

JUN 1978
 U.S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

STATION 1001
 HAWAII
 LATITUDE 18° 30' TO 19° 00'
 LONGITUDE 155° 30' TO 156° 00'
 DIAGRAM NE 5-1,5 HAWAII

Form 525b
 (11-8-55)

U.S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: AN/GKR-5 Antenna USE

CHIEF OF PARTY: D.J. Florwick YEAR: 1964 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object:

The station is an unstamped brass disk with the legend DEPARTMENT OF THE ARMY CORPS OF ENGINEERS cast around the edge, located at the South Point Tracking Facility of the Pacific Missile Range. It is cemented in a drill hole in the center of the floor of the blockhouse and plumbed under the vertical axis of a 60-foot dish receiving antenna mounted on the roof of the building. A traverse connection was made to triangulation station KOLONO 1961, the distance being 28,830 meters (94,586 feet) north-northwest of station KOLONO 1961.

Described by

COGS-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION AN/GKR-5 ANTENNA USE

STATE HAWAII

YEAR 1964

SECOND

ORDER

SOURCE G-13429

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	18 56 32.222	ELEVATION	112.55 METERS
GEODETIC LONGITUDE	155 41 06.638		370.5 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	μ OR Δ OR ANGLE*
HI 1	5101	430,015.31	39,596.43	- 0 03 56

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE μ OR Δ OR θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION KOLONO

QF 425

JUN 1978
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1002
 HAWAII
 LATITUDE 18 ° 30' TO 19 ° 30'
 LONGITUDE 155 ° 30' TO 156 ° 00'
 DIAGRAM NE 5-1,5 HAWAII

Form 525b
 (11-8-55)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY

TRAVERSE

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: AN/GKR-6 Antenna

CHIEF OF PARTY: D.J. Florwick YEAR: 1964 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object: The station is the center of the conical steel pedestal of an antenna at the South Point Tracking Facility of the Pacific Missile Range. It is in the northwest corner of the compound, 46 feet southeast of a large octagonal concrete slab, 15 feet south of a fence and 42 feet east of a fence. A traverse connection was made to triangulation station KOLONO 1961, distance being 101.442 meters (332.815 feet) north-northwest of station KOLONO 1961.

Described by _____

COGS-DC 34313

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AN/GKR-6 ANTENNA

STATE: HAWAII YEAR: 1964

THIRD ORDER

SOURCE: G-13429
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE	18 56 34.256	ELEVATION	METERS
GEODETIC LONGITUDE	155 41 07.915		FEET

STATE COORDINATES (Meters)				
STATE & ZONE	CODE	X	Y	Bearing Angle
HI 1	5101	435,888.07	39,801.73	- 0 03 57

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE BORDEN FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION KOLONO			
QF 427			

JUN 1978
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1003
 HAWAII
 LATITUDE 18° 30' TO 19° 00'
 LONGITUDE 155° 30' TO 156° 00'
 DIAGRAM NE 5-1.5 HAWAII

Form 525b
 (11-8-65)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
 TRAVERSE

DESCRIPTION OF TRIANGULATION/OBSERVATION STATION

NAME OF STATION: AN/GKR-6A Antenna

CHIEF OF PARTY: D. J. Florwick YEAR: 1964 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object:

The station is the center of the conical steel pedestal of an antenna at the South Point Tracking Facility of the Pacific Missile Range. It is in the southwest corner of the compound, 47 feet northeast of a large octagonal concrete slab, 44 feet north of a fence and 42 feet east of a fence. A traverse connection was made to triangulation station KOLONO 1961, the distance being 72.232 meters (236.980 feet) west-southwest of station KOLONO 1961.

Described by

Coast-DC 3431:

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: AN/GKR-6A ANTENNA

STATE: HAWAII

YEAR: 1964

THIRD

ORDER

SOURCE: G-13425

NJ OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	18° 56' 30.189	ELEVATION:	METERS
GEODETIC LONGITUDE:	155° 41' 07.894		FEET

STATE COORDINATES (feet)				
STATE & ZONE	CODE	X	Y	θ (OR Δ) ANGLE*
HI 1	5101	435,889.65	39,391.49	- 0 03 37

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ (OR Δ) θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (from south)	PLANE AZIMUTH* (from south)	CODE
POSITION DETERMINED BY TRAVERSE FROM STATION KOLONO			
QF 428			

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

Q 181554 STATION 1004
 HAWAII
 LATITUDE 18 ° 30' TO 15 ° 00'
 LONGITUDE 155 ° 30' TO 156 ° 00'
 DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

Ka lae (Hawaii Island, Hawaiian Government Survey, 1887; E. R. Hand, 1914).—On the south point of Hawaii, Ka lae, between the Ka lae Light and the light keeper's house. Identical with latitude station. Marked by a cross on a brick pier 3 feet high, with a stone marked with a cross in a circle 2.25 meters (7.4 feet) north of it, and another stone similarly marked 1.37 meters (4.5 feet) south of it. A large cairn is built over and around the pier.

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 538

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **Ka Lae** STATE: **Hawaii** COUNTY: **Hawaii**
 ESTABLISHED BY: **Hawaiian Govt.** YEAR: **1887** LOCALITY: **South Point of Hawaii Id.**
 RECOVERED BY: **J. H. Peters** YEAR: **1932**

Detailed statement as to the fitness of the original description: **Found as described.**
 The cairn of large stones is about eight feet across and about six feet high. It is necessary to dig down through the centre of the cairn to get at the station mark.

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 538

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KA LAE** STATE: **Hawaii** COUNTY: **Hawaii**
 ESTABLISHED BY: **H.G.S.** YEAR: **1887** LOCALITY: **South Point, Kau, Hawaii**
 RECOVERED BY: **Chas.L. Murray** YEAR: **1938**

Detailed statement as to the fitness of the original description:
 Location of station: In the southern part of Hawaii, within the Light House lot which is at the southernmost part of the island.

Old station mark found: Drill hole in center of + on top of brick pier 3 feet high and covered with an immense stonepile.

New Station mark: H.T.S. Type "A" Monument 6 feet high with steel steps to top.

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 538

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: **KA LAE** STATE: **HAWAII**
 ESTABLISHED BY: **Haw. Govt. Survey** YEAR: **1887** COUNTY: **HAWAII**
 RECOVERED BY: **L. C. Wilder** YEAR: **1948**

Detailed statement as to the fitness of the original description:

The station was recovered in good condition. A concrete platform has been built over the brick pier with the north and south sides open, allowing access to the mark. A new description follows--

The station is located on Kalae (South Point), the most southerly point of the Hawaiian Islands, and is about 150 yards north of the end of the point about 100 feet south of the Lightkeepers House, about 60 feet east of the flag pole and 111.9 feet north of triangulation station KA LAE 2.

The station is the center of a 1 inch drill hole located in the center of a brick pier which projects about 3 feet. A concrete platform 6 feet square and 7 feet high is built over the brick pier.

This station was located by distance and direction from triangulation station KA LAE 2.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

ADJUSTMENT BY NGS

NAME OF STATION: **KA LAE**
 STATE: **HAWAII**

YEAR: **1887**

OBS BY **CGS**

SECOND

ORDER

SOURCE: **G-16108**

GEODETIC LATITUDE:	18° 54' 57.67023	ELEVATION 8 METERS FEET
GEODETIC LONGITUDE:	155 41 04.14357	

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ϕ OR Δ OR ANGLE °
HI 1	5101	436,239.90	30,058.80	- 0 03' 35"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ϕ OR Δ OR FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
WIND	174° 58' 33.7	175° 02' 09"	5101

THESE DATA OBTAINED FROM ADJUSTMENT OF AUG 1979

RL 013

JUN 1978
U.S. DEPARTMENT OF COMMERCE
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
NATIONAL GEODETIC SURVEY
OLD HAWAIIAN DATUM

QUAD 181554 STATION 1004
LATITUDE ° ' TO ° '
LONGITUDE ° ' TO ° '
DIAGRAM

KA LAE (continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KA LAE
ESTABLISHED BY: HGS YEAR: 1887 STATE: Hawaii BENCH MARK(S) ALSO
RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station was recovered in good condition. A complete description follows:

Station is located about 12 miles southwest of Naalehu, on Ka lae point, the southernmost point of the island, about 338 feet north of Ka Lae Point Light.

To reach station from the post office in Naalehu, go west on State Highway 11 for 5.8 miles; turn left and go south on the South Point Road for 9.1 miles to the South Point Tracking Station; continue ahead for 1.2 miles to a fork. Take right fork and go 0.65 mile to fork at white gate. Take left fork along left side of stone fence and go 0.15 mile; turn right, through opening in fence and go westerly about 60 yards to station.

Station is the center of a 1-inch drill hole in the top of a brick pier about 3 feet high. A Type A signal has been built over the mark by the Hawaii Territorial Survey, with the 6-foot-square, concrete platform 7 feet above ground. It is 111.84 feet north of station KA LAE 2.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KA LAE
ESTABLISHED BY: H.G.S. YEAR: 1887 STATE: Hawaii BENCH MARK(S) ALSO
RECOVERED BY: R. B. Melby YEAR: 1975 COUNTY: Hawaii
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 12 miles SW of Naalehu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

The station was recovered in good condition. The socket that supports the metal signal pole is badly rusted and the metal signal is in poor repair.

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KA LAE
ESTABLISHED BY: H.G.S. YEAR: 1887 STATE: HAWAII BENCH MARK ALSO
RECOVERED BY: R. B. MELBY YEAR: 1978 COUNTY: HAWAII
AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 12 MILES SOUTHWEST OF NAAHELU
HEIGHT OF TELESCOPE ABOVE STATION MARK 8 FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

OBJECT	BEARING	DISTANCE		DIRECTION ° ' "
		FEET	METERS	
WIND, 1964	S	(329)		0 00 00.0
KA LAE LIGHT	S	111.84	34.089	191 53 22
KA LAE 2, 1948				192 14 24

THE STATION WAS RECOVERED AS DESCRIBED IN 1967, EXCEPT THE METAL SIGNAL POLE THAT ROSE ABOVE THE CONCRETE PLATFORM WAS RUSTED AWAY.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1005
 HAWAII
 LATITUDE 18 ° 30' TO 19 ° 00'
 LONGITUDE 155 ° 30' TO 156 ° 00'
 DIAGRAM NE 5-15 HAWAII

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: **KA LAE 2** STATE: **HAWAII** COUNTY: **KAU DISTRICT HAWAII**

CHIEF OF PARTY: **L. C. WILDER** YEAR: **1948** Described by: **G. J. HOEPEL**

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK METERS.†	HEIGHT OF LIGHT ABOVE STATION MARK METERS.	DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION		
			BEARING	DISTANCE	
	Surface-station mark, Underground-station mark		feet	meters	
Pipe					
	Puu Ki				00 00 00
	KA LAE				62 09
12e	R M 1	N	111.927	34.115	233 52 37
	KA lae Lighthouse	S	22.413	6.832	241 35 53.8
12e	R M 2	W	26.690	8.136	322 01 56

Detailed description:

The station is located on Kalaie (South Point), the most southerly point of the Hawaiian Islands, and is about 100 yards north of the end of the Point, 216.2 feet north of the center of the lighthouse tower, 147 feet south of a flag pole, 111.9 feet south of triangulation station KA LAE, about 125 feet west of a rock wall and 65.6 feet northwest of the northwest corner of a small shack.

The station is a standard disk, stamped KA LAE 2 1948, set in cement in the top of a 4 inch cast iron soil pipe which projects about 1 inch.

Reference mark number 1 is a standard disk, stamped KA LAE 2 NO 1 1948, set into a drill hole in a boulder which projects about 1 inch and is about the same elevation as the station.

Reference mark number 2 is a standard disk, stamped KA LAE 2 NO 2 1948, set into a drill hole in a boulder which projects about 1 inch and is about the same elevation as the station.

The lighthouse is constructed of a steel framework, has a base of about 10 feet and is about 40 feet in height. A fixed light, pointed south is mounted on the catwalk near the top of the tower. It is located about 5 feet south of a generator house.

* Refer to notes in manuals of triangulation and state publications of triangulation. † Direction-angle measured clockwise, referred to initial station.
 ‡ To nearest meter only, when no trigonometric leveling is being done. 10-58200-1 U. S. GOVERNMENT PRINTING OFFICE

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KA LAE 2**

STATE: **HAWAII**

YEAR: **1948**

SECOND

ORDER

SOURCE: **G- 9275**

GEODETTIC LATITUDE	18 54 56.573	ELEVATION	12.20 METERS
GEODETTIC LONGITUDE	155 41 04.250		30.5 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ θ ANGLE °
HI 1	5101	436,225.73	29,547.83	- 0 03 35

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETTIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
WIND	175 06 07.6	175 09 43	5101

QE 157

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 OLD HAWAIIAN DATUM

QUAD 181554 STATION 1005
 LATITUDE 0' TO 0'
 LONGITUDE 0' TO 0'
 DIAGRAM

KA LAE 2 (continued)

FORM 526a
 (9-16-69)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KAE LAE 2
 ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii
 RECOVERED BY: D.J. Florwick YEAR: 1964 COUNTY: Hawaii

OBJECT	BEARING	DISTANCE		DIRECTION		
		FEET	METERS			
WIND				0	00	00.0
RM 1	S	22.420	6.835	183	50	24
RM 2	W	26.710	8.140	271	58	25

The station mark, reference mark number 1 and reference mark number 2 were recovered and found in good condition. A new and complete description follows:

The station is on the southwesterly point of Hawaii Island, at about the center of the old Coast Guard station and 1.5 miles, air-line, south of the Pacific Missile Range Tracking Facility.

To reach the station from the Pacific Missile Range Tracking Facility, go south on the main road for 1.1 miles to a T-road right. Turn right and go southerly on the main road for 0.4 mile to the old Coast Guard Station and the end of the road. Turn left and follow the lava rock wall fence southerly for 0.15 mile to an opening in the wall. Turn right and go west for 150 feet to the station.

The station mark, a standard disk stamped KA LAE 2 1948, is set in the top of a 3-inch-diameter steel pipe projecting 3 inches above a 3-foot square concrete slab. It is 155 feet south of an old flag pole, about 250 feet north of a lighthouse and 5 feet west of an old road.

Reference mark 1, a standard disk stamped KA LAE 2 NO 1 1948, is cemented in a drill hole in the top of a small lava rock flush with the ground. It is 200 feet north of the lighthouse and 175 feet south of the flag pole.

Reference mark 2, a standard disk stamped KA LAE 2 NO 2 1948, is cemented in a drill hole in the top of a small lava rock flush with the ground. It is 155 feet south of the flag pole and 245 feet north of the light house.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27178-P88

FORM 526a
 (9-16-69)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: KA LAE 2
 ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii
 RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
 Island: Hawaii

OBJECT	BEARING	DISTANCE		DIRECTION	
		FEET	METERS		
PALAHOMO (HGS) 1898	-----1948	DISTANCE	and DIRECTION	-----	00 00 00.0
RM No. 1	S	22.413	6.832	124	48 57
RM No. 2	W	26.690	8.136	212	58 16
KALAE (HGS) 1887	N	111.927	(34.115)	313	05 20
PALAHOMO (HGS) 1898	-----1967	DISTANCE	and DIRECTION	-----	00 00 00.0
RM No. 1	S	22.424	6.835	124	49 48
RM No. 2	W	26.711	8.142	212	57 12
KA LAE (HGS) 1887	N	111.840	(34.089)	313	05 20.7

Station was recovered and all marks found in good condition. A complete description follows:

Station is located about 12 miles southwest of Naalehu, on Kalae Point, the southernmost point of the island; 216 feet north of the Ka Lae Point Light and 111.84 feet south of station KA LAE (HGS) 1887. To reach station from the post office in Naalehu, go west on State Highway 11 for 5.8 miles; turn left and go south on the South Point

Road for 9.1 miles to the South Point Tracking Station; continue ahead for 1.2 miles to a fork. Take right fork and go 0.65 mile to fork at white gate. Take left fork along left side of stone fence and go 0.15 mile; turn right, through opening in fence, and go west 50 yards to station.

Station mark is a standard disk stamped "KA LAE 2 1948", set in cement in the top of a 4-inch iron pipe that projects 1-1/2 inches from the center of a 3-foot-square, concrete pad flush with ground, 12 feet west of center line of track road leading to lighthouse. NOTE: The shack mentioned in 1948 description is gone, and the flagpole no longer stands, although the base remains.

Reference mark number one is a standard disk stamped "KA LAE 2 NO 1 1948", cemented in a drill hole in lava bedrock flush with ground. It is 16 feet west of center line of track road.

Reference mark number two is a standard disk stamped "KA LAE 2 NO 2 1948", cemented in a drill hole in a lava boulder that projects 2 inches.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27178-P88

(Continued on next page)

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 Old Hawaiian Datum

QUAD 181554 STATION 1005
 LATITUDE ° ' TO ° '
 LONGITUDE ° ' TO ° '
 DIAGRAM

KA LAE 2 (Continued)

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KA LAE 2
 ESTABLISHED BY: L.C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: R.B. Melby YEAR: 1975 COUNTY: Hawaii
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 12 miles SW of Naalehu

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:
 The station was recovered in good condition. A vehicle can be driven to the station site.

U.S. DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY
 FORM 9-1165
 (Rev. 12-74)
REPORT ON PERMANENT SURVEY MARK AREA OFFICE

STATE Hawaii COUNTY Hawaii QUADRANGLE 1
 QUOTE PRIMARY REFERENCE station is located on Kalae (South Point), 100 yds N. of the end of the point. (Direction and distance)

DESIGNATION (LISTED KA LAE 2)
 (STAMPED) TYPE OF MARK: BM _____ TT _____ TRIANG. X
 Lat. 18° 54' 56.570'' CONDITION Disturbed USGS USBR
 Long. 155° 41' 04.290'' Destroyed USC&GS State GS
 Elev. 32 feet Not Found USNPS USNFS
 USGLO USBLM (Other)

REMARKS OR REVISED DESCRIPTION:

Description adequate. Lighthouse has been removed. Station mark and Rm. No. 1 were recovered in good condition. Rm. No. 2 has been destroyed. Drill hole recovered.

SUBMITTED BY Yukio Yamamoto
 TITLE Cartographer DATE 1/26/78
 AGENCY USGS

RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: KA LAE 2
 ESTABLISHED BY: L. C. Wilder YEAR: 1948 STATE: Hawaii BENCH MARK ALSO
 RECOVERED BY: R. B. MELBY YEAR: 1978 COUNTY: Hawaii
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: 12 MILES SOUTHWEST OF NAAHELU
 HEIGHT OF TELESCOPE ABOVE STATION MARK 5 FEET. HEIGHT OF LIGHT ABOVE STATION MARK FEET.

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
WIND, 1964				0 00 00.0
KA LAE (HGS), 1887				12 06 41
R. M. 1	N	111.84	34.089	183 51 46
KA LAE LIGHT	S	22.42	6.834	191 34 28
R. M. 3	S	217.15	66.187	271 23 52
	W	27.74	8.456	

THE STATION, REFERENCE MARK 1 AND THE OLD STATION KA LAE (HGS), 1887 WERE RECOVERED AS DESCRIBED IN 1967. REFERENCE MARK 2 WAS NOT RECOVERED, ONLY THE DRILL HOLE IN THE BURIED BOULDER REMAINS. A NEW DISK WAS CEMENTED IN THE DRILL HOLE AND DESIGNATED AS REFERENCE MARK 3.

REFERENCE MARK 3 IN A NATIONAL OCEAN SURVEY DISK STAMPED KA LAE 2 1948 RM 3 CEMENTED IN A DRILL HOLE IN A BURIED TRIANGULAR BOULDER THAT PROJECTS ABOUT 1 INCH ABOVE THE SURFACE OF THE GROUND AND IT IS WEST OF THE STATION.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

QUAD 181554 STATION 1006
 HAWAII
 LATITUDE 18° 30' TO 19° 00'
 LONGITUDE 155° 30' TO 156° 00'
 DIAGRAM NE 5-1.5 HAWAII

DESCRIPTION OF TRIANGULATION INTERSECTION STATION TRAVERSE

NAME OF STATION: KA LAE LIGHT

CHIEF OF PARTY: R. S. MELBY YEAR: 1978 STATE: HAWAII COUNTY: HAWAII

Description, including sketch of object:

THE STATION IS LOCATED ABOUT 12 MILES SOUTHWEST OF THE TOWN OF NAALEHU, ON KA LAE (SOUTH POINT), ON THE SOUTHERNMOST TIP OF THE ISLAND OF HAWAII AND AT THE SOUTH END OF THE SOUTH POINT ROAD, IN AN OPEN FLAT AREA ABOUT 60 FEET ABOVE SEA LEVEL.

THE STATION IS THE WHITE LIGHT ATOP A 1.4 FOOT IN DIAMETER, OCTAGONAL, CONCRETE POST THAT RISES ABOUT 30 FEET ABOVE A 14 FOOT SQUARE, CONCRETE BASE.

DESIGNATED AS NO. 3683 IN THE PUBLICATION 'LIGHT LIST, VOLUME III, PACIFIC COAST AND PACIFIC ISLANDS, 1977'. THE LIGHT IS 217 FEET SOUTH OF STATION KA LAE 2, 1948.

ADJUSTED HORIZONTAL CONTROL DATA ADJUSTMENT BY NGS

NAME OF STATION: KA LAE LIGHT

OBS BY NGS

STATE: HAWAII YEAR: 1978

THIRD ORDER

SOURCE: G-16108

GEODETIC LATITUDE:	18° 54' 54.43191	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 41 04.55307		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	$\theta \Delta \alpha$ ANGLE *
HI 1	5101	436,200.25	29,732.19	- 0° 03' 35"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\theta \Delta \alpha$ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

THESE DATA OBTAINED FROM ADJUSTMENT OF AUG 1979

RL 010

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1007
 HAWAII
 LATITUDE 18° 30' TO 19° 00'
 LONGITUDE 155° 30' TO 156° 00'
 DIAGRAM NE 5-15 HAWAII

NO ORIGINAL TEXT

Kamilo (Hawaii Island, Hawaiian Government Survey, 1898; E. R. Hañd, 1914).—On southern coast of Hawaii, in southern Ka-u, on Kamilo Point, about 3/4 mile east of Kaaualu Bay, and about 150 meters inside the high-water line. Marked by a drill hole and cross cut in the solid rock. Over the mark is built a large cairn, 10 feet high, and 12 feet in diameter at base, terraced, with vertical sides, and painted white. Its top is 21 feet above mean high water.

RECOVERY NOTE, TRIANGULATION STATION

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 536

NAME OF STATION: **KAMILO**
 ESTABLISHED BY: **Hawaiian Govt** YEAR: 1898 STATE: **HAWAII**
 RECOVERED BY: **L. O. Wilder** YEAR: 1949 COUNTY: **HAWAII**

Detailed statement as to the fitness of the original description: At the time of this survey a 2 1/2 inch iron pipe which projects about 2 feet from the top of a circular stone and concrete platform was used as the station. This pipe was reportedly centered over the original station by the Territory Survey Department when the old cairn was cemented into a circular platform. A new description follows—

The station is located about 7 miles south of Waiohinu, about 6.5 miles northeast of South Point (Ka lae), about 0.6 mile east of the dock on Pakea Point about 150 meters north of the sea and 100 feet north of a dim road.

To reach from the school house and church, in the village of Waiohinu; go west and north, on the road which leads toward Captain Cook, for 4 miles; turn left, as per the sign reading 'South Point', and go south for 4.4 miles; turn left, onto a dirt road, and go southerly for 1.5 miles; turn left, pass through a board gate, and go easterly for 0.4 mile; pass through a board gate and follow the dim field road south and east for 2.4 miles; pass through a gate and continue south and east, through the lava bed, for 0.8 mile to the old dock on the westerly side of Pakea Point; bear to the left and follow the dim beach road easterly for 0.6 mile to station.

The station is the center of a 2 1/2 inch iron pipe which projects about 2 feet from the top of a circular concrete platform which is about 10 feet in diameter and projects about 5 feet above the surrounding rock.

No reference or azimuth marks were established for this station.

Object	Distance	Direction
MAHANA (metal target) SW		00 00 00
AKIHI (metal target) NW		90 26 23.4
KIPAEPAE (metal target) NE		146 34 15.3

The Hawaii Territory Survey reports that the old station, a cross cut in solid pahoehoe was recovered in 1938, and the 2 1/2 inch pipe mentioned above in this description, was then installed vertically over the old mark.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **KAMILO**

STATE: **HAWAII**

YEAR: 1898

SECOND

ORDER

SOURCE: G- 9279

GEODETIC LATITUDE: 18 58 23.300	ELEVATION: 5.5 METERS
GEODETIC LONGITUDE: 155 36 15.919	18 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ or ANGLE
HI 1	5101	463,922.77	50,777.92	- 0 02 02

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ or FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
AZIMUTH MARK	78 22 11.6	78 24 14	5101

QE 091

(continued on next page)

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

Q 181554 STATION 1008
 HAWAII
 LATITUDE 18 °30' TO 19 °00'
 LONGITUDE 155 °30' TO 156 °00'
 DIAGRAM NE 5-1.5 HAWAII

NO ORIGINAL TEXT

Mahana (Hawaii Island, Hawaiian Government Survey, 1898; E. R. Hand, 1914).—In southern Ka-u, in Kamaoa, on a prominent smooth grassy hill 3 miles northeast of Ka lae, the south point of Hawaii, and 740 meters N. 28° W. from top of eroded hill which is at the head of a deep bay. Marked by a cross and a drill hole in a rock set in the ground, and covered by a stone cairn 8 feet high.

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 538
RECOVERY NOTE. TRIANGULATION STATION

NAME OF STATION: **MAHANA** STATE: **Hawaii** COUNTY: **Hawaii**
 ESTABLISHED BY: **H.G.S.** YEAR: **1898** LOCALITY: **Kau, Hawaii**
 RECOVERED BY: **Wm. L. Murray** YEAR: **1938**

Detailed statement as to the fitness of the original description:

Location of station: In the southern part of Kau on a prominent smooth grassy hill 3 miles northeast from Kalae Light House and about 3/4 mile from the sea.

Old station mark found: Drill hole in center of + cut in large stone over which was a pile of stones.

New station mark: H.T.S. Type D-1 monument (Triangular concrete monument 7 1/2 feet on each side with 1 7/8 steel bar 2 feet, on steel legs over the station mark which is left exposed to view. A standard metal target is set over the steel bar).

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 538
RECOVERY NOTE. TRIANGULATION STATION

NAME OF STATION: **MAHANA** STATE: **HAWAII** COUNTY: **HAWAII**
 ESTABLISHED BY: **Hawaiian Govt.** YEAR: **1898**
 RECOVERED BY: **L. C. Wilder** YEAR: **1949**

Detailed statement as to the fitness of the original description: At the time of this survey an iron bar projecting about 2 feet from the top of a triangular platform was drilled and used as the station. A new description follows—

The station is located about 3 miles northeast of Kalae (South Point), about 0.6 mile north of Papakolea Bay and on the summit of a low grassy hill.

To reach from the school house and church, in the village of Waiohunu; go west and north, on the road which leads toward Captain Cook, for 4.0 miles; turn left, as per the sign reading 'South Point', and go southerly for 10.4 miles; continue straight ahead, southeasterly, for 0.6 mile to an abandoned Army Camp; turn right and go southerly for 0.5 mile to the beach; turn left, on a poor track road, and go easterly for 0.5 mile; pass through a board gate and follow the beach road easterly for 2.0 miles; pass through a board gate, turn left and go northerly, across country, for 0.4 mile to the summit of the low hill and the station.

The station is the center of a solid 1 1/2 inch iron bar which projects about 2 feet from the top of a triangular slab of concrete which is about 6 feet on each side and which projects about 1 foot above the surface of the ground.

Reference mark number 1 is a standard disk, stamped MAHANA NO 1 1948, set into a drill hole in a boulder which projects about 2 inches and is located at about the same elevation as the station.

Object	Distance	Direction
PALAHENO (Metal target)		00 00 00
Tank W	1.5 miles	71 57 10.9
Tank NW	2.8 miles	107 37 33.3
Tank NNE	3.0 miles	135 42 38.7
R. M. 1 NNE	66.4±0 ft 20.246 m	166 32 39

The Hawaii Territory Survey reports that the original mark, a drill hole in the center of a cross, was recovered in 1938, and a 1 1/2 inch bar was placed vertically over the old mark, which old mark could be sighted through an opening in the concrete slab.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: **MAHANA**
 STATE: **HAWAII** YEAR: **1898** SECOND ORDER
 SOURCE: **G- 9279**

GEODETTIC LATITUDE:	18 56' 46.169	ELEVATION:	80.8 METERS
GEODETTIC LONGITUDE:	155 39 02.560		265 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	B OR Δ OR ANGLE *
Hi i	5101	447,921.71	40,991.93	- 0 02' 56"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE B OR Δ OR ANGLE FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETTIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
UMIS AHU	124 40 53.1	124 43 49	5101

QE 050

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 OLD HAWAIIAN DATUM

QUAD 181554 STATION 1008

LATITUDE ° ' TO ° '
 LONGITUDE ° ' TO ° '
 DIAGRAM

MAHANA (continued)

FORM 526a
 (9-18-69)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY
RECOVERY NOTE, TRIANGULATION STATION

R

NAME OF STATION: MAHANA
 ESTABLISHED BY: HGS YEAR: 1898 STATE: Hawaii
 RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
 Island: Hawaii

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
UMI'S AHU (HGS) 1887 ---1949 DISTANCE and DIRECTION-----	NNE	66.420	20.246	00 00 00.0 76 34 07
R.M. 1				
UMI'S AHU (HGS) 1887 ---1967 DISTANCE and DIRECTION-----	NNE	66.396	20.238	00 00 00.0 76 34 41
RM No. 1	E	23.998	7.316	150 52 30
RM No. 2				

Station and reference mark were recovered. The 2-inch iron shaft was found rusted off from the station platform. It was not possible to see the original drill hole mark in the hole in center of the platform. The station was re-marked with a standard disk in center of hole in platform and one new reference mark was established. A complete description follows:

Station is located about 9 miles south-southwest of Naalehu, 3 miles northeast of the extreme south tip of the island, and 1/2 mile north of Mahana Bay, at about 258 feet elevation, on a grassy hill in open pasture land.

To reach station from the post office in Naalehu, go west on State Highway 11 for 5.8 miles; turn left and go south on macadam road for 9.1 miles to the South Point Tracking Station; continue ahead for 1.2 miles to fork. Take left fork and go east 0.85 mile to end of macadam road. Go south on track road 0.2 mile to a boat launching ramp. Go left along coast road for 2.0 miles to cattleguard; continue for 0.5 mile to second cattleguard, cross it and go left, cross-country, for 0.45 mile to top of hill and station.

Station mark is a standard disk stamped "MAHANA HGS 1898 1967", set in cement in center of 3-1/2-inch hole at center of a triangular, concrete platform about 7 feet on each side and projecting 4 inches. Station is about 500 feet east of a fence line and is surrounded by a large, circular, stone wall about 3 feet high.

Reference mark number one is a standard disk stamped "MAHANA NO 1 1948", cemented in a drill hole in an 8-inch boulder that projects 2 inches and is at about same elevation as station mark.

Reference mark number two is a standard disk stamped "MAHANA HGS 1898 NO 2 1967", cemented in a drill hole in the top of a 10-inch-diameter boulder that projects 3 inches. It is 1.4 feet lower than station mark.

*Name of chief of party should be inserted here. The officer who actually visited the station should sign his name at the end of the recovery note.

NOTE - One of these forms must be used for every station recovered.

USCOMM-DC 27173-P89

JUN 1978
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1009
 HAWAII
 LATITUDE 18 ° 30' TO 19 ° 00'
 LONGITUDE 155 ° 30' TO 156 ° 00'
 DIAGRAM NE 5-1,5 HAWAII

Form 525b
 (11-8-58)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
 TRAVERSE

DESCRIPTION OF TRIANGULATION CONTROL STATION

NAME OF STATION: North Telemetry Boresight Pole

CHIEF OF PARTY: D.J. Florwick YEAR: 1964 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object: The station is the center of an 80-foot wooden pole located about 0.25 mile north of the South Point Tracking Facility of the Pacific Missile Range. It is inside a fenced enclosure, 130 feet west-northwest of the gate into the enclosure and 39 feet east of a fence. A traverse connection was made to triangulation station WIND, distance being 7.022 meters (23.038 feet) north of station WIND.

Described by .

Coast-DC 3431:

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: NORTH TELEMETRY BORESIGHT POLE

STATE: HAWAII

YEAR: 1964

THIRD

ORDER

SOURCE: G-13429

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE: 18 ° 56' 43.366	ELEVATION	METERS
GEODETIC LONGITUDE: 155 41 13.810		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE *
HI 1	5101	435,323.19	40,721.25	- 0 ° 03' 39"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ OR Δ FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION WIND

QF 425

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1010
 HAWAII
 LATITUDE 18 ° 30' TO 15 ° 00'
 LONGITUDE 155 ° 30' TO 156 ° 00'
 DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Palahemo (Hawaii Island, Hawaiian Government Survey, 1898; E. R. Hand, 1914).—In southern Ka-u, in Kanaoa, about 2 miles northeast of Ka lae, the southern point of Hawaii, on a smooth grassy hill about 600 meters from the sea. Hill also called Pohakuloa or Puu Ulaula. Marked by drill hole inside triangle cut in a rough "aa" lava bowlder. Over this a cairn was built.

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 535

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Palahemo STATE: Hawaii COUNTY: Hawaii
 ESTABLISHED BY: H.G.S. YEAR: 1898 LOCALITY: KAUI, Hawaii
 RECOVERED BY: Chas.L.Murray YEAR: 1938

Detailed statement as to the fitness of the original description:

Location of station: In the southern part of Hawaii on a grassy hill about 2000 feet above the sea and about 2 miles northeast of Kalae Light House.

Old mark found: Drill-hole in + cut in rock over which was a stonspile roughly thrown together.

New station mark: H.T.S. Type D monument (Triangular concrete monument 7 1/2 ft. on each side with 2 1/2" pipe 2 feet long set on steel legs over the old mark which is left exposed to view. A standard metal target is set in the 2 1/2" pipe.

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 535

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PALAHEMO
 ESTABLISHED BY: Hawaiian Govt. YEAR: 1898 STATE: HAWAII
 RECOVERED BY: L. C. Wilder YEAR: 1948 COUNTY: HAWAII

Detailed statement as to the fitness of the original description:

The station was recovered, as described, in good condition. The station is now surrounded by a triangular concrete platform which is about 6 feet on each side. A new description follows—

The station is located on the rocky summit of a low hill, surrounded by open pasture land, which lies about 1.5 miles northeast of Ka lae (South Point), about 600 meters northwest of the sea and about 500 meters northwest of a track road.

To reach from the school house and church in Waichinu; go west and north on the road which leads toward Captain Cook for 4 miles; turn left, as per the sign reading "South Point", and go south for 10.4 miles; continue straight ahead, south and east for 0.6 mile to an old army camp; turn right and go southeast for 0.6 mile to the beach; turn left, onto a track road, and go easterly for 0.6 mile; pass through a board gate and continue easterly for 0.9 mile; turn left and go across country, northerly, for 0.25 mile to the summit of a rocky knoll and the station.

The station is the center of a 2 1/2 inch iron pipe which projects about 2 feet above the top of a triangular concrete platform which is about 6 feet on each side and projects about 8 inches above the ground.

Reference mark number 1 is a standar disk, stamped PALAHEMO NO 1 1948, set into a drill hole in a boulder which projects about 6 inches and is about the same elevation as the station.

Object	Distance	Direction
KALAE 2		
Tank NNW 2 miles		00 00 00
R. M. 1 N	38.290 ft 11.671 m	103 49 50.4
MAHANA (metal target)		123 48 07
		160 33 44.2

The Hawaii Territory Survey, reports that the old station, a drill hole in the center of a cross cut in rock, was recovered in 1938, and the 2 1/2 inch pipe mentioned above in the description, installed vertically over the old mark.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PALAHEMO
 STATE: HAWAII YEAR: 1898 SECOND ORDER
 SOURCE: G- 9279

GEODETIC LATITUDE: 18 55 54.401	ELEVATION: 55.3 METERS
GEODETIC LONGITUDE: 155 39 40.233	175 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	R OR Δ OR ANGLE
HI 1	5101	444,300.85	35,773.31	- 0 03 06

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\rho \sin \Delta \theta$ FORMULA NEGLECTING THE SECOND TERM

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
UMIS AHU	145 54 47.7	145 57 56	5101

QE 158

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 OLD HAWAIIAN DATUM

QUAD 181554 STATION 1010
 LATITUDE ° ' TO ° '
 LONGITUDE ° ' TO ° '
 DIAGRAM

PALAHEMO (continued)

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PALAHEMO
 ESTABLISHED BY: Hawaiian Govt. YEAR: 1898 STATE: Hawaii
 RECOVERED BY: Walter K. Helm YEAR: 1961 COUNTY: Hawaii

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KA LAE 2 1948 - RM 1 -	N	38.232	11.653	0 00 00.0 123 47 31

The station mark and reference mark were recovered as described by L.C. Wilder in 1948. The station was marked by a standard disk at this time. A new description follows:

The station is located on the highest point of a rocky hill about 1-1/2 miles northeast of the most southern point of Hawaii Island and 1/2 mile northwest of the coast.

To reach from the school house in Waiohinu, go west on State Highway 11 for 4.0 miles to a paved road left. Turn left and go south for 10.4 miles to a fork. Take the left fork and go southeast for 0.6 mile to an abandoned army camp. Follow track road southeast for 0.5 mile to a reverse Y at coast line. Turn left and go east for 0.5 mile to a board gate. Pass through the gate and continue east for 0.9 mile. Turn left and go north across country for 0.25 mile to the summit of the rocky knoll and the station.

The station mark, a standard disk stamped PALAHEMO 1898 1961, is set in the center of a triangle shaped concrete platform. The 2 1/2-inch pipe is still setting over the disk.

Reference mark 1, a standard disk stamped PALAHEMO NO 1 1948, is cemented in a drill hole in a boulder which projects 10 inches above the ground.

FORM 526a
 (11-18-52)

U.S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PALAHEMO
 ESTABLISHED BY: HGS YEAR: 1898 STATE: Hawaii
 RECOVERED BY: D.J. Florwick YEAR: 1964 COUNTY: Hawaii

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
KA LAE 2 1948 Reference Mark No. 1 Reference Mark No. 2	N SSE	38.240 31.730	11.655 9.671	0 00 00.00 123 47 58 297 46 46

The station mark and reference mark No. 1 were recovered and found to be in good condition. A new reference mark No. 2 was set at this date. A complete description follows.

The station is located about 2.0 miles, airline, northeast of South Point, 0.5 mile north of the coast line and about 2.0 miles southeast of the Pacific Missile Range Tracking Facility.

To reach the station from the Pacific Missile Range Tracking Facility, go south on the main road for 1.1 miles to a "T" road on the right. Continue southerly on the main road for 0.6 mile to a "T" road and an old camp area. Turn right and go east-

southeast for 0.5 mile to the coast line and an old fishing camp. Continue easterly on the main road, crossing an old lava flow, for 0.55 mile to a cattle guard and gate. Continue easterly on the main road for 0.3 mile to the end of the lava flow, thence easterly on the main road for 0.05 mile to a small ridge. Turn left and go northerly along the ridge for 0.45 mile to the highest point and the station.

The station mark is a standard disk, stamped PALAHEMO 1898 1961, set in the center of a triangular concrete slab that projects 10 inches above the surface of the ground.

Reference mark No. 1 is a standard disk, stamped PALAHEMO NO 1 1948, cemented in a drill hole in the top of a piece of lava that projects 6 inches above the surface of the ground.

Reference mark No. 2 is a standard disk, stamped PALAHEMO NO 2 1898 1964, cemented in a drill hole in the top of a piece of lava that projects 12 inches above the surface of the ground.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: PALAHEMO
 ESTABLISHED BY: HGS YEAR: 1898 STATE: Hawaii
 RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
 Island: Hawaii

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
UMI'S AHU (HGS) 1887 -----1964 RM No. 1 RM No. 2	N SSE	38.240 31.730	11.655 9.671	00 00 00.0 32 01 36 206 00 20
UMI'S AHU (HGS) 1887 -----1967 RM No. 1 RM No. 2	N SSE	38.231 31.521	11.653 9.608	00 00 00.0 32 01 26 206 00 24

Station was recovered and all marks found in good condition. A complete description follows:

Station is located about 10-1/2 miles southwest of Naalehu, 2 miles northeast of Ka Lae Point, which is the southernmost point of the island, and 0.4 mile northwest of the coast, on the summit of a low hill of about 175 feet elevation, in open pasture land.

To reach station from the post office in Naalehu, go west on State Highway 11 for 5.8 miles; turn left and go south on the South Point Road for 9.1 miles to the South Point Tracking Station; continue ahead for

1.2 miles to fork. Take left fork and go east 0.85 mile to end of macadam road at old concrete foundations. Go right, south, on track road for 0.2 mile to boat launching ramp by shack. Go left and follow rocky coast road easterly for 0.55 mile to cattle guard; cross and continue for 0.4 mile to fork. Take left fork and continue for 0.15 mile to top of low rise. Here go left, leaving road, and go northerly up-slope for 0.35 mile to top of hill and station. NOTE: A 4-wheel-drive vehicle is best for the rocky beach road.

Station mark is a standard disk, stamped "PALAHEMO 1898 1961", cemented in the hole in the center of a triangular, concrete platform about 7 feet on each side and projecting 6 inches above ground. The 2-1/2-inch iron pipe formerly over center of platform is rusted off.

Reference mark number one is a standard disk stamped "PALAHEMO NO 1 1948", cemented in a drill hole in a bedrock outcrop that projects 8 inches above ground and is about 8 inches higher than station mark.

Reference mark number two is a standard disk stamped "PALAHEMO NO 2 1898 1964", cemented in a drill hole in the top of a small, pointed, bedrock outcrop that projects 1 foot above ground, and is 3.7 feet lower than station mark.

JUN 1978
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

Q 181554 STATION 1011
 HAWAII
 LATITUDE 18° 30' TO 19° 00'
 LONGITUDE 155° 30' TO 156° 00'
 DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Puu Hou (Hawaii Island, Hawaiian Government Survey, 1887; E. R. Hand, 1914).—On southwest coast of Hawaii, in southeastern Ka-u, on the summit of Puu Hou, a large isolated hill 3½ miles northwest of Ka lae, the south point of the island. Erosion by the sea at the base of the hill has completely removed all trace of the station, but plane table tests showed that the peak of the hill remaining, which is very sharp and some 13 feet lower than the station, is probably within 5 meters of the station, and would serve for off-shore hydrography.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: PUU HOU
 STATE: HAWAII YEAR: 1887 THIRD ORDER

SOURCE: G-SPI56

GEODETIC LATITUDE:	18 57 53.415	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 43 06.812		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	θ OR Δ OR ANGLE*
HI 1	5101	424,485.21	47,799.55	- 0 04 16

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE θ OR Δ OR θ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE

QQ 252

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1012
 HAWAII
 LATITUDE 18 °30' TO 19 °00'
 LONGITUDE 155 °30' TO 156 °00'
 DIAGRAM NE 5-15 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

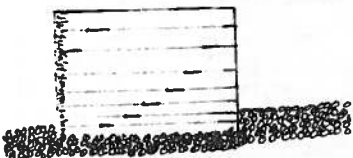
DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 538-D

DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: ROAD TANK YEAR: 1949 STATE: Hawaii COUNTY: Hawaii

CHIEF OF PARTY: L. G. Wilder

Description, including sketch of object: The station is the center and top of a wooden water tank which lies about 6 miles north of the lighthouse at South Point, 5.5 miles, by road, south of the highway which runs between Naalehu and Captain Cook, 70 feet west of the road which leads toward South Point and 15 feet south of a rock wall. Tank is enclosed by a circular rock wall about 4 feet high. It is 16 feet in diameter and 13 feet high. A ladder is on its north side.



Looking North

U. S. GOVERNMENT PRINTING OFFICE 16-66891-1 Described by ---

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

R

NAME OF STATION Road Tank
 ESTABLISHED BY: L.C. Wilder YEAR: 1949 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: Island: Hawaii

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station was recovered. Located about 6 miles southwest of Naalehu, 2-1/4 miles north-northeast of the South Point Tracking Station, and about 500 feet southeast of the South Point Road, on high ground in open pasture land. Station is the center of a black, wooden, flat-topped, water tank 12.5 feet in diameter and 13 feet high. An ironwood tree sets at the north side of the tank and is at present 5 feet higher than the tank.

NAME OF STATION ROAD TANK
 STATE HAWAII YEAR 1949 THIRD ORDER

SOURCE G- 9275
 NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	18 58' 23.84"	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 40' 21.82"		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	B OR Δ or ANGLE °
HI 1	5101	440,323.48	50,850.94	- 0 03' 22"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE B OR Δ or FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH * (From south)	CODE

QE 219

JUN 1978
 U. S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

Q 181554 STATION 1013
 HAWAII
 LATITUDE 18° 30' TO 19° 00'
 LONGITUDE 155° 30' TO 156° 00'
 DIAGRAM NE 5-15 HAWAII

Form 525b
 (11-8-55)

U. S. DEPARTMENT OF COMMERCE - COAST AND GEODETIC SURVEY
 TRAVERSE

DESCRIPTION OF ~~TRAVELING~~ STATION

NAME OF STATION: South Telemetry Boresight Tower

CHIEF OF PARTY: D.J. Florwick YEAR: 1964 STATE: Hawaii COUNTY: Hawaii

Description, including sketch of object:

The station is a plain brass disk, stamped SOUTH TELEMETRY BORESIGHT TOWER 1964, cemented in a drill hole in the center of the concrete base of a 100-foot, portable, 4-legged steel tower located at an old Coast Guard station about 1.7 miles south of the South Point Tracking Facility of the Pacific Missile Range. It is 102 feet southwest of a rock wall, 100 feet east of an old and narrow asphalt road and 72 feet north of the north corner of an old concrete foundation. A traverse connection was made from triangulation station KA LAE 2 1948, distance being 126.789 meters or (415.974 feet) north of station KA LAE 2 1948.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: SOUTH TELEMETRY BORESIGHT TWR

STATE: HAWAII

YEAR: 1964

SECOND

ORDER

SOURCE: G-13429

NO OBSERVATION CHECK ON THIS POSITION

GEODETIC LATITUDE:	18 55 00.666	ELEVATION:	12.77 METERS
GEODETIC LONGITUDE:	155 41 04.793		41.9 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	β OR Δ β ANGLE *
HI 1	5101	436,177.87	30,301.05	- 0 03 36

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE β OR Δ β FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE

POSITION DETERMINED BY TRAVERSE FROM STATION KA LAE 2

QF 426

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

Q 181554 STATION 1014
 HAWAII
 LATITUDE 18° 30' TO 19° 00'
 LONGITUDE 155° 30' TO 156° 00'
 DIAGRAM NE 5-1,5 HAWAII

ADJUSTED HORIZONTAL CONTROL DATA

DEPARTMENT OF COMMERCE
 U.S. COAST AND GEODETIC SURVEY
 FORM 535 D

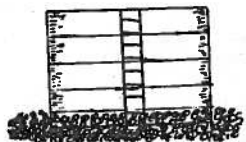
DESCRIPTION OF TRIANGULATION INTERSECTION STATION

NAME OF STATION: **TANK** YEAR: **1949** STATE: **Hawaii** COUNTY: **Hawaii**

CHIEF OF PARTY: **L. C. Wilder**

Description, including sketch of object: **The station is the top and center of a wooden water tank which lies about 4 miles north northeast of South Point, about 1.5 miles east of the road which leads toward South Point and about 150 feet west of two water troughs.**

The tank is 10 feet in diameter and 10 feet high and is enclosed by a circular rock wall about 3 feet high. A ladder is on the easterly side of the tank.



Looking West

U. S. GOVERNMENT PRINTING OFFICE 16-52291-1

RECOVERY NOTE, TRIANGULATION STATION INTERSECTION

NAME OF STATION: **Tank**
 ESTABLISHED BY: **L.C. Wilder** YEAR: **1949** STATE: **Hawaii** BENCH MARK(S) ALSO
 RECOVERED BY: **D.K. Whipp** YEAR: **1967** COUNTY: **Hawaii**
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN: **Island: Hawaii**

R

Detailed statement as to the fitness of the original description; including marks found, stampings, changes made, and other pertinent facts:

Station was recovered. Located about 9 miles southwest of Naalehu, 2-3/4 miles north-northeast of South Point, and 1 mile east-northeast of the South Point Tracking Station, on a low knoll in open pasture land. Station is the center of a black, wooden, flat-topped, water tank 14 feet in diameter and 12 feet high. A circular, stone fence, 3 feet high surrounds the tank.

NAME OF STATION: **TANK**
 STATE: **HAWAII** YEAR: **1949** ORDER: **THIRD**

SOURCE: **G- 9275**

GEODETIC LATITUDE:	18 57 05.502	ELEVATION:	METERS
GEODETIC LONGITUDE:	155 40 10.464		FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	ρ 10H Δ ρ 1 ANGLE
HI 1	5101	441,405.72	42,947.95	- 0° 05' 18"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE ρ 10H Δ ρ 1 FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE

QE 223

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1015
 HAWAII
 LATITUDE 18 ° 30' TO 19 ° 00'
 LONGITUDE 155 ° 30' TO 156 ° 00'
 DIAGRAM NE 5-1,5 HAWAII

NO ORIGINAL TEXT

Umi's Ahu (Hawaii Island, Hawaiian Government Survey, 1887; E. R. Hand, 1914).—In southern part of Hawaii, in district of Ka-u, about 4 miles north of Ka lae, the south point of the island, on the original site of King Umi's "ahu," on a hill commanding a fine view in every direction. It is about 300 meters in from the edge of the cliff which starts at Ka lae, trends north, and leaves the coast line some 2 1/2 miles up. It is 2 miles, N. 66° E. from Puu Hou, and from the sea in this vicinity it will show against the skyline as a low grassy mound, rising slightly above the even line of the slope toward Ka lae. Marked by a drill hole surrounded by a triangle with 1-foot sides cut in the rock. Above this is an extremely slender conical cairn, painted white.

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 528
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: Umi's Ahu STATE: Hawaii COUNTY: Hawaii
 ESTABLISHED BY: H.G.S. YEAR: 1887 LOCALITY: Kau, Hawaii
 RECOVERED BY: Chas.L. Murray YEAR: 1938

Detailed statement as to the status of the original description:

Location of Station: In the southern part of Hawaii on a hill commanding a fine view in all directions and situated about 4 miles above Kalae Light and 1/2 mile N.W. of the Kalae road. The hill cannot be mistaken as the large stone pile on it makes it so conspicuous.
 Old Station Mark found: Drill hole in center of a large Δ one foot on each side cut in a flat rock and covered by a large stone pile 8 feet in diameter and 6 feet high.
 New Station mark: 6-foot 2 1/2" pipe set in concrete over the old station mark and plastered stonepile 8 feet in diameter and 6 feet high. The top of the stone pile is all concreted. Standard metal target set in 2 1/2" pipe.

DEPARTMENT OF COMMERCE
 U. S. COAST AND GEODETIC SURVEY
 FORM 528
RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: UMIS AHU STATE: HAWAII COUNTY: HAWAII
 ESTABLISHED BY: Hawaiian Govt. YEAR: 1887
 RECOVERED BY: L. O. Wilder YEAR: 1949

Detailed statement as to the status of the original description: The original station was not recovered. A drill hole in a triangle was recovered 8.493 meters south southwest of the present station. A new description follows—

The station is located on the summit of a low, rocky knoll, which lies about 4.5 miles north of Kalae (South Point), about 0.4 mile west of the road which leads toward South Point and about 300 meters east of the edge of Kahuku Pali.

To reach from the school house and church in the village of waiohinu; go west and north, on the road which leads toward Captain Cook, for 4.0 miles; turn right, as per the sign reading "South Point" and go south for 7.9 miles; cross over a small stone bridge, turn sharp right, and follow a dim track road northerly for 1.0 mile to the summit of the rocky knoll and the station.

The station is the center of a 2 1/2 inch iron pipe which projects about 1 foot from the top of a stone and cement cairn. The cairn is flat on top and is 7 feet high and about 6 feet in diameter.

Reference mark number 1 is a standard disk, stamped AMIS AHU NO 1 1949, set into a drill hole in a flat boulder which is flush with the surface of the ground and is located 0.86 meter lower than the station.

(continued on next page)

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION: UMIS AHU
 STATE: HAWAII YEAR: 1887 SECOND ORDER
 SOURCE: G- 9279

GEODETIC LATITUDE	18 58 18.378	ELEVATION	238.0 METERS
GEODETIC LONGITUDE	155 41 22.642		78i FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	HORIZONTAL ANGLE
HI 1	510i	434,485.74	50,305.55	- 0 ° 03' 42"

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE $\theta = \Delta \theta$ FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH (From south)	CODE
PUU KI	109 41 28.9	109 45 11	510i

QE 08c

JUN 1978
 U.S. DEPARTMENT OF COMMERCE
 NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
 NATIONAL OCEAN SURVEY, NATIONAL GEODETIC SURVEY

HORIZONTAL CONTROL DATA

by the
 NATIONAL GEODETIC SURVEY
 OLD HAWAIIAN DATUM

QUAD 181554 STATION 1015
 LATITUDE ° ' TO ° '
 LONGITUDE ° ' TO ° '
 DIAGRAM

UMI'S AHU (continued)

Reference mark number 2 is a drill hole in the center of a triangle which is carved into a flat rock which is flush with the ground and is located 0.66 meter lower than the station.

Object	Distance	Direction
PUU KI		00 00 00
Tank NE	About 1.7 miles	121 51 52.6
Tank E	About 1.2 miles	154 54 49.6
R. M. No. 1 SSW	27.933 ft 8.514 m	272 18 59
R. M. No. 2 SSW	27.864 ft 8.493 m	278 04 56
AKIHI (metal target) N		74 04 02.3
MAHANA (metal target) SE		194 58 37.6

The original station was not recovered as it is now covered by masonry. The Hawaii Territory Survey reports that it was recovered in 1938, a drill hole in the middle of a triangle with 1 foot sides cut in flat rock. The 2 1/2 inch pipe was, at that time, installed vertically over the old mark.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: UMI'S AHU
 ESTABLISHED BY: HGS YEAR: 1887 STATE: Hawaii
 RECOVERED BY: D.M. Whipp YEAR: 1967 COUNTY: Hawaii
 Island: Hawaii

OBJECT	BEARING	DISTANCE		DIRECTION
		FEET	METERS	
PUU KI	1949	DISTANCE	DIRECTION	00 00 00.0
R.M. No. 1	SSW	27.933	8.514	272 18 59
PUU KI (HGS) 1914	1967	DISTANCE	DIRECTION	00 00 00.0
R.M. No. 2	ENE	28.440	8.669	146 26 49
R.M. No. 1	SSW	27.929	8.513	272 18 18

Station and reference mark number one were recovered in good condition. Reference mark number two, described in 1949 as a drill hole in a triangle, was recovered by distance and angle, but was found to be a chiseled cross. A new reference mark, number two, was established. A complete description follows:

Station is located about 9 miles southwest of Naalehu and 2 miles north-northwest of the South Point Tracking Station, in pasture land on property of Hawaiian Ranch Co., on a grassy hill of about 778 feet elevation.

To reach station from the post office in Naalehu, go west on State Highway 11 for 5.8 miles; turn left and go south on South Point Road for 7.8 miles to track road right, at power pole 128. Go right for 50 yards to locked, board gate. (Key for gate was obtained at Hawaiian Ranch Co. office in Naalehu). Pass through gate and follow track road for 0.5 mile; take left fork and go 0.3 mile to top of rise. Go left up along low ridge for 0.2 mile to top of hill and station.

Station is the center of a 2-1/2-inch, iron pipe that projects 8 inches from the center of a cylindrical, stone and mortar pier 8 feet in diameter and 6 feet high.

Reference mark number one is a standard disk stamped "UMI'S AHU NO 1 1948", cemented in a drill hole in a large, flat, bedrock section flush with ground. It is 3 feet east of a chiseled cross on a higher point of the same bedrock, and is 8.7 feet lower than top of station pipe.

Reference mark number two is a standard disk stamped "UMI'S AHU HGS 1887 NO 2 1967", cemented in a drill hole in the top of a long, sloping, bedrock outcrop that projects 30 inches above ground. It is 8.2 feet lower than top of station pipe.

HORIZONTAL CONTROL DATA

by the
 National Ocean Survey
 OLD HAWAIIAN DATUM

0 181554 STATION 1016
 HAWAII
 LATITUDE 18° 30' TO 19° 00'
 LONGITUDE 155° 30' TO 156° 00'
 DIAGRAM NE 5-15 HAWAII

FORM 525
 (6-16-60)

U. S. DEPARTMENT OF COMMERCE
 COAST AND GEODETIC SURVEY

DESCRIPTION OF TRIANGULATION STATION

NAME OF STATION: WIND STATE: Hawaii COUNTY: Hawaii
 CHIEF OF PARTY: D.J. Florwiok YEAR: 1964 DESCRIBED BY: A.K.R.

NOTE*	HEIGHT OF TELESCOPE ABOVE STATION MARK 1 METERS, HEIGHT OF LIGHT ABOVE STATION MARK 1 METERS.		DISTANCES AND DIRECTIONS TO AZIMUTH MARK, REFERENCE MARKS AND PROMINENT OBJECTS WHICH CAN BE SEEN FROM THE GROUND AT THE STATION			
	SURFACE-STATION MARK	UNDERGROUND-STATION MARK	DISTANCE		DIRECTION	
	OBJECT	BEARING	FEET	METERS		
desc	PALAHEMO 1898 (HGS)				00 00	00.00
desc	Reference Mark No. 2	W	38.987	11.884	159 10	05
desc	Reference Mark No. 1	N	22.110	6.739	249 20	37

The station is located within a fenced enclosure around the North Telemetry Bore-sight Pole of the South Point Tracking Facility, about 2 1/2 miles north of the Coast Guard light at South Point and about 1/4 mile north of the tracking station.

To reach the station from the entrance to the South Point Tracking Facility, go northerly on a narrow paved road for 0.25 mile, then turn left and go westerly on a track road for 0.15 mile to the station, as described below.

The station mark is a standard disk, stamped WIND 1964, set in the top of a 5-inch cement-filled iron sewer pipe that projects 4 inches above the surface of the ground. It is 115 feet west-northwest of the gate into the enclosure, 105 feet south of a fence, 100 feet west of a fence, 41 feet east of a fence and 24 feet south of the bore-sight pole.

Reference Mark No. 1 is a standard disk, stamped WIND NO 1 1964, set in the top of a 5-inch cement-filled iron sewer pipe that projects 2 inches above the surface of the ground. It is 79 feet south of a fence, 47 feet east of a fence, 4 feet west of the bore-sight pole and about in the center of four old concrete foundation blocks.

Reference Mark No. 2 is a standard disk, stamped WIND NO 2 1964, set in the top of a 5-inch cement-filled iron sewer pipe that projects 7 inches above the surface of the ground. It is 105 feet south of a fence, 45 feet southwest of the bore-sight pole and 2 feet east of a fence.

RECOVERY NOTE, TRIANGULATION STATION

NAME OF STATION: WIND
 ESTABLISHED BY: D.J.F. YEAR: 1964 STATE: Hawaii BENCH MARK(S) ALSO
 RECOVERED BY: R.B.M. YEAR: 1978 COUNTY: Hawaii
 AIRLINE DISTANCE AND DIRECTION FROM NEAREST TOWN:

Detailed statement as to the fitness of the original description, including marks found, stampings, changes made, and other pertinent facts:

The station and reference marks were recovered in good condition.

ADJUSTED HORIZONTAL CONTROL DATA

NAME OF STATION WIND
 STATE HAWAII YEAR 1964 SECOND ORDER

SOURCE G-13429

GEODETIC LATITUDE: 18° 36' 43.150	ELEVATION: 109.76 METERS
GEODETIC LONGITUDE: 155° 41' 13.888	360.1 FEET

STATE COORDINATES (Feet)				
STATE & ZONE	CODE	X	Y	B FOR Δ BY ANGLE*
HI 1	5101	435,315.68	40,699.47	- 0 03 35

* PLANE AZIMUTH HAS BEEN COMPUTED BY THE B FOR Δ B FORMULA NEGLECTING THE SECOND TERM.

TO STATION OR OBJECT	GEODETIC AZIMUTH (From south)	PLANE AZIMUTH* (From south)	CODE
PALAHEMO	298 40 23.1	298 44 02	5101

QF 424