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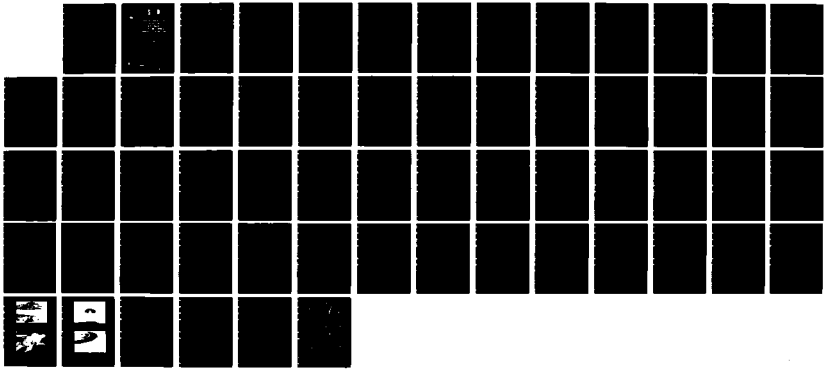

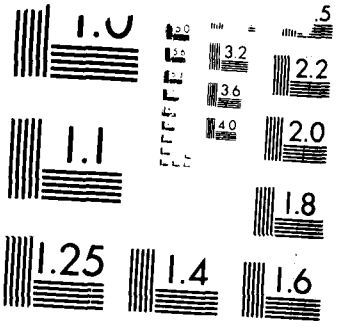

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NAVAL WEAPONS STATION SEAL BEACH FLEET MOORINGS INSPECTION REPORT

SEPTEMBER 1984

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OCEAN ENGINEERING
AND CONSTRUCTION PROJECT OFFICE
CHESAPEAKE DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
WASHINGTON, DC 20374

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19. ABSTRACT (Continue on reverse if necessary & identify by block number)
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Of the 15 buoy systems inspected, only one (Oscar 7) was found to be in good condition. The top jewelry and padeyes of four buoys (Oscar 2, 3, and 4 and Alpha 2) are in unsatisfactory condition and must be replaced if these moorings are to remain in service.

Two buoys, Oscar5 and Oscar 7, are listing about 45 degrees and could be taking on water. Since these two buoys could be in danger of sinking, they should be brought ashore as soon as possible and the cause of the lists determined and corrected.

Detailed information and specific comments concerning each of these moorings are included within this report.

ABSTRACT

This report contains the results of inspection of 12 fleet moorings (15 buoy systems) located within the NWS Seal Beach, California, harbor complex. A CHESNAVFACENGCOM-assigned Engineer-in-Charge and divers from Underwater Construction Team Two conducted the inspection from 30 July to 2 August 1984.

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U.S. NAVAL WEAPONS STATION (NWS)
SEAL BEACH
FLEET MOORING UNDERWATER INSPECTION REPORT

1.0 INTRODUCTION

1.1 Background. Under the COMNAVFACENGCOM Fleet Mooring Maintenance (FMM) Program, CHESNAVFACENGCOM has been assigned the responsibility to plan and conduct periodic diver inspections of all fleet moorings worldwide. In carrying out this responsibility, CHESNAVFACENGCOM designated an Engineer-In-Charge (EIC) to provide inspection planning and onsite technical direction for the underwater inspection of fleet moorings at NWS Seal Beach. The actual underwater portion of the inspection was performed by divers of Underwater Construction Team Two (UCT TWO). The inspection of these moorings was conducted from 30 July to 2 August 1984.

1.2 General Description. The NWS Seal Beach operates and maintains a total of 12 fleet moorings (15 buoy systems), all of which are located within the NWS Harbor Complex. Figure 1 depicts the geographic position of each of the 12 moorings. Eight, designated Oscar 1 through Oscar 8, are installed in the outer harbor, but inside the east and west jetties. Three of these are located to the west of the main entrance channel and five to the east of the channel. The remaining four fleet moorings are located in Anaheim Bay, the inner harbor located within two beach fill areas. Two of these are comprised of a three buoy system, designated Echo 1 through Echo 3, which are installed in the southwestern portion of Anaheim Bay. The final two, which are bow/stern moorings, are designated buoy systems Alpha 1 through Alpha 4 and are located in the eastern portion of Anaheim Bay.

1.3 Mooring Classifications. Based on the original wire diameter of the chain installed, these moorings meet the requirements of either a Class B or Class C mooring system. However, in actuality, these moorings are used by NWS Seal Beach personnel as Class E and Class F moorings. Table 1 depicts both the as-built and as-used classifications of each of these moorings.

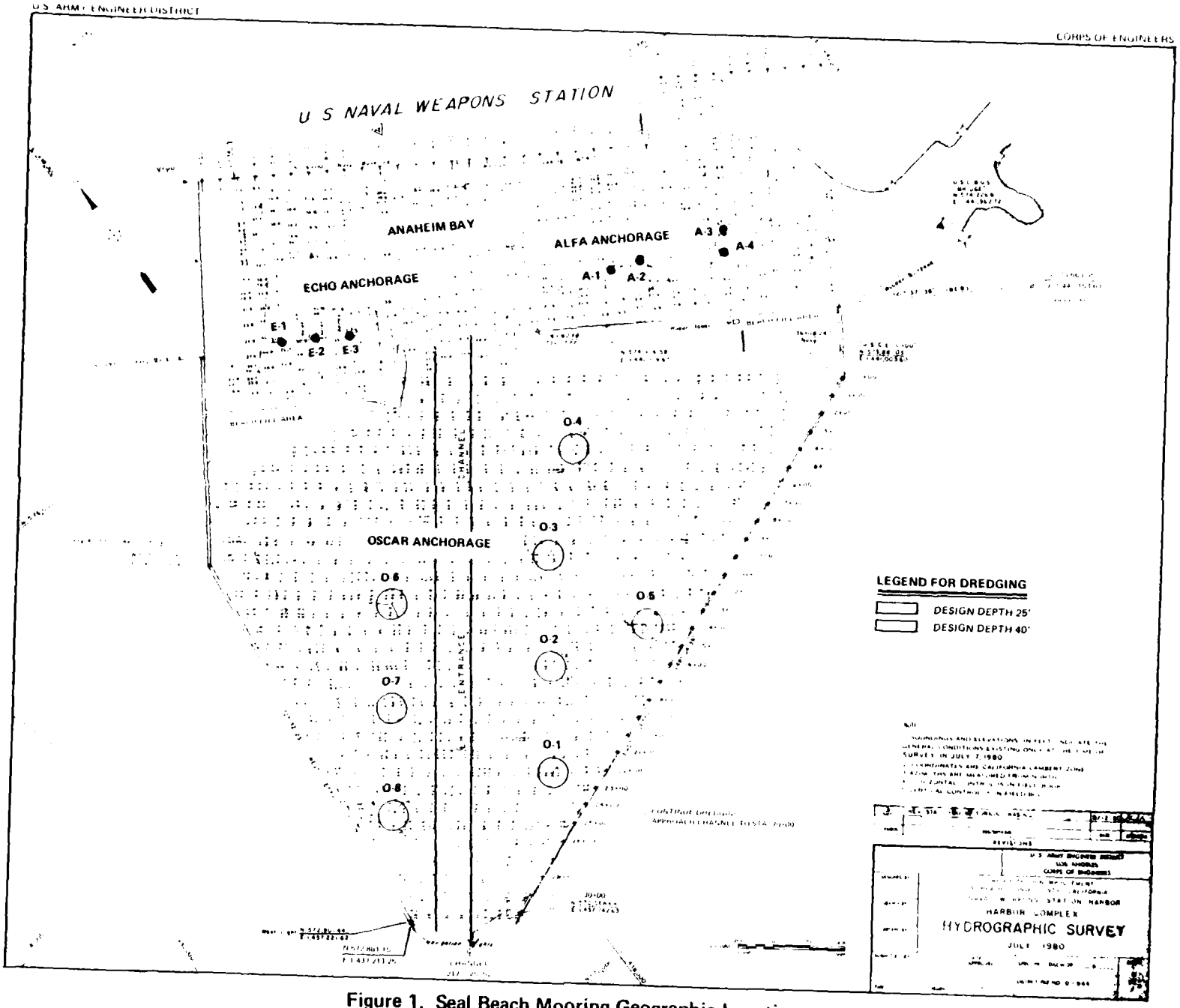


Figure 1. Seal Beach Mooring Geographic Locations

TABLE 1

NWS SEAL BEACH MOORING CLASSIFICATIONS

MOORING	AS-BUILT CLASSIFICATION	AS-USED CLASSIFICATION
01	C	E
02	C	E
03	C	E
04	B	E
05	B	E
06	B	E
07	B	E
08	B	E
E1	B	F
E2	C	F
E3	B	F
A-1	B	E
A-2	B	E
A-3	C	E
A-4	C	E

2.0 INSPECTION PROCEDURES

2.1 Inspection Objectives. The purpose of the mooring inspections was to determine the general condition of the buoys and chain assemblies and, when possible, to verify or update existing as-built and maintenance records. Divers inspected only a portion of the submerged buoy hull and chain assemblies in order to compile a general description of the mooring's condition. The existence of fairly consistent measurements during this inspection provides a good indication of the mooring's overall condition. It should be kept in mind that periodic underwater inspections are intended as an expedient and relatively inexpensive supplement to accurate maintenance records.

2.1.1 Chain Wire Diameter Measurements. Chain wire diameter measurements were used to evaluate the condition of a mooring. A selective sampling of the wire diameter of chain links and connecting hardware was taken in order to determine the amount of deterioration due to corrosion and wear. At each sampling area, the chain was cleaned to bare metal. Single-link measurements were taken where the chain was slack to detect corrosion loss. Double-link measurements were taken where two links connected under tension to detect the combined effects of corrosion and wear. Chain links and other components which measured 90 percent or greater of original wire diameter are considered to be in "good" condition; measurement between 80 and 90 percent of original diameter is considered "fair" condition; any measurement less than 80 percent is considered "poor" and is cause for the mooring to be declared unsatisfactory for fleet use.

2.1.2 Inspection Limits. Standard underwater inspection procedures do not call for the inspection of any part of the mooring which has been buried or which is below a water depth of 130 feet if scuba gear is used. Anchor chain and riser subassemblies were observed only to the point at which they became buried; no attempt was made to locate and inspect anchors or other mooring materials which were not readily visible.

2.2 Buoy

2.2.1 Buoy Topside. Each buoy was inspected to determine its general condition. The buoy markings were checked for conformance to those noted in applicable charts. Physical damage such as holes, dents, or listing was described. Hatches, openings, and penetrations were examined and worn material and rust were reported.

The buoy fenders and chafing strips were checked for integrity and secure connection to the buoy. Buoy top jewelry was measured with calipers to find the overall outside dimensions and areas of most severe reduction in wire size.

2.2.2 Buoy Lower Portion. Divers inspected the buoy below the waterline, recorded the thickness of marine growth, and noted the condition of the buoy bottom.

2.3 Riser Chain Subassembly. To determine chain wear, each riser chain was inspected by taking three consecutive double-link measurements at both ends and at the center of the riser, using precut guages and/or calipers. To determine original chain size, divers took single-link measurements of the wire diameter and measured the link length (link length should be six times the wire diameter).

2.4 Anchor Chain Subassembly. Using pre-cut gauges and calipers, UCT TWO divers took sample measurements of these subassemblies. Most of this chain was found to be in satisfactory condition.

3.0 INSPECTION SUMMARY

An in-depth discussion of the inspection results is contained in Annex A; Annex B contains buoy location survey data; Annex C contains onsite photographs; and Annex D contains a copy of the preliminary report of the inspection results. An evaluation of the information gathered during the inspection indicates the following:

- Of the 15 buoy systems inspected, one (Oscar 7) was found to be in good condition. Four buoy systems are in unsatisfactory condition because some of the top jewelry and padeyes are less than 80 percent of original wire diameter and must be replaced before these moorings can be returned to service. These moorings are Oscar 2, 3, and 4 and Alpha 2. Table 2 presents the current status of NWS Seal Beach fleet moorings.

- Buoys Oscar 5 and Oscar 7 are listing badly. One or more compartments of these buoys could be taking on water and the buoys could be in danger of sinking. These buoys should be brought ashore as soon as possible and the cause of their lists determined and corrected.

- Buoys Oscar 1 and 8, Echo 1, and Alpha 3 are in fair condition due to rust and general deterioration and should be refurbished.

- The top tension bar eye of buoy Alpha 4 is worn to almost 80 percent of its original wire diameter. This tension bar should be repaired as soon as practical. Any further wear may reduce the eye to below 80 percent and render the mooring unsatisfactory for fleet use.

- Anchor chain subassembly A of mooring Alpha 2 is worn to less than 80 percent of its original wire diameter. This subassembly is unsatisfactory and should be replaced before this mooring is returned to service.

- Moorings Oscar 6, Echo 2 and 3, and Alpha 1 have riser and/or anchor chain assemblies worn to within 80 and 90 percent of their original wire diameters. These moorings, however, are in satisfactory condition for continued use in their current capacity as Class E or F moorings.

- Most of the anodes observed have eroded considerably. Plans should be made to replace these anodes in the near future.

TABLE 2

NWS SEAL BEACH INSPECTION SUMMARY

Mooring Number	Condition			Comments
	Good	Fair	Poor	
Oscar 1		X		Buoy needs to be refurbished.
Oscar 2			X	Top jewelry badly worn. Top tension bar padeye worn to about 50 percent of original size.
Oscar 3			X	Top tension bar padeye and attached spider plate worn to 50 percent of original wire diameter.
Oscar 4			X	Top tension bar padeye and attached spider plate worn to less than 80 percent.
Oscar 5		X		Buoy needs to be refurbished. Riser chain worn to between 80 and 90 percent. Buoy listing badly.
Oscar 6		X		Anchor chain subassembly B worn to between 80 and 90 percent.
Oscar 7	X			Buoy listing about 45 degrees. The cause of this list should be investigated. Visible chain in good condition.
Oscar 8		X		Buoy needs to be refurbished.
Echo 1		X		Buoy needs to be refurbished.

TABLE 2 (cont'd)

NWS SEAL BEACH FLEET INSPECTION SUMMARY

Mooring Number	Condition			Comments
	Good	Fair	Poor	
Echo 2			X	Riser and anchor chain assemblies worn to between 80 and 90 percent. Prior inspection measured anchor assemblies below 80 percent.
Echo 3		X[1]		Anchor chain subassembly worn to between 80 and 90 percent.
Alpha 1		X		Riser and anchor chain subassemblies worn to between 80 and 90 percent.
Alpha 2			X	Top tension bar padeye badly worn. Anchor chain subassembly A worn below 80 percent.
Alpha 3		X		Buoy needs to be refurbished.
Alpha 4		X		Top tension bar eye worn to almost 80 percent.

[1] Although the buoy and riser chain subassembly were found to be in good condition, the three anchor chain subassemblies are buried and inaccessible to divers. Since the anchor chain subassemblies of moorings, Echo 1 and Echo 2 (which were installed at the same time as Echo 3) are worn, it is assumed that the anchor chain subassemblies of Echo 3 are probably in similar condition which justifies reducing Echo 3 to a "fair" condition.

ANNEX A

MOORING INSPECTION RESULTS

This annex contains the following for each mooring:

- a summation of the inspection data obtained by the CHESNAVFACENGCOM EIC and the UCT TWO divers; and
- a diver data reporting form.

INSPECTION RESULTS

OSCAR ONE

Buoy

This is a 10-foot-diameter drum-type buoy with a tension bar and a 5-foot freeboard. The top and bottom fenders and the chafing rail are made of timber which is badly deteriorated. The buoy's top and bottom hardware appear to be in satisfactory condition, but the sides of the buoy are covered with a light rust.

Riser Chain Subassembly

The original wire diameter of the riser chain was 2 3/4 inches, much larger than that required for a Class E mooring. Double-link measurements, taken at the top, middle, and bottom of the riser chain, indicate that the chain links are greater than 90 percent of their original wire size. The ground ring was located at a depth of 30 feet, near the bottom under the tidal condition existing at the time of this inspection.

Anchor Chain Subassemblies

These three subassemblies are buried in the bottom and are not available for visual inspection.

Cathodic Protection

Underwater voltmeter readings measured the cathodic protection to be between -.89 volts on the buoy and -.65 volts on the riser chain near the ground ring.

Conclusions/Recommendations

The buoy needs to be refurbished, but the mooring is in satisfactory condition for continued use in its current capacity as a Class E mooring.

MOORING NO.: OSCAR 1 CLASS: E LOCATION: NWS SEAL BEACH LAT: 33° 43' 41.9" LONG: 118° 05' 52.2"W

BUOY TYPE: DRUM (10' DIAM) ANCHOR SIZE/TYPE: 2 I WATER DEPTH: 33' VISIBILITY: 2' BOTTOM TYPE: SILT/SAND

DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J. A. THORNTON DIVERS: HARDING/MANN (0521-0847 HRS)

COMPONENTS		GAUGE SIZE	CONDITION: LINK LENGTH	SINGLE LINK % 90+	SINGLE LINK % 80+	SINGLE LINK % 80–	DOUBLE LINK % 90+	DOUBLE LINK % 80+	DOUBLE LINK % 80–	DEPTH	COMMENTS
BUOY HARDWARE	TOP-2¼" PAD EYE								CPS WGHTS		BUOY HAS TENSION BAR ALL
	2" SPACER PLATE										SITS HIGH IN WATER. 3' OF
	1¾" PEAR (2)								-.89		FREEBOARD. BUOY IS COVERED
	BOTTOM-3" DETACH										WITH LIGHT RUST ON SIDES.
	2½" SHACKLE										TOP DECK HAS LIGHT GLAZE
RISER	NEAR BUOY	2¾"	16½"	√√√			√√√		-.83	8'	CHAFE, WOOD FENDERS/CHAFING
	MIDDLE	↓	↓	√√√			√√√			18'	RAILS BADLY DETERIORATED.
	NEAR GRD RG	↓	↓	√√√			√√√		-.65	27'	
GROUND RING		4½"	× 18" INSIDE DIAMETER						-.69	30'	ACCESSORIES BETWEEN RISER CHAIN
GROUND LEG NO. A	UPPER END										AND GROUND RING – 2¾" DETACH,
	MIDDLE	BURIED									2½" B LINK, 2½" C LINK, 3" ACC
	ENTERS BOTTOM										DETACH
GROUND LEG NO.B	UPPER END										
	MIDDLE	BURIED									
	ENTERS BOTTOM										ALL ANCHOR LEG SUBASSEMBLIES
GROUND LEG NO. C	UPPER END										BURIED
	MIDDLE	BURIED									
	ENTERS BOTTOM										

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

OSCAR TWO

Buoy

This is a 10-foot-diameter peg-top buoy with a 42-inch freeboard. The fenders and chafing strip are rubber and in good condition. The sides and top deck are covered with moderate to heavy rust and the top jewelry is badly worn and in poor condition. In addition, the top padeye of the tension bar is worn to about 50 percent of its original 3-inch wire diameter.

Riser Chain Subassembly

Double-link measurements of this chain were between 80 and 90 percent of the original 2 3/4-inch wire diameter which is considerably larger than required for its use as a Class E mooring.

Anchor Chain Subassemblies

About 2 feet of each of the three subassemblies was visible before they entered the bottom. The upper end of each of these subassemblies was measured to be greater than 90 percent of its original wire diameter.

Cathodic Protection

Underwater voltmeter readings measured the cathodic protection to be between -.82 volts on the buoy to -.69 volts at the upper end of anchor chain subassembly B.

Conclusions/Recommendations

Due to the poor condition of the top jewelry and upper padeye, this mooring is considered to be unsatisfactory for further fleet use. This mooring should be removed from service and overhauled at the nearest practical time.

MOORING NO.: OSCAR 2 CLASS: E LOCATION: NILS SEAL BEACH LAT: 33°43'45.3"N LONG: 118°05'42.5"W

BUOY TYPE: EGG TOP (8' DIAM) ANCHOR SIZE/TYPE: 11 I · WATER DEPTH: 39' VISIBILITY: 2' BOTTOM TYPE: SILT/SAND

DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: HARDING/HALL (1050-1144 HRS)

COMPONENTS		GAUGE SIZE	CONDITION								COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
				90+	80+	80-	90+	80+	80-		
BUOY HARDWARE	TOP - 3" PADEYE								CPS VOLTS		BUOY HAS 3'6" FREEBOARD, MODERATE
	3½" SHACKLE								-.82		TO HEAVY RUST ON SIDES AND TOP
	BOTTOM - 3" B LINK										DECK, FELDERS/CHAFING RAILS
	3" C LINK										(RUBBER) GOOD CONDITION. TOP
	2½" DETACH			✓							HARDWARE IN POOR CONDITION.
RISER	NEAR BUOY	2¾"	16½"	√√√				√√	-.81	8'	PADEYE WORN TO 50%. HEAVY
	MIDDLE	↓	↓	√√				√√	-.79	22'	RUST ON CHAFING RAIL CLIPS.
	NEAR GRD RG	↓	↓	√√			√√		-.72	37'	MODERATE RUST ON BUOY EDGES.
GROUND RING		4½"	x 19"	INSIDE DIAMETER.							ACCESSORIES BETWEEN LEG CHAIN
BRG GROUND LEG NO. A 000°	UPPER END	2½"	15'	√√√					-.72	40'	AND GROUND RING - 3½" DETACH, 2½" D
	MIDDLE										LINK, 2½" C LINK, 3¼" SHACKLE.
	ENTERS BOTTOM										2' LEG A VISIBLE BEFORE BOTTOM.
BRG GROUND LEG NO. B 210°	UPPER END	2½"	15"	√√√					-.69	39'	GROUND RING TO LEGS W HAD 6 - 2½"
	MIDDLE										SHACKLE, 2½" C LINK, 2½" DETACH (2)
	ENTERS BOTTOM										2' LEG B VISIBLE
BRG GROUND LEG NO. C 280°	UPPER END	2½"	15"	√√√					-.72	40'	GROUND RING TO LEG C - 2½" SHACKLE,
	MIDDLE										3" MACO DETACH, 2½" DETACH
	ENTERS BOTTOM										2' LEG C VISIBLE

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

OSCAR THREE

Buoy

This is a 12-foot-diameter peg-top buoy with a 42-inch freeboard. About 25 percent of its wooden fenders and chafing strip are badly deteriorated, and there is a light coating of rust on the sides near the waterline. The top tension bar padeye and attached spider plate are both worn to less than 50 percent of their original wire diameter. There is about 5 inches of marine growth on the bottom of the buoy.

Riser Chain Subassembly

Double-link measurements of the upper portion of the riser chain were between 80 and 90 percent of its original wire diameter. Several fishing lines were intertwined with the riser.

Anchor Chain Subassemblies

Approximately 5 feet of each subassembly was visible before the chain entered the bottom. Double-link measurements of these chains were between 80 and 90 percent of their original wire diameter.

Cathodic Protection

Two anodes, about 40 percent of their original size, were located on the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.80 volts on the buoy to -.62 volts on the lower portion of the riser chain subassembly.

Conclusions/Recommendations

Due to the poor condition of the top jewelry and padeye, this mooring is in unsatisfactory condition for further fleet use. This mooring should be removed from service and overhauled at the earliest practical time.

MOORING NO.: CHAP 5 CLASS: E LOCATION: NWS SEAL BEACH LAT: 33°43'50.1"N LONG: 118°05'41.6"W

BUOY TYPE: PEG TOP ANCHOR SIZE/TYPE: N I WATER DEPTH: 42' VISIBILITY: 2' BOTTOM TYPE: SILT/SAND

DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THORATEC DIVERS: SAKO/CICCONE (1449 - 1538 HRS)

COMPONENTS		GAUGE SIZE	CONDITION								COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
				90+	80+	80-	90+	80+	80-		
BUOY HARDWARE	TOP - 3" SADEYE								CPS RUSTS		BUOY HAS 36" FREEBOARD, SPIDER
	3" SPIDER PLATE								-.86		PLATE AND TOP SADEYE WORN TO
	BOTTOM - 3½" DETACH								-.86		50% ABOUT ¾ OF ROD READINGS/CHAINING
	2½" PEAL										STRUTS IN GOOD CONDITION; LIGHT RUST
	2¾" DETACH										ON SIDES AT WATER LINE, MARINE GROWTH
RISER	NEAR BUOY	2¾"	16½"	√√√				√√√	-.65	8'	5" ON BOTTOM, FISHING LINES INTERTWINED
	MIDDLE	↓	↓	√√√			√√√		-.69	23'	WITH RISER. TWO ANODES (3"x3"x2")
	NEAR GRD RG	↓	↓	√√√			√√√		-.62	38'	40% OF ORIGINAL SIZE ON BODY.
GROUND RING		5½"	x15½" INSIDE DIAMETER							38'	ACCESSORIES BETWEEN RISER CHAIN
BRNG GROUND LEG NO. A 020°	UPPER END				√√√			√√√		42'	HND GROUND RING - 3¼" DETACH 3½"
	MIDDLE										END LINK, 3" C LINK, 4" NACO DETACH.
	ENTERS BOTTOM										
BRNG GROUND LEG NO. B 140°	UPPER END			√√√				√√√		42'	
	MIDDLE										GROUND RING TO EACH LEG - 4"
	ENTERS BOTTOM										NACO DETACH, 2¼" PEAR LINK,
BRNG GROUND LEG NO. C 260°	UPPER END			√√√				√√√		42'	2¼" DETACH
	MIDDLE										ALL THREE LEGS LAYED RADIAL
	ENTERS BOTTOM										5' FROM GROUND RING

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

OSCAR FOUR

Buoy

This is a 10-foot-diameter peg-top buoy with a 4-foot freeboard. The buoy's edges have moderate to heavy rust, and 3 to 4 inches of marine growth on the bottom. The rubber fenders and chafing rail are in good condition. The top tension bar padeye and attached spider plate are worn to 71 and 58 percent, respectively, of their original wire diameters.

Riser Chain Subassembly

Double-link measurements taken near the middle of the riser chain were between 80 and 90 percent of original wire diameter. Otherwise, all readings were greater than 90 percent.

Anchor Chain Subassemblies

Approximately 15 feet of each of these subassemblies was visible before the chain entered the bottom. Measurements taken of the upper end of each chain were greater than 90 percent of original wire diameter.

Cathodic Protection

Two anodes, about 50-75 percent depleted, were located on the buoy bottom. Underwater voltmeter readings measured the cathodic protection to be between -1.01 volts at the buoy anode to -.69 volts on the riser chain near the ground ring.

Conclusions/Recommendations

Due to the badly worn condition of the top jewelry and upper padeye, this mooring is considered to be unsatisfactory for continued fleet use. This mooring should be removed from service and overhauled at the earliest practical time.

MOORING NO.: OSCAR 4 CLASS: E LOCATION: LOS SEAL BEACH LAT: 33°43'54.4"N LONG: 118°05'37.5"W

BUOY TYPE: PEL TOP (10' DIA) ANCHOR SIZE/TYPE: 1 T WATER DEPTH: 40' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 1 AUG 1984 ENGINEER-IN-CHARGE: J. A. THORNTON DIVERS: MANN/PHELPS (0750 - 0544 HRS)

COMPONENTS		GAUGE SIZE	CONDITION							DEPTH	COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %				
				90+	80+	80–	90+	80+	80–		
BUOY HARDWARE	TOP - 3½" PADEYE								CPS VOLTS		BUOY (S/N 41) HAS 4' FREEBOARD AND
	3" SPIDER							(BODY)	-.87		SLIGHT LIST, MODERATE TO HEAVY
	BOTTOM - 4" DETACH							(ANODE)	-1.01		RUST ON EDGES, PADEYE WORN TO
	3½" SHACKLE/PEAR										2½" SPIDER TO 1¾" RUBBER FENDER
	2¾" DETACH										AND CHAFING RAIL GOOD CONDITION
RISER	NEAR BUOY	2½"	15"	√√√			√√√			8'	MARINE GROWTH 3-4" ON BOTTOM, TAG
	MIDDLE	↓	↓	√√√				√√√	-.89	15'	BODY ANODES (34"×3"×3") 50-75%
	NEAR GRD RG	↓	↓	√√√			√√√		-.69	38'	EXPENDED, MOD RUST ON TOP.
GROUND RING										40'	ACCESSORIES BETWEEN RISER CHAIN
BRG GROUND LEG NO. A 000°	UPPER END		15"	√√√			√√√				AND GROUND RING - 2½" DETACH,
	MIDDLE										2¾" G LINK, 2¾" C LINK, 3¼"
	ENTERS BOTTOM										NACO DETACH.
BRG GROUND LEG NO. B 120°	UPPER END		15"	√√√			√√√				
	MIDDLE										ANCHOR SUBASSEMBLY A ENTERS
	ENTERS BOTTOM										BOTTOM 3' BELOW GROUND RING,
BRG GROUND LEG NO. C 240°	UPPER END			√√√			√√√				ANCHOR SUBASSEMBLIES B AND C
	MIDDLE		15"								EACH ENTER THE BOTTOM 15' FROM
	ENTERS BOTTOM										THE GROUND RING

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

OSCAR FIVE

Buoy

This is a 10-foot-diameter peg-top buoy which is listing badly (40-50 degrees). About 20 percent of the wooden chafing strip is badly deteriorated and the two wooden fenders are in poor condition. The sides of the buoy are covered with moderate to heavy rust and the top jewelry is covered with heavy rust. The buoy bottom has 4 inches of marine growth.

Riser Chain Subassembly

One double-link measurement of the riser chain near the ground ring was between 80 and 90 percent of the original wire diameter. A wire rope is entwined with the riser chain. The ground ring was located at a depth of 30 feet.

Anchor Chain Subassemblies

All three subassemblies are buried and could not be inspected.

Cathodic Protection

Underwater voltmeter readings measured the cathodic protection to be between -.69 volts on the buoy to -.63 volts on the upper link of one of the anchor chain subassemblies.

Conclusions/Recommendations

This mooring appears to be in fair condition, but its use should be restricted until the buoy's list is investigated and the cause of this list corrected. In addition, the buoy needs to be overhauled and its fenders and chafing strip replaced.

MOORING NO.: OSCAR 5 CLASS: E LOCATION: NOS SEAL BEACH LAT: 33° 43' 45.5" N LONG: 118° 06' 31.2" W

BUOY TYPE: PECK TC (10' DIAM) ANCHOR SIZE/TYPE: NT WATER DEPTH: 30' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J A. THORNTON DIVERS: HARDING/MANN (1208 - 1248 HRS)

COMPONENTS		GAUGE SIZE	CONDITION							DEPTH	COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %				
				90+	80+	80–	90+	80+	80–		
BUOY HARDWARE	TOP-3½" PADEYE, 3"								CPS VELLS		BUOY LISTING BADLY (40-50°). ONLY 50%
	SPIDER, 2¾" SHACKLE(4)							(BUOY)	-.69		OF WOOD CHAFING RAIL IN SAT CONDITION
	2½" PEAR(4)										TOP WOOD FENDER IN POOR CONDITION. 50%
	BOTTOM-2½" SHACKLE, 2" B										OF LOWER FENDER DETERIORATED,
	LINK, 2½" DETACH										MODERATE TO HEAVY RUST ON SIDES.
RISER	NEAR BUOY	2½"	15"	√√√			√√√		-.66	9'	A WIRE ROPE IS ENTWINED WITH
	MIDDLE	↓	↓	√√√			√√√		-.64		RISER CHAIN AND ONE LEG. HEAVY
	NEAR GRD RG	↓	↓	√√			√√	√		26'	RUST ON TOP JEWELRY. BOTTOM
GROUND RING		4½"	×19" INSIDE DIAMETER							30'	HAS 4" OF MARINE GROWTH.
BRG GROUND LEG NO. A 000°	UPPER END								-.64		ACCESSORIES BETWEEN RISER AND
	MIDDLE	BURIED									GROUND RING - 3" DETACH, 2½" B
	ENTERS BOTTOM										LINK, 2½" C LINK, 4" ANODE DETACH.
BRG GROUND LEG NO. B 270°	UPPER END								-.64		
	MIDDLE	BURIED									GROUND RING TO EACH LEG - 3½"
	ENTERS BOTTOM										ANODE DETACH, 2" PEAR, 2½" DETACH
BRG GROUND LEG NO. C 350°	UPPER END								-.63		
	MIDDLE	BURIED									ANCHOR CHAIN SUBASSEMBLIES BURIED
	ENTERS BOTTOM										BEACH G.R. ACCESSORIES

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

OSCAR SIX

Buoy

This is a 10-foot-diameter peg-top buoy with a 3-foot freeboard. Its rubber fenders and chafing strip are in good condition. The buoy's sides are covered with a light rust, and its upper padeye and fender clips are moderately rusted. The bottom of the buoy has about 4 inches of marine growth.

Riser Chain Subassembly

The riser chain was measured to be greater than 90 percent of its original 2 1/2-inch wire diameter. The ground ring was located at a depth of 38 feet.

Anchor Chain Subassemblies

About 5 feet of each subassembly was visible. Except for subassembly B, which measured between 80 and 90 percent, all measurements were greater than 90 percent.

Cathodic Protection

Two anodes, about 20 percent depleted, were observed on the bottom of the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.96 volts at the anode and -.64 volts on the upper links of anchor chain subassembly A.

Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class F mooring.

MOORING NO.: OSCAR 6 CLASS: E LOCATION: NWS SEAL BEACH LAT: 33°43'53.6"N LONG: 118°06'51.9"W

BUOY TYPE: SECTOR (10' DIAM) ANCHOR SIZE/TYPE: NI WATER DEPTH: 45' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J. A. THORNTON DIVERS: SAKO/CICCONE (1618-1648 HRS)

COMPONENTS		GAUGE SIZE	CONDITION							DEPTH	COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %				
				90+	80+	80–	90+	80+	80–		
BUOY HARDWARE	TOP-3" PADEYE								CPS VOLTS		BUOY HAS 3' FREEBOARD. RUBBER
	3" SPIDER							(ANODE)	-.96		FENDERS/CHAFING GAIL IN GOOD
	BOTTOM-3¼" DETACH							(BUOY)	-.84		CONDITION. LIGHT RUST ON SIDES.
	2½" SHACKLE								-.85		MODERATE RUST AT PADEYE AND ON
											UPPER FENDER CHIPS. BOTTOM HAS 4"
RISER	NEAR BUOY	2½"	15"	√√√			√√√		-.82	8'	OF MARINE GROWTH. BOTTOM TERMINAL
	MIDDLE	↓	↓	√√√			√√√		-.83	20'	SHINY AND CLEAN. TWO ANODES
	NEAR GRD RG	↓	↓	√√√			√√√		-.80	35'	36"x4"x4" ON BUOY BOTTOM (36%
GROUND RING		5¼"	x15"	INSIDE DIAMETER						38'	EXTENDED)
STRAIGHT GROUND LEG NO. A INTO BOTTOM	UPPER END	2½		√√√			√√√		-.64	40'	ACCESSORIES BETWEEN RISER CHAIN
	MIDDLE	↓									AND GROUND RING - 2½" DETACH,
	ENTERS BOTTOM	↓		√√√			√√√			45'	2⅝" C LINK, 4" MACE DETACH.
BENT GROUND LEG NO. B 15°C	UPPER END	↓		√√√				√√√	-.77	40'	
	MIDDLE	↓									GROUND RING TO EACH ANCHOR CHAIN
	ENTERS BOTTOM	↓		√√√			√√√			45'	SUBASSEMBLY - 4" MACE DETACH,
BENT GROUND LEG NO. C 30°C	UPPER END	↓		√√√			√√√		-.76	40'	2¼" PEAR, 2¾" DETACH.
	MIDDLE	↓									ABOUT 5' OF EACH ANCHOR CHAIN
	ENTERS BOTTOM	↓		√√√			√√√			45'	SUBASSEMBLY VISIBLE.

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

OSCAR SEVEN

Buoy

This is a 10-foot-diameter peg-top buoy. The buoy is listing badly (about 45 degrees). Its rubber fenders and chafing strip are in good condition. The side of the buoy with the least freeboard is covered with a light coating of rust.

Riser Chain Subassembly

Single- and double-link measurements of the riser chain were all greater than 90 percent of its original 2 1/2-inch wire diameter. The ground ring is buried.

Anchor Chain Subassemblies

The three subassemblies are buried and could not be inspected.

Cathodic Protection

Two anodes, about 20 percent depleted, were observed on the buoy bottom. Underwater voltmeter readings measured the cathodic protection to be between -.97 volts at an anode to -.74 volts at the lower section of the riser chain.

Conclusions/Recommendations

The mooring chain is in good condition, but the mooring's use should be restricted until the buoy's list is investigated and the cause of the list corrected.

MOORING NO.: OSCAR 7 CLASS: E LOCATION: NWS SEAL BEACH LAT: 33°43'49.8" N LONG: 118°05'35.1" W

BUOY TYPE: Lee Top (10' DIAM) ANCHOR SIZE/TYPE: N.I WATER DEPTH: 45' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 30 JULY 84 ENGINEER-IN-CHARGE: J. A. THORNTON DIVERS: CICCONE/GRIFFIN (1715-1755 HRS)

COMPONENTS		GAUGE SIZE	CONDITION								COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
				90+	80+	80-	90+	80+	80-		
BUOY HARDWARE	TOP - 4" PADEYE								CPS VOLTS		BUOY LISTING ABOUT 45°, RUBBER
	3½" SHACKLE, 3½" SHACKLE							(BUOY)	-.89		FENDERS/CHAFING RAIL ID
	(2) 2¾" GEAR (4)								-.86		GOOD CONDITION, LIGHT RUST
	BOTTOM - 3¾" LACE DETAIL							(ANODE)	-.97		ON SIDES, LIGHT GRASS COVERING
	2½" GEAR, 2⅜" DETAIL										OVER TOP DECK. TWO ANODES ON
RISER	NEAR BUOY	2½"	15'	√√√			√√√		-.85	8'	BUOY 36" x 3½" x 3½" ANGLE
	MIDDLE	↓	↓	√√√			√√√		-.83	30'	20% EXPENDED
	NEAR GRD RG	↓	↓	√√√			√√√		-.74	45'	
GROUND RING		BURIED									
GROUND LEG NO. A	UPPER END										ALL THREE ANCHOR CHAIN
	MIDDLE	BURIED									SUBASSEMBLIES AND GROUND
	ENTERS BOTTOM										RING BURIED.
GROUND LEG NO. B	UPPER END										
	MIDDLE	BURIED									
	ENTERS BOTTOM										
GROUND LEG NO. C	UPPER END										
	MIDDLE	BURIED									
	ENTERS BOTTOM										

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

OSCAR EIGHT

Buoy

This is a 10-foot-diameter peg-top buoy. It has light rust and pitting on its sides and moderate rust on the top hardware. The rubber fenders and chafing strip are in good condition. The bottom is covered with 4 to 5 inches of marine growth.

Riser Chain Subassembly

All single- and double-link measurements were greater than 90 percent of riser chain's original 2 1/2-inch wire diameter. The ground ring and lower portion of the riser are buried.

Anchor Chain Subassembly

These subassemblies are buried in the bottom.

Cathodic Protection

Two anodes, about 20 percent depleted, were observed on the buoy's bottom. Underwater voltmeter measured the cathodic protection to be between -.97 volts at an anode and -.79 volts on the riser near the mud line.

Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class E mooring. However, the buoy should be refurbished.

MOORING NO.: OSCAR 8 CLASS: E LOCATION: NWS SEAL BEACH LAT: 33°43'45"N LONG: 118°05'55.1"W

BUOY TYPE: SEE TOP (10' DIAM) ANCHOR SIZE/TYPE: NI WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 30 JULY 84 ENGINEER-IN-CHARGE: J. A. THORNTON DIVERS: CICCONE / GRIFFEN (1615-1650 HRS)

COMPONENTS		GAUGE SIZE	CONDITION								COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
				90+	80+	80−	90+	80+	80−		
BUOY HARDWARE	TOP - 3" PADEYE								CPS VOLTS		BUOY (S/N 135) HAS LIGHT RUST AND
	3" SPIDER							(ANODE)	-.97		PITTING ON SIDES. MODERATE RUST
	BOTTOM 2½" DETACH								-.96		ON TOP HARDWARE. RUBBER FENDERS
								(BUOY)	-.89		CHAFING STRIP GOOD CONDITION.
									-.88		ABOUT 4-5" OF MARINE GROWTH ON
RISER	NEAR BUOY	2½"	15"	√√√			√√√		-.88	8'	BUOY BOTTOM. TWO ANODES
	MIDDLE	↓	↓	√√√			√√√		-.89	30'	(36" x 3½" x 3½") OBSERVED.
	NEAR GRD RG	↓	↓	√√√			√√√		-.79	42'	ABOUT 30% EXPOSED.
GROUND RING		BURIED									
GROUND LEG NO. A	UPPER END										
	MIDDLE	BURIED									GROUND LINE AND ALL ANCHOR
	ENTERS BOTTOM										CHAIN SUBASSEMBLIES BURIED
GROUND LEG NO. B	UPPER END										
	MIDDLE	BURIED									
	ENTERS BOTTOM										
GROUND LEG NO. C	UPPER END										
	MIDDLE	BURIED									
	ENTERS BOTTOM										

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

ECHO ONE

Buoy

This is a 10-foot-diameter peg-top buoy with a 40-inch freeboard. Although its upper wood fender and chafing strip are in good condition, the lower fender is badly deteriorated. There is heavy rust on the sides of the buoy and on the top fender and chafing strip clips.

Riser Chain Subassembly

Single- and double-link measurements of the riser chain were all greater than 90 percent of its original 2 3/4-inch wire diameter. The ground ring was located at a depth of 40 feet.

Anchor Chain Subassembly

Only the top few links of each subassembly were visible before the chain enters the bottom. These links were also measured to be greater than 90 percent.

Cathodic Protection

Two anodes, each with about 40 percent of their zinc expended, were observed on the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.96 volts at an anode and -.82 volts on the upper links of the anchor chain subassemblies.

Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class F mooring. However, the buoy should be refurbished.

MOORING NO.: ECHC 1 CLASS: F LOCATION: NAVS SEAL BEACH LAT: 33°44'07.1"N LONG: 118°05'36.9"W

BUOY TYPE: SEC TOP (10' DIAM) ANCHOR SIZE/TYPE: 1 NT WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 1 AUG 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS GRIFFIN/HARDING (1330 - 1415 HRS) SAKO/CICCONE (1456 - 1527 HRS)

	COMPONENTS		GAUGE SIZE	CONDITION								COMMENTS
				LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
					90+	80+	80-	90+	80+	80-		
BUOY HARDWARE	TOP 3" PADEYE 3¼"									CPS VOLTS		BUOY (S/N 22) HAS 3¼" FREEBOARD.
	SPIDER 2¾" SIDE (3)								(ANODE)	-.96		LOWER KEEL FENDER BADLY
	2½" REAR (4)								(BUOY)	-.91		DETERIORATED. UPPER KEELSON
	BOTTOM - 3¼" DETACH,											FENDER AND CHAFING STRIP ARE IN
	3⅛" REAR, 2⅝" DETACH											GOOD CONDITION, HEAVY RUST ON
RISER		NEAR BUOY	2¾"	16½"	√√√			√√√		-.88	10'	SIDES OF BUOY, TOP FENDER
		MIDDLE	↓	↓	√√√			√√√		-.86	23'	CLIPS, AND CHAFING STRIP CLIPS,
		NEAR GRD RG	↓	↓	√√√			√√√		-.86	35'	TWO ANODES 34"x3"x3" OBSERVED,
GROUND RING			4¼"	x 18½"	INSIDE DIAMETER					-.87	40'	ABOUT 40% OF ZINC EXPENDED.
ECHC GROUND LEG NO. A 110°		UPPER END	2¼"	13½"	√√√			√√√		-.82	42'	ACCESSORIES BETWEEN RISER
		MIDDLE										CHAIN AND GROUND RING - 3⅜"
		ENTERS BOTTOM										DETACH, 3⅛" AND DETACH, 3½"
BRAG GROUND LEG NO B 240°		UPPER END	2½"	15"	√√√			√√√		-.83	42'	DETACH.
		MIDDLE										
		ENTERS BOTTOM										GROUND RING TO EACH ANCHOR CHAIN
BRAG GROUND LEG NO C 340°		UPPER END	2½"	15"	√√√			√√√		-.82	42'	SUBASSEMBLY - 3¼" SHACKLE, 3" C
		MIDDLE										LINK. CRAZY TOP FENDER LINKS OF
		ENTERS BOTTOM										EACH LEG VISIBLE

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

ECHO TWO

Buoy

This is a 10-foot-diameter peg-top buoy with a 3-foot freeboard. Its rubber fenders and chafing strip are in good condition. It has light rust on its sides and moderate rust on the buoy edges and top jewelry.

Riser Chain Subassembly

Some measurements near the middle and lower end of the riser chain were between 80 and 90 percent of its original 2 1/2-inch wire diameter. The ground ring was located at a depth of 40 feet.

Anchor Chain Subassemblies

Only the top few links of each anchor chain were visible before it entered the bottom. Although subassembly B measured greater than 90 percent of the original 2 1/2-inch wire diameter, the other two subassemblies measured between 80 and 90 percent.

Cathodic Protection

Only one anode, with about 40 percent of its zinc expended, was observed on the buoy. Underwater voltmeter readings measured the cathodic protection between -.96 volts near the anode and -.71 volts at the upper links of the anchor chain assemblies.

Conclusions/Recommendations

Although measurements of the anchor chain subassemblies taken during this inspection were between 80 and 90 percent, measurements taken during the 1982 inspection had subassembly measurements of less than 80 percent. Based on this data, the condition of the mooring is poor. However, due to its oversized chain, this mooring is in satisfactory condition for continued use in its current capacity as a Class F mooring.

MOORING NO.: ECHC 2 CLASS: F LOCATION: NWS SEAL BEACH LAT: 33°44'00.7"N LONG: 118°05'48.1"W

BUOY TYPE: PEG TOP (16' DIAM) ANCHOR SIZE/TYPE: NJ WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: JAN 87 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: SAKO/CICCONE (1536 - 1610 HRS) HARDING/GRIFFIN (1111 - 1310 HRS)

COMPONENTS		GAUGE SIZE	CONDITION: LINK LENGTH	SINGLE LINK % 90+	SINGLE LINK % 80+	SINGLE LINK % 80-	DOUBLE LINK % 90+	DOUBLE LINK % 80+	DOUBLE LINK % 80-	DEPTH	COMMENTS
BUOY HARDWARE	TOP-3½" PADEYE, 3¼"								CPS VOLTS		BUOY (S/N 138) HAS 3' FREEBOARD.
	SADER, 2½" x 3"							(ANODE)	-.96		RUBBER FENDERS AND CHAFING
	SPIDER, 2" PEAR (3)							(BUOY)	-.81		STRIPING GOOD CONDITION, LIGHT
	BOTTOM - 3" PADEYE, 2⅜" SHACKLE										RUST ON SIDES; MODERATE RUST ON BUOY EDGES AND TOP JEWELRY
RISER	NEAR BUOY	2½"	15"	√√√			√√√		-.79	8'	ONE ANODE 36" x 3" x 3" OBSERVED
	MIDDLE	↓	↓	√√√				√√√	-.79	20'	ABOUT 40% EXPENDED.
	NEAR GRD RG			√√√				√√√	-.75	38'	
GROUND RING		4¼"	x 19"	INSIDE DIAMETER					-.74	40'	ACCESSORIES BETWEEN RISER CHAIN
BRG-GROUND LEG NO. A 140°	UPPER END	2½"	15"	√√√				√√√	-.71	42'	AND GROUND RING — 3" DETACH,
	MIDDLE										3" B LINK, 3" C LINK, 4" ACC
	ENTERS BOTTOM										DETACH.
BRG GROUND LEG NO. B 260°	UPPER END	2¼"	13½"	√√√			√√√		-.73	42'	
	MIDDLE										
	ENTERS BOTTOM										ONLY TOP FEW LINKS OF
VERTICALLY GROUND LEG NO. C INCLINED	UPPER END	2¼"	13½"	√√√				√√√	-.71	42'	EACH ANCHOR CHAIN
	MIDDLE										SUBASSEMBLY VISIBLE,
	ENTERS BOTTOM										

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 2

MOORING NO.: ECHC 2 CLASS: F LOCATION: NWS SEAL BEACH LAT: 33°44'06.7"N LONG: 118°05'45.1"W

BUOY TYPE: PEG TOP (16' DIAM) ANCHOR SIZE/TYPE: 1.1T WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: JAN 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: HARDING GRIFFIN

COMPONENTS		GAUGE SIZE	CONDITION								COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
				90+	80+	80−	90+	80+	80−		
BUOY HARDWARE									CPS WLTS		
RISER	NEAR BUOY										
	MIDDLE										
	NEAR GRD RG										
GROUND RING											
VERTICALLY GROUND LEG NO. D INTO BOTTOM	UPPER END	2¼"	13½"	√√				√√	-.69	45'	
	MIDDLE										
	ENTERS BOTTOM										
GROUND LEG NO.	UPPER END										
	MIDDLE										
	ENTERS BOTTOM										
GROUND LEG NO.	UPPER END										
	MIDDLE										
	ENTERS BOTTOM										

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 2 OF 2

INSPECTION RESULTS

ECHO THREE

Buoy

This is a 10-foot-diameter peg-top buoy. Its two rubber fenders and chafing strip are in good condition. There is some light rust on the fender clips. This buoy is in good condition.

Riser Chain Subassembly

All single- and double-link measurements were greater than 90 percent of its original 2 3/4-inch wire diameter. The ground ring was located at a depth of 39 feet.

Anchor Chain Subassemblies

All subassemblies are buried in the bottom and inaccessible for inspection.

Cathodic Protection

Two zinc anodes, about 50-75 percent depleted, were observed on the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.98 volts at an anode and -.83 volts on the riser chain subassembly near the mud line.

Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class F mooring.

MOORING NO.: ECHO 3 CLASS: F LOCATION: NWS SEAL BEACH LAT: 33°44'05.7"N LONG: 118°05'45.2"W

BUOY TYPE: 16 Tcp (16' DIAM) ANCHOR SIZE/TYPE: NI WATER DEPTH: 46' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 1 AUG 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: PHELPS/MANN (0712 - 1002 HRS)

	COMPONENTS		GAUGE SIZE	CONDITION							COMMENTS
				LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
					90+	80+	80−	90+	80+	80−		
BUOY HARDWARE	Top - 3½" PADEYE									CPS VALVES		BUOY (S/N 16) HAS TWO RUBBER
	2¾" SPIDER								(ANODE)	-.98		FENDERS AND ONE CHAFING RAIL
	Bottom - 3½" PADEYE								(BUOY)	-.90		IN GOOD CONDITION. LIGHT RUST
	3¾" C LINK											NOTED ON FENDER CLIPS. TWO
	2½" SHACKLE											ZINC ANODES (34" x 3" x 3") ON BUOY.
RISER		NEAR BUOY	2¾"	16½"	√√'			√√'			9'	ABOUT 50-75% DEPLETED.
		MIDDLE	↓	↓	√√'			√√'		-.87	21'	
		NEAR GRD RG	↓	↓	√√'			√√'		-.83	36'	ACCESSORIES BETWEEN RISER
GROUND RING			5"	x 19'	INSIDE DIAMETER						34'	CHAIN AND GROUND RING — 2¾"
BRG GROUND LEG NO. A 090°		UPPER END										DETACH, 3" C LINK, 3" C LINK, 4½"
		MIDDLE	BURIED									NACO DETACH.
		ENTERS BOTTOM										
BRG GROUND LEG NO B 120°		UPPER END										GROUND RING TO EACH ANCHOR
		MIDDLE	BURIED									CHAIN SUBASSEMBLY - 4" NACO
		ENTERS BOTTOM										DETACH, 2½" PEAR LINK, 2½"
BRG GROUND LEG NO C 270°		UPPER END										DETACH
		MIDDLE	BURIED									ALL ANCHOR CHAIN SUBASSEMBLIES
		ENTERS BOTTOM										BURIED.

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

ALPHA ONE

Buoy

This is a 12-foot-diameter drum-type buoy. The buoy has a combination wood fender/chafing strip (60 percent deteriorated) covering the junction of the top deck and side. In addition it has two rubber fenders and two rubber chafing strips. About 20 percent of the top fender is missing. The buoy is fiberglass coated with some of the fiberglass worn off at the buoy edges. There is light rust bleeding on the top and sides. The top jewelry has heavy rust and pitting.

Riser Chain Subassembly

All single- and double-link chain measurements were between 80 and 90 percent of its original 2 3/4-inch wire diameter. The ground ring was located at a depth of 33 feet.

Anchor Chain Subassemblies

About 15-20 feet of each subassembly was visible before the chain entered the bottom. The upper and middle sections of the visible chain were measured to be between 80 and 90 percent of original 2 1/2-inch wire diameter.

Cathodic Protection

No cathodic protection system has been applied to this mooring.

Conclusions/Recommendations

The buoy needs to be refurbished. Otherwise, this mooring is in satisfactory condition for continued use in its current capacity as a Class E mooring.

MOORING NO.: ALPHA 1 CLASS: E LOCATION: NWS SEAL BEACH LAT: 33°44'01.8"N LONG: 118°05'27.4"W

BUOY TYPE: DRUM (12' DIAM) ANCHOR SIZE/TYPE: NI WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 30 JULY 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: SAKO/PHELPS (1334 - 1416 HRS)

COMPONENTS		GAUGE SIZE	CONDITION								COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
				90+	80+	80−	90+	80+	80−		
BUOY HARDWARE	TOP-3¼" SHACKLE (2)										TOP JEWELRY HAVE HEAVY PITTING
	2½" REAR (4)										AND CORROSION. FIBERGLASS
	BOTTOM-3" END LINK (3)										COATING WORN OFF AT BUOY
	3¼" DETACH										EDGES. THE BUOY HAS ONE
											WOODEN FENDER/CHAFING STRIP
RISER	NEAR BUOY	2¾"	16½"		√√√			√√√		8'	(60% DETERIORATED) AROUND THE
	MIDDLE	↓	↓		√√√			√√√		25'	JUNCTION OF TOP DECK AND SIDE.
	NEAR GRD RG	↓	↓		√√√			√√√		32'	IN ADDITION, THE BUOY HAS TWO
GROUND RING		5-½"	x15½"							33'	RUBBER FENDERS AND TWO CHAFING
BRNG GROUND LEG NO. A 120°	UPPER END	2½"	15"		√√√			√√√			STRIPS. ABOUT 20% OF THE TOP
	MIDDLE	↓	↓		√√√			√√√			FENDER IS MISSING. THERE IS
	ENTERS BOTTOM	↓	↓	√√√			√√√			42'	LIGHT RUST BLEEDING ON THE
BRNG GROUND LEG NO. B 240°	UPPER END	↓	↓		√√√			√√√			TOP AND SIDES.
	MIDDLE	↓	↓		√√√			√√√			GROUND RING TO EACH ANCHOR
	ENTERS BOTTOM	↓	↓	√√√			√√√			45'	CHAIN SUBASSEMBLY - 4" NAIL
BRNG GROUND LEG NO. C 360°	UPPER END	↓	↓		√√√			√√√			DETACH, 2½" REAR, 3" DETACH.
	MIDDLE	↓	↓		√√√			√√√			ABOUT 15-20' OF EACH ANCHOR
	ENTERS BOTTOM	↓	↓	√√√			√√√			42'	CHAIN SUBASSEMBLY VISIBLE.

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

ALPHA TWO

Buoy

This is a 12-foot-diameter drum-type buoy with a 5-foot freeboard. A combination wood fender/chafing strip covers the junction of the top deck and sides. This timber has grooves worn in it from the movement of wire ropes. There is no other fender on the buoy. The top tension bar padeye is severely corroded and worn. Buoy bottom has about 5 inches of marine growth.

Riser Chain Subassembly

The upper end of this chain is worn to between 80 and 90 percent of its original 2 1/2-inch wire diameter. The ground ring was located at a depth of 32 feet.

Anchor Chain Subassemblies

About 7 feet of subassembly A and 25 feet of subassemblies B and C were visible before the chains entered the bottom. The upper end of subassembly A was measured to be less than 80 percent of its original 2 1/2-inch wire diameter, while the other two legs are between 80 and 90 percent.

Cathodic Protection

Two anodes, about 50 percent depleted, were located on the buoy bottom. Underwater voltmeter readings measured the cathodic protection to be between -.85 volts at the top of the riser chain and -.77 volts at the upper end of the anchor chain subassemblies.

Conclusions/Recommendations

Because anchor chain assembly A measures less than 80 percent of original wire diameter, this mooring is in poor condition. Normally, a measurement this low of any component is cause for the mooring to be removed from service until

the unsatisfactory component is replaced. However, since the reduced wire diameter of subassembly A is still larger than that required for a Class F mooring (1 1/4 inches), this mooring is satisfactory for fleet use as long as it is not subjected to loads in excess of Class F load limits as defined in NAVFACENGCOM Design Manual DM-26.

MOORING NO.: ALPHA 2 CLASS: E LOCATION: NWS SEAL BEACH LAT: 33°44'01.1"N LONG: 118°05'25.5"W

BUOY TYPE: DCLH (13' DIAM) ANCHOR SIZE/TYPE: NI WATER DEPTH: 42' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 30 JULY 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: SAKO/PHELPS (1441-1528 HRS)

COMPONENTS		GAUGE SIZE	CONDITION									COMMENTS	
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH			
				90+	80+	80-	90+	80+	80-				
BUOY HARDWARE	TCP-2¾" SPIDER											CPS WLES	BUOY (S/N 120) HAS A TELSON BAR
	2½" PEAR (2)												AND A 5' FREEBOARD. CHAIN WELDED
	BOTTOM-3¼" END LINK												FENDER/CHAFING STRIP COVERS
	2¾" END LINK												JUNCTION OF THE TOP DECK AND
	2¾" DETACH												SIDE. THIS STRIP HAS GROOVES
RISER	NEAR BUOY	2½"	1.5"		VVV			VVV		8'		-.85	WORN IN IT FROM WIRE ROPES.
	MIDDLE	↓	↓	VVV			VVV					-.80	THERE IS SEVERE CORROSION OF
	NEAR GRD RG	↓	↓	VVV			VVV			30'		-.81	THE TCP PADEYE. TWO ANODES
GROUND RING		5½"	x 15"	INSIDE DIAMETER						32'			(36"x4"x3") ON BUOY BOTTOM
GROUND LEG NO. A	UPPER END	2½"	1.5"			VVV			VVV			-.77	AS WELL AS 5" OF MARINE
	MIDDLE	↓	↓		VVV			VVV		7' TO BOTTOM			GROWTH.
	ENTERS BOTTOM	↓	↓	VVV			VVV			42'			ACCESSORIES BETWEEN RISER
GROUND LEG NO B	UPPER END	↓	↓		VVV			VVV				-.77	CHAIN AND GROUND RING -3⅛"
	MIDDLE	↓	↓							25'	TO BOTTOM		DETACH, 3" END LINK, 3¼" C LINK,
	ENTERS BOTTOM	↓	↓	VVV						42'			4" NACO DETACH. GROUND RING
GROUND LEG NO. C	UPPER END	↓	↓		VVV			VVV				-.78	TO EACH LEG, -3¾" NACO DETACH
	MIDDLE	↓	↓							25'	TO BOTTOM		2¼" PEAR, 2¾" DETACH. TWO
	ENTERS BOTTOM	↓	↓	VVV			VVV			42'			LEGS ARE CROSSED.

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

ALPHA THREE

Buoy

This is a 12-foot-diameter drum-type buoy with a 46-inch freeboard. Its rubber fenders and chafing strip are in good condition. There is moderate rust on the top deck where the paint is worn off and some light rust on the fender clips and manhole covers.

Riser Chain Subassembly

Single- and double-link measurements of the riser chain were all greater than 90 percent of its original 2 1/2-inch wire diameter. The ground ring is lying on the bottom at a depth of 30 feet.

Anchor Chain Subassemblies

The three subassemblies are buried in the bottom and inaccessible for inspection.

Cathodic Protection

Two anodes, about 50 percent depleted, were observed on the buoy bottom. Underwater voltmeter readings measured the cathodic protection to be between -.86 volts near the middle of the riser and -.74 volts at the ground ring.

Conclusions/Recommendations

This mooring is in satisfactory condition for continued use in its current capacity as a Class E mooring. However, the buoy should be refurbished.

MOORING NO.: ALPHA 3 CLASS: E LOCATION: N'LC's SEAL BEACH LAT: 33°43'59.0"N LONG: 118°05'20.7"W

BUOY TYPE: DRUM (12' DIAM) ANCHOR SIZE/TYPE: 1'I WATER DEPTH: 30' VISIBILITY: 2' BOTTOM TYPE: SILT/SAND

DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THORNTON DIVERS: HARDING/MANN (0945-1015 HRS)

	COMPONENTS		GAUGE SIZE	CONDITION							COMMENTS
				LINK LENGTH	SINGLE LINK %			DOUBLE LINK %			DEPTH	
					90+	80+	80–	90+	80+	80–		
BUOY HARDWARE	TOP-3" SPIDER									CPS VOLTS		BUOY (S/N 146) HAS 3'10" FREEBOARD
	1½" SHACKLE (2)											RUBBER FENDERS/CHAFING
	BOTTOM-3" DETACH									-.85		STRIP IN GOOD CONDITION.
	2" PEAR											RUST ON TOP DECK WHERE PAINT
	3" DETACH											IS WORN OFF. LIGHT RUST ON
RISER	NEAR BUOY		2½"	15"	√√√			√√√			8'	FENDER CHIPS AND MANHOLE
	MIDDLE		↓	↓	√√√			√√√		-.86	18'	COVERS, TWO ANODES (3"x4"x4")
	NEAR GRD RG		↓	↓	√√√			√√√		-.83	27'	ON BOTTOM - ABOUT 50% DEPLETED.
GROUND RING			4½"	x16"	NO SIDE DIAMETER					-.74	30'	G.R. LYING ON BOTTOM.
GROUND LEG NO. A	UPPER END											
	MIDDLE		BURIED									GROUND RING TO EACH ANCHOR
	ENTERS BOTTOM											CHAIN SUBASSEMBLY - 3" NACO
GROUND LEG NO.B	UPPER END											DETACH, 2¼" PEAR, 2½" DETACH.
	MIDDLE		BURIED									
	ENTERS BOTTOM											LEGS APPEAR TO BEAR TO THE
GROUND LEG NO. C	UPPER END											NORTH. ANCHOR CHAIN
	MIDDLE		BURIED									SUBASSEMBLIES NOT
	ENTERS BOTTOM											VISIBLE (BURIED IN BOTTOM)

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

INSPECTION RESULTS

ALPHA FOUR

Buoy

This is a 12-foot-diameter drum-type buoy. Its two rubber fenders and chafing strip are in good condition. The top tension bar eye is worn to almost 80 percent of its original wire diameter. There is some light rust on the top deck and heavy rust spots on the sides.

Riser Chain Subassembly

Single- and double-link measurements were all greater than 90 percent of original 2 3/4-inch wire diameter. The ground ring was located near the bottom at a depth of 24 feet.

Anchor Chain Subassemblies

About 10 feet of subassemblies A and B was visible but subassembly C is buried. Measurements of the visible chain were greater than 90 percent of original 2 1/2-inch wire diameter.

Cathodic Protection

Two anodes, about 20 percent depleted, were located on the bottom of the buoy. Underwater voltmeter readings measured the cathodic protection to be between -.85 volts on the buoy and -.77 volts at the upper end of anchor chain subassembly A.

Conclusions/Recommendations

This mooring is in fair condition and satisfactory for continued use in its current capacity as a Class F mooring. However, the buoy tension bar should be replaced.

MOORING NO.: ALPHA 4 CLASS: E LOCATION: NWS SEAL BEACH LAT: 33°44'02"N LONG: 118°05'19.5"W

BUOY TYPE: DRUM (12' DIAM) ANCHOR SIZE/TYPE: NI WATER DEPTH: 25' VISIBILITY: 1' BOTTOM TYPE: SILT/SAND

DATE: 31 JULY 84 ENGINEER-IN-CHARGE: J.A. THORLTON DIVERS: HARDING/MANN (0901-0946 HRS)

COMPONENTS		GAUGE SIZE	CONDITION							DEPTH	COMMENTS
			LINK LENGTH	SINGLE LINK %			DOUBLE LINK %				
				90+	80+	80–	90+	80+	80–		
BUOY HARDWARE	TOP - 3¼" SPIDER								CPS VOLTS		BUOY (S/N 140) HAS TWO RUBBER
	2¼" PEAR (2)								-.85		FENDERS AND A RUBBER CHAFING
											STRIP. TOP PADEYE WORN TO 92%
											OF ORIGINAL DIAMETER. LIGHT
											RUST ON TOP DECK. HEAVY RUST
RISER	NEAR BUOY	2¾"	16½"	√√			√√			7'	SPOTS ON SIDES. TWO ANODES
	MIDDLE			√√			√√		-.84	16'	(36" x 4" x 4") ON BUOY BOTTOM.
	NEAR GRD RG			√√			√√			22'	ANODES ABOUT 20% DEPLETED.
GROUND RING		4"	x19"	INSIDE	DIAMETER					24'	ACCESSORIES BETWEEN RISER
GROUND LEG NO. A	UPPER END	2½"	15"	√√			√√		-.77	25'	CHAIN AND GROUND RING - 2½"
	MIDDLE							10' TO	BOTTOM		DETACH. 2½" B LINK, 2½" C LINK,
	ENTERS BOTTOM										4" NACO DETACH.
GROUND LEG NO B	UPPER END	2½"	15"	√√			√√			25'	LIGHT TO MODERATE RUST ON
	MIDDLE							10' TO	BOTTOM		FENDER CLIPS. GROUND RING
	ENTERS BOTTOM										TO EACH ANCHOR CHAIN
GROUND LEG NO. C	UPPER END										SUBASSEMBLY - 4" NACO DETACH,
	MIDDLE	BURIED									2½" PEAR, 2½" DETACH.
	ENTERS BOTTOM										GROUND LEG C BURIED

FOR ADDITIONAL LEGS USE OTHER SHEETS

SHEET 1 OF 1

ANNEX B

SURVEY OF SEAL BEACH

FLEET MOORINGS

SEAL BEACH

CONTROL POINT DESCRIPTION

(see figure B-1)

Station #1 - This station is located between Anaheim Bay and the protected anchorage on the spit of land to the northwest of the channel entrance into Anaheim Bay. The marker is a bronze metal disk in the concrete designated T1001.

Station #2 - This station is located between Anaheim Bay and the protected anchorage on the spit of land to the southeast of the channel entrance into Anaheim Bay. This marker is a temporary orange survey marker implanted but not placed in concrete. It is 500 feet southeast of Station #3 which is a permanent marker. The orange marker is on the protected anchorage side of the spit.

Station #3 - This station is on the southeast spit of land from the channel entrance into Anaheim Bay. The marker is at the end of the spit near the channel entrance and more to the bay side. It is a permanent marker placed in concrete and designated 196.

Station #4 - The station is a temporary marker made by the survey team. It is located on the northwesterly most pier in Anaheim Bay at the Weapons Station. The chiseled "X" is on the left of the pier when facing the bay and marked UCT-2 STATION #4 in orange paint. The pier is southeast of the boat ramp.

Station #6 - The station is a permanent marker on the southeast side of the bay. The marker is designated U1001 and is on the southeast corner of the ship unloading pier close to the water.

The listed stations do not have horizontal control. It was necessary to use the Seal Beach North Water Tank located in the administrative area of the depot,

designated Building 207, and the Seal Beach Navy Radar Tower located near the demolished bridge on old Anaheim Bay Road, designated Building 360, as horizontal control points.

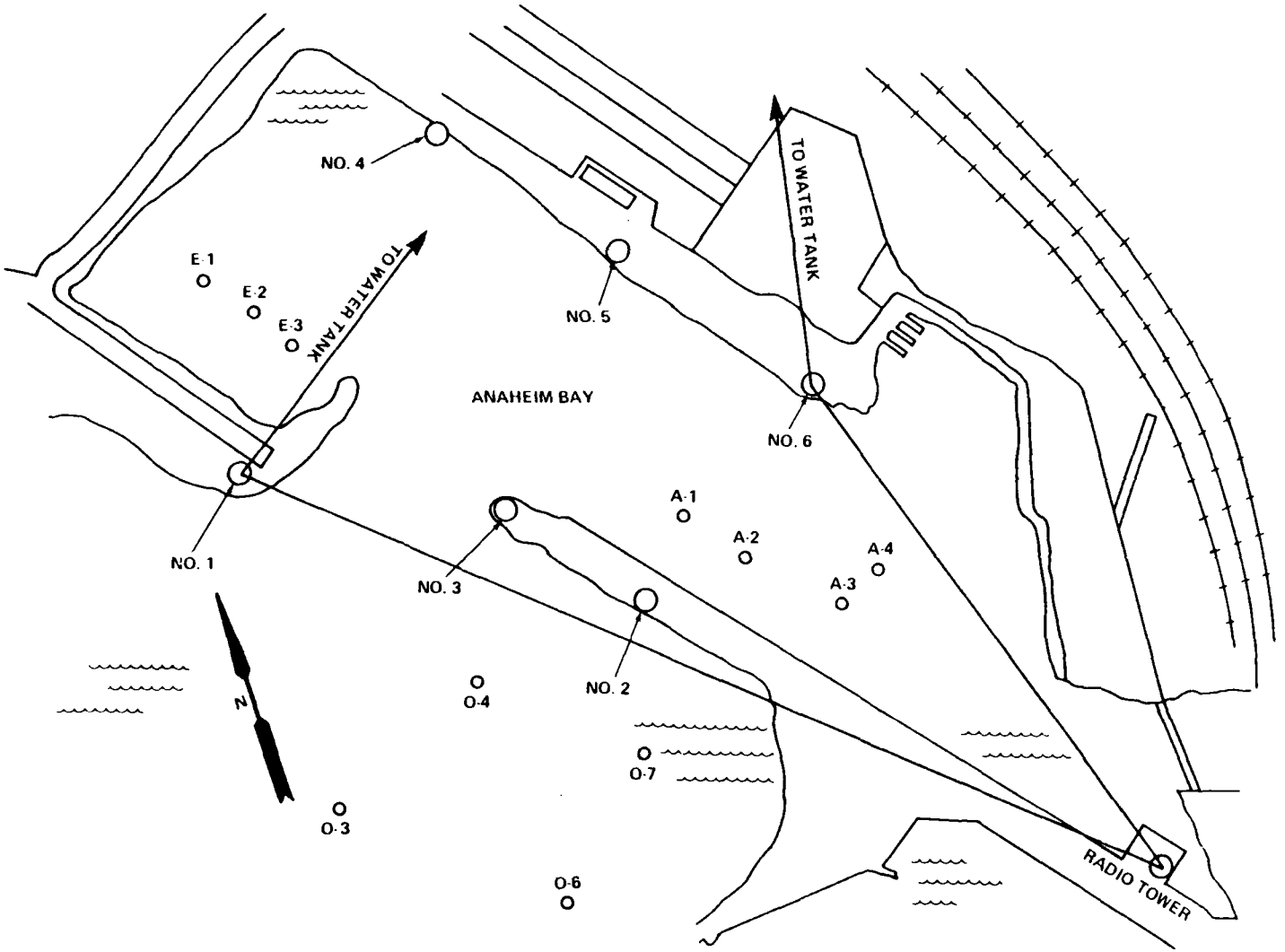


FIGURE B-1. SEAL BEACH CONTROL POINT LOCATIONS

SEAL BEACH SURVEY DATA

Control Points	Designation
Station 1	T1001
Station 2	Orange Marker
Station 3	196
Station 4	UCT-2 marker on pier chisel X
Station 6	U1001

BL = Station 1 to Station 2

	Angle from BL			
Buoy	#1	#2	LATITUDE	LONGITUDE
Oscar 1	85.12°	297.36°	33°43'41.9"N	118°05'50.2"W
Oscar 3	66.67°	303.82°	33°43'50.1"N	118°05'42.6"W
Oscar 5	60.07°	285.30°	33°43'45.5"N	118°05'39.7"W
Oscar 6	106.67°	325.68°	33°43'53.6"N	118°05'51.9"W
Oscar 7	106.67°	318.62°	33°43'49.8"N	118°05'55.2"W
Oscar 8	106.88°	313.53°	33°43'45.9"N	118°05'58.7"W
Alpha 1	345.97°	90.12°	33°44'01.8"N	118°05'27.4"W
Alpha 2	348.05°	118.83°	33°44'01.1"N	118°05'25.5"W

BL = Station 1 to Station 3

	Angle from BL			
Buoy	#1	#3	LATITUDE	LONGITUDE
Oscar 2	86.90°	292.77°	33°43'45.3"N	118°05'40.5"W
Oscar 4	48.57°	283.62°	33°43'54.4"N	118°05'37.5"W

SEAL BEACH SURVEY DATA (continued)

BL = Station 1 to Station 4

Buoy	Angle from BL #1	#2	LATITUDE	LONGITUDE
Echo 1	284.49°	36.10°	33°44'07.7"N	118°05'50.9"W
Echo 2	295.49°	24.92°	33°44'06.7"N	118°05'48.1"W
Echo 3	310.64°	12.33°	33°44'05.7"N	118°05'45.2"W

BL = Station 4 to Station 6

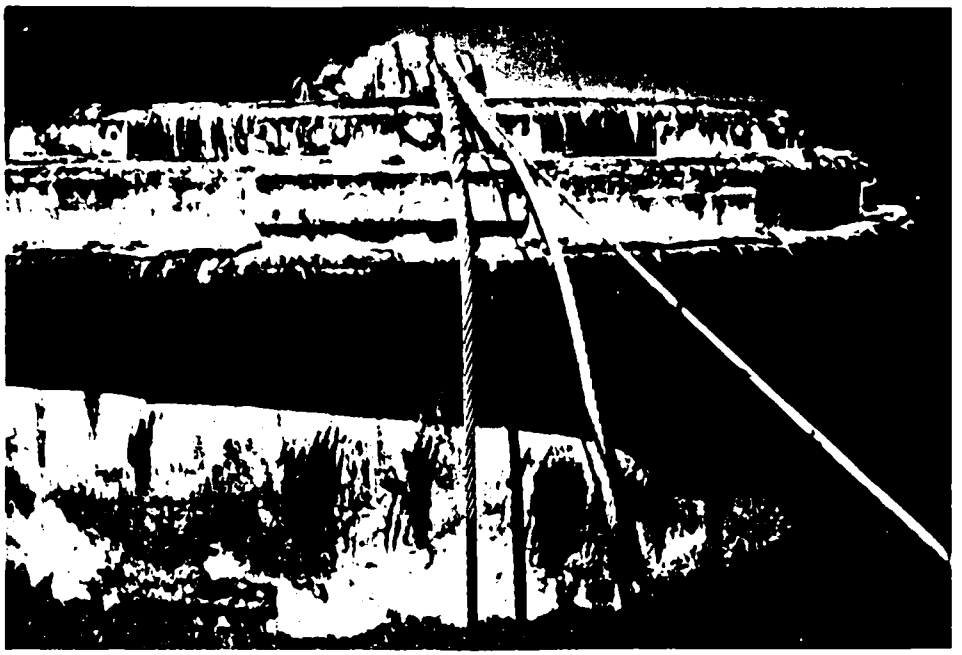
Buoy	Angle from BL #1	#2	LATITUDE	LONGITUDE
Alpha 3	13.87°	266.72°	33°43'59.0"N	118°05'20.7"W
Alpha 4	9.60°	255.32°	33°44'02.0"N	118°05'19.5"W

BL = Station 1 to Station 6

Buoy	Angle from BL #1	#2	LATITUDE	LONGITUDE
S. B. Navy Radar Tower	32.35°	241.21°		
S. B. North Water Tower	301.25°	102.06°		

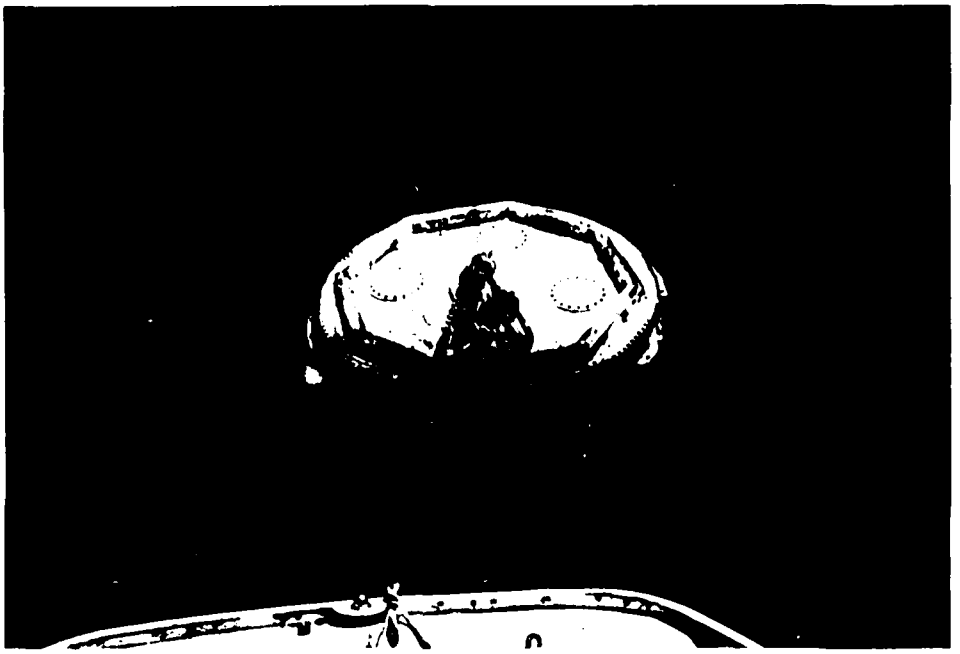
ANNEX C

PHOTOGRAPHS



OSCAR 2. Lower Fender Badly Deteriorated. Deep Scratches and Rust on the Sides.

OSCAR 3. Top Padeye and Jewelry Severely Worn.



Oscar 5. Buoy Listing Severely. Marine Growth on Top of the Buoy.

ALPHA 1. Rubber Fender Torn Away from Sides. Outer Deck-Edge Chafing Strip Missing.

ANNEX D

PRELIMINARY INSPECTION REPORT

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U U N C L A S S I F I E D U
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ROUTINE

R 2418327 AUG 84

FM CHESNAVFACENGCOM WASHINGTON DC

TO WPNSTA SEAL BEACH CA

INFO COMNAVFACENGCOM ALEXANDRIA VA COMCORPAC PEARL HARBOR HI
WESTNAVFACENGCOM SAN BRUNO CA UCT TAG

BT
UNCLAS //N11400//

SUBJ: FLEET MOORING INSPECTION

1. A CHESDIV/DET TWO UNDERWATER INSPECTION OF THE FLEET MOORINGS AT WPNSTA SEAL BEACH WAS CONDUCTED DURING THE PERIOD OF 30 JULY TO 3 AUG [illegible] 1984. THE FOLLOWING IS A PRELIMINARY REPORT OF THE RESULTS AS RELAYED IN A PHONCON BETWEEN MS. S. FUGICKA, WPNSTA SEAL BEACH, AND MR. J. THURNTON, CHESDIV, ON 22 AUG 1984.

2. MOORINGS OSCAR -2, -3, AND -4 ARE IN POOR CONDITION AND UNSATISFACTORY FOR FLEET USE BECAUSE OF WEAR IN THE CHAIN TOP JEWELRY ON THE BUOY.

3. MOORINGS ALPHA -2 AND ECHO -2 ARE IN POOR CONDITION BECAUSE OF CHAIN WEAR. HOWEVER, THESE MOORINGS ARE SATISFACTORY FOR THEIR REPORTED USE OF CLASS E AND CLASS F RESPECTIVELY.

4. THE FOLLOWING MOORINGS ARE IN FAIR CONDITION BUT ARE SATISFACTORY FOR THEIR REPORTED USE:
A. OSCAR -1, -6, AND -8, AND ALPHA -1, -3 AND -4 ARE SAT FOR CLASS E,
B. ECHO -1 AND -3 ARE SAT FOR CLASS F.

5. MOORING OSCAR -5 IS IN FAIR CONDITION ACCORDING TO CHAIN MEASUREMENTS. HOWEVER, THE BUOY IS LISTING SEVERELY AND ITS USE SHOULD BE RESTRICTED UNTIL THE CAUSE OF THE LIST HAS BEEN DETERMINED.

6. MOORING OSCAR -7, IS IN GOOD CONDITION AND IS SATISFACTORY FOR CLASS E USE. HOWEVER, THE BUOY IS LISTING AND ITS USE SHOULD BE LIMITED UNTIL THE CAUSE OF THE LIST HAS BEEN DETERMINED.

CNR:CHESNAVFACENGCOM WASHINGTON DC(9)...ORIG

RIC:000-000/COPIES:0009

/0546/0231/237 - 1 OF 2 M1 0210 23//21:19Z 2418327 AUG 84
..SXCT052U CHESNAVFACENGCOM WASHINGTON DC

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U U N C L A S S I F I E D U
UUUUUUUUUU UUUUUUUUUUUUUUUUUUUUUUUU

7. REPORT OF THE FINAL EVALUATION WILL FOLLOW. POC AT THIS COMMAND IS L. PENNINGTON AT (202) 433-6606 OR A/V 288-6606
BT

END

DTIC

7-86