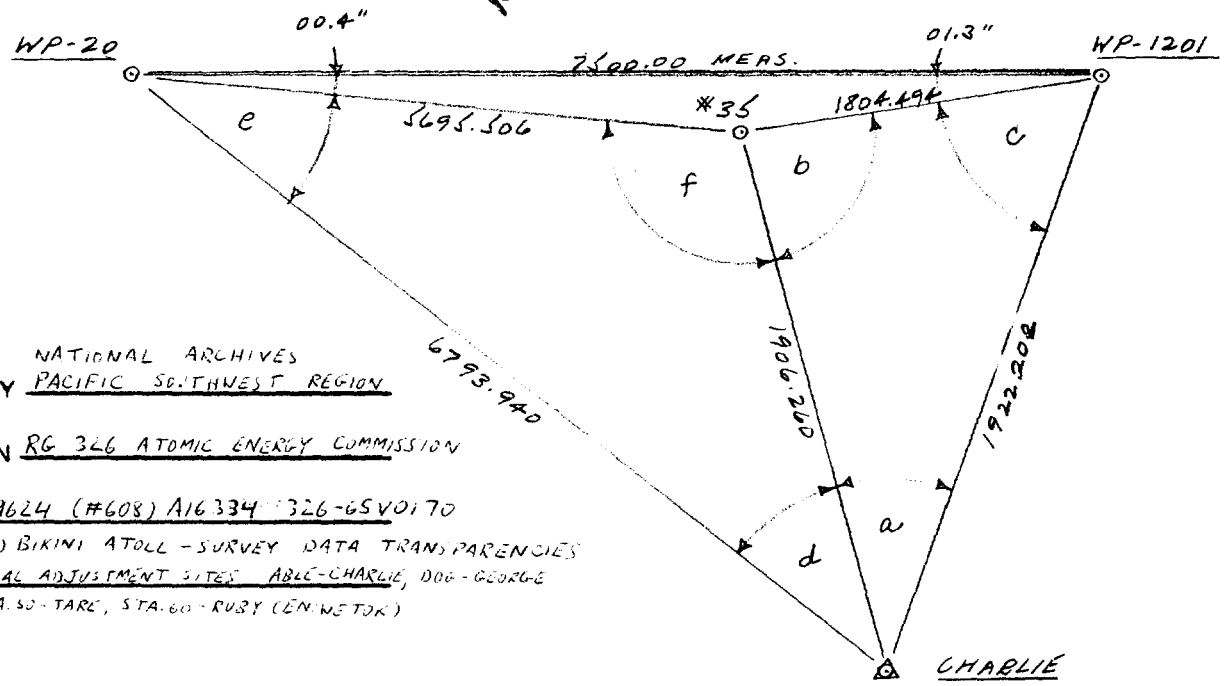
HOLMES & NARVER, INC.
ENGINEERS · CONSTRUCTORS
LOS ANGELES, CALIFORNIA

JOB NO. 667

SHEET 1 OF 4

TITLE LOCAL TRIANGULATION ADJUSTMENT ABLE-CHARLIE AREA BY LSH DATE 10-13

406283



REPOSITORY NATIONAL ARCHIVES PACIFIC SOUTHWEST REGION

COLLECTION RG 326 ATOMIC ENERGY COMMISSION

BOX No. 199624 (#608) A16334 326-65V0170
(6) BIKINI ATOLL - SURVEY DATA TRANSPARENCIES

FOLDER LOCAL ADJUSTMENT SITES ABLE-CHARLIE, DOG-GEORGE
STA. 50 - TARE, STA. 60 - RUBY (ENIWETOK)

	MEAS. ∠	GEO. COND.		TRIG. COND.	
			b+f = 01.7		
a	56-14-26.1	25.7	25.4	25.3	
b	62-19-34.7	34.2	34.9	34.9	
c	61-26-00.6	00.1	59.7	59.8	
	01.4				
d	47-56-18.1	17.3	16.9	17.0	
e	14-23-17.4	16.6	16.3	16.2	
f	117-40-27.0	26.1	26.8	26.8	
	02.5				

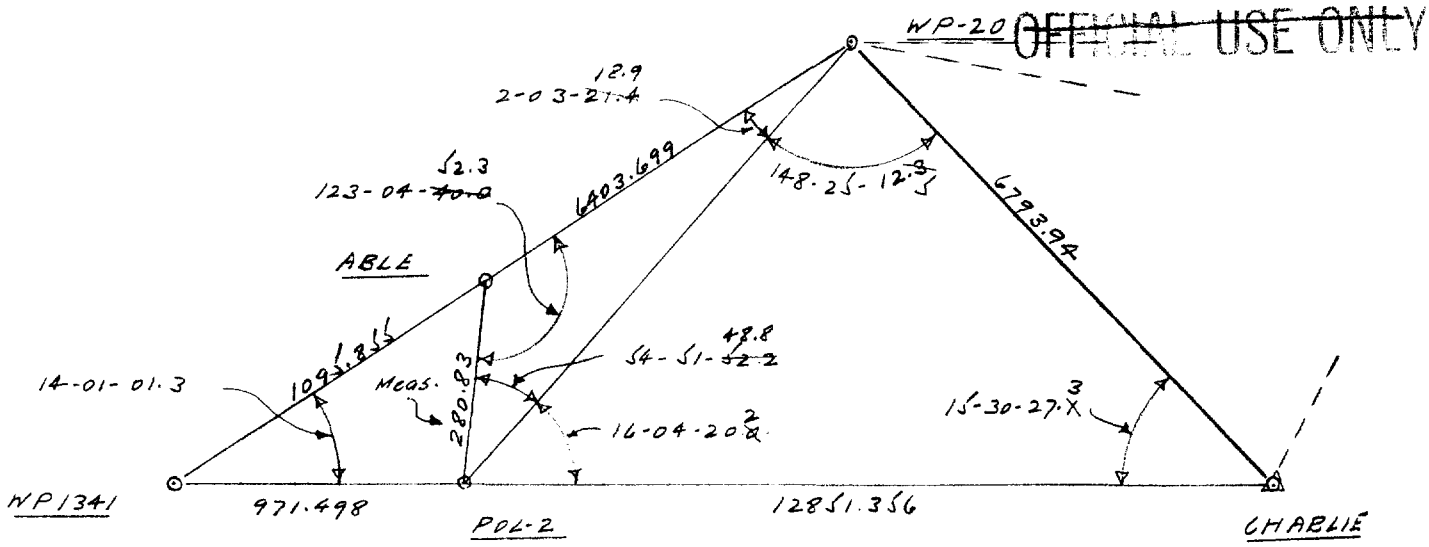
TRIG EQ. $\frac{1804.494 \sin c \sin d}{5695.506 \sin e \sin a} = 1$

1804.494	3.2563555		5695.506	3.7555324	
Sin 61-25-59.7	9.9946234	11.5	Sin 14-23-16.3	9.3952996	82.1
Sin 47-56-16.9	9.8706500	19.0	Sin 56-14-25.4	9.9197977	14.1
	3.0706289	30.5		3.0706297	96.2
				289	30.5
				8	126.7

8/126.7 = 0.06"

5695.506 / Sin 47-56-17.0 — Sin 14-23-16.2 (1906.254) — Sin 117-40-26.8 (6793.936)

1804.494 / Sin 56-14-25.3 — Sin 61-25-59.8 (1906.257) — Sin 62-19-34.9 (1922.202)



6793.94 Sin 15-30-27.3 Sin 148-25-12.5
Sin 16-04-20.2 (6561.205) (12851.356)

6561.205 Sin 2-03-18.9 = 235.306
Cos " = 6556.984

971.498 Sin 14-01-01.3 = 235.307
Cos " = 942.570

280.83
Sin 14-01-01.3 Sin 56-55-07.7 Sin 109-03-51.0
(971.498) (1095.855)

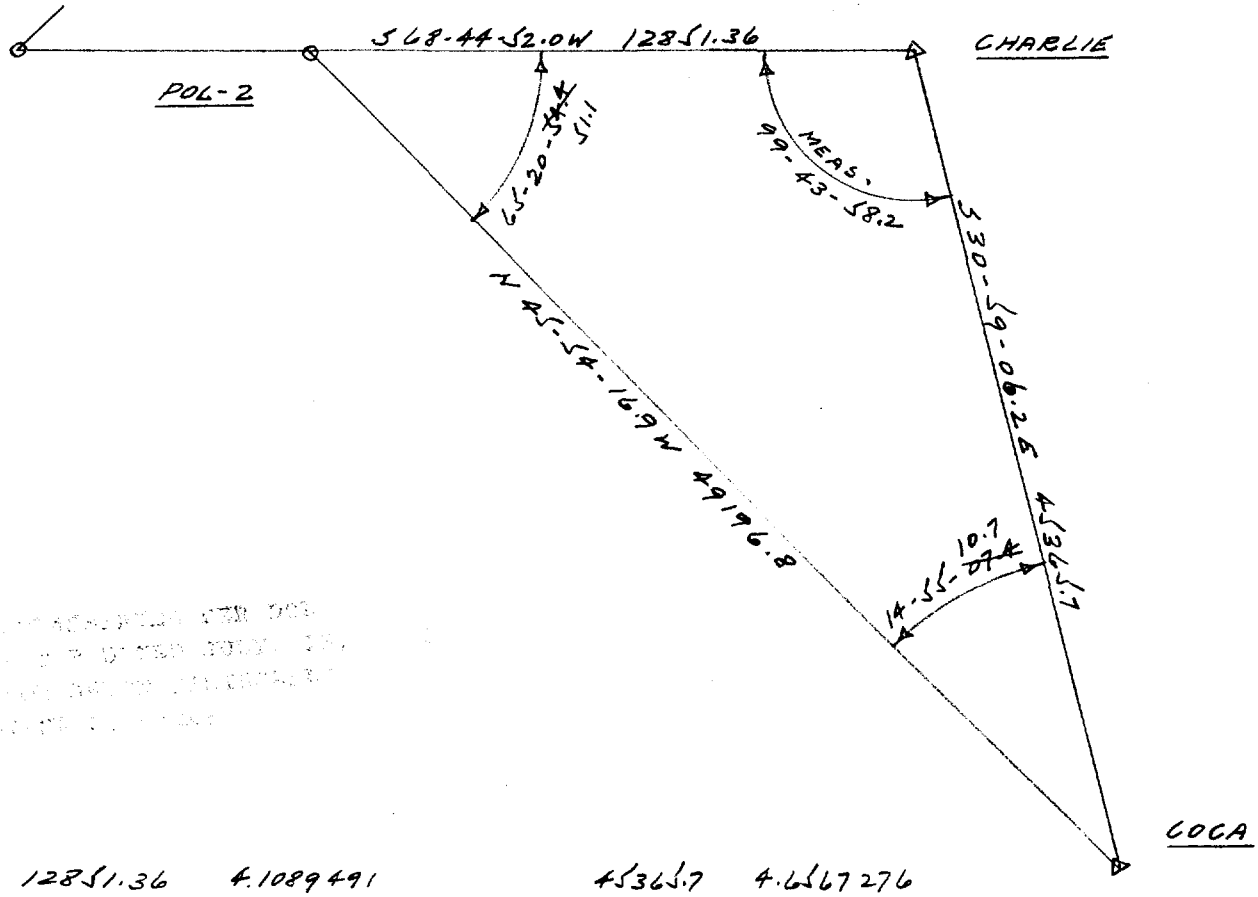
CALCULATED BY MBT DATE 10-13-94 TRAVERSE LOCATION OF STATIONS 20,1201,1341 JOB NO. 884 SHEET NO. 3 OF 4

STATION	BEARING	DISTANCE	COSINE	SINE	LATITUDE	DEPARTURE	CO-ORDINATES NORTH	CO-ORDINATES EAST
△ CHARLIE							171,297.20	82,923.80
WP-20	S 84-15-19.3W	6793.94	10009496	99497788	S 680.039	W 6759.821	170,617.16	76,163.98
WP-1201	N 69-52-02.7E	7500.00	34419370	93889867	N 2581.453	E 7041.740	173,198.61	83,205.72
△ CHARLIE	S 8-26-01.4W	1922.20	98918619	14666525	S 1901.414	W 281.920	171,297.20	82,923.80
WP-20							170,617.16	76,163.98
*35	N 69-52-03.1E	5695.506	34419187	93889934	N 1960.347	E 5347.507	172,577.51	81,511.49
WP-1201	N 69-52-01.4E	1804.494	34419961	93889650	N 621.106	E 1694.233	173,198.61	82,205.72
*35							172,577.51	81,511.49
△ CHARLIE	S 47-48-24.0E	1906.257	67163439	74088275	S 1280.308	E 1412.31	171,297.20	82,923.80
△ CHARLIE							171,297.20	82,923.80
POL-2	S 68-44-52.0W	12851.356	36247419	93199381	S 4658.285	W 11977.384	166,638.92	70,946.42
WP-1341	"	971.498	"	"	S 352.143	W 905.430	166,286.77	70,040.99
ABLE	N 54-43-50.7E	1095.855	57741953	81644760	N 632.768	E 894.708	166,919.54	70,935.69
WP-20	"	6403.699	"	"	N 3697.621	E 5228.285	170,617.16	76,163.98
POL-2							166,638.92	70,946.42
ABLE	N 2-11-17.0W	280.83	99927090	03817949	N 280.625	W 10.722	166,919.54	70,935.69
POL-2							166,638.92	70,946.42
WP-20	N 52-40-31.8E	6561.205	60632849	79521427	N 3978.246	E 5217.564	170,617.16	76,163.98

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

JOB NO. 984
SHEET 4 OF 4
TITLE LOCAL TRIANGULATION ADJUSTMENT ABLE-CHARLIE AREA
BY LSH DATE 10-53

ORIENTATION OF ABLE-CHARLIE AREA



Log. 1285 1.36	4.1089491		45365.7	4.6567276	
Log. Sin 65-20-54.4	9.9584985	9.7	14-55-07.4	9.4106905	79.0
	4.0674476	9.7		4.0674181	79.0
	4181	79.0			
	296	88.7			

296 / 88.7 = 3.3"

45365.7	Sin 14-55-10.7	Sin 99-43-58.2
Sin 65-20-51.1	1285 1.38	49196.81

S 30-59-06.2 E	S 30-59-06.2 E
14-55-10.7	99-43-58.2
N 45-54-16.9 W	S 68-44-52.0 W

HOLMES & NARVER INC.-ENGINEERS CONSTRUCTORS

COMPUTATION OF SITE CHARLIE ~~BASE LINE~~ FIRST ORDER TRAVERSE

OFFICIAL USE ONLY

CALC. BY: McF CHKD BY: L.S.H DATE: 9-53 JOB NO. 884 LOCATION BIKINI ATOLL M.I.

SECTION	DATE	DIR. OF MEAS.	TAPE NO	SUP-PORT	UNCORR. LENGTH NO.	UNCORR. LENGTH METERS	TEMP	CORRECTIONS TEMP	CORRECTIONS BEYOND SET-BACK	CORRECTIONS INCLINATION	CORRECTIONS SEA LEVEL	REDUCED LENGTH	ADOPTED LENGTH
							"C"	METERS	METERS	METERS	METERS	METERS	~~METERS~~-FEET
STA. 0+00													
	8-15-53	F	8193		23	49.99923		+.00654	+.06000	-.00390		1150.04493	
STAKE-23													
	8-15-53	B	8187		23	49.99874		+.00790	+.07490	-.00390		1150.04992	
STA. 0+00												1150.04742	3373.11391
STAKE-23													
	8-15-53	F	8172		23	49.99913		+.00837	+.01710	-.00100		1150.00446	
STAKE-46													
	8-15-53	B	8193		23	49.99923		+.00838	+.01480	-.00100		1150.00447	
STAKE-23												1150.00447	3772.97300
											TOTAL	2300.05189	7546.08691
			46.087					7500.000					
0+00					WP-20							WP-1201 STK-46	

HOLMES & NARVER, INC.
ENGINEERS - CONSTRUCTORS

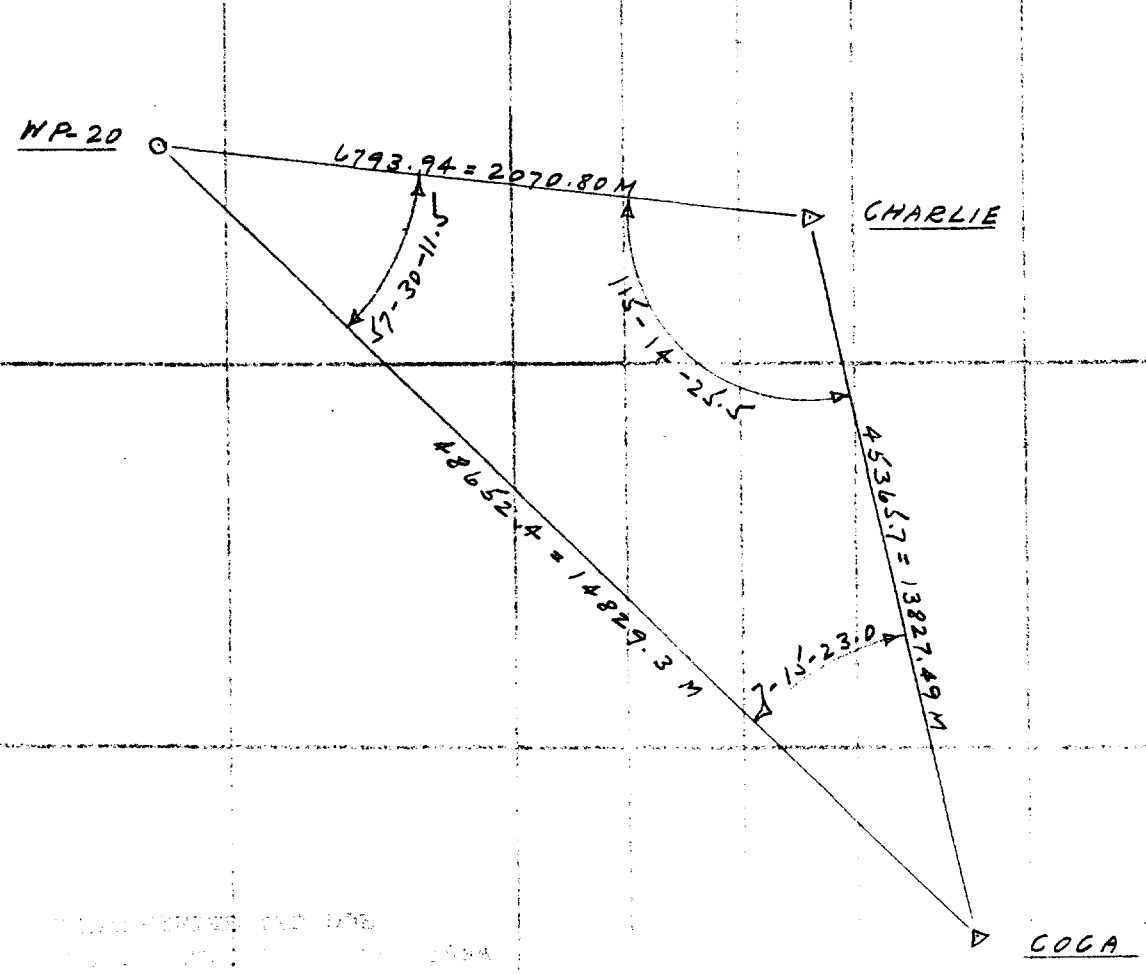
JOB No. 884

~~OFFICIAL USE ONLY~~

COMPUTATION OF TRIANGLES

COMPUTED BY L.S.H. CHECKED BY _____ DATE 10-53

STATION	OBSERVED ANGLE	CORR-N	SPHERICL ANGLE	SPHERICL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						4.1407434
1 WP-20	57-30-11.5	—	11.5	0.0	11.5	0.0739554
2 CHARLIE	115-14-25.5	—	25.5	0.0	25.5	9.9564213
3 COCA	7-15-23.0	—	23.0	0.0	23.0	9.1014363
1-3					14829.3	4.1711201
1-2					2070.80	3.3161351



~~OFFICIAL USE ONLY~~

JOB NO 884

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION SECOND ORDER TRIANGULATION

COMPUTED BY LSM DATE 10-53

CHARLIE	COCA	328	59	24.5	α	3 COCA	to 2 CHARLIE	149	00	11.9
		+115	14	25.5	$3^d\angle$		&	− 7	15	23.0
CHARLIE	to WP-20	84	13	50.0	α	3 COCA	to WP-20	141	44	48.9
		−	0	13.8	$\Delta\alpha$			−	1	01.2
		180	00	00.0				180	00	00.0
WP-20	to CHARLIE	264	13	36.2	α'	1 WP-20	to 3 COCA	321	43	47.7

FIRST ANGLE OF TRIANGLE 57-30-11.5

11	41	33.672	CHARLIE	λ	165	17	32.784	ϕ	11	35	07.935	3 COCA	λ	165	21	27.917
−	0	06.777		$\Delta\lambda$	−	1	08.030	$\Delta\phi$	+	6	18.960		$\Delta\lambda$	−	5	03.164
11	41	26.895	WP-20	λ'	165	16	24.754	ϕ'	11	41	26.895	WP-20	λ'	165	16	24.753

Logarithms		Values in seconds
	$\frac{1}{2}(\phi+\phi')$	11-41-30.284
3.3161382	s	3.3161382
9.0022772	Sin α	9.9977945
8.5124950	Δ'	8.5096662
0.8309104	Sec ϕ'	0.0091039
6.63228	$\Delta\lambda$	1.8327028
9.99559	Sin$\frac{1}{2}(\phi+\phi')$	9.3067385
0.72248	$-\Delta\alpha$	1.1394413
7.35035		
1.6618		
1.9899		
3.6517		

Values in seconds	
	+6.7750
	.0022
	.0000
	+6.7772
	−68.0304
	−13.786

Logarithms		Values in seconds	
s	4.1711207		
Cos α	9.8950265		
B	8.5124983		
h	2.5786455	1st term	−379.0055
h^2	8.34224		
Sin$^2\alpha$	9.58357		
C	0.21848		
	8.64429	2d term	+.0441
h^2	5.1573		
	1.9861		
	7.1434	3d term	+.0014
		$-\Delta\phi$	−378.9600

Logarithms		Values in seconds
	$\frac{1}{2}(\phi+\phi')$	11-38-17.415
s	4.1711207	
Sin α	9.7917862	
A'	8.5096662	
Sec ϕ'	0.0091039	
$\Delta\lambda$	2.4816770	−303.1636
Sin$\frac{1}{2}(\phi+\phi')$	9.3047715	
$-\Delta\alpha$	0.7864485	−61.157

OFFICIAL USE ONLY

JOB Nº 884

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION — SECOND ORDER TRIANGULATION

Station LSH — Page 11-S3

WP-20	CHARLIE	264	13	36.2	α	3	CHARLIE	to 2	WP-20	84	13	S0.0		
		1S0	28	31.4	3 ∠					14	18	S7.2		
WP-20	ABLE	S4	42	07.6	α	3	CHARLIE	to 1	ABLE	69	S4	S2.8		
		—	0	10.S	Δα					—	0	24.4		
		180	00	00.0						180	00	00.0		
ABLE	WP-20	234	41	S7.0	α'	1	ABLE	to 3	CHARLIE					

First angle of triangle = 15-12-31.4

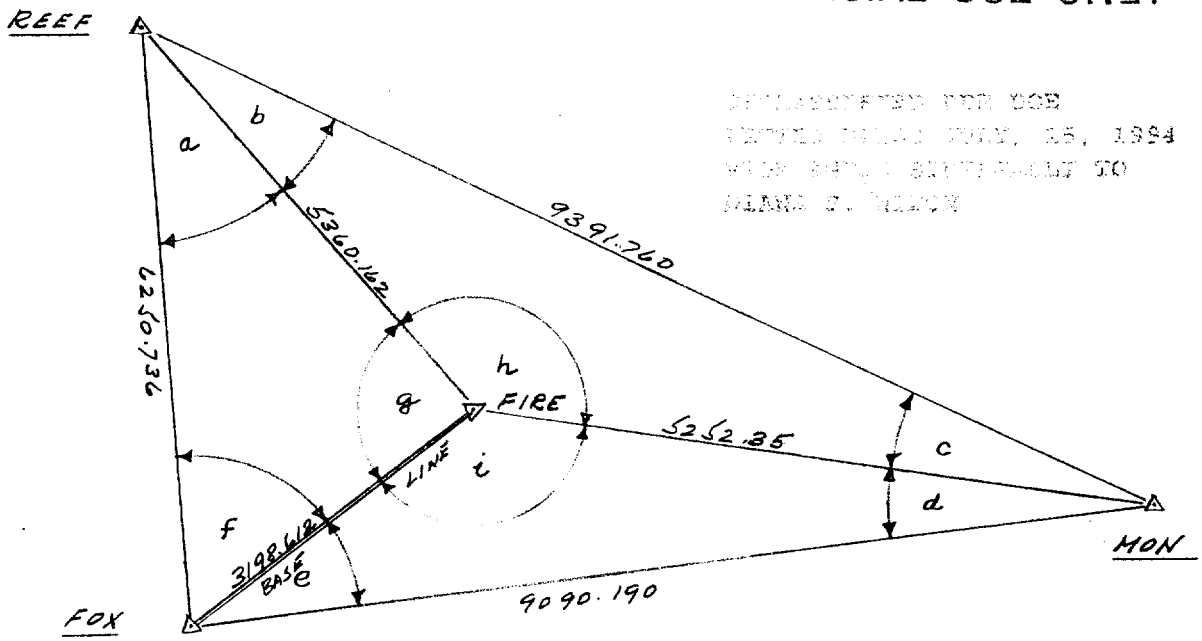
11 41 26.89S	WP-20	λ	16S	16	24.7S4	φ	11	41	33.672	3 CHARLIE	λ	16S	17	32.784
— 0 36.708		Δλ	—	0	S2.S99	Δφ	—	0	43.486		Δλ	—	02	00.629
11 40 S0.187	ABLE	λ'	16S	15	32.1S1	φ'	11	40	S0.186	1 ABLE	λ'	16S	15	32.1S1

Logarithms	Values in seconds		Logarithms	Values in seconds		Logarithms	Values in seconds
3.2904465		½(φ+φ') 11-41-08.541	s 3.S899485		½(φ+φ')	11-41-11.929	
9.7617982			Cos α 9.S3S8247				
8.S12495S			B 8.S12495S0				
1.S647398	+36.7062	s 3.2904465	h 1.6382682	1st term +43.4789	s	3.S899485	
6.S8089		Sin α 9.9117747	s² 7.17990		Sin α	9.9727499	
9.823SS		A' 8.S096663	Sin²α 9.94SS0		A'	8.S096663	
0.722SS1		Sec φ' 0.0090881	C 0.72248		Sec φ'	0.0090881	
7.1269S	2nd term +.0013	Δλ 1.7209756	−S2.S988	7.84788	2nd term +.0070	Δλ	2.0814S28	−120.629
3.129S		Sin½(φ+φ') 9.306S172		3.276S		Sin½(φ+φ')	9.306SS14	
1.9899		−Δα 1.0274928	+10.6S4	1.9899		−Δα	1.3880043	+24.434
	3rd term +.0000			S.2664	3rd term +.0000			
	+36.707S				−Δ'φ +43.48S9			

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

JOB NO. 884
SHEET 1 OF 6
TITLE LOCAL TRIANGULATION ADJUSTMENT DOG-GEORGE AREA
BY LSM DATE 9-53

~~OFFICIAL USE ONLY~~



	MEAS ∠	GEO. COND.		TRIG. COND.	
a	30-46-43.7	43.9		41.3	
b	27-26-47.9	48.1		50.7	
c	28-03-38.3	38.5		35.9	
d	12-59-53.7	53.9		56.5	
e	21-40-36.4	36.6		34.0	
f	59-02-18.7 58.7	19.0		21.6	
g	90-10-55.0	57.1		57.1	
h	124-29-33.7	33.4		33.4	
i	145-19-31.3 00.0	29.5		29.5	

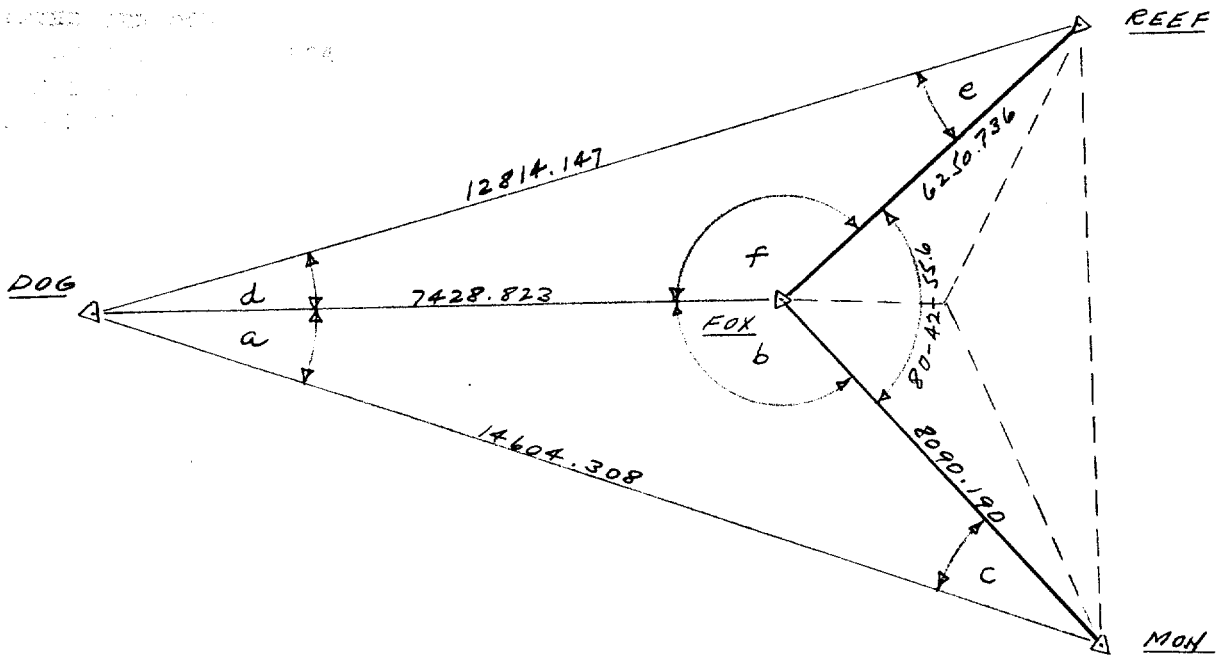
Side Eq $\frac{\text{FOX-FIRE} \sin f \sin b \sin d}{\text{FOX-FIRE} \sin e \sin c \sin a} = 1$

Log 3198.612	=	3.5049615		Log 3198.612	3.5049615	
Log Sin 59-02-19.0	=	9.9332413	12.6	Log Sin 21-40-36.6	9.5674629	53.0
" 27-26-48.1	=	9.6636285	40.6	" 28-03-38.5	9.6724735	39.5
" 12-59-53.9	=	9.3520324	91.3	" 30-46-43.9	9.7090374	35.4
		2.4538637	144.5		2.4539353	127.9
					8637	144.5
					716	272.4

716 / 272.4 = 2.63"

~~OFFICIAL USE ONLY~~

3198.612	Sin 59-02-21.6	Sin 90-10-57.1
Sin 30-46-41.3	(5360.162)	(6250.736)
5360.162	Sin 27-26-50.7	Sin 124-29-33.4
Sin 28-03-35.9	(5252.352)	(9391.760)
3198.612	Sin 21-40-34.0	Sin 145-19-29.5'
Sin 12-59-56.5	(5252.360)	(8090.190)



	MEAS. ∠	GEO. COND.	b+f. = 04.4	TRIG. COND	
a	20-40-00.7	59.2	59.0	00.9	
b	140-25-24.2	22.7	23.2	23.2	
c	18-54-39.5	38.1	37.8	35.9	
	04.4				
d	18-43-07.8	07.8	07.6	05.7	
e	22-25-11.5	11.5	11.2	13.1	
f	138-51-40.7	40.7	41.2	41.2	
	0.00				

Side Eq. $\frac{\text{Fire-Reef} \sin e \sin a}{\text{Fire-Mon} \sin c \sin d} = 1$

Log 6250.736 = 3.7959312
Log sin 22-25-11.2 = 9.5813681 51.0
" 20-39-59.0 = 9.5476837 55.8
2.9249830 106.8

Log 8090.190 = 3.9079588
Log. sin 18-54-37.8 = 9.5106667 61.5
" 18-43-07.6 = 9.5064014 62.1
2.9250269 123.6
49830 106.8
439 230.4

439 / 230.4 = 1.9"

6250.736 sin 22-25-13.1 sin 138-51-41.2
sin 18-43-05.7 (7428.823) (12814.147)

8090.190 sin 18-54-35.9 sin 140-25-23.2
sin 20-40-00.9 (7428.813) (14604.308)

HOLMES & NARVER INC. - ENGINEERS - CONSTRUCTORS — OPERATIONS

CALC. BY _____ DATE _____ CHKD. BY _____ DATE _____

TRAVERSE LOCATION OF STATIONS 1210, 1342, 30, 10 JOB NO. 884

SHEET NO. 4 OF 5

STATION	BEARING	DISTANCE	COSINE	SINE	LATITUDE	DEPARTURE	CO-ORDINATES NORTH	CO-ORDINATES EAST	
△ FOX							170,640.40	124,002.70	1
△ REEF	N 32-07-51.3 E	6250.736	84683506	53185561	N 5293.342	E 3324.489	175,933.74	127,327.19	2
△ MON	S 26-05-40.7 E	9391.760	89806874	43985514	S 8434.446	E 4131.014	167,499.29	131,458.20	3
△ FOX	N 67-09-13.1 W	8090.190	38826139	92154929	N 3141.108	W 7455.509	170,640.40	124,002.69	4
									5
△ FOX							170,640.40	124,002.70	6
△ FIRE	S 88-49-47.1 E	3198.612	02042330	99979142	S 65.326	E 3197.945	170,575.07	127,200.64	7
△ REEF	N 1-21-10.0 E	5360.162	99972129	02360823	N 5358.668	E 126.544	175,933.74	127,327.19	8
									9
△ FIRE							170,575.07	127,200.64	10
△ MON	S 54-09-16.6 E	5252.350	58600000	81060017	S 3075.776	E 4257.556	167,499.29	131,458.20	11
									12
△ MON							167,499.29	131,458.20	13
△ DOG	N 86-03-49.0 W	14604.308	06864891	99764088	N 1002.570	W 14569.855	168,501.86	116,888.35	14
△ REEF	N 54-33-044 E	12814.147	57997491	81463434	N 7431.884	E 10438.844	175,933.74	127,327.19	15
									16
△ FOX							170,640.40	124,002.70	17
△ DOG	S 73-16-10.1 W	7428.823	28787028	95766925	S 2138.537	W 7114.355	168,501.86	116,888.35	18
									19
△ DOG							168,501.86	116,888.35	20
	N 62-12-35.9 W	206.59	46623267	88466213	N 96.319	W 182.762			
WP-1210							168,598.18	116,705.59	21
WP-30,10, 90,40	S 0-47-10.4 E	6900.00	99995855	01372174	S 6899.350	E 94.680	161,698.83	116,800.27	22
~~WP-10~~	N 69-19-16.9 E	2640.06	35312606	93557575	N 932.274	E 2469.976	162,631.10	119,270.24	23
WP-1342	N 69-15-34.9 E	13282.07	35413280	93519514	N 4703.617	E 12421.327	162,334.72	131,691.57	24
△ MON	N 54-48-33.1 W	285.56	57630118	81723739	N 164.569	W 233.370	167,499.29	131,458.20	25
							1		26
WP-30							161,698.83	116,800.27	27
WP-1342	N 69-16-11.7 E	15922.13	35396595	93525831	N 5635.89	E 14891.30	162,334.72	131,691.57	28

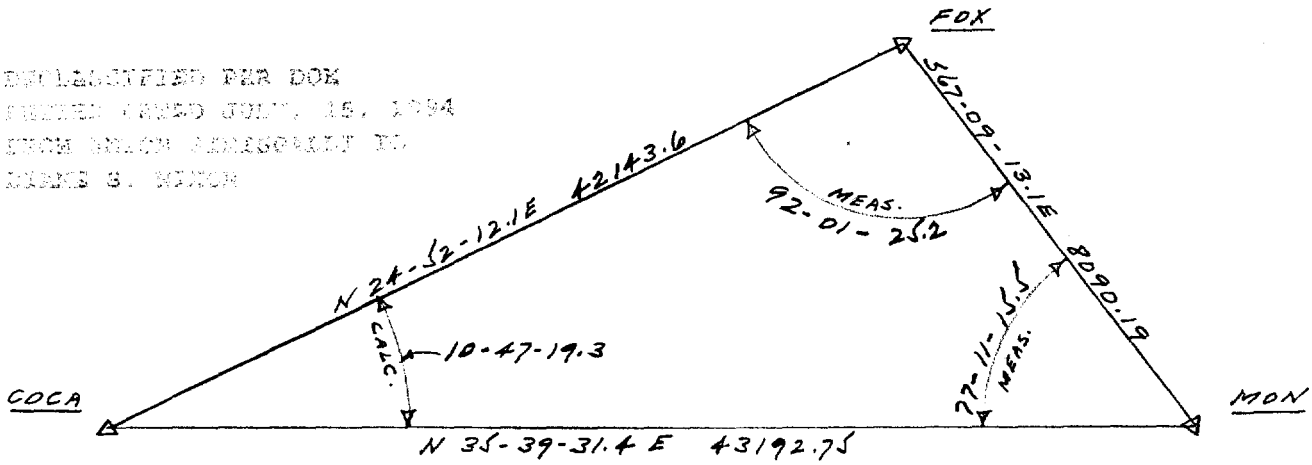
HOLMES & NARVER, INC.
ENGINEERS . CONSTRUCTORS
LOS ANGELES, CALIFORNIA

JOB NO. 884
SHEET 1 OF 1

TITLE LOCAL TRIANGULATION ADJUSTMENT DOG-GEORGE AREA
BY LSH DATE 10-13

~~OFFICIAL USE ONLY~~

ORIENTATION OF DOG-GEORGE AREA



92-01-~~26.4~~ 25.2
77-11-15.5
169-12-40.7
10-47-19.3

Log 42143.60	4.6247316		8090.19	3.9079588	
Log Sin 10-47-19.3	9.2722768	110.5	77-11-15.5	9.9890498	4.8
	3.8970084	110.5		3.8970086	4.8
				0084	110.5
				02	115.5

42143.6 / Sin 77-11-15.5

Sin 10-47-19.3 (8090.19)

Sin 92-01-25.2 (43192.75)

N 24-52-12.1 E
92-01-25.2
S 67-09-13.1 E

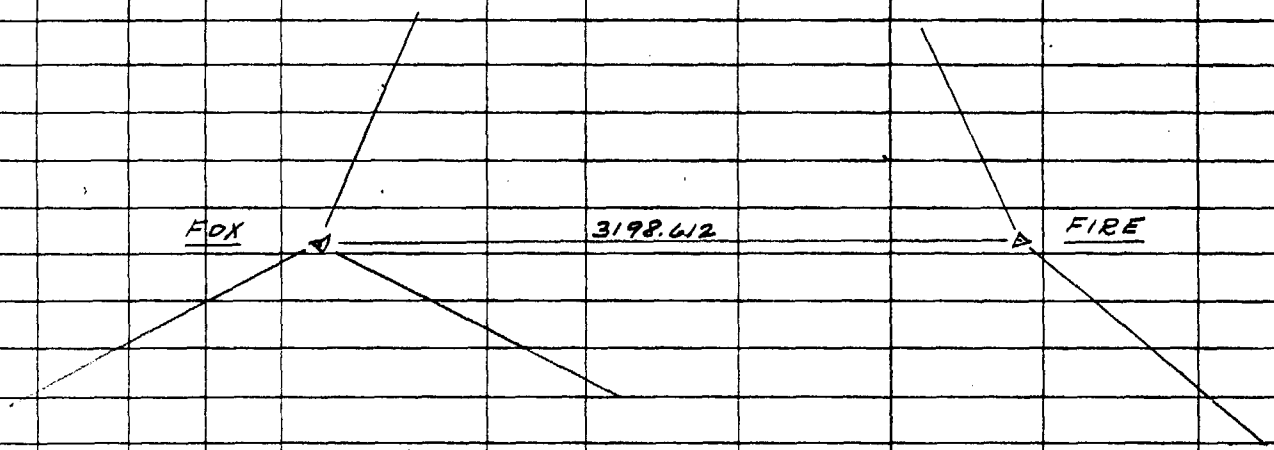
N 24-52-12.1 E
10-47-19.3
N 35-39-31.4 E

HOLMES & NARVER INC.-ENGINEERS CONSTRUCTORS

COMPUTATION OF SITE FOX ~~BASE LINE~~ FIRST ORDER TRAVERSE ~~OFFICIAL USE ONLY~~

CALC. BY: MR CHKD BY: LSH DATE: 9-53 JOB NO. 884 LOCATION BIKINI ATOLL MI

SECTION	DATE	DIR. OF MEAS.	TAPE NO	SUP-PORT	UNCORR. LENGTH NO.	UNCORR. LENGTH METERS	TEMP	CORRECTIONS TEMP.	CORRECTIONS SET-UP SET-BACK	CORRECTIONS INCLINATION	CORRECTIONS SEA LEVEL	REDUCED LENGTH	ADOPTED LENGTH
							"C"	METERS	METERS	METERS	METERS	METERS	~~METERS~~ FEET
STA. FOX													
	8-26-53	F	8187		19½	49.99874		+.00742	+.01320	-.05770		974.93385	
STA. FIRE													
	8-26-53	B	8193		19½	49.99923		+.00789	+.00440	-.05770		974.93958	
STA. FOX													
										ADOPTED	LENGTH	974.93897	3198.612



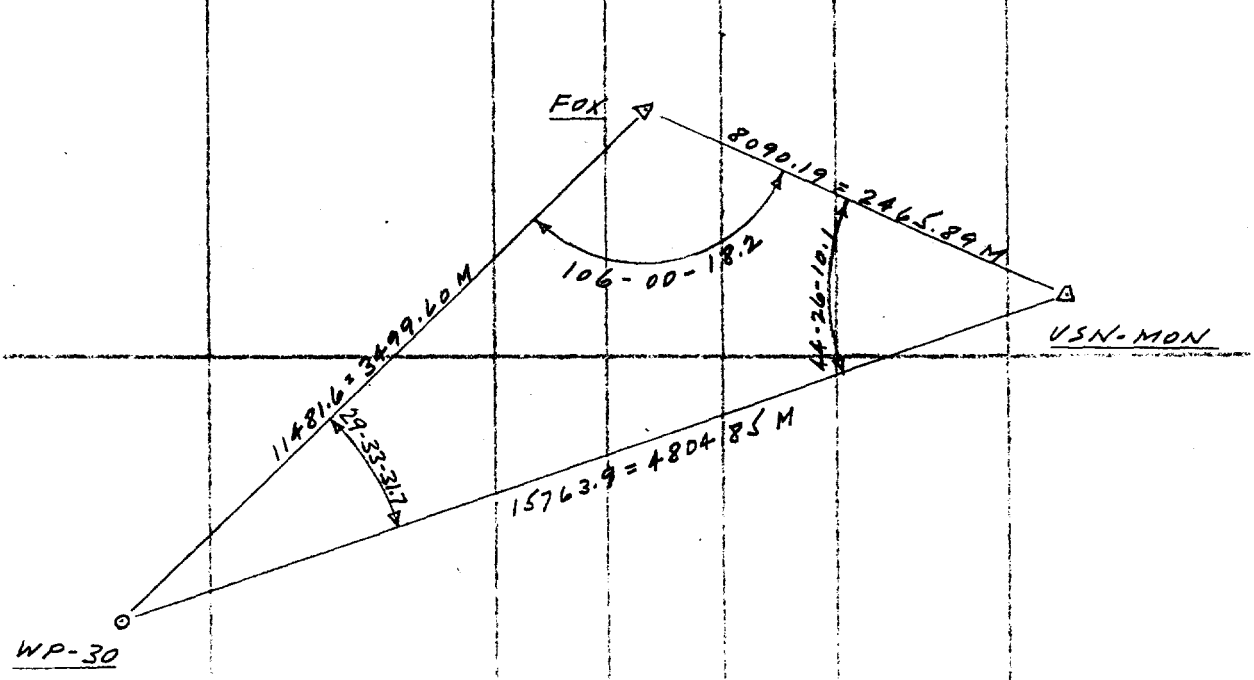
~~OFFICIAL USE ONLY~~

COMPUTATION OF TRIANGLES

~~OFFICIAL USE ONLY~~

COMPUTED BY LSH CHECKED BY DATE 10-53

STATION	OBSERVED ANGLE	CORR-N	SPHERICL ANGLE	SPHERICL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						3.3919737
1 WP-30	29-33-31.7	—	31.7	0.0	31.7	0.3068743
2 FOX	106-00-18.2	—	18.2	0.0	18.2	9.9828307
3 USN-MON	44-26-10.1	—	10.1	0.0	10.1	9.8451687
1-3					4804.85	3.6816787
1-2					3499.60	3.5440167



~~USE ONLY~~

JOB No 884

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION SECOND ORDER TRIANGULATION

COMPUTED BY LSH DATE 10-53

			°	'	"					°	'	"
FOX	USN-MON	292	50	40.9	α	3 USN-MON	to 2	FOX	112	50	56.1
		106	00	18.2	$3^d\angle$		&		44	26	10.1
FOX	WP-30	38	50	59.1	α	3 USN-MON	to 1	WP-30	68	24	46.0
		-	0	14.7	$\Delta\alpha$				-	0	29.9
		180	00	00.0					180	00	00.0
WP-30	FOX	218	50	44.4	α'	1 WP-30	to 3	USN-MON	248	24	16.1

CIRCUIT ANGLE OF TRIANGLE 29-33-31.7

			°	'	"					°	'	"
11 41 27.251	FOX	λ	165	24	26.220	ϕ	11	40	56.091	3 USN-MON	λ	165	25	41.253
- 1 28.705		$\Delta\lambda$	-	1	12.479	$\Delta\phi$	-	0	57.545		$\Delta\lambda$	-	2	27.513
11 39 58.546	WP-30	λ'	165	23	13.741	ϕ'	11	39	58.546	1 WP-30	λ'	165	23	13.740

Logarithms / Values in seconds

			Logarithms	Values in seconds
3.5440184		$\frac{1}{2}(\phi+\phi')$	11-40-42.919	
9.8914223				
8.5124951		s	3.5440184	
1.9479358	1st term	Sin α	9.7974617	+88.702
7.08804		A'	8.5096665	
9.59492		Sec ϕ'	0.0009656	
0.722 52		$\Delta\lambda$	1.8602122	- 72.4790
7.40548	2d term	Sin$^2\frac{1}{2}(\phi+\phi')$	9.3062563	+.002
3.895 9		$-\Delta\alpha$	1.1664685	+ 14.671
1.9899				
5.8858	3d term			+.0001
	- $\Delta\phi$			+88.7051

	Logarithms	Values in seconds
s	3.6816798	
Cos α	9.5657501	
B	8.5124953	
h	1.7599252	
		1st term +57.5341"
s^2	7.36336	
Sin$^2\alpha$	9.93683	
C	0.72319	
	8.02238	
		2d term +.010
h^2	3.5199	
D	1.9896	
	5.5095	
		3d term +.0000
		- $\Delta\phi$ +57.5446

		°	'	"
$\frac{1}{2}(\phi+\phi')$		11-40-27.319		
	Logarithms	Values in seconds		
s	3.6816798			
Sin α	9.9684169			
A'	8.5096665			
Sec ϕ'	0.0009656			
$\Delta\lambda$	2.1688288	- 147.512		
Sin$^2\frac{1}{2}(\phi+\phi')$	9.3060974			
$-\Delta\alpha$	1.4749262	29.849		

JOB № 884

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

POSITION COMPUTATION SECOND ORDER TRIANGULATION

COMPUTED BY L.S.H. DATE 11-53

		°	′	″					°	′	″
FOX	USN-MON	292	50	40.9	α	3 USN-MON	to 2	FOX	112	50	56.1
		+140	25	23.2	3 d 2		8		− 18	54	35.9
FOX	DOG	73	16	04.1	α	3 USN-MON	to 1	DOG	86 93	03 56	39.8 20.2
		−	0	14.5	Δα				−	0	29.7
		180	00	00.0					180	00	00.0
DOG	FOX	253	15	49.6	α′	1 DOG	to 3	USN-MON	273	55	50.5

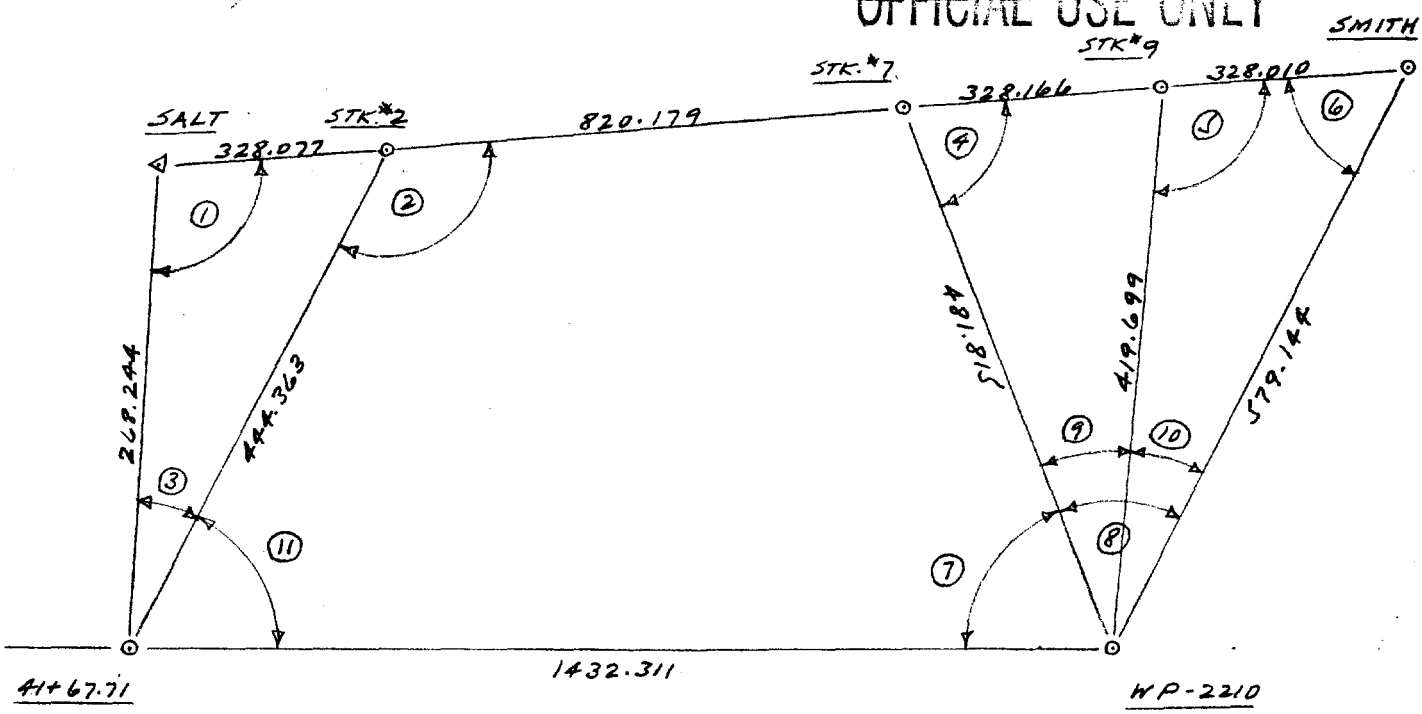
SUM OF ANGLES OF TRIANGLE 20-40-00.9

°	′	″			°	′	″		°	′	″			°	′	″
11	41	27.251	FOX	λ	165	24	26.220	φ	11	40	56.091	3 USN-MON	λ	165	25	41.253
−	0	21.219		Δλ	−	1	11.599	Δφ	+	0	09.941		Δλ	−	2	26.633
11	41	06.032	DOG	λ′	165	23	14.620	φ′	11	41	06.032	1 DOG	λ′	165	23	14.620

Logarithms	Values in seconds		Logarithms	Values in seconds		Logarithms	Values in seconds		Logarithms	Values in seconds
		½(φ+φ′)	11-41-16.642					½(φ+φ′)	11-41-01.061	
3.3549359		s	3.3549359		s	3.6484966		s	3.6484966	
9.4592397		Sin α	9.9812117		Cos α	8.8369151		Sin α	9.9989729	
8.5124951		A′	8.5096663		B	8.5124953		A′	8.5096663	
1.3266707	1st term +21.2164	Sec φ′	0.0090950		h	0.9979070	1st term −9.9519	Sec φ′	0.0090950	
6.70987		Δλ	1.8549089	−71.5993	s²	7.29699		Δλ	2.1662308	−146.632
9.96242		Sin ½(φ+φ′)	9.3065997		Sin² α	9.99795		Sin ½(φ+φ′)	9.3064411	
0.72252		−Δα	1.1615086	+14.505	C	0.72219		−Δα	1.4726719	+29.694
7.39481	2d term +.0025					8.01713	2d term +.0104			
2.6533					h²	1.9958				
1.9899					D	1.9896				
4.6432	3d term +.0000					3.9854	3d term +.0000			
	−Δφ +21.2189						−Δφ −9.9415			

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

JOB NO. 884
SHEET 1 OF 3
TITLE SITE SUGAR-TARE LOCATION OF STA. 50 AND 2211
BY LSH DATE 10-53



(1)	95-49-35.0	37.0	(4)	58-49-35.0	35.0	(7)	53-00-00.0	02.0	(10)	33-48 —	02.5
(2)	36-54-30.0	31.0	(5)	100-49-00.0	00.0	(8)	75-47-27.5	27.5	(11)	42-44 —	04.0
(3)	47-15-50.0	52.0	(6)	45-22-57.5	57.5	(9)	41-59 —	25.0			

328.166
328.010
656.176

656.176
Sin 75-47-27.5

Sin 58-49-35.0
(579.144)

Sin 45-22-57.5
(481.815)

579.144
Sin 100-49-00.0

Sin 45-22-57.5
(419.699)

Sin 33-48-02.5
(328.009)

481.815
Sin 79-11-00.0

Sin 58-49-35.0
(419.699)

Sin 41-59-25.0
(328.167)

328.077
Sin 47-15-52.0

Sin 36-54-31.0
(268.244)

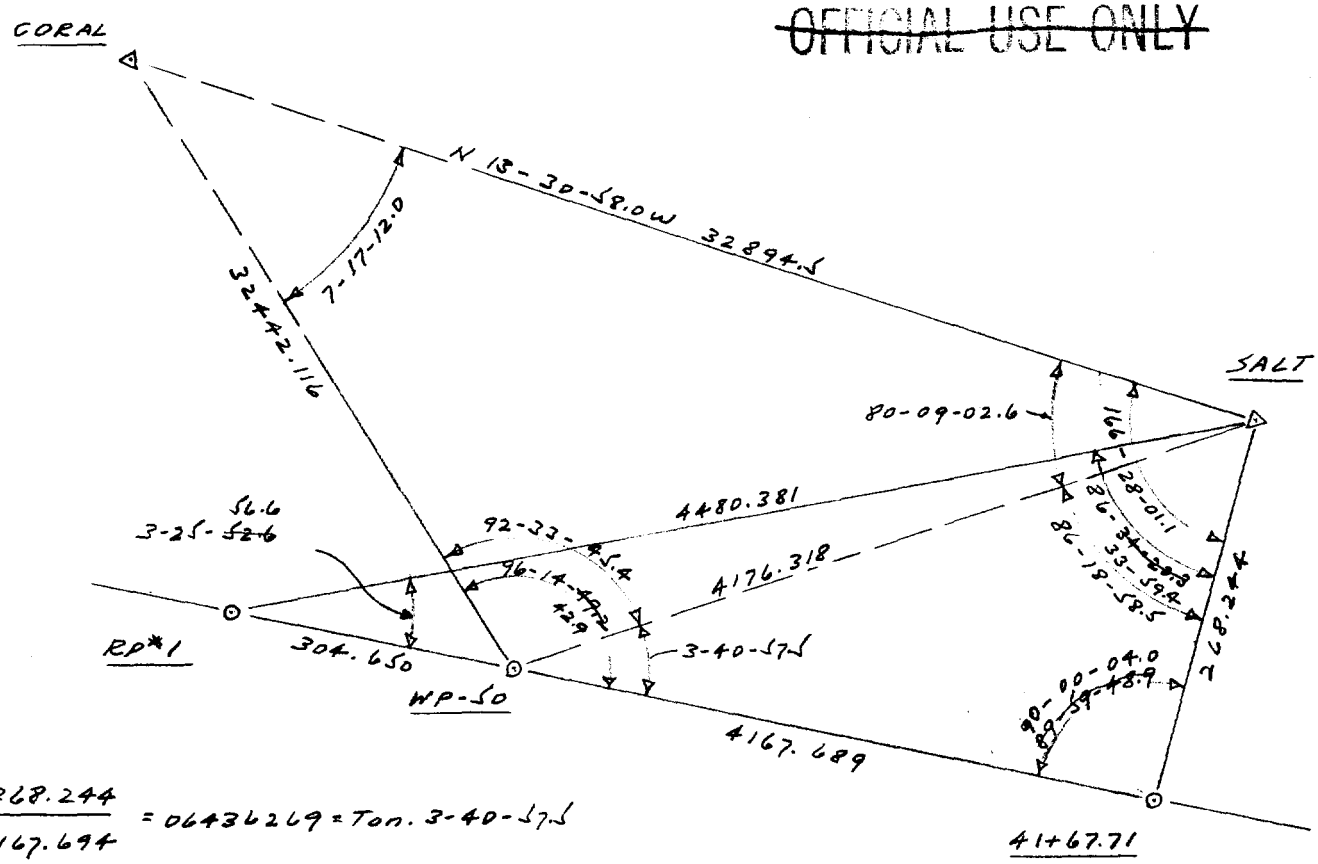
Sin 95-49-37.0
(444.363)

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

JOB NO. 884
SHEET 2 OF 3

TITLE SITE SUGAR-TARE LOCATION OF STA. 50 AND 2211 BY LSH DATE 10-53

~~OFFICIAL USE ONLY~~



$\frac{268.244}{4167.694} = 0643\,6269 = \text{Tan. } 3\text{-}40\text{-}57.5$

$\frac{4167.694}{\text{Cos. } 3\text{-}40\text{-}57.5} = 4176.318$

$\frac{4472.339}{\text{Sin } 86\text{-}33\text{-}59.4}$ Sin 3-25-56.6 (268.243) Sin 90-00-04.0 (4480.381)

$\frac{4176.318}{\text{Sin } 90\text{-}00\text{-}04.0}$ Sin 3-40-57.5 (268.245) Sin 86-18-58.5 (4167.689)

4176.318 3.6207936
Sin 92-33-51.7 9.9995648 1.0
3.6203584 1.0
2545 164.6
1039 165.6

32894.5 4.5171233
Sin 7-17-05.7 9.1031312 164.6
3.6202545 164.6
1039 / 165.6 = 6.3"

$\frac{32894.5}{\text{Sin } 92\text{-}33\text{-}45.4}$ Sin 7-17-12.0 (4176.310) Sin 80-09-02.6 (32442.116)

~~OFFICIAL USE ONLY~~

		DISTANCE	COSINE	SINE	LATITUDE	DEPARTURE	CO-ORDINATES NORTH	CO-ORDINATES EAST
SALT							100,421.60	113,966.80
STK. # 2	N84-11-23.9E	328.077	10123042	99486301	N33.211	E326.392	100,454.81	114,293.19
# 7	"	820.179	"	"	N83.027	E815.966	100,537.84	115,109.16
# 9	"	328.166	"	"	N33.220	E326.480	100,571.06	115,435.64
SMITH	"	328.010	"	"	N33.205	E326.325	100,604.26	115,761.96
W.P.-2210	S38-48-26.4W	579.144	77925776	62670355	S451.302	W362.952	100,152.96	115,399.01
41+67.71	N89-59-03.1W	1432.311	00027586	99999996	N0.395	W1432.311	100,153.36	113,966.70
WP-50	"	4167.689	"	"	N1.150	W4167.689	100,154.51	109,799.01
SALT	N86-19-59.4E	4176.318	06395463	99795280	N267.095	E4167.768	100,421.60	113,966.80
WP-50							100,154.51	109,799.01
COCA	N6-13-46.0	32442.1W	99409533	10851024	N32250.540	W3520.300	132,405.1	106,278.7

SHEET NO. 15H
DATE 10-53
TRAVERSE SITE SUGAR-TARE
LOCATION OF STA. 50, 2210
JOB NO 884
SHEET 3 OF 3

HOLMES & NARVER INC.-ENGINEERS CONSTRUCTORS

COMPUTATION OF *SITE SUGAR-TARE* ~~BASE LINE~~ FIRST ORDER TRAVERSE

~~OFFICIAL USE ONLY~~

CALC. BY: *JD* CHKD BY: *LSH* DATE: *9-63* JOB NO. *884* LOCATION *BIKINI ATOLL M.I.*

SECTION	DATE	DIR. OF MEAS.	TAPE NO.	SUP-PORT	UNCORR. LENGTH NO.	UNCORR. LENGTH METERS	TEMP. "C"	+ CORRECTIONS TEMP. METERS	+ CORRECTIONS SET-BACK METERS	+ CORRECTIONS INCLINATION METERS	+ CORRECTIONS SEA LEVEL METERS	REDUCED LENGTH METERS	ADOPTED LENGTH METERS-FEET
TARGET TO	7-25-63	F	8172		12	49.99913		+.0041	-.0401	+.0120		99.9412	99.9407
STK. 12	7-25	B	8187		12	49.99874		+.0036	-.03575	+.0120		99.9402	
STK 12 TO	7-25	F	8187		12	49.99874		+.0040	-.1200	+.0090		99.8594	99.8577
STK. 24	7-25	B	8193		12	49.99923		+.0038	-.1293	+.0090		99.8589	
STK.24 TO	7-25	F	8193		13	49.99923		+.00512	-.05925	+.0006		649.9349	649.9363
STK. 37	7-25	B	8172		13	49.99913		+.00512	-.05525	+.0006		649.9376	
											TOTAL	METERS 1849.7347	
												FEET 6068.671	
STK 24 TO	7-25	F	8193		4	49.99923		+.0016		-.0002		199.9982	213.3669
STA 41+67.71	7-25	F	8340		13.4/30	13.4000		+.0023	-.0320	-.0016		13.3687	
	7-25	B	8172		4	49.99913		+.0016	-.05525	-.0002		199.9425	213.3670
	7-25	B	8340		13.4/30	13.4300		+.0023	-.0061	-.0016		13.4246	
											TOTAL	METERS 213.3670	
												FEET 700.0216	
									TARGET TO WP-50			468.671 ft	
									WP-50 TO STA 41+67.71			4167.689	
									STA 41+67.71 TO WP-2210			1432.311	
												6068.671 ft	

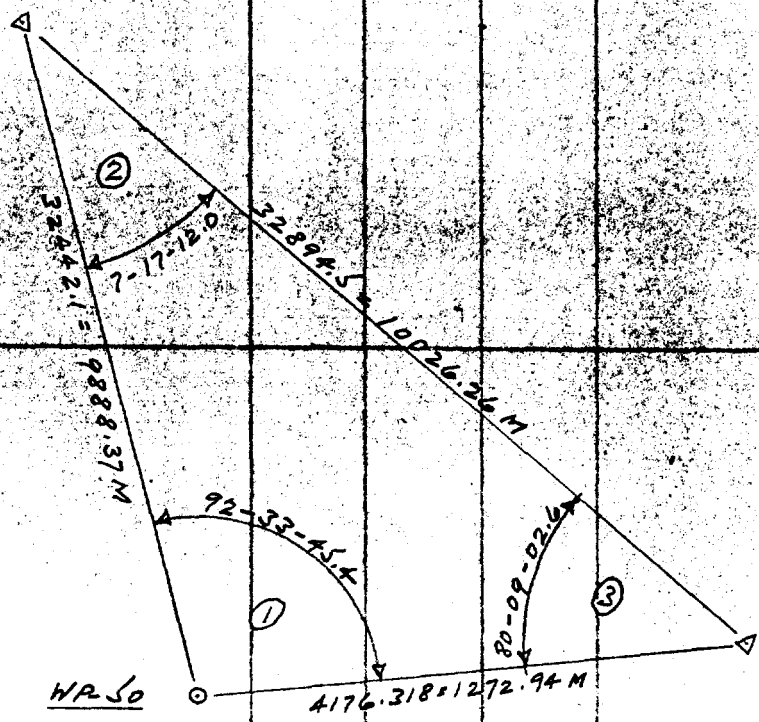
~~OFFICIAL USE ONLY~~

~~OFFICIAL USE ONLY~~

COMPUTATION OF TRIANGLES

COMPUTED BY L SH CHECKED BY _____ DATE 10-53

STATION	OBSERVED ANGLE	CORR-N	SPHERICL ANGLE	SPHERICL EXCESS	PLANE ANGLE AND DISTANCE	LOGARITHM
2-3						4.0011390
1 WP-SO	92-33-45.4	—	45.4	0.0	45.4	0.0004354
2 COCA	7-17-12.0	—	12.0	0.0	12.0	9.1032349
3 SALT	80-09-02.6	—	02.6	0.0	02.6	9.9935513
1-3					1272.94	3.1048093
1-2					9888.37	3.9951257



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

~~OFFICIAL USE ONLY~~

JOB Nº 884

HOLMES & NARVER, INC.
ENGINEERS-CONSTRUCTORS

STATION COMPUTATION SECOND ORDER TRIANGULATION

COMPUTED BY LSH DATE 10-53

COCA	SALT	346	28	20.1	α	3 SALT	to 2 COCA	166	28	35.6
		+ 7	17	12.0	3d ∠		B	- 80	09	02.6
COCA	WP-50	353	45	32.1	α	3 SALT	to 1 WP-50	86	19	33.0
		+	0	07.1	Δα			-	0	08.4
		180	00	00.0				180	00	00.0
WP-50	COCA	173	45	39.2	α'	1 WP-50	to 3 SALT	266	19	24.6

FIRST ANGLE OF TRIANGLE 92-33-45.4

11 35 07.935	COCA	λ	165	21	27.911	φ	11 29 50.670	3 SALT	λ	165	22 45.305
- 5 19.922		Δλ	+	0	35.471	Δφ	- 0 02.656		Δλ	-	0 41.917
11 29 48.01/2	WP-50	λ'	165	22	03.388	φ'	11 29 48.014	1 WP-50	λ'	165	22 03.388

Logarithms	Values in seconds						
3.9951247		$\frac{1}{2}(\phi+\phi')$	11-32-27.974				
9.9974184			Logarithms	Values in seconds	s	3.1048079	
8.5124983		s	3.9951247		Cos α	2.8067385	
2.5050414	1st term +319.9200	Sin α	9.9362781		B	8.5124910	
7.99025		A'	8.5096681		b	0.4240374	
8.07256		Sec φ'	0.0088022		b^2	1.209962	
0.71848		Δλ	1.5498731	+35.4710	$\sin^2\alpha$	9.99821	
6.78129	2d term +.0006	$\sin\frac{1}{2}(\phi+\phi')$	9.3011838		C	0.71508	
5.0101		-Δα	0.8510569	-7.0967		6.92291	
1.9861					n^2	0.8481	
6.9962	3d term +.0012				D	1.9820	
	-Δλ +319.9216					2.8311	

Logarithms	Values in seconds			
	1st term	+2.6548		
	2d term	+.0008		
	3d term	+.0000		
	-Δφ	+2.6556		

$\frac{1}{2}(\phi+\phi')$	11-29-49.342		
	Logarithms	Values in seconds	
s	3.1048079		
Sin α	9.9991064		
A'	8.5096681		
Sec φ'	0.0088022		
Δλ	1.6223846	-41.916	
$\sin\frac{1}{2}(\phi+\phi')$	9.2995450		
-Δα	0.9219296	+8.3547	