 Coral to 2 North Base	255	01	20.1
8	+79	53	48.8	$3^d L$	8	-33	10	30.8
1 North Base to 1 Piiraa	154	55	56.7	α	3 Coral to 1 Piiraa	221	50	49.3
			-12.5	$\Delta \alpha$				+35.4
	180	00	00.0			180	00	00.0
1 Piiraa to 2 North Base	334	55	44.2	α	1 Piiraa to 3 Coral	41	51	24.7

FIRST ANGLE OF TRIANGLE 66-55-40.5

11 33 23.267 2 North Base	α	162	21	09.893	ϕ	11 32 20.254 3 Coral	α	162	17	10.944
+ 2 11.412	$\Delta \lambda$		-1	02.341	$\Delta \phi$	+ 3 11.426	$\Delta \lambda$		+ 2	56.608
11 35 34.679 1 Piiraa	α	162	20	07.552	ϕ	11 35 34.600 1 Piiraa	α	162	20	07.552

Logarithms	Values in seconds		Logarithms	Values in seconds		Logarithms	Values in seconds
3.6491067		$\frac{1}{2}(\phi + \phi')$	11-34-28.973			3.9041724	
9.9570365		Logarithms	Values in seconds			Logarithms	Values in seconds
8.5124996		ϕ	3.6491067		B	8.5124997	
2.1186428	1st term -131.4143	$\sin \alpha$	9.6270451		H	2.2887868	1st term -194.4405
7.29821		A	8.5096676		S^2	7.80834	
9.25409		$\sec \phi$	0.0089513		$\sin^2 \alpha$	9.64844	
0.71736		$\Delta \lambda$	1.7947707	-62.341	C	0.71669	
7.26966	2d term + .0019	$\sin \frac{1}{2}(\phi + \phi')$	9.3024296			8.17347	2d term + .0149
4.2373		$-\Delta \alpha$	1.0972003	+12.508	h^2	4.5776	
1.9851					D	1.9845	
6.2224	3d term + .0000					6.5621	3d term + .0000
	$-\Delta \phi$						$-\Delta \phi$
	-131.4124						-194.4256

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HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

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2 Aoman to 3 Coral	24	32	57.2	α	3 Coral to 2 Aoman	204	32	29.8
	+86	53	44.4	$3^d L$		-30	06	50.8
2 Aoman to 1 Bokon	111	26	41.6	α	3 Coral to 1 Bokon	174	25	39.0
			34.7	$\Delta\alpha$				07.2
	180	00	00.0			180	00	00.0
1 Bokon to 2 Aoman	291	26	06.9	α	1 Bokon to 3 Coral	354	25	31.8

FIRST ANGLE OF TRIANGLE 62-59-24.9

ϕ	11	37	15.282	2 Aoman	λ	162	19	27.584	ϕ	11	32	20.254	3 Coral	λ	162	17	10.944
$\Delta\phi$		+1	06.764		$\Delta\lambda$		-2	52.446	$\Delta\phi$		+6	01.791		$\Delta\lambda$			-35.806
ϕ'	11	38	22.046	1 Bokon	λ'	162	16	35.138	ϕ'	11	38	22.045	1 Bokon	λ'	162	16	35.138

Logarithms				Values in seconds				Logarithms				Values in seconds			
s	3.7491203			$\frac{1}{2}(\phi + \phi')$	11-37-48.662			s	4.0480178			$\frac{1}{2}(\phi + \phi')$	11-35-21.150		
Cos α	9.5630135			Logarithms		Values in seconds		Cos α	9.9979427			Logarithms		Values in seconds	
B	8.5124992			s	3.7491203			B	8.5124997			s	4.0480178		
h	1.8246330	1st term	-66.7779	Sin α	9.9688423			h	2.5584602	1st term	-361.7930	Sin α	8.9872425		
s ²	7.49824			A	8.5096676			s ²	8.09604			A	8.5096677		
Sin ² α	9.93768			Sec ϕ'	0.0090237			Sin ² α	7.97449			Sec ϕ	0.0090237		
C	0.71736			$\Delta\lambda$	2.2366539	-172.4463		C	0.71669			$\Delta\lambda$	1.5539517	-35.8057	
	8.15328	2d term	+ .0142	Sin $\frac{1}{2}(\phi + \phi')$	9.3044775				6.78722	2d term	+ .0006	Sin $\frac{1}{2}(\phi + \phi')$	9.3029656		
n ²	3.6493			$-\Delta\alpha$	1.5411314	+34.764		n ²	5.1169			$-\Delta\alpha$	0.8569173	+ 7.193	
D	1.9851							D	1.9845						
	5.6344	3d term	+ .0000						7.1014	3d term	+ .0013				
		$-\Delta\phi$	-66.7637							$-\Delta\phi$	-361.7911				

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HOLMES & NARVER ENGINEERS JOB N2 640

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

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2 Boga	to 3 Engebi	260	44	14.1	α	3 Engebi	to 2 Boga	80	45	22.3
	B	+ 55	44	06.8	$3^d L$		B	- 80	36	19.7
2 Boga	to 1 Photo	316	28	20.9	α	3 Engebi	to 1 Photo	0	09	02.6
			+ 1	07.7	$\Delta \alpha$				-	00.2
		180	00	00.0				180	00	00.0
1 Photo	to 2 Boga	136	29	28.6	α	1 Photo	to 3 Engebi	180	09	02.4

FIRST ANGLE OF TRIANGLE

11 38 47.715	2 Boga	λ	162	09	17.366	ϕ	11 39 41.964	3 Engebi	λ	162	14	55.152
- 5 49.623		$\Delta \lambda$		+ 5	36.708	$\Delta \phi$	- 6 43.873		$\Delta \lambda$		-	01.078
11 32 58.098	1 Photo	λ'	162	14	54.074	ϕ'	11 32 58.091	1 Photo	λ'	162	14	54.074

Logarithms	Values in seconds			Logarithms	Values in seconds			
4.1706707		$\frac{1}{2}(\phi + \phi')$	11-35-52.903	s	4.0937486	$\frac{1}{2}(\phi + \phi')$	11-36-20.028	
9.8603641		Logarithms	Values in seconds	Cos α	9.9999985	Logarithms	Values in seconds	
8.5124964		s	4.1706707	B	8.5124960	s	4.0937486	
2.5435312	1st term +349.5674	Sin α	9.8380320	h	2.6062431	1st term +403.8712	Sin α	7.4200540
8.34134		A'	8.5096666	s ²	8.18750		A'	8.5096665
9.67606		Sec ϕ	0.0088838	Sin ² α	4.84011		Sec ϕ	0.0088838
0.72082		$\Delta \lambda$	2.5272531 +336.7078	C	0.72139		$\Delta \lambda$	0.0323529 -1078
8.73822	2d term + .0547	Sin $\frac{1}{2}(\phi + \phi')$	9.3032916		3.74900	2d term + .0000	Sin $\frac{1}{2}(\phi + \phi')$	9.3035698
5.0871		$-\Delta \alpha$	1.8305447 -67.693	h ²	5.2125		$-\Delta \alpha$	9.3359227 +0.217
1.9884				D	1.9888			
7.0755	3d term + .0012				72013	3d term + .0016		
	$-\Delta \phi$		+349.6233			$-\Delta \phi$		+403.8728

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HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

2 Engebi to 3 Aoman	298 38 01.3	α	3 Aoman to 2 Engebi	118 38 56.3
8	+ 61 31 01.3	$3^d \angle$	8	- 72 16 56.8
Engebi to 1 Photo	0 09 02.6	α	3 Aoman to 1 Photo	46 21 59.5
	- 0.2	$\Delta \alpha$		- 54.9
Photo to 2 Engebi	180 09 02.4	α'	1 Photo to 3 Aoman	226 21 04.6

FIRST ANGLE OF TRIANGLE

11 39 41.964 2 Engebi	λ	162 14 55.152	ϕ	11 37 15.282 3 Aoman	λ	162 19 27.584
- 6 43.873	$\Delta \lambda$	- 01.077	$\Delta \phi$	- 4 17.191	$\Delta \lambda$	- 4 33.509
11 32 58.091 1 Photo	λ'	162 14 54.075	ϕ'	11 32 58.091 1 Photo	λ'	162 14 54.075

Logarithms	Values in seconds		Logarithms	Values in seconds		Logarithms	Values in seconds	
4.0937487		$\frac{1}{2}(\phi + \phi')$	11 - 36 - 20.028	s	4.0588211	$\frac{1}{2}(\phi + \phi')$	11 - 35 - 06.686	
9.9999985		Logarithms	Values in seconds	Cos λ	9.8388758	Logarithms	Values in seconds	
8.5124960		s	4.0937487	B	8.5124972	s	4.0588211	
2.6062432	1st term +403.8715	Sin α	7.4200540	h	2.4101941	1st term +257.1545	Sin α	9.8595999
8.18750		A'	8.5096665	s^2	8.11764		A'	8.5096669
4.84011		Sec ϕ'	0.0088838	Sin $^2 \alpha$	9.71920		Sec ϕ'	0.0088838
0.72139		$\Delta \lambda$	0.0323580 -1.0774	C	0.71984		$\Delta \lambda$	2.4369717 -273.509
3.74900	2d term + .0000	Sin $^2(\phi + \phi')$	9.3035698		8.55668	2d term + .0360	Sin $^2(\phi + \phi')$	9.3028172
5.2125		$-\Delta \alpha$	9.3359278 +0.217	h^2	4.8204		$-\Delta \alpha$	1.7397889 +54.927
1.9888				D	1.9875			
7.2013	3d term + .0016				6.8079	3d term + .0006		
	$-\Delta \lambda$ +403.8731					$-\Delta \phi$ +257.1911		

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BASE LINE COMPUTATIONS

UNCLASSIFIED PER NND
DATE 08-11-1994
BY SP-6 JMM/STW/STW
FBI/DOJ

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HOLMES & NARVER ENGINEERS JOB NO. 640

COMPUTATION OF RUNIT ISLAND BASE LINE

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE Feb. 28, 1950

SECTION	DATE	DIR OF MEAS	TAPE NO	TAPE SUPPORT	UNCORRECTED LENGTH		TEMP	CORRECTIONS					REDUCED LENGTH	ALCPTELLNGTH	V	C
					TAPE LENGTH	METERS		TEMP	TAPE AND CATENARY	SET-UP SET-BACK	INC. INCLINATION	SEA LEVEL				
Δ North Base							" C "									
Stake No 2	2-24-50	F	6464	2		18.5349	38.0	+0.0001			18.5350	-0.0004	18.5346			
" " 3		F		2	$\frac{1}{2}$	25	34.0	+0.0002			-0.0579	-0.0000	24.9423			
" " 4		F		3	1	50	32.0	+0.0002				-0.0006	49.9996			
" " 5		F		3	1	50	32.0	+0.0002				-0.0040	49.9962			
" " 6		F		3	1	50	32.0	+0.0002				-0.0003	49.9999			
" " 7A		F		3	1	50	32.0	+0.0002			-0.0432	-0.0022	49.9548			
													243.4274	243.4274		
Stake No 7A																
" " 6	2-24-50	B		3	1	50	30.0	+0.0002				-0.0022	49.9980			
" " 5		B		3	1	50	32.5	+0.0002				-0.0003	49.9999			
" " 4		B		3	1	50	34.0	+0.0003				-0.0040	49.9963			
" " 3		B		3	1	50	34.0	+0.0003			-0.0434	-0.0006	49.9563			
" " 2		B		2	$\frac{1}{2}$	25	34.0	+0.0002			-0.0579	-0.0000	24.9423			
Δ North Base		B		2		18.5349	38.0	+0.0001				-0.0004	18.5346			
													243.4274			

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SINESGALLI TO
DILANE S. NIXON

OFFICIAL USE ONLY

HOLMES & NARVER ENGINEERS JOB NO. 640

OFFICIAL USE ONLY

COMPUTATION OF RUNIT ISLAND BASE LINE

DECLASSIFIED PER DOE
 LETTER DATED JULY, 15, 1994
 FROM ACTION CIRCULAR TO,
 DEANE S. NIXON

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE Feb. 24, 1950

SECTION	DATE	DIR. OF MEAS.	TAPE NO.	TAPE SUPPORT	UNCORRECTED LENGTH		TEMP	COR - RECTIONS			REDUCED LENGTH	ADJUSTED LENGTH	V	V V
					TAPE LNTH	METERS		TEMP	TAPE AND CATENARY	SET-UP SET-BACK				
							"C"	METERS	METERS	METERS	METERS	METERS	MM.	MM.
Stake No. 7A														
" " 8	2-24-50	F	6621	3	1	50	34.5	+0.0003		-0.0734	-0.0000	49.9269		
" " 9		F		3	1	50	35.5	+0.0003			-0.0020	49.9983		
" " 10		F		3	1	50	35.0	+0.0003		+0.0526	-0.0000	50.0529		
" " 11		F		3	1	50	36.5	+0.0003			-0.0000	50.0003		
" " 12		F		3	1	50	36.0	+0.0003		-0.0627	-0.0001	49.9375		
" " 13		F		3	1	50	36.5	+0.0003			-0.0002	50.0001		
" " 14		F		3	1	50	33.5	+0.0003			-0.0005	49.9998		
" " 15		F		3	1	50	36.0	+0.0003			-0.0001	50.0002		
" " 16		F		3	1	50	34.5	+0.0003			-0.0000	50.0003		
" " 17		F		3	1	50	34.5	+0.0003			-0.0000	50.0003		
" " 18		F		3	1	50	33.0	+0.0003			-0.0014	49.9989		
" " 19		F		3	1	50	36.5	+0.0003			-0.0001	50.0002		
" " 20		F		3	1	50	37.5	+0.0003		-0.0356	-0.0001	49.9646		
												649.8803	649.8766	
Stake No. 20														
" " 19	2-25-50	B	6619	3	1	50	34.0	+0.0003		-0.0683	-0.0001	49.9319		
" " 18		B		3	1	50	34.0	+0.0003		+0.0411	-0.0001	50.0413		
" " 17		B		3	1	50	33.0	+0.0003			-0.0014	49.9989		
" " 16		B		3	1	50	33.0	+0.0003			-0.0000	50.0003		
" " 15		B		3	1	50	31.0	+0.0002			-0.0000	50.0002		
" " 14		B		3	1	50	32.0	+0.0002			-0.0001	50.0001		
" " 13		B		3	1	50	32.0	+0.0002			-0.0005	49.9997		
" " 12		B		3	1	50	33.0	+0.0003			-0.0002	50.0001		
" " 11		B		3	1	50	34.0	+0.0003		-0.0759	-0.0001	49.9243		
" " 10		B		3	1	50	34.0	+0.0003			-0.0000	50.0003		
" " 9		B		3	1	50	32.0	+0.0002			-0.0000	50.0002		
" " 8		B		3	1	50	32.0	+0.0002			-0.0020	49.9982		
" " 7A		B		3	1	50	33.0	+0.0003		-0.0229	-0.0000	49.9774		
												649.8729		

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HOLMES & NARVER ENGINEERS JOB NO. 640

COMPUTATION OF RUNIT ISLAND BASE LINE

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SINISCALLO TO
DIANE S. NIXON

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE Feb. 28, 1950

SECTION	DATE	DIR. OF NEAS	TAPE NO	TAPE SUPPORT	UNCORRECTED LENGTH		TEMP	CORRECTIONS					REDUCED LENGTH	ACCEPTED LENGTH	LV	LV
					TAPE LNTH	METERS		TEMP	TAPE AND CATENARY	SET-UP SET-BACK	INCLINATION	SEA LEVEL				
Stake No. 20							" C "									
" " 21	2-24-50	F	6619	3	1	50	38.0	+0.0004				-0.0030	49.9974			
" " 22		F		3	1	50	38.0	+0.0004				-0.0002	50.0002			
" " 23		F		3	1	50	38.0	+0.0004				-0.0005	49.9999			
" " 24		F		3	1	50	36.0	+0.0003				-0.0001	50.0002			
" " 25		F		3	1	50	35.0	+0.0003				-0.0010	49.9993			
" " 26		F		3	1	50	33.0	+0.0003				-0.0001	50.0002			
" " 27		F		3	1	50	32.0	+0.0002				-0.0000	50.0002			
" " 28		F		3	1	50	30.0	+0.0002				-0.0000	50.0002			
" " 29		F		3	1	50	30.5	+0.0002				-0.0023	49.9979			
" " 30		F		3	1	50	30.5	+0.0002				-0.0005	49.9997			
" " 31		F		3	1	50	31.0	+0.0002				-0.0004	49.9998			
" " 32		F		3	1	50	31.0	+0.0002				-0.0014	49.9988			
" " 33		F		3	1	50	32.0	+0.0002				-0.0001	50.0001			
" " 34B		F		3	1	50	30.0	+0.0002			No ±	-0.0000	50.0002			
													699.9951	699.9988		
Stake No. 34B																
" " 33	2-25-50	B	6621	3	1	50	29.0	+0.0002				-0.0000	50.0002			
" " 32		B		3	1	50	28.5	+0.0002				-0.0001	50.0001			
" " 31		B		3	1	50	29.0	+0.0002				-0.0014	49.9988			
" " 30		B		3	1	50	29.0	+0.0002				-0.0004	49.9998			
" " 29		B		3	1	50	29.5	+0.0002				-0.0005	49.9997			
" " 28		B		3	1	50	30.0	+0.0002				-0.0023	49.9979			
" " 27		B		3	1	50	30.0	+0.0002				-0.0000	50.0002			
" " 26		B		3	1	50	28.0	+0.0002				-0.0000	50.0002			
" " 25		B		3	1	50	29.0	+0.0002				-0.0001	50.0001			
" " 24		B		3	1	50	29.0	+0.0002				-0.0010	49.9992			
" " 23		B		3	1	50	30.0	+0.0002				-0.0001	50.0001			
" " 22		B		3	1	50	30.0	+0.0002				-0.0005	49.9997			
" " 21		B		3	1	50	31.0	+0.0002				-0.0002	50.0000			
" " 20		B		3	1	50	30.0	+0.0002			+0.0094	-0.0030	50.0066			
													700.0026			

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HOLMES & NARVER ENGINEERS JOB NO. 640

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COMPUTATION OF RUNIT ISLAND BASE LINE

DECLASSIFIED PER DOE
INTERIM DATED JULY, 15, 1994
FROM ACTION SILESGALEE TO
DERRIS S. NIXON

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE Feb. 28, 1950

SECTION	DATE	DIR OF MEAS	TAPE NO.	TAPE SUPPORT	UNCORRECTED LENGTH		TEMP.	CORRECTIONS					REDUCED LENGTH	ADOPTED LENGTH	(V)	(VV)
					TAPE LNTH	METERS		TEMP	TAPE AND CATENARY	SET-UP SET-BACK	INCLINATION	SEA LEVEL				
							"C"	METERS	METERS	METERS	METERS	METERS	METERS	METERS	MM.	MM.
<i>Stake No. 34B</i>																
" " 35	2-25-50	F	646A	3	1	50	37.0	+0.0003			-0.0006		49.9997			
" " 36		F		3	1	50	39.0	+0.0004			-0.0022		49.9982			
" " 37		F		3	1	50	38.0	+0.0004			-0.0001		50.0003			
" " 38		F		3	1	50	37.0	+0.0003			-0.0001		50.0002			
" " 39		F		3	1	50	38.0	+0.0004		-0.0409	-0.0002		49.9593			
" " 40		F		3	1	50	37.0	+0.0003			-0.0000		50.0003			
" " 41		F		3	1	50	39.0	+0.0004			-0.0027		49.9977			
" " 42		F		3	1	50	38.0	+0.0004		+0.0353	-0.0024		50.0333			
" " 43C		F		3	1	50	39.0	+0.0004		-0.0062	-0.0008		49.9934			
													449.9824			449.9832
<i>Stake No. 43C</i>																
" " 42	2-25-50	B	6621	3	1	50	39.0	+0.0004			-0.0008		49.9996			
" " 41		B		3	1	50	38.0	+0.0004			-0.0024		49.9980			
" " 40		B		3	1	50	38.0	+0.0004			-0.0027		49.9977			
" " 39		B		3	1	50	38.0	+0.0004			-0.0000		50.0004			
" " 38		B		3	1	50	37.0	+0.0003			-0.0002		50.0001			
" " 37		B		3	1	50	38.0	+0.0004			-0.0001		50.0003			
" " 36		B		3	1	50	39.0	+0.0004		-0.0165	-0.0001		49.9838			
" " 35		B		3	1	50	39.0	+0.0004			-0.0022		49.9982			
" " 34B		B		3	1	50	38.0	+0.0004		+0.0061	-0.0006		50.0059			
													449.9840			

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HOLMES & NARVER ENGINEERS JOB NO. 640

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COMPUTATION OF RUNIT ISLAND BASE LINE

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
IN ACCORDANCE WITH STANISGALLI TO
DIANE S. NIXON

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE Feb. 28, 1950

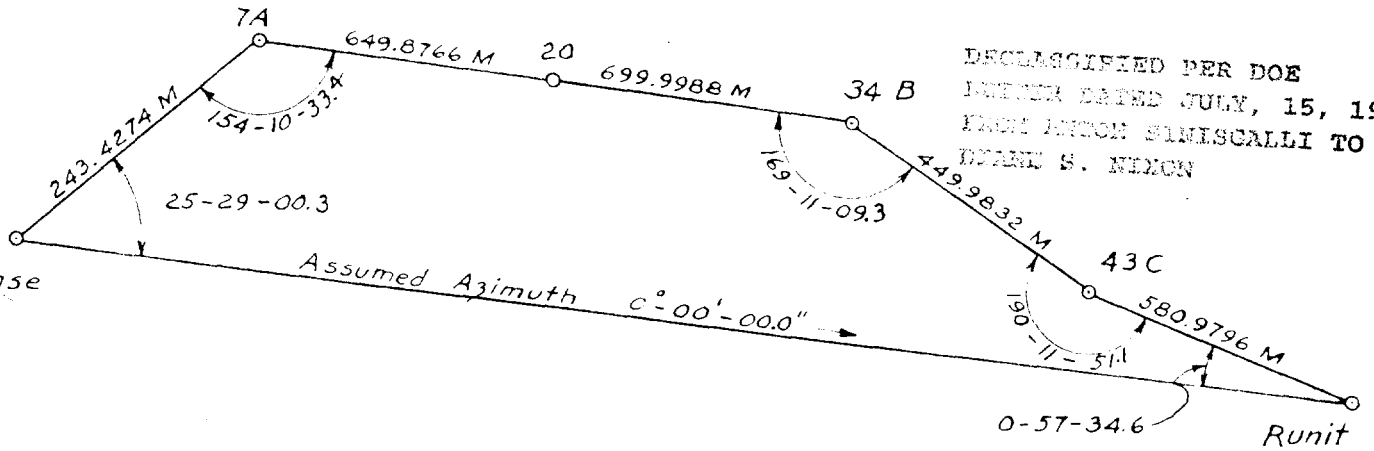
SECTION	DATE	DIR OF MEAS	TAPE NO	TAPE SUPPORT	UNCORRECTED LENGTH		TEMP "C"	CORRECTIONS					REDUCED LENGTH METERS	ADJUSTED LENGTH METERS	(V) MM	(V) MM
					TAPE LENGTH	METERS		TEMP METERS	TAPE AND CATENARY METERS	SET-UP SET-BACK METERS	INCLINATION METERS	SEA LEVEL METERS				
Stake No. 43C																
" " 44	2-25-50	F	6619	3	1	50	34.0	+0.0003		-0.0226	-0.0002		49.9775			
" " 45		F		3	1	50	34.0	+0.0003			-0.0000		50.0003			
" " 46		F		3	1	50	31.0	+0.0002		+0.0203	-0.0004		50.0201			
" " 47		F		3	1	50	36.0	+0.0003			-0.0044		49.9959			
" " 48		F		3	1	50	38.0	+0.0004			-0.0011		49.9993			
" " 49		F		3	1	50	41.0	+0.0004			-0.0061		49.9943			
" " 50		F		3	1	50	37.0	+0.0003		-0.0422	-0.0031		49.9550			
" " 51		F		3	1	50	40.0	+0.0004			-0.0033		49.9971			
" " 52		F		3	1	50	40.0	+0.0004			-0.0000		50.0004			
" " 53		F		3	1	50	34.0	+0.0003			-0.0055		49.9948			
" " 54		F		3	1	50	28.0	+0.0002			-0.0139		49.9863			
" " 55		F		2	1/2	25	29.0	+0.0002		-0.0089	-0.0000		24.9913			
Δ Runit		F		2						+6.0652	-0.0006		6.0646			
													580.9769		580.9796	
Δ Runit																
Stake No 55	2-26-50	B	6621	2						+6.0652	-0.0006		6.0646			
" " 54		B		2	1/2	25	31.0	+0.0002		-0.0086	-0.0000		24.9916			
" " 53		B		3	1	50	30.0	+0.0002			-0.0139		49.9863			
" " 52		B		3	1	50	30.0	+0.0002			-0.0055		49.9947			
" " 51		B		3	1	50	32.0	+0.0002			-0.0000		50.0002			
" " 50		B		3	1	50	32.0	+0.0002		-0.0251	-0.0033		49.9718			
" " 49		B		3	1	50	32.0	+0.0002			-0.0031		49.9971			
" " 48		B		3	1	50	32.0	+0.0002			-0.0061		49.9941			
" " 47		B		3	1	50	32.0	+0.0002			-0.0011		49.9991			
" " 46		B		3	1	50	32.0	+0.0002			-0.0044		49.9958			
" " 45		B		3	1	50	32.0	+0.0003			-0.0004		49.9999			
" " 44		B		3	1	50	32.0	+0.0002			-0.0000		50.0002			
" " 43C		B		3	1	50	32.0	+0.0002		-0.0130	-0.0002		49.9870			
													580.9824			

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DECLASSIFIED PER DOE
 ORDER DATED JULY, 15, 1994
 FROM ERIC SINESCALLI TO
 DEANE S. NIXON



North Base	25-29-00.3	-01.7	25-28-58.6
7-A	154-10-33.4	-01.7	154-10-31.7
34-B	169-11-09.3	-01.8	169-11-07.5
43-C	190-11-51.1	-01.8	190-11-49.3
Runit	0-57-34.6	-01.7	0-57-32.9
	<u>540-00-08.7</u>		<u>540-00-00.0</u>

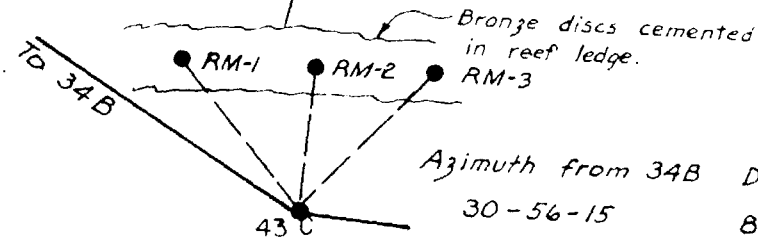
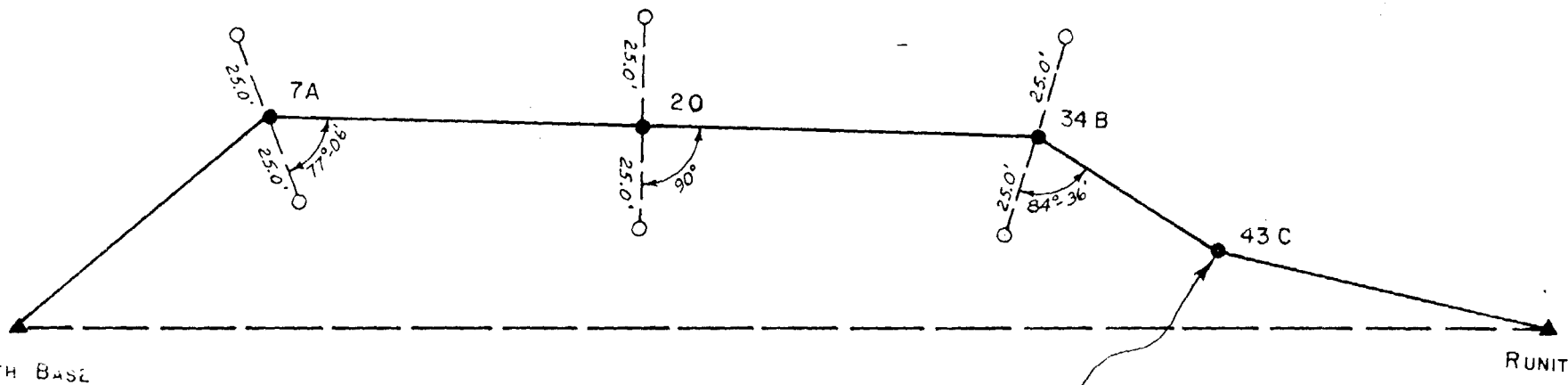
N.B. - Runit	0-00-00.0		<u>2.0200827</u> = +104.7328
	+ <u>334-31-01.4</u>	Log Sin 25-28-58.6	9.6337132
N.B. - 7A	334-31-01.4	Log 243.4274	2.3863695
	+ <u>25-49-28.3</u>	Log Cos 25-28-58.6	<u>9.9555494</u>
7A - 34B	0-20-29.7		2.3419193 = +219.7452
	+ <u>10-48-52.5</u>		
34B - 43C	11-09-22.2		<u>0.9056651</u> = -8.0476
	- <u>10-11-49.3</u>	Log Sin 0-20-29.7	7.7753714
43C - Runit	0-57-32.9	Log 1349.8754	3.1302537
		Log Cos 0-20-29.7	<u>9.9999923</u>
			3.1302860 = +1349.8516
	+ 104.7328		
	- 8.0476		<u>1.9398410</u> = -87.0645
	- 87.0645	Log Sin 11-09-22.2	9.2866447
	- <u>9.1252</u>	Log 449.9832	2.6531963
Σ = 0.1045		Log Cos 11-09-22.2	<u>9.9917148</u>
			2.6449111 = +441.4800
	219.7452		
	1349.8516		<u>0.9878995</u> = -9.7252
	441.4800	Log Sin 0-57-32.9	8.2237386
	<u>580.8981</u>	Log 580.9796	2.7641609
Σ = 2591.9749	- Log 3.4136308	Log Cos 0-57-32.9	<u>9.9999391</u>
			2.7641000 = +580.898

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North Base - Runit base line 2591.9749 M

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Azimuth from 34B	Dist.-Feet
30-56-15	85.30
88-56-45	70.29
115-47-45	82.97

RUNIT BASE LINE
Reference Markers

- = Bronze discs in concrete blocks flush with surface.
 - = Bronze discs in concrete blocks 24" below surface.
- For North Base and Runit reference marks see descriptions of triangulation stations.

HOLMES & NARVER ENGINEERS JOB NO. 640 ~~OFFICIAL USE ONLY~~

DECLASSIFIED PER DOE
LETTER DATED FEB, 15, 1994
FROM ANTON SHERIDAN TO
DIANE S. NICHOL

PROBABLE ERROR COMPUTATION

SECTION	MEASURED DISTANCE	Discrepancy between 2 Measurements of Section			Probable Error	
		$20\sqrt{\text{dist. in Km.}}$	Allowable Maximum m	Actual Difference m	$0.6475\sqrt{\frac{\sum v^2}{n(n-1)}}$	1 Section m
North Base - 7A	F 243.4274	$20\sqrt{.2434274}$	0.0098	0.0000	0.6745×0.000	0.0001
	B <u>243.4274</u> 0.0000					
7A - 20	F 649.8803	$20\sqrt{.6498766}$	0.0161	0.0074	0.6745×0.0037	0.0025
	B <u>649.8729</u> 0.0074					
20 - 34 B	F 699.9951	$20\sqrt{.6999988}$	0.0167	0.0075	0.6745×0.00375	0.0025
	B <u>700.0026</u> 0.0075					
34B - 43C	F 449.9824	$20\sqrt{.4499832}$	0.0134	0.0016	0.6745×0.0008	0.0005
	B <u>449.9840</u> 0.0016					
43C - Runit	F 580.9769	$20\sqrt{.5809796}$	0.0152	0.0055	0.6745×0.00275	0.0019
	B <u>580.9824</u> 0.0055					

0.0001^2
 0.0025^2
 0.0025^2
 0.0005^2
 0.0019^2

$\Sigma = 0.00001637 \quad \sqrt{} = 0.00405 \text{ M}$

F 2624.2621
 B 2624.2693
 0.0072 M

Actual difference 0.0072 = 1:364481
 Probable error 0.00405 = 1:647967

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 FROM ACTION SINISGALI TO
 DIANE S. NIXON

HOLMES & NARVER ENGINEERS JOB NO. ~~OFFICIAL USE ONLY~~

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ABSTRACT OF WYE LEVELS AND
COMPUTATION OF INCLINATION CORRECTIONS.

POINT	DISTANCE	MEAN DIFF OF ELEV	INCLINATION CORRECTION	ELEVATION	MEAN ELEVATION	REMARKS
	METERS	METERS FEET	MM	METERS	METERS	
<i>North Base</i>						
2	18.5349	+ 0.44	0.4			
3	25	- 0.19	0.0			
4	50	- 0.78	0.6			
5	50	+ 2.06	4.0			
6	50	- 0.54	0.3			
7A	50	+ 1.54	<u>2.2</u>			
			$\Sigma = 7.5$			
7A						
8	50	- 0.14	0.0			
9	50	+ 1.48	2.0			
10	50	+ 0.06	0.0			
11	50	+ 0.19	0.0			
12	50	+ 0.07	0.1			
13	50	- 0.48	0.2			
14	50	+ 0.75	0.5			
15	50	+ 0.32	0.1			
16	50	- 0.10	0.0			
17	50	+ 0.24	0.0			
18	50	- 1.20	1.4			
19	50	- 0.33	0.1			
20	50	- 0.34	<u>0.1</u>			
			$\Sigma = 4.5$			

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DATE OF REPRODUCTION, 1996
FROM ANTON SUTSKALNIK TO
D. JOE S. NIXON

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ABSTRACT OF WYE LEVELS AND COMPUTATION OF INCLINATION CORRECTIONS. ~~OFFICIAL USE ONLY~~

POINT	DISTANCE	MEAN DIFF OF ELEV.	INCLINATION CORRECTION	ELEVATION	MEAN ELEVATION	REMARKS
	METERS	METERS- FEET	MM	METERS	METERS	
20						
21	50	+ 1.81	3.0			
22	50	- 0.43	0.2			
23	50	+ 0.75	0.5			
24	50	- 0.31	0.1			
25	50	+ 1.05	1.0			
26	50	+ 0.40	0.1			
27	50	+ 0.12	0.0			
28	50	+ 0.02	0.0			
29	50	- 1.56	2.3			
30	50	- 0.75	0.5			
31	50	+ 0.66	0.4			
32	50	- 1.20	1.4			
33	50	+ 0.34	0.1			
34B	50	- 0.17	<u>0.0</u>			
			$\Sigma = 9.6$			
34B						
35	50	+ 0.80	0.6			
36	50	- 1.53	2.2			
37	50	- 0.35	0.1			
38	50	- 0.32	0.1			
39	50	- 0.49	0.2			
40	50	+ 0.21	0.0			
41	50	- 1.72	2.7			
42	50	- 1.59	2.4			
43C	50	- 0.95	<u>0.8</u>			
			$\Sigma = 9.1$			

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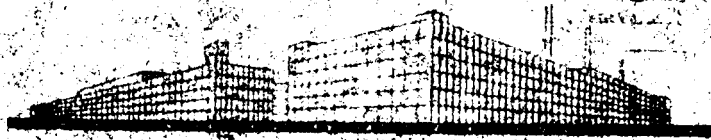
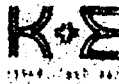
ABSTRACT OF WYE LEVELS AND
COMPUTATION OF INCLINATION CORRECTIONS.

POINT	DISTANCE	MEAN DIFF OF LEVELS	INCLINATION CORRECTION	ELEVATION	MEAN ELEVATION	REMARKS
	METERS	FEET	MM	METERS	METERS	
43C						
44	50	+ 0.43	0.2			
45	50	- 0.03	0.0			
46	50	+ 0.67	0.4			
47	50	+ 2.15	4.4			
48	50	+ 1.08	1.1			
49	50	- 2.56	6.1			
50	50	- 1.84	3.1			
51	50	- 1.88	3.3			
52	50	+ 0.01	0.0			
53	50	- 2.44	5.5			
54	50	+ 3.87	13.9			
55	50	+ 0.07	0.0			
Runit	6.0652	- 0.27	<u>0.6</u>			
			Σ=38.6			

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KEUFFEL & ESSER CO.

Adams and Third Streets Hoboken, N.J.
TELEPHONE HOBOKEN 1-1000 TELETYPE HOBOKEN

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Date _____

REPORT ON

K. & E. TAPING. 780001 - 50 Feet Nickel Steel Tape
LOVAR (Trademark)

Serial No. 10-1

The above identified tape has been compared with our standard (which corresponds to the U. S. Standard at the National Bureau of Standards at Washington, D. C.) and was found to have the following length at 20° Centigrade (68° F.) under the conditions stated below:-

Supported on a horizontal flat surface:-

<u>Tension</u>	<u>Interval</u>	<u>Length</u>
14-1/2 Ks.	0-50 M.	50.000 M.

Supported at the 0, 25 and 50 M. points:-

<u>Tension</u>	<u>Interval</u>	<u>Length</u>
15 Ks.	0-50 M.	50.000 M.

The coefficient of expansion of the tape is assumed to be 0.000 000 4 per degree Centigrade (0.000 000 22 per degree Fahrenheit).

KEUFFEL & ESSER CO.

By Wm Keuffel
Vice President

awk-fp

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KEUFFEL & ESSER CO.

Adams and Third Streets Hoboken, N.J.

TELEPHONE HOBOKEN 3-1100 TELETYPE HOB 1414

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Date Sept. 16, 1949

REPORT ON

K. & E. TAP NO. 769804 - 50 Feet Nickel Steel Tape
LIVAR (Trademark)

Serial No. 6466

The above identified tape has been compared with our standard (which corresponds to the U. S. Standard at the National Bureau of Standards at Lexington, N. C.) and was found to have the following length at 20° Centigrade (68° F.) under the conditions stated below:

Supported on a horizontal flat surface:

Tension	Interval	Length
11-1/2 Kg.	0-50 ft.	50.000 ft.

Supported at the 0, 25 and 50 ft. points:

Tension	Interval	Length
15 Kg.	0-50 ft.	50.000 ft.

The coefficient of expansion of the tape is assumed to be 0.000 000 4 per degree Centigrade (0.000 000 22 per degree Fahrenheit).

KEUFFEL & ESSER CO.

By *Wm. Keuffel*
Vice President

ark-fp

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BUREAU OF STANDARDS

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K-E



KEUFFEL & ESSER CO.

Adams and Third Streets Hoboken, N.J.
TELEPHONE HOBOKEN 3-1100 TELETYPE HOB 1414

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Date February 1st, 1950

REPORT ON

K. & E. TAPE CO. 7698CM - 50 Meters Nickel Steel Tape
LOVAR (Trademark)

Serial No. 5619

The above identified tape has been compared with our standard (which corresponds to the U. S. Standard at the National Bureau of Standards at Washington, D. C.) and was found to have the following length at 20° Centigrade (68° F.) under the conditions stated below:-

Supported on a horizontal flat surface:-

Tension	Interval	Length
11 Kg.	0-50 M.	50.000 M.

Supported at the 0, 25 and 50 M. points:-

Tension	Interval	Length
15 Kg.	0-50 M.	50.000 M.

The coefficient of expansion of the tape is assumed to be 0.000 000 4 per degree Centigrade (0.000 000 22 per degree Fahrenheit).

KEUFFEL & ESSER CO.

By *W. Keuffel*
Vice President

evk-tp

Drafting, Reproduction, Surveying Equipment & Material, Slide Rules, Measuring Tapes

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DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION AOMAN LOCATION Aoman Island
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
Coral	-	-	0-00-00.0	
R.M. No. 1	22.860	75.00	188-08-10.0	
R.M. No. 2	22.860	75.00	278-08-10.0	

ELEV. OF MARK ABOVE MLW 10.0'
 HEIGHT OF TELESCOPE ABOVE MARK 40.5'
 HEIGHT OF LIGHT ABOVE MARK 40.5'

DETAILED DESCRIPTION:

This station is located on Aoman Island approximately 200 feet west of the west end of the Aoman-Bijiri causeway and 90 feet from the high water mark on the lagoon side. It is Traverse Station Aoman of the Joint Task Force Seven Survey and is a standard USC&GS triangulation disk set in a concrete block flush with the surface.

Reference marks are standard Holmes & Narver bronze disks in concrete blocks set flush with the surface.

This station was disturbed. See Recovery Note of June 7, 1951.

DESCRIBED BY FPC

MADE BY 186

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DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION BOGA LOCATION Bogallua Island
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
Coral	-	-	0-00-00.0	
R.M. No. 1	59.015	193.62	94-53-50.0	
R.M. No. 2	36.576	120.00	154-54-00.0	

ELEV. OF MARK ABOVE MSL 7.1'
 HEIGHT OF TELESCOPE ABOVE MARK 40.5'
 HEIGHT OF LIGHT ABOVE MARK 40.5'

DETAILED DESCRIPTION

This station is located on Bogallua Island at the extreme east end of the island approximately 20 feet from the high water mark.

The mark is a standard Holmes & Narver bronze disk set in a concrete block flush with the surface.

The reference marks are standard Holmes & Narver bronze disks set in concrete blocks flush with the surface and are intersection points on the Bogallua topo traverse.

DATE OF SURVEY

FPC

MAP SHEET NO.

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DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION BOKON LOCATION Bokonaarappu Island
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

DISTANCES AND DIRECTIONS TO REFERENCE MARKS				
OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
Aomon	-	-	0-00-00.0	
R.M. No. 1	15.240	50.00	207-24-12.2	
R.M. No. 2	15.240	50.00	279-24-12.2	

ELEV. OF MARK ABOVE MLW 10.4'
 HEIGHT OF TELESCOPE ABOVE MARK 15.5'
 HEIGHT OF LIGHT ABOVE MARK 15.5'

DETAILED DESCRIPTION:

This station is located on Bokonaarappu Island approximately 660 feet from the west end of the island and 56 feet from the high water mark on the lagoon side.

The station mark is a standard Holmes & Narver bronze disk set in a concrete block flush with the surface.

The reference marks are standard Holmes & Narver bronze disks set in concrete blocks flush with the surface.

DESCRIBED BY LEG

MAPPED BY

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R.S. Hammond

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DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION ISLET LOCATION South of Runit Island
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

DISTANCES AND DIRECTIONS TO REFERENCE MARKS				
OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
None				

ELEV. OF MARK ABOVE M.L.W. 8.0'
 HEIGHT OF TELESCOPE ABOVE MARK 11.5'
 HEIGHT OF LIGHT ABOVE MARK 11.5'

DETAILED DESCRIPTION:

This station is located on the first sand island south of Runit at approximately the center of the island.

The disk is a standard Holmes & Narver bronze disk set in a concrete block flush with surface.

Due to the limited area of the island no reference marks were set.

DESCRIBED BY LEG

MARKED BY LEG

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DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION NORTH BASE LOCATION Runit Island
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

DISTANCES AND DIRECTIONS TO REFERENCE MARKS				
OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
Coral	-	-	0-00-00.0	
R.M. No. 3	45.686	149.89	101-59-20.0	
R.M. No. 1	31.992	104.96	267-33-20.0	
R.M. No. 2	25.233	82.785	340-35-50.0	

ELEV. OF MARK ABOVE M.L.W. 8.0'

HEIGHT OF TELESCOPE ABOVE MARK 40.5'

HEIGHT OF LIGHT ABOVE MARK 40.5'

DETAILED DESCRIPTION:

This station is located at the north end of Runit Island approximately 200 feet from the end of the island and 65 feet from the high water mark on the lagoon.

The marker is a standard USC&GS triangulation station disk in a concrete block. This marker has been disturbed and is not in the location recorded in the Report of the Engineer, Joint Task Force Seven.

Reference marks are standard Holmes & Narver bronze disks cemented into the surface of the reef ledge at tide range.

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APPROVED FOR RELEASE BY NSA ON 08-28-2014
 AUTHORITY: E.O. 13526, 13527, 13528
 DATE OF REVIEW: 08-28-2014

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DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION PARRY LOCATION Parry Island
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

DISTANCES AND DIRECTIONS TO REFERENCE MARKS				
OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
Coral	-	-	0-00-00.0	
R.M. No. 1	15.246	50.02	46-34-25.4	
R.M. No. 2	15.224	49.95	181-37-20.4	

ELEV. OF MARK ABOVE M.L.W. 10.0'
 HEIGHT OF TELESCOPE ABOVE MARK 24.5'
 HEIGHT OF LIGHT ABOVE MARK 24.5'

DETAILED DESCRIPTION:

This station is located on Parry Island approximately 450 feet from the north end of the island. The mark is set at the intersection of the diagonals of the opposite legs of a four leg steel communication tower.

A twenty-four foot wood instrument tripod and a platform at the required height on the tower was constructed for observation.

The station is marked with a standard Holmes & Narver bronze disk in a concrete block flush with the surface.

The reference monuments are standard Holmes & Narver bronze disks in concrete blocks flush with the surface.

APPROVED: _____
 DATE: _____
 HONORARY CHIEF OF PARTY

LEG

MARKED BY LSH

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DESCRIPTION OF TRIANGULATION STATION

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NAME OF STATION PIIRAAI LOCATION Piiraa Island
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
N. Base	-	-	0-00-00.0	
R.M. No. 2	22.860	75.00	0-31-55.0	
R.M. No. 1	22.860	75.00	270-31-55.0	

ELEV. OF MARK ABOVE M.L.W. 8.8'
 HEIGHT OF TELESCOPE ABOVE MARK 15.5'
 HEIGHT OF LIGHT ABOVE MARK 15.5'

DETAILED DESCRIPTION:

This station is located on Piiraa Island approximately 350 feet from the south end of the island and 75 feet from the high water mark on the lagoon side.

The station marker is a standard Holmes & Narver bronze disk set in a concrete block flush with the surface.

The reference marks are standard Holmes & Narver bronze disks set in concrete blocks flush with the surface.

APPROVED: _____
 DATE: _____, 1954
 H. S. Narver

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MARKED BY _____
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 H. S. Narver

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DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION PINNACLE LOCATION Eniwetok Lagoon
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

DISTANCES AND DIRECTIONS TO REFERENCE MARKS				
OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
None				

ELEV. OF MARK ABOVE M.L.W. 8.0'
 HEIGHT OF TELESCOPE ABOVE MARK 5.0'
 HEIGHT OF LIGHT ABOVE MARK 5.0'

DETAILED DESCRIPTION

This station is a prefabricated steel tripod which was set in place on a coral reef approximately 2.7 statute miles west of the south end of Runit Island. The station was occupied at low water and under favorable weather conditions.

This is not a permanent station and will be removed as it is considered a navigation hazard.

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 Pacific Southwest Region

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 1950

DESCRIPTION OF LEG

MAP SHEET NO.

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DESCRIPTION OF TRIANGULATION STATION

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NAME OF STATION TEITEIR LOCATION Teiteiripucchi Island
 CHIEF OF PARTY LSH Eniwetok Atoll
Marshall Islands
 DATE 1949-50

OBJECT	DISTANCE		DIRECTION	AZIMUTH
	METERS	FEET		
Coral	-	-	0-00-00.0	
R.M. No. 1	15.240	50.00	125-23-00.0	
R.M. No. 2	15.240	50.00	215-23-00.0	

ELEV. OF MARK ABOVE MLW. 8.6'
 HEIGHT OF TELESCOPE ABOVE MARK 40.5'
 HEIGHT OF LIGHT ABOVE MARK 40.5'

DETAILED DESCRIPTION:

This station is located on Teiteiripucchi Island approximately 800 feet from the west end of the island and 120 feet from the high water mark on the lagoon side.

The mark is a standard Holmes & Narver bronze disk set in a concrete block flush with the surface.

Reference marks are standard Holmes & Narver bronze disks in concrete blocks flush with the surface.

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MADE BY

114

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L.S. Hammond

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RECOVERY NOTE TRIANGULATION STATION

Name of Station	CORAL	Location	Eniwetok Lagoon Eniwetok Atoll
Established by	J.T.F.-7	Year	1947-48 Marshall Islands
Recovered by	LSH	Year	1949-50

Detailed description as to fitness of original description:

This station was recovered and found to be in good condition.

The station is located atop a circular concrete call that is fifteen feet in diameter, about 2 miles east-southeast of the Reef Photo Tower, about 5 miles west of Runit Island and 0.15 mile west of buoy No. 15. The disk is a standard USC&GS station disk set in the center of the structure about 11 feet above M.L.W. stamped CORAL, and is surrounded by a sheet metal wall that projects 3 feet above the deck of the structure.

A 14 foot wooden tower was used for observations at this station.

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RECOVERY NOTE TRIANGULATION STATION

Name of Station: ELGIN (Engebi) Location: Engebi Island
Eniwetok Atoll
Marshall Islands
 Established by: J.T.F.-7 Year: 1947-48
 Recovered by: LSH Year: 1949-50

Detailed description as to fitness of original description:

This station was recovered and found to be in good condition.

The station is located on Engebi Island approximately 900 feet north of south end of island, 500 feet west of seaward side and 300 feet east of the lagoon, 130 feet south of a concrete building. The disk is a standard USC&GS station disk set in a 12 X 12 inch concrete block flush with surface and is stamped ELGIN.

This station has been re-named "ENGEBI" and is also bench mark No. 1 for this island.

RM No. 1 was set at a distance of 50.00 feet 15.240 M from the station at an azimuth of 105°-11'-10".

RM No. 2 was set at a distance of 50.00 feet 15.240 M from the station at an azimuth of 195°-11'-10".

These reference marks are standard Holmes & Narver bronze disks set in concrete blocks flush with the surface.

A 40 foot steel tower was used for observations at this point.

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 2000
 2000

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RECOVERY NOTE TRIANGULATION STATION

Name of Station GRAFLEX Location Aoman Island
Eniwetok Atoll
Established by J.T.F.-7 Year 1947-48 Marshall Islands
Recovered by LSH Year 1949-50

Detailed description as to fitness of original description:

This station has been destroyed.

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RECOVERY NOTE TRIANGULATION STATION

Name of Station	KODAK (Aniyaanii)	Location	Aniyaanii Island Eniwetok Atoll Marshall Islands
Established by	J.T.F.-7	Year	1947-48
Recovered by	LSH	Year	1949-50

Detailed description as to fitness of original description:

This station has been recovered and found to be in good condition. The station has been renamed Aniyaanii and is located about 600 feet south of the north edge of vegetation in a small clearing on the lagoon side of Aniyaanii Island, 80 feet south of the north edge of the clearing, 125 feet east of the high water mark on the lagoon beach and 755 feet north of the northwest leg of a 75 foot steel tower. The marker is a standard USC&GS station disc set in a concrete block flush with the surface and stamped KODAK.

Reference mark No. 1 is set at a distance of 57.398 feet 17.495 M from the station at an azimuth of $214^{\circ}55'42.6''$.

Reference mark No. 2 is set at a distance of 110.819 feet 33.778 M from the station at an azimuth of $326^{\circ}01'28.6''$.

These reference marks are standard USC&GS reference discs set in a concrete block flush with the surface.

Note: This station has been reset. See Restoration Note Triangulation Station of June 7, 1951.

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RECOVERY NOTE TRIANGULATION STATION

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Name of Station	NORTH BASE	Location	Runit Island Eniwetok Atoll Marshall Islands
Established by	USN	Year	1944
Recovered by	LSH	Year	1949-50

Detailed description as to fitness of original description:

This station was recovered and the results of the present survey determine that the marker has been disturbed.

The marker was used in its existing position and a new description and location of reference marks are included under description of triangulation stations.

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RECOVERY NOTE TRIANGULATION STATION

Name of Station PHOTO (Reef Photo Tower) Location Eniwetok Lagoon
Eniwetok Atoll
 Established by J.T.F.-7 Year 1947-48 Marshall Islands
 Recovered by LSH Year 1949-50

Detailed description as to fitness of original description:

This station recovered and found to be in good condition.

The station is a 4 leg 75 foot steel tower constructed atop 4 steel piles encased in concrete at tide range, located on a coral reef approximately 7 statute miles south of Engeh Island, 7 miles west of the north end of Runit Island and 2 miles west-northwest of station Coral.

The marker is a nail set in the wood deck at the intersection of the diagonals of the opposite legs of the tower. This wood deck is approximately 10 feet above M.L.W.

The light was mounted on a wood tripod 4.5 feet above the deck.

This station was not occupied due to excessive vibration.

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RECOVERY NOTE TRIANGULATION STATION

Name of Station PRIVILEGE (Eniwetok) Location Eniwetok Island
Eniwetok Atoll
Marshall Islands
 Established by USN Year 1944
 Recovered by LSH Year 1949-50

Detailed description as to fitness of original description:

This station was recovered and found to be in good condition. The station has been renamed ENIWETOK and is also BM No. 1 for this island.

The station is located on the north end of Eniwetok Island, 225 feet from the north end of the island, 70 feet west of the high water line on the seaward side and 90 feet east of the high water mark on the lagoon side. It is 30 feet north of a large Quonset building and is under a steel tripod which is Beacon B.

The marker is a standard USN triangulation disk set in an 8 X 8 inch concrete block flush with the surface.

Reference mark No. 1 is set at a distance of 39.12 feet 11.924 M from the station and an azimuth of $62^{\circ}-46'-17.4''$.

Reference mark number 2 is set at a distance of 39.12 feet 11.924 M from the station and an azimuth of $332^{\circ}-46'-17.4''$.

These reference marks are standard Holmes & Narver bronze disks set in concrete blocks flush with the surface.

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1944

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RECOVERY NOTE TRIANGULATION STATION

Name of Station	<u>RUNIT</u>	Location	<u>Runit Island</u>
			<u>Eniwetok Atoll</u>
Established by	<u>J.T.F.-7</u>	Year	<u>1947-48</u>
			<u>Marshall Islands</u>
Recovered by	<u>LSH</u>	Year	<u>1949-50</u>

Detailed description as to fitness of original description:

This station was recovered and found to be in good condition.

The station is located approximately 900 feet north of the end of the sand spit at the south end of the island, 120 feet west of the high water mark on the seaward side of the island and 70 feet east of the high water mark on the lagoon side. The disk is a standard USC&GS station disk set in a 12 X 12 inch concrete block flush with the surface and is stamped RUNIT.

Reference mark No. 1 is 41.075 feet north-northwest of the station.

Reference mark No. 2 is 48.062 feet east of the station.

These reference marks are standard USC&GS reference disks set flush with the surface.

The station mark is approximately 9 feet above M.L.W. and a 20 foot wooden tower was used for observations.

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RECOVERY NOTE TRIANGULATION STATION

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Name of Station	SAND	Location	So. of Runit Island
			Eniwetok Atoll
Established by	USN	Year	1944
			Marshall Islands
Recovered by	LSH	Year	1949-50

Detailed description as to fitness of original description:

This station was recovered and found to be in good condition.

The station is located on the third sand island south of Runit Island, about 450 feet south of the north end of the island and 68 feet east of the high water mark on the lagoon side. The disc is a standard USN triangulation disc set in an 8 X 8 inch concrete block flush with the surface.

A 14 foot wooden tower was used for observations at this station.

As this is a remote location with limited land area no reference marks were set.

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RECOVERY NOTE TRIANGULATION STATION

Name of Station STEEL Location Parry Island
Eniwetok Atoll
 Established by USN Year 1944 Marshall Islands
 Recovered by LSH Year 1949-50

Detailed description as to fitness of original description:

This station located on the north end of Parry Island has been destroyed.

Station PARRY of the present survey is in the approximate location of this station.

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Vertical Control

As no records are available of vertical control established here by previous surveys a temporary datum is being established on each of the project islands as surveys are made. This datum may be described as follows.

"A datum approximating mean low water springs was arrived at by applying corrections from the U.S. Coast and Geodetic publication "Tide Tables of the Pacific Ocean" to a series of tidal observations. This is a temporary datum but should be significant to less than a foot".

The procedure is to erect a tide staff at a suitable location at each island and take periodical observations as surveys are made at these islands. After applying corrections a mean of these corrected observations is accepted as the temporary datum. This datum is transferred to a permanent monument in the vicinity which becomes the point of origin of all vertical control on the particular island.

At a later date when personnel are available at these locations a longer series of observations will be taken and corrections applied to the datum. It is not anticipated that any temporary datum now in use will be refined by more than a few tenths of a foot.

When datums are established at all project islands a further check can be made by taking simultaneous observations at all tide staffs to check the relation between the individual datums. Due to little knowledge of currents in the lagoon it is doubtful if any refinement of the individual datums can be made by this method.

A list of the bench marks follows:

Aaraanbiru -- To be established at later date.

Aomon -- Triangulation station Aomon - Elev. 8.61

Bijiri -- Traverse station Bijiri - Elev. 7.67

Bogallua -- Triangulation station Boga - Elev. 7.14

Bokonaarappu -- Triangulation station Bokon - Elev. 10.40

Engebi -- Triangulation station Engebi (Elgin) - Elev. 10.08

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Eniwetok -- Triangulation station Eniwetok - Elev. 10.34

Kirinian -- To be established at later date.

Muzinbaarikku -- To be established at later date.

Parry -- Triangulation station Parry - Elev. 9.80

Piiraa'i -- Triangulation station Piiraa'i - Elev. 8.80

Rojoa -- To be established at later date. Existing elevations are referenced to Traverse station Biijiri.

Runit -- Traverse station Runit - Elev. 12.95

Teiteiripucchi -- Triangulation station Teiteir - Elev. 8.60

The monuments at all points listed are bronze disks set in concrete blocks flush with the surface and these locations will be shown in topographical maps of the islands involved.

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EXPANSION OF HORIZONTAL CONTROL SURVEY

ENIWETOK ATOLL

MARSHALL ISLANDS

1951

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DIRM 8 10000

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LETTER DATED JULY, 15, 1994
FROM ANTON SINISGALLI TO
DIANE S. NIXON

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The primary horizontal control network furnished the basic controls from which the relations of test structures were determined. The scheme was expanded to include the photo stations at sites M, N, P and Q; C, E and V Zero points, and the islands of Bogon and Rigili. The islands of Muzin and Aaraanbiru were located from controls established in the local Zero areas.

General Features

The specifications and criteria for second order triangulation were followed in expanding the scheme. While the strength of figure was weak in some cases, additional observations were taken which offset the weakness.

All observations were made at night, and standard procedure was attempted throughout. Weather conditions and interference from construction and scientific work in the tower areas affected the survey, but the results are considered consistent with requirements.

A quadrilateral was developed including station Bokon, thereby increasing the strength of this station over the single triangle by which it was previously located. The adjusted values vary slightly from those recorded from the previous survey.

Station Islet was also strengthened by inclusion in a quadrilateral with no change in the values previously recorded.

The location of station Rigili is to third order accuracy, which conforms with instructions regarding location of this station.

Field Computations

Computations of the expanded scheme were made at the jobsite. While adjustments to balance out observing errors were not made, the results were within scientific requirements.

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Photo Tower Triangulation Report

A report was issued on May 18, 1951, including the relation of the photo tower to the Zero points. The values are listed as computed from the control network and also from check computations based on observations made at the structure sites. This report is included.

Adjusted Data

Adjusting of the expanded scheme has been completed, and the adjusted values are included in this report. The value of the length of each line is independent of the route followed in the computation.

All observations, including the check observations at the structure sites, were evaluated and used in the adjustments. While this data varies from the values given in the photo tower triangulation report, the differences are small and assure that the values given in this report are within requirements.

In the interests of economy, these computations are not included in this report. The sketches included record the adjusted values determining the inter-relation of the various stations.

The computations and field notes will be a part of the permanent survey records at the jobsite.

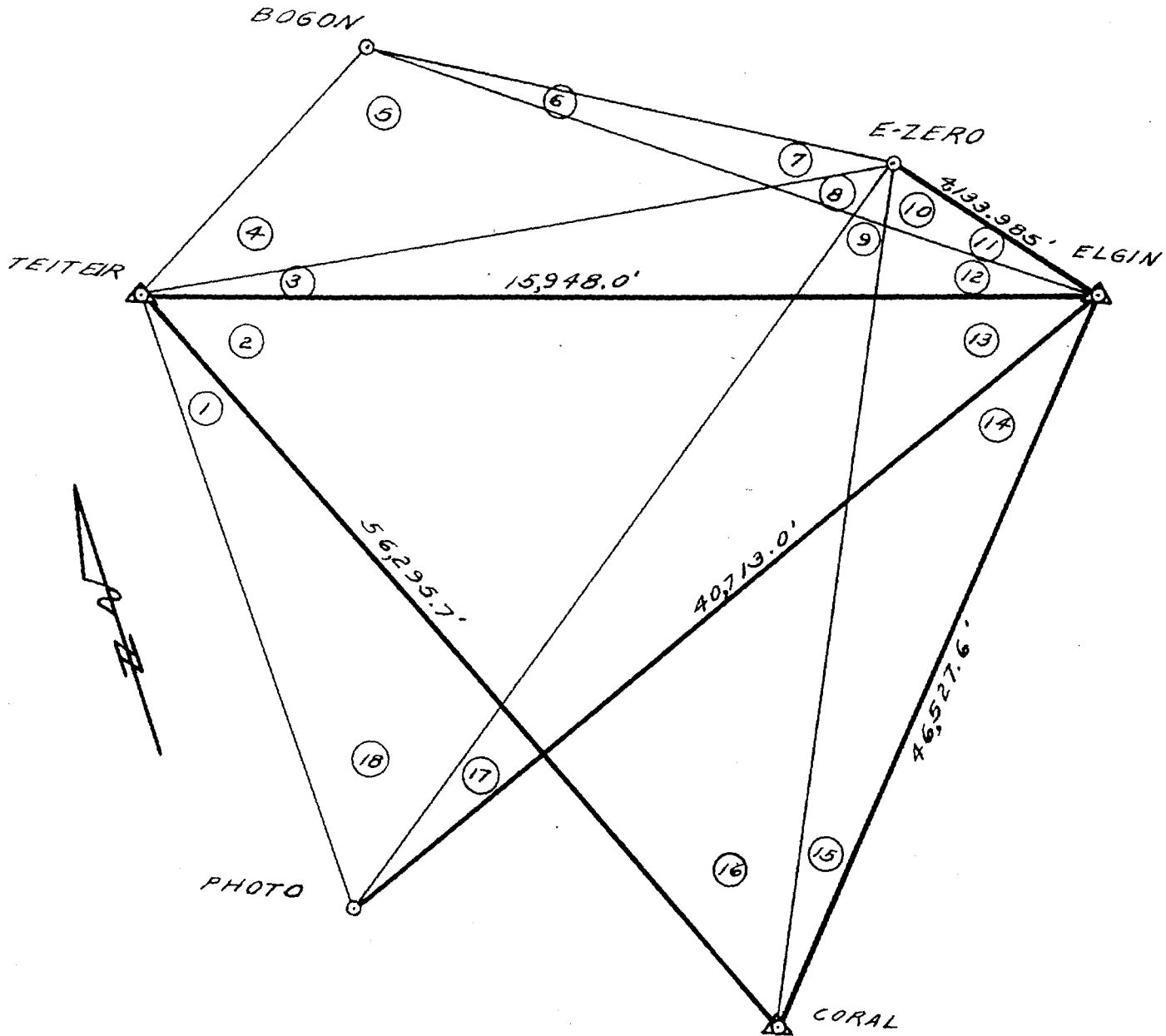
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DATE 08-13-1994
BY SP-6/STW/SMB/STW
REASON: 2.1.1

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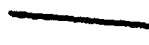
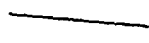
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ADJUSTED ANGLES

①	11°-53'-57.0"	⑩	27°-00'-18.6"
②	45°-29'-32.3"	⑪	21°-05'-09.8"
③	9°-34'-12.5"	⑫	9°-14'-16.6"
④	15°-27'-04.3"	⑬	103°-20'-29.0"
⑤	145°-44'-26.6"	⑭	17°-01'-02.1"
⑥	10°-22'-23.1"	⑮	2°-18'-43.9"
⑦	8°-26'-06.0"	⑯	11°-50'-12.7"
⑧	97°-41'-52.4"	⑰	3°-55'-35.9"
⑨	15°-24'-10.1"	⑱	15°-20'-25.8"

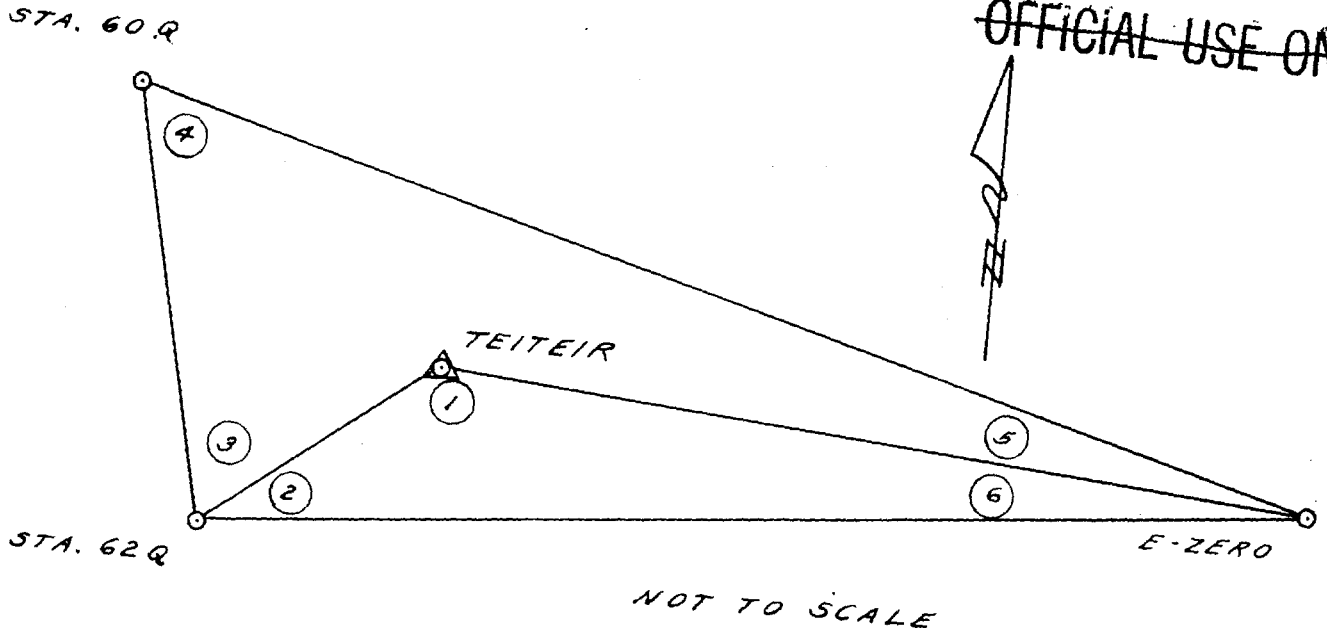
ADJUSTED DISTANCES

E-ZERO - BOGON	8,260.1'
E-ZERO - TEITEIR	12,554.4'
E-ZERO - PHOTO	43,669.8'
E-ZERO - CORAL	50,172.9'
ELGIN - BOGON	11,982.3'
TEITEIR - BOGON	4,548.0'
TEITEIR - PHOTO	47,027.0'

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ADJUSTED ANGLES

- ① 177° - 08' - 02.5"
- ② 2° - 49' - 17.6"
- ③ 101° - 54' - 50.0"
- ④ 70° - 18' - 23.5"
- ⑤ 4° - 54' - 49.0"
- ⑥ 0° - 02' - 39.9"

ADJUSTED DISTANCES

TEITEIR - E-ZERO	12,554.4'
TEITEIR - 62 Q	191.62'
60 Q - 62 Q	1,170.0'
E-ZERO - 60 Q	13,092.3'
E-ZERO - 62 Q	12,745.8'

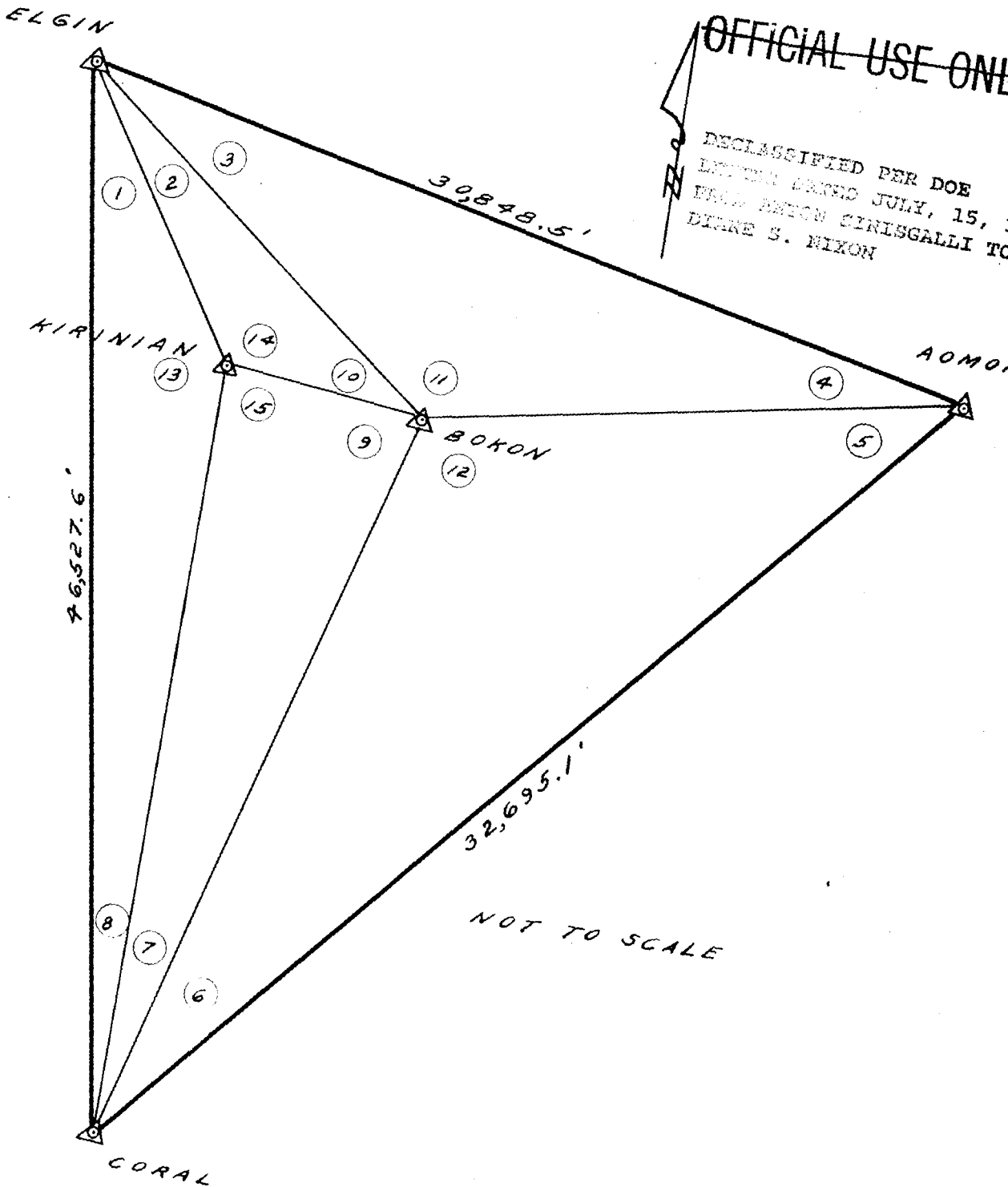
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FRAN ARTHUR SINISGALLI TO
DICK S. NIXON



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ADJUSTED ANGLES

①	24°-14'-40.9"	⑨	125°-39'-52.8"
②	9°-51'-23.2"	⑩	8°-56'-51.1"
③	10°-23'-55.0"	⑪	162°-23'-50.9"
④	7°-12'-14.1"	⑫	62°-59'-25.2"
⑤	86°-53'-44.9"	⑬	152°-12'-33.2"
⑥	30°-06'-49.9"	⑭	161°-11'-45.7"
⑦	7°-44'-26.1"	⑮	46°-35'-41.1"
⑧	3°-32'-45.9"		

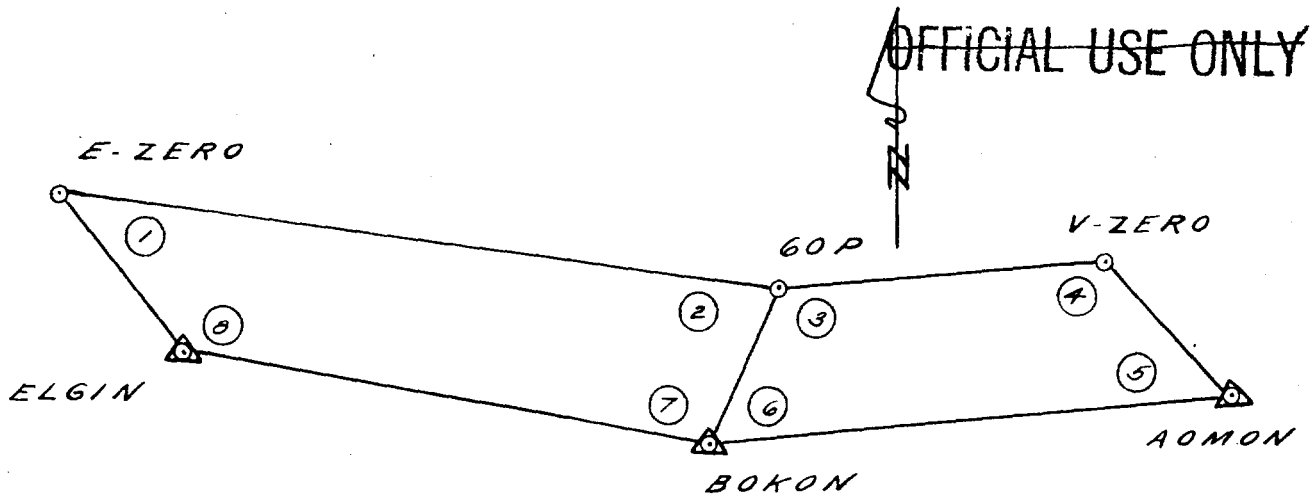
ADJUSTED DISTANCES

BOKON - ELGIN	12,791.9'
BOKON - AOMON	18,412.0'
BOKON - CORAL	36,643.9'
BOKON - KIRINIAN	6,793.4'
KIRINIAN - CORAL	40,978.1'
KIRINIAN - ELGIN	6,172.3'

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ADJUSTED ANGLES

- | | |
|------------------------------|------------------------------|
| (1) $4^{\circ}-07'-18.6''$ | (5) $12^{\circ}-32'-11.9''$ |
| (2) $84^{\circ}-41'-40.0''$ | (6) $66^{\circ}-25'-47.9''$ |
| (3) $116^{\circ}-36'-55.9''$ | (7) $95^{\circ}-58'-03.0''$ |
| (4) $164^{\circ}-25'-04.3''$ | (8) $175^{\circ}-12'-58.4''$ |

ADJUSTED DISTANCES

60P - E-ZERO	16,928.2'
60P - V-ZERO	14,330.1'
60P - BOKON	150.0'
ELGIN - E-ZERO	4,133.985'
ELGIN - BOKON	12,791.9'
AOMON - BOKON	18,412.0'
AOMON - V-ZERO	4,140.9'

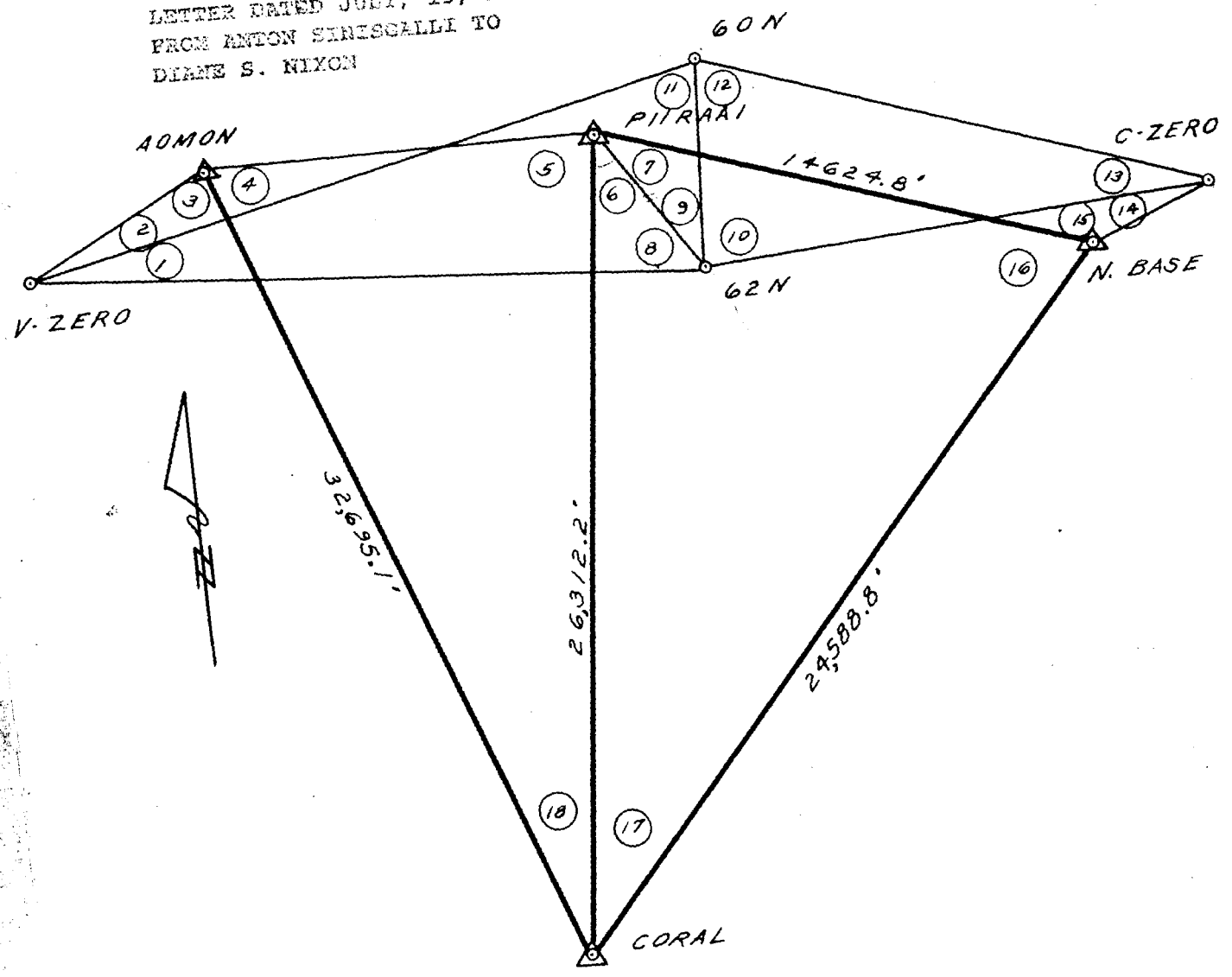
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ADJUSTED ANGLES

①	4°-05'-06.5"	⑩	106°-30'-24.2"
②	21°-28'-00.5"	⑪	98°-55'-43.2"
③	99°-25'-56.8"	⑫	69°-42'-03.2"
④	45°-56'-26.9"	⑬	3°-47'-32.6"
⑤	116°-45'-13.6"	⑭	45°-41'-26.3"
⑥	38°-43'-21.4"	⑮	132°-24'-33.0"
⑦	28°-12'-19.1"	⑯	79°-53'-48.7"
⑧	33°-35'-54.3"	⑰	33°-10'-30.8"
⑨	43°-23'-16.0"	⑱	17°-18'-19.5"

ADJUSTED DISTANCES

V-ZERO	-	AOMON	4,140.9'
V-ZERO	-	60N	14,393.4'
V-ZERO	-	62N	14,593.9'
C-ZERO	-	60N	15,255.6'
C-ZERO	-	62N	14,923.1'
PIIRAAI	-	62N	123.28'
PIIRAAI	-	AOMON	10,891.6'
60N	-	62N	1,052.4'
N. BASE	-	C-ZERO	591.27'

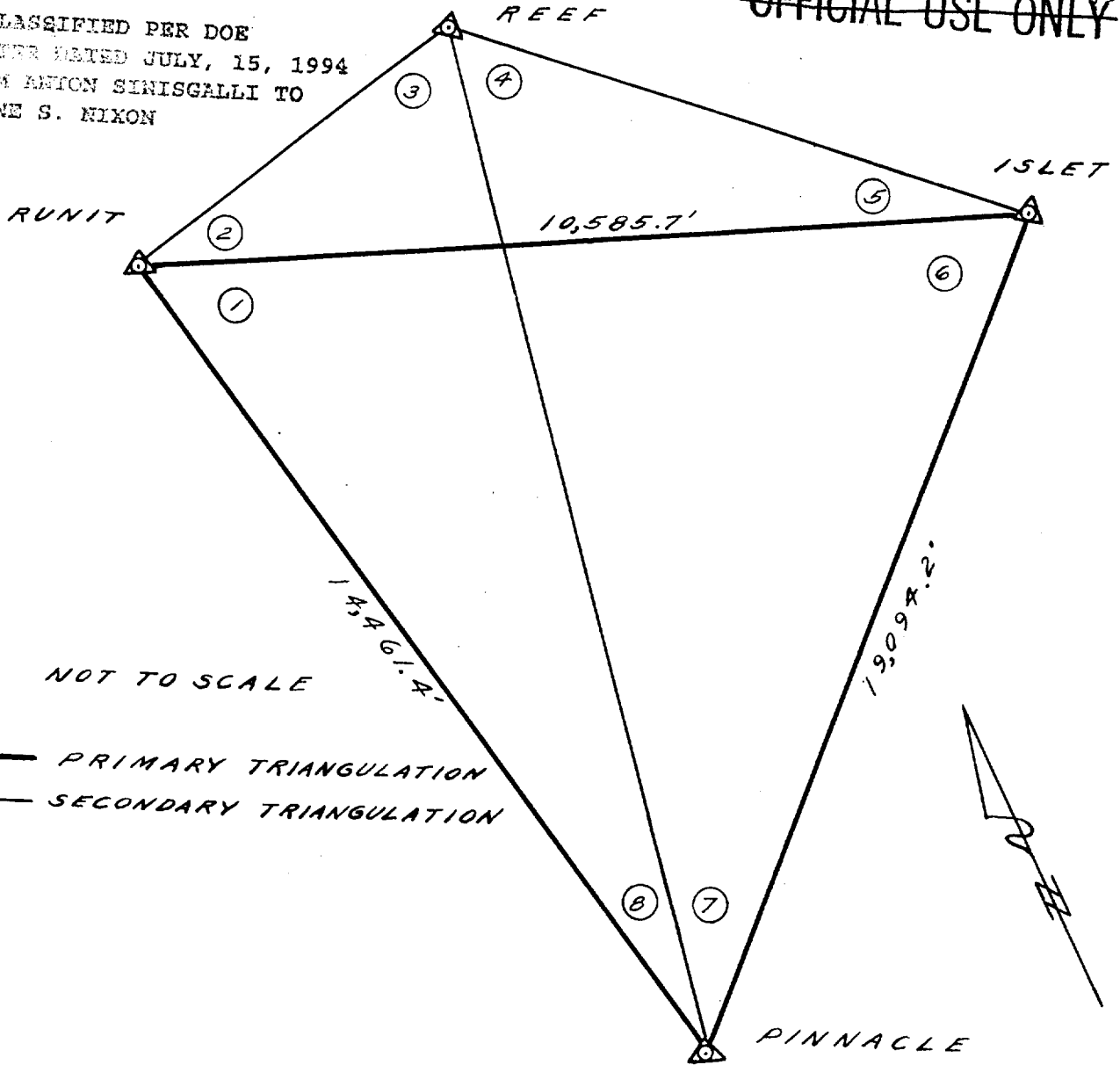
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ADJUSTED ANGLES

①	98°-08'-56.6"	⑤	4°-22'-35.6"
②	7°-10'-07.2"	⑥	48°-33'-58.9"
③	60°-36'-29.4"	⑦	19°-12'-37.7"
④	107°-50'-47.8"	⑧	14°-04'-26.8"

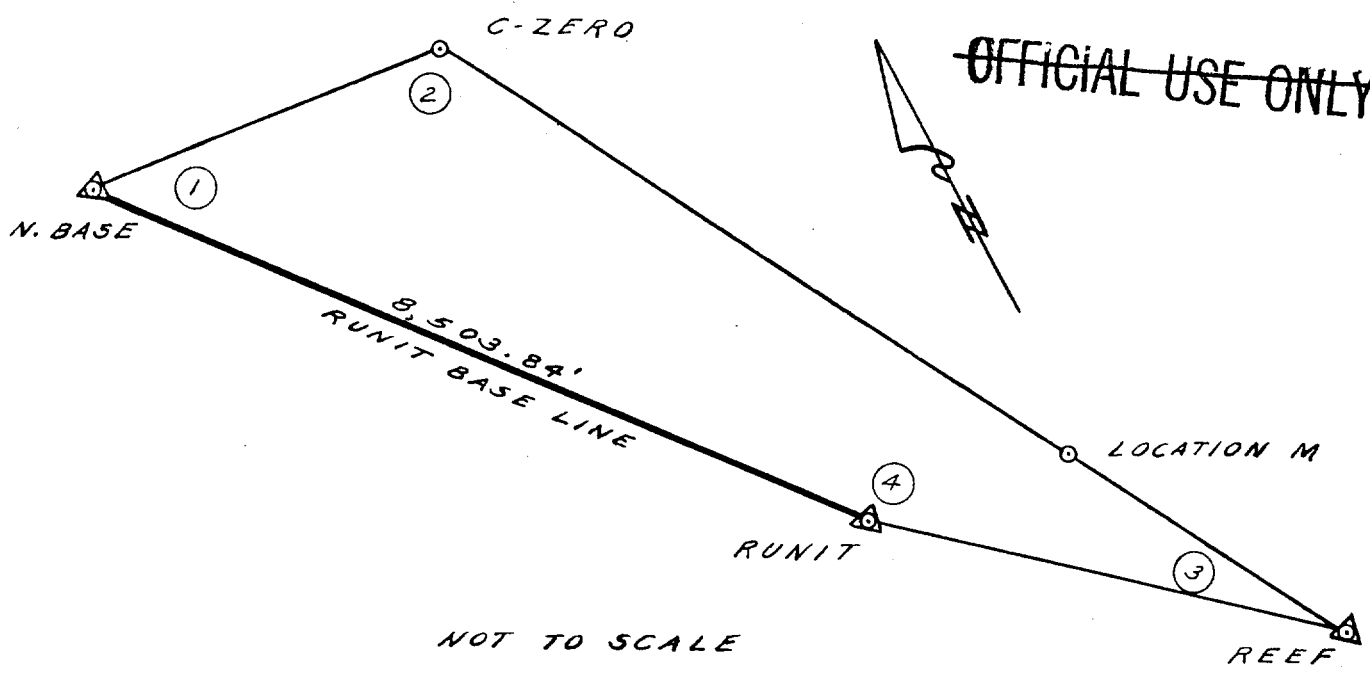
ADJUSTED DISTANCES

REEF - RUNIT	4,036.2'
REEF - ISLET	6,600.3'
REEF - PINNACLE	16,008.2'

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ADJUSTED ANGLES

- ① 35° - 26' - 55.9"
- ② 142° - 25' - 55.4"
- ③ 0° - 39' - 13.8"
- ④ 181° - 27' - 54.9"

ADJUSTED DISTANCES

N. BASE - C-ZERO	591.27'
C-ZERO - LOC. M	12,000.0'
LOC. M - REEF	65.27'
REEF - RUNIT	4,036.2'

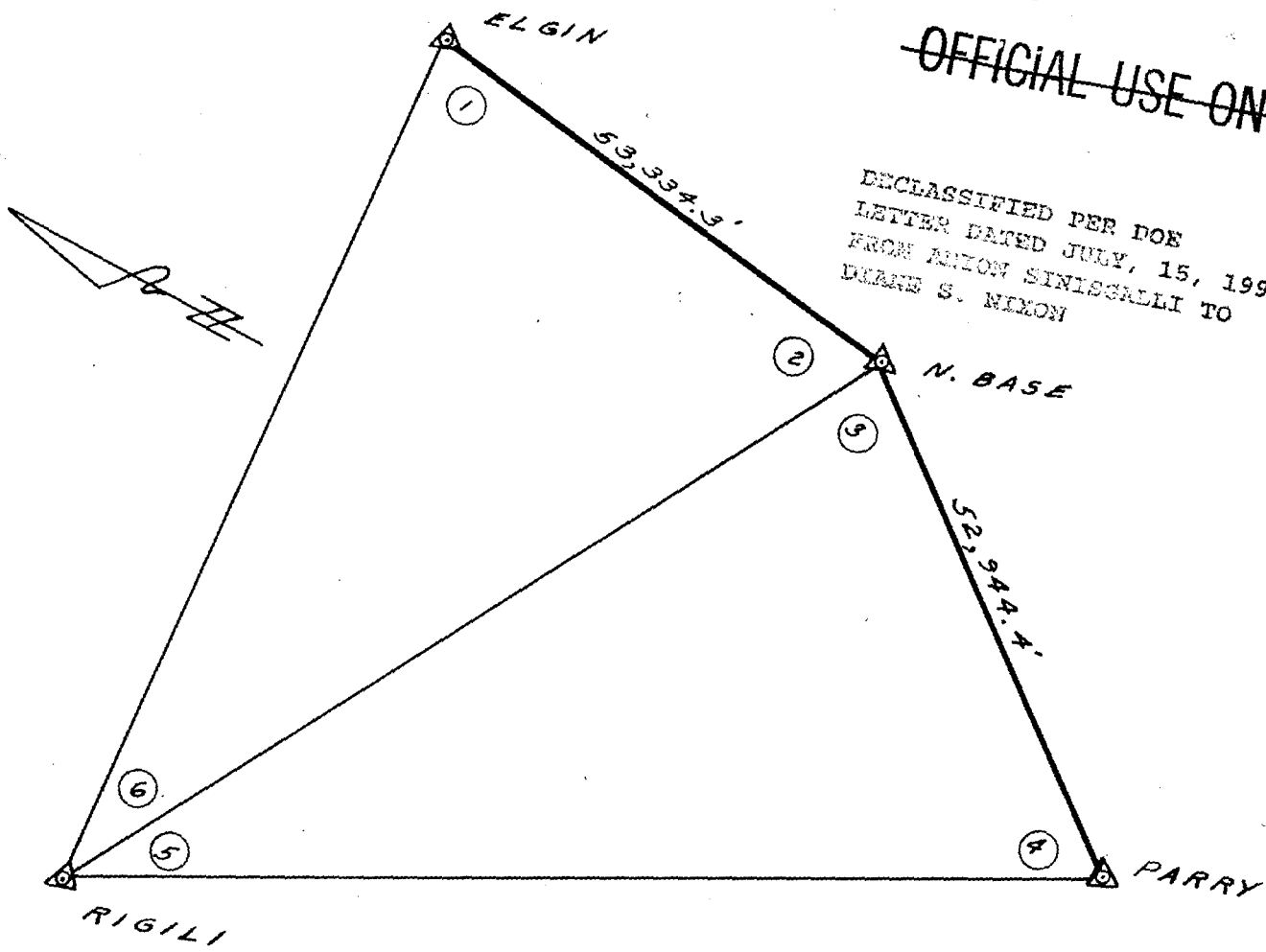
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FROM ANTON SINIGALLI TO
DEANE S. NIXON



NOT TO SCALE

--- PRIMARY TRIANGULATION
 --- SECONDARY TRIANGULATION (3RD ORDER)

ADJUSTED ANGLES

- | | | | |
|---|---------------|---|---------------|
| ① | 81°-04'-39.2" | ④ | 69°-53'-17.5" |
| ② | 66°-20'-35.1" | ⑤ | 30°-32'-11.1" |
| ③ | 79°-34'-31.4" | ⑥ | 32°-34'-45.7" |

ADJUSTED DISTANCES

- | | |
|------------------|------------|
| RIGILI - ELGIN | 90,724.7' |
| RIGILI - N. BASE | 97,849.7' |
| RIGILI - PARRY | 102,483.7' |

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FINAL VALUES GEOGRAPHIC POSITIONS

Locality **BIKINI, Marshall Islands** 2nd order triangulation **ASTRA Datum.**

State **Palau Group** **DOB BOUNDARY - 1944**

Archive No. **305697/1**

STATIONS	LATITUDE S ^o M'	LONGITUDE W ^o M'	BACK AZIMUTH	TO STATIONS	DISTANCE Meters	LOGARITHMS
X BIKINI ARMO. PIER	11 33 23.468	162 21 10.230	310.575			
NORTH BASE	11 33 21.255	162 21 09.890	239.467			
X SOUTH BASE	11 32 02.826	162 22 04.920	149.046			
X BEAK	11 32 19.328	162 17 10.786	346.837			
	238 44 57.63	58 44 57.70		BIKINI ARMO. PIER	12.747	1.105 4216
	325 59 32.56	145 59 43.57		SOUTH BASE	2981.41	3.474 4211
	327 56 52.40	147 57 15.77		NORTH BASE	6680.87	3.824 8331
	74 50 08.53	254 49 20.67		BEAK	7506.61	3.875 4441
	141 40 18.15	321 39 33.90		CAROLINA	10,753.90	4.031 5685
	161 55 55.27	341 55 44.00		CAROLINA	5483.79	3.739 0812
	329 31 31.44	149 31 44.01		SAND	3702.60	3.568 3068
	357 21 58.31	177 22 01.87		LILAO	11,830.00	4.072 9854
	93 15 50.99	273 14 52.17		BEAK	8927.19	3.950 7152
	145 59 43.57	325 59 32.56		NORTH BASE	2981.41	3.474 4211
	145 31 45.84	325 30 39.85		SAND	17,555.80	4.244 4200
	166 43 51.92	346 43 32.85		ASTER	12,519.30	4.097 5798
	183 09 24.19	03 09 27.99		CAROLINA	10,415.70	4.017 6901
	217 40 25.76	37 41 02.45		CAROLINA	9069.22	3.957 5698
	254 49 20.67	74 50 08.53		NORTH BASE	7506.61	3.875 4441
	273 14 52.17	93 15 50.99		SOUTH BASE	8927.19	3.950 7152
	288 54 26.68	108 55 37.81		SAND	11,407.00	4.057 1732
	322 29 18.30	142 30 20.43		LILAO	15,535.40	4.191 3221
	16 04 44.63	196 04 04.93		LAPANA	21,909.70	4.340 6342

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FROM RICHARD MENISCALDI TO
DAVID S. ALFOR

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FINAL VALUES — GEOGRAPHIC POSITIONS

Locality **MINERVE, Marshall Islands** **201-epoch** **Wavelength** **4000** **Distance**

State **Palau** **Country** **REE REEF/REEF - 1944**

Archive No. **305697/1**

STATIONS	LATITUDE	LONGITUDE	Seconds in Meters	AZIMUTH	BACK AZIMUTH	TO STATIONS	DISTANCE Meters	LOGARITHM
SAND	11 30 18.846	162 23 06.811	208.596	08 47 42.82	188 47 34.07	LILAC	8728.98	3.940 9636
				44 11 17.84	224 09 27.65	LANTANA	24,196.90	4.383 7598
				108 55 37.81	288 54 26.68	REEF	11,407.00	4.057 1733
				147 57 15.77	327 56 52.40	NORTH BASE	6680.87	3.824 8311
				149 31 44.01	329 31 31.64	SOUTH BASE	3704.60	3.568 5068
LILAC	11 25 38.510	162 22 28.451	622.709	16 30 25.70	196 30 11.84	PRIVILEGE	7268.86	3.861 4665
				60 40 24.82	240 38 43.69	LANTANA	17,813.50	4.250 7502
				142 30 20.43	322 29 18.50	REEF	15,535.40	4.191 3221
				177 22 01.87	357 21 58.31	SOUTH BASE	11,830.00	4.072 9854
				188 47 34.07	08 47 42.82	SAND	8728.98	3.940 9636
LANTANA	11 20 54.124	162 13 30.661	1536.143	337 48 00.17	157 48 04.42	STEEL	1722.19	3.236 0804
				196 04 04.93	16 04 44.63	REEF	21,909.70	4.340 6362
				224 09 27.65	44 11 17.84	SAND	24,196.90	4.383 7598
				240 38 43.69	60 40 24.82	LILAC	17,813.50	4.250 7502
				246 11 28.67	66 13 13.97	STEEL	17,682.70	4.247 5474
STEEL	11 26 16.504	162 22 44.319	1343.530	262 32 36.16	82 34 05.60	PRIVILEGE	13,579.20	4.132 8757
				26 48 36.39	206 48 18.70	PRIVILEGE	6022.03	3.779 7427
				66 13 13.97	246 11 28.67	LANTANA	17,682.70	4.247 5474
				157 48 04.42	337 48 00.17	LILAC	1722.19	3.236 0804
				82 34 05.60	262 32 36.16	LANTANA	13,579.20	4.132 8757
PRIVILEGE	11 23 51.393	162 21 44.724	446.800	196 30 11.84	16 30 25.70	LILAC	7268.86	3.861 4665
				206 48 18.70	26 48 36.39	STEEL	6022.03	3.779 7427

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GEOGRAPHIC POSITIONS

Locality **Eniwetok, Marshall Islands** 2nd order triangulation Astro Datum.

State **Pacific Ocean**

TO STATIONS **105 BONDITCH - 1944**

Archive No. **305497A**

STATIONS	LATITUDE	Longitude	Seconds in		AZIMUTH	BACK AZIMUTH	TO STATIONS	DISTANCE Meters	LOGARITHMS
			Meters	Seconds					
PSTOVIA	11 38 59.362	162 09 40.134	1623.937	162 09 40.134	239 34 23.79	59 34 48.57	BACE	4305.72	3.634 0460
					243 33 46.69	63 34 28.48	ZIMBIA	6990.42	3.844 5280
					270 33 20.46	90 34 32.30	ABEER	10,777.10	4.032 5004
BACE	11 40 10.824	162 11 42.721	317.215	162 11 42.721	59 34 48.57	239 34 23.79	PSTOVIA	4305.72	3.634 0459
					249 54 41.89	69 54 58.90	ZIMBIA	2712.13	3.433 3102
					287 55 58.27	107 56 45.39	ABEER	7424.24	3.870 6519
					291 10 00.03	111 11 10.10	CAMBIA	11,271.40	4.051 9852
					325 30 39.85	145 3 45.44	BEER	17,555.40	4.244 4200
ZIMBIA	11 40 40.638	162 13 06.222	1248.443	162 13 06.222	63 34 28.48	243 33 46.69	PSTOVIA	6990.42	3.844 5280
					69 54 58.90	249 54 41.89	BACE	2712.13	3.433 3102
					305 28 14.03	125 28 44.17	ABEER	5545.29	3.743 9238
					90 34 32.30	270 33 20.46	PSTOVIA	10,777.10	4.032 5004
ABEER	11 38 55.908	162 15 35.974	1717.503	162 15 35.974	107 56 45.39	287 55 58.27	BACE	7424.24	3.870 6519
					125 28 14.17	305 28 14.03	ZIMBIA	5545.29	3.743 9238
					297 22 24.29	117 22 47.25	CAMBIA	3081.43	3.489 0347
					346 43 32.85	166 43 51.92	BEER	12,519.30	4.077 5798
					09 09 27.97	183 09 24.19	BEER	10,453.70	4.017 6901
CAMBIA	11 37 57.883	162 17 29.724	1776.116	162 17 29.724	111 11 10.10	291 10 00.03	BACE	11,271.40	4.051 9852
					117 22 47.25	297 22 24.29	ABEER	3081.43	3.489 0346
					302 57 25.15	122 57 58.18	CAMBIA	5922.17	3.772 4804
					321 39 31.90	141 40 18.15	BEER BACE	10,753.90	4.031 9685
ZIMBIA	11 36 12.838	162 20 13.748	387.538	162 20 13.748	37 41 02.45	217 40 25.76	BEER	9049.22	3.957 8498
					122 57 58.18	302 57 25.15	CAMBIA	5922.17	3.772 4804
					341 55 44.08	161 55 35.27	BEER BACE	5483.79	3.739 6812

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DIRGE S. NIXON

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DATE DATED JULY, 15, 1994
 BY ANITA SINIGALLI TO
 NAME S. NIXON

1 of 2
 DATE 305 657/A
 DISTANCE

STATION	ELEVATION (FEET)	N LATITUDE (LONGITUDE)	SACDAS IN METERS	AZIMUTH	TO STATION	DISTANCE
EMERALD ASTRO PIER		11 33 23.480	721.4			
		162 21 10.250	310.6			
NORTH BASE		11 33 23.265	714.8	238 44 57.63	EMERALD ASTRO PIER	1.105 6216
		162 21 09.890	299.7			
SAND		11 30 16.981	583.2	147 57 15.78	NORTH BASE	1.824 7980
		162 23 04.873	288.3			
SOUTH BASE		11 32 02.832	87.0	129 31 31.64	SAND	1.568 4716
		162 22 04.915	148.9	145 59 43.57	NORTH BASE	2.474 3860
PIEC		11 32 19.334	594.1	254 49 20.68	NORTH BASE	3.875 4091
		162 17 10.805	327.4	273 34 52.18	SOUTH BASE	3.950 6801
				288 54 26.09	SAND	4.057 3382
LILAC		11 25 38.248	1175.2	142 30 20.43	PIEC	4.191 2870
		162 22 22.847	692.6	177 22 01.87	SOUTH BASE	4.072 9403
				188 47 34.07	SAND	3.940 9286
LANTANA		11 20 54.185	1664.8	196 04 04.94	PIEC	4.340 6011
		162 13 50.693	1537.3	224 09 22.66	SAND	4.383 7247
				240 38 43.70	LILAC	4.250 7852
STAG		11 24 46.366	1624.3	68 13 13.97	LANTANA	4.247 5124
		162 22 44.311	1343.3	157 48 04.42	LILAC	3.236 0452
FRUITAUX		11 21 51.639	1580.5	82 34 05.60	LANTANA	4.132 8407
		162 21 14.785	146.8	196 30 11.84	LILAC	3.861 4315
				206 48 18.79	PIEC	3.779 7076

STATION	ELEVATION (FEET)	N LATITUDE (LONGITUDE)	SACDAS IN METERS	AZIMUTH	TO STATION	DISTANCE
EMERALD ASTRO PIER		11 33 23.480	721.4			
		162 21 10.250	310.6			
NORTH BASE		11 33 23.265	714.8	238 44 57.63	EMERALD ASTRO PIER	1.105 6216
		162 21 09.890	299.7			
SAND		11 30 16.981	583.2	147 57 15.78	NORTH BASE	1.824 7980
		162 23 04.873	288.3			
SOUTH BASE		11 32 02.832	87.0	129 31 31.64	SAND	1.568 4716
		162 22 04.915	148.9	145 59 43.57	NORTH BASE	2.474 3860
PIEC		11 32 19.334	594.1	254 49 20.68	NORTH BASE	3.875 4091
		162 17 10.805	327.4	273 34 52.18	SOUTH BASE	3.950 6801
				288 54 26.09	SAND	4.057 3382
LILAC		11 25 38.248	1175.2	142 30 20.43	PIEC	4.191 2870
		162 22 22.847	692.6	177 22 01.87	SOUTH BASE	4.072 9403
				188 47 34.07	SAND	3.940 9286
LANTANA		11 20 54.185	1664.8	196 04 04.94	PIEC	4.340 6011
		162 13 50.693	1537.3	224 09 22.66	SAND	4.383 7247
				240 38 43.70	LILAC	4.250 7852
STAG		11 24 46.366	1624.3	68 13 13.97	LANTANA	4.247 5124
		162 22 44.311	1343.3	157 48 04.42	LILAC	3.236 0452
FRUITAUX		11 21 51.639	1580.5	82 34 05.60	LANTANA	4.132 8407
		162 21 14.785	146.8	196 30 11.84	LILAC	3.861 4315
				206 48 18.79	PIEC	3.779 7076

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2 of 4

STATION	ELEVATION (FEET)	LATITUDE AND LONGITUDE	SECONDS	AZIMUTH	DATE AND TIME	TO STATION	STATION		
							READING	DIFFERENTIAL	
CAMDEN		11 36 12-925	397.1	345 55 44-01	161 55 55-27	NORTH BASK	3.739	0461	5 493-35
		162 20 13-753	436.5	37 43 02-46	227 49 25-77	REAR	3.937	5147	9 068-14
CAMDEN		11 37 57-783	1775.4	302 57 25-16	122 57 58-19	TAUDIENA	3.772	4455	5 921-69
		162 17 29-738	900.9	321 39 13-91	141 40 13-15	NORTH BASK	4.031	5134	10 753-09
				3 09 28-00	183 09 24-20	REAR	4.047	6550	10 446-90
ASTOR		11 38 55-872	1716.7	297 22 24-20	117 22 47-26	CAMPANIA	3.589	0017	3 821-52
		162 15 15-947	1088.8	346 43 15-86	166 43 51-93	REAR	4.097	5447	12 518-24
BARK		11 40 10-291	316.2	287 55 58-28	107 56 45-60	ASTOR	3.870	6168	7 423-64
		162 11 42-766	1275.3	291 10 09-04	111 11 10-11	CAMPANIA	4.051	9501	11 270-98
				325 30 39-86	165 31 45-85	REAR	4.244	3849	27 554-36
ZINBA		11 40 40-692	1247.5	305 28 14-04	125 28 44-18	ASTOR	3.743	8887	5 514-84
		162 13 08-860	207.8	69 54 58-91	249 54 41-90	REAR	3.633	2731	2 712-91
PRUDA		11 38 59-335	1223.1	339 34 23-81	59 34 48-58	REAR	3.634	0109	4 305-37
		162 09 40-191	1217.4	263 13 46-71	63 34 59-49	CAMPANIA	3.844	6929	6 950-25
				270 33 20-48	90 34 30-31	ASTOR	4.042	4653	10 776-19

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 DATE: 15 JULY 1994
 BY: ANTON SINIGALLI TO
 DIANE S. NIXON

STATION
 SECONDARY

STATION	ELEVATION (FEET)	LATITUDE AND LONGITUDE	SECONDS IN REFLECT	AZIMUTH	TO STATION	TO STATION	DISTANCE (METERS)
WY		11 21 19.317	982.9	79 56 16.2	STEEL		3.265 2268
		162 21 23.110	706.6	95 10 47.2	LILAC		3.265 2222
WE		11 20 21.645	727.7	28 51 17.5	LILAC		3.766 1124
		162 21 51.622	1685.8	157 21 45.5	SAND		3.504 1352
WIG		11 23 40.154	1233.7	71 51 35.0	LANTANA		4.213 9545
		162 22 21.626	716.3	172 37 37.0	LILAC		3.559 7334
WJL		11 23 46.372	1424.8	33 04 50.8	PRIVILEGE		3.624 7354
		162 22 30.602	927.8	176 05 14.8	LILAC		3.537 2493
ZDQ		11 22 30.969	1197.3	77 34 59.7	LANTANA		4.174 8561
		162 21 52.645	1590.1	189 29 51.7	LILAC		3.747 0201
ZDZ		11 21 22.637	695.5	86 06 17.9	LANTANA		4.108 2668
		162 20 52.885	1691.5	199 08 53.9	LILAC		3.919 8006
ZDQ		11 20 44.169	1362.6	209 06 40.5	LILAC		4.014 3623
		162 19 35.959	1090.4	235 11 11.5	PRIVILEGE		3.557 6132
ZDQ		11 20 39.720	1220.4	92 15 38.2	LANTANA		4.053 7963
		162 20 01.690	111.9	204 41 49.2	LILAC		4.004 1541
ZDQ		11 21 29.890	918.4	253 02 32.0	STEEL		4.316 3417
		162 11 50.611	1534.6	286 45 49.0	LANTANA		3.940 1039
ZDQ		11 22 33.846	1099.9	259 58 21.8	STEEL		4.369 7067
		162 10 01.189	24.7	291 55 49.8	LANTANA		3.877 7852
ZDQ		11 27 40.366	1240.2	296 30 49.5	LOCK		4.461 3201
		162 05 50.095	1213.7	210 33 49.5	LANTANA		4.282 9888

STATION
 SECONDARY

STATION	ELEVATION (FEET)	LATITUDE AND LONGITUDE	SECONDS IN REFLECT	AZIMUTH	TO STATION	TO STATION	DISTANCE (METERS)
WY		11 21 19.317	982.9	79 56 16.2	STEEL		3.265 2268
		162 21 23.110	706.6	95 10 47.2	LILAC		3.265 2222
WE		11 20 21.645	727.7	28 51 17.5	LILAC		3.766 1124
		162 21 51.622	1685.8	157 21 45.5	SAND		3.504 1352
WIG		11 23 40.154	1233.7	71 51 35.0	LANTANA		4.213 9545
		162 22 21.626	716.3	172 37 37.0	LILAC		3.559 7334
WJL		11 23 46.372	1424.8	33 04 50.8	PRIVILEGE		3.624 7354
		162 22 30.602	927.8	176 05 14.8	LILAC		3.537 2493
ZDQ		11 22 30.969	1197.3	77 34 59.7	LANTANA		4.174 8561
		162 21 52.645	1590.1	189 29 51.7	LILAC		3.747 0201
ZDZ		11 21 22.637	695.5	86 06 17.9	LANTANA		4.108 2668
		162 20 52.885	1691.5	199 08 53.9	LILAC		3.919 8006
ZDQ		11 20 44.169	1362.6	209 06 40.5	LILAC		4.014 3623
		162 19 35.959	1090.4	235 11 11.5	PRIVILEGE		3.557 6132
ZDQ		11 20 39.720	1220.4	92 15 38.2	LANTANA		4.053 7963
		162 20 01.690	111.9	204 41 49.2	LILAC		4.004 1541
ZDQ		11 21 29.890	918.4	253 02 32.0	STEEL		4.316 3417
		162 11 50.611	1534.6	286 45 49.0	LANTANA		3.940 1039
ZDQ		11 22 33.846	1099.9	259 58 21.8	STEEL		4.369 7067
		162 10 01.189	24.7	291 55 49.8	LANTANA		3.877 7852
ZDQ		11 27 40.366	1240.2	296 30 49.5	LOCK		4.461 3201
		162 05 50.095	1213.7	210 33 49.5	LANTANA		4.282 9888

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STATIONER TO

LAST	11 40 08-811	271.6	349 18 11.4				3-439 5177	2 594.7
	162 14 46-289	1411.1	72 02 46.6				3-978 7671	9 522.9
LAST	11 39 45-994	1413.2	316 54 10.7				1-344 6763	2 401.2
	162 14 48-375	1465.2	81 16 37.7				3-975 5534	9 443.8
RANGERS-THIRDA	11 40 25-298	899.5	291 20 57.4				1-735 2267	5 212.3
	162 13 02-464	827.7	65 58 52.4				1-828 9896	8 726.1
SAGE	11 40 58-920	874.1	75 53 15.5				1-942 6821	8 761.6
	162 14 50-737	622.6	90 30 30.5				1-479 5941	4 756.2
MFL	11 39 45-201	1112.1	85 15 50.7				1-924 2873	9 644.7
	162 14 58-410	1708.6	190 07 51.7				1-773 0922	5 927.9
FINNISH TOURS- KUMIKORU 14.	11 20 47-559	1421.3	91 04 50.2				4-037 1037	10 893.4
	162 19 49-891	1512.8	207 26 92.5				4-002 7529	10 061.6

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