CCN: CTO-0026/0350
FILE: 0208

MEETING MINUTES

Meeting Subjects:	Meeting Date: 20 March 1996
1. Port of Long Beach, Dredging Project for West Basin, Pier T 2. CTO-0110 Kickoff 3. Technical Presentation - Findings of Remedial Investigation, West Basin (Site 7) CTO-026 (RI) Site 7 - West Basin	Meeting Time: 0900 BNI - Norwalk Conference Room 7W

Attendees:

SWDIV	BNI	Agencies
Mike Radecki (RPM)	Krish Kapur (PM)	John Christopher, Cal-EPA/DTSC
Chris Leadon (RTM)	Ömer Kadaster (K)	Alvaro Gutierrez, Cal-EPA/DTSC
Alan Lee	David Liu	Sharon Lemieux, Cal-EPA/DTSC
Bill Fisher	Roy Woodward	Martin Hausladen, USEPA
C. Anna Ulaszewski, LBNSY	Tom McDonnell (BC)	Ned Black, USEPA
CDR Jim Owens, LBNSY	Serge Baghdikian	Jane Diamond, USEPA
CDR Alan Lerchbacker, LBNSY	Sharon Ohannessian (K)	Judith Winchel, USEPA
Steve Hall, LBNSY	Susan Livenick	Hugh Marley, RWQCB-LA
John Pfeiffer, LBNSY	Edward Morelan	Shirley Birosik, RWQCB-LA
John Hill, BRAC	Kathy Stevens	Patricia Velez, Cal-DFG
Faiq Aljabi	BC = Brown and Caldwell	
Louis Misko	K = Kleinfelder	
		Port of Long Beach
		Bob Kanter
		Paul Ward
		Stacey Crouch
		Thomas D. Johnson

copies to:

Walter Sandza, SWDIV	Bong Kown, BNI	Clarence Callahan, USEPA
	Jim Moe, BNI	Laurie Sullivan, NOAA
	John Kluesener, BNI	Carol Roberts, U.S. Fish & Wildlife
	Noriko Kawamoto, BNI	Michael Martin, Cal Fish & Game
		Allen Winans, Cal-EPA/DTSC

Mike Radecki, RPM, welcomed the attendees and called the meeting to order. All attendees introduced themselves. Bob Kanter of the Port of Long Beach (POLB), presented an overview of the POLB's Plans for Pier "T" development and dredging project for West Basin:

- The purpose of the POLB's presentation was to provide an understanding of the POLB's intent of the West Basin waters, and Naval Station and Shipyard land.

- POLB's main project is a new container terminal to be located on a large portion (130 acres) of the former Naval Station property. There are numerous historical buildings on this site, which will require significant evaluation. POLB is also considering a shipyard/boatyard for a portion of the Naval Shipyard.

- An EIR is currently being prepared for the planned container facility (there will be a need to clear land and demolition of existing buildings).

- The berthing requirements of the new facility are a 2,500-foot wharf to hold 2 container ships that will draw around 50 feet of water. The current depth of the northwest portion of West Basin is 20 to 45 feet, and therefore the POLB will need to dredge a significant amount of sediment. There is a testing/sampling plan currently in place for developing a dredging and sediment disposal plan, and for preparing the required permit applications.

- POLB's goal is to have a functioning container terminal by October 1998.

- The land and groundwater environmental concerns are minimal.

- POLB is reviewing possible actions for dealing with the least tern colony, an endangered species, located at the adjacent Port of Los Angeles property. An option is to replace their foraging habitat.

- POLB is also initiating West Basin surge studies to be conducted using the harbor model located at the Vicksburg U.S. Army Corps of Engineers Waterways Experiment Station (WES).

- POLB has developed an aggressive time schedule.

B. Kanter then turned the presentation over to Tom Johnson of POLB to discuss the dredging specifics:

- The northwest area of West Basin will need to be dredged to -51 feet to accommodate the container ships. Sediment testing will be conducted to -53 feet. Some dredging will be conducted at the West Basin entrance and for an approach channel, but the dredging effort will be primarily focused on the northwest corner, at the berthing areas and turning basin in front of the berths.

- A sediment sampling and analysis plan (SAP) for purposes of dredge disposal permits was submitted to and approved by the EPA. A separate SAP has been submitted to the LAWQCB. The SAP assumes that the sediments near Piers 6 and 7 will not be suitable for ocean disposal. A report of the sediment sampling/analysis results will be completed in early June 1996. It is estimated that 2.5 to 3 million cubic yards of sediment will be dredged, from this area, and disposed. POLB is not planning to ocean-dispose sediment dredged from the area extending from Piers 6 and 7 to Pier 3; POLB assumes the sediments from the pier area will not be deemed suitable for ocean disposal. POLB assumes that sediments will most likely be disposed of in an encapsulated area within Los Angeles/Long Beach (LA/LB) Harbor or on land.

- Approximately 3 million cubic yards of sediment will be dredged, all of which cannot be placed into LA-2 (POLB has been allowed to place no more than 500,000 cubic yards into LA-2). 750,000 cubic yards may be used to create a new least tern foraging area (sediments will be encapsulated and topped with clean fill). POLB may also store dredged sediments for future structural fill, or may provide the dredged materials to the Port of Los Angeles for use as structural fill.

- Piers 6, 7, and 9 are planned to be removed.

- The dredge permit applications will be submitted late June 1996 (the data analyses must first be completed and the EIR certified). The EIR is scheduled for release the end of May 1996. POLB is planning on receiving the dredge permit October 1996.

Stacey Crouch of POLB discussed POLB's planned resolutions to the endangered species concerns:

- The biological concerns are twofold: 1) there is a shallow water foraging area on the outside of the Navy Mole that is used by the local least tern colony (an endangered species); and, 2) a colony of black-crowned night herons nest in the trees populating the land planned for clearing.

- The least tern habitat will most likely be relocated off of the elbow of the Navy Mole; there are other potential sites also.

- POLB is proposing to relocate the herons to the end of the Navy Mole. The colony is currently dispersed throughout the former Naval Station property, but most are nesting in trees on the northwest area of the former Naval Station. About 200 nests exist; it is not known how many are occupied.

Paul Ward of POLB discussed other outstanding issues not addressed by the CTO-0026 Remedial Investigation:

- Control of West Basin waters revert to the POLB one year after the waters are no longer being utilized for federal purposes (per a 1963 legal document). West Basin was last used by the Navy September 1994.

- The primary outstanding issue concerns property classification. Mr. Ward recapped the IR sites that are still being studied at the Long Beach Naval Complex. POLB is concerned that small pieces of land can hold up the transfer of the majority of the Naval Station and Naval Shipyard land. POLB is seeking access to the entire Naval Complex property by October 1996 to begin construction.

Break

The CTO-0110 kick-off meeting followed the POLB presentation. CTO-0110 is for development of Proposed Plans and Records of Decision (RODs) for IRP Sites 1 through 5, 6a, and 7 at the Long Beach Naval Complex. Definitions of tasks and schedule were discussed. A detailed minutes of meeting are being issued for the kick-off discussions separately under CTO-0110.

The meeting resumed with the CTO-026 technical presentation. Ömer Kadaster, CTO-026 Leader, provided the introduction and project overview:

Introduction

- The objectives of the meeting were to discuss the findings of the remedial investigation conducted at the West Basin and to obtain from the Agencies their questions and disagreements, if any, regarding the Draft RI Report.

Project Overview

- Ö. Kadaster provided a background description of the project, including a physical description of the site.

- Ö. Kadaster demonstrated the complexity of the project by presenting a list of the many technical oversight Agencies that were involved (most of whom were attending this presentation).

- The key issues/objectives of the RI were to 1) assess sediment toxicity to marine organisms; 2) assess whether toxicity of sediments pose a risk to ecology; 3) assess whether chemicals in fish pose a risk to aquatic predators; and 4) assess whether chemicals in fish pose a risk to recreational and subsistence anglers.

- S. Baghdikian presented a summary of historical discharges to the LA/LB Harbor areas and discussed the current status of discharges to the West Basin.

- Ö. Kadaster summarized the work performed: preparation and implementation of work plans for sediment and fish tissue collection and analysis, and risk assessment methodologies; surface and subsurface sediment sample collection (beneath piers, open basin, and at reference stations); fish tissue collection (whole body, fillet, and

bile); obtaining physical, chemical, and biological analyses; obtaining benthic community analysis; data verification and validation; data management and uploading of laboratory data into an electronic database; performing statistical analyses of data; conducting human health and ecological risk assessments; assess whether mitigation is needed; and preparation of RI Report.

- Ö. Kadaster discussed the site characterization activities, which included physical measurements (grain size and total organic carbon), chemical analyses, bioaccumulation tests, bioassay tests, and benthic community analyses of West Basin and reference sediments.

Data Evaluation

- T. McDonnell presented an overview of the statistical techniques developed and used to evaluate data, characterize the West Basin, assess risk, and develop conclusions.

- T. McDonnell described, in further detail, the data evaluation approach, which was based on sediment evaluation zones (SEZs). The purpose of SEZ delineation was to group stations together according to similar physical and chemical characteristics. SEZs were developed via cluster analysis techniques. The cluster analysis data input included chemicals that were detected in at least 50 percent of West Basin stations. Twenty-four variables were ultimately used in the cluster analyses to develop SEZs.

- T. McDonnell continued his SEZ discussion with the statistical analysis results of West Basin data as compared with reference data:

    - Reference station sediment percent fines were not statistically significantly different from sediment percent fines at any SEZ.

    - No statistically significant difference between SEZ and reference sediment pesticide levels was found.

    - SEZs comprised of sediments beneath and adjacent to piers generally had higher metals concentrations than reference sediments.

    - PAH concentrations at some of the SEZs were statistically significantly higher than at reference stations.

    - Sediment PCB concentrations were statistically significantly higher at many SEZs than reference sediment.

- T. McDonnell continued with a discussion of the physical, chemical, and biological characteristics of each SEZ. The primary results of the SEZ data evaluation were: 1) only SEZs B, G, and H had statistically significantly greater bioassay toxicity (echinoderm development) than reference stations; 2) measured benthic community

indices at each SEZ were not statistically significantly different than reference benthic community indices; and 3) most SEZs were dominated by benthic infaunal species indicating healthy or semi-healthy conditions; indicator species of stressed conditions were absent.

- T. McDonnell next discussed the evaluation matrix that was used as a data evaluation tool to define SEZs potentially requiring additional characterization or remediation (areas of potential ecological concern [AOPECs]). The evaluation matrix summarized and assembled SEZ data results in four categories: chemicals exceeding reference station values, toxicity effects to test organisms, benthic community structure statistically significantly different than reference stations, and bioaccumulation of chemicals in clam tissue. Interpretations of the possible combinations of the results of these categories, as well as the resultant SEZ status, were pre-established at the onset of the project.

- On the basis of using the evaluation matrix approach to data evaluation, 3 of the 8 SEZs were defined as AOPECs: B, G, and H.

- T. McDonnell then explained that the AOPECs were evaluated in the ecological risk assessment portion of the Draft RI Report. Correlation and regression analyses were performed on the data in an attempt to determine if chemical concentrations were related to toxicity (as measured by bioassays). Although sediments from SEZs B, G, and H were found to cause echinoderm toxicity, echinoderm toxicity "hits" were found throughout West Basin, even at sampling stations with low levels of chemical concentrations. Therefore, the RI concluded that echinoderm toxicity was due to a stressor other than those measured as part of the RI. In addition, benthic infauna at SEZs B, G, and H did not appear to be adversely affected.

- Based on the ecological risk assessment findings, the proposed recommendation for West Basin was no further action.

A number of questions and discussion items were raised by the attendees:

- B. Fisher questioned if BNI found any indication that the presence of stressed benthic organisms underneath piers was due to lack of sunlight. T. McDonnell responded that it cannot be distinguished what type of stress is causing the presence of an indicator species, although the presence of oligochaetes (worms) frequently indicates reduced oxygen stressed conditions.

- S. Birosik commented that depth is probably not a stress factor, because she sees the same indicator organisms from Consolidated Slip, Los Angeles Harbor, which is 25 feet deep, similar to the depth of West Basin.

- R. Woodward discussed the "Pier Model" used to describe the benthic community structure that was found underneath West Basin piers. Piers act as a screen for water moving within a harbor, and therefore sediment and debris build up underneath piers. In addition, the Navy has periodically dredged alongside the piers, thereby

creating an even greater build-up underneath the piers. Also, shell hash accumulates underneath the piers, as shellfish such as mussels fall from the pier pilings. The build-up of debris and shell hash eventually stagnates the sediment environment underneath the piers.

- A. Ulaszewski was curious if temperature variations could be causing stressed conditions. It was generally agreed by meeting members that this was not the case.

- The issue of using a reference pier to compare the West Basin pier data with, was brought up. S. Birosik mentioned that the main channel of LA/LB Harbor contains fairly uncontaminated piers that could be used as a reference comparison.

- M. Radecki reminded the meeting members that sediment underneath piers is not directly comparable to sediment from open water areas. C. Leadon also stated that natural contamination must be distinguished from anthropogenic contamination (e.g., the state of Florida has areas of uncontaminated waters with sediments of high organic content; the same benthic indicator species of stressed conditions that were found under West Basin piers are found in such Florida sediments).

- S. Birosik stated that the sediments under West Basin piers have high contaminant levels (PCBs/PAHs) as compared to what the State Water Resources Control Board (SWRCB) sees elsewhere in San Pedro Bay. She also commented that, after examining the cluster analysis dendrograms, Reference Stations 40010 and 40032 look very different from West Basin both physically and chemically; Reference Station 40018 is most comparable to West Basin.

- C. Leadon responded that SWDIV has a standard procedure in place regarding selection of reference stations; the Agencies have been aware of this procedure since inception of the West Basin RI program.

- J. Christopher commented that the benthic diversity at Station 46 looks very different than the other 2 stations underneath Pier 12. He suggested that if BNI examines Station 46 by itself and can explain the data results, BNI may be able to explain the results for the entire West Basin (i.e., explain "inconclusive" results). He also questioned the applicability of the chosen bioassay tests for beneath-pier conditions.

- S. Birosik believes that there are adverse impacts to the West Basin benthic community because of the high levels of contaminants and the presence of oligochaete worms in the sediment underneath piers.

- K. Kapur responded that if sediments beneath the piers were "cleaned-up", the same ecological conditions as presently existing will have developed within 5 years. Therefore, the shell hash has provided a natural cap to beneath-pier sediments.

- A. Lee added that the RI assumes piers stay in place and undisturbed within the West Basin; with that assumption, the RI concludes that the West Basin ecosystem is

healthy. If the POLB wants to remove the piers, dredge, etc. POLB will need to address the risks posed by such disturbances within their EIR.

- S. Birosik reminded the meeting members that sometimes best professional judgment must be used in decision-making, not just statistical numbers. She would rather have the RI conclude with a "lack of conclusion" than "no action".

- M. Radecki responded that the environment underneath the piers is different from the open water, and because no reference pier exists, the RI may not be able to come to a conclusion regarding beneath-pier conditions.

- N. Black stated that Appendix N, Figures 8B, 8C, 9B and 9C were not readable due to print being very small. O. Kadaster said that BNI will endeavor to provide readable copies. N. Black also asked for a reference for fish productivity and asked whether the pilings were sampled. BNI responded that the pilings were not sampled.

- J. Christopher said that he finds the report good, similar to the September 1994 presentation, and asked about the findings on the fish bile. BNI responded that 4 PAHs were found in fish bile from West Basin, in concentrations not statistically significantly different from the reference stations; a discussion on what the findings may mean are presented in the Draft RI Report.

- J. Christopher asked whether sediment quality criteria were useful. T. McDonnell responded that the ER-L and ER-M criteria had been very useful in comparing West Basin sediment data to trends reported from other North American sediment studies.

- S. Birosik mentioned that ERLs and ERMs do not seem to be of much use in LA/LB Harbor investigations. However, there is a new EPA guidance that recommends ERLs and ERMs should be used nationwide for screening purposes.

- S. Birosik observed that the California Enclosed Bays and Estuaries Plan has been struck down by the courts, and no longer exists.

- N. Black stated that the Draft RI Report dismisses sediment resuspension, and does not look at pelagic fish; he did not see the evidence to dismiss.

- J. Christopher responded that Section 3 of the report has a flow chart as to when the water column investigation should be made, if the trigger had been pulled; so far it has not been triggered.

- M. Radecki asked that U.S. EPA discuss and review with its subcontractor reviewing the Draft RI Report their comments; also for the technical oversight agencies to bring their comments together, prior to issuing to SWDIV.

- M. Hausladen mentioned that the review of the report by U.S. EPA was underway; the plan was to provide SWDIV with comments by mid-April 1996. Also, N. Black is replacing Clarence Callahan as ecological risk specialist.

Harbor Seal Hazard Quotient Calculation

- R. Woodward discussed the harbor seal hazard quotient portion of the ecological risk assessment. Consumption of West Basin white croaker was found to present risk to a harbor seal. The risk driver was arsenic. White croaker collected in West Basin had elevated tissue arsenic concentrations, however the arsenic values were similar to arsenic concentrations found in fish collected from other areas of Southern California. In addition, the source of arsenic in white croaker does not appear to be related to arsenic concentrations in West Basin surface sediments.

Human Health Risk Assessment

- D. Liu discussed the West Basin human health risk assessment, which assessed risk to recreational and subsistence anglers ingesting West Basin white croaker and California halibut. No appreciable difference was found between West Basin and reference cancer and noncancer risk. The primary risk driver (both carcinogenic and noncarcinogenic) was arsenic. However, arsenic rapidly converts to a noncarcinogenic form in fish.

Ö. Kadaster concluded the CTO-026 presentation. The general consensus by the oversight Agencies regarding Draft RI comment submittal was that they are trying for a 45 day turn around and so the comments should be received by BNI mid-April 1996.

Copies of legible Figures 8B, 8C, 9B and 9C will be transmitted with the minutes of this meeting.

Figure 8b. Results of cluster analysis on all samples: Species dendrogram

(see Appendix E-2 for Bray Curtis Matrix)

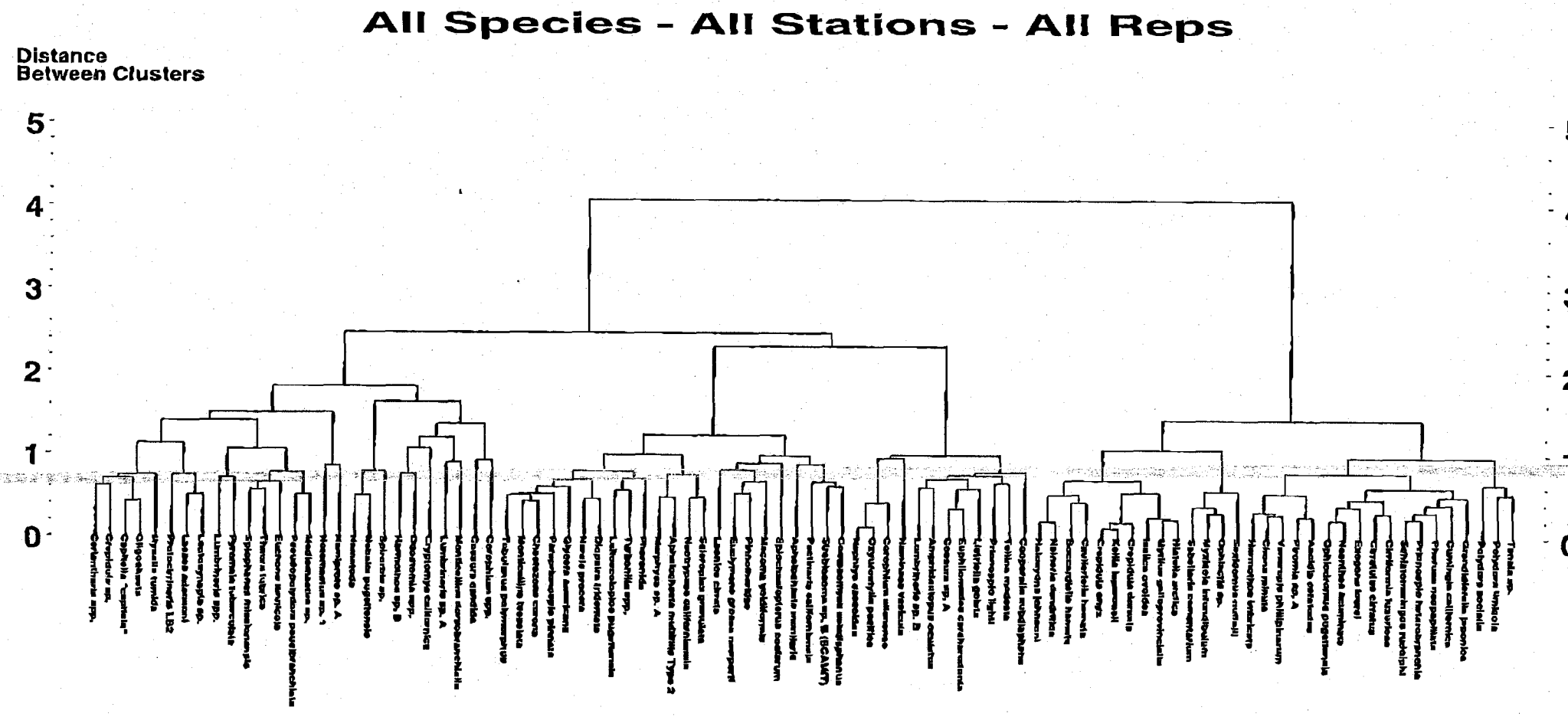
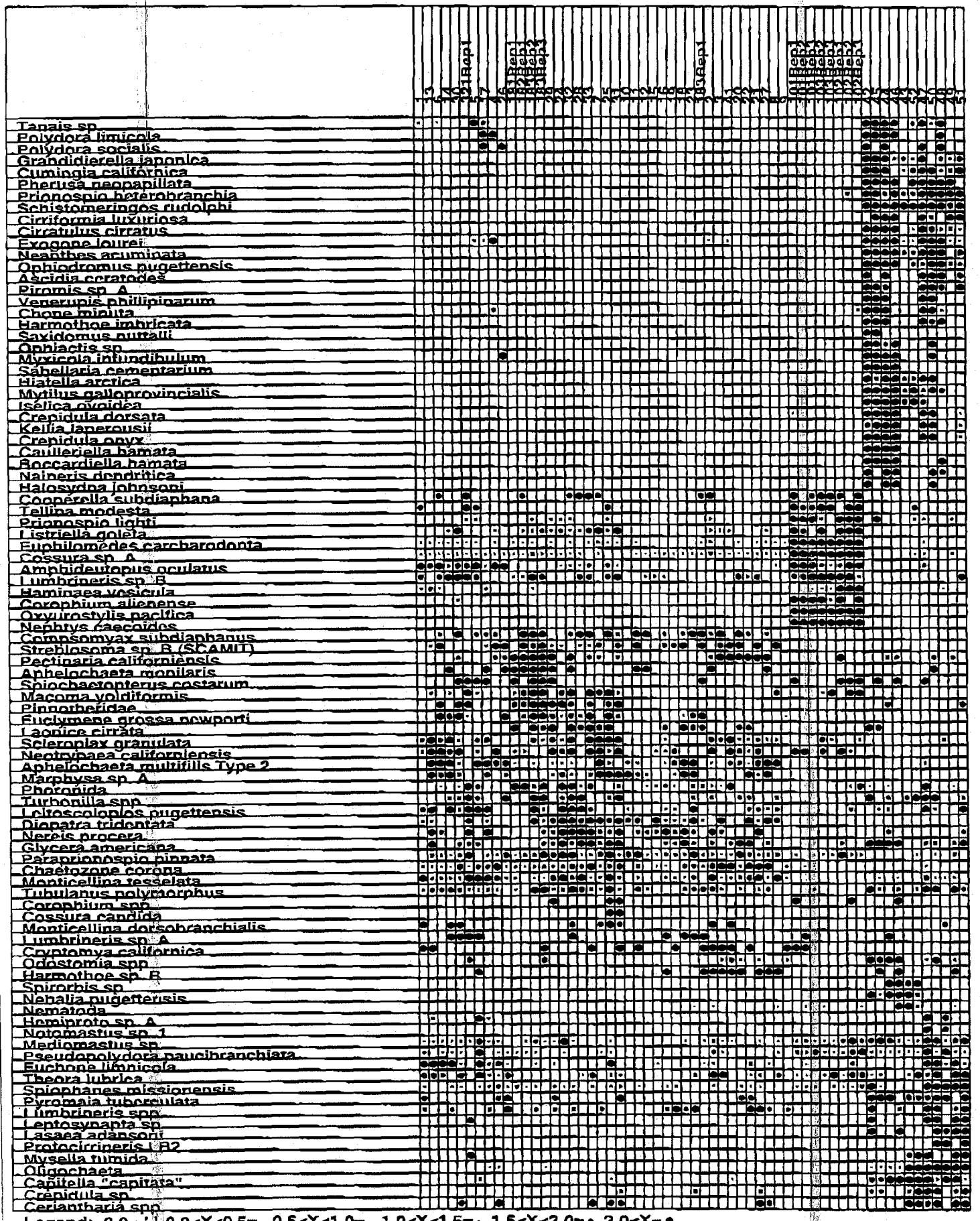


Figure 8c. Results of cluster analysis on all samples: Summary two-way table

All Species - All Stations - All Reps



Legend: 0.0= ' ' 0.0<X<0.5=. 0.5<X<1.0=, 1.0<X<1.5=• 1.5<X<2.0=• 2.0<X=●

Abundance as ratio of species station/time mean to species grand mean

Figure 9b. Results of cluster analysis for West Basin samples: Species dendrogram (see Appendix F-2 for Bray-Curtis Matrix)

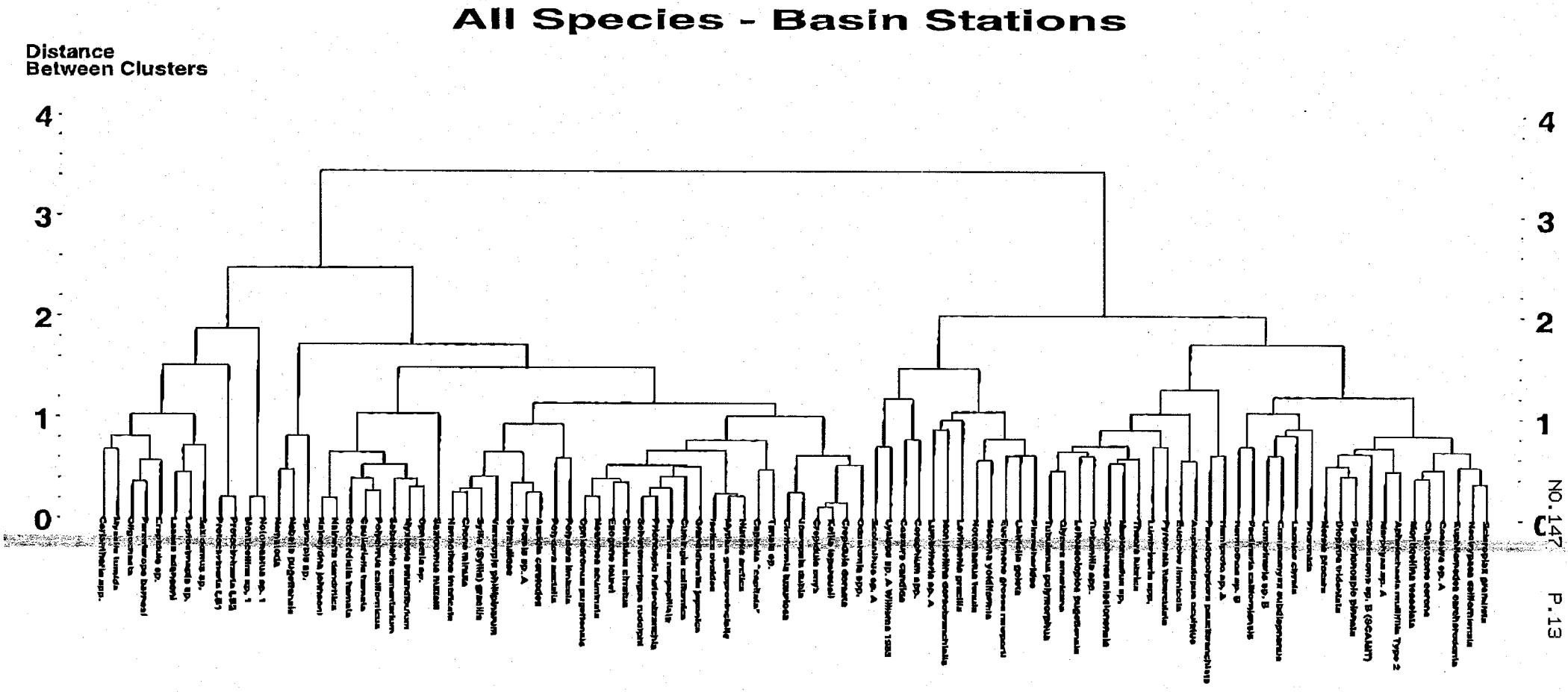
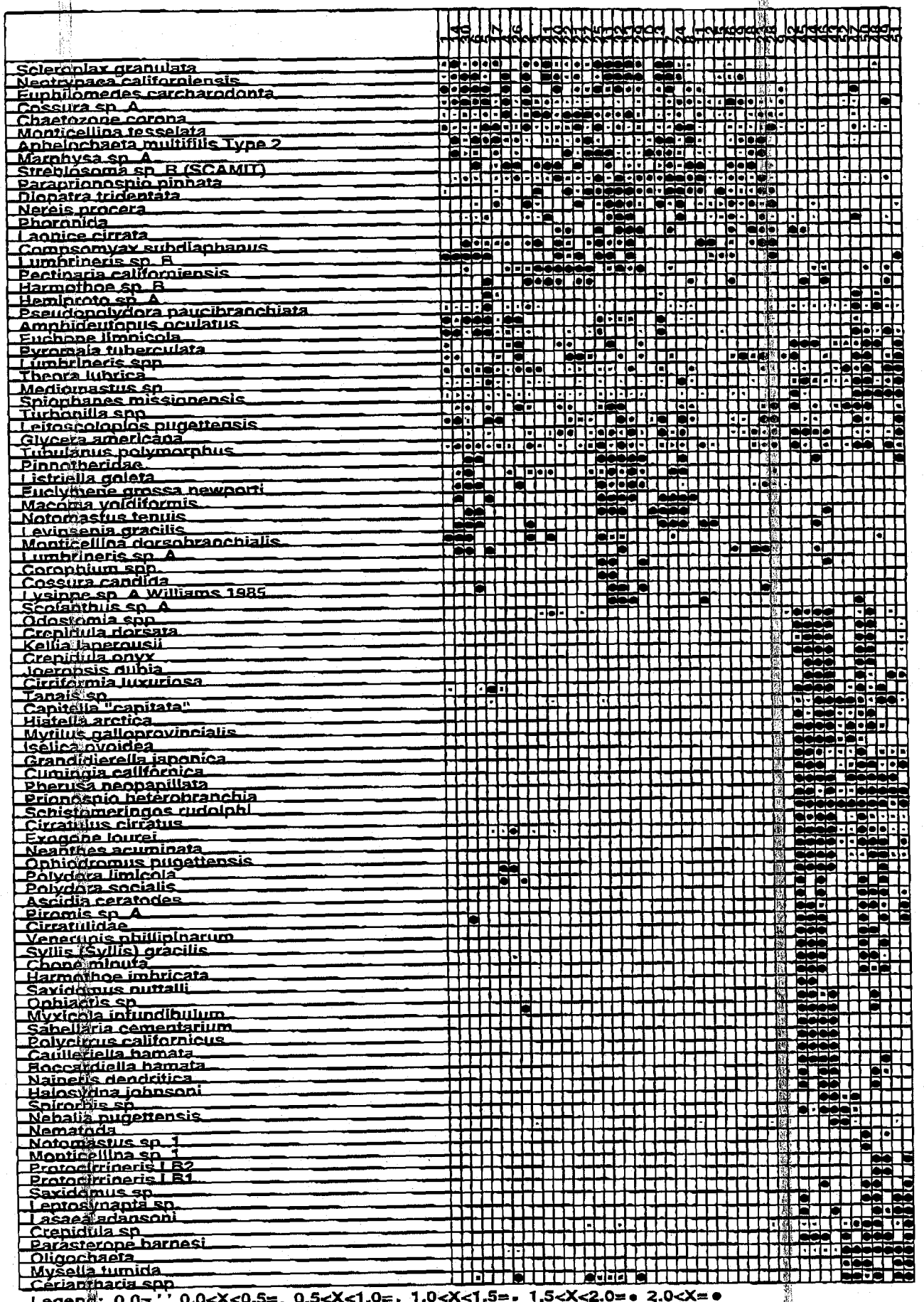


Figure 9c. Results of cluster analysis for West Basin samples:
Summary two-way table

All Species - Basin Stations



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Abundance as ratio of species station/time mean to species grand mean

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Fax # (619) 634-0439	Fax #

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L6351	METALS	CLP-SOW	4.37	14	D	4			
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L6351	CHROMIUM VI	EPA-7196	4.15	14	D	3			
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L6351	CYANIDE	EPA-9010	10.2	14	D	15			
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L6360	PCBs ONLY	CLP-SOW	8.2	14	C	5			
L6360	PAH	EPA-8310	7.13	14	C	5			
L6360	METALS	CLP-SOW	9.37	14	C	8			
L6360	CHROMIUM VI	EPA-7196	9.15	14	C	12			
L6360	FLUORIDE	EPA-340.2	10.28	14	C	12			
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L6360	PH	EPA-9045	10.37	14	C	6			
L6372	METALS	CLP-SOW	9.37	14	C	4			
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L6374	METALS	CLP-SOW	4.37	14	C	4			
L6374	CHROMIUM VI	EPA-7196	4.15	14	C	3			
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L6521	CHROMIUM VI	EPA-7196	9.15	14	C	15			
L6521	CHROMIUM VI	EPA-7196	4.15	14	C	3			
L6521	FLUORIDE	EPA-340.2	10.28	14	C	15			
L6521	FLUORIDE	EPA-340.2	5.28	14	C	3			
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L6598	PAH	EPA-8310	7.13	14	C	7			
L6598	METALS	CLP-SOW	9.37	14	C	12			
L6598	PH	EPA-9045	10.37	14	C	11			
L6632	VOCs	EPA-8240	6.3	14	C	3			
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L6639	METALS	CLP-SOW	9.37	14	D	3			
L6639	PH	EPA-9045	10.37	14	D	1			
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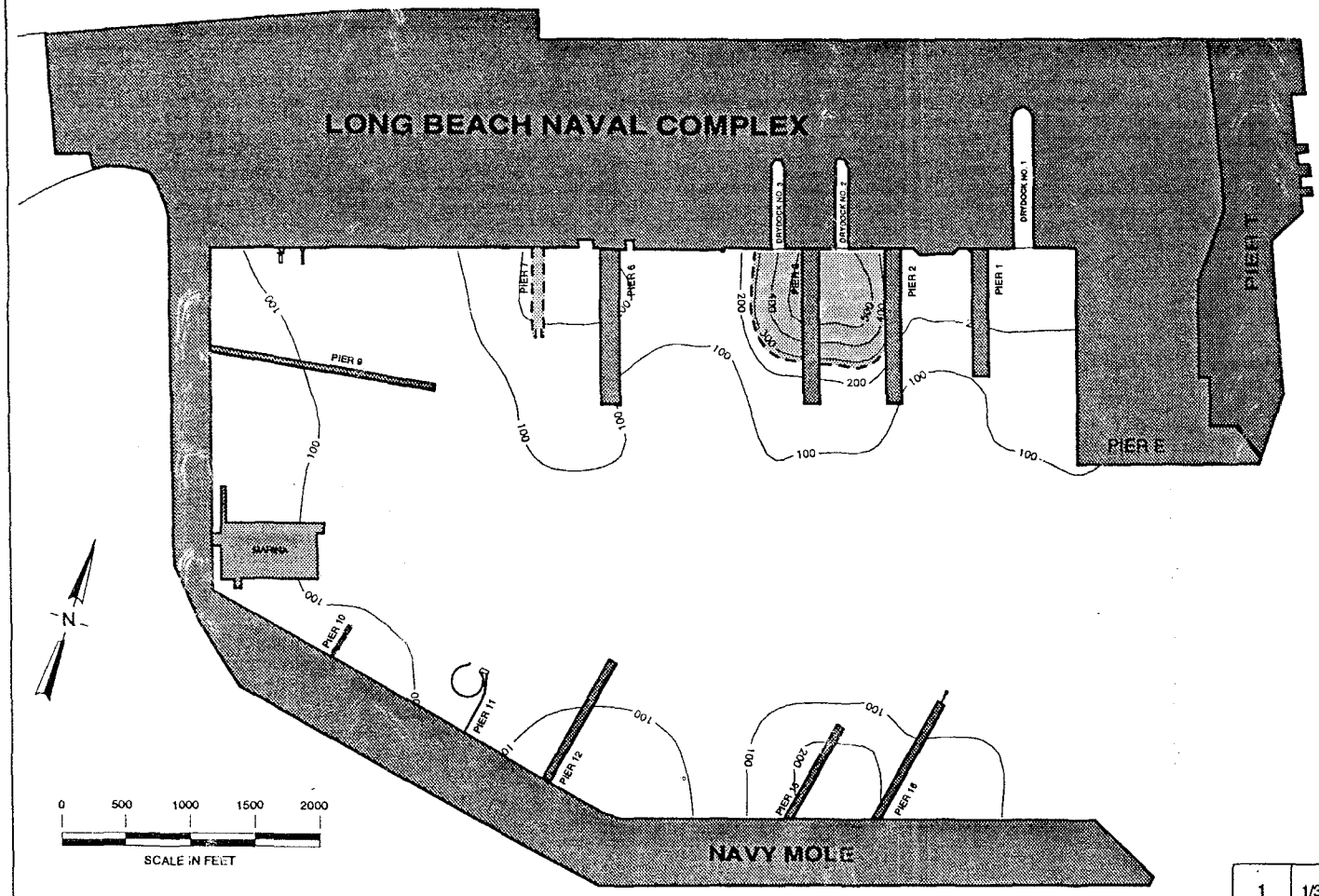
L6678	METALS	CLP-SOW	9.37	14	C	3			
L6678	PH	EPA-9045	10.37	14	C	3			



LEGEND

200 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 270 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

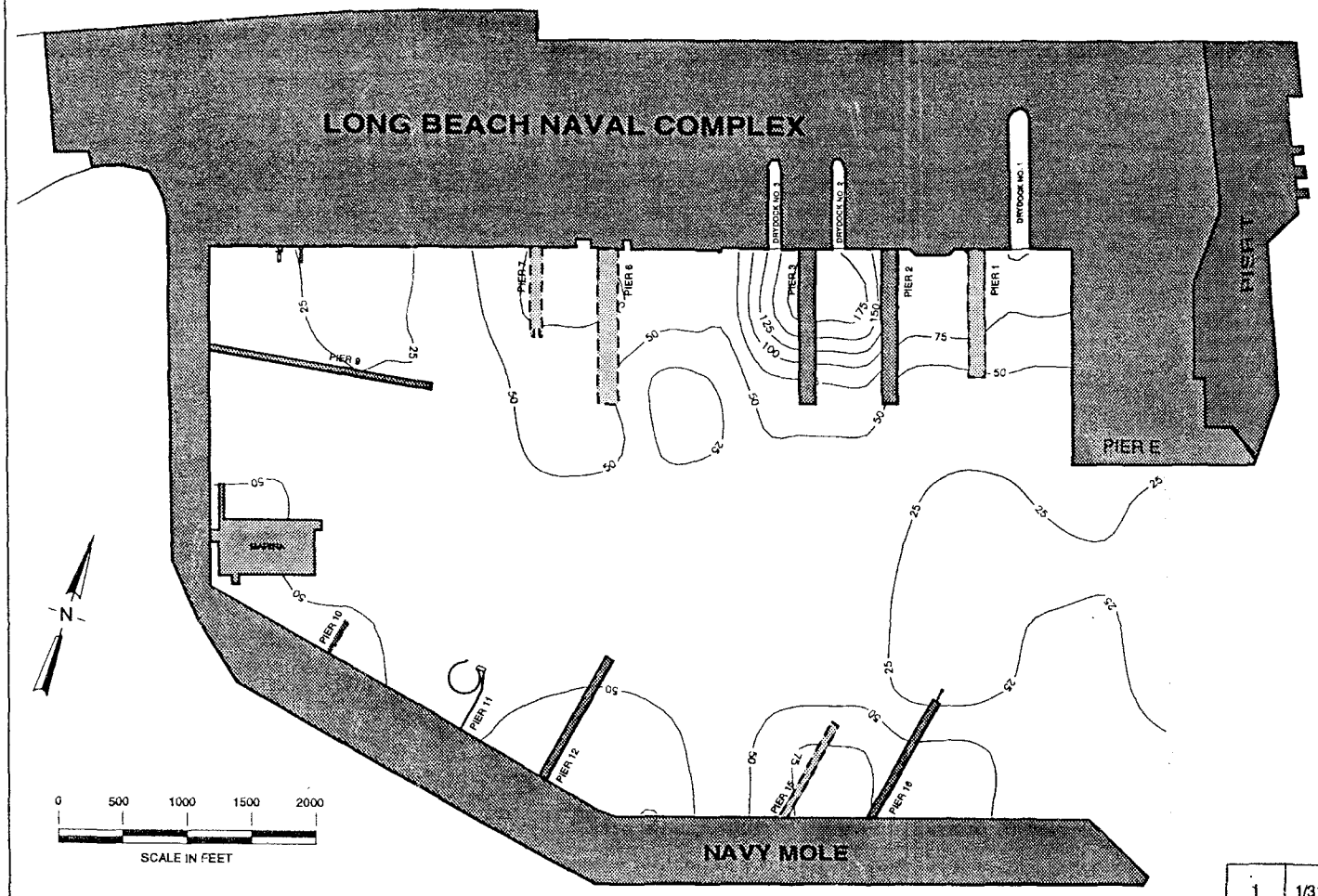
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-14
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL COPPER (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S009.SRF
JOB NO: 22214-026



LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 218 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

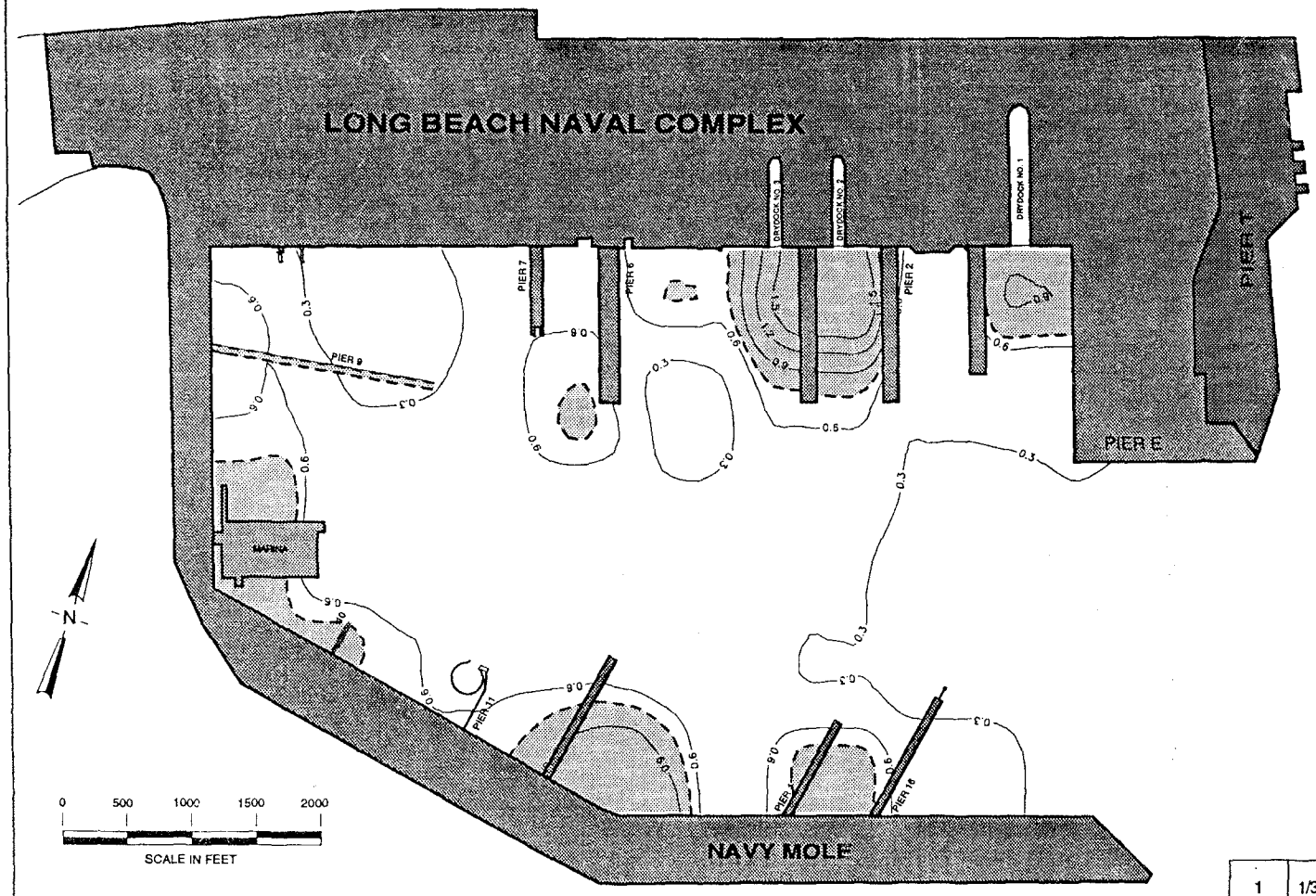
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-15
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL LEAD (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S010.SRF
JOB NO: 22214-026



LEGEND

0.3 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 0.71 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

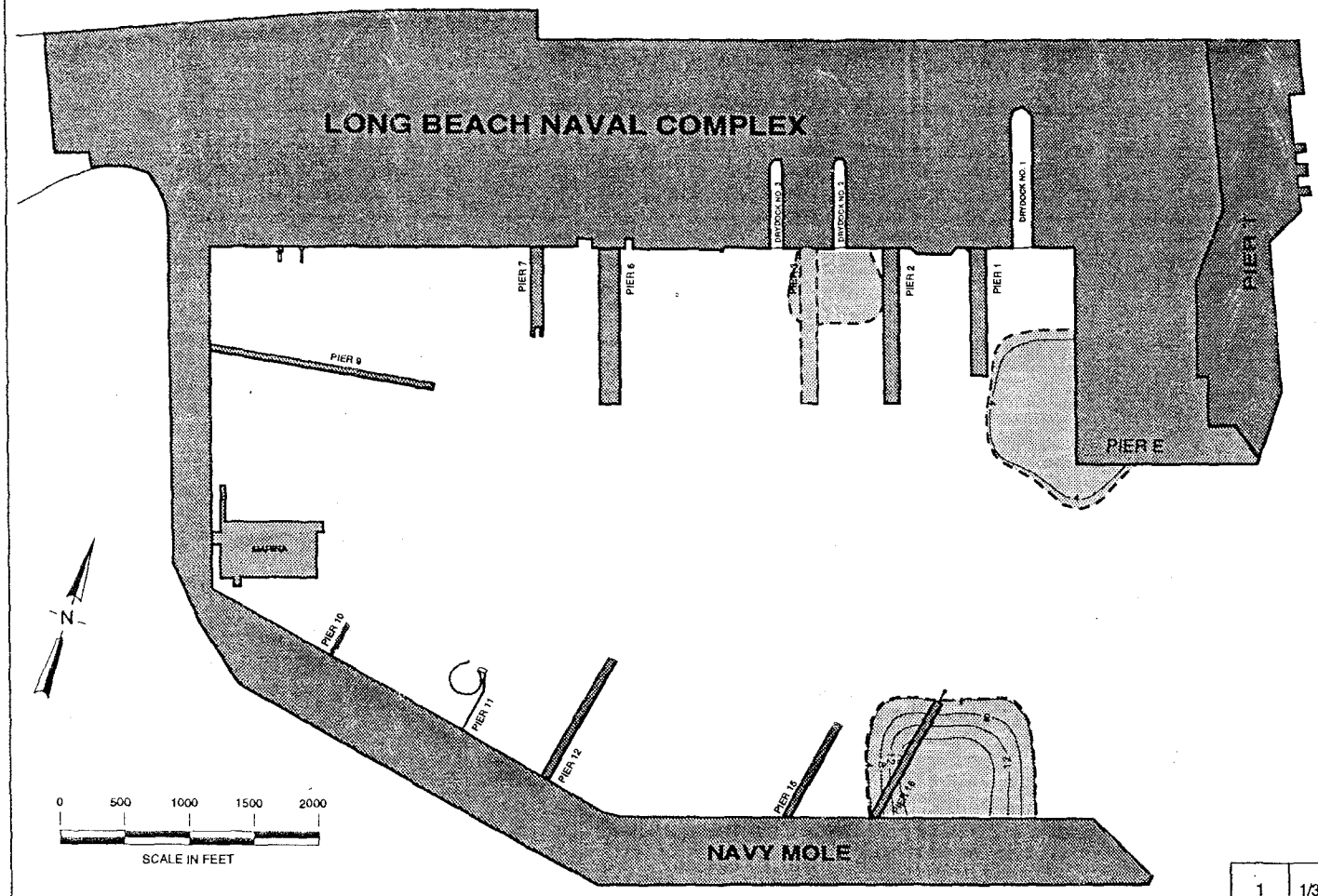
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-15
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL MERCURY (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S011.SRF
JOB NO: 22214-026



LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 3.7 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)

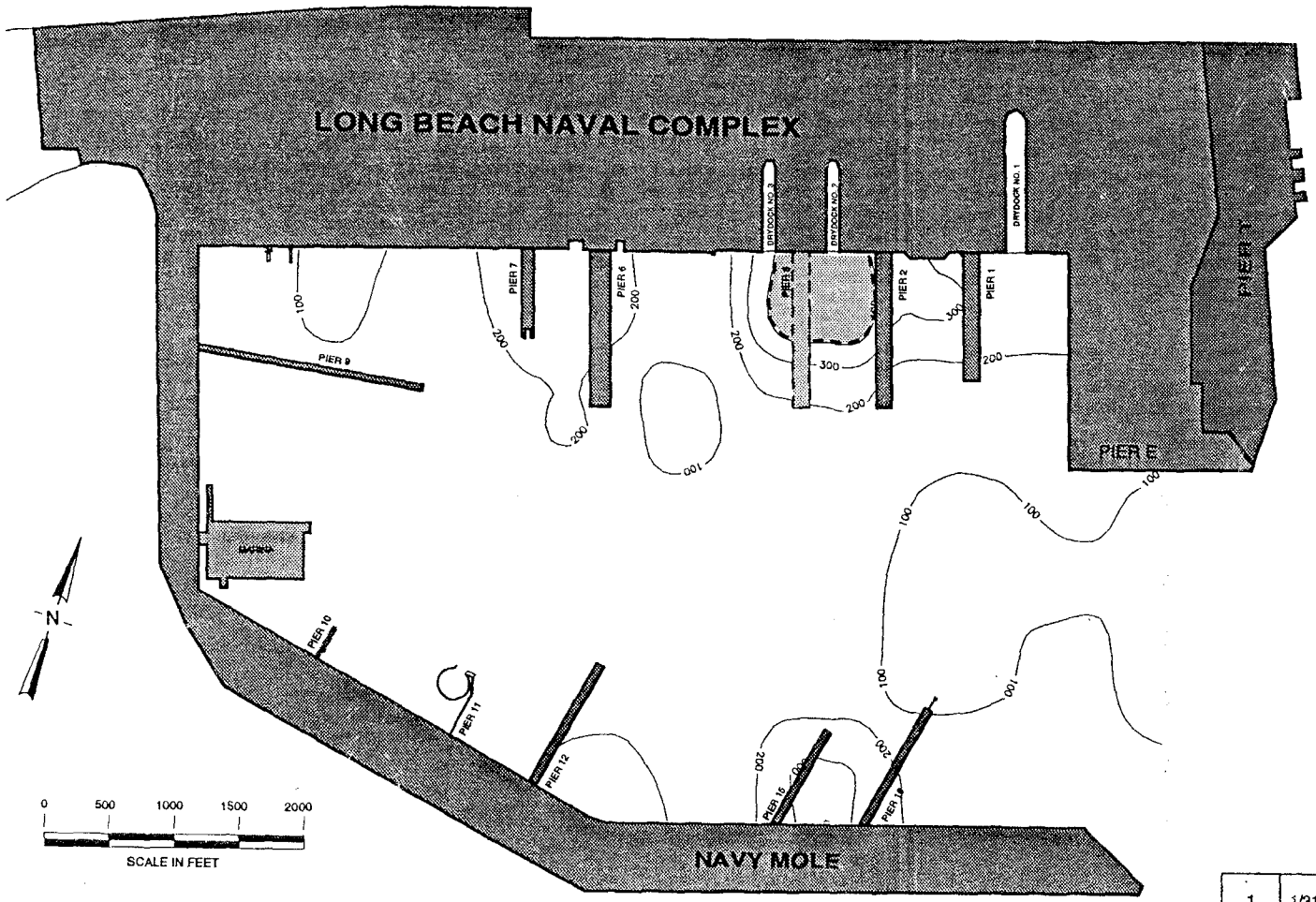
FIGURE 4-18

SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL SILVER (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S013.SRF
JOB NO: 22214-026



LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 410 mg/kg

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

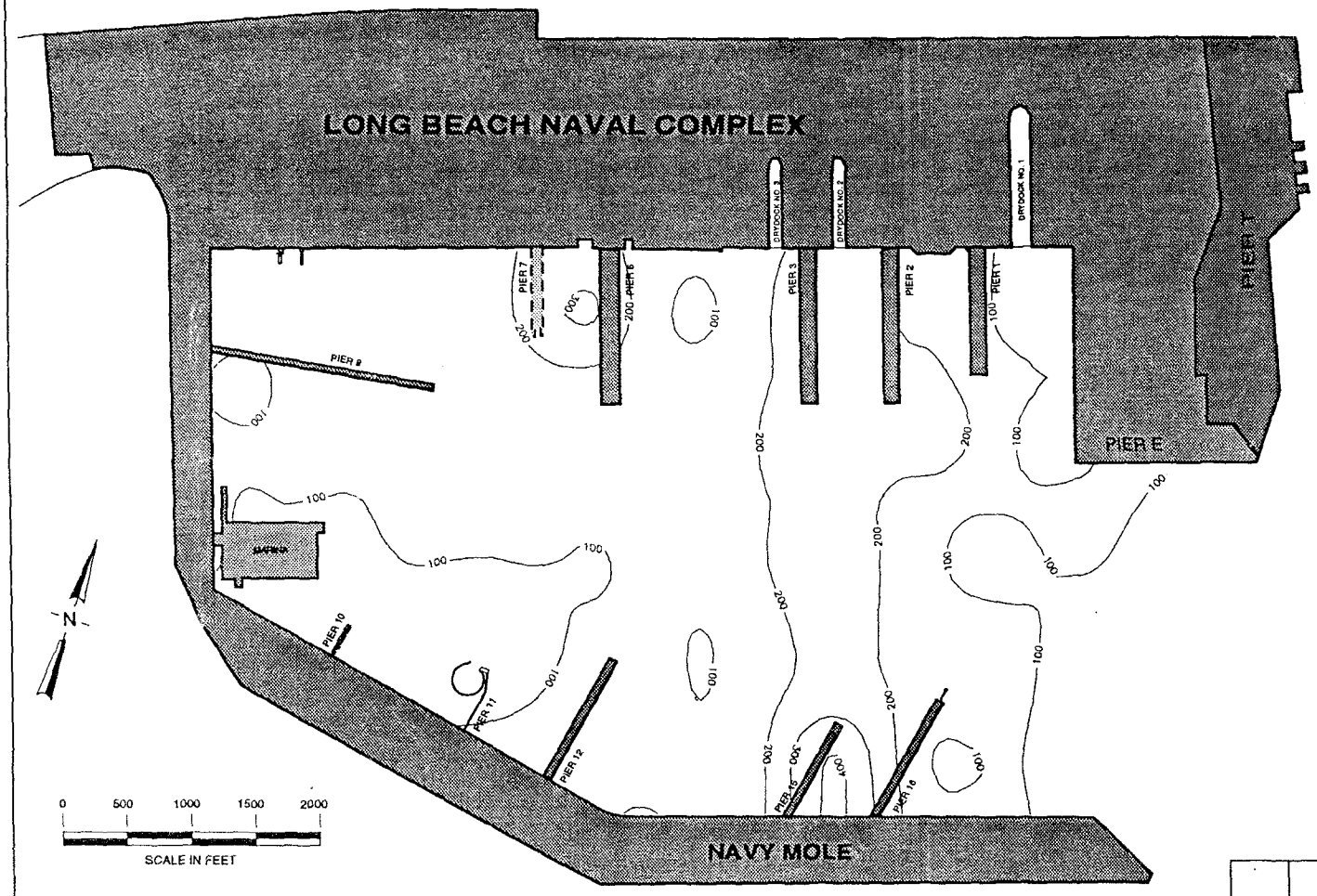
REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-19
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL ZINC (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S014.SRF
JOB NO: 22214-026



LEGEND

200 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 3,160 ug/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)

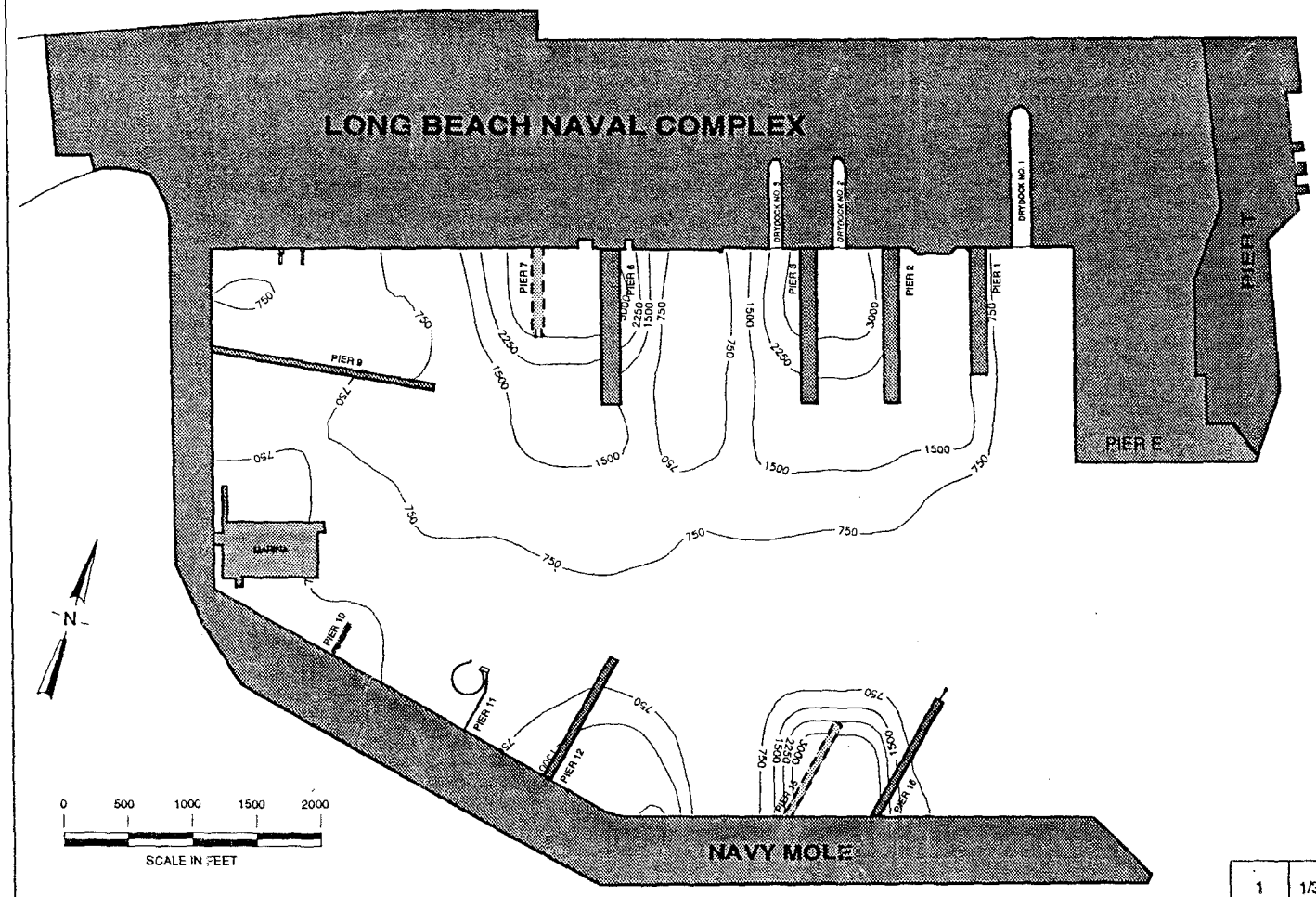
FIGURE 4-

SURFACE SEDIMENT SPATIAL DISTRIBUTION OF LPAH (ug/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S023.SRF
JOB NO: 22214-026



LEGEND

750 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 9,600 ug/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

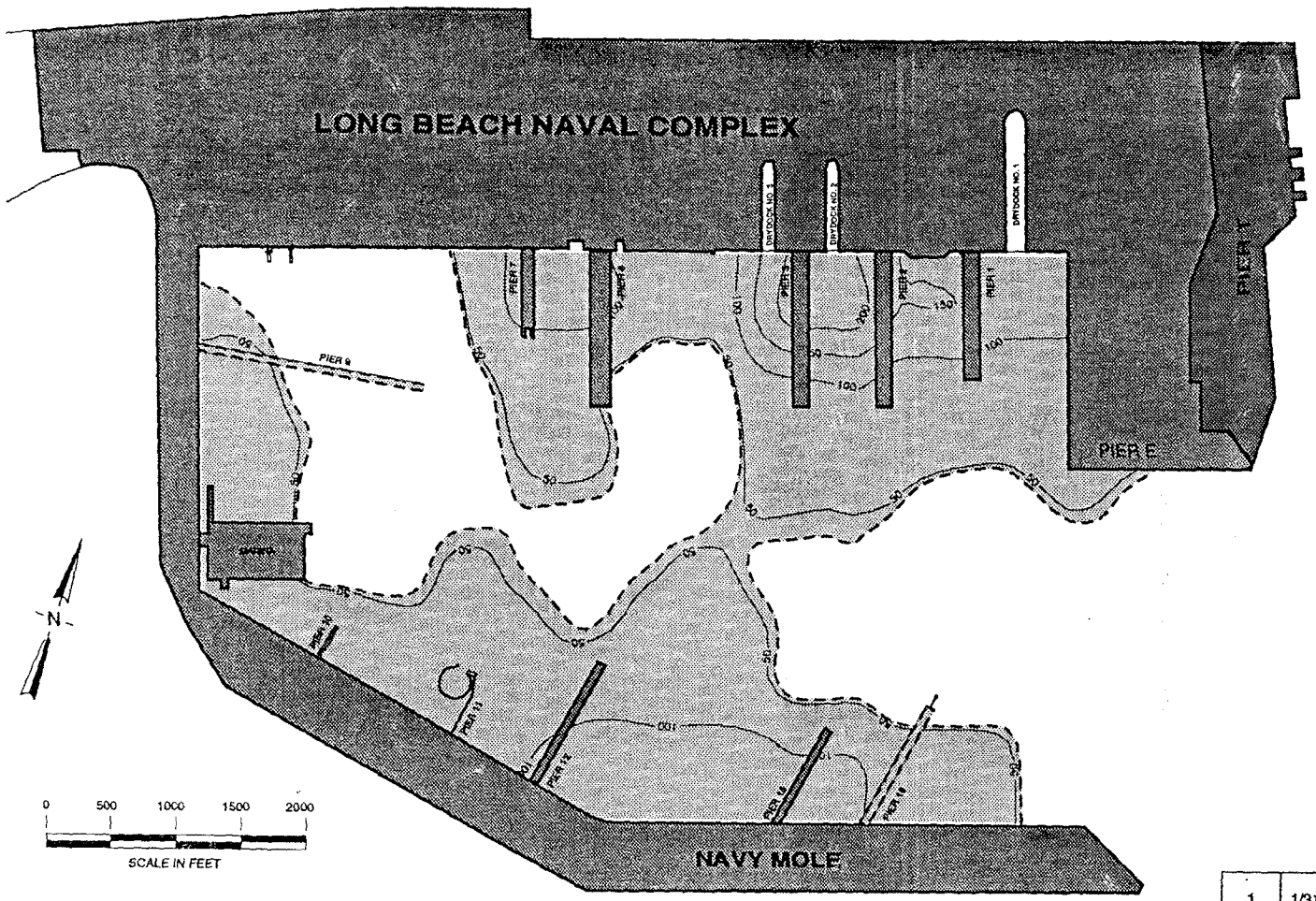
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-24
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF HPAH (ug/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S019.SRF
JOB NO: 22214-026



LEGEND

50 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 46.1 ug/kg

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

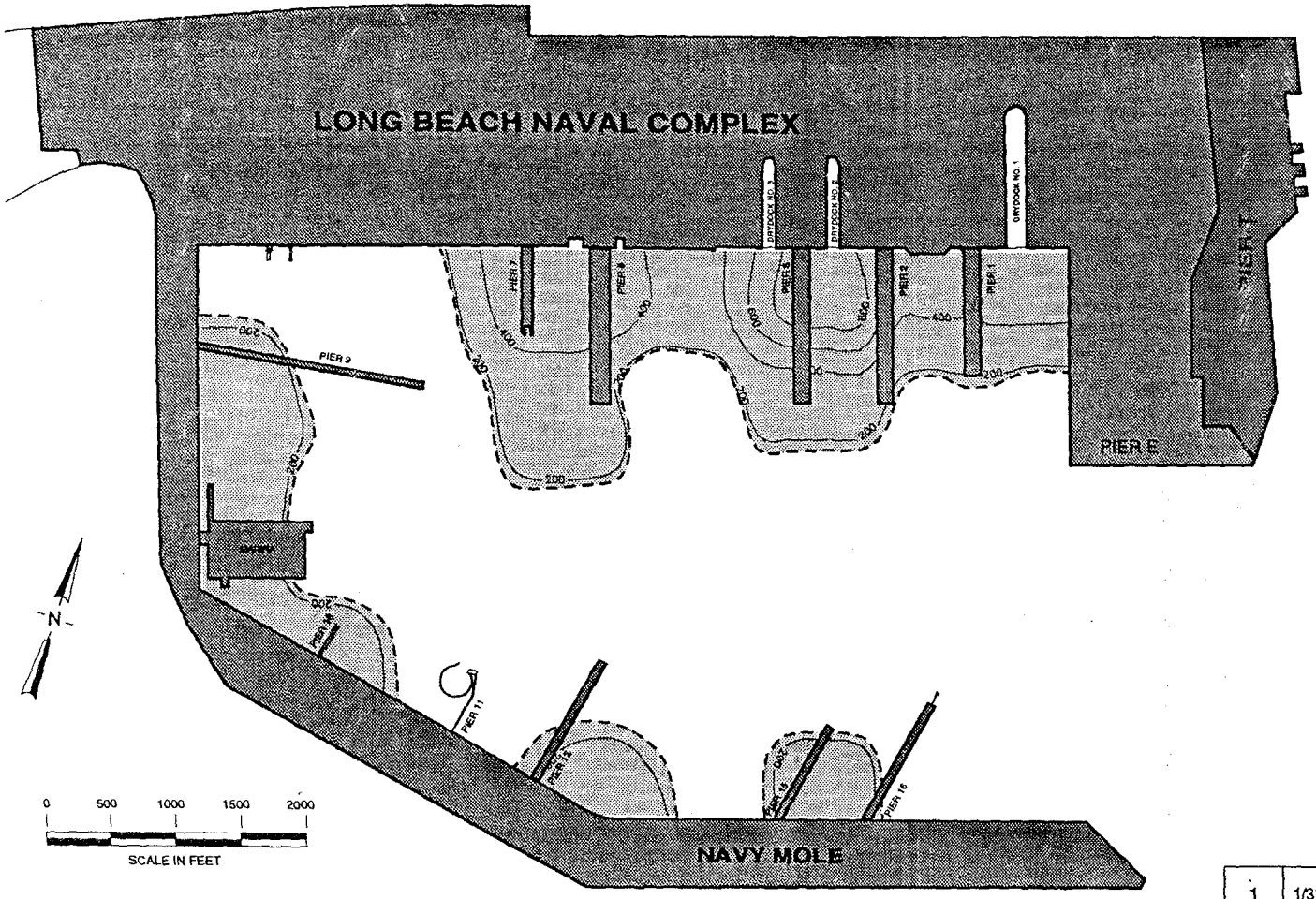
REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-26
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL DDT (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S021.SRF
JOB NO: 22214-026



LEGEND

200 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE EFFECTS RANGE-MEDIAN (ER-M) CONCENTRATION OF 180 ug/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)

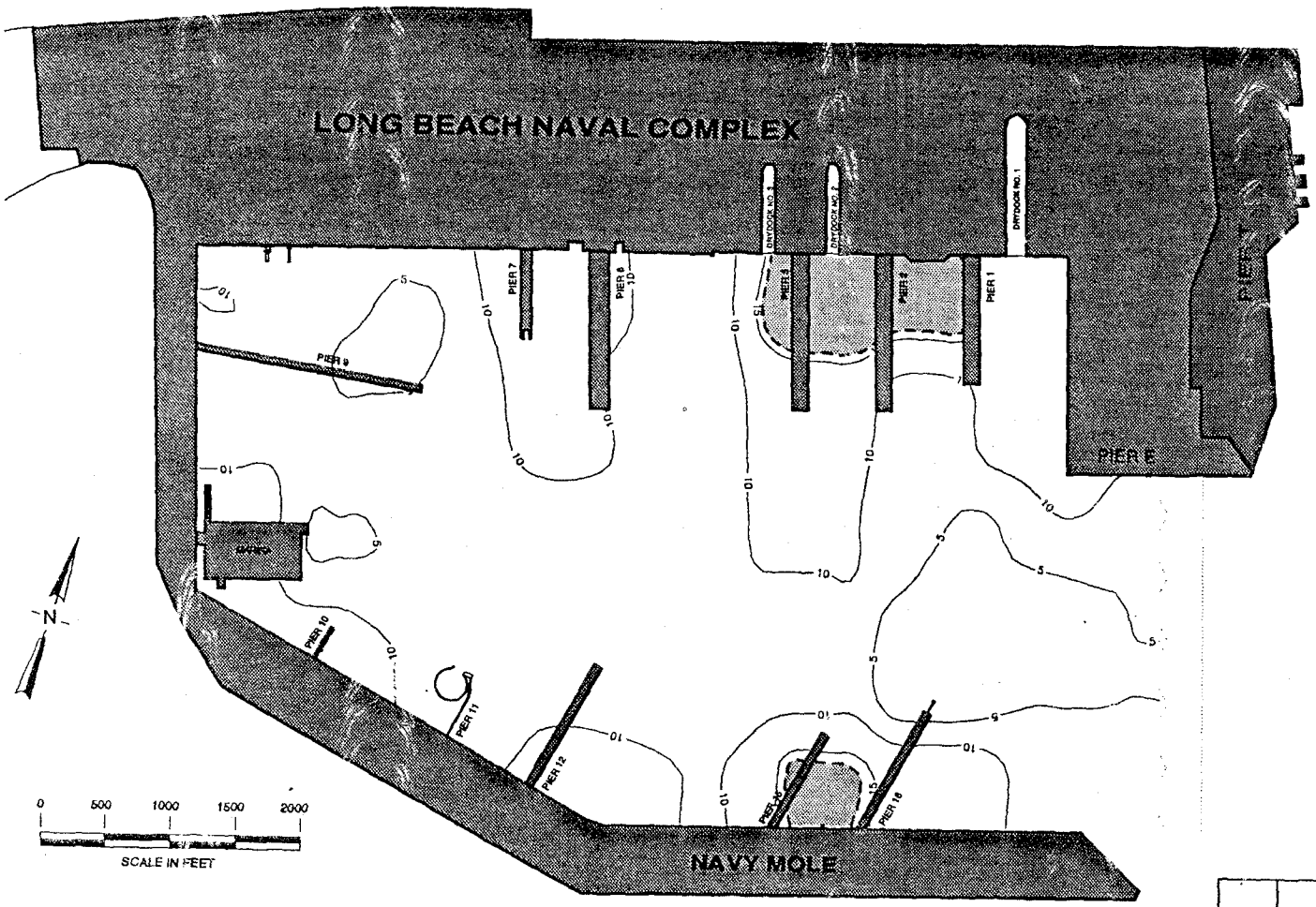
FIGURE 4-25

SURFACE SEDIMENT SPATIAL DISTRIBUTION OF PCB AROCLOR 1260 (ug/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S020.SRF
JOB NO: 22214-026



LEGEND

5 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 16 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY; ~~PIER STATION DATA NOT INCLUDED.~~

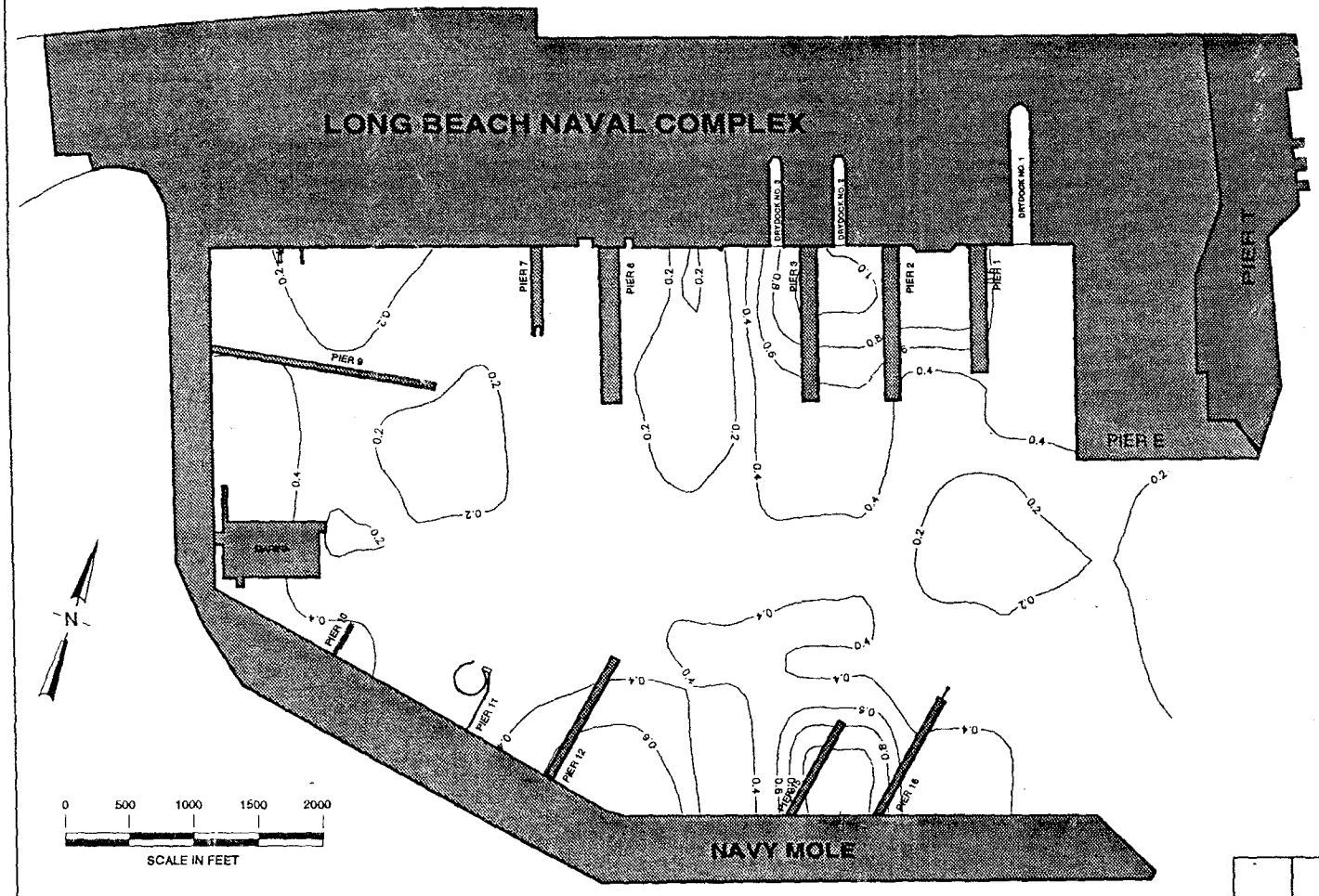
0	2/1/96	DRAFT RI	ECN	TRM	OK
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL ARSENIC (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN I Program

DATE: 2/1/96
FILE NO: S041.SRF
JOB NO: 22214-026



LEGEND

0.2 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 2.7 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY; PIER STATION DATA NOT INCLUDED.

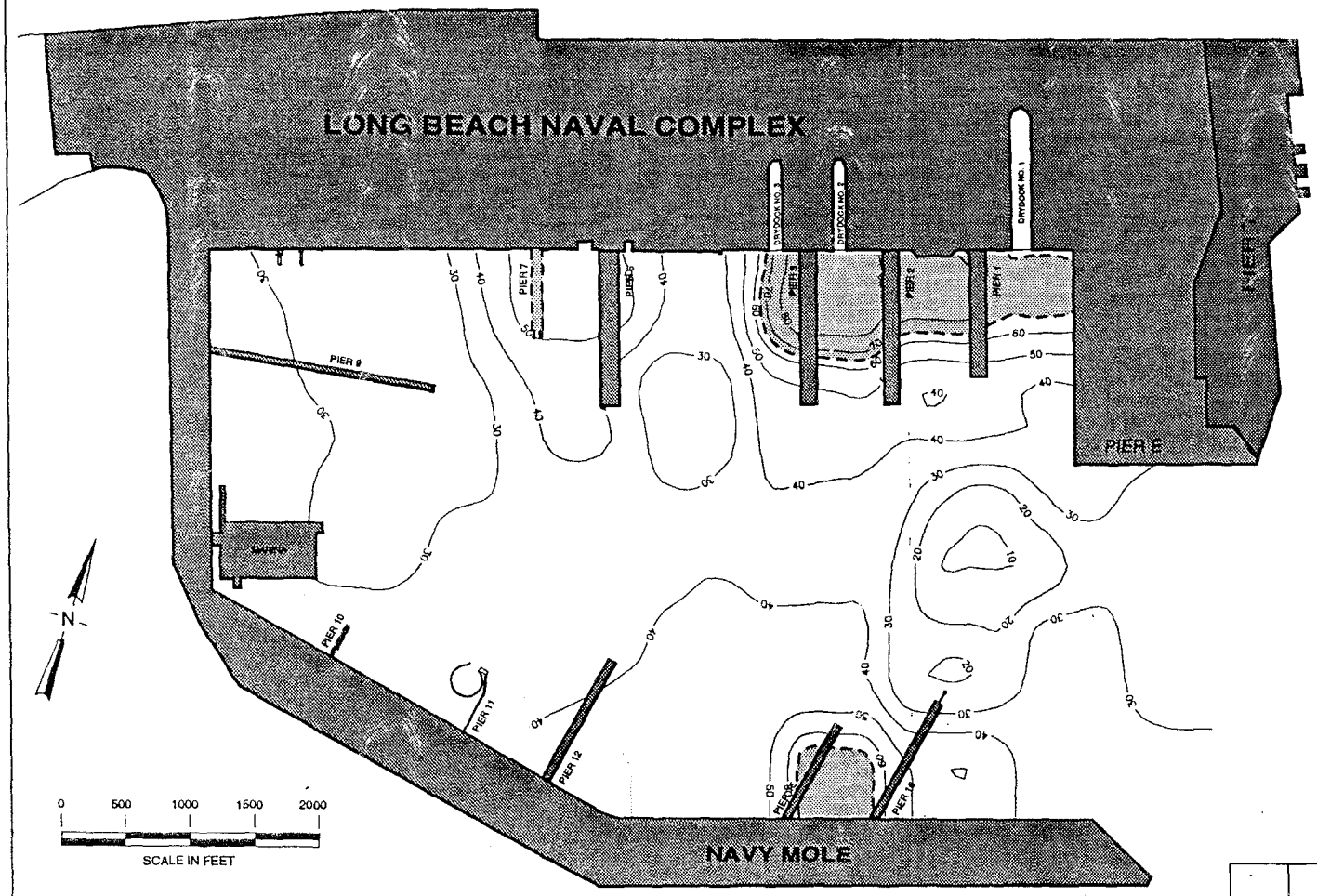
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL CADMIUM (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S042.SRF
JOB NO: 22214-026



LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 65 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY; ~~PIER STATION DATA NOT INCLUDED~~

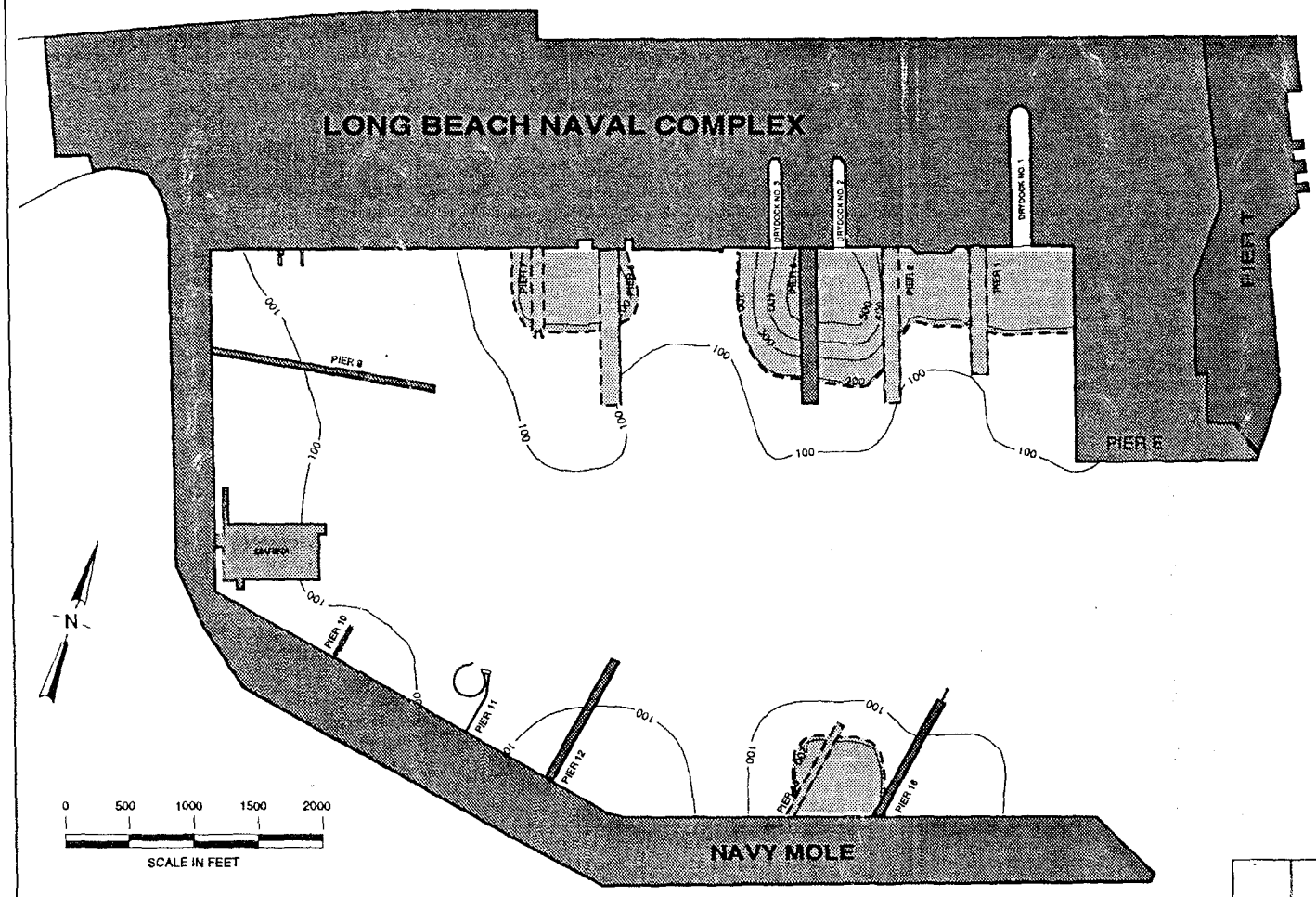
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL CHROMIUM (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S043.SRF
JOB NO: 22214-026



LEGEND

200 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 191 *mg/kg*

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

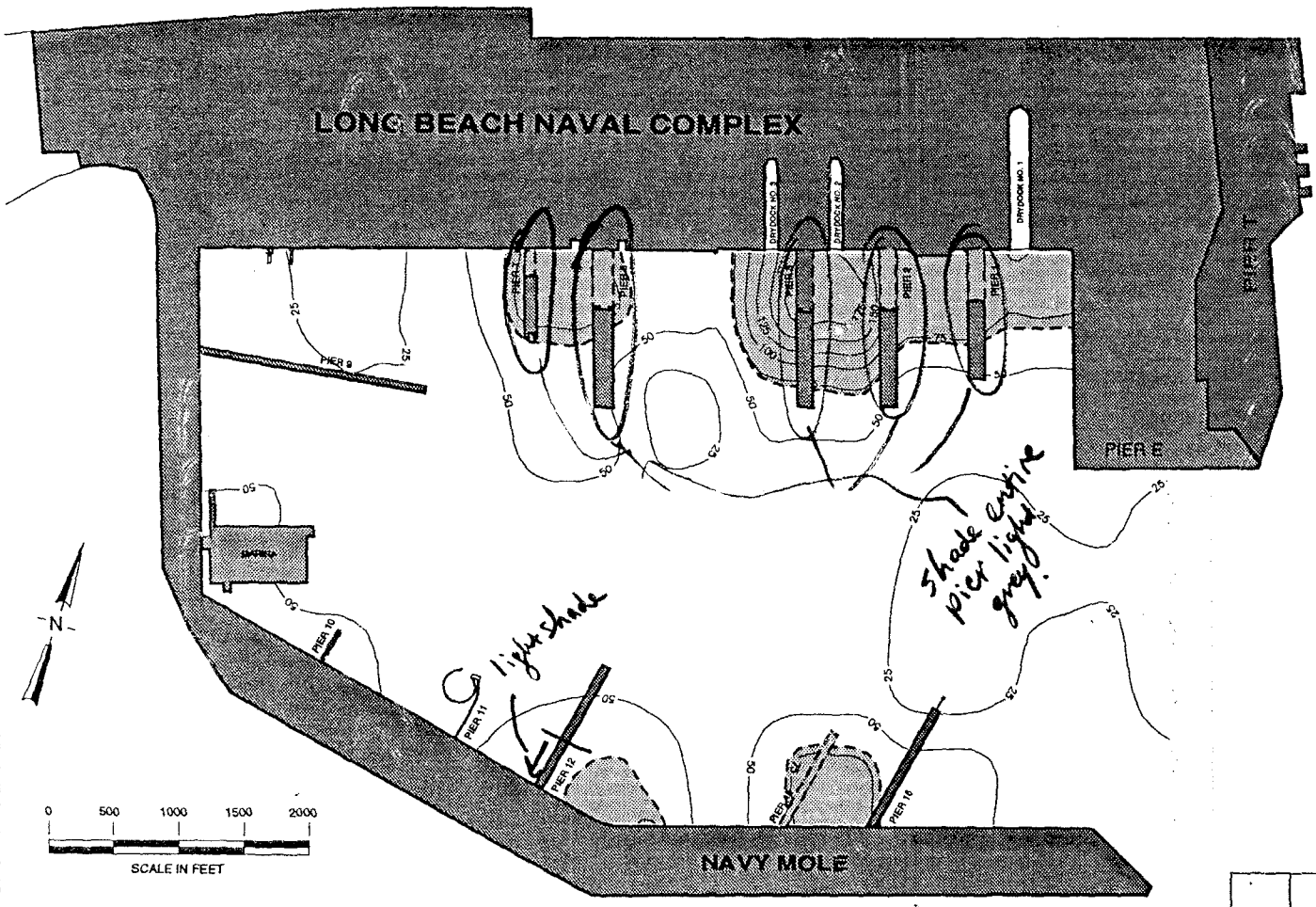
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL COPPER (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S044.SRF
JOB NO: 22214-026



LEGEND

25 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 71 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

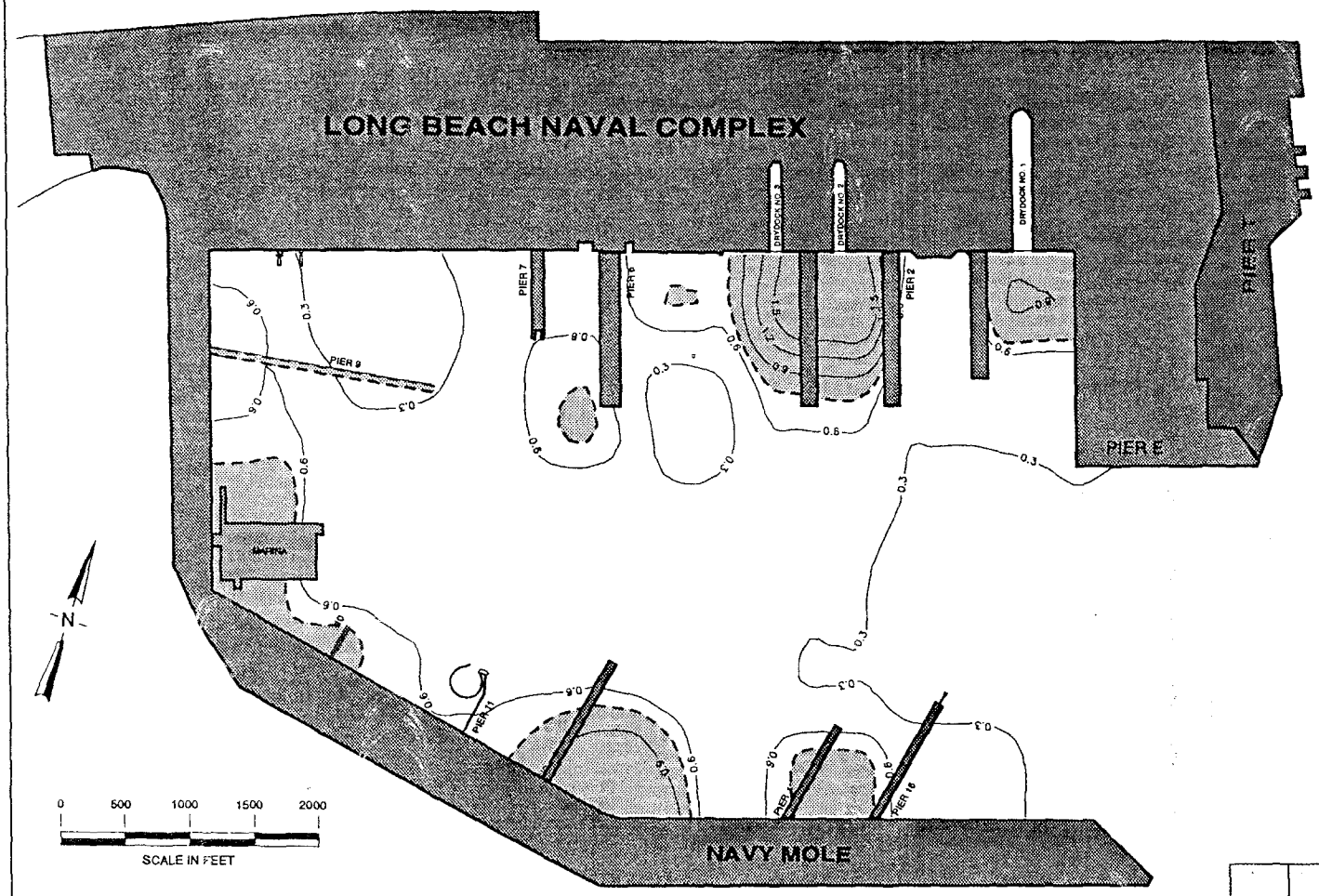
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL LEAD (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S045.SRF
JOB NO: 22214-026



LEGEND

0.3 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 0.71 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

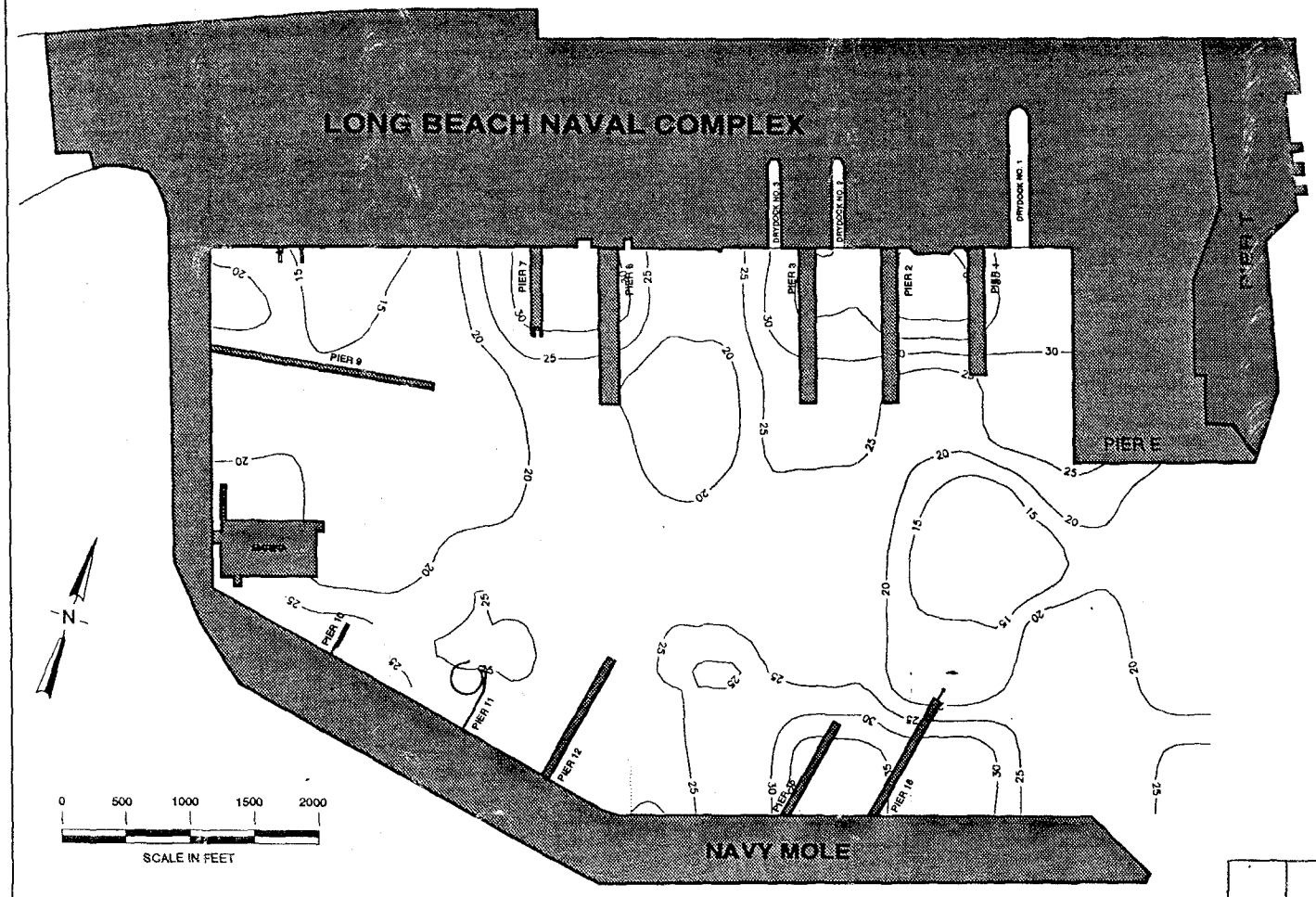
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL MERCURY (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S046.SRF
JOB NO: 22214-026



LEGEND

20 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 46 mg/kg

0	2/1/96	PREDRAFT RI	ECN	TRM	OK
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL

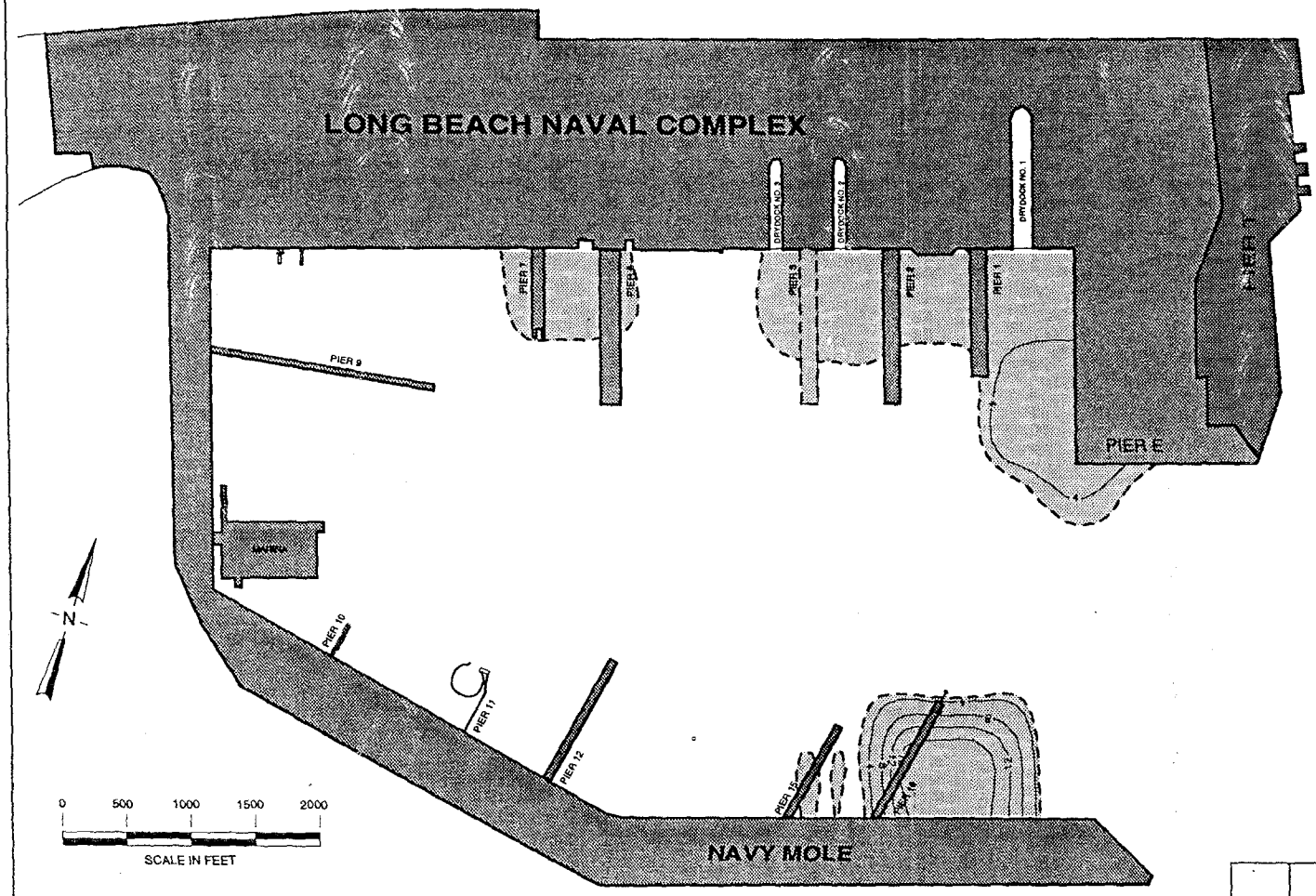
REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL NICKEL (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY; ~~PIER STATION DATA NOT INCLUDED.~~

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S047.SRF
JOB NO: 22214-026



LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 3 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

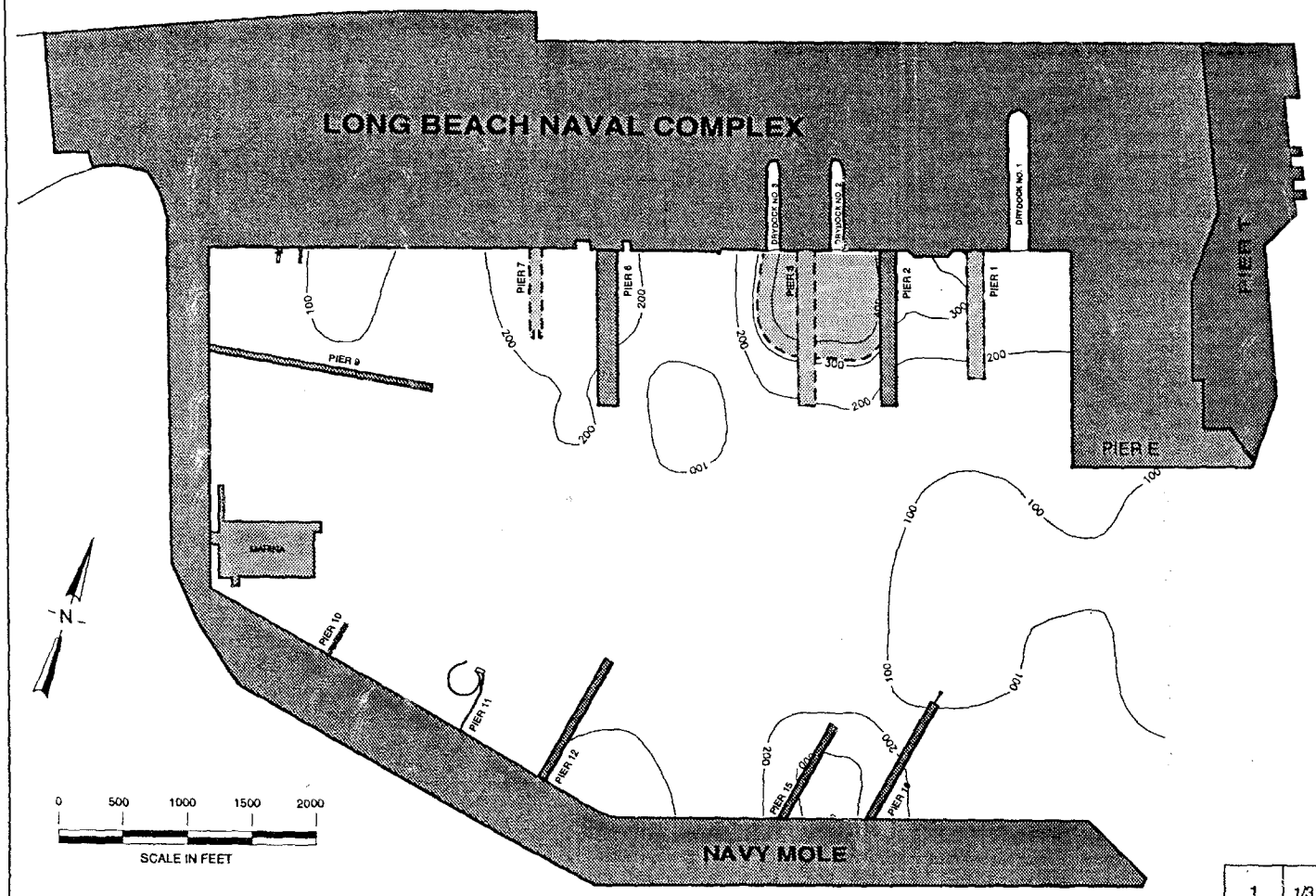
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL SILVER (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S048.SRF
JOB NO: 22214-026



LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 324 mg/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

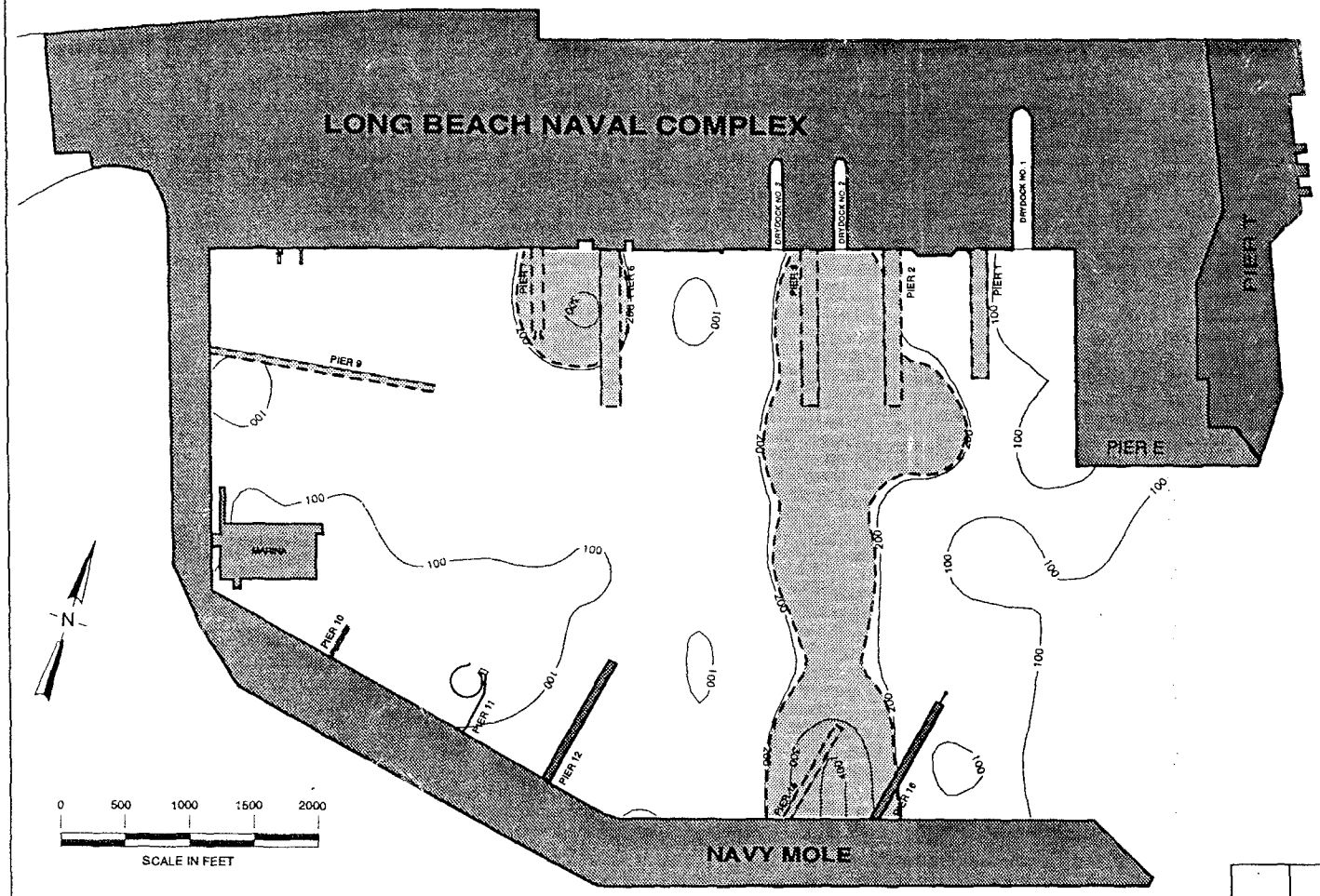
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
1	1/31/96	DRAFT RI	ECN	TRM	OK
0	12/15/95	PREDRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL ZINC (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S049.SRF
JOB NO: 22214-026



LEGEND

200 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 206 ug/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

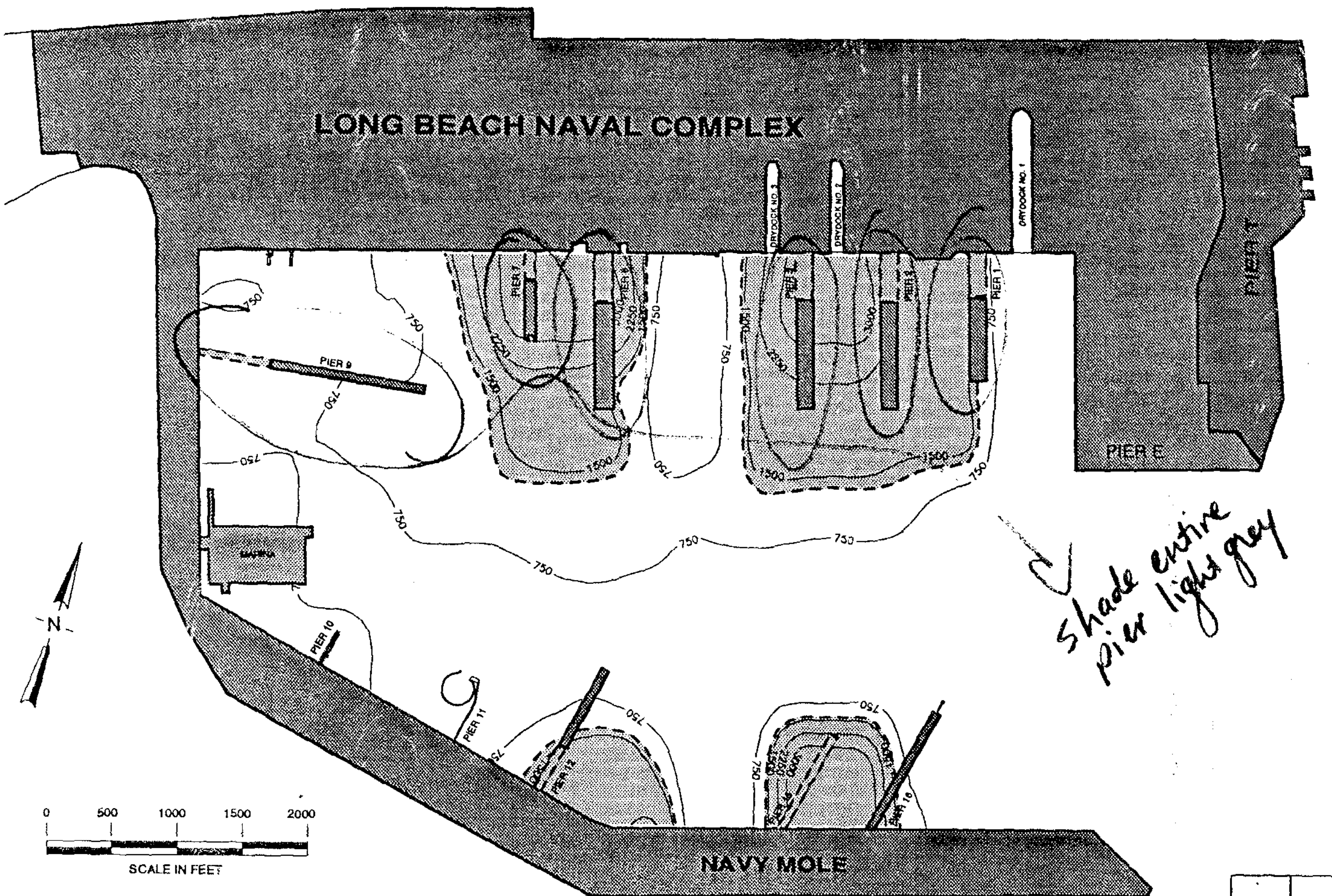
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF LPAH (ug/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S050.SRF
JOB NO: 22214-026



LEGEND

750 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 1311 ug/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

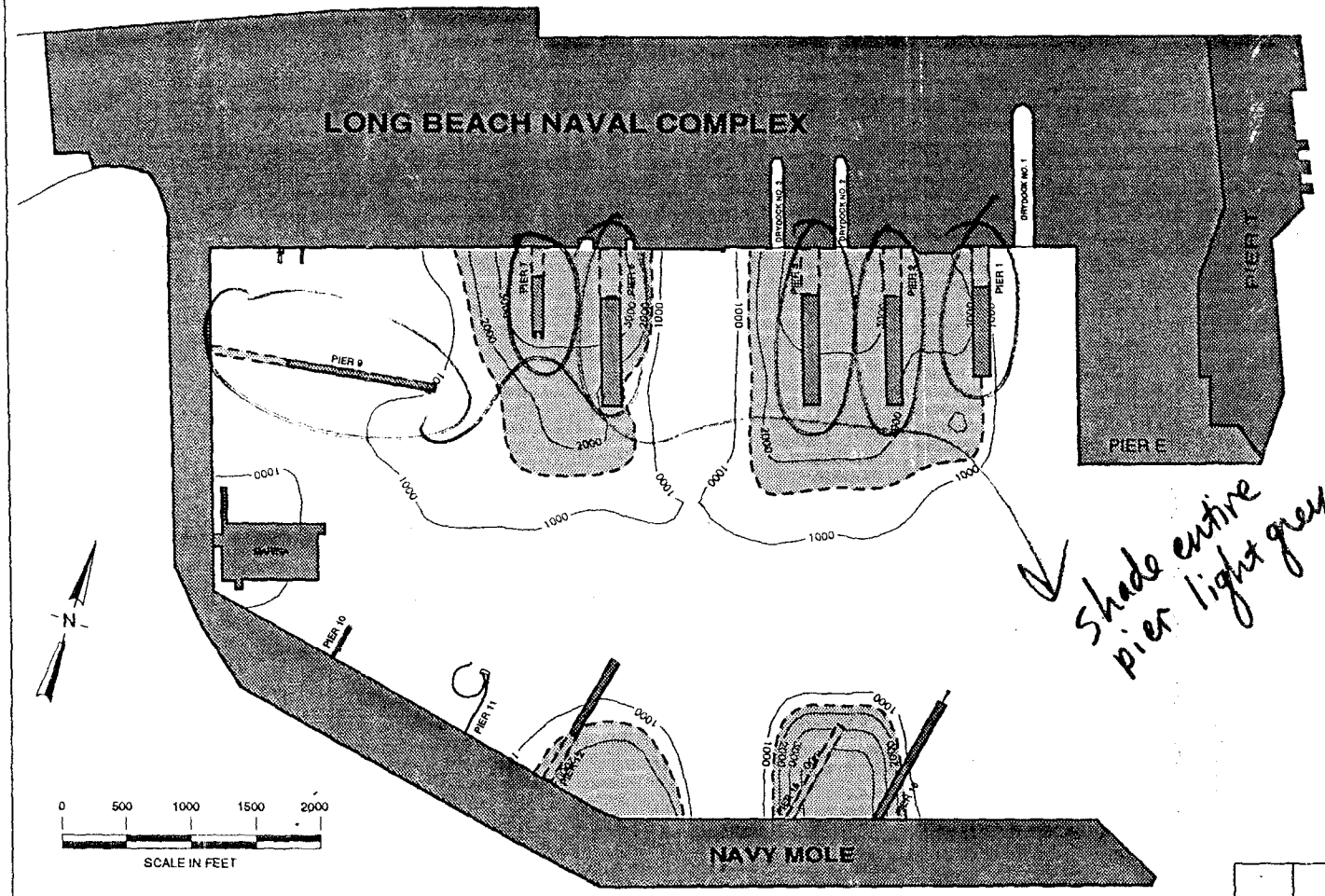
0	2/1/96	DRAFT RI	ECN	TRM	OK
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-24
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF HPAH (ug/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S051.SRF
JOB NO: 22214-026



Shade entire pier light grey

LEGEND

1000 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 1510 ug/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.
~~PIER STATION DATA NOT INCLUDED.~~

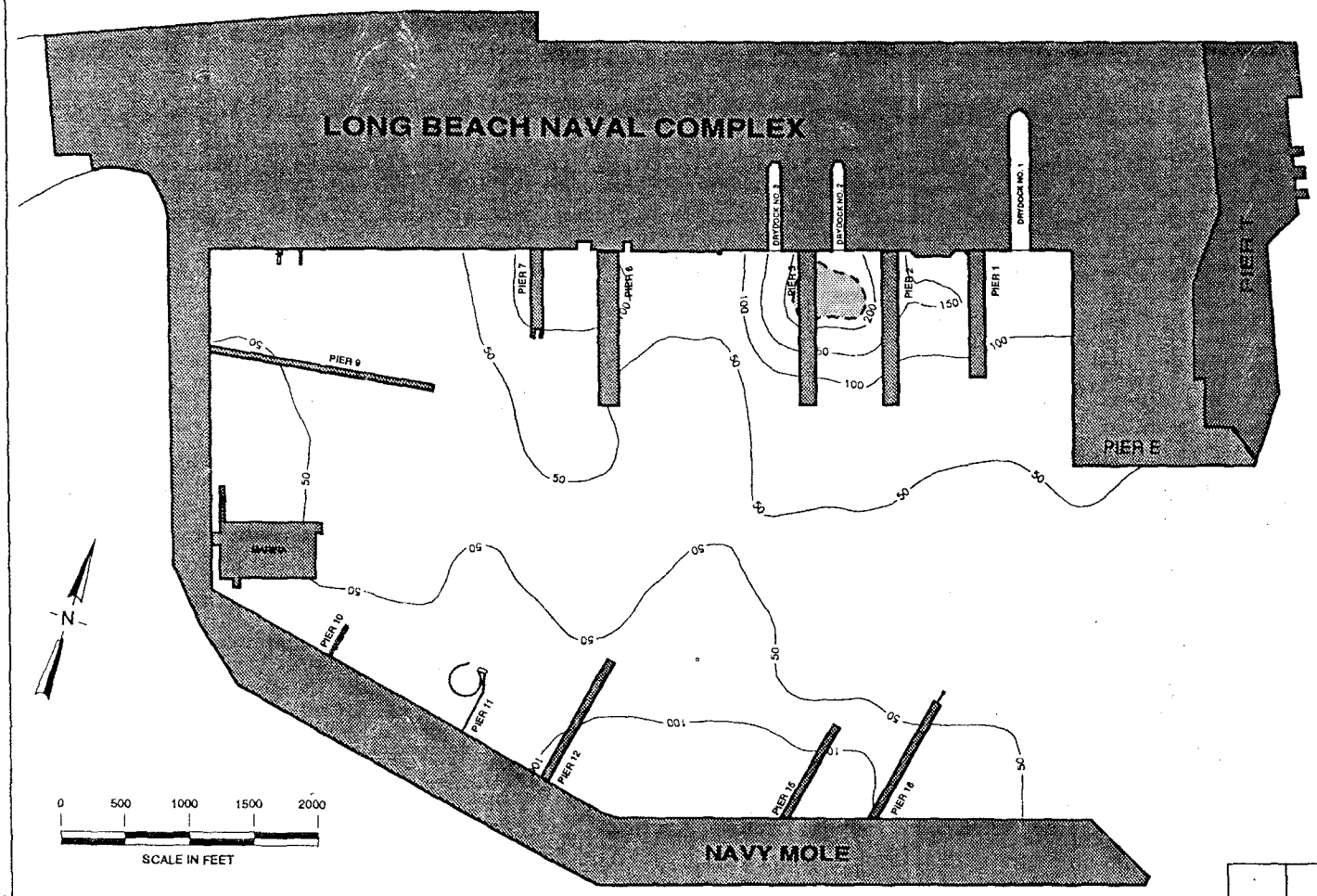
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-23
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF PAH (ug/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S052.SRF
JOB NO: 22214-026



LEGEND

50 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 214 ug/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

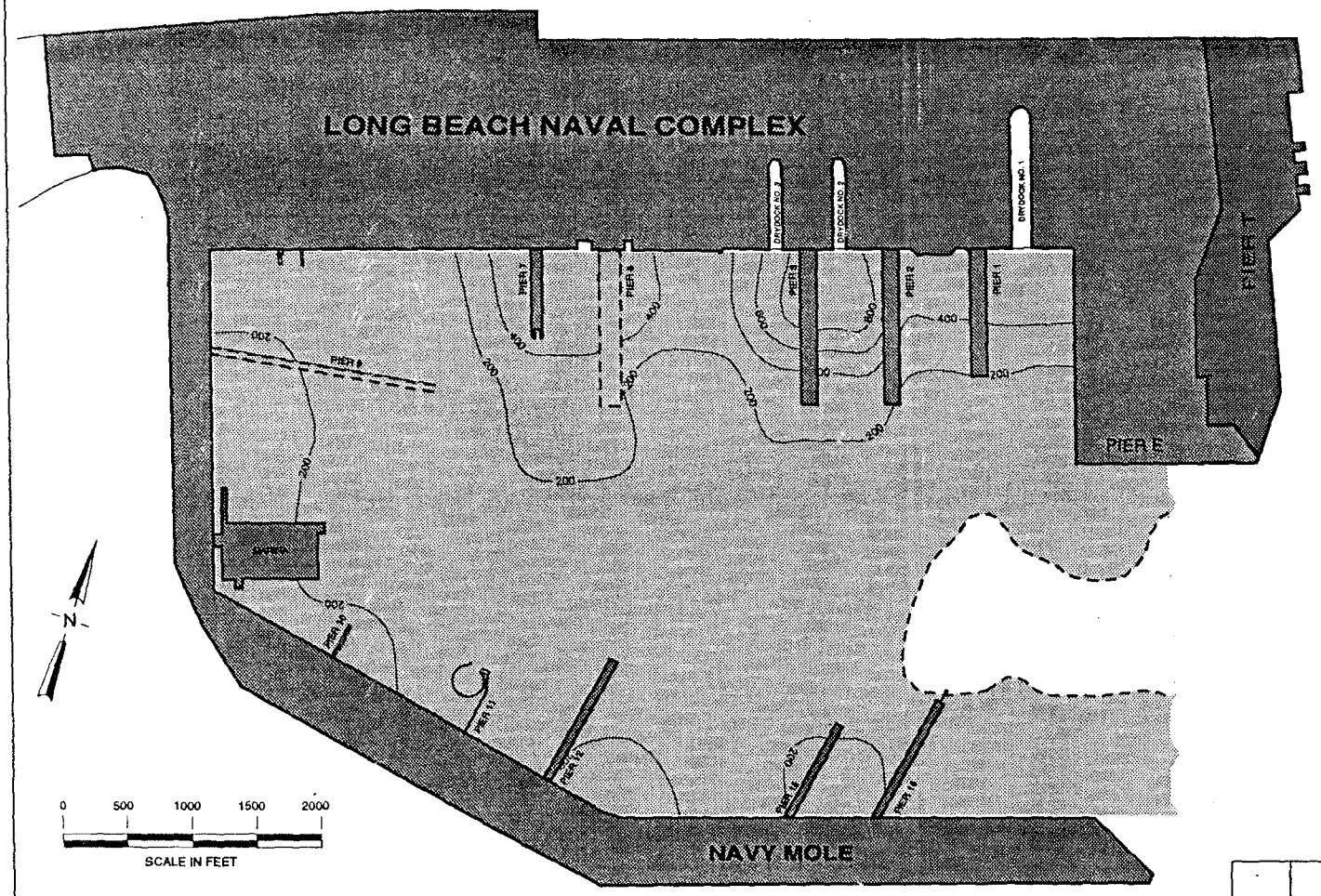
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF TOTAL DDT (mg/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S053.SRF
JOB NO: 22214-026



LEGEND

200 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

CONSTITUENT CONCENTRATIONS GREATER THAN THE REFERENCE 95% UPPER PREDICTIVE LIMIT (UPL) OF 13.2 ug/kg

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

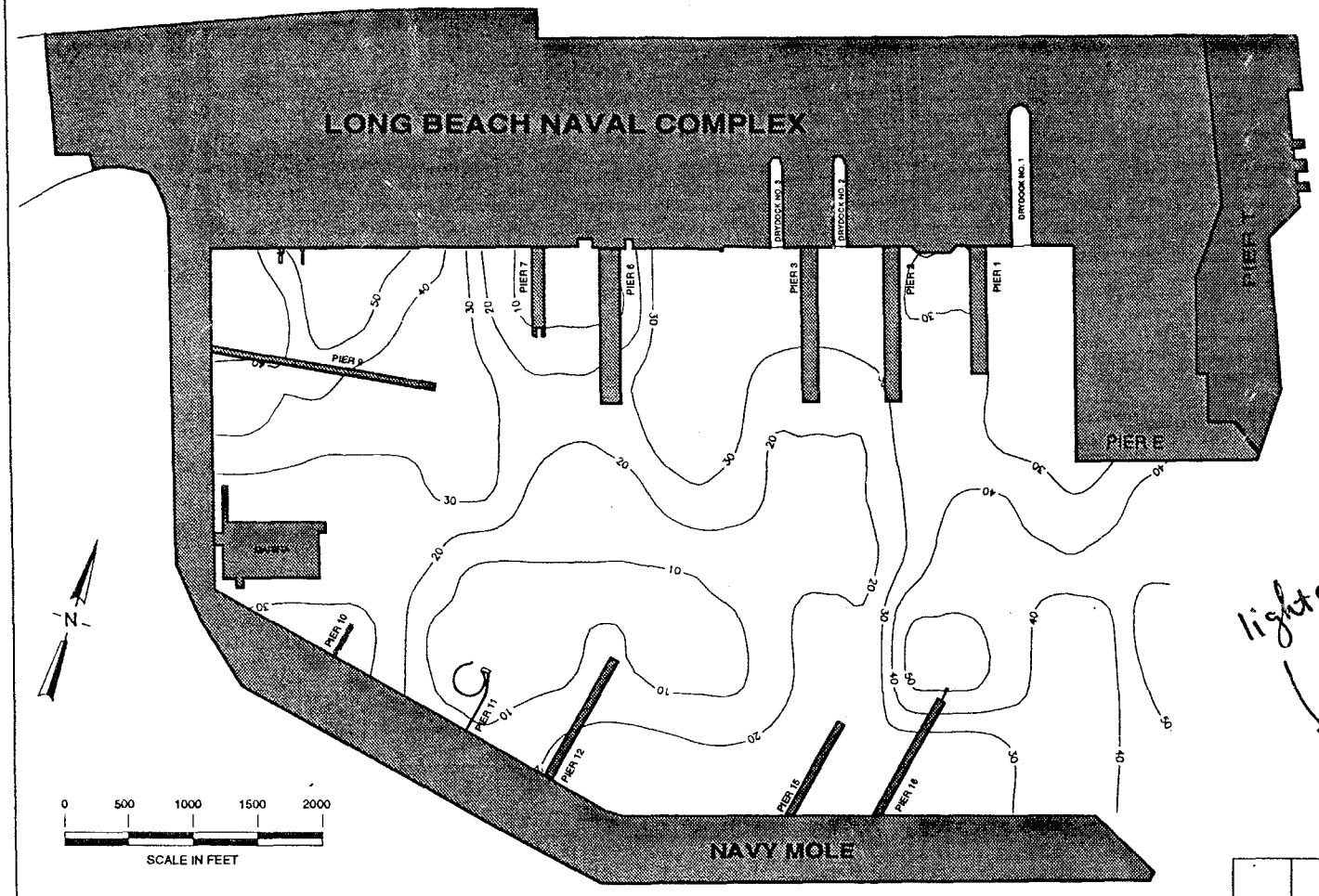
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF PCB AROCLOR 1260 (ug/kg) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S054.SRF
JOB NO: 22214-026



LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

10

light grey

Number of infaunal community species less than 13.9

13.9 Infaunal community species is equal to the 95% lower predictive limit (LPL).

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY ~~PIER STATION DATA NOT INCLUDED.~~

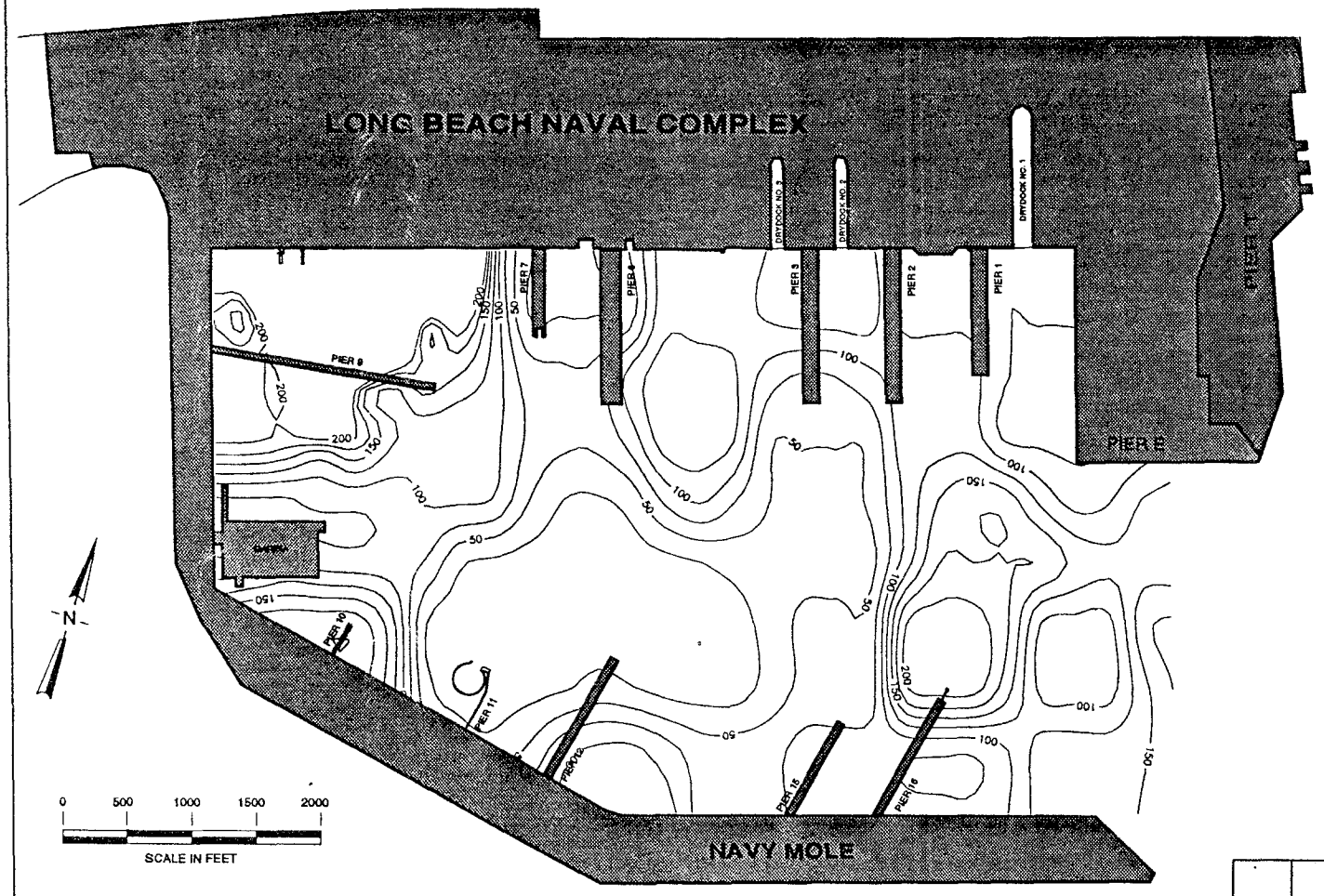
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF THE NUMBER OF INFAUNAL COMMUNITY SPECIES WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S033.SRF
JOB NO: 22214-026



LEGEND

100 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.
~~PIER STATION DATA NOT INCLUDED.~~

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)

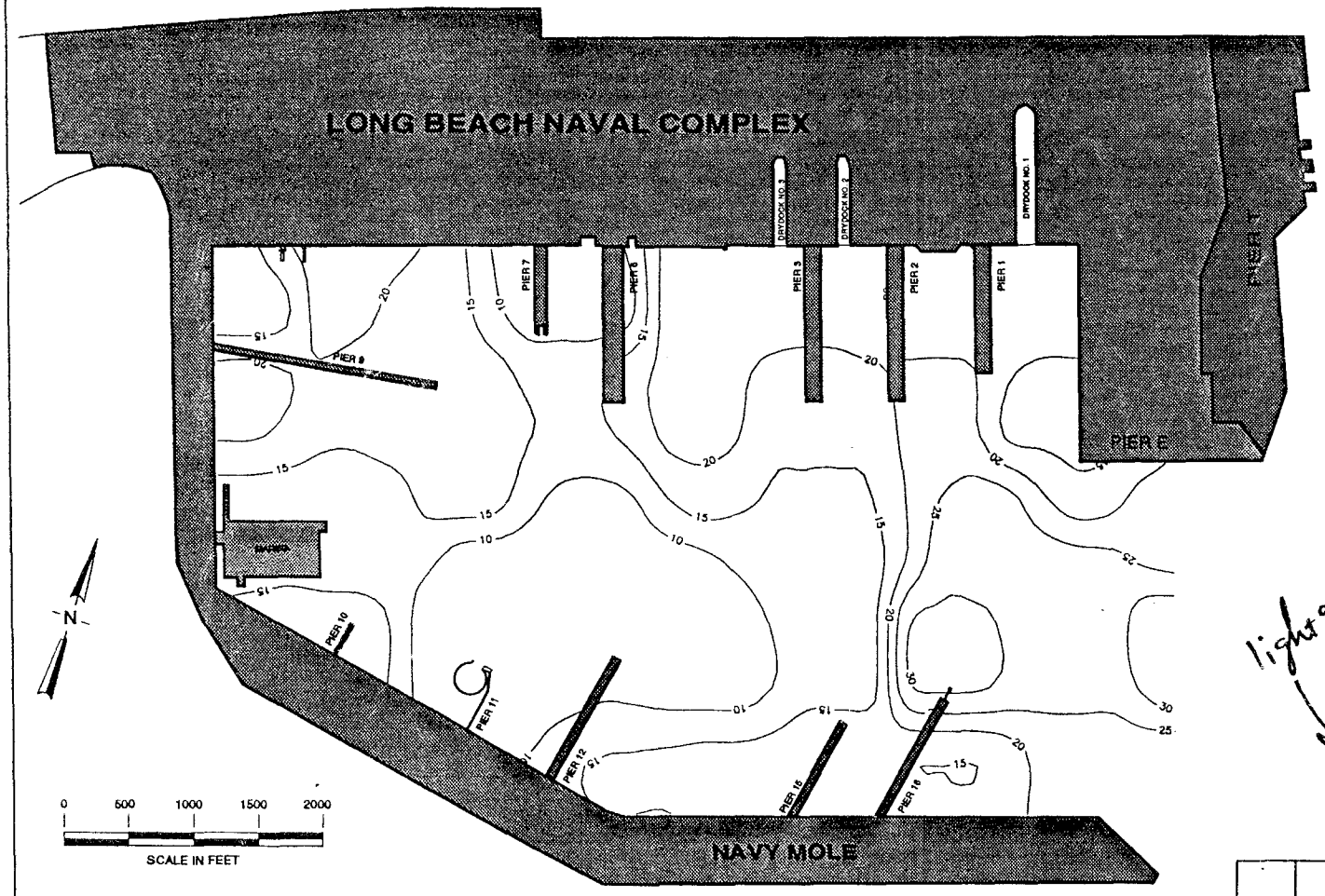
FIGURE 4-

SURFACE SEDIMENT SPATIAL DISTRIBUTION OF BENTHIC INFAUNAL TOTAL ABUNDANCE WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S034.SRF
JOB NO: 22214-026



LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

light grey

10

Number of polychaete species less than 2.8

2.8 Polychaete species is equal to the 95% Lower predictive limit (LPL).

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY. ~~PIER STATION DATA NOT INCLUDED.~~

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)

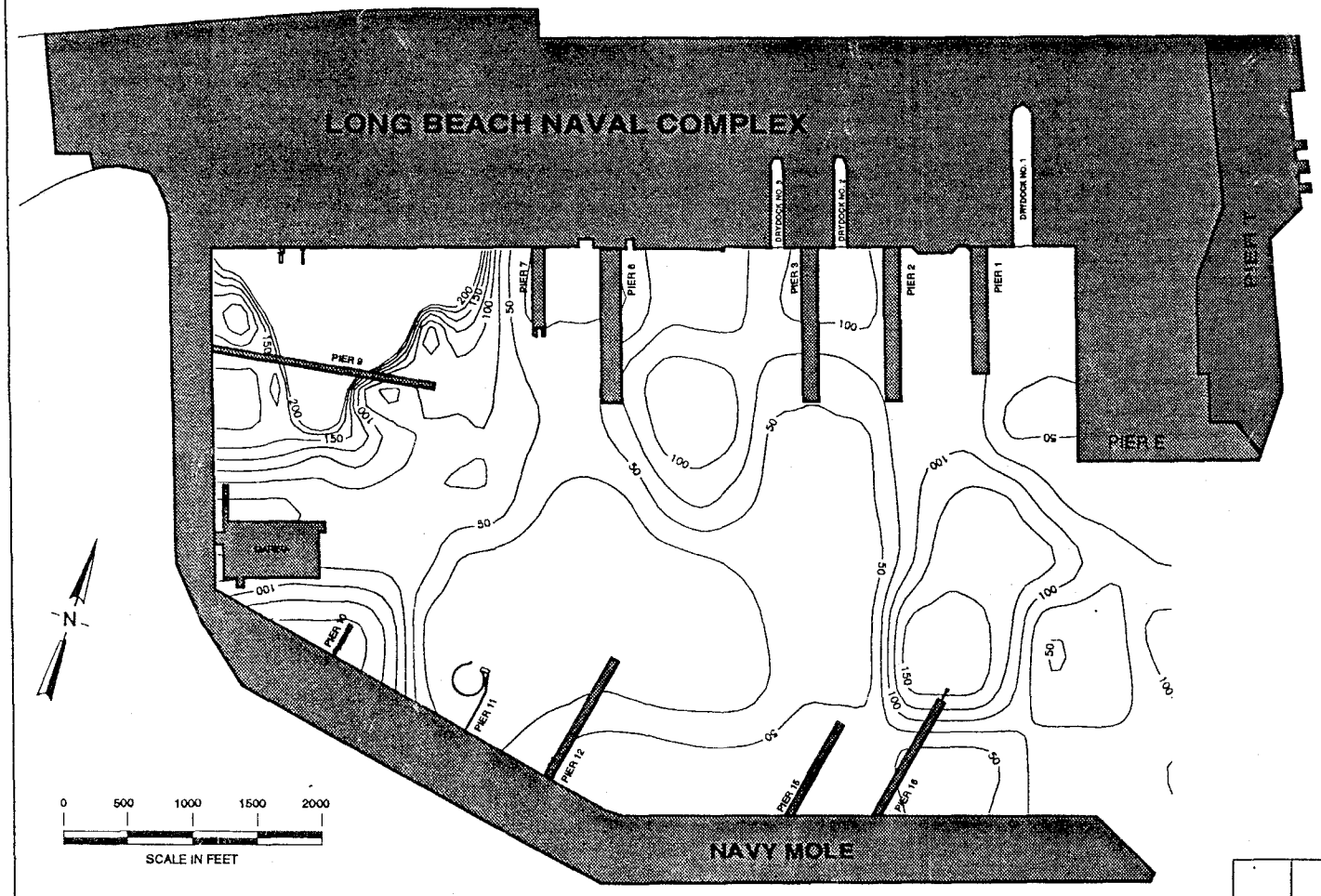
FIGURE 4-

SURFACE SEDIMENT SPATIAL DISTRIBUTION OF THE NUMBER OF POLYCHAETE SPECIES WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S035.SRF
JOB NO: 22214-026



NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY; ~~PIER STATION DATA NOT INCLUDED.~~

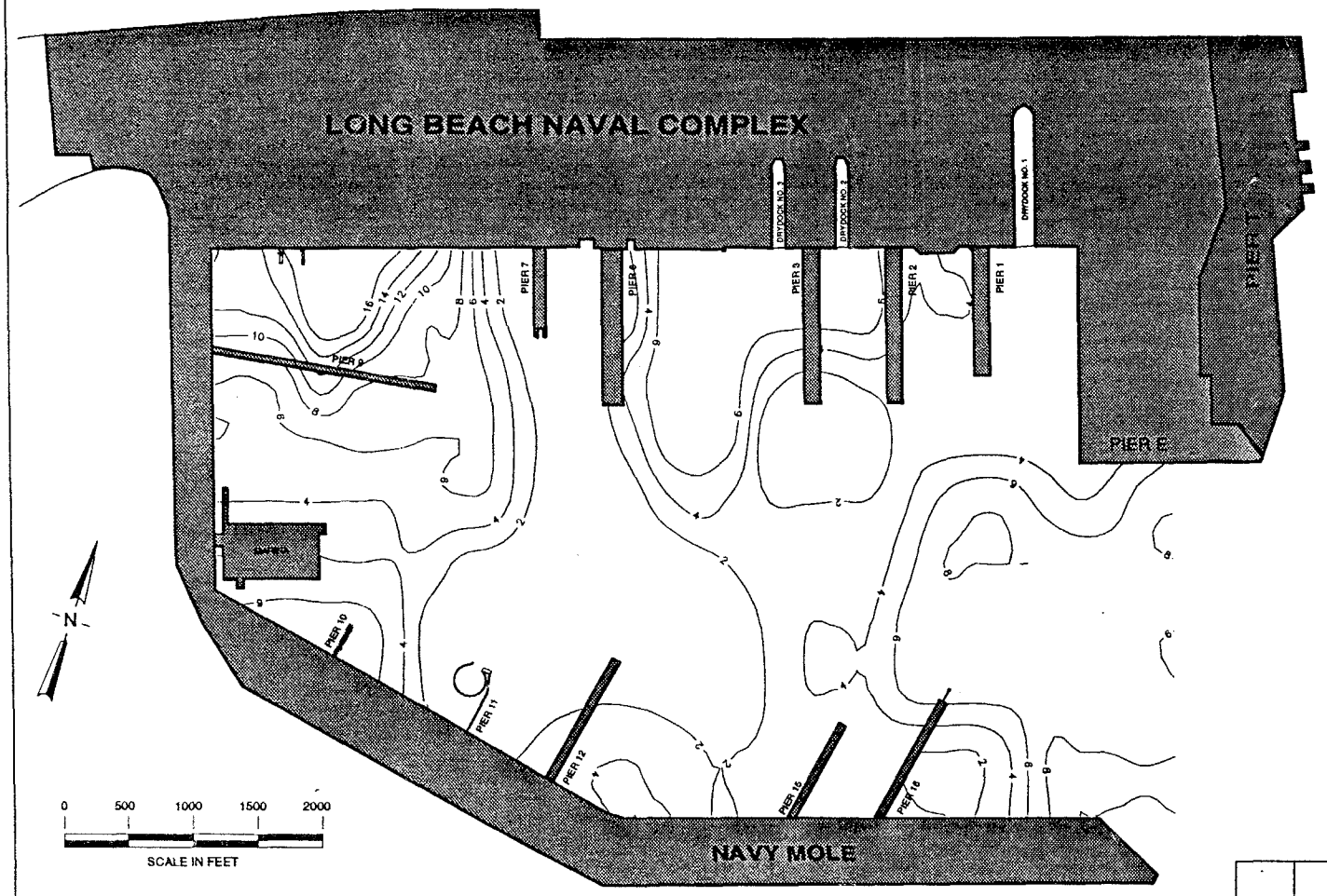
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF POLYCHAETE ABUNDANCE WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S036.SRF
JOB NO: 22214-026



LEGEND

10 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

(1) : Number of crustacean species less than 0.5

0.5 Crustacean species is equal to the 95% lower predictive limit (LPL).

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY, ~~PIER STATION DATA NOT INCLUDED.~~

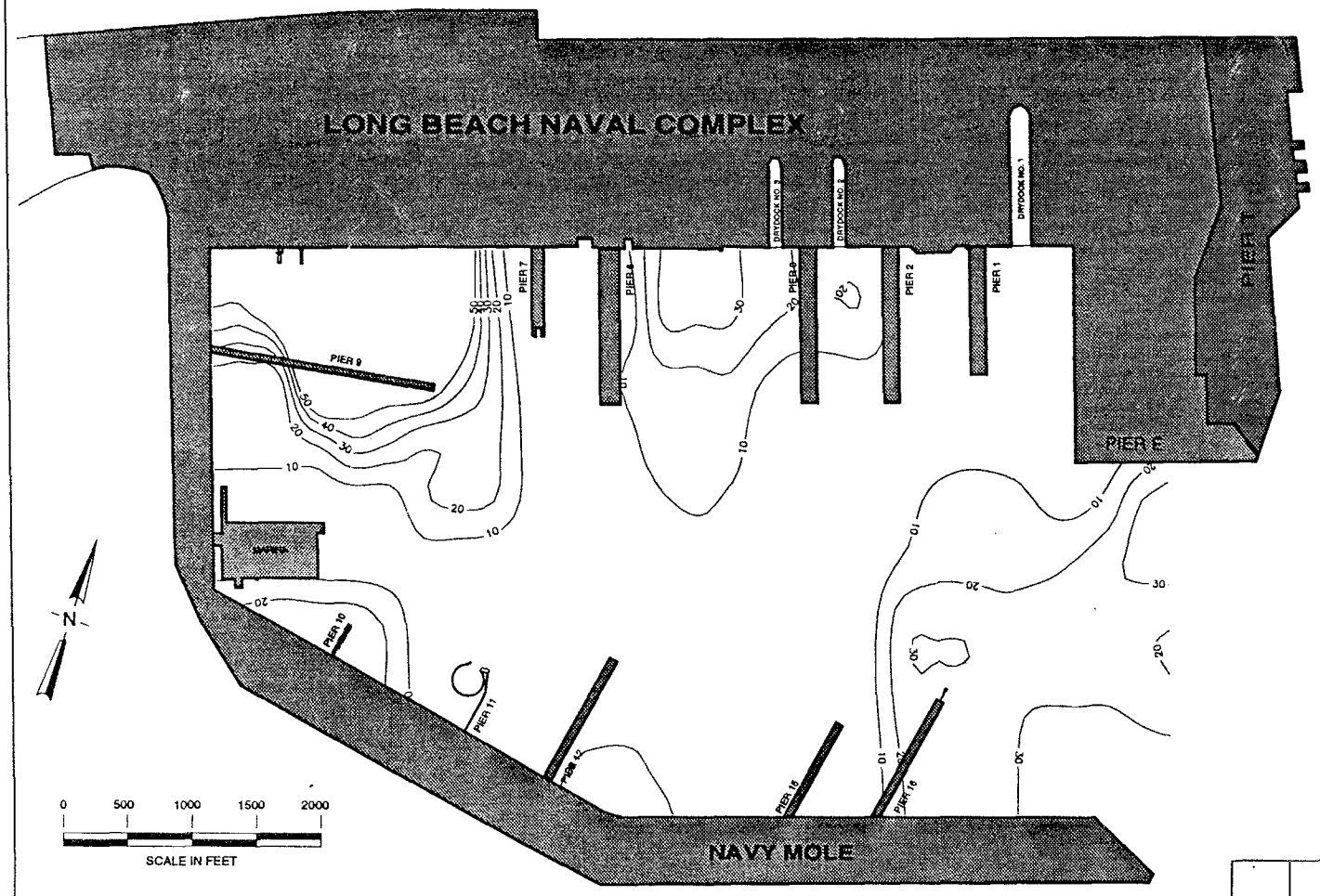
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF THE NUMBER OF CRUSTACEAN SPECIES WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S037.SRF
JOB NO: 22214-026



LEGEND

50 — CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY. ~~PIER STATION DATA NOT INCLUDED~~

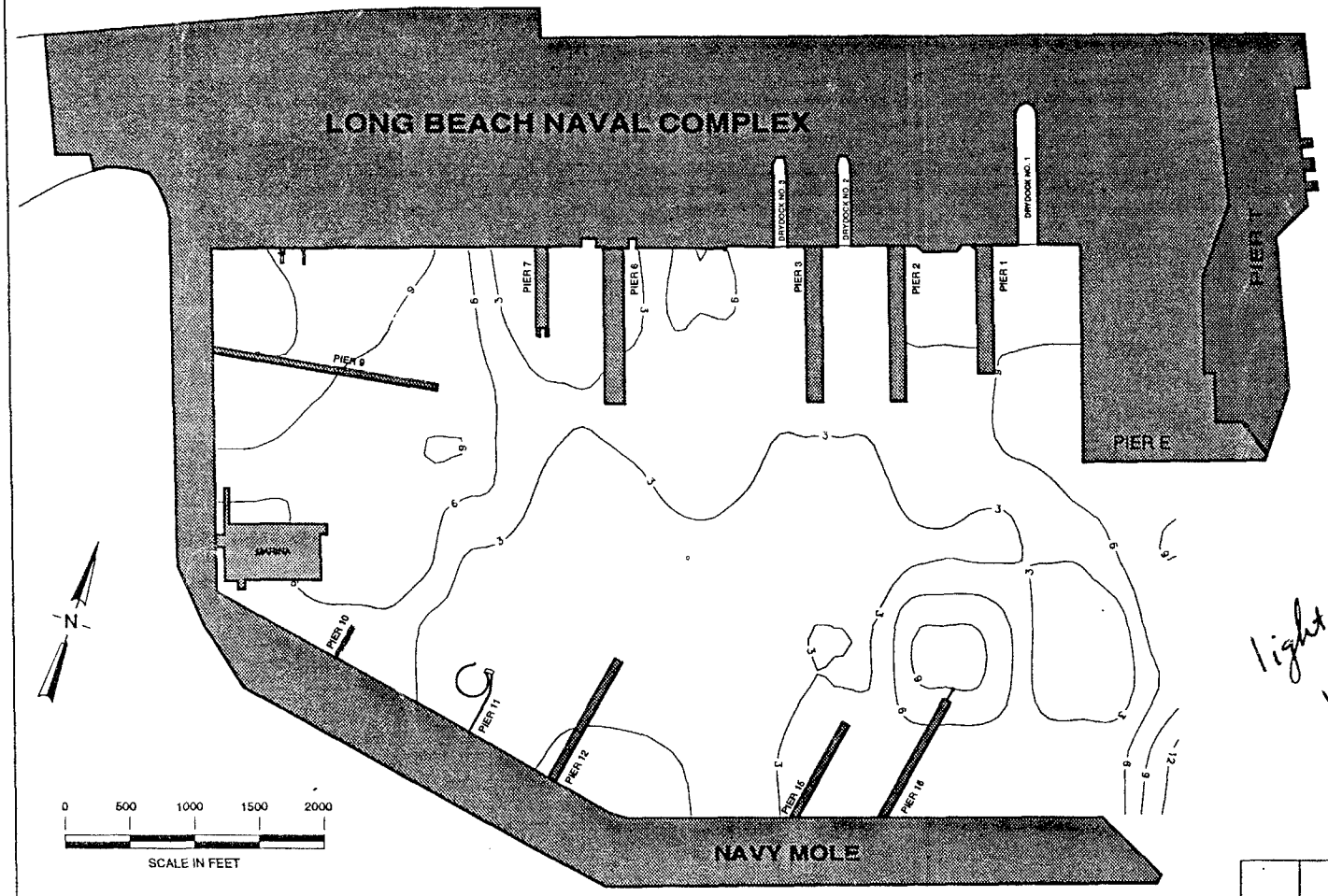
0	2/1/96	DRAFT RI	ECN	TRM	OK
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF CRUSTACEAN ABUNDANCE WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S038.SRF
JOB NO: 22214-026



light grey shade

LEGEND

CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

Number of Molluscan species
Less than 3.1

3.1 Molluscan species is equal to the 95% lower predictive limit (LPL).

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY. PIER STATION DATA NOT INCLUDED

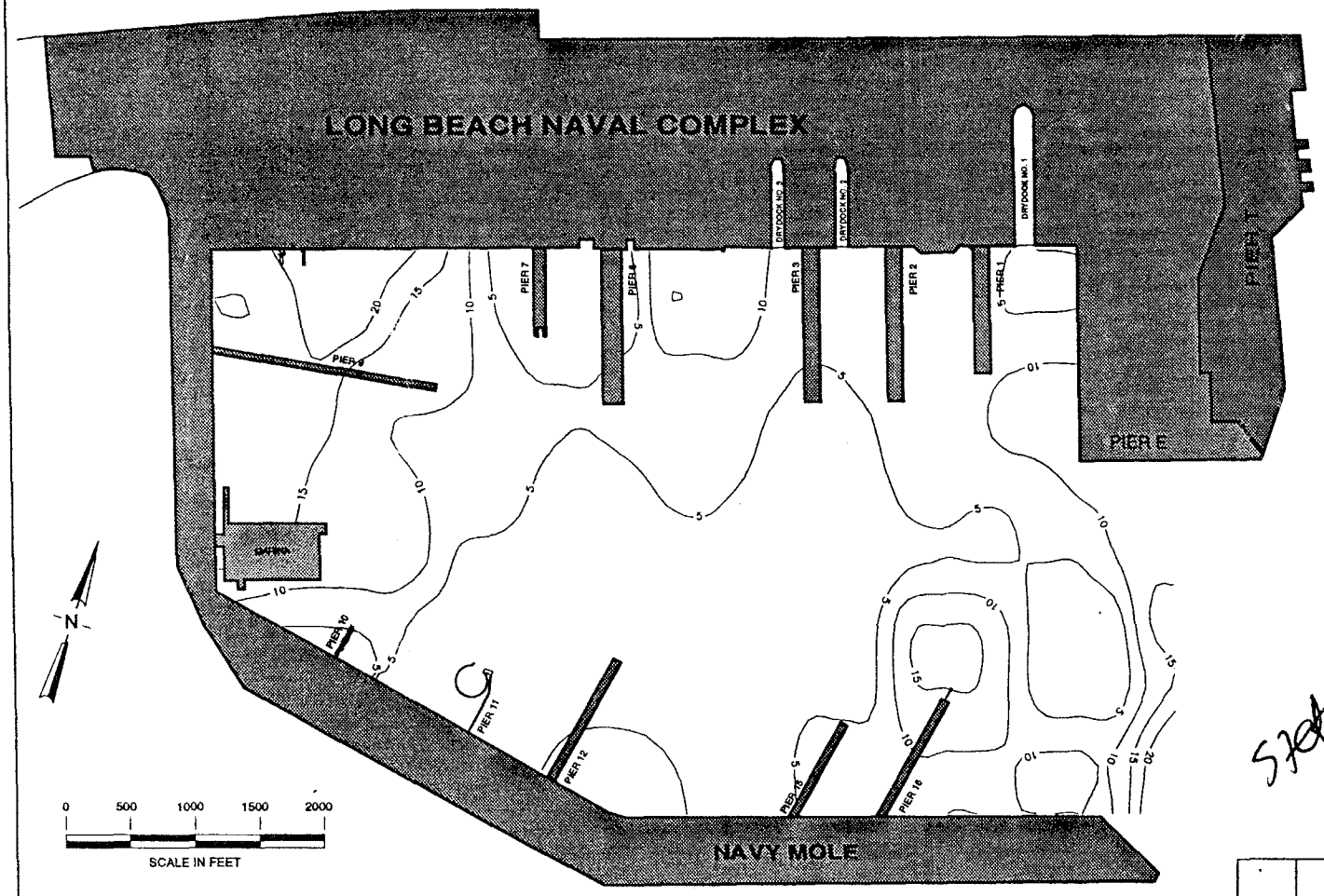
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	2/1/96	DRAFT RI	ECN	TRM	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF THE NUMBER OF MOLLUSCAN SPECIES WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S039.SRF
JOB NO: 22214-026



LEGEND

10 CONTOUR OF CONSTITUENT CONCENTRATION WITH CONCENTRATION SHOWN

Stat sig: Molluscan abundance less than

0	2/1/96	DRAFT RI	ECN	TRM	OK
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL

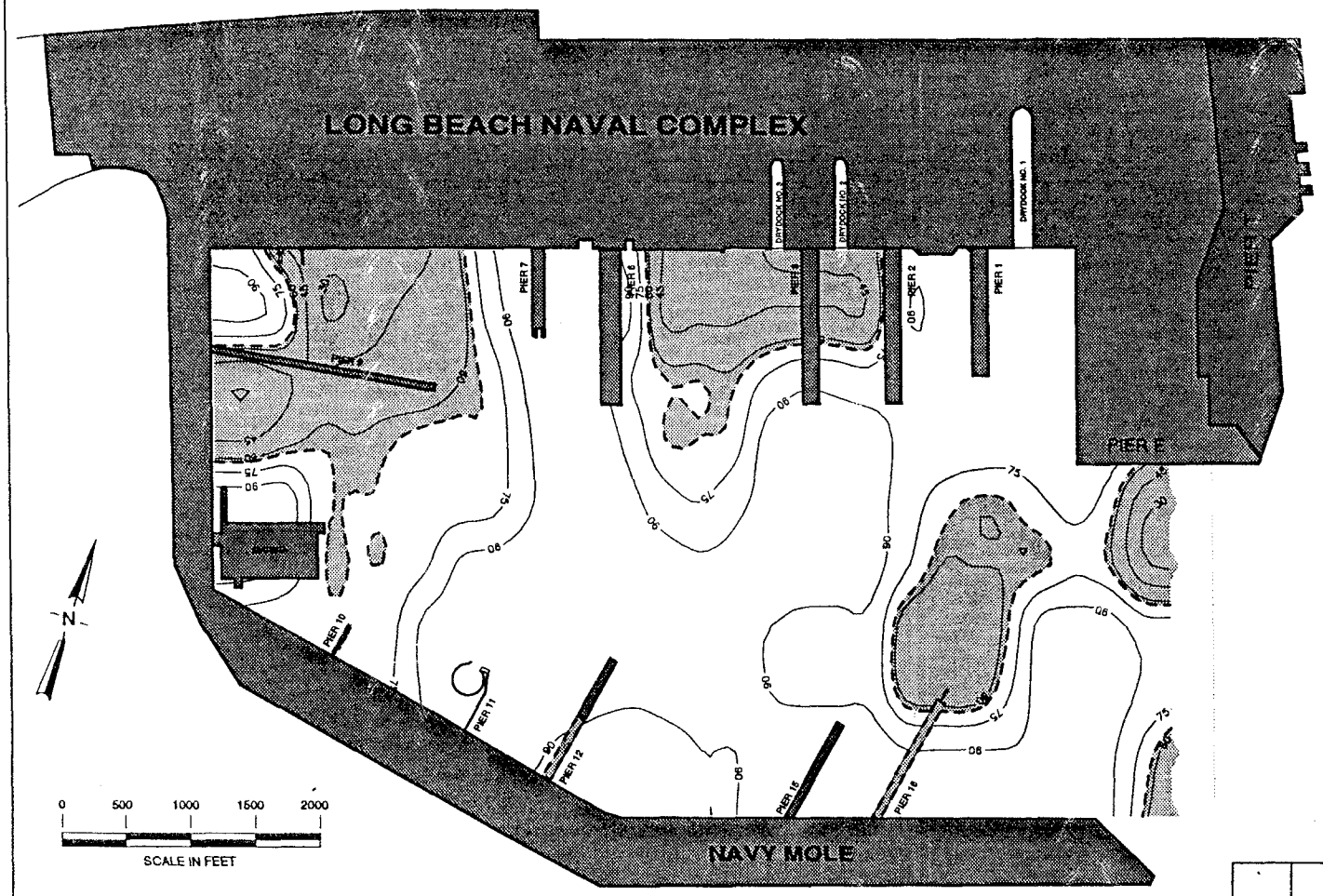
REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE 4-
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF MOLLUSCAN ABUNDANCE WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

NOTE: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY. ~~PIER STATION DATA NOT INCLUDED.~~

Bechtel National, Inc
CLEAN II Program

DATE: 2/1/96
FILE NO: S040.SRF
JOB NO: 22214-026



LEGEND

- CONTOUR OF PERCENT SURVIVAL (90)
- SURVIVAL LESS THAN 64 PERCENT

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	SAO	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF ECHINODERM SURVIVAL(PERCENT) WITHIN WEST BASIN

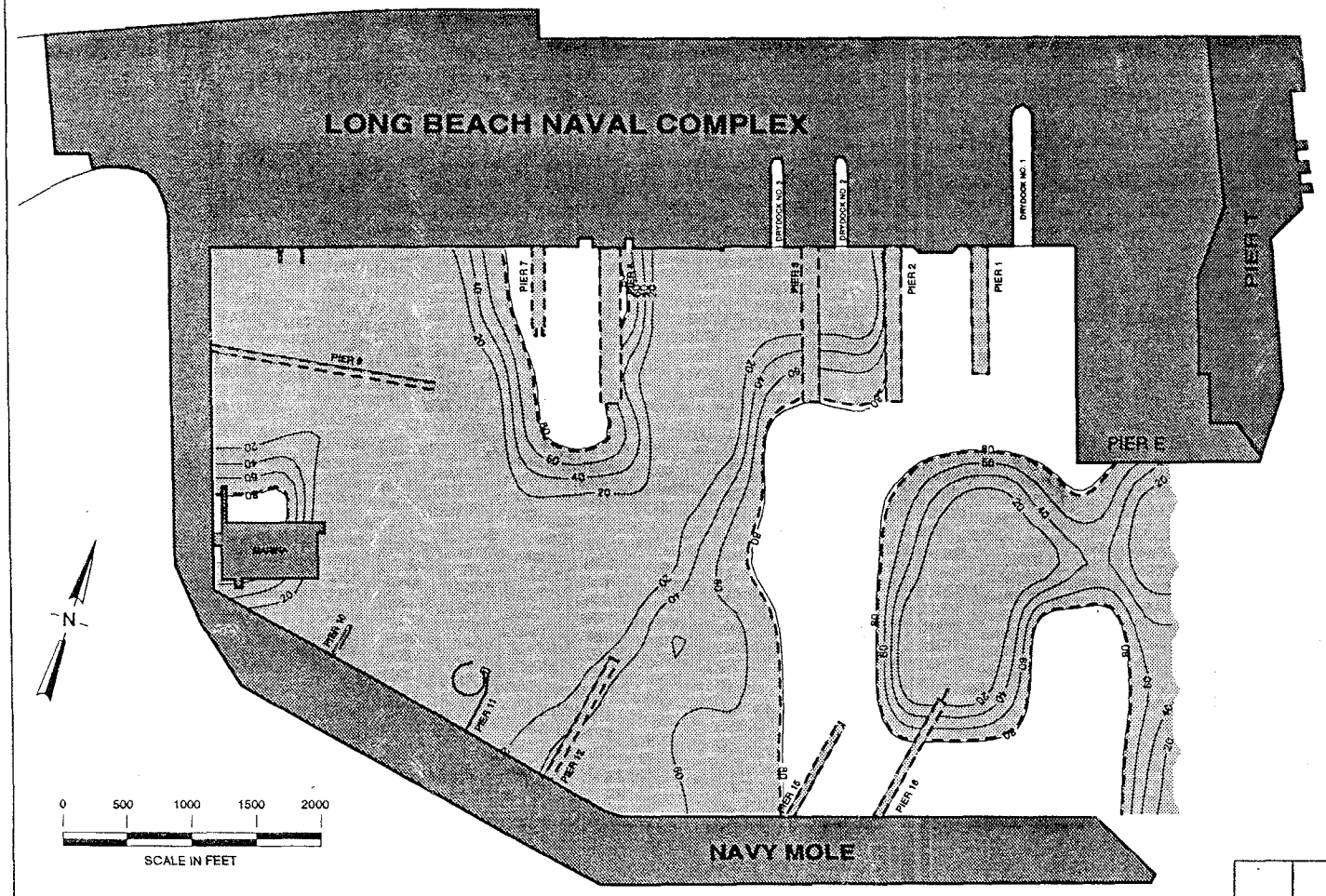
NAVAL COMPLEX, LONG BEACH, CALIFORNIA

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY

64 PERCENT SURVIVAL IS EQUAL TO THE 95% LOWER PREDICTIVE LIMIT (LPL).

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S022.SRF
JOB NO: 22214-026



LEGEND

20 — CONTOUR OF PERCENT NORMAL DEVELOPMENT

NORMAL DEVELOPMENT LESS THAN 78 PERCENT

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

78 PERCENT NORMAL DEVELOPMENT IS EQUAL TO THE 95% LOWER PREDICTIVE LIMIT (LPL).

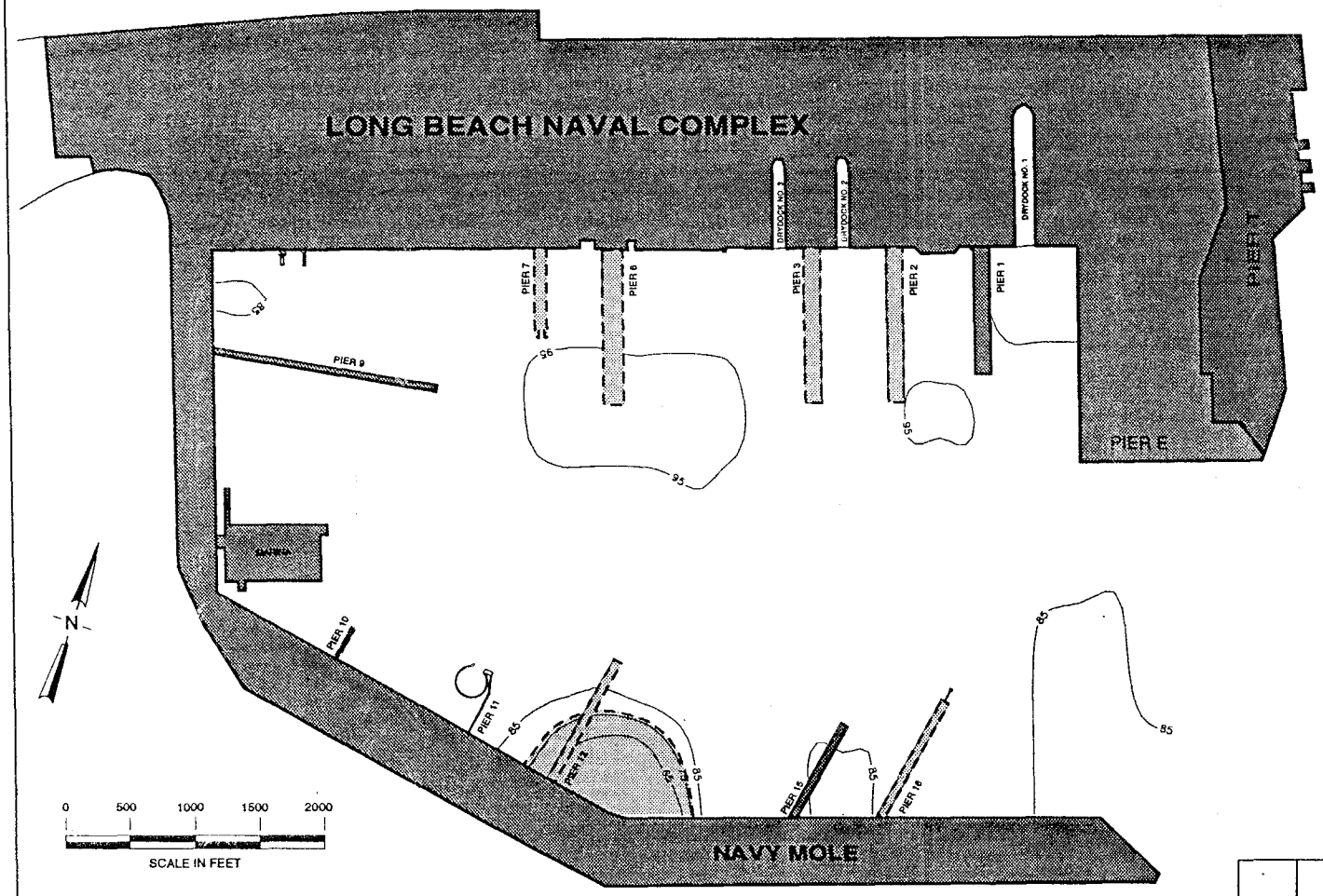
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	SAO	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF ECHINODERM NORMAL DEVELOPMENT (PERCENT) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S024.SRF
JOB NO: 22214-026



LEGEND

85 — CONTOUR OF PERCENT SURVIVAL

SURVIVAL LESS THAN 77 PERCENT

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	SAO	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)

FIGURE

SURFACE SEDIMENT SPATIAL DISTRIBUTION OF AMPHIPOD SURVIVAL (PERCENT) WITHIN WEST BASIN

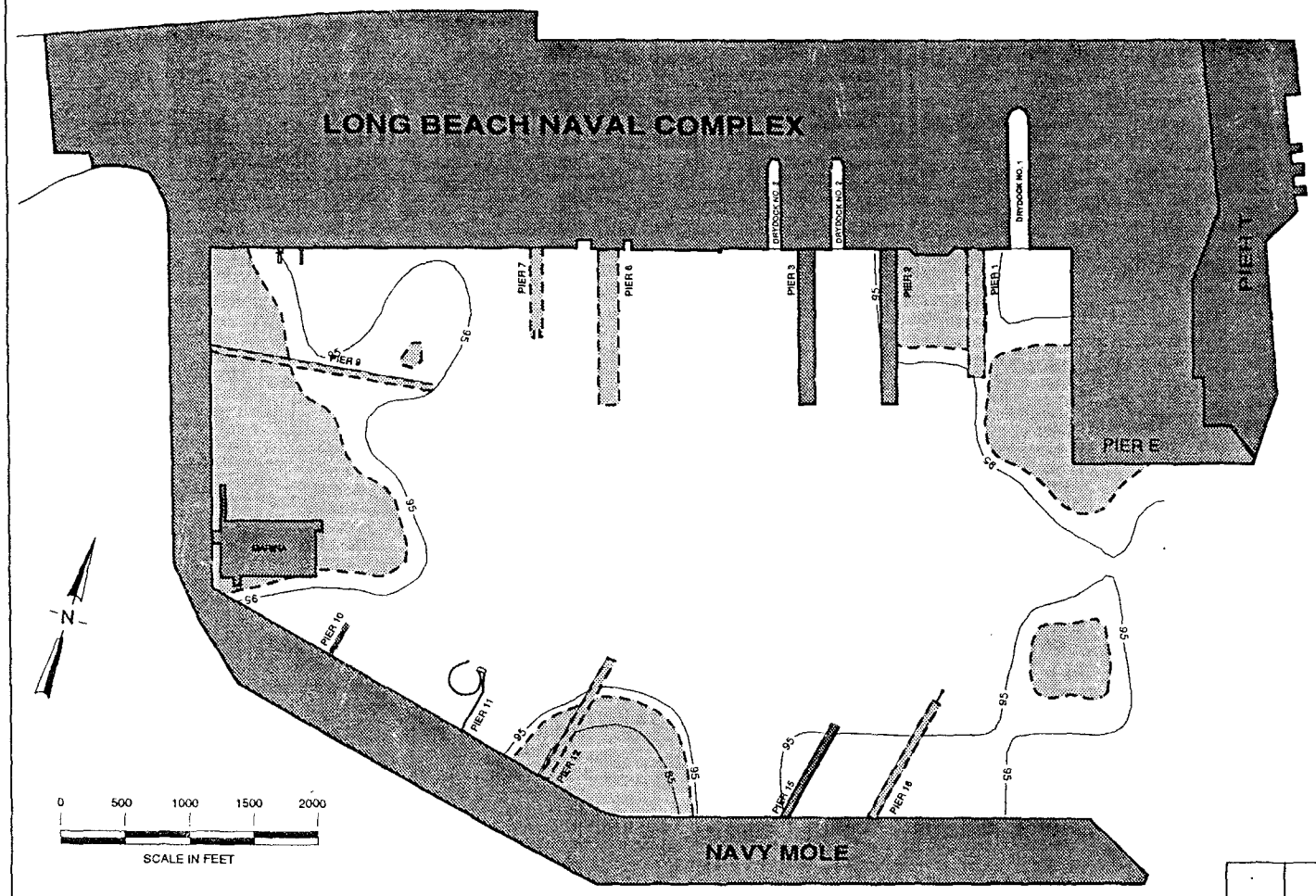
NAVAL COMPLEX, LONG BEACH, CALIFORNIA

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

77 PERCENT SURVIVAL IS EQUAL TO THE 95% LOWER PREDICTIVE LIMIT (LPL).

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S025.SRF
JOB NO: 22214-026



LEGEND

85 — CONTOUR OF PERCENT REBURIAL

REBURIAL LESS THAN 93 PERCENT

0	1/31/96	DRAFT RI	ECN	SAO	OK
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF AMPHIPOD REBURIAL (PERCENT) WITHIN WEST BASIN

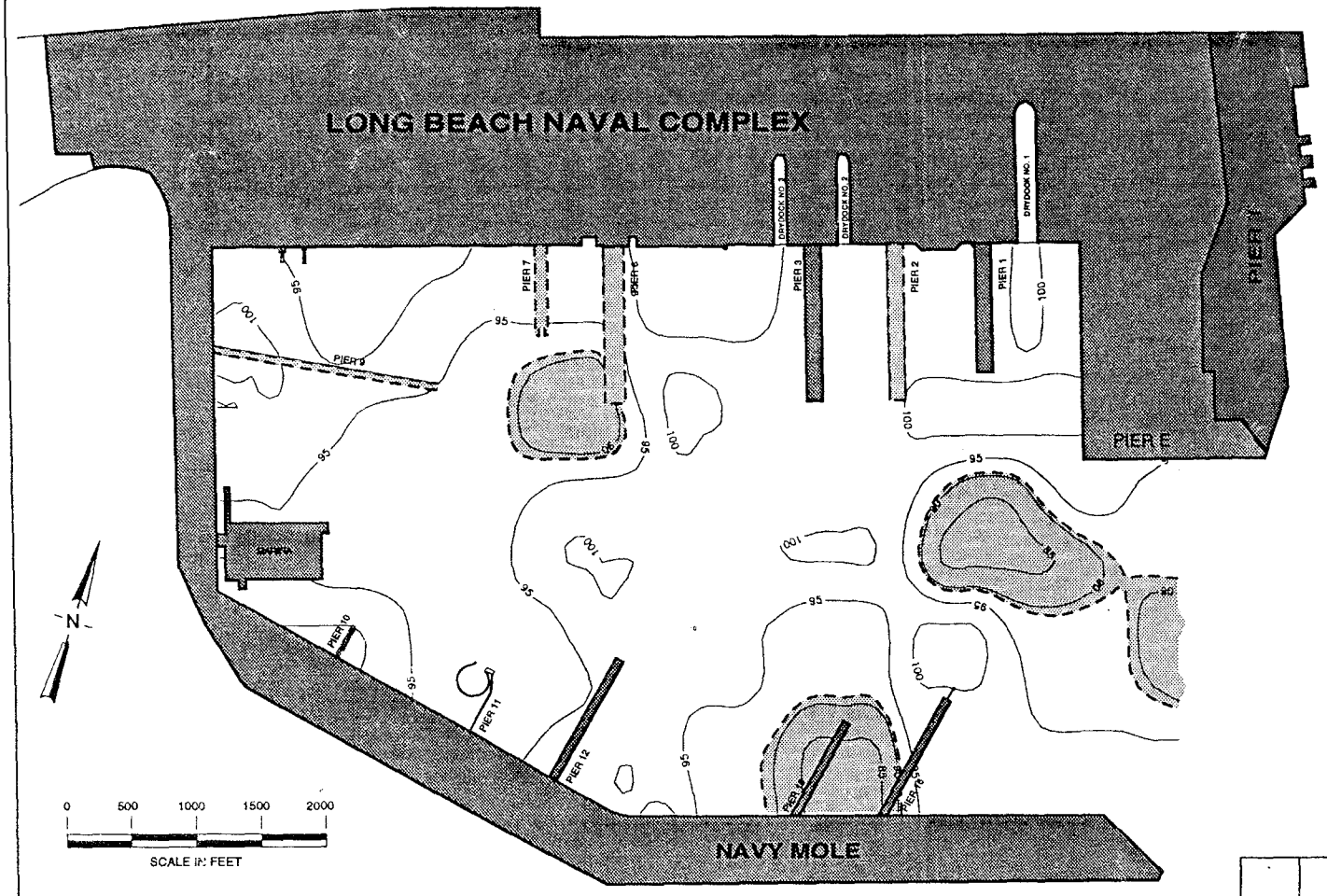
NAVAL COMPLEX, LONG BEACH, CALIFORNIA

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

93 PERCENT REBURIAL IS EQUAL TO THE 95% LOWER PREDICTIVE LIMIT (LPL).

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S026.SRF
JOB NO: 22214-026



LEGEND

85 — CONTOUR OF PERCENT SURVIVAL

SURVIVAL LESS THAN 91 PERCENT

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	SAO	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)

FIGURE

SURFACE SEDIMENT SPATIAL DISTRIBUTION OF POLYCHAETE SURVIVAL (PERCENT) WITHIN WEST BASIN

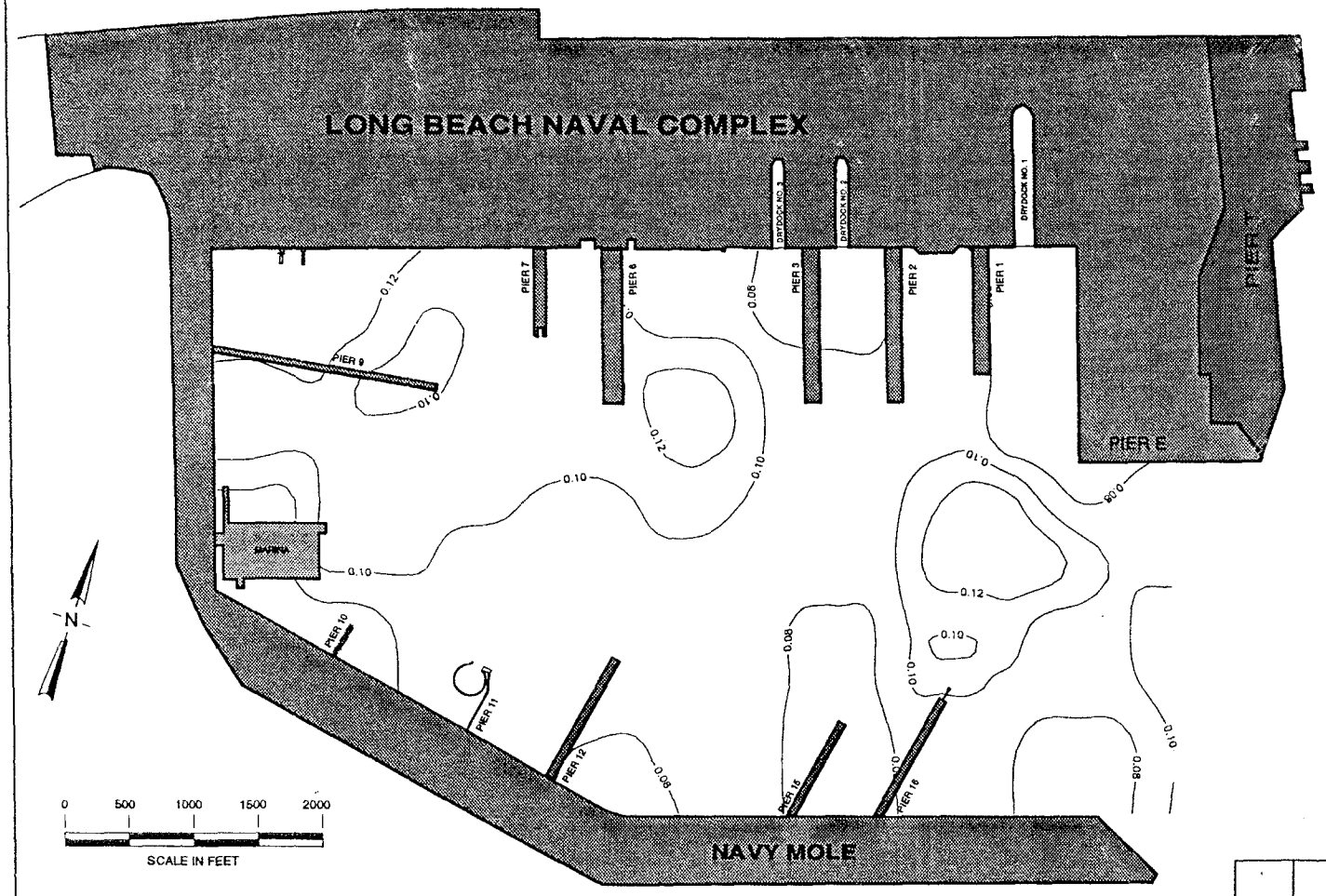
NAVAL COMPLEX, LONG BEACH, CALIFORNIA

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

91 PERCENT SURVIVAL IS EQUAL TO THE 95% LOWER PREDICTIVE LIMIT (LPL).

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S027.SRF
JOB NO: 22214-026



LEGEND

0.10 — CONTOUR OF GROWTH (mg/day)

GROWTH LESS THAN 0.048 mg/day

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

0.048 mg/day GROWTH IS EQUAL TO THE 95% LOWER PREDICTIVE LIMIT (LPL).

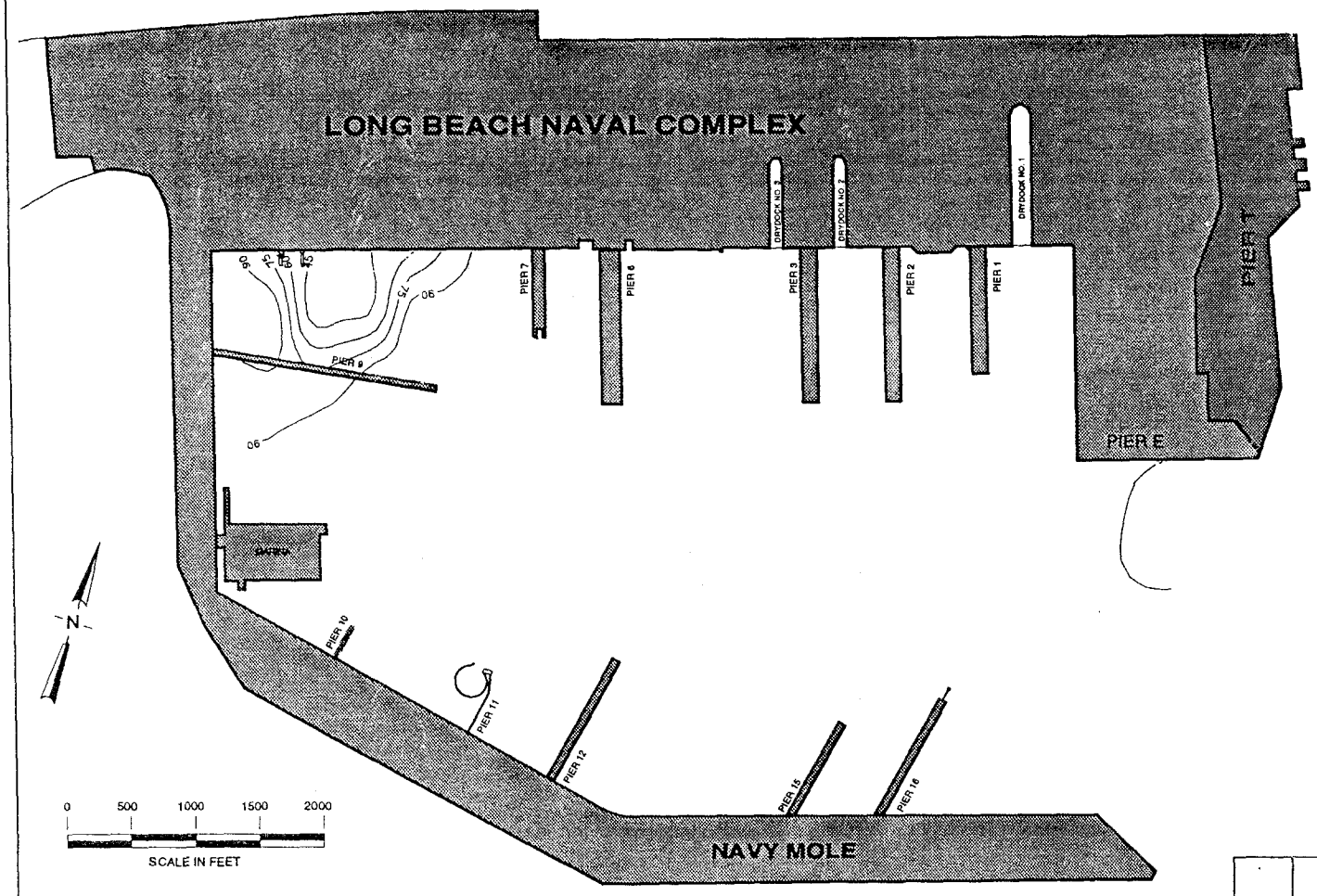
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	SAO	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF POLYCHAETE GROWTH (mg/day) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S028.SRF
JOB NO: 22214-026



LEGEND

50 — CONTOUR OF LC50 VALUE WITH PERCENT PORE WATER CONCENTRATION SHOWN

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

LC50 - MEDIAN LETHAL CONCENTRATION.

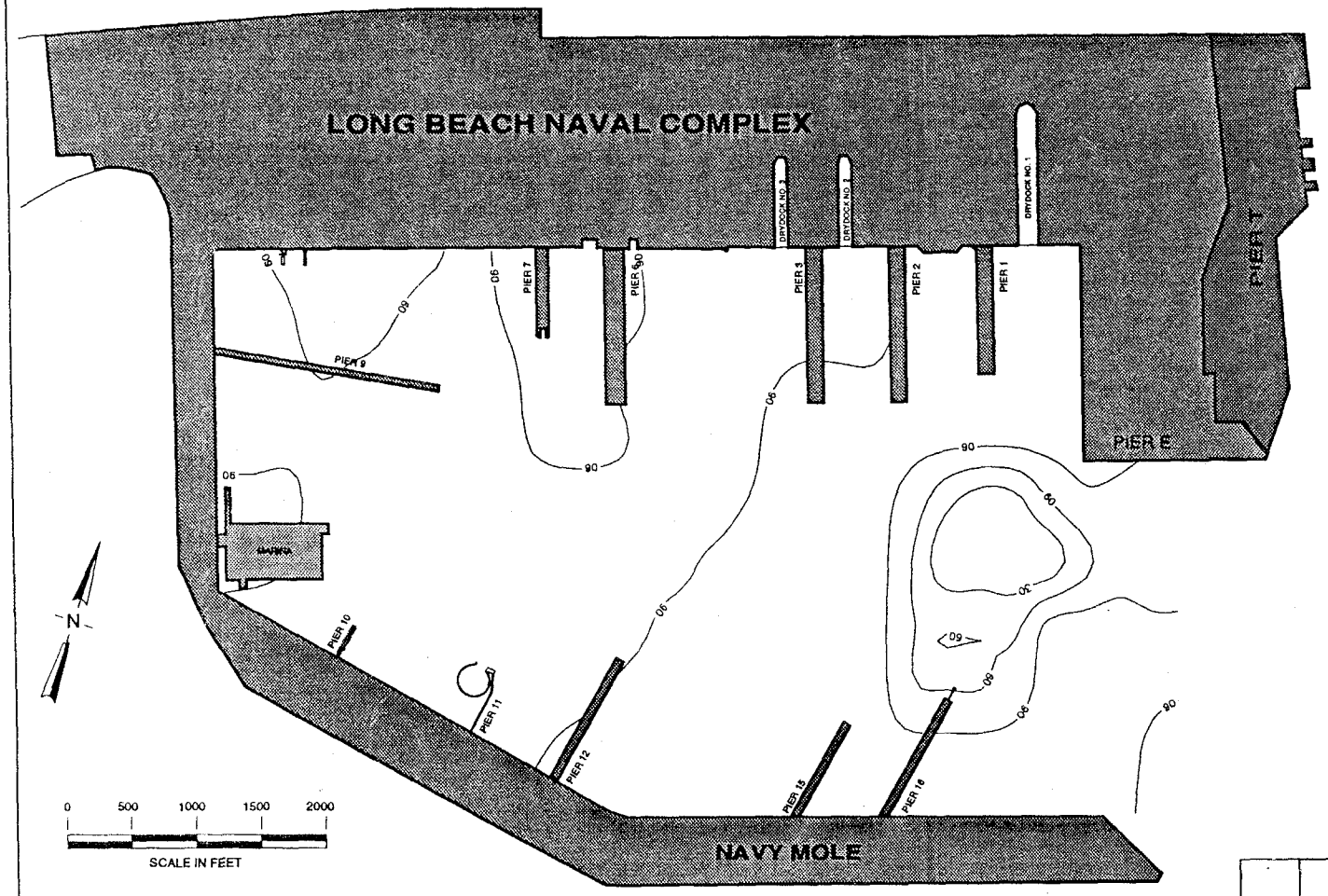
0	1/31/96	DRAFT RI	ECN	SAO	OK
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF ECHINODERM LC50 VALUES (PERCENT PORE WATER CONCENTRATION) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S029.SRF
JOB NO: 22214-026



LEGEND

60 — CONTOUR OF EC50 VALUE, AS MEASURED BY NORMAL DEVELOPMENT, WITH PERCENT PORE WATER CONCENTRATION SHOWN

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

EC50 - MEDIAN EFFECTIVE CONCENTRATION.

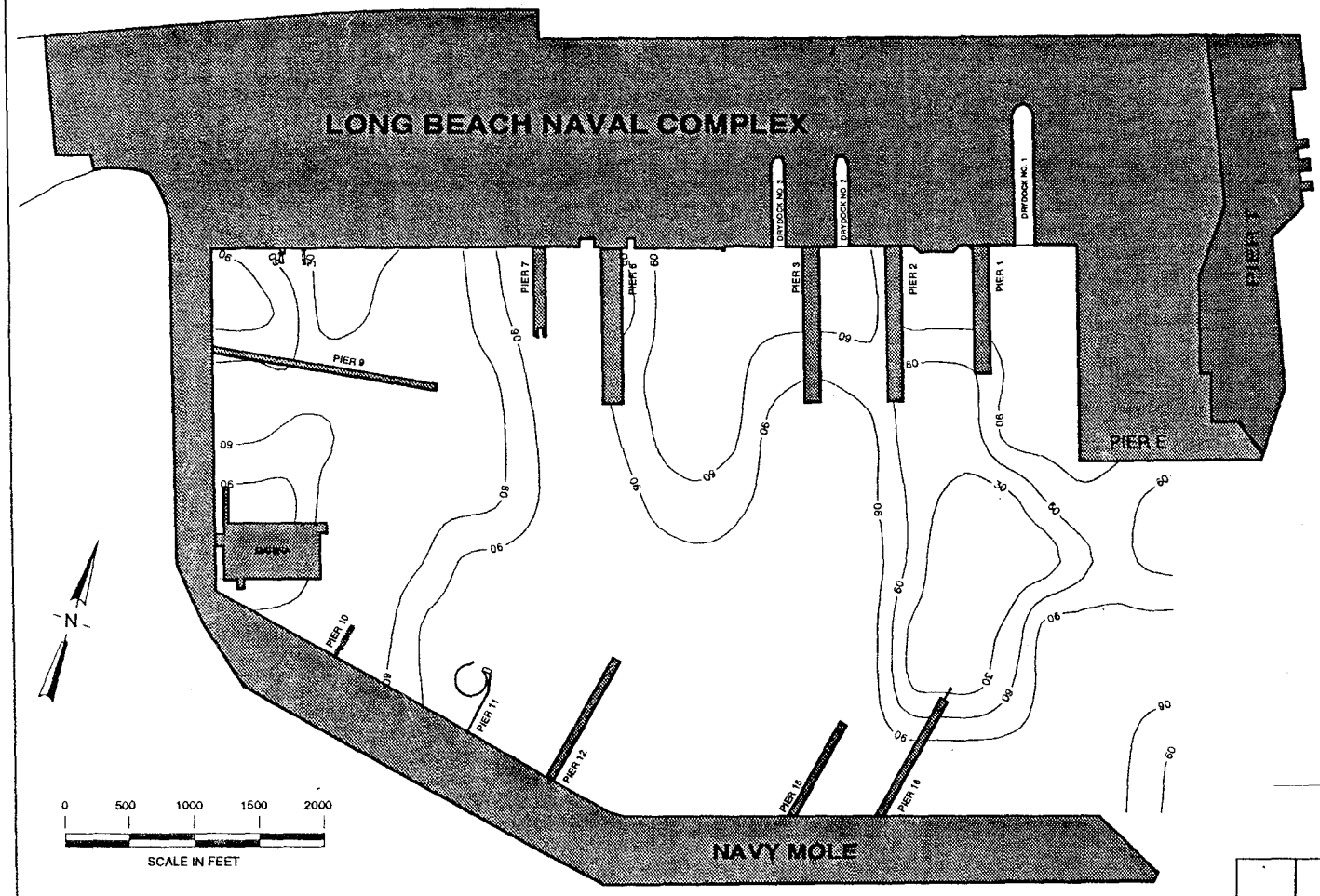
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	SAO	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF ECHINODERM EC50 VALUES (PERCENT PORE WATER CONCENTRATION, AS MEASURED BY NORMAL DEVELOPMENT) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S031.SRF
JOB NO: 22214-026



LEGEND

60 — CONTOUR OF NOEC VALUE, AS MEASURED BY SURVIVAL, WITH PERCENT PORE WATER CONCENTRATION SHOWN

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

NOEC - NO OBSERVED EFFECTS CONCENTRATION.

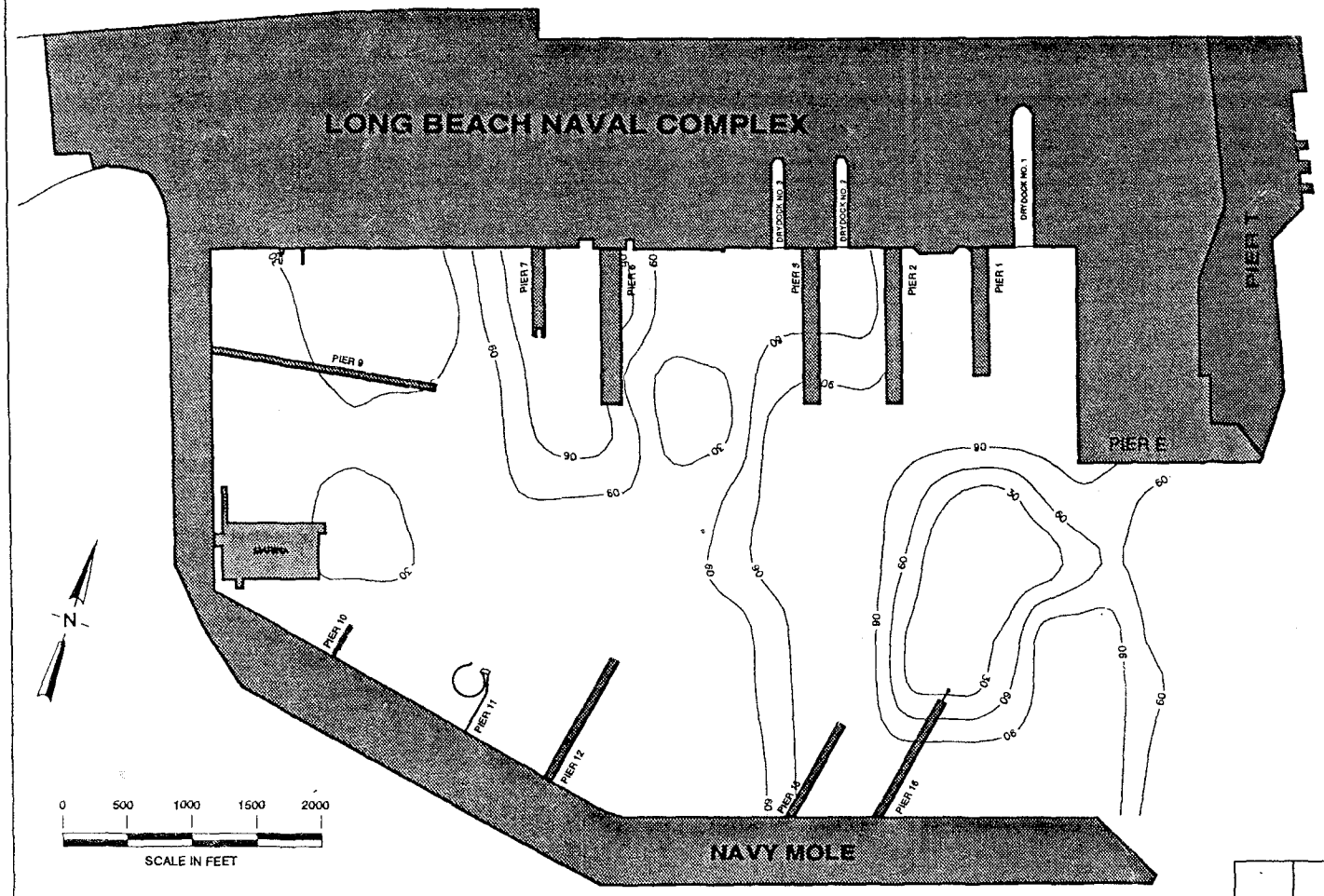
REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	SAO	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF ECHINODERM NOEC VALUES (PERCENT PORE WATER CONCENTRATION, AS MEASURED BY SURVIVAL) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S030.SRF
JOB NO: 22214-026



LEGEND

60 — CONTOUR OF NOEC VALUE, AS MEASURED BY NORMAL DEVELOPMENT, WITH PERCENT PORE WATER CONCENTRATION SHOWN

NOTES: CONTOUR LINES ARE BASED ON BASIN STATION DATA ONLY.

NOEC - NO OBSERVED EFFECTS CONCENTRATION.

REV	DATE	REASON FOR REVISION	BY	CHECK	APPROVAL
0	1/31/96	DRAFT RI	ECN	SAO	OK

REMEDIAL INVESTIGATION REPORT
WEST BASIN (SITE 7)
FIGURE
SURFACE SEDIMENT SPATIAL DISTRIBUTION OF ECHINODERM NOEC VALUES (PERCENT PORE WATER CONCENTRATION, AS MEASURED BY NORMAL DEVELOPMENT) WITHIN WEST BASIN

NAVAL COMPLEX, LONG BEACH, CALIFORNIA

Bechtel National, Inc
CLEAN II Program

DATE: 1/31/96
FILE NO: S032.SRF
JOB NO: 22214-026