5.0 ENVIRONMENTAL ANALYSIS

5.0 OVERVIEW OF EIR METHODOLOGY AND SIGNIFICANCE DETERMINATION

The EIR includes as much detail as possible to maximize information available for public review and thus avoid and/or minimize the need for future environmental documentation (see Section 2.0 of this EIR for further explanation of the EIR process). The EIR includes information gathered from correspondence from utility/service providers (Appendix J), available literature/reference documents, and consultation with potentially affected agencies (see Section 2.7, *INCORPORATION BY REFERENCE*). In addition, several technical studies were prepared for review and incorporation into this EIR. Technical studies completed for the Seawater Desalination Project at Huntington Beach include:

- Noise Data
- Air Quality Data
- Growth Assessment and General Plan Evaluation
- Underground Booster Pump Station Cultural Resources Assessment Reports
- Geological Report - Desalination Site
- Geological Report - Aboveground Product Water Storage Tank
- Preliminary Seismic Assessment
- Report on Local and Regional Power Requirements and Generation Resources
- Local Alternative Site Investigation
- Underground Booster Pump Station Biological Constraints Survey
- Marine Biological Analysis
- Supplemental Report on the Effects of a Retrofitted Diffuser on the Discharge Outfall for the Proposed Seawater Desalination Project at Huntington Beach
- Marine Biological Considerations
- Intake Effects Assessment
- Watershed Sanitary Survey
- Hydrodynamic Modeling Report
- Receiving Water Chemistry and Quality Report
- Distribution System Corrosion Control Study
- Disinfection Byproduct Formation Study
- RO Membrane Cleaning Solution Discharge Test Stream Data
- Pressure Surge Analysis
- Preliminary Pipeline Assessment
- Desalination Facilities Located Throughout the World

The analysis of the project's impacts, as contained in this EIR, is presented to clearly indicate the significance determination for each of the impacts by numbering each impact, with a correspondingly numbered impact discussion, and, if necessary, mitigation measure(s). The significance determinations are based on a number of factors as explained in each impact section. These primarily include Appendix G of the CEQA Guidelines, General Plan policies, ordinances, generally accepted professional standards, and established quantified thresholds by the City of Huntington Beach or other agencies.

The following is an explanation of the different significance determinations made in this EIR:

A. Not Significant

This determination is made when any of the three following cases apply:

1) *No Impact:* Due to the nature or location of the project, this impact will not occur. For example, underground facilities do not have the potential for long-term visual impacts.

2) *Less Than Significant:* Although an impact may occur, it will not be at a significant level based on the above described standards. For example, construction-related air emissions that fall below the adopted air quality standards are less than significant.

3) *Potentially Significant Impact "Mitigated" Through Existing Requirements (No EIR mitigation required):* In this case, there is an impact which, although it is potentially significant, will be reduced to less than significant levels through adherence to and/or implementation of various existing requirements. These existing requirements include the City of Huntington Beach Ordinances, engineering and design requirements (through the Uniform Building Code and other regulations), and from other regional, state, and federal agencies.

B. Less Than Significant With Mitigation

This determination is made when a potentially significant impact can be reduced, avoided or offset to less than significant levels by incorporating EIR mitigation measures.

C. Significant With Mitigation

This determination is made for a potentially significant impact where there is either no mitigation available, or the recommended mitigation measures are not sufficient to reduce the impact to less than significant levels. This determination requires a Statement of Overriding Considerations, pursuant to CEQA Guidelines Section 15093 (this would be adopted by the City of Huntington Beach prior to approving the project).

5.1 LAND USE/RELEVANT PLANNING

The purpose of this section is to discuss the impacts of project implementation upon land uses on the project site and adjacent areas. This section includes a discussion of existing conditions including on-site and off-site land uses. Potential impacts of the proposed project are examined including compatibility with surrounding land uses, the City of Huntington Beach General Plan, the City of Huntington Beach Local Coastal Program, and the City of Huntington Beach Zoning and Subdivision Ordinance.

EXISTING CONDITIONS

PROPOSED DESALINATION FACILITY SITE

On-Site Land Uses

The approximately eleven-acre desalination facility site is located within the City of Huntington Beach, south of Hamilton Avenue, north of Pacific Coast Highway, east of Newland Street, and west of Magnolia Street. The proposed project site consists of three fuel storage tanks formerly used in conjunction with the Huntington Beach Generating Station. The "west" tank site (location for the aboveground product water storage tank) is also developed with a fuel storage tank. For additional information regarding existing conditions, refer to Section 3.0, *PROJECT DESCRIPTION*, Exhibit 3-2, *SITE VICINITY MAP*, and Exhibit 5.7-1, *DESALINATION FACILITY SITE PHOTOGRAPHS.*

Adjacent Land Uses

Surrounding adjacent land uses to the desalination site include the AES Huntington Beach Generating Station (HBGS) to the southwest, a wetland area to the southeast, the Huntington Beach Channel (a facility operated by the Orange County Flood Control District [OCFCD]) to the east, a fuel oil storage tank to the north, and an electrical switchyard to the west. Additional surrounding land uses include Pacific Coast Highway to the south; the Pacific Holdings storage tank facility to the east; Ascon/Nesi Landfill to the northeast; commercial, industrial, recreational, and residential uses to the north; and Newland Street, Huntington-By-The-Sea Mobile Home Park, and Cabrillo Mobile Home Park to the west.

OFF-SITE PIPELINE ALIGNMENT AND UNDERGROUND PUMP STATIONS

On-Site Land Uses

Proposed Pipeline Alignment

The proposed pipeline alternatives (refer to Exhibit 3-3, *CONCEPTUAL PIPELINE ALIGNMENTS*) are proposed to be routed primarily within existing street right-of-way and easements. However, portions of the pipeline alignments are proposed to be installed within areas of the Costa Mesa Country Club (Costa Mesa) and Fairview State Hospital (Costa Mesa).

OC-44 Booster Pump Station

The proposed OC-44 underground pump station site is located within an Orange County Resource Preservation Easement, and is currently occupied by open space and vegetation (refer to Exhibit 5.7-3, *BOOSTER PUMP STATION LOCATION PHOTOGRAPHS*). Although the Resource Preservation Easement is subject to various development restrictions, the pump station would be situated in an area of the easement where limited development is allowed and two underground pump stations already exist. The footprint of the proposed underground pump station would be approximately 100 feet by 100 feet, and would require a construction easement of 125 feet by 125 feet. It should be noted that the proposed pump station site is located adjacent to (but not within) a Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) area.

<u>Coastal Junction Booster Pump Station</u>

The Coastal Junction underground booster pump station is proposed within the parking lot of St. Paul's Greek Orthodox Church within the City of Irvine, located at 4949 Alton Parkway. The underground pump station would be constructed within the north/northwestern portion of the church parking lot, in an area used for both parking and volleyball activities. The footprint of the proposed underground pump station would be approximately 100 feet by 100 feet, and would require a construction easement of 125 feet by 125 feet. Also refer to Exhibit 5.7-3, *BOOSTER PUMP STATION LOCATION PHOTOGRAPHS.*

Adjacent Land Uses

<u>Proposed Pipeline Alignment</u>

The proposed alternative pipeline alignments are situated adjacent to a variety of land uses, including residential, commercial, educational, medical, and recreational.

<u>OC-44 Booster Pump Station</u>

The proposed OC-44 booster pump station site is surrounded by open space to the north, open space and residential to the east, two existing underground pump stations, open space, and residential to the west, and open space to the south. It should be noted that the proposed pump station site is located adjacent to (but not within) a Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) area.

<u>Coastal Junction Booster Pump Station</u>

The Coastal Junction pump station site is surrounded by the St. Paul's Church to the south, the Woodbridge Village Association to the west, an apartment complex to the east and open space to the north.

RELEVANT PLANNING

Zoning and Subdivision Ordinance

The purpose of the City's Zoning and Subdivision Ordinance is to implement the policies of the City of Huntington Beach General Plan. The goal of this document is to promote and protect the public health, safety, and general welfare of Huntington Beach residents and provide the physical, economic, and social advantages, which result from a comprehensive and orderly planned use of land resources. The City of Huntington Beach General Plan designates the proposed project site as Public (P). Typical permitted uses within areas of this designation include governmental administrative and related facilities, such as utilities, schools, public parking lots, infrastructure, religious, and similar uses. The project site is zoned as Public-Semipublic with Oil and Coastal Zone Overlays (PS-O-CZ). This district provides for similar uses to those allowed by the City of Huntington Beach General Plan. The Seawater Desalination Project at Huntington Beach is a permitted use (refer to Exhibit 5.1-1, *ZONING*). The proposed desalination facility does not propose to change any existing zoning designations. As the subject site is located within the coastal zone, the City's Local Coastal Program is inclusive of the Zoning and Subdivision Ordinance and its policies.

City of Huntington Beach General Plan

The City of Huntington Beach General Plan is used by the City of Huntington Beach as the document to set baseline land use criteria within the City (refer to Exhibit 5.1-2 *LAND USE DESIGNATIONS*). The project site is designated as "Public (P)" by the City's General Plan. Typical permitted uses within areas of this designation include governmental administrative and related facilities, such as utilities, schools, public parking lots, infrastructure, religious, and similar uses. The policies and portions of the following General Plan Elements are relevant to the proposed project:

Local Coastal Program (Coastal Element)

The California Coastal Act of 1976 requires that local governments lying whole or in part within the coastal zone prepare a Local Coastal Program for its portion of the coastal zone. The Coastal Zone within the City of Huntington Beach runs from the northern City limit at Seal Beach, south nine miles to the Santa Ana River at the Huntington Beach/Newport Beach boundary, totaling approximately five square miles. The following policies of the Local Coastal Program are relevant to the proposed desalination facility, as it lies within the Coastal Zone:

- Policy 1.1.1 (page Coastal Element IV-C-100): With the exception of hazardous industrial development, new development shall be encouraged to be located within, contiguous or in close proximity to, existing developed areas able to accommodate it or, where such areas are not able to accommodate it, in other areas with adequate public services, and where it will not have significant adverse effects, either individually or cumulatively, on coastal resources.

- Policy 4.2.1 (page Coastal Element IV-C-111): Ensure that the following minimum standards are met by new development in the Coastal Zone as feasible and appropriate:

    1. Preservation of public views to and from the bluffs, to the shoreline and ocean and to the wetlands.
    2. Adequate landscaping and vegetation.
    3. Evaluation of project design regarding visual impact and compatibility.
    4. Incorporate landscaping to mask oil operations and major utilities, such as the electrical power plant on Pacific Coast Highway.

- Policy 4.2.3 (page Coastal Element IV-C-111): Promote the preservation of significant public view corridors to the coastal corridor, including views of the sea and the wetlands through strict application of local ordinances, design guidelines, and related planning efforts, including defined view corridors.

- Policy 4.7.1 (page Coastal Element IV-C-114): Promote the use of landscaping material to screen uses that detract from the scenic quality of the coast along public right-of-way and within public view.

- Policy 4.7.5 (page Coastal Element IV-C-114): Require the review of new and/or expansions of existing industrial and utility facilities to ensure that such facilities will not visually impair the City's coastal corridors and entry nodes.

- Policy 4.7.8 (page Coastal Element IV-C-114): Require landscape and architectural buffers and screens around oil production facilities and other utilities visible from public rights-of-way.

- Policy 4.7.9 (page Coastal Element IV-C-114): Require the removal of non-productive oil production facilities and the restoration of the vacated site.

- Policy 6.1.1 (page Coastal Element IV-C-116): Require that new development include mitigation measures to prevent the degradation of water quality of groundwater basins, wetlands, and surface water.

- Policy 6.1.13 (page Coastal Element IV-C-119): Encourage research and feasibility studies regarding ocean water desalinization as an alternative source of potable water. Participate in regional studies and efforts where appropriate.

- Policy 6.1.19 (page Coastal Element IV-C-119): Prior to approval of any new or expanded seawater pumping facilities, require the provision of maximum feasible mitigation measures to minimize damage to marine organisms due to entrainment in accordance with State and Federal law.

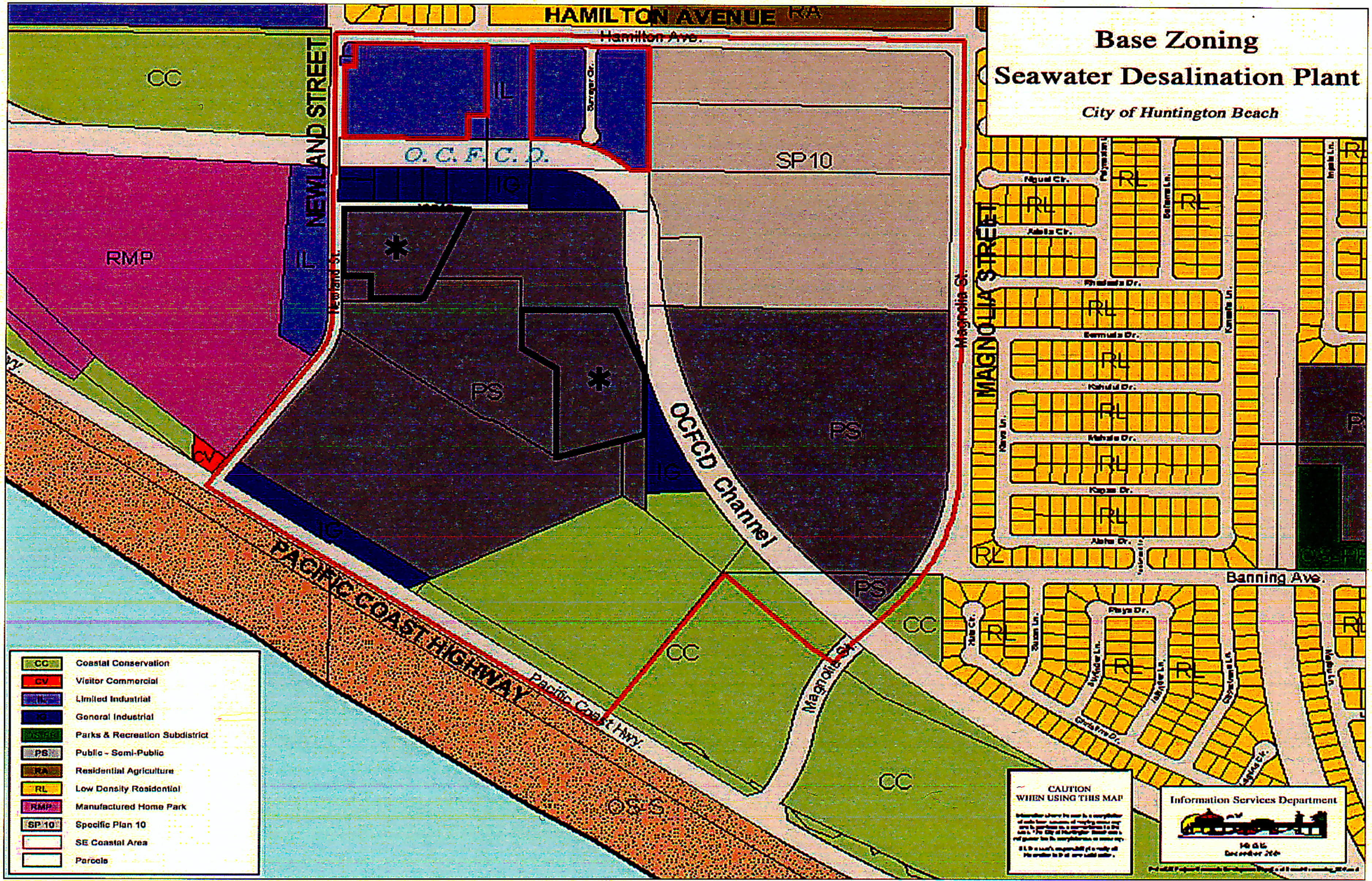
- Policy 7.1.3 (page Coastal Element IV-C-121): Development in areas adjacent to environmentally sensitive habitat areas and parks and recreation areas shall be sited and designed to prevent impacts which would significantly degrade those areas, and shall be compatible with the continuance of those habitat and recreation areas.

- Policy 7.1.4 (page Coastal Element IV-C-121): Require that new development contiguous to wetlands or environmentally sensitive habitat areas include buffer zones. Buffer zones shall be a minimum of one hundred feet setback from the landward edge of the wetland, with the exception of the following:

  A lesser buffer may be permitted if existing development or site configuration precludes a 100-foot buffer, or conversely, a greater buffer zone may be required if substantial development or significantly increased human impacts are anticipated. In either case, the following factors shall be considered when determining whether a lesser or wider buffer zone is warranted. Reduced buffer zone areas shall be reviewed by the Department of Fish and Game prior to implementation.

  1. Biological significance of adjacent lands: The buffer should be sufficiently wide to protect the functional relationship between wetland and adjacent upland.
  2. Sensitivity of species to disturbance: The buffer should be sufficiently wide to ensure that the most sensitive species will not be disturbed significantly by permitted development, based on habitat requirements of both resident and migratory species and the short and long term adaptability of various species to human disturbance.
  3. Susceptibility of parcel to erosion: The buffer should be sufficiently wide to allow for interception of any additional material eroded as a result of the proposed development based on soil and vegetative characteristics, slope and runoff characteristics, and impervious surface coverage.
  4. Use of existing cultural features to located buffer zones: Where feasible, development and buffer zones should be located on the sides of roads, dikes, irrigation canals, flood control channels, etc., away from the environmentally sensitive habitat area.

- Policy 7.1.5 (page Coastal Element IV-C-122): Notify State and Federal agencies having regulatory authority in wetlands and other environmentally sensitive habitats when development projects in and adjacent to such areas are submitted to the City. The implementation of any Habitat Conservation Plan shall require an amendment to



Source: City of Huntington Beach, December 2004.

NOT TO SCALE

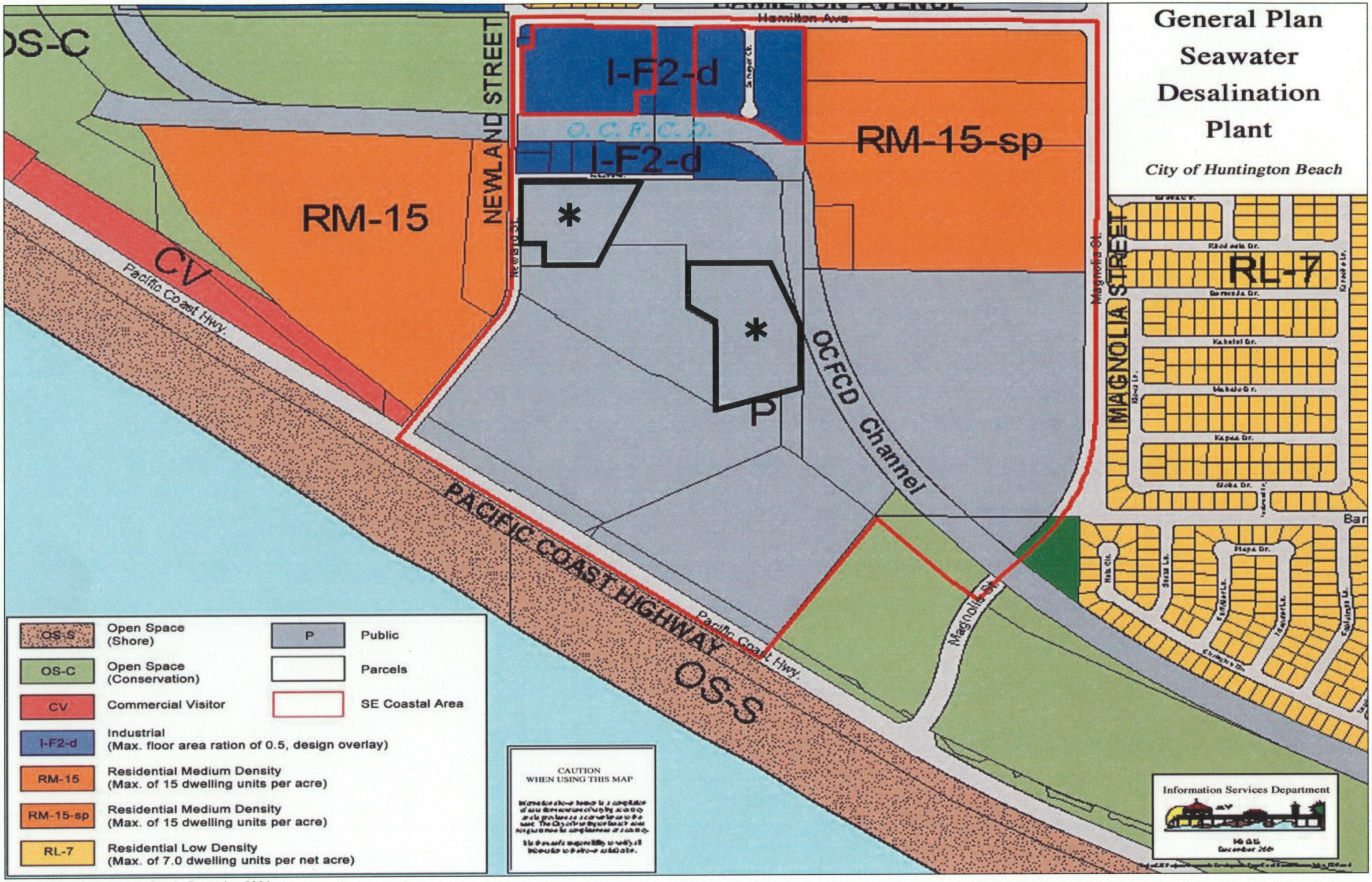
RBF CONSULTING

02/05 • JN 10-101409.002

SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Zoning

Exhibit 5.1-1



Source: City of Huntington Beach, December 2004.

NOT TO SCALE

RBF CONSULTING

02/05 • JN 10-101409.002

SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Land Use Designations

Exhibit 5.1-2

the Local Coastal Program. Incidental take of sensitive habitat and/or species that occurs in the context of development must be consistent with this LCP.

- Policy 10.1.4 (page Coastal Element IV-C-128): Require appropriate engineering and building practices for all new structures to withstand ground shaking and liquefaction such as those stated in the Uniform Building Code.

Land Use Element

- Policy LU 4.1.1 (page II-LU-20): Require adherence to or consideration of the policies prescribed for *Design and Development* in this Plan, as appropriate.

- Policy LU 4.1.2 (page II-LU-20): Require that an appropriate landscape plan be submitted and implemented for development projects subject to discretionary review.

- Policy LU 4.1.6 (page II-LU-20): Require that commercial and industrial development incorporate adequate drought-conscious irrigation systems and maintain the health of the landscape.

- Policy LU 4.2.1 (page II-LU-20): Require that all structures be constructed in accordance with the requirements of the City's building and other pertinent codes and regulations; including new, adaptively re-used, and renovated buildings.

- Policy LU 4.2.4 (page II-LU-20): Require that all development be designed to provide adequate space for access, parking, supporting functions, open space, and other pertinent elements.

- Policy LU 4.2.5 (page II-LU-20): Require that all commercial, industrial, and public development incorporate appropriate design elements to facilitate access and use as required by State and Federal laws such as the American's with Disabilities Act.

- Policy LU 5.1.1 (page II-LU-21): Require that development protect environmental resources by consideration of the policies and standards contained in the Environmental Resources/Conservation Element of the General Plan and Federal (NEPA) and State (CEQA) regulations.

  During the development review process:

  1. Review any development proposal for the Bolsa Chica area to ensure that no development is permitted in Federally delineated wetlands; and
  2. Review any development proposed for non-wetland areas to ensure that appropriate setbacks and buffers are maintained between development and environmentally sensitive areas to protect habitat quality.

- Policy LU 7.1.2 (page II-LU-22): Require that development be designed to account for the unique characteristics of project sites and objectives for community character and in accordance with the Development A Overlay Schedule as appropriate.

- Policy LU 7.1.5 (page II-LU-22): Accommodate the development of a balance of land uses that maintain the City's fiscal viability and integrity of environmental resource.

- Policy LU 12.1.4 (page II-LU-41): Require that new and recycled industrial projects be designed and developed to achieve a high level of quality, distinctive character, and compatible with existing uses.

- Policy LU 12.1.5 (page II-LU-41): Require that new and recycled industrial structures and sites be designed to convey visual interest and character and to be compatible with adjacent uses, considering the:

  1. Use of multiple building masses and volumes to provide visual interest and minimize the visual sense of bulk and mass;
  2. Architectural design treatment of all building elevations;
  3. Use of landscaping in open spaces and parking lots, including broad landscaped setbacks from principal peripheral streets;
  4. Enclosure of storage areas with decorative screening or walls;
  5. Location of site entries to minimize conflicts with adjacent residential neighborhoods; and
  6. Mitigation of noise, odor, lighting, and other impacts.

- Policy LU 12.1.7 (page II-LU-42): Control the development of industrial uses that use, store, produce, or transport toxins, generate unacceptable levels of noise or air pollution, or result in other impacts that may adversely impact Huntington Beach.

Urban Design Element

- Policy UD 2.1.1 (Page II-UD-27): Require that new development be designed to consider coastal views in its massing, height, and site orientation.

Economic Development Element

- Policy ED 2.5.2 (Page II-ED-24): Seek to capture new growth industries such as, but not limited to:

  1. Knowledge based industries, such as research and development firms (higher technology communications and information industries);
  2. Communication industry service providers and equipment manufacturers which are creating the next series of consumer and utility company equipment and services;
  3. Biotechnical industries;
  4. Environmental technology; and
  5. Point of sale industries.

Environmental Resources/Conservation Element

- Policy ERC 4.1.5 (Page IV-ERC-25): Promote the preservation of public view corridors to the ocean and the waterfront through strict application of local ordinances, design guidelines and related planning efforts, including defined view corridors.

Air Quality Element

- Policy AQ 1.8.2 (Page IV-AQ-15): Require installation of temporary construction facilities (such as wheel washers) and implementation of construction practices that minimize dirt and soil transfer onto public roadways.

Environmental Hazards Element

- Policy EH 1.2.1 (Page V-EH-24): Require appropriate engineering and building practices for all new structures to withstand groundshaking and liquefaction such as stated in the Uniform Building Code (UBC).

Noise Element

- Policy N 1.2.2 (Page V-N-6): Require new industrial and new commercial land uses or the major expansion of existing land uses to demonstrate that the new or expanded use would not be directly responsible for causing ambient noise levels to exceed an exterior Ldn of 65 dB(A) on areas containing noise sensitive land uses.

Hazardous Materials Element

- Policy HM 1.1.4 (Page V-HM-7): Implement federal, state, and local regulations for the handling, storage, and disposal of hazardous materials.
- Policy HM 1.2.2 (Page V-HM-7): Ensure that hazardous waste transportation activities are conducted in a manner that will minimize risks to sensitive uses.
- Policy HM 1.4.4 (Page V-HM-8): Require that owners of contaminated sites develop a remediation plan with the assistance of the Orange County Environmental Management Agency (EMA).

Southeast Coastal Redevelopment Plan

The proposed project site is located within the Southeast Coastal Redevelopment Plan area. This redevelopment plan became effective in August of 2002, with the associated Program EIR certified in June of 2002. As adoption of the Southeast Coastal Redevelopment Plan did not change any General Plan or zoning designations within the redevelopment area (including the proposed desalination facility site), the proposed Seawater Desalination Project at Huntington Beach will be consistent with the Southeast Coastal Redevelopment Plan, General Plan, and zoning.

California Coastal Act

As the proposed project is situated within the Coastal Zone in the City of Huntington Beach, and the City has an approved Local Coastal Plan, the desalination facility will require a Coastal Development Permit from the City. However, various types of development within the Coastal Zone are also required to obtain a Coastal Development Permit from the California Coastal Commission. These developments are defined in the California Coastal Act (January 1, 2004), Section 30106 as, "on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste...or construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility..." As such, the proposed desalination facility's ocean discharge will require separate review and approval by the California Coastal Commission of a Coastal Development Permit.

SOUTHERN CALIFORNIA ASSOCIATION OF GOVERNMENTS (SCAG) REGIONAL COMPREHENSIVE PLAN AND GUIDE

Growth Management Chapter

- 3.03: The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the region's growth policies.
- 3.18: Encourage planned development in locations least likely to cause adverse environmental impacts.
- 3.21: Encourage the implementation of measures aimed at the preservation and protection of recorded and unrecorded cultural resources and archaeological sites.
- 3.22: Discourage development, or encourage the use of special design requirements, in areas with steep slopes, high fire, flood, and seismic hazards.
- 3.23: Encourage mitigation measures that reduce noise in certain locations, measures aimed at preservation of biological and ecological resources, measures that would reduce exposure to seismic hazards, minimize earthquake damage, and to develop emergency response and recovery plans.

Air Quality Chapter

- 5.11: Through the environmental document review process, ensure that plans at all levels of government (regional, air basin, county, subregional, and local) consider air quality, land use, transportation, and economic relationships to ensure consistency and minimize conflicts.

IMPACTS

Significance Criteria

A project will normally have a significant adverse environmental impact on land use if it results in any of the following:

- Physically divide an established community;
- Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect; and/or
- Conflict with any applicable habitat conservation plan or natural community conservation plan.

Potential impacts related to land use and relevant planning have been identified and are categorized below according to topic.

LAND USE

The project proposes to implement a seawater desalination facility on a site surrounded by industrial uses. Residential uses are situated in the site vicinity, the nearest of which is located approximately

500 feet west of the subject site. The project has the potential to create impacts with regards to air quality, noise, aesthetics, hazards and hazardous materials, and short-term construction impacts (addressed in the corresponding EIR section). However, the proposed desalination facility would be consistent with the City of Huntington Beach General Plan, Local Coastal Program, and Zoning and Subdivision Ordinance, and will be subject to discretionary review and conditions of approval as part of the City's Conditional Use Permit and Coastal Development Permit process. In addition, the proposed project would replace dilapidated fuel oil storage tanks with a desalination facility and aboveground product water storage tank, which would improve the site's aesthetic character.

The existing site does not provide coastal access and the proposed desalination facility does not interfere or limit access to the coast by the public. The project does not affect the visual elements of the coastal environment. All the proposed facilities are shorter than the existing structures that will be removed. The City's Design Review Board has approved the design of the project, including all landscaping. The treatment facilities are located inside an existing industrial site and will be buffered by the approved landscaping.

HBGS is permitted to withdraw seawater from the ocean 24 hours per day to meet its cooling water needs. The project will not pump or withdraw seawater directly from the ocean. The project is designed to withdraw water from the discharge pipeline of the HBGS cooling water system.

Concern was raised through comments on the previously circulated EIR that approval of the desalination facility would extend the life of the HBGS. This is not the case. As evidenced by the following statement, the California Energy Commission (CEC) is aware of the proposed project and its relationship to the HBGS. "AES (as the land owner) and Poseidon Company have filed for a Conditional Use Permit with the City of Huntington Beach to construct and operate a water desalination facility on a portion of the 53-acre site. The possible development of a desalination facility would not have an effect on the land use considerations relevant to the proposed project (AES retooling). Any land use impacts generated by the desalination facility would be identified and evaluated in the City's environmental analysis."[1]

With implementation of standard construction measures and recommended mitigation measures throughout the EIR, there are no anticipated significant land use impacts associated with short-term construction/remediation activities or long-term facility operation. The proposed pipeline alternatives and underground pump station are adjacent to a variety of land uses, including residential, open space, commercial, educational, medical and recreational. However, the pipelines and underground pump stations would be subsurface and are not anticipated to result in any long-term land use impacts. In addition, it should be noted that the St. Paul's Greek Orthodox Church has been notified of the proposed pump station and has provided a letter of interest in response. These issues are discussed within other EIR sections, including 5.4 (Air Quality), 5.5 (Noise), 5.7 (Aesthetics/Light & Glare), 5.8 (Hazards and Hazardous Materials), and 5.9 (Construction Related Impacts).

RELEVANT PLANNING

The project evaluated within this EIR proposes to implement a 50 mgd desalination facility within an industrial area. Project implementation would be consistent with the City of Huntington Beach General Plan, Local Coastal Program, and Zoning and Subdivision Ordinance, and SCAG Regional Comprehensive Plan and Guide (RCPG) because it would be consistent with the goals and policies of each plan, program and ordinance. During the design development stage, the Applicant will be submitting more detailed plans reflecting code and policy compliance with specific issues. No significant relevant planning issues have been identified.

[1] May 2001 Certification of Units 3 and 4 for the HBGS, page 14.

MITIGATION MEASURES

LAND USE

None required.

RELEVANT PLANNING

None required.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

5.2 GEOLOGY, SOILS, & SEISMICITY

The following section is based on information supplied by the City of Huntington Beach General Plan (May 1996), United States Department of Agriculture Soil Conservation Service and Forest Service Soil Survey (September 1978), the United States Geologic Survey Newport Beach Quadrangle (1981), the Fault-Rupture Hazard Zones in California, Alquist-Priolo Earthquake Fault Zoning Act (Revised 1997), the Geologic Map of Orange County California, Showing Mines and Mineral Deposits, California Geological Survey (formerly the California Division of Mines and Geology) (1981), the Preliminary Review of Geotechnical Constraints and Geologic Hazards, Poseidon Resources Orange County Desalination Project, Huntington Beach, California (July 11, 2002), the Preliminary Review of Geotechnical Constraints and Geologic Hazards, Poseidon Resources Orange County Desalination Project, Huntington Beach, California, North and West Tank Options (July 12, 2002), the Preliminary Seismic Assessment, Orange County Desalination Project (November 2002), and the Federal Emergency Management Agency Flood Insurance Rate Map (revised February 18, 2004). In addition, Robert H. Sydnor of the California Geological Survey provided a comprehensive bibliography and several relevant maps that have been reviewed and incorporated into this section (see Section 10, BIBLIOGRAPHY).

It should be noted that no site-specific geotechnical investigation has been performed for the proposed project. However, there have been several subsurface geotechnical/environmental studies performed in the site vicinity to provide a basis for the Geotechnical Reports prepared for this EIR (refer to Appendix H, GEOLOGICAL REPORT - DESALINATION SITE, and Appendix I, GEOLOGICAL REPORT - ABOVEGROUND PRODUCT WATER STORAGE TANK SITE). These studies include:

- *Geotechnical Investigation for Future Huntington Beach Maintenance Facility, East End of Edison Road, East of Newland Street, Huntington Beach, California. Prepared by G.A. Nicoll, Inc., 2000.*
- *Geotechnical Investigation, Huntington Beach Channel (Flood Control Facility No. D01, City of Huntington Beach, County of Orange, California. Prepared for the Orange County Environmental Management Agency, February 21, 1991.*
- *Huntington Beach Generating Station Phase II Environmental Site Assessment. Prepared by CH2M Hill, November 27, 1996.*
- *Preliminary Geotechnical Assessment, Southeast Reservoir Site Acquisition, Huntington Beach, California. Prepared by GeoLogic Associates, May 24, 2002.*

EXISTING CONDITIONS

PROPOSED DESALINATION FACILITY SITE

Site Topography

The proposed project site is unpaved and is currently developed with three large fuel oil storage tanks (South, East, and West tanks), containment berms, pipelines, pumps, and associated structures. The subject site lies at an elevation of approximately five feet above mean sea level. The three storage tanks on-site are surrounded on all sides by a 10-to 15-foot high soil containment berm (the berm to the north of the South fuel oil tank is situated outside of the project site boundaries, however). Each tank is elevated by approximately two to three feet above the floor of the site, which slopes gently to the southeast.

Surrounding Topography

Areas within the project vicinity are similar in topography to the subject site. Surrounding areas to the west, north, and east are generally flat and have an approximate elevation of five feet above mean sea level. Elevations to the south gradually slope in a southwest orientation along Huntington State Beach and Huntington City Beach towards the Pacific Ocean. The Santa Ana River, located to the east of the project vicinity, lies in a depression with an approximate elevation of sea level at the mouth to six inches above mean sea level a quarter mile upstream. In addition, the Ascon/Nesi Landfill (located approximately 300 feet northeast of the project site) is elevated several feet above grade as a result of the accumulation of oil drilling byproducts and solid waste during its operation from approximately 1938 to 1984.

The most noticeable topographic feature in the area is the Huntington Beach Channel, which is operated and maintained by the Orange County Flood Control District (OCFCD). This channel borders the eastern margin of the project site. This 60-foot wide channel is bounded on each side by a five- to seven- foot high levee, while the bottom of the channel lies at one foot below mean sea level. The interior sides of the portion of the levee nearby the subject site have recently been improved with driven sheet-piles in order to increase the capacity of the channel. Each of the 33- to 36-foot long interconnecting sheet-piles have been driven to the point where only 10 to 12 feet of each pile are exposed above the bottom of the channel. The southern limit of the new sheet-pile wall terminates near the southeast corner of the project site.[1, 2]

SITE GEOLOGY

Surficial Geology

The native soils beneath the project site consist of an upper 60-foot thick layer of interbedded coastal estuarine/littoral sediments consisting of fine sand, silt, clay, and mixtures thereof. According to GeoLogic Associates (2002), these sediments range in age from approximately 8,600 years old to the present. Between depths of about 60 to 90 feet, the native sediments are represented by middle to late Holocene (8,600 to 11,000 years old) fluvial deposits. These sediments are composed largely of sand and clayey sand with layers and lenses of silt and highly plastic clay that contains varying amounts of organic detritus. Below a depth of 90 feet below ground surface are Pleistocene (11,000 to 1.8 million years old) marine and non-marine strata. These native soils are overlain by varying thicknesses of artificial fill soil that was placed during construction of the Huntington Beach Generating Station and associated fuel storage tanks. According to building foundation studies by G. A. Nicoll, Inc. (2000) for the newly constructed Huntington Beach Maintenance Facility (situated approximately 500 feet north of the site), without mitigation these alluvial deposits are considered unsuitable for foundation support due to their compressible nature when placed under structural (i.e. building) loads.

Below this upper layer of highly compressible soils are deposits of sandy coastal alluvial soils that make up the Talbert aquifer. Limited standard penetration test (SPT) data indicate that the uppermost 10 to 16 feet of these sediments are highly susceptible to liquefaction during strong ground motion from nearby seismic sources. Below a depth of approximately 17 to 25 feet below existing ground surface, these alluvial sediments have "N-values" (as derived from SPT data) that are suggestive of soils that are not prone to liquefaction, nor are they considered compressible or subject to collapse under normal structural loads.

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1 Telephone conversation with Albric Ghokasian, Orange County Flood Control District, November 23, 2004.

2 Geotechnical Investigation, Huntington Beach Channel, City of Huntington Beach, County of Orange, California: Consultants Report for Orange County Environmental Management Agency. Prepared by Geosoils, Inc., 1991.

There is no current evidence that would suggest the occurrence of soils containing collapsible, organic peat deposits in the vicinity of the project site.

Seismicity/Faulting

The primary seismic hazard to the subject site vicinity is the possibility of ground shaking due to the proximity of major active faults in the Southern California region. A number of concealed faults exist approximately 1.25 miles north of the proposed project site, while the South Branch Fault (a concealed fault which branches from the Newport Inglewood Fault) traverses the northern portion of the subject site (refer to Exhibit 5.2-1, *REGIONAL GEOLOGY & SEISMICITY*).

Although the project area is not located within an Alquist-Priolo Earthquake Fault Zone (formerly referred to as Special Study Zones) as designated by the California Geological Survey[3], the site is within approximately 1.25 miles of the Newport-Inglewood Fault Zone, an Alquist-Priolo Earthquake Fault Zone. Additional active or potentially active faults in the vicinity include:

- Elsinore Fault - Located 28 miles from the City center and is capable of a magnitude 7.5 earthquake.
- Palos Verdes-Coronado Bank Fault - Located 10 miles from the City center and is capable of a magnitude 7.5 earthquake.
- Raymond Fault - Located 30 miles from the City center and is capable of a magnitude 7.5 earthquake.
- San Andreas Fault - Located 51 miles from the City center and is capable of a magnitude 8.3 earthquake.
- Sierra Madre-San Fernando Fault - Located 32 miles from the City center and is capable of a 7.5 magnitude earthquake.
- Whittier-North Elsinore Fault - Located 19 miles from the City center and is capable of a magnitude 7.5 earthquake.
- Elysian Park Fault - Located 25 miles from City center and is capable of a 7.0 magnitude earthquake.
- Compton Blind Thrust Fault - Located approximately 10 miles from the City center and is capable of a 7.0 magnitude earthquake.
- Torrance-Wilmington Fault - Located approximately 10 miles from the City Center and is capable of a magnitude 7.0 earthquake.

Newport-Inglewood Fault Zone. The subject site is shown as being approximately 1.25 miles south of the Newport-Inglewood Fault Zone, which is an Alquist-Priolo Earthquake Fault Zone.[4] Alquist-Priolo Earthquake Fault Zones are intended to prohibit the location of developments for human occupancy across the trace of active faults in order to minimize the loss of life and property in the event of an earthquake. The Newport-Inglewood Fault Zone is an active right-lateral fault system consisting of a series of *en echelon*[5] fault segments and anticlinal folds that are believed to be the expression of a deep-seated fault within the basement rock.[6, 7, 8] The fault zone is visible on the

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3 Alquist-Priolo Earthquake Fault Zone Map, issued by the State Geologist, 1986; California Division of Mines and Geology Special Publication 42 (1997).

4 Active Fault Near-Source Zones, California Division of Mines and Geology, map atlas page N-34, February 1998.

5 Faults that are in an overlapping or staggered arrangement.

6 Convex upward folds with cores containing the stratigraphically older rocks.

7 Bryant, 1988; Barrows, 1974.

8 City of Huntington Beach General Plan EIR, 1995.

surface as a series of northwest-trending elongated hills, including Signal Hill and the Dominguez Hills, extending from Newport Beach to Beverly Hills. The total fault length is approximately 44 miles. The estimated maximum earthquake magnitude assigned to the fault zone is 6.9Mw (momentum magnitude), based on its estimated rupture length versus magnitude relationship by Slemmons (1982) and its slip rate at 1 2 millimeter/year (a Type B seismic source).

The South Branch Fault, a component of the Newport Inglewood Fault, traverses the northern portion of the project site under the existing South fuel oil storage tank. A seismic study performed for the Bolsa Chica Project (located approximately five miles northwest of the proposed desalination facility) indicates that the South Branch Fault is classified as neither active nor potentially active under the Bolsa Chica site.[9] The City of Huntington Beach utilizes their 1996 General Plan and the CDMG's Alquist-Priolo Earthquake Fault Zones to develop four categories for faults within the City. The City's General Plan indicates that this fault is a Category C fault, requiring special studies and subsurface investigation for critical and important land uses.

In addition, GeoLogic Associates' *Preliminary Seismic Assessment, Orange County Desalination Project* (2002) analyzes the potential for fault rupture beneath the proposed project site, currently occupied by the existing fuel oil tanks. A subsurface stratigraphic correlation/ fault investigation was performed to assess the potential for surface fault rupture within Holocene-age deposits below the potential water tank sites. According to the criteria established by the California Division of Mines and Geology, a fault is considered "active" if it can be demonstrated that the fault has produced surface displacement within Holocene time (about the last 11,000 years). Due to the presence of a relatively thick layer of fill soils and shallow groundwater, conventional fault trenching and soil-stratigraphic techniques could not be employed by GeoLogic Associates to assess the presence of surface fault rupture potential. Instead, their investigation involved the use of cone penetrometer test (CPT) and exploratory borings for stratigraphic correlation purposes, as well as the use of radiocarbon dating of organic sediments and shells obtained from the exploratory borings. According to data collected, no evidence of faulting within Holocene sediments was found beneath the site. The report concludes that the risk of surface fault rupture is minimal over the lifetime of the proposed project.

Liquefaction/Subsidence Potential

Liquefaction is a seismic phenomenon in which loose, saturated, granular soils behave similar to liquid when subject to intense ground shaking. Liquefaction occurs when three general conditions exist: 1) shallow groundwater; 2) low density silty or fine sandy soils; and 3) high-intensity ground motion. Liquefaction occurs when the dynamic loading of a saturated sand or silt causes pore water pressures to increase to the point where grain-to-grain contact is lost and the material temporarily behaves as a viscous fluid. Liquefaction can cause settlement of the ground surface, settlement and tilting of engineered structures, flotation of buoyant buried structures and fissuring of the ground surface. A common trait of liquefaction is formation of sand boils - short lived fountains of soil and water that emerge from fissures or vents and leave freshly deposited conical mounds of sand or silt on the ground surface. The City of Huntington Beach General Plan designates the project area as having a Very High potential for liquefaction. In addition, the Seismic Hazards Zones Map prepared by the State Geologist (April 7,1997) shows the site as an Official Liquefaction Zone.[10] In addition, due to the relatively loose, unconsolidated nature of near surface soils on-site, there is a moderate to high potential for earthquake-induced ground settlement and subsidence.

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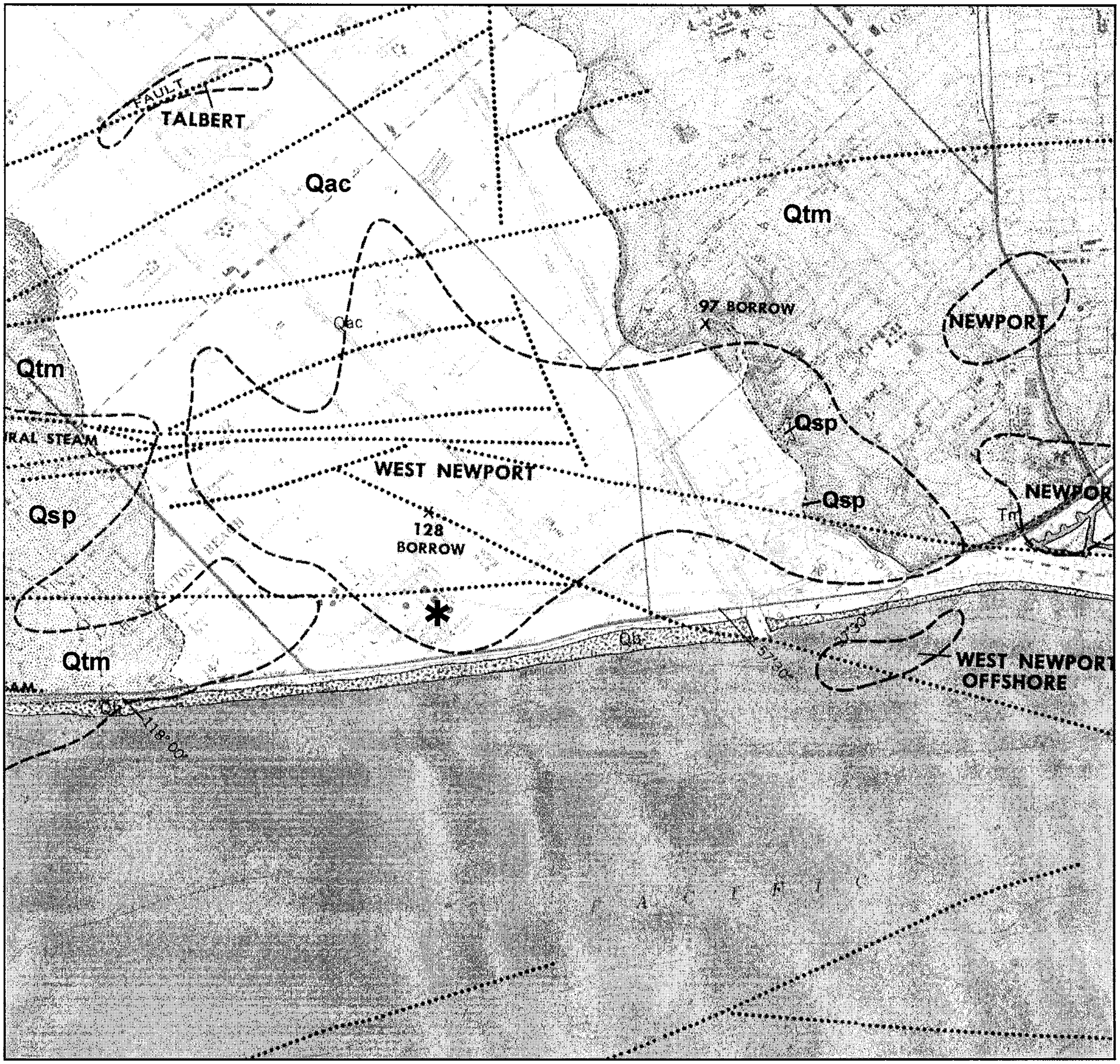
[9] City of Huntington Beach General Plan EIR, 1995.

[10] Seismic Hazard Zones Map, April 7, 1997, prepared by the State Geologist.



Source: Geologic Map of Orange County California, Showing Mines and Mineral Deposits, California Division of Mines and Geology, 1981.

✱ - Project Site

· · · · · · *Concealed Fault Lines*

Limits of oil and gas fields (California Division of Oil and Gas, 1972).

Qsp

San Pedro Formation

Qac	Qb

Qac = Alluvium and colluvium
Qb = Beach sediments

Qt	Qtm

Terrace deposits
Qt = Nonmarine terrace deposits
Qtm = Marine terrace deposits

NOT TO SCALE

RBF CONSULTING

02/05 • JN 10-101409.002

SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Regional Geology and Seismicity

Exhibit 5.2-1

According to building foundation studies by G. A. Nicoll, Inc. (2000) for the newly constructed Huntington Beach Maintenance Facility (situated approximately 500 feet north of the desalination facility site), the uppermost 13 feet of the native Holocene deposits are considered unsuitable for foundation support due to their compressible nature when placed under structural (i.e. building) loads. Limited standard penetration test (SPT) and cone penetrometer test (CPT) data (by G. A. Nicoll, Inc., 2000; and GeoLogic Associates, 2002 for the Beach Maintenance Facility and the proposed project site, respectively) indicate that the uppermost 10 to 16 feet of the native sediments are highly susceptible to liquefaction during strong ground motion from nearby seismic sources. According to the study performed by GeoLogic Associates (2002), the soil layers susceptible to liquefaction were not continuous beneath the proposed project site. Below a depth of about 17 to 25 feet, the native sediments have "N-values" (as derived from SPT and CPT data) that are suggestive of soils that are not prone to liquefaction. Soils below 17 to 25 feet are not considered compressible or subject to collapse under normal structural loads although some deeper sand lenses may be subject to liquefaction.

Lateral Spread

Lateral spreading involves the dislocation of the near surface soils generally along a near-surface liquefiable layer. In many cases, this phenomenon of shallow landsliding occurs on relatively flat or gently sloping ground adjacent to a "free face", such as an unsupported channel wall along a stream or flood control channel. Given the "weak" nature of near surface soils, fine-grained sediments, shallow groundwater, liquefaction-prone soils, and the nearby flood control channel, there is a high potential for lateral spread beneath the site during a major earthquake in the area. In addition, the sheet-piles that have recently been installed along the sides of the Huntington Beach Channel by the OCFCD are not designed to resist liquefaction or lateral loads that could occur as the result of a lateral spread.[11]

Landslides

Potential landslide areas within the City of Huntington Beach are limited primarily to the mesa bluffs region. However, the potential for seismically induced landsliding along the levee of the neighboring Huntington Beach Channel is considered moderate to high. As stated above, the new sheet-pile walls that are to be constructed along the interior walls of the levee are not designed to withstand potentially large lateral forces associated with strong ground motion from a nearby earthquake.

Tsunamis and/or Seiche Waves

Tsunamis are long period sea waves that are seismically generated by seafloor displacements. Previous evaluations put the tsunami potential for the City of Huntington Beach at very low. Of more concern are seiche waves caused by tsunamis captured and reflected within the enclosed area of an inner harbor, such as Huntington Harbor. Seiche area damage is most severe in the same area as tsunami hazards. However, the project site is not in the immediate vicinity of a harbor. There is a potential for seiches to impact the subject site, as it is situated adjacent to the Huntington Beach Channel. The magnitude of seiche waves impacting the project site are anticipated to be lower than that of a tsunami, given the frictional energy dissipation of water running along the bottom and walls of the Channel. In addition, given that the existing 10 to 15-foot high containment berm along the eastern boundary of the project site would remain (running along the Huntington Beach Channel), the likelihood of seiches or tsunamis impacting the site is considered low. Impacts in this regard are anticipated to be less than significant.

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11 Mr. Phil Jones, Orange County Flood Control District, May 21, 2001.

Groundwater/Percolation and Drainage

The subject site rests over the Talbert Aquifer, and is in a designated tidal flats region, characterized by poor drainage. Groundwater beneath the site fluctuates with the tidal cycles and the water level within the neighboring Huntington Beach Channel. Due to this interconnection, groundwater quality beneath the site is considered brackish. The site is underlain by shallow near surface water with depths ranging from five to seven feet under the surface within the project site vicinity.[12] This condition contributes to the vicinity's very high liquefaction potential.

OFF-SITE PIPELINE ALIGNMENT AND UNDERGROUND PUMP STATIONS

Proposed Pipeline Alignment

The proposed off-site product water delivery pipelines would be located primarily within existing roads or easements, generally flat. The pipeline alignment would traverse a wide range of surficial soils with varying characteristics and qualities, as the pipeline's length would be between approximately 30,000 and 40,000 linear feet. As with the desalination facility site, the off-site facilities are subject to typical seismic hazards of southern California. Shallow groundwater may be encountered along the pipeline alignment nearby the proposed desalination facility, depending on the depth of trenching for pipeline implementation.

OC-44 Booster Pump Station

The proposed underground booster pump station site would occur within an unincorporated portion of the County of Orange, within a Resource Preservation Easement. The pump station site rests at an approximate elevation of 200 feet above mean sea level. The surrounding terrain can be characterized as hilly, although much of the surrounding vicinity has been graded for residential development. Bedrock beneath the subject site belongs to the diabase intrusive volcanic formation, overlain by Calleguas clay loam soil.[13] This soil is characterized as being well drained and moderately permeable. It should be noted that the site is within a designated Zone of Required Investigation for liquefaction hazards, and has demonstrated either a historic occurrence of liquefaction or local geological, geotechnical, and groundwater conditions indicate a potential for liquefaction.[14] The subject site is not situated within an Alquist-Priolo Earthquake Fault Zone or earthquake-induced landslide Zone of Required Investigation as designated by the California Geological Survey.[15] As the pump station site is situated approximately 3.5 miles from the Pacific Ocean, inundation by tsunamis and/or seiche waves is not expected to occur.

Coastal Junction Booster Pump Station

The Coastal Junction pump station location is situated at an approximate elevation of 80 feet above mean sea level. The site is located in the parking lot of a church within a developed area. The topography of the site is flat. The subject site is not located within an Alquist-Priolo Earthquake Fault Zone or earthquake induced Zone of Required Investigation as designated by the California Geological Survey.[16] It is underlain by soils from the Sorrento-Mocho association, which is described as nearly level to moderate sloping, well drained sand loams, loams, or clay loams on

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12 Huntington Beach Generating Station Phase II Environmental Site Assessment, CH2M Hill, November 27, 1996.

13 United States Department of Agriculture Soil Conservation Service and Forest Service Soil Survey, September 1978.

14 Seismic Hazard Zones, Tustin Quadrangle, Official Revised Map. California Geological Survey, January 17, 2001.

15 Alquist-Priolo Earthquake Fault Zone Map, issued by the State Geologist, 1986; California Geological Survey Special Publication 42 (1997).

16 Alquist-Priolo Earthquake Fault Zone Map, issued by the State Geologist, 1986; California Geological Survey Special Publication 42 (1997).

alluvial fans and flood plains.[17] It should be noted that the site is within a designated Zone of Required Investigation for liquefaction hazards, and has demonstrated either a historic occurrence of liquefaction or local geological, geotechnical, and groundwater conditions indicate a potential for liquefaction.[18] As the site is located over three miles from the ocean, inundation by tsunamis and/or seiche waves is not expected to occur.

IMPACTS

Significance Criteria

Based on the criteria set forth by CEQA, a project may create a significant geological environmental impact if one or more of the following occurs:

- Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:
  - Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault;
  - Strong seismic ground shaking;
  - Seismic-related ground failure, including liquefaction;
  - Landslides;
- Result in substantial soil erosion or the loss of topsoil;
- Be located on a geologic unit or soil that is unstable or that would become unstable as a result of the project, and potentially result in on or off-site landslide, lateral spreading, subsidence, liquefaction or collapse;
- Be located on expansive soils, as defined in Table 18-1 B of the Uniform Building Code (1994), creating substantial risks to life or property; and/or
- Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.

PROPOSED DESALINATION FACILITY SITE

Wind/Water Erosion

It is anticipated that the entire subject would be either landscaped or paved, thereby reducing the likelihood for long-term operational wind/water erosion impacts to less than significant levels. However, the project would involve construction processes possibly causing wind and water erosion to occur during grading activities. The project would be subject to standard erosion control practices as typically required by the City of Huntington Beach. Any potential temporary increase in wind/water erosion would be reduced to less than significant levels with implementation of standard grading practices such as use of sandbags along the site perimeter (also refer to Section 5.3, *HYDROLOGY AND WATER QUALITY*, and Exhibit 3-16, *CONCEPTUAL LANDSCAPE MASTERPLAN*).

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[17] United States Department of Agriculture Soil Conservation Service and Forest Service Soil Survey, September 1978.

[18] Seismic Hazard Zones, Tustin Quadrangle, Official Revised Map. California Geological Survey, January 17, 2001.

Topography

The proposed desalination facility site consists of three fuel storage tanks on a flat surface, surrounded by soil containment berms of 10 to 15 feet in height. The western and southern interior berms would be removed prior to construction of the desalination facility, while the eastern berm (the northern berm exists outside of the project boundaries) would not be removed. The site does not contain any other unique physical or topographical features. No significant landform impacts are anticipated.

Geology/Soils

As shallow groundwater exists on-site (at a depth of approximately five to seven feet below ground surface), saturated soils and caving conditions would be encountered during removal and excavation for grading/excavation below the groundwater table level. This would necessitate dewatering operations as well as lateral support for the sides of any excavation pits, if necessary. All dewatering activities would comply with National Pollution Discharge Elimination System (NPDES) regulations, and pumped groundwater would be sampled, tested, and treated, if necessary (refer to Section 5.9, *CONSTRUCTION RELATED IMPACTS* for more information regarding dewatering).

As the uppermost 17 feet of native soils within project site boundaries are considered compressible upon placement of structural loads (aboveground storage tank, buildings, etc.), project implementation would require either the complete removal and recompaction of compressible soils or the use of piles and grade beams to support the structure. In addition, Type V cement would be used for concrete and special coatings or other measures for metal pipes to protect against the effects of corrosion.

It is anticipated that the proposed product water storage tank could be supported by a conventional concrete mat type foundation, with provision to accommodate anticipated settlements due to existing saturated, soft soils and liquefaction. Soil conditions would not preclude the use of other foundation systems, however, which would be evaluated when design concepts are available. Dewatering may be necessary during construction, as shallow groundwater exists beneath the West tank site.

A detailed geotechnical survey would be performed during the design phase of the proposed project. This survey would further characterize on-site soil and groundwater conditions and would determine the site's soil bearing capacity. This information would be used to develop a detailed foundation design for on-site structures. With implementation of recommended mitigation measures, and adherence to the Uniform Building Code (UBC), impacts in this regard are anticipated to be less than significant (also refer to Section 5.9, *CONSTRUCTION RELATED IMPACTS*).

Seismicity/Faulting

GeoLogic Associates completed a Preliminary Seismic Assessment for this project (refer to Appendix V, *PRELIMINARY SEISMIC ASSESSMENT*). The results of this preliminary study indicate an absence of evidence that faulting has ever occurred at the facility site and that the risk of future surface faulting at the desalination facility site is minimal.

The Preliminary Seismic Assessment has determined that the maximum ground acceleration for the Maximum Credible Earthquake (MCE) for this site is 0.535 g. An earthquake of magnitude 6.9 on the Newport Inglewood fault was considered to be the MCE for the site. The Preliminary Seismic Assessment also indicates that the return period of an earthquake with the design MCE acceleration of 0.535 g is more than 200 years and its probability of occurrence during the next 50 years is below 10 percent.

As a part of desalination operations, the operations staff would develop an earthquake mitigation and preparedness plan, which would be coordinated with the local jurisdiction's preparedness activities. This plan would define coordination measures to assure continuous facility operations and water delivery under earthquake emergency conditions.

The desalination facility would be designed with one standby reverse osmosis train to provide additional reliability of water production and supply. Typically, desalination facilities, including the existing desalination facilities in California, are designed to operate with all available reverse osmosis trains in operation at all times. During the times of potential outages caused by scheduled or unscheduled maintenance or emergency events, such as an earthquake, these facilities operate at reduced capacity or are down for a certain period of time. The proposed desalination facility would be designed to produce 50 mgd of product water with 12 RO trains, and would be constructed with an additional 13th RO standby train, which can produce up to 4.2 mgd of water at any time. This additional train would provide increased reliability and redundancy that exceeds current reliability standards and common practices for desalination facility design. The proposed desalination facility would be the first facility in California with such additional production standby capacity and reliability provisions.

Although the northern portion of the project site overlays the South Branch Fault, the site is not situated within an Alquist-Priolo Earthquake Fault Zone. The proposed project would be constructed in compliance with the seismic safety requirements of the Uniform Building Code (UBC) and applicable CDMG publications. Given the site's close proximity to the Newport-Inglewood and Compton Blind Thrust Faults, more stringent design measures may be warranted or required, as determined by the site-specific geotechnical survey for the project. All structures would be designed in accordance with the seismic design requirements of the most recent edition of the Uniform Building Code. The specific design provisions (wall and slab thickness, lateral bracing, structural configuration, etc.) for seismic enforcement would be developed during the design phase of this project. In addition, a detailed construction-level geotechnical study would be prepared during the design phase of the project. This report would include mitigation measures regarding grading, foundations, retaining walls, streets, utilities, remedial work, overexcavation/recompaction, dewatering, water quality, and chemical/fill properties of underground items including buried pipe and concrete and protection thereof. Impacts in this regard are expected to be less than significant with implementation of recommended mitigation measures.

Liquefaction Potential

The Preliminary Seismic Assessment prepared for the proposed project concluded that seismic activity from numerous faults within the vicinity, including the Newport Inglewood Fault Zone (the closest active fault), may result in liquefaction in soils at depths of seven to 16 feet below ground surface (bgs). Soils below that depth were not found to be susceptible to liquefaction. Soil layers susceptible to liquefaction were not determined to be continuous throughout the proposed desalination facility site and the "North" and "West" tank sites. Liquefied soils may experience post-liquefaction settlements of four to five inches. Proposed on-site aboveground structures have the potential to experience post-liquefaction distress. In addition, the presence of liquefaction-prone soils and the location of the subject site relative to the Huntington Beach Channel pose a risk of seismically induced lateral spread. Substantial distress to both above and underground structures would occur in the form of seismically-induced landsliding. However, as stated above, a construction-level geotechnical study would be prepared for the proposed project site during the design phase of the project, which would recommend design measures to mitigate liquefaction and lateral spread impacts such as: 1) over excavation and recompaction of liquefaction/lateral spread-prone soils; 2) in-situ soil densification; 3) injection grouting; or 4) deep soil mixing. The desalination facility project would be subject to the Uniform Building Code (UBC) and applicable CDMG publications in regards to liquefaction. Upon adherence to applicable regulations and the incorporation of mitigation measures, impacts in this regard are expected to be less than significant.

OFF-SITE PIPELINES AND UNDERGROUND PUMP STATION

Proposed Pipeline Alignment

The proposed product water delivery pipeline is not anticipated to result in significant impacts in regards to geology and soils, as the majority of the alignment would occur within existing street right-of-way and various utility lines that currently exist along the alignment. Pipeline construction would be subject to standard erosion control measures similar to those implemented for the desalination facility site to contain any potential wind and water erosion on-site. As the pipeline alignment is relatively flat and has been graded, impacts to natural topography are not anticipated. A design-level geotechnical investigation would be performed for the selected pipeline alignment to examine the potential for earthquake shaking hazards, surface rupture, shallow groundwater, and unstable soils (liquefaction, subsidence, lateral spread). Should the potential for such geological hazards exist, adequate mitigation for both pipeline construction and pipeline design would be incorporated to mitigate impacts in this regard to less than significant levels. Also refer to Section 5.9, *CONSTRUCTION RELATED IMPACTS* for a more detailed evaluation of pipeline construction.

OC-44 Booster Pump Station

Construction of the proposed off-site underground booster pump station would also be subject to standard erosion control measures as required by local, state, and federal regulations to contain any potential wind and water erosion on-site. As the site is relatively flat and is only approximately 0.5 acres in size, impacts to the natural topography of the site and surrounding vicinity are not anticipated. A design-level, site specific geotechnical study would be prepared for the underground pump station and would incorporate adequate mitigation measures (if deemed necessary) for geological hazards such as seismic shaking, surface rupture, shallow groundwater, liquefaction, subsidence, lateral spread, and landslides. As the underground pump station would require excavation to a depth of approximately 40 feet, lateral bracing for the sides of the chamber may be necessary as the site is in a designated liquefaction hazard zone.[19] Upon the implementation of both standard and recommended mitigation measures, impacts in regards to geology and soils are not anticipated to be significant.

Coastal Junction Booster Pump Station

As both the geologic/seismic conditions of the site and design characteristics of the pump station are similar to that of the OC-44 pump station, refer to the impact analysis above.

MITIGATION MEASURES

WIND/WATER EROSION

Refer to Section 5.3, *HYDROLOGY DRAINAGE, AND STORM WATER RUNOFF*, mitigation measure HWQ-1.

[19] Seismic Hazard Zones, Tustin Quadrangle, Official Revised Map. California Department of Conservation, Division of Mines and Geology, January 17, 2001.

TOPOGRAPHY

None required.

GEOLOGY/SOILS

GEO-1 A detailed geotechnical report shall be prepared and submitted with the building permit application for the proposed desalination facility. This analysis shall include on-site soil sampling and laboratory testing of materials to provide detailed recommendations regarding grading, foundations, retaining walls, streets, utilities, remedial work, over excavation/recompaction, dewatering, water quality, and chemical/fill properties of underground items including buried pipe and concrete and protection thereof. The reports shall specifically address lateral spreading, flood control channel bank stability, liquefaction potential and groundwater constraints. Appropriate recommendations shall be provided to mitigate potentially adverse conditions. The geotechnical report shall also be submitted to the Department of Public Works for review and approval in conjunction with the grading plan.

GEO-2 In conjunction with the submittal of application for a precise grading permit, the Applicant shall demonstrate to the satisfaction of the City Engineer that the preliminary geotechnical report recommendations have been incorporated into the grading plan unless otherwise specified in the final geotechnical report and/or by the City Engineer.

GEO-3 Excavation for the proposed project shall implement dewatering activities in compliance with NPDES regulations. Pumped groundwater shall be sampled, tested, and (if deemed necessary) treated prior to discharge.

GEO-4 As native on-site soils are compressible upon placement of structural loads, project implementation shall implement complete removal and recompaction of compressible soils or use of piles and grade beams to support on-site structures.

GEO-5 Type V cement shall be used for concrete and buried metal pipes shall utilize special measures (coatings, etc.) to protect against the effects of corrosive soils.

SEISMICITY/FAULTING

GEO-6 Due to the potential for ground shaking in a seismic event, the project shall comply with the standards set forth in the UBC (most recent edition) to assure seismic safety to the satisfaction of the Department of Building and Safety prior to issuance of a building permit, including compliance with California Division of Mines and Geology Special Publication 117 (Guidelines for Evaluating and Mitigating Seismic Hazards in California, adopted March 13, 1997). However, given the proximity of the site to the Newport-Inglewood and Compton Blind Thrust Faults, more stringent measures may be warranted.

GEO-7 As the South Branch Fault (situated beneath the subject site) is classified as Category C by the City of Huntington Beach General Plan, special studies and subsurface investigation (including a site specific seismic analysis) shall be performed prior to issuance of a grading permit, to the approval of the City Engineer. The subsurface investigation shall include CPT and exploratory borings to determine the fault rupture potential of the South Branch Fault, which underlies the subject site.

LIQUEFACTION POTENTIAL

GEO-8 Due to the potential for liquefaction within the project vicinity, the Applicant shall comply with the standards set forth in the UBC (most recent edition) for structures on-site to assure safety of the occupants to the satisfaction of the Department of Building and Safety prior to issuance of a building permit. These standards include compliance with the California Geological Survey Special Publication 117 (Guidelines for Evaluating and Mitigating Seismic Hazards in California, adopted March 13, 1997) and Recommended Procedures for implementation of California Geological Survey Special Publication 117 - Guidelines for Analyzing and Mitigating Liquefaction in California (Dr. Geoffrey R. Martin et al, May 1999).

GEO-9 The proposed project shall incorporate adequate measures to stabilize structures from on-site soils known to be prone to liquefaction. Typical methods include, but are not limited to:

- Over excavation and recompaction of soils;
- in-situ soil densification (such as vibro-flotation or vibro-replacement);
- injection grouting; and
- deep soil mixing.

GEO-10 The site specific geotechnical investigation for the proposed project shall analyze the potential for lateral spread on-site. If deemed a possibility, adequate subsurface stabilization practices (similar to those utilized for liquefaction) shall be incorporated prior to the construction of on-site structures.

OFF-SITE PIPELINES AND UNDERGROUND PUMP STATIONS

Refer to Section 5.9, *CONSTRUCTION RELATED IMPACTS.*

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

5.3 HYDROLOGY, DRAINAGE AND STORM WATER RUNOFF

Information in this section was compiled from a site survey conducted by RBF Consulting on June 22, 2001; the Water Quality Control Plan for the Santa Ana River Basin (8) and amendments (1995) by the Santa Ana Regional Water Quality Control Board; the Federal Emergency Management Agency Flood Insurance Rate Map (revised February 18, 2004); the County of Orange General Plan (July 2, 2003); City of Irvine General Plan (1999); the United States Geological Survey (USGS) National Map Viewer (http://nmviewogc.cr.usgs.gov/viewer.htm); and the Drainage Area Management Plan (2003) prepared by the County of Orange, Cities of Orange County, and the Orange County Flood Control District.

EXISTING CONDITIONS

REGIONAL DRAINAGE CONDITIONS

The proposed project site is situated within the Santa Ana River Basin, which has a total drainage area of approximately 1,700 square miles. In general terms, the Santa Ana River Basin is a group of connected inland basins and open coastal basins drained by surface streams flowing generally southwestward to the Pacific Ocean.[1] The Santa Ana River empties into the Pacific Ocean approximately 1.5 miles downcoast (southeast) of the subject site. The flow of the Santa Ana River is intermittent and only substantial during storms. Long-term annual precipitation near the coast averages about 18.1 inches, of which 90% occurs between November and April. The Pacific Ocean lies approximately 2,000 feet south of the project site. The coast near the proposed project site is fronted by a broad, sandy beach and is backed by lowlands. The sea floor directly offshore is relatively smooth, with isobaths following the coastline. Offshore sediments range from fine to medium sand near-shore to sandy silt at a distance of about one mile from shore. The beach sands are normally transported southeastward by littoral currents, which are generated by incoming waves and modified by seafloor topography.

PROPOSED DESALINATION FACILITY SITE

On-Site Drainage

The proposed desalination facility and associated product water storage tank are completely surrounded by containment berms of approximately 10 to 15 feet in height as a precaution against accidental fuel oil spillage. These berms prevent on-site stormwater from leaving project site boundaries. Stormwater collects within the storage tank area and either evaporates or percolates into the ground. In times of heavy rainfall, stormwater is either released through the manual valve of a drain line or is first tested for pollutants, and, if found to satisfactorily meet regulatory criteria, is pumped into the adjacent Huntington Beach Channel operated by the Orange County Flood Control District (OCFCD), ultimately emptying into the Pacific Ocean.[2]

Surrounding Drainage Conditions

The general topography of the project site vicinity slopes gently to the southwest, towards the Pacific Ocean. Runoff upstream and downstream of the subject site generally follows this slope, emptying

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1 Water Control Management Plan, Santa Ana River Basin (8), Santa Ana Regional Water Quality Control Board, 1995.

2 Han Tan, AES Huntington Beach, June 22, 2001.

into one of the three primary drainage facilities in the region, which consist of the Huntington Beach Channel, the Talbert Channel, and the Santa Ana River. All three drainage facilities are owned and operated by the OCFCD. All surface runoff within the vicinity of the project site eventually flows into the Pacific Ocean. A segment of the Huntington Beach Channel has recently been improved by the OCFCD to effectively double flow capacity (the Channel previously lacked 100-year flood protection capabilities). Metal sheet pile walls were placed on either side to expand the Channel's basewidth from approximately 30 to 85 feet. The project site obtained 100-year regional flood protection upon completion of these channel improvements.[3]

An approximately 131-acre wetland area is located southeast of the proposed project site, along a 1.5 mile stretch of Pacific Coast Highway. The wetlands are divided into two major components. To the southeast, the 17-acre Talbert Marsh opens to the ocean through a 100-foot wide entrance adjacent to the mouth of the Santa Ana River, approximately 1.3 miles downcoast (southeast) of the subject site. The Talbert Marsh is a recovering wetland area reintroduced to tidal influence in 1989. The second component of the wetland area is separated from the Talbert Marsh by Brookhurst Street, and includes 89 privately-owned acres directly southeast of the project site. This wetland area does not have tidal access, and water sources are limited to rainfall, urban runoff, and groundwater seepage. Due to extremely high salinities in the soils and seasonal ponds and poor quality of the brackish water marsh, restoration of the wetland area is proposed to occur in the planning stage.

Water Quality (Groundwater)

The lower part of the Holocene age sediments beneath the proposed project site consists of layered lenses of coarse sand and gravel known as the Talbert aquifer. A relatively impermeable cap of interbedded silts and clay up to about 15 feet thick overlies the Talbert aquifer. Given the proximity of the site to the Pacific Ocean, and its interconnection with the nearby Huntington Beach Channel, depth to groundwater within the site vicinity is between five to seven feet. The actual elevation of the groundwater table fluctuates with the ocean tides and water level in the adjacent neighboring flood control channel. Due to this interconnection, groundwater quality is considered brackish.

Water Quality (Surface Water)

As mentioned above, stormwater at the site is allowed to either evaporate, percolate into the ground, drained via a manual valve, or is pumped in to the OCFCD flood channel adjacent to the project site. No beneficial uses for surface water exist on site. Existing site runoff for the project vicinity contains moderate amounts of pollutants typical of urban areas, including oil and grease from automobiles, as well as incidental fertilizer and pesticides from routine maintenance of existing vegetation.

OFF-SITE PIPELINE ALIGNMENT AND UNDERGROUND PUMP STATIONS

Proposed Pipeline Alignment

The proposed off-site product water delivery pipelines would be between approximately 30,000 and 40,000 linear feet, adjacent to a wide variety of land uses. The proposed pipelines would be located primarily within existing roads or easements that are generally flat and would be located entirely underground. The areas are generally drained by curb/gutter storm drain systems (for portions of the alignment within streets), on-site stormwater drainage systems (for portions within easements and other areas) and infiltration.

3 Telephone conversation with Albric Ghokasian, Orange County Flood Control District, November 23, 2004.

OC-44 Booster Pump Station

The proposed OC-44 pump station site is located in an area where two existing pump stations occur. The existing site is unpaved and slopes gently to the northeast (although in general, the area slopes to the north). The site is situated at an approximate elevation of 250 feet above mean sea level and is located approximately 0.5-mile north of the San Joaquin Reservoir . No storm drain system exists on-site, and the site is drained via surface flow to the northeast.

Coastal Junction Booster Pump Station

The Coastal Junction pump station site is proposed for location in a church parking lot within the City of Irvine. The site exists as a flat, paved area, at an approximate elevation of 50 feet above mean sea level. The site vicinity generally slopes gently to the west. The site vicinity can be characterized as developed/urbanized. The San Diego Creek, a major drainage facility for the region, is situated adjacent to the church parking lot to the north. The existing site is served by an on-site storm water drainage system.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

The proposed project must satisfy the requirements of several federal and state regulatory agencies, most notably, the following:

- The Orange County Third Term NPDES Municipal Storm Water Permit (administered by the Santa Ana Regional Water Quality Control Board [SARWQCB]);
- California's Nonpoint Source (NPS) Pollution Control Program (administered by the State Water Resources Control Board [SWRCB]); and
- The National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (administered by the SWRCB, and discussed further in Section 5.9, *CONSTRUCTION RELATED IMPACTS*).

FEDERAL PROGRAMS

The Environmental Protection Agency (EPA) is the primary federal agency responsible for management of water quality in the United States. The Clean Water Act (CWA) is the federal law that governs water quality control activities initiated by the EPA and others. Section 303 of the CWA requires the adoption of water quality standards for all surface water in the United States. Under Section 303(d), states are required to develop lists of water bodies that do not meet water quality objectives after required levels of treatment by point source dischargers. Total Maximum Daily Loads (TMDLs) for all pollutants for which these water bodies are listed must be developed in order to bring them into compliance with water quality objectives.

In 1972, provisions of the CWA, were amended so that discharge of pollutants to waters of the United States from any point source is effectively prohibited, unless the discharge is in compliance with a NPDES permit. The 1987 amendments to the CWA added Section 402(p), which established a framework for regulating municipal, industrial, and construction stormwater discharges under the NPDES program. On November 16, 1990, USEPA published final regulations that established application requirements for stormwater permits for municipal separate storm sewer systems (MS_4s) serving a population of over 100,000 (Phase 1 communities) and certain industrial facilities, including construction sites greater than five acres. On December 8, 1999, USEPA published the final regulations for communities under 100,000 (Phase II MS_4s) and operators of construction sites between one and five acres.

STATE PROGRAMS

The State Porter-Cologne Act (Water Code 13000, et seq.) is the principal legislation for controlling stormwater pollutants in California. The act requires development of Basin Plans for drainage basins within California. Each plan serves as a blueprint for protecting water quality within the various watersheds. These basin plans are used in turn to identify more specific controls for discharges (e.g., wastewater treatment plant effluent, urban runoff, and agriculture drainage). Under Porter-Cologne, specific controls are implemented through permits called Waste Discharge Requirements issued by the nine Regional Water Quality Control Boards. For discharges to surface waters, the Waste Discharge Requirements also serve as NPDES permits.

NPS pollution, also known as polluted runoff, is the leading cause of water quality impairments in California. Section 319 of the CWA requires that each state prepare and submit a report that "identifies those navigable waters within the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards."

In order to comply with this directive, the California State Water Resources Control Board (SWRCB) adopted California's NPS Control Program (NPS Program) in 1988. The NPS Program was updated in January of 2000 to the Plan for California's Nonpoint Source Pollution Control Program (Program Plan). The chief way in which the Plan fulfills the requirement of CWA Section 319 is through the implementation of management measures (MMs). MMs serve as general goals for the control and prevention of nonpoint source pollution.

The project site is included within the Water Quality Control Plan for the Santa Ana River Basin (also known as the Santa Ana River Basin Plan). This Basin Plan identifies specific controls for discharges as well as implementation standards to achieve such controls. The proposed project would be subject to all applicable rules and regulations contained within the Water Quality Control Plan for the Santa Ana River Basin.

LOCAL PROGRAMS

Since 1990, the City of Huntington Beach has cooperated with other Orange County cities (the "permittees") in complying with the NPDES permits issued by the SARWQCB. The result of this cooperation has been the development of numerous common stormwater programs that have been integrated in the area-wide Drainage Area Management Plan (DAMP).

As a result of the NPDES permits issued in early 2002 (Third Term Permits), the DAMP underwent significant changes and restructuring as part of the formation of the 2003 DAMP. The 2003 DAMP contains model program guidance that was developed through a collaborative effort among all permittees, as well as interested agencies, organizations, and the public. The 2003 DAMP requires that each permittee, including the City, prepare a Local Implementation Plan (LIP) as an Appendix to the 2003 DAMP. The City's LIP describes the activities that the City has previously undertaken and is currently undertaking to meet the requirements of the Third Term Permits and to make meaningful improvements in urban water quality. The LIP is intended to serve as the basis for City compliance during the five-year period of the Third Term Permit.

The 2003 DAMP requires the implementation of site design, source control and treatment control BMPs. The enforcement mechanism for the DAMP are the Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4) Draining the Watersheds of Orange County, the Incorporated Cities of Orange County, and the Orange County Flood Control District within the Santa Ana Region. The permit is also generally known as the SARWQCB Municipal NPDES Permit No. CAS618030.

IMPACTS

Significance Criteria

Under the CEQA Guidelines a project may be considered to have a significant environmental effect if it will:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures, which would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Inundation by seiche, tsunami, or mudflow.

Impacts in regards to long-term hydrology, drainage, and storm water quality are discussed below. As the proposed off-site pipeline alignment and underground pump station would be subsurface, there are no anticipated long-term impacts in regards to hydrology, drainage, and/or water quality. A discussion of short-term construction-related impacts in regards to hydrology and water quality is included in Section 5.9, *CONSTRUCTION RELATED IMPACTS.*

LONG-TERM WATER QUALITY IMPACTS

Proposed Desalination Facility Site

<u>Fertilizers and Pesticides</u>

It is anticipated that the proposed desalination project would incorporate both native and non-native landscaping on-site. Non-native vegetation may require periodic fertilization and pest control. The use of fertilizers and pesticides would comply with City standards as well as the guidelines set forth in the Orange County Management Guidelines for such activities. Based on the size of the landscaped areas, the small amounts of fertilizers and pesticides needed, and the fact that the site landscape would be maintained per local and County standards, it is unlikely that use of these chemicals would be of environmental concern to the groundwater, adjacent ocean waters, or surrounding uses. Therefore, this is not considered a significant impact. However, a Water Quality Management Plan (WQMP) would be prepared for the proposed project, which would identify applicable Best Management Practices (BMPs) and control measures as identified within the Countywide National Pollution Discharge Elimination System (NPDES) Drainage Area Management Plan (DAMP).

Flooding

The proposed project is currently designated with a Federal Emergency Management Agency (FEMA) flood zone designation of "X." However, the City's Local Coastal Program designates the project site as being situated within an area prone to "Flooding with Wave Action". In addition, the open space/wetland area to the southeast of the subject site routinely stores runoff, resulting in high water levels during storm events, which could potentially impact the site. Appropriate hydrology and hydraulic analysis would be performed to determine if the site has adequate drainage.

Storm Water Drainage

The proposed grading activities and development of the proposed project site are anticipated to increase the amount of impervious area, thereby increasing surface runoff. In addition, existing containment berms (which contain storm water on-site) along the western and southern boundaries of the subject site would be removed (berms to the north of the subject site and along the eastern border of the site would remain in place). An on-site local storm water drainage system would be implemented as part of the desalination facility site and product water storage tank. The desalination site would be divided into two areas (north and south), with catch basins and a storm water pump station located in each area. Storm water flows would first be directed to catch basins by gravity, and would then be directed to a storm water pump via gravity lines. The water would then be pumped to the 48-inch by-product concentrated seawater discharge line that ultimately connects to the AES Huntington Beach Generating Station (HBGS) outfall line. Aboveground product water tank implementation would include an on-site storm water system, which would direct storm water to the desalination facility's storm water system. In addition, containment berms surrounding the western and northern side of the West tank site would be left in place, further containing storm water on-site. As alternative options, the desalination facility's on-site storm water system could discharge storm water to the HBGS on-site storm water system or the City of Huntington Beach local storm water system, both of which ultimately convey storm water to the Pacific Ocean via the HBGS outfall. No storm water would be discharged into the adjacent Huntington Beach Channel. A Water Quality Management Plan (WQMP) would be completed for the proposed project as required by the Regional Water Quality Control Board (RWQCB).

If necessary, storm water would be treated prior to off-site discharge in order to minimize impacts from urban pollutants. One of two sedimentation methods would be utilized for treatment, including:

- **Waste Filter Backwash Clarifiers:** The proposed desalination project facility would utilize clarifiers for the purpose of settling the waste stream generated during the backwash of the pretreatment filters. During rainy events, storm water would be combined with the waste filter backwash water and settled in the filter backwash clarifiers. This clarified water would then be combined with the desalination facility's concentrated seawater discharge and sent to the Pacific Ocean via the HBGS outfall. The waste filter backwash clarifiers would be oversized to accommodate the treatment of storm water.
- **Sedimentation in Separate Clarifiers:** As an alternative to combining on-site storm water with the waste filter backwash, storm water directed to on-site storm drains could be treated in separate sedimentation clarifiers for storm water treatment only.

Subsequent to clarification, this water would be discharged via the HBGS outfall with the desalination facility's concentrated seawater discharge and HBGS cooling water.

The most viable storm water treatment alternative would be selected during the design phase of the project, in close coordination with the City of Huntington Beach, RWQCB, and HBGS staff. The storm water facilities would be designed to comply with all applicable requirements of the City of Huntington Beach and the RWQCB.

In addition, stormwater runoff would not affect adjacent sensitive land uses. Although the project site is situated directly adjacent to a wetland area (southeast of the site), the subject site would be graded so that all on-site stormwater would flow away from the wetland area towards an on-site local stormwater drainage system. The on-site local stormwater drainage system that would be implemented as part of the proposed project would not have surface runoff discharge onto Pacific Coast Highway. The existing containment berms along the western and southern boundaries of the subject site would remain, providing additional containment of any stormwater to the project site. The proposed project would also incorporate applicable Best Management Practices (BMPs) in order to contain stormwater runoff, which may contain urban pollutants such as petroleum by-products, trash/grease, pathogens, and pollutants that may occur in association with proposed desalination project operation. The project would be in compliance with all standards as administered by the State Water Resources Control Board and County of Orange.

<u>Water Quality Impacts to Nearby Coastal Wetlands from On-Site Spillage</u>

The existing containment berm along the eastern border of the subject site (to be left in place) would prevent direct spillage of product or by-product water onto the portion of wetlands situated to the east. In the event of an accidental spill associated with proposed project operation of either product or by-product water, no significant effects would occur on the adjacent wetland/open space area or the Huntington Beach Channel because water would not pass the physical separation. Soils of wetlands are already flooded by freshwater during the rainy season, forming standing pools. Product water spills would do the same. Soils are already hypersaline, so spills of by-product water would contribute little to the salinity of soils. Spills into the local Huntington Beach Channel are also likely to have minimal impact. The channel already has multiple year-round fresh water inputs, so product water spills would have no impact. By-product water spills would be diluted by these fresh water inputs. However, if the channel is mostly oceanic at the time of a spill, salinities may be overly elevated. Species likely to be found in the channel, such as topsmelt, can tolerate wide variations in salinity. In addition, the desalination facility would incorporate appropriate leak/spill containment measures to minimize the likelihood for hazardous materials being stored, used, and transported on-site from impacting adjacent uses (refer to Section 5.8, *HAZARDS AND HAZARDOUS MATERIALS*, for a detailed discussion). Impacts in this regard are anticipated to be less than significant.

It should be noted that the Huntington Beach Wetlands Conservancy has proposed a Restoration Plan for several wetland areas both adjacent to and downstream of the proposed subject site. As stated above, significant impacts to these wetlands are not anticipated to occur as a result of an accidental spill of product or by-product water from the proposed desalination project.

MITIGATION MEASURES

LONG-TERM WATER QUALITY IMPACTS

HWQ-1 Prior to issuance of a precise grading permit, the applicant shall submit and obtain approval from the City of Huntington Beach of a Water Quality Management Plan (WQMP) specifically identifying Best Management Practices (BMPs) that would be used on-site to control predictable pollutant runoff. This WQMP shall identify, at a minimum, the routine, structural and non-structural measures specified in the Countywide NPDES Drainage Area Management Plan (DAMP) Appendix which details implementation of the BMPs whenever they are applicable to a project, the assignment of long-term maintenance responsibilities to the applicant, and shall reference the location(s) of structural BMPs. The applicable BMPs include:

- Facility materials that require fertilization and pest control shall be maintained in accordance with Orange County Management Guidelines for Use of Fertilizers and Pesticides.

- BMP structures and facilities shall be cleaned and maintained on a scheduled basis by a Facility Operator appointed person.

HWQ-2 Appropriate site specific hydrology and hydraulic analysis would be performed for the project prior to the issuance of grading or building permits, which ever comes first. The analysis shall include mitigation measures, if necessary, in regards to storm water drainage and flooding.

HWQ-3 Prior to the issuance of building permits (not including demolition permits) an appropriate on-site drainage system shall be installed for the project that integrates permanent stormwater quality features.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

5.4 AIR QUALITY

Information in this section is based primarily upon the <u>CEQA Air Quality Handbook</u>, (South Coast Air Quality Management District [SCAQMD]), Air Quality Data (California Air Resources Board [CARB], 2000 through 2004), the <u>City of Huntington Beach General Plan</u> (1996) and <u>General Plan Environmental Impact Report</u> (1995) and the SCAQMD <u>Final Air Quality Management Plan</u> (August 2003). This section focuses on potential long-term local and regional air quality impacts associated with the proposed desalination project. Section 5.9, CONSTRUCTION RELATED IMPACTS, analyzes potential short-term air quality impacts associated with construction activity for the proposed project.

Note: *Potential air quality impacts of the proposed project have remained consistent with those described in the previously circulated EIR (2002). However, due to changes in regulatory standards since 2002, information has been added to this section to better describe the regulatory framework in the State and air basin, as well as additional impact analysis to demonstrate compliance with existing requirements.*

EXISTING CONDITIONS

The proposed project is located within the South Coast Air Basin (SCAB). The SCAB is characterized as having a "Mediterranean" climate (a semi-arid environment with mild winters, warm summers and moderate rainfall). The SCAB is a 6,600-square mile area bounded by the Pacific Ocean to the west and the San Gabriel, San Bernardino and San Jacinto Mountains to the north and east. The SCAB includes all of Orange County and the non-desert portions of Los Angeles, Riverside and San Bernardino Counties. Additionally, the SCAQMD jurisdiction includes the San Gorgonio Pass area of Riverside County.

The general region lies in the semi-permanent, high-pressure zone of the eastern Pacific. As a result, the climate is mild and tempered by cool sea breezes. The usually mild climatological pattern is interrupted infrequently by periods of extremely hot weather, winter storms, or Santa Ana winds. The extent and severity of the air pollution problem in the SCAB is a function of the area's natural physical characteristics (weather and topography), as well as man-made influences (development patterns and lifestyle). Factors such as wind, sunlight, temperature, humidity, rainfall and topography all affect the accumulation and/or dispersion of pollutants throughout the SCAB.

CLIMATE

Moderate temperatures, comfortable humidity and limited precipitation characterize the climate in the SCAB. The average annual temperature varies little throughout the SCAB, averaging 75 degrees Fahrenheit. However, with a less pronounced oceanic influence, the eastern inland portions of the SCAB show greater variability in annual minimum and maximum temperatures. All portions of the SCAB have had recorded temperatures over 100 degrees in recent years. January is usually the coldest month at all locations while July and August are usually the hottest months of the year. Although the SCAB has a semi-arid climate, the air near the surface is moist because of the presence of a shallow marine layer. Except for infrequent periods when dry air is brought into the SCAB by offshore winds, the ocean effect is dominant. Periods with heavy fog are frequent; and low stratus clouds, occasionally referred to as "high fog" are a characteristic climate feature. Annual average relative humidity is 70 percent at the coast and 57 percent in the eastern part of the SCAB. Precipitation in the SCAB is typically 9 to 14 inches annually and is rarely in the form of snow or hail due to typically warm weather. The frequency and amount of rainfall is greater in the coastal areas of the SCAB. More specifically, the City of Huntington Beach enjoys a mild climate. The greatest precipitation in the City occurs in January with a rainfall of 3.0 inches. The coolest month of the year is December with an average low of 40°F. The warmest month is August with an average high of 85°F.[1]

SUNLIGHT

The presence and intensity of sunlight are necessary prerequisites for the formation of photochemical smog. Under the influence of the ultraviolet radiation of sunlight, certain original, or "primary" pollutants (mainly reactive hydrocarbons and oxides of nitrogen) react to form "secondary" pollutants (primarily oxidants). Since this process is time dependent, secondary pollutants can be formed many miles downwind from the emission sources. Due to the prevailing daytime winds and time-delayed nature of photochemical smog, oxidant concentrations are highest in the inland areas of Southern California.

TEMPERATURE INVERSIONS

Under ideal meteorological conditions and irrespective of topography, pollutants emitted into the air would be mixed and dispersed into the upper atmosphere. However, the Southern California region frequently experiences temperature inversions in which pollutants are trapped and accumulate close to the ground. The inversion, a layer of warm, dry air overlaying cool, moist marine air, is a normal condition in the southland. The cool, damp and hazy sea air capped by coastal clouds is heavier than the warm, clear air that acts as a lid through which the marine layer cannot rise. The height of the inversion is important in determining pollutant concentration. When the inversion is approximately 2,500 feet above sea level, the sea breezes carry the pollutants inland to escape over the mountain slopes or through the passes. At a height of 1,200 feet, the terrain prevents the pollutants from entering the upper atmosphere, resulting in a settlement in the foothill communities. Below 1,200 feet, the inversion puts a tight lid on pollutants, concentrating them in a shallow layer over the entire coastal basin. Usually, inversions are lower before sunrise than during the daylight hours. Mixing heights for inversions are lower in the summer and more persistent, being partly responsible for the high levels of ozone observed during summer months in the SCAB. Smog in Southern California is generally the result of these temperature inversions combining with coastal day winds and local mountains to contain the pollutants for long periods of time, allowing them to form secondary pollutants by reacting with sunlight. The SCAB has a limited ability to disperse these pollutants due to typically low wind speeds.

The area in which the City of Huntington Beach is located offers clear skies and sunshine, however, it is still susceptible to air inversions. This traps a layer of stagnant air near the ground where it is further loaded with pollutants. These inversions cause haziness, which is caused by moisture, suspended dust, and a variety of chemical aerosols emitted by trucks, automobiles, furnaces and other sources.

GLOBAL CLIMATE CHANGE

California is a substantial contributor of global greenhouse gasses emitting over 400 million tons of CO_2 a year. Climate studies indicate that California is likely to see an increase of three to four degrees Fahrenheit over the next century.[2] Methane is also an important greenhouse gas that potentially contributes to global climate change. Greenhouse gases are global in their effect, which is to increase the earth's ability to absorb heat in the atmosphere. Because primary greenhouse gases have a long lifetime in the atmosphere, accumulate over time, and are generally well mixed; their impact on the atmosphere is mostly independent of the point of emission.

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1 Weather Channel, www.weather.com, November 11, 2004.

2 Union of Concerned Scientists and the Ecological Society of America, *Confronting Climate Change in California*, 1999.

In 1988, the United Nations established the Intergovernmental Panel on Climate Change to evaluate the impacts of global warming and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change agreement with the goal of controlling greenhouse gas emissions, including methane. As a result, the Climate Change Action Plan was developed to address the reduction of greenhouse gases in the United States. The plan consists of more than 50 voluntary programs. Additionally, the Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere (i.e. chlorofluorocarbons [CFCs], halons, carbon tetrachloride, and methyl chloroform) were to be phased out by 2000.[3]

SENSITIVE RECEPTORS

Sensitive populations (sensitive receptors) are more susceptible to the effects of air pollution than the general population. Sensitive populations who are in proximity to localized sources of toxins and CO are of particular concern. Land uses considered sensitive receptors include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Existing sensitive receptors are not located within the proposed desalination facility site; however, residential, recreational, and educational uses exist within the vicinity of the project site, and adjacent to the proposed pipeline routes and underground pump stations. It should be noted that an animal shelter and the Wildlife Care Center of Orange County are situated near the project site (along the northern side of Edison Avenue and the northern side of Pacific Coast Highway, respectively), but are not considered sensitive receptors.[4]

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

Regulatory oversight for air quality in the SCAB rests at the regional level with the South Coast Air Quality Management District (SCAQMD), the California Air Resources Board (CARB) at the State level, and the U.S. Environmental Protection Agency (EPA) Region IX office at the Federal level. Laws, ordinances, regulations, and standards applicable to these three agencies are described below.

U.S. ENVIRONMENTAL PROTECTION AGENCY

The principal air quality regulatory mechanism on the federal level is the Federal Clean Air Act (FCAA) and in particular the 1990 amendments to the Federal Clean Air Act (FCAAA) and the National Ambient Air Quality Standards (NAAQS) that it establishes. These standards identify levels of air quality for "criteria" pollutants that are considered the maximum levels of ambient (background) air pollutants considered safe, with an adequate margin of safety, to protect the public health and welfare. The criteria pollutants include ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2 is a form of NO_X), sulfur oxides (SO_2 is a form of SO_X), particulate matter less than 10 and 2.5 microns in diameter (PM_{10} and $PM_{2.5}$, respectively) and lead (Pb) (refer to Table 5.4-1, *NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS).* The EPA also has regulatory and enforcement jurisdiction over emission sources beyond state waters (outer continental shelf), and those that are under the exclusive authority of the Federal government, such as aircraft, locomotives, and interstate trucking.

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3 Methyl chloroform is not slated to be phased out until 2005.

4 Mike Krause, South Coast Air Quality Management District, May 8, 2002.

Table 5.4-1
NATIONAL AND CALIFORNIA AMBIENT AIR QUALITY STANDARDS

Pollutant	Averaging Time	California Standards [1]	Federal Standards[2]	
		Concentration [3]	Primary [3,4]	Secondary [3,5]
Ozone (O_3)	1 Hour	0.09 ppm (180 μg/m)	0.12 ppm (235 μg/m^3)	0.12 ppm (235 μg/m^3)
	8 Hour	N/A	0.08 ppm (157 μg/m^3)	0.08 ppm (157 μg/m^3)
Particulate Matter (PM_{10})	24 Hour	50 μg/m^3	150 μg/m^3	150 μg/m^3
	Annual Arithmetic Mean	20 μg/m^3	50 μg/m^3	50 μg/m^3
Fine Particulate Matter ($PM_{2.5}$)	24 Hour	No Separate State Standard	65 μg/m^3	65 μg/m^3
	Annual Arithmetic Mean	12 μg/m^3	15 μg/m^3	15 μg/m^3
Carbon Monoxide (CO)	8 Hour	9.0 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1 Hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)	35 ppm (40 mg/m^3)
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	N/A	0.053 ppm (100 μg/m^3)	0.053 ppm (100 μg/m^3)
	1 Hour	0.25 ppm (470 μg/m^3)	N/A	N/A
Lead	30 days average	1.5 μg/m^3	N/A	N/A
	Calendar Quarter	N/A	1.5 μg/m^3	1.5 μg/m^3
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean	N/A	0.030 ppm (80 μg/m^3)	N/A
	24 Hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)	N/A
	3 Hour	N/A	N/A	0.5 ppm (1300 μg/m^3)
	1 Hour	0.25 ppm (655 μg/m^3)	N/A	N/A
Visibility Reducing Particles	8 Hour (10 am to 6 pm, PST)	Extinction Coeff. = 0.23 km@<70% RH	No Federal Standards	
Sulfates	24 Hour	25 μg/m3		
Hydrogen Sulfide	1 Hour	0.03 ppm (42 μg/m3)		

Notes:

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter-PM_{10}, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations. In 1990, the CARB identified vinyl chloride as a Toxic Air Contaminant and determined that there was not sufficient available scientific evidence to support the identification of a threshold exposure level. This action allows the implementation of health-protective control measures at levels below the 0.010 ppm ambient concentration specified in the 1978 standard.
2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. EPA also may designate an area as *attainment/unclassifiable*, if it has: 1) monitored air quality data that show that an area has not violated the ozone standard over a three-year period; or if 2) there is not enough information to determine the air quality in the area. For PM_{10}, the 24-hour standard is attained when 99 percent of the daily concentrations, averaged over the three years, are equal to or less than the standard. For $PM_{2.5}$, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the EPA for further clarification and current federal policies.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of mercury. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 mm of mercury (1,013.2 millibar); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. N/A = Not Applicable

Source: California Air Resources Board, November 2004.

CALIFORNIA AIR RESOURCES BOARD

The California Air Resources Board, (CARB), a department of the California Environmental Protection Agency (CalEPA), oversees air quality planning and control throughout California. Its responsibility lies with ensuring implementation of the 1989 amendments to the California Clean Air Act (CCAA), responding to the FCAA requirements and regulating emissions from motor vehicles sold in California. It also sets fuel specifications to further reduce vehicular emissions.

The amendments to the CCAA establish California Ambient Air Quality Standards (CAAQS), and a legal mandate to achieve these standards by the earliest practicable date. These standards apply to the same criteria pollutants as the Federal CAA, and also include sulfate, visibility, hydrogen sulfide, and vinyl chloride (refer to Table 5.4-1).

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQMD)

The SCAQMD is one out of 35 air quality management districts that have prepared Air Quality Management Plans (AQMPs) to accomplish a five percent annual reduction in emissions. The most recent AQMP was adopted in 2003. The 2003 AQMP relies on a multi-level partnership of governmental agencies at the federal, state, regional and local level. The 2003 AQMP proposes policies and measures to achieve federal and state standards for improved air quality in the SCAB and those portions of the Salton Sea Air Basin (formerly named the Southeast Desert Air Basin) that are under SCAQMD jurisdiction.

The 2003 AQMP also addresses several state and federal planning requirements and incorporates significant new scientific data, primarily in the form of updated emissions inventories, ambient measurements, new meteorological episodes and new air quality modeling tools. The 2003 AQMP is consistent with and builds upon the approaches taken in the 1997 AQMP and the 1999 Amendments to the Ozone State Implementation Plan (SIP) for the SCAB for the attainment of the federal ozone air quality standard. However, the 2003 AQMP points to the urgent need for additional emission reductions (beyond those incorporated in the 1997/99 Plan) to offset increased emission estimates from mobile sources and meet all federal criteria pollutant standards within the time frames allowed under the FCAA.

SCAG is responsible under the FCAA for determining conformity of projects, plans and programs with the SCAQMD AQMP. As indicated in the SCAQMD *CEQA Air Quality Handbook*, there are two main indicators of consistency:

- Whether the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and
- Whether the project would exceed the AQMP's assumptions for 2020 or increments based on the year of project build-out and phase.

Applicable Rules and Regulations

The following rules and regulations listed in Table 5.4-2, *SCAQMD RULES AND REGULATIONS*, would be applicable to the proposed project:[5]

[5] Telephone Conversation with Charles Blankson, South Coast Air Quality Management District, November 23, 2004.

Table 5.4-2
SCAQMD RULES AND REGULATIONS

Rules/Regulations	Description
Regulation IX – Standards for Performance for New Stationary Sources (NSPS)	Regulation IX incorporates, by reference, the provisions of Part 60, Chapter 1, Title 40 of the Code of Federal Regulations. It requires compliance with federal Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units.
Regulation XIII – New Source Review	This regulation sets pre-construction review requirements for new, modified, or relocated facilities, to ensure that the operation of such facilities does not interfere with progress in attainment of the national ambient air quality standards, and that future economic growth within the SCAQMD is not unnecessarily restricted. The specific air quality goal of this regulation is to achieve no net increases from new or modified permitted sources of nonattainment air contaminants or their precursors. In addition to nonattainment air contaminants, this regulation will also limit emission increases of ammonia, and Ozone Depleting Compounds (ODCs) from new, modified or relocated facilities by requiring the use of Best Available Control Technology (BACT).
Regulation XIV, Rule – Toxics and Other Non-Criteria Pollutants	Regulation XIV includes rules that regulate Toxics and other Non-Criteria Pollutants. It provides specifications for maximum individual cancer risk (MICR), cancer burden, and non-cancer acute and chronic hazard index (HI) from new permit units, relocations, or modifications to existing permit units, which emit toxic air contaminants. The rules establish allowable risks for permit units requiring new permits pursuant to Rules 201 or 203.
Regulation XX – Regional Clean Air Incentive Market (RECLAIM)	RECLAIM is a market incentive program designed to allow facilities flexibility in achieving emission reduction requirements for Oxides of Nitrogen (NOx), and Oxides of Sulfur (SOx) under the Air Quality Management Plan using methods which include, but are not limited to: add-on controls, equipment modifications, reformulated products, operational changes, shutdowns, and the purchase of excess emission reductions.
Rule 201 – Permit to Construction	Rule 201 establishes an orderly procedure for the review of new and modified sources of air pollution through the issuance of permits. Rule 201 specifies that any facility installing nonexempt equipment that causes or controls the emissions of air pollutant must first obtain a permit to construct from the SCAQMD.
Rule 401 – Visible Emissions	Establishes limit for visible emissions from stationary sources. This rule prohibits visible emissions as dark or darker than Ringlemann No.1 for periods greater than three minutes in any hour.
Rule 402 – Nuisance	Prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public or that damage business or property.

Source: South Coast Air Quality Management District, www.aqmd.gov, November 30, 2004.
Note that Regulation XIV, Rule 201, Rule 401 and Rule 402 also apply to construction emissions.

ATTAINMENT STATUS

The SCAB has been designated as attainment for nitrogen dioxide (NO_x) and sulfur oxides (SO_x) for both State and Federal Standards. The SCAB is designated non-attainment for ozone (O_3) and particulate matter (PM_{10}) under both Federal and State standards (refer to Table 5.4-3, *SOUTH COAST AIR BASIN AMBIENT AIR QUALITY CLASSIFICATIONS*).

Table 5.4-3
SOUTH COAST AIR BASIN AMBIENT AIR QUALITY CLASSIFICATIONS

Pollutant	State	Federal
Carbon Monoxide	Non-Attainment	Attainment
Ozone (1 hour standard)	Non-Attainment/Severe	Non-Attainment/Severe
Ozone (8 hour standard)	Unclassified	Unclassified
Nitrogen Oxides	Attainment	Attainment
Sulfur Dioxide	Attainment	Attainment
Particulate Matter <10 microns	Serious Non-Attainment	Serious Non-Attainment
Source: Telephone conversation with Charles Blankson, South Coast Air Quality Management District, November 2004.		

LOCAL AMBIENT AIR QUALITY

The project area's local ambient air quality is monitored by the SCAQMD and CARB. CARB monitors ambient air quality at approximately 250 air monitoring stations across the state. Air quality monitoring stations usually measure pollutant concentrations ten feet above ground level; therefore, air quality is often referred to in terms of ground-level concentrations. The Costa Mesa Monitoring Station, located along Mesa Verde Drive, is the nearest air monitoring station to the project area. The data collected at this Station are considered to be representative of the air quality experienced in the project vicinity. Air quality data from 2000 to 2004 for the Costa Mesa Monitoring Station are provided in Table 5.4-4, *LOCAL AIR QUALITY LEVELS*. As PM_{10} and $PM_{2.5}$ levels were not monitored at the Costa Mesa station, measurements were taken from the Anaheim – Harbor Boulevard and the Anaheim – Pampas Lane monitoring stations. The following air quality information briefly describes the various types of pollutants.

Ozone

Ozone occurs in two layers of the atmosphere. The layer surrounding the earth's surface is the troposphere. The troposphere extends approximately 10 miles above ground level, where it meets the second layer, the stratosphere. The stratospheric or "good" ozone layer extends upward from about 10 to 30 miles and protects life on earth from the sun's harmful ultraviolet rays (UV-B).

"Bad" ozone is what is known as a photochemical pollutant, and needs VOC, NO_x, and sunlight to form. VOC and NO_x are emitted from various sources throughout the county. In order to reduce ozone concentrations, it is necessary to control the emissions of these ozone precursors. Significant ozone formation generally requires an adequate amount of precursors in the atmosphere and several hours in a stable atmosphere with strong sunlight. High ozone concentrations can form over large regions when emissions from motor vehicles and stationary sources are carried hundreds of miles from their origins.

While ozone in the upper atmosphere protects the earth from harmful ultraviolet radiation, high concentrations of ground level ozone can adversely affect the human respiratory system and other tissues. Many respiratory ailments, as well as cardiovascular disease, are aggravated by exposure to high ozone levels. Ozone also damages natural ecosystems such as forests and foothill communities, and damages agricultural crops and some man-made materials, such as rubber, paint, and plastics. Societal costs from ozone damage include increased medical costs, the loss of human and animal life, accelerated replacement of industrial equipment, and reduced crop yields.

The O_3 State standard is 0.09 ppm, averaged over one hour. The eight-hour O_3 levels at the Costa Mesa monitoring station range between 0.086 ppm in 2000 and 0.087 ppm in 2004. The one-hour State standard was exceeded eight days from 2000 to 2004. The Federal standard for O_3 is 0.12 ppm, averaged over one hour. The Federal standard was not exceeded between 2000 and 2004. The SCAB is designated as a nonattainment area for State and Federal O_3 standards.

Table 5.4-4
LOCAL AIR QUALITY LEVELS

Pollutant	California Standard	Federal Primary Standard	Year	Maximum Concentration[1]	Days (Samples) State/Federal Standard Exceeded
Carbon Monoxide	9.0 ppm for 8 hour	9.0 ppm for 8 hour	2000[4]	6.3	0/0
			2001[4]	4.7	0/0
			2002[4]	4.3	0/0
			2003[4]	6.0	0/0
			2004[4]	3.1	0/0
Ozone for 8 hours	0.09 ppm (1 hour)	0.12 ppm (1 hour)	2000[4]	0.086	NA1
			2001[4]	0.073	NA0
			2002[4]	0.070	NA/0
			2003[4]	0.088	NA/1
			2004[4]	0.087	NA/1
Ozone for 1 hour	NA (8 hour)	0.08 ppm (8 hour)	2000[4]	0.1	1/0
			2001[4]	0.1	1/0
			2002[4]	0.1	0/0
			2003[4]	0.1	4/0
			2004[4]	0.1	2/0
Nitrogen Dioxide	0.25 ppm for 1 hour	0.053 ppm annual average	2000[4]	0.1	0/0
			2001[4]	0.1	0/0
			2002[4]	0.1	0/0
			2003[4]	0.1	0/0
			2004[4]	0.1	0/0
PM_{10}[2,3]	50 µg/m^3 for 24 hours	150 µg/m^3 for 24 hours	2000[5]	126.0	3/0
			2001[5]	93.0	8/0
			2002[6]	69.0	5/0
			2003[6]	96.0	6/0
			2004[6]	62.0	3/0
$PM_{2.5}$[3]	No Separate State Standard	65µg/m^3 for 24 hours	2000[5]	113.9	NA/6
			2001[5]	55.0	NA/0
			2002[5]	68.6	NA/1
			2003[5]	115.5	NA/3
			2004[5]	52.9	NA/0
Sulfur Dioxide	0.25 ppm for 1 hour	0.14 ppm for 24 hours or 0.03 ppm annual arithmetic mean	2000[4]	0.0	0/0
			2001[4]	0.0	0/0
			2002[4]	0.0	0/0
			2003[4]	0.0	0/0
			2004[4]	0.0	0/0

PPM = Parts Per Million
µg/m^3 = Micrograms Per Cubic Meter
NM = Not Measured
PM_{10} = particulate matter 10 microns in diameter or less
$PM_{2.5}$ = particulate matter 2.5 microns in diameter or less
NA = Not applicable

Notes:

1. Maximum concentration is measured over the same period as the California Standards.
2. PM_{10} exceedances are based on state thresholds established prior to amendments adopted on June 20,2002.
3. PM_{10} and $PM_{2.5}$ exceedances are derived from the number of samples exceeded, not days.
4. The Costa Mesa monitoring station is located on 2850 Mesa Verde Dr East, Costa Mesa, California 92626.
5. The Anaheim – Harbor Boulevard monitoring station is located on 1610 S Harbor Blvd, Anaheim, California 92802
6. The Anaheim – Pampas Lane monitoring station is located in Anaheim, California.

Source: California Air Resources Board, *ADAM Air Quality Data Summaries* from 2000 to 2004 as found at http://www.arb.ca.gov/adam/

Carbon Monoxide

Carbon monoxide (CO) is emitted by mobile and stationary sources as a result of incomplete combustion of hydrocarbons or other carbon-based fuels. CO is an odorless, colorless toxic gas that is formed by the incomplete combustion of fuels. In cities, automobile exhaust can cause as much as 95% of all CO emissions. At high concentrations, CO can reduce the oxygen-carrying capacity of the blood and cause headaches, dizziness, unconsciousness, and even death. It is generally associated with areas of high traffic density. State and Federal standards were not exceeded between 2000 and 2004. The SCAB is designated as an attainment area for Federal CO standards and non-attainment for State standards.

Nitrogen Dioxide

Nitrogen oxides (NO_x) are a family of highly reactive gases that are a primary precursor to the formation of ground-level ozone, and react in the atmosphere to form acid rain. NO_2, often used interchangeably with NO_x, is a reddish-brown gas that can cause breathing difficulties at high levels. Peak readings of NO_2 occur in areas that have a high concentration of combustion sources (e.g., motor vehicle engines, power plants, refineries, and other industrial operations) in the vicinity.

NO_x can irritate the lungs, cause lung damage, and lower resistance to respiratory infections such as influenza. The effects of short-term exposure are still unclear, but continued or frequent exposure to concentrations that are typically much higher than those normally found in the ambient air may cause increased incidence of acute respiratory illness in children. Health effects associated with NO_X are an increase in the incidence of chronic bronchitis and lung irritation. Chronic exposure to NO_2 may lead to eye and mucus membrane aggravation, along with pulmonary dysfunction.

State and Federal standards were not exceeded between 2000 and 2004. The SCAB is designated as an attainment area for State and Federal NO_2 standards.

Particulate Matter

Particulate matter pollution consists of very small liquid and solid particles floating in the air. Some particles are large or dark enough to be seen as soot or smoke. Others are so small they can be detected only with an electron microscope. Particulate matter is a mixture of materials that can include smoke, soot, dust, salt, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industrial sources undergo chemical reactions in the atmosphere. PM_{10} refers to particles less than or equal to 10 microns in aerodynamic diameter. $PM_{2.5}$ refers to particles less than or equal to 2.5 microns in aerodynamic diameter and are a subset, or portion of PM_{10}.

PM_{10} and $PM_{2.5}$ particles are small enough to be inhaled into, and lodge in, the deepest parts of the lung. Health problems begin as the body reacts to these foreign particles. Acute and chronic health effects associated with high particulate levels include the aggravation of chronic respiratory diseases, heart and lung disease, coughing, bronchitis and respiratory illnesses in children. Recent mortality studies have shown a statistically significant direct association between mortality and daily concentrations of particulate matter in the air. Non health-related effects include reduced visibility and soiling of buildings.

The State standard for PM_{10} is 50 micrograms per cubic meter ($\mu g/m^3$) averaged over 24 hours. The State standard was exceeded 25 days between 2000 and 2004. The Federal standard for PM_{10} is 150 $\mu g/m^3$ averaged over 24 hours. The Federal standard for PM_{10} was not exceeded between 2000 and 2004. The SCAB is designated as a nonattainment area for State PM_{10} standards. Based upon a desire to set clean air goals throughout the State, the CARB created a new annual average standard for $PM_{2.5}$ at 12 $\mu g/m^3$. Currently, the CARB has issued a staff report, which recommends that the SCAB be designated as nonattainment for State and Federal $PM_{2.5}$ standards.[6]

Sulfur Dioxide

Sulfur dioxide is a colorless, pungent gas belonging to the family of sulfur oxide gases (SO_X), formed primarily by combustion of sulfur-containing fossil fuels (primarily coal and oil), and during metal smelting and other industrial processes. Sulfur dioxide (SO_2) often used interchangeably with sulfur oxides (SOx) did not exceed Federal or State standards between 2000 and 2004. The SCAB is designated as an attainment area for both State and Federal SO_2 standards.

The major health concerns associated with exposure to high concentrations of SOx include effects on breathing, respiratory illness, alterations in pulmonary defenses, and aggravation of existing cardiovascular disease. Major subgroups of the population that are most sensitive to SO_x include individuals with cardiovascular disease or chronic lung disease (such as bronchitis or emphysema) as well as children and the elderly. Emissions of SO_x also can damage the foliage of trees and agricultural crops. Together, SO_x and NO_x are the major precursors to acid rain, which is associated with the acidification of lakes and streams, and accelerated corrosion of buildings and monuments. Sulfur oxides can react to form sulfates, which significantly reduce visibility.

Reactive Organic Gases and Volatile Organic Compounds

Hydrocarbons are organic gases that are formed solely of hydrogen and carbon. There are several subsets of organic gases including Volatile Organic Compounds (VOCs) and Reactive Organic Gases (ROGs). ROGs include all hydrocarbons except those exempted by the California Air Resources Board (CARB). Therefore, ROGs are a set of organic gases based on state rules and regulations. VOCs are similar to ROGs in that they include all organic gases except those exempted by federal law. VOCs are therefore a set of organic gases based on federal rules and regulations. Both VOCs and ROGs are emitted from the incomplete combustion of hydrocarbons or other carbon-based fuels. Combustion engine exhaust, oil refineries, and oil-fueled power plants are the primary sources of hydrocarbons. Another source of hydrocarbons is evaporation from petroleum fuels, solvents, dry cleaning solutions and paint.

The primary health effects of hydrocarbons result from the formation of ozone and its related health effects. High levels of hydrocarbons in the atmosphere can interfere with oxygen intake by reducing the amount of available oxygen through displacement. Carcinogenic forms of hydrocarbons are considered Toxic Air Contaminants, or air toxics. There are no health standards for ROG separately.

Toxic Air Contaminants

According to section 39655 of the California Health and Safety Code, a toxic air contaminant is "an air pollutant which may cause or contribute to an increase in mortality or an increase in serious illness, or which may pose a present or potential hazard to human health". In addition, 189 substances that have been listed as federal hazardous air pollutants (HAPs) pursuant to section 7412 of Title 42 of the United States Code are TACs under the state's air toxics program pursuant to section 39657 (b) of the California Health and Safety Code.

The TACs can cause various cancers depending on the particular chemicals, type and duration of exposure. Additionally, some of the TACs may cause short-term and/or long-term health effects. The ten TACs posing the greatest health risk in California are acetaldehyde, benzene, 1-3

[6] http://www.epa.gov/pmdesignations/documents/120/table.htm, November 10, 2004.

butadiene, carbon tetrachloride, hexavalent chromium, para-dichlorobenzene, formaldehyde, methylene chloride, perchlorethylene, and diesel particulate matter.

IMPACTS

Significance Criteria

In accordance with CEQA, the effects of a project are evaluated to determine if they would result in a significant impact on the environment. An Environmental Impact Report (EIR) is required to focus on these effects and offer mitigation measures to avoid or lesson any significant impacts that are identified. The criteria, or standards, used to determine the significance of impacts may vary depending on the nature of the project. Air quality impacts resulting from implementation of the proposed Project could be considered significant if they cause any of the following to occur:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Violate any air quality standard or contribute substantially to an existing or projected air quality violation;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable Federal or State ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors);
- Expose sensitive receptors to substantial pollutant concentrations; and/or
- Create objectionable odors affecting a substantial number of people.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT THRESHOLDS

Under CEQA, the SCAQMD is an expert commenting agency on air quality and related matters within its jurisdiction or impacting its jurisdiction. Under the FCAA the SCAQMD has adopted federal attainment plans for ozone and PM_{10}. The SCAQMD reviews projects to ensure that they would not: 1) cause or contribute to any new violation of any air quality standard; 2) increase the frequency or severity of any existing violation of any air quality standard; or 3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any federal attainment plan.

The *SCAQMD CEQA Air Quality Handbook* provides significance thresholds for both construction and operation of projects within the SCAQMD jurisdictional boundaries. Exceedance of the SCAQMD thresholds could result in a potentially significant impact. However, ultimately the lead agency determines the thresholds of significance for impacts.[7] If the project proposes development in excess of the established thresholds, as illustrated in Table 5.4-5, *SCAQMD EMISSION THRESHOLDS,* a significant air quality impact may occur and additional analysis is warranted to fully assess the significance of impacts.

In addition, the significance of localized project impacts depends on whether ambient CO levels in the vicinity of the project are above or below State and Federal CO standards. If the project causes an exceedance of either the state one-hour or eight-hour CO concentrations, the project would be considered to have a significant local impact. If ambient levels already exceed a state or federal standard, then project emissions would be considered significant if they increase one-hour CO concentrations by 1.0 ppm or more, or eight-hour CO concentrations by 0.45 ppm or more.

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[7] South Coast Air Quality Management District, *CEQA Air Quality Handbook*, page 6-1, April 1993.

Table 5.4-5
SCAQMD EMISSIONS THRESHOLDS

Phase	Pollutant (lbs/day)				
	ROG	NO_X	CO	SO_X	PM_{10}
Operational	55	55	550	150	150
Source: SCAQMD, *CEQA Air Quality Handbook*, page 6-1, April 1993.					

ODOR-BASED THRESHOLDS

Projects emanating objectionable odors near existing sensitive receptors or other land uses where people may congregate could constitute a significant air quality impact to existing uses. Also, residential or other sensitive receptor projects built for the intent of attracting people near existing odor sources could also cause a significant air quality impact. The SCAQMD suggests a threshold based on the distance of the odor source from people and complaint records for a facility or similar facility.

SHORT-TERM EMISSIONS

For a discussion of short-term air quality impacts associated with remediation, demolition, grading and construction, refer to Section 5.9, *CONSTRUCTION RELATED IMPACTS*.

LONG-TERM EMISSIONS

The operation of the proposed project involves three primary activities that would generate air emissions. These activities are:

- Electricity generation by others for consumption to operate the project facilities and equipment;
- Electricity generation by others for consumption related to pump station operations; and
- Mobile source emissions from employee and truck delivery operations.

Mobile sources refer to emissions from motor vehicles, including tailpipe and evaporative emissions. Depending upon the pollutant being discussed, the potential air quality impact may be of either regional or local concern. For example, ROG, NO_X, and PM_{10} are all pollutants of regional concern (NO_X and ROG react with sunlight to form O_3 or photochemical smog, and PM_{10} is readily transported by wind currents). However, CO tends to be a localized pollutant, dispersing rapidly at the source.

As previously discussed, the SCAB is a non-attainment area for O_3 and PM_{10} (Federal and State). Nitrogen oxides and ROG are regulated O_3 precursors (a precursor is defined as a directly emitted air contaminant that, when released into the atmosphere, forms or causes to be formed or contributes to the formation of a secondary air contaminant for which an ambient air quality standard has been adopted).

Sources of long-term air emissions include machinery, equipment and vehicles within the project site, as well as indirect emissions from electricity and natural gas consumption. All water pumps associated with the proposed project (including the proposed off-site underground booster pump station) would be electrically powered, and would not directly generate air emissions. However, indirect impacts due to electrical consumption factors of the proposed desalination project are analyzed below.

PROPOSED DESALINATION FACILITY SITE

Mobile Source Emissions

Motor vehicles including potential employee and truck delivery trips associated with the project would constitute the primary source of pollutant emissions. It is anticipated that the project would result in an estimated worst-case of 28 worker trips per day, traveling an estimated maximum distance of 50 miles each way. In addition, truck deliveries have been anticipated to generate approximately four trips per day. Project generated vehicle emissions have been estimated with the EMFAC2002 (version 2.2) emissions model. URBEMIS2002 was not utilized for operational emissions due to the minimal amount of area source and vehicular related activities associated with the project. Thus, the estimated long-term emissions from mobile sources would be well below the SCAQMD thresholds for CO, ROG, NO_x and PM_{10}. Table 5.4-6, *MOBILE SOURCE EMISSIONS*, illustrates the minimal impacts associated with the project. Mobile source emissions from operation of the proposed desalination facility are anticipated to result in less than significant impacts.

Carbon Monoxide

The project is not anticipated to result in air quality impacts from CO hotspots. The project does not generate enough vehicular trips to result in a degradation of the level of service (LOS) of roadways in the site vicinity. Therefore, CO hotspots are not anticipated to result from project operations.

Table 5.4-6
MOBILE SOURCE EMISSIONS

Pollutant	Mobile Source Emissions (lbs/day)	SCAQMD Thresholds (lbs/day)	Threshold Exceedance (Yes/No)
Carbon Monoxide (CO)	43.0	550	**NO**
Reactive Organic Gases (ROG)	4.74	55	**NO**
Nitrogen Oxides (NOx)	9.6	55	**NO**
Sulfur Oxides (SOx)	0.4	150	**NO**
Particulate Matter (PM_{10})	0.08	150	**NO**

Notes:
1.Emissions calculated utilizing the EMFAC2002 (v2.2) model.
2.Operational emissions calculations can be found in Appendix B, *Air Quality*.

Electricity Consumption

Based upon power consumption of 15 kilowatt hours per thousand gallons (4,887 kilowatt hours per acre-foot), the proposed 50 mgd (56,000 AF per year) desalination facility would require approximately 30 to 35 megawatts per hour to produce and distribute potable water. As such, the daily energy consumption of the facility is estimated to be between 720 to 840 megawatt hours per day.

In order to take advantage of lower cost power pricing, the facility may utilize off-peak power to the maximum extent practicable by temporarily halting the production of potable water and only pumping product water from the product water storage tank. No back-up electrical generators would be incorporated into the proposed project site, as back-up power would be drawn from the electrical power grid and/or AES Huntington Beach Generating Station's (HBGS) auxiliary reserve bank.

The proposed desalination facility's electrical power source would be controlled by a power marketing company, which, in consultation with the California Independent System Operator (Cal ISO), would obtain power from the HBGS and/or the California power market at the lowest cost possible. As such, a variety of base-, intermediate- and peak-load power generating facilities may produce power for the desalination facility. Typically, base-loaded power plants (such as California's two nuclear power plants and out-of-state coal-fired power plants) as well as several large hydroelectric power dams are the primary source of off-peak power serving Southern California. Intermediate and peak load plants are typically fossil fuel generating facilities (predominantly natural gas fired).

The project would not change any General Plan or Zoning designations, and, as such, air impacts in this regard have been previously accounted for within local and regional planning documents. In addition, emissions resulting from the proposed project's electricity consumption would not be concentrated in the project site vicinity, as such emissions would be distributed throughout the region (with a portion possibly occurring outside of California), and have been previously accounted for through previous environmental documentation prepared for the SCAQMD's Regional Clean Air Incentives Market (RECLAIM) and New Source Review programs (refer to *CONSISTENCY WITH REGIONAL PLANS*, below).[8]

Electric power generating plants are distributed throughout the SCAB and beyond, and their emissions contribute to the total regional pollution burden. As the project is proposed to consume between 720 to 840 megawatt hours per day of electricity, the project may create regional impacts in regards to air quality (especially NO_x, which is typically produced by high temperature combustion processes utilizing fossil fuels, including electricity generating plants).[9] However, it would be speculative to quantify such emissions caused by the proposed project's electricity consumption, as many power sources are located outside of the SCAB or the state, and the time of use by the desalination facility would dictate whether or not off-peak non-fossil fuel electrical power is being consumed.

It should be noted that, although a power plant is located adjacent to the subject site (HBGS), actual project-related emissions are not possible to attribute to any one plant, since the project's electrical demand is met by dozens of power plants connected to a regional power supply grid, with many of those plants located outside of Southern California. It should further be noted that if the HBGS facility were to cease operating, electricity would still be available to the proposed desalination facility, as the proposed project would utilize electricity from the power grid and not directly from HBGS.

Chemical Storage Facilities

Various chemicals typically associated with desalination facilities would be stored on-site. These chemicals include sodium hypochlorite, ammonia, lime, carbon dioxide, ferric sulfate, polymer, sulfuric acid, sodium bi-sulfite and the RO membrane-cleaning solution. All chemicals would be stored, handled, and used in accordance with all applicable Federal, State, and local standards. These chemicals are food-grade purity compounds typically used in most conventional water treatment facilities. The seawater desalination facility would use the same type and grade of chemicals as any other conventional surface water treatment plant. However, the seawater

8 Jonathan Nadler, South Coast Air Quality Management District, February 22, 2002.

9 In the event that the proposed desalinated water entirely replaces a given water provider's water curtailed from the State Water Project along the West Branch, then the power requirements to move imported water through the Central Valley, over the Tehachapi Mountains, and into the Los Angeles Basin could result in substantial power reductions, thus resulting in air quality offsets. Whereas the proposed facility has an "all in" power rate of 4,887 kilowatt hours per acre-foot for producing water and conveyance into the Orange County system, according to the Department of Water Resources Bulletin 132 (1998), the State Water Project has a power rate of 3,200 kilowatt hours per acre-foot (net of hydroelectric power production in the LA Basin). As such, there is only a 1,687 kilowatt-hour per acre foot difference (or an additional 258 megawatts per day) increase in energy consumption over current supplies into the Metropolitan Water District's (MWD) Diemer water treatment facility.

desalination facility would use fewer chemicals of lower dosages than existing conventional water treatment plants in Southern California. Chemical storage and the use of chemicals during the desalination process are not anticipated to have significant impacts to air quality in the region. In addition, based on the types of chemicals stored on site and their containment methods, odors are unlikely to emanate from the project site.

Visibility

A visibility analysis of the project's gaseous emissions is required under the Federal Prevention of Significant Deterioration (PSD) permitting program. The analysis addresses the contributions of gaseous emissions (primarily NOx and PM_{10}) to visibility impairment on the nearest Class 1 PSD areas, which are national parks and national wildlife refuges. There are no national parks or refuges in close proximity to the project. The nearest Class 1 areas to the proposed project are the Channel Islands National Park, Joshua Tree National Park, Cabrillo National Park, Santa Monica Mountains National Recreation Area, Seal Beach National Wildlife Refuge and the Salton Sea National Wildlife Refuge.[10,11] Considering the minimal amount of emissions generated by the operation of the proposed project, modeling was not conducted and impacts in this regard would be less than significant.

OFF-SITE PIPELINES AND UNDERGROUND PUMP STATIONS

Off-site project components would include water transmission pipelines and underground booster pump stations. The underground pump stations would convey potable water from the desalination site to the regional distribution system. Two off-site booster pump stations are proposed, which would include surge tanks to protect the distribution system from sudden pressure changes, telemetry equipment, appurtenances and diesel powered electrical generators for emergency backup equipment. The diesel-powered back-up generators would be Caterpillar model 3516 units or similar equipment and would supply approximately seven megawatts of emergency power for adequate operation of the pump station (in regards to flow and pressure). The largest diesel-powered generator, located on the OC-44 booster station would require an 8,700-gallon diesel fuel storage tank (assuming a 24-hour emergency period).

All internal combustion engines (ICEs) greater than 50 brake horsepower (bhp) are required to obtain a permit to construct from the SCAQMD prior to installation of the engines at the project site. NO_X emissions from diesel-fired emergency engines are 200 to 600 times greater, per unit of electricity produced, than new or controlled existing central power plants fired on natural gas. Diesel-fired engines also produce significantly greater amounts of fine particulates and toxics emissions compared to natural gas fired equipment. In order for generators to be considered an emergency backup generator by the SCAQMD, generators cannot operate more than 200 hours a year and can only operate in the event of an emergency power failure or for routine testing and maintenance. Furthermore, the SCAQMD has provided a list of models of equipment as meeting all applicable air quality requirements and have issued permits to the dealer/distributor of these engines. The diesel-powered generator anticipated for the project, Caterpillar model 3516, is included within the approved list provided by the SCAQMD.[12]

In addition to applying for a permit to construct from the SCAQMD (Rule 201, refer to table 5.4-2), it would be necessary to apply for a *Special Application for Temporary Emergency Authorization To*

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10 National Park Service, http://data2.itc.nps.gov/parksearch/state.cfm?st=ca, November 30, 2004.

11 http://gorp.away.com/gorp/location/ca/wrfsc_ca.htm, November 30, 2004.

12 South Coast Air Quality Management District, http://www.aqmd.gov/permit/docs/Emergency%20Generator%20Fact%20Sheet.doc, November 29, 2004.

Operate Electric Backup Generator(s) During Involuntary Power Service Interruptions Permit.[13] The project would obtain all required air quality permits. Therefore, impacts associated with the operation of diesel- powered generators are anticipated to be less than significant.

Pump stations as well as water transmissions lines would occasionally require maintenance, which would generate worker trips. Maintenance activities would occur at sporadic instances, and therefore modeling was not conducted since trip generation from such activities would not result in any significant air quality impacts. Water transmission lines would not result in criteria pollutant emissions and therefore would not have any significant impacts to air quality.

CONSISTENCY WITH REGIONAL PLANS

The purpose of the consistency finding is to determine if a project is inconsistent with the assumptions and objectives of the regional air quality plans, and thus if it would interfere with the region's ability to comply with Federal and State air quality standards. If a project is inconsistent, local governments need to consider project modifications or inclusion of mitigation to eliminate the inconsistency. It is important to note that even if a project has significant operational or cumulative air quality impacts, it can still be found consistent with the regional air quality conformity under the SCAQMD's planning handbook. Therefore, it is necessary to assess the project's consistency with the AQMP and the City of Huntington Beach General Plan.

The subject site has a land use and zoning designation of Public (P). Project implementation would not conflict with the General Plan or Zoning Ordinance, nor would it propose to change any designations. As such, projects consistent with local General Plans are considered consistent with air quality related regional plans, such as the AQMP.[14] Accordingly, air quality emissions and related impacts for the proposed desalination project have been locally and regionally accounted for.[15]

As indicated in SCAQMD's *CEQA Air Quality Handbook*, there are two main indicators of consistency:

- Whether the project would not result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP; and
- Whether the project would exceed the AQMP's assumptions for 2010 or increments based on the year of project build-out and phase.

As previously stated, since the AQMP is based on the City and County's General Plan assumptions, the proposed desalination project is consistent with these General Plan assumptions. Thus, the project would be considered consistent with the AQMP land use assumptions and goals.

In addition, the region (Los Angeles County, Orange County, and half of Riverside County) is regulated by the SCAQMD's Regional Clean Air Incentives Market (RECLAIM). The RECLAIM program, implemented on January 1, 1994, controls the amount of NO_x and SO_x emissions through financial incentives and involves the trading of emissions credits. The RECLAIM program is designed to guarantee annual reductions in air pollution by requiring industrial and business uses (including power plants) emitting four tons or more per year of NO_x and SO_x to cut their emissions by specific amount each year, resulting in an almost 80 percent reduction of NO_x and SO_x by 2003. As

13 South Coast Air Quality Management District, http://www.aqmd.gov/permit/em_back_up_gen.html, November 29, 2004.

14 CEQA Air Quality Handbook, Chapter 12, page 12-2.

15 Jonathan Nadler, South Coast Air Quality Management District, February 22, 2002.

such, future NO_x and SO_x emissions for the region, including those resulting from project implementation, would be offset through the RECLAIM program, and no significant regional air quality planning impacts are anticipated.[16]

The proposed project would also require review by the SCAQMD under Regulation XIII (New Source Review), which establishes pre-construction requirements for new or modified facilities to ensure that operation of such facilities does not interfere with progress toward the attainment of ambient air quality standards (AAQS) without necessarily restricting economic growth. The specific air quality goal of this regulation is to achieve a no net increase from new or modified permitted sources of non-attainment air contaminants or their precursors.[17] This standard review process administered by the SCAQMD would further ensure that the proposed project is consistent with regional air quality plans.

In addition, according to SCAG, the project is consistent with the *Regional Comprehensive Plan and Guide (RCPG).* The following policies taken from the RCPG apply to the project:

Core Growth Management Policies

3.03 *The timing, financing, and location of public facilities, utility systems, and transportation systems shall be used by SCAG to implement the region's growth policies.*

3.18 *Encourage planned development in location least likely to cause adverse environmental impact.*

1.11 *Through the environmental document review process, ensure that plans at all levels of government (regional, air basin, county, sub-regional and local) consider air quality, land use, transportation and economic relationships to ensure consistency and minimize conflict.*

Analysis has shown that the project is consistent with regional plans and therefore would result in less than significant impacts.

MITIGATION MEASURES

LONG-TERM EMISSIONS

None required.

CONSISTENCY WITH REGIONAL PLANS

None required.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

16 http://www.aqmd.gov/reclaim/reclaim.html

17 http://www.aqmd.gov/rules/html/r1301.html

5.5 NOISE

The purpose of this section is to analyze project-related noise source impacts on-site and to surrounding land uses. Mitigation measures are also recommended to avoid or reduce the project's impacts. This section evaluates short-term construction-related impacts as well as long-term buildout conditions. Information in this section is based on the City of Huntington Beach General Plan (1996), and the City of Huntington Beach General Plan EIR (1995). Refer to Appendix A, NOISE DATA, for the assumptions used in this analysis.

ACOUSTICAL TERMINOLOGY

NOISE SCALES AND DEFINITIONS

Sound is technically described in terms of the loudness (amplitude) of the sound and frequency (pitch) of the sound. The standard unit of measurement of the loudness of sound is the Decibel (dB). Since the human ear is not equally sensitive to sound at all frequencies, a special frequency-dependent rating scale has been revised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) performs this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Decibels are based on the logarithmic scale. The logarithmic scale compresses the wide range in sound pressure levels to a more usable range of numbers in a manner similar to the Richter scale used to measure earthquakes. In terms of human response to noise, a sound 10 dBA higher than another is judged to be twice as loud, and 20 dBA higher four times as loud, and so forth. Everyday sounds normally range from 30 dBA (very quiet) to 100 dBA (very loud). Examples, of various sound levels in different environments are shown in Exhibit 5.5-1, *SOUND LEVELS AND HUMAN RESPONSE.*

In general, a three dBA change in sound pressure level is considered a "just detectable" difference in most situations. A five dBA change is readily noticeable and a 10 dBA change is considered a doubling (or halving) of the subjective loudness. It should be noted that a three dBA increase or decrease in the average traffic noise level is realized by a doubling or halving of the traffic volume, or by about a seven mile per hour (mph) increase or decrease in speed.

For each doubling of distance from a point noise source, the sound level would decrease by six dBA. In other words, if a person is 100 feet from a machine, and moves to 200 feet from that source, sound levels would drop approximately 6 dBA. For each doubling of distance from a source, like a roadway, noise levels are reduced by 3 to 5 decibels, depending on the ground cover between the source and the receiver.

Numerous methods have been developed to measure sound over a period of time. These methods include: 1) the Community Noise Equivalent Level (CNEL); 2) the Equivalent Sound Level (Leq); and 3) Day/Night Average Sound Level (Ldn). These methods are described below.

COMMUNITY NOISE EQUIVALENT LEVEL (CNEL)

The predominant community noise rating scale used in California for land use compatibility assessments is the Community Noise Equivalent Level (CNEL). The CNEL reading represents the average of 24 hourly readings of equivalent levels, known as Leq's, based on an A-weighted decibel with upward adjustments added to account for increased noise sensitivity in the evening and night periods. These adjustments are +5 dBA for the evening, 7:00 PM to 10:00 PM, and +10 dBA for the night, 10:00 PM to 7:00 AM. CNEL may be indicated by "dBA CNEL" or just "CNEL".

Leq

The Leq is the sound level containing the same total energy over a given sample time period. The Leq can be thought of as the steady sound level which, in a stated period of time, would contain the same acoustic energy as the time-varying sound level during the same period. Leq is typically computed over one, eight and 24-hour sample periods.

DAY NIGHT AVERAGE (LDN)

Another commonly used method is the day/night average level or Ldn. The Ldn is a measure of the 24-hour average noise level at a given location. It was adopted by the U.S. Environmental Protection Agency (EPA) for developing criteria for the evaluation of community noise exposure. It is based on a measure of the average noise level over a given time period called the Leq. The Ldn is calculated by averaging the Leq's for each hour of the day at a given location after penalizing the "sleeping hours" (defined as 10:00 PM to 7:00 AM) by 10 dBA to account for the increased sensitivity of people to noises that occur at night. The maximum noise level recorded during a noise event is typically expressed as Lmax. The sound level exceeded over a specified time frame can be expressed as Ln (i.e., L90, L50, L10, etc.). L50 equals the level exceeded 50 percent of the time, L10 10 percent of the time, etc.

NOISE ATTENUATION

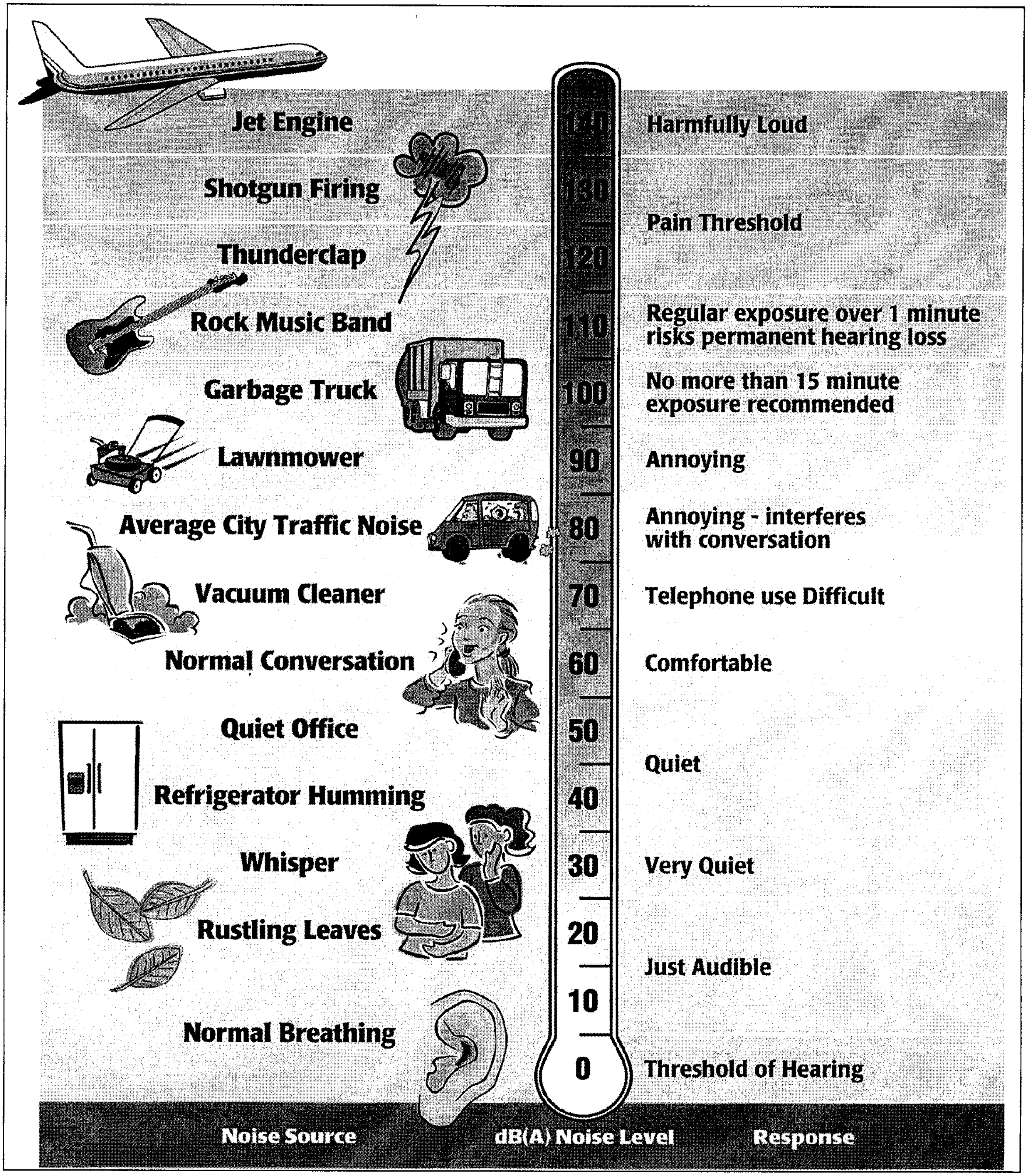
Noise barriers provide approximately a five dBA noise reduction (additional reduction may be provided with a barrier of appropriate height, material, location and length). A row of buildings provides up to five dBA noise reduction with a 1.5 dBA reduction for each additional row up to a maximum reduction of approximately 10 dBA. The exact degree of noise attenuation depends on the nature and orientation of the structure and intervening barriers.

LAWS, ORDINANCES, REGULATIONS AND STANDARDS

It is difficult to specify noise levels that are generally acceptable to everyone. What is annoying to one person may be unnoticed by another. Standards may be based on documented complaint activity in response to documented noise levels, or based on studies on the ability of people to sleep, talk, or work under various noise conditions. All such studies, however, recognize that individual responses vary considerably. Standards usually address the needs of most of the general population.

STATE OF CALIFORNIA GUIDELINES

The California Environmental Quality Act (CEQA) was enacted in 1970 and requires that all known environmental effects of a project be analyzed, including environmental noise impacts. Under CEQA, a project has a potentially significant impact if the project exposes people to noise levels in excess of standards established in the local general plan or noise ordinance. Additionally, under CEQA, a project has a potentially significant impact if the project creates a substantial increase in the ambient noise levels in the project vicinity above levels existing without the project. If a project has a potentially significant impact, mitigation measures must be considered. If mitigation measures to reduce the impact to less than significant are not feasible due to economic, social, environmental, legal, or other conditions, the most feasible mitigation measures must be considered.



Sources: Melville C. Branch and R. Dale Beland, *Outdoor Noise in the Metropolitan Environment*, 1970.
Environmental Protection Agency, *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004)*, March 1974.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Sound Levels and Human Response

Exhibit 5.5-1

California Government Code

California Government Code Section 65302 (f) mandates that the legislative body of each county and city adopt a noise element as part of their comprehensive General Plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services as shown in Table 5.5-1, *LAND USE COMPATIBILITY FOR COMMUNITY NOISE ENVIRONMENTS.*

Table 5.5-1
CALIFORNIA LAND USE COMPATIBILITY NOISE GUIDELINES

Land Use Category	Community Noise Exposure (In Terms Of CNEL)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential - Low Density, Single-Family, Duplex, Mobile Homes	50 – 60	55 - 70	70-75	75-85
Residential - Multiple Family	50 – 65	60 - 70	70 - 75	70 – 85
Transient Lodging - Motel, Hotels	50 – 65	60 - 70	70 - 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 - 70	70 - 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 - 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 - 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 - 75	72.5 - 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	NA	70 - 80	80 – 85
Office Buildings, Business Commercial and Professional	50 – 70	67.5 - 77.5	75 - 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 - 80	75 - 85	NA

Source: General Plan Guidelines, Office of Planning and Research, California, October 2003..

Notes:

NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

CONDITIONALLY ACCEPTABLE
New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but, but with closed windows and fresh air supply systems or air conditioning will normally suffice.

NORMALLY UNACCEPTABLE
New Construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

NA: Not Applicable

The guidelines rank noise-land use compatibility in terms of "normally acceptable", "conditionally acceptable" and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial and professional uses. In addition, the California Noise Insulation Standard (California Administrative Code, Title 25, Chapter 1, Subchapter 1, Article 4) requires that indoor noise levels in multi-family residences do not exceed a CNEL of 45 dBA.

LOCAL JURISDICTIONS

Local agencies may regulate noise levels of most sources not regulated by the Federal or State government. They may provide standards for insulation of noise receivers either within the structure or by placement of noise barriers such as walls; and, through land use decisions, may reduce noise impacts by separating noise generators from noise sensitive uses. To provide a satisfactory noise environment and to minimize complaints about community noise, the local jurisdictions have adopted standards for evaluating the compatibility of land uses with respect to outdoor and certain indoor noise levels. The purpose of the land use compatibility analysis is to screen projects that may require specific design considerations to mitigate noise impacts.

City of Huntington Beach

The City of Huntington Beach has adopted noise objectives and policies in its General Plan. These noise objectives and policies pertain to land use impacts, mobile noise sources, and stationary noise sources. The City of Huntington Beach has also adopted a Noise Ordinance (Chapter 8.40 of the Huntington Beach Municipal Code), which identifies exterior and interior noise standards, specific noise restrictions, exemptions, and variances for sources of noise within the city. The Noise Ordinance applies to all noise sources with the exception of any vehicle that is operated upon any public highway, street or right-of-way, or to the operation of any off-highway vehicle, to the extent that it is regulated in the State Vehicle Code, and all other sources of noise that are specifically exempted. The City's exterior noise standards are identified in Table 5.5-2, CITY OF HUNTINGTON BEACH NOISE ORDINANCE EXTERIOR NOISE STANDARDS. Table 5.5-3, CITY OF HUNTINGTON BEACH NOISE ORDINANCE INTERIOR NOISE STANDARDS, identifies the City's interior noise standards and prohibited interior noise levels.

In both cases, if the ambient noise level is greater than the identified noise standards, the noise standard becomes the ambient noise level without the offending noise. The Noise Ordinance exempts noise sources associated with construction activities from the City's exterior and interior noise standards provided that a permit has been obtained from the City and that the construction activities do not occur between the hours of 8:00 PM and 7:00 AM on weekdays and Saturdays, or at any time on Sundays or federal holidays.

City of Costa Mesa

The City of Costa Mesa maintains a comprehensive Noise Ordinance which sets standards for noise levels citywide and provides the means to enforce the reduction of obnoxious or offensive noises. The basic noise standards outlines the typical land use compatibility standards of 65 CNEL for exterior areas and 45 CNEL for interior areas. The City of Costa Mesa limits the hours of construction activities from 7:00 AM to 8:00 PM, Monday through Friday and from 8:00AM to 6:00 PM on Saturday.

City of Irvine

The City of Irvine treats construction noise separately in the City's noise ordinance because it does not represent a chronic, permanent noise source. To limit the potential nuisance from construction noise, especially for adjacent noise-sensitive receptors, the City of Irvine Noise Ordinance (Section 6-8-205 of the Municipal Code) limits the hours of construction activities from 7:00 AM to 7:00PM, Monday through Friday and from 9:00 AM to 6:00 PM on Saturday. Compliance with the City's noise ordinance of limiting construction activities to those hours indicated in the Municipal Code would reduce construction noise impacts a less than significant level. Additional "standard" conditions such as maintaining mufflers in good condition and placing construction staging areas as far from sensitive receptors would further reduce any construction related noise impact.

Table 5.5-2
CITY OF HUNTINGTON BEACH NOISE ORDINANCE EXTERIOR NOISE STANDARDS

Noise Zone	Land Uses	Noise Level	Time Period
1	All Residential Properties	55 dBA Leq 50 dBA Leq	7 AM to 10 PM 10 PM to 7 AM
2	All Professional Office and Public Institutional Properties	55 dBA Leq	Anytime
3	All Commercial Properties Except Professional Office	60 dBA Leq	Anytime
4	All Industrial Properties	70 dBA Leq	Anytime

Exterior Noise Levels Prohibited:
It shall be unlawful for any person at any location within the incorporated area of the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured on any residential, public institutional, professional, commercial or industrial property, either within or without the City, to exceed the applicable noise standards:
(a) For a cumulative period or more than thirty (30) minutes in any hour;
(b) Plus 5 dBA for a cumulative period of more than fifteen (15) minutes in any hour;
(c) Plus 10 dBA for a cumulative period of more than five (5) minutes in any hour;
(d) Plus 15 dBA for a cumulative period of more than one (1) minute in any hour; or
(e) Plus 20 dBA for any period of time.
In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Source: City of Huntington Beach.

Table 5.5-3
CITY OF HUNTINGTON BEACH NOISE ORDINANCE INTERIOR NOISE STANDARDS

Noise Zone	Land Uses	Noise Level	Time Period
1	All Residential Properties	55 dBA Leq 45 dBA Leq	7 AM to 10 PM 10 PM to 7 AM
2,3,4	All Professional Office, Public Institutional, Commercial, and Industrial Properties	55 dBA Leq	Anytime

Interior Noise Levels Prohibited:
It shall be unlawful for any person at any location within the incorporated area of the City to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level when measured within any other structure on any residential, public institutional, professional, commercial or industrial property to exceed:
(a) The noise standard for a cumulative period or more than five (5) minutes in any hour;
(b) The noise standard plus 5 dBA for a cumulative period of more than one (1) minutes in any hour; or
(c) The noise standard plus 10 dBA for any period of time.
In the event the ambient noise level exceeds any of the first two noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

Source: City of Huntington Beach.

County of Orange

As mandated by the California Government Code, the County of Orange has adopted a noise element as a component of the County of Orange General Plan. The County of Orange Noise Element is administered by the Orange County Planning Division of the Resources and Development Management Department (RDMD) and applies to all unincorporated portions of the County. The Noise Element establishes noise criteria to ensure that each county resident's quality of life is not adversely affected by high noise levels. In general, all outdoor living areas are compatible with noise levels less than CNEL 65 dBA. Similarly, indoor living spaces are compatible with interior noise levels less than CNEL 45 dBA.

The County of Orange has also adopted a noise ordinance. The intent of the County of Orange Noise Ordinance is to control unnecessary, excessive, and annoying sound emanating from unincorporated areas of the County. Section 4-6-7 of the County's Noise Ordinance provides exemptions to the County's noise standards. It specifies that noise sources associated with construction activity are prohibited between the hours of 8:00 PM and 7:00 AM on weekdays, including Saturday or at any time on Sunday or a Federal holiday.

EXISTING CONDITIONS

PROPOSED DESALINATION FACILITY SITE

Noise Environment

The primary noise sources in the project vicinity include commercial and industrial uses, as well as noise from adjacent local roadways. Both mobile and stationary noise sources contribute to the existing noise levels at the project site. Mobile noise sources consist mainly of car and truck traffic, with high volumes of traffic along Pacific Coast Highway, Magnolia Street, and Beach Boulevard (located west of the subject site). Stationary noise sources within the site vicinity include the AES Huntington Beach Generating Station (HBGS) and commercial/industrial uses located to the north along Edison Avenue and Hamilton Avenue.

Noise Sensitive Receptors

Land uses considered sensitive receptors to noise include residential areas, schools, hospitals, churches, recreational areas, office buildings and transient lodging. The site is located adjacent to primarily commercial/industrial uses. Although no residential uses exist on the proposed project site, the Ascon/Nesi Landfill (located northeast of the site) is designated for residential uses, and two contiguous mobile home parks are situated west of the subject site along the inland side of Pacific Coast Highway. Additional residential uses surround the site to the north and east. Edison Community Center exists north of the project site along the northern side of Hamilton Avenue, while Edison High School is situated northeast of the site at the intersection of Hamilton Avenue and Magnolia Street. An open space area, Huntington State Beach, and Huntington City Beach are situated south and southwest of the subject site along Pacific Coast Highway.

Existing Noise Levels

Existing ambient noise levels were measured on-site, at nearby surrounding sensitive receptors and along the proposed water delivery pipeline alignments including the underground pump stations. Noise monitoring equipment used for the ambient noise survey consisted of a Larson Davis Laboratories Model LDL 820 sound level analyzer equipped with a Larson Davis Type 2561 microphone. The instrumentation was calibrated prior to use with a Larson Davis CAL 250 acoustical calibrator to ensure the accuracy of the measurements, and complies with applicable requirements of the American National Standards Institute (ANSI) for Type I (precision) sound level meters. The accuracy of the calibrator is maintained through a program established by the manufacturer, and is traceable to the National Bureau of Standards. All instrumentation meets the requirements of ANSI S1.4-1971. The Leq, Lmax, and source of peak noise for each reading is shown below in Table 5.5-4, *EXISTING ON-SITE AND SURROUNDING AMBIENT NOISE LEVELS* and Table 5.5-5, *EXISTING OFF-SITE PIPELINE/PUMP STATION AMBIENT NOISE LEVELS.*

OFF-SITE PIPELINE ALIGNMENT AND UNDERGROUND PUMP STATIONS

Proposed Pipeline Alignment

The proposed water delivery pipeline would be up to approximately ten miles in length, extending from the proposed desalination facility to the OC-44 water transmission line within the City of Costa Mesa, east of State Route 55 (SR-55) at the intersection of Del Mar Avenue and Elden Avenue. The majority of the pipeline alignment will occur within existing public streets, easements, or other rights-

Table 5.5-4
EXISTING ON-SITE AND SURROUNDING AMBIENT NOISE LEVELS

LOCATION OF NOISE READING	Leq db(A)	Lmax db(A)	PEAK NOISE (Source, db(A))
ON-SITE NOISE LEVELS[1]			
Northwest Portion of Site	54.8	64.5	Airplane – 95.2
Northeast Portion of Site	56.2	70.8	Truck – 98.6
Southwest Portion of Site	60.1	69.4	Helicopter – 94.1
Southeast Portion of Site	57.8	63.7	Airplane – 91.4
SURROUNDING NOISE LEVELS[2]			
Huntington State Beach, adjacent to project site.	51.8	59.9	NA
Corner of Kiowa Lane and Aloha Drive	52.6	52.9	NA
Linear park adjacent to Seaforth Lane and Hamilton Avenue	55.7	64.7	Truck
Cabrillo Mobile Home Park	64.7	75.9	Airplane

[1] Measurements recorded on 4/24/02.
[2] Measurements recorded on 11/11/2004

Table 5.5-5
EXISTING OFF-SITE PIPELINE/PUMP STATION AMBIENT NOISE LEVELS

LOCATION OF NOISE READING	Leq db(A)	Lmax db(A)	PEAK NOISE (Source, db(A))
Brookhurst Street/Adams Avenue Intersection (Primary Alignment)	73.9	86.6	Automobile Horn
Harbor Boulevard/Fair Drive Intersection (Primary Alignment)	73.2	85.1	Bus
Hamilton Avenue/Bushard Street Intersection (Alternative Alignment)	71.0	86.3	Truck
Victoria Street/Placentia Avenue Intersection (Alternative Alignment)	72.6	84.3	Automobile
Del Mar Avenue/Elden Avenue Intersection (terminus of both pipeline alignments)	67.7	78.5	Automobile
OC-44 Booster Pump Station	43.9	63.7	Wildlife
Coastal Junction Booster Pump Station	58.4	71.2	Automobile

* Measurements recorded on 4/12/02 (with the exception of the Coastal Junction Pump Station, which was recorded on 2/22/05). As surrounding conditions (land uses and traffic) of each noise reading location have remained consistent since 2002, ambient noise conditions would remain relatively unchanged to present date.

of-way (ROW) in urbanized areas. Although precise pipeline alignments may be modified during final engineering analyses, the conceptual pipeline alignments are shown in Exhibit 3-3, *CONCEPTUAL PIPELINE ALIGNMENTS.*

Portions of the pipeline alignments are proposed to be installed within areas of the Costa Mesa Country Club (Costa Mesa) and Fairview State Hospital (Costa Mesa).

OC-44 Booster Pump Station

The OC-44 underground booster pump station is proposed to be located within an area of unincorporated Orange County, approximately 1.5 miles south of the University of California, Irvine., and 0.5 mile north of the San Joaquin Reservoir. The proposed OC-44 booster pump station site is surrounded by open space to the north, open space and residential to the east, two existing underground pump stations, open space, and residential to the west, and open space to the south. It should be noted that the proposed pump station site is located adjacent to (but not within) a Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) area.

The pump would be electrically powered and would be placed underground within an Orange County Resource Preservation Easement, in an area adjacent to open space and residential uses.

Coastal Junction Booster Pump Station

The Coastal Junction underground booster pump station is proposed within the parking lot of St. Paul's Greek Orthodox Church within the City of Irvine, located at 4949 Alton Parkway. The underground pump station would be constructed within the north/northwestern portion of the church parking lot, in an area used for both parking and volleyball activities. The footprint of the proposed underground pump station would be approximately 100 feet by 100 feet, and would require a construction easement of 125 feet by 125 feet. The Coastal Junction pump station site is surrounded by the St. Paul's Church to the south, the Woodbridge Village Association to the west, an apartment complex to the east, and open space to the north. Refer to Table 5.5-5, *EXISTING OFF-SITE PIPELINE/PUMP STATION AMBIENT NOISE LEVELS*.

In general, ambient noise levels were lowest at the desalination facility site, nearby surrounding sensitive receptors, and the OC-44 off-site underground pump station facility. Ambient noise levels were higher along the two off-site water transmission pipeline alignments, with an average Leq of 71.7, due to automobile traffic along the proposed pipeline alignments.

IMPACTS

Significance Criteria

Appendix G of the CEQA Guidelines contains analysis guidelines related to the assessment of noise impacts. These guidelines have been utilized as thresholds of significance for this analysis. As stated in Appendix G, a project may create a significant environmental impact if one or more of the following occurs:

- Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive ground borne vibration or ground borne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels; and
- For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels.

SIGNIFICANCE OF CHANGES IN AMBIENT NOISE LEVELS

A project is considered to have a significant noise impact where it causes an adopted noise standard to be exceeded for the project site or for adjacent sensitive receptors. In addition to concerns regarding the absolute noise level that might occur when a new source is introduced into an area, it is also important to consider the existing noise environment. If the existing noise environment is quiet and the new noise source greatly increases the noise exposure, even though a criterion level might not be exceeded, an impact may occur. Lacking adopted standards for evaluating such impacts, general considerations for community noise environments are that a change of over 5 dBA is readily noticeable and, therefore, is considered a significant impact (refer to Table 5.5-6, *SIGNIFICANCE OF CHANGES IN CUMULATIVE NOISE EXPOSURE*). In areas where the ambient noise level without project is between 60 – 65 dBA, some individuals may notice an increase to the ambient noise level of greater than three dBA. Changes in community noise levels by one dBA or more in areas where the ambient noise level is greater than 65 dBA is considered a significant impact because the increase would contribute to an existing noise deficiency.

Table 5.5-6
SIGNIFICANCE OF CHANGES IN CUMULATIVE NOISE EXPOSURE

Ambient Noise Level Without Project (Ldn or CNEL)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels by:
< 60 dBA	+ 5.0 dBA or more
60 - 65 dBA	+3.0 dBA or more
> 65 dBA	+1.0 dBA or more
Sources: FICON, FHWA, and Caltrans as applied by Brown-Buntin Associates, Inc., 1997.	

For a discussion of short-term, construction-related noise impacts, refer to Section 5.9, *CONSTRUCTION RELATED IMPACTS*.

LONG-TERM STATIONARY SOURCES

Proposed Desalination Facility Site

The proposed project involves the implementation of a 50 mgd desalination facility on a site currently occupied by an existing fuel oil storage tank facility. The project site exists within an industrial area, with the HBGS and Pacific Holdings tank farm located in the project vicinity. The primary noise sources would be the feedwater pump area, water supply pumps, workshop and storage buildings, control room, transformers and power control centers. The pump systems would be the most significant noise source at the subject site. High flow, high-head pumps are typically driven by an electric motor and produce broadband noise without strong tonal components. This noise source is omnidirectional and continuous during facility operation.

A total of 36 large electric water pumps are proposed on-site (33 operating continuously and three standby pumps), the largest of which would be utilized indoors. A total of 12 400-horsepower pumps and 12 3,500 horsepower pumps would be operated indoors (reverse osmosis feed pumps and pretreatment transfer pumps), while four 250-horsepower pumps and five 500-horsepower pumps would be operated outdoors (seawater intake pumps, and product water transfer pumps). All indoor pumps would be fully enclosed within the proposed reverse osmosis building. The amount of noise radiated from the wall surfaces and ventilation system of any given pump housing is controllable over a reasonably wide range. The predicted noise levels of the combined indoor and combined outdoor pump systems is illustrated in Table 5.5-7, *PREDICTED PUMP SYSTEM NOISE LEVELS AT THREE FEET*. These assumed noise levels are for steady-state, base load operations, and exclude startups, shutdowns, and off-normal or emergency conditions.

By accounting for standard attenuation from the pump housing components and the reverse osmosis building, the combined sound levels of the pretreatment transfer and reverse osmosis pumps would be reduced by 20 dBA.[1] Additionally, the outdoor intake and product water pumps would be enclosed in underground vaults. Thus, noise emanating from these devices would be negligible. Thus, the major source of noise from the project site would be random incident noise (i.e., maintenance activities, worker activities) and noise from the reverse osmosis building. Assuming a worst case scenario of all of the pumps operating at full capacity within the reverse

1 ANSI S1.31, *Precision Methods for the Determination of Sound Power Levels of Broadband Noise Sources in Reverberation Rooms.*

osmosis building with standard attenuation, the combined sound level would be 100.3 dBA at the edge of the building.

Table 5.5-7
PREDICTED PUMP SYSTEM NOISE LEVELS AT THREE FEET

Condition	250 hp Pump[1]	400 hp Pump[2]	500 hp Pump[3]	3,500 hp Pump[4]	Combined Sound Level[5]
Indoor Pumps (Pretreatment and Reverse Osmosis Pumps)					
# of Pumps in Operation	0	12	0	12	120.3 dBA
Outdoor Pumps (Feedwater and Product Water Pumps)					
# of Pumps in Operation	4	0	5	0	105.3 dBA

Notes:
1 – Assumes overall sound Power (dB) of 88 dBA at 3 feet.
2 – Assumes overall sound Power (dB) of 98 dBA at 3 feet.
3 – Assumes overall sound Power (dB) of 98 dBA at 3 feet.
4 – Assumes overall sound Power (dB) of 109 dBA at 3 feet.
5 – Combined sound Level based on the following formula: $dB_c = 10\ _{log}10\ (10\ ^{\wedge(dBA1/10)} + \ldots\ldots + 10^{\wedge(dBAn/10)})$

Source: L.N. Miller, et. al., *Electric Power Plant Environmental Noise Guide*, 1984.

The reverse osmosis building is the on-site facility that could potentially generate the most noise. The noise level at the nearest sensitive receptor to the reverse osmosis building was calculated from each source using the Inverse Square Law of Noise Propagation. Briefly, this formulation states that noise decreases by approximately six dBA with every doubling of the distance from the source. This methodology is an accurate assessment of noise propagation and is represented as:

$$L_2 = L_1 - 20 \log (R_2/R_1)$$

where:

L_2 = Noise level at a selected distance R_2 from the source.
L_1 = Noise level measured at a distance R_1 from the source.

<u>Reverse Osmosis Building Noise</u>

L_1 = 100.3 dBA
R_1 = three feet
R_2 = 1,000 feet to nearest residential uses west of the subject site

The nearest residential uses to the reverse osmosis building are approximately 1,000 feet west. Based on the Inverse Square Law of Propagation, the noise levels at this distance would be 49.8 dBA. When accounting for existing intervening structures (power plant facilities, tanks, etc.) and features (berms), the anticipated noise level of 49.8 dBA would be further reduced.

The noise emissions of all major facility components during normal base load operation are typically limited by specifying equipment parameters to the vendors of the allowable sound power levels developed in the noise mode. The method for achieving the level required for each element and its physical details would be developed in parallel with the overall detailed design of the desalination facility. In general, all prepackaged components would be purchased under the condition that the noise limit stated in the technical specification would be met and guaranteed by the manufacturers. Special attention would be given to sources that tend to be tonal in nature to ensure that any tones are sufficiently attenuated. As shown above, noise levels from the desalination facility would not exceed 50.0 dBA at the nearest residential uses. In addition, prior to construction of the reverse osmosis building, a detailed acoustical analysis would be performed for the project to insure that noise levels at the HBGS property line do not exceed the City's Industrial noise standard of 70.0

dBA. Methods to further reduce noise levels from the reverse osmosis building include double walls, sound absorbing materials, acoustic barriers, sound control curtains, and sound baffles. Therefore, operational noise from the desalination facility would not have a significant impact in this regard.

Mobile Sources

The proposed project would generate a nominal amount of noise resulting from mobile sources as a result of employee trips and truck-generated traffic. As stated previously, the proposed desalination facility would employ a total of approximately 18 people, with an average of five to seven people on-site per shift on weekdays. In addition, facility operation would require a maximum of four truck trips per day for solid waste disposal and chemical delivery. Noise generated by mobile sources as a result of the proposed desalination facility is anticipated to be less than significant.

Off-Site Pipelines and Underground Pump Stations

Proposed Pipeline Alignment

The proposed product water pipelines would occur entirely underground. Upon completion of construction, these pipelines would not generate noise. As such, noise impacts due to long-term pipeline operations would not be significant.

OC-44 Booster Pump Station

The OC-44 pumping station is proposed to be located underground within an unincorporated area of the County of Orange, along the eastern border of the City of Newport Beach, approximately 1.5 miles south of the University of California, Irvine. The site is within an Orange County Resource Preservation Easement, but outside of the NCCP/HCP area, approximately 0.5-mile north of the San Joaquin Reservoir, where the East Orange County Feeder Number Two and the OC-44 transmission pipelines converge. The OC-44 underground booster pump station would include pumps, a surge tank to protect the distribution system from sudden pressure changes, telemetry equipment, appurtenances, and three diesel powered electrical generators for emergency back-up purposes. These generators would be Caterpillar Model 3516 units or similar equipment and would supply approximately seven megawatts of emergency power for adequate operation of the pump station (in regards to flow and pressure). These diesel-powered generators would require an 8,700-gallon diesel fuel storage tank (assuming a 24-hour emergency period), with a diameter of eight feet and a depth of 26 feet. The booster pump station would be placed entirely underground to maintain the natural character of the surrounding resource preservation easement.

The pump that would be used is a vertical turbine pump. The pump would be less than 500 hp and produce noise levels of approximately 88 dBA at three feet from the source. As the booster pump would both be located underground and contain an adequate amount of acoustical shielding, it is unlikely to emit noise levels in excess of County of Orange codes. Additionally, as the pumps would be placed underground, the off-site underground booster pump station is not anticipated to adversely affect the NCCP/HCP area along the eastern border of the City of Newport Beach. Impacts in this regard are not anticipated to be significant.

Coastal Junction Booster Pump Station

A second underground booster pump station is proposed within the parking lot of St. Paul's Greek Orthodox Church within the City of Irvine, located at 4949 Alton Parkway. The underground pump station would be constructed within the north/northwestern portion of the church parking lot, in an area used for both parking and volleyball activities. The booster pumping station would be placed entirely underground to maintain the appearance and functionality of the existing parking lot.

The underground booster pump station would include pumps, telemetry equipment, appurtenances, and one diesel powered electrical generator for emergency back-up purposes. This generator would be a Caterpillar Model 3516 unit or similar equipment and would supply approximately seven megawatts of emergency power for adequate operation of the pump station (in regards to flow and pressure). This diesel-powered generator would require a 1,300 gallon diesel fuel storage tank (assuming a 24-hour emergency period), with a diameter of six feet and a depth of 15 feet.

Similar to the OC-44 booster pump station, the pump that would be used is a vertical turbine pump. The pump would be less than 500 hp and produce noise levels of approximately 88 dBA at three feet from the source. As the booster pump would both be located underground and contain an adequate amount of acoustical shielding, it is unlikely to emit noise levels in excess of City of Irvine codes. Impacts in this regard are not anticipated to be significant.

MITIGATION MEASURES

LONG TERM STATIONARY NOISE SOURCES

Proposed Desalination Facility Site

NOI-1 Prior to the issuance of any building or grading permits, the Applicant shall prepare an acoustical analysis report and appropriate plans, prepared under the supervision of a City-approved acoustical consultant, describing the stationary noise generation potential and noise mitigation measures (such as the installation of double walls, sound absorbing materials, acoustic barriers, sound control curtains, and sound baffles), if needed, which shall be included in the plans and specifications of the project. All stationary equipment shall be designed to insure that noise levels at the HBGS property line do not exceed the City's Industrial noise standard of 70.0 dBA and will be subject to the approval of the City of Huntington Beach.

Off-Site Pipelines and Booster Pump Stations

None required upon compliance with local noise standards.

MOBILE SOURCES

None required.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

5.6 PUBLIC SERVICES AND UTILITIES

Public services include services such as fire protection, police protection, schools, libraries and parks. Utilities include wastewater, water, solid waste, electricity, gas, telephone, and cable. The purpose of this section is to establish existing conditions for each provider, identify potentially significant impacts and recommend mitigation measures to reduce the significance of such impacts. The primary question regarding utilities and services, relative to the CEQA process, is whether or not the project has any direct effect on the physical environment through impacts to existing facilities or the requirement to construct new facilities, particularly where such impacts would have an adverse impact on the environment. Information in this section is based on the City of Huntington Beach General Plan, City of Huntington Beach General Plan EIR, and correspondence from public service and utilities agencies (refer to Appendix J, CORRESPONDENCE).

EXISTING CONDITIONS

Fire Service

The City of Huntington Beach Fire Department operates a total of eight fire stations within the City, including:

- Station 1 (Gothard Station), located at 18311 Gothard Street;
- Station 2 (Murdy Station), located at 16221 Gothard Street;
- Station 3 (Bushard Station), located at 19711 Bushard Street;
- Station 4 (Magnolia Station), located at 21441 Magnolia Avenue;
- Station 5 (Lake Station), located at 530 Lake Street;
- Station 6 (Edwards Station), located at 18590 Edwards Street;
- Station 7 (Warner Station), located at 3831 Warner Avenue; and
- Station 8 (Heil Station), located at 5890 Heil Avenue.

The fire stations serving the project vicinity are Stations 3, 4, and 5. The fire station nearest the project site is Station 4 (Paramedic Engine Company, staff of four), located at 21441 Magnolia Street approximately 0.5 miles from the subject site. Fire Station 3 (Paramedic Engine Company, staff of four) is located at 19711 Bushard Street approximately three miles from the site. Station 5, situated approximately 2.5 miles from the project site, is composed of a Paramedic Engine Company (staff of four), 95-foot aerial ladder (staff of four), and one ambulance (staff of two Emergency Medical Technicians). The average response times to the project site are four minutes from Station 4 and six to seven minutes from Stations 3 and 5. The current Insurance Services Office (ISO) rating of the site is ISO Class I.[1]

Police Service

The proposed project site is served by the City of Huntington Beach Police Department, which operates through one central police station and two smaller substations. Facilities and their locations are as follows:

- Police Headquarters, located at 2000 Main Street;
- Oakview Center Substation, located at 17483 Beach Boulevard, Suite B; and
- Downtown Substation, located at 204 Fifth Street;

The Police Headquarters facility, located at 2000 Main Street, serves the entire City population of approximately 200,000 residents spread over 28 square miles. Average emergency response times

1 Letter, Fire Marshall Eric Engberg, City of Huntington Beach Fire Department, December 6, 2004.

are approximately four minutes. Approximately two to four officers per shift serve the project site vicinity at any one time.[2] The nearest police facility to the project is the Downtown Substation, situated approximately two miles northwest of the subject site.

Schools

The proposed project site is within the jurisdiction of the Huntington Beach Union High School District and the Huntington Beach City School District. The Huntington Beach Union High School District currently has a total of nine facilities within the Cities of Huntington Beach, Westminster, and Fountain Valley. The high school nearest the subject site is Edison High School, located approximately 0.8 miles to the northeast at 21400 Magnolia Avenue. Edison High School had an actual enrollment of 2,344 students for the fall of 2004.[3]

The Huntington Beach City School District has a total of 12 facilities within the City of Huntington Beach. Ten facilities are active schools, while two are currently inactive. The elementary schools nearest the proposed desalination project site are William E. Kettler Elementary School, located at 8750 Dorsett Drive, and John H. Eader Elementary School, located at 9291 Banning Avenue. Both schools are situated approximately 1.5 miles from the desalination facility site. Also in the project vicinity is Isaac Sowers Middle School, located approximately two miles from the desalination facility site at 9300 Indianapolis Avenue. William E. Kettler Elementary has an enrollment of 434 students, John H. Eader Elementary has an enrollment of 563 students, and Isaac Sowers Middle has an enrollment of 1,257 students.[4]

Libraries

The Huntington Beach Library System consists of five facilities, including:

- Huntington Central Library and Cultural Center, located at 7111 Talbert Avenue;
- Graham Branch Library, located at 15882 Graham Street;
- Oakview Branch Library, located at 17251 Oak Lane;
- Banning Branch Library, located at 9281 Banning Avenue; and
- Main Street Branch Library, located at 525 Main Street.

The Banning Branch Library serves the project vicinity and is located approximately two miles northwest of the subject site. The Banning Branch Library is a small facility and is approximately 2,400 square feet in size. This facility has on average 214 visitors per day and holds 24,197 volumes.[5]

Roadway Maintenance

The City of Huntington Beach Public Works Department provides roadway maintenance to the City of Huntington Beach. The Department performs regular maintenance on City-owned roadways in the form of re-paving, pothole/curb repairs, and striping, as well as roadway widenings, expansions, and improvements. The City of Huntington Beach Public Works Department recently conditioned the widening of both Newland Street (located west of the subject site) and Edison Avenue (situated north of the subject site). The applicant would be required to complete improvements along the southern side of Edison Avenue as a condition of approval for the project, while the City would be

[2] Letter, Lieutenant Tom Donnelly, City of Huntington Beach Police Department, November 18, 2004.

[3] Letter, Ms. Patricia Koch, Huntington Beach Union High School District, November 28, 2004.

[4] Letter, Mr. Richard Masters, Huntington Beach City School District, December4, 2004.

[5] City of Huntington Beach General Plan, Public Facilities and Public Services Element, May 13, 1996.

responsible for street improvements along Newland Street with the applicant responsible for paying their fair share and completing the landscaping improvements adjacent to their site. For more information refer to the "*IMPACTS*" section below.[6]

Parks and Recreation

The City of Huntington Beach contains 71 parks with a total area of 577.28 acres. The City's park system includes six mini-parks totaling 2.7 acres, 58 neighborhood parks totaling 157.39 acres, seven community parks totaling 143.28 acres, and two regional parks (Huntington Central Park and Blufftop Park) encompassing 376 acres. Other recreational opportunities within the City include two publicly owned golf courses, Huntington Beach City Gym and Pool, Oak View Center, various bikeways, and approximately two miles of equestrian trails. The City's coastal recreational facilities include the Huntington Beach Municipal Pier, various beach parks, recreational vehicle (RV) camping, and Huntington Harbor (a popular boating area).[7] The recreational facilities nearest the project site are Edison Community Center, Huntington State Beach, and Huntington City Beach, all of which are located within a radius of approximately 0.5 miles. It should also be noted that the City of Huntington Beach is planning to coordinate with the County of Orange to examine the feasibility of a landscaped riding/hiking trail along the Huntington Beach Channel, adjacent to the subject site. The proposed location and points of connection for the trail would be refined during the planning process for the trail.

Wastewater

The Orange County Sanitation District (OCSD) and the City of Huntington Beach Public Works Department, Utilities Division provides sanitation treatment and sewerage services for the City of Huntington Beach. Presently, 98 percent of the City is connected to the sewer system while the remainder uses septic tanks. The two wastewater treatment plants serving the City of Huntington Beach, Plant 1 and Plant 2, perform primary and secondary treatment procedures and are operated by the OCSD. OCSD Plant 2 would likely serve the proposed project. Within the City, the wastewater system is comprised of major trunk lines, smaller feeder lines, and lift stations. The OCSD has developed engineering plans for plant improvements anticipated to meet the needs of the City to the year 2050.[8]

The nearest City sewer line is an eight-inch line located north of the project site running along the southern side of the Huntington Beach Channel operated by OCFCD in an east-west direction.[9] A 48-inch Orange County Sanitation District (OCSD) trunk line exists along Newland Street, an 84-inch line exists within Pacific Coast Highway, and a 78-inch line is situated within Magnolia Street. OCSD lines also traverse and exist adjacent to the various proposed pipeline alignment alternatives associated with the seawater desalination project.[10] An additional private sewage system is located on the HBGS property, which flows by gravity to an on-site sewage ejector station and is conveyed to OCSD for treatment.

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6 Letter, Terri Elliot/Duncan Lee, City of Huntington Beach Public Works Department, December 1, 2004.

7 City of Huntington Beach General Plan, Recreation and Community Services Element, May 13, 1996.

8 City of Huntington Beach General Plan, Utilities Element, May 13, 1996.

9 Letter, Duncan Lee, Principal Civil Engineer, City of Huntington Beach Public Works Department, December 1, 2004.

10 Map provided by Angie Anderson, Orange County Sanitation District, September 6, 2001.

Storm Water Drainage

The OCFCD and the City of Huntington Beach Public Works Department operate the storm water drainage system within the City of Huntington Beach. The storm drainage system removes water runoff from streets and transports the runoff to the ocean. The OCFCD owns, operates, maintains, and improves regional flood control facilities. The City of Huntington Beach owns and operates 15 storm drainage channel pumping stations, which pump the runoff water into the channels and to the ocean. No runoff from the project site is currently conveyed to the Pacific Ocean via City storm drainage facilities, as only OCFCD facilities provide service to the subject site. The closest storm channel near the project site is the OCFCD Huntington Beach storm channel (DO1) located to the north and east of the site, which confluences with the Talbert Channel (DO2) downstream and eventually flows into the Pacific Ocean.[11] Presently, the County and City are in the process of improving flood control facilities to accommodate higher levels of storm water.[12] The OCFCD has recently improved the Huntington Beach Channel (adjacent to the subject site) in the vicinity of the project site to obtain 100-year regional flood protection.[13]

Water

The Huntington Beach Utilities Division currently produces approximately 35,000 acre feet of potable water per year (afy), an average daily production of 48 cubic feet per second (cfs), and a maximum daily peak of 50 million gallons per day (mgd).[14, 15] Currently, 66 percent of the City's water is supplied by groundwater wells located within the City, while 34 percent is imported from the Metropolitan Water District (MWD). Facilities within the City of Huntington Beach consist of 480 miles of water lines (ranging from 2-inch to 42-inch in diameter), water booster pumps, and five reservoirs with a combined capacity of 55 million gallons.[16]

Distribution piping in the area consists of looped 12-inch diameter asbestos cement (AC) pipe within Hamilton Avenue, Magnolia Street, and Newland Street. Pipelines within Pacific Coast Highway consist of 10-inch and 12-inch AC pipe. As part of a service agreement, the HBGS recently completed a major modification, which includes distributing 10-and 12-inch piping around the entire HBGS property and the proposed project as well as relocating their meter service from Pacific Coast Highway to Newland Street.[17] The City is also in the process of siting a new water storage tank within a portion of the AES site (north of the subject site), to improve water service to the local water pressure zone.

Reclaimed Water

The City of Huntington Beach participated in the Green Acres project (GAP) in association with the OCSD and the Orange County Water District (OCWD). However, the City has only one Green

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11 Letter, R.S. Bavan, Manager, County of Orange Resources and Department Management Department, December 30, 2004.

12 City of Huntington Beach General Plan, Utilities Element, May 13, 1996.

13 Telephone conversation with Albric Ghokasian, OCFCD, November 23, 2004.

14 Letter, Todd Broussard/Duncan Lee, Principal Civil Engineer, City of Huntington Beach Public Works Department, December 1, 2004.

15 Note: Maximum daily peak demand was calculated as a worst-case scenario assuming peak water use plus two major fire events within the City.

16 City of Huntington Beach General Plan, Utilities Element, May 13, 1996.

17 Letter, Todd Broussard/Duncan Lee, Principal Civil Engineer, City of Huntington Beach Public Works Department, December 1, 2004.

Acres project connection, which has not taken water for years. The OCSD produces secondary treated water for the OCWD, where the water is further treated and is distributed for industrial use and landscape irrigation for the Cities of Fountain Valley, Santa Ana, Costa Mesa, and Newport Beach. In addition, the Ground Water Replenishment System (GWRS) is a major new reclamation project currently being developed by the OCSD and OCWD. At the present time, no reclaimed water conveyance facilities are available at or near the subject site, and it is not anticipated that the proposed desalination project would require the use of reclaimed water.[18]

Solid Waste

The County of Orange owns and operates three active landfills. Of the three active landfills, the Frank R. Bowerman Landfill in Irvine and the Alpha Olinda landfill in Brea are currently used in disposal of solid waste from the project site vicinity. The closest facility to the project is the Frank R. Bowerman landfill, which would I likely be the solid waste facility receiving waste from the proposed project site. Rainbow Disposal has been contracted by the City of Huntington Beach to provide solid waste collection services under a long-term contract. The City generates approximately 348,219 tons of solid waste per year, resulting from 52,220 tons of commercial waste, 155,625 tons of residential waste, and 140,374 tons of demolition/industrial waste.[19] The City is responsible for meeting the Assembly Bill 939 (AB 939) mandate of 50% disposal reduction by the start of 2000, and for preparing AB 939 solid waste planning documents. Rainbow Disposal currently transports City solid waste to a transfer station located within the City and then to either Frank R. Bowerman Landfill or Alpha Olinda Landfill.[20]

The California Integrated Waste Management Board requires that all counties have an approved Countywide Integrated Waste Management Plan (CIWMP), which requires sufficient solid waste disposal capacity for at least 15 years. The Orange County landfill system has capacity in excess of 15 years. Consequently, it may be assumed that adequate capacity for the project area is available for the foreseeable future. With regards to daily disposal limitations, the Frank R. Bowerman and Brea Olinda Landfills have been receiving refuse at rates near the maximum limit. As Orange County continues to develop, additional daily disposal demands upon County landfills may necessitate modifications to landfill permits, which would require separate discretionary review undertaken by the County of Orange.

Electricity

The Southern California Edison Company (SCE) currently provides electrical service to the City of Huntington Beach. Major facilities owned by SCE within the City include six substations, various transmission lines and switchyards (AES currently owns and operates a power plant within the City, located along Pacific Coast Highway west of Magnolia Street, adjacent to the project site). Currently, SCE service meets the City's demands for electricity.[21]

Gas

The City of Huntington Beach receives natural gas service from the Southern California Gas Company. The Gas Company receives natural gas from Southern California, Northern California, and out of state suppliers. The Gas Company has no immediate plans to update the existing

18 Letter, Duncan Lee, Principal Civil Engineer, City of Huntington Beach Public Works Department, December 1, 2004.

19 City of Huntington Beach General Plan, Utilities Element, May 13, 1996.

20 Letter, Ms. Sandra Jacobs, Rainbow Disposal Company, Inc., November 24, 2004.

21 City of Huntington Beach General Plan, Utilities Element, May 13, 1996.

equipment or to implement new technologies aside from the routine maintenance checks and replacements of deteriorating supply lines. The Gas Company is currently meeting present demands and can supply additional natural gas to the City, if required.[22]

Southern California Gas Company facilities within the project vicinity include pipelines along Newland Street (located west of the project site) and Edison Avenue and Hamilton Avenue (located north of the project site).[23]

Telephone and Cable Service

Verizon provides telephone service to the project vicinity. According to data provided by Verizon, telephone facilities in the project vicinity include lines located along Newland Street (located west of the project site), Edison Avenue (located north of the project site), and within HBGS property (located south of the project site).[24] Cable television service to the City of Huntington Beach is provided by Time Warner Communications. Existing facilities within the project vicinity are located along Newland Street, and are attached to existing SCE utility poles. There are no existing facilities within the proposed project boundaries.[25]

IMPACTS

Significance Criteria

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains the Initial Study Environmental Checklist form used during preparation of the project Initial Study. The issues presented in the Initial Study Checklist have been utilized as thresholds of significance in this Section. Accordingly, a significant impact to public services would occur if the project would result in:

- Substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:
  - Fire protection;
  - Police protection;
  - Schools;
  - Parks;
  - Other public facilities.
- An increase in the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the park would occur or be accelerated;

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22 City of Huntington Beach General Plan, Utilities Element, May 13, 1996.

23 Letters, Mr. Robert Warth, Southern California Gas Company, July 2, 2001 and November 19, 2004.

24 Letter, Mr. Tom Solano, Verizon, December 2, 2004.

25 Telephone conversation, Mr. Bill Jankowski, Time Warner Communications, December 2, 2004.

- The inclusion of recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment;
- An exceedance of wastewater treatment requirements of the applicable Regional Water Quality Control Board;
- The construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- The construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed;
- A determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments;
- Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs; and/or
- Comply with federal, state, and local statues and regulations related to solid waste.

Fire Service

The project would comply with City of Huntington Beach Fire Department requirements, including the installation of fire sprinklers and fire hydrants. It is not anticipated that project implementation would result in the need for additional Fire Department facilities. The proposed project is not of the scope or nature to create a significant increase in demand for services requiring physical additions to the City of Huntington Beach Fire Department.[26] In addition, the City of Huntington Beach Fire Department, through mutual aid and automatic aid agreements with Orange County and the cities of Westminster, Santa Ana, Newport Beach, Fountain Valley, and Costa Mesa can provide additional staff as needed. Adequate emergency access would be provided in accordance with City and County requirements. Impacts are not anticipated to be significant.

Police Service

The proposed project is not anticipated to create a significant increase in service calls to the project vicinity nor is it expected to create a need for additional police facilities within the City of Huntington Beach. No impacts are anticipated in this regard.[27]

Schools

The proposed project involves the implementation of a seawater desalination facility within the southeastern portion of the City of Huntington Beach. The project does not propose housing or other student-generating uses. According to the Huntington Beach Union High School District, the project is anticipated to have negligible impacts on school facilities within the City of Huntington Beach, and is anticipated to have a student generation rate of .0000340242 per square foot. However, in consideration of A.B. 2926, the Applicant would be required to pay a commercial fee of $0.36 per square foot for non-residential development within the Huntington Beach Union High School District, of which the High School District would receive 39 percent or $0.1404 per square

[26] Telephone conversation, Fire Marshall Eric Engberg, City of Huntington Beach Fire Department, December 6, 2004.

[27] Letter, Lieutenant Tom Donnelly, City of Huntington Beach Police Department, November 18, 2004.

foot of the total fee.[28] The Huntington Beach City School District would receive the remaining 61 percent ($0.2196 per square foot) of the commercial fee, and does not anticipate that the proposed project would have significant student-generating impacts or require other assessment fees or mitigation measures. The project is not expected to generate the need for additional school facilities.[29]

It should be noted that the Huntington Beach City School District is concerned that the proposed project may impact the health of its students that participate on the Dwyer and Sowers Middle School surf teams.[30] These concerns are addressed in Section 5.10, *OCEAN WATER QUALITY AND MARINE BIOLOGICAL RESOURCES*. No significant impacts are anticipated in this regard.

Libraries

The proposed desalination project is not anticipated to have significant impacts on the City of Huntington Beach library system. Although the nearest library facility to the project site (the Banning Branch Library) is small in size (approximately 1,200 square feet) the project is anticipated to have a negligible impact on the branch. The applicant would be required to pay standard library enrichment fees concurrent with building permit issuance. The Library Department has two development fees associated with commercial construction, which include: 1) the Library Development Fee, which is $0.04 per square foot; and 2) the Community Enrichment Library Fee, which is $0.15 per square foot.[31]

Roadway Maintenance

As previously stated, both Newland Street and Edison Avenue have been conditioned to be improved. As a condition of approval by the City of Huntington Beach for the proposed project, the applicant would be required to complete improvements along the southern side of Edison Avenue (situated north of the subject site as shown in Exhibit 3-2, *SITE VICINITY MAP*). These improvements would consist of the dedication of 12 feet along the frontage of the existing Edison Avenue (for curb, gutter, paving, and street lighting improvements) for a total of approximately 600 linear feet. It should be noted that AES Huntington Beach, LLC would be responsible for dedication of property to the City for these improvements, as AES owns the entire southern frontage of Edison Avenue and would lease property to the applicant for the proposed project. However, the project applicant would be responsible for completing these roadway and landscaping improvements as a condition of approval for the project subsequent to property dedication. It should also be noted that street widening along Newland Street (west of the proposed project site) would be performed by the City, with separate entitlements and environmental evaluation. AES Huntington Beach, LLC would dedicate 10 feet of right-of-way (to 50 feet east of centerline) along Newland Street and both AES and the project applicant would be required to pay their fair share of the cost. In addition, traffic impact fees as determined by the City of Huntington Beach would be collected upon project implementation in order to offset any costs incurred for roadway widenings and intersection capacity improvements.[32] Impacts in this regard are anticipated to be less than significant.

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28 Letter, Ms. Patricia Koch, Huntington Beach Union High School District, December 2004.

29 Letter, Mr. Richard Masters, Huntington Beach City School District, December 4, 2004.

30 Letter, Mr. Richard Masters, Huntington Beach City School District, December 4, 2004.

31 Letter, Mr. Ron Hayden, City of Huntington Beach Library Services Department, December 1, 2004.

32 Letter, Todd Broussard/Duncan Lee, Principal Civil Engineer, City of Huntington Beach Public Works Department, December 1, 2004.

Parks and Recreation

The recreational facilities nearest the project site are Edison Community Center, Huntington State Beach, and Huntington City Beach, all of which are located within a radius of approximately 0.5 miles. The proposed desalination project would be situated in an industrial area and would employ approximately 18 people, with five to seven people on duty during regular working hours Monday through Friday, and a minimum of two people on duty during swing shifts, graveyard shifts, and weekends. The project is anticipated to have a negligible impact on parks and recreation facilities within the City of Huntington Beach. Impacts in this regard are not expected to be significant.

Wastewater

It is anticipated that either a new sewer line would need to be constructed to reach the existing 48-inch OCSD trunk line located along Newland Street, or the project would utilize the existing private sewer system on AES property. The proposed project would produce nominal amounts of domestic wastewater, as the facility would employ approximately 18 people, with five to seven on-site during weekdays and a minimum of two employees on-site during swing shifts, graveyard shifts, and weekends. However, desalination facility operation would require that used RO membrane cleaning first rinse solution is discharged into the local sanitary sewer for treatment at the OCSD regional wastewater treatment plant or the existing private sewer system on AES property. Approximately 500,000 gallons of used cleaning solution would be generated per month (90 percent rinse water and 10 percent cleaning solution). The OCSD would impose a commercial/industrial capital facility fee that is collected by the City of Huntington Beach and which the City retains five percent for collection purposes. This capital facility fee would offset any impact to the City and OCSD, and would be used to provide system improvements as necessary.

As stated previously in Section 3.0, *PROJECT DESCRIPTION*, the accumulation of silts or scale on the RO membranes would require periodic cleaning to remove these foulants and extend membrane life. Normally cleaning frequency is twice per year. To clean the membranes, a chemical cleaning solution is circulated through the membranes. The reverse osmosis system trains would be cleaned using a combination of cleaning chemicals such as industrial soaps (e.g. sodium dodecylbenzene, which is frequently used in commercially available soaps and toothpaste) and weak solutions of acids and sodium hydroxide (refer to Table 5.10-11, *REVERSE OSMOSIS MEMBRANE SOLUTION DISCHARGE VOLUMES).*

A portion of the waste cleaning solution from the washwater tank is proposed to be discharged into the local sanitary sewer for further treatment at the Orange County Sanitation District (OCSD) regional wastewater treatment facility. OCSD has indicated that its facilities are of adequate capacity to accommodate this waste cleaning solution.[33] This solution would be transported using a dedicated on-site pump station with a capacity of 150 to 200 gallons per minute (gpm) and a new eight-inch sewer conveyance pipeline leading off-site to the existing 48-inch OCSD sewer pipeline located within Newland Avenue or a 54-inch OCSD line within Pacific Coast Highway. OCSD has also indicated that the pH and flowrate of the washwater tank discharge would be acceptable, contingent upon the acquisition of a Sewer Connection Permit from the City of Huntington Beach and an Industrial Source Control Permit from the OCSD. It should be noted that the OCWD's Water Factory 21 used to discharge cleaning solution into the OCSD system, similar to the process the proposed desalination facility would utilize. Monitoring of waste cleaning solution water quality would be performed per the requirements of the OCSD for wastewater discharges to the sanitary sewer. The cleaning rinse water following the "first rinse" would be mixed with the RO facility concentrated seawater, treated waste filter backwash, and the HBGS facility discharge and sent to

33 Email between Nikolay Voutchkov, Poseidon Resources Corporation, and OCSD, May 29, 2002.

the ocean. This "second rinse" water stream would contain trace amounts of cleaning compounds and would be below detection limits for hazardous waste. Cleaning of the RO system would be staggered so that on average, two RO trains would be cleaned per month after the first year or so of operation, resulting in approximately 500,000 gallons of used cleaning solution generated per month. Impacts on local wastewater facilities are not anticipated to be significant.

An alternative to discharging the RO membrane cleaning solution into the OCSD system is to discharge the solution into the Pacific Ocean via the HBGS outfall. Should this alternative be approved by the Santa Ana Regional Water Quality Control Board (SARWQCB), impacts to local wastewater facilities would be further minimized.

Storm Water Drainage

No City of Huntington Beach storm drainage facilities exist within the project vicinity. It is anticipated that the majority of the subject site would be composed of impervious surfaces, thereby increasing the potential amount of surface runoff. However, an on-site local storm water drainage system would be implemented as part of the desalination facility site. The desalination facility area and aboveground product water storage tank area would feature catch basins and storm water pump stations to provide adequate drainage. Storm water flows would first be directed to catch basins by gravity, and would then be directed to a storm water pump via gravity lines. The water would then be pumped to the 48-inch by-product concentrated seawater discharge line that ultimately connects to the HBGS outfall line. As alternative options, the desalination facility's on-site storm water system could discharge storm water to the HBGS on-site storm water system or the City of Huntington Beach local storm water system. The HBGS on-site storm water system conveys storm water to the Pacific Ocean via the HBGS outfall. The City of Huntington Beach's storm water system conveys storm water to the Pacific Ocean via existing facilities operated by the City and OCFCD. No storm water would be discharged into the adjacent Huntington Beach Channel. A Water Quality Management Plan (WQMP) would be prepared for the proposed project as required by the SARWQCB.

Storm water would be treated prior to off-site discharge in order to minimize impacts from urban pollutants. One of two sedimentation methods would be utilized for treatment, including:

- **Waste Filter Backwash Clarifiers:** The proposed desalination facility would utilize clarifiers for the purpose of settling the waste stream generated during the backwash of the pretreatment filters. During rainy events, storm water would be combined with the waste filter backwash water and settled in the filter backwash clarifiers. This clarified water would then be combined with the desalination facility's concentrated seawater discharge and sent to the Pacific Ocean via the AES outfall. The waste filter backwash clarifiers would be oversized to accommodate the treatment of storm water.

- **Sedimentation in Separate Clarifiers:** As an alternative to combining on-site storm water with the waste filter backwash, storm water directed to on-site storm drains could be treated in separate sedimentation clarifiers for storm water treatment only. Subsequent to clarification, this water would be discharged via the AES outfall with the desalination facility concentrated seawater discharge and AES cooling water.

The most viable storm water treatment alternative would be selected during the design phase of the project, in close coordination with the City of Huntington Beach, RWQCB, and HBGS staff. The storm water facilities would be designed to comply with all applicable requirements of the City of Huntington Beach and the RWQCB. As a result of the proposed project, impacts are not anticipated to be significant.

Water

Implementation of the proposed project would require new facilities to support operational uses (such as pipeline extensions, drinking fountains and restrooms), although these are not anticipated to create significant impacts. It is anticipated that normal domestic demand created by the proposed project can be provided with desalinated water generated on-site. However, should the project require potable water from the City, adequate backflow protection devices would be installed and maintained to ensure that no mixing of potable and subpotable water would occur. The Huntington Beach Utilities Division expects that impacts associated with the proposed project can be sufficiently mitigated.[34] With project implementation and appropriate mitigation, any potential impacts to water would be reduced to less than significant levels. It should also be noted that the proposed project would enhance drought resistance and provide emergency water supply to service areas on the coastal side to the Newport Inglewood Fault.

Refer to Section 5.11, *PRODUCT WATER QUALITY* for a discussion of impacts in regards to water product quality.

Reclaimed Water

As stated above, the City of Huntington Beach is not currently participating in the GAP. The proposed project is not anticipated to require the use of reclaimed water or installation of reclaimed water facilities, as the project itself would be a new reclamation source. As a result, impacts in this regard are not anticipated to be significant.[35]

Solid Waste

The Frank R. Bowerman and Alpha Olinda Landfills are the two landfills that are presently used in the disposal of municipal solid waste from the project area. The landfills have sufficient permitted capacity to accommodate the proposed project's solid waste disposal needs. Rainbow Disposal Company is available to provide solid waste pick-up for the proposed project.[36] In addition, the applicant would prepare a waste reduction plan for the construction and demolition (C&D) waste generated from this project. Impacts in this regard are anticipated to be less than significant.

Electricity

Based upon power consumption of 15 kilowatt hours per thousand gallons (4,887 kilowatt hours per acre-foot), the proposed 50 mgd (56,000 AF per year) desalination facility would require approximately 30 to 35 megawatts per hour to produce and distribute potable water. As such, the daily energy consumption of the facility is estimated to be between 720 to 840 megawatt hours per day.

In order to take advantage of lower cost power pricing, the facility may utilize off-peak power to the maximum extent practicable by temporarily halting the production of potable water from the facility and instead pumping product water from the product water storage tank. No back-up electrical generators would be incorporated into the proposed project site, as emergency power/back-up power would be drawn from the HBGS auxiliary reserve bank. Back-up power for the off-site underground booster pump stations would be provided by underground generator sets using diesel fuel. Maximum emissions from the back-up off-site generators are limited to 500 hours of operation.

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34 Letter, Mr. Todd Broussard, City of Huntington Beach Public Works Department, April 5, 2001.

35 Letter, Duncan Lee, Principal Civil Engineer, City of Huntington Beach Public Works Department, December 1, 2004.

36 Letter, Ms. Sandra Jacobs, Rainbow Disposal Company, Inc., November 24, 2004.

The proposed desalination facility's electrical power source would be controlled by a power marketing company, which, in consultation with the California Independent System Operator (Cal ISO), would obtain power from the HBGS and/or the California power market at the lowest cost possible. As such, a variety of base-, intermediate- and peak-load power generating facilities may produce power for the desalination facility. Typically, base-loaded power plant's (such as California's two nuclear power plants and out-of-state coal-fired power plant's) as well as several large hydroelectric power dams are the primary source of off-peak power serving Southern California. Intermediate and peak load facilities are typically fossil fuel generating facilities (predominantly natural gas fired).

Electric power generating plant's are distributed throughout the state, and the project's electrical demand would be met by dozens of power plant's connected to a regional power supply source, with many of those plants located outside of Southern California. SCE is prepared to install electrical distribution facilities to the subject site.[37] As stated in Appendix Q, *REPORT ON LOCAL AND REGIONAL POWER REQUIREMENTS AND GENERATION RESOURCES*, the 35 megawatt project load would approximately equate to less than one percent of demand within Orange County or Southern California.[38] Thus, impacts in this regard are anticipated to be less than significant (also refer to Section 5.4, *AIR QUALITY*)

Gas

The Southern California Gas Company can provide gas service to the proposed project via numerous gas mains surrounding the subject site.[39] Project implementation would not result in any construction related impacts to the service area. No impacts are anticipated in this regard.

Telephone and Cable

Currently, Verizon has telephone facilities located along Newland Street (located west of the project site), Edison Avenue (located north of the project site), and within HBGS property (located south of the project site). Verizon would be available to provide telephone service to the subject site from existing facilities.[40] Cable television access to the City of Huntington Beach is provided by Time Warner Communications. Time Warner does not anticipate any impacts to its facilities as a result of project implementation. However, short-term impacts to Time Warner facilities may occur if utility poles along Newland Street are relocated.[41] Impacts are anticipated to be less than significant.

It should also be noted that the installation of the 42- to 48-inch product water delivery pipeline within existing street right-of-way (ROW) would consume underground space for utilities along the streets the pipeline is proposed to occupy. However, it is anticipated that the project's water delivery pipeline would be buried deep enough to allow for the installation of smaller utilities (telephone, cable television, electricity, small diameter pipes) crossing above. In addition, preliminary analysis indicates that there is adequate space in Hamilton Avenue for the proposed pipeline and its utilities. Future projects requiring space for underground utilities along the proposed project's pipeline alignment may be required to use an alternative route where adequate space is available.

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37 Telephone conversation, Ms. Spring Bowles, Southern California Edison, December 2, 2004.

38 Local and Regional Electric Power Requirements and Generation Resources, Navigant, July 20, 2004.

39 Letter, Mr. Robert Warth, The Gas Company, November 19, 2004.

40 Letter, Mr. Tom Solano, Verizon, December 2, 2004.

41 Telephone conversation, Mr. Bill Jankowski, Time Warner Communications, December 2, 2004.

MITIGATION MEASURES

Fire Service

None required.

Police Service

None required.

Schools

PSU-1 Prior to the issuance of building permits, the applicant will be required to pay applicable school mitigation fees pursuant to State law.

Libraries

None required.

Roadway Maintenance

PSU-2 The Applicant will be required to pay appropriate traffic impact fees as determined by the City of Huntington Beach Department of Public Works.

Parks and Recreation

None required.

Wastewater

PSU-3 The Applicant will be required to pay five percent of the OCSD connection fee to the City of Huntington Beach.

PSU-4 All work within, over and under the OCFCD and County of Orange right-of-way should not commence until encroachment permits for the proposed work have been obtained from the County.

Drainage

Refer to Section 5.3, *HYDROLOGY AND WATER QUALITY.*

Water

PSU-5 The Applicant will be required to pay appropriate fees for water service connections, installation, and meters. In addition, the City requires payment of a service fee for industrial customers.

Reclaimed Water

None required.

Solid Waste

PSU-6 The Applicant will coordinate with the City's recycling representative to ensure that the proposed project is in compliance with the City's waste reduction and recycling program.

PSU-7 Prior to the issuance of a grading permit, the Applicant will prepare a waste reduction plan for the generation of construction and operational waste from the proposed project. This plan will be submitted to the recycling coordinator from the City of Huntington Beach who will ensure that AB 939 requirements are properly addressed.

Electricity

None required.

Gas

None required.

Telephone and Cable Service

None required.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

5.7 AESTHETICS/LIGHT & GLARE

Visual resources information in this section was compiled from site photographs and site surveys conducted by RBF Consulting on June 22, 2001 and December 1, 2004. Project impacts on the aesthetic character of the site from grading activities and building construction are analyzed and evaluated in relation to existing and surrounding site conditions. Consideration of public scenic views, introduction of new sources of light and glare, and compatibility of the proposed project with adjacent local aesthetic resources are included in this section. Construction-related impacts are addressed in Section 5.9, CONSTRUCTION RELATED IMPACTS. As the proposed off-site pipelines and underground pump station would be subsurface, there are no anticipated long-term aesthetic impacts.

EXISTING CONDITIONS

AESTHETICS

On-Site

The existing site's aesthetic quality can be characterized as low to non-existent, considering that the site is located within an industrial fuel oil storage tank area formerly used in conjunction with the AES Huntington Beach Generating Station (HBGS). The approximately eleven-acre site (seven acres for the desalination facility and four acres for the product water storage tank area) is currently developed with three fuel storage tanks. These fuel oil storage tanks exist on-site and are 205 feet in diameter and 40 feet in height. The exterior shell of all three tanks is composed of a non-reflective metal surface. Containment berms of approximately 10 to15 feet in height surround the perimeter of each tank. The site is fully developed, with no unique vegetation or other visual resources (refer to Exhibit 3-2, *SITE VICINITY MAP* and Exhibit 5.7-1, *DESALINATION FACILITY SITE PHOTOGRAPHS*).

Off-Site

Views of the HBGS are available from numerous areas surrounding the project site, including: Huntington-By-The-Sea Mobile Home Park (located to the west); Beach Boulevard (located to the west); limited locations along Hamilton Avenue (located to the north); limited locations along Huntington State and Huntington City Beaches; and from the vicinity of the intersection of Magnolia Street and Pacific Coast Highway. However, since the proposed project is located behind the main HBGS structures and surrounded by 10-foot by 15-foot high earthen berms, views of the project from the surrounding area are limited. Surrounding adjacent land uses include the HBGS to the southwest, a wetland area to the southeast, the Orange County Flood Control District (OCFCD) flood channel to the east, a fuel oil storage tank to the north, and an electrical switchyard to the west. Additional surrounding land uses include Pacific Coast Highway to the south, the Pacific Holdings storage tank facility to the east, Ascon/Nesi Landfill to the northeast, commercial, industrial, recreational, and residential uses to the north, and Newland Street, Huntington-By-The-Sea Mobile Home Park, and Cabrillo Mobile Home Park to the west (refer to Exhibit 5.7-1, *DESALINATION FACILITY SITE PHOTOGRAPHS*). The Pacific Ocean, Huntington State Beach, and Huntington City Beach are located south of the subject site and can be characterized as high in aesthetic value. Uses surrounding the proposed pipeline route and underground pump stations vary depending upon the location, although uses generally consist of residential with some open space, commercial, school, recreational and medical (Fairview State Hospital in the City of Costa Mesa) uses (refer to Exhibit 5.7-2 *PIPELINE ALIGNMENT PHOTOGRAPHS*, and Exhibit 5.7-3 *BOOSTER PUMP STATION SITE PHOTOGRAPHS*).

LIGHT AND GLARE

On-Site

The current uses on-site produce minimal light and glare due to the lack of high intensity lighting and absence of reflective surfaces on existing facilities. A minimal amount of nighttime security lighting currently exists on-site. Lighting fixtures are located sporadically throughout the project site, on poles and mounted on the existing storage tanks.

Off-Site

Existing off-site sources of light and glare surrounding the project site, proposed pipeline alignments, and proposed underground pump station sites include street lighting, automobile headlights, and nighttime security lighting. Facility lighting and nighttime security lighting are utilized at the Edison Community Center and Edison High School situated northeast of the project site, while Beach Boulevard (a major arterial located west of the project site) produces light and glare as a result of heavy automobile traffic and street lighting.

IMPACTS

Significance thresholds in this Section are based on the CEQA Appendix G Environmental Checklist Form as indicated below.

Significance Criteria

A potentially significant impact to aesthetics would occur if the project caused one or more of the following to occur:

- Have a substantial adverse affect on a scenic vista;
- Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; and/or
- Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

The significance of an aesthetic impact, in terms of this project, can be determined by examining anticipated project effects from a number of different vantage points, including construction-related visual disruption, observer position, and changes to the existing visual character of the area.

For a discussion of short-term, construction-related aesthetic impacts, refer to Section 5.9, *CONSTRUCTION RELATED IMPACTS*.

SITE CHARACTER

The project site exists as part of a fuel oil storage tank facility within an industrial area. Prominent industrial facilities within the vicinity include the HBGS and the Pacific Holdings storage tank facility. The existing project site can be described as low to non-existent in aesthetic value, as the existing fuel storage tanks are as large as 40 feet in height and 205 feet in diameter, and lack aesthetic or architectural enhancements. Currently, no aesthetic screening exists around the proposed project site. The proposed project would improve the aesthetic character of the site vicinity by replacing the existing dilapidated storage tanks with multiple buildings/structures featuring contemporary

A View of the desalination facility site in a northeasterly direction from the HBGS.

B A southerly view of the desalination facility site from the northwestern corner of the site.

C View of the HBGS (situated southwest of the subject site) in an easterly direction from Newland Street.

D A westerly view of the desalination facility site across the Huntington Beach Channel.

E A westerly view of the above ground product water storage tank portion of the project site.

NOT TO SCALE

RBF CONSULTING

Desalination Facility Site Photographs

Exhibit 5.7-1

A An easterly view of Hamilton Avenue, near the intersection of Hamilton Avenue and Magnolia Street (Primary and Alternative Alignment).

B A southerly view of Magnolia Street, between Hamilton Avenue and Adams Avenue.

C An easterly view of the Primary Alignment at the Costa Mesa Country Club.

D View of Victoria Street in a westerly direction, near the intersection of Victoria Street and Monrovia Avenue (Alternative Alignment).

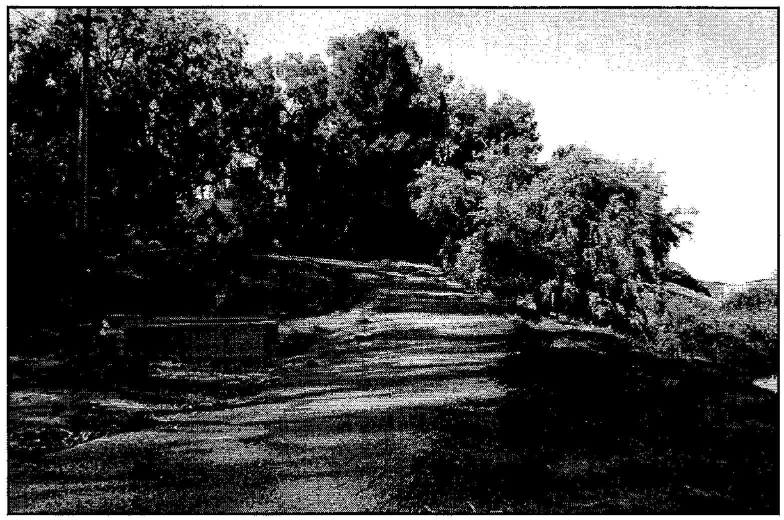
E A northeasterly view of the Elden Avenue/Del Mar Avenue intersection, the point at which both alignment alternatives will connect to the OC-44 line in the City of Costa Mesa.

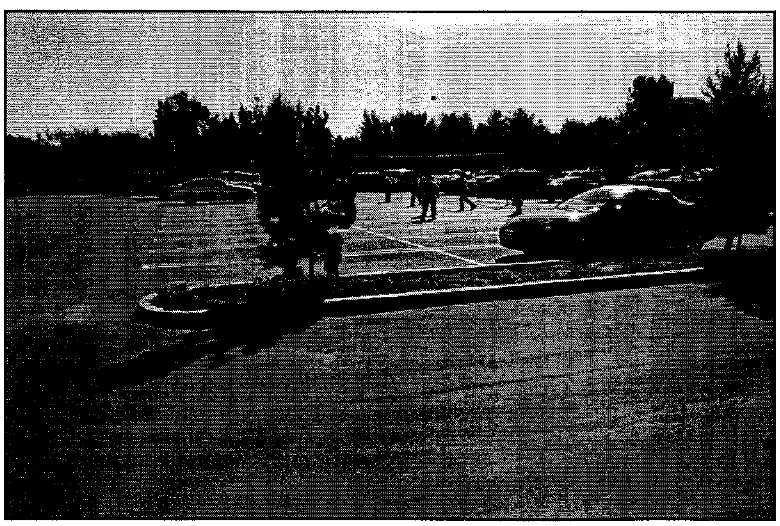
Off-Site Pipeline Alignment Photographs

Exhibit 5.7-2

A A northwesterly view of the proposed booster pump station within an unincorporated area of the County of Orange (OC-44 pump station).

B A northerly view of an·access road and existing pum station facilities located adjacent to the OC-44 pump station site.





C View of the Coastal Junction pump station site, located within the parking lot of St. Paul's Greek Orthodox Church.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Off-Site Underground Pump Station Photographs

Exhibit 5.7-3

architectural design features and significant amounts of landscaping and aesthetic screening techniques in order to minimize any potential impacts of the project on the surrounding community. A visual simulation of the proposed project is provided in Exhibit 5.7-4, *DESALINATION FACILITY VISUAL SIMULATION – MAGNOLIA STREET* and Exhibit 5.7-5, *DESALINATION FACILITY VISUAL SIMULATION – NEWLAND STREET*. Although the proposed aboveground product water storage tank (which would be approximately 250 feet in diameter with a maximum height of 30 feet) would add to the aesthetic impact of the proposed project in regards to surrounding uses and local roadways, the tank would be constructed of non-glare producing materials. When considering that the tank (30 feet high above grade) would replace a dilapidated fuel oil storage tank (40 feet high) with a product water tank featuring contemporary design features, aesthetic screening, and landscaping, impacts in this regard would be considered less than significant. In addition, as the proposed off-site pipelines and underground pump station would be subsurface, there are no anticipated long-term aesthetic impacts associated with these improvements.

Landscaping improvements would be focused primarily on the eastern, western, and northern portions of the subject site (refer to Exhibit 3-16, *CONCEPTUAL LANDSCAPE MASTERPLAN*). Landscaping selection would match that of the HBGS perimeter. Landscaping within the northern portion of the subject site would consist of Melaleuca quinquenervia (Cajeput Tree), *Eucalyptus lehmannii* (Lehmans Mallee), *Callistemon viminalis* (Weeping Bottle Brush Tree), turf, and ornamental drought/salt tolerant shrub and ground cover. Additional landscaping within the eastern portion of the project site would consist of a native wetlands planting area, situated east of the administrative building. Landscaping is also proposed along the western boundary of the product water tank site, along Newland Street, and would include evergreen street trees, accent palm trees, and shrub/groundcover plantings. The project would adhere to all City requirements with regard to building heights, landscaping, lighting, setbacks and lot coverage. Therefore, the project is considered to represent a positive impact relative to change in the existing on-site character.

LIGHT AND GLARE

Existing on-site lighting is limited to sporadic light fixtures mounted on poles and on the existing fuel storage tanks. In addition, the site is void of reflective surfaces capable of producing significant amounts of glare. Additional light fixtures may be necessary for long-term operational use for both the desalination facility and product water storage tank, although any new lighting would be subject to City design standards and would utilize directional lighting techniques and low wattage bulbs (without compromising site safety or security) in order to direct light downwards and minimize light spillover. Project implementation may also result in a minimal amount of additional reflective surfaces on proposed structures, and from vehicles utilizing the facility. However, the resulting glare effects would be relatively minor when compared to existing levels of glare in the site vicinity. Additional lighting or glare-inducing surfaces would not occur as a result of water transmission pipeline or underground booster pump station implementation, as both the pipeline alignment and underground pump station would occur underground. This impact is considered less than significant with implementation of standard design practices and required mitigation.

MITIGATION MEASURES

SITE CHARACTER

ALG-1 For areas visible by adjacent existing or proposed residential areas, exterior mechanical equipment shall be screened from view on all sides, and rooftop mechanical equipment shall be set back 15 feet from the exterior edges of the building. Equipment to be screened includes, but is not limited to, heating, air conditioning, refrigeration equipment, plumbing lines, duct-work and transformers. Said screening shall be architecturally compatible with the building in terms of materials and colors. If screening is not designed specifically into the building, a rooftop mechanical equipment plan showing screening must be submitted for review and approval with the application for building permit(s).

LIGHT AND GLARE

ALG-2 If outdoor lighting is included, light intensity shall be limited to that necessary for adequate security and safety. All outside lighting shall be directed to prevent "spillage" onto adjacent properties and shall be shown on the site plan and elevations.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

Existing View

Key Map

Proposed View

View 1- *From Magnolia Street looking North toward the Proposed Site*

Source: Poseidon Resources Corporation, November 2004.

Note: This visual simulation utilizes computer technology (CADD/digital photo simulation) to translate the 2-dimensional engineering plans and landscape concepts into a composite 3-dimensional image, so as to depict the conceptual overall appearance of the project from off-site locations. The details depicted in this simulation are based on current architectural and landscape architectural plans. The purpose of this simulation is to evaluate grading concepts and character, terracing, juxtaposition of building heights, and softening of building massing with landscape. It is recognized that design details, materials, and colors shown in these exhibits are conceptual and subject to preparation of final engineering and construction documents.

View 2 - *From Newland Overpass looking South toward the Proposed Site*

Source: Poseidon Resources Corporation, November 2004.

5.8 HAZARDS & HAZARDOUS MATERIALS

This section addresses potential impacts associated with the physical effects of the site due to the historic storage fuel oil within the boundaries of the subject site. Any potential site contamination, including soil and groundwater, is discussed within this section. Information contained in this section is based on the Huntington Beach Generating Station Phase II Environmental Site Assessment (prepared by CH2M HILL, November 27, 1996), the Site Investigation Report for Soil and Groundwater, Huntington Beach Generating Station, Huntington Beach, California (prepared by Woodward-Clyde, May, 1998), the Preliminary Hazardous Materials Assessment for the Southeast Coastal Redevelopment Plan (prepared by RBF Consulting, January 11, 2001), and the Environmental Assessment for the Southern California Edison Huntington Beach Fuel Oil Storage Tank Removal Project (prepared by Arthur D. Little, Inc., April 20, 2000).

EXISTING CONDITIONS

PROPOSED DESALINATION FACILITY SITE

On-Site

The subject site, formerly owned and operated by Southern California Edison (SCE), is currently developed with three fuel storage tanks (two at the desalination facility area and one at the product water storage tank area). These three fuel oil storage tanks (designated the "South", "West", and "East" tanks) are 205 feet in diameter and 40 feet in height. It is believed that the South and East tanks contain approximately 200,000 to 350,000 gallons of fuel oil, while the amount of fuel oil remaining in the West tank is unknown. The exact amounts of remaining fuel within all the storage tanks would not be known until the tanks are opened and inspected. Containment berms of 10-15 feet in height surround the perimeter of each tank. The fuel oil tanks are constructed of a thin, metal external shell and an internal insulated layer approximately two inches thick. This insulation material may contain asbestos, although the existence of asbestos would not be determined until the tanks are opened and inspected.

In October and November, 1996, CH2M HILL advanced a total of 19 borings within the boundaries of the former fuel oil storage facility in which the subject site is located (four borings per fuel oil tank and three borings at the distillate fuel tank, located adjacent to the South tank). From the 19 borings, 35 soil samples and five groundwater samples were collected. Soil samples were collected from depths near the ground surface (0.5 feet below ground surface) and also at five-foot intervals to depths of approximately 10 feet below ground surface (bgs). Groundwater was encountered at depths of approximately seven to eight feet bgs within the subject site vicinity. 11 of the 35 soil samples and three of the five groundwater samples were taken surrounding the South, West, and East fuel oil storage tanks. All soil samples were analyzed for total petroleum hydrocarbons-diesel (TPH-D). TPH-D levels exceeded the Los Angeles Regional Water Quality Control Board (LARWQCB)[1] maximum soil screening level of 1,000 mg/kg, with samples as high as 65,000 mg/kg in the vicinity of the West tank and 5,200 mg/kg in the vicinity of the East tank, both at a depth of 0.5 feet bgs TPH-D was detected at concentrations of 0.51 mg/L in groundwater collected from the product water storage tank area. It is unknown whether this value exceeded LARWQCB thresholds for groundwater, as thresholds are established on a site-by-site basis.[2]

1 The Phase II Assessment, prepared by CH2M Hill (dated 11/27/96), uses the LARWQCB *Interim Site Assessment and Cleanup Guidebook* (5/96), as a conservative screening criterion for evaluation of analytical results.

2 Yue Rong, Los Angeles Regional Water Quality Control Board, April 11, 2002.

Surrounding Uses

Additional soil and groundwater samples collected by CH2M HILL within the fuel oil storage facility but outside of project site boundaries were also analyzed for TPH-D and VOCs. TPH-D was detected above screening criteria near tanks located to the west and south of the subject site, with levels as high as 5,000 mg/kg. In addition, TPH-Diesel was detected at levels of 2.6 mg/L in groundwater samples taken from south of the project site, respectively.

A soil and groundwater investigation was performed for the AES Huntington Beach Generating Station (HBGS) (Woodward-Clyde, May, 1998), located immediately southwest of the project site. It was concluded that the screening criteria for petroleum impacted soils was not exceeded, while several metals, including antimony, arsenic, cadmium, cobalt, lead, mercury, selenium, silver, aluminum, iron, nickel, vanadium, copper, and molybdenum, exceeded average metal concentrations in soil for California. Numerous VOCs exceeded state and federal maximum contaminant levels (MCLs) in groundwater, while no SVOCs were detected above potential "threshold" concentrations in groundwater sampled at the HBGS. Various metals, including arsenic, thallium, beryllium, cadmium, chromium, copper, lead, mercury, nickel, silver, and selenium were also found to exceed existing MCLs. Other groundwater contaminants exceeding state and federal MCLs include fluoride, chloride, sulfate, and total dissolved solids (TDS).

Two other petroleum-related storage tank facilities are situated within the project vicinity, including the Pacific Holdings and CENCO Marine Terminal facilities. The Pacific Holdings tank farm is located immediately east of the subject site, consisting of three fuel oil storage tanks, each with a capacity of 21 million gallons. A baseline tank study completed by SCE indicates that TPH levels of up to 7,500 mg/kg exist on-site, resulting from occasional spraying of oil on the soil for corrosion protection. The CENCO Marine Terminal, a former crude oil storage site, is located northwest of the project site. Prior to its demolition, the facility consisted of eight crude oil storage tanks. On-site hydrocarbon contamination was detected and remediation has been completed.

The Ascon/Nesi Landfill, situated immediately east of the subject site, was utilized primarily as a dumping ground for oil drilling wastes until its closure in 1984. Evidence of petroleum and hydrocarbon related contamination exists throughout the site primarily in the form of lagoons filled with oil drilling waste liquids. CH2M HILL performed groundwater sampling near the northern border of the proposed project site and the Ascon/Nesi Landfill. TPH-D and VOCs were not detected in the groundwater samples collected, downgradient of the Ascon/Nesi Landfill site.

OFF-SITE PIPELINES AND UNDERGROUND PUMP STATIONS

Proposed Pipeline Alignments

The proposed water delivery pipeline would be up to approximately ten miles in length, extending from the proposed desalination facility to the OC-44 water transmission line within the City of Costa Mesa, east of State Route 55 (SR-55) at the intersection of Del Mar Avenue and Elden Avenue. The majority of the pipeline alignment would occur within existing public streets, easements, or other rights-of-way (ROW) in urbanized areas. Although precise pipeline alignments may be modified during final engineering analyses, the conceptual pipeline alignments are shown in Exhibit 3-3, *CONCEPTUAL PIPELINE ALIGNMENTS.*

Portions of the pipeline alignments are proposed to be installed within areas of Edison Community Center (Huntington Beach), Costa Mesa Country Club (Costa Mesa), and Fairview State Hospital (Costa Mesa). No known areas of existing hazardous materials contamination are known to exist along the proposed pipeline alignments.

OC-44 Pump Station

The OC-44 underground booster pump station is proposed to be located within an area of unincorporated Orange County, approximately 1.5 miles south of the University of California, Irvine., and 0.5 miles north of the San Joaquin Reservoir. The proposed OC-44 booster pump station site is surrounded by open space to the north, open space and residential to the east, two existing underground pump stations, open space, and residential to the west, and open space to the south. As this site is undeveloped, it is not expected to contain hazardous materials.

Coastal Junction Pump Station

The Coastal Junction underground booster pump station is proposed within the parking lot of St. Paul's Greek Orthodox Church within the City of Irvine, located at 4949 Alton Parkway. The underground pump station would be constructed within the north/northwestern portion of the church parking lot, in an area used for both parking and volleyball activities. The footprint of the proposed underground pump station would be approximately 100 feet by 100 feet, and would require a construction easement of 125 feet by 125 feet. The Coastal Junction pump station site is surrounded by the St. Paul's Church to the south, the Woodbridge Village Association to the west, an apartment complex to the east, and open space to the north. As this pump station site is developed as a parking lot adjacent to a church, hazardous materials are not anticipated to exist on-site.

IMPACTS

Significance thresholds in this section are based on the CEQA Appendix G Environmental Checklist Form as indicated below:

Significance Criteria

Under the CEQA Guidelines, a potentially significant impact in regards to hazards and hazardous materials would occur if the project caused one or more of the following to occur:

- Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials;
- Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment;
- Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school;
- Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would create a significant hazard to the public or the environment;
- For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, the project would result in a safety hazard for people residing or working in the project area;
- For a project within the vicinity of a private airstrip, the project would result in a safety hazard for people residing or working in the project area;
- Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan; and/or

- ❖ Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands.

For a discussion of short-term, hazards/hazardous materials impacts in regards to remediation, construction, and demolition, refer to Section 5.9, *CONSTRUCTION-RELATED IMPACTS*.

LONG-TERM OPERATIONAL IMPACTS

Proposed Desalination Facility Site

Existing On-Site and Off-Site Contamination

The proposed desalination project is not anticipated to result in long-term impacts in regards to existing on- and off-site soil and groundwater contamination. The project would facilitate the remediation of fuel contamination surrounding the fuel oil storage tanks within the boundaries of the proposed subject site consistent with RWQCB and Huntington Beach City standards. In addition, demolition of the fuel storage tanks would also involve the abatement of asbestos and lead-based paint, if detected. The majority of contaminants both on- and off-site (including the Ascon/Nesi Landfill) are petroleum-based, and are not considered toxic or acutely hazardous. The proposed project is expected to have a beneficial impact in regards to long-term hazards and hazardous materials.

Project Operation

The proposed project involves the implementation of a 50 mgd seawater desalination facility, and would involve the storage, handling, and use of hazardous materials. Hazardous materials would be utilized for three components of desalination facility operation: 1) periodic cleaning of the RO membranes which filter impurities from seawater; 2) treatment of potable product water; and 3) storage of diesel fuel for emergency backup electricity generators at the off-site underground pump stations.

RO Membrane Cleaning Solution

As stated previously within Section 3.0, *PROJECT DESCRIPTION*, the accumulation of silts or scale on the RO membranes causes fouling which reduces membrane performance. The membranes would be periodically cleaned to remove these foulants and extend membrane life. Normally cleaning frequency is twice per year. To clean the membranes, a chemical cleaning solution is circulated through the membranes. The reverse osmosis system trains would be cleaned using a combination of cleaning chemicals such as industrial soaps (e.g. sodium dodecylbenzene, which is frequently used in commercially available soaps and toothpaste) and weak solutions of acids and sodium hydroxide. The cleaning process includes two steps: first, circulating a number of cleaning chemicals in a predetermined sequence through the membranes; and second, rinsing the cleaned membranes with clean water (permeate) to remove the waste cleaning solutions and prepare the membranes for normal operation. It should be noted that the actual cleaning chemicals used would be based on the observed operation and performance of the system once it is placed in operation. The cleaning solution is composed of the following chemicals:

Citric acid, two percent solution: The Material Safety and Data Sheet (MSDS) for citric acid states that acute overexposure would cause eye/skin irritation, irritation of the respiratory tract if inhaled, and nausea, vomiting, cramps, and acidic irritation of mouth and throat if ingested.

Sodium hydroxide B, 0.1 percent solution: According to the MSDS for this material, acute exposure to sodium hydroxide may cause severe burns to exposed tissues (including the eyes), injury to the entire respiratory tract if inhaled, and severe injury to the digestive system if ingested.

Sodium tripolyphosphate B, two percent solution: The MSDS for sodium tripolyphosphate indicates that acute overexposure to this material would cause minimal to moderate irritation to the eyes. Human industrial experience has not shown this chemical to be an inhalation hazard.

Sodium dodecylbenzene B, 0.25 percent solution: According to the MSDS for this material, sodium dodecylbenzene would cause irritation to exposed tissues (including the skin/eyes), and irritation to the respiratory or digestive systems, if inhaled or ingested, respectively.

Sulfuric acid B, 0.1 percent solution: The MSDS for sulfuric acid indicates that acute overexposure would result in burns to any exposed area such as the eyes, skin, and respiratory tract.

The citric acid, sodium hydroxide, sodium tripolyphosphate, and sodium dodecylbenzene would be delivered to the subject site in 400-gallon plastic containers, and would be stored in the RO building within concrete enclosures. A drainage system would be provided for chemical evacuation in the event of an accidental spill. As these chemicals would not be used frequently, they would be delivered to the site on an as-needed basis, and no more than one container per chemical would typically be stored or used at one time. Storage for sulfuric acid is described below, under *PRODUCT WATER TREATMENT MATERIALS*.

Product Water Treatment Materials

In addition to the RO membrane cleaning solution, a number of additional chemicals for water treatment would be used, stored, and handled on-site (refer to Table 5.8-1, *PRODUCT WATER TREATMENT CHEMICAL USAGE SUMMARY*). A description of each chemical product water treatment is provided below:

Sodium hypochlorite (chlorine): Chlorine would be delivered in liquid form as a 12% sodium hypochlorite solution. The liquid sodium hypochlorite would be stored in suitable tanks within an enclosed concrete containment structure with a 110-percent spill containment capability. The inner housing of the concrete containment structure would be coated for resistance to chemicals, and would be separated or divided from other chemicals to prevent mixing in the event of accidental spillage. Storage tanks would be high-density polyethylene (HDPE) or fiberglass-reinforced polyester (FRP). All piping, pumps, valves, and other ancillary equipment would be manufactured of materials compatible with this chemical. Generally, polyvinyl chloride (PVC) would be used for low-pressure piping, and lined Teflon piping would be used for high-pressure service. All metals, with the exception of titanium, silver, gold, and platinum would be avoided in pumps and pumping elements, as well as any other piece of equipment that can be expected to come in direct contact with the chlorine solution. No chlorine gas would be present on-site. According to the Material Safety Data Sheet (MSDS) for sodium hypochlorite, acute overexposure would result in strong irritation to the eyes, skin, and respiratory tract. Inhalation of fumes may cause pulmonary edema, while ingestion would cause burns to the mouth, digestive tract, and abdominal distress.

Table 5.8-1
PRODUCT WATER TREATMENT CHEMICAL USAGE SUMMARY

Chemical	Purpose	Normal Concentration	Chemical (lb/day)	Solution (gal/day)	Day Tank Capacity (gallons)	Bulk Storage Capacity* (gallons)
Sodium Hypochlorite	Prevent Biological Growth	12%	1,542	1,541	2,000	10,000
Ferric Sulfate	Enhance Filter Performance	70%	15,420	2,641	N/A	40,000
Polymer	Enhance Filter Performance	0.5%	385	9,244	10,000	5,000 lbs.
Sulfuric Acid	Positive LSI to Membranes	92%	24,672	3,215	4,000	60,000
Sodium Bisulfate	Remove Chlorine	20%	4,626	2,773	3,000	30,000
Carbon Dioxide (If required)	Stabilize Product Water	100%	12,540	NA	NA	38,000
Lime (If required)	Stabilize Product Water	15%	11,676	9,333	10,000	200,000
Sodium Hypochlorite	Disinfection	12%	667	667	1,000	10,000
Ammonia	Disinfection	29%	206	95	100	1,000

Source: Poseidon Resources Corporation, October, 2004.

* Bulk storage capacities are based on the amount of storage capacity necessary for two weeks of operation at proper design dosage rates.

Lime: Lime would be delivered in dry quicklime form and would be stored on-site in 50-ton silos. The silos would have a bag house to minimize the emission of fugitive dust particles during the loading process. The dry lime would be conveyed to a slaking chamber where it would be mixed with water to produce lime slurry. The lime slurry would then be transported to a separate mixing/dilution tank. The lime slaking system would produce a 10-18 percent lime slurry. The materials of construction for storage tanks, conveyance systems, piping systems, and all ancillary equipment would be compatible with the recommendation of the lime supplier and in compliance with all applicable City and state regulations. According to the MSDS for lime, this chemical poses an acute threat for skin and respiratory tract irritation and damage to mucous membranes of the upper respiratory tract.

Carbon Dioxide: Carbon dioxide would be delivered to the facility in liquid pressurized form by truck and stored in two 50-ton pressurized bulk liquid storage tanks which would consist of a welded steel pressure vessel designed, constructed, and tested in accordance with the requirements of the American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code. Although stored as a liquid, carbon dioxide is injected into the water stream as a vapor. No special alloy or plastic distribution piping is required for the carbon dioxide delivery system. The storage tanks would be double-walled vessels in which the outer walls would provide a secondary containment. The inner vessel wall would be made of high-strength carbon steel, while the outer vessel wall material would be aluminum or structural grade carbon steel. The tanks would be equipped with stainless steel piping, nozzles, valves and other fittings and would be designed for unconfined outdoor installation. According to the MSDS, carbon dioxide initially stimulates respiration and than causes respiratory depression. Inhalation of low concentrations (three to five percent) that may occur during accidental gas release has no known permanent harmful effects. Contact with the cold gas can cause freezing of exposed tissue. All forms of carbon dioxide are noncombustible.

Ferric sulfate: Ferric sulfate or ferric chloride would be used as intake water coagulant. Ferric salts would be delivered and stored in liquid form. The coagulant would be a 70 percent concentration of ferric sulfate or ferric chloride solution. Storage tanks shall be fiberglass-reinforced polyester (FRP) or high-density cross-linked polyethylene (HDXLPE). All piping, pumps, valves, and other handling equipment would be manufactured, lined, and/or coated with Kynar7 vinylidene plastic, polyvinyl chloride, rubber, glass, ceramic materials, or other materials specifically manufactured for the intended service. All floors, walls and ancillary equipment subject to splashing would be protected with corrosion-resistant coatings. On-site storage tanks would be placed within an enclosed concrete containment structure with a 110-percent spill containment capability. The inner housing of the concrete containment structure would be coated for resistance to chemicals, and would be separated or divided from other chemicals to prevent mixing in the event of accidental spillage. According to the MSDS for ferric sulfate, acute overexposure would result in irritation to the respiratory system if inhaled, burns, somnolence, diarrhea, tachycardia, shock, acidosis, and hematemesis if ingested, and irritation/corrosion to the eyes.

Polymer: Polymer would be delivered and stored in the form of a dry powder. On average, 100 50-pound bags would be stored. To prepare the polymer for water treatment use, it would be mixed and aged in a batch tank. The polymer system would produce an output concentration of a maximum of 0.5 percent. The materials of construction for storage tanks, pumps, piping systems, and all ancillary equipment would be compatible with the recommendation of the polymer supplier. According to the MSDS for polymer, acute exposure would result in mild eye and skin irritation, while inhalation would cause irritation to the nose, eyes, and throat.

Sulfuric Acid: Sulfuric acid would be delivered and stored in liquid form with a 20 percent concentration. The sulfuric acid would be stored in suitable tanks within an enclosed concrete containment structure with a 110-percent spill containment capability. The inner housing of the concrete containment structure would be coated for resistance to chemicals, and would be separated or divided from other chemicals to prevent mixing in the event of accidental spillage. Storage tanks would be manufactured of high-density polyethylene (HDPE). The materials of construction for pumps, piping systems, and all ancillary equipment would be iron, steel, polyvinyl chloride, or Viton for concentrated sulfuric acid, and glass, lead, or rubber for dilute sulfuric acid. According to the MSDS for sulfuric acid, acute overexposure would result in burns to any exposed area such as the eyes, skin, and respiratory tract.

Sodium Bisulfite: Sodium bisulfite would be delivered and stored in liquid form, and contained in suitable tanks within an enclosed concrete containment structure with a 110-percent spill containment capability. The inner housing of the concrete containment structure would be coated for resistance to chemicals, and would be separated or divided from other chemicals to prevent mixing in the event of accidental spillage. The sodium bisulfate would be a 20 percent concentration solution. The materials of construction for storage tanks, pumps, piping systems, and all ancillary equipment would be in accordance with the recommendation of the chemical supplier. According to the MSDS for sodium bisulfite, acute overexposure would result in severe burns and irritation to the skin, eyes, and mucous membranes. Inhalation may cause respiratory discomfort, and ingestion would result in burns to the gastrointestinal system and possibly death.

Ammonia: Ammonia would be delivered and stored in liquid form, and would be stored in a 1,000 gallon tank with a 110-percent spill containment structure. The storage tank would be constructed of high-density polyethylene (HDPE) or fiberglass-reinforced polyester (FRP). All piping, pumps, valves, and other ancillary equipment would be manufactured of materials compatible with the intended service. Generally, polyvinyl chloride (PVC) would be used for low-pressure conveyance piping, and lined Teflon for high-pressure conveyance piping. According to the MSDS for ammonia, acute overexposure would result in burns to the gastrointestinal tract, skin, eyes, mucous membranes, and respiratory tract.

It should also be noted that feed pumps for sodium hypochlorite, ferric, sulfuric acid, and sodium bisulfite would be hydraulically actuated diaphragm-type or peristaltic type chemical metering pumps equipped with a variable frequency drive. The polymer pumps would be single stage, progressive cavity displacement pumps. Lime slurry would be conveyed to the application points with hose type positive displacement pumps.

The project would incorporate numerous leak and spill containment measures to minimize the risk of upset to both on-site employees and surrounding uses, consistent with all Federal, State, County and City regulations. As stated previously, hazardous materials would be utilized for three components of desalination facility operation: 1) periodic cleaning of the RO membranes which filter impurities from seawater; 2) treatment of potable product water; and 3) storage of diesel fuel for emergency backup electricity generators at the off-site underground pump stations. All hazardous materials would be stored in concrete containment structures with a 110-percent spill containment capability. If necessary, the inner housing of the concrete containment structure would be coated for resistance to chemicals, and each structure would be separated or divided from other chemicals to prevent mixing in the case of accidental spillage. All storage tanks would be constructed of appropriate, non-reactive materials, compatible with the recommendations of the supplier of the hazardous material.

In the event of an accidental liquid chemical spill, the chemical would be contained within the concrete containment structure and evacuated through an individual drainage system. The spilled chemical would then be pumped into hazardous waste containment trucks and transported off-site for disposal at an appropriate facility accepting such waste. This operation would be completed by a specialized contractor licensed in hazardous waste handling and disposal. Appropriate agencies, such as the City of Huntington Beach Fire and Police Departments, would also be contacted if necessary. It should also be noted that the existing containment berms along the northern and eastern boundaries of the proposed desalination site would further minimize the potential release of hazardous materials into the adjacent Huntington Beach Channel and wetlands.

The chemical conveyance piping system connecting chemicals from their storage areas to their points of application would be protected from leaks utilizing one of the following leak protection measures:

- ❖ Use of piping with double containment walls to prevent potential chemical leaks from reaching the soil or groundwater; and
- ❖ Installation of chemical conveyance and feed pipelines in designated plastic or concrete trenches that would contain potential leaks and drain the leaking chemical(s) to a designated containment sump or tank, from where the chemical(s) would be evacuated and disposed of in compliance with all applicable federal, state, and local codes.

On average, seven trucks per week can be expected to deliver chemicals to the proposed desalination project site (during business days, Monday through Friday), which is considered consistent and compatible with the site's designation as an industrial area. The transportation of hazardous materials to the desalination facility would comply with all Caltrans regulations. The facility would utilize registered haulers to further reduce the potential for accidental release or exposure of these hazardous materials to the environment and individuals during transport.

The desalination facility operator would develop hazardous waste management and safety plans in accordance with City, Occupational Health and Safety Association (OSHA), and United States Environmental Protection Agency (EPA) requirements. In accordance with OSHA regulation 29 CFR 1910.119, operation of the proposed facility would require the preparation of a Process Safety Management Program (PSM), which is designed to prevent or minimize the consequences of catastrophic releases of toxic, reactive, flammable, or explosive chemicals. This PSM would provide the following preventative components:

- ❖ Employee participation plan;
- ❖ Process safety information;
- ❖ Process hazard analysis;
- ❖ Written operating procedures;
- ❖ Employee training requirements and written training programs;
- ❖ Inspection and maintenance program to document mechanical integrity;
- ❖ Preventative maintenance program;
- ❖ Contractor training requirements;
- ❖ Hot work cutting and welding permit procedures;
- ❖ Pre-startup safety review and management of change procedures;
- ❖ Compliance audit procedures;
- ❖ External emergency/non-emergency notification;
- ❖ Facilities training requirements; and
- ❖ Reportable quantities of on-site chemicals.

The project would also be in compliance with EPA Risk Management Planning (RMP) Rule 40 CFR 68, which would require the facility operator to register the facility with the EPA prior to on-site storage of hazardous chemicals. For security purposes, the desalination facility would allow site access to authorized personnel only via a secured entry point with a 24-hour guard. Impacts in regards to the long-term operational use, storage, and transport of hazardous materials involved in desalination facility operation are not anticipated to be significant.

Off-Site Pipeline Alignments and Underground Pump Stations

<u>Proposed Pipeline Alignments</u>

As stated above, the proposed off-site pipeline alignments would occur adjacent to a variety of land uses, primarily within existing street right-of-way and easements. No known areas of hazardous materials exist along the proposed alignments. In addition, hazardous materials impacts due to long-term operation of the pipelines are not anticipated to occur, as the only liquid proposed for conveyance is potable water.

OC-44 Pump Station

As stated previously in Section 3.0, *PROJECT DESCRIPTION*, two diesel-powered emergency backup electrical generators would be required for underground pump station implementation. Diesel fuel would be stored within an 8,700-gallon double walled tank with a diameter of eight feet and a height of 26 feet. The City of Irvine Fire Department (which provides service to the OC-44 pump station site) has no preference for either an aboveground or underground storage tank. However, an underground storage tank would be provided since the entire pump station vault would be located below grade, including the diesel generators. The storage tank would be located nearby but separate from the pump station vault and would feature a double-walled containment system with monitoring equipment to prevent and detect leakage. The tank would be contained within the surrounding soil and would supply diesel fuel to the generators (housed within the pump station vault) during power emergencies. Refilling of the tank would occur from the surface via filling ports, similar to the refilling process at a commercial gas station.

The proposed 8,700-gallon diesel fuel storage tank would be placed entirely underground and would be double walled as a preventative measure for leaks and spills. The tank would be buried separate from the underground vault containing the pump station and diesel-fueled emergency back-up electrical generators. In addition, monitoring equipment would be provided to prevent and detect leakage. Because the diesel storage tank would be placed underground and adequate safety measures would be implemented, impacts in regards to the off-site use, storage, and transport of hazardous materials are not anticipated to be significant.

Coastal Junction Pump Station

The Coastal Junction pump station would also require the storage of diesel fuel for the operation of one emergency backup electrical generator. As only one backup electrical generator would be needed, diesel storage capacity would be 1,300 gallons. This diesel fuel would be stored in a similar manner as the OC-44 pump station, and the same safety precautions (double-walled containment system, leakage monitoring equipment) would be incorporated into pump station design. Impacts in this regard are not anticipated to be significant.

MITIGATION MEASURES

None required, other than project design implementation of existing regulations and requirements.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

5.9 CONSTRUCTION RELATED IMPACTS

The purpose of this section is to discuss the short-term demolition, remediation, and construction related impacts of project implementation upon land uses adjacent to the proposed project site. This section examines possible short-term impacts with regards to hydrology and water quality, air, noise, aesthetics/light & glare, hazards and hazardous materials, and traffic. Information used in this section was obtained from the City of Huntington Beach General Plan (1996), City of Huntington Beach General Plan EIR (1995), the City's "Transportation System Needs Analysis 2000-2010" (September 12, 2000, approved by City Council October 2, 2000), the Biological Constraints Survey for the Poseidon Seawater Desalination Plant Pump Station, Orange County, California (May 16, 2002), Historical/Archaeological Resources Survey Report, Poseidon Seawater Desalination Plant Pump Station Site (June 10, 2002), the Southeast Coastal Redevelopment Plan Program Environmental Impact Report (January 23, 2002), and the Paleontological Resources Assessment Report, Poseidon Seawater Desalination Plant Pump Station Site (June 10, 2002).

EXISTING CONDITIONS

PROPOSED DESALINATION FACILITY SITE

On-Site Land Uses

The approximately 11-acre (seven acres for the desalination facility and four acres for the product water tank) site is located within the City of Huntington Beach, south of Hamilton Avenue, north of Pacific Coast Highway, east of Newland Street, and west of Magnolia Street. The proposed project site consists of three fuel storage tanks formerly used in conjunction with the Huntington Beach Generating Station (HBGS). For additional information regarding existing on-site features, refer to Section 4.0, *EXISTING CONDITIONS/ENVIRONMENTAL SETTING*, Section 5.1, *LAND USE/RELEVANT PLANNING,* Exhibit 3-2,*SITE VICINITY MAP*, Exhibit 3-3, *CONCEPTUAL PIPELINE ALIGNMENTS*, Exhibit 3-4, *OC-44 BOOSTER PUMP STATION LOCATION MAP*, Exhibit 3-5, *COASTAL JUNCTION BOOSTER PUMP STATION LOCATION* MAP, and Exhibit 5.7-1, *DESALINATION FACILITY SITE PHOTOGRAPHS*.

Adjacent Land Uses

Surrounding adjacent land uses include the HBGS to the southwest, a wetland area to the southeast, the Orange County Flood Control District (OCFCD) flood channel to the east, a fuel oil storage tank to the north, and an electrical switchyard to the west. Additional surrounding land uses include Pacific Coast Highway to the south, the Pacific Holdings storage tank facility to the east, Ascon/Nesi Landfill to the northeast, commercial, industrial, recreational, and residential uses to the north, and Newland Street, Huntington-By-The-Sea Mobile Home Park, and Cabrillo Mobile Home Park to the west.

The Huntington Beach Wetlands are situated southeast of the desalination site and occupy a 131-acre, 1.5 mile long area along the coast, bordered by Pacific Coast Highway to the southwest, and the Talbert and Santa Ana River Flood Control Channels to the north and southeast.[1] The wetlands are divided into two major components. To the southeast, the 17-acre Talbert Marsh opens to the ocean through a 100 foot-wide entrance adjacent to the mouth of the Santa Ana River. The Talbert Marsh is a recovering wetland area reintroduced to tidal influence on February 17, 1989.[2]

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[1] MEC, 1991.
[2] Reish and Massey, 1990.

The second component of the Huntington Beach wetlands, separated from the Talbert Marsh by Brookhurst Street, includes 89 privately-owned acres abutting the edge of the southeast corner of the proposed project site. This acreage has limited tidal access, and water sources are primarily limited to rainfall, urban runoff, and groundwater seepage.[3] Salinities are extremely high in the soils and seasonal ponds, water quality of the brackish water marsh is poor, and the area in general is considered degraded.[4] The remaining area of the Huntington Beach Wetlands includes almost 20 acres of open water channel of the Talbert Flood Control System.

The privately-owned area of the Huntington Beach wetlands (abutting the edge of the southeast corner of the desalination facility site) is primarily a seasonally flooded estuarine intertidal habitat dominated by pickleweed, along with other plant species that can tolerate high soil salinities and seasonal saturation and drought, such as saltgrass and alkali heath.[5] Many areas of the wetland are heavily disturbed and unvegetated. The back dune habitat along the Pacific Coast Highway supports a moderate number of species including introduced plant species. The dunes have been replanted with native plant species. The site functions as a seasonal wetland for some wildlife, while seasonal ponding in former tidal sloughs supports limited fish and invertebrate use.

The wetland area to the southeast of the desalination facility site is characterized primarily as southern coastal salt marsh. Southern coastal salt marsh is known to occur in bays, lagoons, and estuaries along the coast. Vegetation within this area is high quality with a few disturbed patches due to human encroachment. Vegetation types known to exist within southern coastal salt marsh in the vicinity of the project include:[6]

- common woody pickleweed (*Salicornia virginica);*
- alkali mallow (*Malvella leprosa);*
- alkali heath (*Frankenia salina*);
- curly dock (*Rumex crispus*);
- wild heliotrope (*Heliotropum curassavicum*);
- coastal saltgrass (*Distichlis spicata*);
- cocklebur (*Xanthium strumarium*);
- California encelia (*Encelia californica*);
- Alkali weed (*Cressa truxillensis*); and
- California marsh rosemary (*Limonium californicum*).

Wildlife species known to exist within the project area include:

- Monarch butterfly (*Danaus plexippus*);
- Cooper's hawk (*Accipiter cooperil*);
- Sharp-shinned hawk (*Accipiter striatus*);
- Northern harrier (*Circus cyaneus*);
- White-tailed kite (*Elanus leucurus*);
- Merlin (*Falco columbarius*);
- American peregrine falcon (*Falco peregrinus*);
- Western snowy plover (*Charadrius alexandrinus nivosus*);
- Long-billed curlew (*Numenius americanus*);
- California gull (*Larus californicus*);
- California least tern (*Sterna antillarum browni*);
- Elegant tern (*Sterna elegans*);
- Loggerhead shrike (*Lanius ludovicianus*); and
- Belding's savannah sparrow (*Passerculus sandwichensis beldingi*).

3 MEC, 1991.
4 Coats and Josselyn 1990, CDFG 1982, cited in MEC, 1991.
5 MEC, 1991.
6 Southeast Coastal Redevelopment Plan Program EIR, January 23, 2002.

Desalination Facility Demolition, Remediation, and Construction

Tank/Berm Demolition

Implementation of the Seawater Desalination Project at Huntington Beach would begin with the demolition of on-site fuel oil storage tanks and the removal of the interior portions of the containment berms surrounding the tanks. A total of three storage tanks exist on-site, with a diameter of 205 feet and a height of 40 feet (the "South", "West", and "East" fuel oil storage tanks). The fuel oil tanks consist of a thin, corrugated metal external shell and an internal layer of insulation. The external metal shells would be collected and sold as scrap. All tanks are seated on either concrete footings or piles, which would also need to be removed as part of the tank demolition process.

It is estimated that the South and East fuel oil tanks contain a total of 200,000 to 350,000 gallons of residual fuel oil remaining from former uses associated with the HBGS, while it is unknown how much fuel oil remains in the West tank. Precise amounts of remaining fuel oils would not be known until the tanks have been dismantled and inspected (however, for analysis within this section, a conservative assumption of 175,000 gallons per tank has been utilized). The contents of these tanks would either be transported to an appropriate industrial facility for reuse or disposed of at a suitable disposal site.

Each fuel storage tank is completely surrounded by a 10- to 15-foot high berm utilized to contain any accidental spillage of fuel from the tanks. Implementation of the proposed desalination facility would require the removal of the berms along the southern and western boundaries of the site, as well as the berm separating the South tank from the East tank (it should be noted that the existing northern berm is outside of project boundaries). The berm along the eastern boundary of the site (adjacent to the Huntington Beach Channel) would be left in place, as would the berms surrounding the proposed product water storage tank, except for a small access area. It is estimated that approximately 2,000 cubic yards of soil contained within the berms would be hauled off-site. It should be noted that a City-approved grading plan, grading permit, and haul route would be required prior to any excavation, remediation, or construction activities. It is estimated that a total of 140 truck trips for 2,000 cubic yards of soil (14 cubic yard trucks) would be required. Refer to Table 5.9-1, *DEMOLITION PROCESS DETAILS*, for more information.
Tank demolition would most likely proceed in the following sequence:

- Removal of residual product in the fuel oil tanks;
- Clean the interior of the tanks;
- Removal of interior layer of insulation;
- Dismantling and removal of external metal tank shell;
- Removal of concrete footings or piles; and
- Demolition and removal of containment berms.

The tank demolition phase of the project would result in an approximate total of 510 truck trips, which include the following:

- 60 trips for the removal of 380,000 gallons of fuel oil (6,500 gallon trucks loaded at 6,333 gallons per load);
- 30 trips for 30 tons of storage tank insulation (one-ton trucks);
- 110 trips for 110 tons of external storage tank shell material (one-ton trucks);
- 170 trips for 2,000 cubic yards of concrete footings or piles (14 cubic yard trucks); and
- 140 trips for 2,000 cubic yards of containment berm soil (14 cubic yard trucks).

Refer to Table 5.9-1, *DEMOLITION PROCESS DETAILS*, below.

Table 5.9-1
DEMOLITION PROCESS DETAILS

Activity / (Estimated Earth Export/Import or Other Material Quantity)	Total Activity Length (months)	Total Number of Truck Loads/ Construction Worker Trips	Maximum Number of One-way Truck Trips per Day
Removal of Residual Fuel Remaining in the Tanks (up to 380,000 gallons)	1	60	30
Removal of Tank Insulation (20 tons of metal)	1	30	12
Removal of External Metal Tank Shell (100 tons of metal)	1.5	110	28
Removal of Concrete Footings or Piles (2,000 CY)	1	170	20
Berms Demolition (2,000 CY)	1	140	40

Site Remediation

Areas surrounding the fuel storage tanks on the existing project site have been found to contain contaminants in exceedance of Regional Water Quality Control Board (RWQCB) thresholds.[7] It would not be known until after storage tank demolition if hydrocarbon contamination exists beneath the storage tanks. Prior to site grading, a Phase II hazardous materials evaluation and Remedial Action Plan (RAP) would be prepared to facilitate on-site remediation. However, such studies can only be prepared subsequent to storage tank demolition. Regardless, it is estimated that site remediation would require a total of 170 truck trips for 3,000 cubic yards of soil (14 cubic yard trucks).

Desalination Facility Construction

Construction of desalination facility components within project site boundaries would consist of a pretreatment filter structure, intake pump and pump station installations, reverse osmosis building, numerous pipelines, chemical storage/solids handling building, bulk chemical storage building, electrical substation building, various storage tanks, and an administration building. All buildings and structures on-site would be typical of water or wastewater plants, consisting of cast-in-place concrete and steel construction. All buildings on-site would be Type-II, non-rated. In addition, approximately 1,000 linear feet of pipeline would be installed to connect the desalination facility to the HBGS intake and outfall facilities. An intake and discharge pipeline would be installed from the southern portion of the subject site in a southerly direction, turning west near the HBGS acid retention basin, and connecting to the outfall facilities at HBGS. Refer to Exhibit 3-17, *DESALINATION FACILITY/HBGS COOLING WATER CONNECTION*. Facility construction is anticipated to result in approximately 1,300 trips for 18,800 cubic yards of soil for initial/final site grading (assuming 14 cubic yard trucks). Refer to Table 5.9-2, *SITE GRADING DETAILS*, for more information.

[7] Huntington Beach Generating Station Phase II Environmental Site Assessment. CH2M Hill, November 29, 1996.

Table 5.9-2
SITE GRADING DETAILS

Activity / (Estimated Earth Export/Import or Other Material Quantity)	Total Activity Length (months)	Total Number of Truck Loads/ Construction Worker Trips	Maximum Number of One-way Truck Trips per Day
Initial Site Grading (18,800 cubic yards)	2	1,300	30
Final Site Grading, Paving, and Landscaping (400 cubic yards)	5	30	8

OFF-SITE PIPELINES AND UNDERGROUND PUMP STATIONS

Proposed Pipeline Alignments

As stated previously, implementation of the proposed project would require the installation of up to 10 miles of 42- to 48-inch force main to convey water in an easterly direction to its ultimate destination within the City of Costa Mesa, east of State Route 55 (SR-55) at the intersection of Del Mar Avenue and Elden Avenue. The majority of the pipeline alignment would occur within existing public streets, easements, or other rights-of-way (ROW). Table 5.9-3, *PIPELINE ALIGNMENT DETAILS*, provides information regarding the lengths and characteristics of each pipeline alignment. Although precise pipeline alignments may be modified during final engineering analyses, the conceptual pipeline alignments are shown in Exhibit 3-3, *CONCEPTUAL PIPELINE ALIGNMENTS* and described in Section 3.0, *PROJECT DESCRIPTION.* Additional information regarding the pipeline alignment alternatives is included in Appendix G, *PRELIMINARY PIPELINE ASSESSMENT*.

Table 5.9-3
PIPELINE ALIGNMENT DETAILS

Route	Off Pavement (ft.)	Under Pavement (ft.)	Number of Trenchless Constructions
Primary Alignment	10,700	29,350	6
Alternative Alignment	0	30,000	6

As stated above, the pipeline alignment would require trenchless construction to cross waterways and roadways with a high sensitivity to traffic disturbance. The two methods under consideration are micro-tunneling or directional boring. Generally, micro-tunneling involves the excavation of two jacking and receiving pits, which are vertical excavations with shoring and bracing systems (one on each side of the waterway or roadway to be crossed). A micro-tunneling machine, equipped with either an auger or slurry material removing device, is lowered into the jacking pit and creates a tunnel connecting the jacking and receiving pits. The pipeline can then be installed within the underground tunnel.

Horizontal directional drilling involves the drilling of a pilot hole at a prescribed angle from one end of the waterway/roadway to be crossed to the other utilizing a pilot drill string. Once the pilot hole is complete, the hole must be enlarged to a suitable diameter for the pipeline. This is accomplished by "pre-reaming" the hole to an appropriate diameter. A reamer is attached to the drill string and is pulled through the pilot hole by a drilling rig. Large quantities of slurry are pumped into the hole to maintain the integrity of the hole and to flush out cuttings. Once the drilled hole is enlarged and the pipeline is prefabricated, a reamer is once again attached to the drill string, and the pipeline is connected behind the reamer via a swivel. The drilling rig then pulls the reamer and pipeline through the tunnel until surfacing at the opposite end, once again circulating high volumes of drilling slurry.

For lengths of the pipeline not utilizing trenchless construction (the majority of the pipeline), open trench construction techniques would be utilized. For open trenching, the minimum coverage for a 42- to 48-inch pipe would be at least five to six feet with two feet of available workspace on both sides of the pipe. This would require deep trenches (approximately nine to 10 feet) with appropriate shoring. The required size of any access construction pit would be a minimum of 20 feet by 30 feet and 15 feet by 15 feet for receiving pits. Dewatering operations may be necessary, especially in areas close to the Pacific Ocean within the City of Huntington Beach. Including required lay-down area for supplies and equipment, a 30-foot easement may be required for trenching operations. Refer to Table 5.9-4, *PIPELINE CONSTRUCTION DETAILS*, for more information.

Table 5.9-4
PIPELINE CONSTRUCTION DETAILS

Activity / (Estimated Earth Export/Import or Other Material Quantity)	Total Activity Length (months)	Total Number of Truck Loads/ Construction Worker Trips	Maximum Number of One-way Truck Trips per Day
Crossing of Flood Control Channel at Newland (1,200 CY)	4	90	12
Crossing of Talbert Drainage Channel (1,200 CY)	3	90	12
Removal of 30-inch OCWD Pipe (10 tons of pipe)	1.5	10	8
Soil Remediation (1,600 CY)	2	115	16
Crossing Santa Ana River and Greenville-Banning (2,400 CY)	2	180	20
Crossing Harbor Boulevard at Fair (1,200 CY)	3	90	12
Crossing 55 Freeway (1,200 CY)	3	90	12

OC-44 Pump Station

The off-site construction of an underground booster pump station would be required as part of the seawater desalination facility project in order to convey potable water from the subject site to southern Orange County. The pump station is proposed to be located entirely underground within an unincorporated area of the County of Orange, along the eastern border of the City of Newport Beach, approximately 1.5 miles south of the University of California, Irvine. The site is within the Orange County Resource Preservation Easement, approximately 0.5 miles north of the San Joaquin Reservoir, where the East Orange County Feeder Number Two and the OC-44 transmission pipelines converge (the proposed underground pump station would connect to the OC-44 pipeline). The pump would be electrically powered and would be placed within an underground vault so as to avoid noise and aesthetic impacts to surrounding uses, which include residential and open space uses.

The footprint of the proposed underground pump station would be approximately 110 feet wide by 110 feet long by 40 feet deep, and would include space for the pump station with wet well below. to separate rooms for the electrical generator and diesel-powered emergency backup generator. Also included as part of the underground booster pump station are telemetry equipment, appurtenances, and a surge tank. It is anticipated that the underground pump station would require the import or export of approximately 17,400 cubic yards of earthen material, requiring approximately 1,240 truck trips (14 cubic yard trucks). Refer to Table 5.9-5, *OC –44 BOOSTER PUMP STATION CONSTRUCTION DETAILS*, for more information. The construction process for the proposed underground booster pump station is expected to last approximately 18 months.

Table 5.9-5
OC-44 BOOSTER PUMP STATION CONSTRUCTION DETAILS

Activity / (Estimated Earth Export/Import or Other Material Quantity)	**Total Activity Length (months)**	**Total Number of Truck Loads/ Construction Worker Trips**	**Maximum Number of One-way Truck Trips per Day**
Initial Site Grading (400 CY)	1	30	8
Site Excavation (16,000 CY)	3	1,240	40
Site Final Grading and paving and Landscaping (1,000 CY)	3	70	20

Construction of the proposed off-site underground booster pump station within an unincorporated area of the County of Orange may have impacts in regards to biological and cultural resources. The proposed pump station site is approximately 0.5 acres in size and is undeveloped and currently overgrown with dense native vegetation. The site is situated within a County-designated Resource Preservation Easement designated as a Natural Community Conservation Plan (NCCP) area. While development restrictions exist for the Easement, the underground pump station would be sited in an area where underground facilities are allowed (two underground pump stations exist adjacent to the proposed pump station site). Existing conditions for biological and cultural resources are described below.

Biological Resources

Vegetation

The booster pump station site exists with dense riparian and upland vegetation types on-site. Riparian vegetation types on-site include mule fat scrub, wouldow scrub, freshwater marsh, and open water. Riparian species on-site include the following:

- mule fat (*Baccharis salicifolia*);
- arroyo wouldow (*Salix lasiolepis*);
- Fremont cottonwood (*Populus fremontii*);

- cattail (*Typha* sp.);
- reeds (*Scirpus* spp.);
- wild celery (*Apiastrum angusifolium*);
- western ragweed (*Ambrosia psilotachya*);
- prickly sow thistle (*Sonchus asper*); and
- pampas grass (*Cortaderia selloana).*

Upland vegetation types on-site include coastal sage scrub, California annual grassland, ruderal, ornamental, and developed. Upland species on-site include the following:

- California sunflower (*Encelia californica*);
- California sagebrush (*Artemisia californica*);
- coyote brush (*Baccharis pilularis*);
- black sage (*Salvia mellifera*);
- white sage (*Salvia apiana*);
- monkey flower (*Mimulus aurantiacus*);
- poison oak (*Toxicodendron diversilobum*);
- deer weed (*Lotus scoparius*);
- Mexican elderberry (*Sambucus mexicana);*
- lemonadeberry (*Rhus integrifolia*);
- coast prickly pear (*Opuntia littoralis*);
- California buckwheat (*Eriogonum fasciculatum*);
- California everlasting (*Gnaphalium californicum*);
- golden yarrow (*Eriophyllum confertiflorum*);
- black mustard (*Brassica nigra*);
- telegraph weed (*Heterotheca grandiflora*);
- tocalote (*Centaurea melitensis*);
- non-native grasses (*Avena* and *Bromus* spp.);
- gum trees (*Eucalyptus* spp.); and
- fan palm (*Washingtonia filifera*).

Wildlife

Vegetation types within the boundaries of the proposed booster pump station site provide moderate to high quality habitat for native wildlife species, including birds, amphibians, reptiles, mammals, and fish. Species either observed or expected to occur on-site include the following:

- red-tailed hawk (*Buteo jamaicensis);*
- Cooper's hawk (*Accipiter cooperi*);
- red-shouldered hawk (*Buteo lineatus*);
- mourning dove (*Zenaida macroura*);
- California quail (*Callipepla californica);*
- American crow (*Corvus brachyrhynchos*);
- house finch (*Carpodacus mexicanus*);
- northern mockingbird (*Mimus polyglottos*);
- California thrasher (*Toxostoma redivivum*);
- common yellowthroat (*Geothlypis trichas);*
- coastal California gnatchatcher (*Polioptila californica californica*);
- least Bell's vireo (*Vireo bellii bellii*);
- tree frog (*Hyla regilla*);
- African clawed frog (*Xenopus laevis*);
- western rattlesnake (*Crotalus viridis*);

- gopher snake (*Pituophis melanoleucus*);
- western fence lizard (*Sceloporus occidentalis*);
- side-blotched lizard (*Uta stansburiana*);
- alligator lizard (*Elgaria multicarinata*);
- San Diego horned lizard (*Phyrnosoma coronatum blainvillei*);
- northern red-diamond rattlesnake (*Crotalus ruber ruber*);
- southwestern pond turtle (*Clemmys marmorata pallida*);
- opossum (*Didelphis virginianus*);
- house mouse (*Mus musculus*);
- coyote (*Canis latrans*);
- raccoon (*Procyon lotor*); and
- mosquito fish (*Gambusia* sp.).

Special Status Habitat

Special status habitats are considered to be "depleted" by the California Department of Fish and Game (CDFG) and the County of Orange. Two special status habitats occur on or in the immediate vicinity of the subject site: riparian habitat (including mule fat scrub, wouldow scrub, freshwater marsh, and open water) and coastal sage scrub. In addition, riparian habitats may include wetlands, drainages, and "waters of the United States" which are protected under the jurisdiction of the U.S. Army Corps of Engineers and/or CDFG. It should also be noted that the pump station site is situated adjacent to, but outside of, a Natural Community Conservation Plan/Habitat Conservation Plan (NCCP/HCP) delineation zone, and the underground pump station would be subject to regulations as administered by the CDFG.

Special Status Plant and Wildlife Species

No federal- or state-listed threatened or endangered plant species are expected to occur within the boundaries of the proposed pump station site. However, several federal- and/or state-listed threatened or endangered wildlife species are known to occur in the subject site region, some of which are expected to occur on or in the immediate vicinity of the subject site. These include the coastal California gnatcatcher (federally-listed Threatened and state-listed Species of Special Concern), least Bell's vireo (federally- and state-listed Endangered), and southwestern pond turtle (federally-listed Species of Concern and state-listed Species of Special Concern). It should also be noted that the area has the potential to support raptor nesting habitat. A well-established red-tailed hawk nest was observed approximately 450 feet south of the subject site in a large gum tree.

For a detailed discussion of existing biological resources within and surrounding the proposed booster pump station site, refer to Appendix L, *UNDERGROUND BOOSTER PUMP STATION BIOLOGICAL CONSTRAINTS SURVEY.*

Cultural Resources

Historical/Archaeological Resources

No historical or archaeological resources are known to exist within the boundaries of the proposed booster pump station site. A total of 22 prehistoric archaeological sites are known to exist within a 0.5-mile radius of the subject site (none within or adjacent to the subject site), with eight having eligibility for listing in the National Register of Historic Places. In addition, historic maps indicate that the subject site vicinity appears to be low in sensitivity for historic resources. No buildings, structures, objects, sites, features, or artifacts over 50 years of age exist on-site.

Paleontological Resources

No paleontological localities have been discovered within the boundaries of the proposed booster pump station site or within a one-mile radius. However, some localities have been found elsewhere in the same sedimentary units as those found on the subject site. Because the site is part of the Topanga Formation (containing sediments deposited during the middle Miocene period, highly sensitive for marine invertebrate and vertebrate fossils), there is potential for disturbance of fossil remains during earth-moving operations. No fossil remains are known to exist on the ground surface on or surrounding the subject site.

For a detailed discussion of existing cultural resources within and surrounding the proposed booster pump station site, refer to Appendix M, *UNDERGROUND BOOSTER PUMP STATION CULTURAL RESOURCES ASSESSMENT REPORTS*.

Coastal Junction Pump Station

The Coastal Junction off-site underground booster pumping station would include pumps, telemetry equipment, appurtenances, and one diesel powered electrical generator for emergency back-up purposes. This generator would be a Caterpillar Model 3516 units or similar equipment and would supply approximately seven megawatts of emergency power for adequate operation of the pump station (in regards to flow and pressure). This diesel-powered generator would require a 1,300 gallon diesel fuel storage tank (assuming a 24-hour emergency period), with a diameter of six feet and a depth of 15 feet. The booster pumping station, including the generator and diesel fuel storage tank, would require a total footprint area of approximately 100' by 100' and would be placed entirely underground to maintain the appearance and functionality of the existing parking lot. Also refer to Table 5.9-6, *COASTAL JUNCTION BOOSTER PUMP STATION CONSTRUCTION DETAILS.* As the site is situated within a parking lot in an disturbed/urbanized area, no biological or cultural resources are anticipated to exist on-site.

Table 5.9-6
COASTAL JUNCTION BOOSTER PUMP STATION CONSTRUCTION DETAILS

Activity / (Estimated Earth Export/Import or Other Material Quantity)	Total Activity Length (months)	Total Number of Truck Loads/ Construction Worker Trips	Maximum Number of One-way Truck Trips per Day
Initial Site Grading (400 CY)	1	30	8
Site Excavation (16,000 CY)	3	1,240	40
Site Final Grading and paving and Landscaping (1,000 CY)	3	70	20

PROJECT PHASING

The demolition, remediation, and construction process of the proposed project would last approximately 24 months, including time necessary to acquire all required agreements, permits, and approvals. Project phasing would be divided into three categories described below:

1. **On-Site Desalination Facility Construction:** This portion of the proposed project would last approximately 24 months, and would include such activities as on-site demolition, grading/excavation, construction of desalination facilities, landscaping, and facility startup/testing. Import and export of earthen materials would occur primarily during the first six months and last four months of this phase of the project.

2. **Off-Site Product Water Transmission Pipeline Construction:** This portion of the project would last approximately 21 months, and would start about three months after the beginning of on-site desalination facility construction. This phase would include such activities as pipeline installation, implementation of pipeline under waterways/major roadways, soil remediation, removal of pipeline, and facility startup/testing. Import and export of earthen materials would occur primarily during the middle 12 months of this phase.

3. **Off-Site Product Water Underground Booster Pump Station Construction:** This phase of the proposed project would last approximately 18 months, and would begin approximately six months subsequent to the commencement of on-site desalination facility construction. This portion of the project would include such activities as grading/excavation/paving, pump station construction, emergency power generator construction, landscaping, and facility startup/testing. Import and export of materials would occur mainly within the first six months and final six months of the phase.

It should be noted that it is anticipated that all three phases would be implemented concurrently for the final 18 months of the proposed project.

IMPACTS

Significance Criteria

Significance criteria for construction related impacts are provided within each impact category below.

HYDROLOGY AND WATER QUALITY

Excavation, grading, and backfilling associated with project implementation are anticipated to generate erosive conditions that may include sediment laden storm run-off or dust. Pursuant to Appendix G of the Drainage Area Management Plan (DAMP) by the Orange County Stormwater Management Program, a National Pollution Discharge Elimination System (NPDES) Permit must be obtained from the Santa Ana Regional Water Quality Control Board (SARWQCB) for the demolition, remediation, and construction process. As part of the NPDES process, the project would also comply with the State of California general permit (including the submittal of a Notice of Intent to the SARWQCB) and would include the preparation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP would outline the source control and/or treatment control BMPs that would avoid or mitigate runoff pollutants at the construction site to the "maximum extent practicable". Implementation of BMPs as found in the Orange County NPDES Stormwater ProgramDAMP, and the Standard Specifications for Public Works Construction "Greenbook" which include such measures as use of sand bags and temporary dam building may be applied to sufficiently reduce sediment laden storm run-off. Additionally, area watering and limiting excavation, backfilling and grading activities to non-windy days would sufficiently control the amount of particulate matter that may migrate off-site. Therefore, this is not considered a significant impact with mitigation.

In addition, any dewatering activities due to excavation at the proposed desalination facility site are not anticipated to have significant impacts in regards to hydrology and water quality. As stated previously, dewatering discharge would be directed to a desilting system, and would be sampled and tested periodically to ensure compliance with all NPDES regulations. Should contaminated groundwater be encountered, a remediation contractor would remediate the groundwater prior to discharge into the sanitary sewer system or HBGS storm water system. The dewatering process would be a temporary procedure and would have no long-term impacts on groundwater quality in the project site vicinity. As no potable water supply or extraction wells exist within the vicinity of the subject site, no impacts to the potable groundwater supply would occur. Groundwater conditions would return to existing levels subsequent to the dewatering process, and no adverse impacts on the groundwater basin or seawater intrusion barrier are expected.

AIR QUALITY

Note: *Potential construction related air quality impacts of the proposed project have remained consistent with those described in the previously circulated EIR (2001). However, due to changes in regulatory standards since 2001, information has been added to this section to better describe the regulatory framework in the State and air basin, as well as additional impact analysis to demonstrate compliance with existing requirements.*

South Coast Air Quality Management District Thresholds

Under CEQA, the South Coast Air Quality Management District (SCAQMD) is an expert commenting agency on air quality and related matters within its jurisdiction or impacting its jurisdiction. Under the Federal Clean Air Act (FCAA) the SCAQMD has adopted federal attainment plans for ozone and PM_{10}. The SCAQMD reviews projects to ensure that they would not: 1) cause or contribute to any new violation of any air quality standard; 2) increase the frequency or severity of any existing violation of any air quality standard; or 3) delay timely attainment of any air quality standard or any required interim emission reductions or other milestones of any federal attainment plan.

The SCAQMD *CEQA Air Quality Analysis Guidance Handbook* provides significance thresholds for construction activities of projects within the SCAQMD jurisdictional boundaries. Exceedance of the SCAQMD thresholds could result in a potentially significant impact. However, the lead agency ultimately determines the thresholds of significance for impacts.[8] If the project proposes development in excess of the established thresholds, as illustrated in Table 5.9-7, *SCAQMD EMISSIONS THRESHOLDS,* a significant air quality impact may occur and additional analysis is warranted to fully assess the significance of impacts.

Table 5.9-7
SCAQMD EMISSIONS THRESHOLDS

PHASE	Pollutant (lbs/day)				
	ROG	NO_X	CO	SO_X	PM_{10}
Construction	75	100	550	150	150
Source: SCAQMD, *CEQA AQMD Air Quality Analysis Guidance Handbook,* page 6-1, April 1993.					

8 South Coast Air Quality Management District, *CEQA Air Quality Handbook,* April 1993.

Diesel Toxics Risk Factors

Estimates of potencies and RELs are derived from experimental animal studies or from epidemiological studies of exposed workers or other populations. Uncertainty arises from the application of potency or REL values derived from this data to the general human population. There is debate as to the appropriate levels of risk assigned to diesel particulates since the U.S. Environmental Protection Agency (EPA) has not yet declared diesel particulate matter (DPM)s as a toxic air contaminant. The SCAQMD typically applies a risk level of one in a million as the *de minimis* risk level. However, this type of reporting is only applicable to large populations (such as entire air basins) where the sample group is large and the exposure time is long (which is not the case for typical project-level construction projects).

Odor-based Thresholds

Projects emanating objectionable odors near existing sensitive receptors or other land uses where people may congregate could constitute a significant air quality impact to existing uses. Also, residential or other sensitive receptor projects built for the intent of attracting people near existing odor sources could also cause a significant air quality impact. The SCAQMD suggests a threshold based on the distance of the odor source from people and complaint records for a facility or similar facility. The threshold would be more than one confirmed complaint per year averaged over a three-year period, or three unconfirmed complaints per year averaged over a three-year period. Many of the air contaminants, which may be emitted at the proposed project, have odor thresholds based on empirical data.[9] These thresholds would be utilized to determine the potential to create objectionable odors (i.e. these pollutants would be treated as odor surrogates for comparison against modeled emission concentrations at the maximum point of impact).

Methodologies

The following models and guidelines are used as tools to create the analytical basis for the construction related impact analysis. The tools are discussed below. Note that Section 5.4, *AIR QUALITY* utilized the EMFAC2002 air quality model for long-term operational impacts, due to the project's minimal area source and vehicular related emissions. The construction process, which would generate substantially more mobile emissions, is modeled utilizing the Urbemis2002 model, which more accurately calculates mobile source impacts.

Urbemis2002[10, 11]

Construction emissions are considered short-term impacts and are temporary in nature. URBEMIS2002 estimates construction related emission as if all construction were ongoing at the same time with all paving and architectural coatings applied in the last year. This analysis utilized the emission factors from URBEMIS2002 for the construction analysis. URBEMIS2002 operational emissions are comprised of two separate sources, area sources (i.e. emissions from space heating, landscape maintenance) and mobile sources. These emissions are calculated for the build out period and take into account future fleet mixes and emission controls.

URBEMIS2002 was developed to provide meaningful analysis of both short and long term impacts, and to encourage mitigation measures during project planning. Discrete URBEMIS2002 analysis is limited to annual periods. URBEMIS2002 uses a simplified set of emission factors to estimate

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9 Nagata, *Measurement of Odor Threshold by Triangle Odor Bag Method*, 2002.

10 Jones and Stokes, *Software User's Guide: URBEMIS2002 for Windows with Enhanced Construction Module*, 2003.

11 Note: Unlike Section 5.4, *AIR QUALITY* (which utilizes the EMFAC model), this section utilizes URBEMIS2002 to calculate construction related air emissions. EMFAC does not have the capability to calculate construction equipment emissions. Thus, URBEMIS2002 is the appropriate model for this analysis .

impacts separately for predetermined construction periods and for operational periods as independent events and does not factor in: small discrete periods of project overlap, incremental periods smaller than one year, individual build out rates for each particular element of construction, schedule utilization of individual pieces of equipment, pro-ration for occupancy rate, retrofit technology over the life of equipment, pollutant reactivity or pollutant transport.

Where site specific or project specific data were available, URBEMIS2002 factors were modified to fit with the information (e.g. construction worker trips, demolition details, grading details, etc.). Where little or no information was available for a project, default values were selected (in the case of this project, only the distance that construction workers would be commuting was set to the URBEMIS2002 default). For the cumulative analysis, air emissions that occur in the South Coast Air Basin (SCAB) were utilized.

Screen3

For the purposes of diesel toxics analysis, construction vehicle pollutant emission generators would consist entirely of construction activities associated with rough-grading operations (which is the worst-case pollution emission scenario). The analysis methodology utilized in this report is based upon the SCAQMD *CEQA Air Quality Handbook CEQA Handbook Guidelines* for construction operations. Construction emissions were based upon the EPA AP-42 Report generation rates identified by the SCAQMD for the various classes of diesel construction equipment.

A screening risk assessment of diesel-fired toxics from construction haul trucks was performed using the SCREEN3 dispersion model developed by the EPA's Office of Air Quality Planning and Standards. The SCREEN3 model uses a Gaussian plume dispersion algorithm that incorporates source-related and meteorological factors to estimate pollutant concentration from continuous sources. It is assumed that the pollutant does not undergo any chemical reactions, and that no other removal processes, such as wet or dry deposition, act on the plume during its transport from the source.

Using the aforementioned concentrations obtained from the screening model, the diesel toxic risk can be defined as the following:

$$Risk = \frac{F_{wind} \times EMFAC \times URF_{70\,year\,exposure}}{Dilution}$$

where:

Risk = is the excess cancer risk (probability in one-million);

F_{wind} = is the frequency of the wind blowing from the exhaust source to the receptor (the default value is 1.0);

EMFAC = the exhaust particulate emission factor (the level from the screening model);

$URF_{70\ year\ exposure}$ is = the CARB unit risk probability factor (300 x 10^{-6}, or 300 in a million cancer risk per μg/m^3 of diesel combustion generated PM_{10} inhaled in a 70-year lifetime based upon the California Air Resources Board (CARB)*CARB 1999 Staff Report from the Scientific Review Panel [(SRP)] on Diesel Toxics*); and,

Dilution is = the atmospheric dilution ratio during source-to-receptor transport (the default value of 1.0 assumes no dilution)

Given the above assumptions for wind frequency and atmospheric dilution ratio, and substituting the CARB recommended value for the unit risk probability factor gives the following expression:

$$Risk = \frac{1 \times EMFAC \times 300x10^{-6}}{1} = 300x10^{-6} \times EMFAC \quad \text{per person}$$

Thus, the percentage of risk of cancer to any given person being exposed to a concentration of pollution equal to EMFAC (in $\mu g/m^3$) over a continuous period of 70-years would be:

$$Risk(\%) = (300x10^{-6} \times EMFAC) \times 100 = 300x10^{-4} \times EMFAC \quad \text{per person}$$

Where it can be directly stated that a risk percentage of, say, 25% would indicate a 25% probability of inhaled cancer risk for the given level of exposure (EMFAC) if consumed continuously for a period of 70-years. A 50% probability would correspond to a 50:50 chance of inhaled cancer risk if consumed continuously for a period of 70 years, and so on.

For the construction-related diesel-fired toxics analysis, an area-source consistent in dimensions with the proposed grading area is assumed. A simplified terrain model (which is consistent with the area surrounding the project site) with no building downwash corrections and a worst-case wind direction is utilized.

Impacts

Future construction of the project site would generate short-term air quality impacts during demolition, grading and construction operations. The short-term air quality analysis considers temporary impacts from the project. Construction activities would include:

- Clearing, grading, excavating and using heavy equipment or trucks creating large quantities of fugitive dust, and thus PM_{10};
- Heavy equipment required for grading and construction generates and emits diesel exhaust emissions; and
- The vehicles of commuting construction workers and trucks hauling equipment generate and emit exhaust emissions.

Construction of the project has been divided into three distinct phases: proposed desalination facility site construction, proposed off-site pipeline alignment construction, and off-site underground pump station construction. Although the project has been divided in three different phases, all phases would occur concurrently, and therefore must be analyzed and compared to SCAQMD thresholds as a whole.[12] As previously mentioned, the construction of the entire project is anticipated to take place within a period of 24 months (two years).

The entire project would include site grading for an estimated total of eleven acres. Construction equipment used for grading includes graders, off-highway trucks, off-highway tractors and scrapers. Building and paving equipment includes cranes, construction trucks, tractors, pavers, paving equipment, excavators and tractors/loaders/backhoes. Exhaust emission factors for typical diesel-powered heavy equipment are based on the URBEMIS2002 program defaults. Exhaust emissions would vary substantially from day to day. Numerous variables factored into estimating total construction emissions include: level of activity, length of construction period, number of pieces/types of equipment in use, site characteristics, weather conditions, number of construction personnel and the amount of materials to be transported on-site or off-site. Refer to Appendix B, *AIR*

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[12] Telephone conversation with Steve Smith, South Coast Air Quality Management District, November 17, 2004.

QUALITY DATA, for a listing of mobile and stationary construction equipment included in these calculations. Computer model results are also included in Appendix B.

Fugitive Dust Emissions

Construction activities are a source of fugitive dust (PM10) emissions that may have a substantial, temporary impact on local air quality. In addition, fugitive dust may be a nuisance to those living and working in the project vicinity. Fugitive dust emissions are associated with land clearing, ground excavation, cut and fill operations, and truck travel on unpaved roadways (includes demolition activities). Dust emissions also vary substantially from day to day, depending on the level of activity, the specific operations, and weather conditions.

Fugitive dust from grading and construction is expected to be short-term and would cease following project completion. Additionally, most of this material is inert silicates, rather than the complex organic particulates released from combustion sources, which are more harmful to health. Dust (larger than 10 microns) generated by such activities usually becomes more of a local nuisance than a serious health problem. Of particular health concern is the amount of PM10 (particulate matter smaller than 10 microns) generated as a part of fugitive dust emissions. As previously discussed, PM10 poses a serious health hazard; alone or in combination with other pollutants. The SCAQMD regulates fugitive dust emissions through Rule 403, which aims to reduce the amount of particulate matter entrained in ambient air by requiring actions to prevent, reduce, or mitigate emissions. Such actions include watering during site grading, limiting the speed of construction vehicles, and minimizing the area of disturbance, among others.

The URBEMIS2002 computer model calculates PM10 fugitive dust as part of the site grading emissions (refer to Table 5.9-8, *CONSTRUCTION EMISSIONS*). With implementation of standard construction practices and recommended mitigation measures regarding dust control techniques (i.e., daily watering), limitations on construction hours, and adherence to standard construction practices (requires watering for inactive and perimeter areas, track out requirements, etc.) fugitive dust impacts would be substantially reduced. In addition, the project would comply with the SCAQMD Rule 403 to reduce PM10 impacts. Impacts from PM10 fugitive dust would be less than significant.

Construction Equipment and Worker Vehicle Exhaust

Exhaust emissions from construction activities include emissions associated with the transport of machinery and supplies to and from the on-site desalination facility, off-site product water pipeline locations and the underground booster pump stations. Emitted pollutants would include CO, ROG, NO_X, SO_X, and PM_{10}. As indicated within Table 5.9-8, *CONSTRUCTION EMISSIONS* construction activities would exceed the SCAQMD threshold for NO_X. The project would result in approximately 221,051 cubic yards of soil hauling attributed to grading and excavation from all three separate phases of the project. The export of excess soil would result in additional truck hauling trips, which increases NO_X emissions. Construction equipment and worker vehicle exhaust emissions would be considered significant and unavoidable despite the implementation of standard construction practices and recommended mitigation measures requiring all construction equipment being maintained in proper tune, shutting down equipment when not in use for extended periods of time and utilizing electric equipment for construction whenever possible in lieu of fossil fuel-fired equipment.

Table 5.9-8
CONSTRUCTION EMISSIONS

Emissions Source	Pollutant (pounds/day)[1]				
	ROG	NO_X	CO	PM_{10}	SO_x
Year 1					
On-site Desalination Facility	17.5	119.91	143.65	14.59	0.01
Off-Site Product Water Pipeline	17.4	117.67	140.12	5.35	0.01
Site Product Water Underground Booster Pump Stations Construction	17.6	116.84	146.02	5.57	0.01
Total Un-mitigated Emissions	*52.5*	353.26	429.79	25.51	0.03
SCAQMD Thresholds	**75**	**100**	**550**	**150**	**150**
Is Threshold Exceeded After Mitigation?	***NO***	***YES***	***NO***	***NO***	***NO***
Mitigated Emissions[2]					
On-site Desalination Facility	17.5	119.91	143.65	6.66	0.01
Off-Site Product Water Pipeline	17.4	117.67	142.11	4.35	0.00
Site Product Water Underground Booster Pump Stations Construction	17.6	116.84	146.02	4.78	0.01
SCAQMD Thresholds	75	100	550	150	150
Total Mitigated Emissions	*52.5*	353.26	429.79	15.79	0.03
Is Threshold Exceeded After Mitigation?	***NO***	***YES***	***NO***	***NO***	***NO***
Year 2					
On-site Desalination Facility	22.64	149.24	181.90	5.73	0.00
Off-Site Product Water Pipeline	17.4	113.81	142.11	4.35	0.00
Site Product Water Underground Booster Pump Stations Construction	17.58	113.66	147.16	5.21	0.01
Total Un-mitigated Emissions	57.62	376.71	471.17	15.29	0.01
SCAQMD Thresholds	75	100	550	150	150
Is Threshold Exceeded After Mitigation?	***NO***	***YES***	***NO***	***NO***	***NO***
Mitigated Emissions[2]					
On-site Desalination Facility	22.64	149.24	181.90	5.73	0.0
Off-Site Product Water Pipeline	17.44	113.81	142.11	4.35	0.0
Site Product Water Underground Booster Pump Stations Construction	17.58	113.66	147.16	4.42	0.01
Total Mitigated Emissions	57.62	376.71	471.17	14.5	0.01
SCAQMD Thresholds	75	100	550	150	150
Is Threshold Exceeded After Mitigation?	***NO***	***YES***	***NO***	***NO***	***NO***

CO = Carbon Monoxide ROG = Reactive Organic Gases PM_{10} = Particulate Matter NO_X = Nitrogen Oxides SO_X = Oxides of Sulfur

NOTES:

1. Emissions calculated using the URBEMIS2002 Computer Model as recommended by the SCAQMD.
2. The reduction/credits for construction emission mitigations are based on mitigations included in the UREBMIS 2002 computer model and as typically required by the SCAQMD. Mitigations include the following: proper maintenance of mobile and other construction equipment, replace ground cover in disturbed areas quickly, water exposed surfaces twice daily, cover stock piles with tarps, water all haul roads twice daily and reduce speed limitation on unpaved roads to 15 miles per hour.

Refer to Appendix B, *Air Quality Data*, for assumptions used in this analysis, including quantified emissions reduction by mitigation measures.

ROG Emissions

In addition to gaseous and particulate emissions, the application of asphalt and surface coatings creates ROG emissions, which are O_3 precursors. In accordance with the methodology prescribed by the SCAQMD, the ROG emissions associated with paving have been quantified with the URBEMIS2002 model. All architectural coatings for proposed project structures would need to be in compliance with Regulation XI, Rule 1113 – *Architectural Coating,* listed in the SCAQMD Rules and Regulations.[13] Rule 1113 provides specifications on painting practices as well as the ROG contents within paints used for within the District. It is anticipated that ROG emissions would be well below SCAQMD thresholds.

Toxic Air Contaminants

Diesel particulate matter is part of a complex mixture that makes up diesel exhaust. Diesel exhaust is commonly found throughout the environment and is estimated by the EPA's National Scale Assessment to contribute to human health risk. Diesel exhaust is composed of two phases, either gas or particle and both phases contribute to the risk. The gas phase is composed of many of the urban hazardous air pollutants, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, formaldehyde and polycyclic aromatic hydrocarbons. The particle phase also has many different types of particles that can be classified by size or composition. The size of diesel particulates that are of greatest health concern are those in the categories of fine, and ultra fine particles. The composition of these fine and ultra fine particles may be composed of elemental carbon with adsorbed compounds such as organic compounds, sulfate, nitrate, metals and other trace elements. Diesel exhaust is emitted from a broad range of diesel engines; the on road diesel engines of trucks, buses and cars and the off road diesel engines that include locomotives, marine vessels and heavy duty equipment.

Health Risk Assessments (HRA) for Diesel Particulate Matter (DPM) are typically conducted for areas that would expose sensitive receptors to high concentrations of DPM over a long period of time. Typically, per the California Office of Environmental Health Hazard Assessment (OEHHA) and California Air Pollution Control Officers Association (CAPCOA) guidelines, estimating cancer risk for DPM is not required for construction activities as they occur for a short period of time and therefore would not measurably increase cancer risk. However, in order to provide a conservative analysis for construction impacts, a health risk screening analysis was performed using the EPA approved SCREEN3 model.

To be consistent with the approaches used for other toxic pollutants, a functional comparison of the risk probability per individual person exposed to construction contaminants would be examined. This approach has the advantage of not needing to quantify the population of the statistical group adjacent to the construction site as well as allowing the per-person risk to be expressed as a final percentage. Of course, for a large enough population sample (i.e., a million people) the results are the same as CARB's predictions.

Construction vehicle pollutant emission generators would consist primarily of haul truck activities such as earthwork haulage, concrete delivery and other suppliers, graders and pavers, contractor vehicles, and ancillary operating equipment such as diesel-electric generators and lifts. Construction emissions utilized within the SCREEN3 model were taken from the URBMIS2002 construction outputs for the proposed project (refer to Table 5.9-8, *CONSTRUCTION EMISSIONS*). According to the construction schedule for the project, a majority of the demolition and grading would take place within the first year of construction,

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13 South Coast Air Quality Management District, http://www.aqmd.gov/rules/reg/reg11_tofc.html, November 10, 2004.

which would result in greater particulate matter emissions. Although all stable criteria pollutants are provided, it should be noted that for cancer-risk potential, only PM_{10} is the single contributing factor. Therefore, emissions during the first year of construction were utilized in the SCREEN3 analysis as a worst case scenario. In addition to PM_{10}, SCREEN3 also calculates predicted emissions for non-carcinogenic contaminants, including CO, NO_x, and SO_x.

As illustrated in Table 5.9-8, *CONSTRUCTION EMISSIONS* construction operations were found to generate daily pollutant levels of 429.79 pounds/day of CO, 353.26 pounds/day of NO_x, 0.03 pounds/day of SO_x, and 15.79 pounds/day of PM_{10}. These emissions are assumed to occur over any given 24-hour day (thereby providing an upper bound on expected emission concentrations) and direct comparison with the California Ambient Air Quality Standards (CAAQS). The proposed project development has a working area of roughly 11 acres or 44,516 square-meters (36,422 m^2). Based upon the on-site emission levels identified above, the aggregate emission rates for the various criteria pollutants in grams per second and grams per square-meter (m^2) per second (required as the input parameters for the SCREEN3 model) are given below in Table 5.9-9, *PREDICTED PROJECT EMISSION RATES*. This methodology essentially applies all of the diesel emissions over this working area and provides a worst-case assessment of the impacts to sensitive receptors.

Table 5.9-9
PREDICTED PROJECT EMISSION RATES

Criteria Pollutant	Daily Site Emission Rates (grams/second)	Average Area Emission Rates (grams/m^2/second)
CO	2.25	4.31×10^{-5}
NO_x	1.57	6.17×10^{-5}
SO_x	0.000157	4.31×10^{-10}
PM_{10}	0.83	2.28×10^{-5}

Notes:
1. Total averaging time is 24 hours x 60 minutes/hour x 60 seconds/minute = 86,400 seconds per CAAQS standards.
2. One pound-mass = 453.592 grams

The expected diesel-fired construction emission concentrations from the SCREEN3 model are shown in Table 5.9-10, *SCREEN3 PREDICTED EMISSION CONCENTRATIONS*. Based upon the model results, all criteria pollutants were below the recommended risk level with a PM_{10} risk probability of 0.34% per 70-year exposure duration. A less than significant impact is expected due to proposed construction operations.

NOISE

The proposed project would involve the remediation and demolition of existing fuel oil storage tanks, the construction of the proposed seawater desalination project, the installation of up to ten miles of pipeline within primarily within existing public streets, easements, or other rights -of-way (ROW), and the implementation of two off-site underground booster pump stations. The noise level for the construction of the seawater desalination facility would vary during the construction period, depending upon the construction phase.

TABLE 5.9-10
SCREEN3 Predicted Emission Concentrations

Criteria Pollutant	Pollutant Concentration (μg/m^3)	Pollutant Concentration (ppm)	Pollutant Risk Probability (percent risk per person for 70-year exposure)	California Standards	Significant?
CO	310.0	0.27	n/a	9.0(ppm)	**No**
NO_x	216.3	0.115	n/a	0.04(ppm)	**No**
SO_x	0.021	0.000008	n/a	0.25(ppm)	**No**
PM_{10}	11.44	- -	0.34%	20(μg/m^3)	No

Notes:

1. Diesel risk calculated using: $Risk(\%) = (300x10^{-6} \times EMFAC) \times 100 = 300x10^{-4} \times EMFAC$, based upon CARB 1999 Staff Report from the Scientific Review Panel (SRP) on Diesel Toxics inhaled in a 70-year lifetime.
2. Conversion Factors (approximate):
   - *CO: 1 ppm = 1,150 μg/m^3 at 25 deg-C Standard Temperature and Pressures (STP)*
   - *NO_X: 1 ppm = 1,880 μg/m^3 at 25 deg-C STP*
   - *SO_X: 1 ppm = 2,620 μg/m^3 at 25 deg-C STP*
   - *PM_{10}: 1 ppm = 1 g/m^3 (solid)*

The demolition, remediation, and construction process of the proposed desalination facility would last approximately 24 months. Project phasing would be divided into three separate categories, composed of: 1) on-site desalination facility construction (lasting approximately 24 months); 2) off-site product water transmission pipeline construction (lasting approximately 21 months, beginning about three months after the commencement of on-site desalination facility construction); and 3) off-site product water underground booster pump station construction (lasting approximately 18 months, beginning about 6 months after the start of construction for the on-site desalination facility). During the project implementation process, adjacent sensitive receptors would be exposed to sporadic high noise levels and groundborne vibration associated with remediation, demolition and construction activities (as a result of power tools, jack-hammers, truck trips, pile-drivers, etc.).

As stated above, sensitive receptors exist in the subject site vicinity, the nearest being residential uses approximately 500 feet west of the desalination facility site. These sensitive receptors are located within a primarily industrial area, and are typically exposed to noise generated by the HBGS, industrial uses along Edison Avenue, and high levels of automobile traffic along Beach Boulevard, Pacific Coast Highway, and Magnolia Street. Various sensitive receptors exist along the two alternative pipeline alignments, including residential areas, open space/recreational uses, medical facilities and schools. Open space and residential uses are located adjacent to the proposed off-site underground pump stations located within unincorporated County of Orange and the City of Irvine. The more intense remediation, demolition, and construction noise (including the driving of sheet piles) would occur for brief periods of typically two to four weeks. In addition, the proposed project would require off-site import/export of soils as part of the site grading process. Any off-site truck traffic associated with desalination project implementation would utilize the existing access road located off of Newland Street.

The loudest equipment types generally operating at a site during each phase of construction are presented in Table 5.9-11, *SEAWATER DESALINATION FACILITY CONSTRUCTION EQUIPMENT NOISE LEVELS*. The composite average or equivalent site noise level, representing noise from all equipment, is also presented in the table for each major activity.

Table 5.9-11
SEAWATER DESALINATION FACILITY CONSTRUCTION EQUIPMENT NOISE LEVELS

Construction Phase	Loudest Construction Equipment	Equipment Noise Level at 50 feet (dBA)	Composite Site Noise Level at 50 feet (dBA)
Facility Construction	Forklift (2) Track Mount Crane (1) Wheel Mount Crane (1) Flatbed Truck (2)	75 75 75 88	91.4
Pipeline Construction	Backhoe (1) Compactor (1) Derrick Crane (1) Flatbed Truck (1)	85 80 88 88	92.2
Source: J.D. Barnes, et. al., *Power Plant Construction Noise Guide*, 1977.			

To calculate the noise level at a given distance from a noise source, the noise levels are mathematically propagated using the Inverse Square Law of Noise Propagation. Briefly, this formulation states that noise decreases by approximately 6 dBA with every doubling of the distance from the source. This methodology is represented as:

$L_2 = L_1 - 20 \log (R_2/R_1)$

Where:

L_2 = Noise level at a selected distance R_2 from the source.
L_1 = Noise level measured at a distance R_1 from the source.

Given the following values:

Desalination Facility Construction

$_{max}L_1$ = 91.4 dBA (per Table 5.9-11).
R_1 = 50 ft. (distance from equipment, Table 5.9-11).
R_2 = 1,000 ft. to nearest residential uses west of the subject site

Pipeline Construction

$_{max}L_1$ = 92.2 dBA (per Table 5.9-11).
R_1 = 50 ft. (distance from equipment, Table 5.9-11).
R_2 = 150 ft. to nearest residential uses along pipeline alignment (approximate average)

Applying the above Inverse Square Law formula, the construction noise levels at residential uses adjacent to the Desalination Facility and pipeline alignment would be 65.4 dBA and 82.7 dBA respectively. Since this level of noise is higher than typical ambient environmental noise levels, the construction noise would likely be audible during traffic lull period levels. Table 5.9-12, *CONSTRUCTION NOISE EXEMPTION PERIODS* outlines the hours that City of Huntington Beach, City of Irvine, City of Costa Mesa and the County of Orange exempt construction noise.

Table 5.9-12
CONSTRUCTION NOISE EXEMPTION PERIODS

Jurisdiction	Weekday Exempt Periods	Weekend Exempt Periods
City of Huntington Beach[1]	7 AM to 8 PM	7 AM to 8 PM
City of Costa Mesa[2]	7 AM to 8 PM	8 AM to 6 PM
City of Irvine[3]	7 AM to 7 PM	9 AM to 6 PM
County of Orange[4]	8 AM to 7 PM	8 AM to 7 PM

Notes:
1 – Per Section 8.40.090 of the City of Huntington Beach Municipal Code. Additionally, construction noise is prohibited on Sundays and Federal Holidays.
2 – Per Section 13-279 of the City of Costa Mesa Municipal Code. Additionally, construction noise is prohibited on Sundays and Federal Holidays.
3 – Per Section 6-8-205 of the City of Irvine Municipal Code. Additionally, construction noise is prohibited on Sundays and Federal Holidays.
4 – Per Section 4-6-7 of the County of Orange Code of Ordinances. Additionally, construction noise is prohibited on Sundays and Federal Holidays.

The proposed project would adhere to the above time restrictions to reduce the construction noise impact to adjacent sensitive uses. With the incorporation of the time restriction, as well as standard control measures, construction noise impacts are considered less than significant. All truck traffic, including traffic associated with pipeline implementation, would be subject to a truck and construction vehicle routing plan and would comply with all City/County noise regulations. It should also be noted that no significant noise related impacts would occur at the OC-44 underground booster pump station that would be located along the eastern border of the City of Newport Beach, as it is outside of the NCCP/HCP area. Pre-construction focused bird surveys would be performed, and any potential construction noise impacts would be mitigated as required by applicable regulatory agencies. Construction impacts to biological resources are further discussed below in this section under *BIOLOGICAL RESOURCES.*Given this information, a temporary increase in noise and groundborne vibration from remediation, demolition, and construction is expected to be less than significant with implementation of standard construction practices.

PUBLIC SERVICES AND UTILITIES

The demolition, remediation, and construction process for implementation of both on- and off-site components of the proposed project is not anticipated to result in impacts to public services. However, the proposed project (especially the installation of product water pipeline) may impact utilities in regards to damage or disruption of underground facilities such as water/sewer pipelines, electrical conduits, underground cable television or telephone wiring, and natural gas mains. On- and off-site grading and excavation would occur only after the project engineer has identified the locations of underground utilities.

Should implementation of the product water pipeline conflict with existing subsurface utilities such as sewer or storm water gravity systems, either the proposed pipeline or existing utility would be rerouted. It should be noted that although the new Effingham sewer lift station is located along the Alternative Pipeline Alignment, pipeline construction would avoid this facility and disruption of service would not occur. In the event that a gravity line or other utility cannot be rerouted, the 42- to 48-inch transmission line would be installed either above or below the existing utility (since the water flowing through the proposed pipeline would be under pressure, routing the line under the utility would not affect its operation). In cases where a gravity line or other existing utility can be rerouted, the utility would be routed underneath the proposed pipeline, if possible. Gravity lines would be fitted with a siphon section to allow flow to continue uninterrupted during proposed pipeline implementation. The proposed water transmission pipeline would have adequate sanitary separation from sewer facilities, and, if necessary, the Applicant would obtain necessary permits/approvals from the Department of Health Services (DHS) for portions of the pipeline in restricted zones. Impacts in this regard are not anticipated to be significant.

In addition, the project would require trenchless construction beneath the Huntington Beach Channel as part of the product water pipeline portion of the project. The County of Orange has improved this channel by driving sheet piles 24 feet below ground to achieve a greater level of flood protection.[14] Impacts in this regard are anticipated to be less significant.

AESTHETICS/LIGHT & GLARE

Demolition, remediation, and construction debris, associated mechanical equipment and high levels of truck traffic may adversely impact views of and across the project site, including the pipeline alignment and underground pump station locations. Construction and remediation activities on the proposed desalination project site would be visible from Huntington-By-The-Sea Mobile Home Park (located to the west), Beach Boulevard (located to the west), limited locations along Hamilton Avenue (located to the north), limited locations along Huntington State and Huntington City Beaches (located to the south), and from the vicinity of the intersection of Magnolia Street and Pacific Coast Highway (located to the southeast). However, these impacts would not be considered significant, as they would be short-term in nature. Standard construction measures such as chain link fencing and nylon mesh would be utilized to screen the staging and construction areas from site visitors and the general public at the proposed desalination project site and underground pump station sites. In addition, a staging area for equipment associated with the demolition, remediation, and construction process would be situated within HBGS property boundaries.

HAZARDS AND HAZARDOUS MATERIALS

The short-term demolition, remediation, and construction process of the proposed project may have adverse impacts with regards to hazardous materials. Remediation activities could expose on-site workers, future project employees, and the adjacent community to a variety of potentially hazardous materials. However, site remediation activities are strictly controlled by local, state, and federal requirements, and the majority of contamination in the vicinity of the proposed desalination project site is petroleum-based (which is not considered "toxic" or acutely hazardous). In addition, contaminated soils may be encountered along the proposed pipeline alignment (especially in the vicinity of the proposed desalination facility) as well as on the proposed pump station site. Therefore, compliance with the required mitigation measures (including a Remedial Action Plan subject to regulatory agency approval prior to project implementation for contaminated areas) is expected to reduce potential impacts to less than significant levels.

No known plugged and abandoned oil wells exist within the project boundaries. However, several plugged and abandoned oil wells are located within proximity to the project site.. If possible, development over these wells would be avoided. Should development over a plugged/abandoned well be necessary, the well would be plugged or re-plugged in accordance with current Division of Oil, Gas and Geothermal Resources (DOGGR) specifications. Should any unrecorded or unknown wells be encountered during the excavation or grading process, the construction contractor would immediately report and coordinate with the City of Huntington Beach Fire Department and DOGGR to ensure adequate actions are taken.

Implementation of the water transmission pipeline portion of the project may create potential impacts due to landfill gas generation (particularly methane) from the former Cannery Street Landfill, located at the northwestern corner of Hamilton Avenue and Magnolia Street (currently developed as Edison Community Center/SCE easement). Both pipeline alignment alternatives would pass directly south of the former landfill within Hamilton Avenue. However, pipeline construction in the vicinity of the former Cannery Street landfill would comply with all local, state, and federal regulations in regards to landfill gas. Standard construction practices would be implemented to determine the potential for

[14] Telephone conversation with Albric Ghokasian, OCFCD, November 23, 2004.

landfill gas and, if deemed necessary, appropriate gas detection, venting, and/or barrier system would be implemented to reduce impacts to less than significant levels.

In addition, potential groundwater contamination beneath the subject site may pose a short-term health threat to on-site workers and adjacent land uses during dewatering operations. Groundwater pumped from the project site would be continually monitored for pollutants, and if detected, would be treated prior to discharge to the sanitary sewer system or stormwater facilities. As dewatering operations would meet all federal, State and local criteria for groundwater contaminants, impacts in this regard would be less than significant.

In addition, demolition of existing on-site fuel oil storage tanks may expose persons to asbestos containing materials (ACMs) and/or lead based paint. Existing tanks on-site are constructed with a layer of insulation potentially containing asbestos. The proposed project is not expected to present significant health hazards, as carefully controlled removal operations would comply with all applicable Federal, State, and County regulations, in addition to measures imposed by the City of Huntington Beach and local agencies. Should asbestos or lead based paint be discovered on-site, a licensed asbestos/lead abatement contractor would be retained to remove the hazardous materials prior to the demolition of any structures. All ACMs would be removed in accordance with SCAQMD Rule 1403. No structures would be demolished along the pipeline alignment, as the pipeline alignment would occur within existing public streets, easements, or other rights-of-way (ROW). In addition, the two proposed booster pump location sites are void of structures, thereby eliminating the possibility of asbestos insulation or lead based paint on-site. Impacts are not anticipated to be significant.

TRAFFIC

Implementation of the proposed project may cause short-term, construction-related traffic impacts. The demolition, remediation and construction process would generate traffic in the site vicinity through on-site construction worker vehicle trips and truck trips. However, the City of Huntington Beach's adopted "Transportation System Needs Analysis 2000-2010" (September 12, 2000, approved by City Council October 2, 2000) indicates that no existing deficient street segments (LOS D or worse) surround the subject site. The nearest deficient segment is located along Pacific Coast Highway (PCH), between Beach Boulevard and Huntington Street, to the west of the proposed desalination project site. The truck trips to and from the project site would utilize Beach Boulevard to PCH to Newland Street, thereby minimizing impacts to the deficient segment of PCH located west of the project site. As the truck route would utilize Beach Boulevard from PCH north to the I-405 freeway, the portion of Beach Boulevard from Garfield Avenue to Ellis Avenue (also designated as deficient by the City's "Transportation System Needs Analysis 2000-2010") may be temporarily impacted by short-term demolition, remediation, and construction. However, a Traffic Management Plan would be prepared for the demolition, remediation and construction phases of the proposed project in order to mitigate these short-term impacts to less than significant levels.

Pipeline construction for product water delivery would require temporary disruption along public streets, as the majority of the pipeline is proposed to be installed within existing street right-of-way (ROW) utilizing open trench construction methods. Trenchless construction methods would be utilized to cross roadways sensitive to traffic disruption, such as Brookhurst Street and SR-55. Adequate staging areas would be provided for both open trench and trenchless construction in order to minimize the amount of traffic disruption. In addition, a Traffic Management Plan would be prepared for the pipeline implementation phase of the proposed project in order to mitigate impacts to less than significant levels. The Traffic Management Plan would include measures to minimize traffic impacts due to pipeline implementation, such as the use of plating to reopen travel lanes during peak traffic hours as well as maintaining access to businesses and residences.

In addition, a new pipeline would be necessary to connect existing HBGS intake and outfall facilities to the proposed desalination project. It is not anticipated that the pipeline would require the relocation of structures, utilities, or other AES facilities. The pipeline connecting HBGS facilities to the proposed desalination project would exist entirely within HBGS property boundaries, and would not affect public roadways. Pipeline construction would be short-term in nature, and appropriate mitigation measures would be implemented to reduce impacts on the HBGS to less than significant levels, including provision of temporary parking areas.

Traffic impacts are not anticipated to occur upon implementation of the underground booster pump stations, as the pump station sites are proposed to occur within an Orange County Resource Preservation Easement and a church parking lot and would not require the closure or impede access to any roadways.

BIOLOGICAL RESOURCES

Proposed Desalination Facility Site

Construction of the proposed desalination facility would not directly impact the existing wetland area situated to the southeast of the proposed site, as the facility is proposed entirely within the existing fuel oil storage tank area. Rather, construction-related impacts have the potential to occur indirectly in regards to air quality, noise, light/glare, and storm water runoff. However, as stated above, any such impacts would be short-term in nature and would cease following completion of the project. Construction at the desalination facility would only occur during the hours allowed by the City of Huntington Beach Noise Ordinance (7:00 AM to 8:00 PM).

Western snowy plover (*Charadrius nivosus,* federally-listed as threatened and a state species of concern) forage primarily on sand at the beach-surf interface where they feed on small invertebrates. Snowy plovers nest most commonly on sandspits, dune-backed beaches, beach strands and open areas near river mouths and estuaries.[15] Western snowy plover is a winter migrant in southern California and a localized breeding resident April through September.[16] Reduced tidal influence in the marsh adjacent to the proposed project make it unlikely that western snowy plover would forage in this area. Plovers would also be unlikely to nest in this, or other adjacent marsh areas due to human activity. Western snowy plover nesting was last observed in the area in 1993, when one nesting pair was observed at the protected California least tern breeding area located on the Huntington State Beach.[17]

Belding's savannah sparrow (*Passerculus sandwichensis beldingii*, state-listed as endangered) may use the pickleweed of the Huntington Beach wetlands for breeding, nesting and feeding habitat.[18] Construction impacts, including short-term, temporary noise disturbance, could lead to disruption in Belding's savannah sparrow nesting activities in the marsh adjacent to the project site. Adult birds are likely to avoid areas of construction and operational impacts, minimizing potential effects on adults. In order to minimize potential construction impacts to nesting savannah sparrows, a pre-construction nesting survey would be performed by a qualified biologist in consultation with applicable regulatory agencies. Adequate mitigation (such as relocation, construction noise abatement measures, etc.) would be implemented as appropriate based on the findings of the pre-construction survey. All focused surveys for sensitive biological resources performed prior to proposed project implementation would include a review of data within the California Natural Diversity Data Base (CNDDB) to obtain current information on any previously reported sensitive

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15 Thelander and Crabtree, 1994.
16 AES and URS, 2000.
17 Personal communication, Jonathan Snyder, United States Fish and Wildlife Service, 2003.
18 MEC, 1991.

species/habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

California least tern (*Sterna antillarum brownii*, state- and federally-listed as endangered) are known to fly over the Huntington Beach wetlands, and to feed in the open water of the Talbert Channel.[19] Least terns forage on small shallow-water fish such as anchovies and topsmelt.[20] In order to provide abundant food for their chicks, California least terns breed in loose colonies along the coast near areas of seasonally abundant small fish, such as estuaries, river mouths and shallows. Nests are shallow depressions in sandy open areas with little vegetation. Nests and chicks are highly vulnerable to predation from native and introduced predators. A protected 7.9-acre California least tern breeding area is located on the Huntington State Beach between the Talbert Marsh opening and the mouth of the Santa Ana River, approximately 5,000 ft south east of the proposed project area. Typically 200 to 300 nesting pairs of California least terns utilize this breeding site each year.[21] This area is likely to be unaffected by construction impacts.

Upon adherence to construction standards administered by the City of Huntington Beach, and upon implementation of recommended mitigation measures, impacts to the adjacent wetland area are not anticipated to be significant.

Off-Site Pipelines and Underground Pump Stations

Proposed Pipeline Alignments

Implementation of the proposed project may result in impacts to waterways due to "frac-outs" potentially occurring during pipeline construction. "Frac-outs" occur when drilling fluids (usually bentonite) seep to the surface via cracks in the ground. Prior to the performance of any directional boring, the applicant would prepare a Frac-Out Contingency Plan. The plan would establish criteria under which a bore would be shut down (e.g., loss of pressure, loss of a certain amount of returns) and the number of times a single bore should be allowed to frac-out before the bore is shut down and reevaluated. It would also clearly state what measures would be taken to seal previous frac-outs that have occurred on a given bore to ensure that it does not become the path of least resistance for subsequent frac-outs. Additionally, the site-specific Frac-Out Contingency Plan would be prepared and reviewed by the City Engineer and appropriate resource agencies prior to each major bore.

OC-44 Booster Pump Station

Construction of the proposed OC-44 underground booster pump station may have impacts on biological resources, as the 0.5-acre site is overgrown with dense native vegetation known to support numerous species of wildlife. Pump station construction may impact two special status habitats (riparian and coastal sage scrub) on-site and may adversely affect several federal- or state-listed species (coastal California gnatcatcher, least Bell's vireo, and western pond turtle) expected to occur within the immediate vicinity of the subject site. The applicant would consult with applicable regulatory agencies during the permit application process to determine the precise location of the underground pump station that would minimize impacts to surrounding biological resources. During project design and after the exact location has been determined, the following focused surveys would be performed, if necessary:

- Prior to construction, three coastal California gnatcatcher surveys would be performed for the subject site (preferably during the gnatcatcher breeding season) in accordance with the United States Fish and Wildlife Service (USFWS) and CDFG regulations for development

19 MEC, 1991.
20 Thelander and Crabtree, 1994.
21 Personal communication, Keane, 2001.

within a NCCP region. If the gnatcatcher were detected on or adjacent to the site, consultation and permitting through the USFWS would be required.

- In addition, a focused survey utilizing USFWS protocols for the least Bell's vireo would be performed prior to pump station construction. This protocol requires that eight surveys be conducted at least 10 days apart during the vireo nesting season of April through July. If this species is found to occur on or adjacent to the subject site, consultation and permitting through the USFWS would be necessary. If construction can avoid the nesting season, this survey may not be required.
- As pump station construction may also impact the southwestern pond turtle, a habitat assessment conducted by a qualified biologist experienced with the species would be performed. If adequate habitat is observed, a trapping program may be required to determine the presence or absence of this species. If present, the pond turtles would be trapped and relocated prior to construction to mitigate impacts to this species to less than significant levels.
- A survey for active raptor nests would be conducted 30 days prior to commencement of any construction activities during the raptor breeding season between February 1 and June 30. Any occupied nests found during survey efforts would be mapped on construction plans. Restrictions on construction activities may be required in the vicinity of the nest until the nest is no longer active as determined by a qualified biologist.

According to the 1995 County of Orange Central & Coastal Subregion Natural Community Conservation Plan & Habitat Conservation Plan (NCCP/HCP), the OC-44 pump station to be placed adjacent to the NCCP/HCP area would not be situated within or near a designated "special linkage" area. The purpose of "special linkage" areas is to "maintain connectivity between core coastal sage scrub habitat areas within the subregion, to improve biological linkages between the subregional reserve system and adjacent NCCP subregions, and to provide for other target species habitat located outside the reserve system." The nearest "special linkage" area to the proposed underground booster pump station site is the Coyote Landfill Special Linkage area, situated approximately 2,000 feet to the east. The El Capitan Special Linkage Area is located approximately one mile to the south. Implementation of the proposed off-site underground pump station is not anticipated to impact either of these "special linkage" areas. In addition, the underground pump station site would be situated outside the NCCP/HCP boundary, adjacent to an urbanized area.

In addition, according to Appendix L of the Draft EIR, *UNDERGROUND BOOSTER PUMP STATION BIOLOGICAL CONSTRAINTS SURVEY*, the proposed OC-44 site may include areas within the jurisdiction of the Army Corps of Engineers (ACOE) or California Department of Fish and Game (CDFG). Should the potential for such areas continue to exist after the site is specifically located (outside of NCCP/HCP boundaries), a jurisdictional delineation in accordance with the Corps' Wetland Delineation Manual would be performed to determine the existence and/or extent of jurisdictional area. Adequate mitigation measures shall be implemented in consultation with the ACOE and CDFG during the permit application process, if necessary.

As the proposed underground pump station would include all necessary biological surveys and comply with standard regulations as required by the USFWS, ACOE, and CDFG, impacts to biological resources are not anticipated to be significant (refer to Appendix L, *UNDERGROUND BOOSTER PUMP STATION BIOLOGICAL CONSTRAINTS SURVEY*, for additional information). It should also be noted that any displaced vegetation would be replaced. All focused surveys for sensitive biological resources performed prior to proposed project implementation would include a review of data within the California Natural Diversity Data Base (CNDDB) to obtain current information on any previously reported sensitive species/habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

Coastal Junction Booster Pump Station

As the Coastal Junction pump station is proposed within a church parking lot in a disturbed area, no impacts to biological resources are anticipated.

CULTURAL RESOURCES

Four archaeological studies have been conducted within a half-mile radius of the proposed desalination facility site. Of these studies, one encompasses the project site. This study found two archaeological sites, although none were found at the HBGS facility.[22] In addition, no historic properties have currently been recorded at or nearby the subject site by the State Historic Resources Inventory list. However, due to the sedimentary deposits known to exist in the project area and due to the site's proximity to the coastal resources and fossil production from similar nearby sites, the project area is considered to have a high potential for producing paleontological resources. As such, a qualified paleontologist would be retained to monitor grading operations, and, if necessary, to salvage scientifically significant fossil remains. The paleontologist would have the authority to temporarily divert or direct grading efforts to allow evaluation and any salvage of exposed fossils. Upon implementation of recommended mitigation, significant cultural resources impacts at the proposed desalination facility site are not anticipated to occur.

As no historical or archaeological resources are known to exist within or surrounding the proposed booster pump station sites, impacts are not anticipated to be significant in this regard. However, should buried historical/archaeological resources be discovered during construction, all work in that area would be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

However, as the OC-44 pump station site is underlain by sediments deposited during the middle Miocene period, there is a high potential for the existence of middle Miocene invertebrate fossils and lower potential for middle Miocene vertebrate and Pleistocene vertebrate/invertebrate fossils. As such, a paleontological resource recovery program for Miocene invertebrate fossils would be performed for proposed underground pump station implementation. Earth-moving activities excavating lower than five feet would be monitored for paleontological resources, and a program to mitigate potential impacts to paleontological resources if exposed or unearthed during excavations would also apply (in accordance with the proposed guidelines of the Society of Vertebrate Paleontology). With the implementation of recommended mitigation measures, impacts to paleontological resources are not expected to be significant (refer to Appendix M, *UNDERGROUND BOOSTER PUMP STATION CULTURAL RESOURCES ASSESSMENT REPORTS*, for more information).

MITIGATION MEASURES

HYDROLOGY AND WATER QUALITY

CON-1 Concurrent with the submittal of the Grading Plan, the Applicant shall submit an Erosion Control Plan to the City of Huntington Beach Department of Public Works which would include the following measures:

a) Where necessary, temporary and/or permanent erosion control devices, as approved by the Department of Public Works, shall be employed to control erosion and provide safety during the rainy season from October 15th to April 15th.

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22 Southeast Coastal Redevelopment Plan Program EIR, January 23, 2002.

b) Equipment and workers for emergency work shall be made available at all times during the rainy season. Necessary materials shall be available on-site and stockpiled at convenient locations to facilitate the rapid construction of temporary devices when rain is imminent.

c) Erosion control devices shall not be moved or modified without the approval of the Department of Public Works.

d) All removable erosion protective devices shall be in place at the end of each working day when the 5-day rain probability forecast exceeds 40%.

e) After a rainstorm, all silt and debris shall be removed from streets, check berms and basins.

f) Graded areas on the permitted area perimeter must drain away from the face of the slopes at the conclusion of each working day. Drainage is to be directed toward desilting facilities.

g) The permittee and contractor shall be responsible and shall take necessary precautions to prevent public trespass onto areas where impounded water creates a hazardous condition.

h) The permittee and contractor shall inspect the erosion control work and ensure that the work is in accordance with the approved plans.

i) Water shall be applied to the site twice daily during grading operations or as otherwise directed by the County of Orange Inspector in compliance with South Coast AQMD rule 403 (Fugitive Dust Emissions). A grading operations plan may be required including watering procedures to minimize dust, and equipment procedures to minimize vehicle emissions from grading equipment.

CON-2 Construction of the project shall include Best Management Practices (BMPs) as stated in the Drainage Area Management Plan (DAMP) by the Orange County Stormwater Management Program. BMPs applicable to the project include the following:

❖ Potential pollutants include but are not limited to: solid or liquid chemical spills; wastes from paints, stains, sealants, glues, limes, pesticides, herbicides, wood preservatives and solvents; asbestos fibers, paint flakes, or stucco fragments; fuels, oils, lubricants, and hydraulic, radiator, or battery fluids; fertilizers, vehicle/equipment wash water and concrete wash water; concrete, detergent, or floatable wastes; wastes from any engine/equipment steam cleanings or chemical degreasing; and superchlorinated potable water line flushings.

❖ During construction, disposal of such materials should occur in a specified and controlled temporary area on-site, physically separated from potential stormwater run-off, with ultimate disposal in accordance with local, state, and federal requirements.

CON-3 As part of its compliance with the NPDES requirements, the Applicant shall prepare a Notice of Intent (NOI) to be submitted to the Santa Ana Regional Water Quality Control Board providing notification and intent to comply with the State of California general permit. Prior to construction, completion of a Storm Water Pollution Prevention Plan (SWPPP) would be required for construction activities on-site. A copy of the SWPPP shall be available and implemented at the construction site at all times.

CON-4 Prior to any dewatering activities, the Applicant shall obtain and comply with a general dewatering NPDES permit from the Santa Ana Regional Water Quality Control Board.

CON-5 The Applicant shall submit a dewatering plan for review and approval by the Santa Ana Regional Water Quality Control Board and the City of Huntington Beach Department of Public Works. The Applicant would comply with the approved dewatering plan.

CON-6 The Applicant shall inform the Orange County Water District (OCWD) of its plans for on-site dewatering, and, if necessary, would acquire necessary permits and approvals from the OCWD to ensure that no adverse impacts on the groundwater basin or seawater intrusion barrier occur as a result of the proposed project. The Applicant would comply with any approved dewatering permits or plans.

CON-7 During dewatering operations, a survey program shall be conducted on surrounding properties and structures to ensure that movement or settlement from on-site dewatering operations does not occur. This survey program would be subject to approval by the City Engineer.

CON-8 Should on-site dewatering operations require discharge into the sanitary sewer system, the Applicant shall obtain applicable permits and approvals from the Orange County Sanitation District (OCSD) and City of Huntington Beach Department of Public Works. Should the dewatering discharge be directed to existing AES stormdrain facilities, the Applicant shall ensure that dewatering is addressed in the Applicant's SARWQCB NPDES permit.

AIR QUALITY

CON -9 The project shall comply with SCAQMD Rule 402, which prohibits the discharge from a facility of air pollutants that cause injury, detriment, nuisance, or annoyance to the public or that damage business or property.

CON-10 During clearing, grading, earth moving, or excavation operations, excessive fugitive dust emissions shall be controlled by regular water or other dust preventive measures using the following procedures, as specified in the SCAQMD Rule 403.

- On-site vehicle speed shall be limited to 25 miles per hour.
- All material excavated or graded would be sufficiently watered to prevent excessive amounts of dust. Watering would occur at least twice daily with complete coverage, preferable in the late morning and after work is done for the day.
- All material transported on-site or off-site would be either sufficiently watered or securely covered to prevent excessive amounts of dust.
- The area disturbed by clearing, grading, earth moving, or excavation operations would be minimized so as to prevent excessive amounts of dust.
- These control techniques would be indicated in project specifications. Compliance with the measure would be subject to periodic site inspections by the City.
- Visible dust beyond the property line emanating from the project would be prevented to the maximum extent feasible.

NOISE

CON-11 Prior to the issuance of any grading permits, the Applicant shall ensure evidence acceptable to the City of Huntington Beach Department of Planning and Public Works that:

- ❖ All construction vehicles or equipment, fixed or mobile, operated within 1,000 feet of a dwelling shall be equipped with properly operating and maintained mufflers;
- ❖ All operations shall comply with the City of Huntington Beach Municipal Code Chapter 8.40 (Noise Control);
- ❖ Stockpiling and/or vehicle staging areas shall be located as far as practicable from residential areas; and
- ❖ Notations in the above format, appropriately numbered and included with other notations on the front sheet of grading plans, would be considered as adequate evidence of compliance with this condition.

CON-12 Should the project require off-site import/export of fill material during demolition, remediation, and construction, trucks shall utilize a route that is least disruptive to sensitive receptors, preferably Newland Street to Pacific Coast Highway to Beach Boulevard to I-405. Construction trucks shall be prohibited from operating on Saturdays, Sundays and federal holidays.

CON-13 To reduce project-related construction noise impacts generated by the proposed project, the following conditions shall be implemented:

- ❖ Construction activities shall be limited to hours specified by the City Noise Ordinance; and
- ❖ Unnecessary idling of internal combustion engines shall be prohibited.

PUBLIC SERVICES AND UTILITIES

CON-14 Unless underground utility locations are well documented, as determined by the City of Huntington Beach Public Works Department, the project engineer shall perform geophysical surveys to identify subsurface utilities and structures, the findings of which shall be incorporated into site design. Pipelines or conduits which may be encountered within the excavation and graded areas shall either be relocated or be cut and plugged according to the applicable code requirements.

AESTHETICS/LIGHT & GLARE

CON-15 During construction, a security fence, the height of which shall be determined by the City of Huntington Beach Department of Building and Safety, shall be installed around the perimeter of the site. The construction site shall be kept clear of all trash, weeds, etc.

CON-16 Construction activities, to the extent feasible, shall be concentrated away from adjacent residential areas. Equipment storage and soil stockpiling shall be at least 100 feet away from adjacent residential property lines.

HAZARDS AND HAZARDOUS MATERIALS

CON-17 Prior to excavation of the contaminated and other areas for rough grading, the project site shall be cleared of all excess vegetation, surface trash, piping, debris and other deleterious materials. These materials shall be removed and disposed of properly (recycled if possible).

CON-18 Proper excavation procedures shall be followed to comply with OSHA's Safety and Health Standards. If applicable, the South Coast Air Quality Management District (SCAQMD) Rule 1166 permit shall be obtained prior to the commencement of excavation and remedial activities.

CON-19 The contractor shall follow all recommendations contained within the adopted Remedial Action Plan for the project site.

CON-20 If asbestos or lead-based paints are identified in any on-site structures, the contractor shall obtain a qualified contractor to survey the project site and assess the potential hazard. The contractor shall contact the SCAQMD and the City of Huntington Beach Departments of Planning, Building and Safety, and Fire prior to asbestos/lead paint removal.

CON-21 If any hazardous materials not previously addressed in the mitigation measures contained herein are identified and/or released to the environment at any point during the site cleanup process, operations in that area shall cease immediately. At the earliest possible time, the contractor shall notify the City of Huntington Beach Fire Department of any such findings. Upon notification of the appropriate agencies, a course of action would be determined subject to the approval of the by the City of Huntington Beach Department of Public Works.

CON-22 All structures must be cleaned of hazardous materials prior to off-site transportation, or hauled off-site as a waste in accordance with applicable regulations.

CON-23 Structure removal operations shall comply with all regulations and standards of the SCAQMD.

CON-24 The contractor shall post signs prior to commencing remediation, alerting the public to the site cleanup operations in progress. The size, wording and placement of these signs shall be reviewed and approved by the City of Huntington Beach Departments of Planning and Public Works.

CON-25 Any unrecorded or unknown wells uncovered during the excavation or grading process shall be immediately reported to and coordinated with the City of Huntington Beach Fire Department and State Division of Oil, Gas, and Geothermal Resources (DOGGR).

CON-26 During remediation, if any soil were found to be hazardous due to contamination other than petroleum hydrocarbons, it would be segregated, stockpiled, and handled separately.

CON-27 Dust and volatile organic emissions from excavation activities shall be controlled through water spray or by employing other approved vapor suppressants including hydromulch spray in accordance with Regional Water Quality Control Board (RWQCB) Waste Discharge Requirements and the South Coast Air Quality Management District (SCAQMD) permit conditions.

CON-28 Prior to the excavation process for pipeline construction, the contractor shall coordinate with the County of Orange's Integrated Waste Management Department in order to ensure that proposed pipeline construction does not impact drainage of the former Cannery Street Landfill.

CON-29 Methane migration features would be consistent with the requirements of the City of Huntington Beach Specification Number 429 and other applicable state and federal regulations. The methane migration features shall be submitted for review and approval to the Orange County Health Care Agency (OCHCA), Environmental Health Division.

CON-30 Studies to evaluate the potential for landfill gas (LFG) generation and migration would be completed prior to implementation of the proposed water delivery component of the project. Appropriate mitigation measures would be coordinated with the South Coast Air Quality Management District, Solid Waste Local Enforcement Agency, Regional Water Quality Control Board, and the City of Huntington Beach Fire Department. Mitigation measures could entail active or passive extraction of LFG to control surface and off-site migration and passive barriers with vent layers and alarm systems below trenches and within 1,000 feet of the former Cannery Street Landfill boundary. A comprehensive monitoring network would be established along the pipeline alignment adjacent to the landfill. Periodic monitoring of the monitoring network would be performed.

TRAFFIC

CON-31 A Traffic Management Plan (TMP) shall be prepared and implemented to the satisfaction of the affected jurisdiction within which the facilities are to be constructed when the facilities are to be located where construction would affect roadways. The TMP shall include, but not be limited to, the following measures:

- ❖ Limit construction to one side of the road or out of the roadbed where possible;
- ❖ Provision of continued access to commercial and residential properties adjacent to construction sites;
- ❖ Provide alternate bicycle routes and pedestrian paths where existing paths/ routes are disrupted by construction activities, if any;
- ❖ Submit a truck routing plan, for approval by the City of Huntington Beach, County, and other responsible public agencies in order to minimize impacts from truck traffic during material delivery and disposal;
- ❖ Where construction is proposed for two-lane roadways, confine construction to one-half of the pavement width. Establish one lane of traffic on the other half of the roadway using appropriate construction signage and flagmen, or submit a detour plan for approval by the City Traffic Engineer;
- ❖ The Traffic Management Plan shall be approved by affected agencies at least two weeks prior to construction. Per Caltrans requirements, the applicant shall submit the Traffic Management Plan to Caltrans at the 90-percent design phase;
- ❖ Construction activities shall, to the extent feasible, be coordinated with other construction activity taking place in the affected area(s); and

- Provide for temporary parking, where necessary, during installation of pipelines within the AES site.

CON-32 Prior to initiating the removal of structures and contaminated materials, the contractor must provide evidence that the removal of materials would be subject to a traffic control plan, for review and approval by the by the City of Huntington Beach Department of Public Works. The intent of this measure is to minimize the time period and disruption of heavy duty trucks.

CON-33 Construction related activities would be subject to, and comply with, standard street use requirements imposed by the City of Huntington Beach, County and other public agencies, including the use of flagmen to assist with haul truck ingress and egress of construction areas and limiting the large size vehicles to off-peak commute traffic periods.

CON-34 The Contractor shall obtain the necessary right-of-way encroachment permits and satisfy all permit requirements. Nighttime construction may be performed in congested areas. Also, any nighttime construction activities shall have prior approval by the City of Huntington Beach Department of Public Works.

CON-35 During periods of heavy equipment access or truck hauling, the Contractor would provide construction traffic signage and a construction traffic flagman to control construction and general project traffic at points of ingress and egress and along roadways that require a lane closure.

CON-36 The Applicant shall coordinate with the Department of Public Works, Traffic Engineering Division in developing a truck and construction vehicle routing plan. This plan shall include the approximate number of truck trips and the proposed truck haul routes. It shall specify the hours in which transport activities can occur and methods to mitigate construction related impacts to adjacent residents and the surrounding area. The plan shall take into consideration any street improvement construction occurring in the vicinity. These plans must be submitted for approval to the Department of Public Works.

BIOLOGICAL RESOURCES

CON-37 Prior to construction on the proposed booster pump station site, three focused coastal California gnatcatcher surveys shall be performed in accordance with USFWS protocols, preferably during the gnatcatcher breeding season. Should the species be observed on or adjacent to the site, consultation and permitting through the USFWS would be required.

CON-38 Prior to construction on the proposed booster pump station site, eight focused least Bell's vireo surveys shall be performed for the off-site underground booster pump station (at least 10 days apart during the vireo nesting season of April and July) in accordance with USFWS protocols. Should the species be observed on or adjacent to the site, consultation and permitting through the USFWS would be required. This measure may not be necessary if construction phasing can avoid the vireo nesting season.

CON-39 Prior to construction on the proposed booster pump station site, a qualified biologist shall perform a habitat assessment for the southwestern pond turtle. If habitat for this species is observed, a trapping program would be implemented to determine the presence or absence of these species. If present, pond turtles must be trapped and relocated prior to the start of construction.

CON-40 A survey for active raptor nests shall be performed by a qualified biologist 30 days prior to the commencement of construction activities on the proposed booster pump station site. Any occupied nests discovered during survey efforts shall be mapped on construction plans for the site. If recommended by the biologist, restrictions on construction activities may be required in the vicinity of the nest until the nest is no longer active.

CON-41 Prior to the commencement of any directional boring for water conveyance pipeline implementation, the applicant shall prepare a Frac-Out Contingency Plan. The plan shall establish criteria under which a bore would be shut down (e.g., loss of pressure, loss of a certain amount of returns) and the number of times a single bore should be allowed to frac-out before the bore is shut down and reevaluated. It would also clearly state what measures would be taken to seal previous frac-outs that have occurred on a given bore to ensure that it does not become the path of least resistance for subsequent frac-outs. Additionally, the site-specific Frac-Out Contingency Plan would be prepared and reviewed by the City Engineer and appropriate resource agencies prior to each major bore.

CON-42 In order to minimize potential construction impacts to nesting savannah sparrows adjacent to the proposed desalination facility, a pre-construction nesting survey would be performed by a qualified biologist in consultation with applicable regulatory agencies. Should nesting savannah sparrows be found, adequate mitigation (such as relocation, construction noise abatement measures, etc.) would be implemented as appropriate based on the findings of the pre-construction survey.

CON-43 All focused surveys for sensitive biological resources performed prior to proposed project implementation shall include a review of data within the California Natural Diversity Data Base (CNDDB) to obtain current information on any previously reported sensitive species/habitat, including Significant Natural Areas identified under Chapter 12 of the Fish and Game Code.

CON-44 Prior to implementation of the proposed off-site booster pump station adjacent to the NCCP/HCP boundary, a jurisdictional delineation of the proposed pump station site shall be performed to determine the extent of jurisdictional area, if any, as part of the regulatory permitting process.

CULTURAL RESOURCES

CON-45 Should buried historical/archaeological resources be discovered during excavation on the proposed booster pump station site, all construction work in that area shall be halted or diverted until a qualified archaeologist can evaluate the nature and significance of the finds.

CON-46 During excavation of five feet below ground surface or lower on the proposed booster pump station site, a paleontological resource recovery program for Miocene invertebrate fossils shall be implemented. This program shall include, but would not be limited to, the following:

- ❖ Monitoring of excavation in areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. The monitor shall be equipped to salvage fossils as they are unearthed to avoid construction delays and to remove samples of sediments, which are likely to contain the remains of small fossil invertebrates and vertebrates. The monitor must me empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens. Monitoring may be reduced if the potentially fossiliferous units described herein are not encountered, or upon exposure are determined following examination by qualified paleontologic personnel to have low potential to contain fossil resources;

- ❖ Preparation of recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates;
- ❖ Identification and curation of specimens into a museum repository with permanent retrievable storage. The paleontologist should have a written respository agreement in hand prior to the initiation of mitigation activities; and
- ❖ Preparation of a report of findings with appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency, would signify completion of the program to mitigate impacts to paleontologic resources.

CON-47 A qualified paleontologist shall be retained to monitor grading operations at the proposed desalination facility site, and, if necessary, to salvage scientifically significant fossil remains. The paleontologist shall have the authority to temporarily divert or direct grading efforts to allow evaluation and any salvage of exposed fossils.

UNAVOIDABLE SIGNIFICANT IMPACTS

The proposed desalination project may have unavoidable significant impacts in regards to temporary, short-term emissions for NO_x. This unavoidable significant impact is anticipated to occur for the duration of the demolition, remediation, and construction process (expected to last approximately 18-24 months). NO_x emissions during construction of the proposed project would exceed the SCAQMD emission standards, despite the implementation of applicable mitigation measures.

5.10 OCEAN WATER QUALITY AND MARINE BIOLOGICAL RESOURCES

Information in this section was compiled from the Hydrodynamic Modeling of Source Water Make-Up and Concentrated Seawater Dilution for the Ocean Desalination Project at the AES Huntington Beach Generating Station (2004), prepared by Dr. Scott A. Jenkins Consulting; Watershed Sanitary Survey Report (2002), prepared by Archibald and Wahlberg Consultants; the California Ocean Plan (2001) prepared by the State Water Resources Control Board; Huntington Beach Desalination Facility Intake Effects Assessment (2004), prepared by Tenera Environmental; Evaluation of a Report on Receiving Water Chemistry and Quality Issues Related to the Operation of a Reverse osmosis Desalination Facility at the Huntington Beach Power Generating Station (2004), prepared by Jeffrey B. Graham, Ph.D.; Marine Biological Considerations Related to the Reverse Osmosis Desalination Project at the Applied Energy Sources Huntington Beach Generating Station (2004), prepared by Jeffrey B. Graham, Ph.D.; Existing Conditions for the Proposed Poseidon Desalination Project at Huntington Beach, California; and the Effects of a Concentrated Seawater Discharge on the Marine Environment of Huntington Beach, California prepared by MBC Applied Environmental Services.

EXISTING CONDITIONS

OCEAN WATER QUALITY

The Pacific Ocean is located approximately 2,000 feet south of the proposed project site, along Huntington State and Huntington City Beaches. Source water for the proposed desalination facility will be taken from the existing condenser cooling water circulation system from the Huntington Beach Generating Station facility (HBGS). Up to 507 million gallons per day (mgd) of cooling seawater presently flows to the HBGS through an existing ocean water intake structure located approximately 1,840 feet offshore. The Santa Ana River flows into the Pacific Ocean approximately 8,300 feet from the HBGS intake, while the Talbert Channel discharges into the ocean approximately 1,300 feet upcoast (northwest) from the mouth of the Santa Ana River. The Orange County Sanitation District (OCSD) deep ocean sewage outfall is located five miles offshore of the Santa Ana River at a depth of 195 feet (refer to Exhibit 5.10-1, *LOCATION MAP OF LOCAL SURFACE AND WASTEWATER DISCHARGES*). Bacteria levels are the primary Pacific Ocean water quality concern in the project vicinity.

Natural water temperatures in the Pacific Ocean fluctuate throughout the year in response to seasonal and diurnal variations in currents as well as meteorological factors such as wind, air temperature, relative humidity, cloud cover, ocean waves, and turbulence. Diurnally, natural surface water temperatures generally vary one to two degrees celsius in the summer and 0.3 to one degree celsius in the winter. Reasonably sharp thermoclines (differences between surface and bottom water temperatures) are known to occur in the nearshore waters of Huntington Beach at a depth of 12 to 15 meters during the summer, and are typically absent during the winter. Salinities in the area are fairly uniform and normally range from 33.0 to 34.0 parts per thousand (ppt), while levels of dissolved oxygen range from approximately five to 13 milligrams per liter (mg/L).

Recently, Huntington Beach has experienced several closures of the water area adjacent to the beach. The closures have been due to levels of bacteria in the surf zone that have exceeded the State standard. These closures have prompted a series of studies in order to find the source of contamination that is causing bacteria levels in the surf zone to exceed State standards. A review of multiple studies conducted finds HBGS is not the source of bacteria in the surf zone. A discussion of bacteria in the ocean surrounding the subject site is discussed in Section 4.0, *EXISTING CONDITIONS*.

Potential Sources of Contamination in Proximity to the HBGS Intake

There are a number of discharges and potential sources of contaminants in the vicinity of the HBGS intake (which will be the source of water for the proposed desalination facility). These potential contaminant sources were investigated to determine the quality of water that will enter the desalination facility. A hydrodynamic modeling study was conducted by oceanographers at the Scripps Institution of Oceanography to determine if several of the potential sources of contaminants in the vicinity of the HBGS intake could affect the quality of water at the generating station intake. Appendix E, *WATERSHED SANITARY SURVEY* contains a more thorough discussion of each of the potential contaminant sources, and Appendix C, *HYDRODYNAMIC MODELING REPORT* contains a detailed discussion of the modeling results.

<u>OCSD Wastewater Discharge</u>

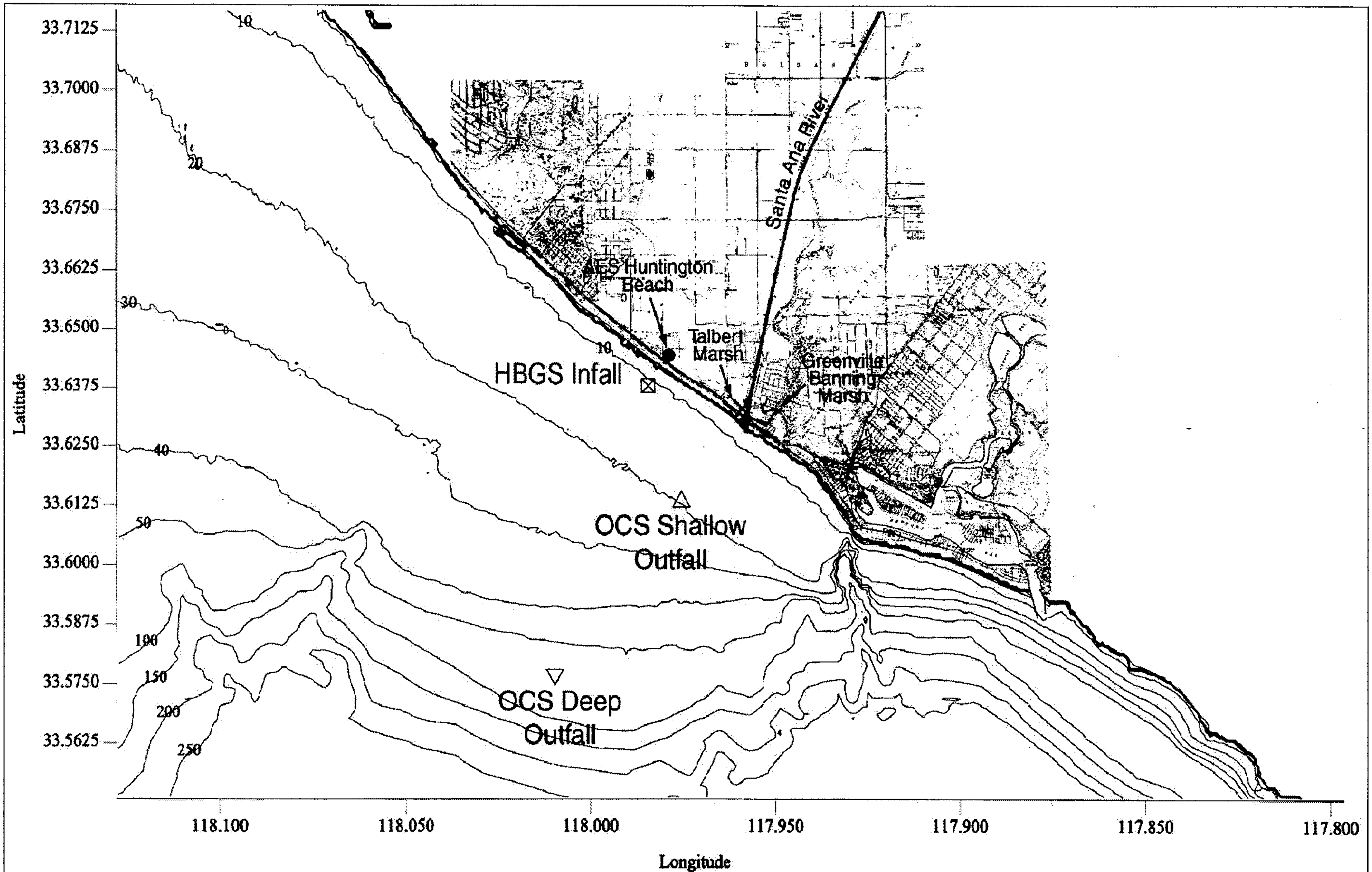
Although disinfection of the OCSD effluent reduces bacteria in the discharge to the level of beach standards in the zone of initial dilution, the potential for the OCSD discharge to impact water quality at the intake of the HBGS was investigated. OCSD discharges a mix of primary and secondary treated wastewater at an outfall that is located 4.5 miles offshore at a depth of 195 feet. The OCSD outfall is located southeast of the HBGS intake (refer to Exhibit 5.10-1, *LOCATION MAP OF LOCAL SURFACE AND WASTEWATER DISCHARGES*).

Under normal oceanographic conditions, the HBGS intake and OCSD discharge are segregated in two different water masses by ocean thermal stratification, with no appreciable exchange between those water masses. Currents generally flow downcoast (i.e. southeast) from the OCSD outfall. The OCSD wastewater discharge would have the greatest potential to impact water quality at the HBGS intake with summer El Nino conditions when net transport by waves and currents is upcoast toward the HBGS intake. A modeling study was conducted to determine if OCSD discharge could potentially affect water quality at the intake of the generating station (the results of the modeling study are discussed below, under *IMPACTS*).

<u>Urban Storm Water Runoff</u>

The Santa Ana River and Talbert Marsh (located southeast of the HBGS intake) are known sources of fecal indicator bacteria to the surf zone during storm events. A modeling study was conducted to determine if these two sources could potentially affect water quality at the intake of the generating station (the results of the modeling study are discussed below, under *IMPACTS*).

Storm water discharges from the Santa Ana River and Talbert Marsh would have the greatest potential to impact water quality at the HBGS intake if an extreme storm event coincided with an El Nino winter and maximum pumping of cooling water into the generating station. Although it is unlikely that all of these events would coincide with one another, this was considered to be the "worst-case" scenario for determining if the Santa Ana River and Talbert Marsh contribute contaminants to the HBGS intake.



Source: Poseidon Resources Corporation, August 2002.

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Location Map of Local Surface and Wastewater Discharges

Exhibit 5.10-1

Dry Weather Runoff

Several studies have shown that the Talbert Marsh is a significant source of fecal indicator bacteria in the surf zone. A modeling study was conducted to determine if dry weather runoff from the Talbert Marsh could affect water quality at the intake of the generating station (the results of the modeling study are discussed below, under *IMPACTS*). Most of the dry weather runoff is now diverted to OCSD for treatment and discharge at the deep water outfall. However, fecal indicator bacteria levels at the outlet of the marsh remain high and these bacteria are flushed out of the marsh, particularly during spring tides.

Recirculation of HBGS Discharge

The HBGS outfall is located 340 feet from the intake. The National Pollution Discharge Elimination System (NPDES) permit for the HBGS allows the facility to discharge up to 516 million gallons per day (mgd). The discharge consists largely of cooling water but up to 1.66 MGD of generating station process wastewater and storm water can be mixed with the cooling water and discharged at the outfall. In addition, upon project implementation, there is a potential for the desalination facility's reverse osmosis (RO) to be recirculated, as the concentrated seawater would be discharged through the HBGS outfall.

Recirculation of the HBGS discharge would have the greatest potential to impact water quality at the intake during wet weather conditions when the maximum amount of storm water is being discharged through the outfall.

Los Angeles and San Gabriel Rivers

The Los Angeles River discharges to the ocean approximately 16 miles upcoast (i.e. northwest) from HBGS, while the San Gabriel River discharges approximately 11 miles upcoast. The United States Geological Survey (USGS) conducted an intensive ocean water quality monitoring program in the summer of 2001 and found a mass of lower-salinity water near the shore in Huntington Beach. The source of the nearshore low-salinity water was not identified in their study but the authors of the report speculated that it may be coming from the San Gabriel and Los Angeles rivers (USGS, 2003). There have been no further studies on the potential impact of these two rivers.

Cruise Ships and Fishing Boats

Cruise ship and fishing boat operations in the vicinity of the HBGS intake have the potential to impact water quality in regards to sewage discharge and leaks or spills of oil/fuel. The nearest major port for cruise ships to the HBGS intake is the Long Beach Harbor, situated approximately 16 miles upcoast. Another major port for cruise ship operations is the Los Angeles Harbor, located approximately 18 miles upcoast of the HBGS intake.

Sportfishing in Orange County is done mostly from piers and boats. A commercial passenger and private fishing vessel fleet, based in Newport Bay, operates in the vicinity of Newport and Huntington Beach. Charter boats operating off Newport and Huntington Beach fish the artificial reefs and sandy bottom, or the rocky areas and kelp beds to the south offshore of Corona Del Mar and Laguna Beach, typically in water depths of 14 to 18 meters deep (OCSD, 2002a).

Recreation

It is estimated that over five million people visit Huntington State Beach each year for recreational purposes. Such users have the potential to affect water quality at the HBGS intake due to sewage and spills of contaminants such as lighter fluid used for bonfires.

Oil and Gas Production Facilities

There are two offshore oil platforms approximately 1.5 miles west of the HBGS intake and four platforms approximately 10 miles west of the intake. Oil and gas pipelines connect the platforms to coastal oil/gas facilities upcoast from the intake. There are no oil tanker shipping lanes in the vicinity of the intake. The closest shipping lanes are six to seven miles offshore. There have not been any reportable spills or leaks from the offshore oil platforms or the pipelines.[1] A catastrophic event at one of the offshore platforms that is near the coast could affect water quality at the HBGS intake.

Red Tides and Algal Toxins

Refer to Section 5.11, *PRODUCT WATER QUALITY* for a discussion of existing conditions in regards to red tides and algal toxins.

Operations at HBGS

Source water quality for the proposed desalination facility has the potential to be affected by HBGS operations. Activities or conditions occurring along the HBGS cooling water system between the HBGS intake and the point at which water is diverted toward the desalination facility could impact water quality (particularly in regards to metals). The diversion point would occur after cooling water has traveled through the HBGS condensers. Other potential sources of contamination at HBGS include cycle water discharges (the discharge of HBGS process byproduct water at various points into the cooling water system), urban runoff discharges, wastewater discharges, hazardous materials, and heat treatments (the periodic diversion of water from the discharge vault back into the cooling water system to be reheated to prevent biological growth). These potential contaminant sources are further analyzed below, under *IMPACTS.*

Elevated Bacteria Levels in the Huntington Beach Surf Zone

Extensive bacterial studies have shown that the Santa Ana River and Talbert Marsh appear to be the primary sources of fecal indicator bacteria to the near shore ocean. In addition, bird droppings and a reservoir of bacteria stored in the sediment and on marine vegetation may continue to be the source of bacteria at the mouths of the river and marsh. Modeling studies and monitoring data indicate that there is likely another unidentified source of bacteria in the vicinity of Stations 6N and 9N. However, three separate studies conducted between 2001 and 2002 have demonstrated that HBGS is not the source of bacteria in the surf zone. Additional information in regards to existing conditions for the elevated bacteria levels in the Huntington Beach surf zone is provided in Section 4.0, *EXISTING CONDITIONS.*

MARINE BIOLOGY

The marine environment offshore of the proposed project site exists within a biologically and climatologically unique region called the Southern California Bight (SCB). Geographically, the SCB is an open embayment extending from Point Conception, California into Baja California, Mexico and

[1] Personal communication, Dave Sanchez, California Division of Oil, Gas, and Geothermal Resources.

125 miles offshore (refer to Figure 4-1, *SOUTHERN CALIFORNIA BIGHT*). Biologically, the SCB is a transition-zone species assemblage positioned between two larger and diverse assemblages: one in the cooler waters to the north, and the other in the warmer waters to the south. SCB organisms comprise a mix of species (some from the cooler northern waters and some from the warmer southern waters).[2]

Physical, biological, and oceanographic factors affect the total SCB biomass and cause year-to-year variation in the number of species occurring within the SCB and in areas such as Huntington Beach. While ocean temperature, current patterns, and upwelling affect nutrient and food supplies, biological variables such as the arrival of planktonic animals to coastal areas, the recruitment of new organisms (addition of young-of-the-year to the population) and habitat availability and quality all influence ecosystem-species composition, diversity, and biomass (Jackson, 1986). The young stages of most marine invertebrates and fishes living at and near Huntington Beach and throughout the SCB begin life as drifting plankton. Their survival into the next life stage requires that the appropriate and vacant habitat be found. Thus, evaluation of either local or regional habitats with respect to their biodiversity, the abundance of different species, and the ages, body size, and growth rates of specific organisms must always be made in the context of the large-scale factors influencing these, whether in the area around Huntington Beach or across the entire SCB.

As stated in Section 4.0, *EXISTING CONDITIONS/ENVIRONMENTAL SETTING,* the marine organisms living in the vicinity of the HBGS discharge occur in one of three habitat classifications: 1) substrate (termed infauna); 2) on the bottom seafloor (termed macroinvertebrates, including worms, crabs, sand dollars, starfish and some fishes); or 3) in the water column itself (consisting of squid, fish, plankton, etc.).

- **Infauna:** Huntington Beach infauna surveys were carried out from 1975 to 1993 by MBC Applied Environmental Sciences (MBC, 1993). The habitat surrounding the HBGS outfall is dynamic and there are many species that can potentially occur in the infauna. However, many of these are rare or appear episodically. Most of these animals have very short lives and it is reasonable to assume that many of them arrive each year in the plankton. Thus, the infaunal species diversity of the extended habitat varies from year to year as does organism age, size, and abundance.

  Table 5.10-1, *MAJOR GROUPS OF INFAUNAL ANIMALS AT HUNTINGTON BEACH, 1975-1993,* summarizes the total diversity of infaunal organisms found over 18 years of study. Table 5.10-2, *ORDER OF ABUNDANCE OF INFAUNAL ANIMALS AT HUNTINGTON BEACH, 1975-1993,* lists the infaunal species in order of their mean abundance from 1975 to 1993. Figure 5.10-1, *INTERANNUAL VARIATION IN HUNTINGTON BEACH INFAUNAL ABUNDANCE AND SPECIS RICHNESS,* shows the numbers of species and numbers of individuals found in samples over time. Average animal density was about 43 per unit volume, but this varied from year to year and by a factor of five over 18 years. In terms of both numbers and species, the most dominant animals each year were polychaete worms and crustaceans. Mollusks were the third most abundant group and showed marked variation from year to year.

- **Benthic macrofauna:** Macrofaunal surveys, conducted from 1975 to 2000, show the repeated occurrence of the same core group of species in the area (MBC, 2001). The macrofaunal species occurring at Huntington Beach are typical of those expected to occur at other comparable open, sandy bottom habitats throughout the SCB. Table 5.10-3,

[2] Marine Biological Considerations Related to the Reverse Osmosis Desalination Project at the AES Huntington Beach Generating Station, J.B. Graham, Ph.D., August 3, 2004 (refer to Appendix S, *MARINE BIOLOGICAL CONSIDERATIONS).*

Table 5.10-1
MAJOR GROUPS OF INFAUNAL ANIMALS AT HUNTINGTON BEACH, 1975-1993

Taxon	Species
CNIDARIA	
Anthozoa	
	Renilla kollikeri [1]
NEMERTEA	
	Carinoma mutabilis
	Lineidae, unid.
	Nemertea, unid.
	Paranemertes californica [2]
	Tubulanus cingulatus
	Tubulanus nothus
	Tubulanus pellucidus/polymorphus [3]
SIPUNCULA	
	Siphonosoma ingens
	Thysanocardia nigra
ANNELIDA	
Polychaeta	
	Ancistrosyllis groenlandica
	Acmira catherinae
	Amaeana occidentalis
	Ampharete labrops
	Apoprionospio pygmaea
	Asychis disparidentata
	Chaetozone cf. setosa
	Chaetozone corona
	Chone albocincta
	Chone mollis
	Diopatra ornata
	Diopatra splendidissima
	Glycera convoluta
	Goniada littorea
	*Harmothoe sp. B of SCAMIT**
	Lumbrineris californiensis
	Lumbrineris tetraura
	Lumbrineris spp.
	Magelona pitelkai
	Mediomastus spp. [4]
	Microphthalmus hystrix
	Nephtys caecoides
	Onuphidae unid.
	Onuphis eremita
	Onuphis eremita parva
	Owenia collaris
	Paraprionospio pinnata
	Pectinaria californiensis
	Pista nr. disjuncta
	Podarkeopsis glabrus [5]
	Prionospio lighti [6]
	Scoloplos armiger
	Sigalion spinosa
	Spiophanes bombyx
	Spiophanes missionensis
	Sthenelais verruculosa
	Tharyx sp. A of SCAMIT [7]
	Tharyx tesselata [7]
	Typosyllis aciculata
CRUSTACEA	
Copepoda	
	Paralteutha simile
Ostracoda	
	Euphilomedes carcharodonta
	Euphilomedes longiseta
	Parasterope barnesi
	Rutiderma rostrata
Cumacea	
	Campylaspis sp. C of MBC
	Cumella sp. A of MBC
	Diastylopsis tenuis
	Leptocuma forsmani
CRUSTACEA (cont).	
Isopoda	
	Edotea sublittoralis
	Uromunna ubiquita [8]
Amphipoda	
	Ampelisca brachycladus
	Aora sp. [9]
	Aoridae, unid.
	Argissa hamatipes
	Cerapus " tubularis"
	Ericthonius brasiliensis
	Gibberosus myersi [10]
	Monoculodes hartmanae
	Pachynus barnardi
	Photis californica
	Photis macinerneyi
	Rhepoxynius menziesi [11]
	Rhepoxynius sp. A of SCAMIT [12]
	Stenothoe sp.
	Synchelidium shoemakeri
Decapoda	
	Neotrypaea californiensis [13]
	Ogyrides sp. A of Roney
	Pinnixa forficulimanus
	Pyromaia tuberculata
MOLLUSCA	
Gastropoda	
	Armina californica
	Balcis rutila
	Crepidula norrisiarum
	Crepidula sp.
	Cylichnella harpa
	Kurtziella plumbea
	Nassarius sp.
	Odostomia sp.
	Olivella baetica
	Ophiodermella cancellata
	Philine bakeri
	Rictaxis punctocaelatus
	Sulcoretusa xystrum
	Turbonilla pedroana
Pelecypoda	
	Cooperella subdiaphana
	Macoma sp.
	Mysella sp. A of SCAMIT
	Nucula tenuis
	Periploma planiusculum
	Siliqua lucida
	Solen sicarius
	Tellina modesta
	Yoldia cooperi
PHORONIDA	
	Phoronida, unid.
BRACHIOPODA	
	Glottidia albida
ECHINODERMATA	
Ophiuroidea	
	Amphiodia psara
	Amphiura arcystata [14]
	Amphiuridae sp. A of MBC [15]
	Ophiuroidea, unid.
HEMICHORDATA	
	Enteropneusta, unid.[16]

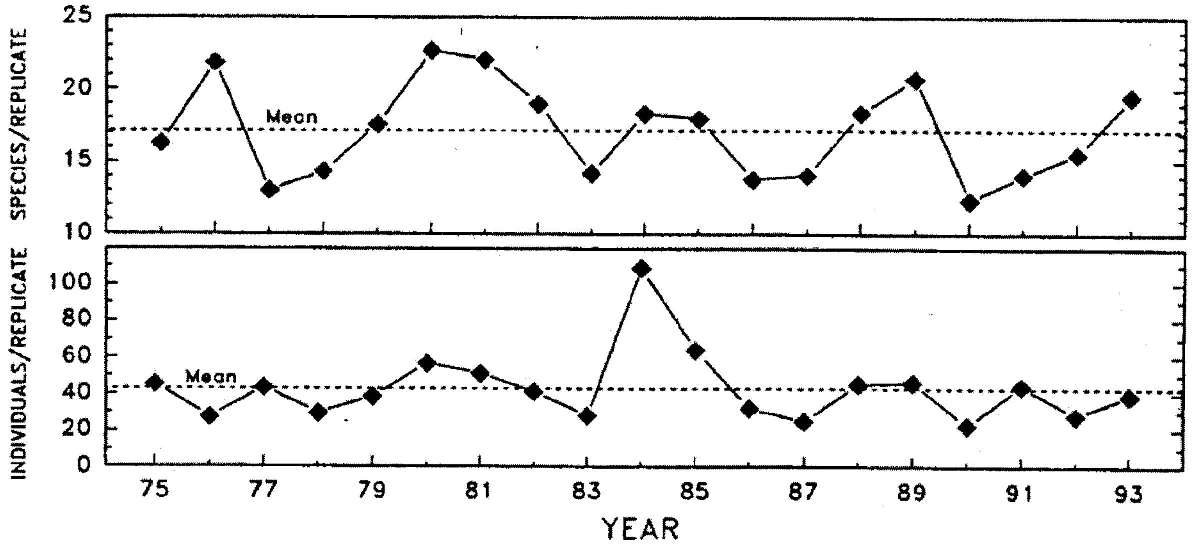
Source: MBC, 1993

Table 5.10-2
ORDER OF ABUNDANCE OF INFAUNAL ANIMALS AT HUNTINGTON BEACH, 1975-1993

Species	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	Mean	SD
Apoprionospio pygmaea	680	430	360	360	44	100	300	50	720	440	21	167	42	133	96	88	1513	29	79	297.4	376.5
Rhepoxynius menziesi	-	-	28	150	290	280	150	180	160	340	675	194	212	975	229	413	496	142	73	262.4	250.0
Diastylopsis tenuis	380	120	270	180	540	530	330	160	160	50	25	794	183	438	83	125	54	96	94	242.8	213.7
Goniada littorea	450	370	380	350	290	240	380	220	210	90	192	389	175	171	213	204	13	233	25	241.8	117.8
Olivella baetica	130	90	44	140	110	25	110	110	4	60	1950	11	29	33	21	33	25	8	1	154.4	460.3
Owenia collaris	-	-	-	180	240	180	800	-	150	40	88	-	-	8	750	54	400	-	4	152.3	253.5
Polydora nuchalis	-	-	-	-	-	-	340	-	30	1470	167	72	-	-	-	-	-	-	-	109.4	358.5
Crepidula naticarum	-	-	-	20	-	20	70	50	-	1670	104	28	-	25	-	-	-	-	-	104.6	401.3
Chaetozone cf. Setosa	60	120	210	20	17	60	10	250	40	20	292	11	200	13	183	121	42	92	14	93.4	94.4
Tharyx sp.	690	280	170	30	17	30	70	80	40	40	-	161	38	-	-	-	-	-	36	88.5	171.0
Mediomastus spp.	-	-	-	100	250	230	80	80	10	30	13	122	233	38	42	100	4	250	48	85.8	85.7
Leitoscoloplos pugettensi	40	210	180	50	39	150	80	300	80	40	92	122	71	-	13	-	4	83	-	81.8	83.0
Tellina modesta	10	-	10	50	90	680	110	50	10	120	8	28	79	17	29	8	-	-	10	68.9	160.3
Dendraster excentricus	-	120	-	-	6	-	130	150	20	310	21	6	12	46	117	21	63	142	-	61.2	82.8
Eohaustorius washingtonianus	-	-	-	190	90	4	10	13	-	90	50	56	100	108	200	83	50	50	-	60.8	63.7
Prionospio lighti*	70	50	40	50	17	200	4	70	30	30	21	6	-	271	58	79	8	63	5	56.5	71.9
Amaeana occidentalis	5	50	50	40	56	10	60	20	10	180	104	-	33	13	4	4	-	258	96	52.3	46.4
Pectinaria californiensis**	40	20	20	70	17	20	10	40	20	320	88	-	8	179	21	8	13	-	4	47.2	81.4
Spiophanes bombyx	50	20	20	30	22	50	20	-	90	170	100	17	21	71	63	33	33	58	24	47.0	41.7
Magelona sacculata	-	-	-	30	33	190	30	80	10	10	150	-	12	46	67	63	75	33	-	43.6	54.3
Photis spp.	60	-	20	-	-	10	17	30	-	410	46	44	4	25	4	4	25	-	-	36.8	96.8
Paraprionospio pinnata	-	40	10	-	6	20	140	100	20	180	17	61	33	8	4	-	-	46	8	36.5	53.4
Ampharete labrops	-	-	10	10	16	30	4	10	10	440	42	22	-	4	38	8	25	8	4	35.8	104.1
Amastigos acutus	-	-	-	-	250	260	80	4	50	-	4	-	-	-	-	-	-	-	-	34.1	84.5
Typosyllis spp.	120	170	-	80	-	-	30	30	40	-	-	-	42	33	29	38	13	-	-	32.9	47.1
Leptocuma forsmanni	20	10	20	20	60	30	20	-	4	11	8	33	29	88	121	42	33	63	10	32.7	31.4
Isocheles pilosus	-	4	10	-	-	330	-	20	10	-	-	6	-	100	96	-	8	-	-	30.7	82.4
Leptopecten latiauratus	5	-	40	-	-	30	40	20	10	290	29	6	-	-	-	-	-	-	-	24.7	69.2
Thalenessa spinosa***	20	50	30	4	17	20	21	20	20	110	59	-	17	8	-	17	-	-	-	21.7	27.3
Rhepoxynius spp.	5	10	10	120	-	20	10	-	-	-	50	17	29	55	-	4	17	8	-	18.7	30.6
Neverita recluziana	-	-	-	-	6	4	10	20	10	130	42	6	8	13	8	-	-	-	-	13.5	31.4

* previously Prionospio cirrifera
** previously Cistena californiensis
*** previously Eusigalion spinosum
Source: MBC 1975-1992

Figure 5.10-1
INTERANNUAL VARIATION IN HUNTINGTON BEACH INFAUNAL ABUNDANCE AND SPECIS RICHNESS, 1975-1993



MACROFAUNAL INVERTEBRATES AT HUNTINGTON BEACH, 1976-2001 lists key macrofaunal invertebrate species surveyed at Huntington Beach. Graphs showing animal abundance and species number for the area reflect the range of annual differences that commonly occur in shallow water habitats (refer to Figure 5.10-2, *INTERANNUAL VARIATION IN HUNTINGTON BEACH MACROFAUNA ABUNDANCES AND SPECIES RICHNESS, 1975-2001*). Average abundances of these and other organisms and total species number varied from year to year. In 1975 and 1980 only 21 species were recorded. In 1994 just after the 1992-1993 El Niño, there were 54 species (Figure 5.10-2). Animal densities also vary considerably, from less than 20 per square meter in 1975 and 1976 to over 160 per square meter in 1990.

From 1975 to 2001, five animal groups (three annelid [polychaete] worms [Diopatra, Owenia, Maldanidae], hermit crabs [Paguridae] and Pacific sand dollars [Dendraster excentricus]) account for about 90% of the marcrofaunal abundance. The relative numbers of these organisms vary from year to year and in different localities and they could be especially abundant, with as many as 3,600-9,000 individuals of various species (sand dollars, polychaete worms, hermit crabs) being taken in one otter trawl net at one sampling site. Pacific sand dollars, for example, were found in great abundance near the discharge and at the upcoast sampling area in 1997, but had not been found in these areas in the preceding four years and have appeared variably at all stations over the survey and are not consistently found in the waters around the HBGS.

- **Fishes:** Since the fish surveys began, 65 species have been collected, all of which can be considered as typical residents of open, sandy bottom coastal habitats in southern California (Horn and Allen, 1978; Mearns, 1979; Allen and DeMartini, 1983). The numbers of fish species taken in Huntington Beach trawl surveys ranged from 13 in 1999 to 29 in 1986 and averages 22 species/year. The fifteen most abundant fish species living in the area between 1976 and 2000 are: white croaker, queenfish, northern anchovy, California halibut, Pacific

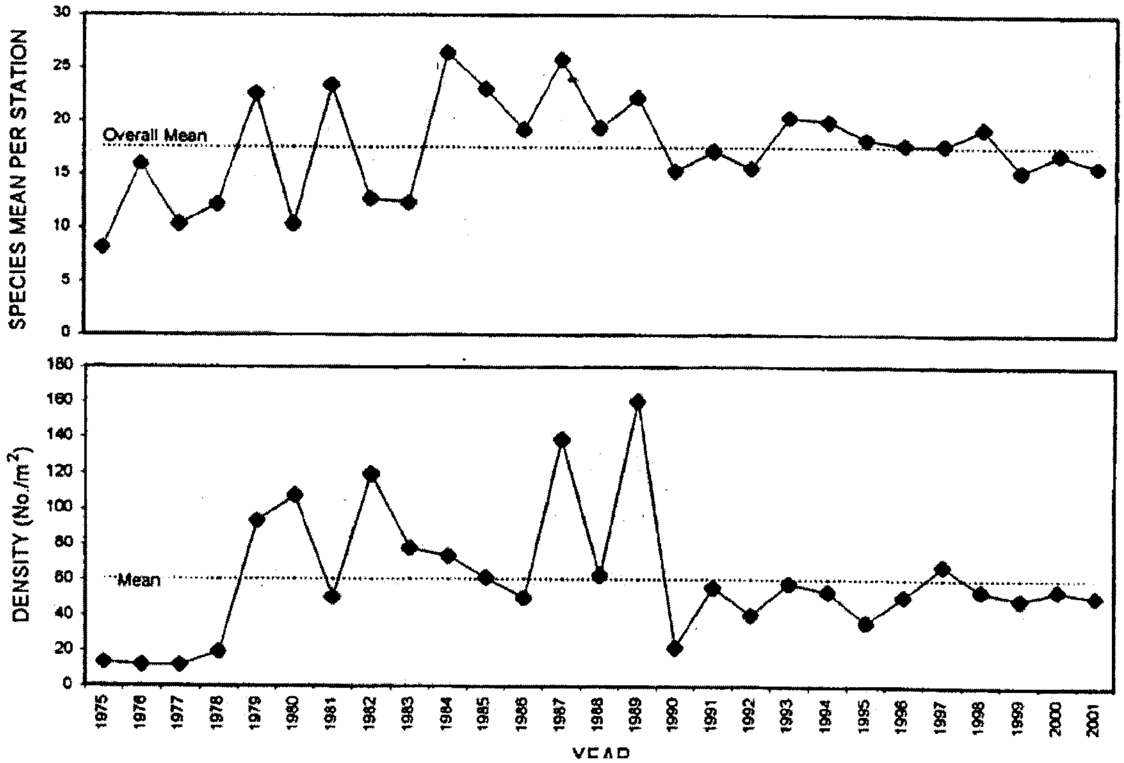
Table 5.10-3
MACROFAUNAL INVERTEBRATES AT HUNTINGTON BEACH, 1976-2001

	Year																												Percent
	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Mean	Total
Total Number of Species	21	38	23	27	48	21	39	24	25	54	43	36	43	32	46	29	37	32	40	29	26	29	26	31	24	27	25	32.4	
Mean Number of individuals (per m²)	13.6	11.8	11.8	19.3	93.3	107.3	50.2	119.4	78.0	73.7	61.8	49.9	139.1	63.1	160.7	22.0	56.1	40.5	58.1	53.6	36.2	51.0	66.4	53.9	49.4	54.5	51.3	61.0	
<u>Mean Densities of Key Species (per m²)</u>																													
Diopatra spp	10.2	5.1	7.7	10.2	10.9	17.6	19.1	23.2	28.6	28.1	43.9	39.1	26.2	10.2	7.9	11.1	40.0	19.6	42.4	43.8	29.0	40.0	23.3	45.5	42.1	44.7	38.2	26.2	45.1
Pagurudea, unid. (includes *Isocheles* sp)	0.0	1.8	1.1	0.2	2.0	0.2	1.6	90.4	0.7	0.5	3.7	0.7	101.9	13.6	128.3	0.5	0.3	10.7	0.3	0.4	0.1	0.5	0.4	0.1	0.2	0.1	0.7	13.4	23.0
Owenia spp	-	-	-	2.1	67.5	85.9	16.2	-	6.6	1.8	0.1	-	0.0	1.8	1.1	0.6	7.4	0.0	0.0	0.1	0.0	0.0	-	0.2	-	-	-	7.1	12.2
Dendraster excentricus	-	-	-	-	-	-	-	-	35.0	20.2	0.0	-	-	2.5	11.8	1.1	0.4	-	-	-	-	-	36.9	-	-	-	-	4.0	6.9
Maldanidae, unid.	0.1	0.2	1.3	1.2	2.7	0.0	1.0	0.3	0.3	0.6	2.3	0.2	1.1	1.0	3.0	2.8	3.1	7.1	3.6	0.2	0.8	1.2	1.7	0.6	0.5	0.8	1.6	1.5	2.5
Ophiuroidea, unid.	-	0.1	0.0	0.0	0.1	-	0.2	0.0	0.3	1.2	2.1	0.7	1.9	0.4	0.6	2.9	1.5	0.4	3.7	1.2	1.5	1.4	1.4	2.6	1.6	3.3	1.0	1.1	1.9
Leptopecten latiauratus	-	-	-	-	0.1	-	0.1	-	-	0.3	1.5	-	0.0	14.0	0.0	-	0.0	0.1	0.0	0.9	0.1	0.1	0.0	0.0	0.0	0.2	0.2	0.7	1.1
Balanus spp	0.0	0.3	-	-	0.3	0.4	2.6	2.1	-	0.0	0.1	0.2	0.3	-	2.3	0.1	0.1	0.3	1.7	0.9	0.4	2.1	0.1	-	0.1	1.8	1.5	0.7	1.1
Crepidula spp	-	0.1	-	-	-	-	0.1	1.7	0.1	0.6	0.7	0.7	0.5	0.9	0.9	0.9	0.3	0.3	0.5	1.9	-	-	0.0	0.5	0.1	0.1	1.8	0.5	0.8
Majidae, unid	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.1	0.0	0.1	0.0	0.1	0.7	1.5	0.1	2.5	0.5	0.5	0.7	0.8	4.5	0.5	0.8
Zaolutus actius	-	0.0	0.0	-	0.4	0.0	1.0	0.0	0.6	0.6	0.0	0.2	0.1	-	-	-	0.0	0.1	0.9	0.2	0.7	0.5	0.2	0.8	2.2	0.5	0.2	0.3	0.6
Olivella spp	1.9	0.2	-	0.0	0.2	-	0.1	0.0	-	0.7	0.4	0.0	0.1	2.2	0.3	0.1	0.0	-	0.0	0.3	-	0.0	0.1	0.2	-	0.1	0.1	0.3	0.4
Spiochaetopterus costarum	0.1	0.1	0.0	0.1	0.2	-	0.1	0.2	0.1	0.1	0.1	0.7	0.1	0.6	-	0.5	1.0	0.7	0.1	0.0	0.1	0.0	0.9	0.5	-	-	-	0.2	0.4
Astropecten armatus	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.3	0.9	0.3	0.4	0.5	0.4	0.6	0.1	0.1	0.2	0.2	0.4	0.2	0.3
Dendronotus frondosus	-	-	-	-	4.0	-	0.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.1	0.3
Nassarius spp	-	0.0	-	0.0	0.1	0.0	0.1	-	-	0.6	0.1	0.1	0.3	1.6	0.1	0.1	0.1	0.0	0.1	-	-	0.0	0.2	0.0	0.2	0.1	0.1	0.1	0.3
Pista spp	-	0.1	0.1	0.0	0.1	0.1	0.2	-	0.2	-	0.6	0.1	1.2	-	-	0.2	0.3	0.2	0.1	0.1	-	-	-	0.0	-	0.0	0.0	0.1	0.2
Hiatella arctica	-	-	-	-	-	-	-	-	3.3	0.2	-	0.0	-	-	0.0	-	-	-	-	0.0	-	-	-	-	-	-	-	0.1	0.2
Phyllochaetopterus spp	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.4	-	-	0.0	-	-	1.3	0.8	0.6	-	-	-	-	0.1	0.2
Stylatula elongata	0.0	0.0	-	-	-	-	0.0	-	0.0	0.2	0.2	-	0.0	-	-	-	-	0.1	0.6	0.4	0.3	0.1	0.4	0.3	0.1	0.2	0.2	0.1	0.2
Renilla kolliken	-	-	-	-	0.0	-	0.0	0.0	-	0.0	0.1	0.1	0.3	0.2	0.2	0.2	0.1	0.1	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2
Solen spp	-	-	-	-	-	-	-	-	-	1.1	0.0	-	-	-	-	-	-	-	1.2	0.3	0.2	0.0	-	-	-	-	-	0.1	0.2
Pyromaia tuberculata	0.0	0.0	-	-	0.2	-	0.7	0.0	0.0	0.4	0.2	0.0	0.0	-	0.0	0.0	0.0	0.0	-	-	-	0.1	0.3	0.2	0.4	0.0	-	0.1	0.2
Chaetopterus variopedatus Cmplx	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.6	0.1	0.0	0.1	0.1	0.3	0.2	0.1	0.2	0.2	0.4	0.1	0.1	0.1	0.2
Harenactis attenuata	0.1	-	-	-	-	-	-	-	-	-	-	-	0.1	0.0	0.1	0.3	0.2	-	-	-	-	-	-	0.4	0.35	0.8	-	0.1	0.1
Polygireulima rutila (Balcis rutila)	-	0.0	0.0	-	0.0	-	0.1	0.0	0.0	0.3	-	0.5	0.4	0.5	0.1	-	-	-	-	-	-	-	-	0.1	0.02	-	-	0.1	0.1
Thalamoporella spp	-	0.1	0.1	-	0.2	-	0.2	0.4	-	0.1	0.1	0.1	-	-	0.0	0.1	0.0	-	0.2	-	-	-	-	-	-	-	-	0.1	0.1
Neverita reclusiana	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	-	0.0	0.1	0.2	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Ophiodermella spp	-	-	0.0	0.0	-	0.1	0.3	0.0	-	0.1	0.0	-	0.0	-	-	0.0	0.0	0.1	0.1	-	-	0.0	0.0	0.1	0.2	0.2	0.1	0.1	0.1
Anthozoa, unid	-	-	-	-	-	0.1	-	-	-	0.4	0.4	-	-	-	-	-	-	-	-	-	-	-	-	0.3	0.1	-	-	0.0	0.1
Argopecten circularis	-	-	-	-	-	-	-	-	-	-	0.3	0.0	0.1	-	-	-	-	0.0	0.7	-	-	-	-	-	-	-	-	0.0	0.1

For 1975 and 1978 data was taken from the same 5 stations sampled since 1977
Note: 0.0 = <0.05

Source: MBC, 2001

Figure 5.10-2
INTERANNUAL VARIATION IN HUNTINGTON BEACH MACROFAUNA ABUNDANCES AND SPECIES RICHNESS, 1975-2001



sardine, speckled sanddab, curflin turbot, kelp pipefish, white seaperch, walleye surfperch, C-O turbot, Pacific butterfish, California lizard fish, salema, and barred surfperch (refer to Table 5.10-4, YEARLY ABUNDANCE OF DEMERSAL FISH SPECIES COLLECTED BY OTTER TRAWL AT HUNTINGTON BEACH, 1976-2001). The persistent representation of the same species indicates that the fish fauna is relatively stable.

Conclusions of the MBC Monitoring

The overall findings of MBC in its NPDES monitoring program are as follows (MBC, 2001):

Operation of the HBGS had no detectable adverse effects on the marine biota or the beneficial uses of the receiving waters:

- There are strong indications that a relatively stable assemblage of organisms occur in the marine habitats near the discharge and, although the numbers and relative abundance rankings of species shift from year to year, no species has either been recruited to or eliminated from the area;
- All of the organisms occurring in waters adjacent to the HBGS have much broader geographic distributions, extending in most instances to beyond the range of the Southern California Bight;
- Both the sea floor and littoral water habitats occurring near the HBGS discharge site are not home to any endangered marine species;

Table 5.10-4
YEARLY ABUNDANCE OF DEMERSAL FISH SPECIES COLLECTED BY OTTER TRAWL AT HUNTINGTON BEACH, 1976-2001

	Year																											Percent
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total	Total
Engraulis mordax	355	3126	2460	6253	166	3138	1	8401	1145	5	61	40	386	11	####	381	3916	####	507	221	826	35	1409	-	528	9	72823	50.205
Genyonemus lineatus	1773	3743	7503	2405	3407	1324	309	1777	1021	890	1200	1017	663	28	239	75	3878	4555	913	780	24	473	103	1	118	390	38609	26.618
Seriphus politus	1822	134	1119	297	1712	2580	529	3968	3056	677	695	303	116	1	602	64	3883	2595	579	654	61	430	199	-	495	125	26728	18.427
Phanerodon furcatus	59	275	148	406	22	378	13	63	4	18	10	4	1	-	1	2	-	9	6	5	-	1	1	-	-	-	1426	0.983
Hyperprosopon argentum	145	254	148	76	76	-	-	33	-	-	-	-	11	-	-	-	1	3	-	-	-	12	1	-	2	20	781	0.538
Paralichthys californicus	7	80	51	12	25	35	72	22	24	40	31	39	52	28	19	25	41	17	11	6	4	13	5	7	1	11	678	0.467
Amphistichus argenteus	18	206	34	167	26	32	-	2	-	1	-	-	-	1	1	-	-	8	-	2	4	1	-	-	6	8	517	0.356
Citharichthys stigmaeus	14	85	5	2	6	-	17	-	-	51	6	67	43	25	40	14	5	8	20	5	21	3	9	18	22	11	497	0.343
Peprilus simillimus	68	1	41	4	13	2	2	137	105	4	15	-	2	-	23	2	12	-	-	5	1	-	38	-	-	-	475	0.327
Cymatogaster aggregata	7	62	41	160	13	76	7	45	-	1	1	-	-	-	3	-	1	4	6	1	2	-	16	-	4	13	465	0.321
Synodus lucioceps	-	5	27	7	-	10	223	1	3	-	3	3	3	39	11	2	31	-	-	1	-	-	9	29	-	21	428	0.295
Pleuronichthys ritteri	-	2	-	2	1	1	12	1	7	11	7	32	21	25	4	20	6	5	2	-	1	-	-	-	-	1	161	0.111
Xystreurys liolepis	-	3	1	2	3	4	32	6	4	18	3	14	9	6	5	12	5	5	1	4	-	-	1	8	1	3	150	0.103
Sardinops sagax	-	-	-	-	-	-	-	-	2	-	-	-	-	-	67	-	7	-	12	-	8	-	45	-	-	-	142	0.098
Leptocottus armatus	-	8	1	-	1	-	-	2	-	38	4	6	49	4	2	-	5	6	2	-	-	1	-	3	6	2	140	0.097
Menticirrhus undulatus	5	3	9	21	2	2	8	8	3	16	8	2	2	-	2	1	3	4	1	-	1	10	14	1	4	-	130	0.090
Anchoa compressa	-	-	-	-	-	1	1	1	1	-	-	-	4	-	-	1	1	10	-	-	-	30	68	-	-	-	118	0.081
Symphurus atricauda	10	11	15	2	1	1	5	3	6	11	8	13	9	4	-	-	-	6	-	-	-	-	-	-	-	-	105	0.072
Syngnathus spp.	5	39	5	2	1	2	4	1	-	-	6	4	14	1	4	-	5	1	1	-	1	-	2	2	-	-	100	0.069
Pleuronichthys verticalis	5	6	16	2	4	5	11	1	1	19	2	9	-	3	-	-	-	1	-	-	-	-	-	9	-	1	95	0.065
Myliobatis californica	-	-	11	8	1	4	1	10	-	11	1	-	-	-	-	1	1	4	-	6	-	5	2	-	16	-	84	0.058
Ophidion scrippsae	1	1	43	-	-	-	-	1	-	1	22	-	1	-	-	-	-	-	-	-	-	-	1	-	-	-	71	0.049
Platyrhinoidis triseriata	-	9	-	3	1	-	-	2	1	13	3	10	4	6	-	2	-	1	1	-	1	-	2	-	-	-	59	0.041
Hypsopsetta guttulata	-	1	3	2	3	1	6	6	-	-	2	2	-	2	-	2	-	1	1	-	-	1	-	-	-	2	35	0.024
Paralabrax nebulifer	-	-	1	-	-	-	3	3	3	1	4	1	2	2	2	-	-	1	1	2	-	-	1	1	-	-	28	0.019
Cheilotrema saturnum	-	-	-	-	-	2	-	13	1	2	2	1	-	-	-	-	-	1	3	1	-	-	-	-	-	-	26	0.018
Embiotoca jacksoni	6	-	1	-	-	10	-	-	-	1	-	-	-	-	-	-	-	-	4	-	-	-	-	-	-	-	22	0.015
Rhinobatos productus	2	3	2	1	-	-	-	-	1	-	-	-	1	6	-	-	-	-	-	-	-	-	-	1	1	-	18	0.012
Mustelus henlei	1	3	-	-	-	-	-	-	-	1	-	-	1	1	-	1	1	1	-	-	-	5	-	-	1	-	16	0.011
Heterostichus rostratus	-	1	-	-	-	1	-	-	-	2	1	2	1	-	-	-	-	1	2	-	-	-	1	-	-	-	12	0.008
Porichthys myriaster	-	4	-	-	1	-	-	-	-	-	2	-	1	-	-	1	-	-	-	-	-	-	2	1	-	-	12	0.008
Sphyraena argentea	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	4	-	-	-	-	1	-	-	-	-	9	0.006
Atherinopsis californiensis	-	-	-	1	1	-	-	-	-	-	-	-	-	-	-	2	1	-	-	1	-	1	1	-	-	-	8	0.006
Squalus acanthias	-	-	-	-	-	-	-	-	-	3	-	2	2	-	1	-	-	-	-	-	-	-	-	-	-	-	8	0.005
Atractoscion nobilis	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	2	-	1	-	6	0.004
Chromis punctipinnis	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	2	1	6	0.004
Damalichthys vacca	1	1	1	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	6	0.004
Girella nigricans	-	1	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	5	0.003
Paralabrax clathratus	-	-	1	-	1	-	-	1	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	5	0.003
Microstomus pacificus	-	-	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	0.003
Syngnathus californiensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	-	4	0.003
Chilara taylori	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	0.002
Scorpaena guttata	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	3	0.002
Trachurus symmetricus	-	-	-	-	-	-	-	1	1	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	3	0.002
Xenistius californiensis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	3	0.002
Citharichthys xanthostigma	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	0.001
Leuresthes tenuis	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	2	0.001
Pleuronectes vetulus	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	0.001
Porichthys notatus	-	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.001
Sebastes paucispinis	-	1	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.001

Table 5.10-4 (CONT'D)
EPIBENTHIS INVERTEBRATES AND FISHES COLLECTED BY TRAWL AT HUNTINGTON BEACH, 1976-2001

	Year																											Percent
	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	Total	Total
Triakis semifasciata	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	1	-	-	-	-	2	0.001
Anchoa delicatissima	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	1	0.001
Dorosoma petenense	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Galeorhinus zygopteros	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Gibbonsia elegans	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Halichoeres semicinctus	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Heterodontus francisci	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Hypsoblennius gilberti	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	1	0.001
Pleuronichthys coenosus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	1	0.001
Pleuronichthys decurrens	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	1	0.001
Raja inornata	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Scomber japonicus	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Sebastes serranoides	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Semicossyphus pulcher	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Torpedo californica	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.001
Number of individuals	4309	8068	11693	9834	5508	7613	1256	14513	5392	1836	2102	1572	1402	194	20638	608	11808	26963	2078	1696	986	1031	1933	82	1314	621	145050	
Number of species	21	28	28	22	24	23	19	28	20	25	29	21	26	19	20	18	21	25	23	17	14	21	23	13	17	17	65	
Number of stations sampled	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	12	6	6	6	6	6	6	6	6		

Source: MBC, 2001

- The area does not have any "environmentally sensitive" habitats such as eel grass beds, surf grass, rocky shores, or kelp beds; and
- The movement, abundance, and diversity of invertebrate and fish populations along the Huntington Beach coast appear all to be in response to natural ecological factors and not in any way influenced or affected by the HBGS discharge.

REGULATORY FRAMEWORK

California Ocean Plan

Since 1973, the California State Water Resources Control Board (SWRCB) and its nine Regional Water Quality Control Boards (RWQCB) have been delegated the responsibility for administering permitted discharge into the coastal marine waters in California. The SWRCB prepares and adopts the Quality Control Plan for Waters of California (Ocean Plan), which incorporates the water quality control standards that apply to all NPDES permits.

The SWRCB adopted the Ocean Plan on July 6, 1972. Since 1972, the Ocean Plan has been amended a number of times, most recently in 2001. The Ocean Plan establishes beneficial uses to be protected, water quality objectives and a program for implementation needed for achieving the water quality objectives. The beneficial uses of the ocean protected by the Ocean Plan include: preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning; shellfish harvesting; recreation; commercial and sport fishing; mariculture; industrial water supply; aesthetic enjoyment; and navigation. The Ocean Plan's water quality objectives for California's ocean waters and provide basis for regulation of wastes discharged into the State's coastal waters. When a discharge permit is written, the water quality objectives defined in the Ocean Plan are converted into effluent limitations that apply to discharges into State ocean waters. These effluent limitations are established on a discharge-specific basis depending on the initial dilution calculated for the facility discharge outfall. The regulatory agency with jurisdiction over the discharge from the Huntington Beach seawater desalination facility would be the SARWQCB. The Ocean Plan's narrative and numerical water quality objectives are based on bacterial, physical, chemical, and biological characteristics as well as radioactivity. The water quality objectives in the Ocean Plan are established for protection of human health from both carcinogens and non-carcinogens. Within the Ocean Plan there are 21 objectives for protecting aquatic life, 20 for protecting human health from non-carcinogens, and 42 for protecting human health from exposure to carcinogens.

The numeric objectives of the 2001 California Ocean Plan, Table B, would apply to discharges from the proposed desalination facility (objectives currently apply to discharges from the AES power plant), and would be evaluated by the Regional Water Quality Control Board as part of the NPDES permit for the project. The NPDES permit (No. CA0001163) issued to AES Huntington Beach, LLC by the SARWQCB includes specific monitoring requirements for monitoring the discharges through the outfall. Those requirements would continue to apply. In addition, the project would be required to obtain a separate NPDES permit from the SARWQCB that would also include monitoring requirements. The RWQCB's Ocean Plan human health standards are designed to protect the beneficial use of body-contact recreation. The discharge from the desalination facility would be required to meet all Ocean Plan standards regulated by the SARWQCB.

Based on the Water Quality Management Plan (WQMP) for the Santa Ana River Basin, the Pacific Ocean's nearshore waters in the project site vicinity serve multiple beneficial uses. Existing beneficial uses within the coastal vicinity include: industrial service supply, navigation, contact water recreation (swimming, diving), non-contact water recreation (sailing, tide pool studies, aesthetic enjoyment, etc.), commercial and sport fishing, wildlife habitat support, rare/threatened/endangered species habitat support, spawning/reproduction/development habitat support, marine habitat, and shellfish harvesting. No "potential uses" for the project vicinity (as categorized within the WQMP) have been recorded.

This project does not require that the Pacific Ocean in the vicinity of the intake be designated as supporting the beneficial use of drinking water (MUN). The Sources of Drinking Water Policy, adopted by the State Water Resources Control Board in 1988, requires that all waters of the state, with certain exceptions, be protected as existing or potential sources of municipal and domestic supply. One of the exceptions is water with a total dissolved solids (TDS) concentration exceeding 3,000 mg/L, which is applicable to the Pacific Ocean. The MUN designation affords some additional chemical protection of a waterway because maximum contaminant levels (MCLs) are to be achieved in ambient waters. There is no additional protection provided for microbial contaminants because MCLs have not been established for pathogens or coliforms.

The Pacific Ocean in the vicinity of the intake is high quality and, in fact, has concentrations of some chemicals that are far below the drinking water MCLs prior to any treatment. An MUN designation would not provide any additional protection because the intake water quality is not influenced by storm water discharges, the Santa Ana River, the Talbert Marsh, or the Orange County Sanitation District (OCSD) wastewater discharge, as described in the hydrologic modeling studies included in Appendix C, *HYDRODYNAMIC MODELING REPORT*. Requiring these discharges to meet MCLs in ambient waters would provide no improvement in water quality at the intake to the desalination facility.

Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California (Thermal Plan)

The State Water Resources Control Board's Thermal Plan regulates the discharges of elevated temperature wastes (thermal discharges) into coastal waters of California. The main purpose of this plan is to assure protection of the beneficial uses and areas of special biological significances from excessive thermal discharges. A key plan objective is to reduce the overall amount of thermal load discharged in State waters, including coastal waters.

The Thermal Plan limits the maximum temperature of thermal discharge to Coastal Waters to 20 degrees Fahrenheit over the ambient ocean water temperature. This plan also requires the discharge of elevated wastes to the ocean not to cause a temperature increase in the natural water by more than 4 degrees Fahrenheit at: (a) the shoreline, (b) the surface of any ocean substrate, or (c) the ocean surface beyond 1,000 feet from the discharge system. The surface temperature limitation is to be maintained at least 50 percent of the duration of any tidal cycle.

SARWQCB Water Quality Control Plan (Basin Plan)

The California Ocean Plan, the Thermal Plan and other plans and policies adopted by the SWRCB are incorporated into the Basin Plan. A revised Basin Plan for the Santa Ana region became effective on January 24, 1995. In 2004, the Basin Plan was amended. This plan specifies beneficial uses and water quality objectives for waters in the "Nearshore Zone" and "Offshore Zone" of the Pacific Ocean in the Santa Ana region.

The "Nearshore Zone" is defined by the Ocean Plan, Chapter II, A.1 as "a zone bounded by the shoreline and a distance of 1,000 feet from the shoreline or the 30-foot depth contour, whichever is further from the shoreline". The "Offshore Zone" is the area bounded between by the "Nearshore Zone" and the limit of the State waters.

NPDES Permit

To comply with regulatory requirements the applicant applied to the SARWQCB for a NPDES permit on May 15, 2003. The NPDES permit application included:

- Submission of an application;
- Submission of an Engineering Report including;
  - Facility Description;
  - Facility Waste Streams;
  - Waste Streams Characterizations;
  - California Ocean Plan Requirements; and
  - Antidegradation policy Applicability.

It is expected that the SARWQCB may include provisions in the NPDES permit pertaining to the following:

- Discharge Water Quality Limits; and
- Water Quality Monitoring and Reporting.

In summary, through issuance of a NPDES permit for the proposed project, the SARWQCB would require that the objectives for marine water quality as defined in the California Ocean Plan, Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays and Estuaries of California, and SARWQCB Basin Plan that would apply to the proposed project include:

- **Bacterial Characteristics:** Samples of water from each sampling station shall have a density of total coliform less than 1,000 per 100 ml (10 per ml), provided that not more than 20 percent of the samples at any sampling station, in any 30-day period, may exceed 1,000 per 100 ml (10 per ml), and provided further that no single sample when verified by a repeat sample taken within 48 hours shall exceed 10,000 per 100 ml (100 per ml). In addition, the fecal coliform density based on a minimum of not less than five samples for any 30-day period, shall not exceed a geometric mean of 200 per 100 ml nor shall more than 10 percent of the total samples during any 60-day period exceed 400 per 100 ml. For all areas where shellfish may be harvested for human consumption, as determined by the Regional Board, the median total coliform density shall not exceed 70 per 100 ml, and not more than 10 percent of the samples shall exceed 230 per 100 ml.

- **Physical characteristics:** Ocean waters shall be free of visible floating particulates, grease, oil, and discoloration. Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste. In addition, the rate of deposition of inert solids and the characteristics of inert solids in ocean sediments shall not be changed such that benthic communities are degraded.

- **Chemical Characteristics:** The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally as a result of the discharge of oxygen demanding waste materials, while the pH shall not be changed at any time more than 0.2 units from that which occurs naturally. In addition, the amounts of dissolved sulfide, nutrient materials, and harmful substances in marine sediments shall be limited so as not to negatively impact marine life.

- **Biological Characteristics:** Marine communities, including vertebrate, invertebrate, and plant species shall not be degraded. In addition, the natural taste, odor, and color of marine resources used for human consumption shall not be altered, nor shall the concentration of organic materials bioaccumulate to levels that are harmful to human health.

- **Radioactivity:** Discharge of radioactive waste shall not degrade marine life.

IMPACTS

Significance Criteria

Based on the CEQA Guidelines, Appendix G, the project would have a significant effect related to water quality if it would:

- Violate any water quality standard or waste discharge requirements;
- Otherwise substantially degrade water quality.

The significance thresholds for biological resources that are identified in Appendix G of the CEQA Guidelines are applicable primarily to terrestrial biological resources. With respect to marine biological resources, guidance in developing appropriate significance thresholds has been taken from the California Coastal Commission (CCC) because the CCC must consider potential impacts of the proposed project before issuing the necessary Coastal Development Permit. In a recent report, dated March 2004, and updated September 2004, the CCC indicated concerns about potential impacts on the marine environment resulting from seawater desalination. The stated concerns in this report are:

- Increased salinity of the effluent;
- Potential detrimental effects from chemicals added to the seawater during the desalination process; and
- Potential for impingement and entrainment in the intake system to degrade the quality of assemblages in the local or regional marine environment.

These generalized concerns encompass the range of potential effects of the desalination facility on ocean water quality and marine organisms, and therefore are the primary focus of this Recirculated EIR for determination of significant effects of the project.

Elevated Salinity

EPA (1986) policy on discharge effects related to salinity acknowledges that fishes and other aquatic organisms are naturally tolerant of a range of dissolved solids concentrations (in this case salinity) and must be able to do this in order to survive under natural conditions. Also, marine species do exhibit variation in their ability to tolerate salinity changes. EPA (1986) recommendations state that, to protect wildlife habitats, salinity variation from natural levels should not exceed 4 ppt when natural salinity is between 13.5 and 35 ppt. The average ocean salinity at Huntington Beach and over a vast expanse of ocean area around it is 33.5 ppt. As applied to the proposed project, discharge scenarios that do not permanently elevate salinities to 37.5 ppt (a 12 percent increase) or greater outside of a reasonable distance from the discharge core would appear effective in not adversely affecting marine organisms.

The study prepared by Dr. Graham (Appendix S) specifically addressed potential effects on local species passing through the area surrounding the discharge core, as well as the potential effects on bethnic organisms living in the area surrounding the discharge core. The study incorporates numerous references and examples where no substantial ecological losses to source populations of marine organisms were observed from short-term exposure to elevated salinity levels.

Based on the results of the referenced studies the following threshold for significant impacts on marine organisms from elevated salinity was defined for the site-specific conditions of the Huntington Beach project:

- Significant impacts related to elevated salinity would occur if the project would discharge salinity levels that result in substantial ecological losses to source populations of marine organisms; and/or
- Permanent elevation of salinity levels to 37.5 ppt or greater outside of a reasonable distance from the discharge core would be significant.

Chemical Discharge

Significant impacts related to chemical discharge would occur if the project would discharge any chemical wastes that would result in substantial ecological losses to source populations of marine organisms.

Impingement and Entrainment

Effects related to impingement and entrainment would be considered significant if:

- The impingement effects (trapping of larger organisms on intake screens) of desalination facility operations result in substantial ecological losses to source populations of the impinged species; and/or
- The entrainment effects (loss of small planktonic organisms passing through cooling water system) of desalination facility operations result in substantial ecological losses to source populations of the entrained species.

OCEAN WATER QUALITY

Oceanographers from the Scripps Institution of Oceanography conducted modeling studies using a computer model that simulates ocean conditions near the HBGS intake and outfall (refer to Appendix C,*HYDRODYNAMIC MODELING REPORT*). The model calculates the degree of mixing of various potential contaminant sources with the Pacific Ocean. The Santa Ana River, Talbert Marsh, OCSD wastewater discharge outfall, HBGS discharge and proposed desalination facility discharge were all investigated. Seawater contamination resulting from any of the above sources could potentially impact the quality of desalinated product water and, to some degree, the quality of byproduct concentrated seawater water to be discharged from the HBGS outfall. The model results show the amount of dilution of each of these sources of pollutants under different oceanographic conditions.

The modelers from Scripps used their many years of experience working along the Southern California coast to determine the "worst case" conditions that would be modeled. The "worst case" conditions were chosen to determine if any adverse water quality or environmental impacts occurred under extreme ocean and weather conditions that were most likely to show an effect. For example, the effect of the Santa Ana River and Talbert Marsh storm water on water quality at the HBGS intake was modeled assuming a very large, prolonged storm event and ocean currents flowing from the mouth of the river towards the HBGS facility. Normally, ocean currents flow in the opposite direction, down the coast (southeast) away from the HBGS.

Potential Sources of Contamination in Proximity to the HBGS Intake

OCSD Wastewater Discharge

As stated above, the OCSD sewage treatment facility discharges a mix of primary and secondary treated wastewater at an outfall located 4.5 miles offshore at a depth of 195 feet. However, it should be noted that OCSD has committed to provide secondary treatment for 100 percent of all effluent it receives. The development of facilities to provide this additional secondary treatment could take up to 11 years to plan, design, construct, and commission. A more detailed implementation plan is being developed by the District.

In addition, on August 12, 2002, the OCSD began disinfecting its wastewater per RWQCB requirements. The OCSD is presently adding bleach as a disinfectant followed by sodium bisulfite to remove residual prior to ocean discharge, and will continue to do so for the next three to five years. Testing and studies are underway to evaluate other disinfection technologies, including ultraviolet light, ozone, and peracetic acid for long-term application.

The OCSD wastewater discharge would have the greatest potential to impact water quality at the HBGS intake with summer El Nino conditions when currents are flowing northwest towards the HBGS. In addition, for worst case conditions, the model assumed that:

- OCSD was discharging at its maximum allowable rate of 480 mgd;
- The temperature conditions in the ocean would allow the wastewater plume to be near the depth of the HBGS intake;
- A current would travel upcoast (northwest);
- End of pipe total coliform counts would be at the mid- to high end of operational ranges prior to OCSD disinfection resolution; and
- HBGS would operate at a maxium flow rate and intake velocity (507 mgd and two feet per second, respectively).

It should be noted that these conditions are atypical and the likelihood of them occurring simultaneously is extremely low.

The worst case model results show that the OCSD discharge is diluted 30 million to one at the HBGS intake. Any contaminants discharged at the OCSD outfall would be diluted far below background levels at the intake to the HBGS. Therefore, the OCSD discharge was not found to be a significant source of contamination at the HBGS intake.

Furthermore, the proposed desalination project discharge is not expected to have a measurable impact on the OCSD's wastewater treatment plant effluent water quality, and therefore will not require changes to OCSD's monitoring program or additional monitoring in the currently monitored area. According to hydrodynamic modeling prepared for the project, the "low flow" scenario ocean water salinity increases as a result of the desalination facility discharge, and discharge salinity concentration will diminish to levels close to the background ocean water salinity of 33.6 ppt before it reaches the OCSD outfall and monitoring area. The accuracy of the currently available instrumentation for seawater salinity measurement is +/- 0.1 ppt. Under the "low flow" scenario the discharge salinity concentration of the desalination facility discharge decreases to 33.6 ppt (within +

0.1 ppt of the background seawater concentration of 33.5 ppt in less than 2,000 feet from the desalination facility point of discharge. The OCSD discharge outfall is more than five miles (26,400 feet) away from the power plant outfall. By the time the desalination facility discharge reaches the OCSD monitoring area, the salinity change contributed to the desalination facility discharge will be within the range of natural variability, and therefore, will be non-detectible. Refer to Appendix C, *HYDRODYNAMIC MODELING REPORT* for additional information.

As far as other constituents of concern for the OCSD discharge, the desalination facility discharge water quality would be well within the limits established in the Ocean Plan. Therefore, the desalination facility discharge is not expected to have any measurable effect on the results of the OCSD's monitoring program.

Urban Storm Water Runoff

The Santa Ana River drains a highly urbanized watershed of 1,700 square miles and flows into the ocean approximately 8,300 feet southeast from the intake to the AES facility. The Talbert Marsh, which receives urban runoff from the City of Huntington Beach and several other communities, discharges to the ocean about 7,000 feet southeast from the AES intake. Under typical conditions, the discharges from the Santa Ana River and Talbert Marsh flow away (southeast) from the AES intake. However, there are times when the currents flow northwest and carry river and marsh water towards the AES facility. Since freshwater is less dense than seawater, the river and marsh discharges normally float on the surface of the sea and are slowly mixed into deeper waters. During storms, winds and waves can mix the river and marsh plumes into deeper water more rapidly.

Storm water discharges from the Santa Ana River and Talbert Marsh would have the greatest potential to impact water quality at the HBGS intake if an extreme storm event coincided with an El Nino winter and maximum pumping of cooling water into the generating station. Although it is unlikely that all of these events would coincide with one another, this was considered to be the "worst-case" scenario for determining if the Santa Ana River and Talbert Marsh contribute contaminants to the HBGS intake.

The model results show that during a 24-hour extreme runoff period only 0.0003 percent of the water at the HBGS intake would come from the Santa Ana River and Talbert Marsh and the remaining 99.9997 percent would be seawater. These results show that contaminants are not transported to the HBGS intake from the Santa Ana River and Talbert Marsh during extreme storm conditions. More detailed modeling results are presented in Appendix C, *HYDRODYNAMIC MODELING REPORT*. Impacts are not anticipated to be significant in this regard.

Dry Weather Runoff

The mouth of the Talbert Marsh is closed by sand spits for short periods of time during the dry season. This can trap up to 200 million gallons of urban runoff and seawater in the Marsh and lower channel system. When very high tides rise over the sand spit, the mouth of the Talbert Marsh opens and 80 to 100 million gallons of water can be released into near shore ocean waters in a single tidal flush. Because Talbert Marsh waters are similar to seawater salinity in the dry season, the discharge does not float on the sea surface and may quickly mix into deeper ocean waters where the HBGS intake is located.

Tidal flushing of the Talbert Marsh would have the greatest potential to impact water quality at the HBGS intake during high spring tides combined with summer El Nino conditions when currents are flowing northwest from the marsh towards the intake. The model showed that under these worst case conditions, the marsh water is diluted 20,000 to one and essentially does not reach the intake. This is due to the fact that the marsh water is released into the surf zone and the onshore waves keep the marsh water in the shallow nearshore waters, whereas the HBGS intake is located 1,840 feet offshore at a depth of approximately 33 feet. Impacts are not anticipated to be significant in this regard.

Recirculation of HBGS Discharge

The HBGS outfall is located approximately 1,500 feet offshore and 340 feet from the HBGS intake. The potential for recirculation of the discharge into the intake was examined. The discharge consists primarily of cooling water, but a small amount of power plant process wastewater and storm water can be mixed with the cooling water. The concentrated seawater from the proposed desalination facility will also be mixed with the power plant cooling water.

Recirculation of the HBGS discharge would have the greatest potential to impact water quality at the intake during El Nino storm conditions when the maximum amount of storm water is being discharged through the outfall. The hydrodynamic model for recirculation of the HBGS discharge was run using the El Nino conditions of February 1998 and the maximum allowable discharge of 1.66 MGD of generating station process wastewater and storm water. In addition, the proposed desalination facility was assumed to be running at full capacity so that 50 MGD of concentrated seawater discharge was mixed with the cooling water discharge. Furthermore, recirculation potential was examined under two generating scenarios: 1) one generating unit on-line with a total discharge of 78.4 MGD of cooling water, storm water, and wastewater, and the concentrated seawater discharge and 2) four generating units on-line producing a total discharge of 458.6 MGD of cooling water, storm water, and wastewater, and the concentrated seawater discharge. The model results under worst case conditions for a 7-day extreme runoff period show that only 0.3 percent of the HBGS discharge would be recirculated to the intake. The results for four generating units show a greater dilution with only 0.1 percent of the HBGS discharge recirculated to the intake. Based on these results, the recirculation of the HBGS discharge during storm events has been shown to not affect the source water quality at the HBGS intake. Impacts are not anticipated to be significant in this regard.

Los Angeles and San Gabriel Rivers

As stated above, the Los Angeles River discharges to the ocean approximately 16 miles upcoast (i.e. northwest) from HBGS, while the San Gabriel River discharges approximately 11 miles upcoast. The amount of dilution that occurs and the fact that the generating station intake is at a depth of approximately 33 feet indicates that contaminants entering the ocean from these two rivers would not likely affect the water quality at the HBGS intake. Impacts in this regard are not anticipated to be significant.

Cruise Ships and Fishing Boats

The nearest major port for cruise ships is located approximately 16 miles northwest of the HBGS intake. Ingress/egress routes for cruise ships for Long Beach and Los Angeles Harbors do not come in close proximity to the HBGS. In addition, given the limited nature of sportfishing that occurs in the project site vicinity, impacts in this regard are not anticipated to be significant.

Recreation

Any contaminants released into the ocean due to recreational use are likely to be small in quantity greatly diluted due to tidal action. It would be difficult for such contaminants to reach the HBGS intake due to its depth of approximately 33 feet below the ocean surface. Impacts in regards to recreational uses are not anticipated to be significant.

Oil and Gas Production Facilities

As stated above, there are two offshore oil platforms approximately 1.5 miles west of the HBGS intake and four platforms approximately 10 miles west of the intake. There have not been any reportable spills or leaks from the offshore oil platforms or the pipelines. A catastrophic event at one of the offshore platforms that is near the coast could affect water quality at the HBGS intake. However, given the relatively low probability based on operational history, impacts in this regard are not anticipated to be significant.

Red Tides and Algal Toxins

Refer to Section 5.11, *PRODUCT WATER QUALITY* for a discussion of potential impacts in regards to red tides and algal toxins.

Operations at HBGS

Activities or conditions occurring along the HBGS cooling water system between the HBGS intake and the point at which water is diverted toward the desalination facility could impact water quality (particularly in regards to metals). The diversion point would occur after cooling water has traveled through the HBGS condensers.

There are numerous water quality constituents regulated in drinking water supplies. Samples were collected from the HBGS intake vault and from the outlet of the condensers (where the desalination facility intake will be located). Table 5.10-5a/b, *COMPARISON OF HBGS INTAKE WELL MONITORING TO PRIMARY MAXIMUM CONTAMINANT LEVELS* compares the intake data to the California Department of Health Services (DHS) primary MCLs. Table 5.10-6a/b, *COMPARISON OF INTAKE WELL MONITORING TO SECONDARY MAXIMUM CONTAMINANT LEVELS* compares the data to the secondary MCLs. Although MCLs apply to treated drinking water, raw water concentrations that exceed MCLs provide an indication of potential contaminants of concern. None of the primary MCLs are exceeded in the intake water and the only secondary MCLs that are exceeded are salts (TDS, chloride, sulfate) that would be removed by the reverse osmosis process. Impacts are not anticipated to be significant in this regard.

Potential sources of contaminants at the HBGS site also include cycle water, storm water, and wastewater that are mixed with the cooling water, and on-site spills of hazardous materials of sufficient magnitude to enter the floor drainage system or yard storm drainage system. These potential contaminants are discussed in more detail in Appendix E, *WATERSHED SANITARY SURVEY.*

Cycle Water Discharges

Cycle water is discharged to the cooling water system at various locations as the cooling water flows through the generating station. The cycle water is under vacuum so the cooling water leaks into the cycle water but the cycle water does not leak into the cooling water. There are several locations where cycle water is discharged into the cooling water system. Table 5.10-7, *CYCLE WATER DISCHARGES TO THE HBGS COOLING WATER SYSTEM* presents a summary of the discharges to the cooling water system that will be upstream of the intake to the desalination facility. The contaminants in these discharges will be greatly diluted by the large volume of cooling water compared to the small volume of the discharges. The only chemical of concern in a drinking water source is nitrite. The other chemicals in the discharges are not toxic to humans and drinking water standards have not been established. Because the volume of cooling water represents a maximum of 0.002 percent of the cooling water flowing through one unit at the HBGS, the nitrite concentration

Table 5.10-5a
COMPARISON OF HBGS INTAKE WELL MONITORING DATA TO PRIMARY MAXIMUM CONTAMINANT LEVELS

Constituent	Primary Maximum Contaminant Level	Monitoring Data		
		Number of Samples	Mean Concentration	Maximum Concentration
Inorganic Chemicals				
Aluminum, mg/L	1	3	0.063	0.073
Antimony, mg/L	0.006	3	0.00009	0.00013
Arsenic, mg/L	0.05	3	0.002	0.003
Asbestos, MFL	7			
Barium, mg/L	1	14	<0.000001	<0.000001
Beryllium, mg/L	0.004	3	<0.000005	<0.000005
Cadmium, mg/L	0.005	4	0.00003	0.0001
Chromium, mg/L	0.05	4	0.002	0.003
Copper, mg/L	1.3	4	0.0005	0.0008
Cyanide, mg/L	0.2	2	<0.001	<0.001
Fluoride, mg/L	2	14	0.724	0.9
Lead, mg/L	0.015	4	0.0001	0.0002
Mercury, mg/L	0.002	4	<0.0001	<0.0001
Nickel, mg/L	0.1	5	0.001	0.002
Nitrate, mg/L as N	10	14	<0.1	<0.1
Nitrate + Nitrite, mg/L as N	10			
Nitrite, mg/L as N	1			
Selenium, mg/L	0.05	3	0.005	0.008
Thallium, mg/L	0.002	3	0.00004	0.00006
Radioactivity				
Gross alpha particle, pCi/L	15	3	3.62	6.62
Gross beta particle, pCi/L	50	2	14.15	23.4
Radium 226 & 228, pCi/L	5	1	0.226	
Radium 226, pCi/L				
Radium 228, pCi/L				
Strontium-90, pCi/L	8			
Tritium, pCi/L	20,000			
Uranium, pCi/L	20			
Organic Chemicals				
Atrazine, mg/L	0.003	1		<0.010
Benzo(a)pyrene, mg/L	0.0002	1		<0.001
Carbofuran, mg/L	0.018	1		<0.050
Di(2-ethylhexyl)pthlate, mg/L	0.004	1		<0.030
Endothall, mg/L	0.100	1		<0.400
Simazine,mg/L	0.004	1		<0.010
2,3,7,8 – TCDD, pg/L	0.003	1		<1.69

Note: August 2001 – November 2001 data as per sanitary survey approved by DHS August 2002.

Table 5.10-5b
COMPARISON OF HBGS INTAKE WELL MONITORING DATA TO PRIMARY MAXIMUM CONTAMINANT LEVELS

Constituent	Primary Maximum Contaminant Level	Monitoring Data		
		Number of Samples	Mean Concentration	Maximum Concentration
Inorganic Chemicals				
Aluminum, mg/L	1	8	0.204	0.496
Antimony, mg/L	0.006	8	0.00011	0.00014
Arsenic, mg/L	0.05	8	0.0016	0.0025
Barium, mg/L	1	14	<0.000001	<0.000001
Beryllium, mg/L	0.004	8	<0.000004	<0.00002
Cadmium, mg/L	0.005	8	0.00004	0.0003
Chromium, mg/L	0.05	8	0.0013	0.0048
Copper, mg/L	1.3	8	0.0011	0.002
Cyanide, mg/L	0.2	4	<0.001	<0.001
Fluoride, mg/L	2	4	1.6	1.9
Lead, mg/L	0.015	8	0.0002	0.0004
Mercury, mg/L	0.002	8	0.00002	0.00005
Nickel, mg/L	0.1	8	0.0029	0.0085
Nitrate, mg/L as N	10	14	<0.1	<0.1
Nitrite, mg/L as N	1	1	<0.6	<0.6
Nitrite + Nitrate, mg/L as N	10	1	<0.6	<0.6
Selenium, mg/L	0.05	8	0.00003	0.00005
Thallium, mg/L	0.002	8	0.000011	0.000025
Radioactivity				
Gross alpha particle, pCi/L	15	3	3.62	6.62
Gross beta particle, pCi/L	50	2	14.15	23.4
Radium 226 & 228, pCi/L	5	1	0.226	0.226
Strontium-90, pCi/L	8	1	< 2	< 2
Tritium, pCi/L	20,000	1	24.6	24.6
Uranium, pCi/L	20	1	1.64	1.64
Organic Chemicals				
Atrazine, mg/L	0.003	1	<0.010	<0.010
Benzo(a)pyrene, mg/L	0.0002	4	<0.000001	<0.000001
Carbofuran, mg/L	0.018	1	<0.050	<0.050
Di(2-ethylhexyl)pthlate, mg/L	0.004	1	<0.030	<0.030
Endothall, mg/L	0.100	1	<0.400	<0.400
Simazine,mg/L	0.004	1	<0.010	<0.010
2,3,7,8 – TCDD, pg/L	0.003	1	<1.69	<1.69

Note: Nov. 2001-Dec 2002 water quality data collected for the desalination facility design and operation criteria.

of 800 mg/L will be diluted to about 0.02 mg/L in the cooling water that would reach the desalination facility. This level of nitrite is well below the drinking water MCL of one mg/L. Nitrite and the other chemicals present in the cycle water discharges will easily be removed by the reverse osmosis membranes. As a result, impacts in this regard are not anticipated to be significant.

Urban Runoff Discharges

Storm runoff from the HBGS site and a limited amount of off-site urban runoff is currently discharged to the cooling water system upstream of the intake to the desalination facility. The applicant would coordinate with HBGS to reroute these discharges during construction of the desalination facility so they would be downstream of the desalination intake and not

Table 5.10-6a
COMPARISON OF HBGS INTAKE WELL MONITORING DATA TO SECONDARY MAXIMUM CONTAMINANT LEVELS

Constituent	Secondary Maximum Contaminant Level	Monitoring Data		
		Number of Samples	Mean Concentration	Maximum Concentration
Aluminum, mg/L	0.2	3	0.063	0.073
Color, units	15			
Copper, mg/L	1.0	4	0.0005	0.0008
Corrosivity	Non corrosive			
MBAS, mg/L	0.5			
Iron, mg/L	0.3	3	0.051	0.081
Manganese, mg/L	0.05	3	0.006	0.009
MTBE, mg/L	0.005	2	<0.002	<0.003
Threshold Odor Number, units	3			
Silver, mg/L	0.1	4	0.0003	0.0006
Thiobencarb, mg/L	0.001	1		<0.010
Turbidity, units	5	27	3.9	16
Zinc, mg/L	5.0	3	0.006	0.008
Total dissolved solids, mg/L	500	26	33,100	39,100
Conductance, umhos/cm	900	24	48,400	49,200
Chloride, mg/L	250	14	19,600	20,200
Sulfate, mg/L	250	14	2,300	2,700

Note: August 2001 – November 2001 data as per sanitary survey approved by DHS August 2002.

Table 5.10-6b
COMPARISON OF HBGS INTAKE WELL MONITORING DATA TO SECONDARY MAXIMUM CONTAMINANT LEVELS

Constituent	Secondary Maximum Contaminant Level	Poseidon Monitoring Data		
		Number of Samples	Mean Concentration	Maximum Concentration
Aluminum, mg/L	0.2	3	0.063	0.073
Color, units	15	1	3	3
Copper, mg/L	1.0	4	0.0005	0.0008
Corrosivity	Non corrosive	NA	NA	NA
MBAS, mg/L	0.5	1	0.065	0.065
Iron, mg/L	0.3	3	0.051	0.081
Manganese, mg/L	0.05	3	0.006	0.009
MTBE, mg/L	0.005	2	<0.002	<0.003
Threshold Odor Number, units	3	4	1	1
Silver, mg/L	0.1	4	0.0003	0.0006
Thiobencarb, mg/L	0.001	1		<0.010
Turbidity, units	5	27	3.9	16
Zinc, mg/L	5.0	8	0.0029	0.0058
Total dissolved solids, mg/L	500	26	33,500	34,340
Conductance, umhos/cm	900	24	48,400	49,200
Chloride, mg/L	250	14	19,600	20,200
Sulfate, mg/L	250	14	2,300	2,700

NA – Not Applicable
Note: Nov 2001 – Dec 2002 water quality data collected for desalination facility design and operation criteria.

Table 5.10-7
CYCLE WATER DISCHARGES TO THE HBGS COOLING WATER SYSTEM

Discharge	Volume	Contaminants
Condensate Overboard	25,000 gallons per unit at start-up, generally once per month.	Chloride - 1-5 mg/L Ammonia - 0.15-0.5 mg/L Silica – 1 mg/L Iron – 1-5 mg/L Copper – 1 mg/L pH – 7.0-8.5
Boiler Blowdown	25,000 gallons per day from each unit.	Chloride – 1-9 mg/L Phosphate – 0.5-10 mg/L Silica – 0.135-0.25 mg/L Iron – 1 mg/L Copper – 1 mg/L pH – 9.15-11 EC – 10-300 umhos/cm Sodium hydroxide – 1-40 mg/L
Bearing Cooling Water Exchanges	Several 1,000 gallons per day from each unit.	Nitrite – 600-800 mg/L EC – 6,000 umhos/cm pH – 8.5 Hardness – 10 mg/L as CaCO3 Sodium fluorescein dye – 1-10 mg/L Polyoxyethylene-polyoxypropylene copolymer Ethoxylated nonylphenol Polydimethysiloxane Isothiazolin Uranine dye – 2-10 mg/L

affect water quality at the desalination intake. The off-site urban runoff is from approximately 70 acres of land near the HBGS. The off-site drainage comes from a road and mobile home/recreational vehicle park to the west, the Wildlife Care Center parking lot located to the south, and a small commercial area north of the site. Dry weather runoff collects in a ditch alongside Newland Street and is currently pumped into the HBGS outfall pipeline. The City of Huntington Beach plans to modify the system so that it flows into the HBGS site by gravity when improvements are made to Newland Street as part of the conditions placed upon the project by the City of Huntington Beach. Impacts are not anticipated to be significant in this regard.

Wastewater Discharges

Low volume wastes, metal cleaning wastes, and pipeline hydrostatic test water are diverted to the HBGS retention basin and then to the outfall, where the wastewater is mixed with cooling water. Currently this waste is discharged downstream of the intake to the desalination facility and would not be included in the source water for the proposed desalination facility. As a result, impacts in this regard are not anticipated to be significant.

Hazardous Materials Spills

A number of petroleum products and other hazardous materials are stored and used at the generating station. Although unlikely due to spill prevention measures and clean-up procedures in place at the HBGS, there is the potential for a spill to reach the floor drain or the storm drainage system and enter the cooling water system. The floor and yard drainage system currently enters the outfall line downstream of the point where the desalination facility will be located and would not be included in the desalination facility's source water. As a result, impacts in this regard are not anticipated to be significant.

Heat Treatments

Periodically water from the discharge vault is diverted back into the facility and reheated. This reheated water is then used to clean the discharge line of biological growths ("bio-film"). This recirculated water contains wastes that have been discharged to the discharge vault prior to the flow being reversed in the facility. The proposed desalination facility would not intake water from the HBGS cooling water system during heat treatments. As a result, impacts in this regard are not anticipated to be significant.

<u>Elevated Bacteria Levels in the Huntington Beach Surf Zone</u>

As stated above, extensive bacterial studies have shown that the Santa Ana River and Talbert Marsh appear to be the primary sources of fecal indicator bacteria to the near shore ocean. In addition, bird droppings and a reservoir of bacteria stored in the sediment and on marine vegetation may continue to be the source of bacteria at the mouths of the river and marsh. Modeling studies and monitoring data indicate that there is likely another unidentified source of bacteria in the vicinity of Stations 6N and 9N. However, three separate studies conducted between 2001 and 2002 have demonstrated that HBGS is not the source of bacteria in the surf zone.

As discussed previously, the results of hydrodynamic modeling performed for the EIR show that contaminants are not transported to the HBGS intake from the Santa Ana River and Talbert Marsh during extreme storm event conditions. In addition, dry weather urban runoff at Talbert Marsh during tidal flushing essentially does not reach the HBGS intake. Although the cause of the elevated bacteria levels in the Huntington Beach surf zone has not been determined, the seawater desalination process would have the ability to remove bacteria and produce potable water meeting all State Title 22 standards. The treatment process and product water quality impacts are further discussed in Section 5.11, *PRODUCT WATER QUALITY.* Impacts in this regard are not anticipated to be significant.

MARINE BIOLOGY

Concentrated Seawater Discharge

Implementation of the proposed desalination project would mix the facility's concentrated seawater discharge with the HBGS cooling water discharge. It should be noted that, in addition to a Coastal Development Permit (CDP) required by the City for the proposed desalination project, a separate CDP will be required by the California Coastal Commission for the changes in HBGS outfall salinity. In-pipe salinity of the combined concentrated seawater/cooling water discharge water will depend upon the level of operation of the HBGS facility.

Following ocean discharge, the combined effluent will mix rapidly with oceanic water. The orientation of the outfall structure produces a vertical discharge stream, which broaches the sea surface as an observable "boil", and promotes mixing. The denser, high-salinity water will subsequently sink to the bottom, and then spread outward from the base of the outfall tower, further mixing with the surrounding water.

Hydrodynamic modeling of water mass dilution and dispersion (included as Appendix C, *HYDRODYNAMIC MODELING REPORT*) utilized the SEDXPORT model, developed at Scripps Institution of Oceanography for the U.S. Navy's Coastal Water Clarity Program. It has been thoroughly peer reviewed (including peer review by Dr. Stanley Grant, Professor at University of California, Irvine), and has been extensively calibrated and validated in numerous applications throughout the Southern California Bight. The model studied the ocean response to the proposed 50 mgd desalination facility using two separate modeling approaches: 1) event analyses of theoretical extreme cases, and 2) continuous long term simulations using the historical sequence ocean and HBGS operating variables. The latter approach was applied to two distinct historical periods: 1) resulting in 7,523 modeled solutions between 1980 and mid 2000; and 2) involving 578 modeled solutions that characterized the post re-powering period using data collected between January 1, 2002 and July 30, 2003.

The event analysis involved some potential situations for operating the desalination facility when the generating station is operating at very low pumping levels. It refers to these as *"low flow cases"* and they produce the highest in-the-pipe concentrations of sea salts from the desalination process. The most common low flow case occurs when two circulating pumps are running and one of the four generating units is in operation. The most extreme of these low flow cases occurs when the generating station is in *standby* mode, when two circulating pumps are running and no generating units are in operation, producing no power and providing no heating of the discharge water. The low flow cases are evaluated in combination with extreme conditions in the ocean environment involving tranquil, dry weather, La Niña type summer climate. By superimposing two conditions that seldom occur together (low HBGS flow cases and a calm ocean) the maximum potential impact of the desalination facility on the local ocean environment can be assessed because the dose level of sea salts is highest when the dilution of those salts by mixing and ventilation is lowest. The event analysis also evaluated an: *"average flow case"* based on seasonal mean ocean conditions and average HBGS flow rates (four circulating pumps running and two generating units operating) to determine the most likely degree of dilution of desalination discharge in nearshore waters.

Discussed below are the results of the event analysis of the theoretical extreme cases (the results from the long term simulated modeling using historical data are discussed in detail in Appendix C, *HYDRODYNAMIC MODELING REPORT*).

Distribution of mid-depth seawater salinity in the vicinity of the HBGS outfall under worst-case scenario conditions is depicted on Exhibit 5.10-2, *PROJECTED MID-DEPTH SALINITY OVER THE HBGS OUTFALL –"LOW FLOW" SCENARIO.* The low flow month scenario assumes that the HBGS facility has only two circulating pumps operating (one generating unit) and that no additional mixing from natural causes such as wind or wave action would occur and is extended for 30 days. This low flow scenario has less than a one percent chance of occurring. With a maximum discharge salinity of 55.4 ppt and no additional mixing from natural causes such as wind or wave action (low flow scenario), the highest salinity in the core of the discharge jet is predicted to be 55.0 ppt at mid-depth and 50.1 ppt at the surface.[3] Following the long axis of the teardrop-shaped plume, the concentration of the discharge salinity at mid-point of column depth is projected to decrease to 40 ppt (20 percent above background salinity) within only 20 feet from the HBGS discharge outfall tower. Approximately 100 feet away from the outfall tower, the discharge salinity will decrease to 38.5 ppt, which is only 15 percent above the background seawater salinity. Within 1,200 feet from the outfall tower the discharge salinity will be only 10 percent higher than the background seawater salinity. Hence the size of the plume in terms of average dimensions of its teardrop shape is 500 feet from the outfall. Under the low flow scenario, the highest salinity on the ocean floor will be 48.3 ppt at the base of the outfall tower, decreasing with distance from the tower, as shown on Exhibit 5.10-3, *PROJECTED SEAFLOOR SALINITY AT THE HBGS OUTFALL – "LOW FLOW" SCENARIO.* The discharge salinity drops to less than 15 percent (38.5 ppt) above the background

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[3] Hydrodynamic Modeling of Source Water Make-Up and Concentrated Seawater Dilution for the Ocean Desalination Project at the AES Huntington Beach Generating Station. Dr. Scott A. Jenkins Consulting, December 1, 2004.

salinity 100 feet away from the discharge. The bottom discharge salinity is reduced to 10 percent of the background salinity within 1,000 feet from the discharge outfall tower. Stated as an average teardrop shape, the size of the plume is within a distance of 465 feet from the outfall. A maximum of 15.6 acres of ocean floor (benthic area) and 18.3 acres of the water (pelagic area) around the discharge are expected to be exposed to water with a salinity 10 percent higher than the ambient seawater during the low flow scenario. These effects are acute and not expected to last for an extended period of time. Composited for one month, the low flow scenario of maximum discharge salinity and no mixing from natural causes (such as wind or wave action) has less than a one percent chance of occurring.

For normal HBGS operation (four circulating pumps associated with two HBGS generating units), typical environmental conditions extended for 30 days and reverse osmosis facility production of 50 mgd ("average flow" scenario), the salinity at mid-depth in the discharge jet is predicted to be about 41.7 ppt, which is 25 percent higher than background salinity, dropping to 38.3 ppt on the sea surface, as shown in Exhibit 5.10-4, *PROJECTED MID-DEPTH SALINITY OVER THE HBGS OUTFALL – "AVERAGE FLOW" SCENARIO.* The concentration of the discharge salinity at mid-point of column depth is projected to decrease to 38.5 ppt (15 percent above background salinity) within 20 feet from the HBGS discharge outfall tower. Within 500 feet (long axis of tear-drop shape) from the outfall tower the discharge salinity will be 10 percent higher than the background seawater salinity. Hence the size of plume in terms of the average dimensions of its teardrop shape is 330 feet from the outfall.

Assuming the average flow month scenario, the highest salinity on the ocean floor will be 37.6 ppt at the base of the outfall tower, (only 12 percent above background salinity), decreasing with distance from the tower as shown on Exhibit 5.10-5, *PROJECTED SEAFLOOR SALINITY AT THE HBGS OUTFALL – "AVERAGE FLOW" SCENARIO.* The discharge salinity drops to less than 10 percent above the background salinity approximately 430 feet away from the HBGS outfall along the long axis of the tear-drop shaped plume or an average distance of 300 feet. During average monthly case conditions a maximum of 6.8 acres of benthic area and 8.3 acres of pelagic area are expected to be exposed to water with a salinity 10 percent higher than ambient seawater. Average case conditions are expected to occur 50% of the time the desalination facility is operating. As more generating units are operated, salinity of the combined discharge will continue to decrease and a smaller area of the surrounding environment will be exposed to elevated salinities.

The pelagic area potentially exposed to a 10 percent increase in salinity as a result of the desalination facility discharge is relatively small, even in the low flow model. A 10 percent anomaly is within the normal variability of seawater salinity and would be tolerated by most fish species. Salinities predicted for the limited area of the discharge jet vicinity during the low flow scenario are potentially fatal to fish species. Mobile species have the ability to avoid areas that they cannot tolerate and, since sharp salinity gradients may act as barriers to the movements of fish, would likely avoid higher salinity areas.[4] Due to the mobility of the fish, commercial fishing would not be impacted. In addition, fish have been observed feeding in the discharge streams of southern California generating stations including the HBGS discharge. This opportunistic behavior is likely to be reduced or completely discontinued following the addition of the concentrated seawater discharge. However, given that the HBGS discharge stream is not the sole food source for fish in the region, impacts in this regard would not be significant. No significant impact to local fish populations as a result of the addition of the concentrated seawater discharge is expected.

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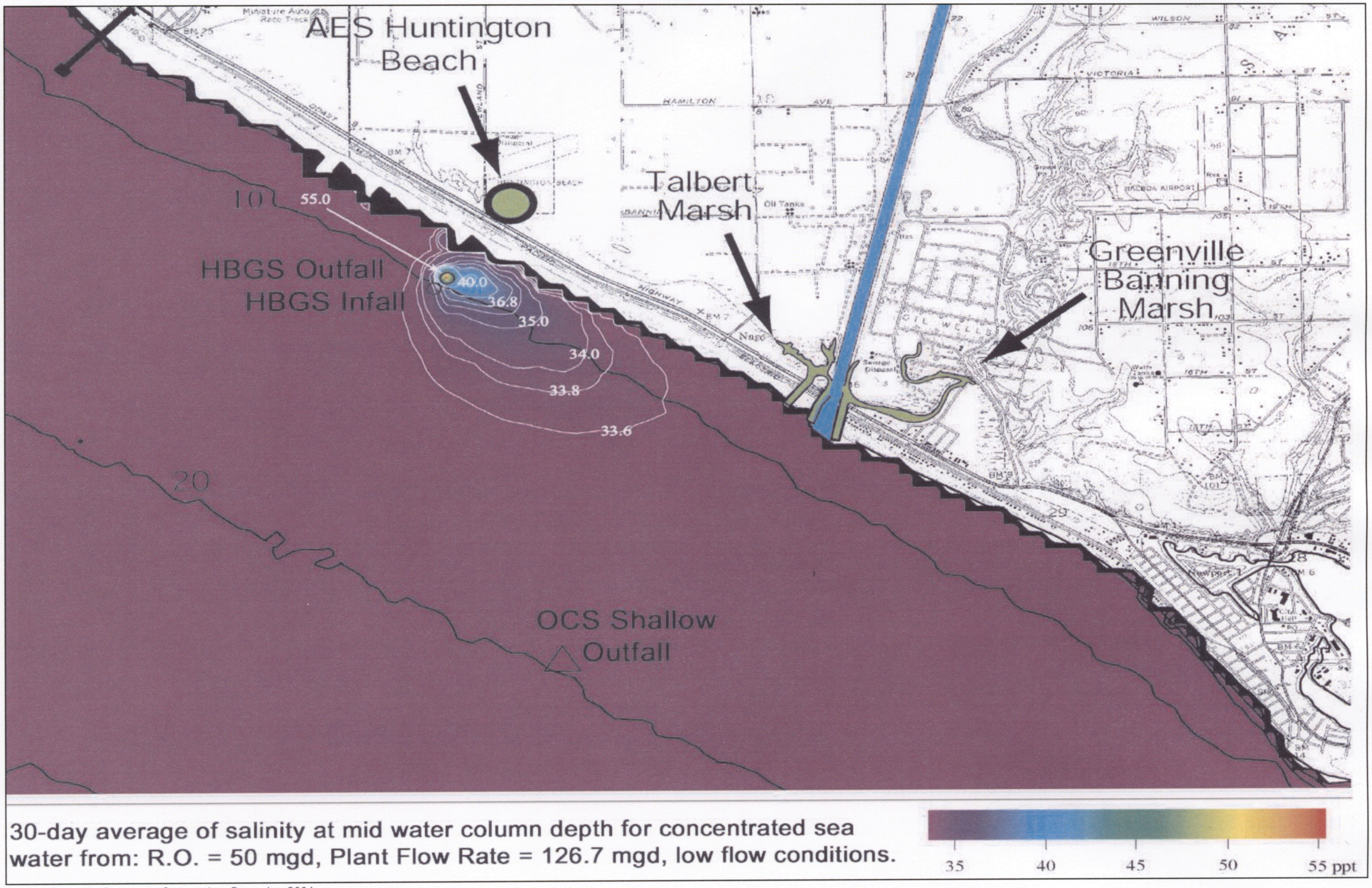
4 "Salinity: Fishes." Marine Ecology. F. Holliday, 1971.



Source: Poseidon Resources Corporation, December 2004.

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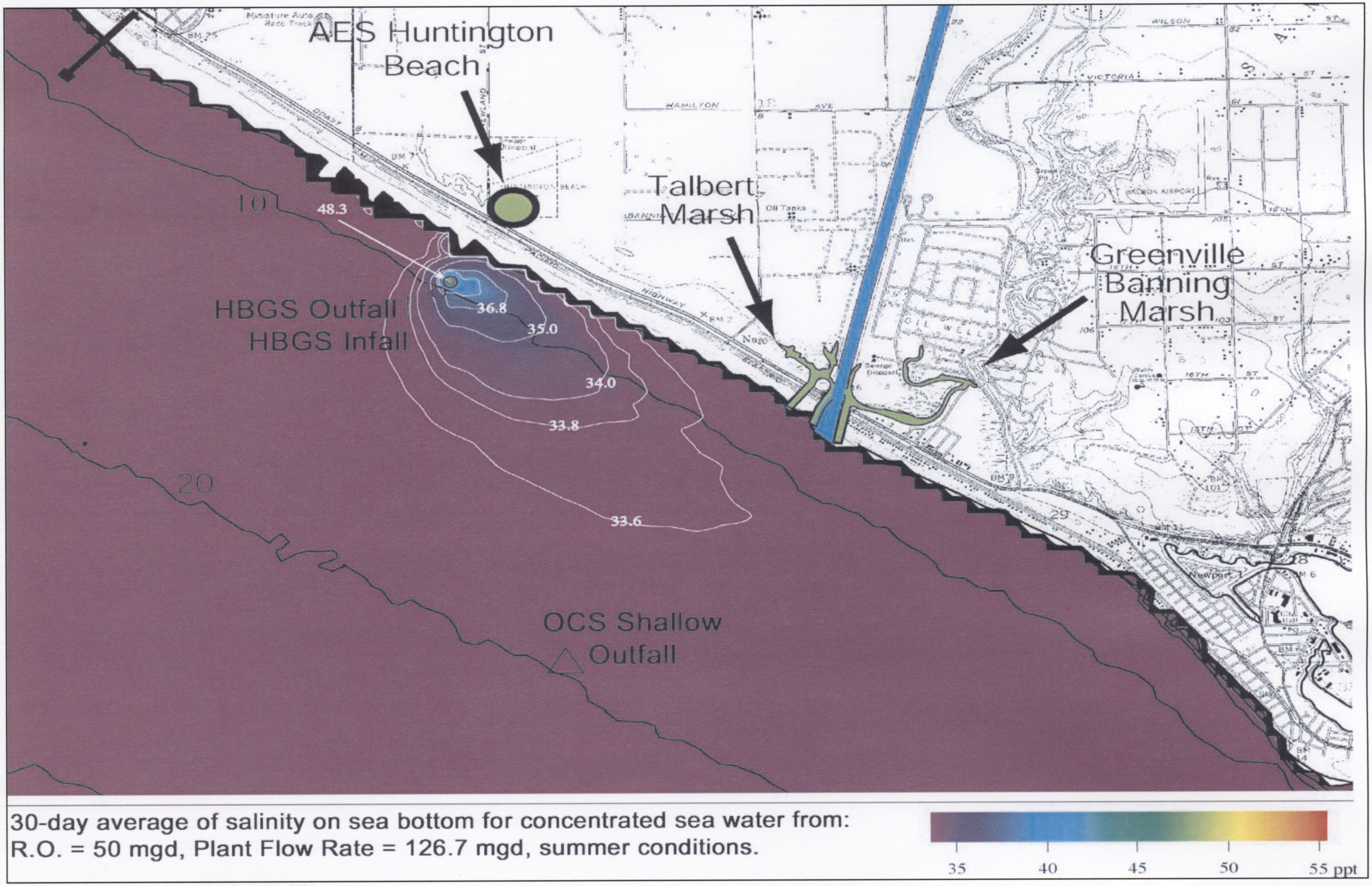
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Projected Mid-Depth Salinity Over the HBGS Outfall - "Low Flow" Scenario

Exhibit 5.10-2



Source: Poseidon Resources Corporation, December 2004.

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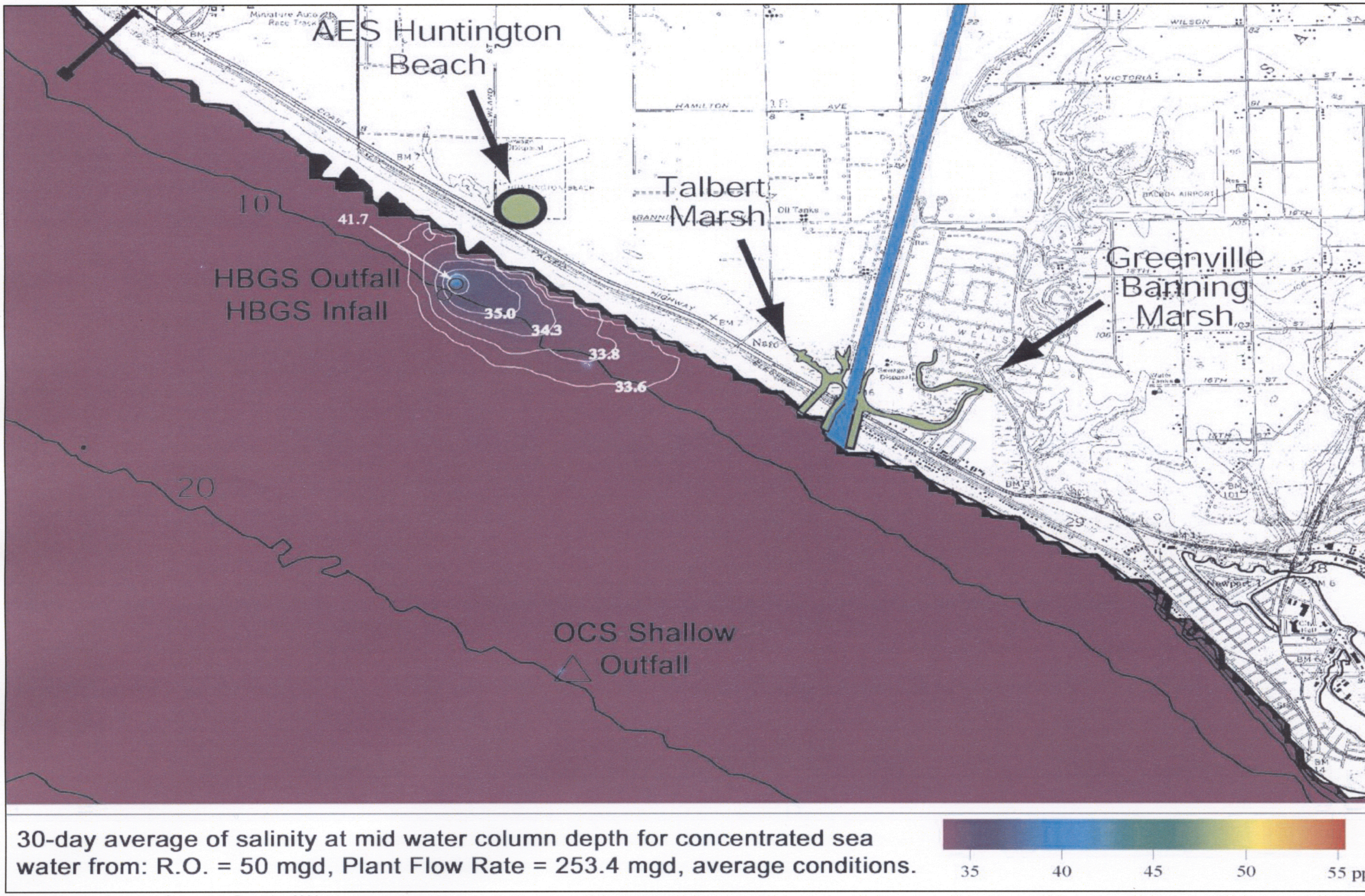
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Projected Seafloor Salinity at the HBGS Outfall - "Low Flow" Scenario

Exhibit 5.10-3



Source: Poseidon Resources Corporation, December 2004.

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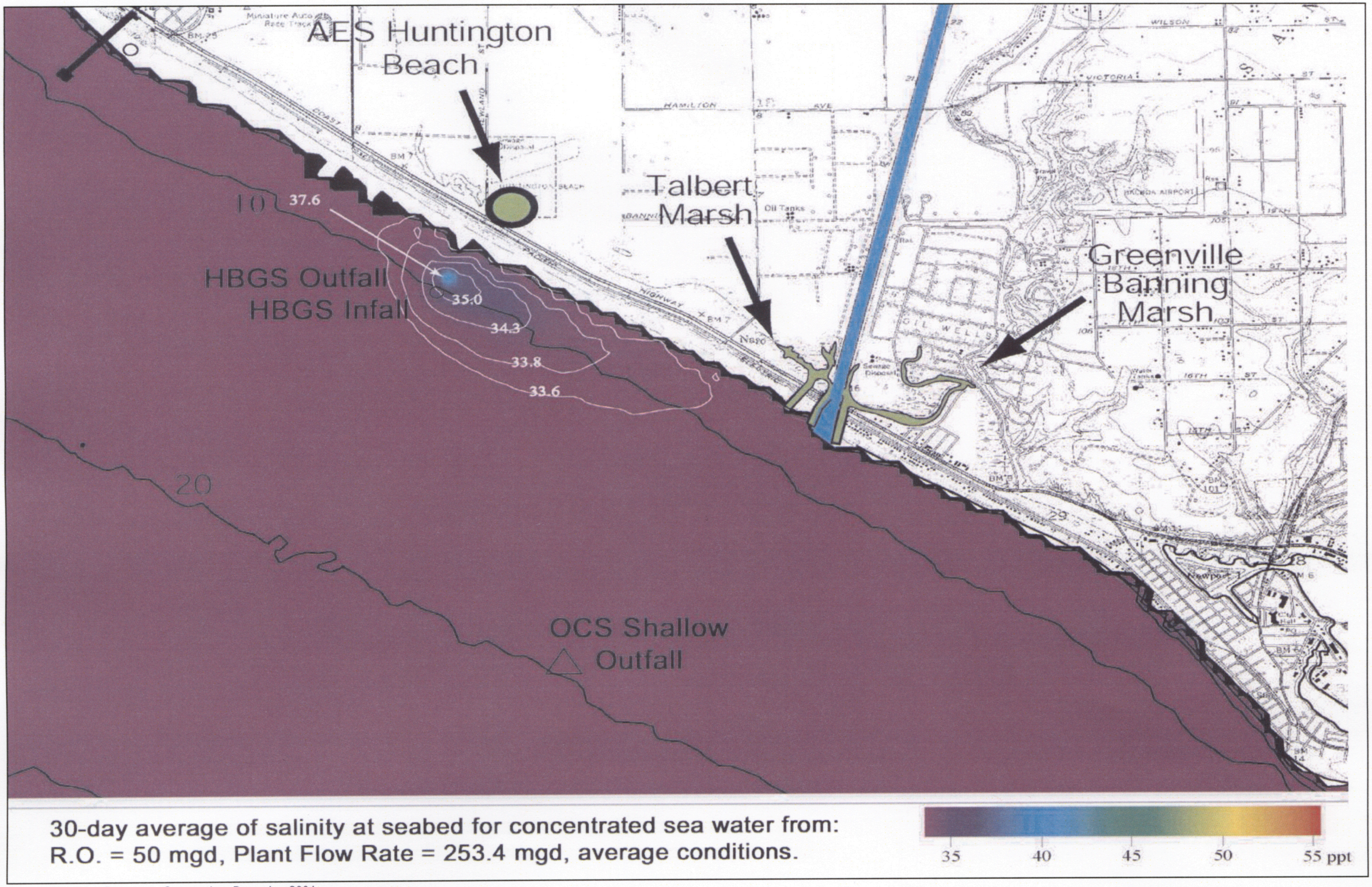
SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Projected Mid-Depth Salinity Over the HBGS Outfall - "Average Flow" Scenario

Exhibit 5.10-4



Source: Poseidon Resources Corporation, December 2004.

NOT TO SCALE

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SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

Projected Seafloor Salinity at the HBGS Outfall - "Average Flow" Scenario

Exhibit 5.10-5

Planktonic species have limited mobility and these species tend to occur in great numbers within the subject site vicinity. Marine planktonic organisms have similar salinity tolerances as local fish species (a 10 percent anomaly can be tolerated by most fish species/planktonic organisms). However, plankton entrained in the discharge stream are likely to be killed, as much by the turbulence and temperature of the discharge (which would occur even without proposed project implementation) as by the salinity increase. No significant increase in plankton loss is expected from the addition of the by-product water to the discharge stream.

The benthic area potentially exposed to a 10 percent increase in salinity as a result of the proposed desalination facility discharge is relatively small in relation to the soft-bottom habitat offshore of Huntington Beach. The benthic community near the discharge structure is dominated by soft-bottom infaunal invertebrate species with limited mobility. Macrofaunal species are the larger members of the benthic community more easily identified in the field and are commonly used to assess the benthic community. Infaunal and other benthic species common offshore of Huntington Beach will have salinity tolerances similar to those of other marine species in the area and should be able to endure salinity increases of up to 10 percent. For most marine organisms, lower salinities are more detrimental than higher salinities, as long as the upper limit does not exceed 40 ppt.[5] During low flow conditions, however, salinities at the base of the discharge tower are expected to exceed 48 ppt, and even during average conditions the salinity of the water at ocean floor immediately around the discharge will be about 38 ppt, higher than local normal oceanic variation.

In times of stress infaunal species can withdraw into the sediments, where the interstitial water is only gradually exchanged with overlaying water. Still, the benthic species at the base of the intake tower will probably be replaced by species which are more tolerant of high salinities. There is also likely to be a general trend of replacement of infaunal species in the area of the 10 percent salinity anomaly footprint with species which are common to areas of fluctuating salinity such as bays, estuaries and river mouths. While species common to the open coast can tolerate salinity fluctuations to some degree, in the open coast these fluctuations are gradual, while operations of either the proposed desalination facility or HBGS may cause rapid changes in local salinity which estuarine species are better adapted to tolerate. Local benthic community diversity is likely to be depressed as a result of desalination facility operations. However, these estuarine species will be functionally similar to the existing community. Still, temporal fluctuations in abundance and diversity of benthic species are the norm for the shallow water communities on the mainland shelf of southern California.[6] Replacement species are most likely to be infaunal species common to local estuaries and bays. The area of this replacement will be relatively small and localized.

In summary, a suite of biological facts indicates that the combined thermal and reverse osmosis discharge would not be large enough to have a significant biological impact on the marine species or communities living near the HBGS (as the reverse osmosis process would not involve the heating or cooling of circulated ocean water, thermal impacts would not occur). Most of the marine organisms living near the HBGS also occur in areas of the SCB and beyond it where salinities can be greater than those that would occur in the combined reverse osmosis and HBGS discharge field. For example, the natural geographic distributions of most of the species living at Huntington Beach extend south to near the tip of Baja California where both coastal temperatures and salinities are as high or higher than those predicted for most areas in the combined discharge field. In addition, some of these species or ones very closely related to them live in the upper part of the Gulf of California where salinities are 36-38 ppt and can be as high as 40 ppt. Thus, many of the species present in water around Huntington Beach naturally experience a salinity range comparable to or greater than what is predicted of the combined discharge area.

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5 Benthic Impact of the Discharge from Desalination Plant. C. Pomory, 2000.

6 The Benthic Macrofauna of the Mainland Shelf of Southern California. G.F. Jones, 1969.

Hydrodynamic modeling for the proposed project also finds that an elevated salinity zone would occur around the discharge core and that all organisms living within these areas would encounter it. For the animals swimming in the water (some macroinvertebrates, fishes, turtles, mammals), the duration of their elevated salinity exposure would depend on their location and their residence time in the zone. Such a brief exposure time would have no effect on marine mammals, turtles, or most fishes which are good osmoregulators and while most fishes are unlikely to prefer salinities this high, comparative data showing fish easily tolerate high salinities for short periods suggest these salinities could be tolerated for a short time. Also, fishes would have the ability to "sense" such a marked salinity change in the water and could thus alter their swimming direction to avoid it.

In the case of organisms that drift across the elevated salinity area, models developed for the discharge flow field show that planktonic animals drifting though the discharge area would experience elevated salinity for variable times. These times would depend upon both the area of the zone and the organism's rate of drift and its position relative to the discharge core.

Exposure to the inner discharge core would be less than one hour and exposure to the core's periphery would be two to three hours. Short-term exposures to higher salinity levels can be tolerated with no impact to marine organisms. While plankton, fishes and other water-column residents would have relatively brief exposures to the highest salinities within the elevated salinity zone, this would not be the case for the benthic organisms occurring in the discharge area. Bottom-dwelling organisms living near the core would experience an increased salinity. One likely biological result of this permanently elevated benthic salinity zone would be some reduction in the total diversity of species living within the zone and the likely increase in the concentration of species having a greater tolerance to the elevated salinity. Such species may already exist in the Huntington Beach bottom community or species from other nearby coastal habitats (tide pool, bays) where salinity is more variable may be recruited to this zone.

In addition, RO treatment requires the pumping of seawater through membrane filters that remove its salts. For each volume of freshwater produced by RO systems an approximately equal volume of doubly concentrated (2x salinity) seawater is also formed. The mass balance analysis of the proposed RO operation at the HBGS requires integration of daily flow volumes through it [e.g., 50 million gallons per day (mgd) each of potable freshwater produced along with 50 mgd of 2x concentrate] and the mixing ratio of the latter with the HBGS cooling water flow (approximately 127 mgd). Because seawater that will undergo RO filtration is pre-treated with iron sulfate (or iron chloride, a chelating agent that coagulates organic solutes and other dissolved materials, and also precipitates a fraction of the trace elements), evaluation of seawater chemistry and physical properties is done before and after pre-treatment and following pretreatment filtration. Another factor affecting mass balance and water chemistry is the volume of RO filter backwash water produced by the intermittent reverse-flow of seawater over the pre-treatment sand filters to rinse away debris.

Chemical comparisons show that all of the trace elements considered in the discharge analysis already occur in the source water and they have the same concentration off Huntington Beach coast as they do in coastal oceans throughout the world. Chemical and physical factor comparisons between the source water and the RO facility discharge stream demonstrate the "concentrating effect" of RO on the source seawater but also show that the RO operation will not significantly affect water turbidity, suspended solids, pH, and oxygen levels.

Mass balance results were based on the assumption of a low HBGS flow rate (127 mgd) and thus conservatively overestimate the concentration that would be expected under normal operation conditions. Nevertheless, the results show that while these trace elements will become slightly concentrated by RO, their discharge concentrations remain far below the numerical water quality standards established to protect aquatic marine life by the Environmental Protection Agency and by the State of California. The only change in discharge water chemistry resulting from the RO facility will be an elevation in dissolved iron. However, this concentration is low and, like the salinity difference between the discharge and receiving waters, the iron concentration will be rapidly diluted to ambient levels. There are no numerical water quality standards governing the discharge of iron, which is usually present in low concentrations in seawater. Moreover, iron is an important ocean nutrient (essential for the growth of phytoplankton) and is likely to be biologically assimilated by primary produce organisms (mainly phytoplankton) in the discharge plume. Additional information is provided in Appendix S, *MARINE BIOLOGICAL CONSIDERATIONS.*

In conclusion, the proposed project's discharge would not have a significant effect on organisms living around the discharge or organisms that would pass through the area. As stated above, most of the marine organisms living near the HBGS also occur in other areas of the SCB where naturally occurring salinities can be higher than what is anticipated at the HBGS outfall. Plankton, fishes, and other water-column species would have brief exposure to the concentrated seawater discharge field, and the area of benthic impacts would be relatively small and localized. In addition, no endangered species or kelp beds exist within the vicinity of the HBGS outfall. As water quality impacts and impacts to marine biological resources are not anticipated to be significant, a separate routine monitoring process is not proposed as part of the project. However, if applicable, biological monitoring during long-term project operation will be conducted as directed by the RWQCB,

Reverse Osmosis Membrane Cleaning Solution

Impacts to the local marine environment due to the discharge of reverse osmosis membrane cleaning solution through the HBGS outfall are anticipated to be less than significant. As stated previously in Section 3.0, *PROJECT DESCRIPTION*, the reverse osmosis system trains will be cleaned using a combination of cleaning chemicals such as industrial soaps (e.g. sodium dodecylbenzene, which is frequently used in commercially available soaps and toothpaste) and weak solutions of acids and sodium hydroxide. Approximate total discharge volumes per reverse osmosis membrane cleaning are shown below in Table 5.10-8, *REVERSE OSMOSIS MEMBRANE SOLUTION DISCHARGE VOLUMES*. Chemicals typically used for cleaning include (it should be noted that the actual cleaning chemicals used will be based on the observed operation and performance of the system once it is placed in operation):

- Citric Acid – (two percent solution)
- Sodium Hydroxide B - (0.1 percent solution)
- Sodium Tripolyphosphate B - (two percent solution)
- Sodium Dodecylbenzene B- (0.25 percent solution)
- Sulfuric Acid B - (0.1 percent solution)

The "first rinse" treated waste cleaning solution from the washwater tank will be discharged into the local sanitary sewer for further treatment at the OCSD regional wastewater treatment facility. The cleaning rinse water following the "first rinse" will be mixed with the RO facility concentrated seawater, treated waste filter backwash, and the AES plant discharge and sent to the ocean. This "second rinse" water stream will contain trace amounts of cleaning compounds and would be below detection limits for hazardous waste. An Industrial Source Control Permit from the OCSD for discharge of waste cleaning solution into the sanitary sewer system will be required for the project. In addition, the discharge must comply with the limits and requirements contained in the OCSD's Wastewater Discharge Regulations. Impacts to the local marine environment in this regard would be less than significant.

Table 5.10-8
REVERSE OSMOSIS MEMBRANE SOLUTION DISCHARGE VOLUMES

TYPE OF DISCHARGE	GALLONS	PERCENTAGE
Concentrated Waste Cleaning Solution	4,000	4.4
Rinse Water - Residual Cleaning Solution	11,000	12.0
Rinse Water - Permeate	45,600	50.2
Rinse Water - Concentrate Removed During Rinsing	30,400	33.4
TOTAL DISCHARGE (gallons)	**91,000**	**100**

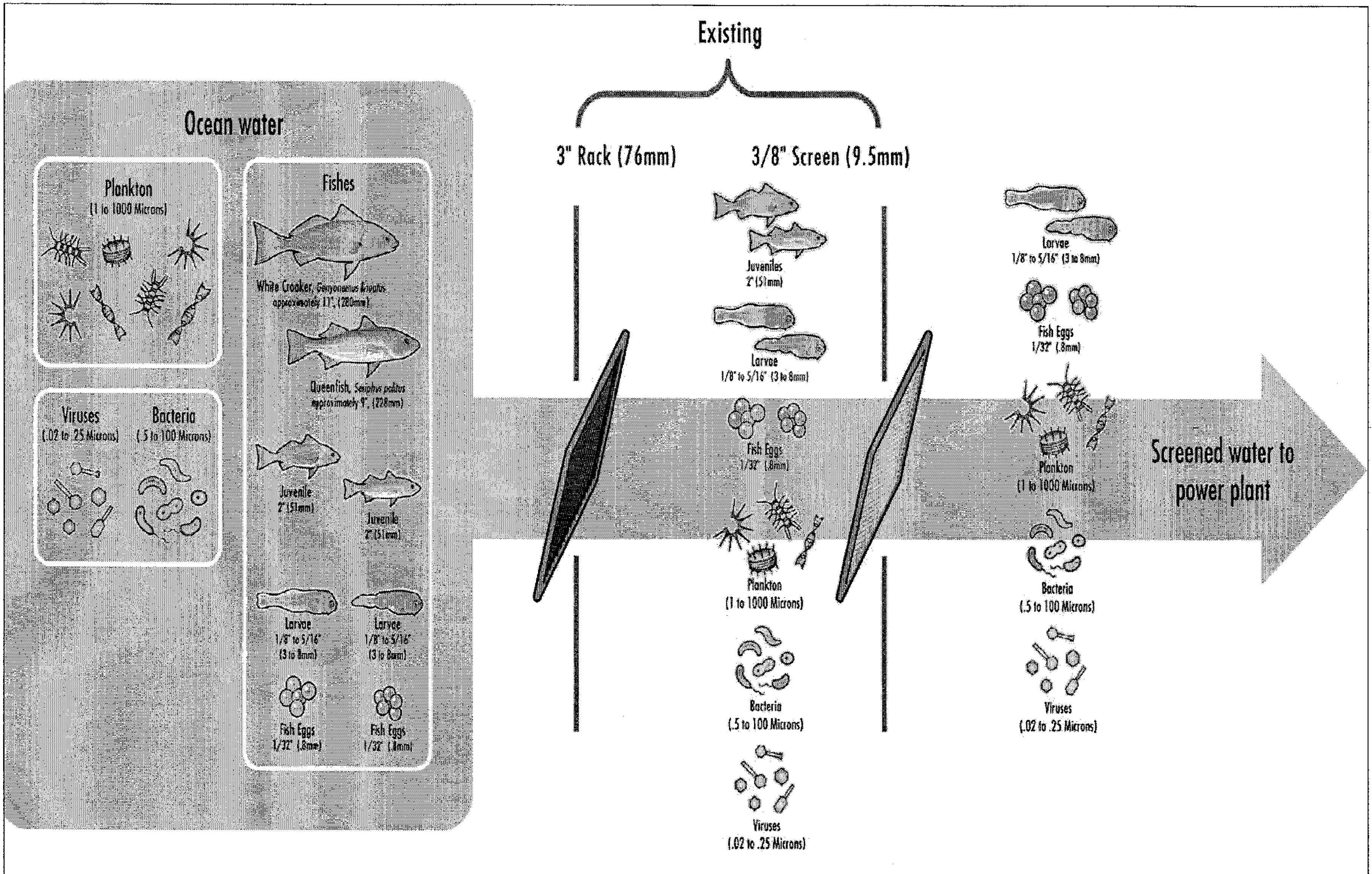
An alternative to discharging the "first rinse" of the RO membrane cleaning solution into the OCSD system is to discharge the solution ("first rinse" and all subsequent rinses) into the Pacific Ocean via the HBGS outfall. On a typical day, this alternative would blend 200,000 to 300,000 gallons of cleaning solution at a rate of 150 to 200 gpm (0.2 to 0.3 mgd) with 50 mgd of concentrated seawater by-product discharge, 10-15 mgd of treated filter backwash, and 400 mgd of HBGS cooling water discharge. Under a low flow scenario (high membrane cleaning solution concentration and low concentrations of concentrated seawater discharge, filter backwash, and HBGS cooling water discharge), the membrane cleaning solution would be diluted at a ratio of 260 to one. The majority of the chemicals within the membrane cleaning solution would be either below detection levels or regulatory limits, even before dilution with other desalination facility and HBGS discharges. Dilution at a 260 to one ratio would further minimize impacts to the marine environment and would assure NPDES compliance. Modeling for this discharge under various concentrations was performed, and is included in Appendix K, *RO MEMBRANE CLEANING SOLUTION DISCHARGE TEST STREAM DATA*.

Impingement and Entrainment

Potential impacts to marine biological resources in regards to impingement and entrainment effects of the proposed source water withdrawal of the desalination facility from the cooling water system discharge of the HBGS are analyzed within Appendix T, *INTAKE EFFECTS ASSESSMENT* (Tenera, 2004). Impingement occurs when larger fishes and invertebrates are trapped against the generating station's cooling water intake screens, while entrainment occurs when small planktonic organisms are drawn through the intake screens and through the generating station's cooling water system. Exhibit 5.10-6, *HBGS INTAKE SCREENING PROCESS,* depicts the HBGS facility's intake screening process.

Two separate and unrelated entrainment studies are being conducted at the HBGS site. A long-term study, in connection with a re-powering project certified by the CEC, is underway to study entrainment effects of the HBGS's cooling water intake system. The CEC required AES to perform a study of the power plant's cooling water intake system as a condition of re-powering certification.

The CEC entrainment study is not a 316(b) study, but was designed using the same sampling methodologies and data analyses employed in several recently completed 316(b) studies (Tenera 2000 a, b, 2001).



Source: Poseidon Resources Corporation, December 2004.

NOT TO SCALE

RBF CONSULTING

02/05 • JN 10-101409.002

SEAWATER DESALINATION PROJECT AT HUNTINGTON BEACH

HBGS Intake Screening Process

Exhibit 5.10-6

The second, but unrelated entrainment study at the site is the desalination feedwater intake study included herein. It should be noted that the proposed project's feedwater withdrawal is not subject to intake regulation under the Federal Clean Water Act (CWA) Section 316(b). The project does not include a cooling water intake structure (CWIS). The CWIS is part of the HBGS existing operations and is presently regulated under Section 316(b). The desalination facility's feedwater would be withdrawn from the HBGS discharge and not directly from the open ocean, and its withdrawal does not affect HBGS intake requirements. The project does not require the HBGS to increase the quantity of water withdrawn nor does it increase the velocity of the water withdrawn. However, taking under consideration that the project will withdraw intake seawater from the generating station discharge flow, the study conducted was consistent with the intent of Section 316(b) which requires "...the location, design, construction, and capacity of cooling water intake structures... are based on the best technology available to minimize the adverse environmental impact associated with the use of cooling water intake structures" (USEPA 2004). The desalination intake study, which is also not a 316(b) study (as none is required for the desalination facility intake), is designed to investigate the potential for desalination facility feedwater intake withdrawn from the HBGS cooling water system to increase HBGS entrainment mortality and assess the significance of this potential entrainment effect on the source water.

The proposed project source water intake would not increase the volume, or the velocity of the HBGS cooling water intake nor would it increase the number of organisms entrained or impinged by the HBGS cooling water intake system. Therefore, the impingement effects of the HBGS are not included in assessing the proposed project's effects. This assessment focuses on the effects of the proposed project's entrainment of organisms already entrained by the generating station before they would be returned to the ocean in the cooling water discharge flow.

Impingement

The proposed desalination facility would not cause any additional impingement losses to the marine organisms impinged by the HBGS, as these organisms would not be exposed to further screening prior to entering the desalination facility's pretreatment system.

The proposed desalination facility would not have a separate direct ocean water intake and screening facilities, and would only use cooling water that is already screened by HBGS's intake. As stated in Section 3.0, *PROJECT DESCRIPTION*, should the HBGS cease to operate, the applicant would purchase the HBGS pumps and intake/discharge facilities and continue to produce and distribute potable water, subject to new permits and approvals required due to a change in the project description.

Entrainment

Entrainment sampling for the desalination feedwater was conducted at an onshore point in the HBGS discharge line just before it is returned in conduits to an offshore discharge location. Bi-weekly samples were collected since the beginning of March 2004 by pumping measured volumes of cooling water discharges through small-mesh nets. The preserved samples were sorted in the laboratory and the fishes and target invertebrates were identified to the lowest taxon practicable.

In general, entrainment effects are assessed using the Empirical Transport Model (ETM), as recommended and approved by the California Energy Commission (CEC), California Coastal Commission (CCC) and other regulatory and resources agencies. This model, used for HBGS intake studies and many other California intake effects studies, compares entrainment larval concentrations to source water larval concentrations to calculate the effects of larval removal on the standing stock of larvae in the defined source water. Tidal exchange ratios, source water volumes, cooling water volumes, larval concentrations, and larval durations were variables used in the ETM calculations. Conservative assumptions of HBGS volumes of 127 MGD were used for developing the estimates of potential losses due to desalination facility operations.

The ETM model estimates the proportion of the available larval supply in the source water that is eliminated by entrainment, but makes no assumptions as to the ultimate effects of such losses on the next generation of adult fishes.

The study for the desalination project was also compared with the preliminary results from the 2004 six-month report submitted to the CEC (which is part of the ongoing HBGS intake entrainment and impingement study).

Six taxa (gobies, blennies, croakers, northern anchovy, garibaldi, and silversides) and a group of larvae that could not be identified were found to comprise 97 percent of all the fish larvae present in the HBGS cooling water system from which the proposed project would withdraw its source water supply. Species with high commercial and recreational importance, such as California halibut and rockfishes, were shown to be very uncommon in the HBGS intake flows.

Under HBGS minimum intake cooling water flow of 127 mgd, and assuming 100 percent through-HBGS larval mortality (based on USEPA 2004), the estimated larval fish entrainment loss is 0.33 percent of the total population of larvae in the local area surrounding the HBGS intake.

Based on in-plant testing, the observed mortality of HBGS is 94.1 percent and the combined estimated mortality (utilizing the ETM) of the proposed project and HBGS at flows of 507 mgd would be 95.3 percent (an increase in mortality of 1.2 percent due to the proposed desalination facility) and 98.7 percent at HBGS flows of 127 mgd (an increase in mortality of 4.6 percent due to the proposed desalination facility). This assessment assumes 100 percent mortality of all organisms upon withdrawal into the desalination facility.

Estimated larval fish loss attributed to the proposed desalination facility would be 0.02 percent (based on HBGS entrainment mortality of 94.1 percent) of the total population of larvae in the local area surrounding the HBGS intake. This would be an order of magnitude less than the HBGS larval population entrainment loss of 0.33 percent. The 0.02 percent figure accounts for the incremental amount of larval fish loss resulting from the proposed desalination facility, aside from that of the HBGS.

From a regional perspective, model results for larval gobies, northern anchovy, and white croaker showed that approximately 0.33 percent of the larvae in the HBGS source water could be affected by HBGS operations at 127 MGD; this represents a de minimis fraction of the total numbers of larval fishes in the Southern California Bight. Results were modeled on encounter rates for the most abundant species entrained from the source water. The loss of marine organisms due to the potential entrainment of the proposed project has no effect on the species' ability to sustain their populations. The loss will not have a measurable effect on the source populations of the species in the Southern California Bight and is an order of magnitude lower than the entrainment loss typically caused by HBGS operations.

Calculations have shown that approximately 25,000–37,000 adult gobies and 6,000–71,000 adult northern anchovy may be lost in a four-month period due to full HBGS operation (507 MGD) (MBC and Tenera 2004). Losses attributed to low flow (127 mgd) operations alone would be approximately 25 percent of these amounts. In addition:

- The most frequently entrained species are very abundant in the area of HBGS intake and the Southern California Bight, and therefore, the actual ecological effects due to any additional entrainment from the desalination facility are insignificant.
- Species of direct recreational and commercial value constitute a very small fraction of the entrained organisms in the HBGS offshore intake and therefore, the operation of the desalination facility does not result in significant ecological impact in NEPA/CEQA context.
- The California Department of Fish and Game (DFG) (2001), in their Nearshore Fishery Management Plan, provides for sustainable populations with harvests of up to 60 percent of unfished adult stocks. The maximum "harvest" effect of HBGS operations at 127 MGD is 0.33 percent, significantly below the accepted (DFG) thresholds of 60 percent. The maximum "harvest" effect of the proposed project is 0.02 percent, an order of magnitude less than 0.33 percent, based on HBGS entrainment mortality of 94.1 percent.

Impacts due to operation of the proposed desalination facility in regards to impingement and entrainment are not anticipated to be significant.

MITIGATION MEASURES

None required.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.

5.11 PRODUCT WATER QUALITY

The following section is based on the Municipal Water District of Orange County 2000 Urban Water Management Plan (December 20, 2000), the Huntington Beach Seawater Desalination Plant Pressure Surge Analysis (January 16, 2003), the Distribution System Corrosion Control for Desalination Seawater (September 27, 2002), and the Disinfection Byproduct Formation Report (March 2004).

EXISTING CONDITIONS

Four water sources (imported water from the Metropolitan Water District of Southern California [MWD], surface water, groundwater, and recycled water) are currently managed, treated and distributed through the Orange County distribution system to customers throughout Orange County. The potable water quality within the Orange County distribution system is in compliance with all regulatory drinking water standards. A description of the regulations currently applicable to the existing potable water supply within Orange County (and which would also be applicable to the proposed project) is provided below.

REGULATORY FRAMEWORK – DRINKING WATER

Department of Health Services – Title 22

The California Department of Health Services (DHS) administers all provisions relating to the regulation of drinking water to protect public health. California's Safe Drinking Water Act requires DHS to administer laws relating to drinking water regulation, including setting and enforcing both federal and State drinking water standards, administering water quality testing programs, and administering permits for public water system operations. The standards established by DHS are found in Title 22 of the California Code of Regulations (CCR).

The DHS is responsible for ensuring that all public and private water systems are operated in compliance with drinking water regulations. Current drinking water regulations include both primary and secondary standards. Compliance with primary standards is mandatory, because these standards are based on potential health effects on water users. The primary standards define maximum concentration levels (MCLs) that cannot be exceeded by any public and private water system. All standards except turbidity are applicable at the water user's tap. Secondary standards are those parameters that may adversely affect the aesthetic quality of drinking water, such as taste and odor. These standards are not federally enforceable, although DHS reserves the right to enforce secondary standards if warranted.

Under Title 22 of the California Code of Regulations, DHS would regulate the operation of the Seawater Desalination Facility at Huntington Beach and would oversee the quality of the product water produced. In addition, DHS would be responsible for ensuring that the product water blended with existing water supplies would meet the minimum recommended standards for contaminants in drinking water that has been established by the United States Environmental Protection Agency (EPA).

To comply with the DHS regulatory requirements, the applicant would apply for a domestic water supply permit as a water supply wholesaler pursuant to the Regulations Relating to Domestic Water Systems. This includes the submission of:

- A Water Quality Emergency Notification Plan (ENP);
- An Engineering Report describing how the proposed new facilities would comply with the treatment, design, performance and reliability provisions of the Surface Water Treatment Rule (SWTR); and
- A Facility Operations Plan.

Permit provisions for similar municipal water supply projects typically include:

- Submittal of plans and specifications for Department approval prior to construction;
- Compliance with the Surface Water Treatment Rule (SWTR) – including the treated water turbidity, disinfection residuals and CT levels;
- All water must be treated – no bypassing;
- Complete water quality analyses conducted by an approved laboratory;
- Adequate corrosion control;
- Updated watershed sanitary survey every five years;
- Mandatory use of American National Standards Institute (ANSI) and National Safety Foundation (NSF) approved chemicals;
- Raw water bacteriological monitoring;
- Certified treatment facility operators; and
- Submission of monthly operation reports and a report after the first year of operation detailing the effectiveness of the facility's performance, a list of any violations and a list of any needed additions or operational changes.

Santa Ana Regional Water Quality Control Board (SARWQCB) – Basin Plan

As part of its Triennial Review of the Water Quality Control Plan for the Santa Ana River Basin (Basin Plan), the SARWQCB reviewed the recommendations of a Task Force report of the 1995 total dissolved solids (TDS)/Nitrogen Management Plan for the basin. This review resulted in the 2004 adoption of an amendment to the Basin Plan that could impact water quality discharge limitations in water reclamation permits leading to increased permit limits of several key water quality constituents:

- Revision of numerical water quality objectives for TDS in the Irvine Groundwater Management Zone. The new water quality objective is 910 mg/L.
- Deletion of numerical groundwater quality objectives for individual mineral constituents, such as sodium and chloride. These have been replaced with narrative water quality objectives: chloride concentrations shall not exceed 500 mg/L in groundwaters of the region designated MUN and sodium concentrations shall not exceed 180 mg/L in groundwaters designated MUN.

IMPACTS

As the proposed project would introduce an entirely new source of potable water into the Orange County water supply system, the following information analyzes the quality of potable water produced by the desalination facility and its potential impacts on existing potable water quality and the distribution system within Orange County. An analysis of the desalinated product water's compliance with regulatory drinking water standards is provided, in addition to a description of potential impacts to existing water supplies in regards to corrosion, chlorine residual, disinfection bypdroducts, taste/odor, and hydraulics.

Significance Criteria

Under the CEQA Guidelines a project may be considered to have a significant environmental effect if it would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted);
- Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects;
- Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed; and/or
- Otherwise substantially degrade water quality.

PROPOSED PRODUCT WATER QUALITY

The product water quality from the Seawater Desalination Project at Huntington Beach can be potentially impacted by the following factors:

- Ocean Water Quality Fluctuations
- Ocean Water Red Tide Algal Bloom Event
- HBGS Non-Routine Operations
- Reverse Osmosis (RO) Membrane Performance

These potential impacts on product water quality are discussed below.

Ocean Water Quality Fluctuations

The product water of the proposed seawater desalination facility may be impacted by natural changes in ocean water salinity, temperature, turbidity and pathogen concentration. Typically, ocean water salinity and temperature changes are triggered by natural seasonal events. As discussed in Section 5.10, *OCEAN WATER QUALITY* and the Watershed Sanitary Survey (Appendix E), the intake ocean water turbidity and pathogen concentration changes are mainly driven by rain events.

In order to maintain a consistent quality of desalinated product water, the applicant would be required to obtain a drinking water permit from the California Department of Health Services (DHS) that would address monitoring of source water quality and its effects on product water quality. The applicant has been working with DHS for the last four years to obtain such a permit. On August 10, 2002, DHS issued a conceptual approval letter for the Seawater Desalination Project at Huntington Beach.

The desalination facility intake water quality in terms of turbidity (which is a surrogate indicator for potential elevated pathogen content) and salinity would be measured automatically and monitored continuously at the desalination facility intake. Instrumentation for continuous monitoring and recording of these parameters would be installed at the desalination facility intake pump station. In event of excessive increase in intake seawater turbidity and/or salinity, this instrumentation would trigger alarms that would notify desalination facility staff. If the intake pathogen count reaches a preset maximum level, this instrumentation would automatically trigger chlorination of the source water, thereby reducing the source water pathogens to acceptable levels even before the water reaches the RO treatment facilities. In addition to the automation provisions, turbidity and salinity would also be measured manually by the desalination staff at least once a day and the intake seawater would be analyzed for pathogen content at least once per week. In the event of elevated intake seawater turbidity, laboratory pathogen content analysis would be performed more frequently.

In addition to the intake water quality monitoring instrumentation, the desalination facility pretreatment filtration facilities would be equipped with filter effluent turbidimeters and particle counters. This equipment would allow facility operators to continuously monitor pretreatment filter performance and to trigger adjustments of desalination facility operations to accommodate intake water quality changes.

Desalinated product water quality would also be monitored continuously for salinity and chlorine residuals and would be tested frequently for pathogen content.

In summary, desalinated product water quality would be tested in accordance with the requirements of the California Code of Regulations (Title 22) and the DHS. Product water quality impacts due to ocean water quality fluctuations are not anticipated to occur upon implementation of the design features described above.

Red Tide Algal Bloom Events

Occasionally, in late summer and fall, the surf zone along the Pacific Ocean may experience excessive growth of red-pigmented algae (phytoplankton), which "bloom" and accumulate into dense visible patches near the ocean surface such that the water appears to be colored red. This phenomenon is commonly known as "red tide". During a red tide event, some of the algae produce elevated concentrations of specific organic compounds (such as the biotoxins saxitoxin and domoic acid) and store these compounds in their cells. Typically, the concentrations of organic compounds produced during red tide events are not harmful for humans if the ocean water is ingested directly. Oysters and other shellfish such as clams, mussels and scallops can accumulate and concentrate these organic compounds in their tissues in excess of 1,000 times. Therefore, directly ingested red-tide ocean water typically does not cause harm to humans, while consumption of shellfish that has high concentrations of organic compounds generated during red tides may result in harm.

Red tides are natural phenomenon usually occurring when temperature, salinity and nutrients in the ocean reach suitable levels to trigger a red tide bloom. The exact combination of factors that trigger red tide blooms is presently unknown, but some experts believe that high temperatures combined with lack of rainfall are at the root of red tide events. There are no known ways to control red tides. Therefore, the desalination facility would be designed to maintain high quality potable water (consistent with regulatory standards) in the event of a red tide event.

The Seawater Desalination Project at Huntington Beach would have a number of provisions/barriers to protect against the passage of red tide-related algal organic compounds through the treatment processes. These provisions/barriers are described below:

- Deep Intake Configuration to Minimize Algae Entrainment: Most of the algal biomass during red tide events floats on the surface. The HBGS intake (the source from which the desalination facility would divert seawater from) is located at depth of approximately 33 feet below the water surface. Algal presence, accumulation and growth at this depth are minimal because of the limited access of sunlight, which is vital for algal growth.

HBGS intake water is collected through a velocity cap atop a rectangular intake tower. The maximum mean water velocity at the inlet to the intake conduit is only two feet per second (fps), which minimizes collection of red tide algae from the ocean surface, where they are most abundant. Because of the low intake velocity and significant depth of the outfall, the amount of the algae that would be entrained along with the intake water and would be conveyed to the desalination facility would be minimized, thereby protecting the desalination facility from exposure to significant amounts of red tide-related algal organic compounds.

- Chlorination of Intake Seawater: The desalination facility intake pump station would be equipped with a sodium hypochlorite feed system which would be used for intake seawater chlorination on as needed basis. During episodes of red tide/algae blooms, chlorine would be applied at dosages of three to five mg/L. Chlorine is a strong oxidant, which, applied at the high dosages indicated above, would reduce the concentration of red tide-related algal organic compounds in the seawater, thereby further minimizing their content in the facility product water. In addition, intake seawater chlorination upstream of the pretreatment sand filters would significantly decrease algae growth in the filter cells.

  Chlorination of intake source water is a method commonly used for controlling algal blooms in conventional water treatment facilities applying direct filtration. At present, a significant portion of the intake water sources in the US are surface water sources occasionally exposed to algae blooms (reservoirs, lakes, slow-flowing portions of rivers). Typically, conventional treatment facilities applying granular media filtration and chlorination as key treatment methods are effective in treating surface water at times of algae blooms.

- Enhanced Coagulation of Intake Seawater: The desalination facility pretreatment filters would be equipped with a coagulant (ferric sulfate or ferric chloride) feed system, which would be applied continuously at the seawater intake at dosages of five to 10 mg/L. During episodes of red tide/algae blooms coagulation dosage would be increased to up to 20 to 30 mg/L to achieve enhanced coagulation and removal of algae from the intake water.

- Microfiltration or Dual Media Sand Filtration Algae Barrier: Algae conveyed with the intake seawater would be retained in the filter media and removed from the filters during filter cell backwashing. Because algae cells are the carrier of the red tide elevated concentration of algal organic compounds, their physical removal in the dual media filters would significantly reduce the potential for release from the algal biomass into the seawater that would be processed in the downstream treatment facilities (cartridge filters and RO membranes). Filter effluent water turbidity is expected to be maintained in a range of 0.05 to 0.3 nephelometric turbidity units (NTU).

- Microfiltration or Dual Media Sand Filter Covers: The surface of all pretreatment filters and filter channels would be covered to minimize sunlight exposure. Filter cell covers have proven to be an effective measure for minimizing algae growth in the filter cells. In combination with chlorination and enhanced coagulation, this measure would assure that the intake water algae are effectively retained and their growth in the filter media suppressed.

- Cartridge Filter Algae Barrier: The pretreatment filter effluent would be processed through five-micron cartridge filters located downstream of the granular media filters and ahead of the RO membranes. The size of the openings of these filters is an order of magnitude smaller than the size of the red tide algae cells. Therefore, the cartridge filters would provide an additional protection barrier in terms of algae cell propagation. The cartridge filter effluent would be practically devoid of all red tide algae and algal particles.

- RO Membranes: Reverse osmosis membranes are very effective in removing soluble compounds of molecular size smaller than the size of the red tide algal organic compounds. The proposed membrane elements at the seawater desalination facility would be capable of removing more than 99.6 % of the chloride ions contained in the seawater. Because the membrane elements work as physical barriers, they would also be very effective in removing organic molecules several times larger than chloride ions, such as these of the red tide algal organic compounds. The reverse osmosis membrane system is projected to remove more than 99 % of the red tide algal organic compounds remaining in the seawater, which would assure safe and reliable product water quality.[1] In addition, a study completed by the US Army Biochemical Research and Development Laboratory in 1993 also clearly indicates that reverse osmosis treatment is an effective method for removal of algal organic compounds, including saxotoxin.

- Final Disinfection: The permeate from the reverse osmosis system would be disinfected with chlorine followed by ammonia addition for chloramination. This final barrier of algal organic compound inactivation would provide additional assurance in terms of product water quality and safety.

- Emergency Facility Shutdown: Desalination facility operation can be discontinued within 10 minutes after notification in the event of red tide/algal blooms of catastrophic proportions or advisory by pertinent local and state heath safety agencies. Red tide genesis and development are usually closely followed by local agencies. Red tide growth to a level of a major calamity usually happens in a matter of days rather than minutes. Continuous communication with pertinent regulatory agencies in the times of red tide conditions would allow ample time for emergency shutdown in extreme cases of red tide occurrence.

Seawater desalination facilities using RO membranes similar to those proposed for the Seawater Desalination Project at Huntington Beach have operated successfully for more than 15 years in other parts of the world with scarce alternative water resources (Spain, Cyprus, Israel, the Middle East and the Caribbean). In all of these locations red tide/algal blooms have occurred occasionally in the past. The fact that there are no documented cases of red tide health or safety problems associated with the operation of RO seawater desalination facilities worldwide is indicative of the capability of these systems to perform reliably and effectively under red tide conditions. Thus, less than significant impacts are anticipated in this regard.

HBGS Non-Routine Operations

Unusual activities at the HBGS, such as seawater emergency intake pump shut downs and failures, electricity equipment malfunctions, excessively high temperature of the cooling water, etc., may impact product water quality and desalination facility performance.

The Seawater Desalination Project at Huntington Beach would have six different provisions incorporating several protection/notification devices to account for non-routine operations at the HBGS:

- Automatic control interlock between HBGS pumps and desalination facility intake pumps: The shutdown controls of the desalination facility intake pumps would be interlocked with the HBGS pumps, so when HBGS pump operation is discontinued to prepare for heat treatment,

1 Letter from Hydranautics to Poseidon Resources Corporation, June 18, 2002.

non-routine or even routine pump shutdown, this would automatically trigger an alarm at the desalination facility along with shutdown of the desalination intake pumps. After this emergency shutdown, the intake pumps would have to be started up manually, and the operations staff would be required to check the reason of shutdown with the HBGS staff before restarting the treatment facility intake pumps.

- Continuous Intake Pump Flow Measurement Devices: Seawater intake pumps would be equipped with flow meters, which would record the pumped flow continuously. If the intake flow is discontinued for any reason, including non-routine HBGS operations, this would trigger automatic intake pump shutdown.

- Continuous Intake Water Temperature Measurement Devices: The desalination facility intake pump station would be equipped with instrumentation for continuous measurement of the intake temperature. Any fluctuations of the intake temperature outside preset normal limits would trigger alarm and intake pump shutdown. This monitoring equipment would provide additional protection against heat treatment or other unusual intake water quality conditions.

- Continuous Intake Water Salinity/Conductivity Measurement Devices: The desalination facility intake pump station would be equipped with instrumentation for continuous measurement of the intake seawater salinity. Any fluctuations of the intake salinity outside preset normal operational limits would trigger an alarm and initiate intake pump shutdown. This monitoring equipment would provide additional protection against discharge of unusual fresh water/surface water streams in the facility outfall.

- Continuous Intake Water Oil Spill/Leak Detection Monitoring Devices: The desalination facility intake pump station would be equipped with instrumentation for oil spill/leak detection. Detection of oil in the intake water even in concentrations lower than 0.5 mg/L would automatically trigger an alarm and initiate intake pump shutdown. This monitoring equipment would provide additional protection against unusual intake water quality conditions.

- Routine Communication with HBGS Staff: The desalination facility staff of each shift would be required to contact HBGS personnel at least once per shift and enquire about unusual planned or unplanned events at the HBGS. If non-routine operations are planned at the HBGS, the desalination facility would be informed and would modify desalination facility operations accordingly.

Implementation of the six provisions described above would minimize impacts in this regard to less than significant levels.

Reverse Osmosis Membrane Performance

As the RO membrane elements age, their rejection capabilities decrease. This may trigger a change in product water quality from the Seawater Desalination Project at Huntington Beach.

The RO system membrane performance would continuously monitor feed seawater and permeate conductivity and the differential pressure through the membranes. If permeate salinity (i.e. total dissolved solids [TDS]) concentration exceeds the design level, membranes would be cleaned to recover their original performance capabilities. In addition, an average of 10 to 15 percent of the membrane elements would be replaced every year, thereby maintaining the product water quality at a steady level.

The Seawater Desalination Project at Huntington Beach would produce product water with lower TDS levels than that currently delivered to Orange County water purveyors by MWD. The TDS product water quality estimate of 350 mg/L is based on the use of high-rejection seawater desalination membranes at the second year of desalination facility operations. Typically, during the first two years of facility operations, the average product water quality TDS concentration would be lower than 350 mg/L. After the second year of operations, a portion (typically 10 to 15 percent per year) of the desalination facility membrane elements would be replaced to maintain the product water quality close to the target TDS concentration of 350 mg/L. Membrane replacement is a standard approach commonly used in seawater desalination facilities to maintain product water quality at a long-term steady target level. In addition, chloride and sodium are estimated to average 180 mg/L and 120 mg/L, respectively.

These estimated water quality levels for TDS, chloride, and sodium are well below the newly adopted narrative water quality objectives in the amended Basin Plan and when the desalinated water is integrated into the water supply system it is unlikely that recycled water would exceed the amended Basin Plan narrative water quality objectives.

The desalination facility would use industry standard eight-inch desalination membrane elements, which are available from a number of specialized membrane manufacturers. The membrane element manufacturers and their products pre-qualified for this project are:

- Hydranautics (SWC3 or better)
- Filmtec/Dow (SW30HR-380 or better)
- Koch/Fluid Systems (TFC2822SS or better)
- Toray (SU820L or better).

Key design membrane element parameters common for the products of these suppliers are:

- Membrane Type: Spiral-wound, thin film composite;
- Applied Flux: eight to 12 gpd/sf at recovery rate of 45 to 50 percent;
- Nominal Salt Rejection: 99.6 percent or higher;
- Applied Pressure: 800 to 1,100 pounds per square inch (psi);
- Maximum Pressure Drop per Element: 10 psi;
- Maximum Feed Water SDI (15 min): 5.0;
- Free Chlorine Resistance: less than 0.1 mg/L;
- Operating pH Range: two to 11; and
- QA/QC Membrane Production and Testing Procedures.

The actual membrane element that would be used for the proposed desalination facility would be selected during the detailed engineering design phase of this project. The product water projections are performed for two conditions: new membranes at facility start up and membranes at the second year of facility operations. All projections are completed for low flow scenario conditions in terms of intake water salinity and temperature and membrane performance characteristics.

At the beginning of the desalination facility operation the TDS concentration of the RO system permeate is projected to be between 226 and 308 mg/L, and at the end of the second year of desalination facility operations is projected to be between 257 and 349 mg/L (based on projections of product water quality and membrane performance in accordance with modeling specifications provided by two of the four membrane suppliers, Toray and Hydranautics). As previously indicated, the permeate water quality would be maintained at a second-year operations level over the entire 30-year period of facility operations by replacement of a portion of the membrane elements every year. It should be noted that the projections above are for the water quality of the RO system permeate as it exits the desalination system. Prior to distribution, the desalination facility permeate would be conditioned by lime and carbon dioxide for stabilization and corrosion control, and with chlorine for final disinfection. The addition of these conditioning chemicals would increase the final product water TDS concentration by 30 to 50 mg/L. Therefore, at facility start-up the TDS of the product water delivered to the distribution system is expected to be in a range of 260 to 340 mg/L, while for the entire 30-year period of facility operations the TDS concentration would be in a range of 300 to 400 mg/L and would average 350 mg/L.

The projections presented above are developed using conservative assumptions for the type and performance of the membrane elements, intake water salinity and temperature. The applicant's previous pilot testing experience in Tampa and Carlsbad and the actual performance of the same Toray membranes in Trinidad indicate that the membrane manufacturer projections carry a safety factor of 10 to 15 percent and the actual product water quality is always better than that projected by the software.

Advances in membrane technology over the next 30 years are expected to yield membrane elements capable of producing water of TDS concentration below 300 mg/L for most of the useful life of the desalination facility. Therefore, the projected product water TDS concentration of 350 mg/L is a reliable and conservative estimate of the potable water quality that would be delivered to the distribution system by the Seawater Desalination Project at Huntington Beach.

As described in Section 3.0, *PROJECT DESCRIPTION*, the facility would be capable of meeting all drinking water standards through multiple treatment processes, which include: pretreatment filters; cartridge filters; reverse osmosis membranes; and product water conditioning and disinfection facilities. A comparison between the product water quality of the Seawater Desalination Project at Huntington Beach and the DHS primary and secondary water quality standards is presented in Table 5.11-3, *PRODUCT WATER QUALITY COMPARISON*. Review of this table indicates that the desalination facility product water quality meets all current DHS water quality MCL standards. The project would also be consistent with all requirements of the SARWQCB Basin Plan. Thus, impacts in this regard would not be significant.

DHS Action Levels

In addition to the Safe Drinking Water Act, which sets the primary and secondary MCLs for water quality constituents, the California DHS has established health-based advisory levels, known as "action levels", for specific chemicals which may be found in drinking water. The levels in Table 5.11-1, *DHS DRINKING WATER NOTIFICATION LEVELS,* provide information to public water agencies and others about certain non-regulated chemicals in drinking water that lack MCLs. Furthermore, Table 5.11-2, *RESPONSE LEVELS*, provides response level information at which DHS recommends removal of a source from service.

Unlike MCLs, which are enforceable regulatory standards, action levels are advisory in nature and not enforceable standards. However, if a chemical is present over its action level, the following apply:

- Local Government Notification;
- Consumer Notification; and
- Removal of a Drinking Water Source from Service – DHS recommends that the drinking water system take the source out of a service if a chemical is present at levels considerably higher than the action levels. Response levels for these recommendations are presented in Table 5.11-2.

Of all the chemicals listed in Table 5.11-1, boron is the only compound that is detectable in the product drinking water from the seawater desalination facility. After the reverse osmosis treatment process the desalted water boron level is approximately 0.6-0.8 mg/l, which is below the DHS action level.

Table 5.11-1
DHS DRINKING WATER NOTIFICATION LEVELS

Chemical	Notification Level (milligrams per liter)
Boron**	1
n-Butylbenzene	0.26
sec- Butylbenzene	0.26
Tert- Butylbenze	0.26
Carbon disulfide	0.16
Chlorate**	0.8
2-Chlorotoluene	0.14
4-Chlorotoluene	0.14
Dichlorodifluoromethane (Freon 12)**	1
1,4-Dioxane	0.003
Ethylene glycol	14
Formaldehyde	0.1
Isopropylbenzene**	0.77
Manganese**	0.5
Methyl isobutyl (MIBK)**	0.12
Naphthalene	0.017
N-Nitrosodiethylamine (NDEA)	0.00001
N-Nitrosodiethylamine (NDMA)**	0.00001
Perchlorate**	0.006
n-Propylbenzene	0.26
Teritiary butyl alcohol (TBA)**	0.012
1,2,3-Trichloropropane (1,2,3-TCP)**	0.000005
1,2,4-Trimethylbenzene**	0.33
1,3,5-Trimethylbenzene**	0.33
Vanadium**	0.05

Source: California Department of Health Services, "Drinking Water Action Levels: An Overview".
**Chemical was detected two or more times in at least one drinking water source 2002-2004.

Table 5.11-2
RESPONSE LEVELS
(at which DHS recommends removal of a source from service)

Chemical	Toxicological Endpoint	Response Level (Multiples of Notification Level)
1,4-Dioxane TBA 1,2,3-TCP	Cancer Risk	100 times the NL
NDMA	Cancer Risk	20 times the NL
NDEA	Cancer Risk	10 times the NL
All Others	Cancer Risk	10 times the NL

Source: California Department of Health Services, "Drinking Water Action Levels: An Overview".

Table 5.11-3
PRODUCT WATER QUALITY COMPARISON

	Primary MCL or (Secondary MCL)	Projected Water Quality Huntington Beach Desalination Facility (Average)	Seal Beach Potable Groundwater (2001 CCR)	Fountain Valley Potable Groundwater (2001 CCR) (Average)	Newport Beach Potable Groundwater (2001 CCR) (Average)	Irvine Ranch Water District (Groundwater) (2001 CCR) (Average)	MWDSC Diemer Filtration Plant (2001 CCR) (Average)
INORGANICS							
Aluminum (µg/L)	1,000 /(200)	10	<DLR	<DLR	<DLR	10	123
Antimony (µg/L)	6	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Arsenic (µg/L)	10	0.01	<DLR	<DLR	<DLR	2.7	2.3
Barium (µg/L)	1,000	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Beryllium (µg/L)	4	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Cadmium (µg/L)	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Chloride (mg/L)	(250)	180	13	36	57	14	69
Chromium, total (µg/L)	50	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Color (Units)	(15)	1	<DLR DS	1.8 DS	<DLR DS	<DLR DS	1
Copper (µg/L) 90th percentile	*	10 (at plant)	180 R	160 R	270 R	190 R	<DLR
Cyanide (µg/L)	150	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Fluoride (mg/L)	2.0	0.15	0.37	0.3	0.34	0.29	0.2
Iron (µg/L)	(300)	2	<DLR	<DLR	<DLR	<DLR	<DLR
Lead (µg/L) 90th percentile	*	0.5 (at plant)	3.1 R	<DLR	<DLR	1.2	<DLR
Manganese (µg/L)	(50)	<DLR	<DLR	<DLR	<DLR	39	<DLR
MBAS (mg/L)	0.5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Mercury (µg/L)	2	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Nickel (µg/L)	100	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Nitrate (mg/L as NO3)	45	0.5	<DLR	3.3	7.5	<DLR	<DLR
Nitrite (mg/L as N)	1	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Odor (TON)	(3)	1	<DLR DS	1 DS	1.7 DS	<DLR DS	No data
Selenium (µg/L)	50	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Silver (µg/L)	100	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Specific Conductance (µmhos/cm)	(900)	720	359	589	730	399	732

"<DLR" (less than the Detection Limit for Reporting purposes) means the contaminant would not be detected at or above the analytical reporting level established for each contaminant by the California Department of Health Services.
"DS" means samples are collected for compliance purposes from the distribution system, not at the well/treatment plant.
"R" means samples for lead and copper compliance are collected from residential taps, not at the well/treatment plant.

Table 5.11-3
PRODUCT WATER QUALITY COMPARISON (cont'd)

	Primary MCL or (Secondary MCL)	Projected Water Quality Huntington Beach Desalination Facility (Average)	Seal Beach Potable Groundwater (2001 CCR)	Fountain Valley Potable Groundwater (2001 CCR) (Average)	Newport Beach Potable Groundwater (2001 CCR) (Average)	Irvine Ranch Water District (Groundwater) (2001 CCR) (Average)	MWDSC Diemer Filtration Plant (2001 CCR) (Average)
Specific Conductance (µmhos/cm)	(900)	720	359	589	730	399	732
Sulfate (mg/L)	(250)	10	26	67	109	40	149
Thallium (µg/L)	2	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
TDS (mg/L)	(500)	300	227	360	481	243	432
Turbidity (NTU)	(5)	<DLR DS	0.1 DS	0.16 DS	0.02 DS	<DLR DS	0.06
Zinc (µg/L)	(5,000)	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
RADIOACTIVITY (pCi/L)							
Gross alpha	15	<DLR	<DLR	4.7	5.3	1.4	3.6
Gross beta	50	<DLR	No data	No data	No data	No data	6.2
Radium 226 and 228	5	<DLR	No data	No data	No data	No data	<DLR
Strontium 90	8	<DLR	No data	No data	No data	No data	No data
Tritium	20,000	<DLR	No data	No data	No data	No data	No data
Uranium	20	<DLR	No data	4.9	5.2	No data	2.6
VOLATILE ORGANICS (µg/L)							
Benzene	1	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Bromoform	THM	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Carbon tetrachloride	0.5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Chlorodibromomethane	THM	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Chloroform	THM	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,2–Dichlorobenzene	600	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,4–Dichlorobenzene	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Dichlorobromomethane	THM	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,1–Dichloroethane	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,2–Dichloroethane	0.5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,1–Dichloroethylene	6	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR

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Table 5.11-3
PRODUCT WATER QUALITY COMPARISON (cont'd)

	Primary MCL or (Secondary MCL)	Projected Water Quality Huntington Beach Desalination Facility (Average)	Seal Beach Potable Groundwater (2001 CCR)	Fountain Valley Potable Groundwater (2001 CCR) (Average)	Newport Beach Potable Groundwater (2001 CCR) (Average)	Irvine Ranch Water District (Groundwater) (2001 CCR) (Average)	MWDSC Diemer Filtration Plant (2001 CCR) (Average)
t–1,2-Dichloroethylene	10	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Dichloromethane	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,2–Dichloropropane	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,3–Dichloropropene	0.5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Ethylbenzene	300	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Monochlorobenzene	70	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
MTBE	13	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Styrene	100	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,1,2,2–Tetrachloroethane	1	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Tetrachloroethylene	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Toluene	150	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,2,4–Trichlorobenzene	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,1,1–Trichloroethane	200	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,1,2–Trichloroethane	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Trichloroethylene	5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Trichlorofluoromethane	150	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,1,2-Trichlorotrifluoroethane	1,200	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Vinyl Chloride	0.5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Xylenes	1,750	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
SYNTHETIC ORGANICS (µg/L)							
Alachlor	2	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Atrazine	1	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
gamma-BHC (Lindane)	0.2	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Bentazon	18	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Carbofuran	18	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR

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Table 5.11-3
PRODUCT WATER QUALITY COMPARISON (cont'd)

	Primary MCL or (Secondary MCL)	Projected Water Quality Huntington Beach Desalination Facility (Average)	Seal Beach Potable Groundwater (2001 CCR)	Fountain Valley Potable Groundwater (2001 CCR) (Average)	Newport Beach Potable Groundwater (2001 CCR) (Average)	Irvine Ranch Water District (Groundwater) (2001 CCR) (Average)	MWDSC Diemer Filtration Plant (2001 CCR) (Average)
Chlordane	0.1	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
2,4-D	70	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Dalapon	200	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
1,2–Dibromo–3–chloropropane	0.2	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Di (2-ethylhexyl)adipate	400	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Di (2-ethylhexyl)phthalate	4	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Dinoseb (µg/L)	7	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Diquat	20	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Endothall	100	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Endrin	2	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Ethylene dibromide	0.05	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Glyphosate	700	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Heptachlor	0.01	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Heptachlor epoxide	0.01	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Hexachlorobenzene	1	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Hexachlorocyclopentadiene	50	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Methoxychlor	30	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Molinate	20	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Oxamyl	50	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Pentachlorophenol	1	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Picloram	500	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Polychlorinated biphenyls	0.5	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Simazine	4	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
2,4,5–TP (Silvex)	50	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
Thiobencarb	70	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR

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Table 5.11-3
PRODUCT WATER QUALITY COMPARISON (cont'd)

	Primary MCL or (Secondary MCL)	Projected Water Quality Huntington Beach Desalination Facility (Average)	Seal Beach Potable Groundwater (2001 CCR)	Fountain Valley Potable Groundwater (2001 CCR) (Average)	Newport Beach Potable Groundwater (2001 CCR) (Average)	Irvine Ranch Water District (Groundwater) (2001 CCR) (Average)	MWDSC Diemer Filtration Plant (2001 CCR) (Average)
Toxaphene	3	<DLR	<DLR	<DLR	<DLR	<DLR	<DLR
MICROBIALS (MPN/100ml)							
Total Coliform - % positives	**	0.1	0	0	0	1.2	0.2 DS
Fecal Coliform - % positives	**	0	0	0	0	0	0
OTHER ANALYSES (mg/L)							
Alkalinity		50	No data	169	179	No data	104
Total Hardness		50	No data	63	79	No data	49
Magnesium		15	No data	11	13	No data	21
pH (Units)		8.0	No data	8.0	8.0	No data	8.0
Potassium		5.0	No data	2.5	3.5	No data	3.5
Sodium		120	60	43	55	52	65

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"DS" means samples are collected for compliance purposes from the distribution system, not at the well/treatment plant.
"R" means samples for lead and copper compliance are collected from residential taps, not at the well/treatment plant.

PRODUCT WATER RELIABILITY

The desalination facility operations would be fully automated and key systems would be provided with redundant equipment and controls per the requirements of Title 22 of the California Code of Regulations. In the event of an underground booster pump station power outage, the booster pump station would be equipped with on-site power generators that would allow their operation to continue even if the main source of power supply has been interrupted. The desalination facility would be provided with two independent sources of power supply, which includes an electrical power grid and/or the HBGS auxiliary reserve bank to assure uninterrupted operations during emergencies. The desalination facility would be manned 24 hours per day, 365 days per year by skilled and certified operators, which would coordinate facility and pump station operations with that of all other water purveyors delivering water to or operating the water distribution system facilities.

As a part of desalination and pumping station operations, the operations staff would develop an earthquake mitigation and preparedness plan, which would be coordinated with the City of Huntington Beach. This plan would define coordination measures to assure continuous facility operations and water delivery under earthquake emergency conditions.

The desalination facility would be designed with one standby reverse osmosis train to provide additional reliability of water production and supply. Typically, desalination facilities, including the existing desalination facilities in California, are designed to operate with all available reverse osmosis trains in operation at all times. During the times of potential outages caused by scheduled or unscheduled maintenance or emergency events, such as an earthquake, these facilities operate at reduced capacity or are down for a certain period of time. The proposed desalination facility would be designed to produce 50 mgd of product water with 12 RO trains, and would be constructed with an additional 13th RO standby train, which can produce up to 4.2 mgd of water at any time. This additional train would provide increased reliability and redundancy that exceeds current reliability standards and common practices for desalination facility design. The proposed desalination facility would be the first facility in California with such additional production standby capacity and reliability provisions.

The issues of reliability of the supply and emergency service provisions would be dictated by the terms of the institutional agreements negotiated with the regional water purveyors (including MWDOC and Metropolitan Water District) and by the terms of the water supply agreements negotiated with potential customers that would purchase the product water produced at the desalination facility. Thus, impacts are anticipated to be less than significant in this regard with mitigation.

ORANGE COUNTY WATER DISTRIBUTION SYSTEM

The introduction of desalinated product water into the existing Orange County distribution system may result in impacts in regards to the following:

- Blended Water Quality
- Blended Water Corrosivity
- Blended Water Chlorine Residual
- Blended Water Disinfection Byproduct Concentration
- Blended Water Taste and Odor
- Hydraulics

Blended Water Quality

Due to distribution system operations at certain points in the system, desalinated water may blend with other source waters, such as local groundwater or imported water from the Metropolitan Water District of Southern California. This blending could have water quality improvement benefits, especially if the receiving agencies are predominantly using imported water, which has higher levels of TDS, sulfate, hardness and disinfection byproducts than desalinated water.

The desalination facility would produce drinking water of very high and consistent quality, which meets or exceeds all applicable regulatory requirements established by the EPA and the DHS. The desalinated water would be produced applying state-of-the-art seawater RO membranes which are capable of removing practically all contaminants in the source water: turbidity; taste, odor, color, bacteria, viruses, salts, proteins, asbestos, organics, etc.

Currently, EPA recognizes RO membrane treatment as a best available technology for water treatment and for meeting future water quality regulations.

The desalinated water would have approximately 100 mg/L lower salinity (i.e. TDS) than the existing drinking water. The lower drinking water salinity would result in better taste and lower overall water distribution system corrosivity. The desalinated seawater would be softer than the existing water sources. Softer water has a number of benefits such as: better taste; formation of less calcium deposits on household appliances and cutlery; and lower detergent use. Commercial and industrial establishments which currently use softening devices to treat the potable water would also benefit from introduction of the softer desalinated water in the distribution system, as their softening costs may be reduced and some of these users may not need to soften their water anymore (most industrial users typically require water with a hardness below 80 mg/L – as desalinated water would reduce hardness by at least 50 percent, softening costs would also be reduced commensurately). Similar to TDS, drinking water of lower sulfate consternation would have a better taste. The desalinated water would have order-of-magnitude lower disinfection byproducts, such as total trihalomethanes and halocetic acids, or TTHM and HAA, respectively) concentrations than the existing drinking water (refer to Appendix N, *DISINFECTION BYPRODUCT FORMATION STUDY*). Disinfection byproducts are well known carcinogens and their reduction in the drinking water as a result of the blending of the desalinated water with other water sources would be an added benefit. As such, the blending of desalinated product water with existing imported MWD water is not anticipated to result in significant impacts.

Blended Water Corrosivity

Blending the desalinated product water with existing water from other sources may change the water quality of the blend in terms of its corrosion effect on the existing water distribution system. When evaluating potential short-term and long-term impacts of blending treated waters from different sources, one of the most important considerations is the potential for corrosion of pipes and residential fixtures. Excessive corrosion over time might lead to colored water in homes, stained fixtures, pipe failures, and non-compliance with the Lead and Copper Rule. In 1992, the EPA promulgated the Lead and Copper Rule to protect drinking water consumers from excessively high concentrations of lead and copper in the drinking water caused by corrosion of household and public building plumbing systems. The rule sets limits for lead and copper in samples collected from faucets with risk for elevated lead and copper concentrations. The limits for lead and copper are 15 μg/L (micrograms per liter), and 1.3 mg/L, respectively.

Similar to all other potable water sources in the distribution system, product water from the Seawater Desalination Project at Huntington Beach would be chemically conditioned at the treatment facility prior to delivery to the distribution system to mitigate its corrosivity. Lime, in combination with carbon dioxide, would be added for post-treatment stabilization of the RO water as a source for pH and alkalinity adjustment and hardness addition. A corrosion control study describing in detail the type and amount of corrosion control chemicals planned to be used for this project are presented in Appendix O, *DISTRIBUTION SYSTEM CORROSION CONTROL STUDY.*

The product water from the seawater desalination facility would be suitable for delivery through the existing water distribution system and would be comparable and compatible to the other water sources currently delivering water to the same system. Prior to delivery to the water distribution system the desalinated water would be conditioned using lime and carbon dioxide to achieve the following corrosion control driven water quality parameters, which are known to be consistent with water currently distributed throughout Orange County:

- pH of 8 to 8.5;
- Langelier Saturation Index (LSI) of 0.0 to 0.5; and
- Alkalinity of 40 mg/L or higher.

These water goals are established based on current practices of the MWD, MWDOC, and most water agencies and municipalities in Orange County. The water goals are rooted in the Safe Drinking Water Act's water quality standards.

These water quality goals would be achieved by the addition of the following chemicals:

- Lime at dosage of 25 to 50 mg/L (average of 30 mg/L)
- Carbon dioxide at dosage of zero to 30 mg/L (average of six mg/L)

Adopting this proven corrosion control strategy would result in a non-corrosive product that can be seamlessly integrated into the system.

In addition, a corrosion monitoring system would be installed in the proposed transmission pipeline at points of interconnection with the existing water distribution system to ensure that the proposed corrosion control measures are effective and adequate. As such, impacts in regards to corrosion are not anticipated to be significant upon implementation of the design features described above.

Chlorine Residual

The disinfected desalinated water may impact the disinfection of the existing water sources. The potential impacts include a change in the concentration of disinfection byproducts and a reduction of chloramine residual in the other water sources with which desalinated water is blended. The potential impacts and their assessment are described in detail in a separate study provided in Appendix N, *DISINFECTION BYPRODUCT FORMATION STUDY.*

The desalinated product water would be disinfected prior to delivery to the distribution system. Chlorine, in the form of sodium hypochlorite, would be added as a disinfectant to meet DHS water quality standards for potable water disinfection. The desalted water would meet current imported water disinfection methods so as to not change any disinfection protocol currently being used by water agencies. Controlling biological growth in the transmission pipelines and in the receiving reservoirs in the distribution system would be accomplished by adding ammonia to the chlorinated water to form chloramines. Potable water from MWD as well as that from some local groundwater sources also contains chloramines as the final residual disinfectant. All of these treated water sources would have compatible chlorine residuals.

The desalinated water would be chloraminated by sequential application of sodium hypochlorite and ammonia to achieve a chloramine residual concentration at the point of delivery to the distribution system is in a range of two to 2.5 mg/L. A detailed description of the proposed chloramination process is provided in Appendix N, *DISINFECTION BYPRODUCT FORMATION STUDY*. This study confirms that after blending of the chloraminated product water from the desalination facility with disinfected product water from other sources, the chloramine residual of the blend meets the target level in the distribution system of two to 2.5 mg/L. As such, impacts in this regard are not anticipated to be significant.

Disinfection Byproduct Concentration

The desalinated product water may impact the content of disinfection byproducts (known to be carcinogenic) of existing water sources within the distribution system. The two key groups of regulated disinfection byproducts that can be impacted are TTHMs and HHAs. The desalinated water typically has higher concentration of bromides than the other water sources. Bromides may create additional disinfection byproducts. Therefore, when blended with other source waters, the desalinated water may increase the concentration of disinfection byproducts in the other sources. On the other hand, the existing water sources in Orange County typically contain much higher level of organics than the desalinated water, which is practically void of organics. Organics are also a potential source of disinfection byproducts. Therefore, blending of desalinated water with other water sources may have a positive impact on water sources with high organic concentrations.

Blending desalinated water with existing sources of supply would result in a product that is comparable to existing supplies and meets all disinfection byproduct limits. Desalinated seawater contains lower levels of organics than existing Orange County sources, such as the MWD's Diemer filtration facility and all other local groundwater water sources. Therefore, blending of desalinated water with other source waters in the distribution system would have a beneficial effect, and would lower the overall disinfection byproduct concentration of the blend. The results of Appendix N, *DISINFECTION BYPRODUCT FORMATION STUDY* confirm the beneficial effect of the desalinated water on the blended water quality in terms of disinfection byproducts. As such, impacts in this regard are not anticipated to be significant.

Blended Water Taste and Odor

No measurable impact on odor is expected as a result of the integration of the desalinated water with water from other sources in the distribution system. The desalinated water would be softer and would have lower salinity than the other water sources. Therefore, blending of these sources would result in an overall reduction of the salinity and hardness of the water delivered to the customers. Lower salinity and hardness of the blended product water would be beneficial and would have a positive effect on the taste of the water delivered to the customers.

As shown in Table 5.11-3, *PRODUCT WATER QUALITY COMPARISON*, the projected quality of the project water after RO treatment is closely comparable with the finished water it would blend with in the distribution system. In terms of odor, the desalination facility product water would meet the DHS MCL. In terms of regulated volatile organics, and other compounds that may impact product water taste and odor, product water from the Seawater Desalination Project at Huntington Beach would comply with all drinking water standards and does not differ substantially from the water quality of the other sources of product water in the distribution system. Therefore, the desalinated water would be better than or equal to existing water sources in the distribution system in terms of taste and odor. With pores ranging from 0.00005 to 0.0000002 microns (for comparison, a human hair is 200 microns in diameter) the RO membranes would retain and remove over 99.5 % of the seawater salinity; and over 99 % of the metals and organics which may cause undesirable taste and odor of the product water.

As indicated in Appendix X, *DESALINATION FACILITIES LOCATED THROUGHOUT THE WORLD*, desalinated seawater has been used for over 15 years worldwide without any problems encountered in terms of taste or odor quality. In 1999, Marin County completed a taste and odor survey of desalinated seawater and over 99 percent of the participants in the test indicated that desalinated seawater tasted better than alternative water sources. At a recent water taste testing event in Florida, the product water of the Marco Island seawater desalination facility (which is the second largest seawater desalination facility in the U.S.) was found to be the best tasting water in Southern Florida.

To protect against potential taste and odor problems associated with the startup of facility operations, just prior to startup, a sequential flushing program would be coordinated with the involved water agencies to minimize any sediment disturbance that might occur due to flow reversal in a portion of the existing distribution system. A flushing program would minimize any aesthetic issues that might be created through flow reversal.

In addition, a sampling location would be established near the physical connection of the transmission pipeline to the OC-44 feeder. A monitoring program would be implemented for this location incorporating the following parameters: coliform bacteria, heterotrophic bacteria, chlorine residual, disinfection byproducts, and aesthetic parameters such as turbidity, odor, and color, as well as corrosion indices. The purpose of this sampling point is to verify on a regular basis that no degradation of water quality has occurred during any period of storage at the facility site or in the transmission pipeline and that mixing of desalinated water with water from other sources continues to be compatible.

In summary, because of the close chemical compatibility between the desalinated water produced at the Seawater Desalination Project at Huntington Beach and that of existing water sources in Orange County, no impacts in regards to taste and odor are expected. If such problems occur, the desalination facility water quality can be adjusted by controlling the RO membrane system removal efficiency in terms of particular compounds that may cause taste and/or odor issues, or the product water conditioning chemicals can be changed.[2]

Hydraulics

Implementation of the proposed project may have hydraulic impacts on the regional water distribution system. A total of three pump stations would be necessary for operation of the project: 1) a product water pump station at the desalination facility site; 2) the OC-44 underground booster pump station in unincorporated Orange County; and 3) the Coastal Junction underground booster pump station in Irvine. Project implementation could potentially alter the flow rate and pressure of multiple transmission lines serving the vicinity. Based on hydraulic modeling performed for the proposed project, the following water transmission mains in the project vicinity are not anticipated to be impacted by the proposed project (it is assumed that all facilities discussed below have design features to prevent hydraulic surges):

- East Orange County Feeder #2
- Irvine Cross Feeder
- Coast Supply Line
- Aufdenkamp Transmission Main

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[2] The RO membrane system efficiency, in terms of particular compounds, would be controlled by measuring the turbidity of the desalinated water produced by the membrane system. Turbidity monitoring is achieved by installation of turbidimeters on the individual RO membrane trains and a turbidimeter that measures the turbidity of the desalinated water at the point of which the water leaves the facility site. If the turbidity is above a preset level determined by the DHS regulatory requirements, the individual RO membrane trains would be checked for leaks and the defective or failed membrane elements would be replaced.

- Tri-Cities Transmission Main
- Newport Beach Wells Supply Line

However, the hydraulic characteristics of the OC-44 pipeline may be affected in one of two ways, depending on whether the pipeline segment in question is east or west of the proposed OC-44 connection point: 1) west of the proposed OC-44 connection point, the flow rate and flow direction would remain unchanged, while a change in water pressure would be negligible (a change of less than five psi); and 2) east of the proposed connection point, the direction of flow would be reversed, the flow rate would increase, and water pressure would decrease. It is anticipated that maximum flow velocity through this portion of the pipeline would be 7.5 fps. All flow rate, pressure, and velocity changes, which may occur in the existing pipelines, are within pipeline design specifications. In addition, the hydraulic characteristics of the East Orange County Feeder No. 2 (EOCF #2) may be affected in one of two ways, depending on whether the pipeline segment in question is north or south of the Coastal Junction (the point at which the Tri-Cities and Aufdenkamp Transmission Mains connect to the EOCF #2): 1) north (upstream) of the Coastal Junction, the flow rate within EOCF #2 would decrease (this decrease may allow water pressure to rise, but the resulting change in water pressure would be well within allowable design pressure for the existing pipeline); and 2) south (downstream) of the Coastal Junction, the direction of flow would be reversed, the water pressure would rise, and the flow rate would increase to a maximum velocity of 3.6 fps. Based on the hydrodynamic model, the pressure class of the existing pipeline is of sufficient strength to accommodate changes incurred by the proposed project. Thus, impacts in this regard would not be significant.

<u>Pressure Surges</u>

Appendix D, *PRESSURE SURGE ANALYSIS*, provides a discussion of potential impacts of the three pump stations associated with the project. The report includes the effect of pressure surges on:

- The proposed desalinated water 42- to 48-inch pipeline (between the desalination facility and the OC-44 transmission main)
- East Orange County Feeder #2
- Irvine Cross Feeder
- Coast Supply Line
- Aufdenkamp Transmission Main
- Tri-Cities Transmission Main

Analysis concludes that in the event of a loss of power to the booster pump stations, a low-pressure wave is predicted to propogate out from the discharge site of each booster pump station and into the associated pipelines. As the water travels toward its applicable destination (reservoirs, demand locations, and booster pump stations), the low-pressure waves cause the pipeline pressure to fall. Simultaneously, a pressure upsurge wave is predicted to propagate out from the suction side of the OC-44 and Coastal Junction pump stations.

Following the loss of power to the pump station located at the desalination site, a vapor condition is created in the desalinated water conveyance pipeline. When the product water conveyance pipeline is re-pressurized by a reflected waterhammer wave, any vapor cavities that are formed would collapse, and may create extremely high local pressure spikes that may damage the pipeline, resulting in premature corrosion and the development of leaks. When subjected to negative pressure, a leak could become a source of pathogen intrusion. If the piping does not have sufficient strength to withstand a full vacuum, the pipeline could collapse under such low pressures.

To eliminate large negative pressures and the possibility of vapor cavity formation in the delivery pipeline system above, surge protection measures for proposed project facilities are recommended as follows:

- Incorporation of pressurized surge tanks at booster pump station locations; and
- Vacuum relief and air release valve improvements.

Hydraulic modifications recommended for the existing water distribution system include the following:

- Hydraulically operated isolation valves;
- Elimination of existing valves; and
- Pressure control valve improvements.

Refer to Appendix D, *PRESSURE SURGE ANALYSIS,* for additional information.

Additional modeling would be performed during the design phase of the project to confirm that the proposed project would not have significant impacts on regional water transmission facilities.

MITIGATION MEASURES

PRODUCT WATER QUALITY

PW-1 Prior to project operations, the applicant shall obtain all required drinking water permits from the California Department of Health Services. These permits are anticipated to consist of:

- a Wholesale Drinking Water Permit; and
- an Administrative Change to Retail Agencies' Drinking Water Permit (to include desalinated water from the proposed project as an approved source of supply for their agency).

PW-2 During final design of the proposed project, the applicant shall incorporate the following six provisions to protect water quality in the event of "non-routine" operations at the HBGS (defined as operations such as seawater emergency intake pump shut downs and failures, electricity equipment malfunctions, excessively high temperature of the cooling water, etc.):

- <u>Automatic control interlock between HBGS pumps and desalination facility intake pumps:</u> The shutdown controls of the desalination facility intake pumps shall be interlocked with the HBGS pumps, so when HBGS pump operation is discontinued to prepare for heat treatment, non-routine or even routine pump shutdown, this would automatically trigger an alarm at the desalination facility along with shutdown of the desalination intake pumps. After this emergency shutdown, the intake pumps shall be started up manually, and the operations staff would be required to check the reason of shutdown with the HBGS staff before restarting the treatment facility intake pumps.

- <u>Continuous Intake Pump Flow Measurement Devices:</u> Seawater intake pumps shall be equipped with flow meters, which would record the pumped flow continuously. If the intake flow is discontinued for any reason, including non-routine HBGS operations, automatic intake pump shutdown shall occur.

- Continuous Intake Water Temperature Measurement Devices: The desalination facility intake pump station shall be equipped with instrumentation for continuous measurement of the intake temperature. Any fluctuations of the intake temperature outside preset normal limits shall trigger alarm and intake pump shutdown. This monitoring equipment shall provide additional protection against heat treatment or other unusual intake water quality conditions.

- Continuous Intake Water Salinity/Conductivity Measurement Devices: The desalination facility intake pump station shall be equipped with instrumentation for continuous measurement of the intake seawater salinity. Any fluctuations of the intake salinity outside preset normal operational limits shall trigger an alarm and initiate intake pump shutdown. This monitoring equipment shall provide additional protection against discharge of unusual fresh water/surface water streams in the facility outfall.

- Continuous Intake Water Oil Spill/Leak Detection Monitoring Devices: The desalination facility intake pump station shall be equipped with instrumentation for oil spill/leak detection. Detection of oil in the intake water even in concentrations lower than 0.5 mg/L shall automatically trigger an alarm and initiate intake pump shutdown. This monitoring equipment shall provide additional protection against unusual intake water quality conditions.

- Routine Communication with HBGS Staff: The desalination facility staff of each shift shall be required to contact HBGS personnel at least once per shift and enquire about unusual planned or unplanned events at the HBGS. If non-routine operations are planned at the HBGS, the desalination facility shall modify desalination facility operations accordingly.

PW-3 During project operations, the RO membrane system shall be continuously monitored for feed seawater and permeate conductivity and the differential pressure through the membranes. If permeate salinity (i.e. total dissolved solids) concentration exceeds the design level, membranes shall be cleaned to recover their original performance capabilities.

PRODUCT WATER RELIABILITY

PW-4 Prior to project operations, the desalination facility operations staff shall develop an earthquake mitigation and preparedness plan, which shall be coordinated with the City of Huntington Beach. This plan shall define coordination measures to assure continuous facility operations and water delivery under earthquake emergency conditions.

ORANGE COUNTY WATER DISTRIBUTION SYSTEM

PW-5 Prior to project operations, a corrosion monitoring system shall be installed in the proposed transmission pipeline at points of interconnection with the existing water distribution system to ensure that the proposed corrosion control measures are effective and adequate.

PW-6 To protect against potential taste and odor problems associated with the startup of facility operations, a sequential flushing program shall be initiated just prior to project startup that shall be coordinated with the involved water agencies to minimize any sediment disturbance that might occur due to flow reversal in a portion of the existing distribution system.

PW-7 Prior to project operations, a sampling location shall be established near the physical connection of the transmission pipeline to the OC-44 feeder. A monitoring program shall be implemented for this location incorporating the following parameters: coliform bacteria, heterotrophic bacteria, chlorine residual, disinfection byproducts, and aesthetic parameters such as turbidity, odor, and color, as well as corrosion indices.

PW-8 Prior to project operations, additional modeling shall be performed to confirm that the proposed project shall not have pressure surge impacts upon the existing regional water distribution system. The model shall recommend appropriate facilities to prevent pressure surges, such as

- Incorporation of pressurized surge tanks at booster pump station locations;
- Vacuum relief and air release valve improvements;
- Hydraulically operated isolation valves;
- Elimination of existing valves; and/or
- Pressure control valve improvements.

PW-9 Prior to project operations, the applicant shall coordinate with and obtain approval as required from applicable local water agencies that own and operate the distribution system in which the desalinated water would come in contact with. Various operating approvals and corresponding agreements shall be signed before the desalinated water is introduced into the local distribution system.

UNAVOIDABLE SIGNIFICANT IMPACTS

None have been identified.