DEPARTMENT OF THE NAVY
SOUTHWEST DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
1220 PACIFIC HIGHWAY
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N68311.000280
NAVSTA LONG BEACH
SSIC NO. 5090.3

5090
Ser 06CA.AT/0998
December 11, 2000

Ms. Soad Hakim:
California Environmental Protection Agency
Department of Toxic Substances Control
5796 Corporate Way
Cypress, CA 90630

Dear Ms. Hakim:

This is to acknowledge that our Command received the comments for the Draft Feasibility Study of IR Sites 8, 10 and 11 from Regulatory Agencies on September 21, 1999, and the additional comments from DTSC on October 23, 2000. We reviewed the comments and enclosure (1) are the Navy responses. If you have any concerns or would like to discuss further the Navy responses, we would like to meet with you to discuss these concerns. We would like to get your concurrence to the Navy's responses before we proceed to the development of the Draft Final Feasibility Study.

Thank you for your guidance and involvement in this project. If you any questions or need additional information please feel free to contact Mr. Tony Tactay, Remedial Project Manager (RPM) at (619) 532-0954 or Fax (619) 532-0940.

Sincerely,

THOMAS MACCHIARELLA
BRAC Environmental Coordinator
By direction of the Commander

Encl: (1) Navy response to the Agency comments on the Draft Feasibility Study

Copy to:
Mr. Martin Hausladen
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Ms. Ana Veloz-Towsend
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Los Angeles Region
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Los Angeles, CA 90013

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Response to Regulatory Comments
Long Beach Naval Complex
IR Sites 8, 10 and 11
Draft Feasibility Study

Comment Number	Draft Section	Comment	Response
Comments from the Regional Water Quality Control Board, Los Angeles Region September 21, 1999			
1		On page x, Table ES-2, *Remedial Action Recommendations for IR Sites 3, 4, 5 and 6A* includes information for IR Sites 8, 10 and 11. The title of this table does not reflect the contents. Please revise this table accordingly.	The title of Table ES-2 was changed. The new title is "Remedial Action Recommendations for IR Sites 8, 10, and 11."
2		The title of the document, including various portions of the document, suggest that IR Sites 8, 10 and 11, are located on the former Long Beach Naval Station, however, the sites are located on the former Long Beach Naval Shipyard. Please revise the report to clarify the site locations accordingly.	The title and text of the feasibility study (FS) were changed everywhere to reflect that Installation Restoration (IR) Sites 8, 10, and 11 are located on the former Long Beach Naval Shipyard (LBNSY) within the Long Beach Naval Complex (LBNC).
3		Since this document was issued, more current versions of the ARAR Tables are available. Please revise the ARAR Tables with the current versions, accordingly.	The ARARs tables were revised.
4		On page 3-1, the report states that a comparison of organic compound concentrations in groundwater was conducted against U.S. EPA Region IX Tap Water PRGs to support the definition of lateral and vertical extents of contamination. Please update the groundwater screening criteria using the 1997 California Ocean Plan. Also revise the conclusion and recommendation to include additional investigation should the screening criteria be exceeded.	Six-month median limiting concentrations from the 1997 California Ocean Plan (SWRCB, 1997) water quality objectives were added to Tables 3-2, 3-5, and 3-9. However, these water quality objectives are for the protection of marine aquatic life and are not applicable as screening criteria for groundwater at IR Sites 8, 10, and 11. Rather, the screening criteria for organic compounds in groundwater at IR Sites 8, 10, and 11 are tap water preliminary remediation goals (PRGs) as determined in the remedial investigation report (RI) (BNI, 1997). Tap water PRGs were used to aid in defining the nature and extent of contamination at the sites and for preliminary designation of areas of potential concern (AOPCs). No changes were made to the text.
5		Please also include the 1997 California Ocean Plan values on Table 3-2, Table 3-5 and Table 3-9, accordingly.	Six-month median limiting concentrations from the 1997 California Ocean Plan (SWRCB, 1997) water quality objectives were added to Tables 3-2, 3-5, and 3-9. These water quality objectives are for the protection of marine aquatic life.

Comment Number	Draft Section	Comment	Response
6		On page 3-11, please provide the rational for analyzing only one soil sample for hexavelent chromium.	Groundwater samples at IR Sites 8, 10, and 11 were analyzed for total chromium. At IR Site 10, only 3 of 9 groundwater samples were positive for chromium. The concentration of total chromium in all three of these positive samples was less than background threshold. One of these positive samples was further analyzed for hexavalent chromium and was found to be non-detect for the hexavalent form.
7		On page 3-16, Table 3-5, some chemical concentrations detected in groundwater exceed the cleanup goal listed, however, no indication of these compounds was mentioned in the text. Please revise the document accordingly.	In two cases at IR Site 10, the concentration of a contaminant in at least one groundwater sample exceeded its tap water PRG or background threshold concentration. Of 27 groundwater samples analyzed for trichloroethylene (TCE), 25 samples were non-detect for TCE, one sample showed a concentration of 2.0 µg/L, and one sample showed a concentration of 8.0 µg/L. Nine of 9 samples for barium showed concentrations of barium in groundwater ranging from 64.8 to 382 µg/L. The background threshold for barium is 177.7. Only one sample, at 382 µg/L, exceeded this background threshold. This exceedence is indicated in paragraph 2 on page 3-14 of the text.

Comment Number	Draft Section	Comment	Response
8		Several metals were detected in the groundwater samples at IR Site 10 at concentrations exceeding the 1997 California Ocean Plan values. We can not concur with the no further action recommendation proposed in the report for the groundwater at this site. At a minimum, groundwater monitoring needs to be completed. Please modify the conclusions and recommendations in the document accordingly.	In all cases, when metal concentrations in groundwater samples at IR Site 10 exceeded 1997 California Ocean Plan values, the background threshold also exceeded 1997 California Ocean Plan values. Further, the maximum concentration of these metals found in any sample at IR Site 10 was less than the background threshold determined for the metal at that site. The methods for determining background thresholds of metals for IR Sites 8, 10, and 11are described in detail in Appendix E of the RI (BNI, 1997). They follow U.S. Environmental Protection Agency (U.S. EPA) guidelines and were accepted by both the Department of the Navy (DON) and the California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC). It is neither reasonable nor prudent to monitor for concentrations of metals in groundwater that do not exceed background thresholds. No changes were made to the text.
Comments from the California Environmental Protection Agency, Department of Toxic Substances Control October 23, 2000			
Sue Hakim, DTSC			
1		Long-term groundwater monitoring should be combined with institutional controls as the proposed remedy for IR Sites 8, 10, and 11 to assure that no contaminants of concern have migrated to surface waters at concentrations that exceed water quality objectives in the State Water Resources Control Board's Ocean Plan.	The remedial investigation (RI) for IR Sites 8, 10, and 11 determined that there are no contaminants of concern (COCs) at these sites. The water quality objectives of the California Ocean Plan (SWRCB, 1997) are not applicable or appropriate as screening criteria for groundwater at IR Sites 8, 10, and 11. Rather, the screening criteria for groundwater at IR Sites 8, 10, and 11 are tap water (preliminary remediation goals) PRGs or background thresholds as determined in the remedial investigation report (RI) (BNI, 1997). No changes were made to the text.
2		Has there been a more definitive risk assessment done in a Phase II remedial investigation to study the groundwater contamination, as referred in footnote (b) of Table 3-12.	No risk assessment subsequent to that performed in the RI (BNI, 1997) has been completed.

Comment Number	Draft Section	Comment	Response
3		IR Sites 8, 10, and 11 are located in the Former Long Beach Shipyard; please correct the document title.	The title and text of the feasibility study (FS) were changed everywhere to reflect that Installation Restoration (IR) Sites 8, 10, and 11 are located on the former Long Beach Naval Shipyard (LBNSY) within the Long Beach Naval Complex (LBNC).
4		In the Executive Summary, Page x, Table ES-2. Remedial Action Recommendations are for IR Sites 8, 10, and 11, not 3, 4, 5, and 6A. Also, please make the same correction in the table of contents, page xiv.	The title of Table ES-2 was changed. The new title is "Remedial Action Recommendations for IR Sites 8, 10, and 11." This change is also reflected in the Table of Contents.
5		In Table A-4, Potential State Chemical-Specific ARARs' title should be for IR Sites 8, 10, and 11 Naval Shipyard, not IR Site 14 Naval Station. The same error is repeated in tables A-5, and A-6.	The title of Tables A-4, A-5, and A-6 were changed as requested.
		John P. Christopher, DTSC	
1		Table 3-10 is confusing. The RI report presented risks and hazards estimated for unpaved soils. Please correct the confusing title and footnotes of this table.	A footnote was added to both Table 3-10 and Table 3-11 to clarify the use of "paved soils" and "unpaved soils" in the titles, respectively.
2		In Table 5-1 and Section 6, please show quantitative estimates of risk reduction associated with each alternative under consideration. The whole purpose of the baseline risk assessment is to create a basis for showing reduction of risk associated with each remedial alternative.	The purpose of the human health risk assessment (HHRA), as stated in the RI (BNI, 1997), was to determine whether the concentrations of the contaminants identified in samples of soil and groundwater at IR Sites 8, 10, and 11 might adversely affect human health. Results of the HHRA showed that the estimated incremental lifetime cancer risks for both industrial workers and utility maintenance workers were either below the point of departure (10^{-6}) defined by National Oil and Hazardous Substances Pollution Contingency Plan (NCP) or within the NCP-defined generally acceptable range (10^{-6} to 10^{-4}) for all of the sites. The HHRA further showed that the concentrations of non-carcinogenic contaminants at IR Sites 8, 10, and 11 are not high enough to cause systemic toxicity in industrial workers or utility maintenance workers at the sites. Because the risk numbers fell within acceptable ranges without application of any remedial technology, no further analyses were done to estimate risk reductions. No changes were made to the text.

<table>
<tr><th>Comment Number</th><th>Draft Section</th><th>Comment</th><th>Response</th></tr>
<tr><td>3</td><td></td><td>We note that the Navy recommends institutional controls for the waste left in place. Please include some language in the restriction to caution individuals who might dig into this waste in the future. Anyone erecting a building on these sites in the future could incur some risk from exposure to the wastes left in place.</td><td>Table 6-1 was revised to include more information on deed restriction provisions.

Table 6-1. Provisions for Institutional Controls for IR Sites 8, 10, and 11
<table>
<tr><th>Deed Restriction Provision</th><th>Function of Restriction</th></tr>
<tr><td>• Prevent unauthorized groundwater use.
• Prohibit disturbance or use of existing groundwater wells unless specifically approved by all regulatory agencies.
• Prohibit use of groundwater for drinking water without authorization from the RWQCB.</td><td>Reduce potential for exposure to contaminants in groundwater.</td></tr>
<tr><td>• Prevent unauthorized subsurface boring or excavation.
• Prohibit removal of soil unless approved by the Cal-EPA DTSC.</td><td>Reduce potential for exposure to contaminants in subsurface soil and groundwater.</td></tr>
<tr><td>• Maintain industrial use.
• Prohibit residential use.
• Prohibit use for schools, day care centers, hospitals, or any permanently occupied human habitation.</td><td>Maintain land use consistent with scenarios in the HHRA.</td></tr>
</table></td></tr>
</table>

Comment Number	Draft Section	Comment	Response
		Mark Berscheid, DTSC	
1		ESU recommends the inclusion of an appendix in the FS that can provide detailed information on the VLEACH analysis.	Contaminants identified from the vadose-zone screening analysis were modeled to determine the leaching rates to groundwater using the VLEACH vadose-zone leaching program (U.S. EPA, 1995). The results for VLEACH modeling were then used as input to groundwater transport modeling using Analytical Transient One-, Two-, Three-Dimensional (AT123D) Simulation (International Groundwater Monitoring Center, 1993). The VLEACH and AT123D modeling programs were used to determine the incremental increase in groundwater concentrations that result from leaching. Section 5 of the RI (BNI, 1997) includes detailed descriptions of these programs, including input parameters and data. Tables 5.7-2, 5.7-3, and 5.7-4, respectively, are summaries of the aquifer properties, infiltration rates, and chemical properties used in the migration analyses. Appendix O of the RI contains specific data sheets for the VLEACH and AT123D models for each contaminant analyzed for each site. It also contains plots of AT123D model groundwater concentrations at AOPCs and at the nearest Southern California Edison (SCE) wells. The RI (BNI, 1997) is part of the administrative record for IR Sites 8, 10, and 11, and is, by law, publicly available information. Because detailed information about both the VLEACH and the AT123D models is available in the RI, no further information on the VLEACH analyses was appended to the FS.
2		ESU recommends the review of this FS in conjunction with the detailed development of the site human health and risk assessment (HHRA), found in the RI report (BNI, 1997), by a Department of Toxic Substances Control (DTSC) toxicologist to insure the risk assessment for this site has been properly performed.	The Draft FS was reviewed by John P. Christopher, Ph.D., D.A.B.T., Staff Toxicologist, Cal-EPA DTSC.

REFERENCES

Bechtel National, Inc. 1997. *Final Remedial Investigation (RI) Report, Installation Restoration Program for Sites 8 through 13, Long Beach Naval Shipyard, Long Beach, California.* 7 volumes

BNI, see Bechtel National, Inc.

International Groundwater Monitoring Center. 1993. *AT123D – Analytical Transient One-, Two-, Three-Dimensional Simulation of Waste Transport in the Aquifer System.*

State of California, Water Resources Control Board. 1997. *California Ocean Plan.* State Water Resources Control Board, California Environmental Protection Agency. July.

SWRCB, see State of California, Water Resources Control Board.

U. S. Environmental Protection Agency. 1995. *VLEACH – A One-Dimensional Finite Difference Vadose Zone Leaching Model, Version 2.2.* Robert S. Kerr Environmental Research Laboratory Center for Surface Modeling Support.

U.S. EPA, see U. S. Environmental Protection Agency.

Comment Number	Draft Section	Comment	Response
		U.S. EPA—September 8, 1998	
		General Comments	
1		The Feasibility Study (FS) does not include a development of the full range of technologies and alternatives under CERCLA or NCP guidance apparently based on the rationale that future site use has been determined and the under that site use, there are no COCs or AOCs. Consequently the alternatives have been reduced to No Action or Institutional Controls (although as discussed under detailed comments even the latter is technically inconsistent with the HHRA conclusion that no COCs or AOCs exist (i.e., as there are no COCs or AOCs, what exposure is there to "control?"), nevertheless the validity of the FS in this case is particularly dependent on (1) the validity of the industrial use scenario and (2) the validity of the HHRA itself. Ecological risk is not considered, even though marine environments are very sensitive to metals found in spend sandblast abrasive.	Remedial alternatives for Installation Restoration (IR) Sites 8, 10, and 11 are developed assuming that land use at these sites will remain industrial. This assumption is made based on the Reuse Plan (City of Long Beach, 1995) of the Local Redevelopment Authority (LRA) which includes industrial use scenarios for the land areas currently designated as IR Sites 8, 10, and 11. That is, according to the Reuse Plan of the Local Redevelopment Authority, the anticipated future land use for IR Sites 8, 10, and 11 is industrial. For this reason, cleanup standards for the sites are based on industrial exposure scenarios. Under industrial exposure scenarios for workers, no chemicals of concern (COCs) or areas of concern (AOCs) exist at these sites. That is, based on industrial exposure scenarios, the overall risks for IR Sites 8, 10, and 11 fall within the U.S. Environmental Protection Agency (U.S. EPA) target range of 10^{-4} to 10^{-6} or below. Thus, cleanup in the form of treatment at the sites is not warranted. If cleanup in the form of treatment at the sites is not warranted, then it is also neither necessary nor cost-effective to evaluate treatment technologies as remedial alternatives. That is, under these circumstances, treatment is not necessary to meet federal or state statutes and regulations, will not have a significantly positive effect in protecting human health and the environment, and will not be more effective in either the long-term reduction of contaminants or in short-term safety. However, restrictions on future use and development of the sites is needed to ensure that land use remains industrial. For this reason, institutional controls, in the form of land use restrictions, are evaluated as a remedial alternative.

Comment Number	Draft Section	Comment	Response
1 (cont'd)			Information in the final remedial investigation report (RI) (BNI, 1997), shows no evidence of groundwater contamination exceeding criteria for the California Ocean Plan (SWRCB, 1995) migrating to marine environments. In fact, direct interactions between groundwater from Long Beach Naval Shipyard (LBNSY) and marine surface water are minimal because a sea wall separates the LBNSY from marine waters. Therefore, groundwater cleanup is not warranted and is not considered among the remedial alternatives. References: Bechtel National, Inc. (BNI). 1997. *Final Remedial Investigation (RI) Report, Installation Restoration Program for Sites 8 through 13, Long Beach Naval Shipyard, Long Beach, California.* 7 Volumes City of Long Beach, Departments of Health and Human Services and Community Development. 1995. *Redevelopment Plan for Reuse of Surplus Navy Property, City of Long Beach, Long Beach, California.* 3 Volumes. State of California, Water Resources Control Board (SWRCB). 1995. *Draft Functional Equivalent Document: Amendment of the Water Quality Control Plan, Ocean Waters of California.* August 23.
2		The FS lacks sufficient detail to support alternative costs.	Cost estimates presented in the FS are order-of-magnitude (+50%, –30%) and are based on engineering judgement. The FS concludes that either no further action or institutional controls are appropriate for IR Sites 8, 10, and 11, because these are no chemicals of concern (COCs) at the sites. More detailed costs, and supporting documentation in Sections 2.0, 3.0, 4.0, and 5.0, are neither warranted nor required for this FS.

Comment Number	Draft Section	Comment	Response
		Executive Summary—General Comments	
1	Exec. Sum.	Please discuss the rationale for grouping Sites 8, 10, and 11 together for Feasibility Study purposes. Please discuss whether actions are considered for each site individually or for all three sites together and please briefly discuss the interrelationships among these actions with other IR sites at LBNSY. Please also discuss whether the cost effectiveness of combining sites for remedial alternatives has been considered in the evaluation.	IR Sites 8, 10, and 11 are included in a single feasibility study (FS) because (1) the three sites were evaluated in a single RI (Bechtel National, Inc. 1997); (2) the land areas occupied by these three sites are all designated for industrial use under the Reuse Plan (City of Long Beach, 1995) of the Local Redevelopment Authority; (3) under an industrial exposure scenario, no COCs or AOCs exist at any of these sites; and thus (4) the remedial alternatives for the three sites are similar. Cost-effectiveness is a consideration in combining the FS evaluation of these three sites. IR Sites 9, 12, and 13, although part of the same RI, all require the application of treatment technologies for remediation, and so are treated separately.
		Executive Summary—Specific Comments	
1	p. vii, bullet 1.	The text in the first bullet on page v indicated that TCE disposal was suspected at IR Site 8. The text indicates the presence of non-chlorinated solvents and metals at this site. Please discuss the potential sources for non-chlorinated solvents at the site in the first bullet on page v.	IR Site 8 is identified as the Building 210 Trichloroethylene Disposal Site because of the trichloroethylene (TCE) thought to have been disposed there in the past. Sources of information about potential contamination include records, aerial photographs, surface and aerial surveys, and personnel interviews. Historically, Building 210 contained an electronic weapons shop that generated about 200 gallons of TCE, along with acids and plating solutions, that were disposed of along the fence line of the site. Although direct, quantitative documentation does not exist, historic contamination of IR Site 8 with non-chlorinated solvents and metals could have resulted from electronic weapons shop activities. Executive summary, p. iii, bullet 1 was changed to read: "IR Site 8 - Building 210, Trichloroethylene (TCE) Disposal Site. IR Site 8 is located in a parking lot near access road Gate 3 along the northern boundary fence of the LBNSY. Historically, Building 210 contained an electronic weapons shop that generated TCE, along with acids and plating solutions, that was disposed of along the fenceline."

Comment Number	Draft Section	Comment	Response
2	p. vii, paragraph 2	Please define the geochemical approach and discuss the rationale for establishing background threshold values for metals in soil that primarily consists of fill. Also discuss the relevance for this FS of the statement about the tendency for metals to absorb onto iron, manganese, or aluminum oxides.	Metals in soils at the LBNSY were screened against both statistically- and geochemically-calculated background levels in order to distinguish site-related contamination from background. This distinction was important in areas where soils and subsurface materials were either partly or primarily fill materials transported to the sites from elsewhere. Metals in groundwater were screened against statistically calculated background values. The RI (Bechtel National, Inc., 1997), Section 3.2 and Appendices E and F, contains a description of the methodology used to establish these criteria, and is not repeated here. A geochemical background evaluation was performed on the distribution of metals in the vadose zone soil at the LBNSY in order to supplement the statistically calculated background metals in soil. At an industrial facility like the LBNSY, obtaining pristine (off-site) background soil samples is usually not feasible. In this case, statistical methods alone may not yield the most appropriate determination of background levels. Metal concentrations slightly above the statistically calculated background values do not necessarily indicate impact to soils as a result of base operation activities. Generally, considering the geochemical properties of the soils while evaluating the statistical data provides a better understanding of background conditions.

Comment Number	Draft Section	Comment	Response
2 (cont'd)			The individual concentrations of naturally occurring metals in soils often are related to the geology of the parent material from which the soils were formed. In a specific soil, the distribution of trace metals is primarily controlled by two factors: (1) the chemical characteristics of each metal; and (2) soil conditions. The chemical characteristics of metals include the type of trace metal present, the concentration of the metal, and metal speciation. The soil conditions include the types of adsorbents present and their sorption capabilities, the available surface area, oxidation-reduction (redox) conditions, and pH. Common adsorbents in soils include clay minerals, organic matter, and metal oxides and hydroxides. Because of their negative surface charges, clay minerals are effective in controlling many heavy metals in soils. The negative surface charges attract metals speciated as cations, positively charged compounds. Soil organic matter is also known to be effective in adsorbing heavy metals. Humus, a series of high molecular weight organics in soils, is responsible for the sorption of cationic species such as copper and lead ions, for example. In addition to clays and organic matter, metal oxides and hydroxides, especially those of aluminum, manganese, and iron, contribute to the sorption of metals. Thus, the distribution of some metals in the vadose soils of the LBNSY may not necessarily reflect contamination by base operations activities, but may be due to the sorptive potential of naturally occurring soil constituents.

Comment Number	Draft Section	Comment	Response
3	p. viii, paragraph 1.	Please discuss how, given the industrial history of LBNC and the Port of Los Angeles, samples from these areas were used to establish background for Sites 8, 10, and 11. Depending upon the specific location of the intended background samples, metals concentrations may in fact reflect contamination at other contaminated sites rather then true natural or urban background. Please verify that samples used for background determinations were not collected from other areas of known or suspected contamination. This information should be included in the FS because a reader from the public may not be familiar with the RI or technical memoranda documenting the determination of a background.	A combined data set of metals concentrations from the vicinity of, and including, the LBNSY, was used to establish background soil and groundwater concentration levels for 19 metals of concern. Soil and groundwater metals data were compiled from existing facility-related reports and from information provided by the California Environmental Protection Agency (Cal-EPA) Department of Toxic Substances Control (DTSC). Specifically, data from Naval Station Long Beach, the LBNSY, and the nearby Port of Los Angeles (POLA) were used to establish background levels for the 19 metals of concern in soil and in groundwater. Identification of background concentrations of metals in soil and groundwater followed a three-step process: (1) identify the background population from the compiled data set; (2) select an appropriate statistical procedure based on the distribution of data; and (3) calculate background levels. The RI (Bechtel National, Inc., 1997), Section 3.2 and Appendices E and F, contains detailed information for calculating background metals concentrations, and is not repeated here. The methods are consistent with U.S. EPA guidelines on statistical issues (U.S. EPA, 1989, 1992, and 1994).

Comment Number	Draft Section	Comment	Response
3 (cont'd)			The RI (Bechtel National, Inc., 1997) is part of the administrative record for IR Sites 8, 10, and 11. As such, it is available for public review at the information repository located at Long Beach Public Library, Government Publications Department, 101 Pacific Avenue, Long Beach, CA 90822. The telephone number for the library is 562-570-7500, and the hours that the library is open are Monday, 10 am to 8 pm; Tuesday through Saturday, 10 am to 5:30 pm; and Sunday, noon to 5 pm. The name, location, and phone number of the information repository, namely the Long Beach Public Library, is provided in Section 1.1, p. 1-3 of the FS. In addition, complete information about the location and availability of the administrative record for IR Sites 8, 10, and 11 will be published in the Proposed Plan/Remedial Action Plan for these sites. Because information in the RI is readily available to the public from the information repository, details from the RI are not included in the FS for IR Sites 8, 10, and 11. References: U.S. Environmental Protection Agency. 1989. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities — Interim Final Guidance.* Office of Solid Waste. U.S. Environmental Protection Agency. 1992. *Draft Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final Guidance.* Office of Solid Waste. U.S. Environmental Protection Agency. 1994. *Statistical Training Course for Groundwater Monitoring Data Analysis.* EPA 530-R-93-003.

Comment Number	Draft Section	Comment	Response
4	p. viii, paragraph 2	Please verify that the use of the acronym COPC for Chemical of Potential Concern is consistent with EPA's definition of this acronym as Contaminants of Potential Concern.	"Chemical of potential concern" (COPC) is defined as a chemical compound or element that was identified as present in soil or groundwater samples collected during the RI. This definition is consistent with the U.S. EPA definition of "contaminant of potential concern" when the contaminant is a chemical. For IR Sites 8, 10, and 11, the only contaminants of potential concern are chemical elements and compounds.
5	p. viii, paragraph 2	Please explain how the Southern California Edison Long Beach Generating Station dewatering system relates to aquifer zones at LBNSY or properties. Also, please discuss the extent to which dilution in the SCE discharge water contributes to the mitigation of contaminant concentrations prior to discharge to locations regulated by the California Ocean Plan Criteria.	Detailed information about the major aquifers in the West Coast Basin is included in the RI (Bechtel National Inc., 1997). Although these aquifers are important water-producing zones within the West Coast Basin, contamination by seawater intrusion has limited their usefulness in areas near the coast, including Terminal Island, on which IR Sites 8, 10, and 11 are located. Several pumping stations that may be influencing the groundwater flow regime are located on or near the eastern portion of Terminal Island. The pumping operations are not likely to impact regional groundwater flow conditions. However, they may impact local conditions in the vicinity of the LBNSY. Details of the pumping systems and their potential influence on groundwater flow conditions are discussed in the RI, Section 2, and are not repeated here. The shallow dewatering system in operation at the Southern California Edison (SCE) Long Beach Generating Station (LBGS) may be influencing the northerly to northeasterly flow direction in the shallowest water-bearing interval of surficial deposits. A review of historic groundwater elevation data compiled from investigations performed at LBNSY and other sites on Terminal Island indicates that the dewatering operations probably influence groundwater flow directions in the shallowest water-bearing interval as far away as the central portion of Naval Station Long Beach.

Comment Number	Draft Section	Comment	Response
5 (cont'd)			The dewatering system at the SCE facility consists of about 210 well points situated around the perimeter of the eastern half of the LBGS. The pumped groundwater is discharged with the plant cooling water under a National Pollution Discharge Elimination System (NPDES) permit. The SCE dewatering system is the dominant influence on groundwater flow direction within the LBNSY. The potential pathway for leached contaminants in the saturated zone from the LBNSY IR Sites is toward the dewatering system located to the north and northeast of the areas of potential concern (AOPCs). Because the SCE dewatering system is the probable discharge location of groundwater from the IR sites, saturated zone transport modeling was performed as part of the RI to estimate the contaminant concentrations in groundwater beneath the AOPCs and the nearest wells of the SCE dewatering system. Concentration levels of contaminants that may be transported to the SCE system wells and extracted from the shallow groundwater are affected primarily by three factors: vadose-zone loading; transport from the AOPC to the SCE system; and mixing of water extracted from the LBNSY side of the SCE system and containing COPCs with water extracted from other directions and not containing COPCs. Additional mixing occurs at the extraction system discharge location with periodic cooling discharge water, and with surface water in the Back Channel at Berth 114. Details of the hydrogeologic models used in analyzing the vadose- and saturated-zone migration pathways, and the results of this modeling are described in detail in Section 5 of the RI, (Bechtel National, Inc., 1997), along with summaries of aquifer properties, infiltration rates, and chemicals properties used in the migration and mixing analyses. They are not repeated here.

Comment Number	Draft Section	Comment	Response
5 (cont'd)			Results of the analyses demonstrate that no COPCs in concentrations exceeding California Ocean Plan (State of California, 1995) criteria will be released to ocean waters as result of the SCE facility discharge.
6	p. viii, paragraph 3	Because the use of industrial PRGs is related to projected land use under the local redevelopment authority, please so indicate and provide a map showing the Land Reuse Plan.	Executive summary, p. vii, paragraph 1 was changed to read: "According to the Reuse Plan of the Local Redevelopment Authority (LRA) (City of Long Beach, 1995), the anticipated future land use for IR Sites 8, 10, and 11 is industrial. For this reason, concentrations of organic contaminants in soils and groundwater at these sites were evaluated using United States Environmental Protection Agency (U.S. EPA) Industrial Preliminary Remediation Goals (PRGs) (U.S. EPA, 1995) only, to identify areas of potential concern (AOPCs). Residential PRGs were not evaluated. Concentrations of inorganic contaminants in soils and groundwater at the sites were compared to background levels."
7	p. ix, paragraph 3	Please provide the range of chronic hazard indices calculated for risk scenarios to support the statement that concentrations of non-carcinogenic chemicals do not appear to be high enough to cause systemic toxicity at any of these sites.	Calculated hazard indices (HI) are tabulated on page 13 of these responses to comments, and are reported in the following paragraphs. For IR Site 8, no volatile or semivolatile organics were detected. These were the only contaminants for which analyses were performed. Consequently, no HIs were calculated for industrial workers based on exposure to unpaved soil (0 to 3 ft bgs). For IR Site 10, AOPC 1, the upper bound HI for industrial workers based on exposure to soil (0 to 3 ft below ground surface [bgs]) overlain by pavement is 0.0000089. For IR Site 10, AOPC 1, the average HI for industrial workers based on exposure to soil (0 to 3 ft bgs) overlain by pavement is 0.00000075.

Comment Number	Draft Section	Comment	Response
7 (cont'd)			For IR Site 10, AOPC 1, the upper bound HI for industrial workers based on exposure to unpaved soil (0 to 3 ft bgs) is 0.16. For IR Site 10, AOPC 1, the average HI for industrial workers based on exposure to unpaved soil (0 to 3 ft bgs) is 0.06. For IR Site 11, AOPC 1, the upper bound HI for industrial workers based on exposure to soil (0 to 3 ft bgs) overlain by pavement is 0.00000044. For IR Site 11, AOPC 1, the average HI for industrial workers based on exposure to soil (0 to 3 ft bgs) overlain by pavement is 0.00000039. For IR Site 11, AOPC 1, the upper bound HI for industrial workers based on exposure to unpaved soil (0 to 3 ft bgs) is 0.94. For IR Site 11, AOPC 1, the average HI for industrial workers based on exposure to unpaved soil (0 to 3 ft bgs) is 0.52. For IR Site 11, AOPC 2, the upper bound HI for industrial workers based on exposure to unpaved soil (0 to 3 ft bgs) is 0.45. For IR Site 11, AOPC 2, the average HI for industrial workers based on exposure to unpaved soil (0 to 3 ft bgs) is 0.14. For IR Site 8, AOPC 1, the upper bound HIs for utility maintenance workers based on exposure to unpaved soil (0 to 11.5 ft bgs) and groundwater (0 to 40 ft bgs) are 0.015 and 0.0031, respectively. For IR Site 8, AOPC 1, the average HIs for utility maintenance workers based on exposure to unpaved soil (0 to 11.5 ft bgs) and groundwater (0 to 40 ft bgs) are 0.00069 and 0.00073, respectively. For IR Site 10, AOPC 1, the upper bound HIs for utility maintenance workers based on exposure to unpaved soil (0 to 11.5 ft bgs) and groundwater (0 to 40 ft bgs) are 0.035 and 0.046, respectively. For IR Site 10, AOPC 1, the average HIs for utility maintenance workers based on exposure to unpaved soil (0 to 11.5 ft bgs) and groundwater (0 to 40 ft bgs) are 0.0021 and 0.0087, respectively.

Comment Number	Draft Section	Comment	Response
7 (cont'd)			For IR Site 11, AOPC 1, the upper bound HI for utility maintenance workers based on exposure to unpaved soil (0 to 11.5 ft bgs) is 0.16. For IR Site 11, AOPC 1, the average HI for utility maintenance workers based on exposure to unpaved soil (0 to 11.5 ft bgs) is 0.016. Exposure to groundwater at IR Site 11, AOPC 1 was not evaluated because the groundwater table is deeper than the assumed depth of excavation (0 to 40 ft bgs) and is, therefore, inaccessible to utility maintenance workers. For IR Site 11, AOPC 2, the upper bound HIs for utility maintenance workers based on exposure to unpaved soil (0 to 11.5 ft bgs) and groundwater (0 to 40 ft bgs) are 0.063 and 0.0015, respectively. For IR Site 11, AOPC 2, the average HIs for utility maintenance workers based on exposure to unpaved soil (0 to 11.5 ft bgs) and groundwater (0 to 40 ft bgs) are 0.0035 and 0.00077, respectively. Thus, the average HI for industrial workers ranged from 0.06 at IR Site 10, AOPC 1 to 0.52 at IR Site 11, AOPC 1. The upper bound HI for industrial workers ranged from 0.16 at IR Site 10, AOPC 1 to 0.94 at IR Site 11, AOPC 1. The average HI for utility maintenance workers ranged from 0.0014 at IR Site 8, AOPC 1 to 0.016 at IR Site 11, AOPC 1. The upper bound HI for utility maintenance workers ranged from 0.018 at IR Site 8, AOPC 1 to 0.16 at IR Site 11, AOPC 1. Executive summary, p. vii, paragraph 4 was changed to read: "The average hazard index (HI) for industrial workers ranged from 0.06 at IR Site 10, AOPC 1 to 0.52 at IR Site 11, AOPC 1. The average HI for utility maintenance workers ranged from 0.0014 at IR Site 8, AOPC 1 to 0.016 at IR Site 11, AOPC 1. Thus, concentrations of noncarcinogenic chemicals are not high enough to cause systemic toxicity in industrial workers or utility maintenance workers at any of the sites."

Hazard Indices for Industrial Workers

	IR Site 8 AOPC 1	IR Site 10 AOPC 1	IR Site 11 AOPC 1	IR Site 11 AOPC 2
Paved Soil (0-3 ft bgs)	Not applicable.	0.0000089 (upper bound) 0.00000075 (average)	0.00000044 (upper bound) 0.00000039 (average)	Not applicable.
Unpaved Soil (0-3 ft bgs)	Not evaluated. No COPCs.	0.16 (upper bound) 0.06 (average)	0.94 (upper bound) 0.52 (average)	0.45 (upper bound) 0.14 (average)

Hazard Indices for Utility Maintenance Workers

	IR Site 8 AOPC 1	IR Site 10 AOPC 1	IR Site 11 AOPC 1	IR Site 11 AOPC 2
Soil (0-11.5 ft bgs)	0.015 (upper bound) 0.00069 (average)	0.035 (upper bound) 0.021 (average)	0.16 (upper bound) 0.016 (average)	0.063 (upper bound) 0.0035 (average)
Groundwater (0-40 ft bgs)	0.0031 (upper bound) 0.00073 (average)	0.046 (upper bound) 0.0087 (average)	Not applicable.	0.0015 (upper bound) 0.00077 (average)

Comment Number	Draft Section	Comment	Response
U.S. EPA—September 8, 1998			
Executive Summary—Specific Comments (continued)			
8	p. ix, bullet 1	Please indicate whether the Remedial Action Objective to maintain industrial use of the sites is consistent with the plans of the Local Redevelopment Authority.	According to the Reuse Plan of the Local Redevelopment Authority (City of Long Beach, 1995), the anticipated future land use for IR Sites 8, 10, and 11 is industrial. Thus, the remedial action objective for IR Sites 8, 10, and 11, to maintain industrial land use at the sites, is consistent with the plans of the Local Redevelopment Authority. Executive summary, p. viii, bullet 1 was changed to read: "To maintain industrial use at the sites consistent with the Reuse Plan of the LRA (City of Long Beach, 1995)."
9	p. ix, last paragraph	The range of remedial alternatives considered for these sites does not appear to meet CERCLA guidance. Please discuss and justify the limited range of alternatives considered.	Remedial alternatives for IR Sites 8, 10, and 11 are developed to address the environmental issues related to the sites so as to comply with applicable or relevant and appropriate requirements (ARARs) and to meet remedial action objectives, namely, to maintain industrial use at the sites consistent with the Reuse Plan of the Local Redevelopment Authority and to prevent unauthorized disturbance of residual soil and groundwater contamination.

Comment Number	Draft Section	Comment	Response
9 (cont'd)			Under industrial land use scenarios, the human health risk assessment (HHRA), part of the final RI (Bechtel National, Inc. 1997), identified no COCs and no AOCs at IR Sites 8, 10, and 11. Thus, cleanup in the form of treatment of the sites is not warranted. Because cleanup in the form of treatment at the sites is not warranted, no cleanup technologies are evaluated as remedial alternatives. Instead, preliminary screening of five potential response actions are evaluated. Institutional controls in the form of land use restrictions and monitoring, and containment controls in the form of surface contour modification and vertical and horizontal barriers, are screened on the basis of effectiveness, implementability, and cost. Section 5.0 of the FS includes a detailed explanation of this screening process, which is consistent with Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) technology evaluation procedures. As a result of preliminary screening, the three containment controls are eliminated as not applicable, and thus not cost-effective, because no COCs or AOCs are identified for IR Sites 8, 10, and 11. Institutional controls in the form of groundwater monitoring is eliminated for the same reason. Institutional controls in the form of deed restrictions is retained and evaluated more extensively as a remedial alternative. In addition, the no further action alternative is evaluated, as required under CERCLA guidance, to establish a baseline against which to compare and evaluate other alternatives.

Comment Number	Draft Section	Comment	Response
10	p. x, paragraph 3	Please discuss whether the projected industrial use results under these alternatives is consistent with intended use under the Local Redevelopment Authority.	According to the Reuse Plan of the Local Redevelopment Authority (City of Long Beach, 1995), the anticipated future land use for IR Sites 8, 10, and 11 is industrial. Under an industrial use scenario, because there are no COCs and no AOCs at the sites, no cleanup or containment controls at the sites are warranted. However, restrictions on future use and development of the sites is needed to ensure that land use remains industrial. Institutional controls in the form of deed restrictions are an effective method to prevent or restrict changes in future land use at IR Sites 8, 10, and 11. Thus, the recommended remedial action, institutional controls in the form of deed restrictions, is consistent with the intended use of the sites under the Reuse Plan of the Local Redevelopment Authority.
Section 1.0: Introduction— Specific Comments			
1	Section 1.1, p. 1-3, paragraph 1	Please present appropriate maps or figures showing the Industrial Redevelopment Plan.	Please provide a map or figure from the Reuse Plan of the Local Redevelopment Authority that shows the proposed future industrial use of IR Sites 8, 10, and 11, and the surrounding area.
2	Figure 1-1	Please explain the relevance of the oil production easements for the City of Long Beach shown on this figure.	The area north of IR Sites 8, 10, and 11 is used by the City of Long Beach for oil production activities. It is an active oil production facility not under the control of LBNSY. However, sampling activities were performed in this area, despite numerous above- and below-ground pipelines associated with the oil field activities.

Comment Number	Draft Section	Comment	Response
		Section 2.0: Site Information—Specific Comments	
1	Section 2.1, p. 2-1, paragraph 2	Please provide a regional location map which clearly shows Terminal Island and the surrounding Los Angeles and Long Beach Harbor Districts. This regional map could be included as an inset on Figure 1-1 and references in this paragraph.	The text of Section 2.1, paragraph 2 was changed to read: "The LBNC is located in Long Beach, CA, on the south side of Terminal Island within the Los Angeles and Long Beach Harbor districts, approximately 24 miles south of downtown Los Angeles (Figure 1-1, Inset). The LBNC is made up of Naval Station Long Beach, located on the western portion of the complex, and LBNSY on the east (Figure 1-1). Naval Station Long Beach is bounded by oil fields and container yards to the north, the Los Angeles Harbor facility to the west, San Pedro Bay to the south, and the LBNSY to the east." A regional location map showing Terminal Island and the surrounding Los Angeles and Long Beach Harbor districts was included as an inset to Figure 1-1.
2	Section 2.1, p.2-2, bullet 1	The text indicates that the potential source of contamination at IR Site 11, spend sandblast grit, is still present. Please discuss whether a removal action is appropriate for this material.	A soils investigation occurred at IR Site 11 from October 1994 through January 1995. Following the soils investigation, approximately 1,400 cubic yards of sandblast-contaminated soil were removed from the southern hillside of IR Site 11 and placed in the level area to the south, but still within the site. The northern and southern hillside drainages of the site were remediated, and the hillsides were regraded and revegetated. These activities are documented in detail in *Removal Action Closeout Report, Including As-Built Records, IR Site 11 - Hillside East of Dry Rock 1, Long Beach Naval Shipyard, Long Beach, California* (International Technology Corporation, 1995). No sandblast grit was found on the northern hillside of the site. The level area, which is now estimated to contain about 3,700 cubic yards of soil mixed with sandblast grit, was graded and sealed with a protective cover of wire mesh and shotcrete.

Comment Number	Draft Section	Comment	Response
2 (cont'd)			At the time of the RI investigations (Bechtel National, Inc., 1997), two areas of IR Site 11 contained visible sandblast grit: the level shotcrete-covered area of the southern part of the site; and the southern hillside. No sandblast grit was observed in any of the other areas of the site. Results of the analytical sampling and the HHRA conducted as part of the RI for IR Site 11 indicated that there were no COCs or AOCs at this site. Thus, the levels of contamination of sandblast grit in the shotcrete-covered area of the southern part of the site and the southern hillside are not of concern, and no further removal actions are needed or appropriate for the sandblast grit at IR Site 11. Reference: International Technology Corporation. 1995. *Removal Action Closeout Report, Including As-Built Records, IR Site 11 - Hillside East of Dry Rock 1, Long Beach Naval Shipyard, Long Beach, California*. Contract No. N47408-92-D-3056, Delivery Order 0008. Prepared for Naval Construction Battalion Center, Naval Facilities Engineering Command.
3	Section 2.2.1, p. 2-2, paragraph 2	A reader from the public may not be familiar with the term "mole." Please define this term and label it on a referenced figure, since this is the first time this term has been used.	The last sentence of Section 2.2.1, paragraph 2, was changed to read: "The top of the mole, the breakwater that extends out into the Pacific Ocean to form Long Beach Harbor West Basin, is about 12 to 15 ft above msl (Figure 1-1)." The mole was labeled Figure 1-1.
4	Section 2.2.2, p. 2-3, paragraph 1	Please discuss whether the high wind velocities associated with northeast Santa Ana winds could contribute to airborne migration of contaminants or sandblast grit at these sites.	Santa Ana winds, which typically occur in the late summer months and which can reach speeds of 80 miles per hour or more, are capable of evaporating and/or aerosolizing liquids and of suspending and transporting particulate matter. Plumes of suspended materials, however, are generally more concentrated under stable atmospheric conditions. High winds generally lead to increased and rapid dispersion.

Comment Number	Draft Section	Comment	Response
5	Section 2.2.4, p. 2-4, paragraph 1	Please locate and label the surface water bodies surrounding Terminal Island that are mentioned in the text on a regional map.	A new Figure 2-1 was added to the FS. This figure illustrates and labels the surface water bodies surrounding Terminal Island.
6	Section 2.2.4, p. 2-4, paragraph 2	Please provide or cite figures showing surface water drainage patterns at LBNC and specifically surface water drainage at IR Sites 8, 10, and 11 should be discussed specifically.	Figure 2-3 of the RI (Bechtel National, Inc., 1997) shows surface water features within a 5-mile radius of the Long Beach Naval Complex (LBNC). Figure 2-4 of the RI shows the storm drainage system for LBNSY, including IR Sites 8, 10, and 11. No more detailed surface water drainage information is available specific to IR Sites 8, 10, and 11.
7	Section 2.2.4, p. 2-4, paragraph 3	The statement that Terminal Island is not within statistical 100 or 500 year floodplains in inconsistent with the conclusion that portions of the site are below mean sea level (msl) and could be susceptible to flooding during high tide conditions. Please clarify this apparent contradiction. Please discuss whether FEMA mapping considers subsidence or similar topographic changes.	Federal Emergency Management Agency (FEMA) flood insurance rate maps are prepared primarily to show statistical 100- and 500-year flooding of flood plains, that is, those portions of river valleys adjacent to the channel that are build of sediments and that are covered with water when the river overflows its banks at flood stages. According to FEMA maps, Terminal Island is not subject to flooding during a statistical 100- or 500-year flood. The FS text, as written, provides caveats, placed on those portions of the LBNSY that could be susceptible to flooding during high tide conditions. Section 2.2.4, paragraph 3 reads: "...these areas could be susceptible to flooding during high tide conditions if there were a breach of a seawall, or in the event of high precipitation and failure of the stormwater pumping system." Subsidence within the LBNSY occurred during the 1940's and 1950s as a result of oil production activities in the Terminal Island area. In order to control subsidence, water injection for pressure maintenance and repressurization was initiated in the 1950s, and full-scale repressurization was implemented by 1960. Benchmark elevation declines stopped within 2 years of repressurization.

Comment Number	Draft Section	Comment	Response
7 (cont'd)			The FEMA rate map used to establish the statistical 100- and 500-year flood levels for the area around Terminal Island was issued after subsidence in the Terminal Island area stopped. FEMA maps do consider changes in stream regimens, ground elevations, etc.
8	Section 2.2.5, p.2-5, paragraph 1	The text states that man-made fills and near-surface native soils comprise the surficial deposits. Please provide a site specific description of Terminal Island geology and hydrogeology including illustrating the portions of Sites 8, 10, and 11 that consist of man-made materials.	Detailed information on the man-made fill that forms part of nearly all of the land portion of the LBNSY is presented in the RI, Section 2.1 (Bechtel National, Inc., 1997) and will not be repeated here in its entirety. In the late 19th century, Terminal Island was an elongated, east-west trending barrier bar island ranging between 500 and 900 ft in width. To the north, between the barrier island and the mainland, was a wide tidal marsh. The island was also cut by a tidal channel (a river mouth) about 650 ft wide. By 1901, the tidal channel shifted to the approximate location of Back Channel. By 1938, most of the tidal marsh had been filled and a strip of dredged fill, 800 to 1,000 ft wide, had been added along the southern side of the eastern part of Terminal Island. The channels on the western, northern, and eastern sides of the island had also been constructed. The area south of Seaside Avenue, later to become LBNSY, was largely sandy beach, about 400 to 600 ft wide. This beach extended and widened eastward to a low spit and breakwater in the northern area of future Pier Echo. Seaside Avenue and Ocean Boulevard were located very close to their present positions. In 1938, the Navy purchased the strip of coastline along the southern part of Terminal Island from the cities of Long Beach and Los Angeles. In the early 1940s, the Navy constructed a seawall, and filled the area between it and the former shoreline with dredged material. Constructed fill on the LBNSY, therefore, occupies nearly the entire facility.

Comment Number	Draft Section	Comment	Response
8 (cont'd)			Detailed information on the geology and hydrogeology of the LBNSY and Terminal Island is presented in the RI, Section 2.1 (Bechtel National, Inc., 1997) and will not be repeated here in its entirety. Beneath the surficial deposits on Terminal Island are four major aquifers, occupying the southern part of the West Coast Basin. The Gaspur aquifer comprises coarse-grained lower Recent geological deposits. Underlying the Gaspur aquifer is the Gage aquifer, within the Lakewood Formation, and the Lynwood and Silverado aquifers within the San Pedro Formation. Subsidence within the LBNSY occurred during the 1940's and 1950s as a result of oil production activities in the Terminal Island area. In order to control subsidence, water injection for pressure maintenance and repressurization was initiated in the 1950s, and full-scale repressurization was implemented by 1960. Benchmark elevation declines stopped within 2 years of repressurization. No detailed information, specific to IR Sites 8, 10, and 11, is available on constructed fill, near surface native soil, geology, or hydrogeology.
9	Section 2.2.6, p.2-5, paragraph 1	This is the first time the Gaspur aquifer is discussed. Other aquifers were discussed in the previous section. Please clearly define all aquifers from the surface to the maximum relevant depth prior to discussing the individual characteristics of any of these aquifers.	Detailed information on the hydrogeology of the LBNSY and Terminal Island is presented in the RI, Section 2.1 (Bechtel National, Inc., 1997) and will not be repeated here in its entirety.

Comment Number	Draft Section	Comment	Response
9 (cont'd)			Beneath the surficial deposits on Terminal Island are four major aquifers, occupying the southern part of the West Coast Basin. The Gaspur aquifer comprises coarse-grained lower Recent geological deposits. Underlying the Gaspur aquifer is the Gage aquifer, within the Lakewood Formation, and the Lynwood and Silverado aquifers within the San Pedro Formation. Section 2.2.6, paragraph 1 was changed to read: "At the LBNSY, there is potential for local interchange of ground-water between the shallow water-bearing intervals and the underlying aquifer(s). This potential for local interchange is due to the predominance of silty sand and floodplain silt in the surficial deposits, which are expected to have local areas of increased vertical permeability (Piper et al., 1953). In the area around Dry Dock No. 1, however, shallow piezometers reportedly showed little to no response to lowering of the potentiometric head in the Gaspur aquifer, the shallow aquifer comprised largely of coarse-grained lower Recent geologic deposits that underlies Terminal Island. This apparent lack of response indicates that significant groundwater communication between the shallow water-bearing zone and the Gaspur aquifer probably is not occurring (WCC, 1978)."

Comment Number	Draft Section	Comment	Response
10	Section 2.2.6, p. 2-5, paragraph 2	The text indicates that direct groundwater interaction between marine water and groundwater is expected to be minimal due to the presence of the sea wall. Please discuss the nature of the construction materials used to build the sea wall and the likely permeability of the sea wall to water flow.	The seawall was constructed by the Navy during the early 1940s. Information on its construction is included in the "Initial Assessment Study of Naval Complex, Long Beach, California," completed by the Department of the Navy (DON) in August 1983. This document is part of the administrative record for IR Sites 8, 10, and 11, and is, by law, publicly available information. Because information on the construction of the sea wall is available in the referenced document, no further information on the sea wall was added to the text of the SF. Reference: Department of the Navy. 1983. "Initial Assessment Study of Naval Complex, Long Beach, California." Naval Energy and Environmental Support Activity.
11	Section 2.2.9, p. 2-7, paragraph 1	The text indicates that the constituents present at adjacent sites do not appear to affect IR Sites 8, 10, and 11. Please provide a figure illustrating the location of adjacent sites in relation to Sites 8, 10, and 11 and, if known, the primary chemicals of concern at these sites.	Information on the environmental investigations performed at various locations within the LBNSY, including a figure (Figure 1-2) showing the location of IR Sites 8, 10, and 11 in relation to other sites investigated, is presented in the RI, Section 1.3 (Bechtel National, Inc., 1997) and will not be repeated here. The last two sentences of the paragraph were changed to read: "Environmental investigations were performed at the several locations around the LBNC. Information from these investigations is summarized in the RI report (BNI, 1997a)." Figure 1-1 was modified to show IR Sites 8, 9, 10, 11, 12, and 13.

Comment Number	Draft Section	Comment	Response
12	Section 2.3.1.1, p. 2-8, paragraph 2	The description of the site features would be aided by a facility map identify the cited features. Please provide. Furthermore, please site the time frame of the aerial photography and indicate whether these photos actually show the methods of mechanical placement (i.e., bulldozers and scrapers) cited here.	Stratigraphic information, including maps, figures, and more detailed information about fill materials, areas filled, and fill thicknesses, is available in Section 2.2, "Local Features," of the RI (Bechtel National, Inc. 1997), and will not be repeated here. The aerial photography does not document methods of mechanical placement of fill materials. The discussion of local features in the RI is based on a LBNC facility-wide investigation performed for Naval Station Long Beach. The purpose of the investigation was to satisfy data needs common to all of the sites being investigated as part of the RI/FS process. No more detailed information specific to IR Sites 8, 10, and 11 is available.
13	Section 2.3.1.1, p. 2-8, paragraph 4	Please identify the former location of the Rattlesnake Island shoreline or barrier island location on the facility map.	The former location of Rattlesnake Island in relation to the existing configuration of Terminal Island is shown in Figure 2-5, "1872 and Present Extents of Terminal Island," of the RI (Bechtel National, Inc., 1997) and will not be repeated here.
14	Section 2.3.1.1, pp. 2-8 & 2-9	In the site specific description, please indicate which of the descriptions apply to IR Sites 8, 10, and 11. The proximity of sites 8, 10, and 11 to the described areas such as Dry Dock No. 1 and Ocean Boulevard, for example, is not apparent form the description. Ocean Boulevard is not labeled on Figure 1-1.	FS Figure 1-1 of the LBNC and IR Sites 8, 10, and 11 shows the locations of these sites relative to piers, parking lots, dry docks, oil production easements, and other features of the LBNC. The site descriptions, as written, apply to IR Sites 8, 10, and 11. Because of the nature and long-term "construction" of the land area of the LBNC, no more accuracy in the detail of description can be provided for the fill materials and native sediments. However, more detailed descriptions of the stratigraphic features of the LBNC are available in Section 2.2 of the RI (Bechtel National, Inc., 1997).
15	Section 2.3.1.2, p. 2-9, paragraph 3	Please cite technical references to support the conclusion that these geochemical values are typical of fine-grained sediments.	The text in the FS is excerpted directly from the RI (Bechtel National Inc., 1997). No further discussion or technical references are provided in the RI.
16	Section 2.3.1.2, p. 2-10, paragraph 1	Please discuss typical ranges of TOC concentrations relative to contaminant fate and distribution processes.	The text in the FS is excerpted directly from the RI (Bechtel National Inc., 1997). No further discussion or technical references are provided in the RI.

Comment Number	Draft Section	Comment	Response
17	Section 2.3.2.1, p. 2-10, paragraph 1	Please discuss how groundwater elevation measurements collected over a period of several days are sufficient to indicate monthly and/or seasonal fluctuations related to tide cycles or other seasonal events. Also address how longer-term variations will be projected to determine the impact of long-term variations on contaminant transport.	During the RI (Bechtel National Inc., 1997), groundwater elevations were measured in 30 monitoring wells within the LBNC over a period of several days. Monitoring was done to evaluate the influence of the tides on groundwater flow within the shallow, unconfined water bearing zone. These measurements were used to gauge tidal influence only and were not extrapolated. Rather, a comparison was made between tidal elevations as measured from a stilling well mounted on a pier in the inner harbor and the changes in groundwater levels as measured in the monitored groundwater wells. The tidal curve from the stilling well shows a sinusoidal trend generally matching that of the Pacific coast. However, water levels from the monitored wells generally lack sinusoidal character, thus suggesting that groundwater elevations on Terminal Island are not significantly affected by harbor tides. If harbor tides do not significantly affect groundwater elevations on Terminal Island, then seasonal variations in harbor tides would not be expected to significantly affect groundwater elevations on Terminal Island. Further, if harbor tides do not significantly affect groundwater elevations on Terminal Island, then they would not be expected to significantly impact contaminant transport in groundwater. If harbor tides are not expected to significantly impact contaminant transport in groundwater, then it is unnecessary to develop projections of how variations in tides might impact contaminant transport. Section 2.3.2.1, paragraph 3, of FS states: "... the general absence of a sinusoidal water-level trend for wells on Terminal Island suggests that groundwater elevations on Terminal Island are not significantly influenced by harbor tides..."

Comment Number	Draft Section	Comment	Response
17 (cont'd)			Section 2.2 of the RI (Bechtel National, Inc.) discusses groundwater conditions, including groundwater flows, groundwater gradients, and tidal influences in detail.
18	Section 2.3.2.1, p. 2-11, paragraph 1	The text indicates that one possible reason for the absence of fluctuations in wells is the distance of those wells from the shoreline. Please discuss whether wells are or should be located closer the shoreline to detect seasonal trends. Please include figures showing the location of all wells relevant to Sites 8, 10, and 11.	During the RI (Bechtel National Inc., 1997), groundwater elevations were measured in 30 monitoring wells within the LBNC over a period of several days. Monitoring was done to evaluate the influence of the tides on groundwater flow within the shallow, unconfined water bearing zone. The conclusion drawn in the RI and restated in the FS is that groundwater elevations on Terminal Island are not significantly affected by harbor tides, and, therefore, that contaminant transport in groundwater is not significantly impacted by harbor tides. Extrapolating from that conclusion (see Comment 17, above), if harbor tides do not significantly influence contaminant transport in groundwater on Terminal Island, then it is unnecessary to install wells close to the shoreline specifically to measure seasonal trends and variations. Figures 2-22 and 2-23, Groundwater Level Monitoring Event Nos. 2 and 11, respectively, in the RI show 7 of the 30 wells monitored for tidal influences, as listed in Table 2-6, "Monitoring Wells Used for Tidal Survey" of the RI. These are the only wells relevant to tidal influences on RI Sites 8, 10, and 11.
19	Section 2.3.2.2, p. 2-11, paragraph 1	Please include and/or cite figures illustrating groundwater gradients and flow directions.	Groundwater gradients and flow directions for the LBNSY are shown in Figures 2-22 and 2-23 of the RI (Bechtel National, Inc., 1997). These figures illustrate groundwater surface elevations for two of the 15 monitoring events discussed in the text of the FS. The following sentence was added to Section 2.3.2.2, paragraph 2: "Groundwater surface elevations for two of the 15 monitoring events are shown in the RI, Figures 2-22 and 2-23 of the final RI report (BNI, 1997a)."

Comment Number	Draft Section	Comment	Response
20	Section 2.3.2.2, p. 2-12, paragraph 1	Please discuss the nature of the reported dewatering activities at the SCE facilities, and the potential influence of dewatering on Sites 8, 10, and 11.	The shallow dewatering system in operation at the SCE Long Beach Generating Station (LBGS) may be influencing the northerly to northeasterly groundwater flow direction in the shallowest water-bearing interval of surficial deposits. A review of historic groundwater elevation data compiled from investigations performed at LBNSY and other sites on Terminal Island indicates that the dewatering operations probably influence groundwater flow directions as far away as the central portion of Naval Station Long Beach. The dewatering system at the SCE facility consists of about 210 well points situated around the perimeter of the eastern half of the LBGS. The pumped groundwater is discharged with the plant cooling water under a NPDES permit. The SCE dewatering system is the probable discharge location of groundwater from IR Sites 8, 10 and 11 as well as the dominant influence on shallow groundwater flow direction within the LBNSY.
21	Section 2.3.2.3, p. 2-12, paragraph 1	Groundwater flow in the area of Site 8 is mentioned, but is not discussed for the area of Sites 10 and 11. Please provide site specific data on groundwater gradient and direction for all sites covered by this FS.	Groundwater gradients and flow directions for the LBNSY are discussed in detail in Section 2.2 of the RI and are shown in Figures 2-22 and 2-23 of the RI (Bechtel National, Inc., 1997). Monitoring data are provided in Table 2-7 of the RI and will not be repeated here. In general, groundwater within the shallow water-bearing intervals of the LBNSY flows in a northerly direction, away from the ocean. In the eastern part of the LBNSY, it flows toward the north-northwest. In the vicinity of IR Site 8, groundwater flow varies from northeast to east. In the vicinity of IR Sites 10 and 11, it flows in a general north to northeasterly direction.

Comment Number	Draft Section	Comment	Response
21 (cont'd)			Section 2.3.2.3, paragraph 1 was changed to read: "As discussed in Section 2.3.2.1, groundwater elevations in the shallow water-bearing intervals on the mainland do not appear to be significantly influenced by tides. In general, groundwater within the shallow water-bearing intervals flows in a northerly direction (the direction of the regional gradient), away from the ocean. In the vicinity of the dry docks and in the eastern part of the LBNSY, it flows toward the north-northwest. In the vicinity of IR Site 8, groundwater flow varies from northeast to east. In the vicinity of IR Sites 10 and 11, it flows in a general north to northeasterly direction. A depression in the groundwater surface appears to be located in the area around the northern ends of Dry Dock Nos. 1 and 2."
22	Section 2.4.2, p. 2-13, paragraph 1	Please explain why the thickness of the fill layer must be identified on the basis of historical information rather than borings. Discuss whether the bottom of fill was identified in any borings.	The contact between the fill and native materials is not easily identified in borings or in cone penetration test (CPT) soundings in the LBNSY. Thus, throughout much of the LBNSY, the thickness of the fill layer is best identified on the basis of historical information rather than borings. Borehole logs, CPT soundings, and geotechnical data were used to supplement historical information in order to infer approximate contacts between hydraulic fill and native sediments. The hydraulic fill materials of the LBNSY consist of loose to medium dense, predominantly fine-grained sand and silty sand, and lenses and pockets of soft to firm sandy silt and silt, with local lenses of shells and silty clay. The soil types and thicknesses are highly variable throughout the fill, and individual sediment layers lack lateral continuity. Over much of the LBNSY, construction-related fill material was placed on top of the hydraulic fill material. Fill materials were also worked mechanically with bulldozers and scrapers, to bring ground elevations to more uniform heights. Over much of the LBNSY, the mechanically worked fill material is largely indiscernible from hydraulically placed fill.

Comment Number	Draft Section	Comment	Response
23	Section 2.4.2, p. 2-13, paragraph 2	Please explain how two groundwater measurements collected during one day are sufficient to allow conclusions to be drawn about tidal influence.	During the RI (Bechtel National Inc., 1997), groundwater elevations were measured in 30 monitoring wells within the LBNC over a period of several days. At the same time, tidal elevations were measured using a stilling well mounted on a pier in the inner harbor. To evaluate the influence of the tides on groundwater flow within the shallow, unconfined water bearing zone, a comparison then was made between tidal elevations as measured from the stilling well and the changes in groundwater levels as measured in the monitored groundwater wells. The tidal curve from the stilling well shows a sinusoidal trend generally matching that of the Pacific coast. However, water levels from the monitored wells generally lack sinusoidal character, thus suggesting that groundwater elevations on Terminal Island are not significantly affected by harbor tides.
24	Section 2.4.2, p. 2-15	A pH of 7.06 is neutral, not slightly basic, considering instrument and calibration accuracy.	The penultimate sentence of Section 2.4.2 was changed to read: "A pH value of 7.06 was noted in a groundwater sample from MW-24, indicating that the pH of the water beneath IR Site 8 is within the range for seawater."
25	Section 2.4.3, p. 2-16, paragraph 1	Please specify the engineering properties that were analyzed for in soil sample SP-08-03.	The fifth sentence of the paragraph was changed to read: "Two soil samples (SP-8-03 at 11 to 11.5 ft bgs and 11.5 to 12 ft bgs) were analyzed for engineering parameters. These data were used to classify soils from the saturated zone and to identify dry density, moisture content, specific gravity, grain size, and Atterberg limits for evaluation and contaminant fate and transport." Additional information can be obtained from Appendix M of the IR, which contains the geotechnical laboratory results.

Comment Number	Draft Section	Comment	Response
26	Section 2.4.3, p. 2-16	Please define the Conditional Phase of the study. The Conditional Phase is not identified in Table 1-1.	The reference to "the Conditional Phase of the study" is unnecessarily confusing. The phrase was deleted, and Section 2.4.3, paragraph 3 was changed to read: "Later in the site characterization, Geoprobe® samplings were taken at three additional locations (HP-8-01, HP-8-02, and HP-8-03) in the area immediately south of the IR Site 8 fence line to collect subsurface soil samples for confirmation of nondetects."
27	Section 2.4.3, p. 2-16, paragraph 3	Please define the Planned Phase as this phase was not included in Table 1-1. Please discuss the general groundwater quality parameters that were analyzed in these samples.	The reference to "the Planned Phase of sampling" is unnecessarily confusing. The phrase was deleted, and Section 2.4.3, paragraph 5 was changed to read: "No groundwater monitoring wells were installed within IR Site 8. However, an existing monitoring well, MS-24, which was installed during the SI, was sampled." The groundwater sample collected from MW-24 was analyzed for the following water quality parameters: total organic carbon (TOC), using U.S. EPA Method 9060; pH, using U.S. EPA Method 150.1; total dissolved solids (TDS), using U.S. EPA Method 160.1; chloride, using U.S. EPA Method 325.2; alkalinity, using U.S. EPA Method 310.1; and sulfate, using U.S. EPA Method 375.2.
28	Section 2.4.3, p. 2-17, paragraph 2	The Planned and Conditional Phases of the study should be defined.	References to "Planned" and "Conditional" phases are unnecessarily confusing. The terms were deleted, and Section 2.4.3, paragraph 6 was changed to read: "The monitoring well was surveyed during initial sampling, and the piezometers were surveyed upon completion of confirmatory sampling."

Comment Number	Draft Section	Comment	Response
29	Section 2.4.3, p. 2-17, paragraph 3; Section 2.5.3, p. 2-24, paragraph 3; and Section 2.6.3, p. 2-30, paragraph 5.	The text includes a more extensive groundwater level monitoring program than previously described for MW-24, however, no results of this program are discussed. Please clarify.	The groundwater-level monitoring program referred to in Section 2.4.3, paragraph 3 was a facility-wide investigation to establish flow patterns in the upper coarser-grained, water-bearing interval. As such, it was not specific to IR Site 8. However, results of this program led to the selection of well MW-24 for water-level monitoring for the remedial investigation for IR Site 8. Similarly, the groundwater level monitoring program referred to in Section 2.5.3 was a facility-wide investigation to establish flow patterns in the upper coarser-grained, water-bearing interval. As such, it was not specific to IR Site 10. However, the results of the program led to the selection of wells MW-10-01 and MW-10-06 for water-level monitoring for the remedial investigation for IR Site 10. Similarly, again, the ground-water level monitoring program referred to in Section 2.6.3 was a facility-wide investigation to establish flow patterns in the upper coarser-grained, water-bearing interval. As such, it was not specific to IR Site 11. However, selection wells, including MW-11-03 were also monitored specifically for water-level monitoring for the remedial investigation for IR Site 11.
30	Section 2.5.2, p.2-18, paragraph 2	Please discuss why the thickness of the constructed hydraulic fill must be determined from aerial photography rather than from site specific borings. Discuss whether the bottom of fill was identified in any Site 10 borings.	The contact between the fill and native materials is not easily identified in borings or in CPT soundings in the LBNSY. Thus, throughout much of the LBNSY, the thickness of the fill layer is best identified on the basis of historical information rather than borings. The hydraulic fill materials of the LBNSY consist of loose to medium dense, predominantly fine-grained sand and silty sand, and lenses and pockets of soft to firm sandy silt and silt, with local lenses of shells and silty clay. The soil types and thicknesses are highly variable throughout the fill, and individual sediment layers lack lateral continuity.

Comment Number	Draft Section	Comment	Response
30 (cont'd)			Over much of the LBNSY, construction-related fill material was placed on top of the hydraulic fill material. Fill materials also were worked mechanically with bulldozers and scrapers, to bring ground elevations to more uniform heights. Over much of the LBNSY, the mechanically-worked fill material is largely indiscernible from hydraulically placed fill. At IR Site 10, soil borings were not deep enough to penetrate to native sediments. Hydropunch® samples and CPT soundings were used to supplement historical information to infer approximate contacts between the hydraulic fill and the native sediments.
31	Section 2.5.2, p. 2-20, paragraph 3	The text makes conclusions on groundwater flow direction from monitoring during June and July 1995. Please discuss whether seasonal variations in gradient or direction are expected.	Seasonal variations in groundwater flow direction and gradients are expected to be minimal. Groundwater flow within the LBNSY is in the general direction of the regional gradient. In addition, groundwater flow and groundwater levels are influenced only minimally by harbor tides. Direct groundwater interaction with marine surface water is minimized by the seawall.
32	Section 2.5.2, p. 2-21, paragraph 2	Please discuss the relevance of the measured TOC concentrations in saturated soils.	TOC samples were analyzed to evaluate general soil and groundwater chemistry. To concentrations in saturated soils were used for comparison with TOC concentrations in groundwater.
33	Section 2.5.2, p. 2-21, paragraph 5 and Section 2.6.2, p. 2-28, paragraph 3	The comments indicated that SC is directly related to TDS. Please discuss whether the consistent relationship between these parameters was observed at various sites.	A consistent positive relationship was observed between TDS concentrations and SC at IR Sites 8, 9, 10, 11, 12, and 13. TDS for brackish water is 1,000 to 10,000 mg/L. SC for harbor water was measured at 53,500 µmhos/cm. Data are calculated in the table shown below.

	IR Site 8	IR Site 9	IR Site 10	IR Site 11	IRSite 12	IR Site 13
TDS Concentration (mg/L)	6,220	21,000 to 33,500	9,900 to 33,500	14,500 to 34,100	5,400 (MW-44) 33,000	29,200
SC (µmhos/cm)	7,880	>19,000*	>20,000*	>19,000*	3,890 (MW-44) 16,940	19,620

* The limit of the upper range of the measuring instrument was 19,000 to 20,000 µmhos/cm.

Comment Number	Draft Section	Comment	Response
		Section 2.0—Specific Comments (continued)	
34	Section 2.5.3, p. 2-22, paragraph 4	Please specify the location of the major GPR anomalies are discussed in the FS report. One is shown on Figure 2-2; if both anomalies were included in the figure, this figure could be referenced.	Only one ground-penetrating radar (GPR) anomaly was found relevant to IR Site 10, It is located in the southwestern corner of the site, as shown in Figure 2-2 of the FS. The GPR records indicate that a structure or materials of a rectangular or other geometric shape may lie beneath the ground surface in the southwest corner of IR Site 10. The object observed on the GPR record may be a subsurface steam tunnel or electric vault. The utility clearance contractor provided a warning "Do Not Dig" on the GPR record for this area. The text of Section 2.5.3, paragraph 4 contains an error which misidentifies the location of the GPR. The relevant clause of Section 2.5.3, paragraph 4 (now paragraph 2) was changed to read: "...a proposed monitoring point in the southwestern area of the site was abandoned due to an extensive ground-penetrating radar (GPR) anomaly in the area;..."
35	Section 2.5.3, p. 2-22, paragraph 3	Please define the Conditional Phase of the study and include in Table 1-1.	The reference to "the Conditional Phase of sampling" is unnecessarily confusing. The phrase was deleted, and text in Section 2.5.3, paragraph 3 was changed to read: "Two CPT soundings were conducted at IR Site 10 during confirmatory sampling."
36	Section 2.5.3, p. 2-23, paragraph 2	Please define the Planned and Conditional Phases of the study.	References to "Planned" and "Conditional" phases are unnecessarily confusing. The terms were deleted, and Section 2.5.3, paragraph 2 (now paragraph 4) was changed to read: "At IR Site 10, soil samples were collected at for Strataprobe™ locations (SP-10-01 through SP-10-04), five monitoring well locations (MW-10-01 through MW-10-04 and MW-10-06), and two boring locations (SB-10-01 and SB-10-02)."

Comment Number	Draft Section	Comment	Response
37	Section 2.5.3, pp. 2-23, paragraph 4 and 2-24, paragraph 1	The text indicates that monitoring wells were completed with materials best suited for that portion of the water bearing zone. Please specify the characteristics of the water bearing zone that were used to determine the selection of materials and what materials were used.	Selection of materials for well construction at the LBNSY was based on professional judgment and experience. The construction details, including screening and sealing materials and intervals, for installation of the monitoring wells at IR Site 10 are presented in RI Table 2-2, and are summarized in Section 2.2 of the RI (Bechtel National, Inc., 1997). The boring and well development process is summarized in Section 4.3 of the RI. Detailed procedures for the process are contained in Appendix A of the RI. Well installation, development, and sampling for IR Site 10 are discussed in Section 5.3 of the RI. They are not repeated here.
38	Section 2.6.2, p.2-25	Please discuss why the thickness of the fill material must be determined from aerial photography rather than from site borings. Discuss whether the bottom fill was determined in any Site 11 borings. Also discuss whether the fill includes the sandblast abrasive placed in the southern part of the site (ES, p.v.)	The contact between the fill and native materials is not easily identified in borings or in CPT soundings in the LBNSY. Thus, throughout much of the LBNSY, the thickness of the fill layer is best identified on the basis of historical information, including aerial photographs, rather than borings. The hydraulic fill materials of the LBNSY consist of loose to medium dense, predominantly fine-grained sand and silty sand, and lenses and pockets of soft to firm sandy silt and silt, with local lenses of shells and silty clay. The soil types and thicknesses are highly variable throughout the fill, and individual sediment layers lack lateral continuity. Over much of the LBNSY, construction-related fill material was placed on top of the hydraulic fill material. Fill materials were also worked mechanically with bulldozers and scrapers, to bring ground elevations to more uniform heights. Over much of the LBNSY, the mechanically-worked fill material is largely indiscernible from hydraulically placed fill.

Comment Number	Draft Section	Comment	Response
38 (cont'd)			At IR Site 11, soil borings were not deep enough to penetrate to native sediments. Hydropunch® samples and CPT soundings were used to supplement historical information to infer approximate contacts between hydraulic fill and native sediments. Following a soils investigation at IR Site 11 in 1994 and 1995, approximately 1,400 cubic yards of sandblast-contaminated soil were removed from the southern hillside of IR Site 11 and placed in the level area to the south, but still within the site. This activity is documented in detail in *Removal Action Closeout Report, Including As-Built Records, IR Site 11 - Hillside East of Dry Rock 1, Long Beach Naval Shipyard, Long Beach, California* (International Technology Corporation, 1995). No sandblast grit was found on the northern hillside of the site. The level area at the southern end of IR Site 11 is now estimated to contain about 3,700 cubic yards of soil mixed with sandblast grit. This area is graded and sealed with a protective cover of wire mesh and shotcrete. At the time of the RI investigations (Bechtel National, Inc., 1997), two areas of IR Site 11 contained visible sandblast grit: the level shotcrete-covered area of the southern part of the site; and the southern hillside. No sandblast grid was observed in any of the other areas of the site.
39	Section 2.6.2, p. 2-27, paragraph 3	Please discuss whether seasonal changes in groundwater gradient or flow direction are anticipated.	Seasonal variations in groundwater flow direction and gradients are expected to be minimal. Groundwater flow within the LBNSY is in the general direction of the regional gradient. In addition, groundwater flow and groundwater levels are influenced only minimally by harbor tides. Direct groundwater interaction with marine surface water is minimized by the seawall.

Comment Number	Draft Section	Comment	Response
40	Section 2.6.2, p. 2-27, last paragraph	If sandblast abrasive was disposed at Site 11, the EEC and TOC values of Site 11 soil might be very different than the values for Sites 10 and 12 soils. Please discuss.	Cation exchange capacity (CEC) in unsaturated soils at IR Site 10 was measured at between 0.050 and 0.064 milliequivalent per gram (meq/g). CECA in unsaturated soils at IR Site 12 was measured at 0.039 meq/g. These values are typical of coarse-grained sediments not capable of sobbing (exchanging) large quantities of cations. Addition of sandblast grit, which is also coarse-grained material, to such soils would not be expected to have a significant effect on the CECA of the soil. Total organic carbon (TOC) in saturated soils at IR Site 10 was measured at 1,000 and 1,800 mg/kg (0.10 and 0.18 percent). TOC in saturated soils at IR Site 12 was measure at between 500 and 800 g/kg (0.05 to 0.08 percent). These values show little organic carbon present in the saturated soils of IR Sites 10 and 12. Addition of sandblast grit, which also contains little organic carbon, to such soils would not be expected to have a significant effect on the TOC of the soil.
41	Section 2.6.3, p. 2-29, paragraph 1	Please discuss whether the various oil lines crossing the site may leak and provide a source of contamination.	It is possible that the oil lines crossing IR Site 11 could leak and provide a source of contamination. However, there is no evidence of any oil leakage from these lines in any of the site investigation activities conducted to date.
42	Section 2.6.3, p. 2-29, paragraph 3 and p. 2-30, paragraph 1	Please explain why it was not necessary to determine materials of construction for the wells based upon local groundwater conditions at IR Site 11 as it was at IR Site 10.	The presupposition of this comment is false. Section 2.6.3 neither states nor implies that "it was not necessary to determine materials of construction for the wells based upon local groundwater conditions." Selection of materials for well construction during the RI was based on professional judgment and experience. The boring and well development process is summarized in Section 4.3 of the RI (Bechtel National, Inc., 1997). Detailed procedures for the process are contained in Appendix A of the RI. Well installation, development, and sampling for IR Site 11 are discussed in Section 5.4 of the RI. They are not repeated here.

Comment Number	Draft Section	Comment	Response
43	Section 2.6.4, p. 2-31, paragraph 2 and p. 2-33, last paragraph	Please estimate the amount of sandblast grit that was not removed from the hillside.	According to the RI, Section 5.4.1 (Bechtel National, Inc., 1997), no records were found to document the quantity of spent sandblast abrasives ultimately disposed of at IR Site 11. However, as reported in the "Initial Assessment Study of Naval Complex, Long Beach, California," completed by the DON in August 1983, the volume of these fill materials was estimated to be about 6,400 cubic yards. Some sandblast material was removed from the southern hillside in 1977, when Parking Lot G was surfaced. The "Removal Action Closeout Report, Including As-Built Records, IR Site 11 - Hillside East of Dry Dock 1, Long Beach Naval Shipyard, Long Beach, California" (International Technology Corporation, 1995), reports that after removal of the sandblast abrasives, the hillside was regraded, covered with 6 inches of compacted topsoil, and revegetated with ice plant. In January and February 1994, about 1,400 cubic yards of sandblast contaminated soil were removed from the southern hillside and placed in the level area to the south. The level area is now estimated to contain about 3,700 cubic yards of soil mixed with sandblast grit. According to the RI, Section 5.4, no sandblast grit was found on the northern hillside. If the initial quantity of sandblast grit emplaced at IR Site 11 was about 6,400 cubic yards, and if the level area is now estimated to contain about 3,700 cubic yards of sandblast grit and soil, and if there is no sandblast grit on the northern hillside, the amount of sandblast grit that was not removed from the southern hillside can be estimated roughly as 3,000 cubic yards.

Comment Number	Draft Section	Comment	Response
43 (cont'd)			Reference: International Technology Corporation. 1995. "Removal Action Closeout Report, Including As-Built Records, IR Site 11 - Hillside East of Dry Dock 1, Long Beach Naval Shipyard, Long Beach, California." Contract No. N47408-92-D-3056, Delivery Order 0008. Prepared for Naval Construction Battalion Center, Naval Facilities Engineering Command.
44	Figure 2-3	Please indicate the nature and relevance of the oil production easement.	The oil production easement, an area north of IR Site 11, is an active oil production facility not under the control of LBNSY. It is used by the City of Long Beach for oil production activities.
45	Figure 2-4	Please include the locations of removal actions on this figure.	The key to Figure 2-4 was changed to indicate the location of removal actions at IR Site 11.
Section 3.0: Nature and Extent of Contamination—Specific Comments			
1	Section 3.0, p. 3-1, bullet 1	For the convenience of a reader from the public, please define sampling "step-out" activities.	The reference to "sampling step-out activities" is unnecessarily confusing. The phrase was deleted, and the bullet was changed to read: "Contaminant populations were identified, and background levels were calculated to determine threshold values. Screening of RI field sampling activities was done to 'nondetect' levels for organic compounds,..."
2	Section 3.0, p. 3-1, bullet 3	A brief summary of or reference to the methodology for determing background values is needed.	The method used to identify background concentrations of metals in soil and groundwater was a three step process: (1) identify the background population from a compiled data set; (2) select an appropriate statistical procedure based on the distribution of data; and (3) calculate background level. This three-step process is described in detail in Section 3.2 of the RI (Bechtel National, Inc., 1997). In addition, Figure 3-1 of the RI is a flow chart that provides detailed guidance for calculating background threshold values.

Comment Number	Draft Section	Comment	Response
2 (cont'd)			Metals in soils at the LBNSY were screened against both statistically- and geochemically-calculated background levels in order to distinguish site-related contamination from background. This distinction was important in areas where soils and subsurface materials were either partly or primarily fill materials transported to the sites from elsewhere. The RI (Bechtel National, Inc., 1997), Section 3.2 and Appendices E and F, contains a description of the methods used to establish these criteria, and is not repeated here.
3	Section 3.0, p. 3-2, bullet 1	The text indicates the presence of non-chlorinated solvents at this site, however, on Executive Summary page v the text indicates only that this site was suspected of TCE disposal. Please discuss the potential sources of the non-chlorinated solvents and metals detected in groundwater at the site.	IR Site 8 is identified as the Building 210 Trichloroethylene Disposal Site because of the trichloroethylene (TCE) thought to have been disposed there in the past. Sources of information about potential contamination include records, aerial photographs, surface and aerial surveys, and personnel interviews. Historically, Building 210 contained an electronic weapons shop that generated about 200 gallons of TCE, along with acids and plating solutions, that were disposed of along the fence line of the site. Although direct, quantitative documentation does not exist, historic contamination of IR Site 8 with non-chlorinated solvents and metals could have resulted from electronic weapons shop activities.
4	Section 3.1.1, p. 3-2, paragraph 3	For IR Site 8 please discuss whether the reported 200 gallons of TCE in Building 210 was generated on an annual basis or whether 200 gallons of TCE were estimated to have been generated over the total of the life of facility. In addition please provide, if possible, the time frame for operation of Building 210.	As reported in the "Initial Assessment Study of Naval Complex, Long Beach, California," completed by the DON in August 1983, the Building 210, which is an electronic weapons repair facility, was constructed in 1970. Between 1974 and 1980, a total of about 200 gallons of TCE was estimated to have been disposed on at this site. It was reported that each year, about 25 to 30 gallons of TCE and smaller amounts of acids and metal plating solutions generated by the electronic weapons shop in Building 210 were disposed of in small quantities, sometimes along the fence line in the area defined as IR Site 8. Additional historical details about past and present land uses at and around IR Site 8 is presented in Section 5.1 of the RI (Bechtel, International, Inc., 1997) and is not repeated here.

Comment Number	Draft Section	Comment	Response
5	Section 3.1.4, p. 3-4	The second sentence in this paragraph appears to be missing several words. Please clarify.	The second sentence of Section 3.1.4 was changed to read: "Detailed information about fate and transport analyses and results for IR Site 8 are presented in Section 5.7 of the RI (BNI, 1997a)."
6	Table 3-2	There is no background level organics. It appears that the fifth column heading should be ratio of maximum concentrations to PRG or background for the organics (consistent with Table 3-3). Please revise.	The heading of the fifth column of Table 3-2 was changed to read: "Ratio of Maximum Concentration to PRG or Background."
7	Section 3.1.4.1, p. 3-7, paragraph 1	Please define the nature of the reported dewatering activities at the SCE facilities, and their potential influence on Site 8, 10, and 11. Please state why a saturated thickness of 30 feet must be assumed for transport analysis. Also, please justify the use of assumed values for hydraulic gradient and effective porosity.	The shallow dewatering system in operation at the SCE LBGS may be influencing the northerly to northeasterly groundwater flow direction in the shallowest water-bearing interval of surficial deposits. A review of historic groundwater elevation data compiled from investigations performed at LBNSY and other sites on Terminal Island indicates that the dewatering operations probably influence groundwater flow directions as far away as the central portion of Naval Station Long Beach. The dewatering system at the SCE facility consists of about 210 well points situated around the perimeter of the eastern half of the LBGS. The pumped groundwater is discharged with the plant cooling water under a NPDES permit. The SCE dewatering system is the probable discharge location of groundwater from IR Sites 8, 10 and 11 as well as the dominant influence on shallow groundwater flow direction within the LBNSY. An effective porosity of 0.35 is a typical, average effective porosity.

Comment Number	Draft Section	Comment	Response
7			The water table at IR Site 8 occurs within the fill, which overlies a silty sand and sand unit. The thickness of the upper sands (fill and underlying sand) at IR Site 8 is about 35 to 40 ft thick. The shallow water table is about 8 ft bgs. Thus, the shallow water-bearing interval at IR Site 8 is about 27 to 32 ft thick. For purposes of analysis, a saturated thickness of 30 ft was assumed. Groundwater gradient and flow estimates are based on groundwater elevation data from the tidal influence study and other groundwater elevation data collected from monitoring wells during RI field investigations. Groundwater surface elevation contours for the LBNSY are shown in Figures 2-22 and 2-23 of the RI (Bechtel National, Inc., 1997). The groundwater elevation gradient ranges from a minimum of 0.002 in the areas between IR Sites 8 and 9, to a maximum of 0.013 in the vicinity of Dry Docks No. 2 and 3, and at IR Site 10. For purposes of analysis, a hydraulic gradient of 0.006 was assumed for IR Site 8. Further details of the hydro-geologic investigation of the LBNSY are in Section 2.2.2 of the RI (Bechtel National, Inc., 1997) and are not repeated here.
8	Section 3.1.4.2, p. 3-10, paragraph 2 and Section 3.2.4.2, p. 3-20	Please briefly state the nature of the Summers model, so that a reader from the public could understand why this model was used.	The Summers model, based on the U.S. EPA's *Determining Soil Response Action Levels Based on Potential Contaminant Migration to Groundwater: A Compendium of Examples* (EPA/540/2-89/057), is used to evaluate whether soil COPCs at levels exceeding applicable criteria have the potential to reach groundwater. More detailed information about the Summers model, including equational representation, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here.

Comment Number	Draft Section	Comment	Response
9	Section 3.2.2, p. 3-11, paragraphs 2 and 3	Please briefly summarized the listed SVOCs and PAHs detected in soil samples or cite the location of tables showing these data.	The semivolatile organic compounds (SVOCs) and poly-aromatic hydrocarbons (PAHs) detected in soil samples at IR Site 10 are listed in Table 3-3 of the FS. SVOC and PAH analytical data for soil samples are summarized in Appendix D, Table D-13 of the RI (Bechtel National, Inc., 1997). A sentence was added to Section 3.2.2, paragraph 2: "Table 3-3 lists the SVOCs and PAHs analyzed and detected in IR Site 10 soils."
10	Table 3-3	Based upon this table, the PAH with highest ratio of maximum concentration to PRG was benzo(a)pyrene, a carcinogenic PAH which was detected at more than 10 times the industrial PRG. Please explain whey benzo(a)pyrene is not a COC and why remediation is not required.	The frequency of detection, (i.e., the number of measurable detections/number of samples analyzed) for benzo[a]pyrene at IR Site 10 was low, 2/12. Both detects were in the northeast corner of the site, which is currently paved with asphalt. In general, at the LBNSY, human exposure to contaminants via the air pathway is considered to be a minor concern. However, there are a few places where surface contamination from organic compounds that absorb to the soil (e.g., PAHs) is potentially of concern. Because the releases at these sites occurred some time ago, continued volatilization of these compounds is not likely to represent a concern for the air pathway , unless it occurs within a confined space such as a building or building basement. IR Site 10 currently has no buildings and is paved with asphalt. Thus, human exposure to pyrene through the air pathway is considered to be of little concern at the site. Direct human contact with PAHs in soils at IR Site 10 is considered to be only a minor exposure pathway. The highest potential for direct contact exists if workers are exposed to soil contamination while excavating within or near a contaminant source area. The groundwater underlying the LBNSY is considered non-potable, so the ingestion pathway for human exposure to contaminants is not of concern.

Comment Number	Draft Section	Comment	Response
10 (cont'd)			The major pathway of concern for groundwater at the LBNSY is discharge to surface water, whereby marine wildlife can be exposed. Much of the shallow groundwater at the main part of the LBNSY is within the capture zone of the SCE dewatering system. The outfall for this system is located on the eastern end of Terminal Island. The shallow groundwater around Dry Dock No. 1 may be migrating into the Gaspur aquifer via the hydrostatic pressure relief system (HPRS) wells and sand drains. The water from the HPRS wells is discharged to the harbor, providing another potential pathway to surface water. The primary potential pathway for contaminant migration at IR Site 10 is considered to be leaching from the vadose zone, and then transport through the shallow groundwater zone, with discharge through the SCE dewatering system. For IR Site 10, leaching and transport analyses (vadose-zone and saturated-zone migration analyses) were done to determine whether predicted concentrations of contaminants in groundwater, that result from leaching, exceed surface water quality criteria at potential discharge locations to surface water bodies. The vadose-zone migration analysis for existing conditions at IR Site 10 indicated that seven PAHs, including pyrene, may affect groundwater at the AOPC at concentrations above California Ocean Plan criteria (State of California, Water Resources Control Board, 1990 & 1995). The vadose-zone analysis for unpaved conditions at IR Site 10 indicated that 12 PAHs, including pyrene, may affect groundwater at the AOPC at concentrations above California Ocean Plan criteria. These 12 PAHs are then further evaluated for their transport in groundwater.

Comment Number	Draft Section	Comment	Response
10 (cont'd)			Results of the transport analysis for existing conditions at IR Site 10 showed that soil leaching of the seven PAHs would affect groundwater beneath the AOPC and at the SCE wells at concentrations below California Ocean Plan criteria. Without degradation in groundwater, four PAHs, including pyrene, would otherwise exceed California Ocean Plan criteria in groundwater at the AOPC. In fact, the average detected groundwater concentration of pyrene beneath the AOPC presently exceeds its California Ocean Plan criterion. However, modeling results indicated that future leaching would not significantly increase the existing detected concentration in groundwater. According to the American Conference of Governmental Industrial Hygienists (ACGIH), benzo[a]pyrene, CAS# 50-32-8, is a suspect human carcinogen. That is, available epidemiological studies are conflicting or insufficient to confirm an increased risk of cancer in exposed humans (American Conference of Governmental Industrial Hygienists, 1998). Cancer risk for IR Site 10 (AOPC 1) was estimated as part of the HHRA for the site. Both the total upper-bound and the average cancer risks were estimated. The total upper-bound lifetime cancer risk for IR Site 10 was estimated to be 1.6×10^{-5}. Dermal contact and incidental ingestion were the dominant risk pathways. This risk was primarily associated with benzo[a]pyrene, which accounts for 48 percent of the total lifetime cancer risk. The average cancer risk for IR Site 10, which was calculated using U.S. EPA toxicity criteria, was below 1.0×10^{-6}. Risk estimated using Cal-EPA criteria was quantified as 1.1×10^{-6}. The HI associated with exposure to surface soils at IR Site 10 (AOPC 1) does not exceed unity (1.0). A HI of less than 1.0 indicates that non-carcinogenic effects are unlikely.

Comment Number	Draft Section	Comment	Response
10 (cont'd)			Because pyrene at IR Site 10 does not pose a threat to human health or the environment, it is not a COC and does not require remediation. References: American Conference of Governmental Industrial Hygienists. 1998. *1998 TLVs® and BEIs®*. State of California, Water Resources Control Board. 1990. *California Ocean Plan, Water Quality Control Plan, Ocean Waters of California.* State of California, Water Resources Control Board. 1995. *Draft Functional Equivalent Document: Amendment of the Water Quality Control Plan, Ocean Waters of California.*
11	Table 3-4	Please clarify the meaning of the phrase "(mixture)" following 1,2-DCE.	Table 3-4 was excerpted directly from the RI (Bechtel National Inc., 1977). There is no explanation for the use of the term "mixture" in the body of the RI. Laboratory and analysis data for VOCs in groundwater are presented and summarized in Appendix D, Tables D-13 and D-14 of the RI.
12	Section 3.2.3, p. 3-15, paragraph 2	The text indicates that the limits of the non-detect VOC plume beneath IR Site 10 are poorly defined to the south and west of the site in the upper coarser-grained water-bearing interval. Please discuss whether additional investigations are warranted to define the extent of the plume in this area, since this area is probably upgradient of the wells with detected concentrations there may be higher concentrations in this area.	Results of analyses of groundwater samplings for VOCs in the western and southern parts of IR Site 10 showed only low level concentrations of few VOCs. In addition, there was no evidence of higher concentrations of VOCs in these areas. Thus, it is probably neither necessary nor cost-effective to implement additional investigations.
13	Section 3.2.4.1, p. 3-18	Groundwater flow in the area of Site 8 is mentioned, but is not discussed for the area of Sites 10 and 11. Please provide site specific data on groundwater gradient and direction.	Groundwater gradients and flow directions for the LBNSY are discussed in detail in Section 2.2 of the RI and are shown in Figures 2-22 and 2-23 of the RI (Bechtel National, Inc., 1997). Monitoring data are provided in Table 2-7 of the RI and will not be repeated here.

Comment Number	Draft Section	Comment	Response
13 (cont'd)			In general, groundwater within the shallow water-bearing intervals of the LBNSY flows in a northerly direction (the direction of the regional gradient), away from the ocean. In the vicinity of the dry docks and in the eastern part of the LBNSY, it flows toward the north-northwest. In the vicinity of IR Site 8, groundwater flow varies from northeast to east. In the vicinity of IR Sites 10 and 11, it flows in a general north to northeasterly direction. A depression in the groundwater surface appears to be located in the area around the northern ends of Dry Dock Nos. 1 and 2.
14	Section 3.2.4.1, p. 3-18	Please indicate why a saturated thickness of 30 feet is assumed, rather than measured.	The water table at IR Site 10 occurs within the fill, which overlies a silty sand and sand unit. The thickness of the upper sands (fill and underlying sand) at IR Site 10 is about 35 to 40 ft thick. The shallow water table is about 6 ft bgs. Thus, the shallow water-bearing interval at IR Site 10 is about 29 to 34 ft thick. For purposes of analysis, a saturated thickness of 30 ft was assumed. It is not practicable to measure (i.e., cost-effective to measure accurately) saturated thickness at IR sites, as both the thickness of the upper water-bearing layer and the depth to the water table range in value over the sites. Further, more accurate estimates of "saturated thickness" would not significantly reduce the uncertainties associated with contaminant fate and transport models for which the thickness estimates are used.

Comment Number	Draft Section	Comment	Response
15	Section 3.2.4.1, p. 3-20, paragraph 1	Please cite the source for the assumed value for hydraulic gradient and effective porosity values.	Groundwater gradient and flow estimates are based on groundwater elevation data from the tidal influence study and other groundwater elevation data collected from monitoring wells during RI field investigations. Groundwater surface elevation contours for the LBNSY are shown in Figures 2-22 and 2-23 of the RI (Bechtel National, Inc., 1997). The groundwater elevation gradient ranges from a minimum of 0.002 in the areas between IR Sites 8 and 9, to a maximum of 0.013 in the vicinity of Dry Docks No. 2 and 3, and at IR Site 10. Further details of the hydrogeologic investigation of the LBNSY are in Section 2.2.2 of the RI (Bechtel National, Inc., 1997) and are not repeated here. An effective porosity of 0.35 is a typical, average effective porosity.
16	Section 3.2.4.1, p. 3-20, paragraph 2	Please indicate the relevance of the distance from the furthest edge of the AOPC to nearest SCE dewatering well.	The SCE dewatering system is the probable discharge location of groundwater from IR Sites 8, 10, and 11 as well as the dominant influence on shallow groundwater flow direction within the LBNSY. The system consists of about 210 well points situated around the perimeter of the eastern half of the LBGS. This dewatering system may also be influencing the northerly to northeasterly groundwater flow direction in the shallowest water-bearing interval of surficial deposits. A review of historic groundwater elevation data compiled from investigations performed at LBNSY and other sites on Terminal Island indicates that the dewatering operations probably influence groundwater flow directions as far away as the central portion of Naval Station Long Beach.
17	Section 3.2.4.1, p. 3-20, paragraph 4	For the unpaved infiltration scenario, please explain why the infiltration rate changes after 2 years and why, in the period following the initial 2 years, it was assumed that the site will be paved.	The leaching and transport analyses for the COPCs at the IR sites consist of a leaching analysis for the COPCs in the vadose-zone soils and transport modeling for the COPCs leaching through the vadose zone to reach the groundwater. Figure 5-89 of the RI (Bechtel National Inc., 1997) is a flow chart of this analysis process.

Comment Number	Draft Section	Comment	Response
17 (cont'd)			Two infiltration scenarios are considered for evaluating the effects of soil leaching on groundwater contaminant concentrations. The first scenario is based on infiltration under existing surface cover conditions. IR Site 10 is currently paved with asphalt. The second scenario assumes that the LBNSY is completely unpaved (soil cover only) for a period of two years, and then repaved. Section 5.7 of the RI contains more detailed information about infiltration scenarios for migration analyses. A sentence was added to the beginning of Section 3.2.4.1, paragraph 5: "A second infiltration scenario assumes that IR Site 10 is unpaved for 2 years and then repaved."
18	Section 3.2.4.2, p. 3-21, paragraph 2	Please indicate how the VLEACH Model and/or the AT123D Simulations Model vary from, and improve upon, the projections from the Summers model sufficiently to warrant accepting these results over those from the Summers model.	The Summers model is based on the U.S. EPA's 1989 *Determining Soil Response Action Levels Based on Potential Contaminant Migration to Groundwater: A Compendium of Examples* (EPA/540/2-89/057). It is used as a screening tool to evaluate whether soil COPCs at levels exceeding applicable criteria have the potential to reach groundwater. More detailed information about the Summers model, including equational representation, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here. The VLEACH model is based on the U.S. EPA's 1995 *VLEACH - A One-Dimensional Finite Difference Vadose Zone Leaching Model, Version 2.2*. The AT123D model is based on the International Groundwater Modeling Center's 1993 *Analytical Transient one-, Two-, Three-Dimensional Simulation of Waste Transport in the Aquifer System*. These codes are more sophisticated that the Summers model. They were used in concert to perform the saturated-zone transport analysis for IR Site 10, to determine the incremental increase in groundwater contaminant concentrations that result from leaching.

Comment Number	Draft Section	Comment	Response
18 (cont'd)			VLEACH was selected for modeling because it allows time-dependent modeling of desorption by infiltration and volatilization within the vadose zone for a specified soil concentration profile. AT123D is applicable to a wide range of transport analysis situations. AT123D was selected for modeling because it provides an analytical solution for transient, two-dimensional transport of dissolved chemicals in a homogeneous aquifer with a uniform hydraulic gradient. More detailed information about the VLEACH and AT123D models, including the use of upper confidence limits for depth intervals, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here.
19	Section 3.3.1, p. 3-22	Please indicate whether the sandblasting grit previously consolidated on the site as part of a temporary removal action will be removed during this final action.	The penultimate sentence of Section 3.3.1, paragraph 1 is misleading. In 1993, the DON initiated an interim removal action (RA), as provided under CERCLA and the National (Oil and Hazardous Substances Pollution) Contingency Plan (NCP), to correct potentially hazardous conditions at IR Site 11. The RA closeout report (International Technology Corporation, 1995) documents the corrective RA, which included placing shotcrete over the exposed sandblast grit in the level area located east of Building 174. This RA was an interim action that did not address final remediation. That is, the RA did not address the Resource Conservation and Recovery Act (RCRA) corrective action protocol. The RI (Bechtel National, Inc., 1997) and this FS address the RCRA corrective action protocol for IR Site 11. The penultimate sentence of Section 3.3.1, paragraph 1 was changed to read: "Sandblast grit was moved to a level area of the site and covered with wire mesh and shotcrete as part of an earlier RA, which did not address RCRA corrective action protocol for the site."

Comment Number	Draft Section	Comment	Response
20	Section 3.3.2.1, p. 3-23, paragraph 1	Please estimate the volume of sandblast grit remaining on the southern hillside.	According to the RI, Section 5.4.1 (Bechtel National, Inc., 1997), no records were found to document the quantity of spent sandblast abrasives ultimately disposed of at IR Site 11. However, as reported in the "Initial Assessment Study of Naval Complex, Long Beach, California," completed by the DON in August 1983, the volume of these fill materials was estimated to be about 6,400 cubic yards. Some sandblast material was removed from the southern hillside in 1977, when Parking Lot G was surfaced. The "Removal Action Closeout Report, Including As-Built Records, IR Site 11 - Hillside East of Dry Dock 1, Long Beach Naval Shipyard, Long Beach, California" (International Technology Corporation, 1995), reports that after removal of the sandblast abrasives, the hillside was regraded, covered with 6 inches of compacted topsoil, and revegetated with ice plant. In January and February 1994, about 1,400 cubic yards of sandblast contaminated soil were removed from the southern hillside and placed in the level area to the south. The level area is now estimated to contain about 3,700 cubic yards of soil mixed with sandblast grit. According to the RI, Section 5.4, no sandblast grit was found on the northern hillside. If the initial quantity of sandblast grit emplaced at IR Site 11 was about 6,400 cubic yards, and if the level area is now estimated to contain about 3,700 cubic yards of sandblast grit and soil, and if there is no sandblast grit on the northern hillside, then the amount of sandblast grit that was not removed from the southern hillside can be estimated roughly as 3,000 cubic yards.

Comment Number	Draft Section	Comment	Response
21	Section 3.3.2.1	Please clarify whether samples from the shotcrete area were analyzed for PCBs and mercury. Both PCBs and mercury have been found to be associated with sandblast grit at other West Coast Naval shipyards.	Samples from the shotcrete area of IR Site 11 (AOPC 1) were analyzed for target analyte list (TAL) metals, including mercury. Lists of the metals detected, the frequencies of detection, and ranges of concentration are presented in Tables 5.4-11 and 5.4-12 of the RI (Bechtel National, Inc., 1997) and Tables 3-8 and 3-9 of the FS. Figure 5-48 of the RI and Figure 3-9 of the FS show the distribution of inorganic analytes detected above background in soil at IR Site 11. No analyses for PCBs were done for IR Site 11.
22	Section 3.3.2, p. 3-26, paragraph 1	For a reader from the public, please explain briefly how sandblasting grit can be differentiated from surrounding soils. This may also be relevant in the case of future removal action if visual criteria are to be used to identify contaminated materials for excavation.	The sandblast grit at IR Site 11 can be visually detected and differentiated from soil at the site because of its uniform coarse texture and black color.
23	Section 3.3.3, p. 3-29, paragraph 1	The text indicates that based upon field and laboratory blanks, chemicals that were not representative of environmental conditions at the site have not been presented. Please discuss how representativeness of chemicals relative to environmental conditions was assessed in order to determine which results to present. In addition, the text states that the COPC metal data set was compared to a Preliminary Set of Criteria" to define COPCs. Please identify what preliminary set of criteria were used for this evaluation.	Following sampling activities at IR Site 11, laboratory and analytical results were reviewed and screened against criteria established in the U.S. EPA's risk assessment guidance for Superfund (RAGS) (U.S. EPA, 1989). This review and screening of data are described in detail in Appendix D of the RI and are not repeated here. The data were used to evaluate background threshold level values and to establish upper confidence limits prior to quantifying human health risk. To identify site-related contamination, metals in soil were screened against both statistically and geochemically calculated threshold values. Metals in groundwater were screened against statistically calculated threshold values. A description of the methods used to establish these criteria is presented in Section 3.2 and Appendices E and F of the RI.

Comment Number	Draft Section	Comment	Response
23 (cont'd)			Section 3.2 of the RI discusses background data sources for both soil and groundwater; summarizes the statistical background metals assessment, including identifying background population, selecting statistical procedures, and calculating background metal concentrations; summarizes the geochemical background metals assessment; and discusses the use of statistical and geochemical results. Appendix E of the RI contains the compiled data sets used as background data sources for metals concentrations in soil and groundwater; a list of excluded data for soil and groundwater, including a justification for each removal; and the cumulative probability distribution plots for metals in soils and in groundwater. Appendix E of the RI also contains details of the application of both the Shapiro-Wilk and D'Agostino's tests to soil and groundwater data sets; and details and sample calculations for the calculation of background metal concentrations using normally distributed data, lognormally distributed data, and data exhibiting neither a normal nor lognormal distribution (i.e., a nonparametric distribution). Appendix F of the RI discusses the geochemical background metals assessment, and includes regression plots that show correlations between certain metals of concern (metal COPCs) and metal oxides. Information presented in Section 3.2 and Appendices E and F of the RI is not repeated here. Reference: U.S. Environmental Protection Agency. 1989. *Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part A), Interim Final.* EPA/540/1-89/002, Office of Emergency Remedial Response.
24	Section 3.3.4.1, p. 3-30, paragraph 1	AOPCs are referenced in the text. Please cite the appropriate figure identifying these locations.	Figure 3-11, showing the AOPCs for IR Site 11, was added to the FS, and reference to the figure is made in Section 3.3.4.1, paragraph 1.

Comment Number	Draft Section	Comment	Response
25	Section 3.3.4.1, p. 3-30, paragraph 2	Please indicate clearly whether the dewatering system at SCE is expected to affect groundwater flow at IR Sites 8, 10, and 11 and if so, please discuss whether the dewatering system is likely to remain in place for the duration of remedial action.	The SCE dewatering system is the probable discharge location of groundwater from IR Sites 8, 10, and 11 as well as the dominant influence on shallow groundwater flow direction within the LBNSY. This dewatering system may also be influencing the northerly to northeasterly groundwater flow direction in the shallowest water-bearing interval of surficial deposits as far away as the central portion of Naval Station Long Beach. The system consists of about 210 well points situated around the perimeter of the eastern half of the LBGS. It is expected to remain in place for the duration of the remedial action.
26	Section 3.3.4.1, p. 3-30, paragraph 3	Please discuss why assumptions are made regarding hydraulic gradient and effective porosity, and explain why actual values from the site were not used.	IR Site 11 is characterized by a steep, west-facing embankment along most of its western side. The embankment ranges in height from about 24 feed at its northern end to about 17 ft at a retaining wall in the middle. From there to the southern end of the site, the embankment is about 4 to 5 ft high. Groundwater gradient and flow estimates for IR Site 11 are based on groundwater elevation data from the tidal influence study and other groundwater elevation data collected from monitoring wells during RI field investigations. Groundwater level contours for the LBNSY are shown in Figure 5-87 of the RI (Bechtel National, Inc., 1997). The groundwater elevation gradient ranges from a minimum of 0.002 in the areas between IR Sites 8 and 9, to a maximum of 0.013 in the vicinity of Dry Docks Nos. 2 and 3, and at IR Site 10. For purposes of analysis, a hydraulic gradient of 0.01 was assumed for IR Site 11. Further details of the hydrogeologic investigation of the LBNSY are in Section 2.2.2 of the RI (Bechtel National, Inc., 1997) and are not repeated here.

Comment Number	Draft Section	Comment	Response
26 (cont'd)			Because of the nonlevel nature of IR Site 11, groundwater flowrates at the site are also dynamic. Thus, it is neither practicable nor possible to obtain a single measure or value of hydraulic gradient for the site. Rather, a best estimate number is used, based on professional judgement and experience. An effective porosity of 0.35 is a typical, average effective porosity.
27	Section 3.3.4.1, p. 3-31, paragraph 2	The statement is made that AOPC 1 is entirely covered by shotcrete. Please discuss whether ground shaking in the area of AOPC 1 during an earthquake could crack the shotcrete. Discuss the integrity of this layer, and explain whether this layer is intended to provide protection against infiltration and leaching or whether it was simply built to cover the sandblast grit in place.	Significant ground shaking during an earthquake could cause the shotcrete that covers IR Site 11, AOPC 1 to crack. The shotcrete that covers AOPC 1 is crack-free. For IR Site 11, AOPC 1 leaching and transport analyses (vadose-zone and saturated-zone migration analyses) were done to determine whether predicted concentrations of contaminants in groundwater, that result from leaching, exceed surface water quality criteria at potential discharge locations to surface water bodies. Two scenarios are modeled. The first, the paved infiltration scenario, assumes that AOPC 1 remains covered in shotcrete. The second, the unpaved infiltration scenario, assumes that AOPC 1 is entirely uncovered for 2 years and then repaved. The vadose-zone migration analysis for existing conditions, the paved infiltration scenario, at AOPC 1 indicated that copper and zinc would affect groundwater beneath the AOPC at concentrations above California Ocean Plan criteria (State of California, Water Resources Control Board, 1990 & 1995) but below groundwater background threshold concentrations. For the SCE wells, the modeling results indicated that these metals would affect groundwater at concentrations below California Ocean Plan criteria.

Comment Number	Draft Section	Comment	Response
27 (cont'd)			The vadose-zone migration analysis for the unpaved infiltration scenario at AOPC 1 also indicated that copper and zinc would affect groundwater beneath the AOPC at concentrations above California Ocean Plan criteria but below groundwater background threshold concentrations. In addition, the modeling results also indicated that arsenic and thallium would affect groundwater at concentrations slightly below California Ocean Plan criteria. However, when combined with average detected groundwater concentrations, these metals would exceed the criteria. Arsenic would be below the groundwater background threshold, and thallium would be above the threshold concentration. However, modeling results also indicated that future leaching would not significantly increase the existing detected concentrations. For the SCE wells, the modeling results indicated that these metals would affect groundwater at concentrations below California Ocean Plan criteria. The vadose-zone migration analysis for both the paved and the unpaved infiltration scenarios at AOPC 1 also indicated that all organic COPCs would affect groundwater beneath the AOPC and at the SCE wells at concentrations below California Ocean Plan criteria. Therefore, the selection or recommendation of remedial alternatives need not depend on the protection against infiltration and leaching provided by the shotcrete at IR Site 11, AOPC 1.

Comment Number	Draft Section	Comment	Response
28	Section 3.3.4.1, p. 3-31, paragraph 5	The text refers to the covering on AOPC 1. Please indicate whether this paragraph was intended to discuss AOPC 2 instead or whether this paragraph is out of sequence. Please indicate clearly where contaminant migration at AOPC 11 is discussed and where AOPC 11 is identified and is discussed. Please revise this paragraph as necessary.	The first sentence of the cited paragraph of Section 3.3.4.1 is unnecessarily confusing, and the reference to AOPC 11 is incorrect. This sentence was deleted, and a paragraph (no. 8) was inserted to read: "Leaching and transport analyses (vadose-zone and saturated-zone migration analyses) for IR Site 11 were done to determine whether predicted concentrations of contaminants in groundwater, that result from leaching, exceed surface water quality criteria at potential discharge locations to surface water bodies. For AOPC 1, two scenarios are modeled. The first, the paved infiltration scenario, assumes that AOPC 1 remains covered in shotcrete. The second, the unpaved infiltration scenario, assumes that AOPC 1 is entirely uncovered for 2 years and then repaved."
29	Section 3.3.4.2, p. 3-32, paragraph 1	Please indicate how the VLEACH Model and/or and AT123D Simulation Model vary from, and improve upon the projections from, the Summers model sufficiently to warrant accepting these results over those from the Summers model.	The Summers model is based on the U.S. EPA's 1989 *Determining Soil Response Action Levels Based on Potential Contaminant Migration to Groundwater: A Compendium of Examples* (EPA/540/2-89/ 057). It is used as a screening tool to evaluate whether soil COPCs at levels exceeding applicable criteria have the potential to reach groundwater. More detailed information about the Summers model, including equational representation, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here. The VLEACH model is based on the U.S. EPA's *VLEACH - A One-Dimensional Finite Difference Vadose Zone Leaching Model, Version 2.2*. The AT123D model is based on the International Groundwater Modeling Center's 1993 *Analytical Transient One-, Two-, Three-Dimensional Simulation of Waste Transport in the Aquifer System*. These codes are more sophisticated than the Summers model. They were used in concert to perform the saturated-zone transport analysis for IR Site 10, to determine the incremental increase in groundwater contaminant concentrations that result from leaching.

Comment Number	Draft Section	Comment	Response
29 (cont'd)			VLEACH was selected for modeling because it allows a time-dependent modeling of desorption by infiltration and volatilization within the vadose zone for a specified soil concentration profile. AT123D is applicable to a wide range of transport analysis situations. AT123D was selected for modeling because it provides an analytical solution for transient, two-dimensional transport of dissolved chemicals in a homogeneous aquifer with a uniform hydraulic gradient. More detailed information about the VLEACH and AT123D models, including the use of upper confidence limits for depth intervals, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here.
30	Section 3.3.4.2, p. 3-32, paragraph 2	Please discuss the nature and use of the SCE dewatering wells. Please indicate whether these are considered wells to be protected in terms of water quality.	The dewatering system at the SCE LBGS is an extraction system that consists of about 210 well points situated around the perimeter of the eastern half of the LBGS. The pumped groundwater is discharged with cooling water from the LBGS under a NPDES permit. The discharge location for the system is in the Back Channel at Berth 114. No plans exist for either industrial or household use of the waters extracted by this dewatering system.
31	Section 3.3.4.2, p. 3-33, paragraph 1	The text states that the average detected groundwater concentrations for nickel beneath IR Site 11 exceeds California Ocean Plan Criteria. Please discuss whether this value also exceeds background threshold levels. If this value exceeds background levels and is considered to be related to releases at other sites, continued leaching from IR Site 11 may be a problem even it does not cause significant or major increases in groundwater contamination. Discharge of groundwater containing nickel may be a problem if nickel reaches the SCE dewatering wells.	The average detected groundwater concentration of nickel beneath IR Site 11, 0.016 mg/L, does not exceed its back-ground threshold value, 0.0958 mg/L (RI Table 5.7-7b, "IR Site 11, AOPC 1 - Leaching Pathway Screening – Unpaved Scenario" (Bechtel National, Inc., 1997). Section 3.3.4.2, paragraph 1 (now paragraph 4) was changed to read: "The average detected groundwater concentration for nickel beneath IR Site 11 presently exceeds its California Ocean Plan criterion, but not its background threshold concentration."

Comment Number	Draft Section	Comment	Response
32	Section 3.3.4.2, p. 3-33, paragraph 2	Please indicate how the VLEACH Model and/or the AT123D Simulation Model vary from, and improve upon the projections from, the Summers model sufficiently to warrant accepting these results over those from the Summers model.	The Summers model is based on the U.S. EPA's 1989 *Determining Soil Response Action Levels Based on Potential Contaminant Migration to Groundwater: A Compendium of Examples* (EPA/540/2-89/057). It is used as a screening tool to evaluate whether soil COPCs at levels exceeding applicable criteria have the potential to reach groundwater. More detailed information about the Summers model, including equational representation, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here. The VLEACH model is based on the U.S. EPA's *VLEACH - A One-Dimensional Finite Difference Vadose Zone Leaching Model, Version 2.2*. The AT123D model is based on the International Groundwater Modeling Center's 1993 *Analytical Transient One-, Two-, Three-Dimensional Simulation of Waste Transport in the Aquifer System*. These codes are more sophisticated than the Summers model. They were used in concert to perform the saturated-zone transport analysis for IR Site 10, to determine the incremental increase in groundwater contaminant concentrations that result from leaching. VLEACH was selected for modeling because it allows a time-dependent modeling of desorption by infiltration and volatilization within the vadose zone for a specified soil concentration profile. AT123D is applicable to a wide range of transport analysis situations. AT123D was selected for modeling because it provides an analytical solution for transient, two-dimensional transport of dissolved chemicals in a homogeneous aquifer with a uniform hydraulic gradient. More detailed information about the VLEACH and AT123D models, including the use of upper confidence limits for depth intervals, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here.

Comment Number	Draft Section	Comment	Response
33		The text seems to indicate that under current conditions, metals may exceed California Ocean Plan Criteria and background threshold levels; however, under the unpaved scenario, the values would be below Ocean Plan Criteria and background thresholds. This is a contradiction, please clarify.	The comment is mistaken. No apparent contradiction exists in the results of modeling the paved and unpaved infiltration scenarios for IR Site 11, AOPC 1. The table shown below reflects, in tabular form, the information presented in prose format in Section 3.3.4.2. The table represents only groundwater concentrations of metals at AOPC 1. For SCE wells, modeling results for both the paved and the unpaved infiltration scenarios indicated that no metals would affect groundwater at concentration that exceeded California Ocean Plan criteria.

	Paved (Existing) Infiltration Scenario		Unpaved Infiltration Scenario	
Metal	California Ocean Plan Criterion	Background Threshold Concentration	California Ocean Plan Criterion	Background Threshold Concentration
Arsenic			slightly below to above	below
Copper	above	below	above	below
Thallium	below		slightly below to above	above
Zinc	above	below	above	below

Comment Number	Draft Section	Comment	Response
34	Section 3.3.4.2, p. 3-34, paragraph 3	Please indicate how the VLEACH Model and/or the AT123D Simulation Model vary from and improve upon the projections from the Summers model sufficiently to warrant accepting these results.	The Summers model is based on the U.S. EPA's 1989 *Determining Soil Response Action Levels Based on Potential Contaminant Migration to Groundwater: A Compendium of Examples* (EPA/540/2-89/057). It is used as a screening tool to evaluate whether soil COPCs at levels exceeding applicable criteria have the potential to reach groundwater. More detailed information about the Summers model, including equational representation, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here. The VLEACH model is based on the U.S. EPA's *VLEACH - A One-Dimensional Finite Difference Vadose Zone Leaching Model, Version 2.2*. The AT123D model is based on the International Groundwater Modeling Center's 1993 *Analytical Transient One-, Two-, Three-Dimensional Simulation of Waste Transport in the Aquifer System*. These codes are more sophisticated than the Summers model. They were used in concert to perform the saturated-zone transport analysis for IR Site 10, to determine the incremental increase in groundwater contaminant concentrations that result from leaching. VLEACH was selected for modeling because it allows a time-dependent modeling of desorption by infiltration and volatilization within the vadose zone for a specified soil concentration profile. AT123D is applicable to a wide range of transport analysis situations. AT123D was selected for modeling because it provides an analytical solution for transient, two-dimensional transport of dissolved chemicals in a homogeneous aquifer with a uniform hydraulic gradient. More detailed information about the VLEACH and AT123D models, including the use of upper confidence limits for depth intervals, is presented in Section 5.7 of the RI (Bechtel National, Inc., 1997) and is not repeated here.

Comment Number	Draft Section	Comment	Response
35	Section 3.3.4.2, p. 3-34, paragraph 3	The text indicates that 9 PAHs may exceed Ocean Plan Criterion for total PAHs. Please indicate how these individual compound values were used for comparison against a criterion expressed only as a total (sum) value. For example, explain whether the Ocean Plan Criterion specify which of the various PAHs are used in the calculation of total PAH levels, and if so, indicate whether the detected PAHs are on that list.	Criteria for the California Ocean Plan (State of California, Water Resources Control Board, 1990 & 1995) are written such that no single PAH should exceed a criterion of $8.8E^{-6}$ nor should the sum of all PAHs exceed a criterion of $8.8E^{-6}$. For the California Ocean Plan, the sum total for PAHs is based on the sum of 13 PAHs: acenaphthylene; anthracene; 1,2-benzanthracene; 3,4-benzofluoranthene; benzo[k]fluor-anthene; 1,12-benzoperylene; benzo[a]pyrene; chrysene; dibenz[a,h]anthracene; fluorene; indeno(1,2,3-cd)pyrene; phenanthrene; and pyrene (RI Table 5.7-1, "Water Quality Criteria" (Bechtel National, Inc., 1997). The PAH sum for screening IR Site 11, AOPC 2 is based on 10 PAHs: benzo[a]anthracene; benzo[a]pyrene; benzo[d]fluoranthene; benzo[g,h,i]perylene; benzo[k]fluor-anthene; chrysene; dibenz[a,h]anthracene; indeno(1,2,3-cd)pyrene; phenanthrene; and pyrene (RI Table 5.7-9a, "IR Site 11, AOPC 2 - Leaching Pathway Screening - Existing Conditions" and RI Table 5.7-9b, "IR Site 11, AOPC 2 - Leaching Pathway Screening - Unpaved Scenario" (Bechtel National, Inc., 1997). The PAH sum for modeling IR Site 11, AOPC 2 is based on 9 PAHs: benzo[a]anthracene; benzo[d]fluoranthene; benzo[g,h,i]perylene; benzo[k]fluoranthene; chrysene; dibenz[a,h]anthracene; indeno(1,2,3-cd)pyrene; phenanthrene; and pyrene (RI Table 5.7-10a, "IR site 11, AOPC 2 - VLEACH/AT123D Results - Existing Conditions" and RI Table 5.7-10b, "IR Site 11, AOPC 2 - VLEACH/AT123D Results - Unpaved Scenario" (Bechtel National, Inc., 1997).
36	Section 3.5	Please explain why the risk to ecological receptors at Site 7 was not calculated. In particular, sandblast grit and metals leached from the grit could conceivably be washed into Site 7 (see Comment 37, below). Please include.	This FS applies to IR Sites 8, 10, and 11 only. Ecological risks at IR Site 7 are addressed in a separate RI/FS for IR Site 7, namely *Draft Final Remedial Investigation (RI) Report, Installation Restoration Program for West Basin (IR Site 7), Naval Station Long Beach, Long Beach, California*, 4 volumes (Bechtel National, Inc., 1997).

Comment Number	Draft Section	Comment	Response
36 (cont'd)			Few terrestrial receptors exist near LBNSY due to the industrial activities at the facility. The most significant are water birds, such as the California brown pelican and the California least tern, which roost on structures at the facility and consume fish from the harbor. Primary aquatic receptors in the harbor are aquatic invertebrates, such as polychaete worms, crustaceans, and mollusks, and fish, including species consumed by birds and humans. Ecological exposure via the air pathway at LBNSY is considered to be of minor concern, because most of the LBNSY is paved. In fact, most of the area of concentration of sandblast grit at IR Site 10 is covered with shotcrete, and therefore not subject to wind erosion and transport. As with the air pathway, ecological exposure through direct contact is also considered to be only a minor pathway on a facility-wide basis, because most of the LBNSY is paved. Again, most of the area of concentration of sandblast grit at IR Site 10 is covered with shotcrete, and therefore not subject to direct contact. The major pathway of concern for ecological exposure is groundwater discharge to surface water, whereby marine life can be exposed. However, most of the shallow groundwater on the main LBNSY facility, including IR Site 10, is within the capture zone of the SCE dewatering system. The outfall for the system is on the eastern end of Terminal Island. The pumped groundwater is discharged under a NPDES permit. That is, all waters discharged through the SCE dewatering system meet U.S. EPA's NPDES standards.

Comment Number	Draft Section	Comment	Response
36 (cont'd)			Once a contaminant enters surface water, through either groundwater discharge or surface runoff, it can remain dissolved in the water column or partition into the sediments. Contaminated sediments in the harbor may be a source of exposure to both benthic and free-swimming aquatic organisms. However, modeling of contaminant migration at IR Site 10 indicates that neither metals nor organics found at the site would affect groundwater at the SCE discharge wells at levels above California Ocean Plan criteria. Thus, it is unlikely that "sandblast grit and metals leached from the [sandblast] grit [at IR Site 10] could conceivably be washed into [IR] Site 7" at any level of concern. Reference: Bechtel National, Inc., 1997. *Draft Final Remedial Investigation (RI) Report, Installation Restoration Program for West Basin (IR Site 7), Naval Station Long Beach, Long Beach, California.* Vols. I-IV.
37	Section 3.5.1, p. 3-37, paragraph 1	The text states that IR sites are currently being used for industrial purposes and "no other uses are anticipated in the foreseeable future." Please discuss whether this anticipation is supported by the Local Redevelopment Authority Land Reuse Plan. The text further states that potential ecological risks to the marine environment of the shipyard are addressed in RI/FS IR Site 7, the West Basin of Long Beach Harbor. Please discuss whether addressing these risks is appropriate only for IR Site 7 or, alternatively, whether source control at sites such as IR Sites 8, 10, and 11 would be more effective in mitigating these ecological risks.	Remedial alternatives for IR Sites 8, 10, and 11 are developed assuming that land use at these sites will remain industrial. This assumption is made based on the Reuse Plan (City of Long Beach, 1995) of the Local Redevelopment Authority which includes industrial use scenarios for the land areas currently designated as IR Sties 8, 10, and 11. That is, according to the Reuse Plan of the Local Redevelopment Authority, the anticipated future land use for IR Sites 8, 10, and 11 is industrial. Contrary to the implication of this comment, Section 3.5.1 neither states nor implies that "addressing these [ecological] risks is appropriate only for IR Site 7." In fact, both the FS and the RI (Bechtel National, Inc., 1997) acknowledge that the major pathway of concern for ecological exposure at IR Sites 8, 10, and 11 is discharge of contaminated groundwater to surface waters, whereby marine life can be exposed.

Comment Number	Draft Section	Comment	Response
37 (cont'd)			For this reason, (fate and transport) modeling of contaminant migration in groundwater at IR Sites 8, 10, and 11 was performed to determine whether contaminants found at these sites could affect marine waters at concentrations above California Ocean Plan criteria (State of California, 1995). Results of the modeling indicate that neither metals nor organics found in soils or groundwater at the sites will be released to surface waters at levels above California Ocean Plan criteria. Because modeling results in the RI show no evidence that groundwater contamination exceeding criteria for the California Ocean Plan at IR Sites 8, 10, and 11 will migrate to marine environments, therefore, "source control" at these sites is not warranted. That is, under these circumstances, sources control is neither necessary nor cost-effective. It is not necessary to meet federal or state statutes and regulations; and it will not have a significantly positive effect in protecting the environment.
38	Section 3.5.1, p. 3-37, paragraph 2	The text indicates that industrial workers would not participate in soil excavation or handling soil. Please indicate whether this would require a form of Institutional Control or prohibition against invasive activities in the future. If so, this protection would not likely exist under the No Action alternative which the HHRA is intended to represent.	For purposes of exposure assessment, the RI (Bechtel National, Inc., 1997) identified both population at risk and representative receptors. For the baseline HHRA, the population at risk, representative receptors, and exposure pathways were established by approval of the Risk Assessment Work Plan for the LBNSY (Bechtel National, Inc., 1994) by U.S. EPA Region 9 and Cal-EPA.

Comment Number	Draft Section	Comment	Response
38 (cont'd)			The population at risk was identified as personnel who work at the LBNSY now and in the foreseeable future. Members of the LBNSY personnel likely to be exposed to chemicals at IR Sites 8, 10, and 11 were identified as full-time employees engaged in typical shipyard work (industrial worker) and individuals engaged in as-needed repair of underground utilities (utility maintenance worker). Construction workers would be exposed if engaged in removal of and reconstruction of buildings and pavement. However, reasonable maximum exposure conditions for the construction worker (10 hours per day exposure time, 90 days per year exposure frequency, and 1 year exposure duration) were less than 50 percent of the total exposure hours for the utility maintenance worker exposed 8 hours per day, 10 days per year for 25 years. Because the exposure rate for the utility maintenance worker is higher than the exposure rate for the construction worker, risk to the construction worker was not estimated. Restrictions on future use and development of IR Sites 8, 10, and 11 is needed to ensure that land use remains industrial, and to prevent disturbance of soils and use of groundwater. The remedial action objectives for IR Sites 8, 10, and 11 are 1) to maintain industrial use at the sites consistent with the Reuse Plan (City of Long Beach, 1995) of the Local Redevelopment Authority and 2) to prevent unauthorized disturbance of residual soil and groundwater contamination. Thus, in this FS, institutional controls, in the form of land use restrictions, are evaluated as a remedial alternative and recommended as a method to prevent changes in future land use that might increase exposure risks at IR Sites 8, 10, and 11. Without institutional controls, (i.e., under the "no further action" alternative), land use restrictions would not obtain at IR Sites 8, 10, and 11, and industrial workers would face increased risk of exposure.

Comment Number	Draft Section	Comment	Response
38 (cont'd)			Reference: Bechtel National, Inc. 1994. "Final RI/FS Risk Assessment Work Plan, CTO No.0037, Long Beach Naval Shipyard, Long Beach, California."
39	Figures 3-5, 3-6, and 3-7	For these figures and all similar figures please provide a key to the various data qualifiers shown on the tables.	A key was added to the figures to identify the data (project, review, and laboratory) qualifiers shown in the tables.
40	Figures 3-8 and 3-10	For these figures and all similar figures, where appropriate, please provide a key to the data qualifiers used. It is inconvenient for a member of the public to simply reference another report, i.e., BNI 1997a, for these definitions.	A key was added to the figures to identify the data (project, review, and laboratory) qualifiers shown in the tables.
Section 4.0: Identification of Remedial Alternatives and Applicable or Relevant and Appropriate Requirements—Specific Comments			
1	Section 4.2.1, p. 4-2	The text states that after chemical-specific ARARs are identified for the FS because there are no Remedial Actions that would generate hazardous waste. Please clarify how ARARs were initially identified, based upon this conclusion, since it is not clear how a conclusion can be reached when potential remedial alternatives have not yet been developed. The appropriate procedure is to identify specific ARARs and evaluate the compliance of remedial technologies with those ARARs during the evaluation of the remedial alternatives, not the reverse. Furthermore, please clarify why only remedial alternatives which generate hazardous wastes would result in chemical-specific ARARs.	Identification of applicable or relevant and appropriate requirements (ARARs) is a site-specific determination that can involve a two-step analysis. First, a determination is made with respect to whether a law or regulation (requirement) is applicable. If the law or regulation (requirement) is not applicable, the a determination is made with respect to whether the requirement is relevant and appropriate. The text was changed to read: "Only a few chemical-specific ARARs were identified for this FS. The drill cuttings and purge water from any new monitoring wells would be tested to determine if these materials meet the criteria for classification as a RCRA characteristic hazardous waste…" A requirement is applicable if the specific terms of the law or regulation directly address a COC, a remedial action, or the specific location of a site. Similarly, a requirement is relevant and appropriate if it is suitable to the conditions at the site and if the circumstances of the site are sufficiently similar to the circumstances under which the law or regulation otherwise applies.

Comment Number	Draft Section	Comment	Response
1 (cont'd)			Chemical-specific ARARs are numeric values that represent health-based or risk-based standards. Results of RI investigations show that there are no COCs at IR Sites 8, 10, or 11. Because IR Sites 8, 10, and 11 contain no COCs, no treatment technologies are needed as remedial alternatives, and no RCRA wastes will be generated at the sites. Contrary to the final statement of this comment, Section 4.2.1 neither states nor implies that "only remedial alternatives which [sic] generate hazardous wastes would result in chemical-specific ARARs." In fact, as stated in the opening statement of this comment, the first sentence of Section 4.2.1 specifically states that "...a few chemical-specific ARARs were identified...."
2	Section 4.2.1, p. 4-3, paragraph 4	The text states that there is no statistically significant increase of hazardous constituents from the groundwater and surface water to the point of entry. Please charily whether this is a site specific determination and if so, provide a statistical basis for this conclusion.	The predominant discharge of groundwater from IR Sites 8, 10, and 11 is through the dewatering system of the SCE LBGS. This dewatering system is the dominant influence on shallow groundwater flow direction within the LBNSY. Thus, the dominant pathway for leached contaminants in the saturated zone from IR Sites 8, 10 and 11 is toward the SCE dewatering system. The discharge location for the system is in the Back Channel of the LBNSY, at Berth 114. Because the potential pathway for leached contaminants in the saturated zone from IR Sites 8, 10, and 11 is toward the SCE dewatering system, saturated zone transport modeling was performed as part of the RI (Bechtel National, Inc., 1997) to estimate the contaminant concentrations in groundwater beneath the sites (AOPCs) and the nearest wells of the SCE dewatering system. Details of the hydrogeologic models used in analyzing the vadose- and saturated-zone migration pathways, and the results of this modeling are described in detail in the RI, Section 5. They are not repeated here.

Comment Number	Draft Section	Comment	Response
2 (cont'd)			Results of the analyses demonstrate that no COPCs in concentrations exceeding California Ocean Plan (State of California, 1995) criteria will be released to ocean waters as a result of the SCE facility discharge.
3	Section 4.2.3, p. 4-5, paragraph 1	The text indicates that action-specific ARARs related to generation of handling of hazardous wastes will not be considered because it is assumed that hazardous waste won't be generated during remedial actions. As noted previously (Comment 1), it is not appropriate to initially identify ARARs based upon conclusions regarding possible remedial alternatives. In fact, the final portion of this paragraph, which indicates that if RCRA-characteristic wastes are identified they would managed appropriately in accordance with regulations, demonstrates that there *are* potential Federal action-specific ARARs. Please modify the ARAR selection process.	Action-specific ARARs are technology- or activity-based requirements or restrictions. Results of RI investigations show that there are no COCs at IR Sites 8, 10, or 11. Because IR Sites 8, 10, and 11 contain no COCs, no treatment technologies or treatment activities are needed as remedial alternatives; no treatment technologies are proposed among the remedial alternatives; and thus, no matter which remedial alternative is selected, no RCRA wastes will be generated as a result of remedial actions at the sites. It is both reasonable and cost-effective to eliminate from consideration as ARARs those requirements on technology-based treatments if there are neither AOCs nor COCs at the sites subject to the remedial investigation, and if, therefore, treatment technologies are neither warranted nor anticipated as part of any remedial actions. The reference to " purge water and drill cuttings" in the first paragraph of Section 4.2.3 refers to waste that might be generated as the result of installation of monitoring wells, as described in Section 4.2.1 of the FS. Installation of monitoring wells is considered and eliminated in the preliminary screening of remedial alternatives for IR Sites 8, 10, and 11. The text was changed to read: "Most action-specific ARARs are related to handling RCRA hazardous waste. If the purge water and drill cuttings from new monitoring wells or other site wastes are tested and found to be RCRA-characteristic waste, these materials will be managed appropriately…"

Comment Number	Draft Section	Comment	Response
4	Section 4.3.1, p. 4-5, paragraph 1	The text indicates that action-specific ARARs related to generation of handling of hazardous wastes will not be considered because it is assumed that hazardous waste won't be generated during remedial actions. As noted previously, it is not appropriate to initially identify ARARs based upon conclusions regarding possible remedial alternatives. In fact, the final portion of this paragraph which indicates that if RCRA characteristic wastes are identified they would managed appropriately in accordance with regulations, demonstrates that there *are* potential State action-specific ARARs. Please modify the ARAR selection process.	This comment refers to action-specific ARARs. However, Section 4.3.1 discusses state chemical-specific ARARs. For purposes of response, it is assumed that the reference to action-specific ARARs is in error. Chemical-specific ARARs are numeric values that represent health-based or risk-based standards. Results of the HHRA for IR Sites 8, 10, and 11 show that there are no chemicals present at the sites that pose a threat to human health, under future use scenarios for the sites as proposed in the Reuse Plan (City of Long Beach, 1995) of the Local Redevelopment Authority. Because no chemicals are present at the sites that, according to the HHRA, represent a threat to human health, it is both reasonable and cost-effective to eliminate from as consideration ARARs those requirements based on chemical-specific health-based or risk-based standards. If no chemicals pose a risk or threat to human health, then treatment technologies for these chemicals are neither warranted nor anticipated as part of any remedial actions, and no non-RCRA hazardous waste will be generated at the sites. The text was changed to read: "The only state chemical-specific ARAR is the Cal-EPA DTSC's definition of Non-RCRA hazardous waste. The drill cuttings and purge water from any new monitoring wells will be analyzed, and, if they are determined to meet the characteristics for non-RCRA California hazardous waste,..." The text was modified further in response to the following comment (No. 5) in Section 4.0.

Comment Number	Draft Section	Comment	Response
5	Section 4.3.1, p. 4-5, paragraph 2	This text states that no other state chemical-specific ARARs were identified. Please discuss whether State Clean Water Act Regulations, Air Quality Regulations or similar regulations may regulate the management of chemicals identified at these sites. It should be noted that the text on page 4-3 includes a discussion of the potential relevance of Federal Water Quality Standards, therefore, it would seem that parallel State programs in those areas would also be relevant and appropriate.	State regulations were added to the ARARs as appropriate. Section 4.3.1 was rewritten. The text now states: "There are two state chemical-specific ARARs. The Cal-EPA DTSC's definition of 'non-RCRA hazardous waste' is applicable for determining whether a waste is a non-RCRA hazardous waste. The drill cuttings and purge water from any new monitoring wells will be analyzed, and, if they are determined to meet the characteristics for non-RCRA California hazardous waste, they will be handled appropriately." "The Comprehensive Water Quality Control Plan for the Los Angeles Basin (Water Code 13240) is also applicable."
6	Section 4.3.2, p. 4-6	As in the case of the chemical-specific ARARs noted above, California State programs paralleling Federal laws regarding issues such as wetlands, endangered species, and the like, should be considered ARARs under this section. Please clarify.	Because no wetlands or threatened or endangered species occur at the sites, state regulations governing these circumstances are not applicable. However, Section 4.3.2 does consider portions of the California Coastal Act of 1976 as applicable, because the sites are within the coastal zone.
7	Section 4.3.3, p. 4-6	It would seem that ARARs cited under this section may in most cases be considered location-specific ARARs since any activities in the regulated zones (i.e., 150 ft of body water's high water mark under the Department of Fish and Game Code) would be regulated and the applicability of the regulations is *not* related to the specific type of action to be taken. Please clarify.	Several of the state ARARs probably fit equally well under more than one category. For example, the California Ocean Plan is listed as an action-specific ARAR, because it deals, in this case, with groundwater discharges to ocean waters. It might equally be placed among location-specific ARARs, because of proximity to the ocean. What is important or not *where* the California Ocean Plan is listed, but *that* the plan is listed, and so will be considered in the evaluation of the remedial alternatives. Further, although several laws and regulations might be listed in multiple locations with the ARARs designations, they are listed only once, to avoid duplication.
8	Section 4.4, p. 4-7	The remedial action objectives for these sites are to maintain industrial use, and the text states that this is considered to be reasonable anticipated scenario. Please state clearly in this section whether this intended use in consistent with redevelopment plans of the Local Redevelopment Authority.	The first sentence of Section 4.4 was changed to read: "ROAs were established to allow identification and screening of alternatives that achieve protection of human health and the environment consistent with reasonably anticipated future land use for IR Sites 8, 10, and 11, as established in the Reuse Plan of the LRA (City of Long Beach, 1995)."

Comment Number	Draft Section	Comment	Response
Section 5.0: Preliminary Screening of Remedial Action Alternatives—General Comment			
1		Please discuss why treatment technologies and other remedial technologies to meet CERCLA guidance requirements for remedial alternatives are not screened in this section. Given that this section screens out any remedial technology on basis of the absence of AOCs and COCs it would seem that same approach could have been used for treatment technologies, as well. This is not intended to suggest that a broad list of technologies should be included to merely to screen them out but again to illustrate the inconsistency of developing and presenting remedial alternatives after conclusions have apparently already been drawn as to the remedial approach that will be adopted for these sites.	Remedial alternatives for Installation Restoration (IR) Sites 8, 10, and 11 are developed assuming that land use at these sites will remain industrial. This assumption is made based on the Reuse Plan (City of Long Beach, 1995) of the Local Redevelopment Authority which includes industrial use scenarios for the land areas currently designated as IR Sites 8, 10, and 11. That is, according to the Reuse Plan of the Local Redevelopment Authority, the anticipated future land use for IR Sites 8, 10, and 11 is industrial. For this reason, cleanup standards for the sites are based on industrial exposure scenarios. Under industrial exposure scenarios for workers, no COCs or AOCs exist at these sites. That is, based on industrial exposure scenarios, the overall risks for IR Sites 8, 10, and 11 fall within the U.S. EPA target range of 10^{-4} to 10^{-6} or below. Thus, cleanup in the form of treatment at the sites is not warranted. If cleanup in the form of treatment at the sites is not warranted, then it is also neither necessary nor cost-effective to evaluate treatment technologies as remedial alternatives. That is, under these circumstances, treatment is not necessary to meet federal or state statutes and regulations, will not have a significantly positive effect in protecting human health and the environment, and will not be more effective in either the long-term reduction of contaminants or in short-term safety. Although a myriad of treatment technologies can be listed, described, and evaluated using the three criteria of the preliminary screening, as suggested in the comment, the process of doing so is superfluous, i.e., neither necessary nor cost-effective. As recognized in the comment, the preliminary screening would "...screen[s] out any remedial technology on [the] basis of the absence of AOCs or COCs...."

Comment Number	Draft Section	Comment	Response
Section 5.0: Preliminary Screening of Remedial Action Alternatives—Specific Comments			
1	Section 5.0, p. 5-3, paragraph 2	The text correctly states that CERCLA guidance requires a No Further Action alternative be included in a General Response Action in the FS. Please discuss whether the range of other alternatives complies with other CERCLA or NCP mandated remedial alternatives and justify deviations from those requirements.	Cleanup in the form of treatment at IR Sites 8, 10, and 11 is not warranted. Therefore, no cleanup technologies are evaluated as remedial alternatives. Instead, preliminary screening of five potential response actions are evaluated. Institutional controls in the form of land use restrictions and monitoring, and containment controls in the form of surface contour modification and vertical and horizontal barriers, are screened on the basis of effectiveness, implementability, and cost. This screening process and the range of remedial alternatives evaluated in this FS complies with the requirements CERCLA and NCP.
2	Section 5.2.2, p. 5-5, paragraph 4	Please provide the rationale for limiting groundwater monitoring to 1 year at Sites 8, 10, and 11.	The presupposition of this comment is false. Section 5.2.2 does not state that groundwater monitoring will be limited to one year. The reference to "one year of monitoring" is made in the context of cost only. That is, one year of "...groundwater sampling is expected to cost about $45,680 per site..." As stated in Section 5.0 of the FS, costs estimated during the preliminary screening of remedial alternatives are intended to provide a reference for comparing alternatives only.
3	Section 5.3.1, p. 5-6, paragraph 2	Containment is ruled out because no COPCs or AOCs were identified in site soil or groundwater. Evaluation of this technology is therefore entirely dependent upon the interpretation of risk scenarios previously discussed. It should be noted that carcinogenic risks at some sites fell within EPA's target range but not necessarily below EPA's threshold criterion of 10^{-6}. Therefore, it cannot be definitely concluded that no risk exists at these sites. Please revise.	The second paragraph of Section 5.3.1 discusses the effectiveness of surface contour modification as a remedial technology type to implement a containment response action. Discussions of U.S. EPA target ranges and threshold criteria for carcinogenic risks are inappropriate in this paragraph. As implied by the comment, benzo[a]pyrene, a suspect human carcinogen (American Conference of Governmental Industrial Hygienists, 1998), was detected at IR Site 10. According to the American Conference of Governmental Industrial Hygienists (ACGIH), available epidemiological studies are conflicting or insufficient to confirm an increased risk of cancer in humans exposed to this PAH.

Comment Number	Draft Section	Comment	Response
3 (cont'd)			The frequency of detection, (i.e., the number of measurable detections/number of samples analyzed) for benzo[a]pyrene at IR Site 10 was low, 2/12. Both detects were in the northeast corner of the site, which is currently paved with asphalt. In general, at the LBNSY, human exposure to contaminants via the air pathway is considered to be of minor concern. However, there are a few places where surface contamination from organic compounds that adsorb to the soil (e.g., PAHs) is potentially of concern. Because the releases at these sites occurred some time ago, continued volatilization of these compounds is not likely to represent a concern for the air pathway, unless it occurs within a confined space such as a building or building basement. IR Site 10 currently has no buildings and is paved with asphalt. Thus, human exposure to pyrene through the air pathway is considered to be of little concern at the site. Direct human contact with PAHs in soils at IR Site 10 is considered to be only a minor exposure pathway. The highest potential for direct contact exists if workers are exposed to soil contamination while excavating within or near a contaminant source area. The groundwater underlying the LBNSY is considered nonpotable, so the ingestion pathway for human exposure to contaminants is not of concern. Thus, the major pathway of concern for groundwater at the LBNSY is discharge to surface water, whereby marine wildlife can be exposed.

Comment Number	Draft Section	Comment	Response
3 (cont'd)			Cancer risk for IR Site 10 (AOPC 1) was estimated as part of the HHRA for the site. Both the total upper-bound and the average cancer risks were estimated. The total upper-bound lifetime cancer risk for IR Site 10 was estimated to be 1.6×10^{-5}. Dermal contact and incidental ingestion were the dominant risk pathways. This risk was primarily associated with benzo[a]pyrene, which accounts for 48 percent of the total lifetime cancer risk. The average cancer risk for IR Site 10, which was calculated using U.S. EPA toxicity criteria, was below 1.0×10^{-6}. Risk estimated using Cal-EPA criteria was quantified as 1.1×10^{-6}. Because pyrene at IR Site 10 does not pose a threat to human health or the environment, it is not a COC and does not require remediation. Thus, surface contour modification would not be effective or needed at IR Site 10 or at either of the other two sites evaluated in this FS.
4	Section 5.3.2, p. 5-7, paragraph 2 and p. 5-8 paragraph 2; and Section 5.3.3, p. 5-9, paragraphs 2 and 4	The text states that since no COCs were identified in groundwater in the sites, vertical varies or other remedial technologies are not necessary. However, modeling results presented previously indicated the potential for leaching of some constituents at concentrations above ARARs to groundwater (i.e., exposure point concentrations may exceed ARARs) and this situation may warrant remediation. Also, conclusions about the potential for migration to receptors are based no model predications, which need to be demonstrated to be true. As a result, long-term monitoring and/or monitoring may be necessary to ensure protection at the exposure point.	Several possible ARARs identified in this FS pertain to groundwater quality. Because the groundwater underlying the LBNSY is non-potable, the concern for groundwater at the LBNSY is discharge to surface water, whereby marine wildlife can be exposed. Hydrogeologic models were used to analyze the vadose- and saturated-zone migration pathways for contaminants at IR Sites 8, 10, and 11 to determine if contaminants in soils or groundwater at the sites could reach surface waters at concentrations in excess of ARAR criteria, the most stringent of which are those of the California Ocean Plan (State of California, 1995). California Ocean Plan criteria apply at the point of exposure, that is, the point at which groundwater is discharged to or enters ocean (surface) waters. California Ocean Plan criteria do not apply to groundwater *per se*.

Comment Number	Draft Section	Comment	Response
4 (cont'd)			Because the major pathway for leached contaminants in the saturated zone from IR Sites 8, 10, and 11 is toward the SCE dewatering system, saturated zone transport modeling was performed, as documented in the RI (Bechtel National, Inc., 1997), to estimate the contaminant concentrations in groundwater beneath the sites (AOPCs) and the nearest wells of the SCE dewatering system. Details of the hydrogeologic models used in analyzing the vadose- and saturated-zone migration pathways, and the results of this modeling are described in detail in the RI, Section 5. They are not repeated here. Results of the analyses demonstrate that no COPCs in concentrations exceeding California Ocean Plan criteria will be released to ocean waters as result of the SCE facility discharge. The pumped groundwater from the SCE facility, mixed with LBGS plant cooling water, is discharged to the Back Channel under a NPDES permit. As documented in Section 5.7 of the RI, specifically for IR Site 8, screening analysis indicated that soil concentrations of contaminants would not impact groundwater. Thus, no vadose-zone leaching analyses or transport modeling were needed for this site, and no contaminants at this site would impact surface waters at concentrations above ARARs criteria. That is, "exposure point concentrations" would *not* "exceed ARARs" criteria at IR Site 8.

Comment Number	Draft Section	Comment	Response
4 (cont'd)			Specifically for IR Site 10, the primary potential pathway for contaminant migration is leaching from the vadose zone, and then transport through the shallow groundwater zone, with discharge through the SCE dewatering system. For IR Site 10, leaching and transport analyses (vadose-zone and saturated-zone migration analyses) were done to determine whether predicted concentrations of contaminants in groundwater, that result from leaching, exceed surface water quality criteria at potential discharge locations to surface water bodies. Two infiltration scenarios were considered for evaluating the effects of soil leaching on groundwater contaminant concentrations. The first scenario was based on infiltration under existing surface cover conditions. IR Site 10 is currently paved with asphalt. The second scenario assumed that the LBNSY was completely unpaved (soil cover only) for a period of two years, and then repaved. The modeling results of these analyses are presented and discussed in detail in Section 5.7 of the RI and are not repeated here. The modeling results for the infiltration scenario for existing conditions at IR Site 10 indicate that several contaminants would affect groundwater beneath the site (AOPC) at concentrations above California Ocean Plan criteria. However, modeling results also indicated that future leaching would not significantly increase the concentrations of these contaminants in groundwater. For the SCE wells, the modeling results indicated that contaminants would not affect groundwater at concentrations above California Ocean Plan criteria.

Comment Number	Draft Section	Comment	Response
4 (cont'd)			The modeling results for the unpaved infiltration scenario also indicate that several contaminants would affect groundwater beneath the site (AOPC) at concentrations above California Ocean Plan criteria. For the SCE wells, however, the modeling results indicate that contaminants would not affect groundwater at concentrations above California Ocean Plan criteria. Thus, modeling results for IR Site 10 showed that no contaminants at that site would impact surface waters at concentrations above ARARs criteria. That is, contrary to the comment, "exposure point concentrations" would *not* "exceed ARARs" criteria at this site. Specifically for IR Site 11 (AOPC 1), leaching and transport analyses (vadose-zone and saturated-zone migration analyses) were done to determine whether predicted concentrations of contaminants in groundwater, that result from leaching, exceed surface water quality criteria at potential discharge locations to surface water bodies. Two scenarios were modeled. The first, the paved infiltration scenario, assumed that AOPC 1 remained covered in shotcrete. The second, the unpaved infiltration scenario, assumed that AOPC 1 was entirely uncovered for 2 years and then repaved. The modeling results of these analyses are presented and discussed in detail in Section 5.7 of the RI and are not repeated here.

Comment Number	Draft Section	Comment	Response
4 (cont'd)			The vadose-zone migration analysis for existing conditions, the paved infiltration scenario, at IR Site 11, AOPC 1 indicated that several contaminants would affect groundwater beneath the AOPC at concentrations above California Ocean Plan criteria, but most would be below the groundwater background threshold concentrations. For the SCE wells, the modeling results indicated that these contaminants would not affect groundwater at concentrations above California Ocean Plan criteria. The vadose-zone migration analysis for the unpaved infiltration scenario at IR Site 11, AOPC 1 also indicated that several contaminants would affect groundwater beneath the AOPC at concentrations above California Ocean Plan criteria but below groundwater background threshold concentrations. Modeling results also indicated that future leaching would not significantly increase the existing concentrations of contaminants in groundwater. For the SCE wells, the modeling results indicated that contaminants would not affect groundwater at concentrations above California Ocean Plan criteria. Thus, modeling results showed that no contaminants at IR Site 11, AOPC 1, would impact surface waters at concentrations above ARARs criteria. That is, contrary to the comment, "exposure point concentrations" would *not* "exceed ARARs" criteria at this site. Specifically for IR Site 11 (AOPC 2), leaching and transport analyses (vadose-zone and saturated-zone migration analyses) were done to determine whether predicted concentrations of contaminants in groundwater, that result from leaching, exceed surface water quality criteria at potential discharge locations to surface water bodies.

Comment Number	Draft Section	Comment	Response
4 (cont'd)			Two infiltration scenarios were considered for evaluating the effects of soil leaching on groundwater contaminant concentrations. The first scenario was based on infiltration under existing surface cover conditions. IR Site 11, AOPC 2 is currently 35 percent soil, 40 percent soil slope with ice plants, and 25 percent pavement. The second scenario assumed that the LBNSY was completely unpaved (soil cover only) for a period of two years, and then repaved. The modeling results of these analyses are presented and discussed in detail in Section 5.7 of the RI and are not repeated here. The vadose-zone migration analysis for existing conditions at IR Site 11, AOPC 2, indicated that several contaminants would affect groundwater beneath the AOPC at concentrations above California Ocean Plan criteria, and above their groundwater background threshold concentrations. For the SCE wells, the modeling results indicated that contaminants would not affect groundwater at concentrations above California Ocean Plan criteria. The vadose-zone migration analysis for the unpaved infiltration scenario at IR Site 11, AOPC 2 indicated that contaminants would not affect groundwater beneath the AOPC at concentrations above California Ocean Plan criteria or above groundwater background threshold concentrations. For the SCE wells, the modeling results indicated that contaminants would not affect groundwater at concentrations above California Ocean Plan criteria. Thus, modeling results showed that no contaminants at IR Site 11, AOPC 2, would impact surface waters at concentrations above ARARs criteria. That is, contrary to the comment, "exposure point concentrations" would *not* "exceed ARARs" criteria at this site.

Comment Number	Draft Section	Comment	Response
5	Table 5-1	Under the No Further Action alternative, please indicate whether CERCLA 5-year review costs should be included in this alternative since waste remains in place. Likewise, under other alternatives where waste remains on-site, please indicate whether 5-year review costs have been included.	As stated in Section 5.0 of the FS, as part of preliminary screening of remedial action alternatives, cost estimates for remedial alternatives are intended to provide a reference for comparing alternatives only. Should a 5-year review be deemed necessary for IR Sites 8, 10, and 11, review costs for all of the remedial alternatives considered for the sites would be approximately equal. Thus, including 5-year review cost estimates for the remedial alternatives does not enhance cost information from the intended perspective of providing a reference for comparison of alternatives. Therefore, cost estimates for 5-year reviews are not included in Table 5-1.
6	Table 5-1 Footnotes	Please indicate the basis for the assumed one year duration of groundwater monitoring at all three sites.	Groundwater monitoring costs, and all other costs, estimated during the preliminary screening of remedial alternatives are intended to provide a reference for comparison only. The assumed "one year duration of groundwater monitoring" is made in the context of providing cost estimates for comparison, and does not imply that groundwater monitoring itself would be limited to one year.
Section 6.0: Detailed Analysis of Remedial Action Alternatives—General Comments			
1	Reduction of Toxicity, Mobility, or Volume	None of the alternatives screened or retained for detailed analysis in this Feasibility Study can achieve the statutory preference for selecting remedial actions that employ treatment technologies to permanently reduce toxicity, mobility, and/or volume of the contaminants.	Under industrial exposure scenarios for workers, no chemicals of concern (COCs) or areas of concern (AOCs) exist at IR Sites 8, 10, and 11. That is, based on industrial exposure scenarios, the overall risks for these sites fall within the U.S. EPA's target range of 10^{-4} to 10^{-6} or below. Thus, cleanup to reduce the toxicity, mobility, and/or volume of contaminants at the sites is not warranted. If cleanup to reduce the toxicity, mobility, and/or volume of contaminants the sites is not warranted, then it is also neither necessary nor cost-effective to reduce them. That is, under these circumstances, treatment to reduce the toxicity, mobility, and/or volume of contaminants at IR Sites 8, 10, and 11 is not necessary to meet federal or state statutes and regulations, will not have a significantly positive effect in protecting human health and the environment, and will not be more effective in either the long-term reduction of contaminants or in short-term safety.

Comment Number	Draft Section	Comment	Response
2	Compliance with ARARs	Under conditions presented in this Feasibility Study, to evaluate alternatives based upon their compliance with ARARs seems redundant since, as presented in previous sections, the ARARs were identified only in light of predetermined Remedial Alternatives. ARARs must be identified in a way that is independent of the outcome of alternative evaluation and selection.	Because there are not contaminants of concern (COCs) at IR Sites 8, 10, and 11, and because, based on the results of the HHRA, there are no human health risks under an industrial scenario, the development of extensive lists of ARARs is unnecessary. The ARARs most likely to be relevant to site conditions are presented. They were selected based on site conditions, not on remedial alternatives, and are independent of the remedial alternatives.
Section 6.0: Detailed Analysis of Remedial Action Alternatives—Specific Comments			
1	Section 6.1.1, p. 6-2, paragraph 1	The statement is made that NFA is expected to provide protection of human health and environment if the industrial land use scenario remains valid. This discussion should acknowledge that this alternative provides no mechanism to ensure that the industrial land use scenario remains valid and therefore cannot ensure achievement of remedial action objectives. Please revise.	Section 6.1.1 was changed to read: "The HHRA in the RI report for IR Sites 8, 10, and 11 determined that the industrial scenario risks associated with the sites are within the generally acceptable range defined by the NCP. The NFA alternative is expected to provide protection of human health and the environment if the industrial land use scenarios assumed for the HHRA remain valid. However, the NFA alternative provides no mechanism to ensure that the industrial use scenarios remain valid. Therefore, the NFA alternative cannot ensure achievement of RAOs."
2	Section 6.1.3, p. 6-2	It appears illogical that NFA would provide protection of human health and the environment, but that this alternative only has limited long-term effectiveness and permanence. Please clarify.	The NFA alternative does not provide long-term effectiveness and permanence because it does not provide a mechanism to ensure that the industrial use scenario, on which the HHRA is based, remains valid. That is, the NFA alternative does not prevent the future use of IR Sites 8, 10, and 11 for non-industrial purposes. Section 6.1.3 was changed to read: "The NFA alternative does not provide long-term effectiveness because contaminants remain in soil and groundwater on IR Sites 8, 10, and 11. Further, the NFA alternative provides no controls to prevent future non-industrial use of the sites. Under the NFA alternative, contaminants would remain at the sites at concentrations protective for industrial exposures, but not necessarily protective for other exposure scenarios."

Comment Number	Draft Section	Comment	Response
3	Section 6.1.7, p. 6-3	Please discuss whether costs for a 5 year CERCLA review should be included in this category.	As stated in Section 6.0 of the FS, costs estimated during the detailed analysis of remedial action alternatives are intended to include the capital and the operations and maintenance (O&M) costs of the remedial alternatives. Should a five-year review be deemed necessary for IR Sites 8, 10, and 11, these costs will be estimated separately.
4	Section 6.2.1, p. 6-4	The conclusion regarding Institutional Controls could be the same as those for containment technologies, i.e., in the absence of AOCs or COCs, Institutional Controls are not required to provide an overall protection of human health and the environment. Alternately, if there are no COCs or AOCs, no further action is required. The logic is inherently inconsistent in suggesting the need for any remedial action at all if there are not AOCs or COCs. Please clarify.	The first paragraph of Section 6.2.1 was changed to read: "The HHRA in the RI report for IR Sites 8, 10, and 11 determined that the industrial scenario risks associated with the sites are within the generally accepted range defined by the NCP. Institutional controls in the form of deed restrictions are expected to provide protection of human health and the environment if the industrial land use scenarios assumed for the HHRA remain valid. Institutional controls in the form of deed restrictions provide a mechanism to ensure that the industrial use scenarios remain valid. Therefore, institutional controls in the form of deed restrictions can ensure achievement of RAOs."
5	Section 6.2.3, p. 6-4	It appears form the last statement, which states in part that the RI report is based on industrial exposure and thus requires institutional controls to ensure long-term effectiveness of risk calculations that the selection of institutional controls as a remedial alternative was a foregone conclusion in the HHRA. Please address this issue.	Institutional controls in the form of deed restrictions provide long-term effectiveness and permanence because they provide a mechanism to ensure that the industrial use scenarios, on which the HHRA is based, remain valid. That is, institutional controls in the form of deed restrictions can prevent the future use of IR Sites 8, 10, and 11 for other than industrial purposes. Section 6.2.3 was changed to read: "Institutional controls in the form of deed restrictions provide long-term effectiveness and permanence because, although contaminants remain in soil and groundwater at IR Sites 8, 10, and 11, the institutional controls can prevent future use of the sites for non-industrial purposes. That is, institutional controls in the form of deed restrictions provide a mechanism to ensure that the industrial scenarios, on which the HHRA is based, remain valid."

Comment Number	Draft Section	Comment	Response
6	Section 6.2.7, p. 6-5	Please discuss whether CERCLA 5-year review costs should be included in this category and indicate that level of costs has been assumed for each of the three sites for implementation and maintenance of Institutional Controls.	As stated in Section 6.0 of the FS, costs estimated during the detailed analysis of remedial action alternatives are intended to include the capital and the operations and maintenance (O&M) costs of the remedial alternatives. Should a 5-year review be deemed necessary for IR Sites 8, 10, and 11, these costs will be estimated separately. Section 6.2.7 was changed to read: "The costs associated with institutional controls, in the form of deed restrictions, at each site depend on the level of administrative effort needed to implement the changes required by these controls. Best estimates for implementation indicate that $6,000 per site may be reasonable to assume, although actual costs may vary significantly. Once implemented, institutional controls in the form of deed restrictions are permanent. Thus, no O&M costs are associated with these controls."
7	Section 6.3.7, p. 6-8	The text refers to summary cost information as presented in Table 5-1. Please indicate where detailed cost data for the alternatives can be reviewed or provide these details in an appendix.	Section 6.3.7 was changed to read: "No additional costs are associated with alternative 1, NFA. Costs for alternative 2, institutional controls, would be small. Best estimates for implementation indicate that $6,000 per site may be reasonable to assume for implementation of institutional controls in the form of deed restrictions. No O&M costs are associated with these institutional controls." Cost estimates presented in the FS are order-of-magnitude (+50%, -30%) and are based on engineering judgment. The FS concludes that either no further action or institutional controls are appropriate for IR Sites 8, 10, and 11, because there are no COCs at the sites. More detailed costs and supporting documentation are not warranted or required for this FS.

Comment Number	Draft Section	Comment	Response
8	Table 6-2	Please provide and discuss the basis for the rating system used and the scores assigned, including citations of either EPA guidance on the use of the rating system or other sites at which it has been used. Please discuss and justify why it is appropriate to assign equal weighting to the threshold criteria as to the primary balancing criteria. Given that the threshold criteria must be achieved by all remedial alternatives, it would seem to at these should be weighted more heavily in the scoring system.	Table 6-2 was unnecessarily complex. It was changed as shown below. In addition, the text of Section 6.3 preceding Table 6-2 was changed to read: "The following analysis compares the two remedial alternatives based on seven of the nine evaluation criteria. The alternatives are rated on primary balancing criteria, using a 1-to-4 scale to rate the alternatives from poor to very good. Results of the comparative analysis are summarized in Table 6-2 and discussed in the subsections that follow. State and community acceptance will be fully addressed during the public comment period."

Table 6-2. Remedial Alternative Evaluation Summary for IR Sites 8, 10, and 11

Criteria	Remedial Alternative	
	Alternative 1: NFA	Alternative 2: Institutional Controls
Overall protection of human health and the environment	No	Yes
Compliance with ARARs	Yes	Yes
Long-term effectiveness and permanence	1	4
Reduction of toxicity, mobility, or volume	1	1
Short-term effectiveness	4	4
Implementability	4	4
Cost	4	4
Total	14	17

Rating scale: 1 = poor; 2 = fair; 3 = good; 3 = very good. High total score is favorable.

Comment Number	Draft Section	Comment	Response
Appendix A: Applicable Relevant and Appropriate Requirements Tables—General Comments			
1	Tables A-1 through A-6	It is recommended that the citations throughout these tables be checked for accuracy. It appears that in a variety of cases, tables labeled as Federal ARARs tables cite CCR, which is interpreted to be the California Code of Regulations. Please verify that the citations are appropriate relative to federal or state regulations. For example, Table A-3, sheet 7 of 19 cites CCR for Federal Action-Specific ARARs while Tables A-3, sheet 8 of 19 cites CFR. Similar discrepancies exist throughout many of these tables.	For those cases in which state regulations are promulgated to meet the requirements of federal laws, e.g., for RCRA, the state regulations are listed for evaluation as potential federal ARARs.
Appendix A: Applicable Relevant and Appropriate Requirements Tables—Specific Comments			
1	Table A-1, p. A-2 and p. A-4	The Federal Clean Water Act Water Quality Criteria are relevant and appropriate. Please discuss why there are no chemical-specific state ARARs comparable to the Clean Water Act (i.e., Porter-Cologne).	Table A-4, Potential State Chemical-Specific ARARs, includes provisions of the California Water Code, the Porter-Cologne Water Quality Control Act, and the Comprehensive Water Quality Control Plan for the Los Angeles Basin. Those provisions that are applicable or relevant and appropriate are so designated in the Table. Because none of the remedial alternatives include discharges from treatment, provisions specifying such treatment are neither applicable nor relevant. Further, other provisions of the Porter-Cologne Act are non-statutory in nature, and therefore, not applicable.
2	Table A-2, p. A-10	Coastal Zone Management Act: Please discuss why there is no state counterpart to the referenced federal regulation.	Table A-5 includes the California Coastal Act of 1976 as an applicable requirement for IR Sites 8, 10, and 11, because the sites are within the coastal zone.
3	Table A-2, p. A-11	Please clarify the statement that no impacts are expected on marine mammal populations due to the distance between the site and the marine ecosystem. Given that the site is located on Terminal Island in a marine environment, please define the distance to the marine ecosystem of concern. Also consider whether sediment and metals leached from sandblast grit could get transported to Site 7.	Few mammalian receptors exist near LBNSY. The most significant are seals, sea lions, and sea otters, which may consume fish and invertebrates from the harbor. Primary aquatic receptors for any contaminants in the harbor are aquatic invertebrates, such as polychaete worms, crustaceans, and mollusks, and fish, including species consumed by marine mammals.

Comment Number	Draft Section	Comment	Response
3 (cont'd)			The major pathway of concern for marine mammalian exposure is groundwater discharge to surface water, whereby marine life can be exposed. However, most of the shallow groundwater on the main LBNSY facility, including that from IR Site 10, where spent sandblast material is present, is within the capture zone of the SCE dewatering system. The outfall for this dewatering system is on the eastern end of Terminal Island. The pumped groundwater is discharged under a NPDES permit. That is, all waters discharged through the SCE dewatering system meet U.S. EPA's NPDES standards. Once a contaminant enters surface water, through either groundwater discharge or surface runoff, it can remain dissolved in the water column or partition into the sediments. Contaminated sediments in the harbor may be a source of exposure to both benthic and free-swimming marine organisms. However, modeling of contaminant migration indicates that neither metals nor organics found at the sites will affect groundwater at the SCE discharge wells at levels above California Ocean Plan (State of California, 1995) criteria. Thus, no impacts are expected to the marine ecosystem. The referenced comment in Table A-2, that "No impacts are expected due to the distance between the Site and the marine ecosystem," is unnecessary in the context of this ARAR determination. It was deleted. Ecological risks at IR Site 7 are addressed in a separate RI/FS for IR Site 7, namely *Draft Final Remedial Investigation (RI) Report, Installation Restoration Program for West Basin (IR Site 7), Naval Station Long Beach, Long Beach, California*, 4 volumes (Bechtel National, Inc., 1997). They are not repeated here. However, as explained above, it is unlikely that "sediment and metals leached from sandblast grit [at IR Site 10] could be transported to [IR] Site 7" at any level of concern.

Comment Number	Draft Section	Comment	Response
4	Table A-3, p. A-12	For on-site waste generation and hazardous waste accumulation, the comment is made that hazardous waste may be generated during site actions. However, on page A-2 of Table A-1 and in the section discussing ARARs in the text, the statement is made that "it is not expected that RCRA hazardous wastes will be generated". These conclusions regarding ARARs are internally inconsistent. Please reconcile.	The referenced comment in Table A-3, that "Hazardous wastes may be generated during site actions," while not incorrect, is misleading. It was replaced everywhere that it occurred with "No generation of RCRA hazardous waste is expected. However, testing will be done, and, if hazardous waste characteristic is present, the regulation will apply."
5	Table A-3, Sheet 10 of 19 on p. A-21	Comments under the Toxic Substances Control Act state in all categories that no PCBs were reported in soils or groundwater. However, the previous discussion of ARARs in the text indicated that PCBs were found, but at concentrations less than the 50 ppm criterion. Please discuss and clarify this discrepancy.	The referenced comment in Table A-3 is incorrect. It was replaced everywhere that it occurred with "No PCBs at concentrations of 50 ppm or greater were reported in soils or groundwater."
6	Table A-3, p. A-24 - Clean Air Act	Please discuss why there is no state counterpart for the referenced federal regulation.	In the State of California, provisions for implementation of the Clean Air Act are made through local or regional Air Pollution Control Districts (APCDs). The APCD that governs the LBNSY is the Los Angeles APCD. Los Angeles APCD rules are listed separately and specifically in Table A-3 under the "Clean Air Act (CAA) 40 USC 7401 et seq."
7	Table A-3, Sheet 13 of 19	Under Clean Air Act, the table cites 40 USC, however, some of the sections also cite Air Pollution Control district rules, which are state rather than federal policies. Please clarify.	The federal Clean Air Act requires that states provide U.S. EPA-approved implementation plans. That is, the federal Clean Air Act is a law that requires states to make provisions for implementation. In the State of California, provisions for implementation of the Clean Air Act are made through local or regional Air Pollution Control Districts (APCDs). The APCD that governs the LBNSY is the Los Angeles APCD. Los Angeles APCD rules are listed separately and specifically in Table A-3 under the "Clean Air Act (CAA) 40 USC 7401 et seq." because they are the provisions for implementing the Clean Air Act that pertain to the LBNSY, and specifically to IR Site 8, 10, and 11.

Comment Number	Draft Section	Comment	Response
8	Table A-3, p. A-27	Under the U.S. Department of Transportation, the comments section indicates that removal or transport of wastes are expected as part of remedial action. This again appears inconsistent with the initial conclusions that no hazardous wastes would be generated using remedial actions. Please clarify. Furthermore, this conclusion appears inconsistent with the selected remedial alternatives for detailed evaluation, because neither alternative involves waste removal or transport.	The referenced comment in Table A-3 is incorrect. It was replaced everywhere that it occurred with "Neither removal nor transport of wastes is expected as part of remedial action for the sites."
9	Table A-4, p. A-31	This table cites state Regional Water Quality Control Board Regulations as potential chemical-specific ARARs. However, on page 4-5 paragraph 5 states clearly that no other state chemical-specific ARARs were identified other than the California EPA DTSC regulations. Please resolve this discrepancy.	Table A-4 is incorrect. The referenced ARAR determination was changed from "Yes" to "No," and the comment was changed to read: "Discharges from treatment are not expected."
10	Table A-4, p. A-31	For the California Water Code, the comments section indicates that discharges from treatment are expected. However, no treatment technologies were screened, evaluated, or retained for detailed analysis in this FS. This is inconsistent, please resolve.	The referenced comment in Table A-4 is incorrect. It was changed to read: "Discharges from treatment are not expected."
11	Table A-4, p. A-32	Regarding the Comprehensive Water Quality Control Plan for the Los Angeles Basin, the comments section states that removal actions are expected. However, removal as a process options was not screened, evaluated or retained for detailed analysis in this FS. This is inconsistent, please resolve.	The referenced comment in Table A-4 is incorrect. It was changed to read: "Removal actions are not expected."
12	Table A-6, p. A-35	Under the State Water Resources Control Board, California Water Code citations, the statement is made in the comments section that discharges of treated groundwater may occur. However, groundwater treatment technology process options were not screened, evaluated or retained for detailed analysis in this FS. This is inconsistent, please clarify.	The SCE dewatering system is the probable discharge location of groundwater from IR Sites 8, 10, and 11 as well as the dominant influence on shallow groundwater flow direction within the LBNSY. The system is an operating extraction system that consists of about 210 well points situated around the perimeter of the eastern half of the LBGS. The pumped groundwater is discharged with cooling water from the LBGS under a NPDES permit. The discharge location for the system is in the Back Channel at Berth 114.

Comment Number	Draft Section	Comment	Response
12 (cont'd)			Although groundwater from IR Sites 8, 10, and 11 is discharged to surface waters through the SCE dewatering system, the system is not a treatment technology for contaminants at IR Sites 8, 10, and 11. Thus, discharges of treated groundwater are not expected as a result of remedial action for IR Sites 8, 10, and 11. The referenced comment in Table A-6 was replaced everywhere that it occurred with: "Discharges of treated groundwater are not expected."