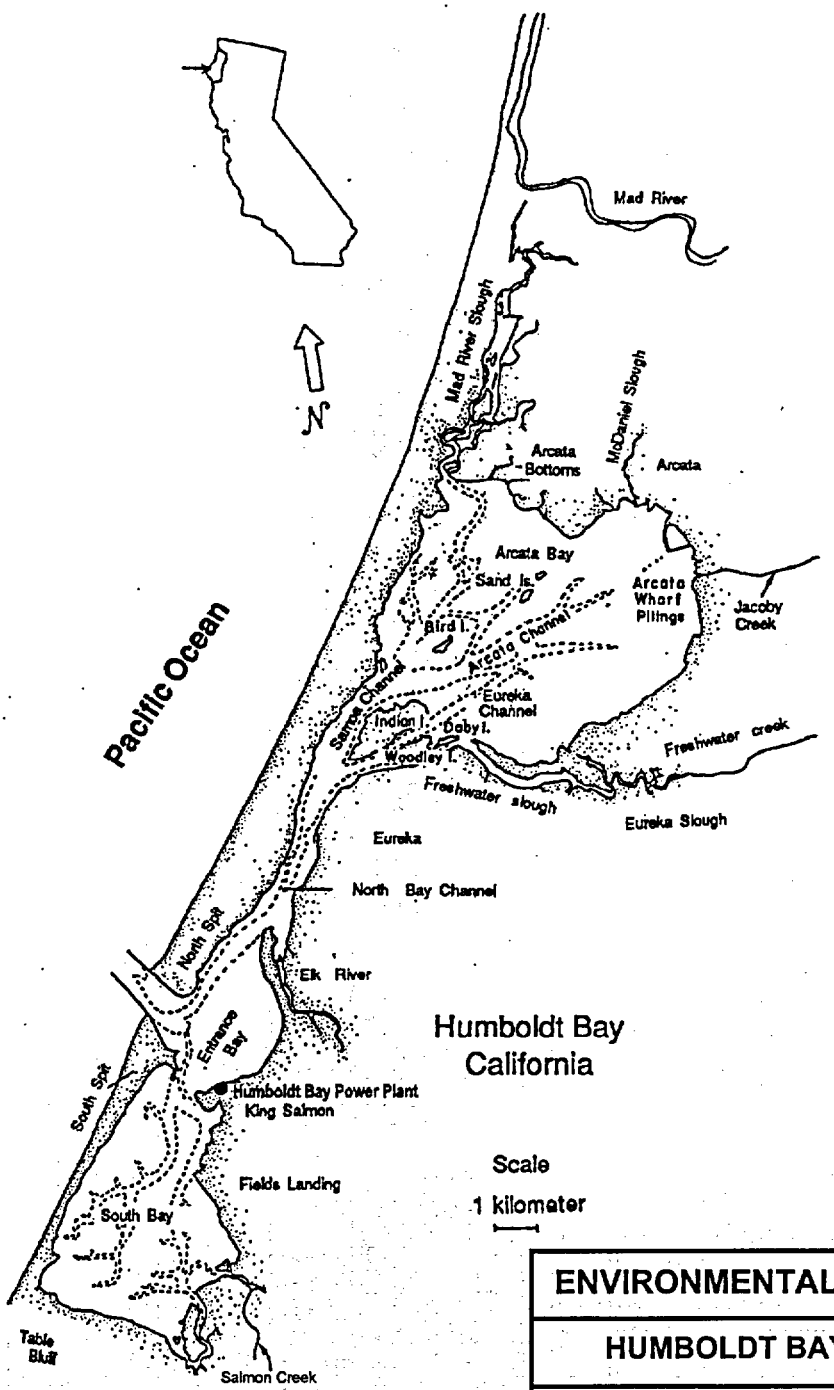
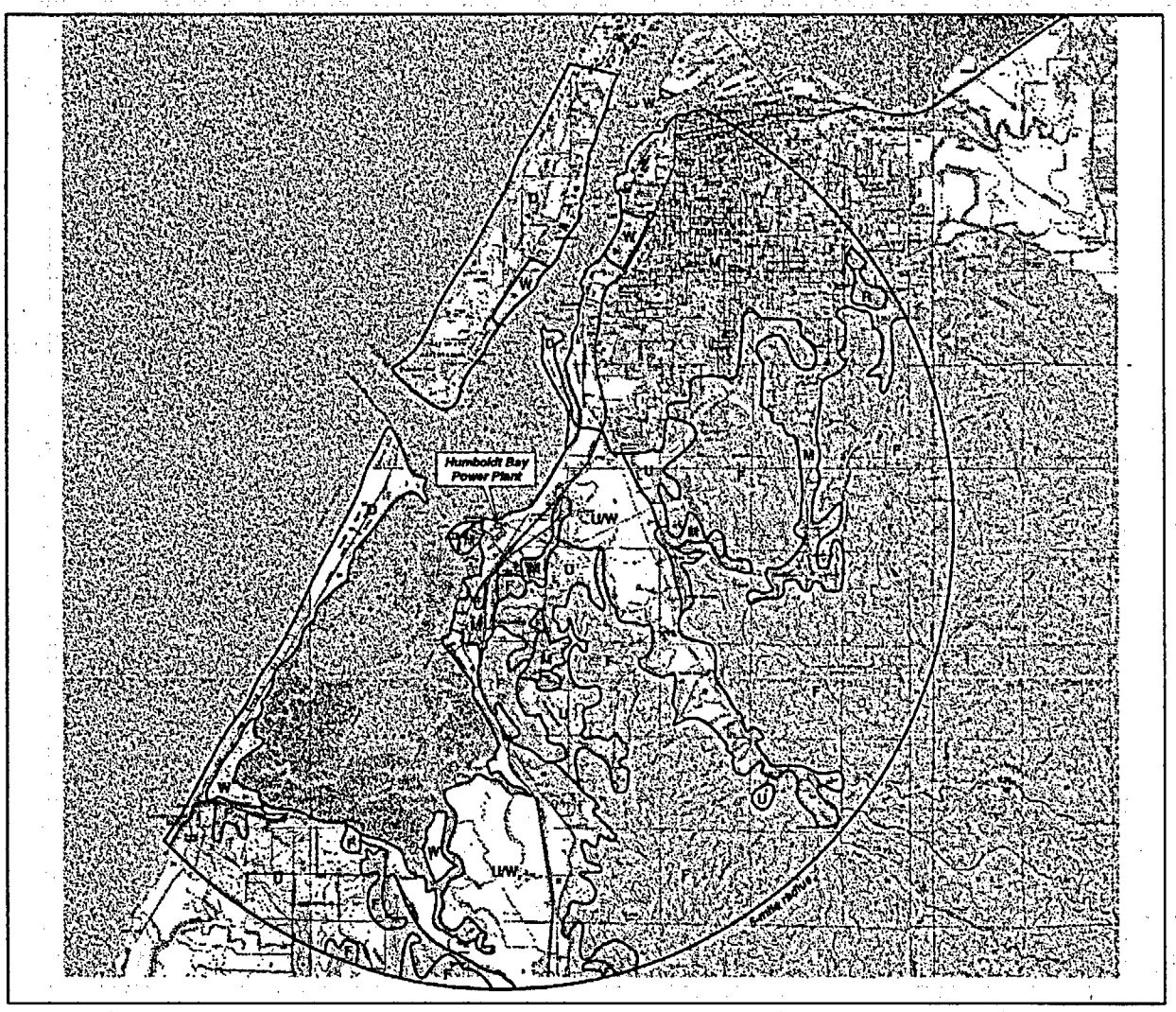


ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.3-1
HUMBOLDT BAY
AND ENVIRONS



Legend

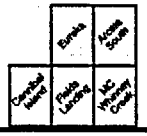
- D Dune Communities
- W Herbaceous Wetland Communities
- U Herbaceous Upland Community
- R Riparian Community
- F Forest Communities
- M Developed/Urban Areas

N

0 1 Mile

Scale = approx. 1:69,000
(1 inch = approx. 1.09 mile)

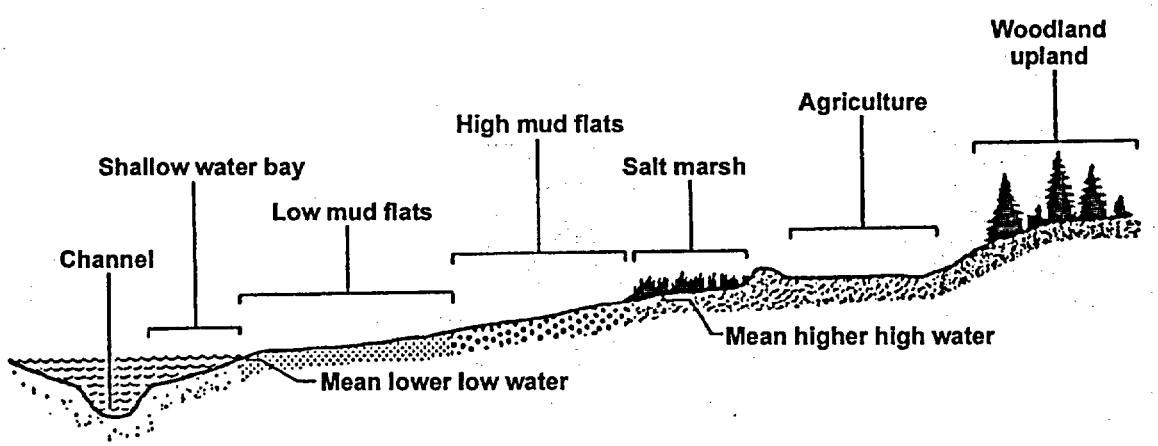
Base Map: USGS 7.5' series quadrangles:



ENVIRONMENTAL REPORT

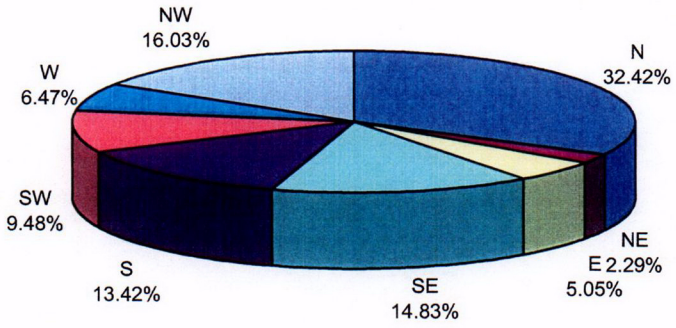
HUMBOLDT BAY ISFSI

FIGURE 2.3-2
PLANT COMMUNITIES IN THE VICINITY OF HUMBOLDT BAY POWER PLANT



ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.3-3 PROFILE OF HUMBOLDT BAY HABITATS

EUREKA, CA - NWS
Wind direction - Percent of Time

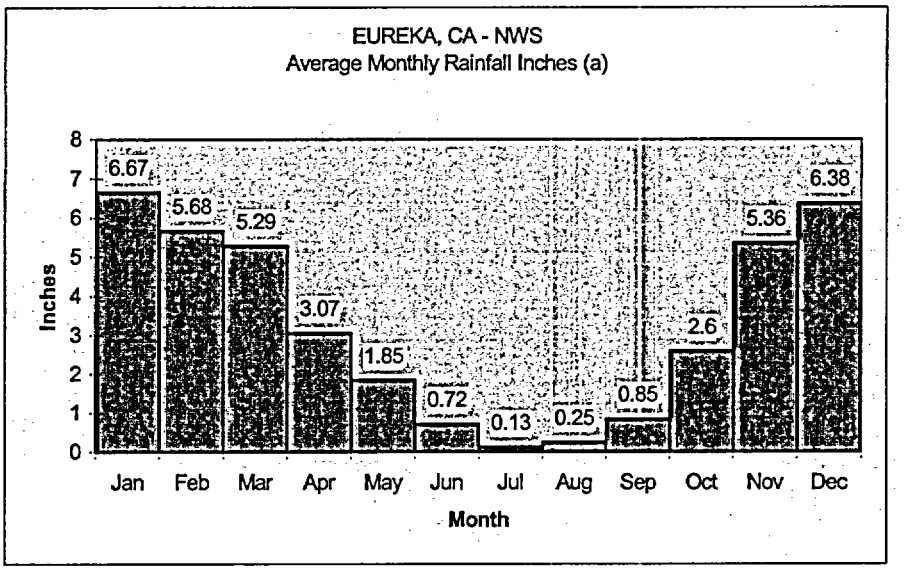


ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

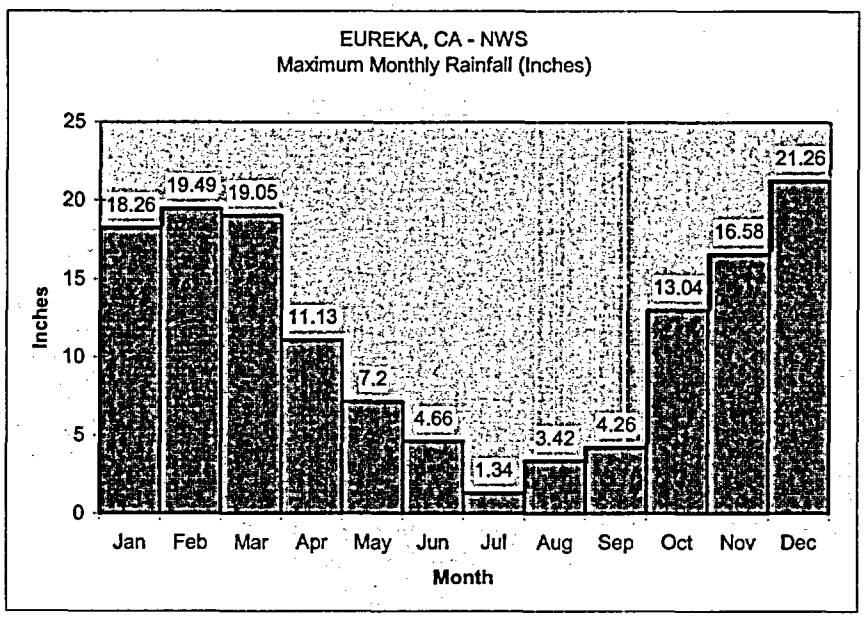
FIGURE 2.4-1
WIND DIRECTIONAL DISTRIBUTION 1905 THROUGH 1996

C-07



(a) Shows monthly rainfall reduced to a uniform period of 30 days using Landsberg's method (Reference 1).

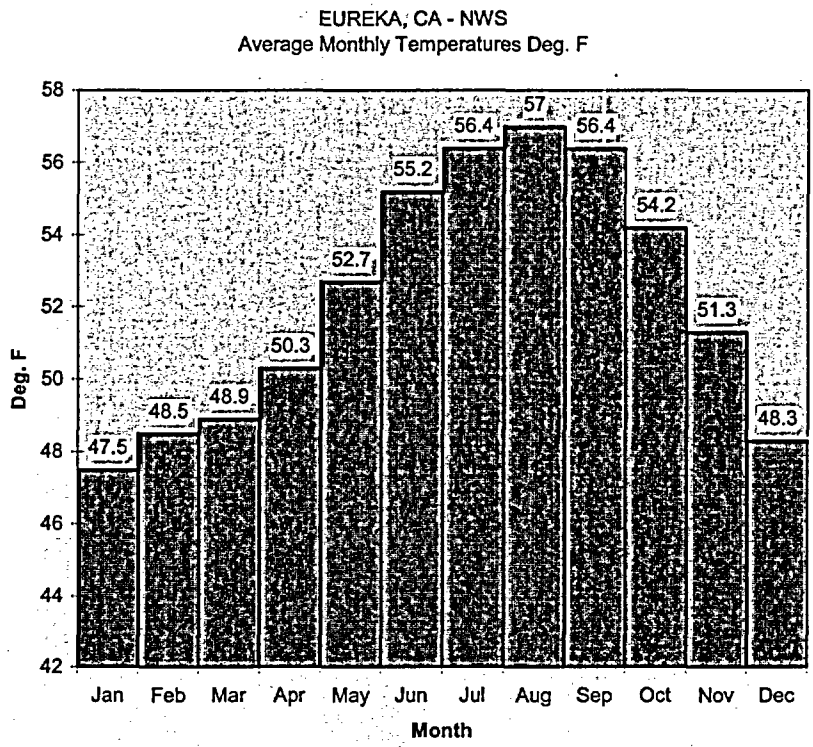
ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.4-2 AVERAGE MONTHLY RAINFALL 1887-1996



ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

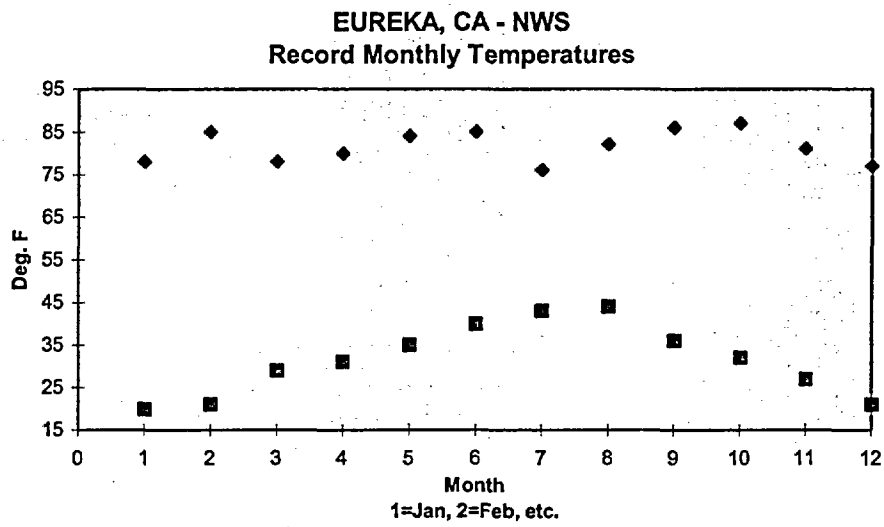
FIGURE 2.4-3
MAXIMUM MONTHLY RAINFALL
1887-1996



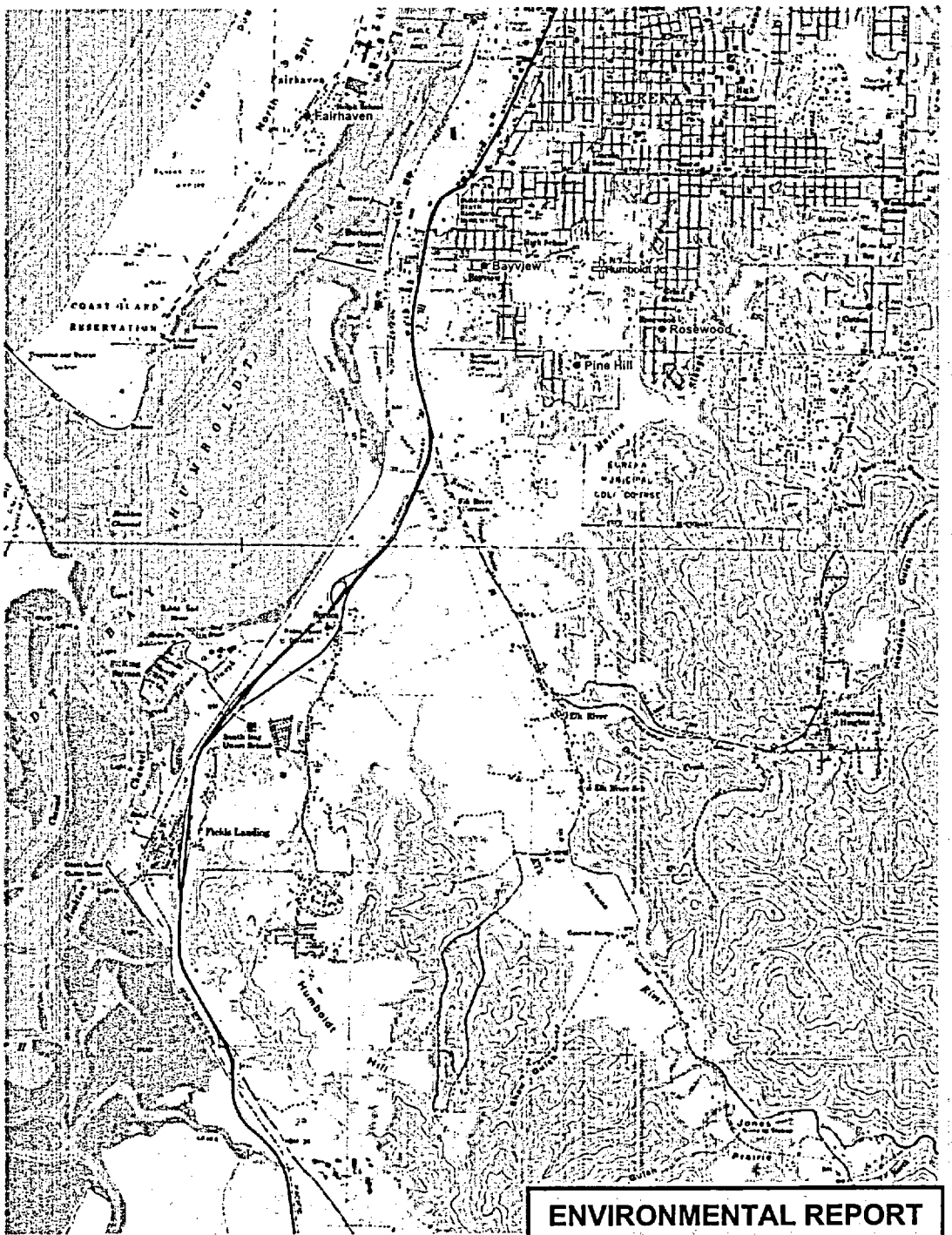
ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.4-4
AVERAGE MONTHLY
TEMPERATURES 1887-1996



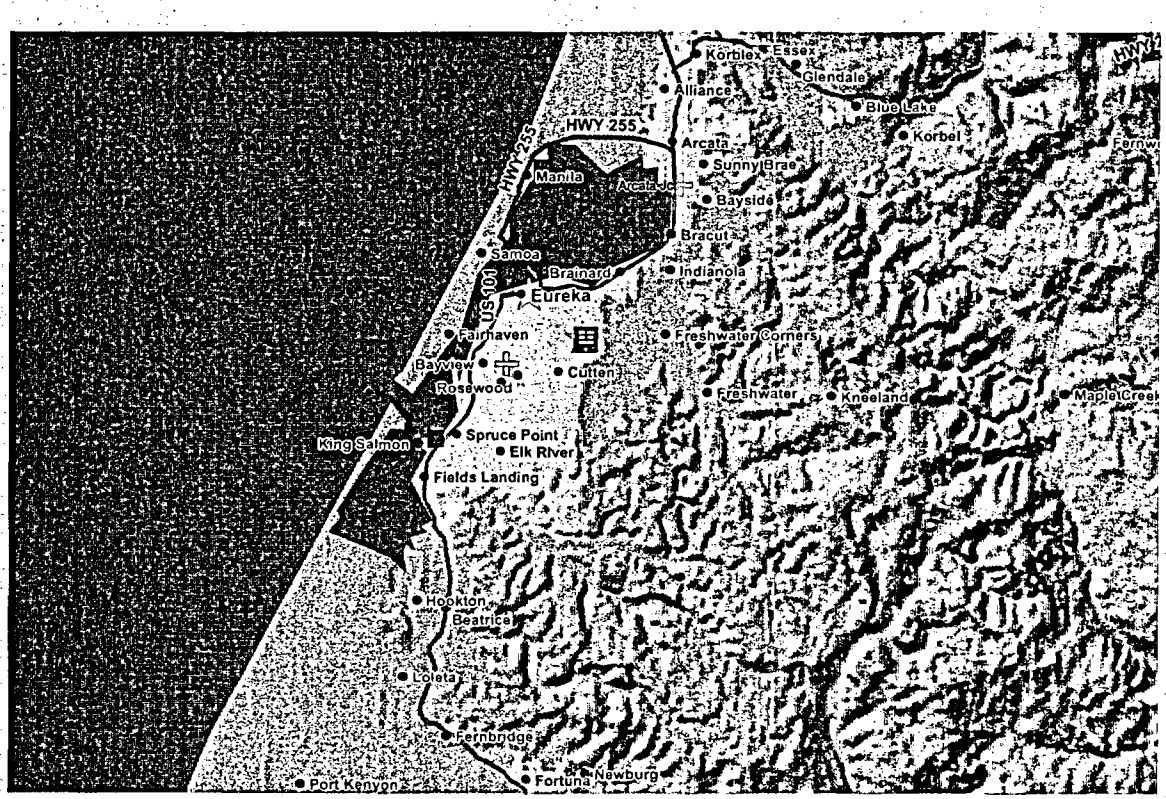
ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.4-5 MAXIMUM AND MINIMUM TEMPERATURES BY MONTH 1887-1996



ENVIRONMENTAL REPORT

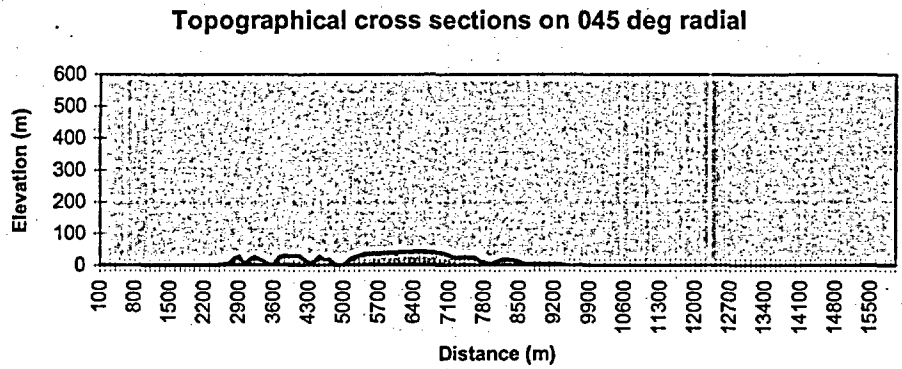
HUMBOLDT BAY ISFSI

FIGURE 2.4-6
TOPOGRAPHIC FEATURES TO 8 KM

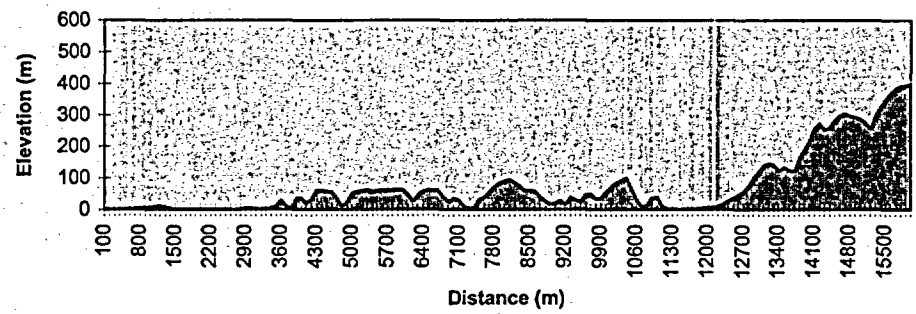


ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.4-7 TOPOGRAPHIC FEATURES TO 16 KM

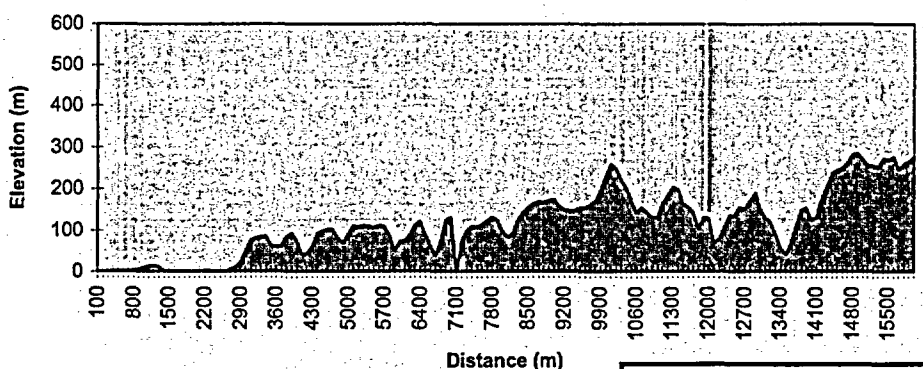
a. NE



b. ENE



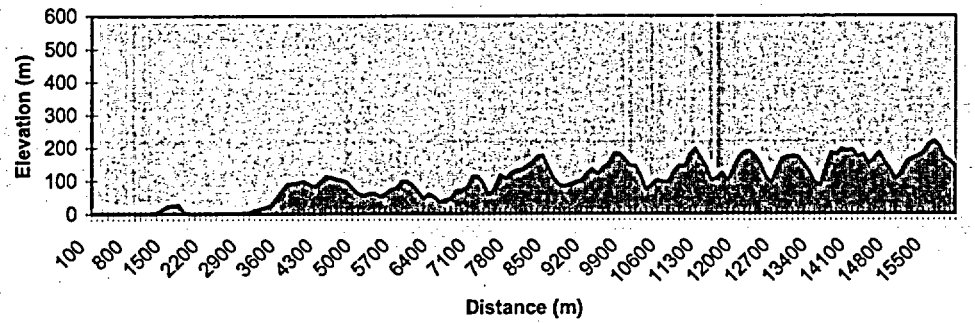
c. E



ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.4-8 TOPOGRAPHICAL CROSS SECTIONS SHEET 1 OF 3

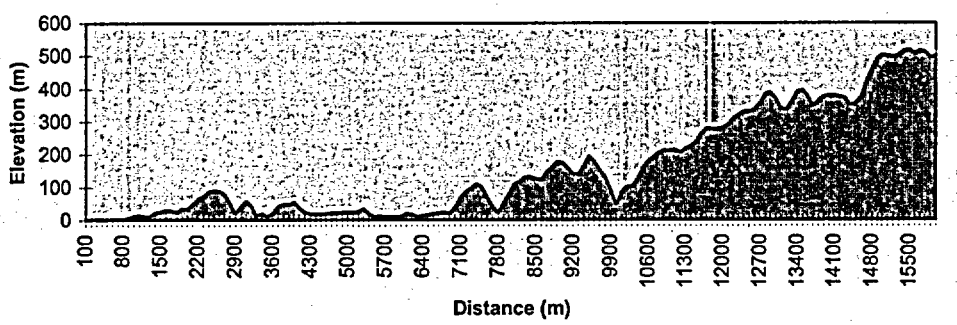
d. ESE

Topographical cross sections on 112.5 deg radial



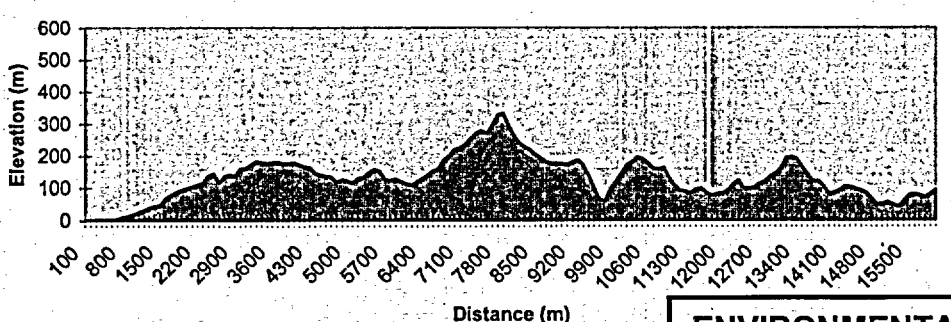
e. SE

Topographical cross sections on 135 deg radial



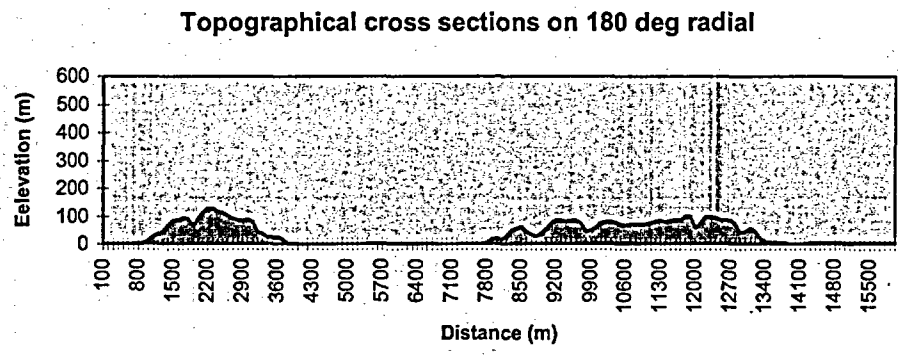
f. SSE

Topographical cross sections on 157.5 deg radial

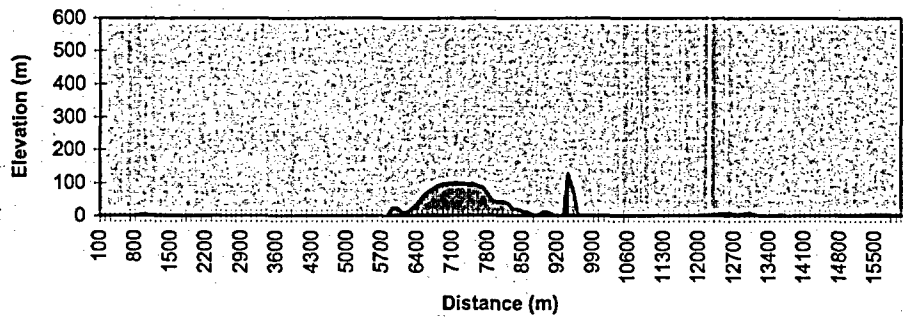


ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.4-8 TOPOGRAPHICAL CROSS SECTIONS SHEET 2 OF 3

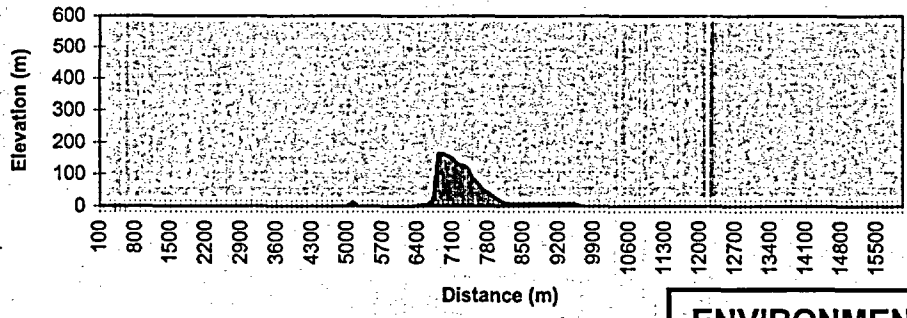
g. S



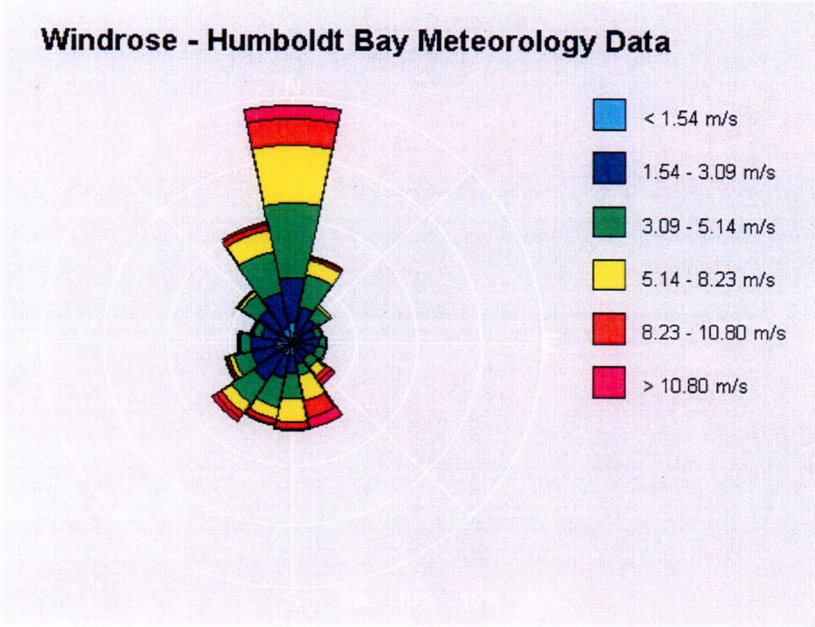
h. SSW



i. SW



ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.4-8 TOPOGRAPHICAL CROSS SECTIONS SHEET 3 OF 3

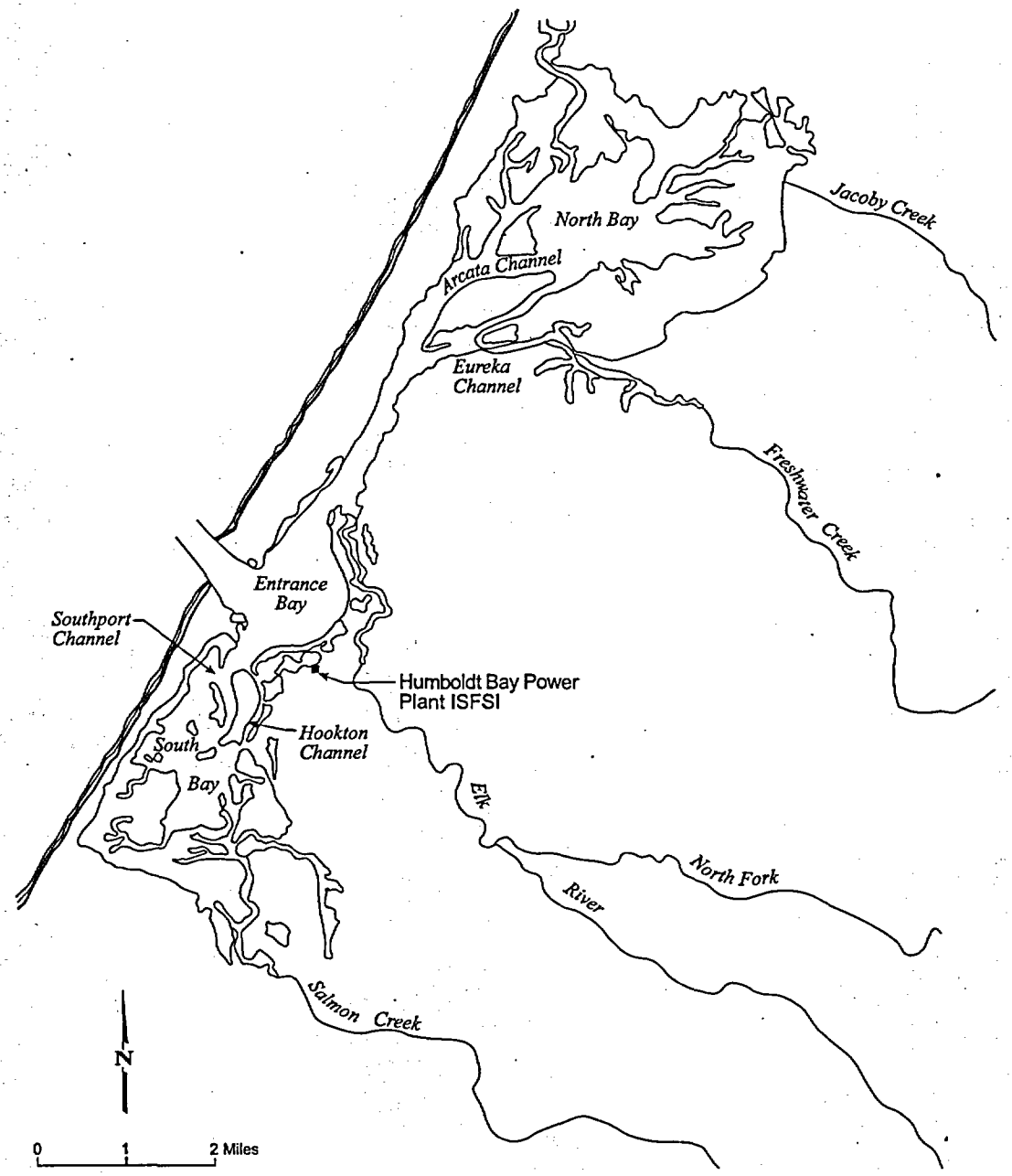


ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.4-9
WINDROSE OF HUMBOLDT BAY METEOROLOGY DATA
1996-1997

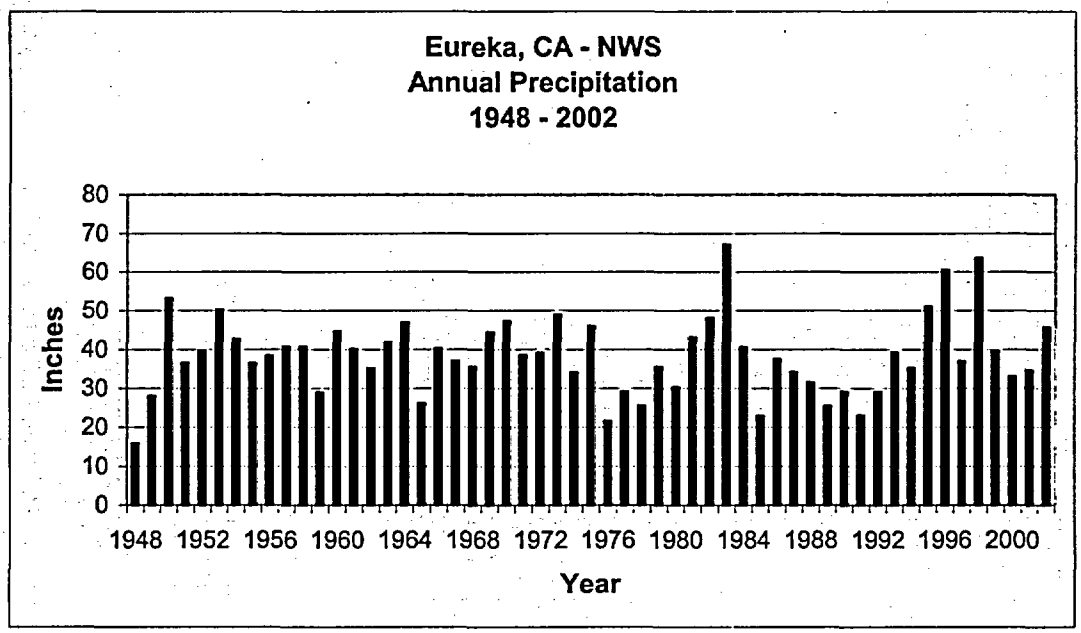
C-08



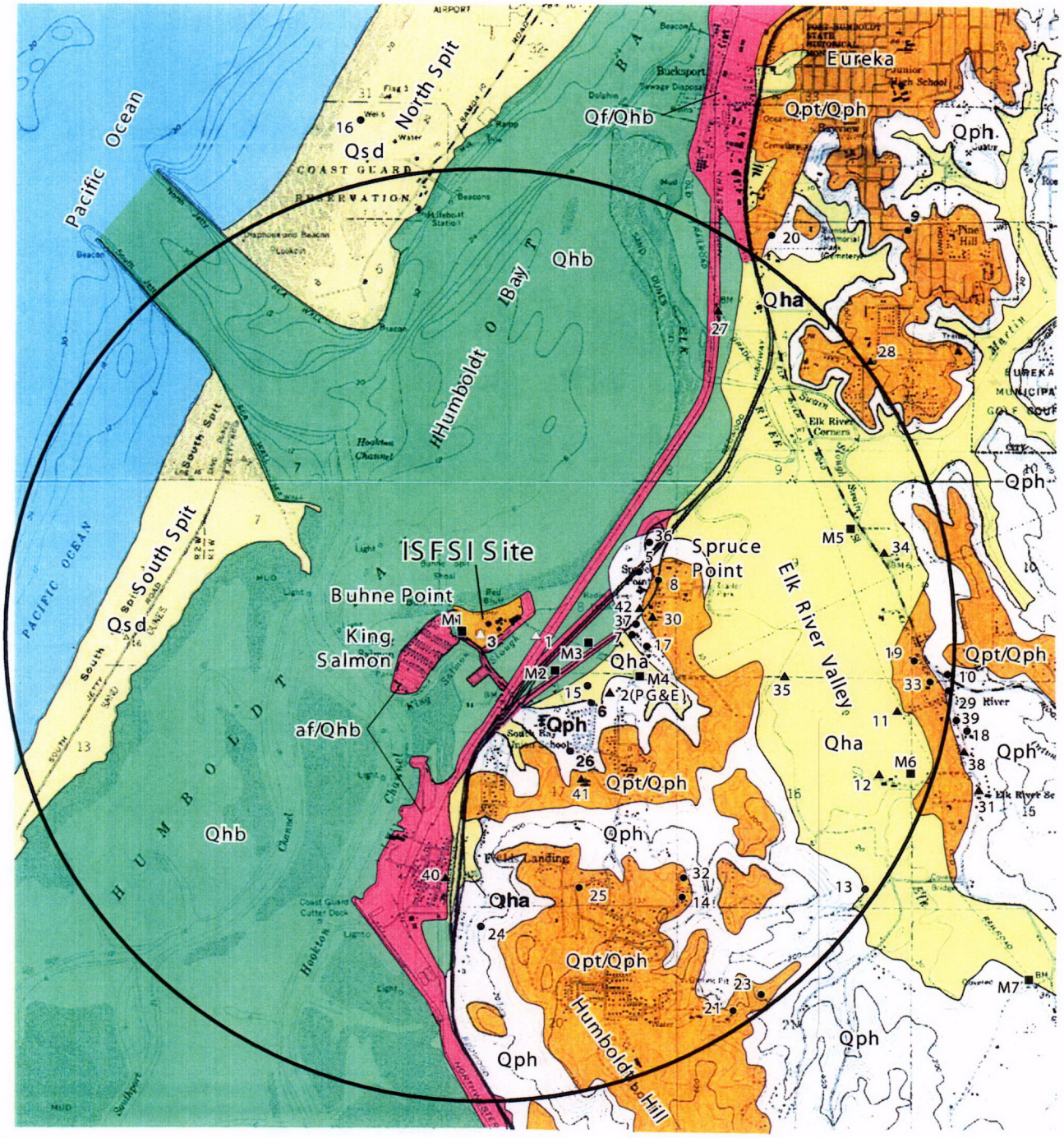
ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.5-1
WATERSHEDS OF HUMBOLDT BAY



ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.5-2 MEAN ANNUAL PRECIPITATION AT EUREKA



af	Fill
Qhb	Holocene bay deposits of Humboldt Bay
Qha	Holocene alluvium
Qsd	Holocene sand dunes
Qpt	Pleistocene marine/bay terrace deposits
Qph	Pleistocene Hookton Formation
13 ●	Domestic wells
12 ▲	Industrial/irrigation/monitoring wells
M1 ■	Test wells (Marliave, 1960)
1 △	Abandoned PG&E wells

0 .5 Miles

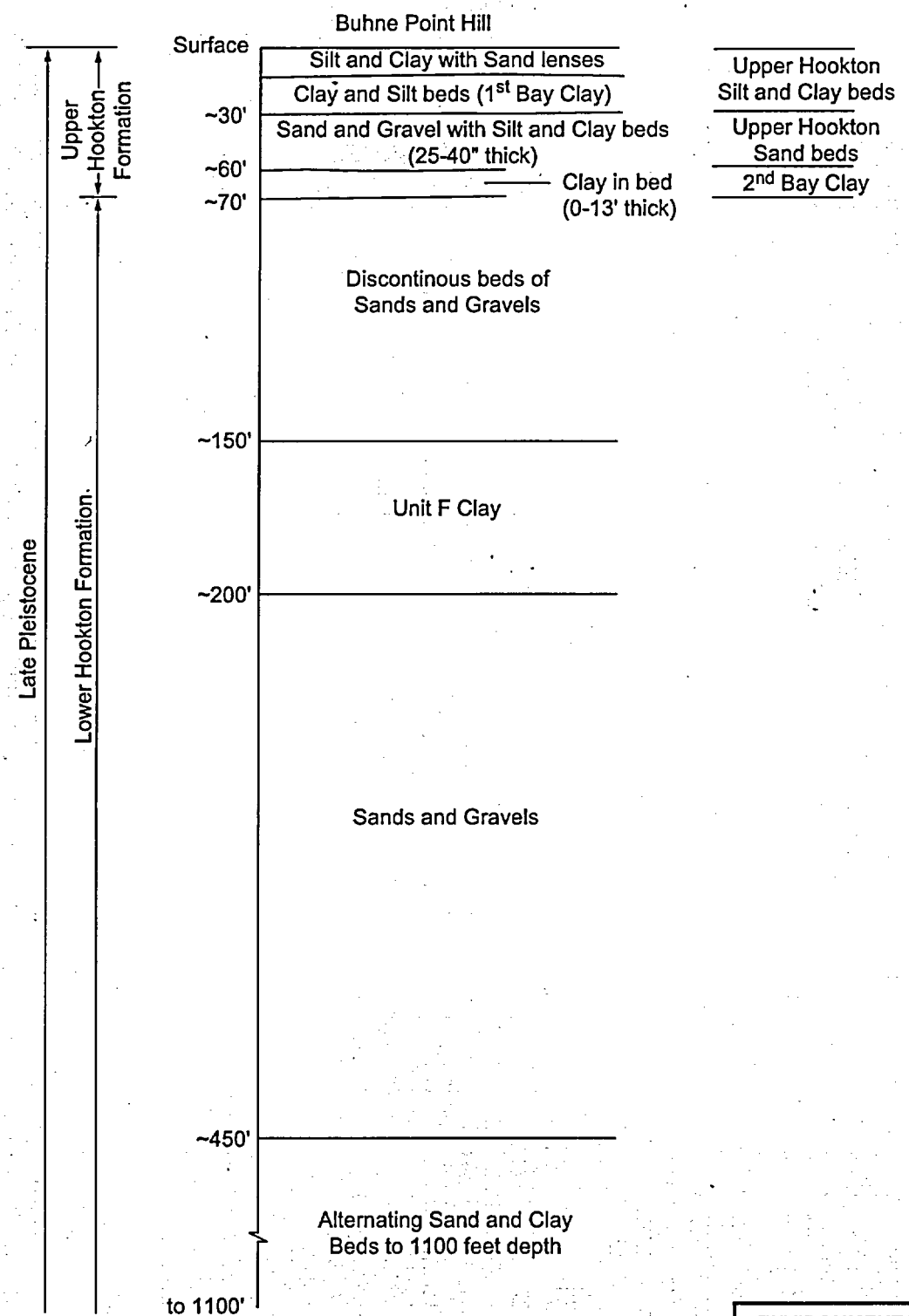
ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

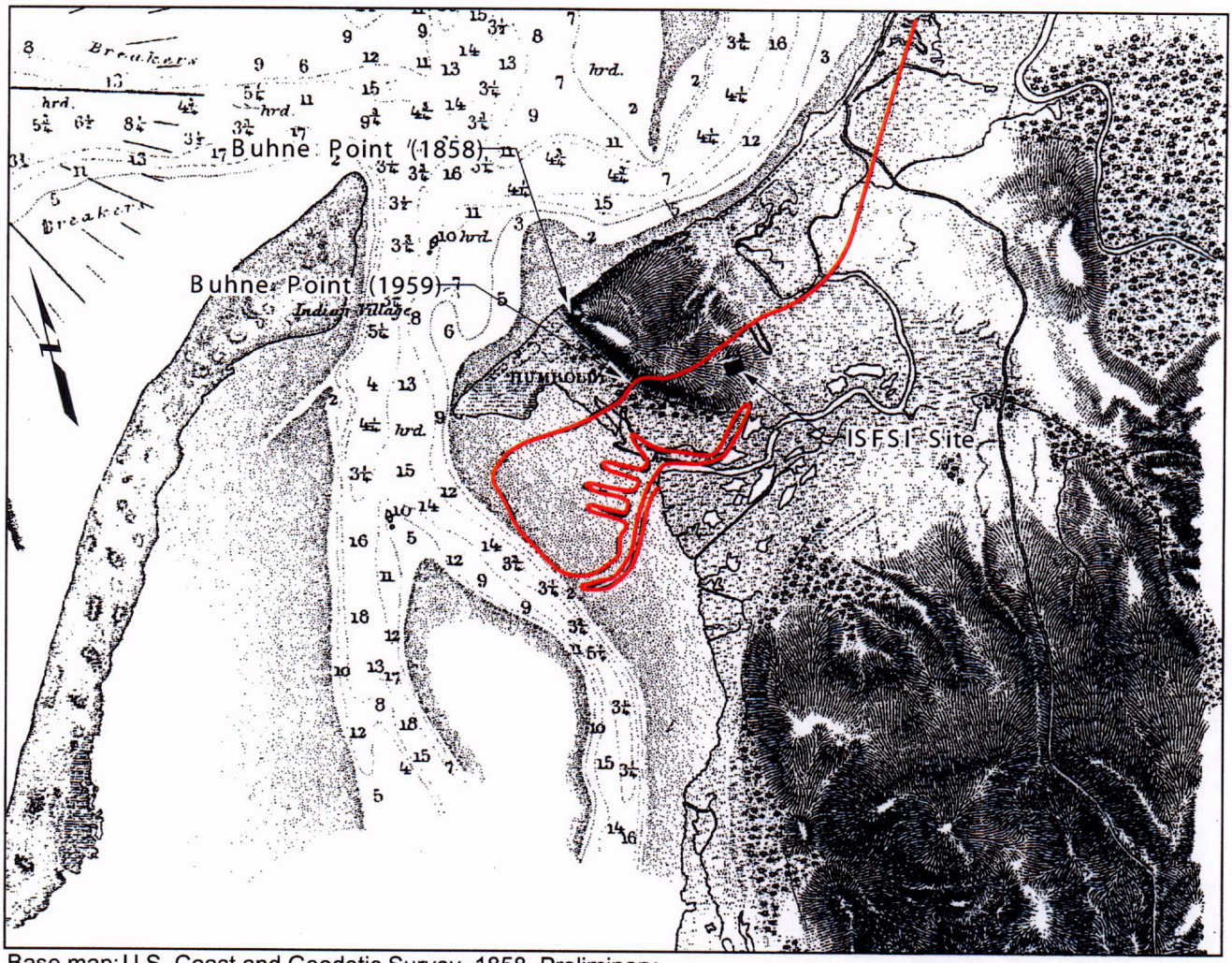
FIGURE 2.5-3
GEOLOGIC MAP OF THE HUMBOLDT BAY ISFSI SITE VICINITY SHOWING WATER WELLS WITHIN 2 MILES OF THE ISFSI SITE

S:\S100s\S117\S117.009\task_10\03_0826_sar_fig_2.5-1.ai

C-09



ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.5-4 GENERALIZED STRATIGRAPHIC COLUMN IN THE HUMBOLDT BAY ISFSI SITE AREA



Base map: U.S. Coast and Geodetic Survey, 1858, Preliminary survey map of Humboldt, California.

0 0.5 Mile

0 1 Kilometer

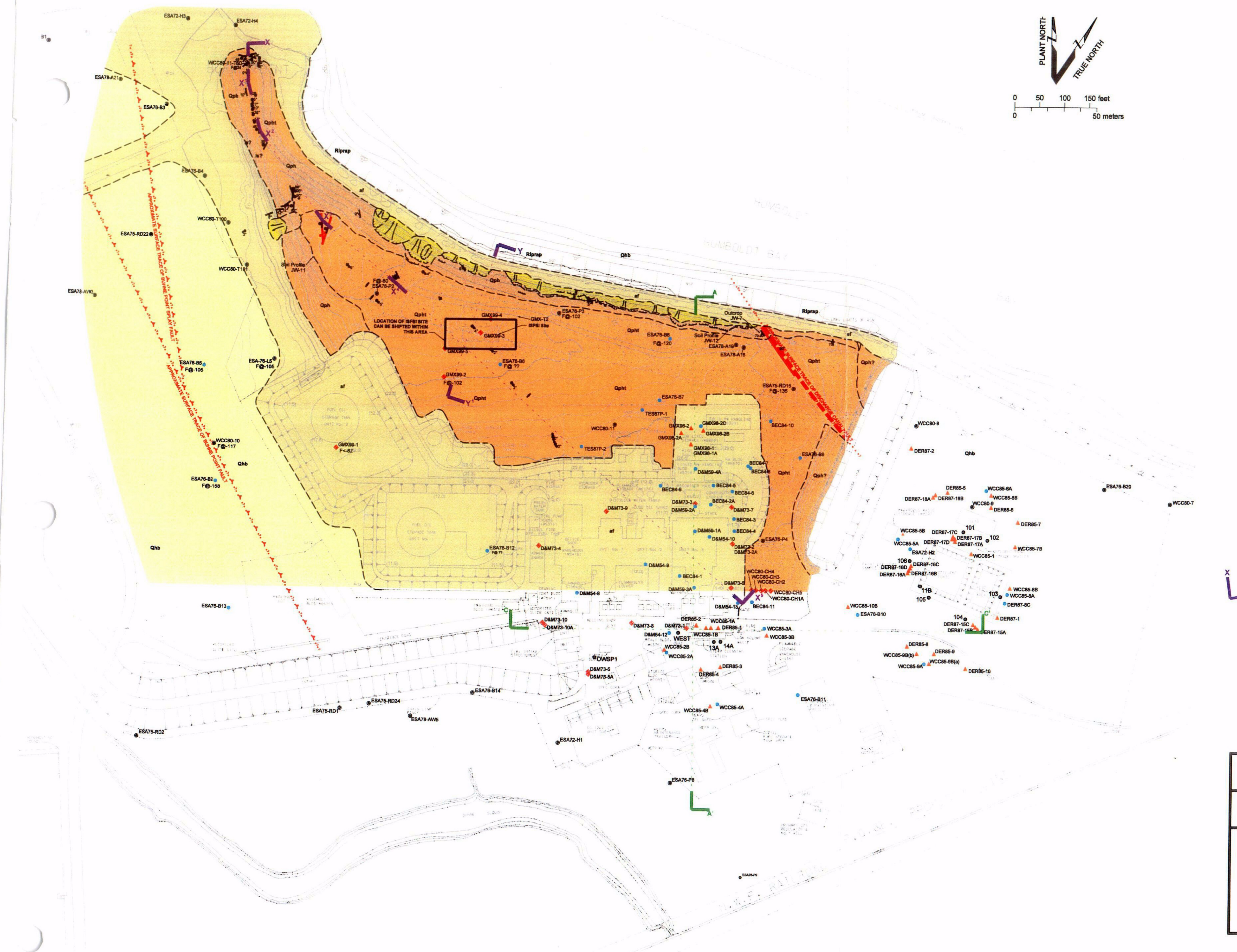
EXPLANATION

Coastline from U.S.Geological Survey (1959) Fields Landing 7.5' Quadrangle, California

ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.5-5

Comparison of the shoreline shown on 1858 and 1959 surveys. The 1959 shoreline is superimposed on the 1858 map to show the extensive coastal erosion and the retreat of Buhne Point that occurred prior to placement of riprap along the shoreline of Humboldt Bay.

C-10



EXPLANATION

Map Symbols

- Lithologic contact, dashed where approximately located
- Reverse fault; dashed where approximately located; queried where uncertain; dotted where buried; barb on upper plate
- 40° Strike and dip of normal fault; bar and ball on downthrown side
- 70-90 Strike and dip of reverse fault; barb on upper plate
- 4° Strike and dip of bedding
- 3° Apparent dip of bedding
- 80° Strike and dip of fractures; double bar indicates dip direction
- 70° Apparent dip of fractures
- Vertical fractures

Lithologic Units

- af — Fill, man-made fill, and disturbed areas
- Historical landslide
- Qhb — Holocene bay deposits
- Qph, Qpht — Pleistocene Hookton Formation
  - Qph = undifferentiated
  - Qpht = terrace surface
- Indicates areas where the surface is disturbed

- Rotary wash borings with SPT blow counts
- Auger borings with SPT blow counts
- Borings with no blow counts
- Other borings from geologic and groundwater investigations
- (12.0) Spot elevation in feet from PG&E design/construction drawings
- X X¹ X² Geologic cross sections shown on Figures 2.5-8 to -9
- 2-foot contour interval (elevation above mean lower low water)

NOTES:

1. Topographic survey made in 1999 and 2000.

ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.5-6 GEOLOGIC MAP SHOWING BORINGS AND MONITORING WELLS IN THE HUMBOLDT BAY ISFSI SITE AREAS

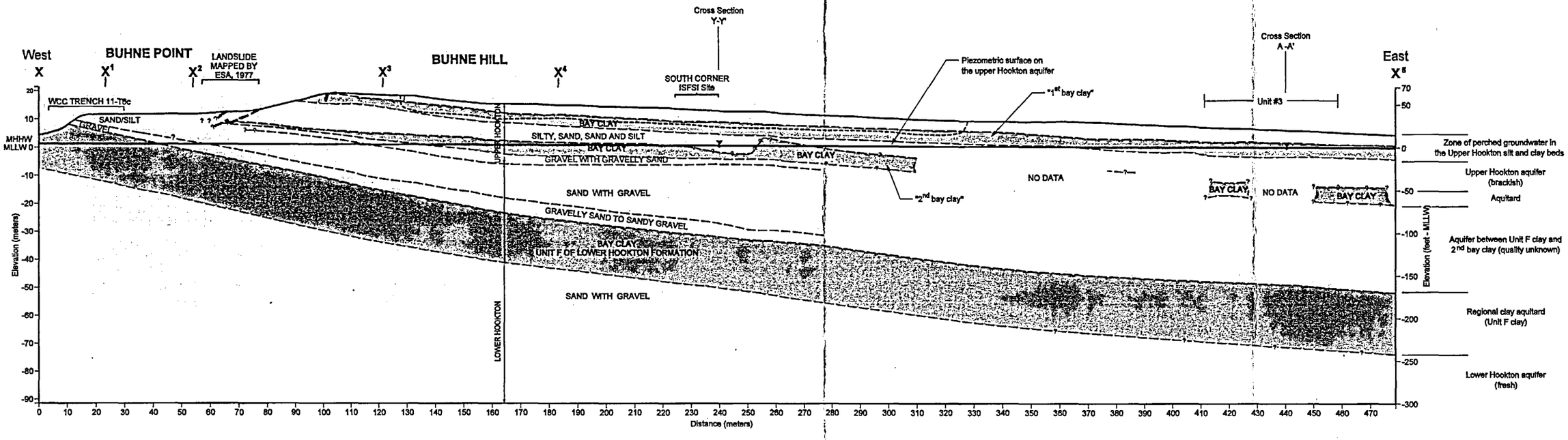
C-11

HOOKTON FORMATION	AQUIFERS IN HOOKTON FORMATION			AQUIFIERS IN HOLOCENE BAY DEPOSITS		HOLOCENE BAY DEPOSITS
Stratigraphy	This Report	Earlier Interpretations		Earlier Interpretations	This Report	Stratigraphy
Silty sand and silt beds with sand lenses	Zone of perched groundwater in upper Hookton clay and silt beds	A Unconfined first water bearing zone of Bower (1988) (in TES, 1988)	1st aquifer of Bower (1988) (brackish water) [in TES, 1988]	A Unconfined first water bearing zone of Bower (1988) (In TES, 1988)	Zone of perched groundwater in Holocene bay deposits	Silt and clay beds
Silt and clay beds 1st bay clay		B		B		
Sands and gravels	Upper Hookton Aquifer	C Semi-unconfined second water bearing zone of Bower (1988) (In TES, 1988). Upper sand zone of Dames and Moore (reported in WCC) D				
Clay bed 2nd bay clay	Aquitard discontinuous across site	Clay layer of Bower (in 1988) (in TES, 1988)				
Sands and gravels	Aquifer between Unit F clay and 2nd bay clay					
Unit F clay	Unit F clay aquitard	Regional aquitard				
Sands and gravels	Lower Hookton aquifer	2nd aquifer of Bower 1998 (in TES, 1988) (freshwater)				

ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.5.7
GENERALIZED MODEL OF AQUIFIERS IN THE HUMBOLDT BAY ISFSI SITE AREA



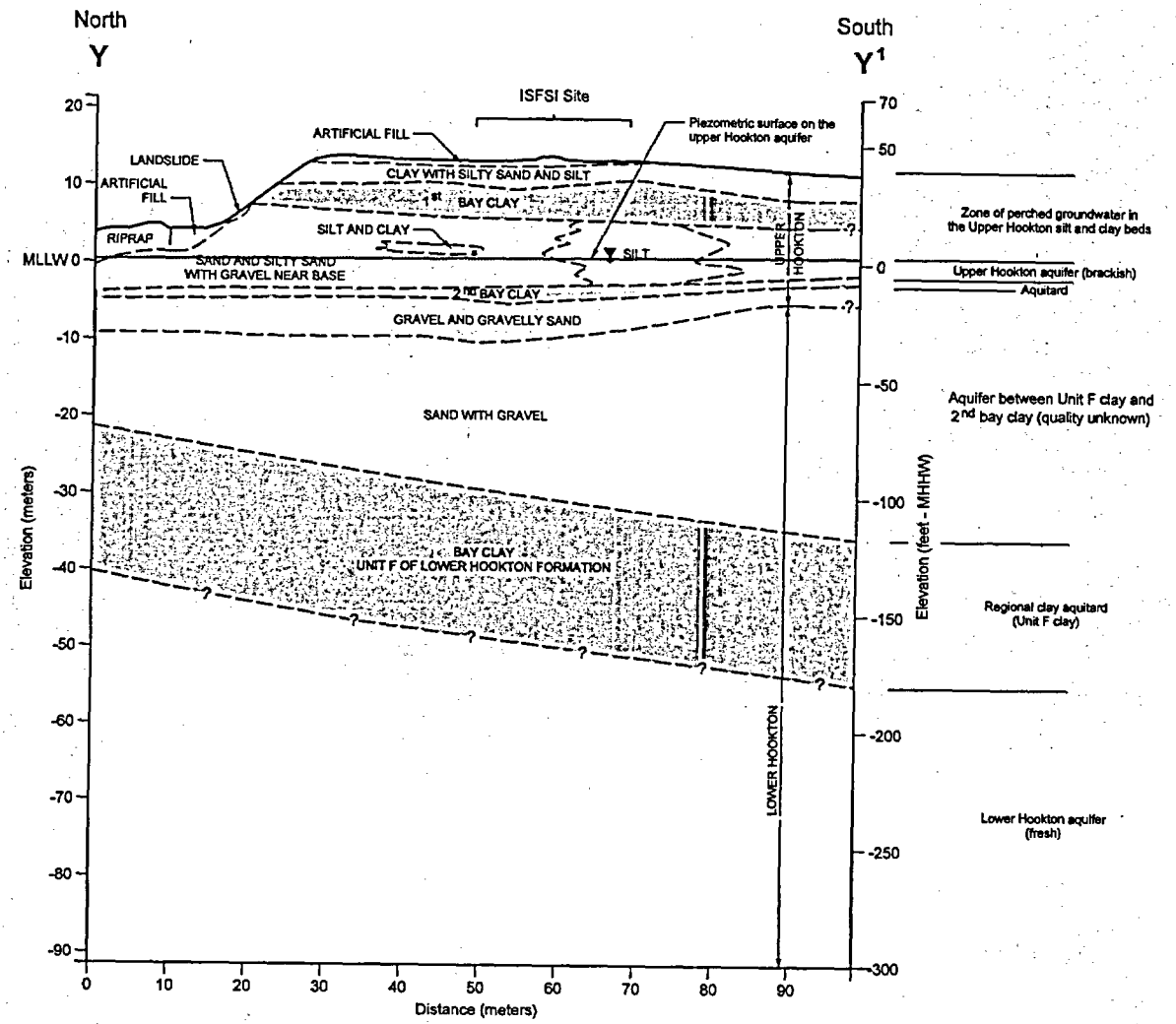
———— Lithologic contact, dashed where approximate, queried where inferred

Note:
Location of cross section is show on Figure 2.5-6

ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.5.8
GEOLOGIC CROSS SECTION X-X' FROM BUHNE POINT TO UNIT NO. 3 POWER PLANT, HUMBOLDT BAY ISFSI SITE AREA



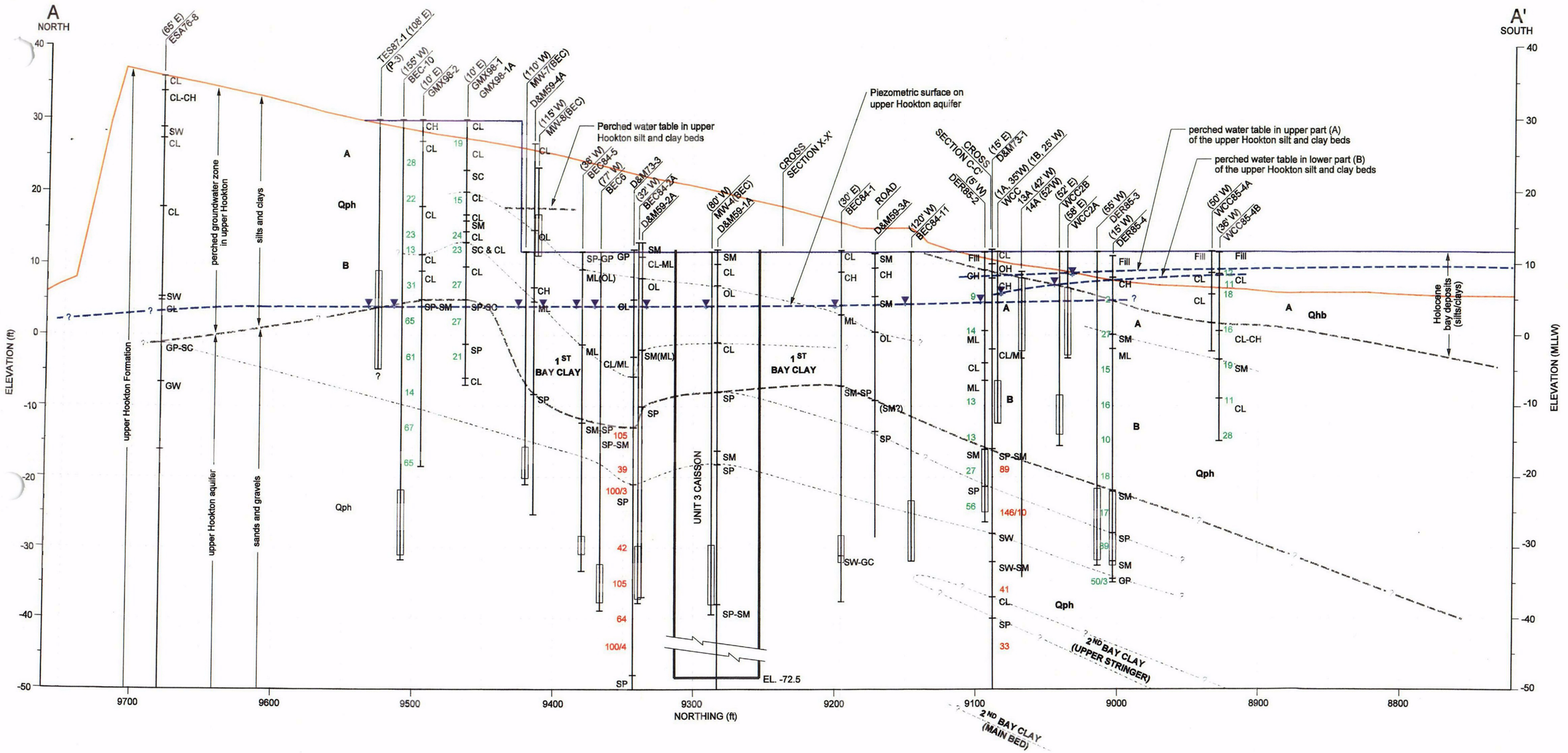
Lithologic contact, dashed where approximate, queried where inferred

Note:
Location of cross section is shown on Figure 2.5-6.

ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.5.9
GEOLOGIC CROSS SECTION Y-Y' THROUGH THE HUMBOLDT BAY ISFSI SITE AREA



EXPLANATION

- PRECONSTRUCTION GROUND SURFACE
- EXISTING GROUND SURFACE
- GEOLOGIC CONTACT BETWEEN MAJOR UNITS
- GEOLOGIC CONTACT WITHIN UNITS
- GEOLOGIC CONTACT EXCAVATED

(50' S) WCC85-10B — BORING
NUMBER INDICATES COMPANY OR DEPARTMENT, YEAR AND NUMBER. NUMBER IN PARENTHESIS IS DISTANCE AND DIRECTION BORING IS PROJECTED TO THE CROSS SECTION LINE; SCREENED SECTION INDICATED AS NARROW BOX

SM — SOIL DESIGNATIONS (UNIFIED SOIL CLASSIFICATION) FROM BORINGS

(SP) — SOIL DESIGNATIONS (UNIFIED SOIL CLASSIFICATION) INTERPRETED FROM BORINGS

89 — SPT BLOW COUNTS IN ROTARY WASH BORINGS

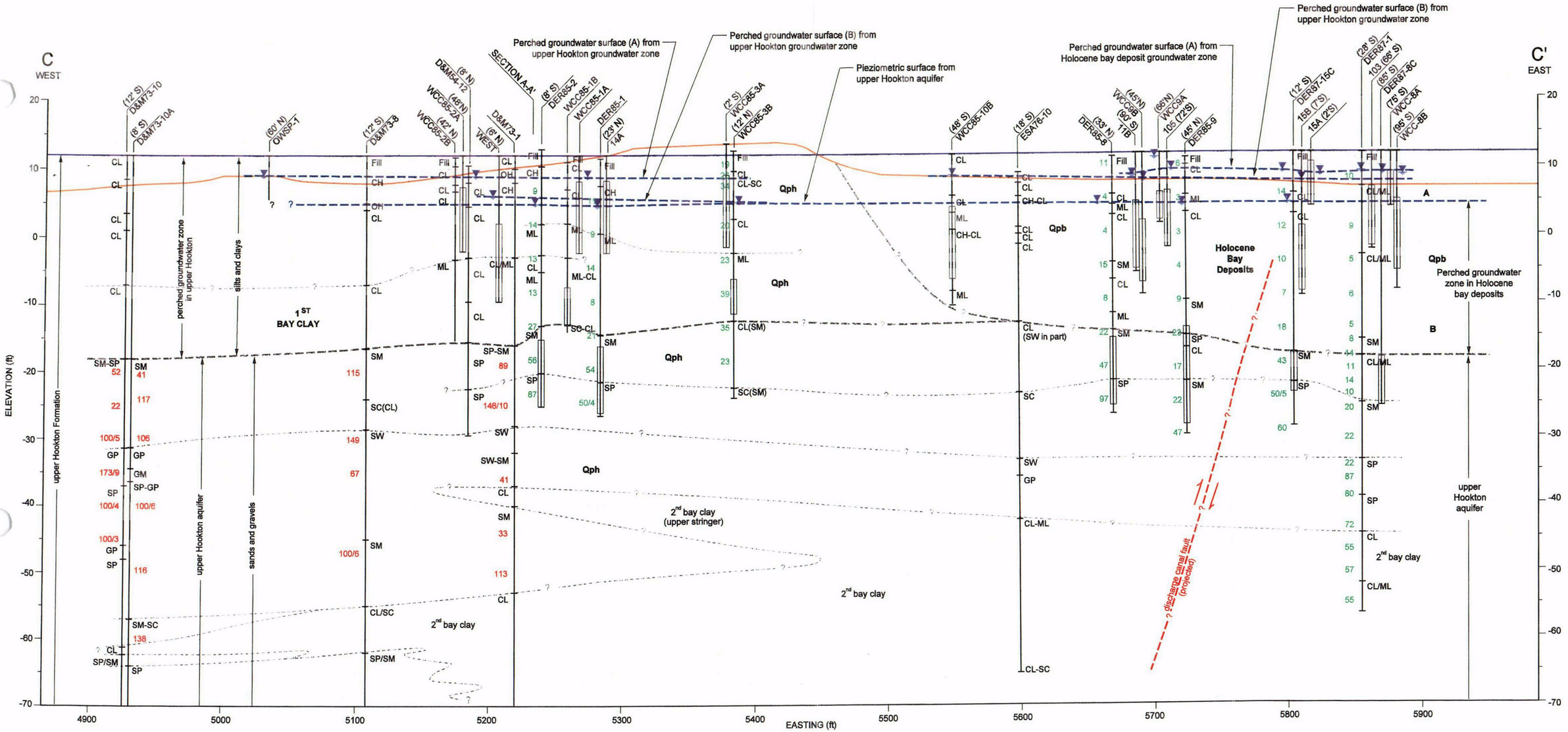
56 — BLOW COUNTS IN AUGER BORINGS

ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.5-10
CROSS SECTION A-A'
THROUGH UNIT 3, HUMBOLDT BAY ISFSI SITE AREA

C-12



EXPLANATION

- PRECONSTRUCTION GROUND SURFACE
- EXISTING GROUND SURFACE
- GEOLOGIC CONTACT BETWEEN MAJOR UNITS
- GEOLOGIC CONTACT WITHIN UNITS
- GEOLOGIC CONTACT EXCAVATED

(50' S) WCC85-10B — BORING
NUMBER INDICATES COMPANY OR DEPARTMENT, YEAR AND NUMBER. NUMBER IN PARENTHESIS IS DISTANCE AND DIRECTION BORING IS PROJECTED TO LINE OF CROSS SECTION; SCREENED SECTION INDICATED AS NARROW BOX

SM — SOIL DESIGNATIONS (UNIFIED SOIL CLASSIFICATION) FROM BORINGS

(SP) — SOIL DESIGNATIONS (UNIFIED SOIL CLASSIFICATION) INTERPRETED FROM BORINGS

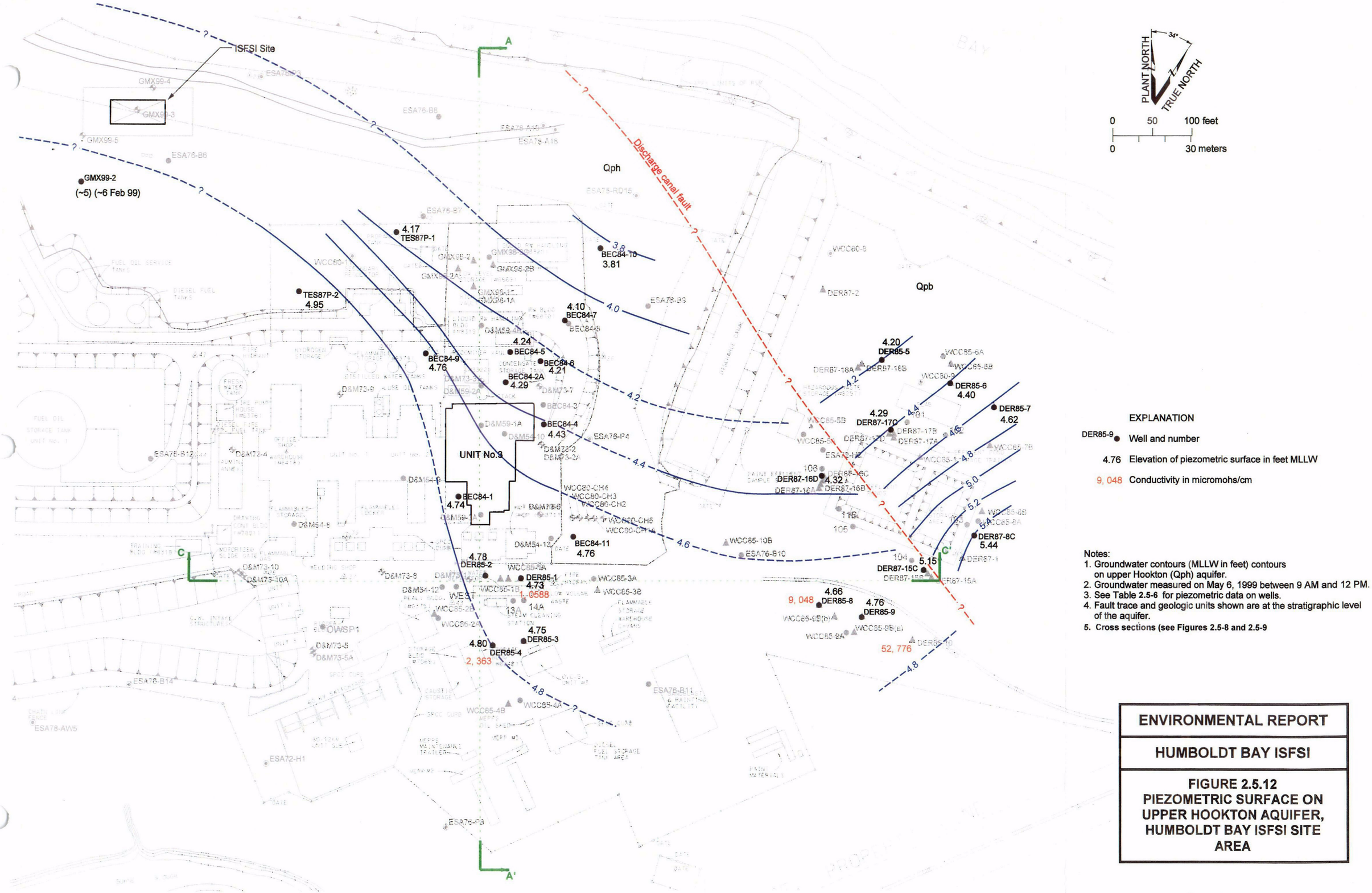
89 — SPT BLOW COUNTS IN ROTARY WASH BORINGS

56 — BLOW COUNTS IN AUGER BORINGS

ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.5.11
CROSS SECTION C-C' SOUTH OF UNIT 3, HUMBOLDT BAY ISFSI SITE AREA



EXPLANATION

DER85-9 ● Well and number

4.76 Elevation of piezometric surface in feet MLLW

9, 048 Conductivity in micromohs/cm

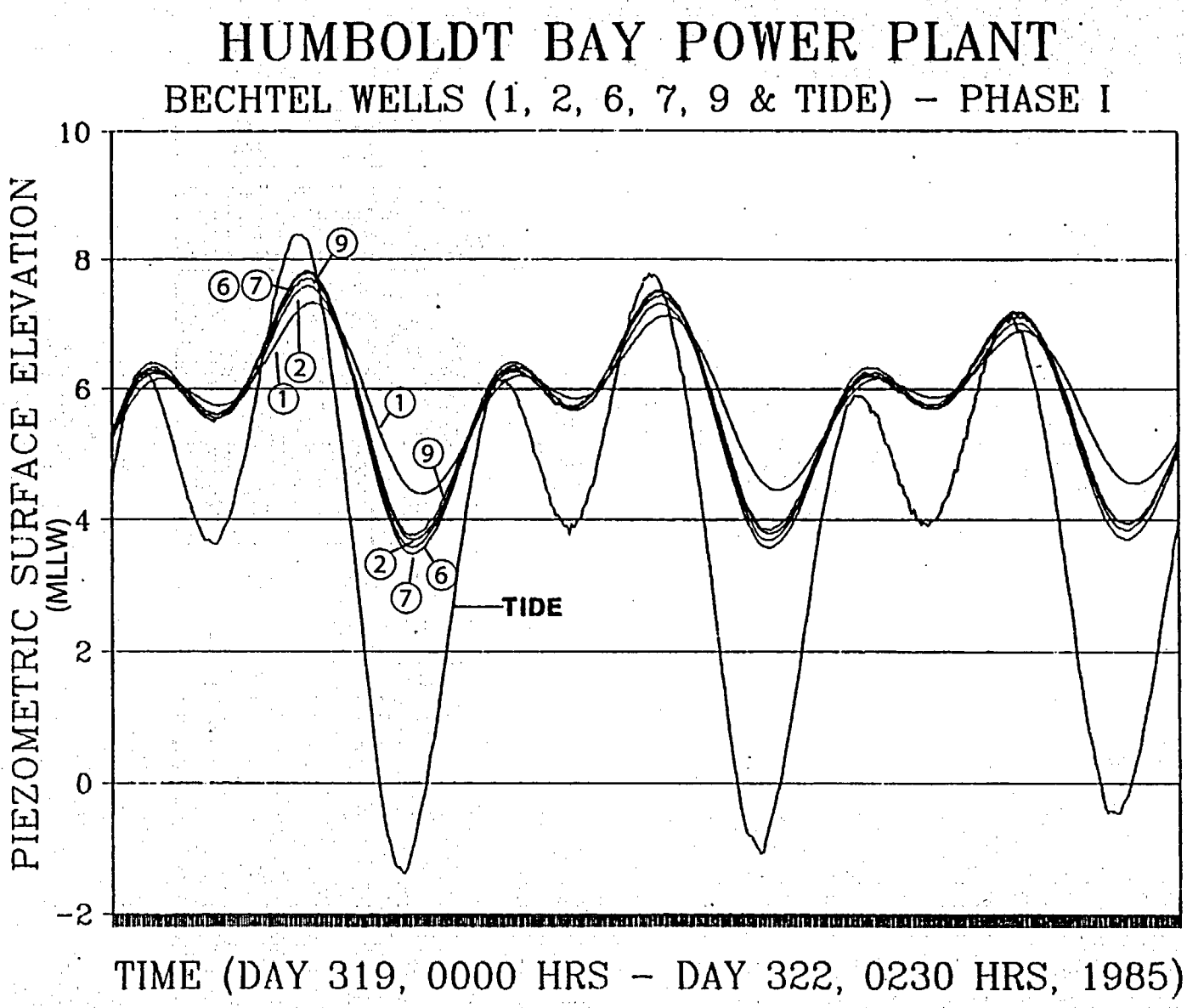
Notes:
1. Groundwater contours (MLLW in feet) contours on upper Hookton (Qph) aquifer.
2. Groundwater measured on May 6, 1999 between 9 AM and 12 PM.
3. See Table 2.5-6 for piezometric data on wells.
4. Fault trace and geologic units shown are at the stratigraphic level of the aquifer.
5. Cross sections (see Figures 2.5-8 and 2.5-9

ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.5.12
PIEZOMETRIC SURFACE ON UPPER HOOKTON AQUIFER, HUMBOLDT BAY ISFSI SITE AREA

C-14



All wells measure the piezometric surface in the upper Hookton aquifer

Note
Figure from PG&E TES, 1987 (Reference 6)

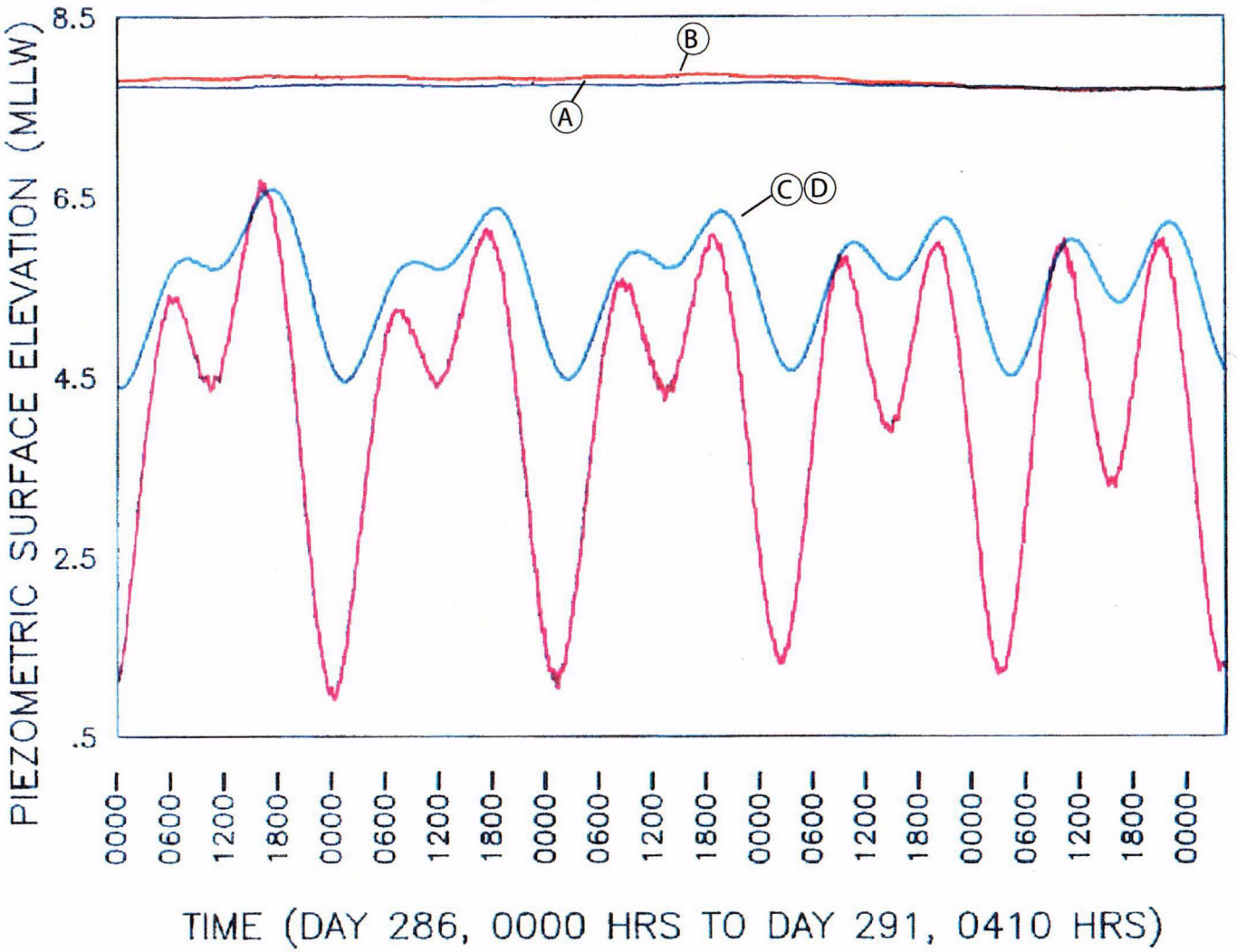
ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 2.5-13
RELATIONSHIP BETWEEN TIDE LEVELS IN HUMBOLDT BAY AND PIEZOMETRIC LEVELS FROM WELLS, MW-1, MW-2, MW-6, MW-7, AND MW-9 (BECHTEL) NEAR UNIT 3 HUMBOLDT BAY ISFSI SITE AREA

HUMBOLDT BAY POWER PLANT

WELL CLUSTER 6 AND TIDE



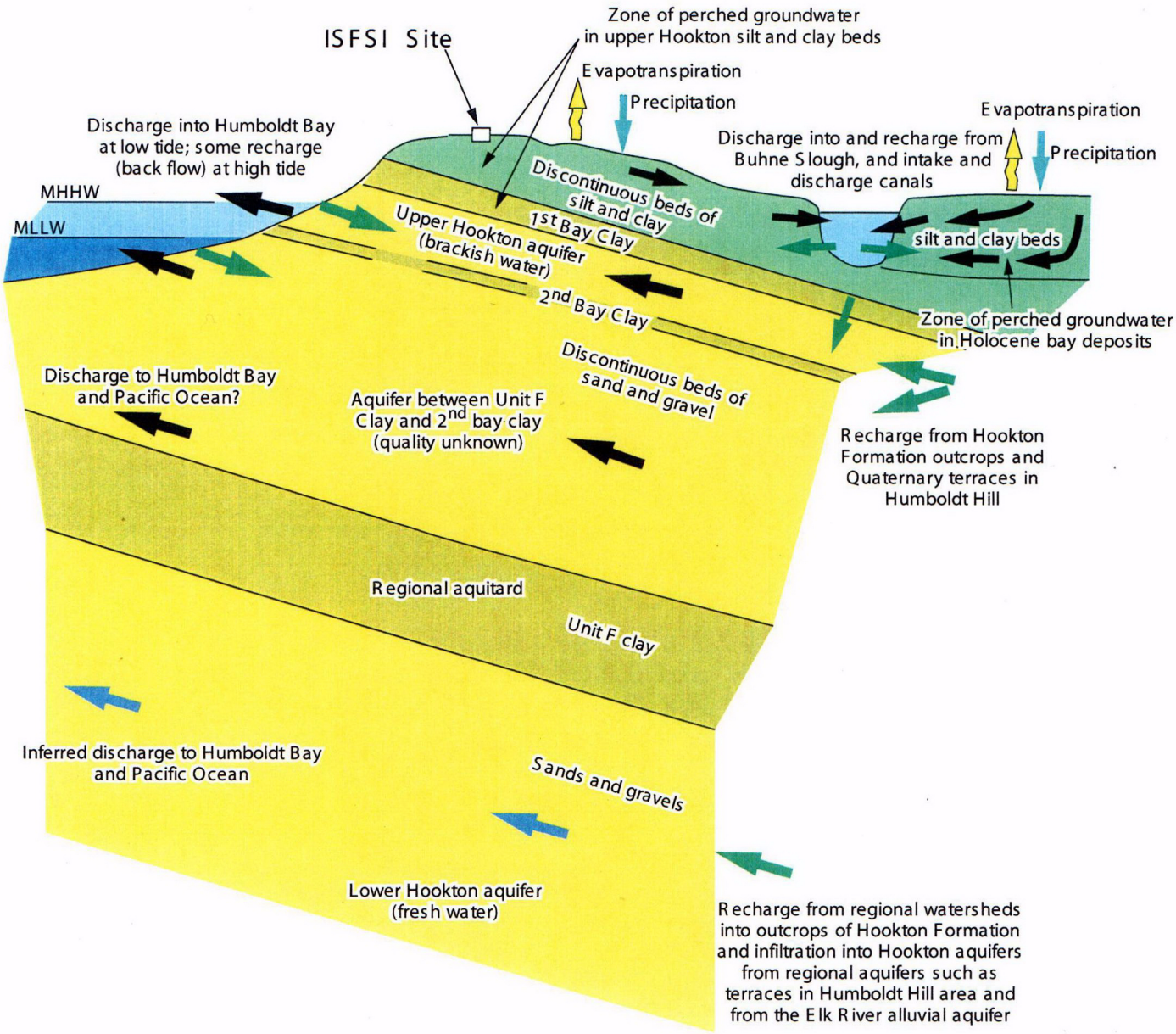
A and B levels are water tables in the groundwater zone in the Holocene bay deposits

C and D are the same level and it is the piezometric surface in the upper Hookton aquifer

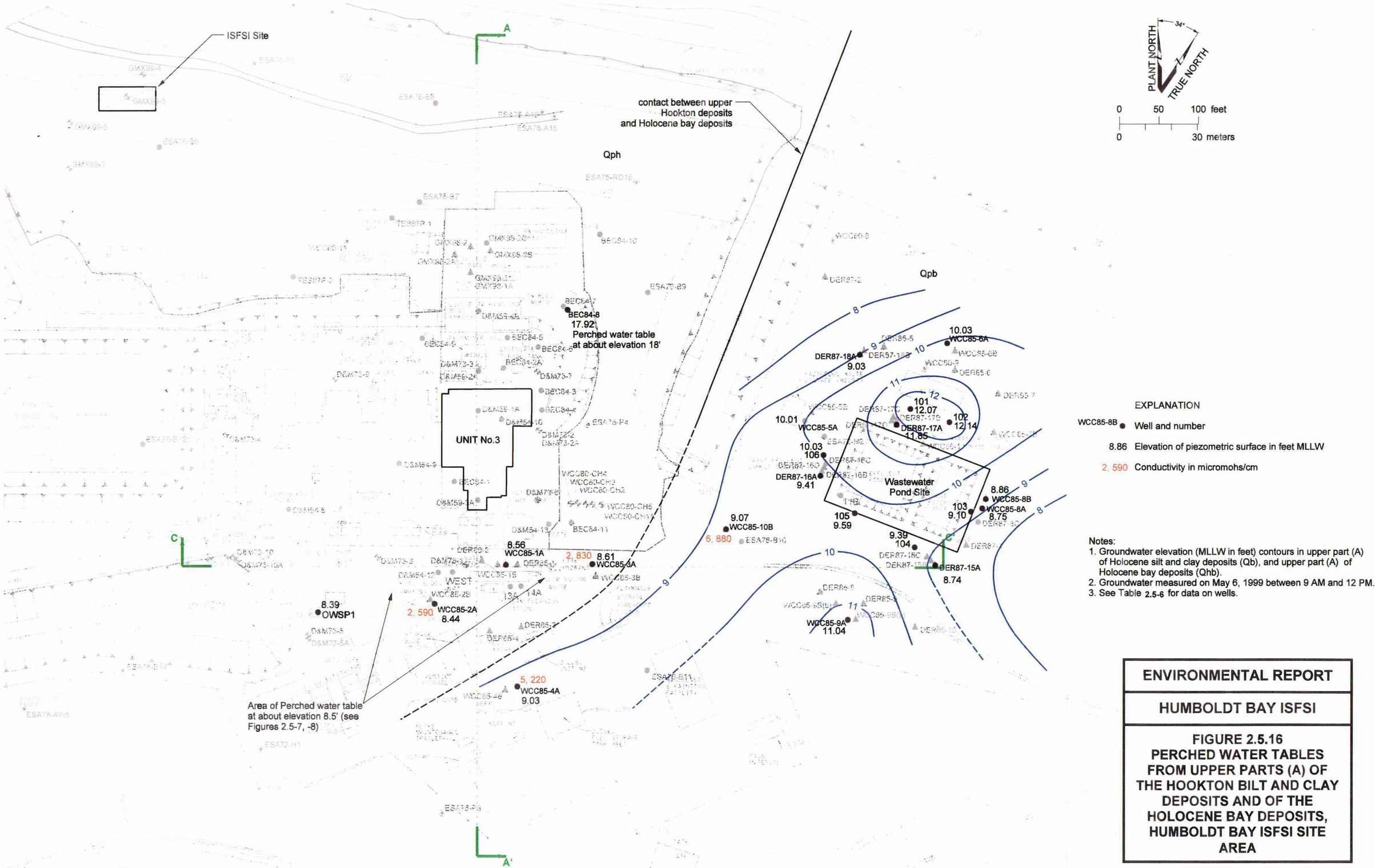
Note
Figure from PG&E TES, 1988 (Reference 2)

ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.5-14 RELATIONSHIP BETWEEN TIDE LEVELS IN HUMBOLDT BAY AND PIEZOMETRIC LEVELS FROM WELL CLUSTER 16-A, 16-B, 16-C, AND 16-D 9 (TES) IN WASTEWATER PONDS AREA, HUMBOLDT BAY ISFSI SITE AREA

C-15



ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.5.15 GENERALIZED MODEL SHOWING AQUIFER RECHARGE AND DISCHARGE IN THE HUMBOLDT BAY ISFSI SITE AREA



EXPLANATION

WCC85-8B ● Well and number

8.86 Elevation of piezometric surface in feet MLLW

2, 590 Conductivity in micromohs/cm

Notes:
1. Groundwater elevation (MLLW in feet) contours in upper part (A) of Holocene silt and clay deposits (Qb), and upper part (A) of Holocene bay deposits (Qhb).
2. Groundwater measured on May 6, 1999 between 9 AM and 12 PM.
3. See Table **2.5-6** for data on wells.

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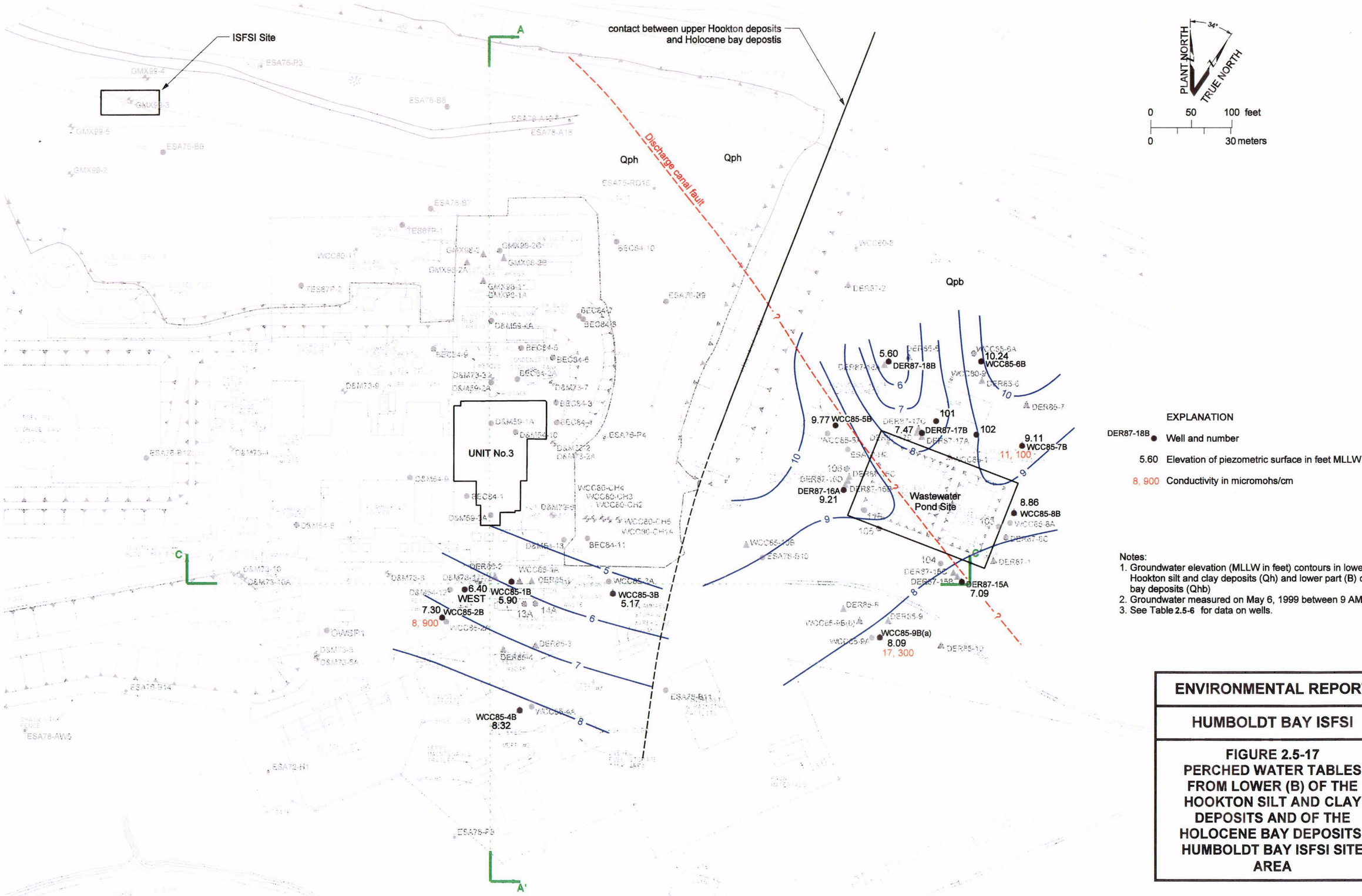
FIGURE 2.5.16
PERCHED WATER TABLES FROM UPPER PARTS (A) OF THE HOOKTON BILT AND CLAY DEPOSITS AND OF THE HOLOCENE BAY DEPOSITS, HUMBOLDT BAY ISFSI SITE AREA

C-17



Notes:
1. Groundwater elevation (MLLW in feet) contours in lower part (B) of Hookton silt and clay deposits (Qh) and lower part (B) of Holocene bay deposits (Qhb)
2. Groundwater measured on May 6, 1999 between 9 AM and 12 PM.
3. See Table 2.5-6 for data on wells.

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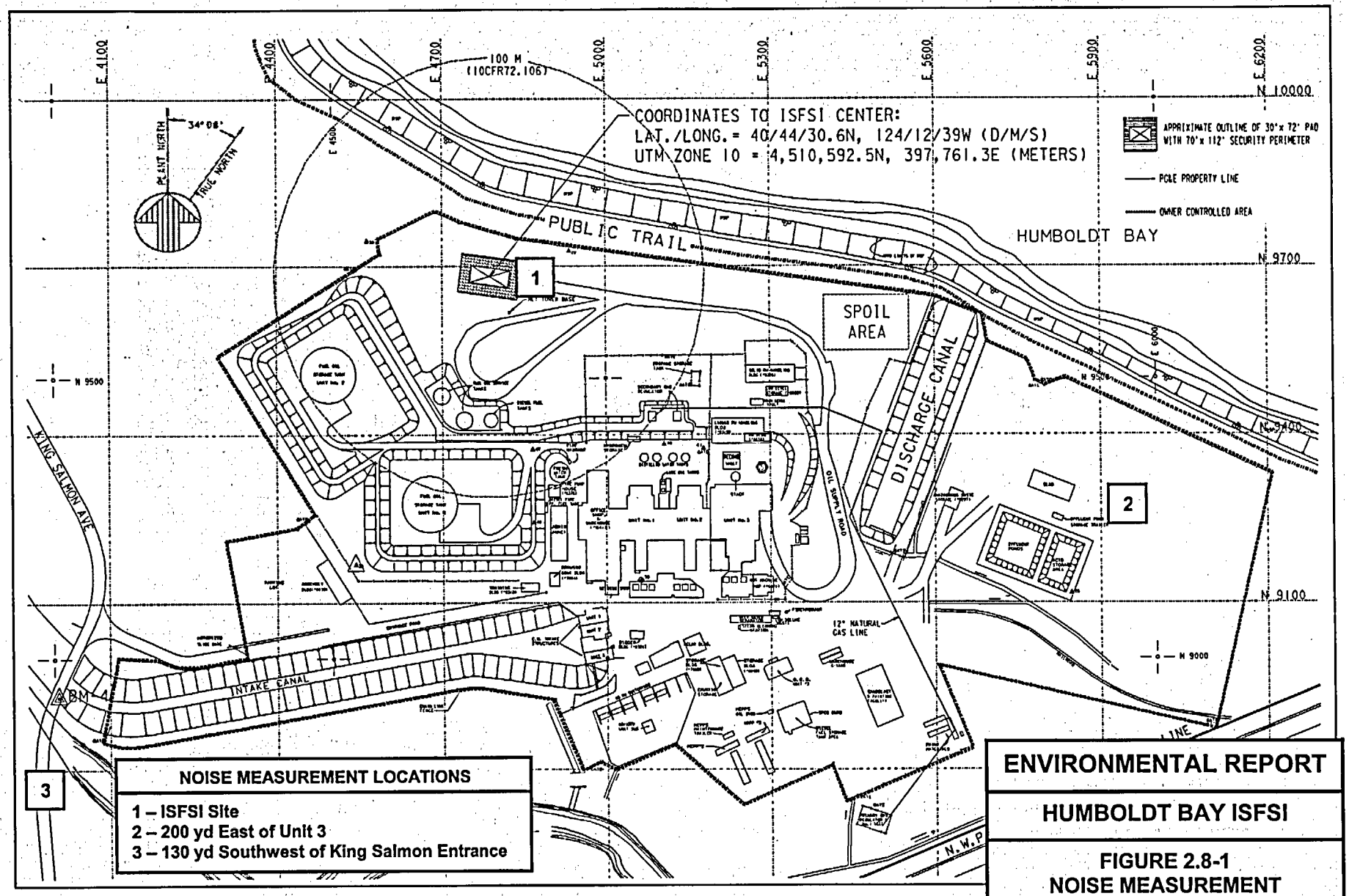
FIGURE 2.5-17
PERCHED WATER TABLES FROM LOWER (B) OF THE HOOKTON SILT AND CLAY DEPOSITS AND OF THE HOLOCENE BAY DEPOSITS, HUMBOLDT BAY ISFSI SITE AREA

C-18



NOISE MEASUREMENT LOCATIONS

1 – ISFSI Site
2 – 200 yd East of Unit 3
3 – 130 yd Southwest of King Salmon Entrance

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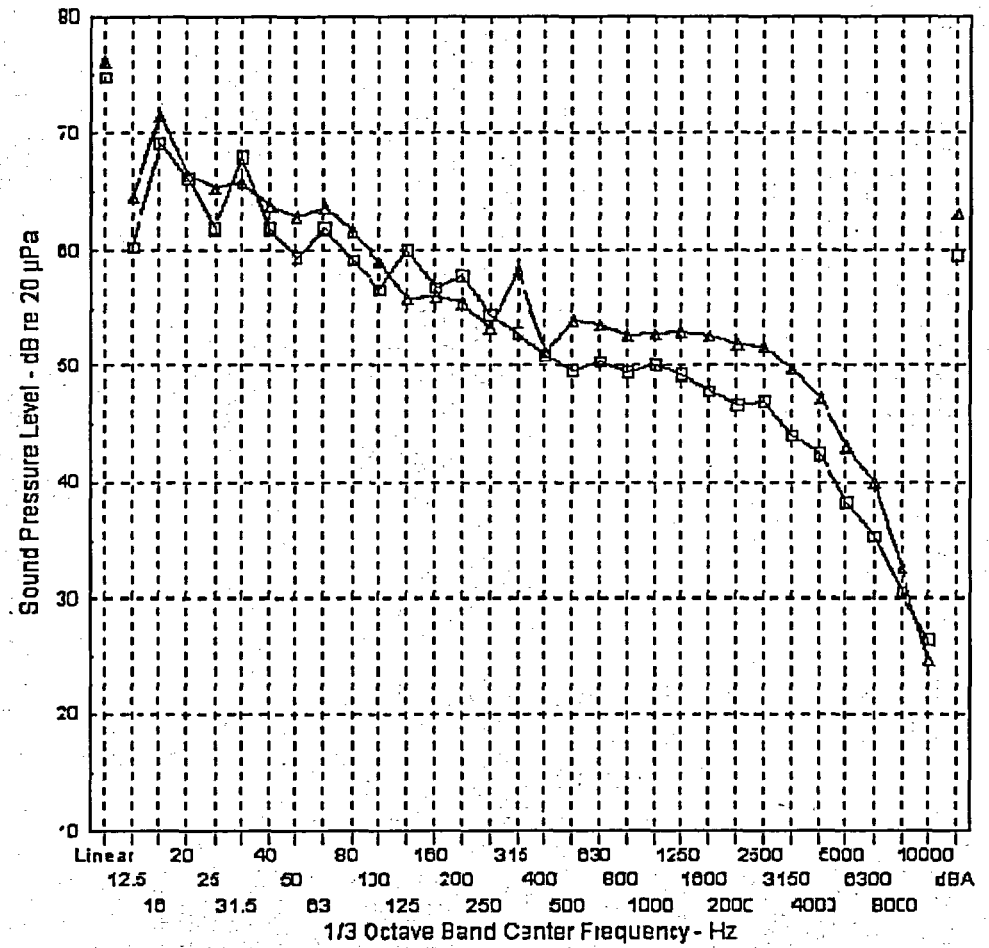
HUMBOLDT BAY ISFSI

FIGURE 2.8-1
NOISE MEASUREMENT LOCATIONS



□ - 200 yd East of Unit 3
Δ - ISFSI Site

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HUMBOLDT BAY ISFSI

FIGURE 2.8-2
EXISTING NOISE PROFILES

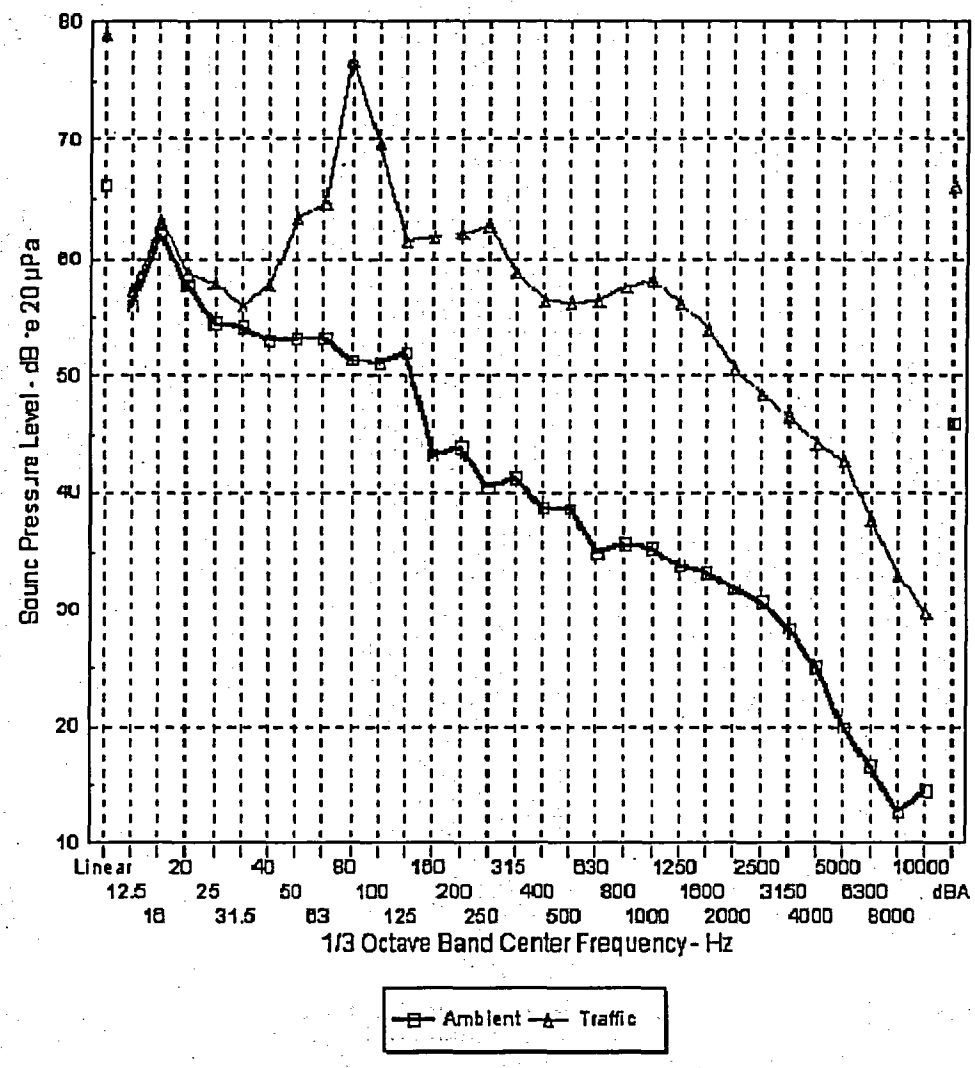

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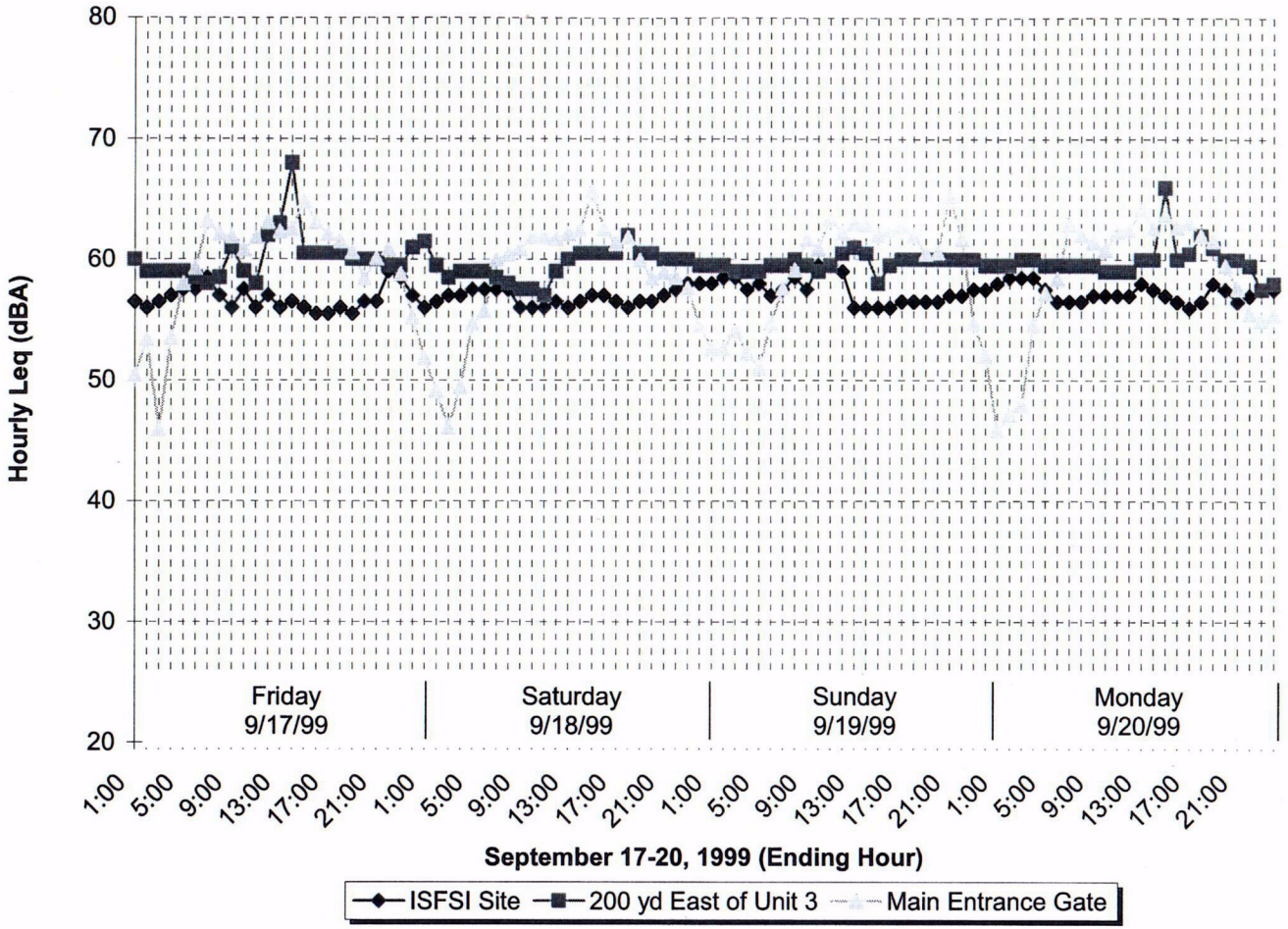
FIGURE 2.8-3
KING SALMON ENTRANCE GATE – EXISTING NOISE PROFILES



ENVIRONMENTAL REPORT
HUMBOLDT BAY ISFSI
FIGURE 2.8-4 EXISTING NOISE LEVELS (dBA)

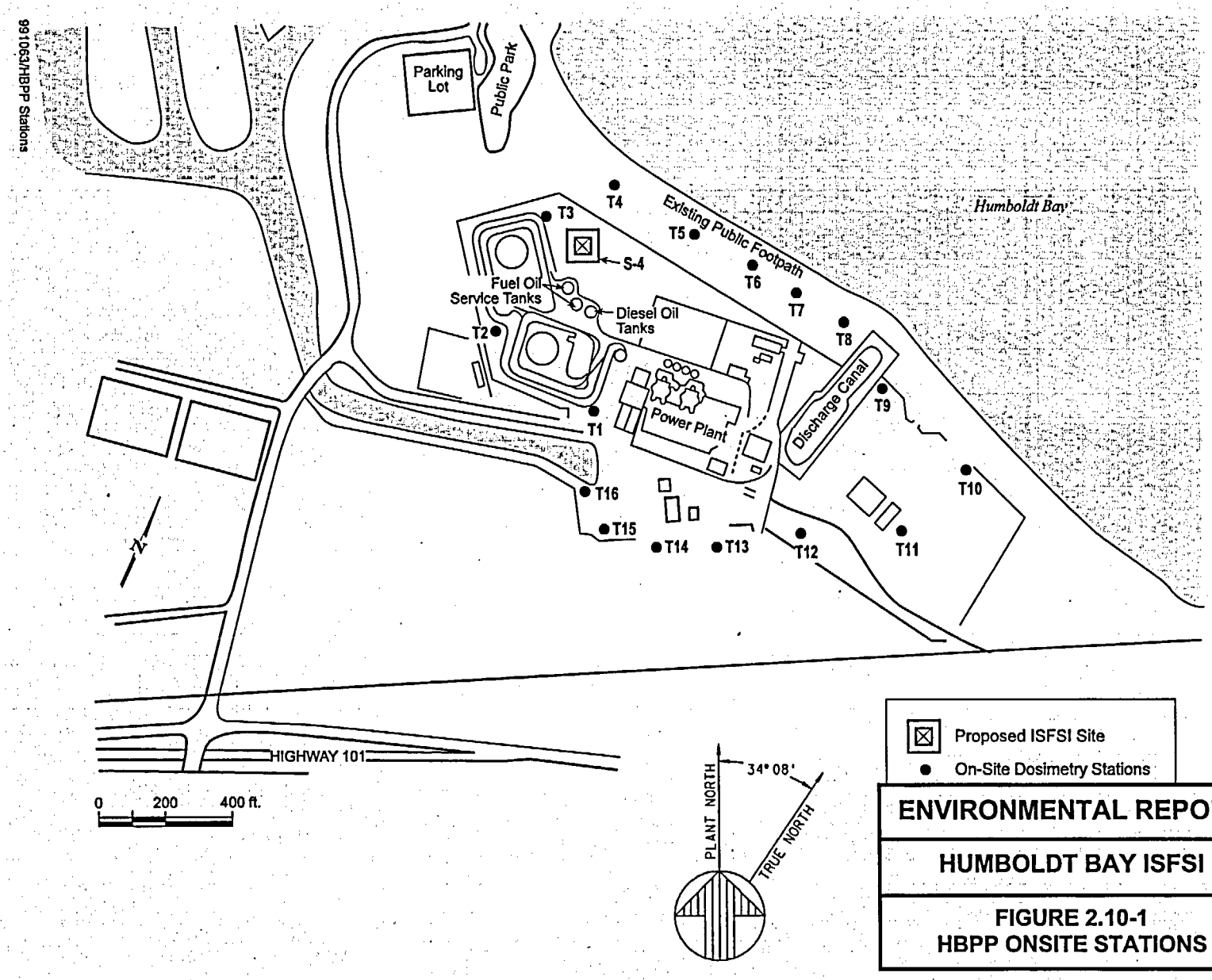


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FIGURE 2.10-1
HBPP ONSITE STATIONS

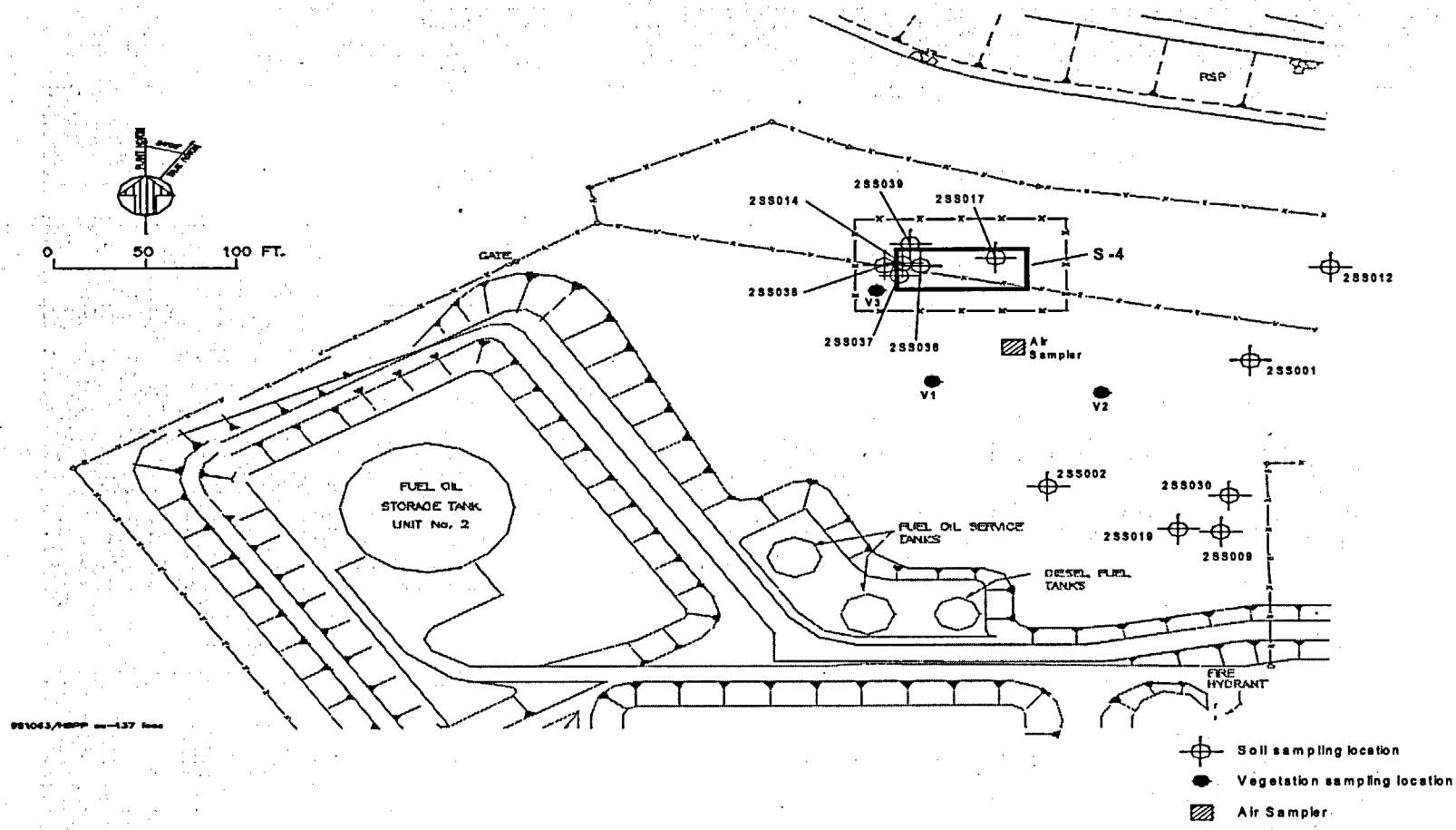

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FIGURE 2.10-2 HBPP SAMPLING LOCATIONS

HUMBOLDT BAY ISFSI
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CHAPTER 3

THE FACILITY

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THE FACILITY

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3.1 EXTERNAL APPEARANCE

The major features of the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) are the six unit vault in-ground reinforced concrete structure, chain link fencing surrounding the storage site, security lighting, surveillance/monitoring systems, and a small single story security building. Other related features include the transport route from the refueling building (RFB) to the ISFSI site and the disposal site for the ISFSI excavation spoils. The ISFSI, RFB, transport route, and spoils disposal area are all within the Humboldt Bay Power Plant (HBPP) site boundary as described in Environmental Report Section 2.1. Travel distance from the RFB to the ISFSI storage site is approximately 0.24 miles and the travel distance from the ISFSI storage site to the disposal site is approximately 0.12 miles (see Figure 2.1-2). The proposed ISFSI site is located on a relatively flat area of the Buhne Point hill between the Northwestern Pacific Railroad tracks and the north shoreline of Buhne Point. The site area is approximately 300 feet northeast of the Unit 2 fuel oil tank, and approximately 70 ft south of the bluff cut into the hill that overlooks Humboldt Bay. The site is nominally at 44 ft above mean lower low water. This elevation is higher than the surrounding flood plain and marshy areas of Humboldt Bay. The location of the proposed ISFSI and associated facilities (security building, transport route, excavation spoils disposal area, and RFB) are shown on a map of the HBPP in Figure 2.2-3. The topography of the area can be seen in Figure 3.1-1.

The storage casks are placed in an in-ground vault configuration that will house the six casks. The vault configuration dimensions are approximately 20 ft x 76 ft within a security area (approximately 60 ft x 128 ft). See Figure 4.2-1 for an artist's rendition of the proposed ISFSI. A restricted area fence, with a locked gate, surrounds the vault structure. The owner controlled (HBPP boundary) area fence at its nearest point to the ISFSI is approximately 64 ft. Each loaded storage cask is approximately 8 ft in diameter, 10 ft high (below ground), and weighs approximately 160,000 pounds (see Figure 3.1-2). A road approximately 26 ft wide and surfaced appropriately for the loading provides a transport route from the RFB to the ISFSI site (see Figure 2.2-3).

The security building will be constructed east of the ISFSI vault outside the security fencing for the ISFSI. This building will be approximately 20 ft x 40 ft. A detailed description of the storage site, the RFB, and the HI-STAR HB System is provided in Chapter 4 of the ISFSI SAR.

3.2 FACILITY CONSTRUCTION

Construction activities for the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) and associated facilities are similar to those required for construction of the foundation for a small commercial building or industrial facility. These types of activities occur routinely throughout the local region.

The major elements of the Humboldt Bay ISFSI that involve construction activities are: (a) the ISFSI vault structure, (b) the security building, (c) the transport route modification, and (d) installations and minor modifications inside the Humboldt Bay Power Plant (HBPP) Refueling Building (RFB). Construction activities will be scheduled during daylight hours. However, some tasks, the completion of which cannot be delayed, could occasionally continue after daylight hours. Such activities could include a large concrete pour or finishing.

3.2.1 PLANT MODIFICATIONS INSIDE THE REFUELING BUILDING

Inside the HBPP RFB, the following modifications will be made: (a) installation of a cask handling crane and (b) a rail dolly for transporting the casks into and out of the RFB.

3.2.2 CONSTRUCTION OF THE ISFSI VAULT

Construction of the ISFSI storage vault will require the removal of vegetation, and soil excavation and backfill. Excavation will be accomplished by using standard earthmoving equipment. Excavation material is proposed to be disposed of at the spoils disposal site shown in Figure 2.2-3. The amount of excavated material that will be disposed on site is estimated to be approximately 1200 cubic yards, which will be contoured to the existing slope. Another approximately 1000 cubic yards will be moved around during construction and used at the ISFSI for final site contour. Concrete for the ISFSI vault will be obtained from offsite sources.

3.2.3 CONSTRUCTION OF AUXILIARY FACILITIES

A single story security building will be constructed for the ISFSI. The security building will be approximately 20 ft x 40 ft and no more than 20 ft in height. The security building will be east of the vault as shown in Figure 4.2-1. There will be water, sewer, electrical, and telephone service to the security building.

Construction of the security building will involve minor excavation in order to install the footing and foundation for the building. Concrete for this operation will be delivered from offsite. Other building materials that may also be brought to the ISFSI security building construction site are lumber, glass, and insulation.

Other auxiliary components of the ISFSI include the installation of chain-link fencing, perimeter lighting, road widening, and security surveillance monitoring equipment.

3.3 FACILITY OPERATION

The physical characteristics of the spent fuel assemblies to be stored are described in the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) Safety Analysis Report (SAR), Section 3.1.

The HI-STAR HB Cask System will be used to load, transfer, and store Humboldt Bay Power Plant (HBPP) spent nuclear fuel. The system consists of a multi-purpose canister (MPC), which contains the fuel and a HI-STAR HB overpack (overpack), which contains the MPC during transfer and storage (see Figure 3.3-1). A general description of these two components is provided in this section. A more detailed description is contained in SAR Section 4.2.

The MPC is a welded cylindrical structure with flat ends and a honeycomb fuel basket. The structural function of the MPC in the storage mode are (1) to position the spent fuel in a subcritical configuration, and (2) to provide a confinement boundary. The HI-STAR HB overpack is a heavy, multilayered steel cylindrical vessel. The overpack serves as a missile barrier and radiation shield, in the storage mode.

Some major design features of the MPC are summarized below:

- The closure system for the MPC consists of two components; the MPC lid and closure ring. The MPC lid is a thick circular annular ring plate welded to the MPC shell and lid. The MPC lid is equipped with vent and drain ports which are utilized for evacuating moisture and air from the MPC following fuel loading and the subsequent backfilling with helium. The vent and drain ports are covered by a cover plate and welded shut before the closure ring is installed.

- The MPC fuel baskets consist of an array of interconnecting plates. The plates are welded along their edges to form a honeycomb structure.

Some major design features of the overpack are summarized below:

- The overpack features an inner shell and multilayered intermediate shells. The multilayered approach eliminates the potential for a crack in any layer to travel uninterrupted through the vessel wall and, thus, lessens the concerns over brittle fracture at low temperature.

- To facilitate handling of a loaded cask, the overpack is equipped with lifting trunnions.

The HI-STAR HB system is designed to accommodate intact fuel assemblies, damaged fuel assemblies, and fuel debris. The damaged fuel assemblies and fuel debris must be placed in a damaged fuel container, which is designed to confine gross fuel particulates to a known, subcritical geometry.

The spent fuel storage process begins in the HBPP RFB where a HI-STAR HB cask, with an empty MPC inside, is lowered into the spent fuel pool. Spent fuel assemblies are loaded into the MPC and verification of the assembly identification is provided. While still underwater, a thick MPC lid is installed for shielding. When the HI-STAR HB cask is removed from the spent fuel pool, the lift yoke, cask, and top of the MPC are rinsed down. Once removed from the spent fuel pool, the top surfaces of the MPC lid and the upper flange of the cask are decontaminated. Dose rates are measured at the cask to ensure that the dose rates are within expected values. The MPC lid is then seal-welded and all liquid water removed from the MPC.

Following successful completion of a dryness test, the MPC is backfilled to a predetermined pressure of helium gas. The backfill ensures adequate heat transfer during storage, and provides an inert atmosphere for long-term fuel integrity. Cover plates are then installed and seal-welded over the MPC vent and drain ports. In order to provide redundant closure of the MPC lid and cover plate confinement closure welds, an MPC closure ring is placed on the MPC and seal-welded. The MPC lid and accessible areas of the top of the MPC shell are smeared, tested, and checked for removable contamination and the HI-STAR cask dose rates are measured. The overpack top is installed and the lid studs and nuts are torqued.

After the overpack top lid is installed, the loaded HI-STAR HB system is rigged to the onsite transporter and transferred to the ISFSI vault. No active components are needed to ensure safe storage of the spent fuel.

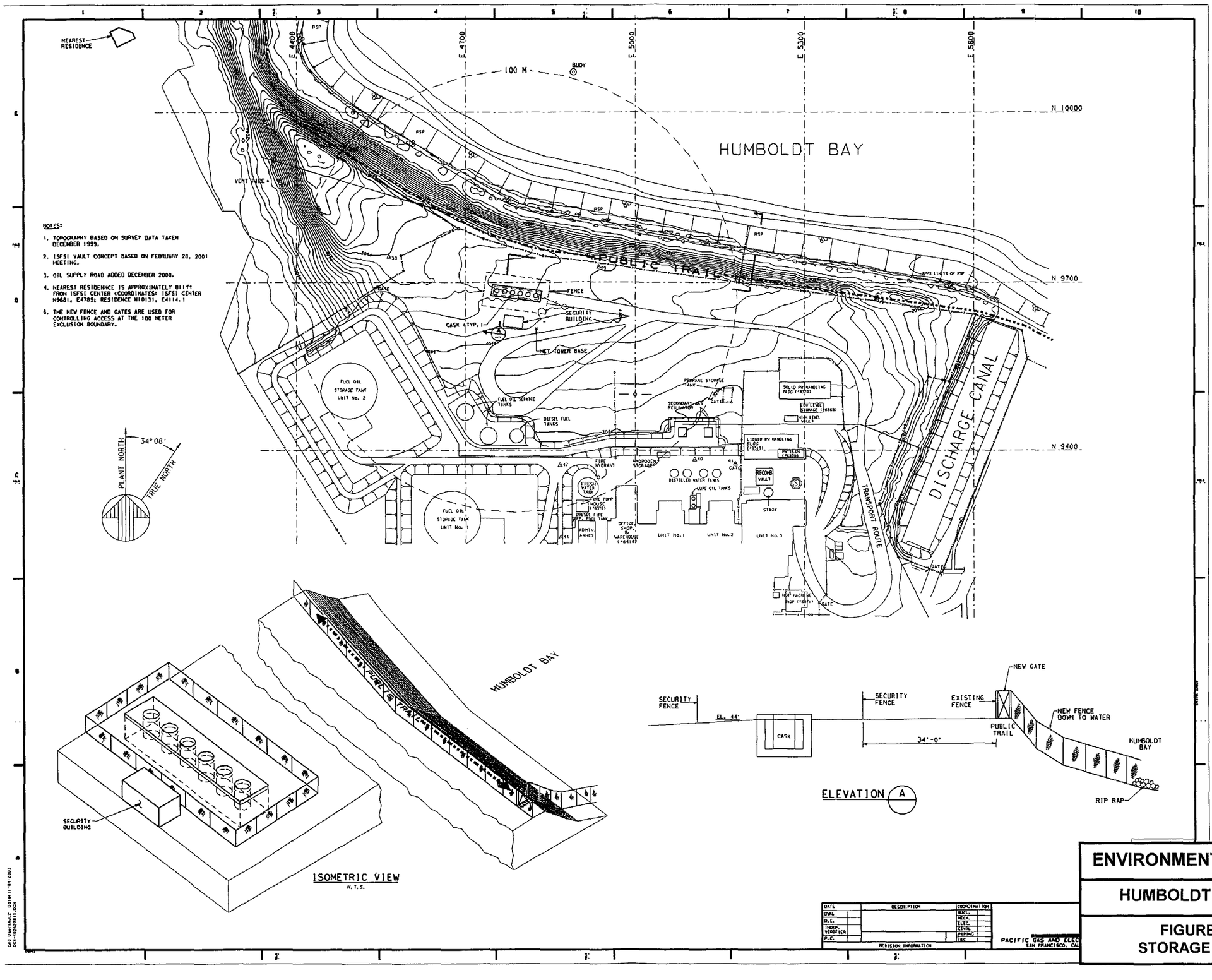
From the MPC shell to the overpack exterior surface, heat is conducted through an array of concentric shells representing the MPC-to-overpack helium gap, the overpack intermediate shells, the Holtite-A neutron shield, and the overpack outer shell. Heat rejection from the outside cask surface to ambient air takes place by natural convection and thermal radiation heat transfer mechanisms. No utilities (that is, water, compressed air, electric power) are required during storage operations.

3.4 WASTE CONFINEMENT AND EFFLUENT CONTROL

No radiological waste control systems are included in the design of the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI). Operation of the Humboldt Bay ISFSI does not result in the generation of radiological gaseous, liquid, or solid effluents. Operation of the Humboldt Bay ISFSI does not result in the generation of non-radiological gaseous, liquid, or solid effluents other than sewage waste from the Security Building restroom, which is connected to the existing Humboldt Bay Power Plant (HBPP) sewer line.

Multi-purpose canister (MPC) loading and closure operations are performed inside the HBPP RFB in a controlled and monitored environment. Radioactive effluent handling during MPC loading operations, which include MPC draining, helium backfilling, sealing, and closure operations, is in accordance with the HBPP SAFSTOR 10 CFR 50 license and radioactive waste management procedures. During MPC closure operations, the lines used for venting or draining are routed to the spent fuel pool or radioactive waste processing systems.

Decontamination of the fuel canisters will take place in the HBPP RFB prior to transferring the canisters to the ISFSI. Radioactive wastes generated during loading operations in the RFB are treated using existing HBPP waste management systems.



NOTES:

1. TOPOGRAPHY BASED ON SURVEY DATA TAKEN DECEMBER 1999.
2. ISFSI VAULT CONCEPT BASED ON FEBRUARY 28, 2001 MEETING.
3. OIL SUPPLY ROAD ADDED DECEMBER 2000.
4. NEAREST RESIDENCE IS APPROXIMATELY 8111 ft FROM ISFSI CENTER (COORDINATES: ISFSI CENTER N9681, E4783; RESIDENCE N10131, E4114.1
5. THE NEW FENCE AND GATES ARE USED FOR CONTROLLING ACCESS AT THE 100 METER EXCLUSION BOUNDARY.

ISOMETRIC VIEW
N.T.S.

ELEVATION (A)

DATE	DESCRIPTION	COORDINATION
DWN.		MECH.
P.E.		MECH.
		ELEC.
CHKD. VERIFIER		CIVIL
		PIPING
P.E.		I&C

REVISION INFORMATION

PACIFIC GAS AND ELEC
SAN FRANCISCO, CAL

ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 3.1-1
STORAGE LAYOUT

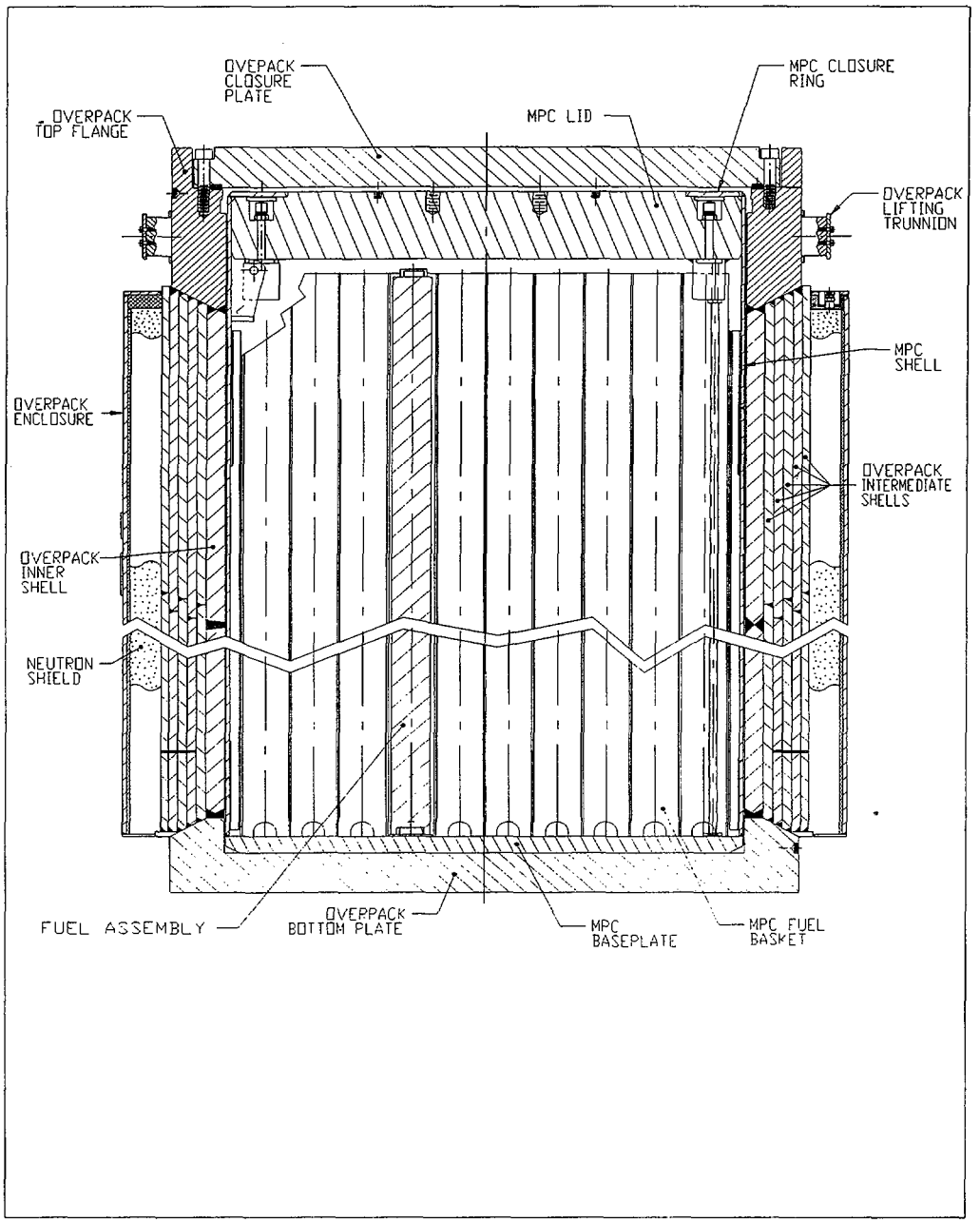


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FIGURE 3.1-2
CASK DIAGRAM

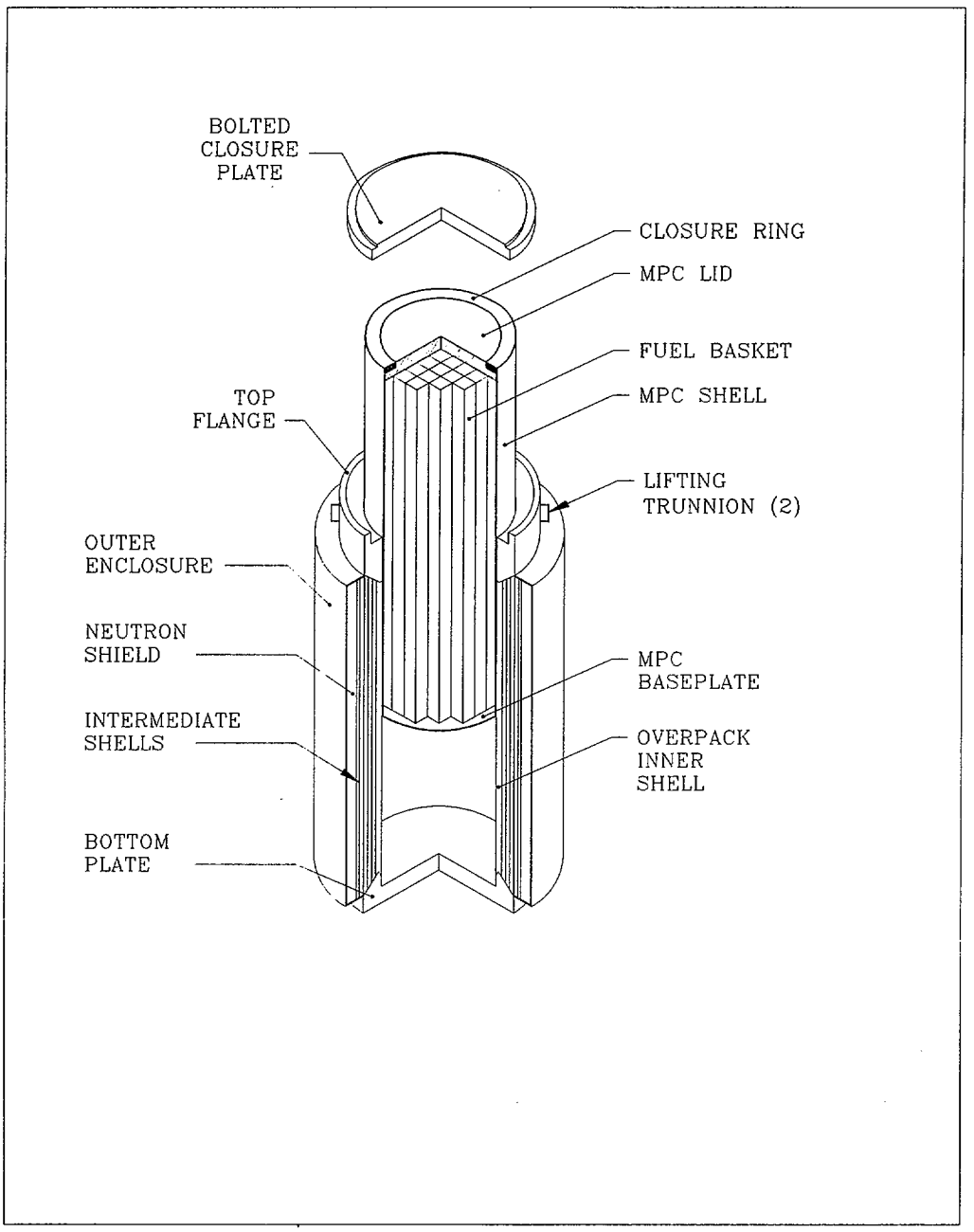

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FIGURE 3.3-1
HI-STAR HB OVERPACK WITH MPC PARTIALLY INSERTED

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CHAPTER 4

ENVIRONMENTAL EFFECTS OF CONSTRUCTION AND OPERATION

CONTENTS

CHAPTER 4

ENVIRONMENTAL EFFECTS OF CONSTRUCTION AND OPERATION

CONTENTS (Con't)

CHAPTER 4

ENVIRONMENTAL EFFECTS OF CONSTRUCTION AND OPERATION

TABLES

CHAPTER 4

ENVIRONMENTAL EFFECTS OF CONSTRUCTION AND OPERATION

FIGURES

CHAPTER 4

ENVIRONMENTAL EFFECTS OF CONSTRUCTION AND OPERATION

This chapter describes how the natural and human environment could be affected by the construction, operation and decommissioning of the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) and associated facilities. This chapter presents or references relevant data, describes the approach and methods used to predict future environmental impacts, and assesses potential environmental impacts. Each section describes, as appropriate, any potential impacts to specific categories of environmental resources. Each section also contains a concluding statement as to the significance of the potential impacts. A standard of significance has been established by the Nuclear Regulatory Commission (NRC) (Reference 1) for assessing environmental impacts. Using the regulatory standards of the Council on Environmental Quality as a basis, each impact is to be assigned to one of the following three significance levels:

Small: The environmental effects are not detectable or are so minor that they will neither destabilize nor noticeably alter any important attribute of the resource.

Moderate: The environmental effects are sufficient to alter noticeably, but not to destabilize, important attributes of the resource.

Large: The environmental effects are clearly noticeable and are sufficient to destabilize important attributes of the resource.

To obtain the SAFSTOR license amendment for Humboldt Bay Power Plant (HBPP), PG&E prepared and submitted an Environmental Report (ER) to the NRC (Reference 2) addressing the potential impact of the storage of spent fuel, at HBPP, on the surrounding environment. The NRC reviewed this environmental report and issued an environmental statement in 1987 (Reference 3) and concluded that HBPP Unit 3 can be placed in SAFSTOR with minimal environmental impact. The NRC issued the Safety Evaluation Report for SAFSTOR on April 29, 1987 (Reference 4).

4.1 EFFECTS OF SITE PREPARATION AND FACILITY CONSTRUCTION

Construction activities for the Humboldt Bay ISFSI and associated facilities are similar to those required for construction of the foundation of a small commercial building or industrial facility. These activities are described in ER Section 3.2.

Applicable Best Management Practices (BMPs) (for example, control of dust, siltation, and erosion protection) will be applied during construction activities. BMPs are defined in both federal and state regulations. The Environmental Protection Agency (EPA) defines BMPs in 40 CFR 122.2, which contains regulations that address the management of practices that could create water pollution. The EPA definition is as follows:

BMPs: BMPs include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States". BMPs also include treatment requirements, operation procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

BMPs proposed to be used during construction activities for the Humboldt Bay ISFSI and related facilities are listed in Table 4.1-1.

4.1.1 EFFECTS ON GEOGRAPHY, LAND USE, AND DEMOGRAPHY

The ISFSI is located within the Pacific Gas and Electric (PG&E) owner-controlled area at HBPP. HBPP is located near the coastal community of King Salmon on the mainland shore of Humboldt Bay in Humboldt County, in northwestern California. Eureka, the largest city in Humboldt County, is located approximately 3 miles northeast of the ISFSI site, see Figure 4.1-1.

PG&E owns approximately 143 acres on the northeastern part of a peninsula on the mainland shore of Humboldt Bay opposite the bay entrance. PG&E also owns the intertidal areas extending approximately 500 ft into Humboldt Bay. The ISFSI will be located approximately 700 ft west of the Unit 3 containment at an elevation of approximately 44 ft above mean lower low water sea level (Figures 2.1-2 and 4.1-2). The coordinates of the ISFSI site are 40°44'30.6" North, 124°12'39" West (UTM Zone 10, 4,510,592.5 meters North, 397,761.3 meters East). The ISFSI location is on a naturally elevated section of the peninsula. Figures 2.1-1 and 3.1-1 show the topography of the site and surrounding areas.

Construction activities will be limited to the immediate vicinity of the ISFSI. Construction materials will be provided from offsite sources. Manufacturing of components for the HI-STAR HB System will also be performed offsite.

Construction activities for the ISFSI and associated facilities will consist of excavation, excavation spoils disposal, forming and pouring of the concrete vault structure, excavation backfill, the addition of paved areas and widening of the existing oil supply road, fences and utilities, grounding, construction of miscellaneous facilities, and control of dust and runoff. The affected areas were previously disturbed during the original construction of HBPP. Approximately 1,200 cubic yards of material will need to be disposed of as a result of excavations for the ISFSI. The excavation spoils disposal site, as shown in Figure 4.1-3, was selected because it was disturbed during previous plant construction activities. The total area of the completed ISFSI will be approximately 11,340 sq. ft, which includes the ISFSI security fenced perimeter, the small security building, and the paved roadway addition to the oil supply road that will extend to the ISFSI vault area. The total area of the 8-foot road widening is approximately 10,056 sq. ft. The spoils site will cover approximately 9000 sq. ft and will be subject to minor grading practices to obtain a consistent ground contour. The potential amount of native

and introduced vegetation and ruderal habitat that may be disturbed during ISFSI construction is approximately 30,396 sq. ft. Since the ISFSI will be located within the HBPP owner-controlled area and construction activities are limited to the immediate vicinity of the ISFSI site and nearby excavation spoils disposal area, there is no need for any offsite construction facility and there will be no alterations to public property surrounding the ISFSI. Transportation of materials, equipment, and personnel to support construction activities will be via existing roadways; no modifications to existing public routes will be required. No rezoning of public lands will be needed to allow construction of the ISFSI. There will be no effect on the geography of Humboldt County from the construction of the ISFSI. Equipment laydown areas are located over the plant site, which is a previously disturbed area, therefore no specific equipment laydown area will be described.

Construction of the ISFSI will not physically divide any communities, conflict with applicable regulations or conservation plans, or affect nearby recreational facilities. The existing recreational trail just west of the ISFSI and bay access below the site will not be impacted as no structures will be placed in these areas. In summary, the impact of construction activities on geography, demography and land use resulting from the Humboldt Bay ISFSI and associated facilities is considered to be small.

4.1.2 EFFECTS ON ECOLOGICAL RESOURCES

Impacts to terrestrial and aquatic resources resulting from the construction of the ISFSI depend primarily on the proximity, orientation, and quality of the habitat, the presence of special status species, the presence of breeding habitat, and the effectiveness of measures instituted to protect these habitats from direct or indirect exposure to project activities. Habitat assessments were conducted at all areas potentially affected by construction activities. The qualities of habitat for terrestrial and aquatic species in these areas were found to be low. All of the construction activities will occur in areas that were previously disturbed during the original construction of HBPP. Disturbance of vegetated surfaces at the ISFSI vault location will be limited to an area located on the west side of the plant, near the site boundary fence adjacent to the public access trail and breakwater. Excavation of material from this previously disturbed area will impact both native and introduced plant species dominated by several species of non-native annual grasses and ruderal populations of native plant species. Non-native annual grasslands are common throughout the region, and the loss of a small amount of habitat is considered a small impact. The designated excavation spoils disposal site will impact areas of sparse natural vegetation currently growing on the previously disturbed site.

Although the habitat value of these ruderal populations are small, all disturbed areas will be re-vegetated with an appropriate seed mix. Excavated materials will be placed at the excavation spoils disposal site and subject to BMPs for the control of storm water runoff, erosion control, and revegetation, as appropriate.

The disposal area provides some habitat value for resident wildlife species including few species of small mammals, and bird species that favor open shrub-grass habitats.

Wildlife habitat quality is generally low because of activity at the plant site, past construction disturbance, and routine vegetation management activities. Temporary noise disturbance and increased human activity during the construction period will further reduce the wildlife habitat value of the immediate ISFSI area. No jurisdictional wetlands have been identified within the immediate area of the ISFSI project, and no impacts to wetlands within the current owner-controlled area are anticipated from the proposed project.

Surveys performed for the project identified no state or federally listed threatened, endangered, or sensitive plant species; unique botanical resources; or threatened or endangered terrestrial wildlife species in areas subject to potential impact from the project. Therefore, no impacts to these resources are anticipated.

The intertidal area west of the ISFSI site does not support populations of any state or federally listed threatened or endangered marine algae or invertebrate species.

Among the marine mammals that frequent near-shore areas within the vicinity of the ISFSI, the southern sea otter is listed as threatened under the Federal Endangered Species Act, and the northern elephant seal, California sea lion, and Pacific harbor seal are protected under the Federal Marine Mammal Protection Act. The proposed project does not involve any activities that will result in discharges to Humboldt Bay and no structures will be built in potential green sea turtle habitat. No direct or indirect effects on green sea turtles are anticipated.

Two species of fish, the south/central California coast steelhead and the tidewater goby potentially could occur in fresh water habitats in the ISFSI site vicinity. The steelhead is currently listed as threatened under the Federal Endangered Species Act. Populations of the tidewater goby north of Orange County were proposed for delisting in June 1999, but currently remain listed as endangered under the Federal Endangered Species Act. Habitat for these species does not occur at the ISFSI site. Although known to occur in the region, neither species has been positively documented in surveys conducted within the ISFSI site vicinity. Some suitable habitat for the tidewater goby is present in intertidal areas west of the construction area. Habitat for steelhead trout occurs within Humboldt Bay, but is not known to occur near the ISFSI. Use of appropriate construction period BMPs will ensure that there will be no ISFSI-related discharges to these marine or freshwater environments. Therefore, no impacts to these species are anticipated. Specific BMPs to protect water quality and the aquatic environment are discussed in Table 4.1-1. A site-specific erosion control and revegetation plan addressing the site disposal area will be developed.

Construction of the ISFSI facility may result in a small irreversible loss of poor quality habitat and associated biological resources. A diligent effort will be made to protect the existing plant community and to keep temporary impacts to a minimum. These temporary impacts will be mitigated through the use of BMPs and the avoidance of locally or regionally significant species or habitats.

Based on these considerations, the environmental impact on ecological resources from construction activities for the Humboldt Bay ISFSI and associated facilities is considered to be small.

4.1.3 EFFECTS ON AIR QUALITY

Air quality related impacts associated with construction of the Humboldt Bay ISFSI and associated facilities will be comprised mainly of gaseous pollutant emissions from diesel-powered construction equipment and fugitive dust emissions from excavation activities and construction equipment traveling on paved roads. There will also be pollutant emissions from private vehicles driven by the construction workers. These types of impacts will have only very localized impacts.

The North Coast Unified Air Quality Management District (NCUAQMD) has permit authority under California Clean Air Act over direct emissions sources in the Humboldt Bay ISFSI area. The permit authority enables the NCUAQMD to determine if emissions from the project exceed the California thresholds for significant air quality impacts from land use projects, and if mitigations are required by Section 23.06.082a.1 of the Coastal Zone Land Use Ordinance. Since the Humboldt Bay ISFSI emissions sources will be construction equipment brought onsite temporarily, the NCUAQMD may require a permit for these sources of emissions. If the NCUAQMD determines that the proposed construction activities require permitting, PG&E will submit an "Application for Authority to Construct," which serves as a permit application.

The generation of fugitive dust during construction will be minimal. Construction traffic will use existing paved roadways. The construction area surrounding the site is currently paved or graveled. The primary source of dust will be from wind transport of dust from excavation and fill operations. Dust control techniques may include watering and/or chemical stabilization of potential dust sources and will comply with state and local NCUAQMD regulations. Other techniques that may be used to control fugitive dust emissions include covering materials being hauled from the site by truck and by routine washing of trucks. Gaseous emissions from construction equipment will be mitigated typically by requiring regular maintenance of equipment.

In summary, the impact of construction activities on air quality resulting from the Humboldt Bay ISFSI and associated facilities is considered to be small.

4.1.4 EFFECTS ON HYDROLOGICAL RESOURCES

The only natural surface water in the immediate vicinity of the ISFSI location is Humboldt Bay. The nearest point of contact would be the Humboldt Bay and breakwater interface adjacent to the ISFSI, which is located approximately 250 ft from the ISFSI site at its nearest approach. Other water bodies in the vicinity are the man-made intake and discharge canals, the water table groundwater, and perched groundwater within the unsaturated zone. Surface drainage around the ISFSI site flows naturally into the existing plant drainage system. By way of the plant drainage system,

the surface water then discharges into the cooling water intake canal, flows through the plant, and discharges into Humboldt Bay via the cooling water discharge canal. In the area of the excavation spoils disposal site, the surface runoff drains to the east toward the discharge canal and to the north toward Humboldt Bay (See Section 2.5.1.2 on Surface Hydrology). Based on observations made during geotechnical trenching in the area, it is expected that some local perched groundwater will be encountered during excavation. However, this perched water should be relatively minor, draining away in a few hours or at most a few days, leaving only seeps coming out of the excavation walls. The amount of water would be smaller in the summer and fall and more in the winter and spring.

All discharges from HBPP are currently regulated by Waste Discharge Requirements (and subsequent 5-year renewals) issued by the North Coast Regional Water Quality Control Board (NCRWQCB) under the federal National Pollutant Discharge Elimination System (NPDES) permit #CA 0005622. The site-specific permit contains numerical effluent limits for pollutants in industrial liquid waste discharges at the HBPP site and requires monitoring of pollutants in both industrial and stormwater discharges from the site. Monitoring of industrial wastewater and stormwater flows is reported to the NCRWQCB. The NCRWQCB will be notified of the project and any modifications to stormwater discharges at the site due to construction or operation. If the affected area exceeds one acre in size HBPP will obtain a General Permit for Stormwater Discharges for Construction Activities and comply with its provisions during the construction period. Following construction regulation of stormwater runoff from the ISFSI site will be incorporated into the existing HBPP NPDES permit and stormwater runoff will be managed in accordance with appropriate BMPs.

Applicable BMPs (Table 4.1-1) will be applied during construction activities in order to protect these waters from site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. In summary, the impact of construction activities on hydrological resources at the Humboldt Bay ISFSI and associated facilities is considered to be small.

4.1.5 EFFECTS ON MINERAL RESOURCES

There are no known mineral resources at the ISFSI site, and no further mineral exploration in the vicinity of Humboldt Bay is ongoing or planned. The land removed from any potential future exploration for the duration of the ISFSI license is minimal compared with the overall owner-controlled land area. The presence of the ISFSI will not preclude mineral exploration of the majority of the owner-controlled land area outside the ISFSI location. Therefore, any potential impact from any unforeseen future use of mineral resources in the vicinity of the ISFSI is negligible, if any.

Consumption of construction materials is expected to be minor compared with available resources. The required quantities are well within the capabilities of local vendors and are not expected to create a significant impact on the overall availability of such resource materials for any other use in the surrounding communities.

In summary, the impact of constructing the Humboldt Bay ISFSI and associated facilities on mineral resources is considered to be small.

4.1.6 EFFECTS ON SOCIOECONOMICS

Personnel needed to construct the Humboldt Bay ISFSI and associated facilities, is not expected to exceed 20 persons during the period of peak construction demand.

Construction of the ISFSI project will provide short-term construction employment, but no permanent employment. The construction of the ISFSI will be done in a single phase. There will be excavation, concrete forming and pouring, excavation backfill, fencing and lighting, security building erection and service connection, in approximately that order. It is expected to take no more than six months to complete the construction of the ISFSI and associated facilities.

Personnel in various construction disciplines will be needed for construction of the facility. It is anticipated that personnel will be drawn from the existing work force in the communities around the ISFSI site. Additional temporary construction personnel may be acquired from other locations if needed to provide a sufficient work force. Use of such additional personnel is expected to be minimal since resources from PG&E and Humboldt County are expected to be sufficient to meet the requirements of ISFSI construction. To the extent possible, existing expertise from HBPP staff will be used to augment the construction personnel needed for ISFSI construction. Construction personnel are expected to reside primarily in the Humboldt County area and commute daily to the ISFSI site during the period of facility construction. Since the maximum number of staff needed for ISFSI construction is expected to be small relative to the overall work force in the community, and since the demand on the work force will be of a relatively short duration, minimal impact is anticipated on the local population and social activities in the county. Should it be necessary to acquire personnel from outside Humboldt County, this additional work force will produce a slight demand on local resources, such as housing and utilities. Any such demand is expected to be negligible due to the small number of personnel involved and the short duration of the construction effort.

Construction of the ISFSI will create a short-term demand for local construction resources and personnel, and will produce a temporary benefit to the local economy by providing additional opportunities in the job market. While the long-term effect of such a benefit to the local community may not be significant, it is expected to offset any burden placed on the local infrastructure by any temporary work force. The demand on local resources is not expected to be a significant burden to the existing economy, educational facilities, social services, medical institutions, government agencies, or public utilities. The existing socioeconomic system of Humboldt County is expected to be adequate to manage any minor and short-term demands related to ISFSI construction.

In summary, the impact of construction of the Humboldt Bay ISFSI and associated facilities on socioeconomics is considered to be small.

4.1.7 EFFECTS OF NOISE AND TRAFFIC

This section addresses the predicted effects of noise on local residences and other sensitive receptors during construction of the ISFSI and associated facilities. Changes in traffic as a result of construction of the ISFSI and associated facilities are also evaluated.

Construction activities associated with the Humboldt Bay ISFSI and associated facilities will generate noise at the construction site and along county roads to the HBPP site. Noise produced during construction can potentially impact three groups: (a) construction workers, (b) the surrounding communities, and (c) surrounding fauna.

The specific number of vehicles or staff personnel needed to support ISFSI construction has not been determined but staffing is not expected to exceed 20 persons. However, traffic to and from the plant by staff supporting ISFSI construction will be via existing paved roads and highways using primarily private automobiles. This amount of traffic is expected to be less than the routine traffic that occurs currently in support of the plant operation.

The impact of Humboldt Bay ISFSI and associated facilities construction noise is considered to be small as discussed below.

4.1.7.1 Significance Criteria

Local agencies typically do not set noise level limits for construction activities occurring during allowed hours (usually between 7:00 a.m. and 6:00 p.m.). They emphasize that construction operations should use available noise suppression devices and techniques to minimize disturbance to nearby businesses and residences.

In general, because of the temporary nature of noise generated from construction activities, significance criteria for construction-related noise have not been established. However, this does not mean that construction noise may not be disruptive. The following are extracted from construction noise specifications often used for civil projects.

4.1.7.1.1 Continuous Noise

In residential areas, construction noise from stationary noise sources that generates repetitive or long-term noise lasting more than 3 hours would be significant if the equivalent noise level, L_{eq} , measured over any 30-minute period, exceeds 65 dBA at a distance of 200 ft or at the nearest sensitive receptor. In commercial areas, such sources should not exceed 70 dBA at a distance of 200 ft or at the nearest sensitive receptor (Reference 5).

4.1.7.1.2 Vibrations

Most local agencies have not established specific criteria for the evaluation of vibration impacts. Table 4.1-2 recommends vibration criteria for different vibration sensitive uses. The human annoyance criteria are primarily intended for construction projects that continue several days in one location. Table 4.1-2 indicates the levels at which a significant vibration impact will occur for humans and buildings.

4.1.7.2 Noise Levels During Construction

Typical noise levels at 50 ft for construction equipment are listed in Table 4.1-3. Two types of noise are associated with construction activities: intermittent and continuous. The maximum intermittent construction noise levels would range from 80 to 88 dBA at 50 ft for supporting structure assembly operations and 84 to 90 dBA during tamping operations. The continuous noise levels from construction activities at 50 ft would range from approximately 69 to 90 dBA. At 100 ft, the continuous noise levels would be 63 to 84 dBA. At 200 ft, the noise levels would be 57 to 78 dBA. A generally used rule-of-thumb is that noise levels drop 6 dBA per each doubling of distance. Complying with all applicable OSHA noise regulations will ensure that the impact on construction workers is similar to many other construction projects that routinely take place in Humboldt County and is considered to be small. The closest residence is 811 ft southwest of the Humboldt Bay ISFSI. Construction noise will not be audible at this location. Noise levels will increase during the period of construction from the existing sound level of 62 dBA to approximately 65 dBA at a distance of 50 ft. These noise levels are minor and less than that currently experienced during normal operations at the HBPP site.

4.1.8 EFFECTS ON REGIONAL HISTORICAL, CULTURAL, SCENIC, AND NATURAL RESOURCES

The greater region of Humboldt County contains cultural, natural, scenic resources, and historical sites. These resources and sites include various evergreen and redwood forests, several national parks along the coastal areas of northern California, Humboldt Bay, and the Carson Mansion in Eureka. However, construction of the ISFSI facility is not expected to affect any of these resources because of the localized nature of ISFSI operation, which is limited to the immediate HBPP area. Any extra lighting for construction will be minimal and will blend in with the existing lighting of the power plant. Construction activities are not expected to continue into the night which would further reduce the impact of nighttime light glare from construction operations. No significant operational effluents or gaseous releases will be generated by the ISFSI construction, and normal support activities during ISFSI construction will not be of an extent that is capable of significantly altering or adversely impacting the nature or quality of any of these regional resources.

PG&E owns the existing HBPP site, including the ISFSI location. The areas owned by PG&E extend into the waters of Humboldt Bay, as well as other land areas around the HBPP site boundary. No historical, archeological, architectural, or cultural resource has

been identified in the immediate area of the HBPP site, and no such resources are planned for development in the vicinity of HBPP. Therefore, no impact on any of these resources is expected to occur near the HBPP site from ISFSI construction.

The construction of the Humboldt Bay ISFSI and associated facilities will be a relatively small operation. The presence of a small workforce and their equipment is not expected to exceed a six-month duration of activity. All 20 workers are not expected to be onsite at one time. Nor is all the equipment necessary to construct the ISFSI and its associated facilities expected to be used at the site at one time. Since the equipment for the ISFSI construction is relatively small and work activities will be spread out over the six-month period, visual or scenic resources will not be adversely affected.

In summary, the construction of the ISFSI will not have any adverse impact on the natural, scenic, cultural, historical, or other resources in the Humboldt Bay region.

4.1.9 RADIATION DOSES TO CONSTRUCTION WORKERS

All activities for construction are outside the Radiological Controlled Area (RCA) for the plant. As such, the annual dose to the public limit of 25 mrem/year will be met. The actual dose is expected to be a small fraction of this limit.

4.1.10 REFERENCES

1. Generic Environmental Impact Statement for License Renewal of Nuclear Plants, NUREG-1437, May 1996.

2. Environmental Report, part of LAR for SAFSTOR Dated July 30, 1984

3. NUREG-1166, Final Environmental Statement for Decommissioning of HBPP Unit 3, April 1987

4. NRC Safety Evaluation Report for SAFSTOR dated April 29, 1987

5. J. T. Nelson, et al. 1982. Handbook of Urban Rail Noise and Vibration Control, US Department of Transportation.

4.2 EFFECTS OF FACILITY OPERATION

4.2.1 EFFECTS ON GEOGRAPHY, LAND USE, AND DEMOGRAPHY

The spent fuel from the Unit 3 spent fuel pool will be removed and placed in the storage casks once the ISFSI is operational, and will remain in the casks during the Independent Spent Fuel Storage Installation (ISFSI) license period. There will be no further fuel movement after the existing fuel has been placed into the casks since no new spent fuel is being generated at Humboldt Bay Power Plant (HBPP). The casks will remain at the ISFSI until spent fuel can be shipped offsite. It is expected that a total of six casks, five containing spent fuel and one containing greater than class C waste (GTCC), will be used at the ISFSI.

The ISFSI will be located within the existing HBPP site (Figure 2.1-2), which is owned by Pacific Gas and Electric (PG&E). Much of the site area enclosed by the plant owner controlled area fence will not be altered by operation of the ISFSI. Only the specific location of the ISFSI itself and associated access roads, which are a relatively small area within the site boundary (see Figure 4.2-1), will be restricted from other access or usage. No planned activity related to the ISFSI will occur outside the PG&E property once the facility becomes operational. Public access to, and recreation activities on the breakwater and bay adjacent to the HBPP will be restricted during ISFSI activities that require limited access within the 100-meter controlled area. ISFSI activities that require limiting access to the public trail and bay will be for short periods of time during cask movement or handling evolutions and in emergency situations. Two lockable gates will be added within PG&E property on the public trail. These gates will only be closed during evolutions that will occur primarily during the initial transport of the storage casks to the facility and potentially not again until the casks are transported off site. As such, the proposed project will have a small effect on public access and recreation areas. Since no additional casks will be needed after the existing HBPP fuel has been placed into storage at the ISFSI, there will be no further disturbance due to traffic related to cask delivery or other activities in the vicinity surrounding the plant area during ISFSI operation.

The ISFSI will be located at an existing site that is restricted from public access. All ISFSI operations are limited to within the site area. Other than the short term impacts of construction, there will be no continuing disturbance to the land in the vicinity of the HBPP site resulting from ISFSI operation. Operation of the ISFSI will not disturb communities, conflict with applicable regulations or conservation plans, or affect nearby recreational facilities except for short-term closures of the existing recreational trail just west of the ISFSI. Activity levels at the site will reduce slightly over time as ISFSI operational activities are minimal compared with current pool storage of spent fuel. Therefore, the impact on the local geography and demography will be small.

4.2.2 EFFECTS ON ECOLOGICAL RESOURCES

As discussed in Section 4.2.1, once the fuel and GTCC waste has been placed into the storage casks and the ISFSI becomes operational, the casks will remain in place at the ISFSI until the spent fuel and GTCC waste can be shipped offsite. The operational activities of the ISFSI will occur within the existing site boundary of HBPP. Therefore, there will be no direct impact on local wildlife or any disturbance to habitats in the vicinity surrounding the HBPP site as a result of ISFSI operational activities.

The site restricted area fence precludes the intrusion of larger wildlife to the ISFSI area. However, it is possible that the addition of the ISFSI facilities at HBPP will inhibit the movement of burrowing animals through the grounds of the ISFSI area that may have otherwise remained undisturbed. The ISFSI structure could increase the opportunity for raptors to prey on general wildlife occurring on the ISFSI site by providing new perch sites. Increased predation would have a small effect on resident small mammal populations. Several bird species may be attracted to the ISFSI as roosting habitat. However, such perturbations to animal behavior are expected to be minimal resulting in small impacts to the animals affected.

Runoff from precipitation at the ISFSI site will be drained in the existing HBPP surface drainage system and discharged into Humboldt Bay. Under normal conditions, radioactive materials associated with the spent fuel are contained within the sealed containers inside the storage casks and are not exposed to precipitation. Therefore, any surface runoff from the ISFSI is uncontaminated and will not adversely affect vegetation or wildlife. Minor alteration in drainage patterns may occur in the immediate area of the ISFSI as a result of the structure of the facility. However, no adverse impact to local vegetation is expected and any potential offsite impact is negligible.

During Humboldt Bay ISFSI operations, measurable radiation will be present in and around the immediate cask storage area. The Nuclear Regulatory Commission previously evaluated the radiation effects on wildlife for Private Fuel Storage (Reference 1), and concluded that the impacts to wildlife exposed to radiation from the top surface of the casks were small. Additionally, Reference 1 concluded that the radiation effects to animals that may be using the light poles in the vicinity of the cask storage facility were also small. The conclusions reached in the previous study are applicable because they were based on similar casks and fuel types, and considered substantially greater numbers of casks than will be stored at the Humboldt Bay ISFSI.

Since the ISFSI will be located at an existing site where activities related to other facilities are ongoing, perturbations on the local ecosystem resulting from ISFSI operation, such as lighting, noise, and traffic, are expected to be minimal compared with existing activities. Therefore, impacts resulting from ISFSI operation are expected to be small.

4.2.3 EFFECTS ON AIR QUALITY

There are no air pollution sources directly associated with the operation of the ISFSI since the storage system is comprised of naturally cooled dry storage casks. There are no gaseous effluents from the ISFSI since the storage casks are a passive system with no motorized components and no direct ventilation from the fuel. The power needed to support operational activities relating to the ISFSI, such as administration and lighting, is provided by power sources that are used to maintain or operate the other facilities at HBPP. The power requirement for ISFSI support is minimal compared with that needed for pool storage of spent fuel and is negligible compared with other activities at the HBPP site. Therefore, any air pollution due to combustible fuel burning devices needed to support the ISFSI is not expected to have significant adverse impacts on air quality. Further, ISFSI operation is not expected to have any measurable impact on the local ambient atmosphere or meteorology.

Vehicle emissions from the minor amount of traffic associated with staff supporting the ISFSI operation will occur until the facility is decommissioned. However, the emission levels will be less than existing levels with Unit 3 in SAFSTOR and substantially less than that previously experienced at the site during Unit 3 operation. Additional discussion on traffic levels during ISFSI operation is provided in Section 4.2.7. Since no further fuel movement or additional casks will be needed once the existing fuel has been placed into storage at the ISFSI, there will be no emissions from fuel moving equipment or cask delivery vehicles. Based on these considerations, no adverse impact from vehicle emissions on air quality due to ISFSI operation is expected.

4.2.4 EFFECTS ON HYDROLOGICAL RESOURCES

There is no direct impact on surface or ground water from operation of the ISFSI since dry casks are used to store the spent fuel. The casks are cooled via natural convection of air and thermal radiation and no cooling water is necessary. Thus, there is no consumption from or discharge of water into Humboldt Bay, the surrounding water channels in the vicinity of HBPP, or the groundwater aquifers in the area that directly result from the ISFSI. No wells will be dug in the site vicinity.

A four inch corrugated polyethylene pipe French drain system as shown in Figure 4.2-2 will be installed around the vault to drain any accumulated groundwater to the ground surface in the vicinity of the No. 2 fuel oil tank as shown on Figure 4.2-3 where it will drain into the existing plant drainage system. As discussed in Section 4.2.2, surface water runoff from precipitation at the ISFSI site will be drained in the existing HBPP surface drainage system, which discharges into Humboldt Bay. Surface runoff from the ISFSI is uncontaminated and will not contaminate surrounding water bodies. Minor alteration in drainage patterns may occur in the immediate area of the ISFSI. However, any differences in drainage patterns or potential accumulation of stagnant water caused by the structure of the facility are not expected to be significant and will not adversely impact existing hydrological resources.

Potable water that is needed to support ISFSI operation will be from existing water supplies at HBPP. Potable water use to support ISFSI operation is not expected to be significant and will be minimal compared with the current usage in support of pool storage of spent fuel, since the number of operating personnel will decrease and there will be no further need to maintain a supply of make-up water for the pool. Therefore, there will be no adverse impact on hydrological resources from consumption of potable water at the ISFSI.

4.2.5 EFFECTS ON MINERAL RESOURCES

PG&E owns the HBPP site, including the proposed ISFSI area. There are no known mineral resources in the proposed area for the ISFSI or on the HBPP site in general, and no further mineral exploration in the vicinity of HBPP is ongoing or planned. Therefore, no impact to any mineral resources is expected from ISFSI operation.

4.2.6 EFFECTS ON SOCIOECONOMICS

The specific number of staff positions to support ISFSI operation has not been determined, but is expected to be approximately 10 full time personnel. Overall, there will be a decrease in the number of operating support staff, since there will be less activity related to ISFSI operation in comparison with the existing pool storage of spent fuel at HBPP Unit 3. More specifically, approximately 100 employees currently work on all facilities at HBPP. The equivalent of 65 full-time employees is needed to maintain Unit 3 in SAFSTOR status. For the duration of the ISFSI life, therefore, there will be a decrease in the net amount of human resources needed in comparison with the current SAFSTOR status. Such a reduction is relatively insignificant compared with the normal labor fluctuations in Humboldt County, and is therefore expected to have negligible impact on the socioeconomics in the area.

The employees needed to support ISFSI operation will be drawn from the existing work force at HBPP or elsewhere in PG&E, and, if necessary, from other labor pools available in the area. Some of the ISFSI personnel may be shared staff that also provide support for the other facilities at HBPP. These employees are expected to reside primarily in the Humboldt County area and commute daily to the ISFSI facility. Since the number of staff needed to support ISFSI operation will be small, there will likely be no significant disturbance to the local population and related socioeconomic structure in the area and will be less than current SAFSTOR activities.

Similarly, operation of the ISFSI and its demand on labor resources are not expected to create any significant burden to the local economy, educational facilities, social services, medical institutions, government agencies, or public utilities. The minimal staff supporting the ISFSI is expected to be or become an integral part of the existing socioeconomic system of Humboldt County. This system is expected to be adequate to manage any demands that may result from the minor changes in the local work force that may occur on occasion during ISFSI operation.

PG&E owns the HBPP site and makes property tax payments to Humboldt County. These tax payments are expected to continue for the duration of ISFSI operation along with the continued operation of the other facilities at the HBPP site. This tax revenue represents a substantial contribution to the local economy and is expected to continue to benefit the local population by helping to fund the local government and support necessary improvements to the regional infrastructure. Since this tax is applicable to the HBPP site regardless of the operation of the ISFSI, any potential impact on tax revenue due directly to ISFSI operation cannot be clearly assessed, although it is expected to be negligible.

4.2.7 EFFECTS OF NOISE AND TRAFFIC

Once the spent fuel and GTCC waste have been placed into the casks, the casks will remain at the ISFSI until fuel can be shipped offsite. The storage of spent fuel and GTCC waste using dry casks at the ISFSI is a passive process and does not involve any noise generation. The cooling for the storage casks is by natural convection, conduction, and radiation, which does not use fans or other types of active cooling equipment. Therefore, no noise will be generated as a direct result of ISFSI operation. Additional discussion on noise and traffic for the ISFSI is provided in Environmental Report (ER) Section 2.8.

Traffic to and from the plant by staff supporting the ISFSI operation will be via existing paved roads and highways using primarily private vehicles. This traffic is expected to be minor in comparison with the traffic that would occur otherwise to support other facilities located at HBPP. The specific number of vehicles or staff personnel needed to support ISFSI operation has not been determined, and may be minimized by sharing staff from the other facilities. However, the necessary personnel, including any associated traffic, is expected to be less than half of that currently needed to support pool storage of the spent fuel, since there will be a decrease in support activities and resource demands associated with cask storage. Hence, the amount of traffic that will occur during ISFSI operation is expected to be much less than current levels. Similarly, therefore, the noise levels associated with ISFSI traffic are expected to be less than existing levels, and no adverse impact is expected.

Thus, the primary sources of noise and traffic associated with ISFSI operation will occur during the brief period of initial delivery of the storage casks to the ISFSI and their placement in the ISFSI vault, the movement and placement of the fuel from the pool into the casks, and the eventual transportation of the casks offsite. These activities will involve minor noise generation from vehicles and cask movement machinery. However, these noise and traffic levels are similar to those that have existed at the site during operation of Unit 3, and which regularly occur on occasion with the other facilities at HBPP such as during outages. Further, any such increase in noise and traffic levels will occur only temporarily, on the order of days, and will not be continuous. Therefore, any impact of noise and traffic from these short phases of ISFSI operation is expected to be small.

4.2.8 EFFECTS ON REGIONAL HISTORICAL, CULTURAL, SCENIC, AND NATURAL RESOURCES

In the greater region of Humboldt County and other nearby areas, cultural, natural, and scenic resources as well as historical sites include various evergreen and redwood forests, several national parks along the coastal areas of northern California, Humboldt Bay, and the Carson Mansion in Eureka. However, operation of the ISFSI facility is not expected to affect any of these resources because of the localized nature of ISFSI operation, which is limited to the immediate HBPP area. No operational effluents or gaseous releases will be generated by the ISFSI, and normal support activities during ISFSI operation will not be of an extent that is capable of significantly altering or adversely impacting the nature or quality of any of these regional resources.

PG&E owns the existing HBPP site, including the ISFSI location. The areas owned by PG&E extend into the waters of Humboldt Bay, as well as other land areas around the HBPP site boundary. No historical, archeological, architectural, or cultural resource has been identified in the immediate area of the HBPP site, and no such resources are planned for development in the vicinity of HBPP. Therefore, no impact on any of these resources is expected to occur near the HBPP site from ISFSI operation.

The ISFSI will primarily be an in-ground structure and will not be visible from areas accessible to the public except for a small structure, fencing, and lighting, which are all required for site security. These security elements will be in accordance with 10 CFR 73 and will result in minor visual impacts primarily consisting of the visibility of the structures and (nighttime) light glare. However, these minor impacts are considered such because the site is already in an industrial use and the ISFSI project components are small in scale when compared to the site as a whole.

The ISFSI facilities are expected to be a relatively small nonobtrusive characteristic among existing local structures. In summary, the presence of the ISFSI will not have any adverse impact on the natural, scenic, cultural, historical, or other resources in the Humboldt Bay region.

4.2.9 RADIOLOGICAL EFFECTS

Operation of the Humboldt Bay ISFSI will result in exposing operating personnel and the general public to ionizing radiation. Normal operations will bring workers into areas where they will receive radiation exposures. These include the personnel that inspect and service the casks, the security personnel, and the personnel who handle and move the casks to their storage locations. Radiological health impacts from the Humboldt Bay ISFSI routine operations are discussed in detail in the Humboldt Bay ISFSI Safety Analysis Report Sections 7.4 and 7.5.

The radiological impacts are considered to be small. The following is a summary of the information provided in SAR Sections 7.4 and 7.5. Potential effects of radioactive

material releases from the Humboldt Bay ISFSI during postulated off-normal and accident conditions are discussed in ER Section 5.1.

4.2.9.1 Estimated Dose to the General Public

The annual offsite dose rate is calculated for direct radiation (neutrons and gammas) from the Multi-Purpose Canister (MPC). Since the MPC is seal welded, there will not be any release of radionuclides during normal operation and no releases were assumed in the radiological dose analysis in accordance with Interim Staff Guidance-18 (Reference 2). The direct radiation dose rate from the ISFSI is the same for normal and off-normal conditions. Since the loading of the HB HI-STAR occurs at the Refueling Building, inside the 10 CFR 50 structure, the offsite dose due to loading operations will remain within the 25 mrem per year allowable.

The nearest boundary of the owner-controlled area is located approximately 64 ft from the center of the ISFSI. However, the nearest resident is located approximately 811 ft from the center of the ISFSI. Therefore, consistent with ISG-13 (Reference 3), the occupancy time at the controlled area boundary for the direct radiation calculation was assumed to be 2,080 hours based on a 40-hour work week and 52 weeks a year while the occupancy time at the nearest resident was assumed to be 8,760 hours (24 hours a day, 365 days a year).

4.2.9.1.1 Direct Radiation Dose Rates

ER Table 5.1-2 presents the dose rate at the site boundary and the nearest resident from direct radiation.

4.2.9.1.2 Dose Rates From Effluent Releases

Since the MPC is seal welded, in accordance with ISG-15 (Reference 4) there will not be any release of radionuclides during normal operation.

4.2.9.1.3 Off Site Dose Rate from HI-STAR HB Loading Operations

ER Table 5.1-3 presents the dose rates at the site boundary from overpack loading operations.

4.2.9.1.4 Total Offsite Collective Dose

ER Table 5.1-4 presents the maximum annual dose rate at the site boundary and the nearest resident from direct radiation from ISFSI operations. There will be a maximum of 6 loading operations, thereafter the annual offsite dose will be limited to the direct radiation and other uranium fuel cycle operations. This table demonstrates compliance with 10 CFR 72.104.

4.2.9.2 Estimated Dose to Occupational Personnel

Workers at the Humboldt Bay ISFSI will perform the following occupational tasks that can expose them to ionizing radiation: (a) handling (that is transferring and moving) of the spent fuel, (b) security, (c) inspection, and (d) maintenance activities. The results presented in this section are based on the analysis of the HI-STAR HB System using design basis fuel. It was assumed that the HI-STAR HB was loaded with an MPC-HB containing fuel with a worst case highest burnup of 23,000 MWD/MTU and 29 -year shortest cooling time. Humboldt Bay ISFSI SAR Table 7.4-1 provides the estimated occupational exposures to HBPP personnel during the following phases of ISFSI operation:

(1) Loading of the MPC contained in the overpack within the RFB

(2) Decontamination of the overpack and MPC in preparation for storage

(3) Transport of the overpack from the RFB to the ISFSI vault

(4) Transfer of the overpack and MPC from the transporter into the vault

(5) Closing of the vault

In SAR Table 7.4-1 the total duration of the operation is shown, as well as the time the personnel will be located in the higher dose rate areas. Therefore, total dose for each operation is a product of the number of personnel, dose at location, and time in dose field.

The results presented in SAR Table 7.4-1 are conservative. Humboldt Bay ISFSI ER Table 5.1-1 provides the estimated annual occupational exposure as a result of normal ISFSI operation, which includes occasional maintenance repairs, and security activities. This table also demonstrates that the dose rates from the ISFSI storage area in the normally occupied locations are well below the 10 CFR 20 limits for monitored radiation workers and are also below the 10 CFR 20 limit of 500 mrem/year for unmonitored workers. Furthermore, the dose rates are below the 50 mrem/year limit for non-occupational exposure ("members of the public").

4.2.9.3 Effects of Radiation on Wildlife

Humboldt Bay ISFSI radiological impacts on wildlife are discussed in Section 4.2.2.

4.2.10 REFERENCES

1. Draft Environmental Impact Statement for the Construction and Operation of an Independent Spent Fuel Storage Installation on the Reservation of the Skull Valley Band of the Goshute Indians and Related Transportation Facility in Tooele County, Utah, NUREG-1714, June 2000.

2. Interim Staff Guidance Document 18, The Design/Qualification of Final Closure Welds on Austenitic Stainless Steel Canisters as Confinement Boundary for Spent Fuel Storage and Containment Boundary for Spent Fuel Transportation, USNRC, May 2003.

3. Interim Staff Guidance Document 13, Revision 0, Real Individual, USNRC, May 2000.

4. Interim Staff Guidance Document 15, Materials Evaluation, USNRC, January 2001.

4.3 RESOURCES COMMITTED

The construction of the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) will not result in any major irreversible commitment of resources. Development of the ISFSI will require raw materials for the ISFSI vault structure, security building, and road modifications. These raw materials will include cement, sand, aggregate, steel, asphalt, and other building materials. The materials in the concrete and pavement are considered irretrievably committed. Table 4.3-1 lists the estimated quantities of imported material for construction of the Humboldt Bay ISFSI, security building, and other related improvements. These materials are a very small fraction of available supplies in the immediate area.

4.3.1 LAND

The Humboldt Bay ISFSI and related structures and improvements will require approximately 30,396 sq ft of the existing Humboldt Bay Power Plant (HBPP) site, approximately 21,396 sq ft for the ISFSI, security building, and road extension and widening to the ISFSI, and approximately 9000 sq ft for the placement of fill materials or spoils disposal. The environmental effects of ISFSI construction on geography and land use are addressed in ER Section 4.1.1.

4.3.2 WATER

There will be no commitments of waterways or bodies of water involved in the construction of the Humboldt Bay ISFSI. Concrete will come to the ISFSI site premixed therefore water will not used for that purpose. Small amounts of onsite water will be used in dust control, and wash down of some concrete equipment. The environmental effects of ISFSI construction on hydrological resources are addressed in ER Section 4.1.4.

4.3.3 AIR

No local or site air resources will be committed to the construction of the Humboldt Bay ISFSI. The environmental effects of ISFSI construction on air quality are addressed in ER Section 4.1.3.

4.3.4 ECOLOGICAL RESOURCES

The ISFSI and excavation spoils disposal site will create a small irreversible loss of poor quality habitat and associated biological resources. A diligent effort will be made to protect the existing plant community and to keep temporary impacts to a minimum. These temporary impacts will be mitigated through the use of BMPs and the avoidance of locally or regionally significant species or habitats. Wildlife habitat quality is low because of past construction disturbance and routine vegetation management activities. Noise disturbance and increased human activity during the construction period will

temporarily further reduce the value of this area for wildlife. No jurisdictional wetlands within the owner-controlled area have been identified within the immediate area of the ISFSI project, and no impacts to wetlands will occur from the proposed project.

As discussed in Section 4.2.1, once the fuel has been placed into the storage casks and the ISFSI becomes operational, the casks will remain at the ISFSI until the spent fuel can be shipped offsite. The operational activities of the ISFSI will occur within the existing site boundary of HBPP. Therefore, there will be negligible impact on local wildlife or any disturbance to vegetation in the vicinity surrounding the HBPP site as a result of ISFSI operational activities.

4.3.5 CUMULATIVE IMPACTS

The impact of the proposed Humboldt Bay ISFSI, when combined with previously evaluated effects from the HBPP, and when added to the past, present, or reasonably foreseeable future actions in the area is not anticipated to result in any significant cumulative impact at the site. The offsite radiation exposure limits for an ISFSI specified in 10 CFR 72.104(a) explicitly include any contribution to offsite dose from other uranium fuel cycle facilities in the region, of which there are none and none planned. Therefore, no other offsite dose contribution from any source should be included in the evaluation of radiological impacts from the proposed Humboldt Bay ISFSI.

4.4 DECONTAMINATION AND DECOMMISSIONING

4.4.1 PRELIMINARY DECOMMISSIONING PLAN

Prior to the end of the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) life, the Hi-STAR HB casks containing spent fuel elements and GTCC waste will be removed from the vault and transported offsite. Since the casks are designed to meet Department of Energy (DOE) guidance applicable to casks for storage, transport and disposal of spent fuel, the spent fuel will remain sealed in the casks such that decontamination of the casks is not required. Following shipment of the casks off site, the Humboldt Bay ISFSI will be decommissioned by the timely identification and removal of any residual radioactive materials above the applicable Nuclear Regulatory Commission (NRC) limits for unrestricted use; performance of a final radiological survey; releasing the site for unrestricted use in accordance with Regulatory Guide 1.86 (Reference 1), and terminating the NRC license. Details on decommissioning are provided in the Humboldt Bay ISFSI application, Attachment F, "Preliminary Decommissioning Plan." A brief summary is provided in this section.

4.4.2 FEATURES THAT FACILITATE DECONTAMINATION AND DECOMMISSIONING

The sources of contamination are the spent fuel itself and the spent fuel pool water. In conformance with 10 CFR 72.130, the spread of contamination from these sources can be controlled via various ISFSI design features and health physics measures.

The design features of the HI-STAR HB dry cask storage system, plus a "start clean/stay clean" philosophy, will facilitate decommissioning the Humboldt Bay ISFSI. Radioactive materials associated with spent fuel assemblies are contained within multi-purpose canisters (MPCs), which will be seal welded before leaving the refueling building (RFB). The MPC conforms to the requirements of Section III of the ASME code and provides assurance that radioactive material will not be released from the MPC over the life of the Humboldt Bay ISFSI. Health physics measures to ensure MPC external surfaces are maintained in a clean condition are implemented during the MPC loading operations. These measures minimize contaminated fuel pool water from contacting the external surfaces of the MPC. Following fuel loading operations, a swipe survey is performed on the MPC lid and HI-STAR HB cask. Using administrative controls, transport of the HI-STAR HB cask and MPC to the storage vault is not permitted if removable contamination levels exceed NRC requirements. Since the MPCs are sealed to preclude release of radioactive material from inside the MPCs, minimizing contamination on the external surfaces of the MPCs transported to the ISFSI storage vault minimizes the quantity of radioactive waste and contaminated equipment.

The interior design of the HI-STAR HB casks facilitates decommissioning, if necessary. The interior of the casks are made of coated steel thereby making them relatively easy to decontaminate.

Minimal non-radioactive hazardous materials may be used or stored at the Humboldt Bay ISFSI and any that are needed to support the ISFSI operations will be identified and controlled in accordance with procedures. Strict measures will be applied to prevent any hazardous materials from contacting radioactive contamination, so that mixed hazardous and radioactive waste will not be generated at the Humboldt Bay ISFSI.

As shown in the HI-STAR 100 system Final Safety Analysis Report, the overpack would be expected to have only minimal interior or exterior radioactive surface contamination. Any neutron activation of the metal cask walls and neutron shielding is expected to be extremely small, and the assembly would qualify as Class A waste in a stable form based on definitions and requirements in 10 CFR 61.55. As such, the material would be suitable for burial in a near-surface disposal site as Low Specific Activity (LSA) material.

It is also likely that both the overpack and MPC, or extensive portions of both, can be further decontaminated to allow recycle or reuse options. After decontamination, the only radiological hazard the HI-STAR HB system may pose is slight activation of the HI-STAR HB materials caused by irradiation over a 40-year storage period.

4.4.3 COST OF DECOMMISSIONING FUNDING METHOD

10 CFR 72.30(b) requires that the proposed decommissioning plan include a decommissioning cost estimate, a funding plan, and a method of ensuring the availability of decommissioning funds.

The philosophy of operating the Humboldt Bay ISFSI is "start clean/stay clean". Thus, the intention is to maintain the facility free of radiological contamination at all times. During the operational phase of the facility, all radioactive contamination will be removed, if possible, immediately upon its discovery.

A cost estimate has been performed by TLG Services, Inc for HBPP Unit 3. This detailed estimate is contained in the 2002 Nuclear Decommissioning Cost Triennial Proceeding (NDCTP) submitted to the CPUC (Application No 02-03-020) on March 15, 2002. As shown therein, it is estimated that decommissioning the Humboldt Bay ISFSI will cost about $878,000 in 2002 dollars. The major cost contributors are cost of labor and radiological surveys. The costs are based on several key assumptions, including regulatory requirements, estimating methodology, contingency requirements (a 30 percent contingency was assumed), and site restoration requirements.

Pacific Gas and Electric (PG&E) has established external sinking fund accounts for decommissioning HBPP Unit 3, as discussed in the Preliminary Decommissioning Plan and PG&E's Letter HBL-03-002 dated March 27, 2003, Decommissioning Funding Report to the NRC, pursuant to the requirements of 10 CFR 50.75(f). With collection of additional funding that was approved by the CPUC in the 2002 NDCTP filing, these accounts will contain adequate monies for any required nuclear decommissioning activities for the Humboldt Bay ISFSI.

4.4.4 LONG-TERM LAND USE AND IRREVERSIBLE COMMITMENT OF RESOURCES

Following removal of all storage casks from the ISFSI and decontamination of the storage vault, as necessary, these structures and associated areas can be released for unrestricted use.

The security-related structures could be dismantled and removed. The concrete structure above the ISFSI vault could be sectioned and removed, or, alternatively, left in place. In either case, the storage vault area could be covered with top soil and replanted with native vegetation; thus returning the land to its original condition.

The long-term plan will be addressed further in the final decommissioning plan that will be submitted prior to ISFSI license termination.

4.4.5 RECORD KEEPING OF DECOMMISSIONING

The following records will be maintained until the Humboldt Bay ISFSI is released for unrestricted use, in accordance with 10 CFR 72.30(d), and will be used to plan the actual decommissioning efforts:

- Records of spills or other unusual occurrences involving the spread of contamination in and around the facility, equipment, or site. These records will include any known information on identification of nuclides, quantities, forms, and concentrations.

- As-built drawings and modifications of structure and equipment in restricted areas.

- A document, which is updated a minimum of every 2 years, containing: (a) a list of all areas designated at any time as restricted areas as defined in 10 CFR 20.1003; and (b) a list of all areas outside of restricted areas involved in a spread of contamination as required by 10 CFR 72.30(d)(1).

- Records of decommissioning cost estimates and the funding method used.

These records will be stored at HBPP as part of the Records Management System.

4.4.6 REFERENCES

1. Regulatory Guide 1.86, Terminating of Operating License for Nuclear Reactors, USNRC, June 1974.

4.5 RADIOACTIVE MATERIAL MOVEMENT

Cask handling and transfer operations will be conducted totally within the Humboldt Bay Power Plant site boundary, and these onsite operations are discussed in the Independent Spent Fuel Storage Installation Safety Analysis Report. Since offsite transportation of radioactive material is not within the scope of this ER, this section is not applicable.

TABLE 4.1-1 Sheet 1 of 2

BEST MANAGEMENT PRACTICES TO BE USED DURING CONSTRUCTION

Construction Activity	**BMPs to be Implemented**
Containment of sediment-ladened storm water runoff during grading and construction	Drainage ditches will be installed where appropriate.
Dissipation of storm water runoff around the facility boundary.	Box culverts and drainage ditches will be installed where appropriate.
Stabilization of the soils spoils area and cut slopes	Silt fencing and sediment traps will be installed where appropriate. A revegetation program will be developed and implemented.
Fugitive dust controls	Construction watering trucks will be used to periodically wet active construction areas.
All	Construction equipment maintenance and repair will be designated and controlled to prevent the discharge of oils, grease, hydraulic fluids, etc.
All	Waste receptacles and/or trash dumpsters will be placed at convenient locations for the regular collection of waste. Where practicable materials suitable to recycling will be collected. Debris shall, at the earliest opportunity, be disposed of at an appropriate offsite facility.
All	Any construction debris or material present onsite, including construction debris or material subject to removal that could potentially contribute to increased sediment loading, shall be covered and/or contained during precipitation events.
All	If external washing of construction vehicles is necessary, no detergents will be used, and the runoff will be captured in a sediment trap.
All	Adequately maintained sanitary facilities will be provided for all construction crews.
Commute traffic for construction materials on county roadways	Comply with any local regulatory traffic timeframe restrictions.

TABLE 4.1-1 Sheet 2 of 2

Best Management Practices (BMPs) are defined in both Federal and State regulations. The Environmental Protection Agency definition is contained in 40 CFR 122.2, which consists of regulations that address the management of practices that could create water pollution. This definition is as follows:

BMPs: Include schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of waters of the United States. BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

TABLE 4.1-2

VIBRATION CRITERIA

Human Annoyance	
Vibration Type and Permissible Aggregate Duration	**Vibration Limit (rms)**
Sustained (≥ 1 hour/day)	0.01 inch/second
Transient (> 1 hour/day)	0.03 inch/second
Transient (< 10 minutes/day)	0.10 inch/second
Potential Building Damage	
Type of Building	**Vibration Limit (ppv)**
Industrial, heavy office, modern construction	1.0 inch/second
Residential, reinforced	0.15 inch/second
Historic, unreinforced	0.05 inch/second

rms = root-mean-square.
ppv = peak particle velocity.

TABLE 4.1-3

TYPICAL NOISE LEVELS OF CONSTRUCTION EQUIPMENT

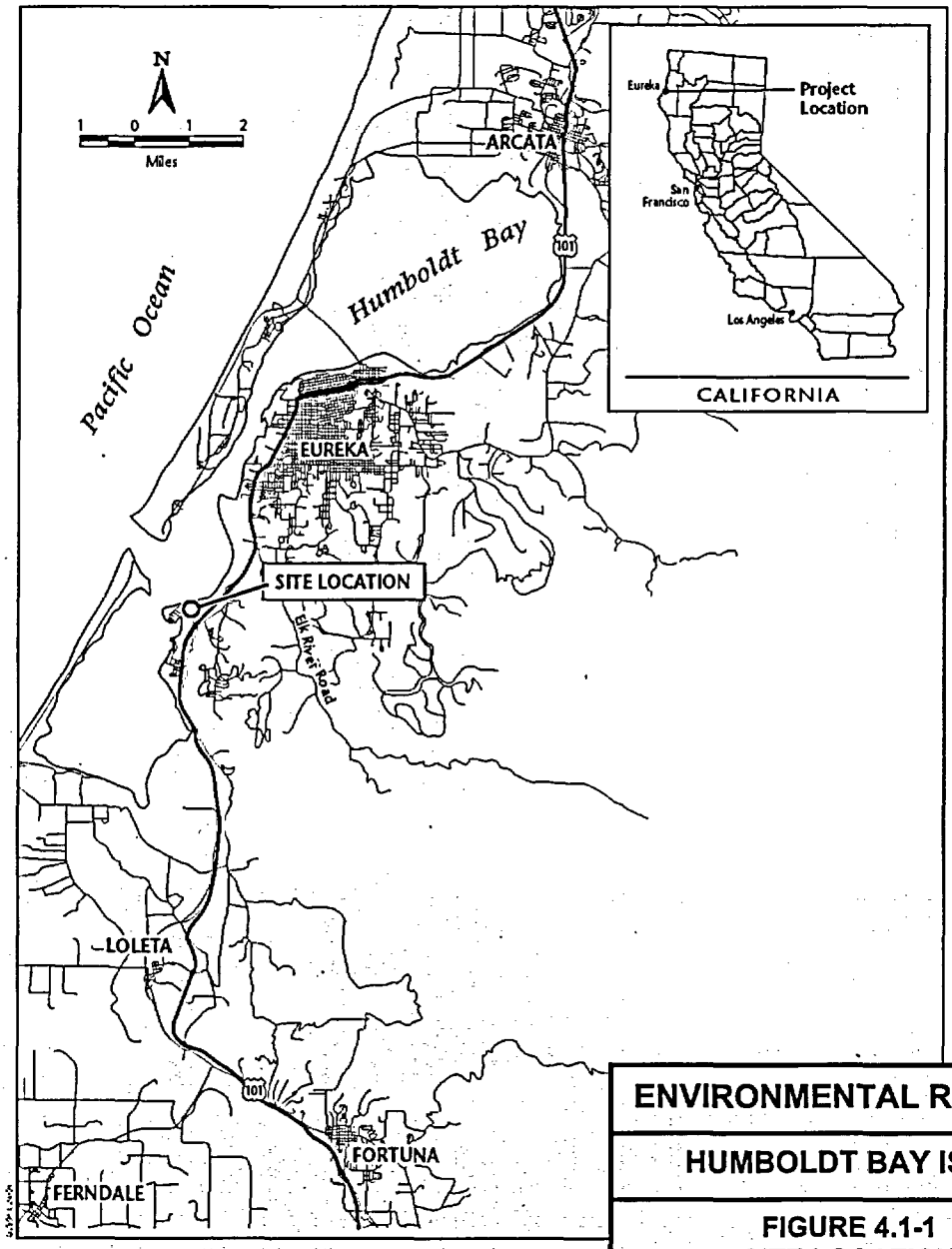
Equipment	Range of Noise Level (dBA) at 50 ft
Earthmoving	
Front loaders	72-84
Backhoes	72-93
Tractors, Dozers	76-96
Scrapers, Graders	80-93
Pavers	86-88
Trucks	82-94
Materials Handling	
Concrete mixers	75-88
Concrete pumps	81-83
Cranes (movable)	75-86
Cranes (derrick)	86-88
Forklifts	76-82
Stationary	
Pumps	69-71
Generators	71-82
Compressors	74-86
Drill Rigs	70-85
Impact	
Pneumatic tools	83-88
Jack hammers and rock drills	81-98
Compactors	84-90

Source: adapted from Magrab (1975) by Wilson, Ihrig & Associates, Inc. (WIA, 1986).

TABLE 4.3-1

IMPORTED CONSTRUCTION MATERIAL QUANTITIES

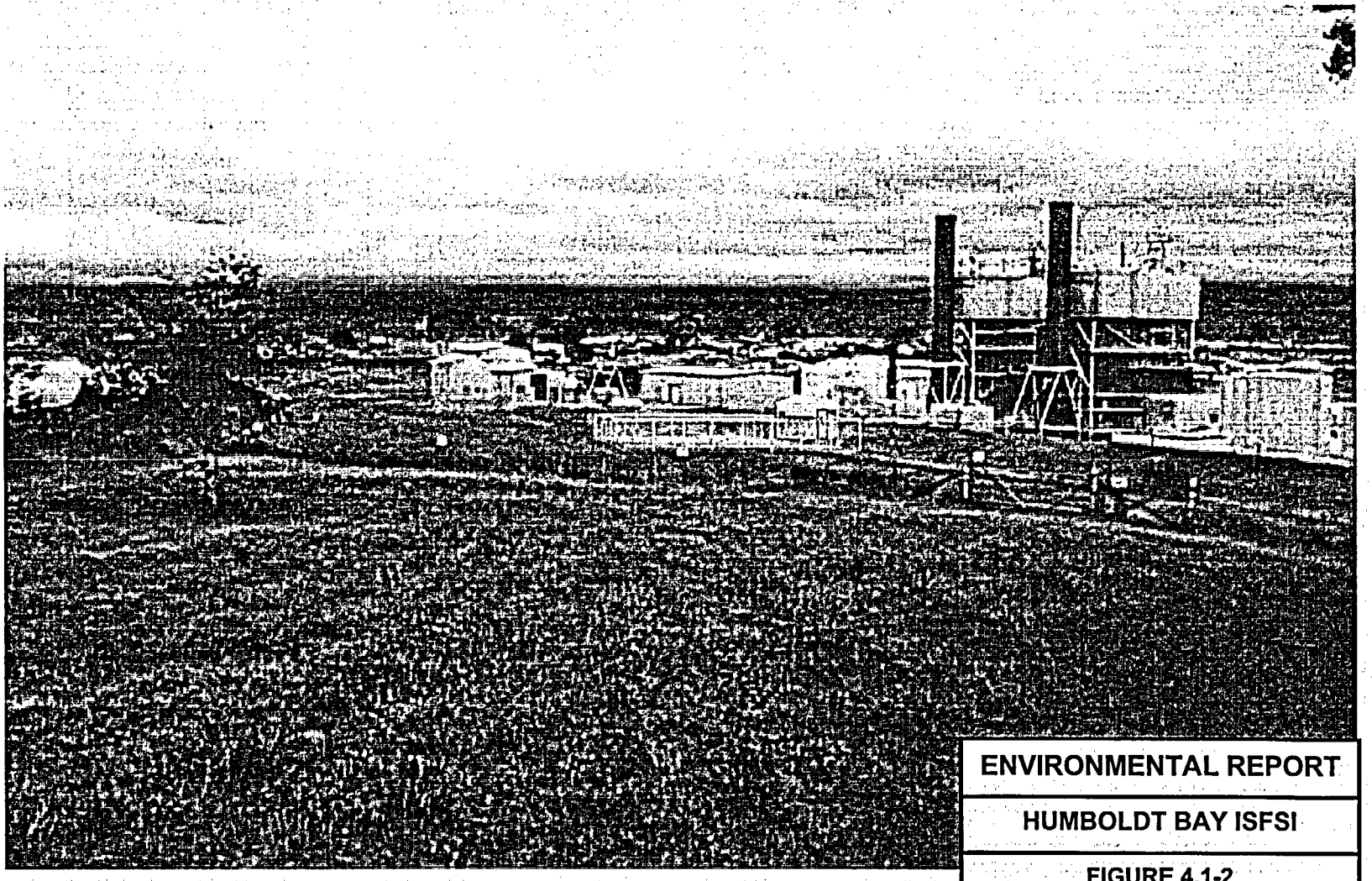
ITEM	QUANTITY
Concrete Aggregates	500 cu yd
Crushed rock grading	<1400 cu yd
Fill materials Structural fill	<500 cu yd
Asphalt paving	375 tons
Steel	50 tons
Lumber	5292 board feet



ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

FIGURE 4.1-1
SITE LOCATION



ENVIRONMENTAL REPORT

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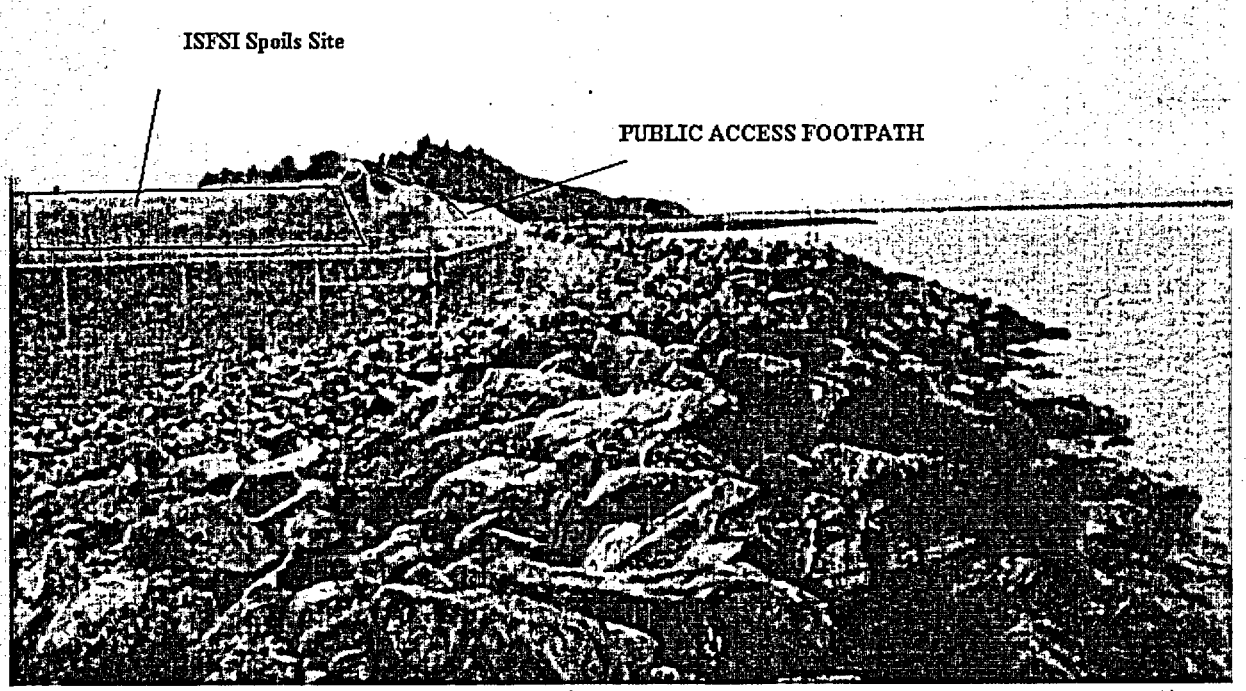
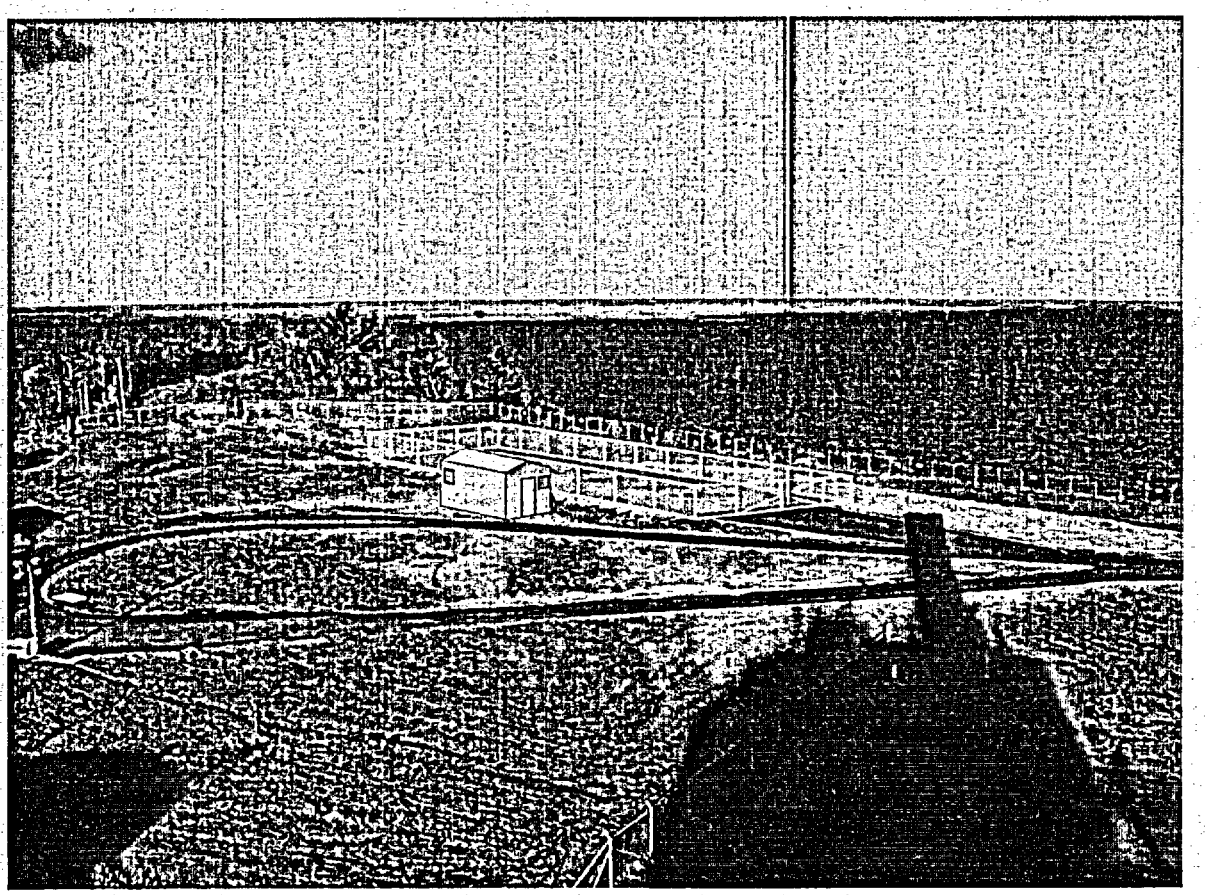
FIGURE 4.1-2
VIEW OF ISFSI FROM THE WEST



ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

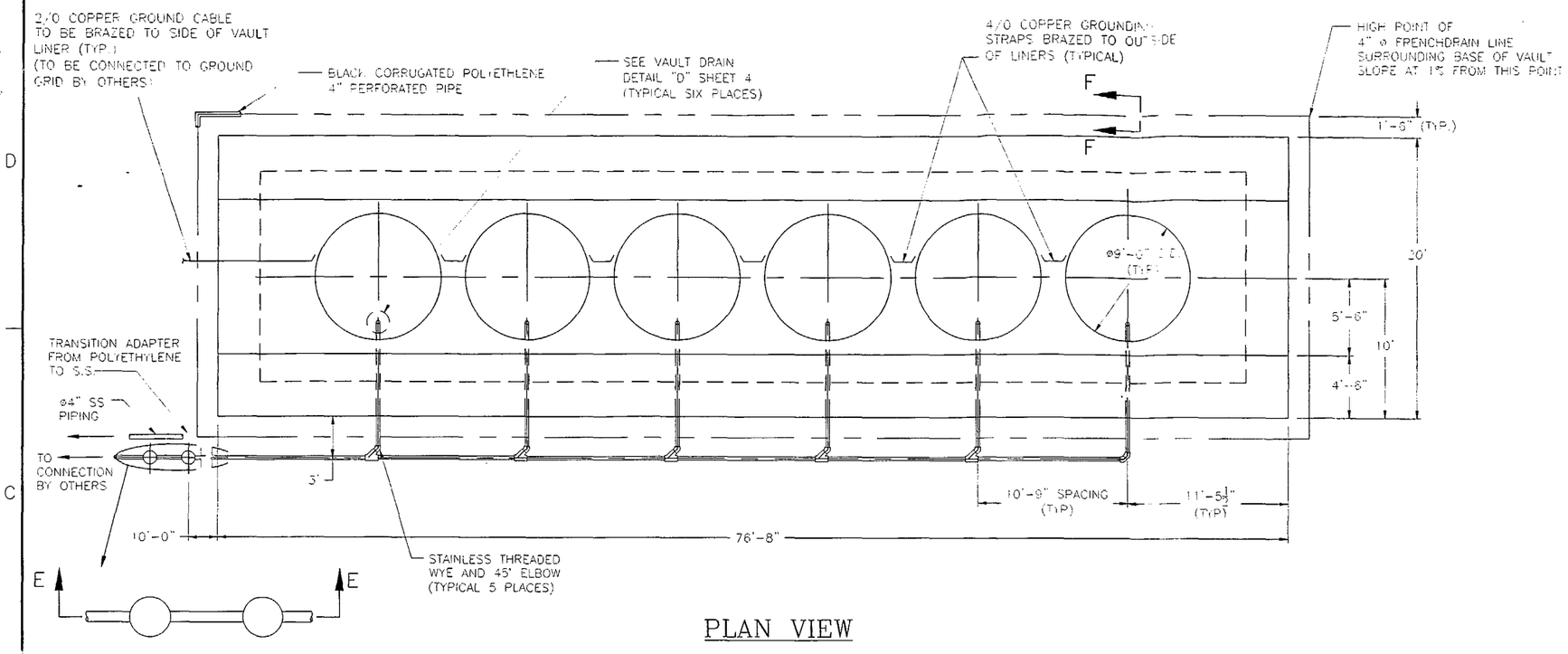
FIGURE 4.1-3
PROPOSED EXCAVATION
SPOILS DISPOSAL SITE



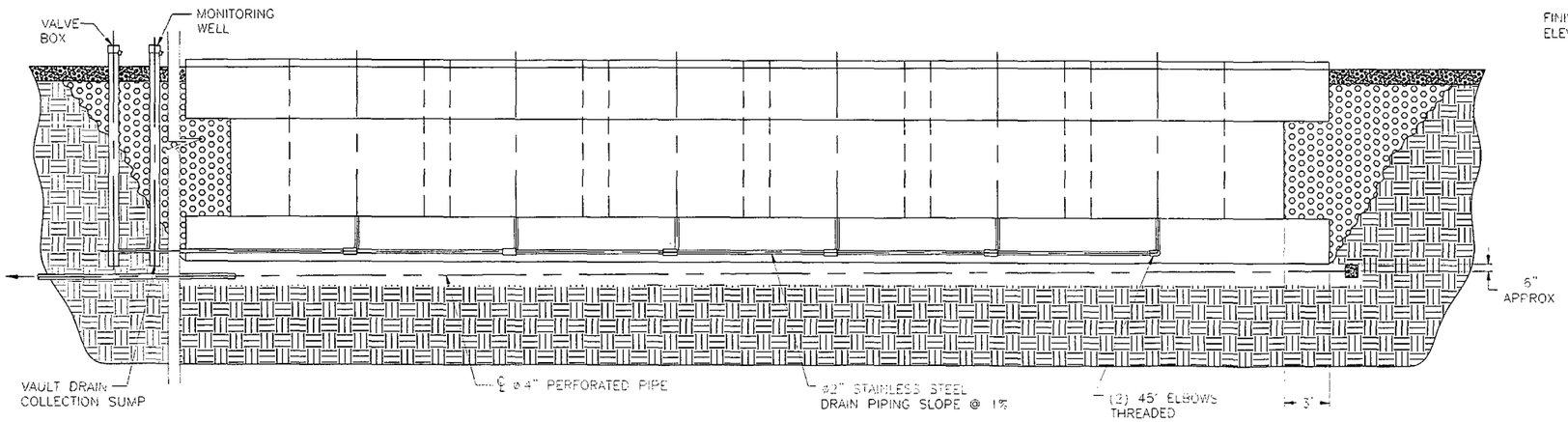
ENVIRONMENTAL REPORT

HUMBOLDT BAY ISFSI

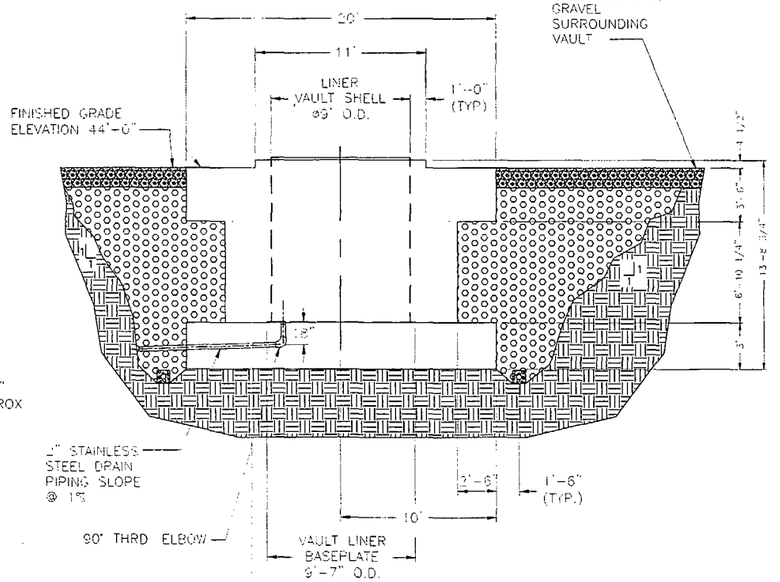
FIGURE 4.2-1
ARTIST RENDITION OF ISFSI FROM AN AERIAL OBLIQUE VIEW



PLAN VIEW



SIDE ELEVATION



END ELEVATION

THE DRAWINGS MUST BE USED IN CONJUNCTION WITH THE APPLICABLE DESIGN DRAWING PACKAGE COVER SHEET WHICH CONTAINS THE APPROPRIATE REVIEWS AND APPROVALS.

HOLTEC INTERNATIONAL
HOLTEC CENTER
555 LINCOLN DRIVE WEST
MARLTON, NJ 08053

CLIENT: ENVIRONMENTAL REPORT HUMBOLDT BAY ISFSI

DESCRIPTION: FIGURE 4.2-2 FRENCH DRAINAGE SYSTEM

PROJECT NO.	COMPANION DRAWINGS	SIZE	DRAWING NO.	SHEET	REV
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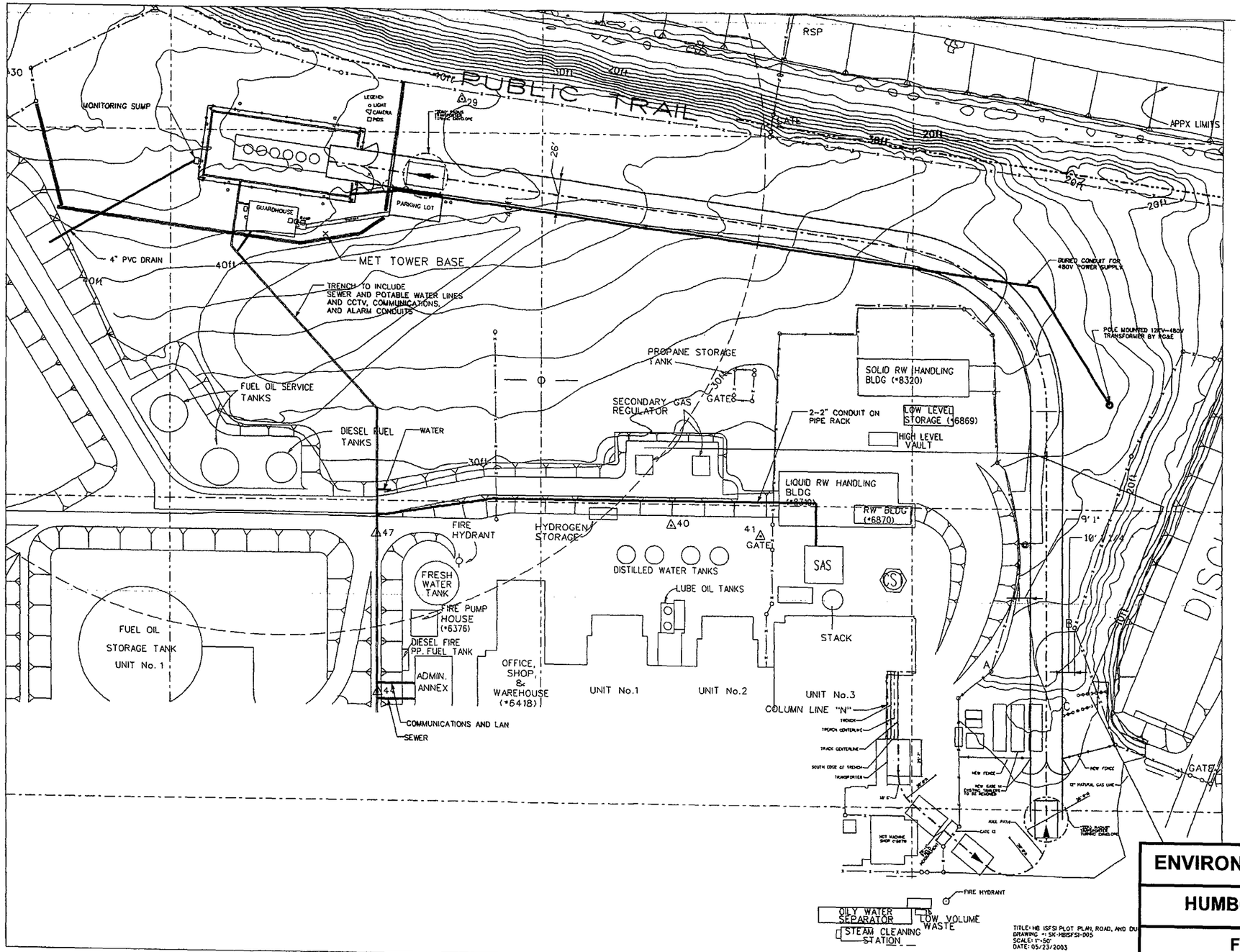

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HUMBOLDT BAY ISFSI

FIGURE 4.2-3
FRENCH DRAINAGE SYSTEM LOCATION

CHAPTER 5

ENVIRONMENTAL EFFECTS OF ACCIDENTS

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CHAPTER 5

ENVIRONMENTAL EFFECTS OF ACCIDENTS

TABLES

CHAPTER 5

ENVIRONMENTAL EFFECTS OF ACCIDENTS

5.1 ACCIDENTS INVOLVING RADIOACTIVITY

The Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) Safety Analysis Report (SAR) addresses the four categories of design events as defined in ANSI/ANS-57.9, which include normal, off-normal, and accident events that are postulated to occur while a loaded storage cask is being moved to the ISFSI storage vault and after the storage cask has been placed in the vault. The four ANSI/ANS-57.9 categories considered in the ISFSI SAR are:

(1) Design Event I: an event associated with normal operations.

(2) Design Event II: an event associated with off-normal operations that can be expected to occur with moderate frequency, or on the order of once during a calendar year of operation of the ISFSI.

(3) Design Event III: an infrequent event that could be reasonably expected to occur over the lifetime of the ISFSI.

(4) Design Event IV: an event that is postulated to occur because it establishes a conservative design basis for systems, structures, and components important to safety.

5.1.1 DESIGN EVENT I

Doses from the Design Event I category are included in the normal routine radiological effects discussion in Environmental Report Section 4.2.9. The annual doses resulting from normal operations and anticipated occurrences at the ISFSI are well below the 10 CFR 72.104 criteria for radioactive materials in effluents and direct radiation. The HI-STAR HB Multi-purpose Canister has a reliable seal-welded confinement boundary in accordance with Interim Staff Guidance-15 (Reference 1) to contain radioactive fission products under all design basis normal, off-normal, and accident conditions. Therefore, in accordance with ISG-18 (Reference 2), no leakage of the MPC confinement boundary is required to be evaluated as either an off-normal or an accident condition.

Table 5.1-1 presents the occupational exposures associated with ISFSI activities. Tables 5.1-2 to 4 present the annual doses at the site boundary and nearest resident from direct radiation for normal ISFSI operations. While Table 5.1-3 demonstrates that the Humboldt Bay ISFSI will meet 10 CFR 72.104 regulatory requirements, ultimate compliance will be demonstrated through the Humboldt Bay Power Plant environmental monitoring program. The actual dose from the ISFSI will be considerably less than the

conservatively estimated values in Table 5.1-4. The following are some of the conservative assumptions used in calculating the dose rates presented:

- The design basis fuel assembly, the design basis operating exposure (burnup) and the design basis post-operation decay (cooling) time were conservatively chosen.
- All fuel assemblies in the MPC are assumed to be identical with the design basis burnup and cooling time.
- The analyzed ISFSI pattern was conservatively chosen to result in the highest offsite dose rate.
- The dose rate was calculated at the most conservative location around the ISFSI.

5.1.2 DESIGN EVENT II

The events designated as Design Event II include a loss of external electrical power, off-normal ambient temperatures, off-normal pressures internal to the MPC, cask drop less than allowable heights, and off-normal transporter operation.

Off-normal operations and accidents could potentially result in members of the general public being exposed to additional levels of radiation or radiological effluents beyond those associated with routine operations. The analyses of potential radiological impacts of off-normal operations and hypothetical accidents are presented in this section only to identify and bound the types of environmental impacts that could accompany these events. A more detailed assessment is included in SAR Chapter 8. None of the credible off-normal operations and hypothetical Design Events II accidents results in any occupational or offsite radiological consequences.

5.1.3 DESIGN EVENTS III AND IV

For the purpose of this evaluation, no distinction is made between Design Events III and IV. Design Events III and IV include events such as earthquakes, tornados and missiles generated by natural phenomena, floods, fire and explosions, lightning, canister leakage under hypothetical accident conditions, storage cask drop or tip-over, and loss of shielding. One of these events (fire) might create situations in which worker personnel and the offsite public could be exposed to higher levels of radiation than normal.

The effects of fires on the cask during transport and storage are bounded by the design basis transporter fire evaluated in the HI-STAR System Final Safety Analysis Report. Section 11.2.3 of the HI-STAR 100 System FSAR describes how the MPC confinement boundary remains intact after a design basis fire.

In the event of a fire accident occurring during transport activities the 100 m controlled area will be maintained. An ISFSI operator would first perform a radiological evaluation and visual inspection to determine the extent of the damage to the overpack and the vault. As appropriate, temporary shielding would be placed around the affected area to reduce dose rates. Therefore no significant offsite dose would occur from a fire during transportation.

5.1.4 REFERENCES

1. USNRC Interim Staff Guidance Document 15, "Materials Evaluation."

2. USNRC Interim Staff Guidance Document 18, "The Design/Qualification of Final Closure Welds on Austenitic Stainless Steel Canisters as Confinement Boundary for Spent Fuel Storage and Containment Boundary for Spent Fuel Transportation."

5.2 TRANSPORTATION ACCIDENTS INVOLVING RADIOACTIVITY

Cask handling and transfer operations will be conducted totally within the Humboldt Bay Power Plant (HBPP) site boundary. Potential accidents involving drops and tipovers during transport of a loaded transfer/storage cask from the HBPP refueling building to the Independent Spent Fuel Storage Installation are considered in Safety Analysis Report Section 8.2.4. It is concluded that such accidents are not credible events.

This section is considered to be non-applicable, as it is believed to apply to accidents associated with offsite transportation of spent fuel in accordance with 10 CFR 71, which is beyond the scope of this Environmental Report.

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TABLE 5.1-1

OCCUPATIONAL EXPOSURES ASSOCIATED WITH ISFSI ACTIVITIES

Activity	Dose Rate (mrem/hr)	Duration (hours/year)	Number of Personnel	Total Annual Dose (rem)
ISFSI walk-downs	0.15	61	1	0.0092
Overpack repairs	0.15	12	2	0.0036

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TABLE 5.1-2

NORMAL OPERATION DOSE RATES AND ANNUAL DOSES AT THE SITE BOUNDARY AND NEAREST RESIDENT FROM DIRECT RADIATION FROM THE HUMBOLDT BAY ISFSI

Location	Dose Rate (mrem/hr)	Occupancy (hours/year)	Annual Dose (mrem)
Site Boundary (53 ft / 16.2 m)	8.16E-03	2080	17.0
Nearest Resident (0.15 mi / 811 ft / 247 m)	5.11E-04	8760	4.48

TABLE 5.1-3

DOSE RATES AT THE SITE BOUNDARY
FROM OVERPACK LOADING OPERATIONS

Condition	Dose Rate (mrem/hr)	Event Duration (hours)	Total Loadings	Total Dose (mrem)
HI-STAR HB movement to ISFSI	0.145	8	6	6.96

TABLE 5.1-4

MAXIMUM TOTAL ANNUAL OFFSITE COLLECTIVE DOSE (MREM) AT THE SITE BOUNDARY AND NEAREST RESIDENT FROM THE HUMBOLDT BAY ISFSI

Direct Radiation	**Overpack Loading Operations**	**Other Uranium Fuel Cycle Operations**	**10 CFR 72.104 Regulatory Limit**
Site Boundary (53 ft / 16.2 m)			
17	6.96	<2	25
Nearest Resident (0.15 miles / 811 ft / 247m) to center of ISFSI			
4.48	1.83	<0.1	25

Note: There will be a maximum of 6 loading operations; thereafter the annual offsite dose will be limited to the direct radiation and other uranium fuel cycle operations.

CHAPTER 6

EFFLUENT AND ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

CONTENTS

CHAPTER 6

EFFLUENT AND ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

6.1 PREOPERATIONAL ENVIRONMENTAL PROGRAMS

The operation of the Independent Spent Fuel Storage Installation (ISFSI) will not generate any chemical, sanitary, or radioactive solid wastes; will not result in liquid or gaseous chemical discharges; and will not release radioactive materials in gaseous or liquid form. However, spent fuel storage in the ISFSI is expected to increase environmental radiation levels in the immediate vicinity of the ISFSI. Therefore, the environmental monitoring program need only assess direct radiation to evaluate the impact of ISFSI operation on the environment. The security building will generate sanitary waste and this will be integrated into the existing sanitary waste system at Humboldt Bay Power Plant (HBPP). Uncontaminated stormwater runoff from the ISFSI and security building area will be directed into the existing runoff pattern at the HBPP site. Further, there will be no releases of radioactive materials in gaseous, liquid, or solid form. Therefore, only the direct radiation portions of the environmental monitoring program needs to be addressed to establish the bases for the evaluation of the impact of ISFSI operation on the environment.

Direct radiation results from the existing Radiological Environmental Monitoring Program (REMP) that is in effect to support SAFSTOR of HBPP Unit 3 will be used as the preoperational program for the ISFSI. Since there are no radioactive effluents from the ISFSI, other radiological monitoring performed for the existing SAFSTOR REMP does not need to be part of the preoperational program for the ISFSI. The existing REMP has been conducted since Unit 3 received approval for the SAFSTOR license in 1986. This program is a modification of the original operational radiological monitoring program for Unit 3, and is described in the Off-site Dose Calculation Manual (ODCM) (Reference 1). Locations of the existing radiation monitoring stations are provided in the ODCM. The results of the REMP can be found in the Annual Facility Status and Survey Report which are routinely submitted to the Nuclear Regulatory Commission.

The existing SAFSTOR REMP provides a base line for making radiological impact evaluations of ISFSI operation. No changes are necessary to the REMP for applicability to the ISFSI. Thus, information from the existing REMP for Unit 3 SAFSTOR is incorporated by reference to establish preoperational conditions for the ISFSI.

6.1.1 REFERENCES

1. SAFSTOR Off-site Dose Calculation Manual (ODCM), Revision 9, April 2, 2003.

6.2 PROPOSED OPERATIONAL MONITORING PROGRAM

The current Humboldt Bay Power Plant (HBPP) SAFSTOR radiological environmental monitoring program will also be used for the Humboldt Bay Independent Spent Fuel Storage Installation operational monitoring program. This program will be augmented to include additional thermoluminescent dosimeters along the ISFSI perimeter fence to record gamma radiation doses. Refer to the HB ISFSI Safety Analysis Report Section 7.3, "Radiation Protection Design Features."

In accordance with Interim Staff Guidance ISG-13 (Reference 1), the environmental monitoring program will reevaluate potential increases in exposure to the real individuals during the term of the license. Compliance with the dose limits in 10 CFR 72.104 will be verified by the environmental monitoring program using direct radiation measurements (TLDs).

Since there are no radioactive effluents from the ISFSI, there will be no other changes to the existing HBPP SAFSTOR Unit 3 radiological environmental monitoring program.

6.2.1 REFERENCES

1. Interim Staff Guidance Document 13, Real Individual, USNRC.

6.3 RELATED ENVIRONMENTAL MEASUREMENT AND MONITORING PROGRAMS

The existing SAFSTOR Radiological Environmental Monitoring Program (REMP) also provides results for radiological monitoring other than for direct radiation Locations and frequency of this monitoring, and analysis of samples, are provided in the Offsite Dose Calculation Manual. The results of the REMP can be found in the Annual Facility Status and Survey Report, which are routinely submitted to the Nuclear Regulatory Commission.

Chapter 7

ECONOMIC AND SOCIAL EFFECTS OF CONSTRUCTION AND OPERATION

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CHAPTER 7

ECONOMIC AND SOCIAL EFFECTS OF CONSTRUCTION AND OPERATION

7.1 BENEFITS

Pacific Gas and Electric (PG&E) Company has evaluated options for the ultimate dismantlement and decommissioning of Unit 3. As a result, PG&E has concluded that decommissioning as soon as possible is the best option. To allow for early decommissioning of Unit 3, an Independent Spent Fuel Storage Installation (ISFSI) must be constructed so that spent fuel can be removed from the spent fuel storage pool (SFP).

Humboldt Bay Power Plant (HBPP) is currently licensed to retain spent fuel in the Unit 3 SFP until 2015. The Department of Energy (DOE) has committed to have a high level waste repository available to receive spent fuel in 2010. With fuel in the SFP, HBPP is required to maintain Unit 3 in the SAFSTOR mode, including maintaining SFP water level and chemistry, as well as controlling Unit 3 liquid and airborne radioactive effluents. Of the approximately 100 employees who currently work on all facilities at HBPP, the equivalent of 65 full time employees is needed to maintain Unit 3 in SAFSTOR. The annual cost to maintain the SAFSTOR mode is approximately $8.3 million in 2002 dollars.

It is expected that operation of the ISFSI will require approximately 10 full time equivalent employees, thus resulting in a reduction of personnel. Estimated annual operating cost for the ISFSI is approximately $2.7 million in 2002 dollars. Assuming spent fuel remains in the ISFSI from 2009 until DOE receives the spent fuel. The annual savings of operation is approximately $5.6 million in 2002 dollars.

Transferring spent fuel from the SFP to the ISFSI allows the dismantlement and decommissioning of Unit 3 to begin in 2009. This will result in a cost savings due to the recent and expected cost increases for low-level radioactive waste disposal and burial.

Storing spent fuel in the ISFSI, instead of the Unit 3 SFP, will provide other benefits indirectly related to cost. For example, maintaining the spent fuel safely in the ISFSI is accomplished without relying on the operation of mechanical equipment. In addition, radioactivity is completely contained in the ISFSI facility, thereby eliminating the generation of radioactive waste or effluents. Also, earlier dismantlement of Unit 3 (in 2009) will allow utilization of the existing staff's experience and expertise. Finally, having spent fuel in an ISFSI provides a measure of security against the possibility of DOE not being able to receive spent fuel at that time. If DOE is not ready to receive spent fuel in 2015, and the HBPP fuel had remained in the SFP, PG&E would have to either: (1) file for an extension of the current SAFSTOR license, (2) try to ship the spent fuel into another ISFSI such as Private Fuels Storage, if one exists, or (3) begin the process of licensing and constructing an Humboldt Bay ISFSI.

7.2 COSTS

The direct costs for the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) include costs for the ISFSI facility plus costs for the casks. Costs for both the facility and casks include the following activities: design, licensing, construction, fuel transfer, maintenance, operation, security, license fees, taxes, and ultimate decommissioning. Direct costs to design, license, construct the ISFSI facility, and procure and load the casks is estimated to be $39.2 million in 2002 dollars. Annual costs for maintenance, operation, security, fees, and taxes are estimated to be approximately $2.7 million in 2002 dollars. Ultimate decommissioning of the ISFSI is estimated to cost $878,000 in 2002 dollars at the end of its life. The costs for licensing and design of the Humboldt Bay ISFSI have been approved by the California Public Utilities Commission and will be funded from the Humboldt Bay Nuclear Decommissioning Trust.

Indirect costs considered include impacts from the environment and social structure, and effect on public land and water use. Because the ISFSI is located on the same site as the existing HBPP operating units, there are no indirect costs associated with replacing the storage of spent fuel from the Unit 3 spent fuel storage pool into the ISFSI.

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CHAPTER 8

SITING DESIGN AND ALTERNATIVES

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SITING DESIGN AND ALTERNATIVES

8.1 SITING ALTERNATIVES

8.1.1 SITE SELECTION CRITERIA

Site evaluation factors were developed based on Independent Spent Fuel Storage Installations (ISFSI) license applications of other utilities and discussions with vendors holding Nuclear Regulatory Commission licenses for spent fuel storage casks. The site selection process consisted of three steps: (1) initial evaluation of potential sites, (2) detailed evaluation of potential sites, and (3) selection of the ISFSI location after extensive additional data were collected. The following site selection attributes were used in evaluating the potential sites.

8.1.1.1 Area Requirements

The site of the ISFSI should be adequate to accommodate the required number of storage casks with provisions for a storage vault, space for handling of casks, radiological separation zones, and space necessary to meet security requirements.

8.1.1.2 Geological/Geotechnical Requirements

The specific selection criteria included the following:

- Geologic hazards: The site should be free of known and potential geologic hazards, including landslides, debris flows, and coastal retreat.
- Flood hazards: The site should avoid marine storm surge areas, and tsunami inundation areas.
- Foundation conditions: The site should have suitable foundation properties (for example, bearing capacity, freedom from liquefaction).
- Access: The site should have suitable access and acceptable roadway grade and stability.
- Topography: The site should require minimal grading requirements and avoid steep topography.

8.1.1.3 Transportation Access

The grade of the access road to be used for transport of the casks should not exceed approximately 8 percent. The width of the transfer route should be no less than 30 ft.

8.1.1.4 Effect on Existing Site Facilities

The disruption to existing plant facilities should be evaluated. If any of the existing facilities, including their underground utilities, need to be relocated, the effect of their relocation on cost and plant operation should be evaluated. Impact on the dismantlement of Unit 3 is a factor.

8.1.1.5 Operational Impact

The site should be located near the power plant for ALARA and operational efficiency considerations. Fuel transport distance and time from the Humboldt Bay Power Plant (HBPP) refueling building to the ISFSI should be minimized.

8.1.1.6 Environmental Impact

The selected site should minimize environmental impacts at HBPP. To the extent possible, the site should be in a previously developed area to minimize new construction and operations impacts as well as new impacts on visual and cultural resources.

8.1.1.7 Cost impact

The site should be cost effective with regard to both public health and safety and environmental considerations. The cost evaluation should consider life cycle costs.

8.1.2 INITIAL SITE EVALUATION

Numerous potential sites on the HBPP plant site were initially considered for the location of the ISFSI. Some of these potential sites were eliminated during screening because they were located too close to the operating facilities, were in unsuitable geological areas (swampy terrain), or were too close to publicly accessible areas. Five candidate sites were selected for additional study using the criteria defined above in Section 8.1.1 (see Figure 8.1-1 for location of candidate sites). These sites are as follows:

- S-1: Site S-1 is a relatively flat area northwest of the main plant site. This area was selected because it is outside the operational area of the operating units.

- S-2: Site S-2 is in the Unit 2 fuel oil storage tank area, and was selected because of its proximity to the power plant, and does not interfere with plant operations. This also fits in well with a planned decommissioning of the Unit 2 oil tank.

- S-3: Site S-3 is in the Unit 1 fuel oil storage tank area, and was selected because of its proximity to the power plant, and does not interfere with

plant operations. This option was selected as an alternate if it was decided to decommission the Unit 1 oil tank versus the Unit 2 tank.

- S-4: Site S-4 is located on a relatively flat area northwest of the plant at a higher elevation. This site is free from any known or potential geologic or flood hazard

- S-5: Site S-5 is located immediately east of Unit 3. This location has the advantage of being near the unit, making a very short, flat transport route, and is founded on competent soils.

8.1.3 EVALUATION OF CANDIDATE SITES

All of the candidate sites are located within the existing plant site boundary, which has been previously disturbed for plant activities. Therefore, all of the sites have similar environmental settings.

Sites S-1, S-2, and S-3 are all low lying locations on the south western side of the property. They are all close to the Buhne Point fault, which increases the susceptibility to seismic-induced loadings, and at elevation +12 ft, are susceptible to tsumani effects. They also interfere with oil tankage operations from a radiation dose perspective.

S-5 has similar tsunami issues as it also is at the +12 ft elevation, however it is better from a seismic perspective. It does however, present an impediment to dismantlement of HBPP Unit 3. In addition, the low-lying location of the above four locations poses an issue with the vault design since the bottom of the vault would be below the normal water table.

Site S-4 is a better site from the perspective of the above issues: (1) the elevation is sufficient to minimize tsunami effects; (2) the vault is above the water table; and (3) the distance from all known faults is maximized. Site S-4 also places the fossil operating units outside the 100-meter isolation zone, which limits impacts on the fossil units operations.

8.1.4 SITE EVALUATION CONCLUSIONS

Geologic and geotechnical investigations were conducted at the five candidate sites to evaluate their feasibility as a location for the Humboldt Bay ISFSI. Site S-4 was assessed as the preferred site because no adverse geologic or geotechnical conditions that would preclude development of the facility were identified. In addition, the site is an area that was previously disturbed during the original HBPP construction and on-going HBPP operational activities. Much of the site is already developed, thus minimizing any new environmental impacts. The site was also judged acceptable under the other siting selection criteria.

8.2 DESIGN ALTERNATIVES

8.2.1 ALTERNATIVE ACTIONS

8.2.1.1 No Action

The purpose of the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) is to provide spent fuel storage so that spent fuel can be removed from the Humboldt Bay Power Plant (HBPP) Unit 3 spent fuel pool and stored until it can be moved to a permanent federal repository. An ISFSI will permit the dismantling of the existing radioactive reactor structures, thereby providing for earlier conversion/decommissioning of the HBPP Unit 3 facility to unrestricted use and termination of the SAFSTOR license. In contrast with the current wet storage method, dry storage is a passive storage process, which does not require extensive operating equipment or personnel to maintain. Therefore, the cost to continue to store the fuel in the existing wet storage is more expensive than dry storage in an ISFSI. Also, the dry storage process will reduce the amount of effluents generated by the existing SAFSTOR operation. In addition, the amount of solid radioactive wastes generated will be reduced. It will also reduce risk from seismic events, which while they would have no public health and safety consequences, could have significant economic impact. Accordingly, the "no action" alternative is not the preferred approach.

8.2.1.2 Ship Fuel to a Permanent Federal Repository

This is the Pacific Gas and Electric (PG&E) Company's preferred solution to storage of spent fuel from HBPP Unit 3. However, a permanent federal repository will not be available in a timeframe consistent with the spent fuel storage needs of HBPP Unit 3. Department of Energy (DOE) is currently working to develop a repository as required by the Nuclear Waste Policy Act of 1982, as amended in 1987. DOE is evaluating a site at Yucca Mountain, Nevada, to determine if it is a suitable location for a high-level radioactive waste repository. Currently, DOE does not anticipate having a licensed repository ready to receive spent fuel any earlier than 2010. Although DOE recommended that a monitored retrievable storage (MRS) facility be constructed and in operation by 1988, the NWPA prohibits siting an MRS before obtaining a construction permit for the permanent repository. Given the uncertainties of schedules for either a repository or an MRS, this alternative does not meet the needs of PG&E to store HBPP Unit 3 spent fuel.

8.2.1.3 Ship Fuel to a Reprocessing Facility

There are no operating commercial reprocessing facilities in the United States nor is there the prospect for one in the foreseeable future. Reprocessing facilities are in operation in other countries (e.g., United Kingdom, France, Germany, and Japan); however, the shipment of domestic spent fuel to a foreign country for storage or disposal involves a number of political, legal, and logistical uncertainties. This is not considered a viable alternative.

8.2.1.4 Ship Fuel to a Private Spent Fuel Storage Facility

There are no private licensed storage facilities available at this time to provide for interim storage of spent fuel and other radioactive materials from HBPP Unit 3. However, several utilities have formed the Private Fuel Storage LLC (PFSLLC) to construct a privately owned ISFSI that will store spent fuel from several nuclear plants at a central site. This ISFSI, called the Private Fuel Storage Facility (PFSF), will be located on the Skull Valley Indian Reservation in Utah. The PFSLLC has entered into a lease agreement with the Skull Valley Band of Goshute Indians for the site.

The PFSF would incorporate the dry cask storage technology, including the HI-STAR system, which is currently in use or proposed for use at several operating nuclear power plants. The construction and operation of the PFSF is therefore a potential substitute for building individual onsite ISFSIs at various nuclear power plant sites. Presently, there is no assurance the project will be successfully licensed and built. Moreover, even if the PFSF were available, this alternative would involve an extra offsite shipment of the spent fuel for ultimate disposal at a DOE repository. This is not considered a viable alternative at this time.

8.2.1.5 Ship Fuel to Another Nuclear Power Plant

This alternative would involve shipping the HBPP Unit 3 spent fuel to another nuclear power plant with sufficient storage capacity. The other utility would have to be licensed for and agree to accept the HBPP Unit 3 spent fuel. Since all the power reactor operators are expected to face spent fuel pool storage shortfalls, they are not expected to be willing to reduce their own storage capacity. No reactor licensees have requested approval from the NRC to accept spent fuel from a reactor site owned by another company, and no proposals for such requests have been identified to date. Shipment to the Diablo Canyon Power Plant (DCPP), a site owned by PG&E, is not allowed by DCPP's license. Even if DCPP's license allowed shipment of HBPP Unit 3 spent fuel to DCPP, this alternative would involve an extra offsite shipment of the spent fuel for ultimate disposal at a DOE repository. Therefore, this is not considered to be a viable alternative.

8.2.1.6 Conclusions

In conclusion, the preferred alterative is on-site dry cask storage at the HBPP site. PG&E will continue to evaluate the availability of the alternative methods to store spent fuel as discussed in Section 8.2.

8.2.2 ALTERNATIVE DRY STORAGE DESIGNS

8.2.2.1 Dry Cask Storage Systems

PG&E evaluated proposals from five different vendors for the Humboldt Bay ISFSI. The fuel storage systems evaluated were all dry storage systems and included:

- Canister-based dual purpose systems suitable for both storage and eventual offsite shipment
- Horizontal and vertical concrete vault systems suitable only for storage

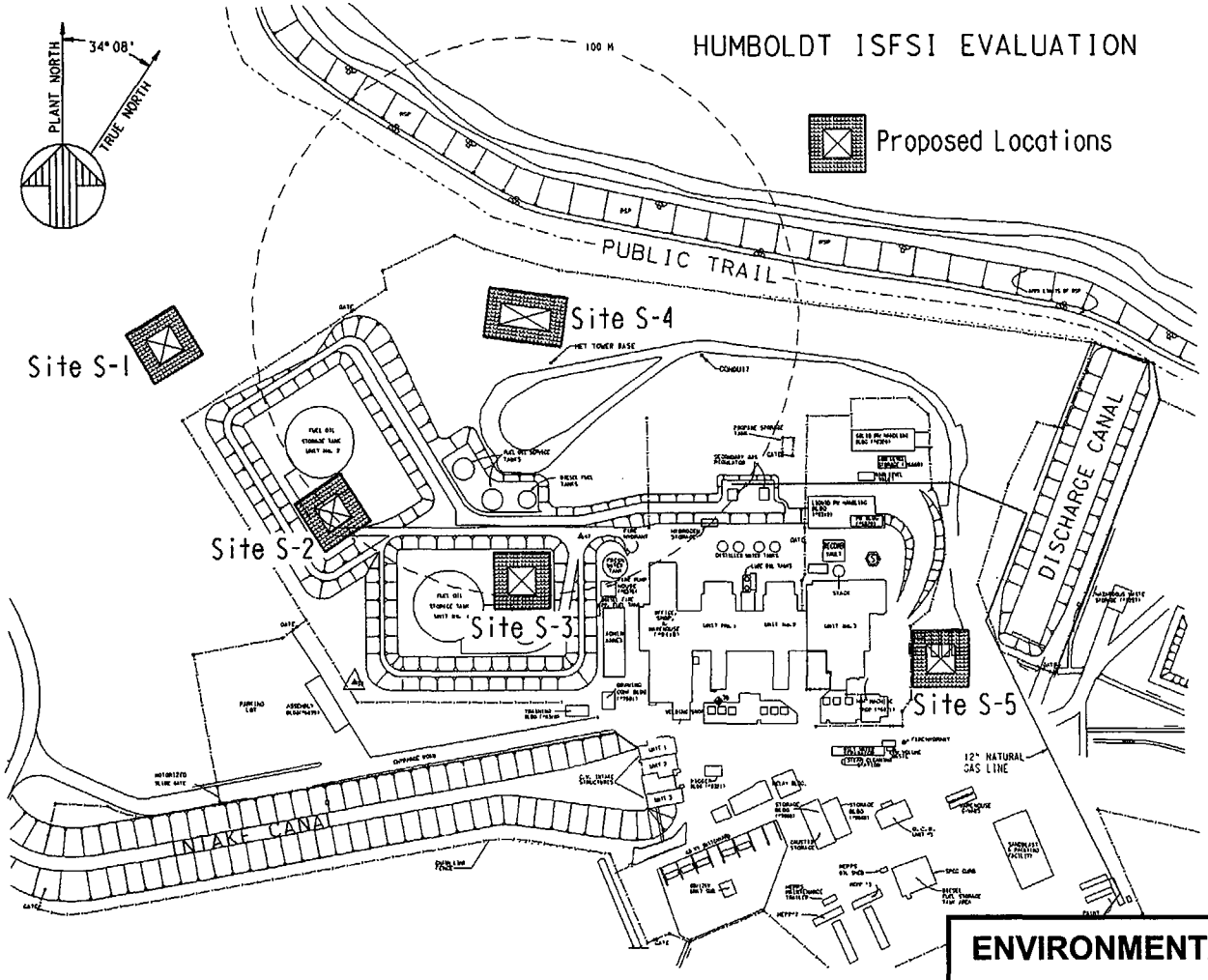
PG&E's evaluation process compared the various designs based on a number of factors including:

- Compatibility with the proposed site
- Potential radiation exposure
- Effects of postulated off-normal events
- Regulatory compliance and licensing issues
- Cost and other commercial considerations
- Engineering/licensing capability of the vendor

Based on this evaluation, PG&E selected the HI-STAR system designed by Holtec International for the storage of their spent fuel. The HI-STAR system is a high-seismic storage system that can be installed in an in-ground storage structure. Since the HI-STAR system is also licensed under 10 CFR 71, it is capable of being used to ship the spent fuel offsite without further transferring of the fuel to another overpack.

8.2.2.2 Storage Structure

PG&E evaluated alternative storage structures consisting of a pad design and a vault design. The vault design was selected since it provides a more robust structure to resist the seismic and tsunami loadings and site industrial hazards and maximum shielding for minimizing radiation exposures to the public and plant workers.



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HUMBOLDT BAY ISFSI

FIGURE 8.1-1
LOCATION OF
CANDIDATE SITES

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CHAPTER 9

ENVIRONMENTAL APPROVALS AND CONSULTATION

CHAPTER 9

ENVIRONMENTAL APPROVALS AND CONSULTATION

9.1 PERMITS AND LICENSES

In addition to approval from the Nuclear Regulatory Commission (NRC), various other permits and licenses will be required during the design, licensing, construction, and operation of the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI), as described below. This Environmental Report (ER) addresses the relevant requirements of 10 CFR 51, which implements the requirements of the National Environmental Policy Act of 1969 (NEPA), the State of California Environmental Quality Act (CEQA). This report also addresses the requirements of the California Coastal Act of 1976.

9.1.1 LOCAL AND COUNTY/REGIONAL

The local and county/regional permits and filings required to build and operate the Humboldt Bat ISFSI are described in Section 9.2 of this ER.

9.1.2 STATE OF CALIFORNIA

The State of California permits and associated permitting process necessary to authorize construction and operation of the Humboldt Bay ISFSI are described in Section 9.3 of this ER.

9.1.3 FEDERAL GOVERNMENT

The NRC is the primary federal agency having jurisdiction over the Humboldt Bay ISFSI. The NRC as the lead agency will review the application for consistency with NEPA. Pacific Gas and Electric (PG&E) Company has consulted periodically with the NRC prior to submittal of the license application. Such consultation will continue throughout licensing, construction and operation of the Humboldt Bay ISFSI. PG&E will also comply with the federal Occupational Safety and Health Administration (OSHA) requirements during construction. In California, the California OSHA (CalOSHA) enforces all federal and state requirements. PG&E will consult with CalOSHA as appropriate.

Listed below are other federal agencies that may be required as determined by the lead agency to review the application:

U.S. Army Corps of Engineers
U.S. Fish and Wildlife Services
U.S. Environmental Protection Agency

9.2 LOCAL AND COUNTY/REGIONAL

The State of California requires that Pacific Gas and Electric (PG&E) Company obtain a California coastal development permit for construction of the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI). Under the application of the coastal development permit, the ISFSI construction project must comply with the California Coastal Act of 1976, the California Environmental Quality Act regional agency requirements and all applicable county environmental ordinances and regulations, as described in the County of Humboldt General Plan, for all aspects of the ISFSI other than radiological health and safety, which are within the jurisdiction of the Nuclear Regulatory Commission (NRC).

An application for a coastal development permit is filed with the California Coastal Commission (CCC). The CCC acts as the lead agency on behalf of the state to review the application for the coastal development permit. These requirements are addressed in Section 9.3.

9.2.1 NORTH COAST REGIONAL WATER QUALITY CONTROL BOARD

The North Coast Regional Water Quality Control Board (NCRWQCB) regulates discharges of industrial wastewater and of stormwater into receiving waters (for Humboldt Bay Power Plant (HBPP)). All discharges from HBPP are currently regulated by waste discharge requirements (subject to 5-year renewals) issued by the NCRWQCB under the federal National Pollutant Discharge Elimination System (NPDES) program. The site-specific permit (Permit No. CA 0005622) contains numerical effluent limits for pollutants associated with industrial activities at the HBPP. Monitoring of industrial wastewater and stormwater flows is conducted and is reported to the NCRWQCB. The NCRWQCB will be notified of the project and any modifications to stormwater discharges at the site due to construction or operation. If the affected area exceeds one acre in size, HBPP will obtain a General Permit for Stormwater Discharges for Construction Activities and comply with its provisions during the construction period. Following construction regulation of stormwater runoff from the ISFSI site will be incorporated into the existing HBPP NPDES permit and stormwater runoff will be managed in accordance with appropriate Best Management Practices (BMPs).

A BMP Plan assessing the potential for discharges of material (e.g., suspended solids) from the ISFSI and specifying applicable measures to mitigate pollutant discharge will be prepared as a condition of the General Permit. There will be no potential for industrial pollutants in the discharges as hazardous materials will not be used and hazardous wastes will not be generated at the site following construction.

9.2.2 NORTH COAST UNIFIED AIR QUALITY MANAGEMENT DISTRICT

The North Coast Unified Air Quality Management District (NCUAQMD) has permit authority under the California Clean Air Act over emission sources at the site. HBPP currently is permitted by the NCUAQMD under the Title V Federal Clean Air Act permit program for all activities at the site (Permit No. NCU-059-12). Although the NCUAQMD will not require specific permits for activities associated with construction of the ISFSI, the general provisions of the permit (e.g., public nuisance, visible emissions) will apply to the site. The California State Air Resources Board (CARB) regulates statewide emissions from portable sources. Since the ISFSI project's emissions sources will be construction equipment (e.g., bulldozers, portable generators, etc.) brought onsite temporarily, the CARB will require permits, as necessary, for these individual sources of emissions. PG&E will contractually require vendors supplying the equipment to obtain the necessary permits from the CARB.

9.2.3 HUMBOLDT COUNTY DEPARTMENT OF ENVIRONMENTAL HEALTH

HBPP is currently required to file a Hazardous Materials Business Plan under California Health and Safety Code Division 20, Chapter 6.95 for all activities at the site. The movement of radioactive material from the pool to storage at the ISFSI will require a revision to the Plan.

9.2.4 OTHER LOCAL AGENCIES

9.2.4.1 County of Humboldt Building Department

PG&E must also obtain a building permit and a grading permit from the County of Humboldt Building Department for the construction of the ISFSI. Neither permit will be issued until a coastal development permit is approved for the construction of the ISFSI.

The Humboldt Fire District No. 1 provides input through the county building department.

9.3 STATE OF CALIFORNIA

The major California State regulations applicable to the Humboldt Bay Independent Spent Fuel Storage Installation (ISFSI) are the California Environmental Quality Act (CEQA) and the California Coastal Act. These requirements are described in the following sections. The California Coastal Commission (CCC) is the lead agency for evaluating compliance with CEQA and the Coastal Act.

9.3.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT

CEQA requires that all projects that may impact the quality of the environment be reviewed by the appropriate governmental agency and that either an environmental "Negative Declaration" be issued stating the reasons that a project will not have a significant effect on the environment or that an environmental impact report be required which identifies significant effects on the environment, identifies alternatives to the project, and indicates the manner in which those significant effects can be mitigated or avoided. CEQA is equivalent to the federal National Environmental Policy Act of 1969.

The lead state agency for this project is the CCC. The CCC will review the proposed project to ensure that it is consistent with the requirements of CEQA.

CEQA prohibits approval of a proposed development if there are feasible alternatives or feasible mitigation measures available that would substantially lessen significant impacts that the activity may have on the environment. The ISFSI project incorporates measures as described in this Environmental Report (ER) to avoid any significant environmental effects from the construction or operation of the ISFSI. Additionally Pacific Gas and Electric (PG&E) has determined storing HBPP spent fuel in on-site dry cask storage is the preferred alternative since it has the least impact on the environment. Therefore, PG&E believes that the proposed Humboldt Bay ISFSI project is consistent with the resource protection policies of CEQA.

9.3.2 CALIFORNIA COASTAL ACT

Principal requirements of the Coastal Act applicable to the construction and operation of the Humboldt Bay ISFSI are identified and addressed in Appendix A of this ER.

9.3.3 OTHER STATE AGENCIES

The California Department of Fish and Game provides input through the Coastal Commission.

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APPENDIX A
STATEMENT OF COMPLIANCE WITH THE
CALIFORNIA COASTAL ACT OF 1976

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APPENDIX A
STATEMENT OF COMPLIANCE WITH THE CALIFORNIA COASTAL ACT OF 1976

The following is a discussion of the proposed project's compliance to the California Coastal Act of 1976 (CCA). This discussion will identify only those sections of the Act, which are pertinent to the proposed project and how the project will comply with those sections.

Section 30211:

> *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

The nearest public access to coastal waters or recreational areas is shown in Figures 4.1-3 and 2.1-2 of this Environmental Report (ER). This access is a footpath to a breakwater that is occasionally used for fishing. There is no public access to the beach through the Humboldt Bay Power Plant (HBPP) site.

10 CFR 72.106 requires a minimum distance from the spent fuel handling and storage facilities to the nearest boundary of the controlled area shall be at least 100 meters. 10 CFR 72.106 allows the controlled area to be traversed by a highway, railroad, or waterway, so long as appropriate and effective arrangements are made to control traffic and to protect public health and safety. This requirement addresses, in part, public safety. The proposed construction activities are wholly within the existing HBPP site; however, a public trail to access a breakwater for fishing transects the Pacific Gas and Electric (PG&E) Company property and traverses the 100-meter Independent Spent Fuel Storage Installation (ISFSI) control area as shown in Figures 4.1-3 and 2.1-2. It is the intent of the project sponsor to not adversely impact this public access. Therefore, public access to, and recreation activities on the breakwater adjacent to the HBPP will not be restricted in any way by the proposed project, except during ISFSI activities that require limited access within the 100-meter control area. Those ISFSI activities that require limiting access to the public trail will be for short time periods during cask movement or handling evolutions. These evolutions will occur primarily during the initial transport of the storage casks to the facility and potentially not again until the casks are transported off site to the U.S. Department of Energy (DOE) repository. The public trail may also be closed if necessary as a precautionary measure during an ISFSI emergency event. As such, the proposed project will have a less than significant effect on public access and recreation areas. The proposed project is in compliance with this section of the CCA.

Section 30214(a):

The public access policies of this article shall be implemented in a manner that takes into account the need to regulate the time, place, and manner of public access depending on the facts and circumstances in each case including, but not limited to, the following:

(1) Topographic and geologic site characteristics.

(2) The capacity of the site to sustain use and at what level of intensity.

(3) The appropriateness of limiting public access to the right to pass and repass depending on such factors as the fragility of the natural resources in the area and the proximity of the access area to adjacent residential uses.

(4) The need to provide for the management of access areas so as to protect the privacy of adjacent property owners and to protect the aesthetic values of the area by providing for the collection of litter.

As discussed above, 10 CFR 72.106 requires a 100-meter control area around the ISFSI facility. This requirement addresses, in part, public safety, rather than the (environmental) issues discussed in this section of the CCA. The proposed construction activities are wholly within the existing HBPP site; however, a public trail to access a breakwater for fishing transects the PG&E property and traverses the 100-meter ISFSI control area. It is the intent of the project sponsor to not adversely impact this public access. Therefore, public access to, and recreation activities on the breakwater adjacent to the HBPP will not be restricted in any way by the proposed project, except during ISFSI activities that require limited access within the 100-meter control area. Those ISFSI activities that require limiting access to the public trail will be for short time periods during cask movement or handling evolutions. These evolutions will occur primarily during the initial transport of the storage casks to the facility and potentially not again until the casks are transported off site to the DOE repository. The public trail may also be closed if necessary as a precautionary measure during an ISFSI emergency event. As such, the proposed project will have a less than significant effect on public access and recreation areas. The proposed project is in compliance with this section of the CCA.

Section 30220:

Coastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.

As with Sections 30211 and 30214(a), this section applies to the public trail, which traverses the PG&E property and 100-meter control area around the ISFSI facility. As discussed above, the project sponsor intends not to adversely impact public access in

the area as a result of the proposed project. Access along the trail will only be curtailed during the transport of the casks, which would be a relatively brief curtailment. The public trail may also be closed if necessary as a precautionary measure during an ISFSI emergency event. Such curtailment would be in compliance with 10 CFR 72.106 and out of concern for public safety. As such, the proposed project will have a less than significant effect on public access and recreation areas. The proposed project is in compliance with this section of the CCA.

Section 30230:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

The proposed project will be located on land that is currently occupied by the HBPP, which is an existing and disturbed industrial site with no onsite biological resources. PG&E owned land in the vicinity of the ISFSI was inventoried for threatened or endangered species in July 1999 and July/August 2002 as required by Nuclear Regulatory Commission (NRC) regulations. No state or federally-proposed or listed threatened or endangered aquatic species have been identified within the immediate ISFSI area. The project site is devoid of suitable habitat for these special status species. The reviewer is referred to Section 2.3 of this ER for a more detailed discussion of biological resources.

The project will result in no impacts to environmentally sensitive habitat areas near the site. In addition, any noise resulting from project activities will be short term and typical for a commercial construction site. Therefore, the construction of a temporary dry storage facility for HBPP spent fuel will have no noise impacts upon any endangered or threatened species, nearby environmentally sensitive habitat areas, or marine resources.

The reviewer is referred to the discussion of Section 30231 below with regard to project-related water runoff. The project is in compliance with this section of the CCA.

Section 30231:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water*

supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.

There will be no liquid industrial waste discharges from the Humboldt Bay ISFSI. The site's existing stormwater drainage infrastructure may be modified to accommodate the new facility, but the project will not change the existing drainage pattern on the site. The existing storm or yard drain system will not be altered. However, during construction of the ISFSI, storm water discharge could be generated and could contribute to sediment loading in receiving waters.

Currently, storm water and liquid industrial waste streams from the HBPP are discharged under an existing industrial National Pollutant Discharge Elimination System (NPDES) permit #CA 0005622. The permit contains specific numeric effluent limits for all suspected pollutants associated with liquid industrial wastes at HBPP. Storm water flows are monitored biannually for potential pollutants. PG&E is required to report monitoring information to the Regional Water Quality Control Board and take action to minimize pollutant discharges. During construction of the ISFSI, PG&E will continue to perform routine sampling of liquid effluents consistent with the HBPP NPDES permit and NRC effluent control requirements. The NCRWQCB will be notified of the project and any modifications to stormwater discharges at the site due to construction or operation. If the affected area exceeds one acre in size HBPP will obtain a General Permit for Stormwater Discharges for Construction Activities and comply with its provisions during the construction period. Following construction regulation of stormwater runoff from the ISFSI site will be incorporated into the existing HBPP NPDES permit and stormwater runoff will be managed in accordance with appropriate BMPs.

Fill placed in the excavation spoils disposal site will be graded to acceptable slopes to minimize potential erosion problems. A revegetation program, which includes temporary seeding and mulching, will be developed and implemented. Until the vegetation is established, maintenance will be performed to correct any localized areas of excessive erosion. The drainage from the disposal sites during and after construction will be designed to follow natural drainage patterns.

Best Management Practices contained in PG&E's HBPP Storm Water Pollution Prevention Plan (prepared as a condition to the NPDES permit) specifically address the potential for discharges of pollutants to surface waters through plant site runoff, plant operations, spillage or leaks, and drainage from material storage areas. In addition, training for good housekeeping practices and emergency response is provided to personnel and regular site inspections are performed. Water used for dust suppression will be collected and either filtered or treated to reduce sediment loading prior to discharge. Storm water runoff will be monitored and treated when necessary to reduce sediment loading.

PG&E will dispose of construction debris generated as part of the ISFSI at an appropriate offsite facility and in accordance with all applicable regulations. PG&E will cover or contain any debris or material left onsite that could potentially contribute to increased sediment loading to receiving waters during precipitation events.

PG&E confirms that the ISFSI can be carried out in a manner that will sustain the biological productivity of coastal waters, maintain healthy populations of all potentially affected species of marine organisms, and protect environmentally sensitive habitat areas. The reviewer is referred to Section 2.3 of this ER for a more detailed discussion of aquatic biological resources. The ISFSI is in compliance with the requirements of this section of the CCA.

Section 30240:

(a) *Environmentally sensitive habitat areas shall be protected against any significant disruption of habitat values, and only uses dependent on those resources shall be allowed within those areas.*

(b) *Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.*

The proposed project will take place on land that is currently occupied by the HBPP, which is an existing and disturbed industrial site with no onsite biological resources. PG&E-owned land in the vicinity of the ISFSI was inventoried for threatened or endangered species in July, 1999, as required by NRC regulations. No state or federally proposed or listed, threatened or endangered plant, terrestrial wildlife, or aquatic species have been identified within the immediate ISFSI area. The project site is devoid of suitable habitat for these special status species. The reviewer is referred to Section 2.3 of this ER for more a more detailed discussion of biological resources.

The ISFSI will result in no impacts to environmentally sensitive habitat areas near the site. In addition, any noise resulting from ISFSI activities will be short term and typical for a commercial construction site. Therefore, the construction of a temporary dry storage facility for HBPP spent fuel will have no noise impacts upon any endangered or threatened species, nearby environmentally sensitive habitat areas, or marine resources. The reviewer is referred to the discussion of Section 30231 below with regard to ISFSI-related water runoff. The ISFSI is in compliance with this section of the CCA.

Section 30244:

> *Where development would adversely impact archaeological or paleontological resources as identified by the State Historic Preservation Officer, reasonable mitigation measures shall be required.*

As discussed above, the ISFSI will take place on land that is currently occupied by the HBPP, which is an existing and disturbed industrial site. There are no registered scenic, natural landmarks or cultural resources that will be impacted by the ISFSI project. A cultural resources investigation was conducted for the project. This investigation consisted of archival research, on-the-ground archaeological and historical inventory of proposed impact areas; and Native American consultation. The ISFSI is in compliance with this section of the CCA.

Section 30250(a):

> *New residential, commercial, or industrial development, except as otherwise provided in this division, shall be located within, contiguous with, or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources. In addition, land divisions, other than leases for agricultural uses, outside existing developed areas shall be permitted only where 50 percent of the usable parcels in the area have been developed and the created parcels would be no smaller that the average size of surrounding parcels.*

The ISFSI is located on the HBPP site within the PG&E property boundary and is adjacent to existing industrial activities. As such, the ISFSI complies with this section of the CCA.

Section 30250(b):

> *Where feasible, new hazardous industrial development shall be located away from existing developed areas.*

As discussed above, the ISFSI will take place on land that is currently occupied by the HBPP, which is an existing and disturbed industrial site. All project construction and cask load handling activities will take place wholly within the HBPP and will not occur in any neighboring developed areas or on public roadways. The reviewer is referred to Section 8.1 and 8.2 of this ER for more a more detailed discussion of alternative sites and alternative actions. The ISFSI is in compliance with this section of the CCA.

Section 30251:

> *The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural landforms, to be visually compatible with the character of the surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas such as those designated in the California Coastline Preservation and Recreation Plan prepared by the Department of Parks and Recreation and by local government shall be subordinate to the character of its setting.*

The HBPP site is situated on a bluff overlooking Humboldt Bay and bordered on the east by U.S. Highway 101. In a past decision, the Coastal Commission determined that the HBPP site is not in an area of high visual quality. As stated in the Staff Recommendation which accompanied the Coastal Permit Application for Permit Number 1-97-075 (for the HBPP Stack Removal Project):

> [Although] the proposed project lies between Highway 101 and Humboldt Bay, this area is not designated as a highly scenic area.

The ISFSI will primarily be an in-ground structure and will not be visible from areas accessible to the public except for a small structure, fencing, and lighting, which are all required for site security. These security elements will be in accordance with 10 CFR 73 and will result in minor visual impacts primarily consisting of the visibility of the structures and (nighttime) light glare. However, these minor impacts are considered such because the site is already in an industrial use and the ISFSI project components are small in scale when compared to the site as a whole. Construction equipment will be visible from Highway 101 during the construction period. The construction period is planned for 2008. Visual impacts during the construction period will be temporary by nature and will blend in with the other industrial activities and structures existing on the site. The ISFSI project is in compliance with this Section of the CCA.

Section 30253:

> *New development shall:*
>
> *(1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
>
> *(2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along bluffs and cliffs.*

(3) Be consistent with requirements imposed by an air pollution control district or the State Air Resources Control Board as to each particular development.

(4) Minimize energy consumption and vehicle miles traveled.

(5) Where appropriate, protect special communities and neighborhoods which, because of their unique characteristics, are popular visitor destination points of recreational uses.

Subsections (1) and (2):

Detailed geologic and geotechnical investigations were conducted for the ISFSI. These investigations concluded that there were no geologic hazards or adverse geologic or geotechnical conditions that would preclude construction and operation of an ISFSI. The reviewer is referred to Section 2.6 of this ER for more a more detailed discussion of geologic and geotechnical aspects of the ISFSI project. The project complies with Subsections (1) and (2).

Subsection (2):

The bluff retreat was arrested when riprap was placed along the base of the bluff in the early 1950s and again in the 80's to prevent further wave erosion. This riprap is part of a previously improved industrial site and will be maintained, but should not require any maintenance. If the need for maintenance should arise, then any necessary permits will be obtained from the US Army Corps of Engineers, as they regulate all work in navigable waters of the United States under Section 10 of the Rivers and Harbors Act.

Accordingly, the development will be safe from coastal erosion and bluff retreat and, as the riprap is a preexisting device and will be maintained for other industrial purposes, will not require construction of protective devices that would substantially alter natural landforms along bluffs and cliffs. Therefore, this ISFSI project is in compliance with the Coastal Commission Act, Section 30253.

Subsection (3):

The North Coast Unified Air Quality Management District (AQMD) has permit authority under the California Clean Air Act and Federal Clean Air Act over direct and fugitive emission sources in the project area. The AQMD has not established California Environmental Quality Act emission thresholds for construction activity and instead relies on district rules to determine whether permit requirements are triggered by construction-related emissions.

Since the ISFSI project's emission sources will be from construction or other equipment brought on the site temporarily, PG&E will either obtain or contractually require vendors supplying the equipment to obtain necessary permits from the AQMD for these

individual sources of emissions. Internal combustion engines powering, for example, generators and pumps, portable diesel generators, cranes and other construction equipment brought on the HBPP site will either have individual AQMD permits, California registration, or be permit exempt. (Drive engines that power construction equipment are exempted by the AQMD).

The ISFSI project complies with Subsection (3).

Subsection (4):

The ISFSI will be a stationary and passive facility. Dry storage is a passive system without such operating equipment as pumps, fans and the need to maintain a pool and pool water quality as is required in the SAFSTOR license. The only energy needs for the ISFSI will be for the security building and site lighting. As such, the ISFSI project complies with Subsection (4).

Subsection (5):

As discussed above, the ISFSI project will take place on land that is currently occupied by the HBPP, which is an existing and disturbed industrial site. All project construction and cask-handling activities will take place wholly within the HBPP and will not occur in any neighboring developed areas or on public roadways. The ISFSI project complies with Subsection (5).