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1949-50 HORIZONTAL CONTROL SURVEY
ENIWETOK ATOLL, MARSHALL ISLANDS

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LETTER DATED JULY 15, 1994
THIS ACTION SENSITIVE TO
DIAHNE S. NIXON

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HORIZONTAL CONTROL SURVEY
ENIWETOK ATOLL
MARSHALL ISLANDS
1949-50

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

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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 Igerin to Bogumbogo. 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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BY RPTN SINGAPORE TO
DR. R. S. NIXON

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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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FROM ANTON SINISGALLI TO
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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 consistant 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.

The calculations involved in establishing the azimuth of this new base line are given below for reference purposes.

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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 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
Piiraai ----- Piiraai 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 Aareaubiru 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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JOHN S. SIMON

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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, Pinnacle, 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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VALIDATED JULY, 15, 1994
FROM ANTHON SIMONEAU TO
DIANE S. NIXON

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HOLMES IS. NAV. SURVEY PROJECT NO. 14

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 targer 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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DALE E. NELSON

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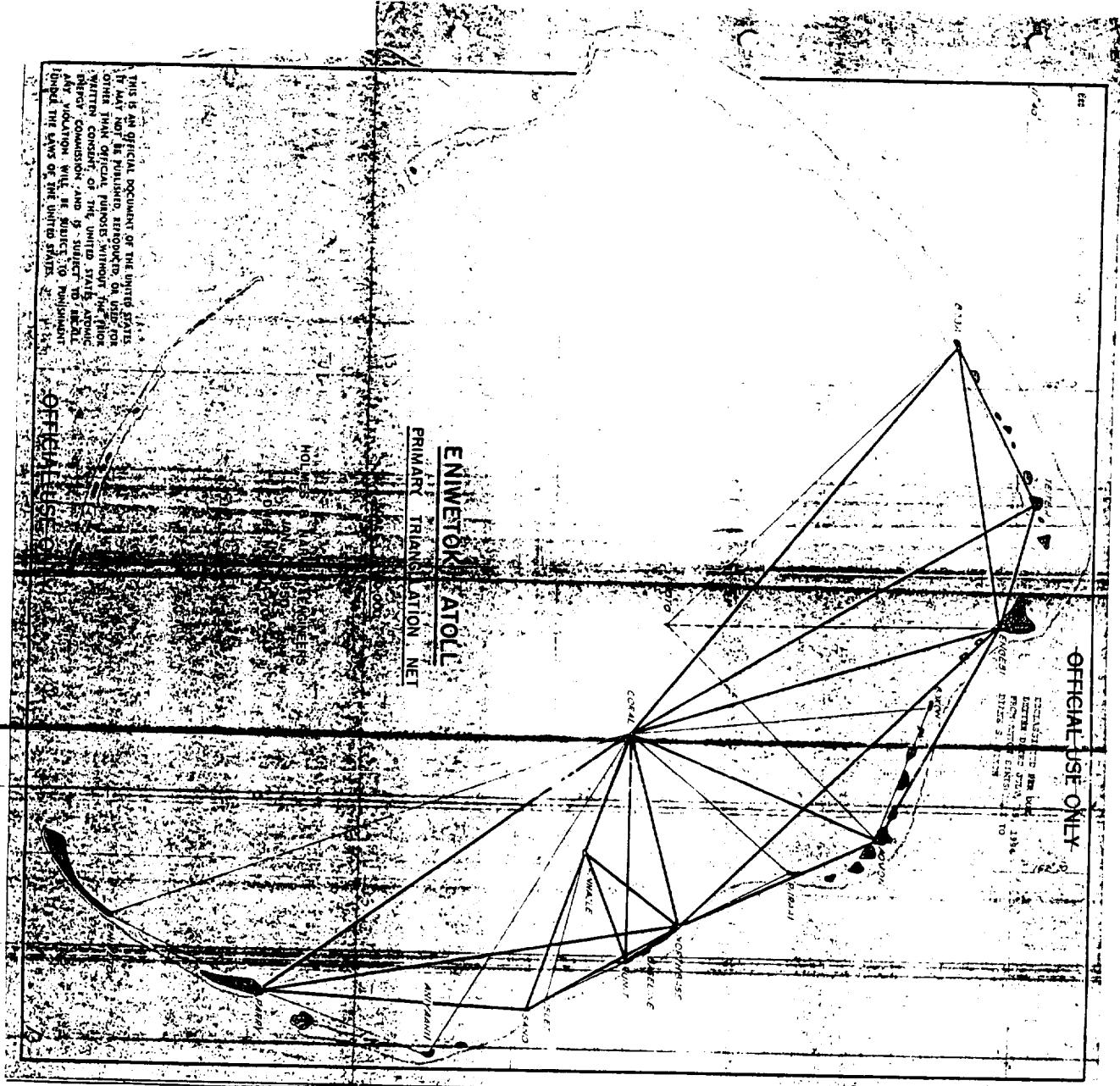
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EXPLANATION OF PLAN
PROJECTION: LAMBERT CONFORMAL
TO SCALE: 1:100,000

ENIVETOK ATOLL

PRIMARY TRAINING NET

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GEOGRAPHIC POSITIONS

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

STATION	LATITUDE AND LONGITUDE	SECONDS IN METERS	BAC/AZIMUTH	TO STATION	LOGARITHM METERS	DISTANCE METERS	FEET
Pinnacle	11° 31' -26.010 N 162° 19' -45.307 E	109 -36 -57.6 21.5 -25 -32.5 249 -34 -07.5 282 -51 -12.0	289 -16 -26.8 35 -35 -51.4 69 -3 -34.8 102 -51 -49.4	Coral North Base Runit Islet	3.6959722 3.6455679 3.6442259 3.7649177	4965.67 4421.48 4407.84 5819.93	16291.3 14506.1 14461.4 19093.2
Aoman	11° 32' -15.282 N 162° 19' -27.584 E	336 -29 -53.3 24 -32 -57.2 46 -21 -59.5 111 -26 -41.6 118 -38 -38.3	156 -30 -13.8 204 -32 -29.8 226 -21 -04.6 291 -26 -06.9 298 -38 -01.3	North Base Coral Photo Bokon Engebi	3.8906165 3.9984988 4.0588211 3.7491203 3.9732497	7773.30 9965.49 11450.40 5612.03 9402.64	23503.6 32695.1 37566.9 18412.1 30848.5
Engebi	11° -39 -41.964 N 162° 14' -55.152 E	298 -38 -01.3 343 -08 -00.5 0 -09 -02.6 80 -45 -22.3 103 -29 -31.7	110 -38 -36.3 163 -08 -27.9 180 -09 -02.4 260 -14 -14.1 283 -29 -00.1	Aoman Coral Photo Boga Teiteir	3.9732497 4.1517262 4.0937487 4.0156166 3.6867231	9402.64 14181.63 12409.34 10366.13 4860.97	30848.5 46527.6 4073.0 34009.5 15948.0
Boga	11° -38 -47.715 N 162° 09' -17.366 E	260 -44 -74.1 309 -40 -17.6 316 -28 -20.9	80 -45 -22.3 129 -41 -52.8 136 -29 -28.6	Engebi Coral Photo	4.0156166 4.2705251 4.1706707	10366.13 18643.40 14813.95	34009.5 61165.9 48602.1
Teiteir	11° -40 -18.863 N 162° 12' -19.086 E	283 -29 -00.1 328 -58 -32.4	103 -29 -31.7 148 -59 -31.2	Engebi Coral	3.6867231 4.2344911	4860.97 17158.96	15948.0 56295.7
Bokon	11° -38 -22.046 N 162° 16' -35.138 E	291 -26 -06.9 354 -25 -31.6	111 -26 -41.6 174 -25 -39.0	Aoman Coral	3.7491203 4.0480178	5612.03 1168.09	18412.1 36643.9

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GEOGRAPHIC POSITIONS

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LOCALITY	STATION	ATOLL MARSHALL ISLANDS				DATUM ENIWETOK ASTRONOMIC 1944				SECOND ORDER TRIANGULATION	
		LATITUDE AND LONGITUDE	SECONDS IN METERS	AZIMUTH	BACK AZIMUTH	TO STATION	LOGARITHM METERS	METERS	FEET		
ENIWETOK	North Base	11°-33'-23.267N 162°-21'-09.893E	322-47-25.7 327-56-56.1 35-25-51.4 75-02-07.9 156-30-13.8 154-55-56.7	142-47-36.7 147-57-19.5 215-25-34.5 255-01-20.1 336-29-53.3 334-55-44.2	Runit Sand Pinnacle Coral Aman Piraoi	2591.9749 6630.20 4421.48 7454.68 7773.50 4457.66	3.41363.08 3.62478.95 3.64556.79 3.87475.93 3.89061.65 3.64910.67	2591.9749 6630.20 4421.48 7454.68 7773.50 4457.66	8503.84 21916.6 14506.1 24588.8 25503.6 14624.8		
ENIWETOK	Runit	11°-32'-16.080N 162°-22'-01.621E	331-25-38.2 69-34-34.8 142-47-36.7	151-25-48.3 249-34-07.5 322-47-25.7	Islet Pinnacle North Base	3226.54 4407.84 2591.9749	3.50813.76 3.64422.59 3.41363.08	3226.54 4407.84 2591.9749	10585.7 14461.4 8503.84		
ENIWETOK	Carol	11°-32'-20.254N 162°-17'-10.944E	255-01-20.1 289-02-53.4 289-36-26.8 300-55-07.4 324-04-06.6 339-03-46.6 129-41-52.8 148-59-31.2 163-08-27.9 174-25-39.0 204-32-29.8 221-50-49.3	75-02-07.9 109-04-04.5 109-36-57.6 120-56-28.8 144-05-13.0 159-04-35.0 309-40-17.6 328-58-32.4 328-58-32.4 159-08-00.5 354-25-31.8 24-32-57.2 41-51-24.7	North Base Sand Pinnacle Anyaanii Parry Eniwetok Boga Teiteir Engabi Bohon Aman Piraoi	7494.68 11411.21 4965.61 16291.3 47265.9 17220.90 20684.66 18643.40 61165.9 17158.96 56295.7 14181.63 46527.6 11169.09 36643.9 996549 3.9041724	4.05733.8 3.6959722 4.1585639 4.2360560 4.3156485 4.2705251 4.2344911 17158.96 141517262 4.0460178 3.9984988 8019.96	7494.68 11411.21 4965.61 16291.3 47265.9 17220.90 20684.66 18643.40 61165.9 17158.96 56295.7 14181.63 46527.6 11169.09 36643.9 996549 3.9041724	24588.8 37438.3 4965.61 16291.3 47265.9 17220.90 20684.66 18643.40 61165.9 17158.96 56295.7 14181.63 46527.6 11169.09 36643.9 996549 3.9041724		

HOLMES & NARVER ENGINEERS JOB NO 640

GEOGRAPHIC POSITIONS

LOCALITY	ENIWETOK ATOLL MARSHALL ISLANDS	DATUM ENIWETOK	ASTRONOMIC / 1944	SECOND	ORDER TRIANGULATION	DISTANCE		
						STATION	LOGARITHM METERS	FEET
Pinnacle	11° 31' -26.010 N 162° 19' -45.307 E		109 -36 -57.6 21.5 -25 -32.5 249 -34 -07.5 282 -51 -12.0	289 -36 -26.8 35 -25 -51.4 69 -34 -34.8 102 -51 -49.4	Coral North Base Runit Islet	3.695972.2 3.645567.9 3.644225.9 3.764917.7	4965.61 4421.48 4407.84 5819.93	16291.3 14506.1 1446.4 19094.2
Aoman	11° 37' -15.282 N 162° 19' -27.584 E		336 -29 -53.3 24 -32 -57.2 46 -21 -59.5 111 -26 -41.6 118 -38 -36.3	156 -30 -13.8 204 -32 -29.8 226 -21 -04.6 291 -26 -06.9 298 -38 -01.3	North Base Coral Photo Bohon Engabi	3.890616.5 3.9984988 4.0588211 3.749120.3 3.9732497	7773.50 9965.49 11450.40 5612.03 9402.64	25503.6 32695.1 37566.9 18412.1 30848.5
Engabi	11° 39' -41.964 N 162° 14' -55.152 E		298 -38 -01.3 343 -08 -00.5 0 -09 -02.6 80 -45 -22.3 103 -29 -31.7	118 -38 -36.3 163 -08 -27.9 180 -09 -02.4 260 -44 -14.1 283 -29 -00.1	Aoman Coral Photo Boga Teiteir	3.9732497 4.1517262 4.0937487 4.0156166 3.6867231	9402.64 14181.63 12409.34 10366.13 4860.97	30848.5 46522.76 40713.0 34009.5 15948.0
Boga	11° 38' -47.715 N 162° 09' -17.366 E		260 -44 -14.1 309 -40 -17.6 316 -28 -20.9	80 -45 -22.3 129 -41 -52.8 136 -29 -28.6	Engabi Coral Photo	4.0156166 4.2705251 4.1706707	10366.13 18643.00 14813.95	34009.5 61165.9 48602.1
Teiteir	11° 40' -18.863 N 162° 12' -19.086 E		283 -29 -00.1 328 -58 -32.4	103 -29 -31.7 148 -59 -31.2	Engabi Coral	3.6867231 4.2344911	4860.97 17158.96	15948.0 56295.7
Bohon	11° 38' -22.046 N 162° 16' -35.138 E		291 -26 -06.9 354 -25 -31.8	111 -26 -41.6 174 -25 -39.0	Aoman Coral	3.749120.3 4.0480178	5612.03 1169.09	18412.1 36643.9

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GEOGRAPHIC POSITIONS

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LOCALITY	Eniwetok Atoll Marshall Islands	DATUM	Eniwetok	ASTRONOMIC		SECOND		ORDER TRIANGULATION			
				STATION	LATITUDE AND LONGITUDE	SECONDS IN METERS	AZIMUTH	BACK AZIMUTH	TO STATION	LOGARITHM METERS	METERS
Piiraoi	11-35-34.679N 162-20-07.552E			334-55-34.2 41-51-24.7	154-35-36.7 221-50-49.3		North Base Coral		3.6491067 3.9041724	44.5766 8019.96	14624.8 26312.2
Tsjet	11-30-43.856N 162-22-52.644E			102-51-29.4 151-25-48.3	282-51-12.0 331-25-38.2		Pinnacle Runit		3.7649177 3.5087376	5819.93 3226.54	19094.2 10585.7
Sond	11-30-18.985N 162-23-06.870E			3-49-52.1 109-04-04.5 147-57-19.5	183-49-47.6 289-02-53.4 327-56-56.1		Parry Coral North Base		4.0104080 4.0573318 3.82247895	10242.55 11411.21 6680.20	33604.1 37438.3 21916.6
Parry	11-24-46.372N 162-22-44.294E			144-05-13.0 183-49-47.6 199-01-47.4 26-48-35.5	324-04-06.6 3-49-52.1 19-02-02.2 206-48-17.8		Coral Sand Anyaanii Eniwetok		4.2360560 4.0104080 3.8400459 3.7796823	17220.90 10242.55 6919.04 6021.19	56498.9 33604.1 22700.2 19754.5
Anyaanii	11-28-19.252N 162-23-58.729E			120-56-28.8 19-02-02.2	300-55-07.4 199-01-47.4		Coral Parry		4.1585639 3.8400459	14406.68 6919.04	47265.9 22700.2
Eniwetok	11-21-51.465N 162-21-14.725E			159-04-35.0 206-48-17.8	339-03-46.6 26-48-35.5		Coral Parry		4.3156485 3.7796823	20684.66 6021.19	67862.9 19754.5
Photo	11-32-58.091N 162-14-54.074E			136-29-28.6 180-09-02.4 226-21-04.6	316-28-20.9 0-09-02.6 46-21-59.5		Boga Engebi Aomon		4.1706707 4.0937487 4.0588821	14813.95 12409.34 11450.40	48602.1 40713.0 37566.9

GEOGRAPHIC POSITIONS

LOCALITY ENIWETOK Atoll MARSHALL ISLANDS

STATION	LATITUDE AND LONGITUDE	SECONDS IN METERS	AZIMUTH	BACK AZIMUTH	TC STATION	SECOND ORDER TRIANGULATION	
						METERS	FEET
Piraoi	11°-35'-34.679N 162°-20'-07.592E	334-55-34.2 41-51-24.7	154-35-56.7 221-10-49.3	North Base Coral	3.691067 3.9041724	445766 8019.96	14624.8 26312.2
Islet	11°-30'-43.856N 162°-22'-52.644E	102-57-49.4 151-25-48.3	282-57-12.0 331-25-38.2	Pinnacle Runit	3.7649177 3.5087376	5819.93 3226.54	19094.2 10585.7
Sand	11°-30'-18.985N 162°-23'-06.870E	3-49-52.4 109-04-04.5 147-57-19.5	103-29-47.6 289-02-53.4 327-16-56.1	Parry Coral North Base	4.0104080 4.0573388 3.8247895	10242.55 11411.21 6680.20	33604.7 37438.3 21916.6
Parry	11°-24'-46.372N 162°-22'-44.294E	144-05-13.0 183-49-07.6 199-01-47.4	324-04-06.6 3-49-52.1 19-02-02.2	Coral Sand Aniyoanii	4.23960560 4.0104080 3.84004459	17220.90 10242.55 6919.04	56498.9 33604.1 22700.2
Aniyoanii	11°-28'-19.232N 162°-23'-58.729E	26-48-35.5	206-08-17.8	Eniwetok	3.7796823	6021.19	19754.5
Eniwetok	11°-21'-51.465N 162°-21'-14.725E	120-56-28.9 19-02-02.2	300-55-07.4 199-01-47.4	Coral Parry	4.1585639 3.84004459	14406.68 6919.04	47265.9 22700.2
Photo	11°-32'-58.091N 162°-14'-54.074E	136-29-28.6 180-09-02.0 226-21-04.6	316-28-20.9 0-09-02.6 46-21-59.5	Baga Engebi Aman	4.1706707 4.0937487 4.0588211	14813.95 12409.34 11430.40	48602.1 40713.0 37566.9

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LIST OF DIRECTIONS

STATION ANIYAANII (Kodak)DATE 3/17/50CHIEF OF PARTY LSHCOMPUTED BY LSHOBSERVER FPCCHECKED BY LMP

OBSERVED STATION	OBSERVED DIRECTION	ECC. 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. 1 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

CLASSIFIED PER COMINT
ON 01 JUNE 1968, BY 3320A
THIS FORM IS UNCLASSIFIED
EXCEPT AS NOTED

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LIST OF DIRECTIONS

STATION BOGA

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPC

CHECKED BY IMP

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. 1 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

UNCLASSIFIED PER DOCS
REF ID: A62264
2024 RELEASE UNDER E.O. 14176

DIA/AB/SP/2024/03/28/2024 10:45 AM
DIANE S. NIKON

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LIST OF DIRECTIONS

STATION BOKONDATE 3/17/50CHIEF OF PARTY LSHCOMPUTED BY LSHOBSERVER FPCCHECKED BY IMP

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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LIST OF DIRECTIONS

STATION CORAL

DATE 3/17/50

CHIEF OF PARTY

COMPUTED BY LSH

OBSERVER _____ **FROM** _____

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	-	-		
Pinnacle	34-35-07.2	-	-		
Aniyaanii	45-53-47.1	-	-		
Parry	69-02-46.3	-	-		
Eniwetok	84-03-20.2	-54.0	-		82-26.2
Boga	234-40-33.4	-	-		
Tuiteir	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					
RECORDED AND REDUCED AT 1000 METERS TIDE, 15, 1944 FROM AVERAGE OF 5 OBSERVATIONS GRANGE N. HENRY.					

ENCLOSURE TITLED PER DOG
WILLIE PAIRING JULY 15, 1934
NAME UNKNOWN AND OWNER TO
CLARK S. NEALE.

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LIST OF DIRECTIONS

STATION ENGEBI (Elgin)DATE 3/17/50CHIEF OF PARTY LSHCOMPUTED BY LSHOBSERVER FPCCHECKED 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	17-01-0215	-	-		
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

RECORDED AND INDEXED
 H. L. NARVER, C.E., 1950
 H. L. NARVER, C.E., 1950
 H. L. NARVER, C.E., 1950

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LIST OF DIRECTIONS

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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. I 11.924 M	62-46-17.4	-			
R.M. No. 2 11.924 M	332-26-17.4	-			

Diagram description: A hand-drawn diagram on the right side of the page illustrates the survey setup. It shows three points: Parry (top), Coral (middle-left), and R.M. No. 2 (bottom). Lines connect these points to a central point labeled 'Sta. Eniwetok'. A line from 'Sta. Eniwetok' to Parry is labeled '47-43-42.7 calc.'. A line from 'Sta. Eniwetok' to Coral is labeled '47-49-22.5 obs'. An angle between these two lines is labeled '104° 36''. A circle at the bottom is labeled '11.924 M'. Arrows point from the text labels to their corresponding points in the diagram.

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

DECLASSIFIED PER DOE
 APPROVED DATE JULY 16, 1994
 BY [unclear] FOR RELEASE TO
 ERIC S. NARVER

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LIST OF DIRECTIONS

STATION ISLET

DATE 3/17/50

CHIEF OF PARTY LSH

COMPUTED BY LSH

OBSERVER FPG

CHECKED BY LNP

OBSERVED STATION	OBSERVED DIRECTION	ECC. RED.	SEA LEVEL RED.	CORRECTED DIR. ZERO INITIAL	ADJ. DIR.
Coral	0° 00' 00.00"			0° 00' 00.00"	
Runit	48-33-58.9				

No eccentricity of lights or instrument at this station
 Observations made from 11 foot wood tower
 No reference monuments set

UNCALIBRATED FOR LENS
 MADE AND ADJUSTED MARCH 18, 1954
 TELESCOPIC SIGHTS ADJUSTED TO
 DIANE S. NIKON

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LIST OF DIRECTIONS

~~OFFICIAL USE ONLY~~STATION NORTH BASEDATE 3/17/50CHIEF OF PARTY LSHCOMPUTED BY LSHOBSERVER FPCCHECKED 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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 RELEASED UNDER E.O. 14176
 APPROXIMATELY 20 YEARS FROM 1984
 BY THE U.S. GOVERNMENT

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LIST OF DIRECTIONS

STATION PARRYDATE 3/17/50CHIEF OF PARTY LSHCOMPUTED BY LSHOBSERVER FPCCHECKED 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"	
N. Base	25-42-13.5	-	-		
Sand	39-44-35.3	-	-		
R.M. No. I 15.246 M	46-34-25.4	-	-		
Aniyaanii	54-56-34.4	-	-		
R.M. No. 2 15. 224 M	181-37-20.4	-	-		
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

DATA ACCEPTED PER COM
3/18/50 APPROVED JUN 15, 1950
JOHN H. HOLMES
HOLMES & NARVER ENGINEERS
1000 BROADWAY, NEW YORK CITY

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LIST OF DIRECTIONS

~~OFFICIAL USE ONLY~~STATION PIIRAAIDATE 3/17/50CHIEF OF PARTY LSHCOMPUTED BY LSHOBSERVER FPCCHECKED 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. REQ.	SEA LEVEL REQ.	CORRECTED ZERO	DIR. INITIAL	ADJ. DIR.
Coral	" 00 00 00 "	-	-	" 00 00 00 "	-	-
N. Base	105-48-37.3	-	-			
Runit	139-57-10.4	-	-			
Islet	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

LIST OF DIRECTIONS

~~OFFICIAL USE ONLY~~

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

STATION SAND

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 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

~~OFFICIAL USE ONLY~~STATION TEITEIRDATE 3/17/50CHIEF OF PARTY LSHCOMPUTED BY LSHOBSERVER FPCCHECKED 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. I 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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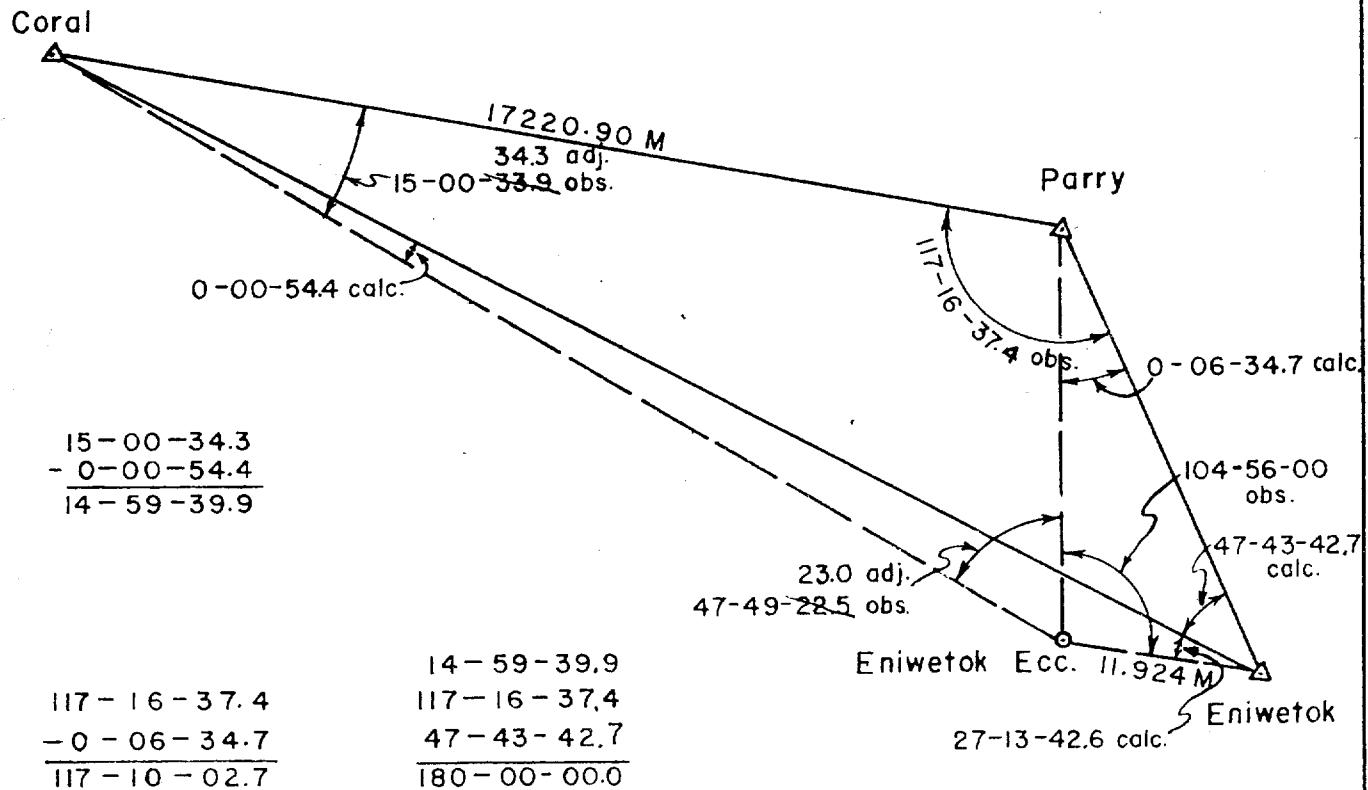
Eccentric Station—ENIWETOK

$$\text{Log. } d = 1.07642$$

$$\text{colog Sin } l'' = \frac{5.31443}{6.39085}$$

$d = 39.12 \text{ Ft.} = 11.924 \text{ M.}$

	a °	Log. Sin a	Log s Meters	Log($\frac{\sin a}{s}$)	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"



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Pacific Southwest Region

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HOLMES & NARVER ENGINEERS JCB NO. 640

ABSTRACT OF DIRECTIONS

STATION *Aniyaanii* COMPUTED BY *L.S.H.* DATE *12-14-49*

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

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

CLASSIFIED PER DON
NOTICE DATED MARCH 15, 1994
DISTRIBUTION STATEMENT TO
DIRECTOR OF DEFENSE

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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTHONY SINISGALLI TO
DIAHNE 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		
	Coral	Bokon	Engebi North Base
INITIAL			
0.00	86°-53'	94°-05'	311°-56'
1	0.00	45.4	59.6
2	0.00	47.8	59.8
3	0.00	41.3	56.2
4	0.00	42.0	00.0
5	0.00	48.4	59.2
6	0.00	39.5	56.1
7	0.00		
8	0.00		
SUM	264.4	350.9	338.7
MEAN	44.1	58.5	56.4
CORR FOR ECC.			
DIRECTION	441	58.5	564

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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ARSON PHYSICALLY 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

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 E.C.C.		
DIRECTION		02.8

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
 LOMMUR DATED JULY, 15, 1994
 FROM ACTION SINISGALLI TO
 DIAHNE G. 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

POSITION	STATIONS OBSERVED		
	Coral	Teiteir	Engebi
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	

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HOLMGREN & NARVER ENGINEERS AND CONSULTANTS

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM DIRECTOR SIMONEAU TO
DIANE S. KELON

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

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

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HOLMES & NARVER ENGINEERS Job No 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
DATE DATED JULY, 15, 1994
FROM ANTHONY SINKSALLA 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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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SINUSALI 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

POSITION	STATIONS OBSERVED							
	North Base	Boga	Teiteir	Engebi	Bokon	Aoman	Piirgai	
INITIAL $0^{\circ}00'$		$234^{\circ}40'$	$253^{\circ}58'$	$268^{\circ}07'$	$279^{\circ}24'$	$309^{\circ}31'$	$326^{\circ}49'$	
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		

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HOLMES & NARVER ENGINEERS JOB NO. 640

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTHONY SINGORALI TO
DIANE S. NELSON

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

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	

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~~OFFICIAL USE ONLY~~

HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER COM
LETTER DATED JULY 15, 1994
FROM AIR FORCE COMMANDER TO
DIRECTOR 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

POSITION	STATIONS OBSERVED					
	<i>Parry</i>	<i>Aniyaanii</i>				
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				

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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
UPON REQUEST SPECIFICALLY TO
ERIN S. NIXON

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

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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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM LIBRARY SPECIALLY TO
DIANE S. MINTON

STATION ENGEBI COMPUTED BY L.S.H. DATE Nov. 17, 1949
OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM DIRECTOR COMINT/CIA TO
DEAN OF S. WASH.

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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HOLMES & NARVER ENGINEERS JOB NO. 640

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DEC
INITIAL DATE JULY, 15, 1994
FROM ANTON SIMISCALLI TO
DIAHES & NUNON

STATION ENIWETOK COMPUTED BY L.S.H. DATE Dec 19, 1949

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

POSITION	STATIONS OBSERVED	
	Coral	Parry
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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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

RECORDED PER DOB
LEAVING DAYTON JULY, 15, 1994
FROM DAYTON BIMISCALLI TO
DIANE G. 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

POSITION	STATIONS OBSERVED	
	Pinnacle	Runit
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	

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE

REF ID: A3146 JULY, 15, 1994
LINE DRAWN SIMILARLY TO
DIANE S. NIXONSTATION NORTH BASE COMPUTED BY L.S.H. DATE Dec. 3, 1949OBSERVER F.P.C. CHECKED BY W.E.H. INST. Wild T-2

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	

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HOLMES & NARVER ENGINEERS JOB NO. 640

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON SINISCALLI 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 $0^{\circ} 00'$		$81^{\circ} 28'$	$252^{\circ} 54'$	$274^{\circ} 44'$
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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HOLMES & NARVER ENGINEERS JOB NO. 640

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
RELEASED UNDER JULY, 15, 1994
FROM RAYMOND 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	Piiraai
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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HOLMES & NARVER ENGINEERS JCB NO. 640

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
 LETTER DATED JULY, 15, 1994
 FROM ARONI SINGAPORE 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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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
ELECTRONICALLY
FROM AUTOMATICALLY 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				
	Coral	North Base	Runit	Islet	
INITIAL $0^{\circ}00'$		$105^{\circ}48'$	$139^{\circ}57'$	$173^{\circ}14'$	
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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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ALTON SINGCALLI TO
DIANE S. NIXON

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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HOLMES & NARVER ENGINEERS

~~OFFICIAL USE ONLY~~
JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
LETTER DATED JULY, 15, 1994
FROM ANTON STENBERG TO
DIANE S. NIXONSTATION RUNIT COMPUTED BY L.S.H. DATE Dec. 4, 1949OBSERVER 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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HOLMES & NARVER ENGINEERS JOB NO. 640

ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOE
 LETTER DATED JULY, 15, 1994
 FROM ANTON MINCZEWSKI TO
 DEAN S. NIXON

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			
	<i>Parry</i>	<i>Coral</i>	<i>North Base</i>	
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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HOLMES & NARVER ENGINEERS JOB NO. 640

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ABSTRACT OF DIRECTIONS

DECLASSIFIED PER DOD
 RELEASED UNDER E.O. 14176
 FROM ANONYMOUS SENDER 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	475	28.4		

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VOLUME 6 NUMBER FLOWERS JUNE 64

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TRIANGLE COMPUTATIONS

SEARCHED INDEXED FILED
JULY 17, 1994
FBI - LOS ANGELES
BY [unclear]

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COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOE
 RELEASED UNDER E.O. 14176
 FROM NINON SINGGALI 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	73-13-01.5	-0.2	01.3	-0.0	01.3	9.9810958
I-3	00.4	0.4		0.0		3.6442259
I-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	105-48-37.3	-0.4	36.9	-0.1	36.8	9.9832515
I-3	01.5	-1.4		-0.1		3.6959722
I-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	51-57-03.8	-0.4	03.4	-0.0	03.4	9.8962414
I-3	01.2	-1.2		0.0		3.9449197
I-2						3.8747505
23						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	21-15-57.7	-0.2	57.5	-0.0	57.5	9.5595450
I-3	0.7	-0.7		0.0		3.6442220
I-2						3.6959712

HOLMES & NARVER ENGINEERS JOB NO 640

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COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOE
 DATED DAILED JULY, 15, 1994
 FROM ANTON SINISCALLI 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						
1 Aoman	48-03-03.6	+ 0.3	03.9	- 0.0	03.9	3.8747533
2 North Base	81-28-05.5	+ 0.4	05.9	- 0.1	05.8	0.1285782
3 Coral	50-28-49.9	+ 0.4	50.3	- 0.0	50.3	9.9951673
I-3	59.0	+ 1.1		- 0.1		9.8872850
I-2						3.9984988
						3.8906165
2-3						
1 Engebi	44-29-58.6	+ 0.6	59.2	- 0.1	59.1	3.9984988
2 Aoman	94-05-58.5	+ 0.6	59.1	- 0.1	59.0	0.1543401
3 Coral	41-24-01.4	+ 0.5	01.9	- 0.0	01.9	9.9988873
I-3	58.5	+ 1.7		- 0.2		9.8204108
I-2						4.1517262
						3.9732497
2-3						
1 Engebi	27-26-14.7	+ 0.9	15.6	- 0.1	15.5	3.8747533
2 North Base	60-40-51.5	+ 0.9	52.4	- 0.1	52.3	0.3365036
3 Coral	91-52-51.3	+ 1.0	52.3	- 0.1	52.2	9.9404709
I-3	57.5	+ 2.8		- 0.3		9.9997659
I-2						4.1517278
						4.2110228
2-3						
1 Aoman	142-09-02.1	+ 0.1	02.2	- 0.1	02.1	4.2110228
2 North Base	20-47-14.0	+ 0.0	14.0	- 0.0	14.0	0.2121229
3 Engebi	17-03-43.9	+ 0.0	43.9	- 0.0	43.9	9.5501041
I-3	00.0	+ 0.1		- 0.1		9.4674744
I-2						3.9732498
						3.8906201

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COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOE
LAWRENCE BERKELEY NATIONAL LABORATORY JULY, 15, 1994
FROM ARSON SURVEYOR 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						
1 Boga	48 - 56 - 03.7	- 0.2	03.5	- 0.1	03.4	4.1517262
2 Engebi	97 - 37 - 22.0	- 0.2	21.8	- 0.2	21.6	0.1226537
3 Coral	33 - 26 - <u>35.3</u> 01.0	- 0.2 - 0.6	35.1	- 0.1 - 0.4	35.0	9.9961452 9.7412367
I-3						4.2705251
I-2						4.0156166
2-3						
1 Teiteir	45 - 29 - 31.6	+ 0.7	32.3	- 0.0	32.3	4.1517262 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> 57.8	+ 0.8 + 2.4	56.7	- 0.1 - 0.2	56.6	9.3881817
I-3						4.2344911
I-2						3.6867231
2-3						
1 Boga	66 - 38 - 35.3	- 0.6	34.7	- 0.1	34.6	4.2344911 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> 02.2	- 0.6 - 1.9	38.8	- 0.1 - 0.3	38.7	9.5190623
I-3						4.2705310
I-2						3.7906861
23						
1 Teiteir	139 - 33 - 19.1	+ 0.4	19.5	0.0	19.5	4.0156166 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> 59.0	+ 0.3 + 1.0	31.9	0.0 0.0	31.9	9.4831312 3.7906928
I-3						3.6866957
I-2						

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COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOD
DATE JULY, 15, 1994
FROM ANITA GENISCALLI TO
DIANE 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						
1 Sand	38-53-14.2	+ 0.8	15.0	- 0.0	15.0	3.8747533
2 Coral	34-01-32.5	+ 0.8	33.3	- 0.0	33.3	0.2021834
3 North Base	107-05-10.9	+ 0.9 + 2.5	11.8	- 0.1 - 0.1	11.7	9.7478528 9.9803951
I-3	57.6					3.8247895
I-2						4.0573318
2-3						
1 Parry	39-44-35.3	- 0.6	34.7	- 0.1	34.6	4.0573318
2 Coral	35-01-13.8	- 0.6	13.2	- 0.1	13.1	0.1942652
3 Sand	105-14-13.1	- 0.7 02.2	12.4	- 0.1 - 0.3	12.3	9.7588110 9.9844590
I-3		- 1.9				4.0104080
I-2						4.2360560
23						
1 Parry	25-42-13.5	+ 0.1	13.6	- 0.1	13.5	3.8747533
2 Coral	69-02-46.3	+ 0.1	46.4	- 0.1	46.3	0.3627925
3 North Base	85-15-00.3	+ 0.0 00.1	00.3	- 0.1 - 0.3	00.2	9.9702860 9.9985058
I-3		+ 0.2				4.2078318
I-2						4.2360516
23						
1 Sand	144-07-27.3	+ 0.2	27.5	- 0.1	27.4	4.2078318
2 Parry	14-02-21.8	+ 0.1	21.9	- 0.0	21.9	0.2320808
3 North Base	21-50-10.6	+ 0.1 + 0.4	10.7	- 0.0 - 0.1	10.7	9.3848717 9.5704917
I-3	59.7					3.8247843
I-2						4.0104043

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COMPUTATION OF TRIANGLES

DECLASSIFIED PER DOE
LETTER DIRECTED DATED, 15, 1994
FROM ARSON SAKSAGALY 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 Bokon	62-59-24.7	+ 0.2	24.9	- 0.0	24.9	0.0501568
2 Aoman	86-53-44.1	+ 0.3	44.4	- 0.1	44.3	9.9993622
3 Coral	30-06- <u>50.7</u> 59.5	+ 0.1 + 0.6	50.8	- 0.0 - 0.1	50.8	9.7004647
I-3						4.0480178
I-2						3.7491203
2-3						3.8747533
1 Piirai	66-55-40.3	+ 0.2	40.5	- 0.0	40.5	0.0362062
2 North Base	79-53-48.5	+ 0.3	48.8	- 0.1	48.7	9.9932129
3 Coral	33-10- <u>30.7</u> 59.5	+ 0.1 + 0.6	30.8	- 0.0 - 0.1	30.8	9.7381472
I-3						3.9041724
I-2						3.6491067
2-3						3.6442259
1 Islet	48-33-58.9	0.0	58.9	0.0	58.9	0.1250993
2 Pinnacle	33-17-04.5	0.0	04.5	0.0	04.5	9.7394124
3 Runit	98-08- <u>56.6</u> 00.0	0.0 0.0	56.6	0.0 0.0	56.6	9.9955925
I-3						3.5087376
I-2						3.7649177
2-3						4.2360559
1 Aniyaanii	101-54-26.6	- 0.0	26.6	- 0.1	26.5	0.0094470
2 Parry	54-56-34.4	- 0.0	34.4	- 0.1	34.3	9.9130610
3 Coral	23-08- <u>59.2</u> 00.2	- 0.0 - 0.0	59.2	- 0.0 - 0.2	59.2	9.5945430
I-3						4.1585639
I-2						3.8400459

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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						
1 Eniwetok	47-43-42.2	+ 0.6 + 0.4 + 0.5	42.8 39.9 40.0	- 0.1 - 0.0 - 0.1	42.7 39.9 37.4	4.2360560 0.1307881 9.4128382
2 Coral	14-59-39.5					
3 Parry	117-16-37.4	+ 0.1 + 1.2	37.5	- 0.1 - 2.0		9.9488044
I-3	59.1					3.7796823
I-2						4.3156485
2-3						
1						
2						
3						
I-3						
I-2						
2-3						
1						
2						
3						
I-3						
I-2						
2-3						
1						
2						
3						
I-3						
I-2						
2-3						
1						
2						
3						
I-3						
I-2						

YARDINER'S COMPUTATION
117-16-37.4 40.0 0.1
14-59-39.5 39.9 0.0
47-43-42.2 42.7 0.1
117-16-37.4 37.4 0.1
59.1 3.7796823
3.7796823 4.3156485

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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						
1 Photo	46-12-03.1	- 0.9	02.2	- 0.1	02.1	3.9732498 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
I-3	<u>000</u>	<u>+ 0.3</u>		<u>- 0.3</u>		4.0588211
I-2						4.0937487
2-3						
1 Photo	43-39-32.7	+ 1.1	33.8	- 0.1	33.7	4.0156166 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
I-3	<u>00.0</u>	<u>+ 0.3</u>		<u>- 0.3</u>		4.0937486
I-2						4.1706707
2-3						
1						
2						
3						
I-3						
I-2						
2-3						
1						
2						
3						
I-3						
I-2						

COMPUTED FOR DOD
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JUNIUS S. NARVER
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CHECK COMPUTATION OF THE JOINT TASK FORCE SEVEN SURVEY TO DETERMINE THE AZIMUTH OF THE BASE LINE NORTH BASE-RUNIT OF THAT SURVEY.

ENCLOSURE PER FOR
JOINT TASK FORCE SEVEN, 1994
JOINT BASE SAN ANTONIO
DRONE A. MURRAY

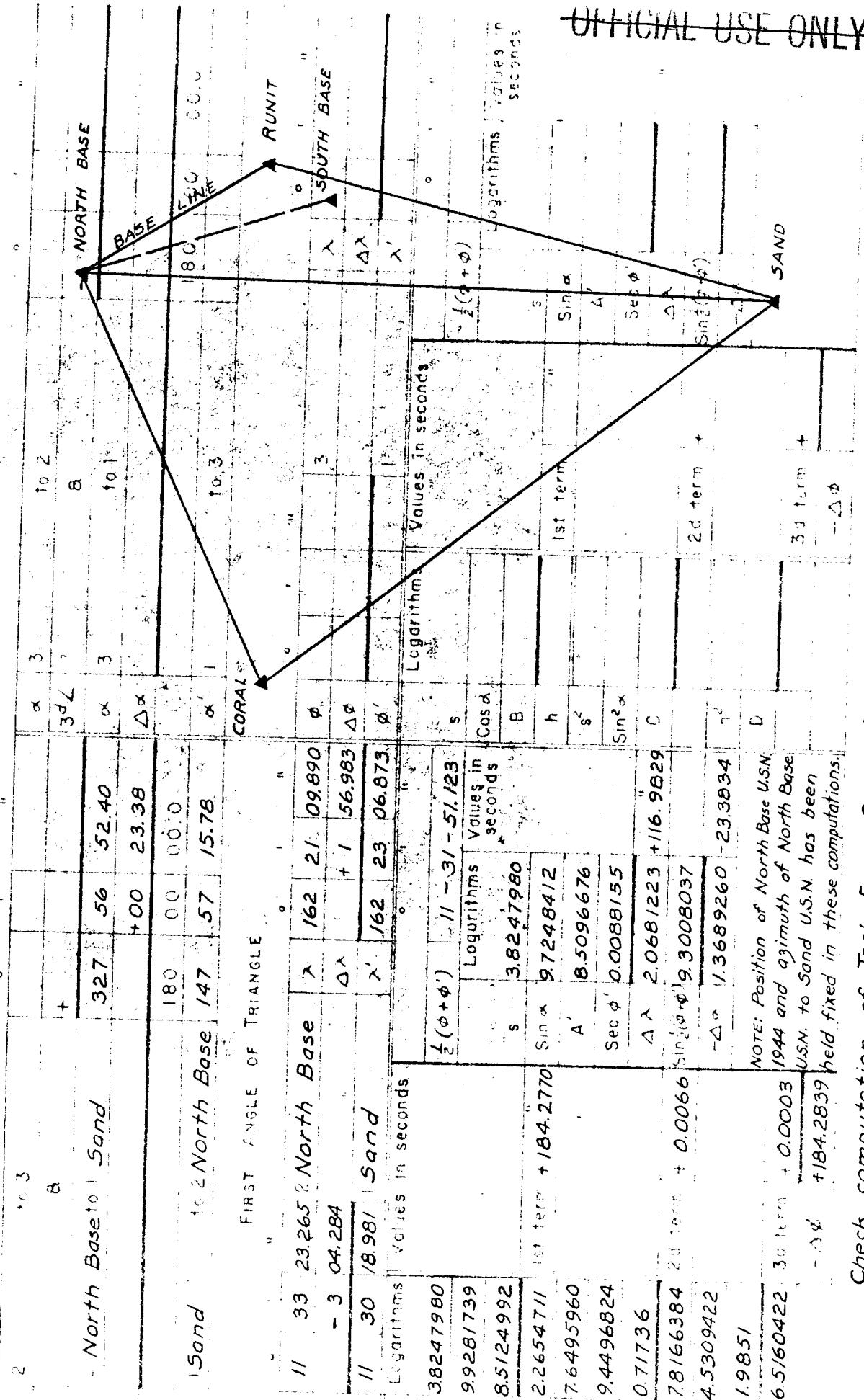
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HOLMES & NARVER ENGINEERS JOB NO 640
FROM ABICA SINGAPORE TO
DIANE S. NIXON

POSITION COMPUTATION

SECOND ORDER TRIANGULATION



Check computation of Task Force Seven Survey

1

Pacific Southwest Region 25, 1994

SEARCHED INDEXED SERIALIZED FILED TO

HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

2 North Base to Sand	327	56	52.40	α	3 Sand	to 2 North Base	147	57	15.78
8	+07	05	20.48	β	3d \angle		-38	53	11.73
2 North Base to Coral	75	02	12.88	α	3 Sand	to 1 Coral	109	04	04.05
Coral	-00	47.84	$\Delta\alpha$				-01	11.10	
	180	00	00.00				180	00	00.00
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	09890	ϕ	11	30	18.981	3 Sand
-1 03.010	$\Delta\lambda$	-3	58.959	$\Delta\phi$	+2	01.274			
11 32 20.255 1 Coral	λ'	162	17	10.931	ϕ'	11	32	20.255	1 Coral
Logarithms Values in seconds									Logarithms Values in seconds
$\frac{1}{2}(\phi + \phi')$		//	-32.51.760						$\frac{1}{2}(\phi + \phi')$
3.874770/									11 -31 -19.618
0.03 α	9.4119507								Logarithms Values in seconds
0.5124992									$\cos \alpha$ 9.5141314
17992200	1st term	+62.9825							B 8.5125007
77495402									$\sin \alpha$ 2.0839837
9.9700372									1st term 121.3342
0.7173600									$\sin^2 \alpha$ 8.1147032
8.4369374	2d term	+ 0.0274	$\sin^2(\phi + \phi')$ 9.3014290						$\sec^2 \alpha$ 9.9509856
3.5984400									A 8.5096677
1.9850000									$\sec \phi'$ 0.0088675
5.5834400	3d term	+ 0.00000							$\Delta \lambda$ 2.55/3796 - 355.940
									$\Delta \alpha$ 1.85/8581 + 71.098
									ONLY
									70

Check computation of Task Force Seven Survey

HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

2 Coral	3 North Base	255	01	25.04	α	3 North Base	to 2 Coral	75	02	12.88
		+ 15	48	09.52	$\Delta \alpha$			8	- 1/2	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

Run#	Coral	180	180	180	180	180
Run#	Coral	180	180	180	180	180
1	180	50	32.70	α	Run#	Run#
2	90	50	32.70	α	to 3 North Base	47
3	180	50	32.70	α	27.4X	6

$\frac{1}{2}(\phi + \phi')$	$11 - 32 - 18.17$	3.4136298
Logarithms	Values in seconds	9.9011336
8.5124997	8.5124992	3.4136298
0.6164244	1.8272626	$\sin \alpha$
7.88988	6.82726	9.7815864
9.99991	9.56317	8.5096676
0.71669	0.71800	0.0088660
8.60648	7.10843	$1.7137498 + 51.7309$
1.23285	3.65453	-1α
1.98450	1.98510	$1.0151573 - 10.3555$
3.21735	5.63963	$+ 0.0000$
		$+ 67.1846$

Check computation of Task Force Seven Survey

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GEOGRAPHIC POSITION COMPUTATIONS

HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

2 Runit		3 Coral		50 32.7		3		10 2		8		-	
2 Runit		North Base		57 03.4		34.2		10 1		8		-	
2 Runit		North Base		42 47 36.1		3		10 4		8		-	
2 Runit		North Base		- 10.4		Δα		- 10.4		Δα		-	
180 00 00		180 00 00		180 00 00		180 00 00		180 00 00		180 00 00		00.0	
North Base to 2 Runit		322 47 25.7		162 22 01.621		8		10 3		8		-	
322 47 25.7		162 22 01.621		8		10 3		8		-		-	
FIRST ANGLE OF TRIANGLE		Δλ		- 51.728 Δφ		8		Δλ		8		-	
11 32 16.080 2 Runit		11 33 23.267 North Base		162 21 09.893		8		Δλ		8		-	
11 32 16.080 2 Runit		11 33 23.267 North Base		162 21 09.893		8		Δλ		8		-	
$\frac{1}{2}(\phi + \phi')$		11 32 16.080 2 Runit		11 32 16.080 2 Runit		8		10 3		8		-	
Logarithms		Logarithms		Logarithms		Logarithms		Logarithms		Logarithms		Logarithms	
Cos α		Values in seconds		Cos α		Values in seconds		Cos α		Values in seconds		Cos α	
B		S		B		S		B		S		B	
3.4136308		3.4136308		3.4136308		3.4136308		3.4136308		3.4136308		3.4136308	
Cos α		9.9011639		A'		9.7815338		A'		9.7815338		A'	
B		8.5125002		8.5096678		8.5096678		8.5096678		8.5096678		8.5096678	
h		1.8272949 Int term		- 67.1885		- 67.1885		- 67.1885		- 67.1885		- 67.1885	
g		6.82726		Sec φ'		0.0088946		Sec φ'		0.0088946		Sec φ'	
sin α		9.56307		A λ		1.7137270		- 51.728		C		- 51.728	
0.71656		7.10689		7.10689		Sin ² (φ + φ')		Sin ² (φ + φ')		+ 10.355		h ²	
3.6546		1.9845		1.9845		- 1.051043		- 1.051043		+ 10.355		- 1.051043	
5.6391		30 term		30 term		+ .0000		+ .0000		C		+	
- Δφ		- 67.1872		- 67.1872		- 67.1872		- 67.1872		- Δφ		-	

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Pacific South Division, Engineers
from Anon. Minigalli to
Diane S. Nixon

HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

North Base to 3 Runit	322	47	25.7	α	3 Runit	to 2 North Base	142	47	36.1
+ 72	38	25.7	34.4	β		- 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			Δ x			- 27.3			
130	00	00.0				180	00	00.0	

FIRST ANGLE OF TRIANGLE 34 - 08 - 33.0

11	33	23.267	2 North Base	162	21	09.893	φ	//	32.080 3 Runit
Δ x	- 1	57.257		Δ x	- 1	24.586	α	- 0	80.070
Δ x	11	31	26.010 1 Pinnacle	162	19	45.307	α	162	19 45.307
Δ x			Logarithms in seconds				Logarithms in seconds		
3.6455679			$\frac{1}{2}(\phi + \phi')$			// - 32 - 29.638	3.64422259	// - 31 - 51.045	
Sec φ	9.9110599		Logarithms in seconds			3.64422259			
8.5124992			9.9110599			Logarithms in seconds			
0.069270			8.5124992			9.9110599			
7.29114			3.6455679			8.5124992			
9.52644			3.6455679			3.6455679			
0.71736			3.6455679			3.6455679			
7.53494			3.6455679			3.6455679			
4.1382			3.6455679			3.6455679			
1.9847			3.6455679			3.6455679			
6.1229			3.6455679			3.6455679			
+ 117.2573			+ 117.2573			+ 117.2573			

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FROM ANTON SINISCALLI TO

DIADE S. NIKON

HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

North Base to 3 Pinnacle	35	25	51.4	3 Pinnacle	to 2 North Base	215	25	34.5
+ 39	36	16.5	3.2	8	- 105	49	36.9	
North Base to 1 Coral	75	02	07.9	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	Coral	to 3 Pinnacle	289	36.26.8
FIRST CYCLE OF TRIANGLE 34 - 35 - 06 - 7								
33	23.267	2 North Base	162	21	09.893	11	31	26.010 3 Pinnacle
- /	03.0/3		$\Delta\alpha$	- 3	58.949	46	+ 54.244	162 19 45.307
32	20.254	Coral	162	17	10.944	11	32	20.254 1 Coral
Logarithms Values in seconds								
3.8747533		$\frac{1}{2}(\phi + \phi')$		// - 32 - 51.765	s	3.6959722	$\frac{1}{2}(\phi + \phi')$	// - 31 - 23.32
94119899						Logarithms Values in seconds	Logarithms Values in seconds	Logarithms Values in seconds
8.5124996						Cos α 9.3259702	B 8.5125006	A 9.36959722
1.7992428	1st term	+ 62.9858	Sin α	9.9850158				
774951								
8.43690	2d term	+ .0273	Sin β	238.949	C 0.716/0			
3.5985								
1.9851								
5.5836.	3d term	+ .0000						
	- 24	+ 63.0/26						

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POSITION COMPUTATION

SECOND ORDER TRIANGULATION

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SECOND ORDER TRIANGULATION

Engebi *Engebi* *Boga*

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Ergonomics in Design, Vol. 1, No. 1, 1994

HOMES & HARVEY ENGINEERS 108 NO. 640
DANIEL S. HARRIS 108 NO. 640
C. W. SINISGALLI TO

POSITION COMPUTATION SECOND ORDER TRIANGULATION

~~CONFIDENTIAL~~

FROM ANTHONY SINISGALLI TO
DIANE S. NIXON

HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

2 Coral	North Base	255	01	20.1		3 North Base to 2 Coral	75	02	07.9
+ 34	01	33.3				8	-107	05	11.8
Coral	Sand	289	02	53.4		3 North Base to 1 Sand	327	56	56.1
+ 1	11.1						+ 234		
		180	00	00.0			180	00	00.0
	Sand	109	04	04.5		to 3 North Base	147	57	19.5
	to 2 Coral								

FIRST ANGLE OF TRIANGLE 38 - 53 - 15.0

Logarithms		Values in seconds		Logarithms		Values in seconds		Logarithms		Values in seconds	
1/2 (φ + ψ)	11 - 31 - 19.620	3.8247895		1/2 (φ + ψ)	11 - 31 - 51.726	3.8247895		1/2 (φ + ψ)	11 - 31 - 51.726	3.8247895	
1/2 20.254 2 Coral	162 17 10.944	11	33 23.267 3 North Base	162	21	09.893		1/2 (φ + ψ)	11 - 31 - 51.726	3.8247895	
- 2 01.269	Δ 2 4.5 55.926	Δ A	- 3 04.282	Δ A	+ 1	56.977		1/2 (φ + ψ)	11 - 31 - 51.726	3.8247895	
1/2 30 18.985 Sand	162 23 06.870	Δ φ	11 30 18.985 Sand	162	23	06.870		1/2 (φ + ψ)	11 - 31 - 51.726	3.8247895	
4.05733/8	4.05733/8			B 8.5/24.992				A' 8.5096677		A' 8.5096676	
9.5/370/3	9.5/370/3			C 9.281783				Sec φ' 0.0088155		Sec φ' 0.0088155	
8.5/24.997	8.5/24.997			D 9.9248287							
2.0835328	2.0835328	1st term	4/21.2084	h 2.2654670	1st term	4/184.2753					
8.11466	8.11466			s 7.64958							
9.95109	9.95109			sin² x 9.44966							
0.71669	0.71669			A 2.55/35.92 + 355.9256	C 0.71733						
8.78244	8.78244	2d term	+ .0606 sin ² (φ + ψ) 9.3004785	7.81657	2d term	+ .00666 sin ² (φ + ψ) 9.3008037					
4.1671	4.1671			-Δ a 1.8510377 - 71.095	7.81657						
1.9845	1.9845										
6.15/6	6.15/6	3d term	+ .0001 - Δ φ + 1/21.269/	6.5160	3d term	+ .0003 - Δ φ + 1/84.2822					

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

THE HISTORICAL JOURNAL

HOLMES & NARVER ENGINEERS JOB NO 640
DIANE S. NIXON

SECOND ORDER TRIANGULATION POSITION COMPUTATION

Engineering

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

2 Coral	to 3 Parry	324	04	06.6	α	3 Parry	to 2 Coral	144	05	13.0
8		+ 14	59	40.0		3d		- 117	16	37.5
2 Coral	to 1 Eniwetok	339	03	46.6	α	3 Parry	to 1 Eniwetok	26	48	35.5
		+ 180	00	00.0	α	1 Eniwetok	to 3 Parry	180	00	00.0
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

| Logarithms values in seconds |
|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|------------------------------|
| 1/2 (φ + ψ) | 1/2 (φ - 05.860 | S 3.7796823 |
| 4.3156485 | Logarithms values in seconds | Cos α 9.9508122 |
| 9.9703346 | S 4.3156485 | B 8.5123035 |
| 8.5124997 | Sin α 9.5530842 | H 2.2427980 |
| 2.7984828 | 1st term + 628.7570 | A' 8.5036677 |
| 8.63130 | Sec φ' 0.0085993 |
| 9.10617 | Δ λ 2.3869997 |
| 0.71669 | Sin (ψ + φ) 9.2978492 | 7.57959 | 7.57959 | 7.57959 | 7.57959 | 7.57959 | 7.57959 | 7.57959 | 7.57959 | 7.57959 |
| 8.45416 | -Δ α 1.6848489 | -48.400 | -48.400 | -48.400 | -48.400 | -48.400 | -48.400 | -48.400 | -48.400 | -48.400 |
| 5.5970 | D 1.9800 | 6.4656 | 6.4656 | 6.4656 | 6.4656 | 6.4656 | 6.4656 | 6.4656 | 6.4656 | 6.4656 |
| 1.9845 | 7.5815 | 3d term + .0038 | -Δ φ + 628.7894 |

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POSITION COMPUTATION SECOND ORDER TRIANGULATION

HOLMES & NARVER ENGINEERS
DIANE S. NIXON
JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

North Base	Coral	75.02	07.9	3 Coral	No 2 North Base	25.5	01.	201	
+ 7.9	83	16.8	3.62	8		- 3.3	10.3	30.8	
North Bases	Piraoi	154	55	56	3 Coral	101 Piraoi	22.1	50.3	49.3
						- 12.5			35.4

FIRST CHURCH OF CHRIST, SCIENTIST, TRIANON F 56 - 55 = 40⁵

11 33 23.267 2 North Base		162 21 09.893	11 32 20.254 3 Coral	162 17 10.944
+ 2 11.412		- 1 02.341	+ 3 14.226	- ΔX + 2. 56.608
11 35 34.679 1 Piroai		162 20 07.552	11 35 34.669	162 20 07.552
Logarithms	Values in seconds	Logarithms	Values in seconds	Logarithms Values in seconds
$\frac{1}{2}(\phi + \alpha)$	11 - 34.28973	Sin φ 3.9041729	1st term - 94.4405	Sec φ 3.9041724
9.9570365		Cos φ 9.8721147	1st term - 94.4405	Sec φ 3.9041724
8.5124996				
3.6491067		B 8.3124997		
2.1186428	1st term - 31.4143	H 2.2887868	1st term - 94.4405	Sec φ 9.8242197
	Sin α 9.627045	A 7.00834		
	A 8.5098676			
9.25409	Sec φ' 0.000895/3	Sin α 9.64844		
0.71736	Δ λ 1.7947707	-62.341	C 0.71669	Sec φ' 0.00895/3
726966	2.1 + 5 cm + .0019		8.17347	Sec φ 2.2470111
42373	Sin λ 0.93024296		2d term + .0149 Sin $\frac{1}{2}(\phi + \alpha)$	+ 176.6083
1.9851	-Δ α 1.0972003	+ 12.508	D 1.9845	- Δα 1.5491168 - 35.469
62224	3d term + .0000			
+ 131.4124				
				- Δφ - 192.4256

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HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION SECOND ORDER TRIANGULATION

2 Aoman	10 3 Coral	24	32	57 2	3. Coral	10 2 Aoman	204	32	29.8
a	a	+ .86	.53	.44	3d 2	a	.36	.06	.50.8
2 Aoman	10 1 Bokon	111	26	41.6	3 Coral	10 1 Bokon	174	25	39.0
a	a	-	-	34.7	2d	a	-	-	.07.2
1 Bokon	10 2 Aoman	291	26	06.9	a	1 Bokon	10 3 Coral	354	25 31.8
FIRST ANGLE OF TRIANGLE 62° 59' - 24.9									
11	37 15 282 2 Aoman	162	19	27.584	11	32 20 234 3 Coral	162	17	10.944
Δ φ	+ 1 06.764	Δ λ	- 2	52.446	Δ φ	+ 6 01.791	Δ λ	-	35.806
φ'	11 38 22.046 1 Bokon	162	16	35.130	φ'	38 22.045 Bokon	162	16	35.138
Logarithms Values in seconds Logarithms Values in seconds Logarithms Values in seconds Logarithms Values in seconds									
5	3.7491203	$\frac{1}{2}(\phi + \phi')$	11.37 48.662	4.0480178	5	$\frac{1}{2}(\phi + \phi')$	11.35 48.662	4.0480178	5
Cos α	9.5630135	Logarithms	Values in seconds	Cos α	9.9979427	Logarithms	Values in seconds	Cos α	9.9872425
B	8.5124992	Sec α	3.7491203	B	8.5124997	Sec α	3.7491203	B	8.5096677
n	1.8246330	1st term	-66.779	n	2.5584602	1st term	-361.7930	n	0.0090237
g ²	7.49824	A	8.5096676	g ²	8.09604	A	8.5539517	g ²	1.5539517 - 35.8057
Sin ² α	9.93768	Sec α	0.0090237	Sin ² α	7.97449	Sec α	0.0090237	Sin ² α	0.0090237
g	0.71736	Δ λ	2.2366539 - 172.4463	C	0.71669	Δ λ	2.2366539 - 172.4463	C	0.71669
8/15328	2d term + .0/42	Sin $\frac{1}{2}(\phi + \phi')$	9.3044775	6.78722	2d term + .0006	Sin $\frac{1}{2}(\phi + \phi')$	9.3029656	8/15328	9.3029656
n ²	3.6493	Δ φ	1.5411314 + 34.764	n ²	5.1169	-Δ φ	0.8569173 + 7193	n ²	0.8569173 + 7193
D	1.9851	D	1.9845	D	7.1014	D	7.1014	D	7.1014
5.6344	3d term + .0000	-Δ φ	-66.7637	-Δ φ	-361.7911	-Δ φ	-361.7911	-Δ φ	-361.7911

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HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

2 Boga	to 3 Engabi	260	44	14.1	α	3 Engabi	to 2 Boga	80	45	22.3
+ 55	44	06.8			$\Delta\alpha$	8		- 80	36	19.7
2 Boga	to 1 Photo	316	28	20.9	α	3 Engabi	to 1 Photo	0	09	02.6
+ 1	07.7				$\Delta\alpha$			-	00.2	
180	00	00.0								
Photo	to 2 Boga	136	29	28.6	α	Photo	to 3 Engabi	180	09	02.4
FIRST ANGLE OF TRIANGLE										
11 38 47.715 2 Boga		α	162	09	17.366	α	11	39	41.964	3 Engabi
- 5 49.623		$\Delta\alpha$	+ 5	36.708		$\Delta\alpha$	- 6	43.873		
11 32 58.098 1 Photo		α'	162	14	54.074	α'	11	32	58.091	Photo
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	
4.98603641										
8.5124964										
2.54353/2	1st term	+ 349.5674	Sin α	9.8380320						
8.34134										
9.67606										
0.72082										
8.73822	2d term	+ .0547	Sin $\frac{1}{2}(\phi + \phi')$	9.3032916						
5.0877										
1.9884										
7.0755	3d term	+ .0012	- $\Delta\phi$	+ 349.6233						

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DIANE S. NIXON

HOLMES & NARVER ENGINEERS JOB NO 640

POSITION COMPUTATION

SECOND ORDER TRIANGULATION

Engebri	to 3 Aoman	2 98	38	01.3	α	3 Aoman	to 2 Engebri	118	38	56.3
		+ 61	31	01.3	$\Delta\alpha$					
Engebri	to 1 Photo	0	09	02.6	α	3 Aoman	to 1 Photo	46	21	59.5
		-	0.	0.2	$\Delta\alpha$			-	54.9	

Photo	to 2 Engebri	180	09	02.4	α'	Photo	to 3 Aoman	226	21	04.6
		-	180	00	00.0			-	180	00

FIRST ANGLE OF TRIANGLE

11	39 41.964 2 Engebri	α	162	14	55.152	ϕ	11	37	15.282	3 Aoman
	- 6 43.873	$\Delta\alpha$			- 01.077	$\Delta\phi$		- 4	17.191	
11	32 58.091 Photo	α'	162	14	54.075	ϕ'	11	32	58.091	Photo
		Logarithms in seconds								Values in seconds
		$\frac{1}{2}(\phi + \phi')$	11 - 36 - 20.028	s	4.0588211					
		Logarithms in seconds	11 - 35 - 06.686							
		11	39 41.964 2 Engebri		4.0937487					
		11	32 58.091 Photo		4.0937487					
		11	37 15.282 3 Aoman		4.0588211					
		11	36 - 20.028		4.0588211					
		11	35 - 06.686		4.0588211					
		11	36 - 20.028		4.0588211					
		11	35 - 06.686		4.0588211					
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		11	36 - 20.028		4.0588211					
		11	35 - 06.686		4.0588211					
		11	36 - 20.028		4.0588211					

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BASE LINE COMPUTATIONS

MAILED 100 PGS
JULY 10, 1994
SPECIAL MAILING TO
U.S. GOVERNMENT

~~OFFICIAL USE ONLY~~

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OFFICIAL USE ONLY

COMPUTATION OF RUN/T ISLAND BASE LINE

HOLMES & NARVER ENGINEERS JOB NO. 64U

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

SECTION	DATE	DIR OF MEAS	TAPE NO.	INCORRECTED LENGTH	COR-	- RECTIONS -			REDUCED LENGTH METERS	ALCFT LENGTH METERS	M.M.	M.M.
						TEMP	TAPE AND CATENARY	SET-UP SET-BACK	INCLINATION METERS	SEA LEVEL METERS		
△ North Base												
Stake No. 2	2-24-50	F	6464	2	1/2	18.5349	38.0 + 0.0001	1/2	18.5350	-0.0004	18.5346	
"	" 3	F		2	1/2	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	
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			-0.0005	49.9563	
"	" 2	B		2	1/2	2.5	34.0 + 0.0002		-0.0434	24.9423		
△ North Base				18.5349		38.0 + 0.0001		-0.0579	-0.0000		18.5346	
											243.4274	

HOLMES & NARVER ENGINEERS JOB NO. 640

COMPUTATION OF RUMIT ISLAND BASE LINE

OFFICIAL REGISTRY

REFURBISHED PER DOB
LAWTON TUESDAY JULY 15, 1994
REMOVED FROM CANNONBALL TO,
TOMMY S. KINNUN E6 DATE Feb 24, 1950
M.P.

SECTION	DATE	DIR. OF MEAS.	TAPE NO.	TAPE SUPPORT	UNCORRECTED LENGTH	TEMP	CATENARY	COR- RECTIONS			REDUCED LENGTH	ACROSS LENGTH (V)	(V)
								METERS	"C"	METERS			
Stake No. 7A													
"	8	2-24-50	F	6621	3	/	50	34.5	+0.0003	-0.0734	-0.0000	49.9269	
"	9		F		3	/	50	35.5	+0.0003		-0.0020	49.9983	
"	10		F		3	/	50	35.0	+0.0003		-0.0000	50.0529	
"	"	11	F		3	/	50	36.5	+0.0003		-0.0000	49.9375	
"	"	12	F		3	/	50	36.0	+0.0003	-0.0627	-0.0001	50.0001	
"	"	13	F		3	/	50	36.5	+0.0003		-0.0002		
"	"	14	F		3	/	50	33.5	+0.0003		-0.0005	49.9998	
"	"	15	F		3	/	50	36.0	+0.0003		-0.0001	50.0002	
"	"	16	F		3	/	50	34.5	+0.0003		-0.0000	50.0003	
"	"	17	F		3	/	50	34.5	+0.0003		-0.0000	50.0003	
"	"	18	F		3	/	50	34.5	+0.0003		-0.0000	50.0003	
"	"	19	F		3	/	50	33.0	+0.0003		-0.0114	49.9989	
"	"	20	F		3	/	50	36.5	+0.0003		-0.0001	50.0002	
							50	37.5	+0.0003	-0.0356	-0.0001	49.9696	
												649.8803	
Stake No. 20													
"	"	2-25-50	B	6619	3	/	50	34.0	+0.0003	-0.0663	-0.0001	49.9319	
"	"	18	B		3	/	50	34.0	+0.0003	+0.0411	-0.0001	50.0413	
"	"	17	B		3	/	50	33.0	+0.0003		-0.0014	49.9989	
"	"	16	B		3	/	50	33.0	+0.0003		-0.0000	50.0003	
"	"	15	B		3	/	50	31.0	+0.0002		-0.0000	50.0002	
"	"	14	B		3	/	50	32.0	+0.0002		-0.0001	50.0001	
"	"	13	B		3	/	50	32.0	+0.0002		-0.0005	49.9997	
"	"	12	B		3	/	50	33.0	+0.0003		-0.0002	50.0001	
"	"	11	B		3	/	50	34.0	+0.0003	-0.0759	-0.0001	49.9243	
"	"	10	B		3	/	50	34.0	+0.0003		-0.0000	50.0003	
"	"	9	B		3	/	50	32.0	+0.0002		-0.0000	50.0002	
"	"	8	B		3	/	50	32.0	+0.0002		-0.0020	49.9982	
"	"	7A	B		3	/	50	33.0	+0.0003	-0.0229	-0.0000	49.9774	
												649.8729	

HOLMES & NARVER ENGINEERS JOB NO. 640

~~OFFICIAL USE ONLY~~

COMPUTATION OF RUNNIT / ISLAND BASE LINE

DECLASSIFIED PER DOD
LETTER DATED JULY, 15, 1994
FROM ACTION SINGAPORE TO
LIAISON S. NIXON
DATE Feb. 28, 1950

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

SECTION	DATE	DIR. TAPE NO.	TAPE SUPPORT MEAS	UNCORRECTED LENGTH		TEMP "C"	TEMP CATENARY	- RECTIONS -			REDUCED LENGTH	ACCEPTED LENGTH	METERS	MM.	MM.
				TAPE LENGTH	METERS			SET-UP	SET-BACK	INCLINATION					
<i>Stake No. 20</i>															
" 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	36.0	+ 0.0003			-0.0005	49.9999			
" 24		F		3	1	50	35.0	+ 0.0003			-0.0010	49.9993			
" 25		F		3	1	50	33.0	+ 0.0003			-0.0001	50.0002			
" 26		F		3	1	50	32.0	+ 0.0002			-0.0000	50.0002			
" 27		F		3	1	50	30.0	+ 0.0002			-0.0000	50.0002			
" 28		F		3	1	50	30.5	+ 0.0002			-0.0023	49.9979			
" 29		F		3	1	50	30.5	+ 0.0002			-0.0005	49.9997			
" 30		F		3	1	50	31.0	+ 0.0002			-0.0004	49.9998			
" 31		F		3	1	50	31.0	+ 0.0002			-0.0014	49.9988			
" 32		F		3	1	50	32.0	+ 0.0002			-0.0001	50.0001			
" 33		F		3	1	50	30.0	+ 0.0002		No ±	-0.0000	50.0002			
" 34B		F		3	1	50	29.0	+ 0.0002			-0.0000	699.9988			
<i>Stake No. 34B</i>															
" 33	2-25-50	B	6621	3	1	50	28.5	+ 0.0002			-0.0000	50.0002			
" 32		B		3	1	50	29.0	+ 0.0002			-0.0001	50.0001			
" 31		B		3	1	50	29.0	+ 0.0002			-0.0014	49.9988			
" 30		B		3	1	50	29.5	+ 0.0002			-0.0004	49.9998			
" 29		B		3	1	50	30.0	+ 0.0002			-0.0005	49.9997			
" 28		B		3	1	50	30.0	+ 0.0002			-0.0023	49.9979			
" 27		B		3	1	50	28.0	+ 0.0002			-0.0000	50.0002			
" 26		B		3	1	50	29.0	+ 0.0002			-0.0001	50.0001			
" 25		B		3	1	50	29.0	+ 0.0002			-0.0010	49.9992			
" 24		B		3	1	50	30.0	+ 0.0002			-0.0001	50.0001			
" 23		B		3	1	50	30.0	+ 0.0002			-0.0005	49.9997			
" 22		B		3	1	50	31.0	+ 0.0002			-0.0002	50.0000			
" 21		B		3	1	50	30.0	+ 0.0002			+ 0.0094	50.0030			
" 20		B		3	1	50						700.0026			

HOLMES & MARVER ENGINEERS JOB NO. 640

~~OFFICIAL USE ONLY~~

COMPUTATION OF

RUN UNIT ISLAND

BASE LINE

DECLASSIFIED PER DOB
INITIAL DRAFT JULY, 15, 1994
FINAL ACTION SILESGAARD TO
DRAFT 3, NIXON
DATE FEB. 28, 1990
CHECKED BY L.S.H.
COMPUTED BY L.M.P.

SECTION	DATE	DIR OF MEAS	TAPE NO.	TAPE SUPPORT LENGTH	UNCORRECTED LENGTH		TEMP: "C"	TAPE AND CATENARY METERS	COR - RECTIONS		REDUCED LENGTH METERS	ADOPTED LENGTH METERS	(V)	(VV)
					METERS	"C"			TEMP SET-UP	SET-BACK				
Stake No. 34B														
" 35	2-25-50	F	6464	3	50	37.0	+ 0.0003				-0.0006		49.9997	
" 36		F		3	50	39.0	+ 0.0004				-0.0022		49.9982	
" 37		F		3	50	38.0	+ 0.0004			-0.0001		50.0003		
" 38		F		3	50	37.0	+ 0.0003			-0.0002		50.0002		
" 39		F		3	50	38.0	+ 0.0004			-0.0009		49.9593		
" 40		F		3	50	37.0	+ 0.0003			-0.0000		50.0003		
" 41		F		3	50	39.0	+ 0.0004			-0.0027		49.9977		
" 42		F		3	50	38.0	+ 0.0004			+ 0.0053		50.0333		
" 43C		F		3	50	39.0	+ 0.0004			+ 0.0062		49.9934		
													449.9824	449.9832
Stake No. 43C														
" 42	2-25-50	B	6621	3	50	39.0	+ 0.0004				-0.0008		49.9996	
" 41		B		3	50	38.0	+ 0.0004			-0.0024		49.9980		
" 40		B		3	50	38.0	+ 0.0004			-0.0027		49.9977		
" 39		B		3	50	38.0	+ 0.0004			-0.0000		50.0004		
" 38		B		3	50	37.0	+ 0.0003			-0.0002		50.0001		
" 37		B		3	50	38.0	+ 0.0004			-0.0001		50.0003		
" 36		B		3	50	39.0	+ 0.0004			-0.0165		49.9838		
" 35		B		3	50	39.0	+ 0.0004			-0.0022		49.9982		
" 34B		B		3	50	38.0	+ 0.0004			+ 0.0061		50.0059		
													449.9840	

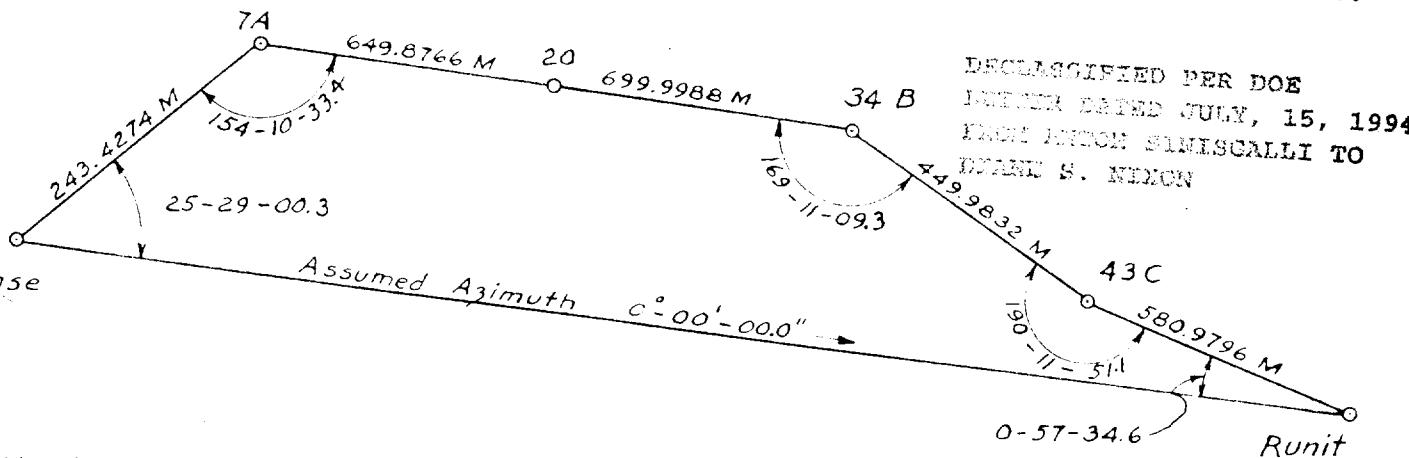
HOLMES & NARVER ENGINEERS JOB NO. 640

COMPUTATION OF RUNIT ISLAND BASE LINE

OFFICIAL USE ONLY

DECLASSIFIED PER DOE
LAWTON, OKLAHOMA JULY 15, 1994
FBI -OKLAHOMA CITY
MISSISSIPPI WIRE

COMPUTED BY L.S.H. CHECKED BY L.M.P. DATE Feb. 20, 1956

~~OFFICIAL USE ONLY~~

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	<u>0 - 57 - 34.6</u>	- 01.7	<u>0 - 57 - 32.9</u>
	<u>540° 00' 08.7"</u>		<u>540° 00' 00.0"</u>

$$N.B. - Runit \quad 0 - 00 - 00.0 \quad 2.0200827 = + 104.7328$$

$$+ \underline{334 - 31 - 01.4}$$

$$N.B. - 7A \quad 334 - 31 - 01.4$$

$$+ \underline{25 - 49 - 28.3}$$

$$7A - 34B \quad 0 - 20 - 29.7$$

$$+ \underline{10 - 48 - 52.5}$$

$$34B - 43C \quad 11 - 09 - 22.2$$

$$- \underline{10 - 11 - 49.3}$$

$$43C - Runit \quad 0 - 57 - 32.9$$

$$0.9056651 = - 8.0476$$

$$\text{Log Sin } 0 - 20 - 29.7 \quad 7.7753714$$

$$\text{Log } 1349.8754 \quad 3.1302537$$

$$\text{Log Cos } 0 - 20 - 29.7 \quad 9.9999923$$

$$3.1302860 = + 1349.8516$$

$$+ 104.7328$$

$$- 8.0476$$

$$- 87.0645$$

$$- \underline{9.7252}$$

$$\Sigma = 0.1045$$

$$1.9398410 = - 87.0645$$

$$\text{Log Sin } 11 - 09 - 22.2 \quad 9.2866447$$

$$\text{Log } 449.9832 \quad 2.6531963$$

$$\text{Log Cos } 11 - 09 - 22.2 \quad 9.9917148$$

$$2.6449111 = + 441.4800$$

$$219.7452$$

$$1349.8516$$

$$0.9878395 = - 9.7252$$

$$441.4800$$

$$\text{Log Sin } 0 - 57 - 32.9 \quad 8.2237386$$

$$580.8981$$

$$\text{Log } 580.9796 \quad 2.741609$$

$$\Sigma = 2591.9749 = \text{Log } 3.4136308$$

$$\text{Log Cos } 0 - 57 - 32.9 \quad 9.99999391$$

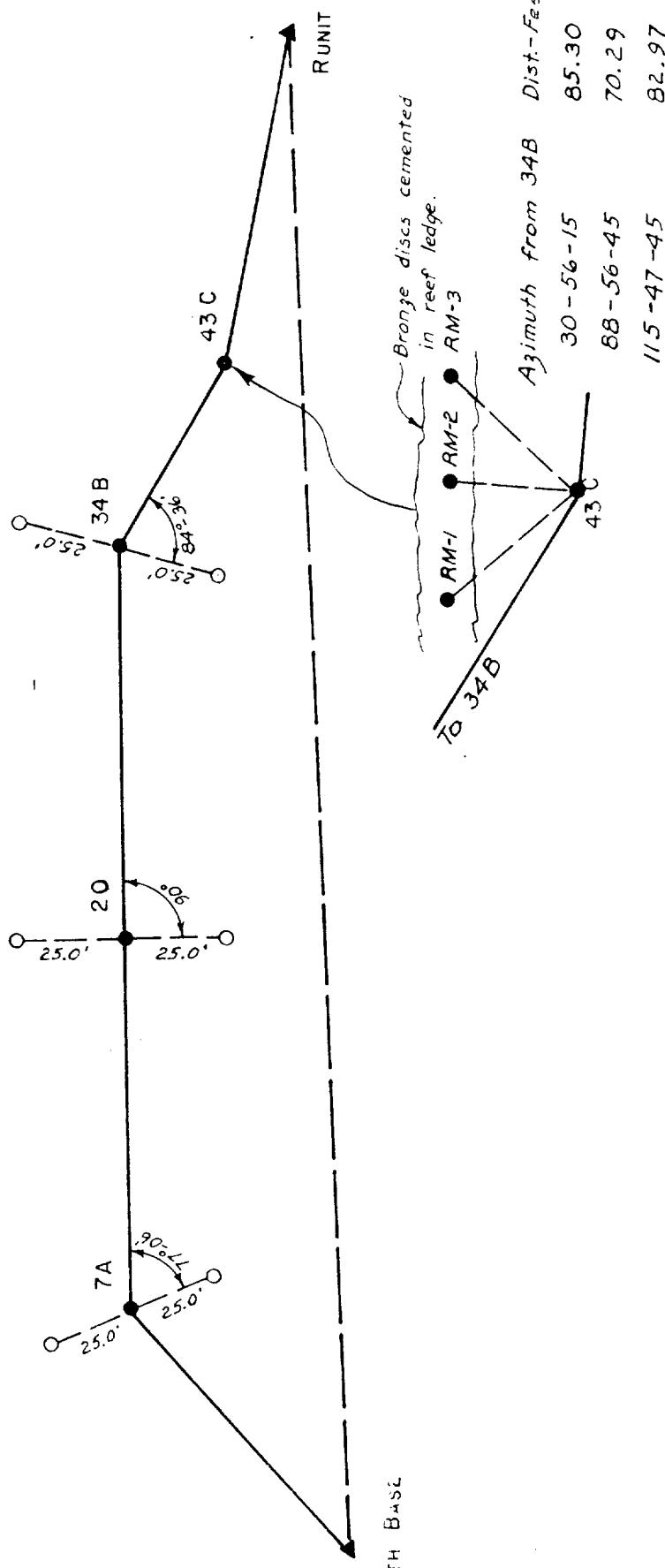
$$2.7641000 = + 580.898.$$

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North Base - Runit base line 2591.9749 M

96

DECLASSIFIED PER DOE
DATE 15 JULY 1994
FROM AUTOM SIMISCALLI TO
DARRELL S. KINCH



DECLASSIFIED PER DOE
LETTER DATED JULY, 16, 1994
FROM ANTHONY SINGSCALLI TO
DRANE S. NIXON

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.

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Pacific Southwest Region

PROBABLE ERROR COMPUTATION

HOLMES & NARVER ENGINEERS JOB NO. 6201

5c
~~OFFICIAL USE ONLY~~

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

$$\left. \begin{array}{l} 0.0001^2 \\ 0.0025^2 \\ 0.0025^2 \\ 0.0005^2 \\ 0.0005^2 \end{array} \right\} \Sigma = 0.0000/637 \quad \sqrt{\Sigma} = 0.00405 M$$

$$\begin{array}{l} F 2624.2621 \\ B 2624.2693 \end{array}$$

$$\begin{array}{l} \text{Actual difference} \quad 0.0072 = 1:364481 \\ \text{Probable error} \quad 0.00405 = 1:647967 \end{array}$$

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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	
North Base						
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>			
			$\Sigma = 4.5$			

RECEIVED FEB 19 1996
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FEDERAL BUREAU OF INVESTIGATION
DIRECTOR S. R. NIXON

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

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	0.0			
			<u>$\Sigma = 9.6$</u>			
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	0.8			
			<u>$\Sigma = 9.1$</u>			

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ABSTRACT OF WYE LEVELS AND
COMPUTATION OF INCLINATION CORRECTIONS.

POINT	DISTANCE METERS	MEAN DIFF. OF LEVEL	INCLINATION CORRECTION	ELEVATION METERS	MEAN ELEVATION METERS	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>			
			Z=38.6			

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KEUFFEL & ESSER CO.

Adams and Third Streets Hoboken, N.J.
TELEPHONE HOBOKEN 1-1121 TELETYPE HOBTA 44

OFFICIAL USE ONLY

Date January 10, 1934

REPORT ON

K. & E. TYPE NO. 7000 - 50 Meters Nickel Steel Tape
LOVAR (Trademark)

Serial No. 1001

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
14-1/2 Kgs.	0-50 M.	50.000 M.

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

Tension	Interval	Length
15 Kgs.	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 *Mark Keuffel*
Vice President

awk-fp

RECORDED IN OUR LOG
JANUARY 10, 1934
TIME 10:00 A.M. 1934
BY JAMES A. KEUFFEL

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

NEW YORK - CHICAGO - ST. LOUIS - SAN FRANCISCO - LOS ANGELES - MONTREAL

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K-E

KEUFFEL & ESSER CO.

Adams and Third Streets, Hoboken, N.J.

TELEPHONE HOBOKEN 3-1100 TELETYPE HOB 1414

~~OFFICIAL USE ONLY~~

Date Sept. 16, 1939

REPORT ON

N. S. T. P. No. 76980M - 50 Meters Nickel Steel Tape
Loyar (Grade 1)

Serial No. 6464

The above identified tape has been compared with our stock
and 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
11-1/2 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 de-
gree Fahrenheit).

KEUFFEL & ESSER CO.

By *John K. andell*
Vice President

awh-fp

Sept. 16, 1939

ILYON

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KEUFFEL & ESSER CO.

Adams and Third Streets, Hoboken, N.J.
TELEPHONE HOBOKEN 3-1180 - TELETYPE HOB 4-114

~~OFFICIAL USE ONLY~~

Date February 1st, 1950

REPORT ON

K. & E. TAPE NO. 7698C, 50 Meters Nickel Steel Tape
LOVAR (Trademark)

Serial No. 5019

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>
11 Kg.	0-50 M.	50,000 L.

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

<u>Tension</u>	<u>Interval</u>	<u>Length</u>
15 Kg.	0-50 M.	50,000 L.

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

KEUFFEL & ESSER CO.

By

P.W. Kell
Vice President

ewk-tp

Drafting, Ruling, Drawing, Surveying Equipment & Materials, Scale Rules, Measuring Tapes

NEW YORK DETROIT CHICAGO ST. LOUIS SAN FRANCISCO LOS ANGELES MONTREAL

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DESCRIPTION OF TRIANGULATION STATION

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

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		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

MAILED BY

106

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D.C. Johnson

~~OFFICIAL USE ONLY~~

DESCRIPTION OF TRIANGULATION STATION

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

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS			
	METERS	FEET	DIRECTION	AZIMUTH
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 M.L.W. 7.1'HEIGHT OF TELESCOPE ABOVE MARK 40.5'HEIGHT OF EYE 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.

ADJUSTED ELEVATION

ADJUSTED DIRECTIONS

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DESCRIPTION OF TRIANGULATION STATION

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

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 LEGMARKED BY LEG

108

~~OFFICIAL USE ONLY~~

R.S. Hammond

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

DESCRIPTION OF TRIANGULATION STATION

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

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

EL. OF MARK ABOVE MLW. 8.01

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.

LEG

MARKEED BY THE STATE OF CALIFORNIA

~~For internal use only~~

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HOLMES & NARVER ENGINEERS JOB NO 640

~~OFFICIAL USE ONLY~~

DESCRIPTION OF TRIANGULATION STATION

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

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 MLW 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.

100
100
100
100
100
100

DESCRIBED BY FPC

MARKED BY 110

~~OFFICIAL USE ONLY~~

HOLMES & NARVER ENGINEERS JOB NO 640

~~OFFICIAL USE ONLY~~

DESCRIPTION OF TRIANGULATION STATION

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

OBJECT	DISTANCES AND DIRECTIONS TO REFERENCE MARKS		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.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.

LEG

MANUAL 81

111

~~OFFICIAL USE ONLY~~

L.C. R. 6-1949

DESCRIPTION OF TRIANGULATION STATION

~~OFFICIAL USE ONLY~~

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

DISTANCES AND DIRECTIONS TO REFERENCE MARKS				
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 Piiraai 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.

APR 10 1949

FPC

MARKED BY

112

DEPT. OF THE NAVY

J. S. Narver

HOLMES & NARVER ENGINEERS JOB NO 640

~~OFFICIAL USE ONLY~~

DESCRIPTION OF TRIANGULATION STATION

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

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

ELEV. OF MARK ABOVE MEDIUM TIDE 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.

113
113
113

DECOR 420 - B

LEG

MAP 6

~~OFFICIAL USE ONLY~~

K. S. K. 113

DESCRIPTION OF TRIANGULATION STATION

~~OFFICIAL USE ONLY~~

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

DISTANCES AND DIRECTIONS TO REFERENCE MARKS				
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.

DESCRIBED BY

FPC

MAKED BY

114

~~OFFICIAL USE ONLY~~

L. J. Hartman

~~OFFICIAL USE ONLY~~

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 cell 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.

John C. Holmes
John G. Riney

116

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RECOVERY NOTE TRIANGULATION STATION

Name of Station **ELGIN (Engebi)** Location Engebi Island

Eniwetok Atoll

Established by J.T.F.-7 Year 1947-48 Marshall Islands

Renovated 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.

100-1000000000000000
100-1000000000000000
100-1000000000000000

117

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RECOVERY NOTE TRIANGULATION STATION

Name of Station	GRAFLEX	Location	Aoman Island
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 destroyed.

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RECOVERY NOTE TRIANGULATION STATION

Name of Station	KODAK (Aniyaanii)	Location	Aniyaanii 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 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 Ariyaanii 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 214-55'42.6".

Reference mark No. 2 is set at a distance of 110.819 feet 33.778 M from the station at an azimuth of 326-01'-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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HOLMES & NARVER ENGINEERS INC NO 640

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RECOVERY NOTE TRIANGULATION STATION

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

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.

RETRACED BY R.C.
11 AUGUST 1949, 11, 1949
RETRACED BY R.C.
11 AUGUST 1949

120

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RETRACED

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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 Engebi 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
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 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.

1944

122

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R. J. T. - 122

RECOVERY NOTE TRIANGULATION STATION

Name of Station	RUNIT	Location	Runit Island
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 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.

123

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J.C. Johnson

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RECOVERY NOTE TRIANGULATION STATION

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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124

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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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125

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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

1964 FEBRUARY 20
1964 MARCH 10
1964 APRIL 10
1964 MAY 10

Biijiri -- Traverse station Biijiri - 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

Piiraai -- Triangulation station Piiraai - 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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1997 BY SPARTAN GROUP, INC., 15, 1994
Spartan Group, Inc. 1994

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128

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EXPANSION OF HORIZONTAL CONTROL SURVEY

ENIWETOK ATOLL

MARSHALL ISLANDS

1951

UNCLASSIFIED PER DCM
LAWRENCE GATSON JULY, 15, 1994
FBI - LOS ANGELES
SEARCHED INDEXED SERIALIZED FILED
MARSHALL ISLANDS

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130

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

~~OFFICIAL USE ONLY~~

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.

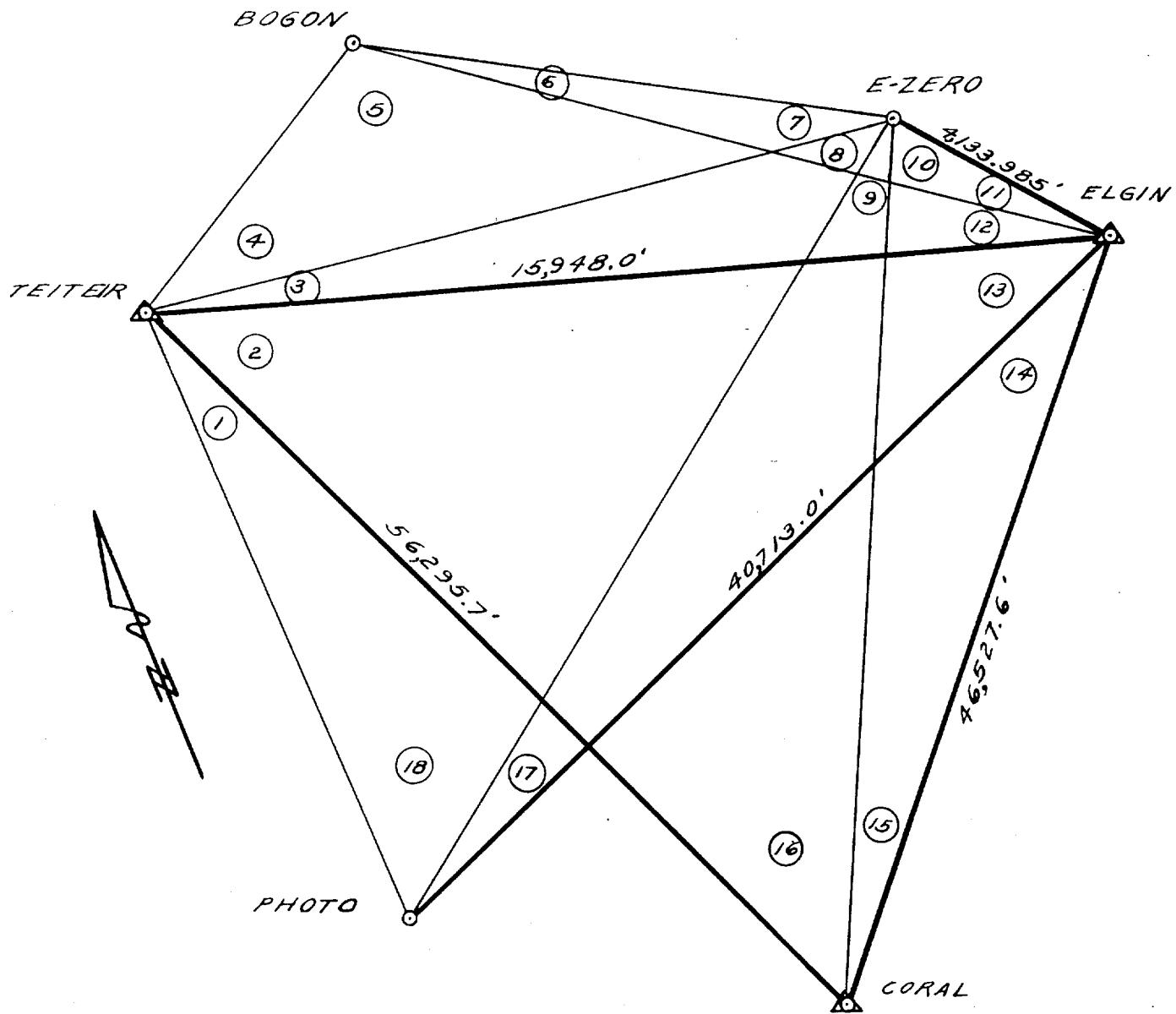
WILSON'S SURVEY FILE DOB
FEDERAL PROJECT NUMBER 10, 1954
FEDERAL AVIATION ADMINISTRATION HQ
MARCH 2, 1954

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



NOT TO SCALE

— PRIMARY TRIANGULATION

— SECONDARY TRIANGULATION

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133

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ADJUSTED ANGLES

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

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'

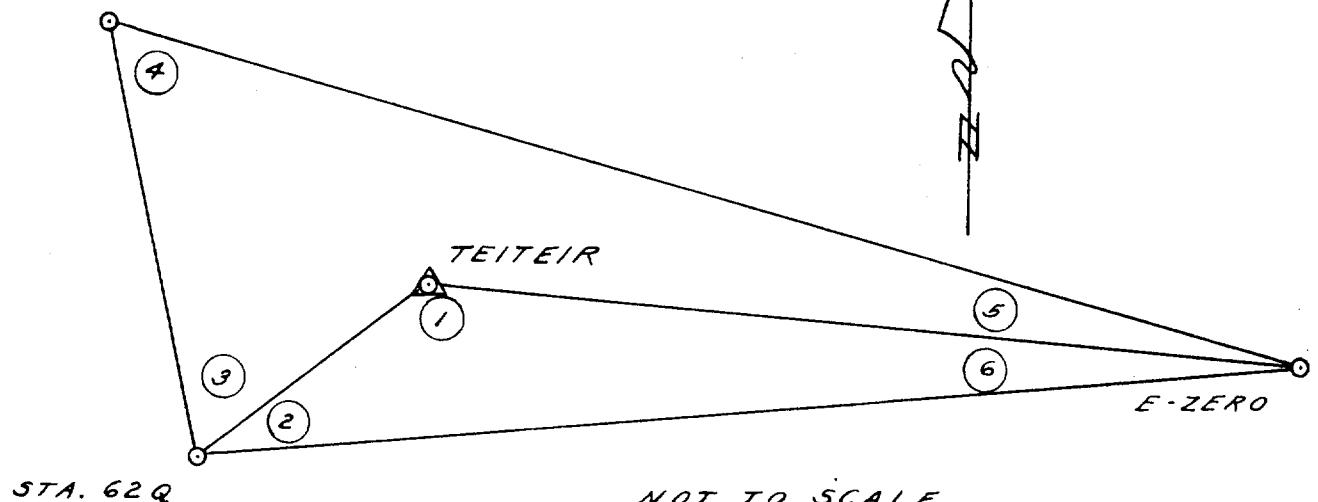
RECEIVED FROM DOW
JULY 10 1954
RECORDED JULY 10 1954
TO
DOW CHEMICAL CO.

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134

~~OFFICIAL USE ONLY~~

STA. 60 Q



ADJUSTED ANGLES

- (1) $177^\circ - 08' - 02.5''$
- (2) $2^\circ - 49' - 17.6''$
- (3) $101^\circ - 54' - 50.0''$
- (4) $70^\circ - 18' - 23.5''$
- (5) $4^\circ - 54' - 49.0''$
- (6) $0^\circ - 02' - 39.9''$

ADJUSTED DISTANCES

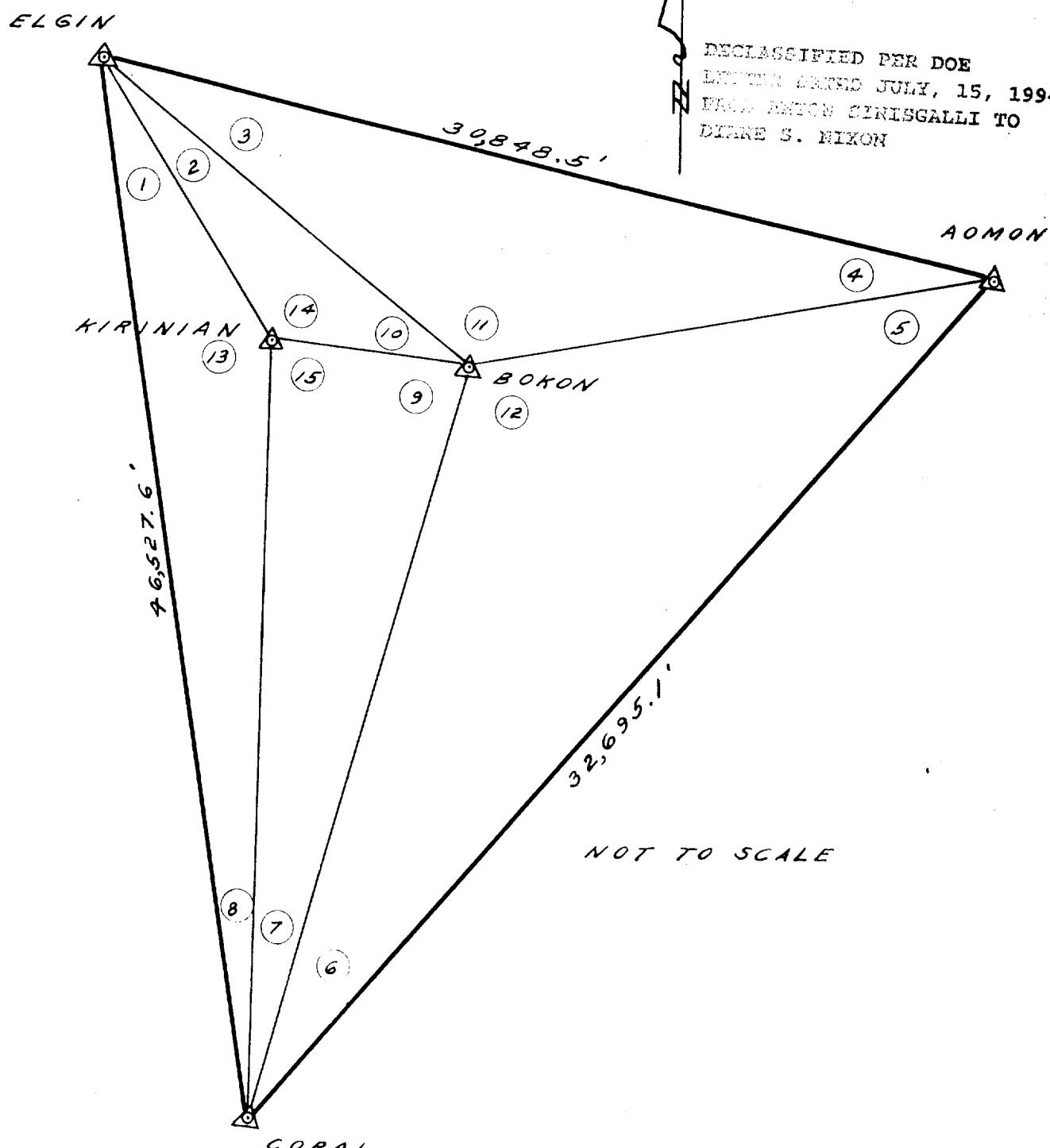
TEITEIR - E-ZERO	$12,554.4'$
TEITEIR - 62 Q	$191.62'$
60 Q - 62 Q	$1,170.0'$
E-ZERO - 60 Q	$13,092.3'$
E-ZERO - 62 Q	$12,745.8'$

RECORDED BY: [unclear]
APR 22 1966
SACRAMENTO, CALIFORNIA
MAY 10 1966

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



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136

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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"		

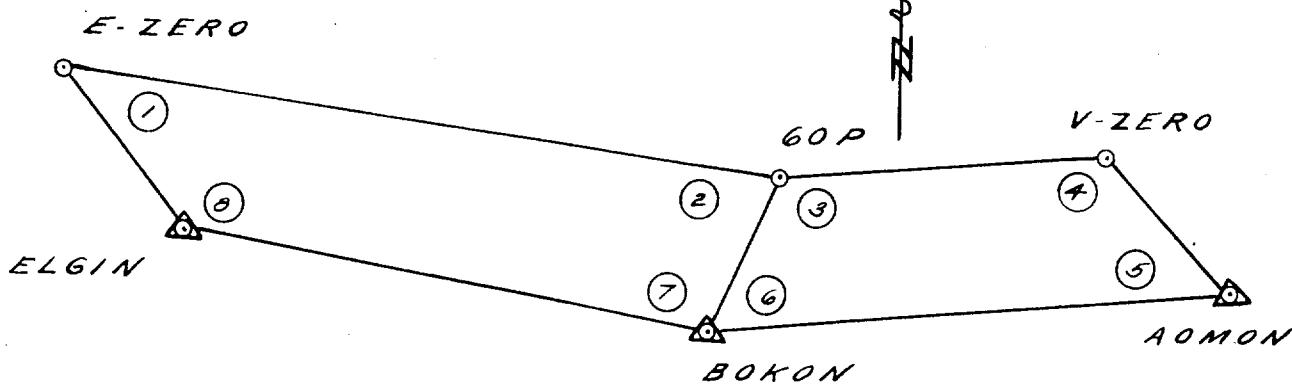
ADJUSTED DISTANCES

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'

MANUFACTURED FOR
HOLMES & NARVER ENGINEERS
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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	7,133.985'
ELGIN	- BOKON	12,791.9'
AOMON	- BOKON	18,412.0'
AOMON	- V-ZERO	4,140.9'

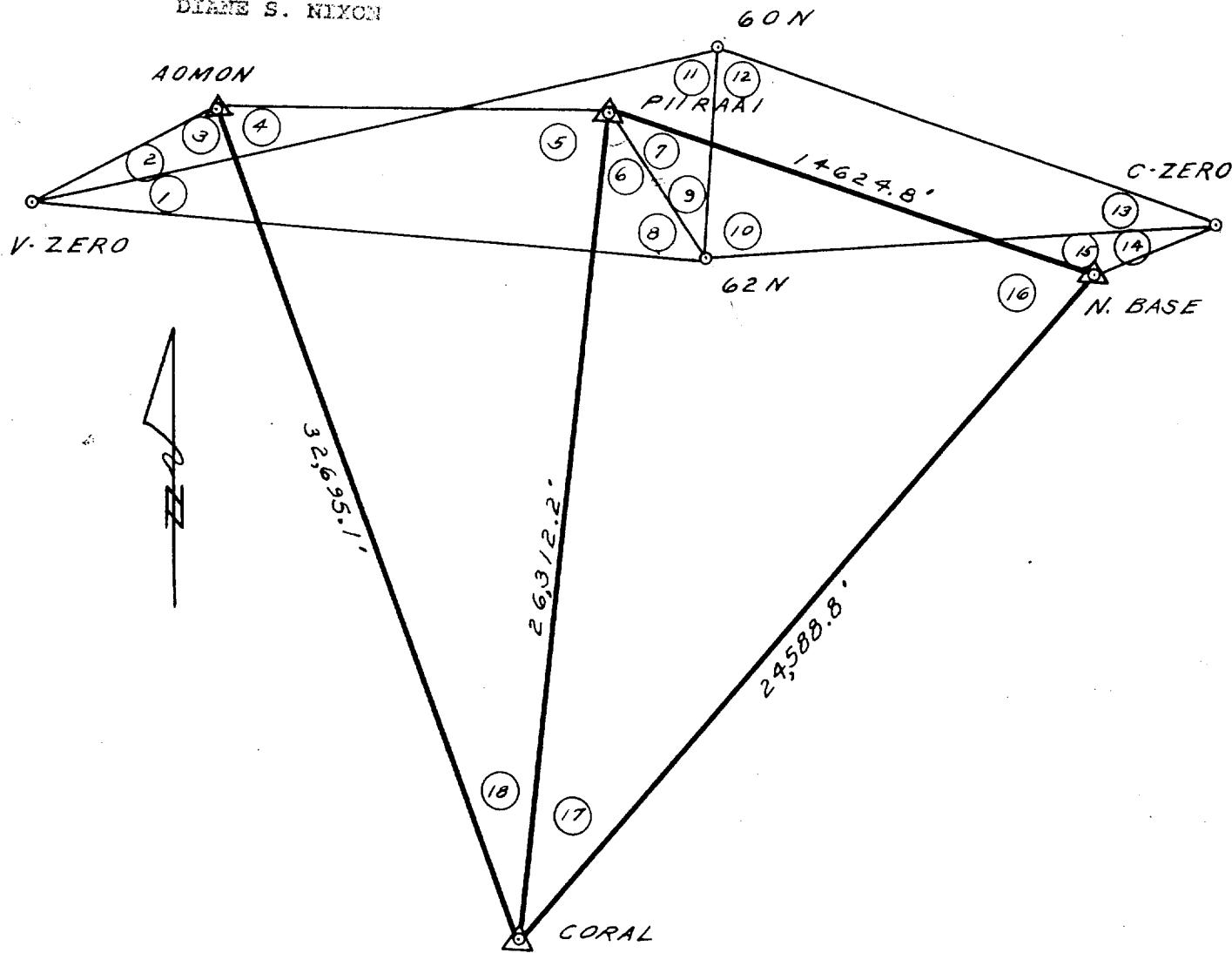
PROTRACTED AND DRAFTED
JULY 19, 1964, BY J. H. 1964
DRAFTED AND CHECKED JULY 10
CHARLES M. MURRAY

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



— PRIMARY TRIANGULATION
 — SECONDARY TRIANGULATION

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134

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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)	85° - 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

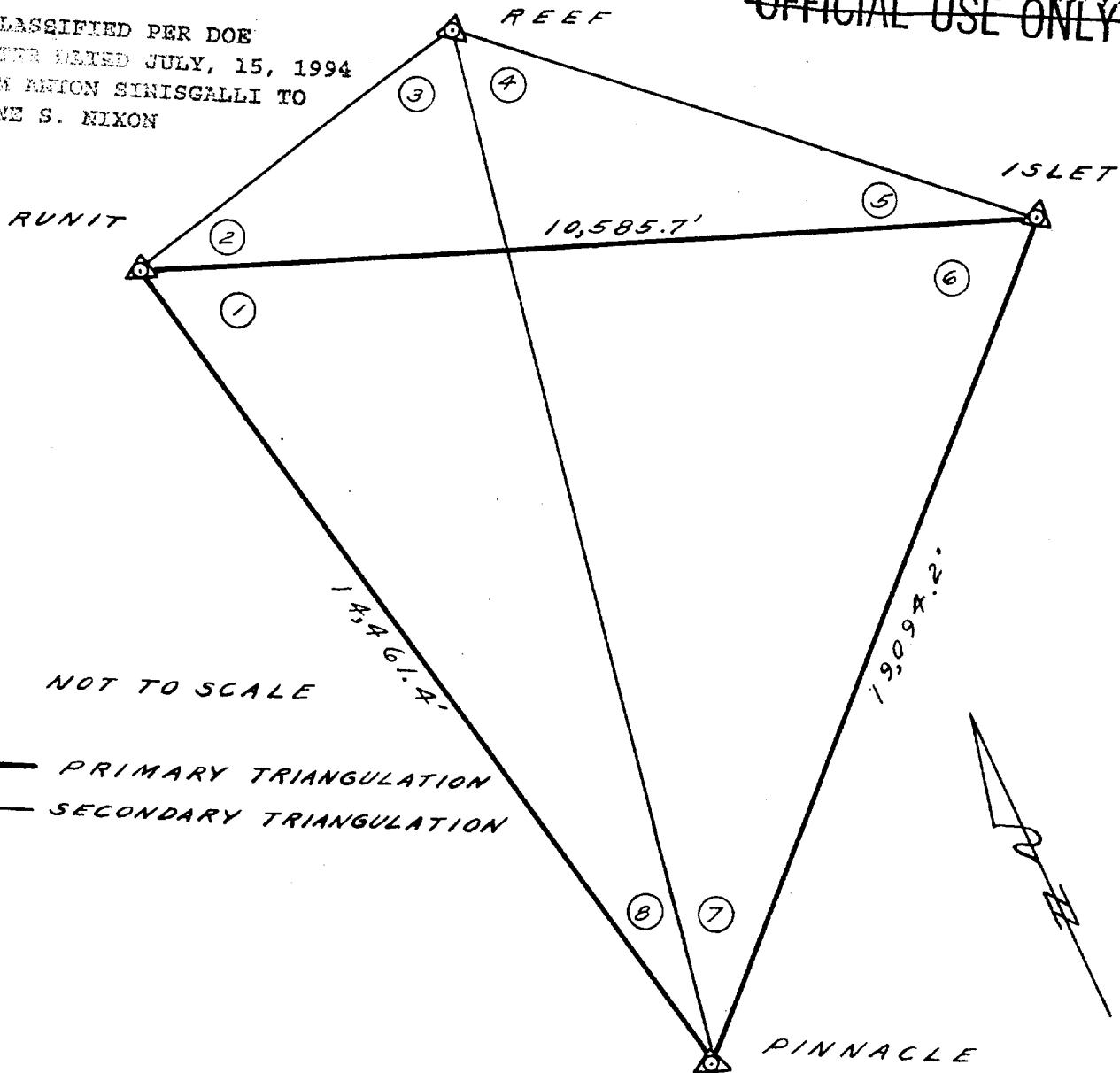
V-ZERO	- AOMON	4,140.9'
V-ZERO	- 60N	14,393.4'
V-ZERO	- 62N	14,593.9'
C-ZERO	- 60N	15,255.6'
C-ZERO	- 62N	14,923.1'
PIIRAAI	- 62N	123.28'.
PIIRAAI	- AOMON	10,891.6'
60N	- 62N	1,052.4'
N. BASE	- C-ZERO	591.27'

RECORDED IN PDR
MAY 10, 1994
MAILED TO
JOHN S. REED

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146

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

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ADJUSTED ANGLES

- | | | | |
|-----|------------------------------|-----|-----------------------------|
| (1) | $98^{\circ} - 08' - 56.6''$ | (5) | $4^{\circ} - 22' - 35.6''$ |
| (2) | $7^{\circ} - 10' - 07.2''$ | (6) | $48^{\circ} - 33' - 58.9''$ |
| (3) | $60^{\circ} - 36' - 29.4''$ | (7) | $19^{\circ} - 12' - 37.7''$ |
| (4) | $107^{\circ} - 50' - 47.8''$ | (8) | $14^{\circ} - 04' - 26.8''$ |

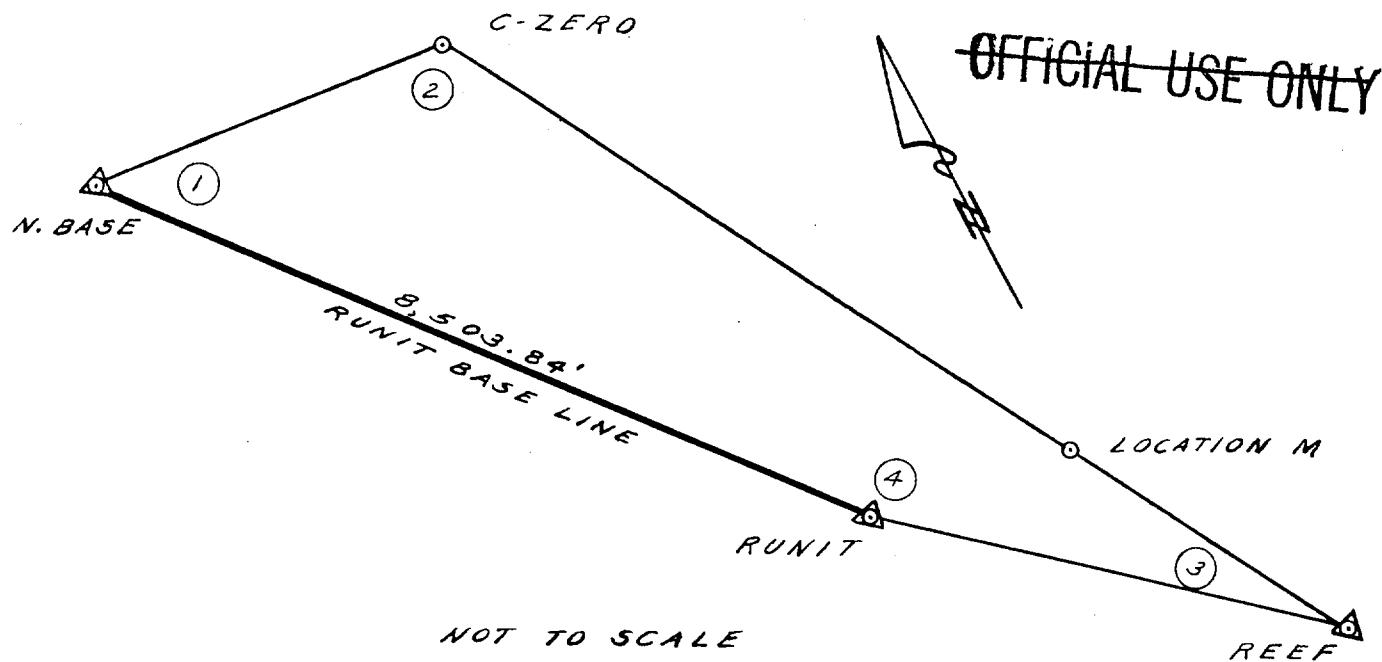
ADJUSTED DISTANCES

REEF - RUNIT	9,036.2'
REEF - ISLET	6,600.3'
REEF - PINNACLE	16,008.2'

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141

JOB NO. 640



PRIMARY TRIANGULATION
SECONDARY TRIANGULATION

ADJUSTED ANGLES

- (1) $35^{\circ} - 26' - 55.9''$
 - (2) $142^{\circ} - 25' - 55.4''$
 - (3) $0^{\circ} - 39' - 13.8''$
 - (4) $181^{\circ} - 27' - 54.9''$

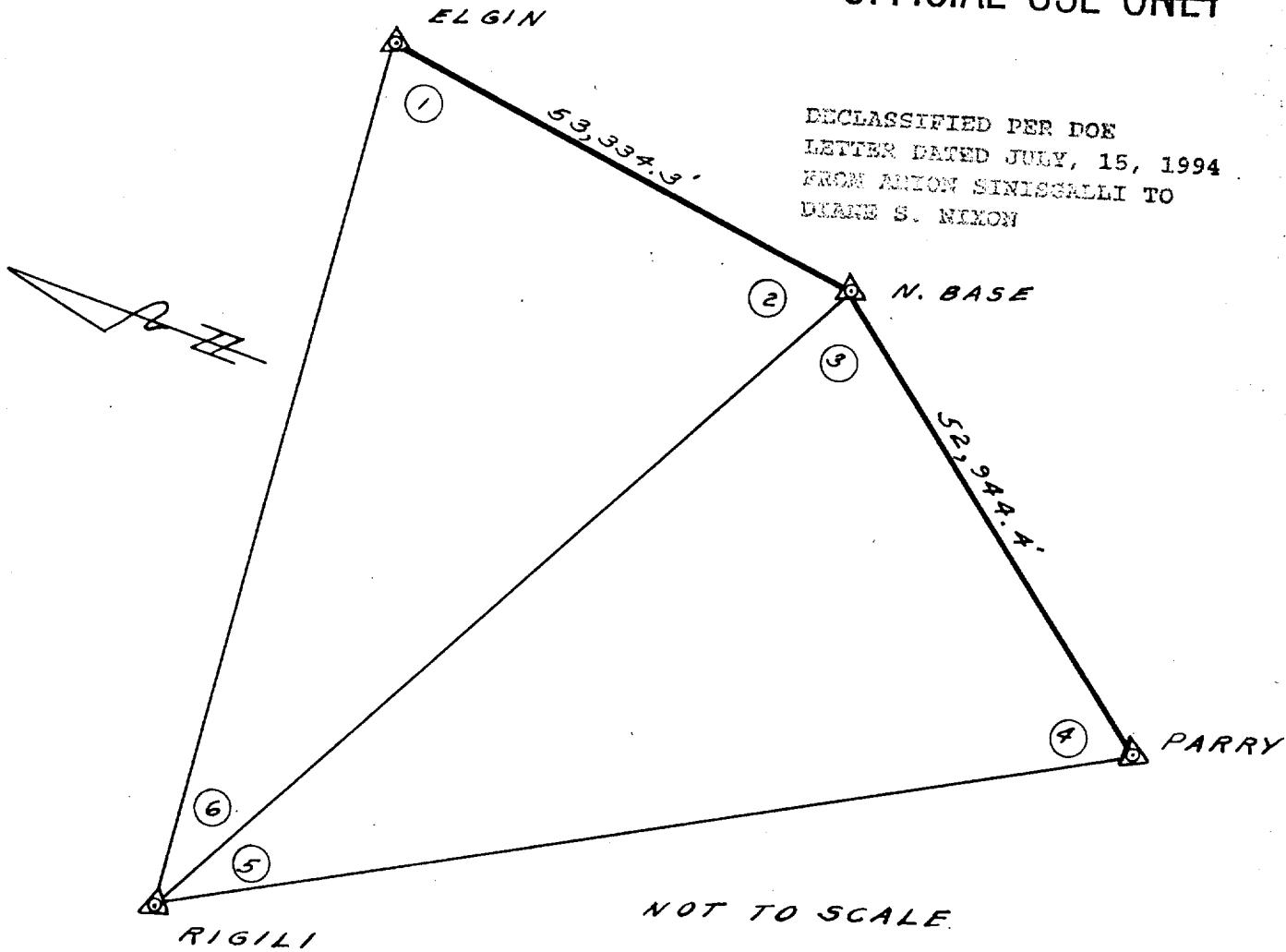
ADJUSTED DISTANCES

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

REF ID: A6524
UNCLASSIFIED PER EOC
2025 RELEASE UNDER E.O. 14176

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142

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— 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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LATTER DATED JULY 15, 1994
FROM ALTON RENISCALLI TO
CLAYDE S. NELSON

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FINAL VALUES

GEOGRAPHIC — POSITIONS

Locality W.M.D. 40 Latitude Longitude Altitude Station Data

State Pennsylv. Date Year

NAME DELMONTH - 1944 Arrival No. 304697/1

STATION	LATITUDE	LONGITUDE	AZIMUTH	BACK AZIMUTH	TO STATIONS		DISTANCE Metres	LOGARITHMS
					"	"		
LILAC	42° 57' 19"	75° 42' 23"	06.483	200.556	06.47	168.47	34.07	LILAC 8726.98 3.940 9636
LANTANA	42° 57' 44"	75° 42' 09"	224.09	27.65	224.09	27.65	24.196.90	LANTANA 4.383 7598
RELY	42° 57' 40"	75° 42' 28.8	288.54	26.68	288.54	26.68	11.407.00	RELY 4.057 2733
NORTH BANK	42° 57' 47"	75° 42' 32.7	56.52	40	56.52	40	66.80.87	NORTH BANK 3.484 6331
SOUTH BANK	42° 57' 41"	75° 42' 31.6	329.31	31.64	329.31	31.64	3704.60	SOUTH BANK 3.568 5068
PRIVILEGE	42° 57' 30"	75° 42' 30	196.30	11.64	196.30	11.64	7248.86	PRIVILEGE 3.861 4665
LANTANA	42° 57' 40"	75° 42' 26	43.69	43.69	43.69	43.69	17.813.50	LANTANA 4.250 7502
RELY	42° 57' 43"	75° 42' 29	18.30	18.30	18.30	18.30	15.533.40	RELY 4.191 3221
SOUTH BANK	42° 57' 47"	75° 42' 31	58.31	58.31	58.31	58.31	11.830.00	SOUTH BANK 4.072 9854
SAND	42° 57' 47"	75° 42' 48	42.82	42.82	42.82	42.82	8728.98	SAND 3.940 9636
STEEL	42° 57' 41"	75° 42' 48	04.42	04.42	04.42	04.42	1722.19	STEEL 3.236 0804
Do not write in this margin								
LANTANA	42° 57' 40"	75° 42' 23	20.461	1536.539	20.461	1536.539	21.909.70	LANTANA 4.340 6362
SAND	42° 57' 45"	75° 42' 11	17.84	17.84	17.84	17.84	24.196.90	SAND 4.383 7598
LILAC	42° 57' 49"	75° 42' 09	24.82	24.82	24.82	24.82	17.813.50	LILAC 4.250 7502
STEEL	42° 57' 43"	75° 42' 13	13.97	13.97	13.97	13.97	17.682.70	STEEL 4.247 5676
PRIVILEGE	42° 57' 42"	75° 42' 05	05.60	05.60	05.60	05.60	13.579.20	PRIVILEGE 4.132 8757
LANTANA	42° 57' 40"	75° 42' 22	44.319	1343.539	44.319	1343.539	6022.03	LANTANA 3.779 7427
RELY	42° 57' 45"	75° 42' 11	28.67	28.67	28.67	28.67	17.682.70	RELY 4.247 5676
LILAC	42° 57' 49"	75° 42' 00	00.37	00.37	00.37	00.37	1722.19	LILAC 3.236 0804
SAND	42° 57' 43"	75° 42' 38	38.16	38.16	38.16	38.16	13.579.20	SAND 4.132 8757
LANTANA	42° 57' 42"	75° 42' 26	25.30	25.30	25.30	25.30	7268.86	LANTANA 3.861 4665
STEEL	42° 57' 46"	75° 42' 26	36.39	36.39	36.39	36.39	6022.03	STEEL 3.779 7427

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LETTER TAPED JULY, 15, 1994
FROM ANTHONY SINGARANI TO
DIANE S. NIXON

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DATED JULY, 15, 1954
BY ANTONI SINISGALLI TO
AFB S. NITRO

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ORIGINATOR POSITION

RECEIVER POSITION

STATION

1 of 2

STATION	ELEVATION (feet)	CALTITUDE N AND LONGITUDE	SUBCROSS W ETRS	FROM STATION	TO STATION	DISTANCE (feet)	REF ID
INTERSTATE ASTRO PIER	11 33 23.480	714.8	721.4				
	162 21 10.250	310.6					
NORTH BASE	11 33 23.265	714.8	218.44 57.63	58 44 57.70	INTERSTATE ASTRO PIER	1.105 4216	12.747
	162 21 09.590	322.7					
SAND	11 30 16.981	581.2	147.57 25.78	127.56 52.40	NORTH BASE	1.024 2980	6 480.31
	162 21 06.873	208.3					
SOUTH BASE	11 32 02.832	87.0	329.31 31.04	149.31 44.01	SAND	3.5683 4716	3 702.30
	162 22 04.915	148.9	145.59 43.57	225.59 32.56	NORTH BASE	2.471 2860	2 681.17
SOUTH	11 32 19.334	594.1	254.49 20.63	74.50 08.53	NORTH BASE	1.873 4091	7 44.01
	162 32 10.805	357.6	273.36 52.19	93.15 50.99	SOUTH BASE	3.950 6801	8 926.49
LILAC	11 25 38.249	1173.2	142.20 20.43	222.29 18.31	LILAC	4.191 2870	15 534.13
	162 22 22.647	693.6	177.22 01.87	257.21 58.31	SOUTH BASE	4.072 9503	11 629.06
LANTANA	11 20 54.185	1664.8	196.04 04.94	16 04 44.64	LANTANA	4.340 6011	21 907.92
	162 13 50.695	1537.2	224.99 23.66	14 32 32.85	SAND	4.383 2242	21 191.53
STELL	11 24 46.356	1426.1	66.13 13.97	60 40 24.82	LILAC	4.250 7152	17 812.10
	162 22 44.311	1343.3	157.48 04.42	246.22 26.68	LANTANA	4.247 5124	17 881.23
BUDDLE	11 21 51.649	1580.5	82.34 35.60	262.32 38.17	LANTANA	4.332 6107	13 578.15
	162 21 31.715	116.8	196.20 21.81	16 30 20.30	LILAC	3.861 4315	7 268.28
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MAY 15, 1994
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DIANE S. NIXON

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LUST		11 40	08 841	271.6	326	18	11.4	146	14	21.3	ASTRA	3 430	2377	2 674.7
162	14	46.392	1411.1	72.02	30.6			257	94	34.5	PETROLIA	3.078	7671	3 223.9
12	39	45.994	1413.2	316	54	10.7		120	26	28.3	SACMI	1.334	8793	1 2 174.2
162	14	43.375	1465.2	81	16	27.7		261	25	35.1	PETROLIA	3.072	2514	1 9 443.8
14	40	23.298	493.5	591	36	57.4		162	21	28.6	ASTRA	3.735	7672	3 442.3
162	13	04.664	82.7	65	38	52.5		263	23	32.5	PETROLIA	2.836	9256	1 6 726.1
16	60	58.920	374.1	75	33	12.5		252	52	32.8	PETROLIA	1.942	6253	0 761.6
162	14	30.737	632.9	20	30	30.5		270	21	28.6	SACMI	1.678	9911	1 756.2
11	39	36.201	1112.1	85	35	50.7		262	24	46.8	PETROLIA	2.984	2873	9 644.7
162	14	58.410	1709.6	199	97	51.7		260	07	12.6	SACMI	2.772	9922	1 927.9
FINAL TOTAL								271	01	32.7	LANTANA	4.037	1637	10 892.6
ENTRICK 15.								27	26	33.8	LILAS	4.002	7529	10 063.6

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