APPLICATION FOR RENEWAL OF
NPDES CA0107409 and
301(h) MODIFIED SECONDARY TREATMENT REQUIREMENTS

Point Loma Ocean Outfall

VOLUME III
LARGE APPLICANT QUESTIONNAIRE

City of San Diego
Metropolitan Wastewater Department

November 2007

Application for Renewal of NPDES CA0107409

&

301(h) Modified Secondary Treatment Requirements for Biochemical Oxygen Demand and Total Suspended Solids

POINT LOMA OCEAN OUTFALL &

POINT LOMA WASTEWATER TREATMENT PLANT

Submitted under provisions of
Section 301(h) of the Clean Water Act

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Metropolitan Wastewater Department
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November 2007
(updated)

APPLICATION FOR RENEWAL OF NPDES CA0107409
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POINT LOMA OCEAN OUTFALL

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VOLUME III

LARGE APPLICANT QUESTIONNAIRE

Volume III Summary*: Regulations established in Title 40, Section 125, Subpart G, of the Code of Federal Regulations require 301(h) applicants to respond to a series of technical questions (Large Applicant Questionnaire). This volume presents responses to the Large Applicant Questionnaire. Technical Appendices supporting the Large Applicant Questionnaire responses are presented in Volumes IV through VIII. As documented within the application, the Point Loma Ocean Outfall discharge complies with all applicable regulations and requirements established pursuant to Section 301(h) of the Clean Water Act.*

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LARGE APPLICANT QUESTIONNAIRE

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LIST OF ABBREVIATIONS

ASBS	areas of special biological significance
ATSD	*Amended 301(h) Technical Support Document* (EPA, 1994)
BAF	biological aerated filter
BIP	balanced indigenous population
BMP	best management practices
BOD	biochemical oxygen demand
BOD_5	five day biochemical oxygen demand
BRI	Benthic Response Index
CBOD	carbonaceous biochemical oxygen demand
CCC	criteria continuous concentration
CFL	contributory flow limits
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CFU	colony forming units
CIU	categorical industrial user (subject to federal categorical pretreatment req'ts)
CMC	criteria maximum concentration
COD	chemical oxygen demand
CPFV	commercial passenger fishing vessel
CTD	conductivity, temperature, density
DO	dissolved oxygen
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
FPUD	Fallbrook Public Utility District
g	gram
IBWC	International Boundary and Water Commission
HCH	hexachlorocyclohexane
HHW	Household Hazardous Waste Program
HMS	highly migratory species (fish)
IDOD	immediate dissolved oxygen demand
ITI	Infaunal Trophic Index

LIST OF ABBREVIATIONS (Continued)

IWCP	City of San Diego Industrial Wastewater Control Program
IWTP	International Wastewater Treatment Plant
lb	pound
km	kilometer
m	meters
m/sec	meters per second
m^3/sec	cubic meters per second
MBC	Metro Biosolids Center
MDL	Method Detection Limit
MER	mass emissions rate
mgd	million gallons per day
mg/l	milligrams per liter (10^{-3} g/l)
ml/l	milliliters per liter
MLLW	mean low low water
MMPA	Federal Marine Mammals Protection Act
MPRAS	Marine Protection, Research and Sanctuaries Act
MTBE	methyl tertiary butyl ether
mt	metric ton (1000 kilograms)
mt/yr	metric tons (1000 kilograms) per year
NA	not applicable
NBOD	nitrogenous biochemical oxygen demand
ND	not detected (also nd)
ng/l	nanograms per liter (10^{-9} g/P)
NMFS	National Marine Fisheries Service
North City WRP	North City Water Reclamation Plant
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric turbidity units
O&M	operation and maintenance
OPRA	Ocean Pollution Reduction Act of 1994
PCB	polychlorinated biphenyl

LIST OF ABBREVIATIONS (Continued)

pg/l	picograms per liter (10^{-12} g/l)
PLOO	Point Loma Ocean Outfall
POTW	public owned treatment works
Regional Board	California Regional Water Quality Control Board, San Diego Region
ROV	remotely operated vehicle
RSB	initial dilution simulation model of EPA ATSD
SANDAG	San Diego Association of Governments
SCB	Southern California Bight
SCCWRP	Southern California Coastal Water Research Project
SEDPXY	solids transport computer simulation model
SBOO	South Bay Ocean Outfall
SIU	significant industrial user
South bay WRP	South Bay Water Reclamation Plant
TOC	total organic carbon
TOMP	Toxic Organic Management Plan
TSS	total suspended solids
TTO	total toxic organics
TUa	acute toxicity units
TUc	chronic toxicity units
TVS	total volatile solids
Φg/l	micrograms per liter (10^{-6} g/l)
USMC	U.S. Marine Corps
USFWS	U.S. Fish and Wildlife Service
WRP	Water Reclamation Plant
WTP	Wastewater Treatment Plant
ZID	zone of initial dilution

Section I

Large Applicant Questionnaire

I. INTRODUCTION

Section 301(h) of the Clean Water Act sets forth conditions under which the Environmental Protection Agency (EPA) may issue modified secondary treatment requirements for ocean discharges of treated municipal wastewater. EPA has promulgated regulations governing the application for such modified secondary treatment requirements within Title 40, Section 125, Subpart G of the *Code of Federal Regulations.*

Appendix B to 40 CFR 125, Subpart G presents a two-section questionnaire to be used by large applicants for modification of secondary treatment requirements. The City of San Diego meets the criteria for a large applicant; a large applicant is defined as a discharger serving a population of 50,000 or more, or having a discharge flow of 5 mgd or more.

Response Format - Large Applicant Questionnaire

The questionnaire presented in 40 CFR 125, Subpart G, Appendix B includes the following two sections of questions:

Section II **General Information and Basic Data Requirements**. Section II of the questionnaire presents questions for describing the treatment, source control, and outfall system, the proposed discharge, receiving water conditions, and how the discharge complies with state and federal laws.

Section III **Technical Evaluation.** Section III of the questionnaire presents questions to assess the effects of the discharge. Section III questions assess the physical characteristics of the discharge, compliance with water quality standards, impacts on public water supplies and recreation, biological impacts of the discharge, and compliance with applicable regulations for toxics control.

Guidance for responding to the questions is provided in *Amended Section 301(h) Technical Support Document* (EPA Publication 842-B-94-007, September 1994).

In accordance direction presented in the *Amended Section 301(h) Technical Support Document*, the following sections present responses to the Section II and Section III questions from the Large Applicant Questionnaire. For questions requiring lengthy responses, a brief synopsis of the response is presented in italics at the beginning of the response. More detailed information is presented in regular type font below the italicized summary.

Attached Technical Studies. Responses to more complex issues are evaluated in detail within attached technical appendices (which are presented in Volumes IV through VIII). Technical support studies prepared specific to this 2007 301(h) application include:

- Metro System Facilities and Operations (Appendix A),
- Point Loma Ocean Outfall (Appendix B),
- Compliance with Water Contact Standards (Appendix C),
- Effluent Disinfection Evaluation (Appendix D),
- Benthic Sediments and Organisms (Appendix E),
- Bioaccumulation Assessment (Appendix F),
- Beneficial Use Assessment (Appendix G),
- Endangered Species (Appendix H),
- Proposed Monitoring Program (Appendix I),
- Source Control Program (Appendix K),
- Outfall Zone ROV Inspection (Appendix Q), and
- Analysis of Ammonia (Appendix R).

Several technical studies (and associated data) related to oceanography and outfall performance ere presented as part of the City's 1995 301(h) application. These studies remain valid, and for reference are again presented within this 2007 301(h) application. These studies include:

- Re-entrainment (presented in Appendix M),
- Oceanography (presented in Appendix N), and
- Initial Dilution Simulation Models (presented in Appendix O).

An additional 1995 study that assessed receiving water dissolved oxygen has been updated to incorporate recent data. This updated Dissolved Oxygen Demand study is presented as Appendix P. Two additional appendices present annual reports for calendar year 2006, including:

- Annual Biosolids Report (Appendix J), and
- Annual Pretreatment Program Report (Appendix L).

These technical studies are summarized and referenced within applicable sections of the Large Applicant Questionnaire.

Several of the Large Applicant Questionnaire sections involve items for which both of the following conditions are satisfied:

- no material change in facilities, operations, or oceanographic conditions have occurred since the City's prior 2001 waiver application, and
- the question at issue is not affected by the discharge improvements proposed within this request for renewal of NPDES permit CA0107409.

For questions satisfying the above conditions, applicable technical studies are summarized and referenced, and the reader is additionally referred to the appropriate detailed response presented within the City's prior 301(h) waiver applications.

Effluent and Receiving Water Data. Effluent and receiving water monitoring data required under the provisions of Monitoring and Reporting Program No. R9-2002-0025 (NPDES CA0107409) have been previously submitted by the City to the Regional Water Quality Control Board (Regional Board) in the form of monthly, quarterly, semiannual, and annual reports. These reports are incorporated by reference as part of this 301(h) application.

In accordance with an agreement between City staff and staff of EPA Region IX, to eliminate duplication and paper waste, effluent and receiving water data from these reports are not reprinted in their entirety herein. Instead, these data have been transmitted to EPA in electronic format. Additionally, the data are summarized and analyzed where appropriate within the Large Applicant Questionnaire and attached appendices.

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Section II.A

Large Applicant Questionnaire

II. GENERAL INFORMATION AND BASIC DATA REQUIREMENTS

II.A. *Treatment System Description*

II.A.1. On which of the following are you basing your application: a current discharge, improved discharge, or altered discharge, as defined in 40 CFR 125.58? [40 CFR 125.59(a).]

SUMMARY: This application is based on an "improved" discharge, as defined by 40 CFR 125.58(g).

Current, improved, and altered discharges are defined in 40 CFR 125.58(g) as follows:

> *Current discharge means the volume, composition, and location of an applicant's discharge as of anytime between December 27, 1977, and December 29, 1982, as designated by the applicant.*
>
> *Improved discharge means the volume, composition, and location of an applicant's discharge following:*
>
> *(1) Construction of planned outfall improvements, including, without limitation, outfall relocation, outfall repair, or diffuser modification; or*
>
> *(2) Construction of planned treatment system improvements to treatment levels or discharge characteristics; or*
>
> *(3) Implementation of a planned program to improve operation and maintenance of an existing treatment system or to eliminate or control the introduction of pollutants into the applicant's treatment works.*
>
> *Altered discharge means any discharge other than a current discharge or improved discharge.*

Past System Improvements. Significant improvements to the City's source control, wastewater treatment, solids handling, and recycled water facilities and operations have been implemented during the prior two NPDES permit periods.

Table II.A-1 (page II.A-2) summarizes overall improvements to the Point Loma discharge that occurred during the previous NPDES permit periods.

Table II.A-1
Basis for Application for Modification of Secondary Treatment Requirements
Key Metro System Improvements

Operations Category	Facilities or Operations Improvements		
	Completed During 1996-2002[1]	Completed During 2003-2007[2]	Proposed for Completion in 2007-2012[3]
Permitted hydraulic capacity increased at the Point Loma WTP to achieve 10.51 m^3/sec (240 mgd) average dry weather flow treatment capacity	●		
Improvements to Point Loma solids handling and digestion	●		
Solids handling facilities at Metro Biosolids Center (MBC) brought online	●		
Flows from Mexico reduced by implementation of International Boundary and Water Commission (IBWC) International Wastewater Treatment Plant (IWTP)	●		
North City Water Reclamation Plant (North City WRP) brought online	●		
Additional North City WRP recycled water users brought online	●	●[4]	●[4]
South Bay Water Reclamation Plant (South Bay WRP) brought online and discharge to South Bay Ocean Outfall initiated		●[5]	
Offsite distribution of South Bay WRP recycled water		●[6]	●[7]
Approval and Implementation of Urban Area Pretreatment Program	●		
Installation and implementation of prototype effluent disinfection facilities at the Point Loma WTP[8]			●[8]
Follow-up disinfection system studies[9]			●[9]

1 Completed during the effective period of Order No. 95-106, the original Point Loma 301(h) modified NPDES permit issued in 1995.
2 Completed during the effective period of Order No. R9-2002-0025.
3 Proposed for completion during the 5-year period of renewed 301(h) NPDES requirements.
4 The City of San Diego Water Department maintains ongoing programs (see page II.A-13) to market recycled water, retrofit sites, and bring additional recycled water users online within the distribution service area of the North City WRP.
5 The South Bay WRP discharge to the SBOO was initiated in May 2002.
6 Offsite distribution of South Bay WRP recycled water was initiated in the summer of 2006. Connection of the South Bay WRP distribution system to the Otay Water District recycled water distribution system was completed in May 2007.
7 The City of San Diego Water Department and Otay Water District (which receives and markets South Bay WRP recycled water) maintain ongoing programs to retrofit sites and bring additional recycled water users online within their respective recycled water service areas.
8 Prototype disinfection facilities have been installed at the Point Loma WTP to allow the discharge to comply with recreational body-contact bacteriological standards throughout the water column (ocean surface to ocean bottom) in all State-regulated waters (within three nautical miles of the coast). See Appendices A, C, and D for details. The City has submitted a formal request to the Regional Board (see Appendix U) to begin operation of this prototype disinfection system under the requirements of Order No. R9-2002-0025. Point Loma WTP effluent disinfection operations will be initiated immediately upon receipt of Regional Board approval (anticipated in early 2008).
9 Follow-up studies will be performed to determine if any modifications to the prototype disinfection facilities are required to improve the efficiency or cost-effectiveness of the disinfection operation.

As shown in Table II.A-1, key Metro System improvements achieved during the effective period of Order No. R9-2002-0025 included:

- bringing the South Bay Water Reclamation Plant (South Bay WRP) online and bringing recycled water users online within the South Bay WRP service area, and
- increasing recycled water use within the service area of the City's North City Water Reclamation Plant (North City WRP).

Metro System wastewater collection and treatment facilities are operated by the City of San Diego Metropolitan Wastewater Department. Recycled water produced at the North City WRP and South Bay WRP is purveyed by the City of San Diego Water Department. City-wide recycled water use totaled 10,870 acre-feet per year (AFY) in 2007. The Water Department projects City-wide recycled water use of approximately 13,600 AFY in year 2008 and approximately 14,700 AFY by year 2010. These projections are in keeping with the City's 2010 Long-Range Planning target of 15,000 acre-feet per year (AFY) of recycled water use. As documented in the response to Question II.A.2, the City is currently engaged in a number of ongoing efforts to market recycled water produced at the North City WRP and the South Bay WRP, including

- completing retrofits on "in fill" use sites,
- requiring recycled water use at newly developed sites,
- coordinating recycled water use expansion plans with existing institutional users,
- extending recycled water mains to new service zones, and
- purveying recycled water to adjoining agencies.

Overview of Proposed System Improvements. Existing facilities and proposed improvements (addressed in Question II.A.2) are summarized in Appendix A (Volume IV). Key proposed facilities improvements within 2008-2013 (the five-year effective period of the renewed NPDES permit) will include (1) initiating operation of prototype effluent disinfection facilities at the Point Loma WTP, and (2) completing studies to assess if refinement or modification of the prototype facilities/operations is warranted.

Effluent Disinfection. The 4.5-mile-long (7.2 km) Point Loma Ocean Outfall (PLOO) discharges beyond the three-mile-limit of State-regulated waters and is designed to minimize the potential for onshore transport of the discharged wastewater. A database of over 10,000 bacteriological samples from at or near the three-mile limit (see Appendix C) indicates that the PLOO discharge has achieved more than 99.5 percent compliance with recreational body-contact bacteriological standards (the same bacteriological standards that are applied to the Region's beaches) at all depths within three nautical miles (3.5 statute miles) of the coast. The few instances of outfall-related higher bacteriological concentrations detected at the three-mile limit occurred at the ocean bottom. The PLOO thus provides a high degree of protection to all ocean water beneficial uses.

The City has determined (see Appendix C), that a 2.1 (approximately 99 percent) removal of pathogen indicator organisms (fecal coliform, total coliform, and enterococcus) from the PLOO discharge would allow the outfall to comply with applicable recreational body-contact bacteriological standards at all water depths in all State-regulated waters. Initial disinfection studies (see Appendix D) indicate that this 2.1 log reduction in pathogen indicator organisms can be achieved by dosing the PLOO effluent to a 7 mg/l concentration of sodium hypochlorite. (Sodium hypochlorite is currently in use at the Point Loma WTP for odor control.) The disinfection studies also show that the 7 mg/l concentration of sodium hypochlorite will be consumed during ocean outfall transit prior to reaching the outfall diffuser, and will not lead to effluent toxicity or non-compliance with any Ocean Plan standards.

The City has submitted a request to the Regional Board to initiate operations of the prototype disinfection facilities under the requirements of Order No. R9-2002-0025 and addenda thereto. Operation of the prototype effluent disinfection facilities will be initiated upon the Regional Board's approval of this request.

Follow-Up Effluent Disinfection Studies. Effluent disinfection studies will follow implementation of the prototype effluent disinfection system. The studies will assess performance of the prototype disinfection facilities and identify any required improvements to disinfection facilities or operations that would provide for more efficient or cost-effective reduction of pathogen indicator organisms.

With these proposed additional Metro System improvements, the PLOO discharge may be categorized as an “improved discharge.”

In addition to implementing these planned Metro System facilities improvements, the City will endeavor to increase recycled water use within the service areas of the North City WRP and South Bay WRP.

No Proposed Changes or Concentration Standards or Increase in Mass Emissions Limits. As documented in this 301(h) application, the City has:

- constructed 1.97 m^3/sec (45 mgd) of recycled water treatment capacity and continues efforts to market recycled water within the Metro System service area,
- consistently achieved 58 percent or better removal of biochemical oxygen demand (BOD),
- consistently achieved 80 percent or better removal of total suspended solids (TSS), and
- achieved compliance (see Figure II.A-1 on page II.A-6 and Table II.A-2 below) with TSS mass emission limits that implement a reduction in permitted TSS mass emissions during the period of 301(h) modification.

As part of this 301(h) NPDES application, the City does not request any change in existing NPDES effluent concentration limitations established in Order No. R9-2002-0025. Additionally, as shown in Table II.A-2, the City does not propose any increase in mass emissions over and above the permitted mass emission limits established within Order No. R9-2002-0025. As shown below, proposed PLOO mass emission limits are in keeping with regulated MER limits established in the prior two 301(h) NPDES permits.

Table II.A-2
Comparison of Proposed TSS Mass Emission Rates with Prior Mass Emission Limits

Year of NPDES Permit	Total Suspended Solids (TSS) Mass Emission Rate (MER) (Metric tons per year)		
	Original TSS MER Established in Order No. 95-106[1,2]	Existing TSS MER Established in Order No. R9-2002-0025[1,3]	Proposed TSS MER for Renewal of NPDES CA0107409[1]
Year 1	15,000	15,000[4]	15,000
Year 2	15,000	15,000[4]	15,000
Year 3	15,000	15,000[4]	15,000
Year 4	15,000	15,000[4]	15,000
Year 5	13,600	13,599	13,598

1 Not to include solids contributions from (1) Tijuana, Mexico via the emergency connection, (2) federal facilities in excess of solids contributions received in calendar year 1995, (3) Metro System flows treated in the City of Escondido, (4) South Bay WRP flows discharged to the South Bay Ocean Outfall, and (5) emergency use of the Metro System by participating agencies over their capacity allotments.
2 Original Point Loma WTP 301(h) NPDES permit adopted in 1995. TSS mass emission limit of 15,000 mt/yr applied through December 31, 1999, and TSS mass emission limit of 13,600 mt/yr applied after January 1, 2000.
3 Mass emission limits within Order No. R9-2002-0025, as amended by State Water Resources Control Board Order No. WQO 2002-0013. TSS mass emission limit of 15,000 mt/yr applied through December 31, 2005, and TSS mass emission limit of 13,599 mt/yr applied after January 1, 2006.
4 The original version of Order No. R9-2002-0025 imposed a TSS MER limit of 13,995 mt/yr for years 1 through 4, but this was revised to 15,000 mt/yr by State Water Resources Control Board Order No. WQO 2002-0013.

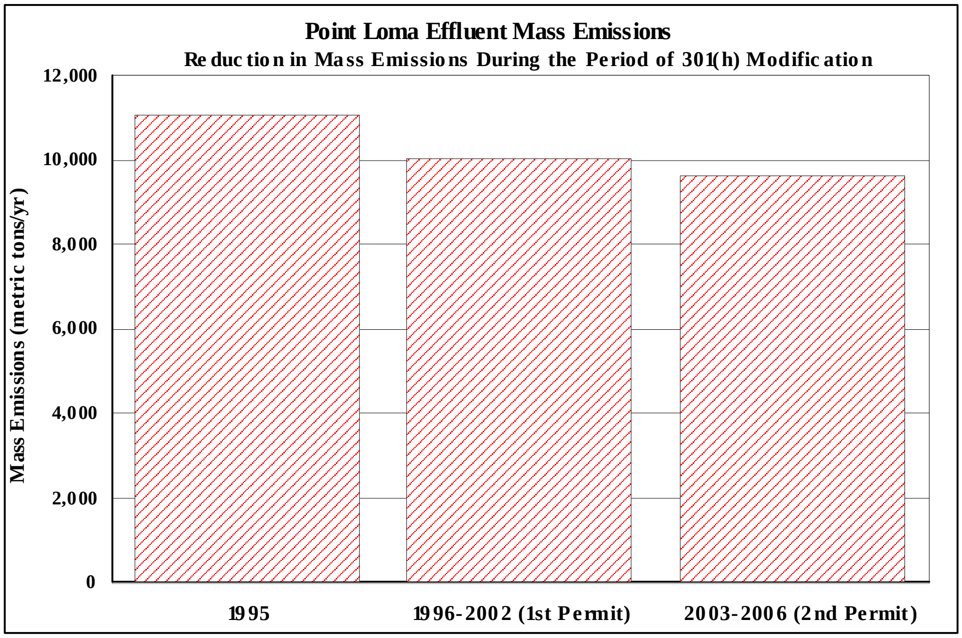

Figure II.A-1 Reduction in PLOO Effluent TSS Mass Emissions During Period of 301(h) Modifications

As documented in this 301(h) application, continuation of TSS mass emission rates established in Order No. 95-106 (see Table II.A-2 on page II.A-5) is not projected to result in degradation of waters off the coast of Point Loma. Principal reasons for this include:

- **Toxics Control.** The City proposes to maintain existing concentration requirements for toxic compounds. During the past 20 years the City has achieved significant reduction in mass emissions of toxic constituents in both the Point Loma WTP influent and effluent.

- **Consistent Solids Removal.** Advanced primary treatment operations at the Point Loma WTP have achieved consistent solids removal. Additionally, system-wide solids removal rates have been improved slightly over rates achieved during the prior NPDES period. During 2006, for example, Point Loma WTP effluent TSS concentrations averaged 35 mg/l (the secondary treatment standard is 30 mg/l), and settleable solids averaged 0.4 milliliters per liter (ml/l. In addition to resulting in reduced TSS mass emissions, the achieved TSS removal lessens the degree of particle settling in the ocean environment.

- **Biological Uptake.** Approximately 71 percent of the discharged solids are organic. As discussed in the response to Questionnaire Section III.A.5 (see page III.A-20), approximately 50 percent of the organic portion of the discharge is eliminated through biological uptake/decay within one week of discharge. A total of 99.8 percent of the discharged organics are eliminated through biological uptake/decay within two months.

- **Effectiveness of PLOO**. PLOO provides a high degree of initial dilution. As assigned within Order No. R9-2002-0025, the PLOO provides a Aminimum month≅ regulatory initial dilution of 204 to 1, and a median initial dilution of 338 to 1. Additionally, the PLOO discharge is to deep waters; PLOO discharges at a 95 meter (310 foot) depth - a depth significantly below the euphotic zone.

- **Prevention of Discernible Solids Deposition.** As discussed in response to Questionnaire Section III.A herein, the outfall diffuser is located near the edge of the mainland shelf, and significantly deeper waters exist immediately offshore from the diffuser. Further, an erosional environment exists at the outfall diffuser zone (see ocean floor photos in Appendix Q) that prevents accumulation of solids on the ocean bottom. Non-organic solids that are not consumed are carried off and dispersed into these deeper waters.

II.A.2. Description of the treatment/outfall system [40 CFR 125.61(a) and 125.61(e)]

a. Provide detailed descriptions and diagrams of the treatment system and outfall configuration which you propose to satisfy the requirements of 40 CFR part 125, subpart G. What is the total discharge design flow upon which this application is based?

SUMMARY: This application is based on an annual average flow of 10.5 m^3/sec (240 mgd) through the 7,148-meter-long (23,472-foot-long) PLOO. Discharged wastewaters undergo chemically assisted primary treatment. Detailed descriptions of existing Metro System treatment, solids handling, wastewater conveyance, and ocean discharge facilities are presented in Appendix A (Volume IV). Appendix A also presents facilities improvements proposed within the next five-year period. A brief summary of these existing and proposed facilities is presented below.

System Overview - Existing System

Figure II.A-2 (page II.A-9) presents a schematic of existing Metro System treatment and solids handling facilities. As shown in the figure, existing Metro System wastewater treatment facilities include the:

- E.W. Blom Point Loma Wastewater Treatment Plant (Point Loma WTP),
- North City Water Reclamation Plant (North City WRP), and
- South Bay Water Reclamation Plant (South Bay WRP).

Waste solids from the South Bay WRP are conveyed to the Point Loma WTP for treatment. Waste solids from the Point Loma WTP and North City WRP are conveyed to the Metro Biosolids Center (MBC) for dewatering and disposal.

Figure II.A-3 (page II.A-10) presents the location of key Metro System facilities. Appendix A (Volume IV) presents detailed descriptions of Metro System collection, treatment, solids handling, and ocean disposal facilities. Brief descriptions of current Metro System facilities and operations are presented in the following sections.

Pump Station No. 2. Pump Station No. 2 is the largest and most important pump station within the Metro System. Virtually all wastewater delivered to the Point Loma WTP is pumped through Pump Station No. 2. In addition to pumping wastewater, Pump Station No. 2 provides chemical addition (ferric chloride) and coarse screening for all effluent directed to the Point Loma WTP.

Point Loma WTP. The 10.5 m^3/sec (240 mgd average daily flow) Point Loma WTP is the terminal treatment facility that discharges to PLOO. The Point Loma WTP receives a blend of secondary treated effluent from North City WRP, return solids from the South Bay WRP, and untreated sewage from all other parts of the Metro System. Appendix A (Volume IV) presents a detailed description of the Point Loma WTP, along with unit process design criteria. Unit processes at the Point Loma WTP include:

- preliminary treatment with 15-millimeter mesh mechanical bar screens (5 units),
- ferric chloride addition at the Parshall flumes (see Appendix A for a complete list of Metro System chemical use, application points, typical dose rates, and purposes),
- aerated grit removal (6 units),
- chemical addition (anionic synthetic polymer) at the sedimentation basin entrances,
- sedimentation basins (12 units), and
- outfall conveyance facilities which allow Point Loma WTP effluent to be discharged to PLOO through (1) a direct connection with the sedimentation basins, (2) a throttling valve which regulates water surface levels in the outfall diversion structure, or (3) a bypass valve which can divert treated effluent to the outfall via a vortex structure.

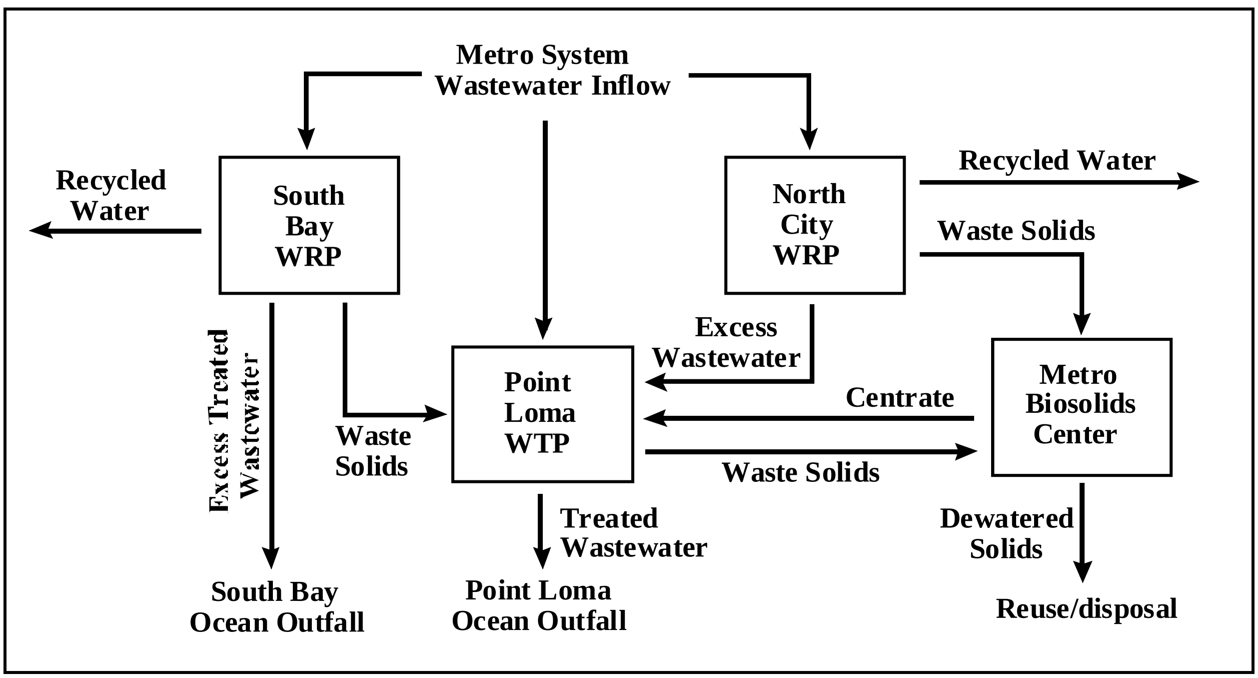

Figure II.A-2 - Schematic of Metro System Operations

Figure II.A-3
Location of
Metro System Facilities

The Point Loma WTP provides onsite digestion of waste solids from the sedimentation basins with six anaerobic digesters. Biogas produced by the digesters is used for fueling an onsite cogeneration facility, which serves onsite power needs (excess power produced by the cogeneration facility is sold to SDG&E to help meet regional power demands). Digested solids from the digesters are pumped to the MBC for dewatering and disposal.

Metro Biosolids Center. MBC processes digested waste solids from the Point Loma WTP and raw waste solids from North City WRP. Appendix A (Volume IV) presents a detailed description of MBC solids processing. Appendix A also presents design criteria for MBC facilities, presents schematics of MBC processes, and presents a layout of the facilities at MBC. Raw solids from the North City WRP are stabilized through the following unit processes:

- raw solids receiving tanks (2 units),
- sludge degritting (3 units),
- thickening centrifuges (5 units),
- sludge screens,
- thickened sludge blending tanks (2 units), and
- anaerobic digesters (3 units).

Digested North City WRP solids are then blended with digested solids from the Point Loma WTP and dewatered using the following unit processes:

- digested solids storage tanks (2 units),
- dewatering centrifuges (8 units),
- dewatered biosolids storage silos (8 units), and
- truck loading facilities (2 bays).

Dewatered solids are beneficially used as an alternate daily cover at a landfill or used as a soil amendment. Appendix J (Volume VI) presents the City's 2006 Annual Sludge Disposal Report.

Ocean Outfall (PLOO). A detailed description of PLOO is presented in Appendix B (Volume IV). No changes in the physical structure of PLOO have occurred during the past five years, and no changes are proposed during the next five years.

Recycled Water Treatment. Two recycled water tertiary treatment facilities exist upstream from the Point Loma WTP. The 1.31 m^3/sec (30 mgd) North City WRP collects and treats wastewater from a service area that includes Del Mar, La Jolla Valley, Mira Mesa, Peñasquitos, Poway, and Sorrento Valley. The 0.66 m^3/sec (15 mgd) South Bay WRP collects and treats wastewater from a service area that includes portions of Chula Vista and the South Bay portion of San Diego.

As described in Appendix A, the North City WRP serves two purposes. First, the plant produces tertiary-treated recycled water for delivery to customers in the North City region. Second, the North City WRP contributes to Metro System TSS and BOD removal, providing relief to the downstream Point Loma WTP. North City WRP wastewater flows in excess of recycled water demands receive secondary treatment; secondary treated effluent is returned to the sewer for conveyance to the Point Loma WTP. North City WRP waste solids are directed to the MBC for digestion and dewatering.

The South Bay WRP also serves two purposes. In addition to producing tertiary-treated recycled water for delivery to customers in the South Bay Region, the South Bay WRP provides hydraulic capacity relief to Metro System wastewater collection facilities and the Point Loma WTP. South Bay WTP wastewater flows in excess of recycled water demands receive secondary treatment and are discharged to the South Bay Ocean Outfall (SBOO). The South Bay WRP secondary effluent discharge to the SBOO is regulated by Regional Board Order No. R9-2006-0067 (NPDES CA0109045).

Waste solids from the South Bay WRP are discharged to the sewer system for transport to the Point Loma WTP for treatment and removal.

Recycled Water Use. The City's recycled water operations are regulated by the following water reclamation requirements established by the Regional Board:

- Order No. 97-03 and addenda thereto for the 30 mgd North City WRP, and
- Order No. 2000-203 for the 15 mgd South Bay WRP.

Irrigation comprises more than 95 percent of recycled water demand from the North City WRP and South Bay WRP. Recycled water irrigation demands are highly seasonal. Peak summer irrigation demands are approximately double the average annual demand.

Use of North City WRP and South Bay WRP recycled water is increasing. Recycled water demands during Fiscal Year 2008 are projected to be approximately 66 percent greater than in Fiscal Year 2007. Much of this increased recycled water use is due to new online recycled water wholesale users, including the Olivenhain Municipal Water District that receives North

City WRP recycled water and Otay Water District that receives South Bay WRP recycled water. The City of San Diego's retail customer base is also trending higher with a 90 percent annual increase of new customer meter connections since 2005. A total of 18 meters were installed in 2005, 26 meters in 2006 and 34 were installed in 2007.

North City WRP Recycled Water Use. The North City WRP presently serves over 420 recycled meters, plus two wholesale connections with the City of Poway and the Olivenhain Water District. The 2007 top North City WRP recycled water consumers included:

- MBC (781 AFY),
- the City of San Diego Park & Recreation Department - parkland and open space (627 AFY),
- Santaluz residential development (490 AFY),
- U.S. Marine Corp Air Station Miramar (293 AFY),
- Caltrans (177 AFY),
- The University of California at San Diego (146 AFY), and
- the City of San Diego Environmental Services Department Landfill (98 AFY)

North City WRP currently treats 22.5 MGD of wastewater to a secondary level, 75 percent of the plant's 30 mgd capacity. During 2007, approximately 6600 AFY of recycled water was beneficially used. North City WRP recycled water use in 2008 is projected at 7210 AFY. The City is continuing ongoing efforts to market recycled water to "in-fill" customers (users within the existing North City WRP service area) continues.

The City is also coordinating with key institutional users of North City WRP recycled water. The City is working with the U.S. Marine Corps Air Station Miramar on expansion of their recycled water irrigation system to serve other areas of the base; the additional service is expected to add another 126 AFY of beneficial reuse. Recycled water use is also being expanded at the University of California at San Diego. Additional ongoing efforts are aimed toward completing city property retrofits and small pipeline extensions to reach new customers. Currently, the City's Park and Recreation has nineteen recycled water meter connections, with three more parks and a maintenance assessment district expected to come on-line in 2008 with a total estimated demand of over 74 AFY. Over the next three years recycled water retrofits of parklands and open space as well as related pipeline extension projects are planned with a total estimated demand of 203 AFY.

Planned capital improvement projects within the next three to five years will extend the North City WRP recycled water service area. The Carmel Valley and Los Peñasquitos Recycled Water Pipelines are projected to serve approximately 1010 AFY of recycled water by year 2015. Further, by 2009 the City is scheduled to complete a pipeline extension to serve up to 500 AFY of recycled water to a mining and aggregate processing facility.

South Bay WRP Recycled Water Use. The South Bay WRP began service to its first retail customer, International Boundary & Water Commission, in the summer of 2006. Service to the first wholesale customer, Otay Water District, commenced in May of 2007. Otay Water District provides service to over 600 retail recycled water meters. Additionally, the City has reserved a capacity of 1 mgd in Otay's transmission may to serve customers within the City of San Diego (including CALTRANS, which has an ultimate demand of approximately 730 AFY).

While the design capacity of the South Bay WRP is 15 mgd, wastewater flows into the plant currently average approximately 9 mgd. During peak summer months, nearly all of the available South Bay WRP inflows are used for recycled water production. On an annual basis, use of South Bay WRP recycled water totaled 4270 AFY in 2007 and is projected to increase to 6370 AFY in 2008.

Secondary Treatment Studies. As noted, this 301(h) application is based on maintaining advanced primary treatment at the Point Loma WTP. While this application proposes continuation of advanced primary treatment at the Point Loma WTP, the City has performed feasibility and pilot plant studies to assess means of achieving compliance with secondary treatment standards at the Point Loma WTP. In 2005, the City completed an assessment entitled: *Biological Aerated Filter Pilot Study Report* (Brown and Caldwell and City of San Diego, June 2005). The study assessed the biological aerated filter (BAF) process as a potential means of providing space-effective secondary treatment at the Point Loma WTP, and concluded that BAF technology is capable of polishing advanced primary effluent sufficiently to comply with federal secondary treatment standards for TSS and CBOD (carbonaceous BOD) under both wet weather and dry weather conditions.

While BAF technology could polish the Point Loma WTP effluent so as to comply with secondary treatment standards, Point Loma WTP effluent concentrations for TSS (which averaged approximately 35 mg/l during 2006) are close to the secondary treatment TSS concentration standard of 30 mg/l. As documented within this 301(h) application, implementation of secondary treatment at the Point Loma WTP would not result in any discernible improvement in receiving water quality in or near the PLOO discharge zone. On the other hand, a number of environmental impacts (e.g. solids production, energy consumption and power needs, "carbon footprint") are associated with conversion of the Point Loma WTP.

As a result of the lack of receiving water benefits and the cost and environmental impacts associated with converting the plant to secondary treatment, the City does not have any current plans to incorporate BAF technology at the Point Loma WTP. The City also does not have any current plans to further quantify environmental consequences (e.g. increased power consumption, carbon emissions, chemical use, traffic) associated with implementing BAF at the Point Loma WTP.

Proposed Facilities Improvements

As detailed in the response to Questionnaire Section II.A.1, prototype disinfection facilities have been installed at the Point Loma WTP, and the City has requested Regional Board approval to initiate disinfection treatment within the provisions of Order No. R9-2002-0025. The City will initiate operation of the prototype disinfection facilities upon receipt of Regional Board approval. The disinfection facilities will achieve a minimum 2.1 logarithm reduction in Point Loma WTP effluent pathogen indicator organisms. Appendix A presents a description of the disinfection facilities and operations.

b. Provide a map showing the geographic location of the proposed outfall(s) (i.e. discharge). What is the latitude and longitude of the proposed outfall(s)?

Appendix B (Volume IV) presents a detailed description of the PLOO. Figure II.A-4 (page II.A-17) presents the location of the PLOO discharge in plan view. Figure II.A-5 (page A-18) presents a profile view of the PLOO.

As shown in Figure II.A-4, the 7,154-meter-long (23,472 feet) PLOO extends to near the edge of the mainland shelf. (Off the coast of Point Loma, the edge of the shelf is located at approximately the 110-120 meter contour; beyond the edge of the shelf the slope of the ocean bottom steepens significantly.)

The outfall discharges at a depth of approximately 95 meters (310 feet). The outfall features a "Y"-shaped diffuser. The center of the "Y" diffuser is located at:

- north latitude 32 degrees, 39 minutes, 55 seconds, and
- longitude 117 degrees west, 19 minutes, 25 seconds.

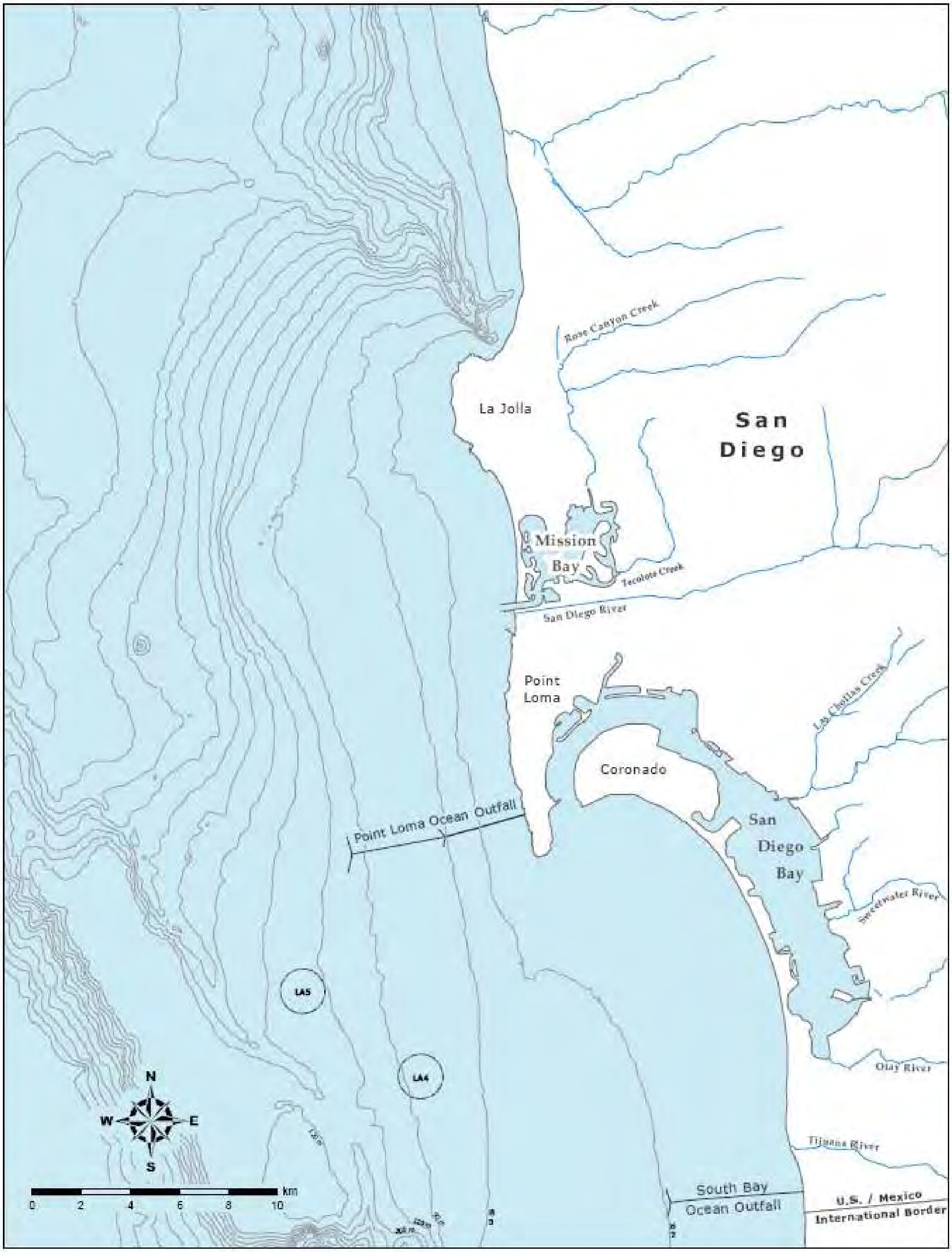

Figure II.A-4 Location of Point Loma Ocean Outfall

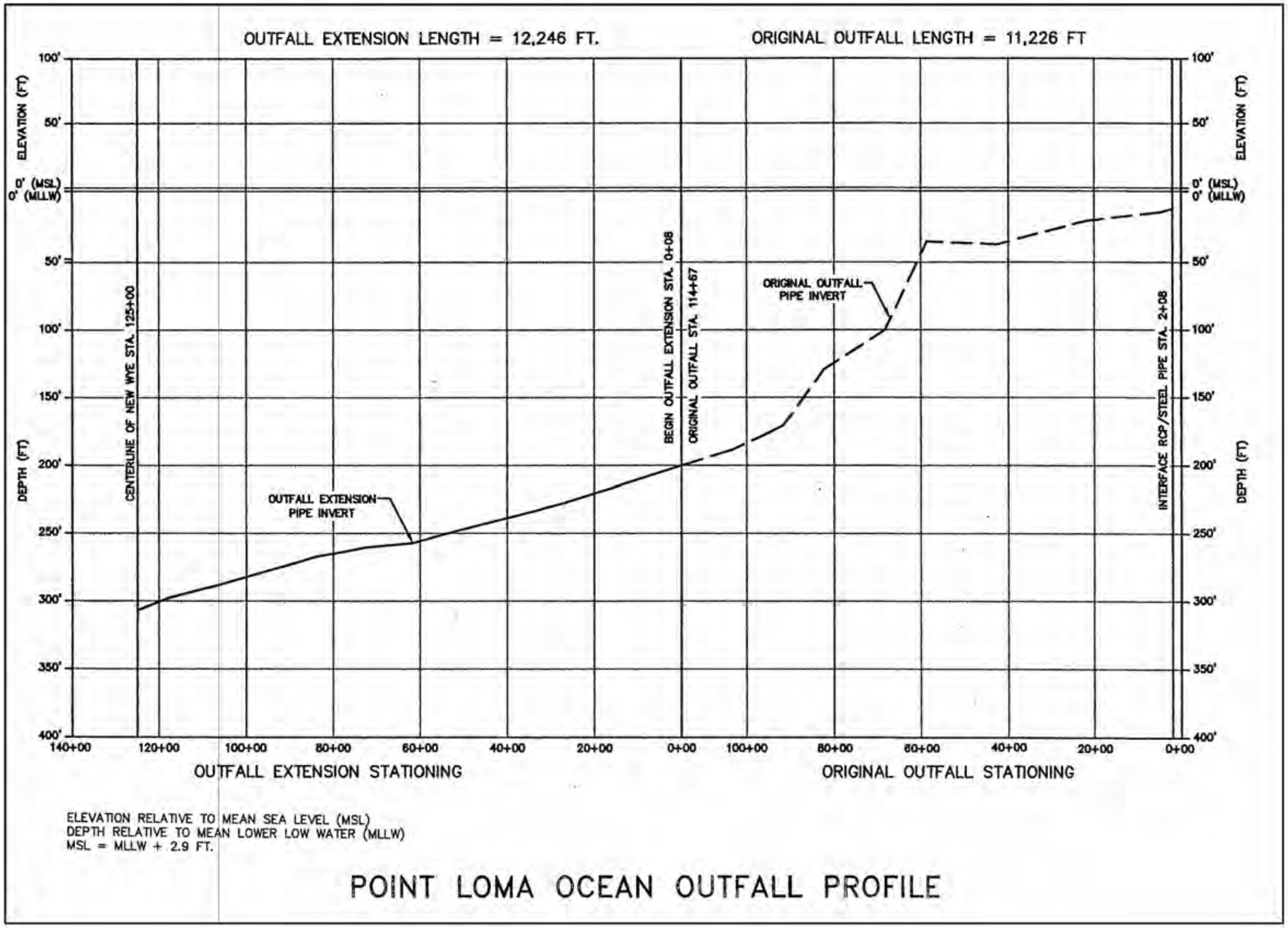

Figure II.A-5 Point Loma Ocean Outfall Profile

c. For a modification based on an improved or altered discharge, provide a description and diagram of your current treatment system and outfall configuration. Include the current outfall latitude and longitude, if different from the proposed outfall.

Descriptions and diagrams of the current and proposed wastewater treatment and solids handling facilities and operations are provided in the response to Question II.A.2 (a) above and in Appendix A (Volume IV of this application).

A description of outfall facilities (including diagrams) is presented in Appendix B. A diagram of the current outfall, including latitude and longitude, is also presented in the response to Question II.A.2(b) above. As noted, no changes in outfall facilities or operations are proposed during the 5-year NPDES permit.

II.A.3. Primary or Equivalent Treatment Requirements [40 CFR 125.60]

a. Provide data to demonstrate that your effluent meets at least primary or equivalent treatment requirements as defined in 40 CFR 125.58 (r).

SUMMARY: The Point Loma WTP achieves a degree of treatment significantly in excess of the primary treatment requirements defined in 40 CFR 1256.58(r).

CFR Title 40, Part 125 requires 301(h) applicants to maintain a minimum of primary treatment and achieve 30 percent or more removal of suspended solids and biochemical oxygen demand (BOD). Chemically-assisted primary sedimentation at the Point Loma WTP provides a degree of treatment significantly greater than the 30 percent removal requirement.

Existing Facilities Performance. Effluent data for calendar years 2002 through 2006 have been previously submitted to the Regional Board in monthly, quarterly, semiannual, and annual monitoring reports. The data have also been electronically transmitted to EPA.

Table II.A-3 (page II.A-21) summarizes TSS removal by month during 2002-2006. Solids removal rates presented in Table II.A-3 are computed as part of monitoring required by the City's existing NPDES permit (NPDES CA0107409, Regional Board Order No. R9-2002-0025). In accordance with reporting procedures required in the City's effluent monitoring program, the solids removal rates presented in Table II.A-3 are computed on a system-wide basis, so as to avoid "double counting" of waste flow returns to the Point Loma WTP influent from the MBC solids processing facilities, the North City WRP, and the South Bay WRP.

As shown in Table II.A-3, monthly TSS percent removal rates during 2002-2006 ranged from 83 to 90 percent. During 2006, TSS percent removal averaged 88 percent, and was at 85 percent or greater each month during the year.

Table II.A-3
System-Wide TSS Removal, 2002-2006

Month	System-Wide TSS Percent Removal[1]				
	2002	2003	2004	2005	2006
Jan	86	87	84	85	87
Feb	83	86	86	85	88
Mar	86	86	86	86	87
Apr	86	86	86	86	86
May	86	85	86	86	87
Jun	85	86	86	84	88
Jul	83	86	86	84	85
Aug	85	87	86	87	87
Sep	88	87	86	87	90
Oct	87	85	87	85	90
Nov	86	85	86	87	89
Dec	86	86	86	88	87
Annual Average	86	86	86	86	88
Maximum Month	88	87	87	88	90
Minimum Month	83	85	84	84	85

1 TSS percent removal computed on a system-wide basis. Data from PLOO annual monitoring reports submitted to the Regional Board for 2002-2006.

Table II.A-4 (page II.A-22) summarizes BOD percent removals during 2002-2006 for the PLOO discharge. Per requirements in Order No. R9-2002-0025, BOD removal is computed on a "system-wide" basis to avoid double-counting of returned solids streams. As shown in Table II.A-4, monthly BOD percent removal rates during 2002-2006 ranged from 59 percent to 71 percent. During 2006, BOD removal averaged 65 percent. The minimum monthly BOD removal during 2006 was 60 percent.

BOD and TSS removal at the Point Loma WTP thus greatly exceed the minimum 30 percent removal requirements established in 40 CFR 125.58 (r).

Table II.A-4
System-Wide BOD Removal, 2002-2006

Month	System-Wide BOD_5 Percent Removal[1]				
	2002	2003	2004	2005	2006
Jan	65	67	62	62	65
Feb	61	65	64	62	66
Mar	67	63	62	60	63
Apr	66	61	64	61	63
May	69	61	65	60	64
Jun	70	61	64	59	62
Jul	68	62	63	60	60
Aug	69	64	60	62	64
Sep	71	66	61	63	67
Oct	68	65	66	60	69
Nov	65	67	63	63	67
Dec	68	66	62	63	66
Annual Average	67	64	63	61	65
Maximum Month	71	67	66	63	69
Minimum Month	61	61	60	59	60

1 BOD percent removal computed on a system-wide basis. Data from PLOO annual monitoring reports submitted to the Regional Board for 2002-2006.

b. If your effluent does not meet primary or equivalent treatment requirements, when do you plan to meet them? Provide a detailed schedule, including design, construction, start-up and full operation, with your application. This requirement must be met by the effective date of the new Section 301(h) modified permit.

The question is not applicable. As demonstrated in II.A.3(a), the Point Loma WTP provides a degree of treatment superior to that required in 40 CFR 125.58(r).

II.A.4. Effluent Limitations and Characteristics [40 CFR 125.60(b) and 125.61(e)(2)]

a. Identify the final effluent limitations for five-day biochemical oxygen demand (BOD_5), suspended solids, and pH upon which your application for a modification is based:

- **BOD_5 (mg/P)**
- **Suspended solids (mg/P)**
- **pH (range)**

SUMMARY: This application is based on the following:

1. *A minimum of 80 percent removal of total suspended solids, computed as a monthly average on a system-wide basis,,*
2. *A minimum of 58 percent removal of BOD, computed as an annual average on a system-wide basis, and*
3. *A pH requirements of 6 -9 pH units at all times.*

Proposed BOD Removal, TSS Removal, and pH Limits. Table II.A-5 (page II.A-25) presents the BOD, suspended solids, and pH requirements on which this application is based. In accordance with State of California *Water Quality Control Plan for Ocean Waters* (Ocean Plan) and requirements set forth in Section 301(h) of the Clean Water Act, proposed BOD requirements are expressed in terms of percent removal and TSS requirements are expressed in terms of percent removal and maximum month concentration.

Per requirements of Order No. R9-2002-0025, the City computes percent BOD and TSS removal rates on a "system-wide" basis to avoid double-counting of return solids and centrate streams. This application does not propose any change in the percent removal computational procedures set forth in Order No. R9-2002-0025.

Table II.A-6 (page II.A-25) compares the requirements on which this application is based with applicable state and federal regulations. As shown in the table, the proposed requirements are in accordance with the Ocean Plan and provisions of 40 CFR 124.60.

Table II.A-5
Proposed BOD, Suspended Solids, and pH Limitations
City of San Diego Point Loma Ocean Discharge

Parameter	Mean Annual Percent Removal	Mean Monthly Percent Removal	Mean Annual Effluent Concentration	Monthly Average Effluent Concentration	Maximum Day Effluent Concentration
Total Suspended Solids	No Requirement	80%[1]	No Requirement	75 mg/l	No Requirement
5-Day Biochemical Oxygen Demand	58%[1]	No Requirement	No Requirement	No Requirement	No Requirement
pH	No Requirement	No Requirement	6 - 9 Units[2]	6 - 9 Units[2]	6 - 9 Units[2]

1 To be computed on a system-wide basis in accordance with procedures established in Order No. R9-2002-0025.
2 Effluent pH to be maintained between 6.0 and 9.0 pH units at all times.

Table II.A-6
Comparison of Proposed Modified Requirements
With Applicable State and Federal Limitations

Requirement	BOD Removal	Suspended Solids Removal	pH Limitation
Requirement on Which this Application is Based	58% Removal[1]	80% Removal[2]	6 - 9 pH Units[7]
Current Requirement of Order No. R9-2002-0025 (NPDES CA0107409)	58% Removal[1]	80% Removal[2]	6 - 9 pH Units[7]
Requirement in State of California Ocean Plan[3]	Receiving Water Requirements Only[4]	75% Removal[5]	6 - 9 pH Units[7]
Requirement in 40 CFR 125.60[6]	30% Removal[6]	30% Removal[6]	6 - 9 pH Units[7]

1 Annual average value to be computed on a system-wide basis in accordance with procedures established in Order No. R9-2002-0025.
2 Monthly average value to be computed on a system-wide basis in accordance with procedures established in Order No. R9-2002-0025.
3 From the 2005 State of California Ocean Plan. (See Appendix T, Volume VIII.)
4 The Ocean Plan does not establish a percent removal BOD requirement or a BOD effluent concentration limit. In lieu of establishing effluent BOD requirements, the Ocean Plan regulates the discharge of oxygen-demanding wastes through establishing BOD-related receiving water requirements, including dissolved oxygen, light transmittance, and biostimulation.
5 Ocean Plan TSS removal limit is computed as 30-day average. In addition, the Ocean Plan establishes receiving water requirements to prevent the discharge of suspended solids from impacting beneficial uses of marine waters.
6 Primary treatment or equivalent regulations promulgated in 40 CFR 125.58 and 125.60 per Sections 301(h) and 303 of the Clean Water Act.
7 Effluent pH to be maintained between 6.0 and 9.0 pH units at all times

b. Provide data on the following effluent characteristics for your current discharge as well as for the modified discharge if different from the current discharge:

Flow (m^3/sec):

- **minimum**
- **average dry weather**
- **average wet weather**
- **maximum**
- **annual average**

BOD_5 for the following plant flows:

- **minimum**
- **average dry weather**
- **average wet weather**
- **maximum**
- **annual average**

Suspended Solids for the following plant flows:

- **minimum**
- **average dry weather**
- **average wet weather**
- **maximum**
- **annual average**

Toxic Pollutants and pesticides (μg/l)

Dissolved Oxygen (prior to chlorination) for the following plant flows:

- **minimum**
- **average dry weather**
- **average wet weather**
- **maximum**
- **annual average**

Immediate dissolved oxygen demand

PLOO effluent data have been submitted to the Regional Board in monthly, quarterly, semiannual, and annual reports. Through agreement with EPA, these data are not reproduced in their entirety herein, but the data have been electronically transferred to EPA. The following section presents a brief summary of effluent flow, BOD, suspended solids, toxic pollutants, and dissolved oxygen data for the current PLOO discharge.

Flow, BOD, and Suspended Solids in Current Discharge. Table II.A-7 (page II.A-27) summarizes wastewater flow, effluent BOD concentrations, effluent total suspended solids concentrations, and effluent dissolved oxygen for the current discharge, as reflected in average daily values for calendar year 2006 (the last year for which a full twelve months of data are available).

During calendar year 2006, precipitation at the Point Loma WTP was 15.65 centimeters (6.16 inches) - a total approximately two-thirds of the long-term average precipitation at Point Loma. Wet weather averages for 2006 have been determined using the arithmetic average of data for days on which recorded precipitation occurred at the Point Loma WTP. (Table III.H-3 on page III.H-8 presents precipitation days at the Point Loma WTP.)

As shown in Table II.A-7, the highest recorded average daily flow at the Point Loma WTP was 9.83 m^3/sec (224 mgd), which occurred on April 5, 2006.

Table II.A-7
Point Loma WTP Effluent Flows and Quality
Current Discharge - Calendar Year 2006

Condition	Parameter	Flow		Effluent pH	Effluent BOD (mg/l)	Effluent Total Suspended Solids (mg/l)	Effluent Dissolved Oxygen[1] (mg/l)
		m^3/sec	mgd				
All Days[2]	Average Value	7.44	170	7.21	102	35	1.5
	Maximum Value[5]	9.83[7]	224[7]	7.72	137	55	3.5
	Minimum Value[6]	6.28	143	6.88	72	22	0.06
Dry Weather[3]	Average Value	7.39	169	7.21	102	35	1.5
	Maximum Value[5]	8.16	186	7.72	137	55	NA
	Minimum Value[5]	6.28	143	6.88	72	22	NA
Wet Weather[4]	Average Value	7.67	175	7.21	103	36	0.5
	Maximum Value[5]	9.83[7]	224[7]	7.54	125	47	NA
	Minimum Value[6]	6.95	159	6.93	83	25	NA

1 The Point Loma WTP effluent is no longer evaluated for dissolved oxygen. The listed dissolved oxygen concentrations represented recorded values during August 1992 through July 1993, the last 12 month period during which the Point Loma WTP effluent was routinely sampled for dissolved oxygen.
2 Average values for all days during calendar year 2006.
3 Based on observed daily Point Loma WTP flows and water quality during days when no rainfall was recorded during 2006. See Table III.H-3 on page III.H-8 for wet weather days during 2006 at the Point Loma WTP.
4 Based on observed daily Point Loma WTP flows and water quality during days when rainfall was recorded during 2006.
5 Maximum daily value recorded during calendar year 2006. The maximum flow, pH, BOD, and TSS values did not occur on the same day.
6 Minimum daily value recorded in calendar year 2006. The minimum flow, pH, BOD, and TSS values did not occur on the same day.
7 The listed maximum wet weather flow is the highest recorded daily wet weather flow at the Point Loma WTP during 2006. The recorded flow occurred on April 5, 2006. Minimum and maximum values for pH, BOD, and TSS did not occur on the same day as either the minimum or maximum flows.

Table II.A-8 presents a month by month breakdown of effluent flow, pH, TSS, and BOD for calendar year 2006. Only slight seasonal variation occurs in Point Loma WTP flows and water quality.

Table II.A-8
2006 Point Loma WTP Flows and Water Quality by Month[1]

Month	Flow		Effluent pH Units	Effluent BOD (mg/P)	Effluent TSS (mg/P)
	m^3/sec	mgd			
Jan	7.7	176	7.34	98	36
Feb	7.6	172.6	7.33	101	37
Mar	7.9	179.9	7.40	102	37
Apr	7.8	178	7.31	105	38
May	7.5	170.9	7.30	105	35
Jun	7.5	170.2	7.43	108	34
Jul	7.5	170.6	7.31	112	37
Aug	7.4	168.4	7.35	102	37
Sep	7.2	164.2	7.34	98	31
Oct	7.2	163.4	7.24	92	32
Nov	7.1	162.7	7.18	97	34
Dec	7.1	162.4	7.24	100	32
Average	7.44	170	7.21	102	35

1 Monthly values from *City of San Diego Point Loma Ocean Outfall Annual Monitoring Report, 2006.*

Flow, BOD, and Suspended Solids for Improved Discharge. Appendix A (Volume IV of this application) presents detailed descriptions of facilities improvements proposed as part of the improved discharge. Key improvements include implementation of effluent disinfection at the Point Loma WTP to achieve a minimum 2.1 logarithm reduction in effluent pathogen indicator organisms.

Table II.A-9 (page II.A-29) summarizes the discharge improvements proposed under this application. As shown in Table II.A-9, the discharge improvements are not projected to have an effect on Point Loma WTP BOD or TSS concentrations. As a result, Point Loma WTP effluent concentration values for 2006 are projected to be representative of future effluent quality upon implementation of the improvements.

Table II.A-9
Summary of Projected Effects
Proposed Improved Point Loma WTP Discharge

Proposed Improvement	Projected Year of Implementation	Projected Effect on Point Loma WTP Effluent Quality
Effluent chlorination using sodium hypochlorite	2007	No effect on Point Loma effluent BOD, TSS, or other physical/chemical parameters. Effluent disinfection presents the potential for the formation of chlorination byproducts, but effluent disinfection studies (see Appendix D) have concluded that the chlorination dose rates will not adversely affect effluent toxicity or cause noncompliance with Ocean Plan receiving water standards for chlorinated byproducts.

Toxic Inorganic Compounds. Table II.A-10 (page II.A-30) summarizes concentrations of toxic organic constituents in the Point Loma WTP effluent during 2006 under average, wet weather, and dry weather conditions. Table II.A-10 also presents maximum monthly average concentrations of toxic inorganic constituents reported by the City during 2006.

Table II.A-11 (page II.A-31) presents a percentile breakdown of all individual sample values during the five year period 2002-2006. As shown by comparing Tables II.A-10 with II.A-11, the mean year 2006 concentration values are consistent with median concentration values for 2002-2006. Year 2006 values are thus representative of long-term Point Loma WTP water quality.

As shown in Table II.A-11, significant differences exist between the maximum (100th percentile) and 90th percentile concentration values for several toxic inorganic constituents. Such occurrences are indicative of isolated "outlayer" values that occurred at some point during the five-year period for some of the toxic inorganic constituents. (For example, the highest observed molybdenum concentration during 2002-1006 was 164 µg/l, while all other molybdenum samples during 2002-2006 had concentrations of 20 µg/l or less.)

Table II.A-10
Summary of Point Loma Effluent Quality for Calendar Year 2006
Toxic Inorganic Constituents

Toxic Inorganic Constituent	Number of Samples	Concentration in µg/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
aluminum	44	0.7	1060	61	50	0.83	0.73
antimony	44	< 0.7	2.8	ND[7]	2.9	0.83	0.75
arsenic	44	< 0.6	0.88	ND[7]	0.4	0.65	< 0.52
barium	44	36	73	21	20	32	33
beryllium	44	< 0.02	.024	ND[7]	0.4	< 0.02	< 0.02
cadmium	44	< 0.12	0.44	ND[7]	0.53	< 0.14	< 0.14
chromium	44	< 1.8	6.2	ND[7]	1.2	1.9	< 1.8
cobalt	44	< 0.9	2.4	ND[7]	0.16	1.0	< 0.8
copper	44	22	42	11	0.63	24	20
lead	44	< 1.2	5.3	ND[7]	2.0	< 1.5	< 1.0
lithium	44	38	45	30	1.0	37	37
mercury	44	< 0.05	0.14	ND[7]	0.09	< 0.06	< 0.05
molybdenum	44	13	164	5.9	0.53	7.4	13
nickel	44	8.6	14	5.4	0.12	8.2	9.7
selenium	44	0.98	1.25	0.64	0.28	0.9	0.92
silver	44	< 0.16	0.91	ND[7]	0.4	< 0.22	< 0.17
thallium	44	< 0.9	0.9	ND[7]	3.9	ND[7]	< 1.0
vanadium	44	< 3.7	8.0	ND[7]	0.48	2.9	< 2.9
zinc	44	27	64	9.4	0.55	22	25
ammonia	44	31,700	36,700	28,000	200	30,700	30,600
cyanides, total	44	< 1.6	3.0	ND[7]	2.0	< 1.6	< 1.6

1 Mean value for calendar year 2006. Computed on the basis of the arithmetic mean of all samples collected during the sample year. If a constituent was not detected in a sample at the referenced Method Detection Limit (MDL), a concentration equal to one-half the MDL was assigned to the "not detected" sample for purposes of computing the mean. Computed mean values shown in this table vary from those shown in the City's 2006 annual report, which assume a zero concentration for "not detected" samples in computing the mean. If "not detected" results occur for 100 percent of the samples during the year, the mean is listed as "ND".
2 Maximum concentration for any individual sample during calendar year 2006.
3 Minimum concentration for any individual sample during calendar year 2006.
4 Method Detection Limit (MDL) achieved for year 2006 Point Loma WTP effluent analyses.
5 Mean wet-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when precipitation was recorded during 2006. See Table III.H-3 on page III.H-8 for a list of wet weather dates for 2006 at the Point Loma WTP. A total of 8 of the above 44 samples occurred during days on which precipitation was recorded during 2006.
6 Mean dry-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when no precipitation was recorded during 2006. A total of 36 of the above 44 samples occurred during days of no precipitation.
7 Not detected at the referenced Method Detection Limit (MDL).

Table II.A-11
Statistical Breakdown of Point Loma WTP Effluent Concentrations, 2002-2006
Toxic Inorganic Constituents

Toxic Inorganic Constituent	Total Number of Samples[1]	No. of Samples with "Not Detected" Results[2]	Concentration in µg/l (2002-2006)					
			Maximum Monthly Average[3]	Maximum Sample Value[4] (100th Percentile)	90th Percentile Value[5]	75th Percentile Value[5]	50th Percentile Value[5]	25th Percentile Value[5]
aluminum	228	2	417	1060	284	212	143	97
antimony	228	165	76	83.5	37	23	3.5	ND[6]
arsenic	228	7	1.86	2.74	1.9	1.5	0.91	0.65
barium	228	0	49	72.9	41	39	35	31
beryllium	228	227	< 0.39	0.685	ND[6]	ND[6]	ND[6]	ND[6]
cadmium	228	163	2.7	4.5	1.0	0.23	ND[6]	ND[6]
chromium	228	113	11.1	23.4	3.8	1.9	0.23	ND[6]
cobalt	210	104	5.0	7.1	1.4	0.79	0.24	ND[6]
copper	228	0	163	325	91	61	36	23
lead	228	207	1.8	31.5	< 1.384	ND[6]	ND[6]	ND[6]
lithium	228	5	0.060	0.08	0.057	0.049	0.041	0.034
mercury	228	221	0.23	0.70	ND[6]	ND[6]	ND[6]	ND[6]
molybdenum	191	11	61	164	13	11	9.0	7.0
nickel	228	107	16	22	11	8.3	5.9	ND[4]
selenium	228	0	1.48	1.7	1.3	1.2	1.1	0.92
silver	228	193	9.5	19.7	0.4	ND[6]	ND[6]	ND[6]
thallium	228	226	< 1.8	40	ND[6]	ND[6]	ND[6]	ND[6]
vanadium	199	82	16	41.1	9.3	3.7	1.37	ND[4]
zinc	228	3	50	81.3	33	28	24	19
ammonia	227	0	32,600	36,700	30,800	29,700	28,300	27,200
cyanides, total	227	60	6.8	10	4.0	3.0	2.0	< 2

1 Total number of Point Loma WTP effluent samples for the listed constituent during 2002-2006. From monthly monitoring reports submitted by the City to the Regional Board, 2002-2006.
2 Number of monitoring samples in which the constituent was not detected at the referenced MDL. From monthly monitoring reports submitted by the City to the Regional Board, 2002-2006. See Table II.A-10 (page II.A-30) for applicable MDLs achieved during 2006.
3 Maximum monthly average concentration for the five-year period 2002-2006. From annual monitoring reports submitted by the City to the Regional Board, 2002-2006. (Note: Monthly averages reported in the City's annual monitoring reports are based on a "zero" concentration for any "not detected" samples.)
4 Maximum concentration in any single sample during the five-year period 2002-2006. From monthly monitoring reports submitted by the City to the Regional Board, 2002-2006.
5 Statistical percentile of all Point Loma WTP individual sample values, 2002-2006. The 90th percentile value is the concentration at which 90 percent of the samples have a lower concentration and 10 percent have a higher concentration.
6 ND indicates "not detected". See Table II.A-10 (page II.A-30) for applicable Method Detection Limits (MDLs) achieved during 2006.

As noted, the City is not requesting changes in effluent concentration limits or mass emission limits for toxic compounds as part of this 301(h) application. Concentrations listed in Table II.A-11 are projected to be representative of the proposed improved discharge as well as the current discharge.

Toxic Organic Compounds. The City routinely monitors the Point Loma WTP effluent for a variety of toxic organic compounds, including:

- chlorinated pesticides,
- organophosphorus pesticides,
- tributyltin,
- acid extractable compounds,
- base-neutral compounds,
- volatile organic compounds, and
- dioxins and furans.

Tables II.A-12 through II.A-18 (pages II.A-33 through II.A-39) presents the results of Point Loma WTP effluent monitoring for each of these categories of toxic organic compounds. Mean, maximum, minimum, wet-weather mean, and dry-weather mean values are presented for each toxic organic constituent.

As shown in Tables II.A-12 through II.A-18, toxic organic compounds that were detected in the Point Loma WTP effluent during 2006 on a consistent or near-consistent basis included:

Chlorinated Pesticides:	BHC gamma (lindane)
Acid Extractable Compounds:	phenol
Purgeable Organic Compounds:	acetone bromodichloromethane (dichlorobromomethane) 2-butanone chloroform (trichloromethane) 1,4-dichlorobenzene methylene chloride methyl tertiary butyl ether (MTBE) toluene
Base-Neutral Compounds	bis (2-ethylhexyl) phthalate

Three additional toxic organic constituents were detected during 2006 in the Point Loma WTP effluent on an infrequent basis. Tetrachloroethylene was detected during 2006 in one of twelve monthly samples. Dibromochloromethane (chlorodibromomethane) and dimethyl phthalate were each detected in two of the twelve monthly samples during 2006.

Table II.A-12
Summary of Point Loma Effluent Quality for Calendar Year 2006
Chlorinated Pesticides

Chlorinated Pesticide	Number of Samples	Concentration in ng/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
aldrin	44	ND[7]	ND	ND[7]	60	ND[7]	ND[7]
dieldrin	44	ND[7]	ND	ND[7]	50	ND[7]	ND[7]
BHC, alpha isomer	44	ND[7]	ND	ND[7]	20	ND[7]	ND[7]
BHC, beta isomer	44	ND[7]	ND	ND[7]	20	ND[7]	ND[7]
BHC, gamma isomer[8]	44	< 10	17	ND[7]	10	< 10	< 10
BHC, delta isomer	44	ND[7]	ND	ND[7]	20	ND[7]	ND[7]
alpha (cis) chlordane	44	ND[7]	ND[7]	ND[7]	30	ND[7]	ND[7]
gamma (trans) chlordane	44	ND[7]	ND[7]	ND[7]	80	ND[7]	ND[7]
oxychlordane	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
DDT & derivatives	44	ND[7]	ND[7]	ND[7]	60	ND[7]	ND[7]
p,p-DDD (4,4'-DDD)	44	ND[7]	ND	ND[7]	20	ND[7]	ND[7]
p,p-DDE (4,4'-DDE)	44	ND[7]	ND	ND[7]	20	ND[7]	ND[7]
p,p-DDT (4,4'-DDT)	44	ND[7]	ND	ND[7]	50	ND[7]	ND[7]
o,p-DDD (2,4'-DDD)	44	ND[7]	ND	ND[7]	20	ND[7]	ND[7]
o,p-DDE (2,4'-DDE)	44	ND[7]	ND	ND[7]	10	ND[7]	ND[7]
o,p-DDT (2,4'-DDT)	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
alpha endosulfan	44	ND[7]	ND[7]	ND[7]	30	ND[7]	ND[7]
beta endosulfan	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
endosulfan sulfate	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
Endrin	44	ND[7]	ND[7]	ND[7]	50	ND[7]	ND[7]
endrin aldehyde	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
heptachlor	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
heptachlor epoxide	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
hexachlorocyclohexanes	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
methoxychlor	44	ND[7]	ND[7]	ND[7]	60	ND[7]	ND[7]
mirex	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
trans nonachlor	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
cis nonachlor	44	ND[7]	ND[7]	ND[7]	20	ND[7]	ND[7]
PCBs[9]	44	ND[7]	ND[7]	ND[7]	4000	ND[7]	ND[7]
toxaphene	44	ND[7]	ND[7]	ND[7]	4000	ND[7]	ND[7]

1 Mean value for calendar year 2006. Computed on the basis of the arithmetic mean of all samples collected during the sample year. If a constituent was not detected in a sample at the referenced MDL, a concentration equal to one-half the MDL was assigned to the "not detected" sample for purposes of computing the mean. Computed mean values shown in this table vary from those shown in the City's 2006 annual report, which assume a zero concentration for "not detected" samples in computing the mean. If "not detected" results occur for 100 percent of the samples during the year, the mean is listed as "ND".
2 Maximum concentration for any individual sample during calendar year 2006.
3 Minimum concentration for any individual sample during calendar year 2006.
4 MDL achieved for year 2006 Point Loma WTP effluent analyses.
5 Mean wet-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when precipitation was recorded during 2006. See Table III.H-3 on page III.H-8 for a list of wet weather dates for 2006 at the Point Loma WTP. A total of 8 of the above 44 samples occurred during days on which precipitation was recorded during 2006.
6 Mean dry-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when no precipitation was recorded during 2006. A total of 36 of the above 44 samples occurred during days of no precipitation.
7 Not detected at the referenced MDL.
8 Also known as lindane.
9 Polychlorinated biphenyls.

Table II.A-13
Summary of Point Loma Effluent Quality for Calendar Year 2006
Organophosphorus Pesticides

Organophosphorus Pesticide	Number of Samples	Concentration in ng/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
demeton O	2	ND[7]	ND[7]	ND[7]	0.15	NA[8]	ND[7]
demeton S	2	ND[7]	ND[7]	ND[7]	0.08	NA[8]	ND[7]
diazinon	2	ND[7]	ND[7]	ND[7]	0.03	NA[8]	ND[7]
guthion	2	ND[7]	ND[7]	ND[7]	0.15	NA[8]	ND[7]
malathion	2	ND[7]	ND[7]	ND[7]	0.03	NA[8]	ND[7]
parathion	2	ND[7]	ND[7]	ND[7]	0.03	NA[8]	ND[7]

1 Mean value for calendar year 2006. Computed on the basis of the arithmetic mean of all samples collected during the sample year. If a constituent was not detected in a sample at the referenced MDL, a concentration equal to one-half the MDL was assigned to the "not detected" sample for purposes of computing the mean. Computed mean values shown in this table vary from those shown in the City's 2006 annual report, which assume a zero concentration for "not detected" samples in computing the mean. If "not detected" results occur for 100 percent of the samples during the year, the mean is listed as "ND".
2 Maximum concentration for any individual sample during calendar year 2006.
3 Minimum concentration for any individual sample during calendar year 2006.
4 MDL achieved for year 2006 Point Loma WTP effluent analyses.
5 Mean wet-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when precipitation was recorded during 2006. See Table III.H-3 on page III.H-8 for a list of wet weather dates for 2006 at the Point Loma WTP. A total of 8 of the above 44 samples occurred during days on which precipitation was recorded during 2006.
6 Mean dry-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when no precipitation was recorded during 2006. A total of 36 of the above 44 samples occurred during days of no precipitation.
7 Not detected at the referenced MDL.
8 Both semiannual samples during 2006 occurred during dry weather. No wet weather samples are available.

Table II.A-14
Summary of Point Loma Effluent Quality for Calendar Year 2006
Tributyl Tin

Constituent	No. of Samples	Concentration in µg/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
dibutyl tin	12	ND[7]	ND[7]	ND[7]	7	ND[7]	ND[7]
monobutyl tin	12	ND[7]	ND[7]	ND[7]	16	ND[7]	ND[7]
tributyl tin	12	ND[7]	ND[7]	ND[7]	1	ND[7]	ND[7]

1 Mean value for calendar year 2006. Computed on the basis of the arithmetic mean of all samples collected during the sample year. If a constituent was not detected in a sample at the referenced MDL, a concentration equal to one-half the MDL was assigned to the "not detected" sample for purposes of computing the mean. Computed mean values shown in this table vary from those shown in the City's 2006 annual report, which assume a zero concentration for "not detected" samples in computing the mean. If "not detected" results occur for 100 percent of the samples during the year, the mean is listed as "ND".
2 Maximum concentration for any individual sample during calendar year 2006.
3 Minimum concentration for any individual sample during calendar year 2006.
4 MDL achieved for year 2006 Point Loma WTP effluent analyses.
5 Mean wet-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when precipitation was recorded during 2006. See Table III.H-3 on page III.H-8 for a list of wet weather dates for 2006 at the Point Loma WTP. A total of 8 of the above 44 samples occurred during days on which precipitation was recorded during 2006.
6 Mean dry-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when no precipitation was recorded during 2006. A total of 36 of the above 44 samples occurred during days of no precipitation.
7 Not detected at the referenced MDL.

Table II.A-15
Summary of Point Loma Effluent Quality for Calendar Year 2006
Acid Extractable Compounds

Acid Extractable Compound	No. of Samples	Concentration in µg/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
2-chlorophenol	44	ND[7]	ND[7]	ND[7]	1.76	ND[7]	ND[7]
4-chloro-3-methylphenol	44	ND[7]	ND[7]	ND[7]	1.34	ND[7]	ND[7]
2,4-dichlorophenol	44	ND[7]	ND[7]	ND[7]	1.95	ND[7]	ND[7]
2,4-dimethylphenol	44	ND[7]	ND[7]	ND[7]	1.32	ND[7]	ND[7]
2,4-dinitrophenol	44	ND[7]	ND[7]	ND[7]	6.07	ND[7]	ND[7]
2-methyl-4,6-dinitrophenol	44	ND[7]	ND[7]	ND[7]	4.29	ND[7]	ND[7]
2-methylphenol	44	ND[7]	ND[7]	ND[7]	1.51	ND[7]	ND[7]
2-nitrophenol	44	ND[7]	ND[7]	ND[7]	1.88	ND[7]	ND[7]
4-nitrophenol	44	ND[7]	ND[7]	ND[7]	3.17	ND[7]	ND[7]
Pentachlorophenol	44	ND[7]	ND[7]	ND[7]	5.87	ND[7]	ND[7]
Phenol	44	14	25.6	10.4	2.53	13	14
2,4,5-trichlorophenol	44	ND[7]	ND[7]	ND[7]	1.66	ND[7]	ND[7]
2,4,6-trichlorophenol	44	ND[7]	ND[7]	ND[7]	1.75	ND[7]	ND[7]
Total chlorinated phenols	44	ND[7]	ND[7]	ND[7]	5.87	ND[7]	ND[7]
Total nonchlorinated phenols	44	ND[7]	ND[7]	ND[7]	6.07	ND[7]	ND[7]

1 Mean value for calendar year 2006. Computed on the basis of the arithmetic mean of all samples collected during the sample year. If a constituent was not detected in a sample at the referenced MDL, a concentration equal to one-half the MDL was assigned to the "not detected" sample for purposes of computing the mean. Computed mean values shown in this table vary from those shown in the City's 2006 annual report, which assume a zero concentration for "not detected" samples in computing the mean. If "not detected" results occur for 100 percent of the samples during the year, the mean is listed as "ND".
2 Maximum concentration for any individual sample during calendar year 2006.
3 Minimum concentration for any individual sample during calendar year 2006.
4 MDL achieved for year 2006 Point Loma WTP effluent analyses.
5 Mean wet-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when precipitation was recorded during 2006. See Table III.H-3 on page III.H-8 for a list of wet weather dates for 2006 at the Point Loma WTP. A total of 8 of the above 44 samples occurred during days on which precipitation was recorded during 2006.
6 Mean dry-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when no precipitation was recorded during 2006. A total of 36 of the above 44 samples occurred during days of no precipitation.
7 Not detected at the referenced MDL.

Table II.A-16
Summary of Point Loma Effluent Quality for Calendar Year 2006 - Purgeable Organic Compounds

Purgeable Organic Compound	No. of Samples	Concentration in µg/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
acetone	12	1030	2780	403	20	1160	1005
acrylonitrile	12	ND[7]	ND[7]	ND[7]	13.8	ND[7]	ND[7]
acrolein	12	ND[7]	ND[7]	ND[7]	11.4	ND[7]	ND[7]
benzene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
bromodichloromethane	12	< 1.1	3.7	ND[7]	1.0	2.5	0.9
bromoform	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
bromomethane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
2-butanone	12	14	58	4.1	4.0	33	10
carbon tetrachloride	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
chlorobenzene	12	ND[7]	ND[7]	ND[7]	1.0	ND	ND[7]
chloroethane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
chloroform	12	< 6.4	11.2	3.9	1.0	8.4	6.0
chloromethane	`1	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
2-chloroethylvinyl ether	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
dibromochloromethane	12	< 0.9	2.9	ND[7]	1.0	2.0	0.7
1,2-dichlorobenzene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,3-dichlorobenzene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,4-dichlorobenzene	12	< 2.6	3.4	ND[7]	1.0	3.1	2.6
1,1-dichloroethane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,2-dichloroethane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,1-dichloroethylene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
trans-1,2-dichloroethene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,2-dichloropropane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
cis-1,3-dichloropropene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
trans-1,3-dichloropropene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
ethylbenzene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
MTBE	12	2.5	4.6	1.4	1.0	1.4	2.7
methylene chloride	12	< 2.4	3.6	ND[7]	1.0	3.4	2.2
1,1,2,2-tetrachloroethane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
tetrachloroethene	12	< 1.2	3.4	ND[7]	1.0	ND[7]	< 1.2
toluene	12	< 1.5	3.0	ND[7]	1.0	1.6	1.5
1,1,1-trichloroethane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,1,2-trichloroethane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
trichloroethylene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
trichlorofluoromethane	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
vinyl chloride	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]

1 Mean value for calendar year 2006. Computed on the basis of the arithmetic mean of all samples collected during the sample year. If a constituent was not detected in a sample at the referenced MDL, a concentration equal to one-half the MDL was assigned to the "not detected" sample for purposes of computing the mean. Computed mean values shown in this table vary from those shown in the City's 2006 annual report, which assume a zero concentration for "not detected" samples in computing the mean. If "not detected" results occur for 100 percent of the samples during the year, the mean is listed as "ND".
2 Maximum concentration for any individual sample during calendar year 2006.
3 Minimum concentration for any individual sample during calendar year 2006.
4 MDL achieved for year 2006 Point Loma WTP effluent analyses.
5 Mean wet-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when precipitation was recorded during 2006. See Table III.H-3 on page III.H-8 for a list of wet weather dates for 2006 at the Point Loma WTP. A total of 2 of the above 12 samples occurred during days on which precipitation was recorded during 2006.
6 Mean dry-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when no precipitation was recorded during 2006. A total of 10 of the above 12 samples occurred during days of no precipitation.
7 Not detected at the referenced MD.

Table II.A-17
Summary of Point Loma Effluent Quality for Calendar Year 2006
Base Neutral Compounds

Base Neutral Compound	No. of Samples	Concentration in µg/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
anthracene	12	ND[7]	ND[7]	ND[7]	4.04	ND[7]	ND[7]
acenaphthene	12	ND[7]	ND[7]	ND[7]	2.2	ND[7]	ND[7]
benzidine	12	ND[7]	ND[7]	ND[7]	1.02	ND[7]	ND[7]
benzo(a)anthracene	12	ND[7]	ND[7]	ND[7]	7.68	ND[7]	ND[7]
benzo(a)pyrene	12	ND[7]	ND[7]	ND[7]	6.53	ND[7]	ND[7]
benzo(e)pyrene	12	ND[7]	ND[7]	ND[7]	7.67	ND[7]	ND[7]
benzo(g,h,i)perylene	12	ND[7]	ND[7]	ND[7]	6.5	ND[7]	ND[7]
3,4-benzo(B)fluoranthene	12	ND[7]	ND[7]	ND[7]	6.63	ND[7]	ND[7]
benzo(k)fluoranthene	12	ND[7]	ND[7]	ND[7]	7.36	ND[7]	ND[7]
biphenyl	12	ND[7]	ND[7]	ND[7]	2.43	ND[7]	ND[7]
4-bromophenyl phenyl ether	12	ND[7]	ND[7]	ND[7]	4.04	ND[7]	ND[7]
bis (2-chloroethyl) ether	12	ND[7]	ND[7]	ND[7]	2.62	ND[7]	ND[7]
bis (2-chloroethoxy) methane	12	ND[7]	ND[7]	ND[7]	1.57	ND[7]	ND[7]
bis-(2-chloroisopropyl) ether	12	ND[7]	ND[7]	ND[7]	8.95	ND[7]	ND[7]
bis-(2-ethylhexyl) phthalate	8[9]	< 7.1	15.2	ND[7]	10.43	ND[7,9]	< 7.7[9]
butyl benzyl phthalate	12	ND[7]	ND[7]	ND[7]	4.77	ND[7]	ND[7]
2-chloronapthalene	12	ND[7]	ND[7]	ND[7]	2.41	ND[7]	ND[7]
4-chlorophenyl phenyl ether	12	ND[7]	ND[7]	ND[7]	3.62	ND[7]	ND[7]
chrysene	12	ND[7]	ND[7]	ND[7]	7.49	ND[7]	ND[7]
dibenzo(A,H)anthracene	12	ND[7]	ND[7]	ND[7]	6.19	ND[7]	ND[7]
1,3-dichlorobenzene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,2-dichlorobenzene	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,4-dichlorobenzene	12	2.6	3.4	1.3	1.0	3.1	2.6
3,3-dichlorobenzidine	12	ND[7]	ND[7]	ND[7]	2.43	ND[7]	ND[7]
diethyl phthalate	12	4.4	11.2	ND[7]	6.97	ND[7]	4.3
dimethyl phthalate	12	ND[7]	ND[7]	ND[7]	1.49	ND[7]	ND[7]
di-n-butyl phthalate	12	ND[7]	ND[7]	ND[7]	6.49	ND[7]	ND[7]
di-n-octyl phthalate	12	ND[7]	ND[7]	ND[7]	8.59	ND[7]	ND[7]
2,4-dinitrotoluene	12	ND[7]	ND[7]	ND[7]	1.49	ND[7]	ND[7]
2,6-dinitrotoluene	12	ND[7]	ND[7]	ND[7]	2.43	ND[7]	ND[7]

Table II.A-17 is continued on the following page. See following page for table footnotes.

Table II.A-17 (continued)
Summary of Point Loma Effluent Quality for Calendar Year 2006
Base Neutral Compounds

Base Neutral Compound	No. of Samples	Concentration in µg/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
1,2-diphenylhydrazine	12	ND[7]	ND[7]	ND[7]	2.49	ND[7]	ND[7]
fluorene	12	ND[7]	ND[7]	ND[7]	2.43	ND[7]	ND[7]
fluoranthene	12	ND[7]	ND[7]	ND[7]	6.9	ND[7]	ND[7]
hexachlorobenzene	12	ND[7]	ND[7]	ND[7]	4.8	ND[7]	ND[7]
hexachlorobutadiene	12	ND[7]	ND[7]	ND[7]	2.87	ND[7]	ND[7]
hexachloroethane	12	ND[7]	ND[7]	ND[7]	3.55	ND[7]	ND[7]
hexachlorocyclopentadiene	12	ND[7]	ND[7]	ND[7]	Not listed[8]	ND[7]	ND[7]
indeno(1,2,3-CD)pyrene	12	ND[7]	ND[7]	ND[7]	6.27	ND[7]	ND[7]
isophorone	12	ND[7]	ND[7]	ND[7]	1.93	ND[7]	ND[7]
naphthalene	12	ND[7]	ND[7]	ND[7]	1.52	ND[7]	ND[7]
N-nitrosodi-n-propylamine	12	ND[7]	ND[7]	ND[7]	1.63	ND[7]	ND[7]
N-nitrosodiphenylamine	12	ND[7]	ND[7]	ND[7]	2.96	ND[7]	ND[7]
nitrobenzene	12	ND[7]	ND[7]	ND[7]	1.52	ND[7]	ND[7]
PAHs[10]	12	ND[7]	ND[7]	ND[7]	7.68	ND[7]	ND[7]
perylene	12	ND[7]	ND[7]	ND[7]	6.61	ND[7]	ND[7]
phenanthrene	12	ND[7]	ND[7]	ND[7]	4.15	ND[7]	ND[7]
pyrene	12	ND[7]	ND[7]	ND[7]	5.19	ND[7]	ND[7]
total dichlorobenzenes	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
1,2,4-trichlorobenzene	12	ND[7]	ND[7]	ND[7]	1.44	ND[7]	ND[7]

1 Mean value for calendar year 2006. Computed on the basis of the arithmetic mean of all samples collected during the sample year. If a constituent was not detected in a sample at the referenced MDL, a concentration equal to one-half the MDL was assigned to the "not detected" sample for purposes of computing the mean. Computed mean values shown in this table vary from those shown in the City's 2006 annual report, which assume a zero concentration for "not detected" samples in computing the mean. If "not detected" results occur for 100 percent of the samples during the year, the mean is listed as "ND".
2 Maximum concentration for any individual sample during calendar year 2006.
3 Minimum concentration for any individual sample during calendar year 2006.
4 MDL achieved for year 2006 Point Loma WTP effluent analyses.
5 Mean wet-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when precipitation was recorded during 2006. See Table III.H-3 on page III.H-8 for a list of wet weather dates for 2006 at the Point Loma WTP. A total of 2 of the above 12 samples occurred during days on which precipitation was recorded during 2006.
6 Mean dry-weather concentration computed as described in footnote 1 for Point Loma WTP effluent samples on days when no precipitation was recorded during 2006. A total of 10 of the above 12 samples occurred during days of no precipitation.
7 Not detected at the referenced MDL.
8 No MDL is available for the listed constituent.
9 A total of eight samples developed results for bis (2-ethylhexyl) phthalate during 2006. A total of two of these samples occurred during precipitation days.
10 Polynuclear aromatic compounds.

Point Loma WTP effluent quality during calendar year 2006 is representative of recent effluent quality. Table II.A-19 (page II.A-40) presents a percentile breakdown of all toxic organic constituents detected in the Point Loma WTP effluent during the five year period 2002-2006. Median values for 2002-2006 presented in Table II.A-19 (2002-2006) are comparable with year 2006 mean values for the toxic organic constituents normally detected in the Point Loma WTP effluent.

Table II.A-18
Summary of Point Loma Effluent Quality for Calendar Year 2006
Dioxins and Furans

Base Neutral Compound	No. of Samples	Concentration in ng/l					
		Mean Value[1]	Maximum Value[2]	Minimum Value[3]	MDL[4]	Wet-Weather Average Value[5]	Dry Weather Average Value[6]
2,3,7,8-tetra CDD	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,7,8-penta CDD	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,4,7,8-hexa-CDD	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,6,7,8-hexa CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,7,8,9-hexa CDD	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,4,6,7,8-hepta CDD	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
octa CDD	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]
2,3,7,8-tetra CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,7,8-penta CDF	12	ND[7]	ND[7]	ND[7]	0.25	ND[7]	ND[7]
2,3,4,7,8-penta CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,4,7,8-hexa CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,6,7,8-hexa CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,7,8,9-hexa CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
2,3,4,6,7,8-hexa CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,4,6,7,8-hepta CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
1,2,3,4,7,8,9-hepta CDF	12	ND[7]	ND[7]	ND[7]	0.5	ND[7]	ND[7]
octa CDF	12	ND[7]	ND[7]	ND[7]	1.0	ND[7]	ND[7]

1 Mean value for calendar year 2006. Computed on basis of mean of all samples collected during the sample year. If a given sample was not detected, a concentration equal to one-half the mean was assigned for purposes of computing the mean. Computed mean values shown in this table vary from those shown in the City's 2006 annual report, which assume a zero concentration for "not detected" samples in computing the mean. If all samples are not detected during the year, the mean is listed as "ND".
2 Maximum sample value during calendar year 2006.
3 Minimum sample value during calendar year 2006.
4 Method Detection Limit (MDL) for the analyses.
5 Mean value computed as described in footnote 1 for samples on days when no rainfall was recorded during 2006. See Table III.H-3 on page III.H-8 for wet weather days during 2006 at the Point Loma WTP.
6 Mean value computed as described in footnote 1 for samples on days when rainfall was recorded during 2006. A total of 2 of the 12 monthly samples during 2006 occurred during days of precipitation.
7 Not detected at the referenced Method Detection Limit (MDL).

Table II.A-19
Statistical Breakdown of Point Loma WTP Effluent Concentrations, 2002-2006
Detected Toxic Inorganic Constituents[1]

Toxic Inorganic Constituent Detected in PLOO Effluent During 2002-2006 [1]	Total Number of Samples[2]	No. of Samples with "Not Detected" Results[3]	Concentration in µg/l (2002-2006)				
			Maximum Monthly Average[4]	Maximum Value[5] (100th Percentile)	90th Percentile Value[6]	75th Percentile Value[6]	50th Percentile Value[6]
Chlorinated Pesticides							
alpha chlordane	229	228	0.031	0.092[8]	ND[9]	ND[9]	ND[9]
BHC Gamma	229	165	0.053	0.175	0.019	0.012	ND[9]
diazinon	9	4	0.125[7]	0.125	0.12	0.10	< 0.02
malathion	9	2	0.375[7]	0.375	0.17	0.13	0.10
Acid Extractable Compounds							
phenol	227	0	18.4	25.6	16	13	11
Purgeable Organic Compounds							
acetone	58	0	4,560[7]	4,560	1,970	1,580	965
bromodichloromethane	59	27	3.7[7]	3.7	2.2	1.4	1.1
2-butanone	56	20	57.6[7]	57.6	15.4	9.0	6.2
chloroform	59	0	11.2[7]	11.2	7.9	6.8	6.0
dibromochloromethane	59	36	2.87[7]	2.87	1.8	1.2	ND[9]
1,4 dichlorobenzene	121[10]	55	3.8	4.71	3.6	3.1	2.5
MTBE	58	14	5.22[7]	5.2	3.7	2.3	1.6
methylene chloride	58	9	17.9[7]	17.9	4.3	3.5	2.6
tetrachloroethylene	59	53	3.4[7]	3.4	< 1	ND[9]	ND[9]
toluene	59	7	8.05[7]	8.05	3.5	2.340	1.750
Base Neutral Compounds							
bis (2-ethylhexyl) phthalate	58	54	49.8[7]	49.8	< 10.4	ND[9]	ND[9]
diethyl phthalate	62	57	11.2[7]	11.2	ND[9]	ND[9]	ND[9]
naphthalene	62	61	1.85[7]	1.85	ND[9]	ND[9]	ND[9]

1 Toxic organic constituents in the Point Loma WTP effluent that were detected in any sample during 2002-2006 at a concentration equal to or greater than the corresponding MDL. See prior tables for applicable MDLs.
2 Total number of Point Loma WTP effluent samples for the listed constituent during 2002-2006. From monthly monitoring reports submitted by the City to the Regional Board, 2002-2006.
3 Number of monitoring samples in which the constituent was not detected. From monthly monitoring reports submitted by the City to the Regional Board, 2002-2006. See prior tables for applicable MDLs achieved during 2006.
4 Maximum monthly average concentration for the five-year period 2002-2006. From annual monitoring reports submitted by the City to the Regional Board, 2002-2006. (Note: Monthly averages reported in the City's annual monitoring reports are based on a "zero" concentration for any "not detected" samples.)
5 Maximum concentration in any single sample (100th percentile value) during the five-year period 2002-2006. From monthly monitoring reports submitted by the City to the Regional Board, 2002-2006.
6 Statistical percentile of all Point Loma WTP individual sample values, 2002-2006. The 90th percentile value is the concentration at which 90 percent of the samples have a lower concentration and 10 percent have a higher concentration.
7 The constituent is sampled on a monthly or less frequent basis. Therefore the concentration for the maximum individual sample during 2002-2006 and maximum monthly average during 2002-2006 are the same.
8 Detectable concentrations were found in only 1 of 228 samples of alpha chlordane during 2002-2006.
9 Not detected at the respective MDL. See prior tables for MDLs.
10 Total number of grab samples during 2002-2006 for 1,4-dichlorobenzene. An equal number of 24-hour composite samples for the constituent were analyzed for but concentrations in the composite samples were non-detectable.

Radioactivity. Table II.A-20 presents the results of radioactivity monitoring of the Point Loma WTP effluent during 2006.

Table II.A-20
Summary of Monthly Effluent Radiation
Calendar Year 2006

Month	Alpha Radiation (picocuries/liter)	Beta Radiation (picocuries/liter)
Jan	0.7 ± 0.8	12.3 ± 3.6
Feb	0.7 ± 1.3	38.3 ± 5.2
Mar	2.7 ± 1.4	10.5 ± 3.2
Apr	2.7 ± 1.3	10.9 ± 3.1
May	1.5 ± 1.2	16.3 ± 3.4
Jun	1.0 ± 1.1	12.1 ± 3.8
Jul	1.6 ± 1.2	14.6 ± 3.7
Aug	1.5 ± 1.0	13.3 ± 3.6
Sep	0.7 ± 0.9	10.7 ± 2.9
Oct	0.2 ± 0.7	13.4 ± 3.9
Nov	2.7 ± 1.5	17.7 ± 4.0
Dec	1.9 ± 1.3	12.8 ± 2.5
Average	1.5 ± 1.1	15.2 ± 3.6
Maximum	2.7 ± 1.5	38.3 ± 5.2

Immediate Dissolved Oxygen Demand. The large applicant questionnaire (40 CFR 125, Subpart G, Appendix B) requires 301(h) applicants to identify the "immediate dissolved oxygen demand" (IDOD) of the discharge. The IDOD test is highly unreliable, and has not been an accepted test for measuring oxygen-demanding effects of a wastewater for over 30 years. As a result of the test's inherent unreliability, the 14th edition of *Standard Methods for the Examination of Water and Wastewater* (published in 1975) eliminated the IDOD test.

To satisfy the requirements of 40 CFR 125, Subpart G, the City of San Diego performed a series of IDOD tests in 1994 in accordance with procedures listed in the 13th edition of *Standard Methods* (which was published in 1971). The maximum observed IDOD from nine samples was 1.74 mg. The average IDOD value in the nine samples was 0.95 mg/l.

II.A.5. Effluent Volume and Mass Emissions [40 CFR 125.62(e)(2) and 125.67]

a. Provide detailed analyses showing projections of effluent volume (annual average, m^3/sec) and mass loadings (mt/yr) of BOD_5 and suspended solids for the design life of your treatment facility in five-year increments. If the application is based on an improved or altered discharge, the projections must be provided with and without the proposed improvements or alterations.

The "design life" of Metro System treatment facilities varies among the treatment components. Mechanical equipment may have a design life of 20 years, while concrete structures may last for 50 years or more. A design life of 20 years (representing the replacement life for some of the onsite mechanical equipment) is used for purposes of projecting the flow and mass emission data requested by Question II.A.5(a).

The City's Metropolitan Wastewater Department (operator of the Metro System) annually prepares flow and load projections for use in long-term facilities planning. (See Section A.3 of Appendix A within Volume IV.) Current flow projections extend 20 years in the future to year 2027.

The projections of Metro System wastewater flows and loads are based on adopted regional population forecasts and anticipated per capita generation rates. Metro System flow projections through year 2027 are based on Series 10 growth forecasts by the San Diego Association of Governments (SANDAG). The SANDAG projections are on five year increments, and values are interpolated between these increments.

Table II.A-21 (page II.A-43) present projected Metro System flows through year 2027 based on the SANDAG Series 10 population projections. Flow projections within Table II.A-21 are based on the highest per capita flow generation rates that have occurred during the past five years. It should be noted that water conservation efforts of the City of San Diego and other regional water agencies have resulted in current per capita wastewater flow generation rates that are approximately 10 percent less than prior values. Current Metro System flows are thus approximately 10 percent less than the projected flows shown in Table II.A-21. While the flow estimates presented in Table II.A-21 are conservative when compared to existing Metro System flows, these projected flows are appropriate for use in long-term facilities planning as the flow projections incorporate a factor of safety.

Table II.A-21
Metro System Service Area Population, Flow, and Load Projections for Long-Term Facilities Planning

Year	Metro System Population[a]	Total Metro System Flows		Total Metro System Loads		Projected PLOO Discharge	
		Average Flow[b] (mgd)	Peak Flow[c] (mgd)	TSS [d] (metric tons per year)	BOD [d] (metric tons per year)	Projected Flow[e] (mgd)	TSS [f] (metric tons per year)
2008	2,158,399	206	458	75,800	81,800	191	11,400
2009	2,180,528	208	463	76,600	82,600	193	11,500
2010	2,202,658	210	467	78,800	83,400	194	11,800
2011	2,225,981	212	471	78,000	84,300	195	11,700
2012	2,249,305	214	476	78,800	85,200	197	11,800
2013	2,272,629	216	481	79,600	86,100	199	11,900
2014	2,295,953	219	486	80,400	86,900	202	12,100
2015	2,319,276	221	491	81,300	87,700	203	12,200
2016	2,341,012	224	495	81,900	88,600	205	12,300
2017	2,362,748	225	500	82,800	89,400	207	12,400
2018	2,384,484	227	504	83,400	90,200	209	12,500
2019	2,406,220	229	509	84,300	91,000	211	12,600
2020	2,427,957	231	513	84,900	91,900	212	12,700
2021	2,446,596	233	517	85,600	92,500	214	12,800
2022	2,465,236	234	521	86,200	93,200	215	12,900
2023	2,483,876	236	525	86,900	93,900	217	13,000
2024	2,502,515	238	528	87,400	94,500	219	13,100
2025	2,521,155	240	532	88,100	95,200	221[g]	13,200[g]
2026	2,542,780	242	537	88,900	96,000	222[g]	13,300[g]
2027	2,564,405	244	541	89,600	96,800	224[g]	13,400[g]

[a] SANDAG Series 10 Forecasts are used for the system-wide flow projections unless more specific data are acquired. SANDAG provided regional forecasts in a five-year increment, e.g. 2010, 2015, 2020, etc,; straight-line interpolation was applied to determine projections for other years. The specific projection data provided by the City of Chula Vista was incorporated in this flow projection.

[b] System-wide Metro System generated annual average daily flow for facility planning purposes. The facilities planning flow projection are based on the highest unit generation rate in the past 5 years and a 10-year return period wet weather flow.

[c] Peak-hour wet-weather flow for a 10-year return period, per MWWD System wide Planning Design Event Analysis for Peak Flows and Volumes - PS1 and PS2, April 24, 1997.

[d] Average annual system-wide Metro System generated loads expressed in dry metric tons per year. Projections are based on the 10-year-return average annual dry weather flow and the highest waste strengths in the past 5 years for facility planning purpose. Values are rounded to nearest 100 metric tons per year.

[e] Average annual PLOO flow projections based on Metro System flow projections for long-term facilities planning. Average annual PLOO flows will vary depending on hydrologic conditions, recycled water demands, and SBOO flows. The above approximations are based on average annual recycled water use in the North City WRP service area of 7210 AFY in 2008, 7760 AFY by 2010, 8260 AFY by 2012, linearly increasing beyond 2012 to 8.9 mgd (9970 AFY) by year 2027. Estimates are also based on combined South Bay WRP reuse and SBOO flows of 6730 AFY in 2008, 6930 AFY in 2010, 7490 AFY in 2012, linearly increasing beyond 2012 to 7.9 mgd (8850 AFY) by year 2027. Estimates also based on net annual Metro System flow reductions of 3.0 mgd from recycled water use from the Padre Dam MWD Santee WRP and the Otay Water District WRF.

[f] The Point Loma WTP is required to achieve a minimum month system-wide TSS removal of 80 percent. During the past five years, the Point Loma WTP has consistently achieved a system-wide average annual TSS removal in excess of 85 percent. The above Point Loma outfall TSS mass emission estimates are based on the listed average annual Metro System system-wide TSS loads and an annual average 85 percent system-wide removal of TSS. Actual future TSS mass emissions may be greater or less than these values depending on system-wide influent TSS mass emissions and system-wide percent removals. Estimates rounded to nearest 100 metric tons per year.

[g] Estimates do not incorporate flow and TSS mass emission reductions that will occur when the 21 mgd South Bay WTO and onsite South Bay solids processing facilities are brought online (currently scheduled for approximately year 2025). When the 21 mgd South Bay WTP and onsite processing facilities are brought online, PLOO flows and PLOO effluent TSS mass emissions will be reduced below the estimated values shown above. Depending on future Metro System flows and solids mass emissions, the 21 mgd South Bay WTP and associated onsite solids processing facilities may be brought online earlier or later than year 2025.

Table II.A-21 (page II.A-43) also presents estimates of PLOO effluent flow and TSS mass emissions through the year 2027. While water conservation efforts have resulted in reduced unit per capita flow generation rates within the Metro System, per capita influent BOD and TSS generation rates have remained relatively steady. The flows and mass emission projections presented in Table II.A-21 are based on:

- continuation of the TSS mass emission limits established in Order No. R9-2002-0025,
- continuation of a permitted minimum month system-wide TSS system-wide removal rate of at least 80 percent (and continuation of the average annual system-wide TSS removals of approximately 85 percent that have been achieved during the past 10 years),
- projections for developed by SANDAG, and extrapolations of these estimates within five-year projection intervals,
- no significant increase in Metro System unit generation rates for solids or flows,
- continued marketing and expansion of North City WRP recycled water use (increasing from 7210 AFY in 2008 to 8260 AFY by 2012, and reaching approximately 9970 AFY by year 2027),
- continued marketing and expansion of South Bay WRP recycled water use (increasing from 6730 AFY in 2008 to 7490 AFY by 2012, and reaching approximately 8850 AFY by year 2027), and
- completion of flow equalization improvements at Pump Station No. 2 to improve Metro System wet weather flow handling capabilities.

By year 2025, the portion of the Metro System flows that are directed to the Point Loma WTP are projected to approach 240 mgd during inclement weather periods when no recycled water use occurs. At that time, additional treatment facilities (e.g. South Bay Wastewater Treatment Plant and associated solids handling facilities) will be required to handle future increases in Metro System flows. (South Bay Wastewater Treatment Plant and associated solids handling facilities may be required before or after this 2025 date, depending on future realized flow and TSS mass emission rates.)

Improved Discharge. Question II.A.5(a) requires that mass emissions projections be provided *with* and *without* the proposed discharge improvements. Proposed discharge treatment improvements (effluent disinfection, which is addressed in Appendix A and the response to Questionnaire Section II.A.1) are not projected to influence Metro System flows and mass loads. As a result, the flow and mass load projections presented in Table II.A-21 are representative of conditions with and without implementation of the Point Loma WTP effluent disinfection facilities.

b. Provide projections for the end of your five-year permit term for 1) the treatment facility contributing population and 2) the average daily total discharge flow for the maximum month of the dry weather season.

Table II.A-21 (page II.A-43) presents year-by-year population, average daily flow, and peak flow projections for the five-year NPDES permit period.

Population and Average Annual Flows in 2013. As shown in Table II.A-21, the projected Metro System population at the end of the five-year NPDES permit (year 2013) is approximately 2.27 million. Average annual system-wide Metro System flows during 2013 are conservatively projected at 216 mgd (9.5 m^3/sec).

Influence of Recycled Water on Dry Season Discharge Flows. Maximum month dry season flows in 2013 will be less than this annual average flow, and will depend on the quantity of recycled water being used within the North City WRP service area, the South Bay WRP recycled water service area, and the recycled water service areas of Metro System member agency water recycling plants (e.g. Padre Dam Municipal Water District plant and Otay Water District plant).

Table II.A-22 (page II.A-46) presents average PLOO discharge flows during the maximum month of the dry season under two conditions. A "high estimate" is presented which assumes that recycled water demands are zero (highly unlikely during summer months), while a "low estimate" is presented which assumes that PLOO flows are reduced as a result of upstream peak recycled water demands.

As shown in Table II.A-22, PLOO flows at the end of the five-year permit period are projected to range from approximately 187 mgd (peak recycled water demands) to 216 mgd (zero recycled water demand).

Table A.II-22
Dry Season Maximum Month PLOO Flows for Year 2013

Estimate Range	Metro System Flows[1] (mgd)	Recycled Water Use (mgd)	Projected PLOO Maximum Month Dry Season Flow in Year 2013 (mgd)
High estimate	216	0[2]	216
Low estimate	216	29[3,4]	187

1 Projected Metro System flow. From Table II.A-21 (page II.A-43) for year 2013.
2 Low estimate based on zero recycled water use during periods of zero irrigation demand (e.g. cool weather, rainfall, etc.)
3 High estimate is based on recycled water use during summer months of peak recycled water demand.
4 Average annual North City WRP recycled water demands (see page II.A-13) are estimated at 8260 AFY (7.4 mgd) for year 2012. Peak summer North City WRP recycled water demands in year 2013 are projected at approximately 15 mgd (approximately double the annual average demand). Average annual South Bay WRP recycled water demands (see page II.A-14) are estimated at 7480 AFY (6.7 mgd) during 2012. Peak summer South Bay WRP recycled water demands in year 2013 are projected at approximately 11 mgd (100 percent of the available South Bay WRP inflows). Peak PLOO flow reductions associated with recycled water use at the Padre Dam MWD and Otay Water District recycled water facilities are projected at approximately 3 mgd. Total peak recycled water use at the end of the 5-year permit period is thus estimated at approximately 29 mgd (15 mgd North City WRP peak flow, 11 mgd South Bay WRP peak flow, and 3 mgd Metro System member agency recycled water peak flow).

II.A.6. Average Daily Industrial Flow (m^3/sec) [40 CFR 125.64] Provide or estimate the average daily industrial inflow to your treatment facility for the same time increments as in Question II.A.5(a) above.

Appendix K (Volume VII) presents a detailed breakdown of the distribution of industrial flow by type of industry. Appendix K also presents estimates of industrial users and industrial flows discharged within the Metro System.

As documented in Appendix K, several major industrial flow contributors have downsized or relocated from the area in recent years. As a result, industrial flows within the Metro System have been significantly reduced. While the number and type of future Metro System industrial discharges will be dependent on economic conditions, it is probable that the recent trends will continue of (1) a decreased number of industrial dischargers and (2) a decreased amount of industrial flows.

Table II.A-23 (page II.A-48) summarizes projected industrial flow contributions to the Metro System for the next 20 years. As shown in the table, industrial flows contribute less than 5 percent of the total Metro System flows. Flows from industries for which federal categorical standards have been established comprise a fraction of 1 percent of the total Metro System flow.

Table II.A-23
Existing and Projected Flows and Industrial Users

Parameter	Year					
	2006	**2010**	**2013**	**2018**	**2023**	**2027**
Number of CIUs	50[1]	49[2]	49[2]	49[5]	49[5]	49[5]
CIU Flows (mgd)	0.3[1]	0.3[2]	0.3[2]	0.3[5]	0.3[5]	0.3[5]
Percent CIU Flow[3]	0.2%[1,3]	0.1%[2,3]	0.1%[2,3]	0.1%[3,5]	0.1%[3.5]	0.1%[3,5]
Number of SIUs	70[1]	67[2]	65[2]	65[5]	65[5]	65[5]
SIU Flows (mgd)	6.5[1]	5.7[2]	5.7[2]	5.7[5]	5.7[5]	5.7[5]
Percent SIU Flow[3]	3.8%[1,3]	2.8%[2,3]	2.6[2,3]	2.5%[3,5]	2.4%[3,5]	2.3%[3,5]
Total Metro System Flow (mgd)	170[1]	206[4]	216[4]	227[4]	236[4]	244[4]
Total Number of Industrial User Permits	1548[1]	1364[2]	1146[2]	1146[5]	1146[5]	1146[5]
Total Industrial Flow (mgd)	6.7[1]	5.9[2]	5.9[2]	5.9[5]	5.9[5]	5.9[5]
Percent Total Industrial Flow[3]	3.9[1,3]	3.3[2,3]	3.40[2,3]	2.6[3,5]	2.5[3,5]	2.4[3,5]

Note: Industrial flows rounded to nearest 0.1 mgd.

1 Existing values for year 2006.

2 Projections for years 2010 and 2013 are based on SANDAG economic projections. See Table K.1-4 on page K.1-8 of Appendix K.

3 Percentage of total Metro System flows.

4 Future Metro System flows per Table II.A-21 (page II.A-39). As noted, flow projections presented in Table II.A-21 are conservative and are based on the highest per capita flow generation rates observed during the past five years. As a result of current water conservation efforts, existing Metro System flows are approximately 10 percent less than these estimates.

5 Long-term future number of industries and industrial flows within the Metro System will depend on economic conditions. The above estimates assume "flat growth" (zero change) in number of industries and industrial flows beyond 2013.

II.A.7. Combined Sewer Overflows [40 CFR 125.65(b)]

a. Does (will) your collection and treatment system include combined sewer overflows?

No. The City of San Diego maintains separate collection systems for storm water and sewage.

b. If yes, provide a description of your plan for minimizing combined sewer overflows to the receiving water.

Not applicable.

II.A.8. Outfall/Diffuser Design. Provide the following data for your current discharge as well as for the modified discharge, if different from the current discharge: [40 CFR 125.61(a)(1)]

- **Diameter and length of the outfall(s) (meters)**
- **Angles of port orientations from horizontal (degrees)**
- **Port diameter(s) in meters and the orifice contraction coefficients(s), if known.**
- **Vertical distance in meters from mean lower low water (or mean low water) surface and outfall centerline (meters)**
- **Number of ports**
- **Port spacing (meters)**
- **Design flow rate for each port if multiple ports are used (m^3/sec)**

Appendix B presents a detailed description of the PLOO. No changes in outfall design parameters or configuration is proposed as part of this current NPDES application. As documented in Appendix B, the PLOO consists of original outfall pipe and a larger extended section added in 1994. Basic design criteria of the PLOO include:

- The original section is a 3,422-meter-long (11,226-foot-long), reinforced concrete pipe with an internal diameter of 2.74 meters (9 feet), The PLOO extension, also constructed of reinforced concrete pipe, has an internal diameter of 3.66 meters (12 feet) and a length of 3,732 meters (12,246 feet).
- The total length of the outfall system is 7,154 meters (23,472 feet). The orientation of the extension is S 78^o 40' W.
- The "Y" shaped diffuser system for the outfall extension has two legs that are each 760.8 meters (2,496 feet) in length.
- The internal diameter of each diffuser leg is reduced from 2.1 meters to 1.2 meters (7 feet to 4 feet) over the length of the diffuser leg.
- The compass directions (proceeding from the "Y" structure) for the two diffuser legs are N 17^o 13' W. and S 11^o 16' W, respectively.
- The diffuser ports are positioned 15 centimeters (6 inches) above pipe springline.
- The angle of port orientation is 5° below horizontal, and perpendicular to the pipe. The port diameters are 9.53 cm (3.75 inch) in the 7-foot diffuser sections, 10.80 cm (4.25 inch) in the 5.5-foot sections, and 12.07 cm (4.75 inch) in the 4-foot sections.

- The respective number of ports in each diffuser leg are: 84, 70, and 54.
- The orifice contraction coefficient varies from 0.970 to 0.975.
- The vertical distance from the ocean surface (mean lower low water) to the outfall port centerline varies from 93.3 meters to 95.4 meters (306 feet to 313 feet).
- There are a total of 416 diffuser ports (208 ports on each diffuser leg), all of which are open.
- The port spacing is 7.32 meters (24 feet) (measured on each side of the pipe).
- Ports are positioned opposite each other on the two sides of the diffuser pipes (i.e., not staggered).

Table II.A-24 summarizes overall port design criteria. As shown in the table, the design maximum flow rate for each port varies from 0.0477 m^3/sec to 0.0503 m^3/sec (1.09 mgd to 1.15 mgd).

At the annual average Point Loma WTP capacity of 10.5 m^3/sec (240 mgd), the average discharge flow per outfall port is projected at approximately 0.0253 m^3/sec (0.58 mgd).

Table II.A-24
Point Loma Ocean Outfall Diffuser Configuration

Section[1]	Length Per Leg (m)	Internal Diameter (m)	Pipe Thickness (cm)	Port Spacing[2] (m)	Port Diameter (cm)	Number of Ports Per Leg	Approx. Range of Depth[3] MLLW (m)	Port Design Flow Rate (m^3/sec) (max)
1	307.2	2.13	22.86	7.32	9.53	84[4]	93.3 - 94.2	0.048
2	256.0	1.68	22.86	7.32	10.80	70[4]	94.2 - 94.8	0.050
3	197.5	1.22	22.86	7.32	12.07	54[4]	94.8 - 95.4	0.049
Total (each leg)	760	---	---	---	---	208[4]	---	---
Approximate discharge flow per port for maximum dry weather flow - 10.51 m^3/sec (240 mgd)[5]								0.025[5]
Approximate discharge flow per port for peak hour flow - 19.76 m^3/sec (451 mgd)[5]								0.048[5]

1 Each diffuser leg is comprised of three sections of pipe, each with a successively decreasing diameter.
2 Port spacing shown is for ports on the same side of diffuser leg. Ports are located on both sides on the diffuser leg.
3 Elevation from the centerline of the ports to the ocean surface at Mean Lower Low Water (MLLW).
4 All ports are open.
5 Nominal diffuser port discharge flow based on listed maximum dry weather and maximum peak hour flows, divided by 416 ports. Actual flows through individual ports under these load conditions will vary with port diameter. Discharge flows through the ports will be within design limits for both maximum dry weather and peak hour flows.

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Section II.B

Large Applicant Questionnaire

II.B. *Receiving Water Description*

II.B.1. Are you applying for a modification based on a discharge to the ocean or to a saline estuary (40 CFR 125.58(q))? [40 CFR 125.59(a)]

This application for modification of secondary treatment requirements is based on a discharge to the ocean.

II.B.2. Is your current discharge or modified discharge to stressed waters? If yes, what are the pollution sources contributing to the stress? [40 CFR 125.61(f)]

SUMMARY: Receiving waters in the vicinity of PLOO are not stressed.

The City's prior 301(h) application documented that waters off the coast of Point Loma are of excellent quality and provide a healthy habitat for fish and wildlife. Since the City's original 1995 NPDES 301(h) permit was approved, comprehensive water quality monitoring, sediment monitoring, benthic species monitoring, fish abundance, and bioassay monitoring continue to demonstrate the excellent quality of waters and habitat off the coast of Point Loma. As documented in Appendices E and F, and in the responses to Question III.D, this comprehensive monitoring record demonstrates that:

- Receiving waters in the Point Loma area continue to comply with water quality standards established in State of California Ocean Plan for the protection of marine species and human health.
- As is typical in waters of the Southern California Bight, dissolved oxygen concentrations in the receiving water typically range from 7 mg/l or more near the surface to 3 mg/l or more in deep waters.
- Fish are abundant both near the outfall and at reference sites, and the lack of physical abnormalities and indicators of disease such as fin erosion, lesions and tumors indicate that populations have remained healthy off Point Loma since monitoring began.
- Concentrations of contaminants such as trace organics, metals, pesticides, PCBs, and PAHs in sediments within and beyond the zone of initial dilution for the outfall, as well as at reference sites, continue to be near background levels for the Southern California Bight.
- Balanced indigenous populations of fish, shellfish, benthic infauna, and other wildlife exist beyond the ZID.
- Key species parameters such as infaunal abundance, species diversity, benthic response index (BRI), and the numbers and populations of indicator species are maintained within the limits of variability that typify natural benthic communities of the Southern California Bight.
- Infaunal abundance values (the number of organisms per unit area of ocean bottom) demonstrate the healthiness of the marine environment offshore from

Point Loma. For example, abundances have averaged over 3300 organisms per square meter at ZID and reference stations since discharge began.

- Species cited by EPA as being a "pollution-sensitive" such as *Amphiodia urtica* and closely related species occur near the ZID and at reference stations in abundances that are within the range of natural populations throughout the Southern California Bight.

Detailed descriptions of sediment chemistry and benthic infauna during the period 2002-2006 is presented in Appendix E. Appendix F presents an evaluation of bioaccumulation in organism tissue.

The City collects and analyzes receiving water quality in the Point Loma area as part of a comprehensive water quality monitoring program. Detailed receiving water monitoring information has previously been submitted to the Regional Board as part of monthly, quarterly, semiannual, and annual reports. The City has also transmitted water quality monitoring data to EPA as part of this application for renewal of 301(h) requirements.

As documented in the attached appendices and in the responses to Questionnaire Sections III.B and III.D, receiving waters in the Point Loma area continue to be of excellent quality, and are not stressed.

II.B.3. Provide a description and data on the seasonal circulation patterns in the vicinity of your current and modified discharge(s). [40 CFR 125.61(a)]

SUMMARY: The PLOO discharge produces a submerged wastefield, and the minimum depth to the top of the wastefield is typically 100 feet (30m). Currents at this depth are dominated by longshore (upcoast and downcoast) motion. Net currents are upcoast at approximately 3 centimeters per second (cm/sec). Short-period cross-currents occur but are of limited duration.

A detailed characterization of seasonal circulation patterns in the Point Loma vicinity was presented in the City's 1995 301(h) application which included a description of:

- regional and local bathymetry,
- regional currents and currents in the Point Loma shelf area.

Appendix N presents the detailed characterization from the City's 1995 301(h) application. Seasonal circulation patterns in the Point Loma area remain as described in this 1995 document, and are summarized below.

Seasonal Patterns. Local ocean current circulation in the vicinity of the PLOO discharge occurs within a larger circulation of the California Current, California Undercurrent, and Southern California Undercurrent. These currents are graphically represented in Figure II.B-1 (page II.B-5).

The California Current is a broad current that typically moves at a velocity of 10 to 20 cm/sec. Surface circulation within the Southern California Bight is dominated by the Southern California Countercurrent, a counter-clockwise circulation between the California Current and the coast. Flow rates of this current vary by season, but are typically greatest during the spring. The California Undercurrent is a northward flow beneath the Southern California Countercurrent.

Mainland Shelf Currents. Current measurements presented in Appendix N document characteristics of mainland shelf currents off the coast of Point Loma. Key general characterizations of these mainland shelf currents include:

- the net subsurface flow is upcoast at approximately 3 cm/sec,
- the net surface flow is in the opposite direction (downcoast) at approximately 6 cm/sec,

- net flow immediately near the ocean bottom has a strong offshore (toward deeper waters) component that can exceed the longshore flow velocity,
- variations in the longshore currents occur on time intervals longer than tidal periods,
- variations in cross-shore currents are dominated by tidal cycles,
- typical transport distances associated with tidal cycles are approximately 0.6 to 1.9 miles (1 to 3 km),
- waters along the near-shore shelf are dispersed with offshore waters on time scales of weeks, and
- long-term variability in currents can equal or exceed the seasonal variability.

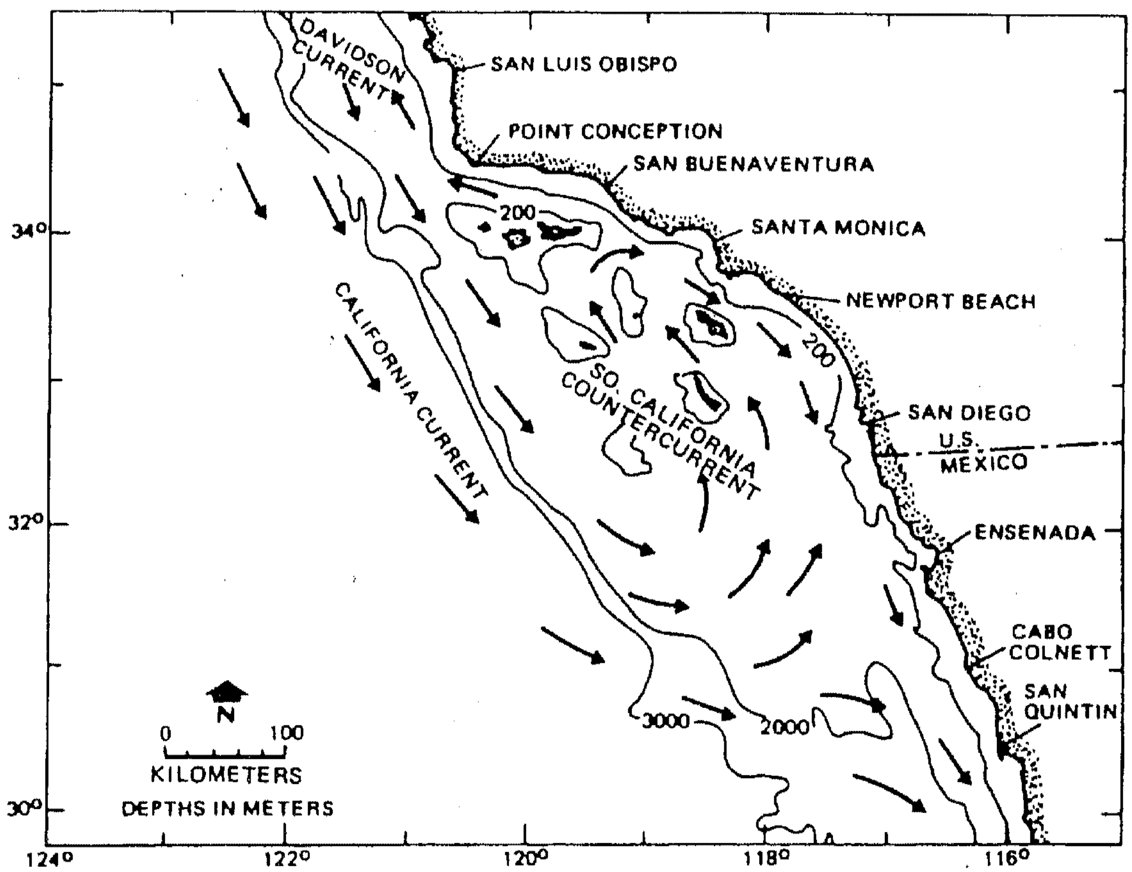

Figure II.B-1 Primary Currents of the Southern California Bight

Appendix N presents the results of comprehensive current monitoring for the Point Loma vicinity. Observed current data were used as input to a computer model (see Appendix Q of the City's 1995 3901(h) application) that simulated movement of the PLOO wastefield. The modeling assessed movement within a simulation area 30 km by 12 km (19 by 7.5 miles). The modeling determined an average flushing time for this simulation area of approximately 4.5 days. The modeling also projected a 90 percent probability that any given "parcel" of wastewater discharged from the PLOO would, after a high degree of dilution and dispersion, be transported out the simulation area within 10 days.

II.B.4 Oceanographic conditions in the vicinity of the current and proposed modified discharge(s). Provide data on the following: [40 CFR 125.62(a)]

- **Lowest ten percentile current speed (m/sec)**
- **Predominant current speed (m/sec) and direction (true) during the four seasons**
- **Period(s) of maximum stratification (months)**
- **Periods of natural upwelling events (duration and frequency, months)**
- **Density profiles during period(s) of maximum stratification**

SUMMARY: A detailed characterization of the oceanographic conditions in the vicinity of PLOO is presented in Appendix N (Volume VIII). Lowest ten percentile current speeds in the vicinity of the discharge are approximately 2 to 3 centimeters per second (cm/sec). Predominant (net) currents are upcoast and also typically range from 2 to 3 cm/sec. The period of maximum stratification is typically January. Stratification is typically weakest (allowing the potential for upwelling) during May.

A detailed characterization of oceanographic conditions in the vicinity of the PLOO discharge was presented in the City's 1995 301(h) application. This characterization remains valid, and is presented in Appendix N and summarized below.

Lowest Ten Percentile Speed. Ocean current studies performed during the early 1990s prior to construction of the extended PLOO remain valid in characterizing the lowest ten percentile current speed. Results of these earlier ocean current monitoring efforts are presented in Appendix N.

Table II.B-1 (page II.B-8) summarizes 10th percentile, 50th percentile (median), and 90^{th} percentile of current speeds within the typical depth range of the PLOO wastefield. As shown in Table II.B-1, 10^{th} percentile current speeds are typically 2 to 3 cm/sec. Median current speeds are on the order of 7 to 10 cm/sec.

Predominant Seasonal Current Speeds and Directions. Appendix N presents the results of comprehensive ocean current studies performed prior to construction of the extended PLOO. These prior measurements of current speeds and directions remain valid.

As documented in Appendix N, seasonal ocean currents can be described in terms of net flow and variations about the net flow. Table II.B-2 summarizes net flow by season, and Table II.B-3 (page II.B-9) summarizes variations about the net flow. As shown in Table II.B-2, net speeds are highest during fall, winter, and spring months. Currents are predominantly longshore during these times.

As shown in Table II.B-3, longshore currents vary over longer time intervals (intervals greater than tidal cycles), while cross-shore currents are dominated by tidal influences. Because cross-shore currents occur over shorter periods of time (and reverse with tidal events), the potential for onshore transport of the PLOO wastefield is reduced. Net currents are thus dominated by the longshore currents.

Table II.B-1
Statistical Characterization of Ocean Currents in Vicinity of the PLOO[1]

Statistical Parameter	Depth (meters)	Ocean Current Speed (cm/sec)				
		Winter 1990	Spring 1990	Summer 1990	Fall 1990	Winter 1991
10th Percentile	60	3.5	3.2	3.1	2.1	2.8
	80	4.0	3.4	1.8	2.8	2.5
Median	60	9.4	9.3	7.8	8.1	7.6
	80	12.5	9.5	8.5	7.6	7.5
90th Percentile	60	18.5	19.2	16.8	15.2	15.8
	80	20.9	18.3	17.7	14.8	15.7

1 From pre-construction oceanographic studies of the PLOO extension. See Appendix N for details.

Table II.B-2
Net Current Speeds by Season in the Vicinity of the PLOO[1]

Season	60m Depth		80m Depth	
	Current Speed (cm/sec)	Direction	Current Speed (cm/sec)	Direction
Winter - 1990	4.9	020	6.5	005
Spring 1990	4.6	018	5.1	008
Summer 1990	2.0	081	0.7	123
Fall 1990	3.3	033	2.6	004
Winter 1991	2.1	029	1.3	029

1 From pre-construction oceanographic studies of the PLOO extension. See Appendix N for details.

Table II.B-3
Variances by Season and Frequency

Season	Subtidal Frequency				Tidal Plus Super-Tidal Frequency			
	Longshore Variation (cm^2/sec^2)		Cross-Shore Variation (cm^2/sec^2)		Longshore Variation (cm^2/sec^2)		Cross-Shore Variation (cm^2/sec^2)	
	60m	80m	60m	80m	60m	80m	60m	80m
Winter	32.9	23.8	8.4	8.6	30.8	20.6	23.5	37.3
Spring	64.0	50.9	9.7	8.1	21.1	19.5	22.2	30.4
Summer	55.5	55.9	7.2	7.0	26.5	26.7	14.5	27.2
Fall[1]	33.3	15.8	2.0	0.9	27.3	29.4	31.5	36.5
Winter	52.8	40.9	5.2	6.0	30.5	32.6	18.4	63.2

1 From pre-construction oceanographic studies of the PLOO extension. See Appendix N for details.

Period of Maximum Stratification. Maximum stratification occurs when the thermocline depth is great and density gradients across the thermocline remain sufficiently strong to trap the discharged waste plume.

The City's 1995 301(h) application characterized temperature density profiles, and described how the thermocline depth (as measured from the ocean surface) increases during summer and autumn months) and reaches a maximum depth typically in or near January. Computer modeling using these density data was used to confirm that the period of maximum stratification oc curs at this time - t ypically in or near January. Appendix O presents stratification analysis and initial dilution modeling from this 1995 301(h) application.

Data and conclusions presented in this 1995 effort remain valid. The City collects temperature/salinity/density data at several dozen stations in the vicinity of the PLOO. Figure II.B-2 (page II.B-11) characterizes seasonal changes in temperature and salinity in the PLOO vicinity. As shown in Figure II.B-2, seasonal stratification characteristics are strongly defined, with the thermocline deepening and strengthening (strong density gradients) in the summer, deepening but with less pronounced density gradients in the late summer and fall, and reaching maximum depths in late fall/early winter.

Computer modeling (see Appendix O) confirms that the combination of strength and depth of the thermocline during these winter months (in combination with the depth of the PLOO discharge) create maximum stratification conditions.

Period of Natural Upwelling Events. Oceanographic work to characterize upwelling events in the vicinity of the PLOO discharge were presented in the City's 1995 301(h) application and remain valid. For reference, these 1995 studies are presented in Appendix N. As documented in Appendix N, seasonal stratification conditions are typically weakest in mid-spring (May). The potential for upwelling is greatest during such weak stratification conditions.

Local upwelling (vertical currents), however, can occur in waters beneath the thermocline without significantly disturbing the depth or strength of the thermocline. Such upwelling events are localized, and are interspersed with similar episodes of downwelling.

Density Profiles During Periods of Maximum Stratification. Density profiles during typical periods of maximum stratification are presented in Appendix O.

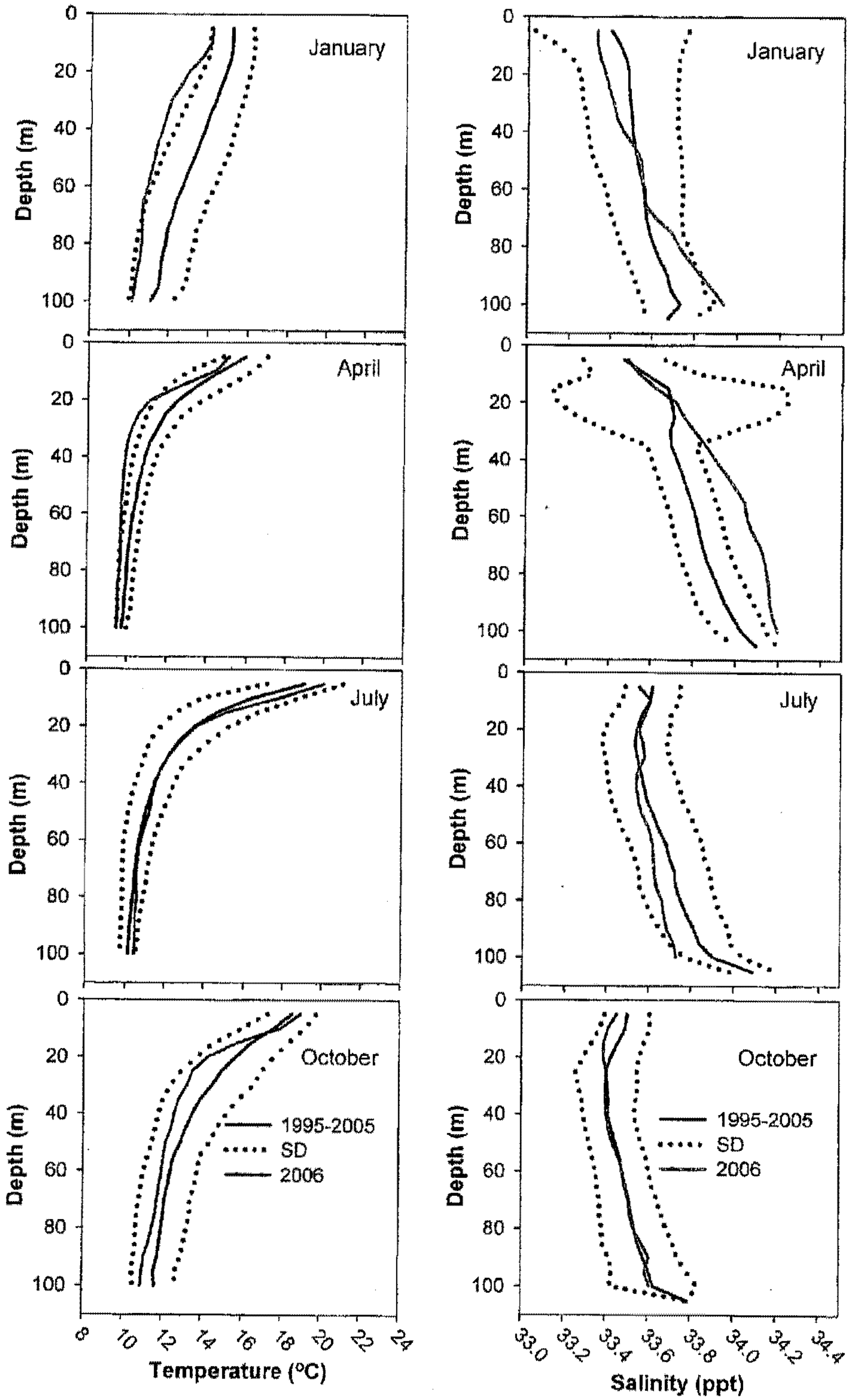

Figure II.B-2 Seasonal Changes in PLOO Temperature/Salinity Profiles

II.B.5. Do the receiving waters for your discharge contain significant amounts of effluent previously discharged from the treatment works for which you are applying for a section 301(h) modified permit? [40 CFR 125.57(a)(9)]

SUMMARY: The effectiveness of the PLOO is not significantly affected by re-entrainment; receiving waters for the PLOO discharge do not contain significant amounts of previously discharged effluent.

The City's 1995 301(h) waiver application evaluated re-entrainment for a wastewater flow of 240 mgd (10.51 m^3/sec). Results from this detailed re-entrainment modeling study remain valid, and are presented in Appendix M,

As documented in Appendix M, deep-water ocean currents off the coast of Point Loma are predominantly longshore. Typical current speeds range from 7.5 m/sec to 12.5 cm/sec (see Table II.B-1 on page II.B-8). Such current speeds advect the wastefield away from the vicinity of the outfall. Intermittent re-entrainment can, however, occur during periods of current reversals if previously discharged wastewater is transported back into the ZID. During such episodes, the overall "effective" initial dilution could be diminished as a result of this re-entrainment.

As documented in Appendix M, a volumetric mass-distribution model was used to evaluate potential re-entrainment effects for the 240 mgd (10.51 m^3/sec) PLOO discharge. A total of 13,757 time-series cases were investigated to determine the amount of effluent that re-enters the initial dilution zone during any 30-day period. Any time effluent is carried back into the initial dilution zone, the "effective" initial dilution is reduced.

Table II.B-4 (page II.B-13) summarizes the results of the modeling for the 13,757 time-series cases. As shown in the table, little overall difference exists between the computed "effective" initial dilution (dilution including the effects of re-entrainment) and the median initial dilution (for the 13,757 test cases) that would have occurred in the absence of any re-entrainment.

Table II.B-4
Effective Initial Dilutions Considering Re-Entrainment
240 mgd (10.51 m^3/sec) PLOO Discharge)

Parameter	Computed Volumetric Initial Dilution[1,3]	Effective Initial Dilution Including Re-entrainment[2,3]	Percent difference
Median Initial Dilution	338:1	317:1	6.6 %

1 Volumetric initial dilution is the initial dilution that would occur in the absence of any re-entrainment. Values shown above are from Table M-3, page M-12 from Appendix M.

2 Median computed effective initial dilution (initial dilution incorporating the effects of re-entrainment) for 13,757 time-series cases. Computed for an average background concentration at 67m depth.

3 Values shown above are from Table M-3, page M-12 from Appendix M.

II.B.6. Ambient Water Quality Conditions During the Period(s) of Maximum Stratification: at the zone of initial dilution (ZID) boundary, at other areas of potential impact, and at control stations: [40 CFR 125.61(a)(2)]

a. Provide profiles (with depth) on the following for the current discharge location and for the modified discharge location, if different from the current discharge:

- **BOD_5 (mg/l)**
- **Dissolved oxygen (mg/l)**
- **Suspended solids (mg/l)**
- **pH**
- **Temperature (°C)**
- **Salinity (ppt)**
- **Transparency (turbidity, percent light transmittance)**
- **Other significant parameters (e.g. nutrients, toxic pollutants and pesticides, fecal coliforms)**

Receiving water quality data collected is submitted to the Regional Board in monthly, quarterly, and annual monitoring reports. Within the annual reports, City scientists analyze the data and develop conclusions relative to data trends and causative factors.

These monitoring reports are incorporated by reference into this 301(h) application. In accordance with an agreement with EPA, these monitoring reports are not reproduced herein, but the City has transmitted these data in electronic format to EPA for review.

As documented in these monitoring reports, no discernible differences exist between the ZID station profiles of control station profiles for BOD_5, DO, TSS, pH, temperature, salinity, percent light transmittance, or other significant parameters.

b. Are there other periods when receiving water quality conditions may be more critical than the period(s) of maximum stratification? If so, describe these other critical periods and provide the data requested in 5.a for the other critical periods. [40 CFR 125.61(a)]

No. The period of maximum stratification represents the most critical period.

The City's 1995 waiver application assessed a number of potentially critical water quality periods for the 10.5 m^3/sec (240 mgd) PLOO discharge, including:

- periods of maximum stratification,
- periods of maximum hydraulic loading,
- potential critical periods associated with seasonal or temporary changes in water quality,
- potential critical periods associated with exceptional biological activity, and
- potential critical periods associated with low circulation or flushing.

Analyses presented in these 1995 studies remain valid. Appendix N presents the oceanographic study from the 1995 301(h) application, and Appendix O presents the stratification/initial dilution modeling studies. As documented in Appendices O and N, stratification is the factor most significant in affecting receiving water ocean water quality in the vicinity of the PLOO discharge. No significant seasonal changes in hydraulic loading occur, and no periods of low flushing or low circulation occur in the discharge zone.

Ambient receiving water quality off the coast of Point Loma consistently complies with Ocean Plan water quality objectives, and no water quality-related critical periods occur. None of these factors has as much impact on water quality as the period of maximum stratification.

Maximum stratification typically occurs in or around January. As discussed in the response to Question III.A.1, minimum month initial dilution for a flow of 10.5 m^3/sec (240 mgd) is more than 50 percent lower than the projected 338 to 1 median initial dilution. Since no critical periods exist due to seasonal changes in hydraulic loading, water quality, biological activity, or ocean currents, the period of maximum stratification is concluded to represent "worst case" receiving water conditions.

II.B.7. Provide data on steady state sediment dissolved oxygen demand and dissolved oxygen demand due to resuspension of sediments in the vicinity of your current and modified discharge(s) (mg/l/day).

The City's 1995 301(h) application evaluated steady state sediment dissolved oxygen demand and dissolved oxygen demand due to resuspension. These analyses remain valid, and an updated version of the analyses are attached as Appendix P.

Summaries of steady-state sediment dissolved oxygen depression (DO) and DO depression due to resuspension are presented in the response to Questionnaire Section III.B.3.

Section II.C

Large Applicant Questionnaire

II.C. *Biological Conditions*:

II.C.1. Provide a detailed description of representative biological community (e.g. plankton, macrobenthos, demersal fish, etc.) in the vicinity of your current and modified discharge(s): Within the ZID, at the ZID boundary, at other areas of potential, discharge-related impact, and at reference (control) sites. Community characteristics to be described shall include (but not be limited to) species composition; abundance; dominance and diversity; spatial and temporal distribution; growth and reproduction; disease frequency; trophic structure and productivity patterns; presence of opportunistic species; bioaccumulation of toxic materials; and the occurrence of mass mortalities.

SUMMARY: A detailed characterization of the pre-discharge biological community within the vicinity of the PLOO discharge was presented in the City's 1995 301(h) waiver application. No significant changes in these communities have occurred in the years after the PLOO discharge was initiated.

The City's 1995 301(h) application presented a detailed description of the pre-discharge biological community that existed in the PLOO region. Included in this 1995 pre-discharge characterization of the Point Loma biological community were the following:

- a description of the plankton, phytoplankton, zooplankton, macrobenthic invertebrates, demersal fish, the Point Loma kelp bed, marine birds and marine mammals. (Appendix T, Volume XIII of the 1995 waiver application),
- a description of the sediment characteristics and the infaunal and hard bottom communities within and outside the ZID (presented in Appendix U, Volume XIV of the 1995 waiver application),
- an assessment of the bioaccumulation of toxic materials in rig and trawl caught fish (presented in Appendix V, Volume XV of the 1995 waiver application), and
- a description of threatened and endangered species found within the Point Loma region (presented in Appendix W, Volume XV of the 1995 waiver application).

Since submittal of the City's 1995 waiver application, the City has continued to conduct a comprehensive monitoring program of water quality, sediment chemistry, benthic organisms, rig-caught fish, and trawl caught organisms. Appendix E presents a detailed evaluation of how the overall biological communities in the Point Loma area have remained consistent with regional averages.

Appendix G presents an evaluation of beneficial uses, including fisheries, habitat, and recreation. Appendix H presents a detailed description of endangered species that may be found in the PLOO vicinity.

As documented in Section III.D, the PLOO discharge has not significantly altered the biological communities in the vicinity of the PLOO discharge.

II.C.2. a. Are distinctive habitats of limited distribution such as kelp beds or coral reefs) located in areas potentially affected by the modified discharge? [40 CFR 125.61(c)]

b. If yes, provide information on type, extent, and location of habitats.

SUMMARY: The Point Loma kelp bed is the only distinctive habitat of limited distribution in the general vicinity of the discharge point. The City's 1995 301(h) waiver application presented detailed information on this kelp bed. Several distinctive habitats of limited distribution are located in excess of 8 kilometers (5 miles) from the discharge point.

Point Loma Kelp Bed. The Point Loma kelp bed is an underwater forest of giant kelp (*Macrocystis pyrifera*) that is located approximately one mile off the coast of Point Loma. The kelp bed is designated Bed #3 by the California Department of Fish and Game.

The Point Loma kelp bed is one of the largest kelp beds south of Santa Barbara, and is one of the most studied kelp forests of the world. Underwater research has been conducted in the Point Loma kelp bed since the mid 1950's when Wheeler North of the California Institute of Technology and his associates at Scripps Institution of Oceanography began long-term investigations of kelp bed ecology. Professors Paul Dayton and Mia Tegner of the Scripps Institution of Oceanography have performed ecological surveys at fixed locations in the Point Loma kelp bed since 1971, and their descriptive and experimental studies have established a database unique in the world.

Dayton and Tegner (see references cited in Appendix G) have demonstrated that large-scale, low-frequency episodic changes in oceanographic climate ultimately control kelp forest community structure. Local biological processes, like recruitment, growth, survivorship, and, reproduction, may be driven by small-scale ecological patterns. Decade-long shifts in climate (between cold water, nutrient-rich La Niñas and warm water, nutrient-stressed El Niños) and rare but catastrophic storms have been the principal forces governing the diversity and productivity of the kelp forest community at Point Loma. The Point Loma kelp continues to serve as a site for Scripps Institution of Oceanography and San Diego State University graduate student research.

While the overall extent of the Point Loma kelp bed varies with oceanographic conditions, the main portion of the forest is bounded by the southern tip of Point Loma (to the south) and the San Diego River (to the north).

A description of the Point Loma kelp is provided in Appendix G. As documented in Appendix G, regular estimates of the condition and size of the Point Loma *Macrocystis* bed are available from 1949 to the present. Intermittent estimates of the kelp bed size and condition are available from the mid-1800s into the 1940s. During this time, measured kelp canopies have ranged from a maximum of 15.4 km^2 (3800 acres) in 1911 to a low of 0.025 km^2 (6 acres) in 1963. In recent years, the size of the bed has ranged from a low of 0.28 km^2 (69 acres) during the 1983 El Niño year to 6.2 km^2 (1530 acres) in 1994, its largest size of record since 1942. The Point Loma kelp bed has averaged approximately 4 km^2 (1000 acres) during the past 50 years.

Regional estimates of kelp bed condition and size have been conducted in the Southern California Bight since the 1960s. The surveys have documented the significant position that the Point Loma kelp bed plays as a habitat resource. Twenty distinct regional kelp beds have been identified and have been surveyed annually since 1967 in Orange and San Diego Counties. The Point Loma bed has consistently exceeded 30 percent of the regional kelp area, and has comprised 45 percent of the total Southern California kelp beds on average.

Until recently, the kelp bed was harvested by a local company to provide a source of algin for use in manufacturing pharmaceuticals, household products, and food products. In 2006, however, International Special Products facility (formerly Kelco) closed their kelp processing facility in San Diego, terminated kelp harvesting of the Point Loma kelp bed, and moved their operations overseas.

The kelp bed remains a favorite recreational destination for anglers and divers. Appendix G summarizes kelp bed beneficial uses by divers and anglers.

Other Habitats of Limited Distribution. In addition to the Point Loma kelp bed, a number of areas of special biological significance exist offshore from San Diego. These areas of significance are located a minimum of 7.2 kilometers (4.5 miles) from the PLOO discharge point. These areas of special biological significance include marine sanctuaries and underwater parks, and are identified and described in Appendix G the response to Question II.D.3.

II.C.3 a. Are commercial or recreational fisheries located in areas potentially affected by the discharge? [40 JCFR 125.61(c)]

b. If yes, provide information on types, location, and value of the fisheries.

SUMMARY: Both commercial and recreational fisheries are located in areas potentially affected by the discharge. These commercial and recreational fisheries catch a variety of species, and represent a multi-million dollar industry. The various types of fisheries are not affected by the PLOO discharge.

Both commercial and recreational fisheries are located off the coast of Point Loma. A detailed description of commercial and recreational fishing in the vicinity of the PLOO is presented in Appendix G (Volume V). A summary of commercial and recreational fishing activities in the Point Loma area is presented below.

Commercial Fishing. Fishery catch statistics are reported for large fishery blocks that are 9 nautical miles (16.7 km) by 11 nautical miles (20.4 km) in size. Figure II.C-1 (page II.C-6) presents the California Department of Fish and Game fish blocks in the vicinity of the PLOO. The PLOO is located in Block 860.

Many commercially important species are found in block 860. The most commonly landed species during the years 2000-2006 were red urchin, California spiny lobster, rock crab, sheephead, California halibut, white seabass, and albacore tuna. The most commonly landed species from block 860 during 1994-1998 were red urchin, California lobster, sheephead, white croaker, sea cucumber, top snail, and rockfish (Wolfson and Glinski 2000). Urchin and lobster were by far the top two catches throughout the entire 1994-2006 period. The mean red urchin catch during 1994-1998 was 885,363 lbs/yr (402 mt/yr). During 2000-2006 the mean urchin catch was 770,236 lbs/yr (349 mt/yr). The mean California lobster catch during 1994-1998 was 155,912 lbs/yr (71 mt/yr). During 1994-1998 the mean California lobster catch was 150,463 lbs/yr (68 mt/yr).

Not all fish caught from Block 860 are landed in San Diego, so the proportion of the catch that contributes to San Diego's economy is unknown. Catch data specific to Point Loma is not available. However, landing data is collected at the two landing ports closest to Point Loma: San Diego Port basin adjacent to Point Loma (Point Loma Harbor) and Mission Bay Harbor. These data provide a better estimate of the economic contribution of Point Loma's fisheries to the local economy. Landings for the top ten commercially important species (in terms of weight and value) at Point Loma and Mission Bay during 2006 are presented in Table II.C-1.

Figure II.C-1 Southern California Fisheries Block Chart

From catch data supplied by commercial fishermen, California Department of Fish and Game reports the total number of pounds of commercial fish landed by species in California. The reported yearly catch from Block 860 during 2000-2006 is presented in Table II.C-1 (page II.C-7). Table II.C-2 (page II.C-8) presents landings by poundage and value. The highest landing dollar values at Point Loma and Mission Bay during 2006 were for the California spiny lobster and the red urchin (red urchin had the highest poundage). These top two commercial "fish" species are the same as in previous years (Wolfson and Glinski 1986, 1990, 1992, 1994, 1995, 2000). Lobster catch landings and dollar values at Point Loma and Mission Bay Harbors during the 2001-2006 seasons are shown in Figure II.C-2 (below).

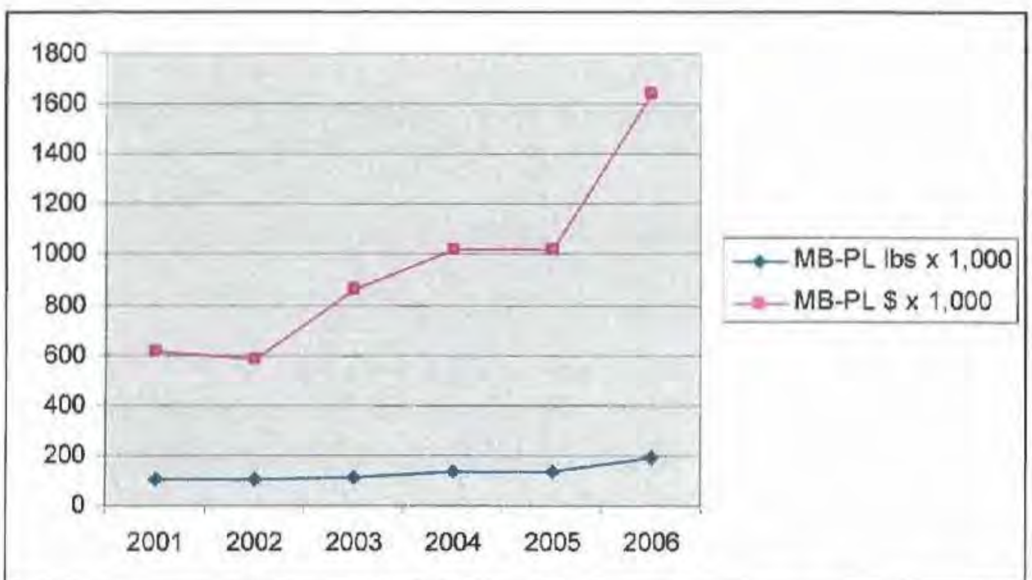

Figure II.C-2 Lobster Catch and Value for Point Loma plus Mission Bay

Table II.C-1
Yearly Catch from Block 860

Species	Yearly Catch (number of fish)						
	2000	2001	2002	2003	2004	2005	2006
Barracuda, CA	4,146	3,338	9,946	1,011	2,774	2,419	847
Bonito, Pacific	267	9	244	902	1,174	795	6,708
Cabezon	28	106	253	88	340	166	104
Crab, rock	125,149	108,621	40,954	76,883	71,938	42,179	25,510
Crab, spider	3,920	1,601	1,861	2,696	3,747	3,615	7,825
Croaker, white	26	0	316	0	0	0	0
Dolphinfish	306	139	0	666	188	21	201
Eel, moray	33	13	0	301	341	7	0
Halibut, CA	22,206	18,730	8,928	6,057	7,713	9,767	6,167
Lingcod	13	41	319	1,118	1,182	471	615
Lobster, CA	160,743	119,734	107,925	125,873	171,029	152,095	215,840
Louvar	0	358	0	424	91	0	149
Octopus	0	0	162	61	215	80	19
Opah	4,234	1,739	257	4,141	932	76	460
Prawn, spot	884	90	218	24	262	4,4053	6,894
Queenfish	0	0	4,005	4,489	0	0	0
Rockfish, all	4,759	4,130	2,209	859	5,519	3,718	2,982
Sablefish	3,685	65	0	6,155	2,483	1,373	592
Sanddab	459	48	0	0	0	0	9
Sardine, Pacific	658	0	687	0	263	170	137
Scorpionfish,CA	2,871	3,232	3,265	14	140	178	244
Sea cucumber	6,408	1,110	17,347	8,440	9,357	10,505	0
Seabass, giant	0	221	80	10	166	326	135
Seabass, white	5,793	3,800	11,596	25,105	6,850	12,620	3,522
Shark, bigeye	522	94	0	457	152	233	0
Shark, leopard	533	313	442	181	613	49	0
Shark, shortfin mako	2,185	7,267	2,999	2,611	4,838	7,454	313
Shark, soupfin	1,121	1,350	133	15	10	213	105
Shark, thresher	7,062	4,014	4,081	1,472	3,915	1,884	1,062
Sheephead	11,346	7,236	10,926	14,694	14,994	29,368	15,333
Shrimp, ghost	319	263	94	354	185	19	0
Snail, sea	13	126	44	0	32	0	0
Snail, top	26,148	8,448	1,200	664	1,663	745	0
Sole	249	208	9	0	0	0	0
Squid, jumbo	586	0	734	0	0	133	0
Squid, market	794	473	0	0	34,371	0	954
Surfperch	542	1,175	0	30	0	214	0
Swordfish	19,685	20,839	2,749	23,810	6,070	1,577	7,397
Thornyheads	157	0	2	67	3	6	0
Tuna, albacore	3,585	12,370	54,389	18,219	13,243	109	0
Tuna, bigeye	0	1,508	0	0	0	0	0
Tuna, bluefin	9,177	505	623	1,624	554	0	25
Tuna, skipjack	457	191	35	1,114	45	286	63
Tuna, yellowfin	1,063	2,542	0	1,091	399	35	277
Urchin, purple	0	25	300	521	654	1,936	596
Urchin, red	585,438	763,362	999,719	832,300	764,933	679,456	766,444
Whelk, Kellet	1,624	966	183	68	42	8,360	20,986
Whitefish, ocean	25	13	381	21	58	157	32
Yellowtail	8,305	4,536	1,194	1,825	8,886	3,682	1,481

Source: California Department of Fish and Game. See Appendix G.

Table II.C-2
Commercial Fishery Landings at Point Loma and Mission Bay

Species	Poundage	Value	Harvest method & depth
Lobster, CA spiny	189,742	$1,643,317	Kelp, traps 30 ft <120 ft
Urchin, red	788,395	$471,794	Kelp, hand, 30 ft- 80 ft
Prawn, spot	18,853	$208,522	Bottom traps 600-1,800 ft
Sablefish	27,949	$114,863	Trawl, net, traps, 900-4,200 ft
Sheephead, CA	21,385	$91,246	Kelp, rock, trap, hook,<280 ft
Thornyhead, shortspine	20,774	$85,897	Trawl/net 1,200-4,200 ft
Seabass, white	6,725	$11,852	Surface < 400 ft, hook & line
Rockfish, blackgill	10,976	$11,286	Trap, hook, 150-900 ft
Crab, rock unspecified	14,599	$10,371	Bottom traps 90-300 ft
Rockfish, group shelf	5,129	$10,282	Trap, hook, 150-900 ft

Source: California Department of Fish and Game. See Appendix G.

The lobster catch was relatively stable with a slight increase in landed weight during 2001-2006. The dollar value of the catch increased substantially during the period to over $1.6 million dollars in 2006.

Comparing the current period, 2001-2006, to the prior period (1994-1999) as reported in Wolfson and Glinski (2000), sea urchin landings decreased in 1997-1998, reflecting the influence of an El Niño effect. This was not the case for lobster – 1994 had the lowest catch and 1997 the highest, with the lobster harvest at Point Loma averaging 150,000 lbs/year (68 mt/yr) during the 1994 to 1998 seasons. The current period was not as productive, averaging 130,333 lbs/yr (59 mt/yr) landed at Point Loma-Mission Bay. The 2006 lobster harvest landed at Point Loma-Mission Bay was 189,742 lbs/yr (86 mt/yr).

Sea urchin are harvested for their roe, which is known as "uni". Harvesting is done by divers in the Point Loma kelp bed, usually in depths of 30 - 70 feet (9 - 21m) using a hookah breathing system connected to a surface vessel or platform.

The overall California catch of red sea urchin has varied considerably during the past 30 years, as depicted in Figure II.C-3 (page II.C-9). Variations reflect a number of factors including limited development of the fishery prior to the mid-1980s, a strong 1982-1983 El Niño, weak El Niños in 1987 and 1992, and catch restrictions. The continued diminished urchin harvests in 1997-1998 were a result of the loss of kelp, their primary food source, during the prevailing strong El Niño (Wolfson and Glinski 2000).

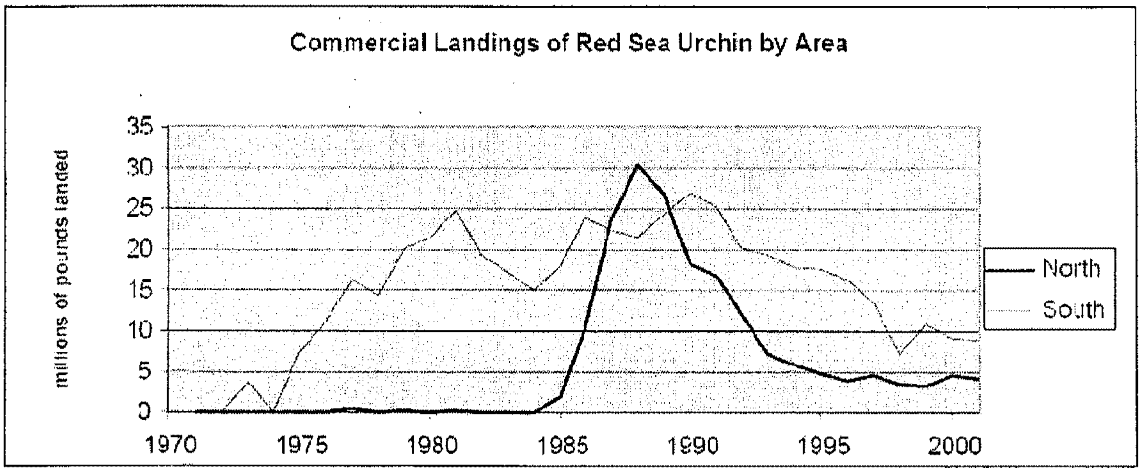

Figure II.C-3 California Annual Red Urchin Landings

Since 1999, the entire southern California catch (minus San Diego county catch) has continued to decline while the San Diego county catch has remained relatively steady with some increase. The Point Loma-Mission Bay harvest averaged 812,962 lbs/yr (369 mt/yr) through the period 2001-2006.

Both the lobster and urchin fisheries occur near or in the kelp beds, which are limited to maximum depths of about 90 feet over consolidated bottom (out to about 1 mile from shore). Thus, these fisheries take place at a distance of 3.5 miles (5.6 km) or greater from the PLOO.

Over the past twenty years there has been a steady increase in demand for "live" finfish. This began primarily to serve members of the Asian community and has since grown to include many markets and Asian restaurants. The primary target species weigh generally 1.5 - 2.5 pounds (0.7 - 1.1 kg) and include CA sheephead, CA halibut, CA scorpionfish, cabezon, lingcod and several members of the genus *Sebastes* (rockfish). From 1989 to 1995, live landings of CA sheephead increased more than 10-fold, more than 100-fold for CA halibut, and more than 1,000-fold for cabezon.

California sheephead are another profitable fishery in the Point Loma area. The California sheephead, *Semicossyphus pulcher,* is a large, colorful wrasse. Populations off southern California have declined because of fishing pressure. Large males are now rare because they are sought by recreational spear fishermen. Sheephead are taken commercially by traps and kept alive for display in restaurant aquaria where patrons select a specific fish for preparation. The red color and soft, delicate flesh are especially prized in Asian cuisine.

Sablefish are caught by trawls, nets, trap, and hook and line. Sablefish can live 50 years and can weigh up to 126 lbs (57 kg). They enter the fishery as early as 1 year of age and most are taken by the trawl fishery by years 4-6, at a weight of less than 25 lbs (11 kg). Traps and long-line hook fisheries generally catch the older, larger fish. Most of the catch is exported to Japan where it is served as sushi. In the U.S., sablefish are often marketed as black cod, the smaller ones are often filleted and sold as butterfish.

Spot prawn (shrimp) are caught in traps set on the sea floor at depths of 600 - 1,200 ft (183 - 366m); with some taken incidentally in the ridgeback prawn fishery. Much of the spot prawn catch off Point Loma goes to supply restaurants featuring live display.

Rock crabs off Point Loma are mostly caught in traps to depths of 300 ft. The predominant species taken is the yellow rock crab, *Cancer anthonyi*. In southern California, rock crab are most common on rocky bottoms at depths of 30-145 feet (9 - 44m), but are also found on open sandy bottoms where they partially bury themselves when inactive.

Shortspine thornyheads are found off California in waters ranging from 100-5,000 ft deep. They migrate to deeper water as they grow and are closely associated with the bottom. They are usually fished from bottom waters 1,200 - 4,200 ft deep (366 - 427m) with peak abundance generally in the 1,800-3,000 ft range (549 - 914m). They are members of the family Scorpaenidae, and like sablefish, they are currently primarily exported to Japan for sushi.

California halibut, a regular component of the fisheries catch off Point Loma, are a prized, non-schooling flatfish. In the San Diego area they are caught in depths to about 300 feet (91m), by hook and line, directed longline, and set gill nets in federal waters (more than three nautical miles offshore). California halibut range in size up to a maximum of about 70 pounds (32 kg), although most are much smaller.

White seabass can grow to 90 lbs (41 kg), although fish over 60 lbs (27 kg) are rare. Adults school over rocky areas or near and within kelp beds. They are caught near the surface and to depths of nearly 400 ft (122 m).

Rockfish are non-migratory, and many species of rockfish are caught in the offshore area of Point Loma. Numerous rockfish stocks in both northern and southern California are considered depleted, and in an effort to better regulate the stocks, rockfish were divided into nearshore, shelf and slope groups in 2001.

The shelf group (see Table II.C-3) includes 32 fish of the genus *Sebastes*. They are most commonly caught by trap and hook and line over the continental shelf from depths of 20- 150 fm (120 - 900 ft). Figure II.C-4 (page II.C-12) graphically depicts the rockfish locations.

Table II.C-3
Rockfish Distribution in Southern California

Location	Species	
Shallow Nearshore Rockfish	black-and-yellow (*S. chrysomelas*) China (*S. nebulosus*) gopher (*S. carnatus*)	grass (*S. rastrelliger*) kelp (*S. atrovirens*)
Deep Nearshore Rockfish	black (*Sebastes melanops*) blue (*S. mystinus*) brown (*S. auriculatus*) calico (*S. dalli*)	copper (*S. caurinus*) olive (*S. serranoides*) quillback (*S. maliger*) treefish (*S. serriceps*)
Shelf Rockfish	bocaccio (*Sebastes paucispinis*) bronzespotted (*S. gilli*) canary (*S. pinniger*) chameleon (*S. phillipsi*) chilipepper (*S. goodei*) cowcod (*S. levis*) dwarf-red (*S. rufinanus*) flag (*S. rubrivinctus*) freckled (*S. lentiginosus*) greenblotched (*S. rosenblatti*) greenspotted (*S. chlorostictus*) greenstriped (*S. elongatus*) halfbanded (*S. semicinctus*) honeycomb (*S. umbrosus*) Mexican (*S. macdonaldi*) pink (*S. eos*)	pinkrose (*S. simulator*) pygmy (*S. wilsoni*) redstriped (*S. proriger*) rosethorn (*S. helvomaculatus*) rosy (*S. rosaceus*) silvergrey (*S. brevispinis*) speckled (*S. ovalis*) squarespot (*S. hopkinsi*) starry (*S. constellatus*) stripetail (*S. saxicola*) swordspine (*S. ensifer*) tiger (*S. nigrocinctus*) vermilion (*S. miniatus*) widow (*S. entolemas*) yelloweye (*S. ruberrimus*) yellowtail (*S. flavidus*)
Slope Rockfish	aurora (*S. aurora*) bank (*S. rufus*) blackgill (*S. melanostomus*) darkblotched (*S. crameri*) Pacific ocean perch (*S. alutus*) redbanded (*S. babcocki*)	rougheye (*S. aleutianus*) sharpchin (*S. zacentrus*) shortraker (*S. borealis*) splitnose (*S. diploproa*) yellowmouth (*S. reedi*)

Other important commercial species caught in the area (Table II.C-3) include:

<u>*Groundfish Species*</u> - slope rockfish and nearshore rockfish, scorpionfish, lingcod, longspine thornyhead and cabezon are caught off Point Loma. The invertebrates; octopus, sea cucumber and spider crab are also taken in small numbers on or near the bottom.

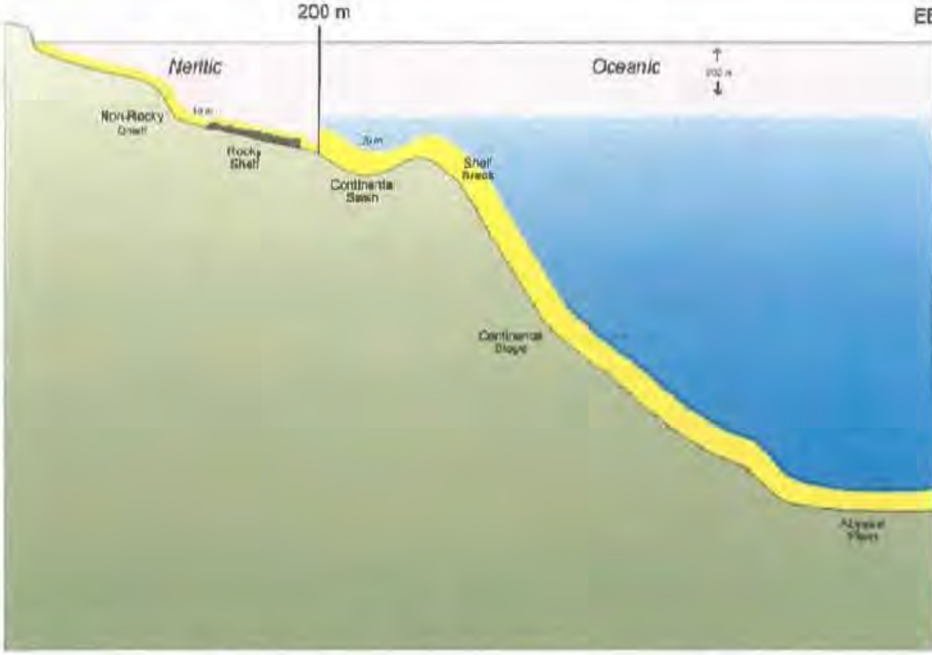

Figure II.C-4 Pacific Coast Rockfish Locations

<u>*Highly Migratory Species*</u> - are represented by catches of albacore, swordfish and thresher shark. Albacore are usually found 20-100 miles (32 - 320 km) offshore. Normal catch size is 20-40 pounds (9 - 18 kg). Swordfish are caught far off Point Loma every year. There were 30,933 pounds (worth $142,245) of swordfish landed at Point Loma and Mission Bay Harbor during 2005.

<u>*Coastal Pelagic Species*</u> - Pacific sardine, northern anchovy, jack mackerel, chub (Pacific) mackerel, and market squid support important fisheries along the southern California coast. Pacific mackerel are caught in surface waters by the purse seine fleet. Most Pacific mackerel caught off California weigh less than 3 pounds (1.4 kg). The catch is mainly targeted for human consumption and for use as pet food. A small amount is sold at fresh seafood markets. The other Coastal Pelagic Species are also caught by the purse seine fleet.

Figure II.C-5 (page II.C-13) compares the total catch value of all species landed in Point Loma and Mission Bay during 2001-2006 with the remainder of San Diego County (which includes Oceanside Harbor, San Diego Harbor, and Imperial Beach).

The value of species landed at Point Loma-Mission Bay was relatively stable compared to other ports in San Diego County during the period. In 2001, the value of the Point Loma-Mission Bay catch alone was 50 percent of the value from the rest of San Diego County, and represented 33 percent of the total catch value for the entire county (Point Loma-Mission Bay plus remainder of San Diego ports). By 2006, the Point Loma-Mission Bay catch was 71 percent of the value from the rest of San Diego County, and represented 59 percent of the total catch value for the entire county.

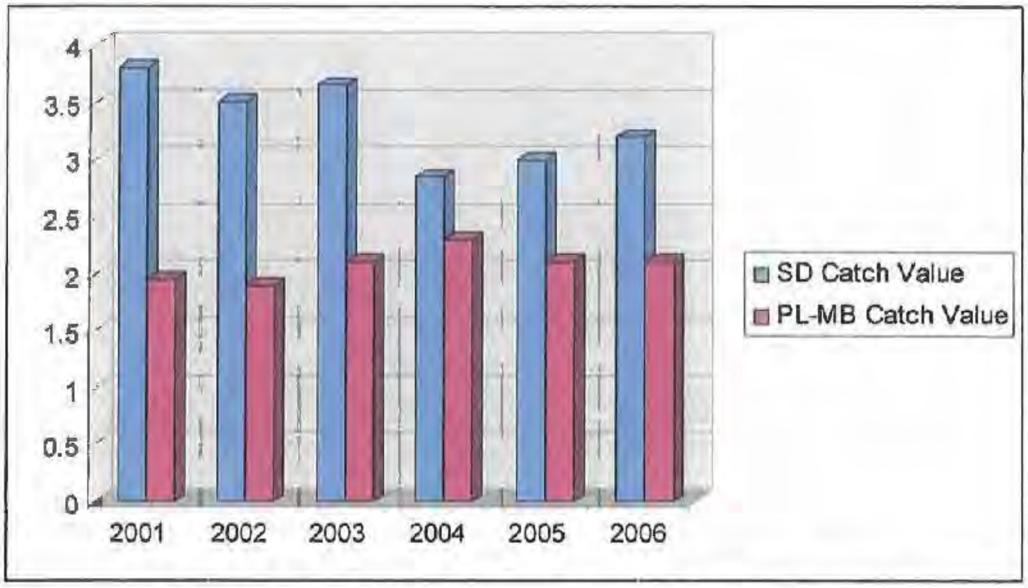

Figure II.C-5 Six Year Commercial Catch Value ($ millions)

The harvesting of giant kelp (*Macrocystis pyrifera*) had previously been a key economic asset to the region; kelp from the Point Loma kelp bed had been harvested by the same company since 1929. During most of this time, kelp has been the single most valuable fishery in the vicinity of Point Loma because of the high value product algin, a hydrocolloid created from it. Algin is used as a binder, stabilizer, and, emulsifier in pharmaceutical products, in cosmetics and soaps, and, in a wide variety of food, drink, and industrial products. The Point Loma kelp bed, the largest kelp bed in San Diego County, had special commercial importance because of its proximity to the San Diego kelp processing plant (Wolfson and Glinski 2000). The company that harvested and processed the kelp in San Diego (International Specialty Products Company, formerly Kelco), terminated operations in San Diego in 2006 and relocated to Scotland.

Recreational Fishing. Much of Point Loma is a military reservation with restricted shoreline access – thus shorefishing is limited and the vast majority of sportfishing is done from boats. Typical species targeted by recreational anglers include rockfish, Pacific mackerel, kelp/sand bass, California barracuda, Pacific bonito, California sheephead, white seabass, California halibut, yellowtail, rockfish, and seasonally, Highly Migratory Species (HMS) such as tunas.

Of all the California fisheries, the most profound changes in catch composition has occurred in the southern California private vessel and Commercial Passenger Fishing Vessel (CPFV) fisheries (Love 2006). Most striking is the sharp decline in the numbers of rockfishes caught, particularly bocaccio, and olive and blue rockfishes. Once mainstays of the fishery, bocaccio, olive and blue rockfishes have practically disappeared from the recreational catch. It is likely this was caused both by overfishing (recreational and commercial) and 25 years of juvenile recruitment failure from adverse oceanographic conditions (Love et al. 1998a,b). During the same period, a number of warm-water species, such as yellowtail, Pacific barracuda, California scorpionfish, ocean whitefish, vermilion rockfish, and honeycomb rockfish became much more abundant. Perhaps the most fundamental, recent change in the California fishing industry is the emergence of the private recreational vessel fleet, which is now the single largest component of the recreational fishery (Love 2006).

In the Point Loma area, the extensive kelp bed remains the primary focus of sportfishing activity. A still flourishing commercial passenger fishing vessel (CPFV) and private fishing vessel fleet, based in San Diego Bay and Mission Bay, operates in the vicinity of Point Loma. CPFVs (commonly called party boats) provide bait, gear rental, food service, fish cleaning, and transportation to fishing grounds for paying passengers on half-day and full day trips. CPFVs mainly fish the outside edge of the kelp bed, as do the majority of private sportfishing boats (Wolfson and Glinski 1986, 1990, 1992, 1995, 2000).

Catch data for the commercial passenger fishing vessel fleet in San Diego and Mission Bays during 2001- 2006 appears below in Table II.C-4 (below) and Table II.C-5 (page II.C-15).

Table II.C-4
Number of Anglers and CPFVs,
San Diego and Mission Bay CPFV[1] Fleet, 2001-2006

Parameter	2001	2002	2003	2004	2005	2006
Number of Anglers	182,428	152,848	147,700	149,383	126,783	133,677
Number of CPFVs	81	80	105	98	98	89
Catch per Angler	3.41	4.89	4.62	4.68	4.25	4.08

1 Commercial passenger fishing vessel (CPFV).

Table II.C-5
San Diego and Mission Bay CPFV Fleet Catch, 2001-2006

Common Name	Fleet Catch (number of fish)					
	2001	2002	2003	2004	2005	2006
Barracuda, CA	44,206	53,861	28,082	44,015	17,387	24,707
Bass, barred sand	67,164	114,353	100,025	52,799	76,938	4,505
Bass, kelp	67,457	60,518	69,054	98,616	46,988	48,175
Bonito, Pacific	4,687	5,066	11,618	30,760	7,938	53,319
Cabezon	225	82	164	112	46	60
Croaker, white	1,071	391	166	88	353	300
Dolphinfish	3,440	0	0	0	0	0
Fishes, unspecific	4,197	3,540	5,674	5,764	4,210	5,420
Flatfishes, unspecific	152	34	35	6	12	25
Halfmoon	92	0	0	0	0	0
Halibut, CA	507	402	306	448	332	167
Inverts, unspecific	0	7,814	523	977	10,365	684
Lingcod	629	5,352	7,690	2,274	3,014	2,444
Mackerel, jack	1,319	200	155	24	82	7
Mackerel, Pacific	16,697	16,279	14,034	6,556	13,344	5,573
Other HMS	0	51,277	80,476	80,026	72,676	97,974
Rockfish, all	56,612	60,379	52,856	58,900	80,888	63,468
Sanddab	0	100	73	300	484	200
Scorpionfish, CA	32,542	18,927	20,006	25,647	30,287	18,936
Seabass, white	614	227	243	227	195	218
Shark, all	244	48	59	112	167	115
Sheephead, CA	2,235	1,545	1,893	1,517	1,473	2,720
Tuna, albacore	178,843	272,349	217,726	174,047	94,679	19,898
Tuna, bluefin	19,573	0	0	0	0	0
Tuna, skipjack	7,512	0	0	0	0	0
Tuna, yellowfin	30,194	0	0	0	0	0
Whitefish, ocean	23,551	15,626	12,538	11,339	15,413	9,733
Yellowtail	57,576	58,730	59,442	104,513	61,565	143,263
TOTAL LANDINGS	621,339	747,101	682,238	699,067	538,836	545,663

The principal sportfish caught in the vicinity of Point Loma during the period were sand bass, kelp bass, rockfish, barracuda, scorpionfish. Offshore (5 - 25 nautical miles), the principal sportfish caught included the seasonal migratory species albacore tuna and yellowtail (jack). With some minor yearly fluctuations in rank, these were the same top-rated sportfish caught in the area during 1983-1985, 1991-1993 and 1994-1998 (Wolfson and Glinski 1986, 1995, 2000, respectively).

The number of reporting CPFVs in the San Diego/Mission Bay area increased by about twenty-percent during the 2001-2006 period (from 81 to 89, although it peaked at 105 during 2003), whereas there was a decline in both the number of anglers and in fish landings. The catch/angler remained roughly the same with the overall 6 year average catch/angler being 4.32 fish per trip. A comparison of San Diego/Mission Bay's CPFV fleet activity to the statewide CPFV fleet activity (omitting San Diego/Mission Bay) from 2001-2006 is presented in Figure II.C-6.

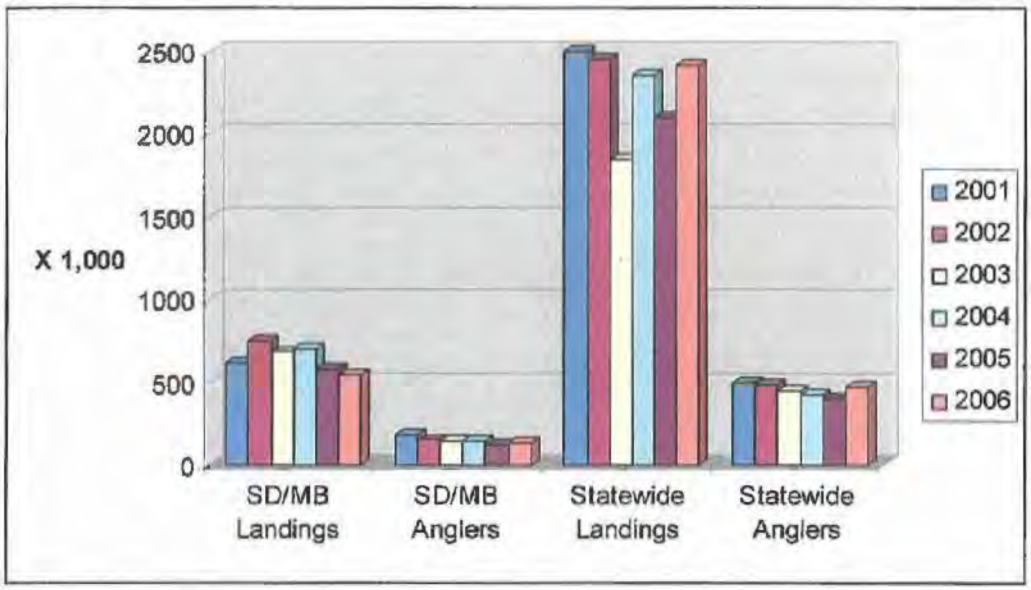

Figure II.C-6 San Diego/Mission Bay vs. Statewide CPFV Activity 2001-2006

The number of CPFV anglers declined somewhat during the 6 year period, both for San Diego/Mission Bay and the rest of the state. This probably reflects the overall state trend of increasing private boat ownership and participation in ocean recreational fishing previously described. CPFV landings show variation during the period, with a relatively steady downward trend for the state in general and a less clear fluctuation for the Point Loma-Mission Bay CPFV fleet.

Although numerous factors contribute to the availability of sportfish, and therefore landings, the multi-year decline in landings generally reflects the decline in the number of CPFV anglers in both regions - since the catch per angler remained relatively steady throughout the period. Anglers aboard CPFVs statewide did slightly better in the overall average number of fish landed during the period. Statewide, anglers averaged 4.90 fish/angler/ trip compared to 4.32 fish for anglers in the San Diego/Mission Bay region. The precise causes for this are unknown, but might include overall fishing pressure differences (commercial and recreational), and a seasonal shift (summer) of San Diego fishing effort from the nearshore and kelp bed areas to well offshore in search of highly prized albacore tuna when they are within 5-20 miles of the coast. Increased interest in multiple day trips occur when HMS are available. The offshore catch (and presumably the availability of HMS) has greater variability than catches of coastal pelagic species or groundfish species. Therefore, the overall number of fish landed may decline while the individual fish size increases. For example, albacore are highly prized large fish - anglers are often willing expend more effort and money to catch desireable HMS compared to numerous, smaller sand bass, kelp bass or rockfish. When HMS are within reach, anglers often prefer private boats and fast sportfish charter boats known as 6-pacs (referring to the number of passengers Captains are licensed to carry). Quantitative records of catches from 6-pac boats and private vessels are not reflected in the CPFV catch above.

The California Recreational Fisheries Survey is a statewide sampling program designed to collect catch/effort data on all modes of marine recreational finfish fishing. It is a collaborative effort of the California Department of Fish and Game and the Pacific States Marine Fisheries Commission. This survey began in 2004, but includes data from previous programs dating back to 1999. Data are collected from 6 districts; the South District includes Los Angeles, Orange and San Diego counties. Table II.C-6 (page II.C-18) summarizes fishing modes and trips during 2005, as compiled by the California Recreational Fisheries Survey. The data include fishing activities from CPFVs, harbors, marinas, piers, landings and from shore and other shore structures.

Because much of Point Loma is a restricted military installation, the percentage of fishing from beaches and man-made structures is greatly reduced compared to that of the southern district overall as shown above. In previous recreational boat position studies off Point Loma, Wolfson and Glinski found fishing from private boats concentrated on the kelp bed, and often mirrored CPFVs positions (Wolfson and Glinski 1985). This resulted in similar species being caught, with the exception of shellfish species (lobster, crab, rock scallops, sea snails, sea cucumber and sea urchin) which are taken by sport divers in the nearshore zone.

Table II.C-6
Estimated Number and Mode of Fishing Trips
South District, 2005[1]

Fishing Mode	Number of Annual Fishing Trips[1]
Man-made structures	518,763
Beaches and banks	210,974
CPFVs	254,646
Private and rental boats	326,010
South District Total	1,310,393

1 Data for calendar year 2005. From California Department of Fish and Game and Pacific States Marine Fisheries Commission for the South District, which includes Los Angeles, Orange, and San Diego Counties.

Sportfishing by divers, both free-divers and SCUBA, at Point Loma also takes place in and around the Point Loma kelp bed. Abalone can no longer be collected, but lobster and scallops continue to be collected (by hand) and a variety of fish are taken by spear. The rip rap boulders covering the outfall pipeline form an artificial reef providing good recreational fishery catch (Wolfson and Glinski 1994).

Table II.C-7 (page II.C-19) categorizes the typical catch zones of species caught by recreational fishers in the vicinity of Point Loma and offshore.

Recreational fishing varies seasonally and is weather related, especially when fishing from boats, as is the case off Point Loma. Summer months show an increase in fishing activity in both state and federal waters. Inshore recreational fishing gradual increases throughout the calendar year beginning in March and ending in February. Recreational fishing trips generally peak during the summer months.

Table II.C-7
Typical Catch Zones for Recreational Species

Type	Species	Surface Waters	Mid-Depth	Bottom
Fish	Barracuda	●		
	Bass, sand			●
	Bass, kelp	●	●	●
	Bonito	●	●	
	Flatfish			●
	Lingcod		●	●
	Mackerels	●		
	Rockfish			●
	Scorpionfish			●
	Sheephead			●
	Tunas, all	●	●	
	Whitefish			●
	Yellowtail	●		
Shellfish	Crab			●
	Lobster			●
	Sea snail			●
	Sea Urchin			●

● indicates typical catch zones by depth for the listed species

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Section II.D

Large Applicant Questionnaire

II.D. *State and Federal Laws:*

II.D.1. Are there any water quality standards applicable to the following pollutants for which a modified discharge is requested:

- **Biochemical oxygen demand or dissolved oxygen?**
- **Suspended solids, turbidity, light transmission, light scattering, or maintenance of the euphotic zone?**
- **pH of the receiving water?**

SUMMARY. The State of California Ocean Plan establishes numerical effluent standards, numerical receiving water standards, and narrative receiving water objectives to prevent impacts to designated beneficial uses of the state's ocean waters. The Ocean Plan establishes specific objectives that address potential impacts from the discharge of wastewater that contains BOD, TSS, or other pollutants that may inhibit light transmittance and maintenance of the euphotic zone.

California Ocean Plan . As noted in the response to Questionnaire Section II.A.4, this application requests modified water quality standards for BOD and TSS. The State of California establishes water quality standards in the *State of California Water Quality Control Plan for Ocean Waters* (Ocean Plan) to ensure that discharges of BOD and TSS do not impact beneficial uses of the State's ocean waters. A copy of the 2005 version of the Ocean Plan is presented as Appendix T. The 2005 Ocean Plan defines ocean waters as follows:

> *OCEAN WATERS are the territorial marine waters of the State as defined by California law to the extent that these waters are outside of enclosed bays, estuaries, and coastal lagoons. If a discharge outside the territorial waters of the State could affect the quality of the waters of the state, the discharge may be regulated to assure no violation of the Ocean Plan will occur in ocean waters.*

California law defines territorial waters of the State as marine waters that extend to 3.0 nautical miles (5.6 km) offshore from the coast.

The Ocean Plan establishes numerical effluent standards, numerical receiving water standards, and narrative receiving water standards to protect beneficial uses of the State's ocean waters. Provision I.A of the Ocean Plan states:

> *Beneficial uses of the ocean waters of the State that shall be protected include industrial water supply; water contact and non-contact recreation, including aesthetic enjoyment; navigation; commercial and sport fishing; mariculture; preservation and enhancement of designated Areas of Special Biological Significance (ASBS); rare and endangered species; marine habitat; fish migration; fish spawning an shellfish harvesting.*

Standards Related to BOD. The discharge of BOD or other oxygen demanding pollutants to the marine environment may potentially:

- result in reduced dissolved oxygen concentrations in sediments or receiving waters,
- increase dissolved sulfide concentrations in sediments, or
- provide a source of nutrition that leads to algae blooms or nuisance growth that in turn causes reduction in receiving water dissolved oxygen concentrations, reduced light transmittance, water discoloration, aesthetic impacts, or other objectionable impacts.

The degree to which the discharge of BOD may affect the marine environment is dependent on a number of discharge- and site-specific factors, in part including:

- depth and location of discharge,
- outfall design, ocean currents, temperature and stratification conditions,
- ambient water quality and light transmittance characteristics,
- discharge flow, concentration, and mass emissions of oxygen-demanding pollutants,
- size and settling characteristics of discharged organic particulate matter,
- sediment conditions,
- receiving water assimilative capacity, and
- benthic and biological communities in the vicinity of the discharge.

The Ocean Plan recognizes that a "one size fits all" BOD effluent concentration standard does not necessarily address or prevent impacts to receiving water quality and beneficial uses. As a result, in lieu of establishing an effluent BOD standard, the Ocean Plan establishes a series of numerical receiving water limits designed to ensure that the discharge of oxygen-demanding wastes does not adversely impact receiving water quality and beneficial uses. Table II.D-1 (page II.D-3) presents 2005 Ocean Plan standards related to wastewater discharges of BOD or other oxygen-demanding wastes.

As shown in Table II.D-1, Ocean Plan receiving water standards related to BOD (or other oxygen-demanding wastes) include receiving water standards for dissolved oxygen, dissolved sulfides, organic material in sediments, nutrients, and light transmittance. Additionally, the Ocean Plan establishes standards to prevent degradation (as statistically defined in the Ocean Plan) of marine communities due to the discharge of oxygen-demanding wastes or any other pollutants.

Table II.D-1
Ocean Plan Standards to Regulate the Discharge of BOD to Ocean Waters of California[1]

Requirement No.[1,2]	Regulated Parameter[1]	State of California Ocean Plan Water Quality Objective[1]
II.C.2	Receiving water color	The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface.
II.C.3	Light transmittance	Natural light shall not be significantly[4] reduced at any point outside the initial dilution zone as a result of the discharge of waste.
II.D.1	Receiving water dissolved oxygen	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[3] materials.
II.D.3	Receiving water dissolved sulfides	The dissolved sulfide concentration of waters in and near sediments shall not be significantly[4] increased to levels which would degrade[5] indigenous biota.
II.D.5	Organic materials in marine sediments	The concentration of organic materials in marine sediments shall not be increased to levels that would degrade[5] marine life.
II.D.6	Nutrients	Nutrient materials shall not cause objectionable growths or degrade[5] indigenous biota.
II.E.1	Biological characteristics	Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.[5]

1 Standard established in the 2005 Ocean Plan. (See Appendix T.)
2 Section number within the Ocean Plan where the standard is established.
3 The Ocean Plan defines "waste" as the discharger's total discharge of whatever origin, i.e. gross, not net, discharge.
4 As defined by the Ocean Plan: "Significant difference is defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level."
5 The Ocean Plan defines degradation as follows: "Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae."

Standards Related to TSS. The Ocean Plan establishes both effluent and receiving water standards to prevent discharges of suspended solids from adversely impacting beneficial uses of marine waters. Table II.D-2 (page II.D-4) summarizes Ocean Plan standards that related to the discharge of suspended solids.

Table II.D-2
Ocean Plan Standards to Regulate the Discharge of TSS to Ocean Waters of California[1]

Requirement No.[1,2]	Regulated Parameter[1]	State of California Ocean Plan Water Quality Objective[1]
II.C.1	Floating particulates	Floating particulates and grease and oil shall not be visible.
II.C.2	Receiving water color	The discharge of waste shall not cause aesthetically undesirable discoloration of the ocean surface.
II.C.3	Receiving water light transmittance	Natural light shall not be significantly[4] reduced at any point outside the initial dilution zone as a result of the discharge of waste.
II.C.4	Solids deposition in receiving waters	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[5].
II.D.6	Nutrients	Nutrient materials shall not cause objectionable growths or degrade[5] indigenous biota.
II.E.1	Biological characteristics	Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded.[5]
III.B	Effluent TSS and TSS removal	Dischargers shall, as a 30-day average, remove 75% of suspended solids from the influent stream before discharging wastewaters to the ocean, except that the effluent limitation shall not be lower than 60 mg/l.
III.B	Settleable solids	Effluent settleable solids shall not exceed an instantaneous maximum of 3.0 milliliters per liter (ml/l), a weekly (7-day) average of 1.5 ml/l, nor a monthly (30-day) average of 1.0 ml/l.
III.B	Effluent turbidity	Effluent turbidity shall not exceed a maximum of 225 Nephelometric Turbidity Units (NTU), a weekly (7-day) average of 100 NTU, or a monthly (30-day) average of 75 NTU.

1 Standard established in the 2005 Ocean Plan. (See Appendix T.)
2 Section number within the Ocean Plan where the standard is established.
3 The Ocean Plan defines "waste" as the discharger's total discharge of whatever origin, i.e. gross, not net, discharge.
4 As defined by the Ocean Plan: "Significant difference is defined as a statistically significant difference in the means of two distributions of sampling results at the 95 percent confidence level."
5 The Ocean Plan defines degradation as follows: "Degradation shall be determined by comparison of the waste field and reference site(s) for characteristic species diversity, population density, contamination, growth anomalies, debility, or supplanting of normal species by undesirable plant and animal species. Degradation occurs if there are significant differences in any of three major biotic groups, namely, demersal fish, benthic invertebrates, or attached algae."

San Diego Region Basin Plan. The California Regional Water Quality Control Board, San Diego Region (Regional Board) establishes beneficial uses for the San Diego Region and regional water quality standards to protect the beneficial uses within the *Water Quality Control Plan for the San Diego* Basin (Basin Plan). To protect designated regional beneficial uses of State-regulated marine waters, the Basin Plan incorporates effluent and receiving water standards established in the Ocean Plan.

II.D.2. If yes, what is the water use classification for your discharge area? What are the applicable standards for your discharge area for each of the parameters for which a modification is requested? Provide a copy of all applicable water quality standards or a citation to where they can be found.

SUMMARY: No federal or state water use classification has been established for the discharge area. The California Ocean Plan establishes effluent and receiving water standards to prevent the discharge of BOD and TSS from impacting beneficial uses of marine waters. Appendix T presents a copy of the 2005 Ocean Plan.

Water Use Classification. No federal or state water use classification has been established for the discharge area.

Ocean Plan Standards. As discussed in the response to Questionnaire Section II.D.1, the California Ocean Plan establishes a number of effluent and receiving water standards to prevent the discharge of BOD and TSS from adversely impacting beneficial uses of marine waters. Appendix T presents a copy of the current 2005 version of the Ocean Plan.

Specific effluent and receiving water standards applicable to discharges of BOD and TSS (and citations where they may be found) are presented in Tables II.D-1 and II.D-2 (pages II.D-3 and II.D-4).

II.D.3. Will the modified discharge: [40 CFR 125.59(b)(3)]

- **Be consistent with applicable State coastal zone management program(s) approved under the Coastal Zone Management Act as amended 16 U.S.C. 1451 *et seq*? (See 16 U.S.C. 1456(c)(3)(A))**
- **Be located in a marine sanctuary designated under Title III of the Marine Protection, Research and Sanctuaries Act (MPRSA) as amended, 16 U.S.C. 1431 *et seq*. or in an estuarine sanctuary designated under the Coastal Zone Management Act as amended, 16 U.S.C. 1461? If located in a marine sanctuary designated under Title III of the MPRSA, attach a copy of any certification or permit required under regulations governing such marine sanctuary (See 16 U.S.C. 1432(f)(2))**
- **Be consistent with the Endangered Species Act, as amended, 16 U.S.C. 1531 *et seq*? Provide the names of any threatened or endangered species that inhabit or obtain nutrients from waters that may be affected by the modified discharge. Identify any critical habitat that may be affected by the modified discharge and evaluate whether the modified discharge will affect threatened or endangered species or modify a critical habitat (See 16 U.S.C. 1536(a)(2)).**

SUMMARY: The PLOO discharge will be consistent with provisions of the Coastal Management Act, Marine Protection, Research, and Sanctuaries Act, and Endangered Species Act.

Coastal Management. The State of California regulates activities within a designated coastal zone through seven regional State Coastal Commissions. Coastal Commission regulatory authority over waste discharges to the ocean is limited to:

- considering treatment plant siting issues,
- treatment plant aesthetics, and
- new volumes of sewage originating within the coastal zone.

The Point Loma WTP and PLOO are within the coastal zone regulated by the San Diego Coast Region of the State Coastal Commission. Each of these existing facilities was constructed and operates in accordance with permits issued by the San Diego Coast Region. Additionally, improvements to these facilities have been implemented in accordance with Sa Diego Coast Region permits. The City's 1995 and 2001 301(h) waiver application presented information on prior Coastal Development permits for existing Point Loma WTP treatment, conveyance, disposal facilities, or improvement projects.

Future improvements to the Point Loma WTP will also be in accordance with requirements and permits established by the Coastal Commission. The City is currently coordinating with the San Diego Coast Region to process coastal development permits for several proposed Point Loma WTP improvement and maintenance projects. Table II.D-3 summarizes the status of coastal development permits for these proposed or ongoing Point Loma WTP maintenance/improvement projects.

Table II.D-3
Status of Coastal Development Permits
Proposed or Ongoing Point Loma WTP Maintenance/Improvement Projects

Coastal Development Permit Number	Point Loma Facility or Project	Project or Permit Status
6-04-027-E2	Point Loma Wastewater Treatment Plant South Use Areas	Coastal Commission staff are processing a permit extension.
9-70-07	Point Loma Wastewater Treatment Plant Penstock Seismic Retrofit	Coastal permit has been issued and the project is underway.
6-05-115	Point Loma Wastewater Treatment Plant Grit Aeration System	Coastal permit to construct has been issued. The project is in construction, with construction projected to be complete in late 2007.
6-07-067	Sewage Pump Stations (Groups I-IV)	Coastal Commission staff are processing permit re-application.

As part of developing this 301(h) application for modified secondary treatment requirements, the City of San Diego will request that the California Coastal Commission, San Diego Coast Region, provide a determination that the existing and proposed discharge is in accordance with applicable coastal zone management requirements. A copy of the City's proposed letter requesting this determination is presented in Appendix U.

Marine Sanctuary. As noted in the City's 2001 301(h) waiver application, the PLOO discharge is not located in a marine sanctuary.

More than a dozen protected marine areas exist within San Diego County. Two of these protected areas are designated by the State Water Resources Control Board (State Board) as "Areas of Special Biological Significance" (ASBS). As designated by the California State Legislature, ASBS zones are defined as having biological communities of such extraordinary value that no risk of change in their environment can be entertained. The California Ocean

Plan prohibits discharge of waste into an ASBS and requires that outfalls be located at a sufficient distance away from an ASBS to assure the maintenance of natural water quality conditions.

The two San Diego County ASBS-designated areas are located approximately 13-14 miles (21-22 km) north of the PLOO discharge zone, and include:

- the San Diego La Jolla Ecological Reserve, and
- the San Diego Marine Life Reserve.

These ASBS-designated areas are summarized in Table II.D-4 and described below.

Table II.D-4
Areas of Special Biological Significance[1]
Designated by the State of California Water Resources Control Board

Designated ASBS	Coastline Length	Offshore Boundary	Approximate Distance North of the PLOO
San Diego-La Jolla Ecological Reserve	11 kilometers (7 miles)	0.6 kilometer (1 mile)	21 kilometers (13 miles)
San Diego Marine Life Reserve	1.6 kilometer (1.6 mile)	300 meters (1000 feet)	22 kilometers (14 miles)

1 Areas of Special Biological Significance (ASBS) as designated in the Basin Plan and State Water Resources Control Board Resolution No. 74-28. Discharges of wastewater are prohibited within Areas of Special Biological Significance. Plants and invertebrates are protected within the listed areas.

San Diego-La Jolla Ecological Reserve. The San Diego-La Jolla Ecological Reserve is located approximately 13 miles (21 km) north of the PLOO. The reserve includes 1.62 miles (1.6 km) of shoreline and extends seaward 0.67 mi (1.1 km) to include an area of rocky reef habitat at depths out to 280 ft (85 m). The reserve protects near-shore habitat that supports research activities of the Scripps Institution of Oceanography. The San Diego-La Jolla Ecological Reserve is located within the larger 5,977 acre (24.2 km^2) San Diego-La Jolla Underwater Park which was dedicated by the San Diego City Council in 1970 to protect the natural ecology and environment. The Park extends from Alligator Point in La Jolla north to Del Mar and out to a distance of 8,000 ft (2.4 km) from shore. The underwater park is managed by the City of San Diego's Park and Recreation Department, Coastal Division, and is overseen by an Underwater Parks Management Committee.

San Diego Marine Life Refuge. The San Diego Marine Life Refuge is located immediately north of the San Diego-La Jolla Ecological Reserve in La Jolla Bay, adjacent to Scripps Institution of Oceanography. In 1929, the California State Legislature granted the University of California "sole possession, occupation, and use" of the intertidal zone and subtidal zone to 1,000 ft offshore along the 2,600-ft (790 m) oceanfront of the Scripps Institution of Oceanography. This area was designated as the San Diego Marine Life Refuge in 1957 and was included in the University of California's Natural Reserve System in 1965. The 92-acre (0.37 km^2 San Diego Marine Life Refuge is part of the 5,977-acre (24.2 km^2) San Diego-La Jolla Underwater Park. San Diego Marine Life Refuge includes three distinct habitats: a broad, sandy shelf; a concrete pier piling system; and an intertidal mudstone reef complex of dikes, boulders, and ledges with depths of 0 - 20 ft (0 - 6 m). The Scripps Coast Reserve is within this refuge, and extends to depths of 745 ft (227 m).

In addition to the above-described ASBS-designated areas, other protected marine areas within San Diego County include:

- The Mia J. Tegner State Marine Conservation Area and Cabrillo National Monument, both located immediately south of the Point Loma WTP,
- Border Field State Park, located 13 miles (21 km) south of the PLOO,
- Torrey Pines State Reserve, located 18 miles (29km) north of the PLOO,
- the Encinitas State Marine Conservation Area, located 26 miles (41 km) north of the PLOO,
- the Cardiff and San Elijo State Marine Conservation Area, located 24 miles (38 km) north of the PLOO, and
- seven state beaches (Cardiff, Carlsbad, Leucadia, San Elijo, Silver Strand, South Carlsbad, and Torrey Pines).

Mia J. Tegner State Marine Conservation Area. The Mia J. Tegner State Marine Conservation Area and Cabrillo National Monument are located at the southern tip of Point Loma and are the protected areas closest to the PLOO discharge point. The Mia J. Tegner State Marine Conservation Area extends along 0.7 miles (1.1 km) of shoreline and extends 150 feet (45 meters) seaward to include intertidal and subtidal habitat. The conservation area protects marine populations in the Cabrillo National Monument.

The Cabrillo National Monument, a major attraction for both research scientists and the public, is one of the largest, readily accessible, best preserved tidal area in San Diego. The Cabrillo National Monument extends approximately 0.6 kilometers (0.4 miles) along the tip of Point

Loma, and includes intertidal lands. The oceanic boundary of Cabrillo National Monument extends 275 m (900 ft) offshore from mean low-low water.

The Mia J. Tegner State Marine Conservation Area and Cabrillo National Monument are approximately 4.5 miles (7.2 km) east of the PLOO discharge point. Appendix G (Volume V) presents a detailed description of protected areas in the PLOO region.

Endangered Species. State and federal regulations to identify and protect endangered or threatened species include:

- The Endangered Species Act (ESA) of 1973 (16 U.S.C. §§ 1531 et seq.), which establishes protection over and conservation of threatened and endangered species and the ecosystems on which they depend. The U.S. Fish and Wildlife Service serves as lead in ESA implementation, but all federal agencies are required to implement protection programs for threatened and endangered species and to use their authority to further the purposes of the ESA.
- The Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. §§ 1361 et seq.) established a moratorium on the "taking" of marine mammals in waters or on lands under U.S. jurisdiction. The National Marine Fisheries Service (NMFS) serves as lead in MMPA implementation. The MMPA prohibits harassing, capturing, disturbing, or, killing marine mammals except under special permit.
- The California Endangered Species Act (CESA) of 1970, re-amended in 1984, is part of the California Fish and Game Code and is administered by the California Department of Fish and Game. Species that are not recognized as threatened or endangered under the federal Endangered Species Act may be listed as threatened or endangered under the California Endangered Species Act. CESA provisions are generally parallel those in the federal ESA although, unlike its federal counterpart, the CESA also applies take prohibitions to species petitioned for listing (i.e., state candidates).

Twenty-four endangered species covered under the ESA, the MMPA, or the CESA may occur in the vicinity of the Point Loma WTP or PLOO. As shown in Table II.D-5 (page II.D-11), these include eight marine mammals, seven birds, five sea turtles, two fish, and two invertebrates. The population, biology, status, and distribution of these endangered and threatened species are summarized in Appendix H.

Table II.D-5
Endangered or Protected Species Near the Point Loma WTP or PLOO[1]

Category	Species		Status
Marine Mammals	Blue Whale	*Balaenoptera musculus*	Endangered
	Fin Whale	*Balaenoptera physalus*	Endangered
	Humpback Whale	*Meaptera novaeangliae*	Endangered
	Right Whale	*Eubalaena japonica*	Endangered
	Sei Whale	*Balaenoptera borealis*	Endangered
	Sperm Whale	*Physeter macrocephalus*	Endangered
	Guadalupe Fur Seal	*Arctocephalus townsendi*	Threatened
	Steller Sea Lion	*Eumetopias jubatus*	Threatened
Birds	California Brown Pelican	*Pelicanus occidentalis californicus*	Endangered
	California Least Tern	*Sterna antillarum browni*	Endangered
	Light-footed Clapper Rail	*Rallus longirostris levipes*	Endangered
	Western Snowy Plover	*Charadrius alexandrinus nivosus*	Threatened
	Short-tailed Albatross	*Phoebastria albatrus*	Endangered
	Marbled Murrelet	*Brachyramphus marmaoratus*	Threatened
	Xantus Murrelet	*Synthliboramphus hypoleucus*	Candidate
Sea Turtles	East Pacific Green Turtle	*Celonia mydas*	Endangered
	Loggerhead Turtle	*Caretta caretta*	Endangered
	Leatherback Turtle	*Dermochelys coriacea*	Endangered
	Olive Ridley Turtle	*Lepidochelys olivacea*	Endangered
	Hawkbill Turtle	*Eretmochelys imbricata*	Endangered
Fish	Chinook Salmon	*Oncorhynchus tshawytscha*	Endangered
	Steelhead	*Oncorhynchus mykiss*	Endangered
Mollusk	White Abalone	*Haliotis sorenseni*	Endangered
	Black Abalone	*Haliotis cracherodii*	Candidate

1 Includes candidate species for threatened or endangered listing.

Whales. Of the eight species of great whales that pass through San Diego coastal waters six are endangered: the blue whale, the fin whale, the humpback whale, the right whale, the sei whale, and the sperm whale. The other two great whales, the gray whale and the minke whale, were previously endangered but have now recovered. The gray whale and minke whale frequent shallow water, while the other whales that periodically traverse the area off Point Loma are deeper water species.

Seals and Sea Lions. The other endangered marine mammals, the Guadalupe fur seal, *Arctocephalus townsendi*, the Steller sea lion, *Eumetopias jubatus*, are occasional but uncommon visitors to San Diego offshore waters. The Guadalupe fur seal breeds only on Guadalupe Island about 100 miles off the Baja California coast. The Steller sea lion ranges from Baja California to Alaska, but is seldom seen in southern California except near the Channel Islands.

Birds. Of the seven species of endangered birds listed in Table II.D-5, only the California brown pelican and the California least tern are regularly encountered in marine waters off Point Loma. Populations of California brown pelicans are now primarily controlled by the availability of food and have recovered to the extent that USFWS is considering delisting the species (Arnold et al. 2007, USFWS 2006).

The California least tern, *Sterna antillarum browni*, migrates to California from central and south America in April, breeds on ce or twice during the summer, then heads south in September. Least terns are occasionally observed feeding in nearshore waters along the coast of Point Loma and in the kelp bed. Recently, a five-year review has recommended downlisting the species from endangered to threatened (USFWS 2007e).

Sea Turtles. Five species of sea turtles occasionally visit San Diego ocean waters: green, loggerhead, leatherback, olive Ridley, and hawksbill – all are protected under the Endangered Species Act. All five species of sea turtles forage along the California coast in the summer and early fall when sea temperatures are warmest (Eckert 1993). There are no known sea turtle nesting sites in the San Diego area or anywhere on the west coast of the United States (USN 2005).

Fish. In 1997, National Marine Fisheries Service (NMFS) listed the southern California Evolutionary Significant Unit of West Coast steelhead (*Oncorhynchus mykiss*) as endangered (Federal Register: 18 August 1997 [Volume 62, Number 159, Pages 43937-43954]) (NMFS

1997). In March of 1999, the NMFS added nine species of salmon and steelhead to the Endangered Species list and designated critical habitat for them in 2005 (NMFS 2005b). Though most of these are Pacific northwest species, the chinook salmon and steelhead range south to California. Chinook salmon are mostly encountered north of Point Conception.

Invertebrates. The white abalone, *Haliotis sorenseni*, historically found from Punta Abreojos, Baja California, Mexico, to Point Conception, California lives on rocky reefs in depths of 80 to 200 feet (NMFS 2007l). The black abalone, *Haliotis cracherodii*, inhabits the intertidal and shallow subtidal zones where it has been easily targeted for exploitation. It has also experienced population declines throughout its range due to overfishing and is now thought to be extinct south of Point Conception (NMFS 2007m). In 2005, the black abalone was proposed by NMFS as a candidate for listing as an endangered species (NMFS 2005c). There is concern that the low remaining densities of both black and white abalone may be insufficient for continued reproductive success.

Effects of PLOO Discharge on Endangered Species. None of the endangered species that may occur in the vicinity of PLOO are likely to be affected by the PLOO discharge. Analysis of the receiving waters monitoring data off San Diego indicates that the PLOO has had a limited effect on the local marine environment. There has been no indication of change in any physical or chemical water quality parameter (e.g., dissolved oxygen, pH) that can be attributed to wastewater discharge off Point Loma. (See Appendix E) Instead, changes in these parameters have historically been associated with natural events such as storm activity and the presence of plankton blooms.

The PLOO discharge is not projected to affect endangered mollusks. As documented in Appendix E, benthic conditions off Point Loma show some changes that may be expected near large ocean outfalls, although these were restricted to a relatively small, localized region near the discharge site. For example, sediment quality data (see Appendix E) have indicated slight increases over time in sulfide and BOD concentrations at sites nearest the ZID, an area where relatively coarse sediment particles have also tended to accumulate. However, other measures of environmental impact such as concentrations of sediment contaminants (e.g., trace metals, pesticides) showed no patterns related to wastewater discharge.

While some descriptors of benthic community structure (e.g., abundance, species diversity) or indicators of environmental disturbance (e.g., brittle star populations) have shown temporal differences between reference areas and sites nearest the ZID, environmental disturbance indices such as the Benthic Response Index suggest that macrobenthic invertebrate communities in the Point Loma region remain characteristic of natural conditions. Analyses of bottom dwelling demersal) fish and trawl-caught megabenthic invertebrate communities also reveal no spatial or temporal patterns that can be attributed to effects of wastewater discharge.

Endangered whale species will not be impacted by bioaccumulation. A review by O'Shea and Brownell (1994) suggests that bioaccumulation is not a significant issue for baleen whales; baleen whales typically inhabit deep water (away from nearshore sources of contamination) and feed at a low level in the food web. The blue whale, fin whale, humpback whale, sei whale, and right whale are baleen whales. The other endangered whale that may cross the Point Loma marine area, the sperm whale, also feeds at a relatively low level in the food chain (on squid) and haunts deeper water.

Endangered predators are also not discernibly affected by the PLOO discharge. The paucity of pathological evidence from local fish and the results of bioaccumulation studies suggest that local fish assemblages remain healthy and are not adversely affected by wastewater discharge or other anthropogenic inputs. The PLOO discharge does not have any detectable concentrations of DDT and PCBs (see Table II.A-12 on page II.A-29). Additionally, PLOO mass emissions of toxic metals are low. As documented in Appendix F, no significant bioaccumulation effects are seen in benthic species or fish in the PLOO vicinity. Thus, while the Guadalupe fur seal and the Steller sea lion are top-level predators feeding primarily on fish, neither seal species is projected to be affected by the PLOO discharge. Populations of both seal species are currently increasing exponentially (O'Hara and O'Shea 2005, Woshner 2006, Carretta et al. 2007).

Populations of bird species are likewise not projected to be adversely affected by the PLOO discharge. Contaminant burdens in fish tissues at Point Loma are comparable to those at reference sites beyond the influence of the discharge (Allen 2006, Allen et al. 2007). Endangered birds feeding in the PLOO area should not be exposed to a higher risk of bioaccumulation than at reference sites.

Of the five species of endangered sea turtles that may pass through the San Diego marine environment, the green sea turtle would be most common and the one found closest to shore. Although capable of deep dives, most sea turtles passing San Diego would be in surface waters. They should be unaffected by the discharge which is normally trapped below the thermocline, especially during the summer when turtles would be most prevalent.

The other endangered species possibly occurring at Point Loma (salmon species and abalone species) should not be threatened by the PLOO discharge. The salmon would be transitory, and the abalone, if present, would be significantly inshore of the outfall discharge zone.

Long-term monitoring shows no evidence of significant impacts from operation of the PLOO on environmental conditions or biological communities that could affect the health and well-being of endangered species. Thus, maintaining the existing discharge through the Point Loma outfall should not have an adverse impact on endangered species or threaten their critical habitats.

Consultation with Resource Agencies. To initiate additional informal consultation on endangered species, the City of San Diego has submitted correspondence to the USFWS and NMFS inviting comments on the existing discharge and proposed 301(h) waiver. Copies of the correspondence are presented in Appendix U.

Critical Habitats. No critical habitats are located in the vicinity of the PLOO.

II.D.4. Are you aware of any State or Federal Laws or regulations (other than the Clean Water Act or the three statutes identified in item 3 above) or an Executive Order which is applicable to your discharge? If yes, provide sufficient information to demonstrate that your modified discharge will comply with such law(s), regulations, or order(s). [40 CFR 125.59(b)(3)]

SUMMARY: The PLOO discharge occurs outside of State-regulated marine waters, and the City is not aware of any state or federal laws that are applicable to the renewal of the City's 301(h) waiver application.

State Laws. PLOO discharges 7,154 meters (23,472 feet) offshore into federal waters, outside of the three-nautical-mile limit for waters controlled by the State of California. As a result, State laws apply only to the discharge as it may affect waters within the three-nautical-mile coastal limit.

While the City is not aware state laws applicable within the discharge zone, the State of California Endangered Species Act is applicable within the three-mile limit. As described in the response to Questionnaire Section II.D.3, the State Endangered Species Act contains provisions similar to that of the federal Endangered Species Act, and is administered by the State of California Department of Fish & Game. Appendix H presents information on the State Endangered Species Act.

Federal Laws. The Ocean Pollution Reduction Act of 1994 (HR 5176) provided the City of San Diego with the opportunity to re-enter the 301(h) process. The law established four conditions for the City's re-entrance into the 301(h) process:

- achieve an annual average 58 percent BOD removal,
- achieve a monthly average 80 percent TSS removal,
- construct 45 mgd of recycled water treatment capacity, and
- reduce the mass emissions of solids during the period of modification.

As documented herein and in the City's prior 301(h) applications, the Point Loma WTP discharge achieved compliance with each of these provisions.

Section III.A

Large Applicant Questionnaire

III. TECHNICAL EVALUATION

III.A.1 What is the critical initial dilution for your current and modified discharge(s) during 1) the period(s) of maximum stratification and 2) any other critical period(s) of discharge volume/composition, water quality, biological seasons, or oceanographic conditions?

SUMMARY: No modifications have been implemented to the extended PLOO since its construction, and initial dilution characteristics of the PLOO remain as documented in prior 301(h) applications. Appendix O presents the results of initial dilution modeling conducted in 1995 to assess PLOO initial dilution characteristics. As documented in Appendix O, critical initial dilution was concluded as occurring during maximum stratification. A median initial dilution of 338 to 1 was computed for an average Point Loma WTP flow of 240 mgd (10.51 m^3/sec). A critical "minimum month" initial dilution of 202 to 1 was computed for the 240 mgd (10.51 m^3/sec) PLOO discharge. Additional modeling conducted by EPA in 2002 confirmed the modeling results presented in Appendix O. On the basis of the EPA modeling, Order No. R9-2002-0025 established the PLOO minimum month initial dilution at 204 to 1 (minimum month average initial dilution). This 204 to 1 initial dilution is applied for determining compliance with water quality criteria and standards for the protection of aquatic life. Order No. R9-2002-0025 also established an initial dilution of 338 to 1 (long-term median) for purposes of determining compliance with water quality criteria and standards for the protection of human health.

Appendix O presents the results of initial dilution modeling conducted in 1995 for a PLOO flow of 240 mgd (10.51 m^3/sec). No modifications to the PLOO have been implemented since 1995, and the modeling results remain valid.

As documented in Appendix O, two sets of long-term oceanographic data were combined for purposes of developing the PLOO initial dilution estimates. The first data set consisted of CTD (conductivity-temperature-depth) data collected during predesign studies for the extended outfall, and data from the monthly monitoring hydrocast surveys following commencement of discharge.

The second data set consisted of concurrent time-series measurements of the ocean currents (at 20m depth intervals) and the temperature structure of the water column (at 5m depth intervals).

Initial dilutions were computed from the oceanographic data using a modified version of the EPA RSB initial dilution simulation model (EPA, 1994). Modifications (discussed in detail in Appendix O) were made to the RSB model to:

a) Provide solutions for certain types of density stratification that the original version was not capable of solving.
b) Incorporate an input data file structure that was suitable for the large number of observations provided by the time-series measurements.
c) Provide an output data file structure appropriate in format and content for subsequent programs that used the initial dilution simulation information as input data.
d) Increase the accuracy of the initial dilution equation solutions.

Computed Initial Dilution - Time Series Data. The time-series measurements are based on simultaneous measurements of the density structure of the water column (via the temperature measurements) and the ocean currents. The simulations also include the daily, as well as monthly, variations in the discharge rate. Therefore, the initial dilutions calculated from this data base provide the most realistic representation of the initial dilutions associated with the two discharge rates.

The distributions of initial dilutions calculated for an annual average discharge rate of 10.51 m^3/sec (240 mgd) are summarized in Table III.A-1 (page III.A-3). As shown in Table III.A-1, for a PLOO average annual flow rate of 240 mgd (10.51 m^3/sec):

- a median flux-averaged initial dilution of 338:1 is projected, and
- eighty percent of the initial dilutions are between 223 to 1 and 544 to 1.

As detailed in Appendix O, if the time-series density profiles are used with ocean currents set equal to zero, the median flux-averaged initial dilutions are 283 to 1 for the 240 mgd (10.51 m^3/sec) discharge rate.

Table III.A-1
Distribution of Flux-Averaged Initial Dilutions
Based on Observed Time-Series Density/Current Data
(Actual Currents - - 13,757 Cases)

Probability	Computed Initial Dilution at 240 mgd PLOO Flow[1]
95-percentile	634
90-percentile	544
70-percentile	409
Median (50-percentile)	338
30-percentile	284
10-percentile	223
5-percentile	200

1 See Appendix O for description of initial dilution model and model results. Simulation calculations include daily and monthly flow variations that result in the average annual PLOO flow of 240 mgd (10.5 m^3/sec).

Computed Initial Dilution - CTD Data. Appendix O also presents regulatory flux-averaged initial dilutions for conditions of zero ocean current (per California Ocean Plan requirements). Table III.A-2 (page III.A-4) summarizes the results of computer modeling of regulatory flux-averaged initial dilutions at a PLOO flow of 240 mgd (10.51 m^3/sec). As shown in Table III.A-2, assuming that ocean currents are zero (no flow-induced enhancement of initial dilution), monthly initial dilution rates are computed at values ranging from 202 to 1 (winter conditions of maximum stratification) to 324 to 1 (summer conditions).

As documented in Appendix O, the (annual) average of the computed initial dilutions using the CTD data set was 271:1 for a PLOO flow of 240 mgd (10.51 m^3/sec). As shown in Table III.A-2, the average regulatory initial dilution for the period January through September (using the CTD data) is 294 to 1.

As shown in comparing Tables III.A.1-1 and III.A.1-2, the median initial dilutions calculated from the time-series measurements are more conservative than the median initial dilutions computed from the CTD data and zero ocean currents. The seasonal variation in the monthly average initial dilutions computed from the time-series data is also comparable with the pattern of the dilutions computed from the CTD data (see Appendix O). Since the simulations computed from the two different data sets involve different assumptions (e.g., density-temperature relationships, discharge variability, under sampling effects, etc.), this consistency lends support for the validity of the modeling results.

Table III.A-2
Monthly Regulatory Flux-Averaged Initial Dilutions
Based on CTD Data and Zero Ocean Currents
(State of California Ocean Plan)

Month	Computed Initial Dilution for 240 mgd PLOO Discharge[1]
January	202
February	224
March	263
April	284
May	295
June	324
July	320
August	294
September	307
October	281
November	249
December	207
Annual Average	271
Jan-Sept Average	294

1 See Appendix O for description of initial dilution model and model results. Simulation calculations include daily and monthly flow variations that result in the average annual PLOO flow of 240 mgd (10.5 m^3/sec).

EPA-Assigned Initial Dilution. Initial dilution simulations conducted by EPA (reported in the EPA Tentative Decision Document dated February 8, 2002) verified the results of the PLOO computer modeling presented in Appendix O. Based on this EPA modeling, initial dilutions for a PLOO flow of 240 mgd (10.51 m^3/sec) were determined as follows:

204 to 1 (minimum month average initial dilution), and

338 to 1 (long-term average).

In accordance with these initial dilution modeling results, Order No. R9-2002-0025 utilized an initial dilution of 204 to 1 for determining compliance with California Ocean Plan standards for the protection of aquatic habitat. An initial dilution of 338 to 1 is used for purposes of demonstrating compliance with California Ocean Plan standards for the protection of human health.

III.A.2 What are the dimensions of the zone of initial dilution for your modified discharge(s)?

Guidance regarding the assigned dimensions of the zone of initial dilution (ZID) is presented on page 56 of the *Amended Section 301(h) Technical Support Document (EPA, 1995)*

No modifications to the PLOO have been implemented since its construction that affect the dimensions of ZID, and the PLOO ZID remains unchanged from the City's prior 301(h) applications.

Figure III.A-1 (page III.A-6) presents the PLOO ZID dimensions. As shown in Figure III.A-1, the ZID extends 307 feet (93.5 meters) on either side of the PLOO diffuser legs.

Appendix O presents estimates of distances associated with completion of initial dilution at a PLOO flow of 240 mgd (10.51 m^3/sec). Table III.A-3 presents a statistical breakdown of computed distances required for completion of initial dilution.

Table III.A-3
Horizontal Downstream Distance from Outfall Ports to the Completion of Initial Dilution

Parameter		Horizontal Downstream Distance[1] from PLOO Ports (240 mgd Flow)	
		Feet	Meters
Minimum Value		34.5	10.5
Percentile Value	10	82.0	25.0
	20	99.7	30.4
	30	152	46.4
	40	241	73.5
	50	294	89.7
	60	349	106.4
	70	407	123.9
	80	477	145.5
	90	582	177.4
	99	925	281.9
Maximum Value		1,799	548.3

1 Computed horizontal downstream distance from the ports to the completion of initial dilution process. Based on oceanographic data collected during 1990-1991. See Appendix O.

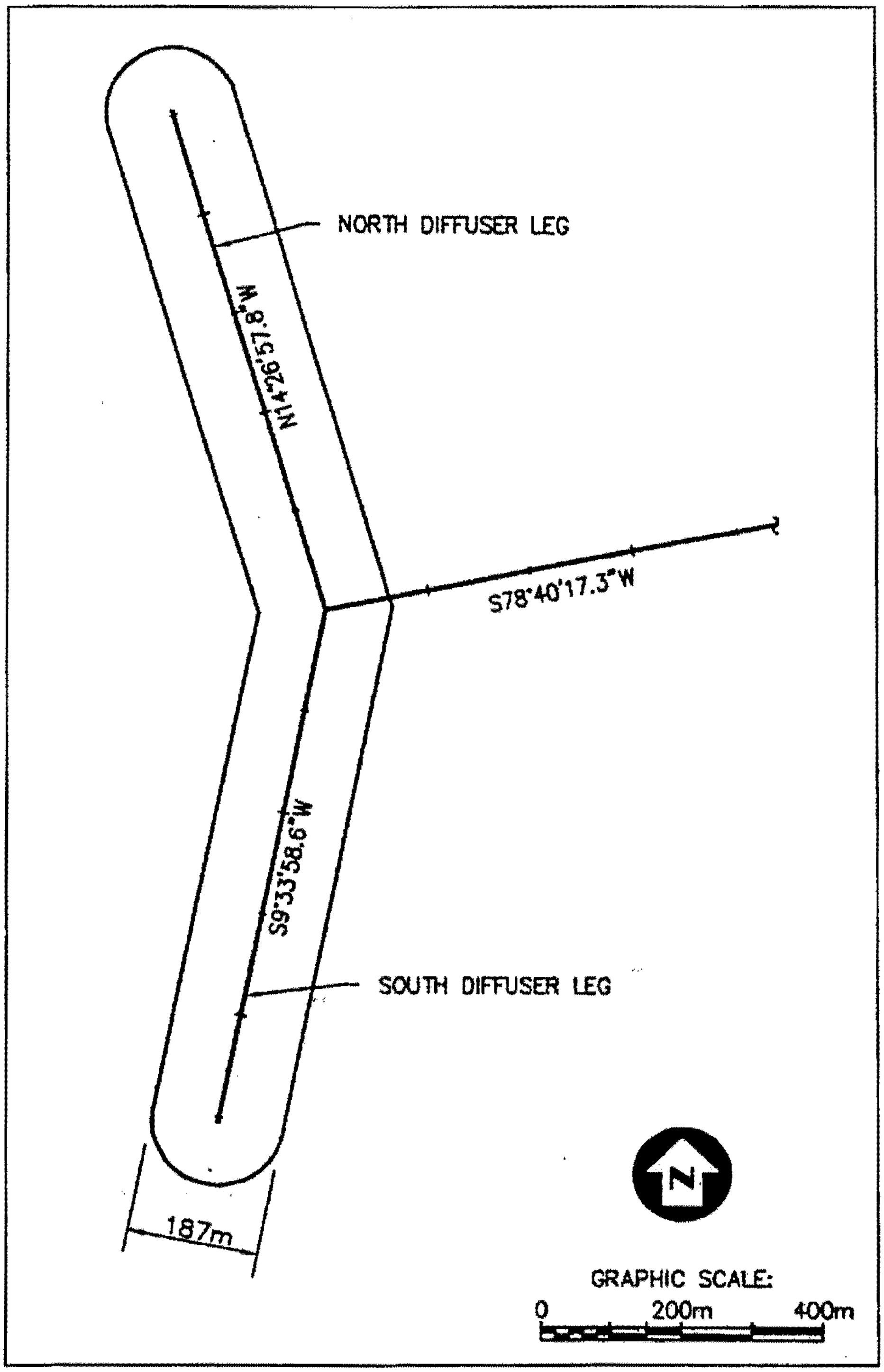


Figure III.A-1 Point Loma Ocean Outfall ZID Dimensions

III.A.3 What are the effects of ambient currents and stratification on dispersion and transport of the discharge plume/wastefield?

SUMMRY: Stratification effects will keep the wastefield submerged and subject to effects of deeper ocean currents. Ambient deeper ocean currents will help disperse the wastefield upcoast, downcoast, and to deeper waters.

Ocean currents and stratification conditions in the PLOO vicinity remain as documented in the City's prior 301(h) applications. Comprehensive predesign and oceanographic studies conducted in the 1990s to assess oceanographic conditions and plume transport for PLOO flow of 240 mgd (10.51 m^3/sec) remain valid. The effects of ambient currents and stratification on dispersion and plume transport are presented in Appendix N, and summarized below.

Stratification. The stratification of the water column and the currents in the vicinity of the discharge are discussed in detail in Appendices N and O. The Point Loma outfall terminates in 310 to 315 feet (94 to 96m) of water. At this depth, the water column is sufficiently stratified to trap the wastefield below the surface throughout the year. The wastefield is typically confined to the depth interval between 180 to 285 feet (55m to 87m).

As documented in Appendix O, the monthly average depths to the top of the wastefield at the completion of the initial dilution process range between approximately 160 to 200 feet (48m to 61m) for an average annual discharge rate of 240 mgd (10.5 m^3/sec). The shallowest depth to the top of the wastefield during any month ranges from approximately 95 to 138 feet (29 to 42m) for a 240 mgd discharge. The monthly average depth to the bottom of the wastefield at a 240 mgd flow ranges from approximately 282 to 290 feet (86m to 88m).

Ambient Net Currents. Table III.A-4 (page III.A-8) summarizes net seasonal current speeds from comprehensive pre-discharge studies conducted during January 1990 to April 1991 prior to construction of the extended outfall. Since the wastefield generated by the PLOO discharge typically lies at depths between 180 to 285 feet (55 to 87m), the net currents shown in Table III.A-4 are representative of the net currents that affect the PLOO waste plume.

As shown in Table III.A-4, net currents are predominantly longshore currents, with net current speeds ranged from 0.7 to 6.5 cm/sec. While net currents (shown in Table III.A-4) range from 0.7 to 6.5 cm/sec, instantaneous currents typically range (see Appendix N) from 7.5 to 12.5 cm.

Table II.A-4
Net Current Speeds by Season[1]

Season	60m (197 ft) Depth		77m (253 ft) Depth[2]	
	Current Speed (cm/sec)	Direction[3]	Current Speed (m/sec)	Direction[3]
Winter - 1990	4.9	020	6.5	005
Winter - 1991	2.1	029	1.3	029
Spring	4.6	018	5.1	008
Summer	2.0	081	0.7	123
Fall	3.3	033	2.6	004

1 Pre-discharge net current measurements at a depth of 265 feet (81m) along the PLOO outfall. Fluctuations of these net current speed sand directions occur both on short- and long-period bases. See Appendix N. To yield the above net current speeds, typical ocean current velocities range from 7,.5 to 12.5 cm/sec.
2 Depths of 197 ft (60m) and 253 ft (77m) in 81m of water. The currents at the 77m depth may be affected by proximity to the bottom.
3 Direction heading in degrees. (A heading of 000 corresponds to due north.)

Temporal Characteristics of Currents. While net currents are predominantly longshore, significant short-term and long-term temporal variation in both current speed and direction occurs. The temporal characteristics of the fluctuations vary between the longshore component (parallel to the isobaths) and the cross-shore component. Table III.A-5 (page III.A-9) summarizes the variances associated with:

- supertidal (short-term variations that vary more frequently than tidal variations),
- tidal (variations associated with tides), and
- subtidal (long-term variations that vary more slowly than tidal variations).

The transport distances associated with the temporally varying components of the currents depend on their duration (periodicity), as well as their strength. As shown in Table III.A-5, flows in the outfall vicinity are dominated by subtidal variations in the longshore component of flow. Typical cross-shore tidal excursions are on the order of a kilometer, or less. The outfall diffuser is about 4-5 km offshore from the outer edge of a kelp bed. This horizontal separation is several times greater than typical cross-shore tidal excursions.

Transport is more effective in the longshore direction since the majority of the total variance in the longshore currents is associated with subtidal frequency variations. These fluctuations generally have periodicities ranging from a week to more than a month (Appendix N). These slowly varying fluctuations act like net currents over time-scales of a few days to weeks. It is the combination of the seasonal net flow and these slowly varying changes that is responsible for the transport of wastewater away from the outfall vicinity.

Table III.A-5
Variances by Season and Frequency Band[1]

Season	Subtidal Frequency Band				Tidal Plus Supertidal Frequency Band			
	Longshore Variances(cm^2/sec^2)		Cross-Shore Variances (cm^2/sec^2)		Longshore Variances (cm^2/sec^2)		Cross-Shore Variances	
	60m (197 ft) Depth	77m (353 ft) Depth[2]	60m (197 ft) Depth	77m (353 ft) Depth[2]	60m (197 ft) Depth	77m (353 ft) Depth[2]	60m (197 ft) Depth	77m (353 ft) Depth[2]
Winter 1990	52.8	40.9	5.2	6.0	30.5	32.6	18.4	63.2
Winter 1991	32.9	23.8	8.4	8.6	30.8	20.6	23.5	37.3
Spring	64.0	50.9	9.7	8.1	21.1	19.5	22.2	30.4
Summer	55.5	55.9	7.2	7.0	26.5	26.7	14.5	27.2
Fall[1]	33.3	15.8	2.0	0.9	27.3	29.4	31.5	36.5

1 Pre-discharge net current measurements at a depth of 265 feet (81m) along the PLOO outfall. Fluctuations of these net current speed sand directions occur both on short- and long-period bases. See Appendix N.
2 Depths of 197 ft (60m) and 253 ft (77m) in 81m of water. The currents at the 77m depth may be affected by proximity to the bottom.

The combination of horizontal spatial separation and deep confinement (vertical separation) combines to isolate the kelp bed from intrusions of the PLOO wastefield. This is confirmed by receiving water bacteriological data that consistently show low coliform concentrations at the kelp bed stations - concentrations far below recreational body contact bacterial standards. (See Appendix C.)

Re-entrainment. The above-described short-term variations in longshore and cross-shore currents lead to the possibility that previously discharged effluent might be re-entrained into the initial dilution plume. Lateral re-entrainment can occur during a ocean current reversal that transports a portion of the wastefield back into the ZID. Vertical re-entrainment can occur if vertical movements of isotherms depress a portion of the wastefield into the entrainment depth interval.

Predischarge oceanographic studies (see response to Question II.B.5 and Appendix M) assessed the potential for such re-entrainment. These prior studies remain valid for the current PLOO discharge. As documented in Appendix M, re-entrainment impacts on PLOO performance are minimal. Typical re-entrainment effects reduce the effective initial dilution of the PLOO wastefield by approximately 8 to 9 percent.

III.A.4 Will there be significant sedimentation of suspended solids in the vicinity of the modified discharge?

Question III.A.4 is applicable only to "small dischargers". Dischargers defined under 40 CFR 125, Subpart G as large dischargers (with 5 mgd flows or serving a population of 50,000) are required to provide a more detailed evaluation of sedimentation under Question III.A.5.

III.A.5 Sedimentation of suspended solids.

a. What fraction of the modified discharge's suspended solids will accumulate within the vicinity of the modified discharge?

SUMMARY: For a PLOO discharge flow of 240 mgd (10.5 m^3/sec) and a TSS mass emission rate of 20,000 mt/year (higher than the currently proposed mass emission rate), conservative computer simulations projected that approximately 8 to 9 percent of the suspended solids discharged from the PLOO would be deposited within an area extending approximately 8 miles (15 km) upcoast and downcoast from the discharge and about 4.3 miles (7 km) offshore from the diffuser. Visual observation of the PLOO diffuser zone indicates that these previous estimates were overly conservative, as no discernible accumulation of outfall solids is seen in the vicinity of the PLOO.

The vertical velocity of PLOO wastewater upon discharge is approximately 0.03 ft/sec (10 cm/sec). As a result, the waste plume buoyancy carries almost all particles in the discharge upward into the waste field. The degree to which particles settle out from the waste field is dependent on the solids mass emission rate, the height of waste plume rise, ocean currents, and settling velocities of the particles.

1995 Projections of Solids Accumulation. Computer simulation rates of solids deposition and accumulation were presented in the City's 1995 301(h) application (see Appendix Q of the 1995 301(h) application). As documented in the City's 1995 waiver application, solids deposition, accumulation, and transport were assessed using three computer models:

- The EPA ATSD particle simulation model, and
- The SEDPXY solids transport model.

The fraction of solids that would accumulate in the vicinity of the PLOO diffuser was estimated for two scenarios:

Scenario 1: PLOO TSS mass emission rate of 16,500 mt/yr under average annual ocean conditions, and

Scenario 2: PLOO TSS mass emission rate of 18,100 mt/yr under critical (maximum stratification) ocean conditions.

Under Scenario 1, the EPA ATSD model projected that approximately 8.1 percent of the discharged solids are simulated as settling within a zone extending approximately 7 miles (11.3 km) upcoast and downcoast from the outfall. Under Scenario 2, the model projected that approximately 8.6 percent of the discharged solids would settle within this zone.

The SEDPXY model coupled particle settling with a program that (1) simulated the movement of parcels of wastewater using a progressive vector approach, and (2) computed solids deposition within each 33 foot by 33-foot (10 m by 10 m) model element. For each of the two model scenarios, the SEDPXY model projected that approximately 8 to 9 percent of the PLOO solids would be deposited within a 17 mile (30 km) by 8 mile (14 km) zone surrounding the outfall. (See Appendix Q of the City's 1995 301(h) application.)

Conservative Nature of 1995 Solids Deposition Projections. Both the EPA ATSD and SEDPXY models simulated a great majority of the discharged solids as being carried far from the PLOO discharge point. While only a small fraction is simulated as settling within the general area offshore from San Diego, the sedimentation model results overstate the amount of deposited solids that would actually accumulate on the ocean floor. Key reasons the models overstate solids deposition rates include:

- particle settling velocities in the current PLOO discharge are significantly slower than settling velocities that were used in the solids deposition models,
- mass emissions of TSS were overestimated,
- solids loss through organic uptake was neglected, and
- resuspension effects were neglected.

Overly Conservative Particle Settling Velocities. Solids deposition rates projected by both the ATSD and SEDPXY models were based on Point Loma WTP effluent settling characteristics measured in 1978 - before chemically enhanced treatment was implemented at the Point Loma WTP. As a result, solids deposition computations presented in the City's 1995 301(h) application were conservative to an extreme degree.

Demonstrating this, Table III.A-6 (page III.A-14) characterizes the difference in PLOO solids during 1978 and 2006. As shown in Table III.A-6, PLOO suspended solids are significantly less than solids concentrations in the 1978 PLOO discharge. Due to improved treatment at the Point Loma WTP, 2006 settleable solids (solids with higher settling rates) are currently less than the 1978 values by more than a factor of five. Settling velocities in the present-day PLOO effluent are considerably slower than those used in the City's 1995 301(h) application. These slower settling rates translate to significantly reduced settling and accumulation of discharged solids in the vicinity of the PLOO than was projected in the City's 1995 301(h) application.

Table III.A-6
Comparison of 1978 and 2006 PLOO Effluent Solids

Year	Means of Treatment	Average Annual TSS (mg/l)	Average Annual Settleable Solids (ml/l)
1978[1]	Primary Sedimentation	134 mg/l	2.3
2006	Chemically-assisted primary sedimentation	35 mg/l	0.4

1 Year used for solids settling computations presented in the City's 1995 301(h) application. See Appendix Q of the City's 1995 301(h) application.

Organic Composition/Decay Was Neglected. During 2006, effluent volatile (organic) suspended solids averaged 24.8 mg/l in the PLOO discharge, while effluent TSS averaged 34.9 mg/l. Organic solids thus comprised approximately 71 percent of the total solids in the PLOO discharge during 2006.

Upon discharge, organic solids are eliminated by consumption (biological uptake) or decay, resulting in reduced deposition of settled solids on the ocean bottom. The 1995 solids deposition models did not account for such organic consumption or losses.

Resuspension Effects Were Neglected. Both models presented in the 1995 301(h) application neglect the effects of resuspension. Conditions at the Point Loma outfall (sediment particle sizes, current speeds, and lack of visual evidence of sediment accumulation) indicate that particle resuspension is a significant factor limiting the accumulation of sediments near the Point Loma outfall diffuser.

The PLOO outfall diffuser is located near the edge of a shelf that significantly steepens to deep waters immediately west of the diffuser. As demonstrated by ocean current monitoring (see Appendix N), the near-bottom flow has an offshore component toward these deeper waters that is comparable to, or exceeding, the dominant longshore component of flow. Particles resuspended near the edge of the shelf are carried off the shelf into deeper water, promoting the loss of resuspended material from the shelf.

Erosional and resuspension effects are evidenced by (1) the fact that natural soils at the diffuser site generally consist of sands rather than clay or silt particles, and (2) visual observations of the outfall diffuser area that indicate no discernible visual accumulation of sediments.

Outfall ROV Visual Observations. The extended PLOO discharge was initiated in 1994, and the discharge has been continuous since that time. Visual observations of the vicinity of the PLOO by remotely operated vehicle (ROV) confirm that the solids deposition projections presented in the City's 1995 301(h) application are overly conservative.

Appendix Q presents ROV photographs of the outfall diffuser and outfall vicinity. As shown in the photographs, no discernible solids accumulation occurs in the vicinity of the PLOO discharge. Actual outfall solids deposition rates and rates of accumulation are thus significantly less than the theoretical calculations presented in the City's prior 301(h) applications.

III.A.5 b. What are the calculated area(s) and rate(s) of sediment accumulation within the vicinity of the modified discharge(s) ($g/m^2/yr$)?

SUMMARY: The City's prior 301(h) applications presented conservative computer simulations of suspended solids deposition and transport in the vicinity of the PLOO diffuser. Results from these models indicate that solids deposition rates will decrease with distance from the outfall. Using the procedures outlined in EPA's Amended Technical Support Document, maximum theoretical depositional flux rates in the area of the outfall diffuser were estimated at approximately 33 $g/m^2/yr$ for average annual conditions under a PLOO TSS mass emission rate of 16,500 mt/yr. Under critical 90-day conditions (and a TSS MER of 18,100 mt/year, maximum deposition rates are conservatively computed at 68 $g/m^2/year$. These simulated deposition rates are based on several conservative assumptions, including (1) assuming faster particle settling velocities, (2) neglecting organic decay/uptake, (3) neglecting resuspension, and (4) using TSS mass emission rates higher than those proposed in this 301(h) application. These compounding conservative assumptions combine to cause significantly overestimation of the rates of solids deposition and accumulation. The overly conservative nature of these modeling estimates is confirmed by visual observation of the PLOO diffuser zone which shows a lack of discernible accumulation of outfall solids.

As noted in the response to Question III.A.5a, two modeling methods were used to simulate solids deposition for the modified Point Loma ocean outfall discharge. The response to Question III.A.5a presents a brief description of each model.

Method 1 - EPA ATSD. As documented in Appendix Q of the City's 1995 301(h) application, the EPA ATSD model was used to simulate deposition at a PLOO discharge of 240 mgd (10.51 m^3/sec) for the following scenarios:

Scenario 1: PLOO TSS mass emission rate of 16,500 mt/yr under average annual ocean conditions, and

Scenario 2: PLOO TSS mass emission rate of 18,100 mt/yr under critical (maximum stratification) ocean conditions.

Table III.A-7 and Table III.A-8 (page III.A-17) summarizes the results solids deposition modeling for this scenario. As shown in Table III.A-7, a Scenario 1 solids deposition rate of approximately 33 $g/m^2/yr$ is simulated for a zone that extends approximately 1.1 miles (2 km) upcoast and downcoast from the PLOO diffuser.

A solids depositional rate of approximately 68 g/m^2/yr (see Table III.A-8) is simulated under critical conditions (Scenario 2) within a zone that extends approximately 0.7 miles (1.2 km) upcoast and downcoast from the PLOO diffuser.

Table III.A-7
Summary of Results of EPA ATSD Model
Fraction of Discharged Solids for 240 mgd, 16,100 mt/year Discharge[1]
Average Annual Conditions

Particle Size Group (Settling velocity range in cm/sec)	Size of Ellipse within which Average Particle in Given Size Group is Deposited			Simulated Cumulative Deposition Rate within Ellipse[3] g/m^2/yr
	Area[2] (km^2)	Length (km)	Width (km)	
> 0.1	9.9	3.94	2.87	33
0.1 - 0.01	989	39.4	28.7	0.8
0.01 - 0.006	2746	65.7	47.9	0.13
0.006 - 0.001	98,960	394	287	0.02

1 See Appendix Q of the City's 1995 waiver application for details on the ATSD modeling method and input data. To be conservative, a TSS mass emission rate of 16,500 mt/yr was used - a rate higher than the mass emission rates proposed in this 301(h) application.
2 Depositional areas from Table Q-5 of Appendix Q of the City's 1995 301(h) application.
3 Cumulative depositional flux. From Table Q-6 of Appendix Q of the City's 1995 301(h) application.

Table III.A-8
Summary of Results of EPA ATSD Model
Fraction of Discharged Solids for 240 mgd, 18,100 mt/year Discharge[1]
Critical 90-Day Period

Particle Size Group (Settling velocity range in cm/sec)	Size of Ellipse within which Average Particle in Given Size Group is Deposited			Simulated Cumulative Deposition Rate within Ellipse[3] g/m^2/yr
	Area[2] (km^2)	Length (km)	Width (km)	
>0.1	4.6	2.53	2.45	68
0.1 - 0.01	460	25.3	24.6	2.0
0.01 - 0.006	1279	42.1	41.0	0.3
0.006 - 0.001	46,036	394	287	0.04

1 See Appendix C (Volume IV) for details on the ATSD modeling method and input data. To be conservative, a TSS MER of 22,000 mt/year is used for the "critical period", even though the proposed Point Loma discharge is to discharge no more than 20,000 mt/year.
2 Depositional areas from Table Q-5 of Appendix Q of the City's 1995 301(h) application.
3 Cumulative depositional flux. From Table Q-6 of Appendix Q of the City's 1995 301(h) application.

Method 2 - SEDPXY. The City's 1995 301(h) application also presented depositional simulations using the 36,000 element SEDPXY model. (The SEDPXY model is described in detail in Appendix Q of the City's 1995 301(h) application.) The SEDPXY model offers several advantages over the EPA ATSD model, but does not account for account organic decay and resuspension. Additionally, the SEDPXY model makes use of conservative Point Loma WTP effluent settling characteristics.

Solids deposition rates projected in the SEDPXY model were significantly less than the EPA ATSD model. Under Scenario I (240 mgd, 16,100 mt/yr TSS mass emission, and average annual ocean conditions), a solids deposition rate was computed at 2 $g/m^2/yr$ within an area approximately 0.46 mi^2 (1.3 km^2) surrounding the PLOO diffuser.

Solids Accumulation Conclusions. The deposition rate predictions from the two simulation models represent the theoretical maximum flux of effluent particles settling from the water column onto the ocean bottom. Both the EPA ATSD and SEDPXY models significantly overstate the amount of deposited solids that would be deposited (and accumulate) on the ocean floor, as a result of the following conservative assumptions:

- particle settling velocities in the current PLOO discharge are significantly slower than settling velocities that were used in the solids deposition models,
- PLOO mass emissions of TSS were overestimated,
- solids loss through organic uptake was neglected, and
- resuspension effects were neglected.

As documented in the response to Question III.A.5(a) (pages III.A-11 and III.A-12) these assumptions compound to cause significant overestimation in the theoretical solids deposition rates developed using the ATSD and SEDPXY models. Visual observations by subsurface ROVs of the vicinity of the PLOO confirm that the theoretical deposition rates projected in each of the two models are overly conservative. As documented in Appendix Q (Volume VIII), no discernible visual accumulation of solids occurs in the vicinity of the PLOO discharge.

Actual outfall solids deposition rates and rates of accumulation are thus significantly less than the theoretical calculations developed using the ATSD and SEDPXY models.

III.A.5. c. What is the fate of settleable solids transported beyond the calculated sediment accumulation area?

SUMMARY: The majority of the PLOO discharge solids are organic, and will be eliminated through biological uptake and decay. Small inorganic particles will be carried out of the discharge zone and dispersed to deeper waters where they will be dispersed and eventually aggregate into larger particles and settle.

As discussed in the response to Questions III.A.5(a) and III.A.5(b), computer modeling presented in the City's 1995 301(h) application projected that 8 to 9 percent of the discharged solids would settle in a zone located 8 miles (15 km) upcoast and downcoast from the PLOO diffuser and 4.3 miles (7 miles) offshore from the diffuser. Remaining particles were simulated as settling at greater distances from the outfall, with the slowest settling particles being carried the farthest distance.

Figures III.A-2 and III.A-3 (page III.A-21 and III.A-22) respectively present the theoretical distribution of discharged particles as a function of particle settling velocity, based on modeling studies presented in the City's 1995 301(h) application. (See Appendix Q of the City's 19995 301(h) application.)

As noted in the response to Questions III.A.5(a), the models significantly overestimate the amount of solids deposited in the outfall vicinity, as

- current PLOO particle settling velocities are significantly less than those used in the models,
- the models assumed a higher TSS mass emission rate than is proposed in this 301(h) application,
- the models neglected organic consumption (uptake) and decay, and
- the solids deposition models neglected effects of resuspension.

Particles not deposited in the outfall vicinity will either be eliminated through biological consumption and decay or transported out of the outfall zone to deep ocean waters.

Particle Settling Overview. As also noted in Appendix O, the wastefield upon initial dilution typically forms at an elevation of about 85-90 feet (26-27m) above the ocean bottom.

Computer modeling presented in the City's 1995 301(h) application (see Appendix Q of the 1995 application) concluded that discharged particles with settling speeds in excess of 0.002 - 0.007 cm/sec would be deposited on the shelf within several miles of the outfall.

No settling velocity studies have been conducted for the current PLOO discharge. Settling studies conducted in 1978 (before the current Point Loma WTP advanced primary treatment was initiated) concluded that approximately 90 percent of the PLOO particle mass had settling speeds slower than this 0.002 to 0.007 cm/sec threshold.

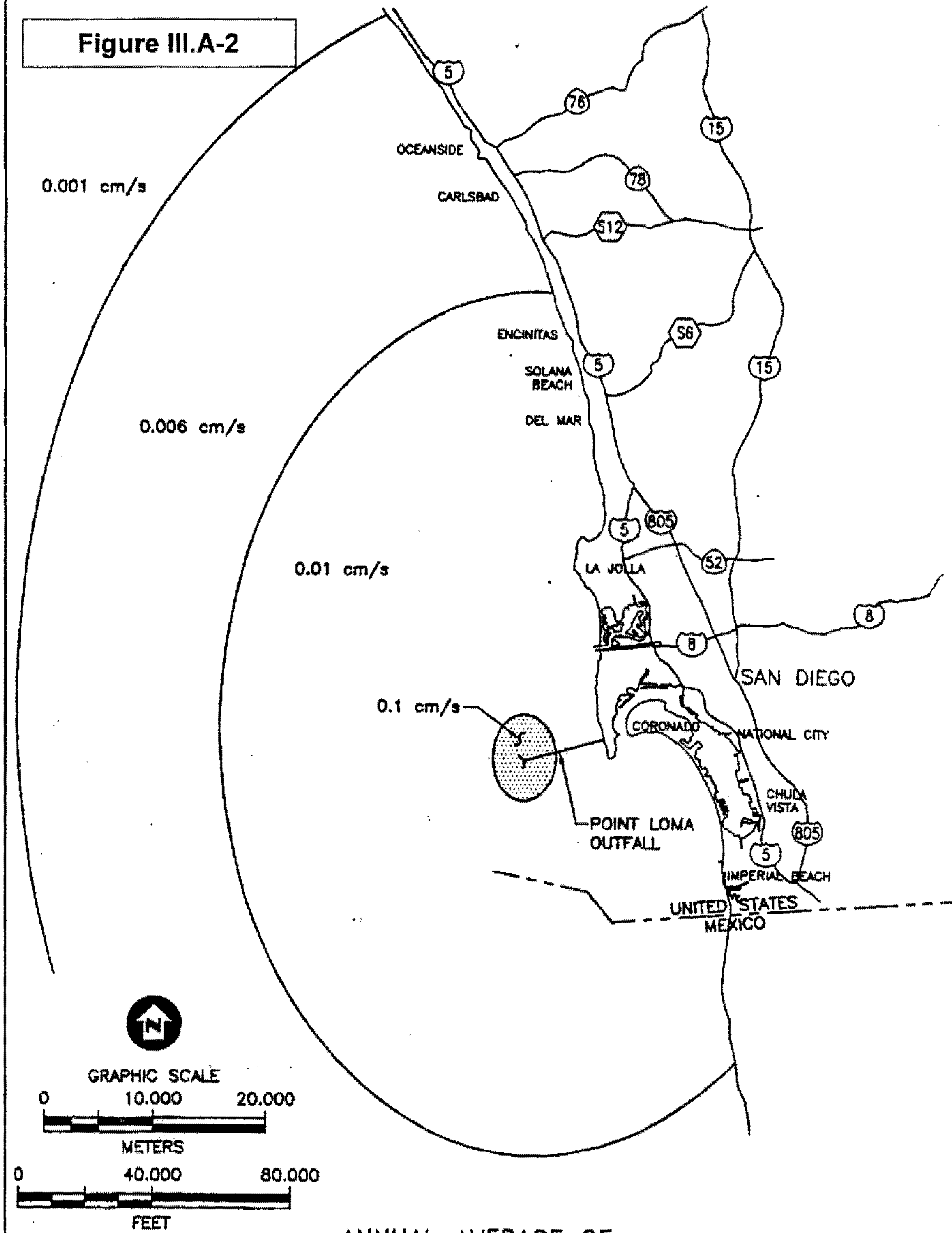
Since present day PLOO TSS and settleable solids concentrations are significantly lower than in 1978, it is probable that only a small fraction of the PLOO solids would have settling faster than 0.007 cm/sec. As a result, particle settling and accumulation within the vicinity of the PLOO outfall would be negligible. This projected lack of particle accumulation in the PLOO vicinity is confirmed by visual evidence collected by remotely operated submersibles (see Appendix Q).

Particles transported beyond the calculated sediment accumulation area have long residence times in the water column. Approximately 30 days are required for another 10 percent of the effluent particle mass to be deposited--assuming that the particles remain inert and there is not increase in the settling distance.

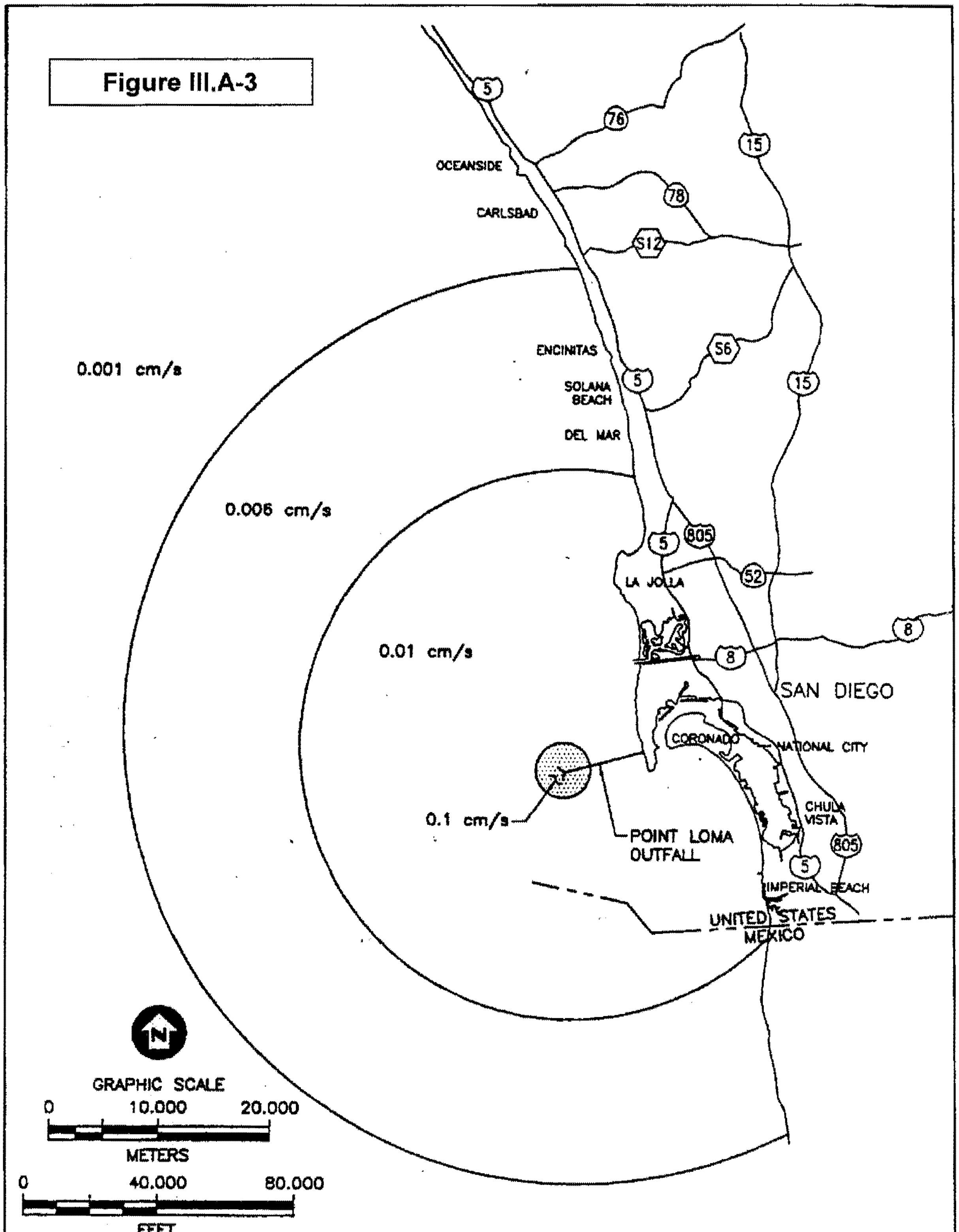
Loss of Organic Material. During 2006, volatile (organic) suspended solids comprised 71 percent of the total suspended solids. As documented in the City's 1995 301(h) application, this organic portion of the discharged solids will be virtually consumed within 60 days through decay or biological uptake. Table III.A-9 (page III.A-23) summarizes how this loss of organics affects the overall mass of discharged solids.

As shown in Table III.A-9, one-quarter of the organic mass will be consumed within 3 days of discharge, and half within one week. Within one month, less than one-quarter of the total mass (organic plus inorganic) remains. By the end of two months, only the inorganic fraction of the discharged solids remain Over this two-month time frame, cross-shore transport will disperse the particles offshore and into deeper and more distant water. (See Figures III.A-2 and III.A-3 on pages III.A-21 and III.A-22.)

Figure III.A-2



ANNUAL AVERAGE OF
TRANSPORT DISTANCES FOR PARTICLES
WITH SETTLING SPEEDS OF 0.1, 0.01, 0.006 AND 0.001cm/s
FOR 240 MGD FLOW



CRITICAL 90-DAY PERIOD OF
TRANSPORT DISTANCES FOR PARTICLES
WITH SETTLING SPEEDS OF 0.1, 0.01, 0.006 AND 0.001cm/s
FOR 240 MGD FLOW

Table III.A-9
Loss of Organic Material Due to Decay/Consumption

Elapsed Time	Organic Fraction Remaining[1] (percent of total)	Total Mass Fraction Remaining[2] (percent of total)	Estimated Percent Organic[3]
0	100%	100%	71.0%
12 hours	95.1%	96.1%	70.2%
1 day	90.5%	92.4%	69.6%
3 days	74.1%	79.3%	66.4%
1 week	49.7%	59.8%	59.0%
2 weeks	24.7%	39.8%	44.1%
1 month	4.8%	23.8%	14.3%
2 month	0.2%	20.2%	0.8%

1 Percent of organic material in the PLOO discharge that remains after decay and consumption. From Appendix Q of the City's 1995 301(h) application.
2 Total mass fraction remaining after decay/consumption of organic solids. From Table Q-16, Appendix Q of the City's 1995 301(h) application.
3 Adapted from Table Q-16, Appendix Q of the City's 1995 301(h) application to reflect the fact that current volatile solids represent approximately 71 percent of total solids.

In addition to reducing the mass of solids, this loss of organic material also may affect the size of remaining particles. Some of the particles will be reduced in size as a result of organic loss. Discharged nutrients biologically consumed in the water column may be returned as waste products in various particle sizes. As a result of these processes, the distribution of particle settling speeds becomes more difficult to estimate as the discharge is transported farther from the outfall vicinity.

Resuspension Effects. As documented in the response to Question III.A.5(b), resuspension is a key factor in affecting the rate of accumulated solids in the PLOO vicinity. The PLOO diffuser is located at the edge of a shelf, and the ocean bottom steepens to significant depths immediately beyond the diffuser. Demonstrating this, Figure III.A-4 (page III.A-25) presents a three-dimensional view of ocean bathymetry west of the PLOO diffuser.

The near-bottom flow (see description of oceanography in Appendix N) has a significant offshore component toward these deeper waters. Particles resuspended near the edge of the shelf are carried off into deeper water, promoting the loss of resuspended material from the shelf. These erosional and resuspension effects are evidenced by domination of sand particles (as opposed to more easily resuspended silt or clay particles) in the PLOO diffuser sediments.

Farfield Particle Fate. Insert solids with slow settling velocities will remain suspended in the water column as they are dispersed to greater distances (and depths) from the outfall. Ultimately, the particles will aggregate with other natural particles or will be biologically consumed and discharged as fecal pellets by zooplankton. Quantitative estimates of such particle aggregation and subsequent settling is not possible, however, due to variabilities associated with:

- alterations of particle size due to organic losses (decay and biological uptake),
- dependence of settling rates on the type and abundance of zooplankton,
- the wide range of settling speeds of the aggregated particles, and
- the wide range of particle sizes and settling speeds of fecal pellets (less than 0.002 to greater than 3 cm/sec).

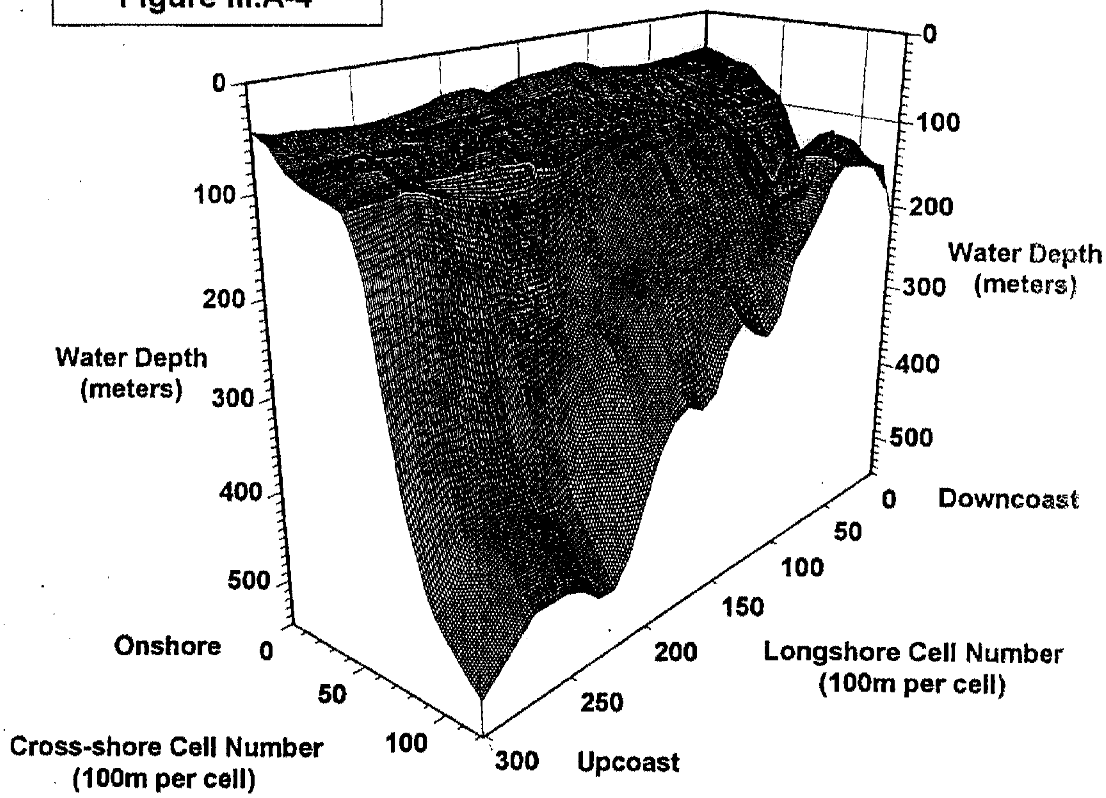
In summary, particles transported out of the calculated accumulation area will become increasingly inorganic in content, and will be dispersed over an increasingly large area by the ocean currents with correspondingly low deposition rates. Since the remaining particle mass is expected to be mixed with natural particles, their contribution to the accumulation of inorganic material in the sediments outside the calculated accumulation area is expected to be minor compared with the accumulation of natural particles.

The effect of discharged particles on the farfield ocean environment will be negligible, as a result of:

- low overall discharge TSS concentrations in the PLOO discharge and low quantity of settleable solids,
- reduced (slower) effluent particle settling velocities resulting from Point Loma WTP treatment improvements,
- high organic content and associated organic losses through biological uptake and decay, significant increases in ocean bottom depths offshore from the diffuser, and
- wide dispersion of discharged solids.

Receiving water monitoring collected by the City at 36 offshore stations and 8 inshore stations confirms the lack of farfield impacts associated with discharged solids. No discernible differences exist in light transmittance between outfall and reference stations. Receiving water light transmittance values at the PLOO monitoring stations are within the range of variability that normally within the Southern California Bight.

Figure III.A-4



BATHYMETRY USED FOR THE DEPOSITION SIMULATIONS

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Section III.B

Large Applicant Questionnaire

III.B.1 What is the concentration of dissolved oxygen immediately following initial dilution for the period(s) of maximum stratification and any other critical period(s) of discharge volume/composition, water quality, biological seasons, or oceanographic conditions?

SUMMARY: Because of the high dilution achievable by PLOO, the largest dissolved oxygen depression is minimal (0.05 mg/l, or approximately 1 percent). Natural variability of DO in the ocean is significantly greater than this 0.05 mg/l value.

The City's 1995 301(h) waiver application assessed the farfield dissolved oxygen depression for a PLOO discharge of 240 mgd. Results of this analysis remain applicable, and are updated in Appendix P and summarized below.

DO Computation per EPA Methodology. Methodology for computing dissolved oxygen depression is presented on pages B-14 through B-18 of the EPA *Amended Section 301(h) Technical Support Document* (EPA, 1994). This 1994 EPA support document presents the following equations for computing receiving water dissolved oxygen concentrations:

$$DO_f = DO_a + \frac{(DO_e - IDOD - DO_a)}{S_a}$$ (Equation III.B-1)

where:
- DO_f = Final dissolved oxygen concentration (mg/l) of receiving water at the plume trapping level,
- DO_a = Affected ambient dissolved oxygen concentration (mg/l) immediately up current of the diffuser averaged over the tidal cycle (12.5 hours) and from the diffuser port depth to the trapping level,
- DO_e = Effluent dissolved oxygen (mg/l),
- IDOD = Immediate dissolved oxygen demand (mg/l),
- S_a = Flux averaged initial dilution, and
- DO_p = Ambient dissolved oxygen (mg/l) at diffuser port depth (93m).

The depression of dissolved oxygen due to wastewater after completion of initial dilution is given in percent by:

$$\Delta DO\% = 100 \times \frac{(DO_t - DO_e + IDOD)}{DO_t \times S_a}$$ (Equation III.B-2)

where: DO_t = Ambient dissolved oxygen concentration at the trapping level, mg/l

IDOD is a difficult value to measure because the chemical test often gives unreliable answers. As a result, *Standard Methods for the Examination of Water and Wastewater* has eliminated the IDOD test since its 14th Edition. In 1994, the Point Loma WTP effluent IDOD was measured at values ranging from 0.45 to 1.74 mg/l in 1994 (nine total samples).

The 1994 EPA *Amended 301(h) Technical Support Document* suggests (page B-15 of the technical support document) assigning IDOD values on the basis of outfall travel time and effluent BOD. Table III.B-1 presents estimated PLOO travel times at the current flow of 170 mgd (7.45 m^3/sec) flow, the permitted average annual flow 240 mgd (10.51 m^3/sec), and the permitted maximum day flow of 432 mgd (15.61 m^3/sec). As shown in Table III.B-1, average PLOO travel times through the outfall (not counting the diffuser) are projected at approximately 133 minutes for 170 mgd), 94 minutes for 240 mgd), and 52 minutes for 432 mgd.

Table III.B-1
Estimated PLOO Travel Times at 240 mgd

Outfall Segment	Inside Diameter		Length		Estimated PLOO Travel Time (minutes)		
	feet	meters	feet	Meters	170 mgd[1]	240 mgd[2]	432 mgd[3]
Original outfall	9.0	2.74	11,226	3,422	45.2	32.1	17.8
Extended outfall	12.0	3.66	12,246	3,732	87.8	62.2	34.5
Diffuser Section 1[4]	7.0	2.13	1008	307.2	4.9	3.5	1.9
Diffuser Section 2[4]	5.5	1.68	852	256	2.6	1.8	1.0
Diffuser Section 3[4]	4.0	1.22	648	197.5	1.0	0.7	0.4
Total Estimated Travel Time - Outfall Only					133.0	94.3	52.3
Total Estimated Travel Time - Outfall & 3 Diffuser Legs					141.5	100.3	55.6

1 Average annual year 2006 PLOO flow was 170 mgd.
2 Maximum average annual PLOO flow permitted by Order No. R9-2002-0025.
3 Maximum day peak wet weather PLOO flow permitted by Order No. R9-2002-0025.
4 Each of the two PLOO diffuser legs is comprised of three sections with successively smaller pipe diameters. Half the PLOO flow is assumed to go through each of the two diffuser legs.

For an outfall travel time of more than 100 minutes and an effluent BOD concentration of 100 mg/l (the 2006 Point Loma WTP BOD averaged 102 mg/l), the EPA guidance document recommends an IDOD value between 3 and 4 mg/l. (See page B-15 of the *Amended 301(h) Technical Support Document.*)

In accordance with this EPA guidance, receiving water DO is conservatively computed based on:

- an effluent IDOD of 4 mg/l,
- an assumed effluent DO of zero, and
- observed receiving water DO and trapping depth measurements from 1990 and 1991 (deemed to represent critical receiving water conditions).

Results of the calculation are presented in Table III.B-2. The "worst case" computed DO depression was 0.05 mg/l.

Table III.B-2
Calculation of Dissolved Oxygen Immediately Following Initial Dilution[1]
(240 MGD)

Date of Historic DO/CTD Data Set Used in Computation[2]		S_a	Dissolved Oxygen (mg/l)				ΔDO	
			DO_p	DO_t	DO_a	DO_f	mg/l	%
1990	Mar. 7	287	4.23	5.37	4.80	4.77	0.03	0.6
	Apr. 17	253	4.30	4.78	4.54	4.50	0.04	0.7
	May 23	230	3.65	4.47	4.06	4.03	0.03	0.8
	Jun. 20	355	5.23	5.60	5.42	5.39	0.03	0.5
	Jul. 25	238	4.35	5.20	4.78	4.79	0.05	0.7
	Aug. 29	416	5.60	6.08	5.84	5.81	0.03	0.4
	Sept. 27	409	3.99	4.68	4.33	4.31	0.02	0.5
1991	Jan. 26	275	6.60	7.15	6.88	6.84	0.04	0.6
	Feb. 7	212	4.60	5.83	5.22	5.17	0.05	0.8
	Mar. 7	260	4.15	5.00	4.58	4.54	0.04	0.7
	Apr. 7	258	3.63	5.18	4.41	4.37	0.04	0.7

Note:
S_a = flux averaged initial dilution,
DO_p = ambient dissolved oxygen (mg/l) at diffuser port depth (93m),
DO_t = ambient dissolved oxygen concentration (mg/l) at the trapping level,
DO_a = affected ambient dissolved oxygen concentration (mg/l) immediately up current of the diffuser averaged over the tidal cycle (12.5 hours) and from the diffuser port depth to the trapping level, and
DO_f = final dissolved oxygen concentration (mg/l) of receiving water at the plume trapping level,

1 Calculations conservatively based on IDOD = 4.0 mg/l and DO_e = 0.0 mg/l. Actual Point Loma WTP IDOD is projected to be significantly less than 4.0 mg/l.

2 Receiving water DO and thermocline data from 1990 and 1991 are representative of critical receiving water conditions.

During the critical period (January through March), a "worst case" DO_f value of 4.54 mg/l was computed. (See Appendix O for details associated with these DO depression calculations.) As shown in Table III.B-2, DO depression is projected at less than 1 percent throughout a wide range of naturally-occurring ambient DO concentrations and oceanographic conditions.

The conservative DO depression computations presented in Table III.B-2 and Appendix O remain valid, as (1) assumptions on PLOO effluent DO and IDOD are conservative, and (2) receiving water data from 1990-1991 remain representative of critical thermocline trapping conditions.

Receiving Water DO Concentrations. Receiving water monitoring conducted off the coast of Point Loma confirm the lack of discernible outfall-related DO depression

The City monitors receiving water DO concentrations at 36 offshore stations and 8 kelp bed stations. While receiving water DO may vary significantly as a result of naturally-occurring seasonal and long-term oceanographic conditions, no discernible outfall-related change in receiving water DO has been observed. Table III.B-3 (page III.B-5) summarizes DO measurements at the three 100-meter-deep outfall stations closest to the outfall diffuser (Stations F29, F30, and F31).

As shown in Table III.B-3, observed receiving water DO values remains high throughout the water column, and are in keeping with historic DO values that were used within the above computation of theoretical DO depression. Additionally, DO concentrations at these outfalls stations are consistent with DO concentrations at upcoast and downcoast reference stations along the 100-meter-contour. Current receiving water DO concentrations are also consistent with pre-discharge monitoring conducted prior to initiation of the extended PLOO discharge.

As also shown in Table III.B-3, natural variability in receiving water DO concentrations is significantly greater than computed maximum 0.05 mg/l outfall-related DO depression.

Table III.B-3
Receiving Water Dissolved Oxygen in the Vicinity of the PLOO Diffuser[1]

Depth	Time Period	Receiving Water Dissolved Oxygen (mg/l)			
		Jan	Apr	Jul	Oct
< 2 meters	2006	8.5	9.6	8.1	7.6
	1995-2005	8.0	8.4	8.1	7.6
10-20 meters	2006	7.6	7.6	8.0	8.4
	1995-2005	7.9	8.1	8.7	8.3
> 88 meters	2006	3.5	2.6	3.6	4.6
	1995-2005	4.7	3.4	4.2	5.0

1 Data from Stations F29, F30, and F31 along the 100-meter-depth contour. Station F-30 is at the diffuser "wye", and Stations F29 and F31 are approximately 1 km upcoast and downcoast from the "wye". Data the City's 2006 annual receiving water report: *City of San Diego Annual Receiving Waters Monitoring Report for the Point Loma Ocean Outfall, 2006.*

III.B.2. What is the farfield dissolved oxygen depression and resulting concentration due to BOD exertion of the wastefield during the period(s) of maximum stratification and any other critical period(s)?

SUMMARY: Because of the high dilution of the outfall, DO depression will are projected to not exceed 0.14 mg/l during the critical period (January through March). The maximum DO depression is projected to be 2.4 percent during the critical period.

The City's 1995 301(h) waiver application assessed the farfield dissolved oxygen depression for a PLOO discharge of 240 mgd. Results of this analysis remain applicable, and are updated in Appendix P and summarized below.

Ocean Plan Requirements. In lieu of establishing a requirement for BOD, the Ocean Plan (2005) establishes the following receiving water dissolved requirement:

> *The dissolved oxygen concentration shall not at any time be depressed more than 10 percent from that which occurs naturally, as the result of the discharge of oxygen demanding waste materials.*

This Ocean Plan requirement excludes the effects on DO of the entrainment of deeper and colder ambient water (which has lower natural DO) into the plume during the initial dilution process. Accordingly, the DO depressions presented herein were developed assuming the concentration of DO in the entrained ambient water to be the same as the DO at the trapping level.

Factors Affecting Farfield DO. After the initial dilution, DO in the wastefield is further reduced as a result of nitrogenous and carbonaceous BOD demands. Time-dependent DO changes resulting from BOD demands are computed by:

$$\Delta DO_{BOD}(t) = \Delta CBOD \times \left(1 - e^{-k_c t}\right) + \Delta NBOD \times \left(1 - e^{-k_n t}\right) \qquad \text{(Equation B.III-3)}$$

where:

- $\Delta DO_{BOD}(t)$ = the time-dependent depression of DO in the farfield waters,
- $\Delta CBOD$ = carbon-associated BOD concentration (above ambient) at the completion of initial dilution,
- $\Delta NBOD$ = nitrogen-associated BOD concentration (above ambient) at the completion of initial dilution,
- k_c = decay rate for carbon-associated BOD, and
- k_n = decay rate for nitrogen-associated BOD.

Farfield DO is also affected by time-dependent subsequent dilution that occurs as a result of ocean mixing beyond the ZID. The time-dependent depression of DO in the farfield waters can be computed as follows:

$$\Delta DO_w(t) = \frac{-\Delta DO_t - \Delta DO_{BOD}(t)}{D_s(t)} \qquad \text{(Equation III.B-4)}$$

Where:

$\Delta DO_w(t)$ = the time-dependent depression of DO in the farfield waters,

ΔDO_t = the change in DO due to initial dilution and effluent IDOD, computed per equation III.B-2,

ΔDO_{BOD} = the time-dependent farfield DO depression resulting from nitrogenous and carbonaceous BOD demand(i.e., the reduction in the level of DO in the wastefield resulting from DO and IDOD in the effluent, DO uptake by the BOD exertion, and subsequent oceanic mixing with the surrounding higher DO water), and

$D_s(t)$ = time-dependent subsequent dilution of the wastefield due to oceanic mixing.

As documented in Appendix P, historic DO and CTD data (which are still representative of current PLOO conditions) are used as input to the above equations to estimate farfield DO depressions resulting from the PLOO discharge. Resulting farfield DO estimates for the critical period of maximum stratification are presented in Table III.B-4 (page III.B-8). As documented in Appendix P, the farfield DO depression estimates presented in Table III.B-4 are conservative.

Table III.B-4
Calculation of Farfield Dissolved Oxygen Depression Due to Waste Material
240 mgd (10.51 m³/sec) PLOO Discharge

Date of Historic DO/CTD Data Set Used in Computation[1]	S_a	Dissolved Oxygen (mg/l)		ΔDO(%)[2]	Hours to Minimum Computed DO	Subsequent Dilution Factor[3]
		DO_t	ΔDO			
3/07/90	287	5.37	0.10	1.9	34.5	2.14
4/17/90	253	4.78	0.11	2.4	35.5	2.18
5/23/90	230	4.47	0.13	2.8	35.5	2.18
6/20/90	355	5.60	0.08	1.5	34.5	2.14
7/25/90	238	5.20	0.12	2.4	35.0	2.16
8/29/90	416	6.08	0.07	1.2	34.0	2.11
9/27/90	409	4.68	0.07	1.5	35.5	2.18
1/26/91	275	7.15	0.11	1.5	32.0	2.02
2/07/91	212	5.83	0.14	2.4	34.0	2.11
3/07/91	260	5.00	0.11	2.2	35.0	2.16
4/07/91	258	5.18	0.11	2.2	35.0	2.16

1 See Appendix P. Historic data from 1990 and 1991 used in the calculation remain applicable to characterize critical oceanographic conditions in the vicinity of the PLOO discharge.
2 Computed farfield DO depression (as a percent). See Appendix P for computation methodology.
3 Computed additional dilution factor subsequent to initial dilution due to oceanic mixing. As shown above, the Point Loma WTP effluent is further diluted by more than a factor of two within approximately 36 hours of initial dilution. See Appendix P.

III.B.3 What are the dissolved oxygen depressions and resulting concentrations near the bottom due to steady sediment demand and resuspension of sediments?

SUMMARY: Critical 90-day dissolved oxygen depression due to sediment oxygen demand is projected to be less than 0.045 mg/l. Maximum oxygen depression due to resuspension of sediments is estimated at 0.077 mg/l. Actual observed sediment deposition rates near the PLOO diffuser appear to be significantly lower than the assumed values used to compute DO depression values.

The City's 1995 301(h) waiver application assessed dissolved oxygen depressions due to steady sediment demand and resuspension of sediments for a PLOO discharge of 240 mgd. Results of this prior analysis remain valid, and are summarized below and presented in Appendix P.

Steady State Oxygen Demand. As documented in Appendix P, oxygen depletion due to steady-state oxygen demand was computed using the method outlined in the *Amended 301(h) Technical Support Document*. Page B-35 of this EPA technical support document presents the following equation for computing steady-state oxygen demand:

$$\Delta DO = \frac{a \times S_{avg} \times k_d \times X_M}{86{,}400 \times U \times H \times D} \quad \text{(Equation III.B-5)}$$

Where:

ΔDO	=	steady sediment oxygen depletion in (mg/l)
a	=	oxygen sediment stoichiometric ratio,
k_d	=	sediment decay constant
S_{avg}	=	average concentration of deposited organic sediments over the deposition area (g/m^2)
X_m	=	length of deposition area (m)
U	=	current speed (m/sec)
D	=	subsequent dilution associated with horizontal mixing.

Appendix P presents information on each of the above input parameters, and computes or estimates appropriate input values. Table III.B-5 (page III.B-10) summarizes the input values used in the evaluation of steady-state dissolved oxygen depression for the critical ocean conditions.

Using these input values, Table III.B-6 summarizes the results of dissolved oxygen computations (see Appendix P) for a 240 mgd discharge and TSS mass emission rate of 18,100 mt/year. As shown in table, the steady state dissolved oxygen depression is computed at 0.045 mg/l.

Table III.B-5
Parameter Values - Steady Sediment Oxygen Demand Equation[1]

Variable	Description	Estimated Value[2]
a	Stoichiometric ratio	1.07 mg O_2/mg sediment
k_d	Sediment decay constant	0.01/day
S_{avg}	Average concentration of deposited organic sediments over the deposition area	17.14 g/m^2
X_m	Length of deposition area	2700 m
D	Dilution	1.6 to 1
U	Ocean current speed	0.029 m/sec
H	Layer thickness	2.7 m

1 Parameters for the steady-state sediment oxygen demand equation (Equation III.B-5) developed in accordance with information presented by EPA in *Amended 301(h) Technical Support Document* (EPA, 1994).
2 Parameters computed in accordance with the EPA *Amended 301(h) Technical Support Document*. See Appendix P details on each parameter.

Table III.B-6
Computed Steady Sediment Oxygen Depression[1]

Parameter	Value
Computed steady sediment oxygen depression	0.045 mg/l
Minimum observed dissolved oxygen at depth during 2006 at PLOO diffuser stations[2]	2.6 mg/l
Percent depression	1.7%

1 Computed in accordance with instructions presented in *Amended 301(h) Technical Support Document* (EPA, 1994). Input values for the steady sediment dissolved oxygen depression equation (Equation III.B-5) are presented in Table III.B-5.
2 Minimum receiving water DO during 2006 at depth at the ocean monitoring stations nearest the PLOO diffuser (F29, F30, and F31).

Comparison to Minimum Ambient DO at Depth. The City monitors receiving water DO at 36 oceanographic stations and 8 kelp bed stations. The minimum DO observed at monitoring stations near the PLOO ZID (Stations F29, F30, and F31) during 2006 was 2.6 mg/l (April 2006). The computed steady-state 0.045 mg/l dissolved oxygen depression thus corresponds to a depression of approximately 1.7 percent of the lowest observed year 2006 ambient DO.

Resuspension Oxygen Demand. For determining oxygen demand due to sediment resuspension, the *Amended 301(h) Technical Support Document* requires a "worst case" analysis based on all accumulated sediments being resuspended. In accordance with this technical support document, oxygen depletion due to sediment resuspension can be computed by:

$$\Delta DO = \frac{S_r}{D \times H} \times \left[1 - exp\left(\frac{-k_r t}{24}\right)\right] \quad \text{(Equation III.B-6)}$$

Where:

ΔDO	=	oxygen depletion due to sediment resuspension in (mg/l)
S_r	=	average organic accumulation of resuspended sediments (g/m^2)
D	=	horizontal (subsequent) dilution
H	=	depth of water volume containing resuspended materials (m)
K_r	=	decay rate of resuspended sediments
t	=	elapsed time since resuspension (hr)

Appendix P applies this equation to the City's 240 mgd PLOO discharge (at an assumed TSS mass emission rate of 18,100 mt/yr). Table III.B-7 (page III.B-12) summarizes the input values used in Appendix for the computation of dissolved oxygen depression due to sediment resuspension.

Table III.B-8 (pa ge III.B-12) summarizes the results of the sediment resuspension DO computations using these input values. As shown in Table III.B-8, the dissolved oxygen depression due to sediment resuspension is computed at 0.077 mg/l.

This computed DO depression due to sediment resuspension is likely a significant overestimate. Due to effluent settling velocities and ocean currents in the vicinity of the diffuser, organic accumulation near the diffuser is significantly less than the 20.9 g/m^2 value assumed in the above DO depression computation.

Table III.B-7
Estimated Parameter Values - Oxygen Demand Due to Sediment Resuspension

Variable	Description	Estimated Value[1]
S_r	Average organic accumulation of resuspended sediments	20.9 g/m^2
D	Horizontal (subsequent) dilution	0.01/day
H	Depth of water volume containing resuspended materials	Computed as function of elapsed time and vertical diffusion coefficient[2]
k	Decay rate of resuspended sediments	0.1/sec

1 Parameters estimated or computed in accordance with information provided in *Amended 301(h) Technical Support Document*. See Appendix P for details on each parameter.

2 Depth of water volume containing resuspended materials "H" is computed as a function of elapsed time and vertical diffusion coefficient (5 cm/sec^2), as follows:

$$H = \frac{\pi^{0.5}}{100}\sqrt{3600 \times t \times \varepsilon_Z}$$

Where, ε_Z = vertical diffusion coefficient during resuspension (5 cm2/sec), and
T = elapsed time following resuspension (hours).

Table III.B-8
Computed Oxygen Depression Due to Sediment Resuspension[1]

Parameter	Value
Computed oxygen depression due to sediment resuspension[2]	0.077 mg/l
Minimum observed dissolved oxygen at 93 m depth for January through March critical period[3]	3.2 mg/l
Percent depression	2.4%

1 Computed in accordance with instructions presented in *Amended 301(h) Technical Support Document* (EPA, 1994). Input values for the steady sediment dissolved oxygen depression equation are presented in Table III.B-7.

2 Computed dissolved oxygen depression due to resuspension is time-dependent. The maximum oxygen depression is computed as occurring approximately eight hours after resuspension. See Appendix P.

3 Minimum receiving water DO during 2006 at depth at the ocean monitoring stations nearest the PLOO diffuser (F29, F30, and F31).

III.B.4 What is the increase in receiving water suspended solids concentration following initial dilution of the modified discharge?

SUMMARY: The average increase in receiving water TSS concentration resulting from the 240 mgd PLOO discharge is approximately 1 to 2 percent of the natural background concentration.

The concentration of TSS at the completion of initial dilution is calculated using the following equation presented on page B-40 in the *Amended Section 301(h) Technical Support Document*:

$$SS_f = SS_a + \frac{SS_e - SS_a}{S_a} \qquad \text{(Equation III.B-7)}$$

where SS_f = Suspended solids concentration at completion of initial dilution, mg/l.

SS_a = Affected ambient suspended solids concentration immediately upcurrent of the diffuser averaged over one-tidal period (12.5 hours) and from the diffuser port depth to the trapping level, mg/l.

SS_e = Effluent suspended solids concentration, mg/l.

S_a = Flux-averaged initial dilution (California regulatory monthly averages based on CTD data).

As noted in the response to Questionnaire Section II.A.4, the average effluent TSS concentration for the Point Loma WTP discharge during 2006 was 35 mg/l. During 2006, Metro System facilities achieved an average system-wide TSS removal of 87.7 percent.

As documented in the City's prior 301(h) applications, receiving water TSS concentrations vary significantly with season and natural conditions. Monitoring conducted as part of a special 1994 receiving water study showed ambient receiving water TSS concentrations ranging from 2.2 mg/l near the PLOO ZID to 11.2 mg/l at reference stations, with a depth-averaged value over a complete tidal cycle of 7 mg/l. While significant variation in receiving water TSS can occur, these 1994 values remain valid for purposes of computing TSS impacts on receiving waters.

Table III.B-9 (page III.B-14) presents computed receiving water TSS concentrations associated with the 240 mgd (10.51 m^3/sec) PLOO discharge. Values presented in Table III.B-9 are based on computed monthly initial dilutions (see Appendix O) and an average assumed ambient ocean water TSS value of 7 mg/l. As shown in Table III.B-9, the PLOO discharge is projected to increase receiving water TSS concentrations by approximately 1 to 2 percent.

Recognizing that natural ambient receiving water TSS concentrations may vary significantly over both short-term and long-term time periods, Table III.B-10 (page III.B-15) presents estimated PLOO effects on receiving waters for a range of assumed receiving water TSS concentrations. The PLOO discharge is projected to increase receiving water TSS concentrations at the edge of the ZID by 0.1 to 0.2 mg/l.

Table III.B-9
Suspended Solids Concentration at the Completion of Initial Dilution
Assuming an Ambient Receiving Water TSS Concentration of 7 mg/l

Month	Year 2006 Average Monthly Point Loma WTP TSS Concentration[1] SS_e (mg/l)	Average Ambient TSS Concentration Upcurrent from Outfall Diffuser[2] SS_a (mg/l)	Initial Dilution[3] S_a	Computed Receiving Water TSS Concentration after Initial Dilution[4] SS_f(mg/l)	Increase in Receiving Water TSS concentration (mg/l)	Percent Change in Receiving Water TSS Concentration ΔSS(%)
January	35.7	7.0	206	7.14	0.14	2.0%
February	36.8	7.0	202	7.15	0.15	2.1%
March	36.8	7.0	224	7.13	0.13	1.9%
April	37.9	7.0	263	7.12	0.12	1.7%
May	35.0	7.0	284	7.10	0.10	1.4%
June	33.7	7.0	295	7.09	0.09	1.3%
July	37.3	7.0	324	7.09	0.09	1.3%
August	37.1	7.0	320	7.09	0.09	1.3%
September	30.6	7.0	294	7.08	0.08	1.1%
October	31.7	7.0	307	7.08	0.08	1.1%
November	33.9	7.0	281	7.10	0.10	1.4%
December	32.5	7.0	249	7.10	0.10	1.5%
Average	34.9	7.0[2]	271	7.11	0.11	1.5%
Maximum	37.9	--	324	7.15	0.15	2.1%

1 Average of daily Point Loma WTP daily effluent TSS concentrations during the listed month. See Table II.A-8 on page II.A-24.
2 Assumed average annual receiving water TSS concentration. From monitoring work conducted in 1994 (which remains valid) presented in the City's 1995 301(h) application. See Table III.B-10 (page III.B-15) for computed receiving water TSS concentrations over a range of potential receiving water concentrations.
3 Computed mean monthly regulatory initial dilutions. (From Appendix O).
4 Computed suspended solids concentrations per Equation III.B-7 (page III.B-12).

Table III.B-10
Suspended Solids Concentration at the Completion of Initial Dilution
At a Range of Assumed Potential Receiving Water TSS Concentrations

Receiving Water TSS Concentration[1]	Maximum Monthly Conditions[2]		Annual Average Conditions[2]	
	Maximum Monthly Increase in Receiving Water TSS Concentration (mg/l)	Percent Change	Computed Increase in Receiving Water TSS (mg/l)	Percent Change
2.2	0.12	5.6%	0.17	7.8%
7.0	0.11	1.5%	0.15	2.1%
11.2	0.09	0.8%	0.13	1.1%

1 Range of ambient receiving water TSS concentrations upgradient from the PLOO diffuser ranged from 2.2 to 11.2 mg/l during monitoring conducted in 1994. (From the City's 1995 301(h) application.)

2 Computed as above in Table III.B-9 using the listed assumed receiving water TSS concentration.

III.B.5 What is the change in receiving water pH immediately following initial dilution of the modified discharge ?

The maximum change in receiving water pH (Δ pH) immediately following initial dilution is 0.02 units, which is well below the state standard of 0.2 units.

The City's 1995 waiver application computed projected effects of a 10.5 m^3/sec (240 mgd) discharge on the pH of receiving waters. These 1995 computations were based on methodology presented in the *Amended 301(h) Technical Support Document*.

As documented in the 1995 waiver application, a maximum pH change of 0.02 pH units is projected. As a result of the high dilution provided by PLOO, the computed maximum pH change of 0.02 units is projected to be a rare event.

The computations from the 1995 waiver application for a 240 mgd discharge remain valid; no significant changes in wastewater pH are projected as part of the PLOO discharge.

III.B.6 Does (will) the modified discharge comply with applicable water quality standards for:

- **Dissolved oxygen?**
- **Suspended solids?**
- **pH?**

SUMMARY: The PLOO discharge complies with all applicable water quality standards for dissolved oxygen, suspended solids, and pH.

Dissolved Oxygen. The Ocean Plan requires that dissolved oxygen (DO) concentrations not be depressed more than 10 percent as the result of oxygen demanding wastes. The response to Questionnaire Section III.B.1 assesses the DO concentration of receiving waters following initial dilution during maximum stratification.

As detailed in the response (and in Appendix O), DO after initial dilution at maximum stratification is projected to be depressed less than 0.05 mg/l. This maximum DO depression complies by a wide margin with the Ocean Plan standard that receiving water DO not be depressed more than 10 percent.

The response to Questionnaire Section III.B.2 addresses farfield DO depression. As discussed in the response to Questionnaire Section III.B.2 (and in Appendix O), farfield DO depression associated with the PLOO discharge is projected to be less than 2.4 percent - a value a factor of four less than the Ocean Plan limit.

The response to Questionnaire Section III.B.3 addresses DO depression near the ocean bottom due to sediment DO demand. As presented in the response, DO depression at the bottom as a result of steady sediment DO demand is projected at 1.4 percent. Dissolved oxygen depression at the ocean bottom due to sediment resuspension is projected at 2.4 percent. Both values are within the allowable Ocean Plan DO limit by a significant margin.

Suspended Solids. The Ocean Plan requires that dischargers achieve a 30-day average of 75 percent removal of suspended solids from the effluent stream. The City's existing NPDES permit requires 80 percent TSS removal.

Table III.B-11 presents Metro System TSS percent removals during 2002-2006. As shown in Table III.B-11, the City achieved 100 percent compliance with the Ocean Plan 75 percent removal standard and the 80 percent removal standard established by Order No. R9-2002-0025 (NPDES CA0107509).

Table III.B-11
PLOO System-Wide TSS Removal, 2002-2006

Month	System-Wide TSS Percent Removal[1]				
	2002	2003	2004	2005	2006
Jan	86	87	84	85	87
Feb	83	86	86	85	88
Mar	86	86	86	86	87
Apr	86	86	86	86	86
May	86	85	86	86	87
Jun	85	86	86	84	88
Jul	83	86	86	84	85
Aug	85	87	86	87	87
Sep	88	87	86	87	90
Oct	87	85	87	85	90
Nov	86	85	86	87	89
Dec	86	86	86	88	87
Annual Average	86	86	86	86	88
Maximum Month	88	87	87	88	90
Minimum Month	83	85	84	84	85

1 TSS percent removal computed on a system-wide basis. Data from PLOO annual reports submitted to the Regional Board for 2002-2006.

In addition to establishing a 75 percent TSS removal requirement, the Ocean Plan allows Regional Boards to establish TSS effluent concentrations at values not less than 60 mg/l. Order No. R9-2002-0025 establishes a monthly average effluent TSS concentration limit of 75 mg/l.

Table III.B-12 presents monthly average Point Loma WTP effluent TSS concentrations during 2002-2006. As shown in Table III.B-12, monthly average TSS concentrations during 2002 ranged from 31 to 52 mg/l - values comfortably within the 75 mg/l effluent limit.

Table III.B-12
Point Loma WTP Effluent TSS Concentrations, 2002-2006

Month	Monthly Average Point Loma WTP Effluent TSS Concentration[1] (mg/l)				
	2002	2003	2004	2005	2006
Jan	41	41	46	38	36
Feb	47	42	44	39	37
Mar	41	40	44	36	37
Apr	42	41	44	38	38
May	43	46	42	40	35
Jun	47	44	44	45	34
Jul	52	44	44	47	37
Aug	46	41	43	41	37
Sep	39	40	46	42	31
Oct	39	41	38	43	32
Nov	42	41	38	39	34
Dec	45	43	42	39	32
Annual Average	44	42	43	41	35
Maximum Month	52	46	46	47	38
Minimum Month	39	40	38	36	31

1 Data from PLOO annual monitoring reports submitted to the Regional Board for 2002-2006.

pH. The Ocean Plan requires that receiving water pH not be changed at any time more than 0.2 units from that which occurs naturally. As shown in the response to Questionnaire Section III.B.5, the PLOO discharge is projected to affect receiving water pH by less than 0.02 units.

The Ocean Plan also establishes pH effluent limits of 6 to 9 pH units. Table III.B-13 (page III.B-20) presents Point Loma WTP effluent pH concentrations during 2002-2006. During 2002-2006, the maximum daily Point Loma WTP effluent pH concentration was 7.26 and the minimum pH was 6.65.

Table III.B-13
Point Loma WTP Effluent pH Concentrations, 2002-2006

Year	No. Samples	Summary of Daily pH Values[1]		
		Average[2]	Maximum[2]	Minimum[2]
2002	364	7.26	7.68	6.65
2003	365	7.17	7.50	6.86
2004	365	7.23	7.87	6.91
2005	365	7.22	7.62	6.67
2006	365	7.21	7.72	6.88

1 Data from PLOO monthly monitoring reports submitted to the Regional Board for 2002-2006.
2 Average, maximum, and minimum of Point Loma effluent pH daily values.

Turbidity. The Ocean Plan establishes a 30-day average effluent turbidity standard of 75 Nephelometric Turbidity Units (NTU) for wastewater discharges to the ocean. The Ocean Plan also establishes weekly average and instantaneous maximum standards of 100 and 225 NTU.

Table III.B-14 compares Point Loma WTP effluent turbidity during 2002-2006 with Ocean Plan effluent limits. As shown in the table, the PLOO discharge complied with Ocean Plan turbidity limits by a wide margin.

Table III.B-14
Point Loma WTP Effluent Turbidity Concentrations, 2002-2006

Year	No. Samples	Summary of Daily Turbidity Values (NTU)[1]		
		Average[2]	Maximum[2]	Minimum[2]
2002	365	45	62	31
2003	365	45	63	27
2004	366	50	81	36
2005	365	48	70	25
2006	365	42	58	34

1 Turbidity data (in Nephelometric Turbidity Units or NTU) from PLOO monthly monitoring reports submitted to the Regional Board for 2002-2006.
2 Average, maximum, and minimum of Point Loma WTP effluent turbidity daily values.

In addition to establishing effluent turbidity limits, the Ocean Plan establishes the following narrative objective for light transmittance:

> *Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste.*

As discussed in Appendix O, the average depth to the top of the wastefield is below 40 meters, which is well below the euphotic zone. Within this deeper zone of the PLOO waste field, natural light levels are less than 1 percent of incident light at sea surface.

As part of the City's comprehensive ocean monitoring program, depth profiles of light transmittance and chlorophyll *a* are assessed at 36 oceanographic stations and 8 kelp bed stations. These data have been presented to EPA and the Regional Board in monthly and annual reports. In accordance with an agreement with EPA, the data are not reproduced herein, but City staff are coordinating with EPA for electronic transfer of the data to regulators.

Figure III.B-1 (page III.B-22) presents a graphical summary of light transmittance and chlorophyll *a* for 1995-2006. As shown in the figure, water clarity has increased in the PLOO region (both at ZID and control stations) since 1995. This increase in clarity, however, is due to natural conditions and is unrelated to the PLOO discharge.

As shown in Figure III.B-1, chlorophyll *a* concentrations have decreased in recent years in the vicinity of the PLOO, a trend consistent with chlorophyll *a* levels observed in northern Baja California, Mexico. This decrease in chlorophyll *a* is due to local ambient ocean currents and conditions and is not related to operation of the PLOO.

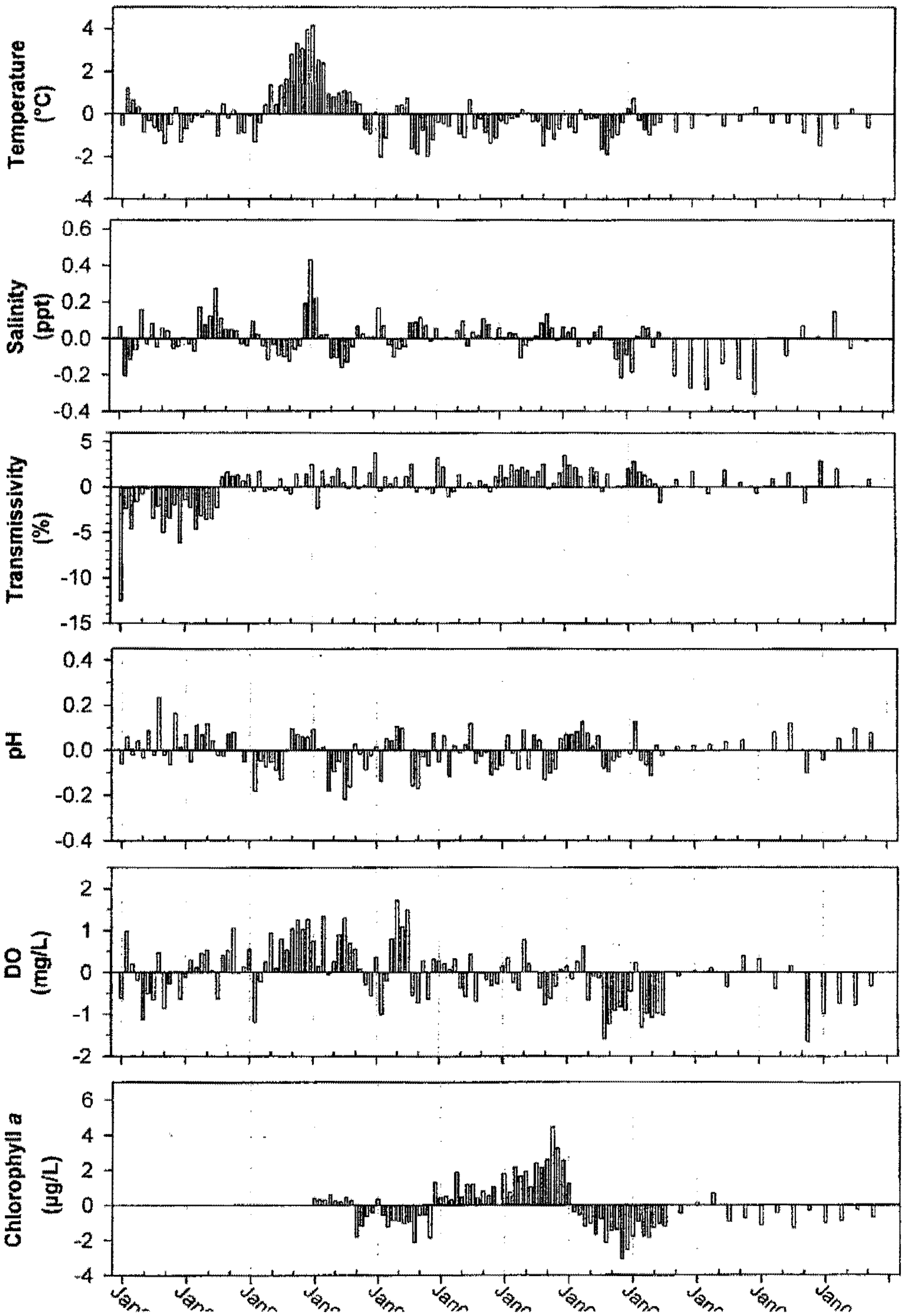


Figure III.B-1 Summary of PLOO Receiving Water Quality Comparison of Monthly Means with Long-Term Mean

III.B.7. Provide data to demonstrate that all applicable State water quality standards, and all applicable water quality criteria established under Section 304(a)(1) of the Clean Water Act for which there is no directly corresponding numerical applicable water quality standards approved by EPA, are met at and beyond the boundary of the ZID under critical environmental and treatment plant conditions in the waters surrounding or adjacent to the point at which your effluent is discharged. [40 CFR 125.62(a)(1)]

SUMMARY: The PLOO discharge complies with water quality objectives and criteria established by the State of California. The PLOO discharge also conforms with water quality criteria established by EPA.

Ocean Plan Effluent Limitations. The State of California Ocean Plan establishes effluent and receiving water standards for wastewater discharges within the three-mile limit off the California coast. State effluent standards for wastewater discharges to the ocean are established in Chapter IV, Table A of the Ocean Plan.

Table A Constituents. Table A of the Ocean Plan establishes effluent limitations for grease and oil, TSS, settleable solids, turbidity, and pH. Table III.B-15 (page III.B-24) presents the Ocean Plan Table A physical/chemical effluent standards.

Table III.B-16 (page III.B-24) summarizes Point Loma WTP grease and oil effluent concentrations during 2002-2006. The Point Loma WTP effluent achieved 100 percent compliance with Ocean Plan Table A monthly, weekly, and maximum standards for grease and oil during 2002-2006.

Table III.B-11 (page III.B-18) documents compliance of the PLOO discharge with Ocean Plan TSS percent removal requirements. The 2005 Ocean Plan allows Regional Boards to establish effluent TSS standards of no less than 60 mg/l. Order No. R9-2002-0025 establishes a monthly average TSS effluent concentration limit of 75 mg/l.

Table III.B-12 (page III.B-19) summarizes compliance with the NPDES effluent concentration limit for TSS. As shown in Tables III.B-11 and III.B-12, the PLOO discharge achieved 100 percent compliance with TSS percent removal and effluent concentration standards during 2002-2006.

Table III.B-15
Ocean Plan Table A Effluent Limitations for Physical/Chemical Constituents

Constituent	Units	Ocean Plan Table A Effluent Limitation[1]		
		30-day Average	7-Day Average	Max Value
grease & oil	mg/l	25	40	75
settleable solids	Ml/l	1.0	1.5	3.0
suspended solids	% removal	75%	NS	NS
TSS	ml/l	1.0	1.50	3.0
turbidity	NTU	75	100	225
pH	units	6 - 9	6 - 9	6 - 9

1 From Table A of the 2005 California Ocean Plan. NS indicates that the Ocean Plan does not establish a standard for the listed condition.

Table III.B-16
Point Loma WTP Effluent Grease and Oil[1] Concentrations, 2002-10006

Year	Number of Samples	Summary of Daily Grease and Oil Concentrations[1,2] (mg/l)		
		Mean Annual Value	Maximum Monthly Average	Maximum Day Value
2002	365	9.4	12	24
2003	365	11	18	35
2004	365	14	18	27
2005	365	14	17	28
2006	365	10	11	26

1 Values from January 1, 2002 through November 1, 2003 are from the Freon extraction Grease and Oil (Standard Methods 5220B). Values after November 1, 2003 are for the EPA-approved Hexane extraction method (EPA 1664).

2 Point Loma WTP effluent grease and oil or hexane extractable material concentrations during 2002-2006. Data are from PLOO monthly monitoring reports submitted to the Regional Board for 2002-2006.

Table III.B-17 (page III.B-25) summarizes Point Loma WTP settleable solids effluent concentrations during 2002-2006. The Point Loma WTP effluent achieved 100 percent compliance with Ocean Plan Table A monthly, weekly, and maximum standards for settleable solids during 2002-2006.

As discussed in the response to Questionnaire Section III.B.4, the PLOO discharge achieved 100 percent compliance with Ocean Plan pH requirements. (See Table III.B-13 on page III.B-20.)

Table III.B-17
Point Loma WTP Effluent Settleable Solids Concentrations, 2002-2006

Year	Number of Samples	Number of Samples with Non-Detected Settleable Solids[1]	Summary of Daily Settleable Solids[1,2] (ml/l)		
			Mean Annual Value	Maximum Monthly Average	Maximum Day Value
2002	365	125	0.3	0.3	1.5
2003	365	142	0.3	0.3	1.8[3]
2004	365	38	0.5	0.8	7.5[4]
2005	365	44	0.3	0.5	2.1
2006	365	42	0.4	0.5	2.0

1 Number of samples during the year with settleable solids concentrations below the 1 ml/l Method Detection Limit.
2 Point Loma WTP effluent settleable solids concentration data are from PLOO monthly monitoring reports submitted to the Regional Board for 2002-2006.
3 One value (Dec 5, 2003) was reported at 5 ml/l, but reporting error is suspected.
4 Two effluent settleable solids violations occurred in 2004. See Table III.B-28 on page III.B-43.

Acute Toxicity. Table B of the 2005 Ocean Plan establishes a daily maximum receiving water acute toxicity standard of 0.3 TUa. The Ocean Plan acute toxicity objective applies to receiving waters beyond the edge of the 10 percent point of the ZID. The Ocean Plan requires that compliance with this receiving water toxicity limit be determined on the basis of the following equation:

$$C_a = \frac{C_e}{1+\frac{D_m}{10}} \quad \text{(Equation III.B-8)}$$

where C_a = Receiving water acute toxicity at the edge of the 10 percent point of the ZID.
C_e = the effluent acute toxicity in TUa.
D_m = Minimum month initial dilution.

Order No. R9-2002-0025 requires the City to conduct semiannual acute toxicity tests on the Point Loma WTP effluent. Per requirements of Order No. R9-2002-0025, the City initially conducted three rounds of tests using *Atherinops affinis* (topsmelt) and *Mysidopsis bahia* (shrimp) to determine the most sensitive species. *Mysidopsis bahia* was determined to be the most sensitive species, and subsequent semiannual tests were conducted using that species.

Table III.B-18 summarizes the results of acute toxicity testing for the Point Loma WTP effluent conducted under Order No. R9-2002-0025. As shown in Table III.B-18, the PLOO discharge achieved 100 percent compliance with the 2005 Ocean Plan acute toxicity standard.

Table III.B-18
Compliance of Point Loma Outfall Discharge with
Ocean Plan Receiving Water Acute Toxicity Standard of 0.3 TUa

Date	Acute Toxicity (TUa)			
	Atherinops affinis (topsmelt)		*Mysidopsis bahia* (shrimp)	
	Point Loma WTP Effluent Value[1]	Computed Receiving Water Value at 10 Percent Point of ZID[2]	Point Loma WTP Effluent Value[1]	Computed Receiving Water Value at 10 Percent Point of ZID[2]
January 13, 2003	2.6	0.12	3.5	0.16
July 7, 2003	2.2	0.10	1.7	0.08
January 6, 2004	4.2	0.20	5.3	0.25
July 18, 2004	No test[3]	No test[3]	3.7	0.17
March 20, 2005	No test[3]	No test[3]	3.0	0.14
July 17, 2005	No test[3]	No test[3]	3.3	0.15
February 12, 2006	No test[3]	No test[3]	3.7	0.17
July 16, 2006	No test[3]	No test[3]	2.6	0.12

1 From monthly toxicity monitoring reports submitted to the Regional Board, 2003-2006. Acute toxicity monitoring conducted per Order No. R9-2002-0025. Year 2003 was the first full year of acute toxicity testing for acute toxicity species specified in Order No. R9-2002-0025.
2 Receiving water acute toxicity at the 10 percent point within the ZID was computed per Equation III.B-8 above, in conformance with requirements set forth in the 2005 California Ocean Plan. Computations based on a minimum month initial dilution of 204 to 1, per Order No. R9-2002-0025.
3 No test was required, as *Mysidopsis bahia* (shrimp) was determined to be the most sensitive species.

Chronic Toxicity. Table B of the 2005 Ocean Plan establishes a daily maximum receiving water chronic toxicity standard of 1.0 TUc. The Ocean Plan acute toxicity objective applies to receiving waters beyond the edge of the ZID. The Ocean Plan requires that compliance with this receiving water toxicity limit be determined on the basis of the following equation:

$$C_a = \frac{C_e}{1 + D_m} \qquad \text{(Equation III.B-9)}$$

where C_a = Receiving water chronic toxicity at the edge of the ZID.
C_e = the effluent chronic toxicity in TUc.
D_m = Minimum month initial dilution.

R9-2002-0025 requires the City to screen chronic toxicity on a biannual basis to determine the most sensitive species from among:

- *Atherinops affinis* (topsmelt) for survival and growth,
- *Haliotis rufeuscens* (red abalone) for larval development, and
- *Macrocystis pyrifera* (giant kelp) for germination and germ-tube length (development).

Toxicity screening testing (see Table III.B-19 on page III.B-28) demonstrated that red abalone and giant kelp were most sensitive, and monthly chronic toxicity tests on these species are performed. As shown in Table III.B-19, 100 percent compliance with the Ocean Plan chronic toxicity receiving water standard was achieved for:

- topsmelt survival (4 tests during 2003-2006),
- topsmelt growth (4 tests during 2003-2006),
- red abalone larval development (47 tests during 2003-2006), and
- giant kelp germination (54 tests during 2003-2006).

Compliance with the chronic toxicity limit was achieved in 48 of 50 (96 percent) of the tests for giant kelp germ-tube length (development). Two tests (May 4, 2003 and December 19, 2003) exceeded the Ocean Plan limits. Results from these two tests appear to be isolated anomalies, however, as:

(1) all other chronic and acute toxicity tests performed on the Point Loma WTP effluent on May 4, 2003 and December 19, 2005 showed normal values and were in compliance with applicable toxicity limits,

(2) subsequent repeat (accelerated) tests on the Point Loma WTP effluent after the exceedances showed normal values for all test species (all tests were in compliance), and

(3) concentrations of toxic inorganic or organic compounds in the Point Loma WTP effluent at the time of the non-complying toxicity tests were at normal values.

Table III.B-19
Compliance of Point Loma Outfall Discharge with Ocean Plan Receiving Water Chronic Toxicity Standard of 1.0 TUc

Species	Test	Year	Number of Tests[3]	Computed Chronic Toxicity at the Edge of the ZID[1,2] (TUc)			Percent of Tests in Compliance[5]
				Median Value[4]	Mean Value[4]	Maximum Value[4]	
Atherinops affinis (topsmelt)	Survival[6]	2003	3	0.31	0.31	0.31	100%
		2005	1	0.31	0.31	0.31	100%
	Growth[6]	2003	3	0.31	0.31	0.31	100%
		2005	1	0.31	0.31	0.31	100%
Haliotis rufeuscens (red abalone)	Larval development	2003	11	0.31	0.31	0.31	100%
		2004	12	0.31	0.31	0.31	100%
		2005	12	0.31	0.31	0.31	100%
		2006	12	0.31	0.33	0.56	100%
Macrocystis pyrifera (giant kelp)	Germination	2003	15	0.31	0.39	1.00	100%
		2004	12	0.31	0.31	0.31	100%
		2005	12	0.31	0.38	0.56	100%
		2006	15	0.31	0.35	0.56	100%
	Germ tube length	2003	15	0.31	0.53	3.25	93%[7]
		2004	11	0.31	0.35	0.56	100%
		2005	12	0.31	0.56	3.25	92%[8]
		2006	14	0.31	0.33	0.56	100%

1 Chronic toxicity testing conducted per requirements of Order No. R9-2002-0025 during 2003-2006. Results are from monthly toxicity monitoring reports submitted by the City to the Regional Board. (Year 2003 is the first full year of chronic toxicity testing under Order No. R9-2002-0025.)

2 Receiving water chronic toxicity at the edge of the ZID was computed per Equation III.B-9 above, in conformance with requirements set forth in the 2005 California Ocean Plan. Computations based on a minimum month initial dilution of 204 to 1, per Order No. R9-2002-0025.

3 Total number of tests for the listed species and test conducted during the year.

4 Statistical median (50th percentile), mean, and maximum values during the listed year for computed receiving water chronic toxicity at the edge of the ZID.

5 Percent of sample that complied with the Ocean Plan receiving water chronic toxicity limit of 1.0 TUc at the edge of the ZID.

6 Order No. R9-2002-0025 requires biannual screening for chronic toxicity, with monthly monitoring for species determined to be most sensitive. The City conducted biannual screening for topsmelt in 2003 and 2005. Monthly chronic toxicity monitoring for red abalone and giant kelp is performed, as the screening shows these species to be most sensitive.

7 The May 4, 2003 chronic toxicity test for giant kelp germ tube length (development) exceeded the 1.0 TUc Ocean Plan receiving water chronic toxicity limit, but all other toxicity tests performed on that date complied with the limit. In response to the exceedance, the City implemented accelerated toxicity testing for giant kelp germination and development. Repeat tests demonstrated compliance with the chronic toxicity limit. No unusual concentrations occurred in the Point Loma WTP effluent on or immediately prior to the May 4, 2003 test. The cause of the toxicity result is unknown.

8 The December 19, 2005 chronic toxicity test for giant kelp germ tube length (development) exceeded the 1.0 TUc Ocean Plan receiving water chronic toxicity limit, but all other toxicity tests performed on that date complied with the limit. In response to the exceedance, the City implemented accelerated toxicity testing for giant kelp germination and development. Repeat tests demonstrated compliance with the chronic toxicity limit. No unusual concentrations occurred in the Point Loma WTP effluent on or immediately prior to the May 4, 2003 test. The cause of the toxicity result is unknown.

Ocean Plan Receiving Water Standards - Protection of Aquatic Life. Table B of the California Ocean Plan establishes receiving water quality objectives to be achieved after completion of initial dilution (at the edge of the ZID). Table III.B-20 summarizes the general categories of Ocean Plan Table B standards.

Table III.B-20
Categories of Regulated Parameters within Table B of the Ocean Plan

Category	Targeted Compounds	Regulated Parameters	
		To Protect Against Chronic Impacts	To Protect Against Acute Impacts
Protection of marine aquatic life	Toxic organic and inorganic compounds	• 6-month median	• Daily maximum • Instantaneous maximum
Protection of human health	Toxic noncarcinogens	• 30-day average	Not applicable
	Toxic carcinogens	• 30-day average	Not applicable

Table B of the Ocean Plan protects against chronic impacts (impacts resulting from long-term exposure) to marine aquatic life by establishing 6-month median limits for toxic organic and inorganic compounds. Table III.B-21 (page III.B-30) presents projected PLOO receiving water concentrations for these constituents on the basis of:

- 90th percentile Point Loma WTP effluent values from 2002-2006, and
- the 204 to 1 minimum month initial dilution assigned in Order No. R9-2002-0025.

As shown in Table III.B-21, the PLOO discharge achieved 100 percent compliance with the Ocean Plan Table B 6-month median parameters for the protection of marine aquatic life.

Table B of the Ocean Plan establishes daily maximum and instantaneous maximum receiving water standards to protect marine aquatic life from acute (short-term) impacts. Table III.B-22 (page III.B-31) compares maximum computed PLOO receiving water conditions with the daily maximum and instantaneous maximum Ocean Plan Table B standards.

Maximum PLOO receiving water conditions are computed on the basis of maximum Point Loma WTP concentrations observed during 2002-2006 and the assigned 204 to 1 minimum initial dilution. During 2002-2006, the PLOO discharge achieved 100 percent compliance with all Ocean Plan standards for the protection of marine aquatic life.

Table III.B-21
Compliance with Ocean Plan Standards
Objectives for Protection of Marine Aquatic Life - 6 Month Median Standards[1]

Parameter	Concentration in µg/l			Compliance with Ocean Plan 6-Month Median Receiving Water Standard?
	Ocean Plan Receiving Water Standard[1] (to be achieved upon completion of initial dilution) 6-month median	Point Loma WTP 90th Percentile Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
arsenic	8	1.9	3.0[4]	Yes
cadmium	1	1.0	0.005	Yes
chromium (VI)[5]	2	3.8	0.019	Yes
copper	3	91	2.4[4]	Yes
lead	2	< 1.384	< 0.007	Yes
mercury	0.04	ND	< 0.0007[4]	Yes
nickel	5	11	0.054	Yes
selenium	15	1.3	0.006[4]	Yes
silver	0.7	0.4	0.16	Yes
zinc	20	33	8.1[4]	Yes
cyanide	1	4.0	0.020	Yes
chlorine residual	2	NA[7]	NA[7]	Yes[7]
ammonia	600	30,800	150	Yes
phenolic compounds	30	16	0.077	Yes
chlorinated phenolics	1	NA[7]	NA[7]	Yes[7]
alpha endosulfan	0.009[8]	ND[6]	< 0.0001	Yes
beta endosulfan	0.009[8]	ND[6]	< 0.0001	Yes
endrin	0.002	ND[6]	< 0.00015	Yes
alpha HCH	0.004[9]	ND[6]	< 0.0001	Yes
beta HCH	0.004[9]	ND[6]	< 0.0001	Yes
delta HCH	0.004[9]	ND[6]	< 0.0001	Yes
gamma HCH	0.004[9]	ND[6]	< 0.0001	Yes

1 From California *Ocean Plan*, Table B. Constituents listed in order of appearance in Table B.
2 Point Loma WTP effluent 90th percentile value during 2002-2006. (The 90th percentile value is the concentration at which 90 percent of the PLOO effluent samples had lower concentrations, and 10 percent of the samples had higher concentrations. From Tables II.A-11 (page II.A-27) and Table II.A-19 (page II.A-36).
3 Computed receiving water concentration upon completion of initial dilution. Computation based on the 204 to 1 minimum month initial dilution assigned in Order No. R9-2002-0025.
4 In accordance with the Ocean Plan, the projected receiving water concentration for arsenic, copper, mercury, selenium, and zinc are computed assuming a background sea water concentrations of 3.0 µg/l arsenic, 2.0 µg/l for copper, 0.0005 µg/l for mercury, 0.16 µg/l for silver, and 8 µg/l for zinc.
5 Total chromium used in lieu of hexavalent chromium.
6 ND indicates not detected at a MDL of 0.020 µg/l for alpha and beta endosulfan and 0.020 µg/l for alpha, beta, and delta HCH.
7 The Point Loma WTP was not chlorinated during 2002-2006.
8 The listed Ocean Plan standards are for total endosulfan.
9 The listed Ocean Plan standards are for total HCH.

Table III.B-22
Compliance with Ocean Plan Standards
Objectives for Protection of Marine Aquatic Life - Daily and Instantaneous Maximum Standards[1]

Parameter	Concentration in μg/l				Compliance with Ocean Plan Daily Maximum Receiving Water Standard?
	Ocean Plan Receiving Water Standard[1] (to be achieved upon completion of initial dilution)		Point Loma WTP Maximum Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
	Daily Maximum	Instant. Maximum			
arsenic	32	80	2.74	3.0[4]	Yes
cadmium	4	10	4.5	0.022	Yes
chromium (VI)[5]	8	20	23.4	0.11	Yes
copper	12	30	325	3.6[4]	Yes
lead	8	20	31.5	0.15	Yes
mercury	0.16	0.4	0.7	0.004	Yes
nickel	20	50	22	0.11	Yes
selenium	60	150	1.7	0.008	Yes
silver	2.8	7	19.7	0.26[4]	Yes
zinc	80	200	81.3	8.4[4]	Yes
cyanide	4	10	10	0.049	Yes
chlorine residual	8	60	NA[7]	NA[7]	Yes[7]
ammonia	2400	6000	36,700	180	Yes
phenolic compounds	120	300	25.6	0.12	Yes
chlorinated phenolics	4	10	NA[7]	NA[7]	Yes[7]
alpha endosulfan	0.018[8]	0.027[8]	ND[6]	< 0.0001[6]	Yes
beta endosulfan	0.018[8]	0.027[8]	ND[6]	< 0.0001[6]	Yes
endrin	0.004	0.006	ND[6]	< 0.0001[6]	Yes
alpha HCH	0.008[9]	0.012[9]	ND[6]	< 0.0001[6]	Yes
beta HCH	0.008[9]	0.012[9]	ND[6]	< 0.0001[6]	Yes
delta HCH	0.008[9]	0.012[9]	ND[6]	< 0.0001[6]	Yes
gamma HCH	0.008[9]	0.012[9]	0.175	0.0009	Yes

1 From California *Ocean Plan*, Table B. Constituents listed in order of appearance in Table B.
2 Maximum observed Point Loma WTP effluent concentration during 2002-2006. Toxic inorganics from Table II.A-11 (page II.A-27) and toxic organics from Table II.A-19 (page II.A-36).
3 Computed receiving water concentration upon completion of initial dilution. Computation based on the 204 to 1 minimum month initial dilution assigned in Order No. R9-2002-0025. Values rounded to two significant figures
4 In accordance with the Ocean Plan, the projected receiving water concentration for arsenic, copper, mercury, selenium, and zinc are computed assuming a background sea water concentrations of 3.0 μg/l arsenic, 2.0 μg/l for copper, 0.0005 μg/l for mercury, 0.16 μg/l for silver, and 8 μg/l for zinc. (This represents no change from the background concentration.)
5 Total chromium used in lieu of hexavalent chromium.
6 ND indicates not detected at a MDL of , 0.020 μg/l for alpha endosulfan, beta endosulfan, alpha HCH, beta HCH, and gamma HCH. Maximum receiving water concentrations for these non-detected constituents are computed using the MDL, and are reported as "<x µg/l".
7 The Point Loma WTP was not chlorinated during 2002-2006.
8 The listed Ocean Plan standards are for total endosulfan.
9 The listed Ocean Plan standards are for total HCH.

Ocean Plan Receiving Water Standards - Protection of Human Health. Ocean Plan Table B receiving water standards for the protection of human health are established on the basis of 30-day average values. Table III.B-23 (page III.B-33) presents Ocean Plan standards for the protection of human health (noncarcinogens). During 2002-2006, the PLOO discharge achieved 100 percent compliance with all Ocean Plan standards for the protection of human health (noncarcinogens).

Table B of the Ocean Plan also establishes water quality objectives for the protection of human health for carcinogenic compounds. Table III.B-24 (pages III.B-34 and III.B-35) presents Ocean Plan objectives for the protection of human health (carcinogens).

As noted in the response to Questionnaire Section II.A.4(b), several Ocean Plan Table B constituents for the protection of human health were detected in the Point Loma WTP effluent on a consistent or semi-consistent basis, including:

- bis (2-ethylhexy) phthalate,
- chlorodibromomethane (dibromochloromethane),
- chloroform,
- 1,4-dichlorobenzene,
- dichlorobromomethane (bromodichloromethane), and
- dichloromethane (methylene chloride).

As shown in Table III.B-23 and Table III.B-24, the City achieved 100 percent compliance with Ocean Plan water quality objectives for each of these constituents.

The only toxic constituent violation within the Point Loma WTP effluent during 2002-2006 was caused by a single sample on July 24, 2004 in which the pesticides alpha chlordane and heptachlor were detected. Alpha chlordane was not detected (at a MDL of 0.030 μg/l) in 227 of the 228 Point Loma WTP effluent samples analyzed during 2002-2006. An alpha chlordane concentration of 0.092 μg/l was detected in the July 4, 2004 Point Loma effluent sample. Three other non-detected samples occurred during July 2004, but the monthly average value of the four samples was 31 μg/l, resulting in violation of the Ocean Plan 30-day chlordane limit. Heptachlor was also detected in the Point Loma WTP influent during July 24, but three other non-detected results during the month resulted in a monthly average value for July of less than the heptachlor MDL. Chlordane and heptachlor have been banned by EPA since the 1980s. The July 24, 2004 discharge occurred on a Saturday, suggesting that the discharge probably resulted from a homeowner or landscaper illegally disposing of liquid from an old container. Because of the low NPDES permit limits, an illicit discharge of as little as a gallon of the chemical could cause the Point Loma WTP effluent noncompliance.

Table III.B-23
Compliance with California Ocean Plan Standards
Objectives for Protection of Human Health - Noncarcinogens[1]

Parameter	Concentration in µg/l				Compliance with Ocean Plan 30-Day Average Standards?
	Ocean Plan Receiving Water Standard[1] (to be achieved upon completion of initial dilution) 30-Day Average	Point Loma WTP Effluent Method Detection Limit (MDL)	Point Loma WTP Maximum Month Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
acrolein	220	11.4	ND[4]	< 0.056[4]	Yes
antimony	1200	2.9	83.5	0.4	Yes
bis(2-chloroethoxy) methane	4.4	1.57	ND[4]	< 0.0077[4]	Yes
bis(2-chloroisopropyl) ether	1,200	8.95	ND[4]	< 0.044[4]	Yes
chlorobenzene	570	1.0	ND[4]	< 0.0049[4]	Yes
chromium (III)	190,000	1.2	11.1	0.054	Yes
di-n-butyl phthalate	3,500	6.49	ND[4]	< 0.032[4]	Yes
1,2-dichlorobenzene	5,100[5]	1.0	ND[4]	< 0.0080[4]	Yes
1,3-dichlorobenzene	5,100[5]	1.0	ND[4]	< 0.0080[4]	Yes
diethyl phthalate	33,000	6.97	11.2	0.055	Yes
dimethyl phthalate	820,000	1.49	ND[4]	< 0.016[4]	Yes
4,6-dinitro-2-methylphenol	220	4.29	ND[4]	< 0.021[4]	Yes
2,4-dinitrophenol	4.0	6.07	ND[4]	< 0.030[4]	Yes
ethylbenzene	4,100	1.0	< 1	< 0.0049	Yes
fluoranthene	15	6.9	ND[4]	< 0.034[4]	Yes
hexachlorocyclopentadiene	58	2.87	ND[4]	< 0.014[4]	Yes
nitrobenzene	4.9	1.52	ND[4]	< 0.0098[4]	Yes
thallium	2.0	3.9	< 40	< 0.20	Yes
toluene	85,000	1.0	8.1	0.040	Yes
tributyltin	0.0014	1.0	ND[4]	< 0.0098[4]	<MDL[6]
1,1,1-trichloroethane	540,000	1.0	ND[4]	< 0.0049[4]	Yes

1 From California *Ocean Plan*, Table B. Constituents listed in order of appearance in Table B.
2 Point Loma WTP maximum observed effluent concentration during 2002-2006. From tables in Section II.A.
3 Computed receiving water concentration upon completion of initial dilution. Computation based on the 204 to 1 minimum month initial dilution assigned in Order No. R9-2002-0025 and the maximum observed Point Loma WTP effluent concentration from 2002-2006.
4 ND indicates not detected at the listed MDL. Maximum receiving water concentrations for these non-detected constituents are computed using the MDL, and are reported as "<x µg/l".
5 The listed Ocean Plan standard is for dichlorobenzene.
6 The PLOO effluent sample analysis MDL was in accordance with required "minimum level" MDLs listed in the Ocean Plan. Per the Ocean Plan, compliance is presumed if the constituent is not detected and the achieved MDL is within the method-specific "minimum level" required by the Ocean Plan.

Table III.B-24
Compliance with California Ocean Plan Standards
Objectives for Protection of Human Health - Carcinogens[1]

Parameter	Concentration in $\mu g/l$				Compliance with Ocean Plan 30-Day Average Standards?
	Ocean Plan Receiving Water Standard[1] (to be achieved upon completion of initial dilution) 30-Day Average	Point Loma WTP Effluent MDL	Point Loma WTP Maximum Month Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
acrylonitrile	0.10	13.8	ND[4]	< 0.0673[4]	Yes
aldrin	2.2E-005	0.060	ND[4]	< 0.0003[4]	<MDL[8]
benzene	5.9	1.0	ND[4]	< 0.0049[4]	Yes
benzidene	6.9E-005	1.0	ND[4]	< 0.0050[4]	<MDL[8]
beryllium	0.033	0.0395 - 0.39	< 0.395	0.0019	Yes
bis (2-chloroethyl) ether	0.045	2.6	ND[4]	< 0.0128[4]	Yes
bis (2-ethylhexyl) phthalate	3.5	10.43	49.8	0.24	Yes
carbon tetrachloride	0.90	1.0	ND[4]	< 0.0049[4]	Yes
alpha (cis) chlordane	2.3E-005[5]	0.030	0.031[9]	0.00015[9]	See Note[9]
gamma chlordane	2.3E-005[5]	0.014	ND[4]	< 0.0001[4]	<MDL[8]
oxychlordane	2.3E-005[5]	0.020	ND[4]	< 0.00010[4]	Yes
chlorodibromomethane	8.6	1.0	2.9	0.0140	Yes
chloroform	130	1.0	11.2	< 0.055	Yes
o,p-DDD (2,4'-DDD)	0.00017[6]	0.020	ND[4]	< 0.00010[4]	Yes
o,p-DDE (2,4'-DDE)	0.00017[6]	0.020	ND[4]	< 0.00010[4]	Yes
o,p-DDT (2,4'-DDT)	0.00017[6]	0.020	ND[4]	< 0.00010[4]	Yes
p,p-DDD (4,4'-DDD)	0.00017[6]	0.020	< 0.020	< 0.00010[4]	Yes
p,p-DDE (4,4'-DDE)	0.00017[6]	0.020	ND[4]	< 0.00010[4]	Yes
p,p-DDT (4,4'-DDT)	0.00017[6]	0.020	ND[4]	< 0.00010[4]	Yes
1,4-dichlorobenzene	18	2.3	3.8	0.019	Yes
3,3-dichlorobenzidene	0.0081	2.4	ND[4]	< 0.0119[4]	<MDL[8]
1,2-dichloroethane	28	1.0	ND[4]	< 0.0049[4]	Yes
1,1-dichlroethylene	0.9	1.0	ND[4]	< 0.0049[4]	Yes
dichlorobromomethane	6.2	1.0	3.7	0.018	Yes
dichloromethane (methylene chloride)	450	1.0	17.9	0.087	Yes
cis 1,3-dichloropropene	8.9	1.0	ND[4]	< 0.0049[4]	Yes
dieldrin	4E-005	0.050	ND[4]	< 0.0002[4]	<MDL[8]
2,4-dinitrotoluene	2.6	1.5	ND[4]	< 0.0073[4]	Yes
1,2-diphenylhydrazine	0.16	2.5	ND[4]	< 0.0121[4]	Yes
bromoform	130[7]	6.1	ND[4]	< 0.0298[4]	Yes
bromomethane (methyl bromide)	130[7]	1.0	ND	0.0049	Yes
chloromethane (methyl chloride)	130[7]	1.0	1.2	0.0059	Yes
heptachlor	5E-005	0.020	ND[4]	< 0.0001[4]	< MDL[8]
heptachlor epoxide	2E-005	0.030	ND[4]	< 0.0001[4]	< MDL[8]
hexachlorobenzene	0.00021	4.8	ND[4]	< 0.0234[4]	< MDL[8]
hexachlorobutadiene	14	2.9	ND[4]	< 0.0140[4]	Yes
hexachloroethane	2.5	3.6	ND[4]	< 0.0173[4]	Yes

Table III.B-24 is continued on page III.B-35 (Table III.B-24 footnotes follow on page III.B-35)

III.B-24 (continued)
Compliance with California Ocean Plan Standards
Objectives for Protection of Human Health - Carcinogens[1]

Parameter	Concentration in µg/l				Compliance with Ocean Plan 30-Day Average Standards?
	Ocean Plan Receiving Water Standard[1] (to be achieved upon completion of initial dilution) 30-Day Average	Point Loma WTP Effluent MDL	Point Loma WTP Maximum Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
isophorone	730	1.9	ND[4]	< 0.0094[4]	Yes
N-nitrosodimethylamine	7.3	2.0	ND[4]	< 0.0098[4]	Yes
N-nitrosodi-n-propylamine	0.38	1.6	ND[4]	< 0.0080[4]	Yes
N-nitrosodiphenylamine	2.5	3.0	ND[4]	< 0.0144[4]	Yes
acenaphthylene	0.0088[10]	2.20	ND[4]	< 0.0107[4]	< MDL[8]
anthracene	0.0088[10]	4.04	ND[4]	< 0.0197[4]	< MDL[8]
benzo (a) anthracene (1,2-benzanthracene)	0.0088[10]	7.68	ND[4]	< 0.0375[4]	< MDL[8]
3,4-benzofluoranthene (benzo(b)fluoranthene)	0.0088[10]	6.63	ND[4]	< 0.0323[4]	< MDL[8]
benzo (k) fluoranthene	0.0088[10]	7.36	ND[4]	< 0.0359[4]	< MDL[8]
benzo (g,h,i) perylene (1,12-benzoperylene)	0.0088[10]	6.50	ND[4]	< 0.0317[4]	< MDL[8]
benzo (a) pyrene	0.0088[10]	6.53	ND[4]	< 0.0319[4]	< MDL[8]
chrysene	0.0088[10]	7.49	ND[4]	< 0.0365[4]	< MDL[8]
dibenzo (a,h) anthracene	0.0088[10]	6.19	ND[4]	< 0.0302[4]	< MDL[8]
fluorene	0.0088[10]	2.43	ND[4]	< 0.0119[4]	< MDL[8]
ideno (1,2,3-cd) pyrene	0.0088[10]	6.27	ND[4]	< 0.0306[4]	< MDL[8]
phenanthrene	0.0088[10]	4.15	ND[4]	< 0.0202[4]	< MDL[8]
pyrene	0.0088[10]	5.19	ND[4]	< 0.0253[4]	< MDL[8]
PCBs	1.9E-005	4.0	ND[4]	< 0.0195[4]	< MDL[8]
TCDD equivalents	3.9E-009	0.00007	< 0.0001[11]	< 4.9E-007[4]	< MDL[8]
1,1,2,2-tetrachloroethane	2.3	1.0	ND[4]	< 0.0049[4]	Yes
tetrachloroethylene	2.0	1.0	< 1	< 0.0049[4]	Yes
toxaphene	0.00021	4.0	ND[4]	< 0.0195[4]	< MDL[8]
trichloroethylene	27	1.0	ND[4]	< 0.0049[4]	Yes
1,1,2-trichloroethane	9.4	1.0	ND[4]	< 0.0049[4]	Yes
2,4,6-trichlorophenol	0.29	1.8	ND[4]	< 0.0085[4]	Yes
vinyl chloride	36	1.0	ND[4]	< 0.0049[4]	Yes

1 From California Ocean Plan, Table B. Constituents listed in order of appearance in Table B.
2 Point Loma WTP effluent maximum observed concentration during 2002-2006.
3 Computed receiving water concentration upon completion of initial dilution. Computation based on the 204 to 1 minimum month initial dilution assigned in Order No. R9-2002-0025 and the maximum Point Loma WTP effluent concentration from 2002-2006.
4 ND indicates not detected at the listed MDL. Maximum receiving water concentrations for these non-detected constituents are computed using the MDL, and are reported as "<x µg/l".
5 The listed Ocean Plan standard is for total chlordane.
6 The listed Ocean Plan standard is for total DDT isomers.
7 The listed Ocean Plan standard is for total halomethanes.
8 The PLOO effluent sample analysis MDL was in accordance with required "minimum level" MDLs listed in the Ocean Plan. Per the Ocean Plan, compliance is presumed if the constituent is not detected and the achieved MDL is within the method-specific "minimum level" required by the Ocean Plan.
9 The listed maximum month value is an anomaly. Alpha chlordane was detected in only 1 of 228 samples collected during 2002-2006. Alpha chlordane was either not detected or less than the MDL in each of the remaining 227 samples. See text on page III.B-32 for explanation.
10 The listed Ocean Plan standard is for total PAHs (polyaromatic hydrocarbons).
11 A total of 1025 analyses of CDD and CDF isomers were conducted on the Point Loma WTP effluent during 2002-2006. A total of 1023 of the samples resulted in "not detected" values at MDLs ranging from 0.00025 to 0.001 µg/l MDL, and 2 samples showed concentrations of octa-CDD at less than a 0.001 µg/l MDL.

Method Detection Limits and Compliance. As shown in Tables III.B-21, 22, and 23, Ocean Plan receiving water standards are established at concentrations less than achievable MDLs for several constituents. The Ocean Plan requires attainment of "Minimum Levels" that represent the lowest quantifiable concentration based on proper application of method specific analytical procedures. The City's wastewater chemistry laboratory achieves MDLs that are consistent with the required Minimum Levels established in the Ocean Plan.

Implementation Provision C.8(a) of the 2005 Ocean Plan states:

> *C.8(a) Dischargers are out of compliance with the effluent limitation if the concentration of the pollutant in the monitoring sample is greater than the effluent limitation and greater than or equal to the reported Minimum Level.*

Except for the above-noted anomaly on the July 4, 2004 Point Loma WTP effluent sample for alpha chlordane, all other effluent samples during 2002-2006 were either below the corresponding Ocean Plan-based effluent limit or below the reported Minimum Level.

Additional Ocean Plan Receiving Water Objectives. In addition to establishing receiving water quality objectives for toxic constituents, the Ocean Plan establishes numerical receiving water quality objectives for total and fecal coliform, dissolved oxygen, and pH. The Ocean Plan also established narrative objectives for physical, chemical, and biological characteristics.

Compliance of the PLOO discharge with Ocean Plan standards for DO, suspended solids, and pH are addressed in the response to Questionnaire Section III.B.6.

The response to Questionnaire Section III.E.2 and Appendix C addresses compliance of the existing and improved PLOO discharge with Ocean Plan bacteriological standards.

Federal Water Quality Criteria. EPA establishes federal water quality criteria to protect marine life and human health. Current updated federal water quality criteria are located at: http://www.epa.gov/waterscience/criteria/wqcriteria.html. Federal criteria applicable to the PLOO discharge include:

- acute and chronic criteria for the protection of saltwater aquatic habitat, and
- criteria for the protection of human health (consumption of organisms).

The federal criteria apply to ocean waters within the 12-mile territorial limits of the United States. The federal criteria do not represent standards, but are available for use by states in considering and establishing standards. The criteria also are useful in assessing potential impacts from wastewater discharges.

Table III.B-25 (pages III.B-38) presents Criteria Maximum Concentration (CMC) values established by EPA for the protection of saltwater habitat (acute effects). Table III.B-25 compares the water quality criteria with maximum projected receiving water concentrations after initial dilution. The receiving water computations are based on (1) maximum observed Point Loma WTP effluent concentrations during 2002-2006, and (2) the 204 to 1 minimum month initial dilution assigned by Order No. R9-2002-0025. As shown in the table, maximum observed Point Loma WTP effluent concentrations during 2002-2006 were within all EPA acute saltwater criteria.

Table III.B-26 (pages III.B-39 through III.B-41) present federal water quality to prevent long-term exposure effects for EPA priority pollutants. These criteria include Criteria Continuous Concentration (CCC) values established for the protection of saltwater habitat and criteria for the protection of public health. Table III.B-26 compares the maximum month PLOO receiving water concentrations with the long-term EPA criteria. As shown in the table, the Point Loma WTP discharge complies with applicable federal CCC and human health criteria.

Table III.B-27 (page III.B-42) presents saltwater CCC values and criteria for the protection of human health for EPA non-priority pollutants. The Point Loma WTP discharge complies with applicable federal criteria for non-priority pollutants for which saltwater CCC and human health criteria have been established.

Table III.B-25
Compliance with Federal Water Quality Criteria
Saltwater Acute (CMC) Criteria

EPA Priority Pollutant No.	Parameter	Concentration in µg/l				Compliance with EPA Water Quality Criteria?
		EPA Water Quality Criteria Saltwater CMC[1]	Point Loma Effluent MDL	Point Loma WTP Maximum Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
2	arsenic	69	0.4	2.74	3.0[4]	Yes
4	cadmium	40	0.53	4.5	0.02	Yes
5	chromium VI	1100	1.2	23.4[5]	0.11	Yes
6	copper	5	0.63	325	3.58[4]	Yes
7	lead	210	2.0	31.5	0.15	Yes
8	mercury	1.8	0.09	0.7	0.004[4]	Yes
9	nickel	74	0.53	22	0.11	Yes
10	selenium	290	0.28	1.7	0.08	Yes
11	silver	1.9	0.4	19.7	0.26[4]	Yes
13	zinc	90	0.55	81.3	8.36[4]	Yes
14	cyanide	1	2.0	10	0.05	Yes
53	pentachlorophenol	13	5.87	ND[6]	< 0.029[6]	Yes
102	aldrin	1.3	0.00006	ND[6]	< 2.9E-007[6]	Yes
105	gamma HCH	0.160	0.00001	0.175	0.0009	Yes
107	gamma chlordane	0.09	0.00008	ND[6]	< 3.9E-007[6]	Yes
107	alpha (cis) chlordane	0.09	0.00003	0.092	0.00045	Yes
110	p,p-DDT (4,4'-DDT)	0.13	0.00005	ND[6]	< 2.4E-007[6]	Yes
111	dieldrin	0.71	0.00005	ND[6]	< 2.4E-007[6]	Yes
112	alpha endosulfan	0.034	0.00003	ND[6]	< 1.5E-007[6]	Yes
113	beta endosulfan	0.034	0.00002	ND[6]	< 9.8E-008[6]	Yes
115	endrin	0.370	0.00005	ND[6]	< 2.4E-007[6]	Yes
117	heptachlor	0.053	0.00002	0.044	0.00021	Yes
118	heptachlor epoxide	0.053	0.00002	ND[6]	< 9.8E-008[6]	Yes
119	PCBs	0.014	0.004	ND[6]	< 0.00002[6]	Yes
120	toxaphene	0.21	0.004	ND[6]	< 0.00002[6]	Yes

1 Criteria Maximum Concentration (CMC) established by EPA for the protection of saltwater habitat. Criteria are updated by EPA at: http://www.epa.gov/waterscience/criteria/wqcriteria.html. EPA water quality criteria are not enforceable standards, but represent thresholds at which beneficial uses may be impacted and may form the basis for water quality standards.
2 Point Loma WTP effluent maximum observed concentration during 2002-2006.
3 Computed receiving water concentration upon completion of initial dilution. Computation based on the 204 to 1 minimum month initial dilution assigned in Order No. R9-2002-0025 and the maximum observed Point Loma WTP effluent concentration from 2002-2006.
4 In accordance with the Ocean Plan, the projected receiving water concentration for arsenic, copper, mercury, selenium, and zinc are computed assuming background sea water concentrations of 3.0 µg/l arsenic, 2.0 µg/l for copper, 0.0005 µg/l for mercury, 0.16 µg/l for silver, and 8 µg/l for zinc.
5 Point Loma WTP effluent analyzed for total chromium.
6 ND indicates not detected at the listed MDL. Maximum receiving water concentrations for these non-detected constituents are computed using the MDL, and are reported as "<x µg/l".

Table III.B-26
Compliance with Federal Water Quality Criteria
Saltwater Chronic (CCC) and Public Health Criteria

EPA Priority Pollutant No.	Parameter	Concentration in μg/l					Compliance with EPA Water Quality Criteria?
		Federal Water Quality Criteria[1]		Point Loma Effluent MDL	Point Loma WTP Maximum Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
		Salt water Chronic (CCC)	Public Health				
1	antimony	NA	640	2.9	50	0.24	Yes
2	arsenic	36	NA	0.4	1.9	3.0[8]	Yes
4	cadmium	8.8	NA	0.53	1.3	0.006[8]	Yes
5	chromium VI	50	NA	1.2[4]	11.1[4]	0.054	Yes
6	copper	3.1	NA	0.63	163	2.8[8]	Yes
7	lead	8	NA	2	< 18	< 0.010	Yes
8	mercury	0.94	0.3	0.09	0	0.0010[8]	Yes
9	nickel	8.2	4600	0.53	16	0.078	Yes
10	selenium	71	4200	0.28	1.48	0.007	Yes
12	thallium	NA	0.47	3.9	< 40	0.019	Yes
13	zinc	81	NA	0.55	50	8.20[8]	Yes
14	cyanide	1	140	2	6.8	0.033	Yes
16	TCDD equivalents	NA	5.1E-009	0.00025	1.00E-004	4.9E-007	< MDL[6]
17	acrolein	NA	290	13.8	ND[5]	< 0.067[5]	Yes
18	acrylonitrile	NA	0.25	13.44	ND[5]	< 0.066[5]	Yes
19	benzene	NA	51	1	ND[5]	< 0.0049[5]	Yes
20	bromoform	NA	140	1	ND[5]	< 0.0049[5]	Yes
21	carbon tetrachloride	NA	1.6	1	ND[5]	< 0.0049[5]	Yes
22	chlorobenzene	NA	1600	1	ND[5]	< 0.0049[5]	Yes
23	chlorodibromomethane	NA	13	1	2.9	0.014	Yes
26	chloroform	NA	470	1	11.2	0.055	Yes
27	dichlorobromomethane	NA	17	1	3.7	0.018	Yes
29	1,2-dichloroethane	NA	37	1	ND[5]	< 0.0049[5]	Yes
30	1,1-dichlroethylene	NA	7100	1	ND[5]	< 0.0049[5]	Yes
31	1,2-dichloropropane	NA	15	1	ND[5]	< 0.0049[5]	Yes
32	cis 1,3-dichloropropene	NA	21	1	ND[5]	< 0.0049[5]	Yes
33	ethylbenzene	NA	2100	1	ND[5]	< 0.0049[5]	Yes
34	bromomethane (methyl bromide)	NA	1500	1	ND[5]	< 0.0049[5]	Yes
36	dichloromethane (methylene chloride)	NA	590	1	6.3	0.031	Yes
37	1,1,2,2-tetrachloroethane	NA	0.17	1	ND[5]	< 0.0049[5]	Yes
38	tetrachloroethylene	NA	3.3	1	ND[5]	< 0.0049[5]	Yes
39	toluene	NA	15,000	1	8.1	0.040	Yes
40	1,2-trans-dichloroethylene	NA	10,000	1	ND[5]	< 0.0049[5]	Yes
42	1,1,2-trichloroethane	NA	16	1	ND[5]	< 0.0049[5]	Yes
43	trichloroethylene	NA	30	1	ND[5]	< 0.0049[5]	Yes

Table III.B-26 is continued on page III.B-40 (Table III.B-24 footnotes follow on page III.B-41)

**Table III.B-26 (Continued)
Compliance with Federal Water Quality Criteria
Saltwater Chronic (CCC) and Public Health Criteria**

EPA Priority Pollutant No.	Parameter	Concentration in µg/l					Compliance with EPA Water Quality Criteria?
		Federal Water Quality Criteria[1]		Point Loma Effluent MDL	Point Loma WTP Maximum Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
		Salt water Chronic (CCC)	Public Health				
44	vinyl chloride	NA	2.4	1	ND[5]	< 0.0049[5]	Yes
45	2-chlorophenol	NA	150	1.76	ND[5]	< 0.0086[5]	Yes
46	2,4-dichlorophenol	NA	290	1.95	ND[5]	< 0.010[5]	Yes
49	2,4-dinitrophenol	NA	5,300	6.07	ND[5]	< 0.030[5]	Yes
53	pentachlorophenol	7.9	3.0	5.87	ND[5]	< 0.029[5]	Yes
54	phenol	NA	1,700,000	2.53	18.4	0.090	Yes
55	2,4,6-trichlorophenol	NA	2.4	1.75	ND[5]	< 0.0085[5]	Yes
58	anthracene	NA	40,000	4.04	ND[5]	< 0.020[5]	Yes
60	benzo (a) anthracene (1,2-benzanthracene)	NA	0.018	7.68	ND[5]	< 0.037[5]	< MDL[5]
61	benzo (a) pyrene	NA	0.018	6.53	ND[5]	< 0.032[5]	< MDL[6]
62	3,4-benzofluoranthene (benzo(b)fluoranthene)	NA	0.018	6.63	ND[5]	< 0.032[5]	< MDL[6]
63	benzo (g,h,i) perylene (1,12-benzoperylene)	NA	0.018	6.5	ND[5]	< 0.032[5]	< MDL[6]
64	benzo (k) fluoranthene	NA	0.018	7.36	ND[5]	< 0.036[5]	< MDL[6]
66	bis (2-chloroethyl) ether	NA	0.53	2.62	ND[5]	< 0.013[5]	Yes
67	bis (2-chloroisopropyl) ether	NA	65,000	8.95	ND[5]	< 0.044[5]	Yes
68	bis (2-ethylhexyl) phthalate	NA	2.2	10.43	55.0	0.268	Yes
70	butyl benzyl phthalate	NA	1900	4.77	ND[5]	< 0.023[5]	Yes
71	2-chloronaphthalene	NA	1600	2.41	ND[5]	< 0.012[5]	Yes
73	chrysene	NA	0.018	7.49	ND[5]	< 0.037[5]	< MDL[6]
74	dibenzo (a,h) anthracene	NA	0.018	6.19	ND[5]	< 0.030[5]	< MDL[6]
75	1,2-dichlorobenzene	NA	1300	1	ND[5]	< 0.0049[5]	Yes
76	1,3-dichlorobenzene	NA	960	1	ND[5]	< 0.0049[5]	Yes
77	1,4-dichlorobenzene	NA	190	1	3.8	0.019	Yes
78	3,3-dichlorobenzidene	NA	0.028	2.43	ND[5]	< 0.012[5]	Yes
79	diethyl phthalate	NA	44,000	6.97	9.6	0.047	Yes
80	dimethyl phthalate	NA	1,100,000	3.26	ND[5]	< 0.016[5]	Yes
81	di-n-butyl phthalate	NA	4,500	6.49	ND[5]	< 0.032[5]	Yes
82	2,4-dinitrotoluene	NA	3.4	1.49	ND[5]	< 0.0073[5]	Yes
85	1,2-diphenylhydrazine	NA	0.20	2.49	ND[5]	< 0.012[5]	Yes
86	fluoranthene	NA	140	6.9	ND[5]	< 0.034[5]	Yes
87	fluorene	NA	5,300	2.43	ND[5]	< 0.012[5]	Yes
88	hexachlorobenzene	NA	2.9E-005	4.8	ND[5]	< 0.023[5]	< MDL[6]
89	hexachlorobutadiene	NA	18	2.87	ND[5]	< 0.014[5]	Yes
91	hexachloroethane	NA	3.3	3.55	ND[5]	< 0.017[5]	Yes

Table III.B-26 is continued on page III.B-41 (Table III.B-24 footnotes follow on page III.B-41)

Table III.B-26 (Continued)
Compliance with Federal Water Quality Criteria
Saltwater Chronic (CCC) and Public Health Criteria

EPA Priority Pollutant No.	Parameter	Concentration in µg/l					Compliance with EPA Water Quality Criteria?
		Federal Water Quality Criteria[1]		Point Loma Effluent MDL	Point Loma WTP Maximum Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
		Salt water Chronic (CCC)	Public Health				
92	ideno (1,2,3-cd) pyrene	NA	0.018	6.27	ND[5]	< 0.031[5]	< MDL[6]
93	isophorone	NA	960	1.93	ND[5]	< 0.009[5]	Yes
95	nitrobenzene	NA	690	1.52	ND[5]	< 0.007[5]	Yes
96	N-nitrosodimethylamine	NA	3.0	1.63	ND[5]	< 0.008[5]	Yes
97	N-nitrosodi-n-propylamine	NA	0.51	1.63	ND[5]	< 0.008[5]	Yes
98	N-nitrosodiphenylamine	NA	6.0	2.96	ND[5]	< 0.014[5]	Yes
100	pyrene	NA	4,000	5.2	ND[5]	< 0.025[5]	Yes
101	1,2,4-trichlorobenzene	NA	70	1.44	ND[5]	< 0.007[5]	Yes
102	aldrin	NA	0.000050	6E-005	ND[5]	< 2.9E-007[5]	Yes
103	alpha HCH	NA	0.005	2E-005	ND[5]	< 9.8E-008[5]	Yes
104	beta HCH	NA	0.017	2E-005	ND[5]	< 9.8E-008[5]	Yes
105	gamma HCH	NA	1.8	0.00001	44	0.21	Yes
107	gamma chlordene	0.04	0.00081	Not listed[7]	ND[5]	ND[5]	Yes
107	alpha (cis) chlordene	0.04	0.00081	Not listed[7]	ND[5]	ND[5]	Yes
107	gamma chlordane	0.04	0.00081	8E-005	ND[5]	< 3.9E-007[5]	Yes
107	alpha (cis) chlordane	0.04	0.00081	0.00003	0.031	0.00015	Yes
108	p,p-DDD (4,4'-DDD)	NA	0.00031	2E-005	< 20[5]	< 9.8E-008[5]	Yes
109	p,p-DDE (4,4'-DDE)	NA	0.00022	2E-005	ND[5]	< 9.8E-008[5]	Yes
110	p,p-DDT (4,4'-DDT)	0.001	0.00031	0.00005	ND[5]	< 2.4E-007[5]	Yes
111	dieldrin	0.0019	5.4E-005	0.00005	ND[5]	< 2.4E-007[5]	Yes
112	alpha endosulfan	0.0087	89	0.00003	ND[5]	< 1.5E-007[5]	Yes
113	beta endosulfan	0.0087	89	0.00002	ND[5]	< 9.8E-008[5]	Yes
115	endrin	0.002	0.060	0.00005	ND[5]	< 2.4E-007[5]	Yes
116	endrin aldehyde	NA	0.3	2E-005	ND[5]	< 9.8E-008[5]	Yes
117	heptachlor	0.0036	7.9E-005	2E-005	< 20	< 9.8E-008[5]	Yes
118	heptachlor epoxide	0.0036	3.9E-005	2E-005	ND[5]	< 9.8E-008[5]	Yes
120	toxaphene	0.0002	0.00028	0.004	ND[5]	< 0.00002[5]	Yes

1 Criteria Maximum Concentration (CMC) established by EPA for the protection of saltwater habitat. Criteria are updated by EPA at: http://www.epa.gov/waterscience/criteria/wqcriteria.html. EPA water quality criteria are not enforceable standards, but represent thresholds at which beneficial uses may be impacted and may form the basis for water quality standards.
2 Point Loma WTP effluent maximum observed concentration during 2002-2006.
3 Computed receiving water concentration upon completion of initial dilution. Computation based on the 204 to 1 minimum month initial dilution assigned in Order No. R9-2002-0025 and the maximum observed Point Loma WTP effluent concentration from 2002-2006.
4 Listed Point Loma WTP effluent value is for total chromium.
5 ND indicates not detected at the listed MDL. Maximum receiving water concentrations for these non-detected constituents are computed using the MDL, and are reported as "<x µg/l".
6 The PLOO effluent sample analysis MDL was in accordance with required "minimum level" MDLs listed in the Ocean Plan. Per the Ocean Plan, compliance is presumed if the constituent is not detected and the achieved MDL is within the method-specific "minimum level".
7 MDL not reported for the undetected constituent. Receiving water concentrations of the constituent (which would be reduced by a factor of 205 to 1) will also be undetectable.
8 In accordance with the Ocean Plan, the projected receiving water concentration for arsenic, copper, mercury, selenium, and zinc are computed assuming background sea water concentrations of 3.0 µg/l arsenic, 2.0 µg/l for copper, 0.0005 µg/l for mercury, 0.16 µg/l for silver, and 8 µg/l for zinc.

Table III.B-27
Compliance with Federal Water Quality Criteria
Saltwater Chronic (CCC) and Public Health Criteria - Non-Priority Pollutants

EPA Non-Priority Pollutant No.	Parameter	Concentration in µg/l					Compliance with EPA Water Quality Criteria?
		Federal Water Quality Criteria[1]		Point Loma Effluent MDL	Point Loma WTP Maximum Effluent Concentration 2002-2006[2]	Maximum Receiving Water Concentration after Initial Dilution[3]	
		Salt water Chronic (CCC)	Public Health				
14	demeton	0.1	NA[4]	0.15	ND[6]	< 0.00073[6]	Yes
17	guthion	0.1	NA[4]	0.15	ND[6]	< 0.00073[6]	Yes
21	malathion	0.1	NA[4]	0.03	ND[6]	< 0.00015[6]	Yes
23	methoxychlor	0.03	NA[4]	6E-005	ND[6]	< 2.9E-007[6]	Yes
24	mirex	0.001	NA[4]	2E-005	ND[6]	< 9.8E-008[6]	Yes
34	diazanon	0.82	NA[4]	0.03	ND[6]	< 0.00015[6]	Yes
46	tributyltin	0.0074	NA[4]	2	ND[6]	< 0.010[6]	< MDL[7]
47	2,4,5-trichlorophenol	NA[5]	3600	1.66	ND[6]	< 0.0081[6]	Yes

1 Criteria Maximum Concentration (CMC) established by EPA for the protection of saltwater habitat. Criteria are updated by EPA at: http://www.epa.gov/waterscience/criteria/wqcriteria.html. EPA water quality criteria are not enforceable standards, but represent thresholds at which beneficial uses may be impacted and may form the basis for water quality standards.
2 Point Loma WTP effluent maximum observed concentration during 2002-2006.
3 Computed receiving water concentration upon completion of initial dilution. Computation based on the 204 to 1 minimum month initial dilution assigned in Order No. R9-2002-0025 and the maximum observed Point Loma WTP effluent concentration from 2002-2006.
4 No EPA public health water quality criterion is established for the listed constituent.
5 EPA does not establish a CCC value for 2,4,5-trichlorophenol.
6 ND indicates not detected at the listed MDL. Maximum receiving water concentrations for these non-detected constituents are computed using the MDL, and are reported as "<x µg/l".
7 The PLOO effluent sample analysis MDL was in accordance with required "minimum level" MDLs listed in the Ocean Plan. Per the Ocean Plan, compliance is presumed if the constituent is not detected and the achieved MDL is within the method-specific "minimum level".

NPDES Permit Requirements and Performance Benchmarks. In addition to establishing effluent limits that implement Ocean Plan receiving water standards, Order No. R9-2002-0025 (NPDES CA0107409) establishes effluent benchmarks. The benchmarks are established to determine which parameters require antidegradation analysis at the end of the current NPDES permit period.

An analysis of compliance with the benchmarks is presented in Chapter 2 of the Antidegradation Study portion of this 301(h) application. (See Part 3 of Volume II.) As shown in the Antidegradation Study, the City achieved compliance with all NPDES mass emission benchmarks during 2002-2006 except for phenol. Analysis presented in Part 3 of Volume II demonstrates that the phenol mass emissions are in compliance with Tier I antidegradation regulations. No Tier II analysis is thus required.

Violations of Effluent Standards During 2002-2006. Four isolated incidents occurred during 2002-2006 that resulted in violation of Point Loma WTP effluent standards established within Order No. R9-2002-0025. Two of these incidents occurred as a result of an illicit pesticide discharge to the sewer, and two are believed to be related to sample contamination. Table B-28 summarizes these occurrences.

Table III.B-28
Point Loma WTP Effluent Violations During 2002-2006

Constituent	Date	Point Loma WTP Effluent Concentration	Violation/Discussion
Settleable Solids	6/20/04	7.5 ml/l	**Violation:** Single sample exceeded the instantaneous maximum limit of 3.0 ml/l and caused noncompliance with the 1.5 ml/l weekly limit. **Suspected Cause:** Sample contamination. The 7.5 ml/l value is significantly above normal values. The Point Loma WTP plant performance during the day was excellent, with 88.5 percent solids removal. Removal of grease and oil, floatables, BOD, and turbidity during the day were above average values. **Response:** Laboratory ordered in the future to resample when unusual results occur to recheck value and to avoid triggering violation of weekly average limit.
Chlordane	7/24/04	0.044 µg/l	**Violation:** Exceeded the monthly average limit of 0.010 µg/l. **Suspected Cause:** Illicit discharge to the sewer system. Both heptachlor and chlordane were detected in the Point Loma WTP influent and effluent, indicating that the pesticides may have been simultaneously discharged to the sewer system. Once readily available, both substances were severely restricted or banned in the 1980s. The discharge occurred on a Saturday, suggesting an illicit discharge by a homeowner or landscaper to a residential sewer (as opposed to an industrial discharge) as a means of disposing of liquid from an old container. Because of the low permit limits, discharge of as little as a gallon of the chemical could cause the Point Loma WTP effluent noncompliance. **Response:** Continue household hazardous waste (HHW) education program.
Heptachlor	7/24/04	0.092 µg/l	**Violation:** Exceeded the monthly average limit of 0.010 µg/l. **Suspected Cause:** Illicit discharge to the sewer system. Both heptachlor and chlordane were detected in the Point Loma WTP influent and effluent, indicating that the pesticides may have been simultaneously discharged to the sewer system. Once readily available, both substances were severely restricted or banned in the 1980s. The discharge occurred on a Saturday, suggesting an illicit discharge by a homeowner or landscaper to a residential sewer (as opposed to an industrial discharge) as a means of disposing of liquid from an old container. Because of the low permit limits, discharge of as little as a gallon of the chemical could cause the Point Loma WTP effluent noncompliance. **Response:** Continue HHW education program.
Settleable Solids	8/21/04	3.5 ml/l	**Violation:** Exceeded the instantaneous maximum limit of 3.0 ml/l. **Suspected Cause:** Sampling inadvertently performed at time influent screen maintenance was being performed. Point Loma WTP plant performance during the day was excellent, with 87.2 percent solids removal. Removal of grease and oil, floatables, BOD, and turbidity during the day were above average values. Repeat sample showed normal settleable solids concentrations. **Response:** Laboratory staff now check with operators before sampling to ensure that the sample will not be contaminated by any onsite maintenance activities.

III.B.8. Provide the determination required by 40 CFR 125.60(b)(2) or, if the determination has not yet been received, a copy of a letter to the appropriate agency(s) requesting the required determination.

The City has requested (see City of San Diego letter in Appendix U) that the Regional Board provide an updated determination of compliance for the PLOO discharge. A copy of this determination will be forwarded to EPA when it is received by the City.

Section III.C

Large Applicant Questionnaire

III.C. *Impact on Public Water Supplies* [40 CFR 125.61(b)].

III.C.1. Is there a planned or existing public water supply (desalinization facility) intake in the vicinity of the current or modified discharge?

SUMMARY: No existing or planned water supply facilities are located in the vicinity of the PLOO discharge.

The only planned seawater desalination facility in San Diego County is a 50 mgd facility proposed in by a private water developer (Poseidon Resources Corporation) at the site of the Encina Power Station in Carlsbad, California. The Encina Power Station site is located 30 miles north of the PLOO.

Under the proposed desalination plan, Poseidon proposes to divert up to 100 mgd of saline water from Agua Hedionda Lagoon via an existing Encina Power Station cooling water intake structure. Waste brine from the desalination facility would be discharged to the Pacific Ocean (surf zone discharge south of the mouth of Agua Hedionda Lagoon) via an existing Encina Power Station cooling water effluent channel.

In 2006, the Regional Board adopted a NPDES permit (Order No. R9-2006-0065, NPDES CA0109233) to regulate the Poseidon Resources Corporation discharge of waste brine to the ocean. The California Coastal Commission approved the desalination project in November 2007.

As part of oceanographic studies submitted to the Regional Board in application for the NPDES permit, computer modeling presented by Poseidon concluded that only a small portion of the Poseidon seawater desalination brine discharge (less than 1 percent) would be reintrained in the Agua Hedionda Lagoon intake. (*Report of Waste Discharge for the Poseidon Resources Corporation Carlsbad Seawater Desalination Facility,* Poseidon Resources Corporation, 2005) The mouth of Agua Hedionda Lagoon mouth is located north of the brine discharge point, and the PLOO is a further 30 miles south. As a result, the PLOO discharge will not have any discernible effect on the proposed Agua Hedionda Lagoon seawater intake.

The Poseidon Resources Corporation seawater desalination facility proposed at Carlsbad is the only seawater desalination facility identified within long-term water plans developed by the San Diego County Water Authority. (*Updated 2005 Urban Water Management Plan*, San Diego County Water Authority, 2006)

III.C.2. If yes,

a. **What is the location of the intake(s) (latitude and longitude)?**

b. **Will the modified discharge(s) prevent use of the intake(s) for public water supply?**

c. **Will the modified discharge(s) cause increased treatment requirements for the public water supply(s) to meet local, State, and EPA drinking water standards?**

The question is not applicable, since no existing or planned public drinking water supply intake facilities exist or are proposed in the vicinity of the discharge.

Section III.D

Large Applicant Questionnaire

III.D.1 Does (will) a balanced indigenous population of shellfish, fish, and wildlife exist:

- **Immediately beyond the ZID of the current and modified discharge(s)?**
- **In all other areas beyond the ZID where marine life is actually or potentially affected by the current and modified discharge?**

SUMMARY: A balanced indigenous population (BIP) exists immediately beyond the ZID of the current discharge. Given the proposed wastewater loadings and effluent quality, it is projected that a BIP will be maintained in the future for the modified discharge.

This question is addressed in two sections. First, the City's comprehensive monitoring database on sediment quality and benthic species is reviewed. On the basis of comparison of pre-discharge and post-discharge conditions, it is concluded that a BIP exists beyond the ZID for benthic invertebrate species and bottom dwelling (demersal) fishes. Existing data and evidence are reviewed to determine that the outfall does not discernibly affect the health or population of plankton, mammals, birds, fish, or endangered species.

EVALUATION OF EXISTING CONDITIONS

To assess existing conditions, environmental monitoring data are available from the City of San Diego's Ocean Monitoring Program, which has developed over 16 years of data for the receiving waters region surrounding the Point Loma Ocean Outfall (PLOO). These data include pre-discharge (pre-construction and construction from July 1991 to October 1993) and post-discharge periods (January 1994 to present). As part of this 301(h) application, data for the 1994-2000 post-discharge period, 2001-2006 post-discharge period, and all post-discharge years combined through 2006 (i.e., 1994-2006) were evaluated and compared with pre-discharge (1991-1993) conditions in accordance with direction received from EPA staff. Data for calendar year 2007 are not yet fully available, but will be submitted according to regular NPDES permit reporting schedules. Pre- and post-discharge monitoring data are examined to explore the relationships(s) between the wastewater discharge from the Point Loma outfall and measured environmental changes.

Detailed assessments of existing sediment conditions, benthic infauna communities, and demersal fish and megabenthic invertebrate communities are presented in Appendix E (Volume IV), while details of the City's bioaccumulation assessment program for fish tissues are presented in Appendix F (Volume IV); references within this section to various tables and figures are to those included in Appendices E and F. In accordance with direction received from EPA staff, data are presented within Appendix E in a format similar to that originally used by EPA in the *Tentative Decision Document* addressing the City's 1995 waiver application and subsequently in the City's 2001 waiver application that covered all monitoring through calendar year 2000.

Also in accordance with direction received from EPA, sediment, benthic infauna, fish, and bioaccumulation data are not reproduced herein in their entirety. Instead, the City has submitted the data to EPA in electronic format. Data in printed form have been submitted to the Regional Board and EPA Region IX in the form of monthly, quarterly, and annual reports as required by Monitoring and Reporting Program No. R9-2002-0025.

Overview and Summary of Findings. The City of San Diego's discharge of municipal wastewater into offshore marine waters is not affecting the maintenance of natural conditions in sediments and biota (benthic invertebrates and fishes) beyond the ZID. The City's ocean monitoring program has collected and analyzed more than 3400 benthic samples (sediments and infauna) from different monitoring stations around the PLOO and surrounding areas from 1991 through 2006 (see Figure E-1 in Appendix E for benthic station locations). In addition, nearly 430 otter trawls have been performed during this time to monitor demersal fish and megabenthic invertebrate communities in the region (see Figure E-35 in Appendix E for trawl locations), while additional trawls and rig fishing activities have been conducted to monitor the bioaccumulation of contaminants in fish tissues (see Figure F-1 in Appendix F).

Overall, 10 quarterly pre-discharge surveys (July 1991-October 1993) were conducted to assess background conditions and their temporal and spatial patterns of variability, while data from up to 45 post-discharge surveys (January 1994-July 2006) have been analyzed to detect changes that may indicate s outfall related effects. Differences between sampling frequencies for the various program components and changes in the above monitoring activities over time are detailed in Appendices E and F (see sections E.2-E.3 of Appendix E and F.2-F.3 of Appendix F, respectively).

After 13 years of wastewater discharge from the extended PLOO, monitoring results show that a balanced indigenous population (BIP) is maintained beyond the ZID off Point Loma.

Benthic habitats beyond the ZID boundary are populated by natural indigenous benthic invertebrate communities characteristic of the Southern California Bight (SCB). Key parameters such as infaunal abundance, species diversity, benthic response index (BRI), and patterns of key bioindicator species, are being maintained within the limits of variability that typify natural benthic communities of the SCB continental shelf. Finally, analysis of trawl-caught fish and invertebrate communities as well as the results concerning the bioaccumulation of contaminants in fish tissues show no evidence of outfall effects.

Sediment Conditions. Characteristics of ocean sediments (e.g., grain size, organic content, contaminant levels) are important factors influencing benthic communities. Sediment data are currently collected at 22 monitoring stations off the coast of Point Loma (see Figure E-1). Twelve of these stations are located along the 98-m discharge depth contour. In accordance with direction from EPA, sediment conditions off Point Loma were analyzed based on a total of 372 0.1-m^2 grab samples collected at the 12 outfall depth stations. Of these samples, 60 were collected prior to discharge (1991-1993) and 312 were collected during the post-discharge period (1994-2006). The latter includes 168 samples for the period covered in the City's previous 2001 waiver application (i.e., 1994-2000) and 144 samples for the period from 2001 through 2006.

Patterns and trends for physical sediment characteristics (e.g. grain size distribution) and concentrations of total organic carbon (TOC), total volatile solids (TVS), total nitrogen, sulfides, biochemical oxygen demand (BOD), individual trace metals, chlorinated pesticides, PCBs and PAHs in benthic sediments are discussed in detail in Appendix E. The following section summarizes and highlights some of the key findings regarding potential influences of the extended outfall on local sediments.

Since the extended outfall was placed in operation, there has been little evidence of organic and contaminant loading in the area. Most measured parameters continue to exist at levels within the range of natural variability for the San Diego region and other SCB reference areas. The only sustained effects were restricted mostly to a few sites located within about 120-300 m of the outfall. These include station E14 located near the ZID boundary just west of the center of the outfall wye, and stations E11 and E17 located near the ends of the southern and northern diffuser legs, respectively. These effects include an increase in sediment particle size through time, measurable increases in sulfide concentrations, and smaller increases in BOD levels (see below).

Grain size distribution: Differences in the composition of sediments (e.g., fine vs. coarse particles) and associated levels of organic loading can affect the burrowing, tube building and feeding abilities of infaunal invertebrates, which in turn may lead to changes in benthic community structure. Parameters such as grain size and the dispersion of sediment particles are also indicative of the local hydrodynamic regime, while physical properties of the sediments (size, shape, density, and mineralogy) interact with deposited organic particles to create new conditions in sediment carbon coupling at the boundary layer.

Grain size characteristics of sediments around the PLOO are summarized in Table E-3 and Figures E-2 through E-4 in Appendix E. Sediment composition off Point Loma is within the range of natural variability seen for other mid-shelf environments of the SCB. Average grain sizes for all sites were 60 and 70 microns during the pre- and post-discharge periods, respectively, while the percentage of fine sediments (silt and clay) averaged about 40 percent and 37 percent during these times. The sites are generally similar in terms of the composition of sand, silt and clay; although sediments nearest the outfall (station E14) showed a slight increase in mean particle size after discharge began. However, this change is likely related to the movement of ballast materials used to support the outfall pipe and the presence of patchy sediments in the area at this near-ZID site. There has also been little change in grain size characteristics since the previous waiver application in 2001 (i.e., years 1994-2000 vs. 2001-2006). Additionally, sediments at northern reference station B12 were frequently characterized by the presence of very coarse materials such as shell hash and gravel, which distinguished this station from most other outfall depth sites. Relatively coarse materials were also characteristic of sites located near the LA-5 dredge materials disposal site located southwest of the outfall. Overall, there were no consistent changes in sediment composition over time that might correspond to wastewater discharge.

Sulfides: Sediment sulfides showed a distinct outfall-related pattern at discharge depths that was restricted to the three stations located nearest the discharge area (see Table E-3 and Figure E-9 of Appendix E). Sulfide levels increased sharply after the discharge began at station E14 located about 120 m from the center of the diffuser legs, and to a lesser extent at stations E11 and E17 located about 250-300 m from the ends of the southern and northern diffuser legs, respectively. For example, average sulfide concentrations increased from 1.7 ppm at station E14 prior to discharge to 18.6 ppm afterwards. Overall, these values are considerably less than comparable measurements of 50-500 ppm off Newport Beach and Santa Monica. Additionally, there is no evidence that the small increase in sulfide concentrations off Point Loma is affecting sediment quality to the point of degrading the resident marine biota.

BOD: BOD is a measure of the level of oxidative metabolism by bacteria of discharged organic material. There was a slight increase in BOD at sites off Point Loma between the pre- and post-discharge periods (see Table E-3 and Figure E-8 of Appendix E). The greatest increase in BOD concentrations since discharge began occurred at station E14 located nearest the discharge site, a pattern consistent with predictions that a light sprinkling of organic material from the outfall might occur within or near the ZID. BOD concentrations averaged 270 ppm at outfall depths during the pre-discharge period 312 ppm afterwards. All of these values are within the range of typical background levels of 250-1000 ppm for BOD in SCB sediments, and there is no evidence that they are causing or related to any environmental degradation.

Overall, there is no evidence that wastewater discharge off Point Loma is affecting the quality of benthic sediments near or beyond the ZID to the point of degrading environmental conditions, resident communities of benthic invertebrates, or demersal fishes.

Benthic Infauna. Benthic infaunal organisms represent excellent indicators of changes that occur in the marine environment due to the effects of wastewater discharges or other anthropogenic or natural sources. As with sediments, benthic infauna (macrofauna) data are currently collected at 22 monitoring stations off the coast of Point Loma (see Figure E-1 of Appendix E). In accordance with direction from EPA, benthic communities off Point Loma were analyzed based on a total of 743 0.1-m^2 grab samples collected at the 12 outfall depth stations during January and July from 1991 through 2006. Of the samples collected at these sites, 120 were collected prior to discharge (1991-1993) and 623 were collected during the post-discharge period (1994-2006). The latter includes 335 samples for the period covered in the City's previous 2001 waiver application (i.e., 1994-2000) and 288 samples for the period from 2001 through 2006.

Patterns and trends for key benthic community parameters are discussed in detail within Appendix E. Benthic community parameters include number of species (species richness or species diversity), infaunal abundance, Swartz dominance, the benthic response index (BRI), abundances of major taxa (e.g., polychaetes, echinoderms, crustaceans, molluscs), abundances of various pollution sensitive, pollution tolerant or opportunistic species (i.e., bioindicators), and abundances of numerically dominant taxa (i.e., top 10 species by abundance).

Tables E-4 and E-5 of Appendix E summarize and compare values for many of these parameters between the pre- and post-discharge periods and with other reference surveys.

Additional comparisons of changes in the benthos were made using the BACIP statistical design (see Table E-6 of Appendix E). Outfall-related effects were evaluated in terms of the range of natural variability under reference conditions, the magnitude and spatial extent of the effect, and an assessment of the potential for adverse effects. Estimates of natural variability for benthic community parameters in the SCB have been extracted from various regional and bight-wide surveys conducted since 1985 (see Table E-4 of Appendix E). These studies include the 1985 and 1990 SCCWRP reference surveys, the 1994 Southern California Bight Pilot Project, the 1998 and 2003 Southern California Bight Regional Monitoring Programs (i.e., Bight′98 and Bight′03, respectively), and annual region-wide surveys of the San Diego mainland shelf conducted as part of regular South Bay Ocean Outfall monitoring requirements. A long-term assessment of the annual regional surveys off San Diego and calculated reference tolerance intervals for various benthic community indicators are presented in Attachment E.1 of Appendix E. Additionally, side-by-side comparisons of regional sediment conditions off San Diego during the 1994-2000 and 2001-2006 post-discharge periods are presented in Attachment E.5 of Appendix E. The following section summarizes and highlights some of the key findings regarding potential influences of the extended outfall on local benthic infaunal communities off Point Loma.

Benthic communities near and beyond the ZID are dominated by ophiuroid-polychaete based assemblages that are prevalent throughout the SCB. Changes in these communities and populations of individual species that have occurred since monitoring began have mirrored similar changes throughout the SCB benthos. For example, the brittle star *Amphiodia urtica* and the spionid polychaete *Spiophanes duplex* were dominant species during both the pre- and post-discharge periods off Point Loma. Polychaetes continue to account for the greatest number of species and individuals overall (see Table E-5 of Appendix E). Similar assemblages dominate much of the southern California benthos, including the San Diego region, although patches of other benthic assemblages occur in areas of different sediment types. The shifts in community composition that have occurred over time off Point Loma probably represent variation in southern California assemblages related to large-scale oceanographic events such as El Niños and La Niñas, to natural population fluctuations, and habitat heterogeneity.

Although variable, infaunal communities off Point Loma have remained steady between years in terms of the number of species, number of individuals, and dominance. The values for these parameters in the PLOO region are similar to other sites off San Diego and throughout the entire SCB. In spite of this overall stability, comparisons of data from the pre- and post-discharge periods indicate some trends. For example, there has been a general increase in the total abundance and number of species of benthic infauna since wastewater discharge began (see Table E-4, and Figures E-24 and E-25 of Appendix E). However, this continued an upward trend that began prior to wastewater discharge. The increase in species richness was most pronounced nearest the outfall, contrary to what would be expected if environmental degradation were occurring. Increases in infaunal abundance were also generally accompanied by decreases in dominance (i.e., higher Swartz dominance index values; see Figure E-26), another pattern contrary to known pollution effects. There did appear to be a minor shift in the relative abundance of different phyla at some stations that may be related to the discharge or physical structure of the outfall, with echinoderms decreasing and polychaetes and molluscs increasing since discharge began. Considering the net effects of above changes, benthic communities near and beyond the ZID are not being dominated by a few pollution tolerant species, a precursor to adverse environmental impact.

Other changes in the benthos near the outfall also suggest moderate effects coincident with anthropogenic activities. For example, the increased variability in number of species and infaunal abundance at near-ZID station E14 since discharge began may be indicative of community destabilization. A similar increase in BRI values at this station during the post discharge period may also be indicative of enrichment or disturbance events. However, BRI values at this and all other sites are still considered characteristic of reference or background conditions (BRI < 25; see Figure E-28 of Appendix E). Finally, the patchiness of sediments near the outfall and the corresponding shifts in assemblage structure suggest that changes in the area may be related to localized physical disturbance (e.g., shifting sediment types) as well as to organic enrichment.

Populations of some indicator organisms did show minor changes that may correspond to organic enrichment or other disturbances, while populations of others revealed no evidence of impact. For example, there was a significant change in the difference between ophiuroid (*Amphiodia* spp) populations that occur at one site nearest the outfall (i.e., station E14) and those present at the two northern control sites (see Tables E-6 and E-7 of Appendix E). The difference in *Amphiodia* populations was due to both a decrease in numbers of this brittle star at station E14 and corresponding increases at the control sites (stations B9 and E26) during the post-discharge period.

More recently, however, populations of *Amphiodia* at these sites have become more similar, particularly between 2004 and 2006. Although changes in *Amphiodia* populations at station E14 may be related to organic enrichment, other factors such as increased predation pressure near the PLOO may be important. Additionally, populations of *Amphiodia* at stations E11 and E17 also located close to the outfall (i.e., within 300 m), were much less affected during the post-discharge period (see Figure E-30 of Appendix E). Whether or not the observed changes in *Amphiodia* populations are related to organic enrichment, predation, or some other factor, abundances of these brittle stars off Point Loma are still within the range of natural populations in the SCB. Patterns of change in populations of the polychaete *Capitella* "*capitata*," the bivalve *Parvilucina tenuiscuplta*, and ostracods of the genus *Euphilomedes* also suggest a subtle enrichment effect near the outfall (see Table E-7, Figures E-32 and E-34; however, densities of these organisms are still within the range of natural variation for the SCB. Populations of other benthic polychaetes (e.g., *Mediomastus*, *Dorvillea*, *Armandia*), and amphipods (e.g., *Rhepoxynius* and *Ampelisca*) that have been suggested as bioindicators also revealed little evidence of outfall related changes.

Although some changes in benthic assemblages have occurred over time in the receiving waters off Point Loma, these assemblages are still similar to those present prior to discharge and to natural indigenous communities of the southern California outer continental shelf. Thus, after 13 years of operation, the discharge of wastewater through the Point Loma outfall has not caused any changes in benthic community structure near or beyond the ZID that may be construed as degrading marine habitat.

Demersal Fishes and Megabenthic Invertebrates. Demersal fishes and megabenthic invertebrates are conspicuous members of the continental shelf and slope habitats, and assessment of their communities is an important focus of ocean monitoring programs throughout the world. Trawl-caught fish and invertebrate data are currently collected at six monitoring stations located along the 100-m depth contour off the coast of Point Loma (see Figure E-35 of Appendix E). In accordance with direction from EPA, communities of these fishes and invertebrates collected at these sites were analyzed based on a total of 186 otter trawls conducted during January and July from 1991 through 2006. Of these trawls, 30 were performed prior to discharge (1991-1993) and 156 afterwards (1994-2006).

Patterns and trends for the demersal fish and megabenthic invertebrate communities off Point Loma are discussed in detail in Appendix E. These assessments focused on key community parameters such as the number of species (species richness), total abundances, and changes in the abundance of dominant or common species. Tables E-8, E-9 and E-10 of Appendix E summarize and compare values for many of these parameters between the pre- and post-discharge periods and with other reference surveys.

A total of 61,580 fishes representing 71 distinct species were collected in the above 186 trawls conducted off Point Loma from 1991 through 2006 (see Attachment E.2 to Appendix E). The demersal fish community was dominated by Pacific sanddabs, which alone accounted for approximately 50 percent of the total catch over these years. Other relatively abundant species off Point Loma include:

- the yellowchin sculpin (approximate 13%),
- halfbanded rockfish (approximately 8%),
- Dover sole (approximately 6%) and
- longspine combfish (approximately 5%).

All of these species are common in the types of soft-bottom habitats that characterize much of this region and the mainland shelf of the SCB. There appears to be only minor differences between the pre- and post-discharge periods at the nearfield and farfield sites (see Table E-8 of Appendix E). For example, the relative abundance of Pacific sanddabs comprised a smaller proportion of the nearfield fish assemblage during the post-discharge period than prior to discharge, while they remained the same over time at the farfield sites. The opposite pattern was true for longspine combfish and halfbanded rockfish. Overall, fluctuations in populations of dominant fish near the outfall were within the range of variability observed at farfield sites. Additionally, the lack of physical abnormalities and indicators of disease such as fin rot, lesions and tumors indicate that fish populations remain healthy off Point Loma. Thus, wastewater discharge is not having any significant effect on the populations or health of demersal fish near or beyond the ZID off Point Loma.

A total of 337,390 megabenthic invertebrates, comprising 133 taxa, were recorded in the above trawls conducted off Point Loma between 1991 and 2006 (Attachment E.3 to Appendix E). The sea urchin *Lytechinus pictus* dominated these assemblages, accounting for about 94 percent of the total catch. Other occasionally abundant species included the sea pen *Acanthoptilum* sp, and the sea urchin *Allocentrotus fragilis*. Most of the remaining species were captured infrequently and/or in low numbers, with 85 taxa being represented by 10 or fewer individuals since monitoring began. There are no temporal or spatial trends in the number of trawl-caught invertebrate species or abundances that suggest an outfall-related impact near or beyond the ZID.

Overall, analyses of temporal and spatial patterns did not reveal any significant outfall-related effects on trawl-caught fish and invertebrate communities off Point Loma. Despite the high variability of both types of communities, patterns of change in species richness and abundance were similar at stations near the outfall and at those farther away. Although the abundance of dominant fish such as Pacific sanddabs declined at stations nearest the discharge site (nearfield stations) relative to overall post-discharge populations, sanddab abundances were still within the range of natural variability described for SCB reference areas. Furthermore, no changes in fish and invertebrate community structure were detected in the nearfield assemblages that corresponded to the initiation of wastewater discharge. Finally, patterns of species dominance and relative abundance are similar between outfall and reference sites and natural indigenous assemblages of demersal fishes and macroinvertebrates occur throughout the Point Loma region.

Bioaccumulation of Toxic Materials. Demersal fishes can accumulate chemical contaminants from the environment, including surrounding waters, benthic sediments, and from the food they consume. The City of San Diego currently monitors the bioaccumulation of contaminants in fishes inhabiting areas surrounding the PLOO by analyzing liver and muscle tissue samples of species collected from four trawl zones (6 stations) and two rig fishing stations (see Figure F-1 in Appendix F). These stations are located along the mainland shelf at depth ranges similar to where wastewater is discharged (98-m depth contour). Specific species are targeted for analysis based on their ecological or commercial importance.

Patterns and trends for the key bioaccumulation parameters are discussed in detail within Appendix F. Results are presented for contaminant levels of 11 metals, DDT and other chlorinated pesticides, polychlorinated biphenyl compounds (PCBs), and polycyclic aromatic hydrocarbons (PAHs) measured in 23 species of fish collected from surveys conducted between October 1995 and October 2006 (see Tables F-1, F-2 and F-3 of Appendix F).

Three trace metals (mercury, selenium and zinc) occurred at low levels in nearly every liver and muscle tissue sample, but showed no temporal or spatial patterns with respect to the onset of wastewater discharge or distance from the outfall. Detection rates of some metals sampled and analyzed were highly variable. For example, arsenic, cadmium and copper occurred in 3 to 100 percent of the muscle samples and 44 to 85 percent of the liver samples. Other metals, including chromium, lead, nickel, silver and tin were detected infrequently. Concentrations of these metals in fish tissues varied substantially in space and time, although they showed no patterns relative to the PLOO, either near or beyond the ZID. Concentrations of chromium, mercury, selenium or zinc very rarely exceeded the Median International Standard for these metals, or the U.S. Food and Drug Administration and California

Department of Public Health advisory levels for mercury. In contrast, arsenic concentrations often exceeded the Median International Standard. Overall, metal concentrations were considerably less in muscle than liver tissues, and contaminant loads were generally within the range of those reported previously for other Southern California Bight (SCB) fish assemblages.

DDT occurred in all species of fish with detection rates greater than 90 percent for liver and muscle tissues. Concentrations of DDT were highly variable, ranging from non-detected to maximum values of 878 ppb in muscle tissues and 23,336 ppb in liver tissues. However, there was no correlation between these concentrations and distance from the PLOO. Additionally, DDT residues in fish muscle tissues were below seafood consumption limits. Several other chlorinated pesticides were detected in the tissues of fish off Point Loma, of which hexachlorobenzene and total chlordane were most prevalent. Although these two pesticides have been detected at all stations in recent years, concentrations were low and revealed no patterns relative to the outfall or wastewater discharge.

PCB compounds were also prevalent in fish tissues, occurring in 91 percent of the liver samples and 43 percent of muscle samples. Maximum total PCB concentrations were 13,264 ppb in liver and about 99 ppb in muscle tissues. Most samples showed slightly higher average concentrations near the LA-5 disposal site than in the other areas. As documented in Appendix F, there does not appear to be any relationship between concentrations of either total PCBs or individual PCB congeners in fish tissues and distance from the PLOO.

PAHs were rarely detected in liver or muscle tissue samples. Fish rapidly metabolize most PAH compounds and excrete them in bile, therefore making them hard to detect in fish tissues. For that reason, PAHs were eliminated from the NPDES permit that took effect in October 2003.

In summary, concentrations of metals and organic compounds found within fish muscle and liver tissues are consistent with concentrations from other areas of SCB, including reference sites. There appears to be species-related differences in the concentrations of some trace metals or organic pollutants. No outfall-related effects, however, are evident from the bioaccumulation data. The overall concentrations of most contaminants in fish tissue were low. Many constituents were only detectable in the fish liver. Since the liver represents such a small overall amount of the mass of the fish, the potential for further bioaccumulation of these pollutants in the food chain is minimal.

Plankton. The City is not required to monitor plankton, but water quality data collected by the City indicate that the outfall should not have a noticeable effect on plankton. The discharge depth of the San Diego outfall traps the nutrient-laden wastewater at a depth of 40 meters or more, well below the optimum depth for phytoplankton growth (and the surface zone where most zooplankton are found). Additionally, long-term studies of the City's water quality data have shown that there is no noticeable change in water clarity, visual observations at the surface, dissolved oxygen, or changes in chlorophyll α concentrations (see Figure III.B-1 on page III.B-22). Overall, no information exists that suggests there is any discernible effect of the outfall on plankton populations.

Kelp. The PLOO diffuser discharges wastewater approximately 5 km (three miles) offshore from the Point Loma kelp bed. No evidence exists that the discharge has adversely impacted the kelp bed. Ocean monitoring data collected to date do not indicate that PLOO discharge has had any adverse impact on the kelp bed through onshore movement of bacteria, solids, or nutrients.

Marine Birds. Only a few bird species are present in the area near the diffuser . Since the waste field will be confined to depths of 40m (130 feet) or more, it is concluded that reissuance of the modified 301(h) permit will not affect local birds populations or habits.

Endangered Species. Endangered species are discussed in Appendix H (Volume V of this application). Key conclusions regarding endangered or threatened species include the following:

- endangered, threatened or rare species are unlikely to be discernibly adversely affected by the proposed discharge. No detectable concentrations of total DDT or PCBs are found in the PLWTP effluent. Any existing or historic sediment concentrations of these same constituents in the offshore waters are the result of historically deposited materials or from other sources.
- preferred prey of listed endangered species potentially found in the vicinity of the discharge are not likely to be found at the depth of the waste field. Specifically, northern anchovies and juvenile rockfish, which are fed upon by the brown pelican and least tern, are not encountered at 300 foot depths.

As documented in Appendix H, the PLOO discharge will not direct or indirect impact endangered, threatened or rare species.

Marine Mammals. On the basis of information presented in Appendix H, it is concluded that few species are likely to occur within the ZID or come in contact with the discharged wastewater. No evidence exists to suggest that bioaccumulation in prey is occurring, or that marine mammal populations will be impacted by the discharge. It is concluded that the proposed modified permit will not result in any changes which would adversely impact marine mammal populations.

DETERMINATION OF A BALANCED INDIGENOUS POPULATION (BIP)

Regulations promulgated pursuant to Section 301(h) of the Clean Water Act require that modified 301(h) discharges result in the maintenance of a balanced indigenous population (BIP) beyond the boundary of the zone of initial dilution (ZID).

The data provided in Appendix E support the demonstration that there are balanced indigenous populations (BIPs) of benthic infauna and demersal fishes living in or near sediments beyond the ZID. There is conclusive evidence that benthic communities near and beyond the ZID boundary and at reference sites are similar to those observed prior to discharge and to natural indigenous communities characteristic of the Southern California Bight. For example, community structure parameters such as total infaunal abundance, species diversity, dominance, and abundances of individual species have showed similar patterns of change throughout the monitoring region. ROV survey observations of the areas around and offshore of the Point Loma outfall (see Appendix Q) have also documented little or no visible sedimentation within and beyond the ZID.

Organic and contaminant loading of sediments is not evident in the discharge vicinity. Further, the ZID boundary is characterized by a non-degraded benthic infaunal community that is representative of indigenous species and populations living under natural conditions. Key community factors such as abundance, diversity, benthic response index (BRI), and patterns of key "indicator" species are being maintained within the limits of variability that typify naturally-occurring regional benthic communities of southern California's outer continental shelf.

PROPOSED IMPROVED DISCHARGE

As discussed above, data from the City’s comprehensive monitoring program conclusively demonstrates that a BIP exists beyond the boundaries of the ZID. Continuation of 301(h) requirements for the PLOO and implementation of proposed Point Loma WTP improvements are not projected to adversely affect a BIP beyond the ZID. Reasons for this conclusion include:

- no changes in permitted PLOO effluent concentration limits are proposed,
- no increase in permitted PLOO mass emissions are proposed,
- the discharge complies with applicable NPDES mass emission benchmarks which are based on mass emission rates from 1990-1995,
- the PLOO provides a high degree of initial dilution, and is highly effective in preventing deposition of sediments in and around the ZID,
- no trends are evident in the existing data that would suggest the potential for future significant changes in sediment chemistry,
- no trends are evident in the benthic infauna data that would suggest the potential for future degradation in species diversity, abundance of organisms, dominance, or BRI,
- no trends are evident in the bioaccumulation data that would suggest the potential for future significant changes in bioaccumulation of toxic constituents in fish or benthic species,
- the proposed PLOO discharge will continue to comply with applicable Ocean Plan water quality standards, and with federal water quality criteria for the protection of marine aquatic habitat,
- the PLOO discharge is not projected to result in discernible changes in receiving water dissolved oxygen, water clarity, or turbidity,
- the PLOO discharge is not projected to result in any discernible impacts on fish, plankton, mammals, or endangered species,
- no trends are evident that would suggest the potential for future adverse changes in sediment dissolved oxygen or receiving water dissolved oxygen, and
- proposed improvements (effluent disinfection) will not result in noncompliance with Ocean Plan receiving water standards or cause toxicity in the PLOO effluent.

Based on the combination of these factors, it is concluded that a BIP will continue to be maintained beyond the ZID for renewal of 301(h) requirements for the continued and improved PLOO discharge.

III.D.2 Have distinctive habitats of limited distribution been impacted adversely by the current discharge and will such habitats be impacted adversely by the modified discharge?

No impacts to distinctive habitats of limited distribution will occur.

The Point Loma kelp bed is the only habitat of limited distribution in the vicinity of the PLOO. (See response to Questionnaire Section II.C.2.)

As documented in Appendix G and in the above responses to Questionnaire Section III.D.1, the PLOO discharge has not and will not adversely impact the Point Loma kelp bed.

III.D.3 Have commercial or recreational fisheries been impacted by the current discharge (e.g. warnings, restrictions, closures, or mass mortalities) or will they be impacted adversely by the modified discharge?

SUMMARY: Commercial or recreational fisheries have not been impacted by the current discharge; no impacts are projected to occur as a result of renewal of 301(h) requirements for PLWTP.

Commercial and recreational fishing activities are detailed in Appendix G (Volume V). Appendix G also presents recent data describing the commercial and recreational catch and landed value of the catch.

As detailed in Appendix G, commercial and recreational fisheries off Point Loma are not adversely affected by the current PLOO discharge, and are not projected to be adversely affected by continuation of the discharge. Further, no Point Loma area fishery resources are underutilized as a result of effects from PLOO discharge. These conclusions are based on the following evidence:

- No warnings, closures, or mass mortalities of fish have occurred in either the nearshore or offshore areas of Point Loma since the initiation of the extended PLOO discharge in November 1993.
- Department of Fish and Game, State Department of Health Services, or San Diego County Department of Health Services have not issued any fishery-related health advisories for the waters in the vicinity of the extended PLOO.
- Concentrations and mass emissions of metals in the PLOO discharge have been reduced by a significant margin during the past 30 years as a result of the City's industrial and nonindustrial source control programs.
- No outfall-related violations of Ocean Plan standards for coliform or toxic compounds have occurred at kelp bed stations since the extended PLOO outfall discharge was initiated in November 1993.
- As documented in Tables III.B-21 through III.B-24 (pages III.B-30 through III.B-35), the PLOO discharge complies with Ocean Plan standards for the protection of public health and standards for the protection of aquatic habitat.

- As documented in Tables III.B-25 through III.B-27 (pages III.B-38-III.B-42), receiving waters in the vicinity of the extended PLOO comply with federal saltwater acute criteria, federal saltwater chronic criteria, and federal water quality criteria for the protection of public health from consumption of organisms.

- Routine trawling and collection of fish and benthic species (performed as part of the City's comprehensive receiving water quality monitoring program) have not revealed any difference in the incidence of fin erosion, fish disease, or other abnormalities between the outfall vicinity and control stations. (See response to Questionnaire Section III.D.4.)

- Bioaccumulation studies performed as part of the receiving waters monitoring program show no biologically significant accumulations of toxic compounds in fish or benthic species. (See Appendix F and response to Questionnaire Section III.D.4.)

III.D.4 Does the current or modified discharge cause the following within or beyond the ZID: [40 CFR 125.62(c)(3)]

- **Mass mortality of fishes or invertebrates due to oxygen depletion, high concentrations of toxics, or other conditions?**
- **An increased incidence of disease in marine organisms?**
- **An abnormal body burden of any toxic material in marine organisms?**
- **Any other extreme, adverse biological impacts?**

SUMMARY: No mass mortality, increased disease, or other extreme biological effects have occurred.

Mass Mortality of Fish. Mass mortalities of fish or invertebrates have not been reported in the area of the outfall by field biologists working for the City.

Incidence of Disease. All trawled fish caught in the monitoring program are visually examined for gross morphological evidence of diseases and ectoparasites. Three types of ectoparasites have been observed in recent years: leeches, isopod fish lice *Livoneca vulgaris,* and copepods (including the eye parasite *Phyryxocephalus cincinatus*). Since all but *P. cincinatus* are mobile parasites, the fish collected in a trawl sample lose and/or acquire parasites during the normal collection, sorting, and processing of the sample.

The incidence of observed parasitism in post-discharge monitoring was low and not significantly different than incidences found prior to initiation of the discharge at the new location. Additionally, the incidences of ectoparasitism were low compared to collections in many areas of the Southern California Bight. Parasites on trawled macroinvertebrates were also rare.

No fin erosion or tumors were found on trawl caught fish in the discharge area. Further, incidences of fin lesions, other diseases and abnormalities, and parasitism were low or nonexistent. Overall, no evidence exists that the PLOO discharge causes any extreme abnormalities in fish or invertebrates.

Tissue Burden. As presented in Appendix F and summarized in response to Questionnaire Section III.D.1, the discharge from the extended outfall does not appear to cause abnormal body burden of any toxic pollutant known to have adverse effects on the organism or consumers.

The presence of PCB and DDT compounds in fish caught for bioaccumulation analyses is not attributed to the PLOO discharge, as the discharge does not contain detectable concentrations of these constituents. Further, no spatial pattern of DDT or PCB sediment contamination exists around the outfall.

Rather than being related to the outfall discharge, tissue burden levels of some trace metals, pesticides, and PCBs appear to be related to regional influences from other sources, particularly the LA-5 dredge disposal site.

Other Biological Impacts. No other extreme, adverse, biological impact is known to have occurred or is expected to occur. The City's monitoring program, however, will continue to examine fish and invertebrates for any such effects.

III.D.5 For discharges to saline estuarine waters:

Does or will the current or modified discharge cause substantial differences in the benthic population within the ZID and beyond the ZID?

Does or will the current or modified discharge interfere with migratory pathways within the ZID?

The question is not applicable; the PLOO discharge is not to saline estuarine waters, nor does the discharge affect saline estuarine waters.

III.D.6. For improved discharges, will the proposed improved discharge(s) comply with the requirements of 40 CFR 125.61(a) through 125.61(d)? [40 CFR 125.61(e)]

SUMMARY: The PLOO discharge will comply with the requirements of 40 CFR 125.61(a) through 125.61(d).

Requirements established within 40 CFR 125.61(a) through 125.61(d) specify that dischargers receiving modified secondary treatment requirements must demonstrate compliance with state and federal water quality standards. In addition, the CFR requirements prohibit 301(h) discharges from adversely impacting public water supplies, biological communities, or recreation.

Compliance with State and Federal Water Quality Standards. The current and proposed PLOO discharges comply with the requirements of 40 CFR 125.61(a) through (d). As demonstrated in the response to Questionnaire Section III.B.7, the existing PLOO discharge complies with Ocean Plan receiving water quality objectives. The discharge also complies with federal water quality criteria for the protection of human health and marine species.

As also documented in the response to Questionnaire Section III.B.7, the discharge is projected to continue to comply with Ocean Plan standards and federal water quality criteria. As part of the proposed improved PLOO discharge, no changes are proposed in permitted TSS mass emission rates.

Further, the discharge has complied with complied with NPDES mass emission benchmarks that were established on the basis of historic mass emissions during 1990-1995.

The improved PLOO discharge will continue to comply with applicable state and federal standards for BOD and TSS removal. Further, as documented in the responses to Questionnaire Sections III.B.1, III.B.2, and III.B.3, the City will comply with Ocean Plan dissolved oxygen standards. As discussed in the response to Questionnaire Section III.B.4, the discharge does not (and will not) discernibly affect receiving water suspended solids concentrations, and the discharge is projected to continue to comply with applicable Ocean Plan light transmittance objectives.

Public Water Supplies. The discharge of wastewater 7,240 meters (23,760 feet) offshore is not projected to impact public water supplies. No public water supply intakes exist in the vicinity of the PLOO. As documented in the response to Questionnaire Section III.C.1, the discharge will not impact a seawater desalination operation proposed for North San Diego County.

Biological Communities. The responses to Questionnaire Sections III.D.1 through III.D.4 document how the discharge influences the biological community in the area surrounding the extended outfall. Appendix E (Volume IV of this application) presents detailed analyses on how the discharge affects benthic species and fish. The response to Questionnaire Section III.D.1 documents the lack of impact to birds, mammals, and phytoplankton.

Appendix F (Volume IV of this application) presents data on the bioaccumulation of toxics, and documents that no significant discharge-related bioaccumulation effects are in evidence. No bioaccumulation effects are projected to occur with renewal of 301(h) requirements for the Point Loma WTP. As part of this 301(h) renewal application, the City proposes no change in TSS mass emission rates or in concentration standards for toxic constituents. Further, the excellent performance of PLOO and the erosional environment at the diffuser will prevent long-term sediment accumulation in and near the ZID. These factors will combine to (1) prevent discernible adverse changes in sediments, benthic species, fish, and mammals outside the ZID, and (2) insure maintenance of a BIP beyond the ZID boundary.

Recreation. As documented in Appendix G and the responses to Questionnaire Sections III.E.1 and III.E.2, the existing PLOO discharge does not impact recreation. The proposed improved PLOO discharge will comply with Ocean Plan recreational water contact standards at all depths in all State-regulated waters.

In summary, the PLOO discharge is (and will remain) in compliance with state and federal water quality standards. Further, the PLOO discharge will not affect public water supplies or recreation, and will not significantly change the biological community. It is thus concluded that the current and proposed discharges comply with the requirements of 40 CFR 125.61 (a) through (d).

III.D.7. For altered discharges, will the altered discharge(s) comply with the requirements of 40 CFR 125.61(a) through 125.61(d)? [40 CFR 125.61(e)]

The question is not applicable. The proposed PLOO discharge is an improved discharge. (See Questionnaire Section III.D.6 for projections on whether the discharge complies with the requirements of 40 CFR 125.61(a) through 125.61(d).

III.D.8. If your current discharge is to stressed waters, does or will your current or modified discharge(s): [40 CFR 125.61(f)]

a. **Contribute to, increase, or perpetuate such stressed condition?**

b. **Contribute to further degradation of the biota or water quality if the level of human perturbation from other sources increases?**

c. **Retard the recovery of the biota or water quality if human perturbation from other sources decreases?**

The question is not applicable. As discussed in the response to Questionnaire Section II.B.2, the PLOO does not discharge to stressed waters.

Section III.E

Large Applicant Questionnaire

III.E.1. Describe the existing or potential recreational activities likely to be affected by the modified discharge(s) beyond the zone of initial dilution.

SUMMARY: SCUBA diving is the primary offshore recreational activity that could potentially be impacted by the PLOO discharge. Swimming, snorkeling, and surfing also occur in nearshore waters.

A wide variety of recreational activities occur in Point Loma marine waters. These recreational activities are described in Appendix G (Volume V). The ocean shoreline along the southern portion of Point Loma is predominantly on a military reservation (Fort Rosecrans). The extreme southern portion of Point Loma is within the Cabrillo National Monument. As a result, access to the shoreline is limited to several designated tidepooling areas within the boundaries of the national monument.

Ocean recreation at Point Loma includes aesthetic enjoyment, sightseeing, sunbathing, hiking, picnicking, tide-pooling, whale watching, boating, sailing, and sport fishing (Appendix G: Beneficial Use Assessment). These types of activities are designated as non-contact water recreation by the Regional Board and are defined as "involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible" (Regional Board, 1994).

Ocean recreation off Point Loma also includes swimming and wading, skim boarding, water skiing and wake boarding, snorkeling, surfing, sailboarding, kite-sailing, kayaking, outrigger canoeing, paddleboarding, free diving, SCUBA diving, and personal watercraft (PWC) (jet ski) operation. These activities are designated by the San Diego Regional Water Quality Control Board as water contact recreation and are defined as "involving body contact with water, where ingestion of water is reasonably possible" (Regional Board, 1994).

The only data on the specific distribution of recreational activity off Point Loma comes from field observations made in the mid 1980's by Wolfson and Glinski (1986), who identified and plotted the position of individual boats and water craft during the summer of 1986. Most ocean recreation in the vicinity of Point Loma was found to occur in the inshore and nearshore areas, with fishing and diving concentrated in the kelp bed area. Power boating and sailing were the only recreational activities observed with any regularity beyond the outer edge of the kelp bed (beyond 1 mile (mi) from shore). The intensity of these activities rapidly diminished at increasing distance offshore.

The territorial waters of the State of California extend to 3 nautical miles (nm) offshore. The United States Federal Government has exclusive jurisdiction from 3-12 nm offshore (DOALOS, 2007). Although no specific investigations of recreational use of Federal waters off Point Loma have been conducted, information is available from monitoring logs and observations of the crew of the MWWD ocean monitoring vessels. As shown on Figure III.E-1 (page III.E-3) and Figure III.E-2 (page III.E-4), the PLOO ocean monitoring program includes a grid of stations extending from 3 mi (4.6 km) south of the outfall to 8 mi (12.7 km) north of the outfall. The sampling stations in the grid range in depth from 30 ft (9 m) to 380 ft (116 m) and extend from 0.3 mi (.5 km) to 6.8 mi (11 km) offshore.

The monitoring vessel captain keeps a log of sampling activity at each sampling station and notes prevailing conditions, including boats and ships in the area. From January 2001 to July 2007, monitoring logs indicate the presence of boats or ships during 17 of the 1,726 station sampling events in Federal waters (Table III.E-1). The observations included Navy and Coast Guard vessels and fishing and sail boats, but no water contact recreation craft were observed in the vicinity of sampling stations in Federal waters.

Table III.E-1
Boats and Ships Observed in the Vicinity of PLOO Monitoring Stations in Federal Waters
January 2001 through July 2007

Station Type	Station Number	Sample Date	Comments
Water quality	F21	27-Mar-02	Boats
Water quality	E15	17-Jul-02	Light chop, Fishing boat
Water quality	E16	30-Aug-02	Calm, Sailboat
Water quality	E24	30-Aug-02	Calm, Coast Guard vessel
Water quality	E23	26-Sep-02	Calm, Coast Guard vessel
Water quality	E13	26-Sep-02	Navy dolphin boat
Water quality	B13	15-Oct-02	Calm, Fishing boat
Water quality	E8	15-Oct-02	Calm, Navy ships
Water quality	E10	22-Nov-02	Calm, Coast guard vessel
Water quality	E11	14-Apr-05	Calm, Fishing boats
Water quality	F16	12-Apr-06	Calm, Boats
Water quality	F19	5-Jul-06	Calm, Boats
Water quality	F34	7-Jul-06	Small fishing boat
Water quality	F15	5-Oct-06	Boats
Water quality	F30	9-Apr-07	Navy ship on station
Water quality	F35	9-Apr-07	Sportfishing boat
Water quality	F25	11-Apr-07	Sportfishing boat

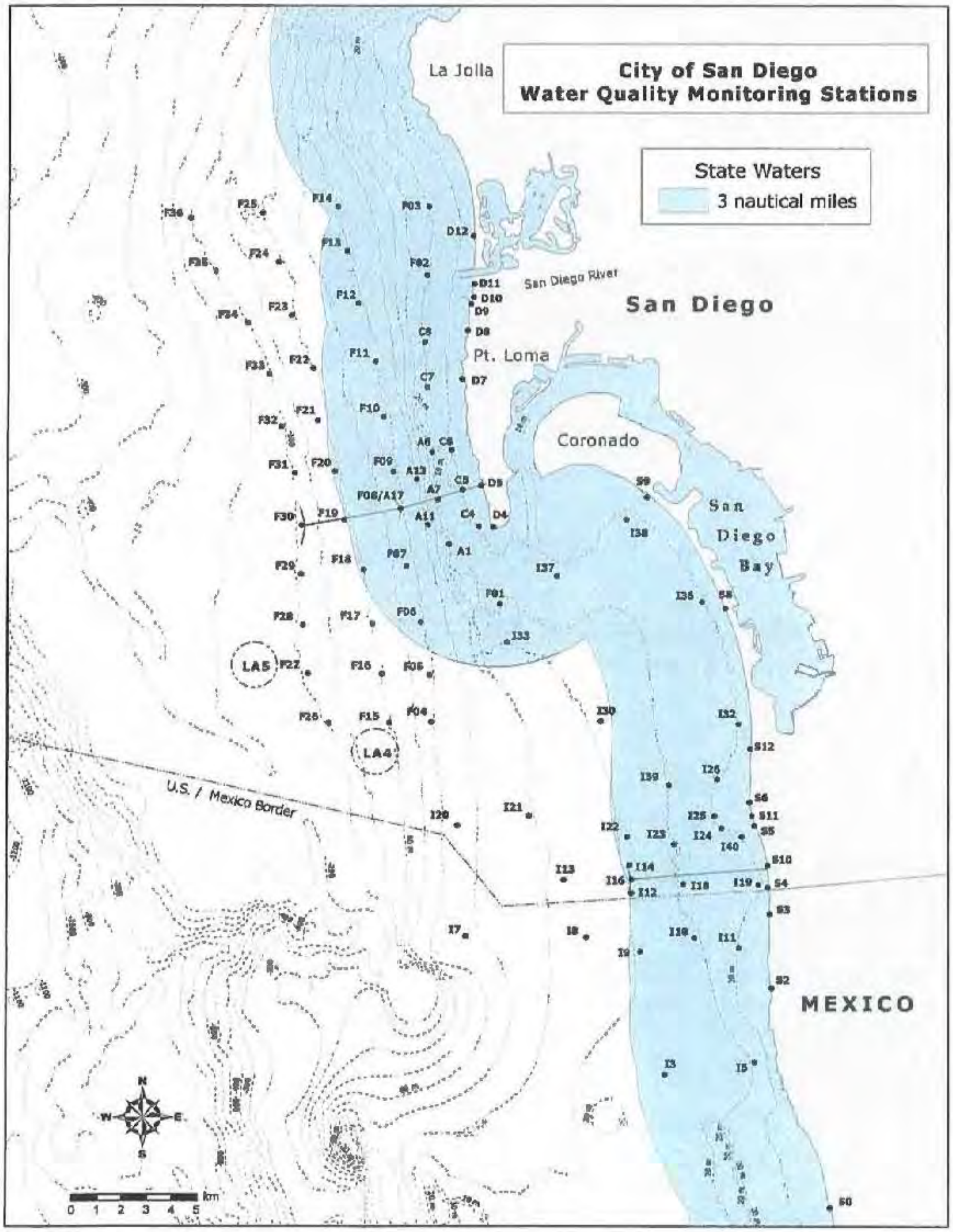


Figure III.E-1 City of San Diego Water Quality Monitoring Stations (2003-2007)

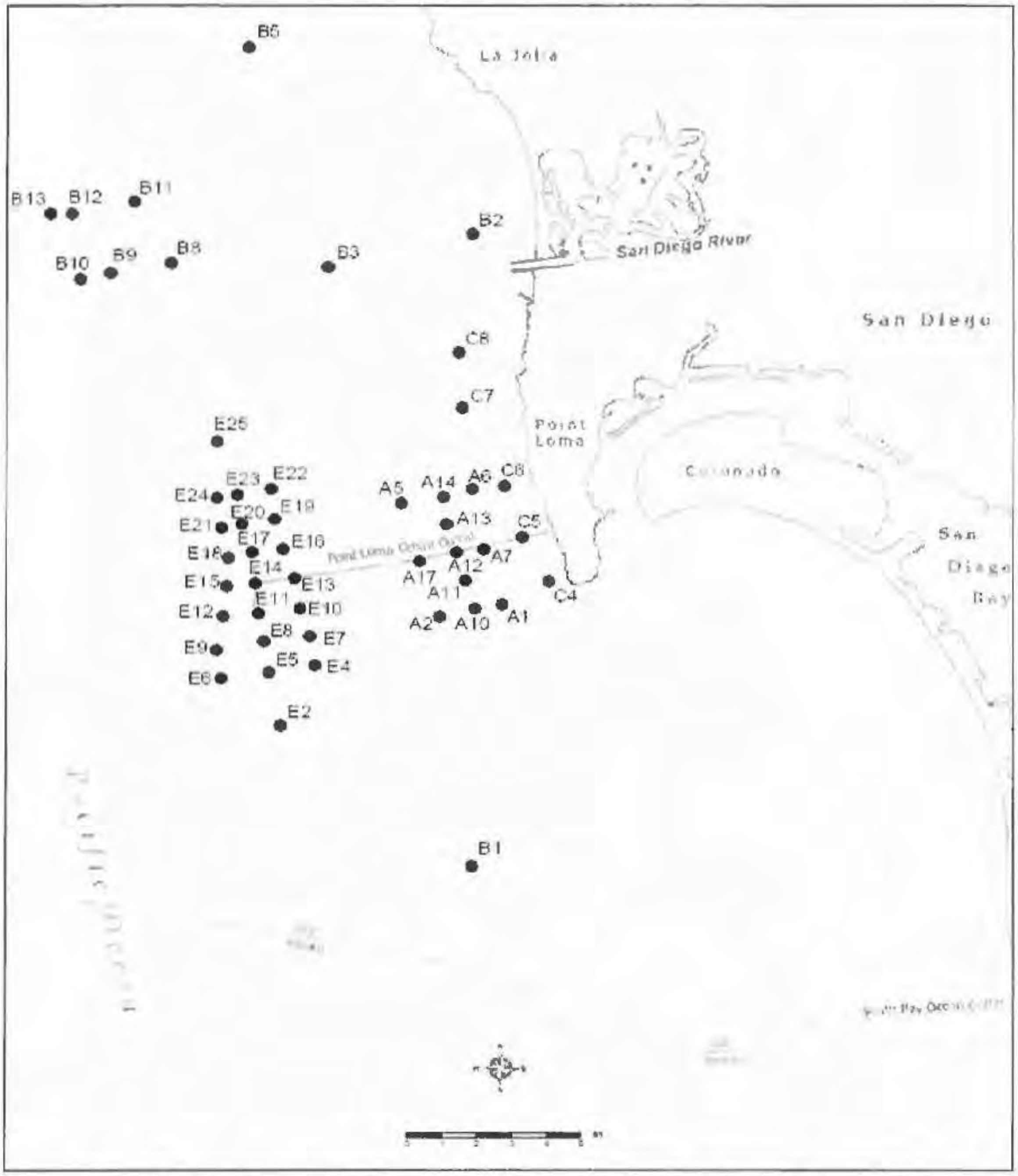


Figure III.E-2. City of San Diego Water Quality Monitoring Stations (Prior to 2003)

From January 2001 to July 2007, the three City of San Diego monitoring vessels, *Metro*, *Monitor III*, and *Oceanus*, spent 1,354 days at sea. Interviews were conducted on November 14 and 15, 2007 with four members of the ocean monitoring crew who served a total of 2,262 days on these vessels during the period. Their observations of maritime and recreational activity are summarized below.

Large vessels, principally Navy ships and commercial carriers (cargo transports, oil tankers, barges), generally transit the Point Loma area beyond 5 miles offshore. Most ship traffic funnels into and out of San Diego Bay well to the south of the outfall area. Recreational vessels (fishing and pleasure boats) in Federal waters off Point Loma are heading to or returning from offshore fishing banks and islands. Power and sail boats traversing the Point Loma area generally cruise along the outer edge of the kelp bed and are rarely seen more than a mile and a half offshore.

Recreational fishing in Point Loma ocean waters takes place primarily in the nearshore zone and in the kelp bed area. The monitoring crews report occasionally seeing commercial passenger fishing vessels (Party Boats) and sport fishing craft as far out as the decommissioned outfall (2 miles offshore) but practically never further offshore.

Swimming, surfing, and snorkeling occur in the nearshore area, inside the kelp bed. The vast majority of personal watercraft operators, water skiers, wake boarders, board sailors, kite boarders, kayakers, canoers, and paddleboarders are seen inshore of the kelp bed. The monitoring crews could not recall a single incident of these types of recreational activities occurring in Federal waters.

Recreational SCUBA diving off Point Loma is focused on the kelp bed, with dive boats rarely sighted beyond a mile and a quarter offshore. Recreational fishers venturing into deeper water may occasionally free dive below floating kelp patties to spear gamefish, but this activity has not been observed by the monitoring crew in Federal waters.

Table III.E-2 (page III.E-6) summarizes where water contact recreation takes place off Point Loma, based on these monitoring observations and on the recreational use assessment in Appendix G. Virtually all swimming, surfing, diving, paddling, fishing from paddle craft, board sailing, water skiing, and PWC operation is confined to waters less than 2 nautical miles from shore. No known water contact recreational uses exist outside of State-regulated waters (outside the three-nautical-mile limit).

Table III.E-2
Water Contact Recreation in the Vicinity of the PLOO

Activity	Inshore (depth 0 to 10ft)	Nearshore (depth 10 to 30ft)	Kelp Bed (to 100ft/1 mi offshore)	Offshore State Waters (1-2nm)	(2-3nm)	Federal Waters (3-12nm)
Swimming and wading	■					
Skim boarding	■					
Water skiing and wake boarding	■	■				
Snorkeling	■	■				
Surfing	■	■				
Sail/Kite board	■	■	■			
Kayak/canoeing	■	■	■			
Paddleboarding	■	■	■	■		
Free diving		■	■	■		
SCUBA diving			■	■		
Personal watercraft			■	■		

Overall, a number of factors combine to prevent water contact recreation from occurring in federal waters off the coast of Point Loma, including:

- lack of diving or sporting attractions in the deeper offshore waters compared to nearshore waters,
- offshore water depths that extend well beyond the range of recreational divers,
- adverse wind and current conditions in open offshore waters that create dangers for personal watercraft and self-propelled craft,
- shipping lane traffic that creates dangers for small watercraft,
- haze and fog may limit visibility of the shoreline, and
- range restrictions (fuel-related or otherwise) associated with personal watercraft and self-propelled craft.

III.E.2. What are the existing and potential impacts of the modified discharge(s) on recreational activities? Your answer should include, but not be limited to, a discussion of fecal coliform bacteria.

SUMMARY: The PLOO discharge complies with NPDES Permit standards and does not adversely impact recreational activities. Proposed discharge improvements (Point Loma WTP disinfection) will ensure compliance with recreational body-contact bacteriological standards at all depths (ocean surface to ocean bottom) in all State-regulated ocean waters. The renewed 301(h) waiver discharge will also comply with water quality standards for the protection of recreation and would not adversely impact recreational activities.

Bacteriological Standards to Protect Body-Contact Recreation. Table III.E-3 (page III.E-8) summarizes receiving water bacteriological standards established in Order No. R9-2002-0025. Order No. R9-2002-0025 establishes body-contact bacteriological standards for total coliform and fecal coliform.

Subsequent to the adoption of Order No. R9-2002-0025, the California Ocean Plan was revised to incorporate standards for enterococcus. Table III.E-4 (page III.E-8) presents Ocean Plan bacteriological standards for body-contact recreation. Both the NPDES and Ocean Plan bacteriological standards apply to State-regulated waters (ocean waters within the three mile limit) that are:

- within 1000 feet (300 m) from the shoreline or within the 30-foot (9 m) depth contour, whichever is further from the shore, and
- in areas outside this zone that are designated by the Regional Board as a water contact sports zone (including kelp beds).

PLOO Bacteriological Monitoring. Order No. R9-2002-0025 requires the City to implement a comprehensive monitoring program that assesses receiving water total coliform, fecal coliform, and enterococcus concentrations. These bacteriological concentrations, together with oceanographic data, provide information about the movement and dispersion of wastewater discharged through the outfall. Monitoring of the San Diego and neighboring coastline also included satellite and aerial remote sensing (see Oceanographic Monitoring Summaries, City of San Diego, 2005, 2006, 2007). These surveys assist in detecting the turbidity signature from the PLOO plume and differentiating between the outfall plume and coastal discharges. Such data help distinguish between bacterial contamination events caused by the PLOO discharge and those attributable to other point and non-point sources (e.g., river and bay discharges).

Table III.E-3
NPDES Receiving Water Standards Established in Order No. R9-2002-0025

Receiving Water Limitation[1]	Parameter	Requirement[1,2]
C.1.a(1)(a)	Total coliforms	Total coliform concentrations shall not exceed 1000 per 100 milliliters (ml)
		Not more than 20 percent of the samples at any station may exceed 2000 per 100 ml in any 30-day period
		No single sample, when verified by a repeat sample taken within 48 hours shall exceed 10,000 per 100 ml.
C.1.a(1)(b)	Fecal coliform	Based on minimum of not less than five samples in any 30-day period, the 30-day geometric mean shall not exceed 200 per 100 ml
		Not more than 10 percent of the total samples during any 60 day period shall exceed 400 per 100 ml.

1 Standards established in Receiving Water Limitations C.1.a(1) of Order No. R9-2002-0025.

2 Standards established in Order No. R9-2002-0025 are applicable to areas within 1000 feet (300 m) of the shore, or areas less than 30 feet (9 m) in depth, whichever is less. Standards also applicable in areas outside this zone designated by the Regional Board for body-contact recreation, including kelp beds.

Table III.E-4
Receiving Water Standards Established in 2005 California Ocean Plan

Parameter	Ocean Plan Water Quality Objective II.B.1.a(1): Water Contact Standards[1,2]
Total coliforms	The geometric mean of the most recent five samples at any station shall not exceed a total coliform concentrations of 1000 per 100 milliliters (ml)
	Total coliform concentrations shall not exceed a single sample maximum of 10,000 per 100 ml.
Fecal coliform	The geometric mean of the most recent five samples at any station shall not exceed a fecal coliform concentration of 200 per 100 ml
	Fecal coliform concentrations shall not exceed a single sample maximum of 400 per 100 ml.
Fecal coliform	The geometric mean of the most recent five samples at any station shall not exceed a enterococcus density of more than 35 per 100 ml
	Enterococcus concentrations shall not exceed a single sample maximum of 104 per 100 ml.
	Enterococcus concentrations shall not exceed 1000 per 100 ml when the fecal to total coliform ratio is greater than 0.1.

1 Standards established in the 2005 version of the California Ocean Plan.

2 Standards established in Order No. R9-2002-0025 are applicable to areas within 1000 feet (300 m) of the shore, or areas less than 30 feet (9 m) in depth, whichever is less. Standards also applicable in areas outside this zone designated by the Regional Board for body-contact recreation, including kelp beds.

The PLOO monitoring program is designed to assess general water quality and determine the level of compliance with receiving water bacteriological standards established in Order No. R9-2002-0025. As a part of the PLOO monitoring program, water samples for bacteriological analyses are collected at fixed shore and offshore sampling sites. Since 2004, sampling has been conducted throughout the year.

Bacteriological sampling is performed at eight shore stations (Stations D4, D5, and D7 through D12). Figure III.E-3 (page III.E-10) presents the locations of these stations. Seawater samples are collected from the surf zone at each shoreline station. Visual observations of water color and clarity, surf height, human or animal activity, and weather conditions are recorded at the time of sample collection.

Thirty-six offshore stations (Stations F01 through F36) are also sampled quarterly (January, April, July, and October) to estimate the spatial extent of the wastewater plume at these times. The number of samples collected at each offshore station is depth-dependent, ranging from 3 to 5 fixed depths. Figure III.E-3 (page III.E-10) presents the location of these offshore stations.

Eight stations located in the Point Loma kelp bed are also monitored to assess water quality conditions in areas used for water contact sports (e.g., SCUBA diving and kayaking). These stations include three sites (Stations C4, C5, C6) located near the inshore edge of the kelp bed along the 9-m depth contour, and five sites (Stations A1, A6, A7, C7, C8) located near the offshore edge of the kelp bed along the 18-m depth contour (see Figure III.E-3). Samples are taken at three depths for each station – at the surface, in midwater, and near the bottom. The shore and kelp stations are sampled on a weekly basis on a schedule such that each day of the week is represented over a two month period. The seawater samples are transported on ice to the City's Marine Microbiology Laboratory and analyzed to determine concentrations of total coliform, fecal coliform, and enterococcus bacteria.

Monthly mean densities of total coliform, fecal coliform, and enterococcus bacteria are calculated for each station, depth (offshore stations), and transect (offshore stations). In order to detect spatial-temporal patterns in bacteriological contamination, these data are evaluated relative to monthly rainfall and climatological data collected at Lindbergh Field (San Diego, CA) and remote sensing data collected by Ocean Imaging Corporation. Shore and kelp bed station compliance are determined according to the number of days that each station was out of compliance with the 30-day total coliform, 10,000 total coliform, 60-day fecal coliform, and geometric mean standards.

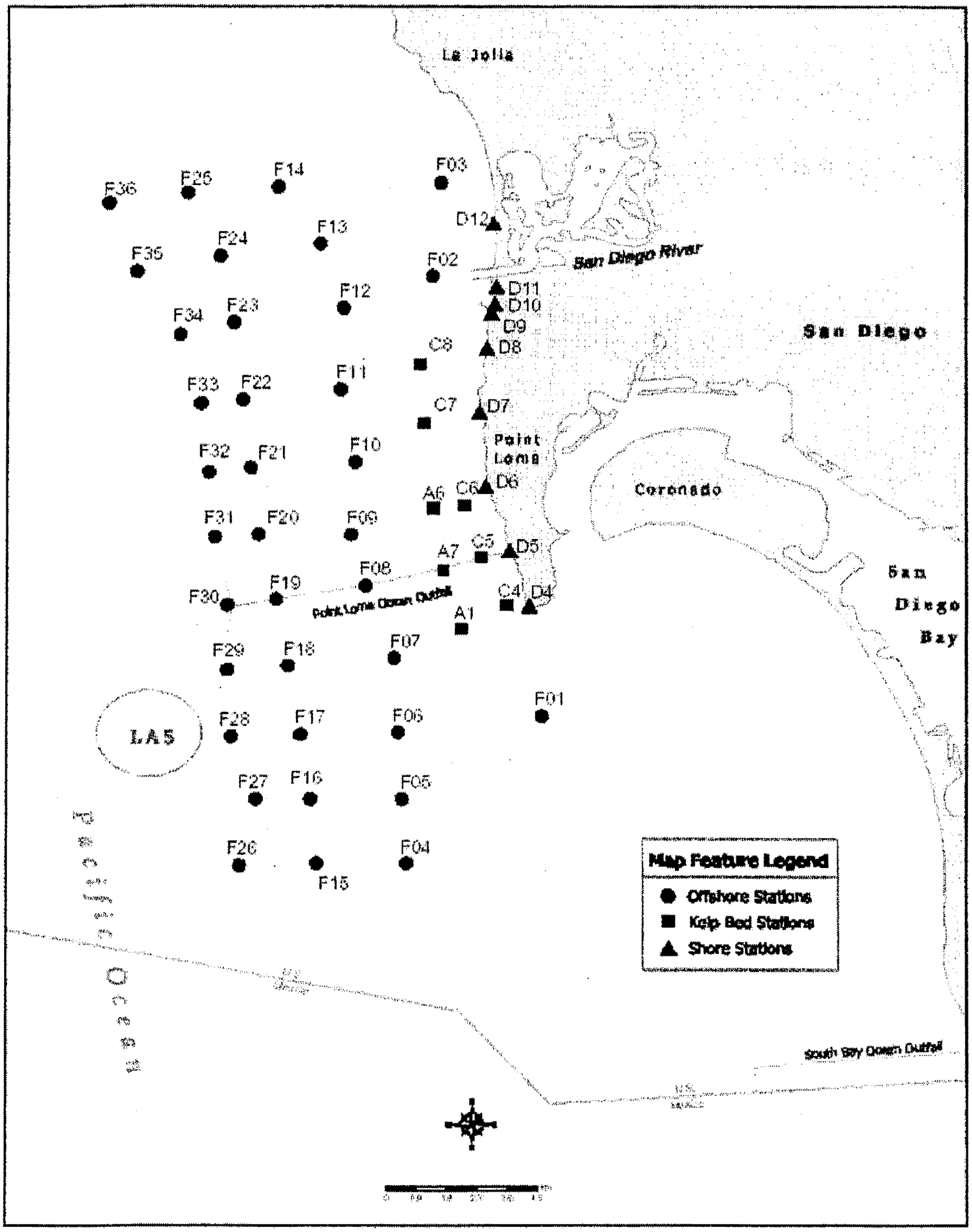


Figure III.E-3 PLOO Monitoring Stations

Bacteriological data for the offshore stations are not subject to Ocean Plan standards; but, these data are used to examine patterns in the dispersion of the waste field. Oceanographic conditions and other events (e.g., storm water flows, nearshore and surface water circulation patterns) identified through remote sensing data are evaluated relative to the bacterial data. Bacteriological benchmarks are used as reference points to distinguish elevated bacteriological values in receiving water samples. These benchmarks are:

a) greater or equal to 1000 CFU/100 ml (colony forming units per 100 milliliters) for total coliform,

b) greater or equal to 400 CFU/100 ml for fecal coliforms, and

c) greater or equal to 104 CFU/100 ml for enterococcus.

"Contaminated" water samples are considered to have total coliform concentrations ≥1000 CFU/ 100 ml and a fecal:total (F:T) ratio ≥0.1. Samples from offshore monthly water quality stations that meet these criteria are used as indicators of the PLOO waste field.

Shore station compliance with PLOO NPDES Permit bacteriological standards during 2004 is summarized in Table III.E-5 (page III.E-12). Offshore station compliance with the NPDES bacteriological standards is summarized in Table III.E-6 (page III.E-13).

Tables III.E-5 and III.E-6 list the number of days during 2004 that respective stations were out of compliance. As shown in the tables, compliance with bacteriological standards at the shore and kelp stations was generally high during 2004, despite heavy rainfall that periodically affected nearshore water quality (see Oceanographic Conditions Summary, City of San Diego, 2005).

Water quality samples from the shoreline stations in 2004 were over 80 percent compliant with the 30-day total and 60-day fecal coliform standards and 100 percent compliant with the 10,000 total coliform and geometric mean standards. Similarly, 2004 kelp bed samples were compliant with the 30-day total coliform standard over 95 percent of the time, and almost 100 percent of the time with the 60-day fecal coliform standard. The few exceptions occurred in October, November, or December. During this time, water quality samples exceeded the 30-day total coliform standard at Stations D8 and D11 (October–November) and Station D7 (December).

Table III.E-5
2004 Shoreline Station Compliance[1,2]

Number of Days of Noncompliance with 30-Day Total Coliform Standard									
Month	# Days	D4	D5	D7	D8	D9	D10	D11	D12
Jan	31	0	0	0	0	0	0	0	0
Feb	29	0	0	0	0	0	0	0	0
Mar	31	0	0	0	0	0	0	0	0
Apr	30	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0
Jun	30	0	0	0	0	0	0	0	0
Jul	31	0	0	0	0	0	0	0	0
Aug	31	0	0	0	0	0	0	0	0
Sep	30	0	0	0	0	0	0	0	0
Oct	31	0	0	0	15	0	0	3	0
Nov	30	0	0	0	26	0	0	21	0
Dec	31	0	0	1	0	0	0	0	0
% Compliance		100%	100%	<100%	89%	100%	100%	93%	100%
Number of Days of Noncompliance with 60-Day Fecal Coliform Standard									
Month	# Days	D4	D5	D7	D8	D9	D10	D11	D12
Jan	31	0	0	0	0	0	0	0	0
Feb	29	0	0	0	0	0	0	0	0
Mar	31	0	0	0	0	0	0	0	0
Apr	30	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0
Jun	30	0	0	0	0	0	0	0	0
Jul	31	0	0	0	0	0	0	0	0
Aug	31	0	0	0	0	0	0	0	0
Sep	30	0	0	0	0	0	0	0	0
Oct	31	0	0	0	15	0	0	0	0
Nov	30	0	0	0	30	0	0	0	0
Dec	31	0	0	0	19	0	0	0	0
% Compliance		100%	100%	100%	83%	100%	100%	100%	100%

1 Summary of noncompliance with California Ocean Plan recreational water contact standards for PLOO shore stations during 2004. See Figure III.E-3 (page III.E-10) for the location of the shore stations. The values reflect the number of days within a given month that the receiving water samples exceeded the Ocean Plan bacteriological water contact standard. From left to right in the above columns, the shore stations are listed in order from south to north.

2 Data are from City of San Diego monthly and annual reports submitted to the Regional Board for 2004.

Table III.E-6
2004 Kelp Bed Station Compliance[1,2]

Number of Days of Noncompliance with 30-Day Total Coliform Standard									
Month	# Days	C4	C5	C6	A1	A7	A6	C7	C8
Jan	31	0	0	0	0	0	0	0	0
Feb	29	0	0	0	0	0	0	0	0
Mar	31	0	0	0	0	0	0	0	0
Apr	30	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0
Jun	30	0	0	0	0	0	0	0	0
Jul	31	0	0	0	0	0	0	0	0
Aug	31	0	0	0	0	0	0	0	0
Sep	30	0	0	0	0	0	0	0	0
Oct	31	0	0	0	0	0	0	0	0
Nov	30	1	0	0	1	12	0	0	0
Dec	31	1	1	1	1	1	0	0	1
% Compliance		99%	<100%	<100%	99%	96%	100%	100%	<100%
Number of Days of Noncompliance with 60-Day Fecal Coliform Standard									
Month	# Days	C4	C5	C6	A1	A7	A6	C7	C8
Jan	31	0	0	0	0	0	0	0	0
Feb	29	0	0	0	0	0	0	0	0
Mar	31	0	0	0	0	0	0	0	0
Apr	30	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0
Jun	30	0	0	0	0	0	0	0	0
Jul	31	0	0	0	0	0	0	0	0
Aug	31	0	0	0	0	0	0	0	0
Sep	30	0	0	0	0	0	0	0	0
Oct	31	0	0	0	0	0	0	0	0
Nov	30	0	0	0	0	0	0	0	0
Dec	31	1	0	0	0	0	0	0	0
% Compliance		<100%	100%	100%	100%	100%	100%	100%	100%

1 Summary of noncompliance with California Ocean Plan recreational water contact standards for PLOO kelp bed stations during 2004. See Figure III.E-3 (page III.E-10) for the location of the kelp bed stations. The values reflect the number of days within a given month that the receiving water samples exceeded the Ocean Plan bacteriological water contact standard. From left to right in the above columns, the kelp bed stations are listed in order from south to north.

2 Data are from City of San Diego monthly and annual reports submitted to the Regional Board for 2004.

Samples collected at Station D8 also exceeded the 60-day fecal coliform during all three months. In addition, a few samples collected at kelp bed Stations A1, A7, and C4 during November and at most kelp stations in December caused these sites to exceed the 30-day total coliform standard. Stations C4 and C5 exceeded the 10,000 total coliform standard once each in December, and Station C4 also exceeded the 60-day fecal coliform standard once in December (City of San Diego, 2005). Generally, these incidences of non-compliance followed periods of high rainfall. For example, exceedences of the 10,000 coliform standard at Stations C4 and C5 occurred on December 30 following a 2-day storm that accumulated 2.9 inches of rain. Since these samples had relatively low fecal coliform values and F:T ratios ≤ 0.1, the origin of the contamination probably was not sewage related.

Two samples collected at Station D8 (on September 29 and October 17, 2004) had total and fecal coliform densities well above their respective benchmark values, but occurred when there was little or no rain. Visual observations recorded during both sampling events indicated large amounts of kelp, trash, and the presence of dogs, all of which are likely contributors to the source of the elevated coliform densities.

Of the 564 bacteriological samples collected at the offshore quarterly stations in 2004, 67 samples (12 percent) had total coliform densities less than 1000 CFU/ml and an F:T ratio ≥ 0.1. Total coliform concentrations in surface and subsurface waters (1–25 m) ranged from non-detectable levels to 400 CFU/100 ml throughout the year. Moreover, all surface and subsurface fecal coliform densities were less than 160 CFU/100 ml. In contrast, total coliform concentrations in relatively deep waters (60–98 m) ranged between 2 and 22,000 CFU/100 ml. Each of the 67 samples with total coliform densities ≥1000 CFU/ml and F:T ratios ≥0.1 came from this depth range suggesting that the stratified water column restricted the plume to mid- and deep-water depths throughout the year (see Microbiological Sampling Summary, City of San Diego, 2005).

Similarly, there was little evidence that discharged wastewater impacted nearshore waters in 2004. Mean bacterial levels along the 80-m and 98-m depth transects stations were much higher than those closer to shore (i.e., 18-m and 60-m transects). Sixty-five of the sixty-seven samples with total coliform densities ≥1000 CFU/ml and F:T coliform ratios ≥0.1 came from the 80-m and 98-m depth transects. The other two samples occurred along the 60-m transect, both at Station F08.

Kelp bed stations were 100 percent in compliance in 2004 with bacteriological standards expect during November-December following significant rainfall (Table III.E-6). It is possible that persistent northward surface currents helped drive storm-related contamination from more southern sources in to the waters off Point Loma (see Oceanographic Summary, City of San Diego, 2005). Compliance with NPDES Permit bacteriological standards for shore and kelp bed stations in 2005 is shown in Table III.E-7 (below) and Table III.E-8 (page III.E-16).

Table III.E-7
2005 Shore Station Compliance[1,2]

Number of Days of Noncompliance with 30-Day Total Coliform Standard									
Month	# Days	D4	D5	D7	D8	D9	D10	D11	D12
Jan	31	0	0	24	29	0	0	0	0
Feb	28	6	0	0	1	0	0	0	0
Mar	31	0	0	0	0	0	0	0	0
Apr	30	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0
Jun	30	0	0	0	0	0	0	0	0
Jul	31	0	0	0	0	0	0	0	0
Aug	31	0	0	0	0	0	0	0	0
Sep	30	0	0	0	0	0	0	0	0
Oct	31	0	0	0	0	0	0	0	0
Nov	30	0	0	0	0	0	0	0	0
Dec	31	0	0	0	0	0	0	0	0
% Compliance		98%	100%	93%	92%	100%	100%	100%	100%
Number of Days of Noncompliance with 60-Day Fecal Coliform Standard									
Month	# Days	D4	D5	D7	D8	D9	D10	D11	D12
Jan	31	0	0	0	31	0	0	0	0
Feb	28	0	0	0	25	0	0	0	0
Mar	31	0	0	0	0	0	0	0	0
Apr	30	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0
Jun	30	0	0	0	0	0	0	0	0
Jul	31	0	0	0	0	0	0	0	0
Aug	31	0	0	0	0	0	0	0	0
Sep	30	0	0	0	0	0	0	0	0
Oct	31	0	0	0	0	0	0	0	0
Nov	30	0	0	0	0	0	0	0	0
Dec	31	0	0	0	0	0	0	0	0
% Compliance		100%	100%	100%	85%	100%	100%	100%	100%

1 Summary of noncompliance with California Ocean Plan recreational water contact standards for PLOO shore stations during 2005. See Figure III.E-3 (page III.E-10) for the location of the shore stations. The values reflect the number of days within a given month that the receiving water samples exceeded the Ocean Plan bacteriological water contact standard. From left to right in the above columns, the shore stations are listed in order from south to north.

2 Data are from City of San Diego monthly and annual reports submitted to the Regional Board for 2005.

Table III.E-8
2005 Kelp Bed Station Compliance[1,2]

Number of Days of Noncompliance with 30-Day Total Coliform Standard									
Month	# Days	C4	C5	C6	A1	A7	A6	C7	C8
Jan	31	28	28	18	18	1	0	0	11
Feb	28	0	0	0	0	0	0	0	0
Mar	31	0	0	0	0	0	0	0	0
Apr	30	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0
Jun	30	0	0	0	0	0	0	0	0
Jul	31	0	0	0	0	0	0	0	0
Aug	31	0	0	0	0	0	0	0	0
Sep	30	0	0	0	0	0	0	0	0
Oct	31	0	0	0	0	0	0	0	0
Nov	30	0	0	0	0	0	0	0	0
Dec	31	0	0	0	0	0	0	0	0
% Compliance		92%	92%	95%	95%	<100%	100%	100%	97%
Number of Days of Noncompliance with 60-Day Fecal Coliform Standard									
Month	# Days	C4	C5	C6	A1	A7	A6	C7	C8
Jan	31	31	15	0	0	0	0	0	0
Feb	28	27	17	0	0	0	0	0	0
Mar	31	0	0	0	0	0	0	0	0
Apr	30	0	0	0	0	0	0	0	0
May	31	0	0	0	0	0	0	0	0
Jun	30	0	0	0	0	0	0	0	0
Jul	31	0	0	0	0	0	0	0	0
Aug	31	0	0	0	0	0	0	0	0
Sep	30	0	0	0	0	0	0	0	0
Oct	31	0	0	0	0	0	0	0	0
Nov	30	0	0	0	0	0	0	0	0
Dec	31	0	0	0	0	0	0	0	0
% Compliance		84%	91%	100%	100%	100%	100%	100%	100%

1 Summary of noncompliance with California Ocean Plan recreational water contact standards for PLOO kelp bed stations during 2005. See Figure III.E-3 (page III.E-10) for the location of the kelp bed stations. The values reflect the number of days within a given month that the receiving water samples exceeded the Ocean Plan bacteriological water contact standard. From left to right in the above columns, the kelp bed stations are listed in order from south to north.

2 Data are from City of San Diego monthly and annual reports submitted to the Regional Board for 2005.

During 2005, shore and kelp stations had a perfect record of compliance with bacteriological standards except during the heavy rainfall in January and February (see Tables III.E-7 and III.E-8). Compliance with the 30-day total coliform standard at the shore stations ranged from 92 to 100 percent in 2005, with only three stations below 100 percent compliance. This is similar to 2004, another year of heavy rains, when compliance ranged from 89 to 100 percent and only two stations had less than 100 percent compliance.

The few exceedances of the 30-day total coliform standard along the shoreline occurred at Stations D4, D7, and D8 during the wettest months of January and February. Station D8 was the only shore station that exceeded the 60-day fecal coliform standard. Compliance with the 60-day fecal coliform standard at Station D8 in 2005 (85 percent) was similar to compliance in 2004 (83 percent). All shore stations were 100 percent compliant with the 10,000 total coliform and 30-day fecal coliform geometric mean standards.

The highest mean total coliform and enterococcus densities occurred in January in samples collected along the shore on January 3 and 9, when 3.2 inches of rain accumulated over a seven day period. However, only 6 out of 12 samples with total coliforms ≥1000 CFU/100 ml occurred in January and February during rain events. Only 1 of these 6 samples contained bacterial levels that exceeded the benchmark values for fecal coliforms and enterococcus (400 and 104 CFU/100 ml, respectively) and was indicative of wastewater. This sample, collected from Station D8 on January 3, had an F:T ratio ≥0.1 and densities of fecal coliforms and enterococcus above their benchmark values (400 and 104 CFU/100 ml, respectively).

In contrast, samples from Stations D8 and D11 on June 26, and Station D11 on December 29, 2005 had total and fecal coliform densities well above their respective benchmark values but occurred when there was no recorded rainfall. Potential sources of contamination that may have contributed to these elevated bacterial densities include dogs, which were present at Station D11 on June 26, and kelp, which was present at Station D8 on June 26 and Station D11 on December 29. The beach around Station D11 is unique in that it is a designated area for people to walk their dogs. In addition, contamination may have resulted from a population of transient people living upstream of Station D11. High counts of indicator bacteria have also been present during dry periods at Station D8 in previous years.

Levels of compliance for the kelp stations were slightly lower in 2005 compared to 2004. Compliance with the 30-day total coliform standard at these stations ranged from 92 to 100 percent in 2005 (Table III.E-8 on page III.E-16) compared to 96 to 100 percent in 2004 (Table III.E-6 on page III.E-13). The exceedances of the 30-day total coliform standard occurred only in January. Stations C4 and C5 were the only kelp stations out of compliance with the 60-day fecal coliform standard. Elevated total and fecal coliform levels from the end of December 2004 caused the initial exceedances in the beginning of 2005. All kelp stations were 100 percent compliant with the 10,000 total coliform and 30-day fecal coliform geometric mean standards.

Most of the bacteriological samples collected from the kelp bed and offshore stations in 2005 were not indicative of contaminated waters. Only 3 percent of the samples (65 samples) had total coliform densities ≥1000 CFU/100 ml an d an F:T ratio ≥0.1 (see Microbiological Summary, City of San Diego, 2006). Total coliform densities in shallow waters (1–25 m) ranged from 0 to 2,600 CFU/100 ml throughout the year, while densities of fecal coliforms ranged from 0 to 500 CFU/100 ml. All but 2 of the samples indicative of contaminated water came from sample depths greater than 25 m. The highest mean indicator bacterial densities came from depths of 60 m and greater, suggesting that the stratified water column restricted the plume to mid- and deep-water depths throughout the year.

Compliance with bacteriological standards during 2006 for shore and kelp stations was very high (City of San Diego, 2007). Shore Station D11 was the only station to fall below 100 percent compliance. The few exceedances of the 30-day total coliform standard occurred at Station D11 during March, the wettest month of the year. All kelp stations were 100 percent compliant with bacteriological standards.

Table III.E-9 (page III.E-19) presents shoreline station bacteriological compliance during 2006. In 2006, a total of 2,496 samples were collected for bacteriological analyses, including 495 from the shoreline stations, 1,437 at the kelp stations, and 564 at the quarterly offshore stations. Of these, only 49 had total coliform concentrations greater than or equal to the 1000 CFU/100 ml benchmark. Five of these samples were collected at the shore stations and 44 at the offshore stations, while none were collected at the kelp stations. Forty of these 44 offshore samples also had F:T ratios ≥0.1 and were used as possible indicators of plume movement.

Bacterial densities were generally low at the shore stations in 2006 (see Table III.E-9). Monthly total coliform densities during the year averaged from 2 to 1,264 CFU/100 ml. Although rainfall was below average for the year, the highest mean densities occurred during the wet months. (City of San Diego, 2007) For example, total coliform densities were highest in February as a result of one sample collected from Station D11 on February 21 following a rain event. Of the five shore samples with total coliforms ≥1000 CFU/100 ml, two were collected in February and May during rain events, and one occurred in March when trace amounts of rain fell prior to sampling. Two samples from Station D8 were not associated with rain events but did contain bacterial levels that exceeded the benchmark values for total and fecal coliforms and were indicative of contaminated water (F:T ratio ≥0.1). However, high counts of indicator bacteria have also been present during dry periods at Station D8 in previous years (City of San Diego, 2005, 2006) and the relationship between rainfall and monthly mean fecal coliform concentrations was not significant (Spearman correlation; $n=12$, $p=0.32$).

Table III.E-9
2006 Shoreline Station Mean Indicator Concentrations[1,2]

Month	Rainfall (in)	Parameter	2006 Mean Monthly Concentration (CFU/100 ml)								
			D4	D5	D7	D8	D9	D10	D11	D12	All Stations
Jan	0.36	Total Coliform	5	4	5	274	96	132	141	22	85
		Fecal Coliform	6	2	3	140	6	15	14	3	24
		Enterococcus	3	2	3	24	10	11	16	5	9
Feb	1.11	Total Coliform	57	6	59	61	8	77	1264	5	195
		Fecal Coliform	6	3	70	21	2	16	37	4	20
		Enterococcus	3	5	7	8	2	6	17	2	6
Mar	1.36	Total Coliform	2	3	6	54	16	256	668	90	137
		Fecal Coliform	2	2	4	20	3	20	25	4	10
		Enterococcus	3	2	2	16	4	12	10	6	7
Apr	0.88	Total Coliform	2	57	3	58	10	72	230	10	55
		Fecal Coliform	2	17	3	23	4	6	17	4	9
		Enterococcus	2	6	2	6	2	3	4	3	4
May	0.77	Total Coliform	85	43	23	176	10	286	319	6	119
		Fecal Coliform	4	12	6	46	3	24	42	2	17
		Enterococcus	3	9	7	94	2	29	54	3	25
Jun	0.00	Total Coliform	49	56	24	76	24	40	76	115	56
		Fecal Coliform	2	6	4	9	3	11	18	10	8
		Enterococcus	2	2	5	4	2	7	7	38	8
Jul	0.04	Total Coliform	13	20	128	32	13	53	116	21	49
		Fecal Coliform	2	2	7	14	2	49	28	8	14
		Enterococcus	2	2	4	2	2	9	31	2	7
Aug	0.01	Total Coliform	52	16	92	28	13	180	96	52	66
		Fecal Coliform	3	4	5	4	2	19	17	9	8
		Enterococcus	2	2	2	2	2	12	29	7	8
Sep	0.00	Total Coliform	6	15	124	80	10	48	32	7	40
		Fecal Coliform	2	4	4	28	3	12	14	10	10
		Enterococcus	2	6	8	9	2	3	4	2	5
Oct	0.76	Total Coliform	17	24	57	137	21	61	29	16	45
		Fecal Coliform	2	3	10	53	4	24	11	5	14
		Enterococcus	4	2	18	22	2	15	6	7	10
Nov	0.15	Total Coliform	11	32	136	360	16	81	49	61	93
		Fecal Coliform	6	6	29	113	4	22	30	33	30
		Enterococcus	9	6	10	84	8	7	7	39	21
Dec	0.71	Total Coliform	7	10	13	164	52	66	64	22	50
		Fecal Coliform	4	6	6	92	20	30	40	7	26
		Enterococcus	2	30	2	287	18	38	142	14	67
Annual Means		Total Coliform	24	24	55	128	25	112	251	34	--
		Fecal Coliform	3	5	12	48	5	21	24	8	--
		Enterococcus	3	6	6	46	5	13	27	11	--

1 Mean monthly concentration (CFU/100 ml) for total coliform, fecal coliform, and enterococcus during 2006 for PLOO shore stations. See Figure III.E-3 (page III.E-10) for the location of the shore stations. From left to right in the above columns, the shore stations are listed in order from south to north.

2 Data are from City of San Diego monthly and annual reports submitted to the Regional Board for 2006.

Other potential sources of shoreline contamination that may have contributed to elevated bacterial densities at Stations D8 and D11 include kelp and seagrass beach wrack (Martin and Gruber, 2005) and shorebirds, all of which were present during the collection of many of the samples. There is also a tidally influenced storm drain at Station D8, which may accumulate organic debris (kelp and surfgrass) and amplify bacterial densities (Martin and Gruber, 2005). In contrast, the beach around Station D11 is a designated dog recreation area and has a population of transient people living along the San Diego River upstream of the sampling site. Contamination from both sources is suspected in the elevated bacterial counts at this station.

Only 2 percent of the 2006 offshore station samples (40 samples) collected were indicative of contaminated waters (total coliform density ≥1000 CFU/100 ml and an F:T ratio ≥0.1 (City of San Diego, 2006). Total coliform densities in shallow depths (1–25 m) ranged from <2 to 1400 CFU/100 ml throughout the year, while densities of fecal coliforms ranged from <2 to 160 CFU/100 ml. Only one shallow water sample (from Station F01 in April) was indicative of contaminated water. The highest mean densities of indicator bacteria came from depths of 60 m and greater (Figure III.E-4A on page III.E-21), suggesting that the stratified water column restricted the plume to mid- and deepwater depths throughout the year.

There was little evidence that the wastewater plume reached nearshore waters in 2006. For example, none of the bacteriological samples collected from the kelp bed stations had elevated bacterial densities. As shown in Figure III.E-4B (page III.E-21), mean bacterial densities were highest at stations along the 80 and 98-m transects of quarterly offshore stations. Thirty-five of the forth samples indicative of contaminated water were collected from sites along these transects. The other five samples came from Station F01 (18-m depth contour) and Stations F05, F06, F09, and F10 (60-m depth contour). The relatively high bacterial densities in samples collected at Station F01 may be related to the release of over 10 million gallons of sewage during 2005–2006 from Naval Base San Diego into San Diego Bay (US Navy, 2006).

Tables III.E-10 and III.E-11 (page III.E-22) respectively present mean bacterial densities at PLOO kelp bed and offshore stations during 2006. As shown in the tables, coliform concentrations were generally higher at the 60-meter-depth stations in April 2006, and higher at the 98-meter-depth stations in July and October 2006. The lowest densities occurred in January 2006, in which elevated concentrations occurred in only one sample. Indicator organism mean concentrations remained low at the kelp bed stations throughout the year.

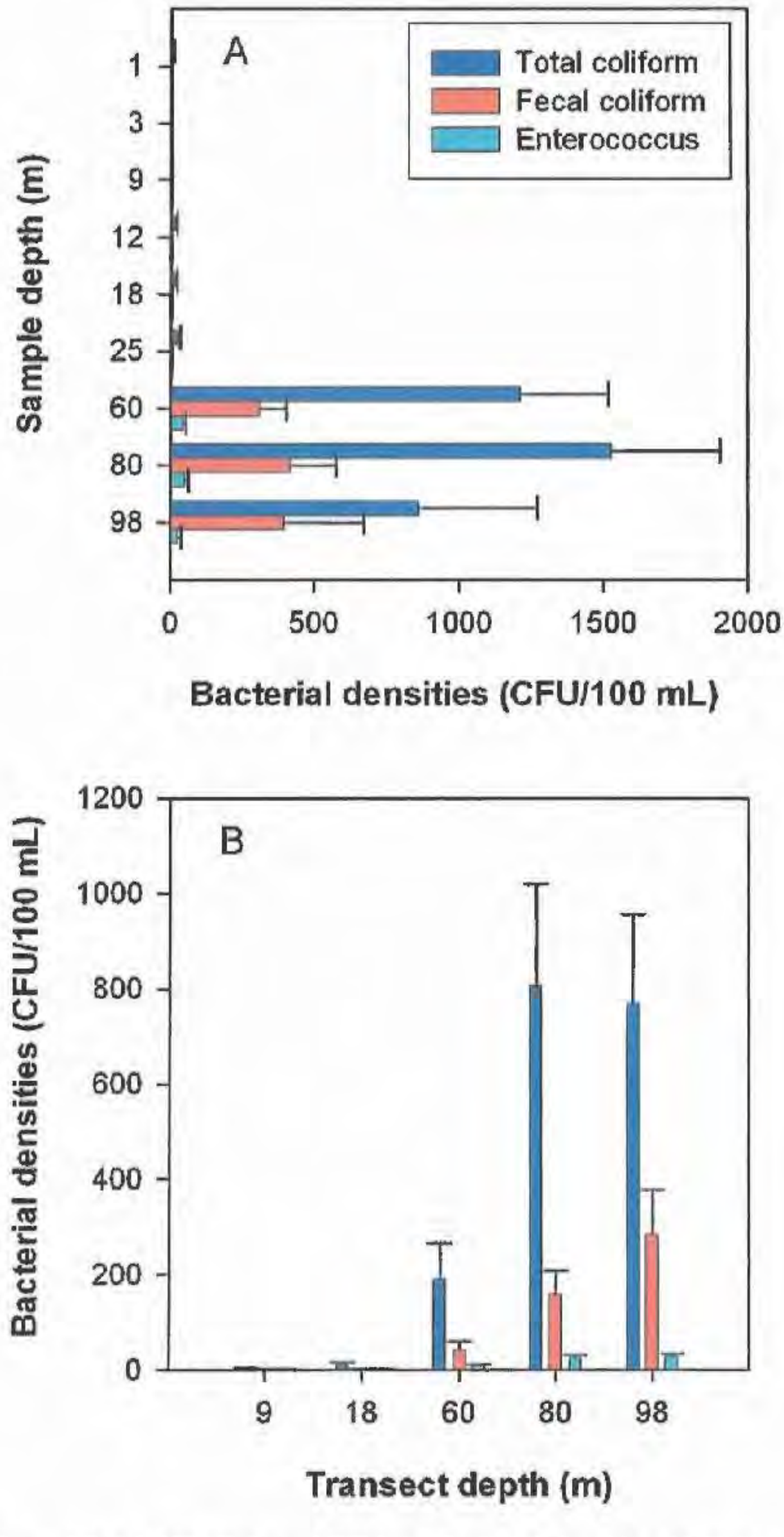


Figure III.E-4 2006 Kelp and Offshore Bacterial Densities at Point Loma

Table III.E-10
Mean Concentration of Indicator Parameters
PLOO Kelp Bed Stations, 2006

Parameter	Kelp Bed Station	Number of Samples	Mean Concentration of Quarterly Samples[1] (CFU/100 ml)			
			January	April	July	October
Total Coliform	9 m (ft) depth	45[2]	3	2	3	4
	18 m (60 ft) depth	75	10	13	3	11
Fecal Coliform	9 m (30 ft) depth	45	2	2	2	2
	18 m (60 ft) depth	75	3	3	2	2
Enterococcus	9 m (30 ft) depth	45	2	2	2	2
	18 m (60 ft) depth	75	2	2	2	2

1 From monthly and annual PLOO receiving water monitoring report submitted to the Regional Board. (City of San Diego, 2006)

2 Number of samples for the 9 m kelp bed stations is 42 for January 2006.

Table III.E-11
Mean Concentration of Indicator Parameters
PLOO Offshore Stations, 2006

Parameter	Kelp Bed Station	Number of Samples	Mean Concentration of Quarterly Samples[1] (CFU/100 ml)			
			January	April	July	October
Total Coliform	18 m (60 ft) depth	9	8	184	109	2
	60 m (200 ft) depth	33	109	584	34	37
	80 m (260 ft) depth	44	123	1362	451	1284
	98 m (320 ft) depth	55	150	6	1809	1110
Fecal Coliform	18 m (60 ft) depth	9	3	27	28	3
	60 m (200 ft) depth	33	20	127	9	4
	80 m (260 ft) depth	44	23	331	91	193
	98 m (320 ft) depth	55	35	3	754	345
Enterococcus	18 m (60 ft) depth	9	2	2	24	2
	60 m (200 ft) depth	33	9	23	4	2
	80 m (260 ft) depth	44	11	61	10	18
	98 m (320 ft) depth	55	14	2	60	33

1 From monthly and annual PLOO receiving water monitoring reports submitted to the Regional Board. (City of San Diego, 2006)

Figure III.E-5 (page III.E-23) presents the special distribution of the PLOO wastefield. As shown in Figure III.E-5, the spatial distribution of the wastefield varied by quarter in 2006. Interpolation of the bacteriological data from 60 m and below indicates that there was a possible offshore movement in January, as evidenced by the lack of elevated bacterial densities around and inshore of the PLOO diffusers. The only January sample containing higher bacterial densities occurred 5.6 km north of the PLOO at Station F33 (60 m depth sample). MODIS satellite imagery showed offshore movement of San Diego River flows that occurred up to one week before the January quarterly sampling (Ocean Imaging, 2007).

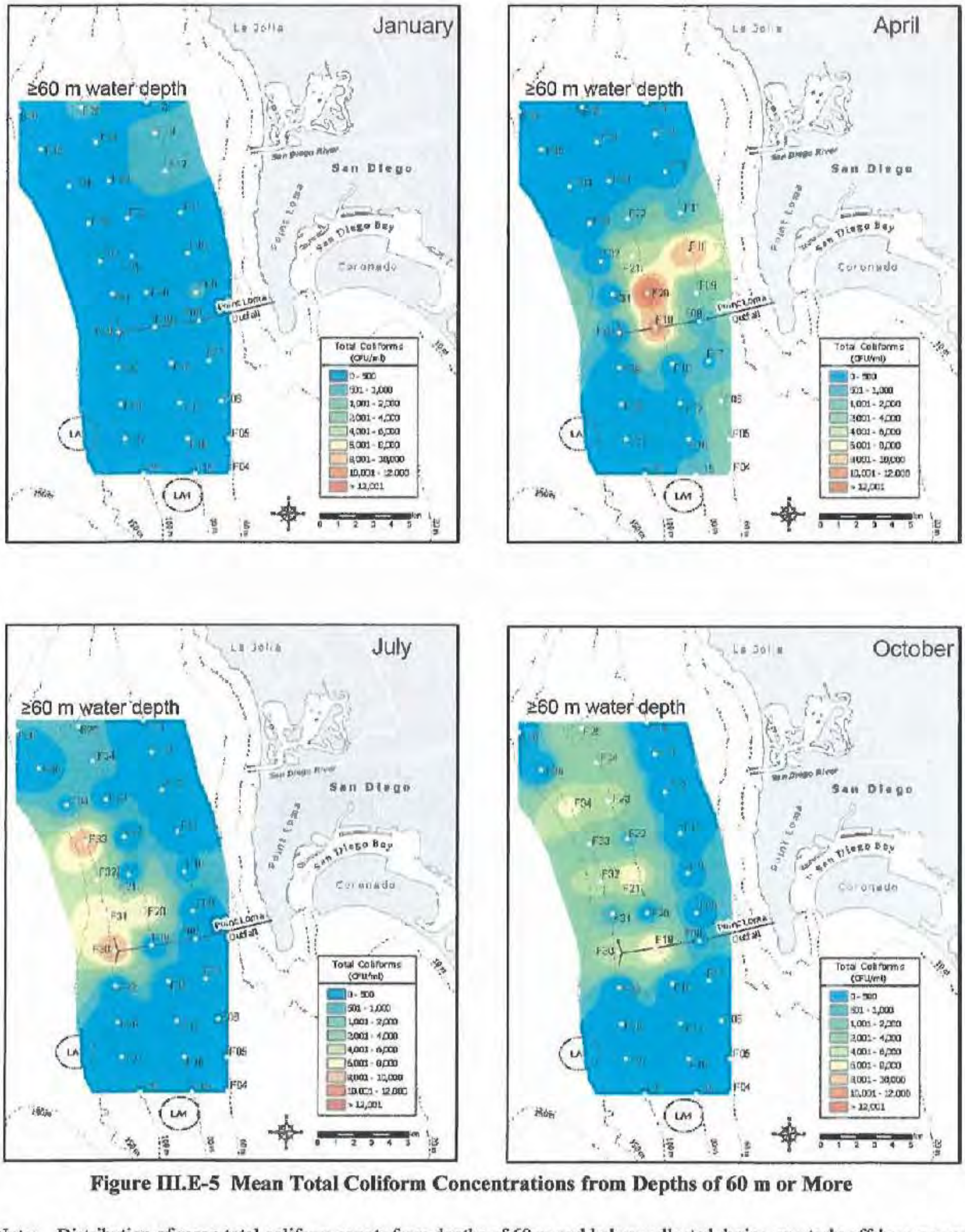


Figure III.E-5 Mean Total Coliform Concentrations from Depths of 60 m or More

Note: Distribution of mean total coliform counts from depths of 60 m and below collected during quarterly offshore surveys in 2006. Contaminated water (see text) was generally not detected in samples shallower than 60 m depth.

In April 2006, the wastefield was detected along the 80 and 60 m contours, mostly to the north and inshore of the outfall. Although the wastefield appeared to have moved eastward in April, it was not detected at special study Stations A11 and A13 or at any of the kelp bed stations. MODIS satellite imagery indicated that surface waters were flowing north in early April, but had switched back to a southward flow right before the April 2006 quarterly sampling (Ocean Imaging, 2007). Elevated bacterial densities were found up to 7.5 km south of the PLOO along the 60 m contour in April and may have been due to discharge from the San Diego Bay and Tijuana River following several rain events. MODIS satellite imagery revealed turbidity plumes from the San Diego Bay and Tijuana River in the sampling area before the April sampling (Ocean Imaging, 2007).

In July and October of 2006, contaminated water was detected up to 12.5 km (7.8 mi) north of the PLOO (Stations F36 and F25) along the 80 m and 98 m contours. Data from an acoustic doppler current profiler (ADCP) also indicated that the dominant direction of current flow for bottom waters (42–98 m depths) around the PLOO diffusers in October 2006 was north with some movement east and west (City of San Diego, unpublished data).

Analysis of Historical Data. The extension of the PLOO was designed to eliminate bacterial contamination in the Point Loma kelp bed and nearshore waters. To evaluate the effectiveness of the outfall extension, mean bacterial densities for pre-discharge (1/1/1991–11/23/1993) and post-discharge (11/24/1993–12/31/2006) periods were compared for shore, kelp, and offshore station surveys (see Materials and Methods, City of San Diego, 2007). The results are presented in Figure III.E-6 (page III.E-25) and Figure III.E-7 (page III.E-26). As shown in the figures, since initiation of the extended PLOO discharge (November 2003), the wastefield has rarely, if ever, been detected along the shoreline or the kelp beds.

Mean total and fecal coliform densities from samples collected at the shore stations, and all 3 indicator bacteria at the kelp stations, were significantly lower once discharge through the extended outfall began (see Table III.E-12 on page III.E-27). Station D5, located along the shoreline where the outfall pipe meets the shore, had the largest decline in fecal coliform densities during the post-discharge period. The largest overall decrease at the kelp stations occurred in total coliform densities, while fecal coliform densities declined at all depths in the post-discharge period.

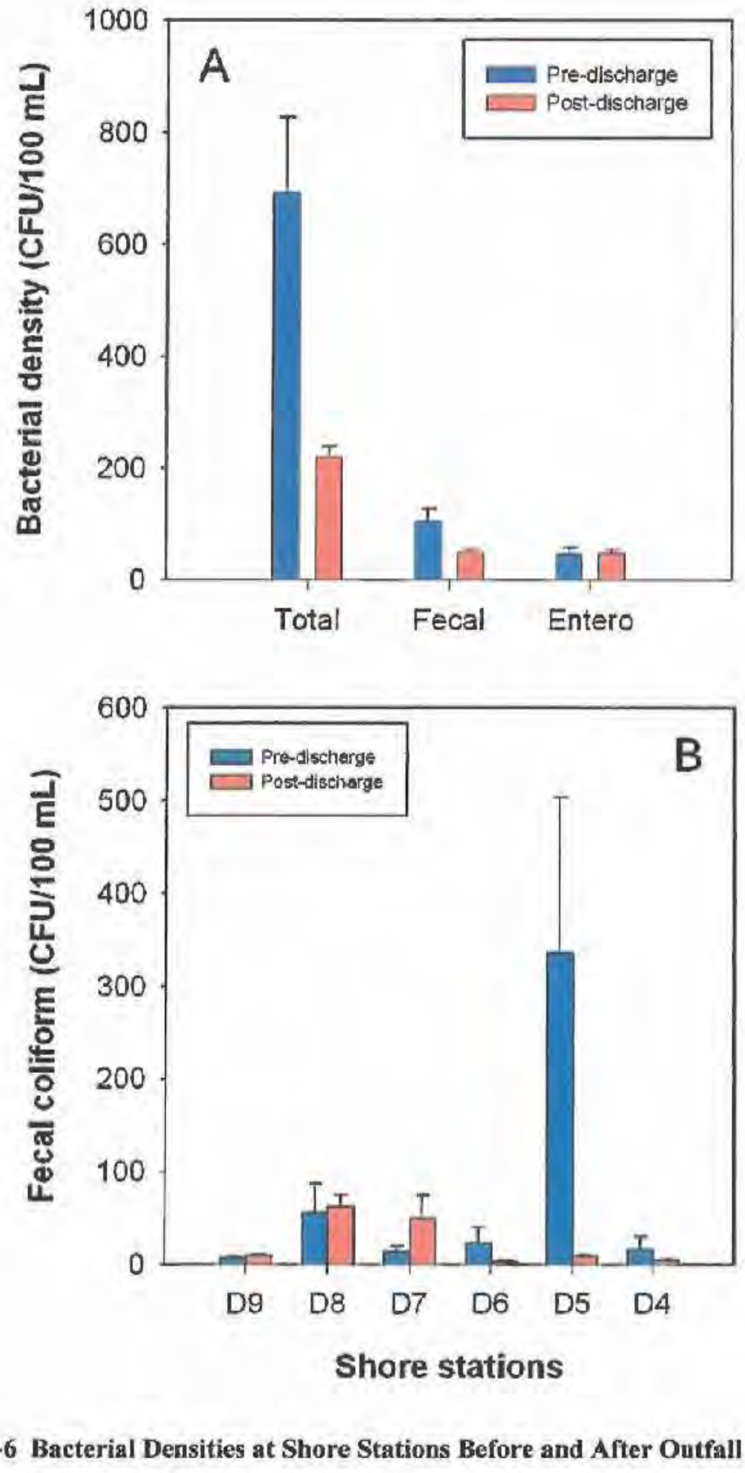


Figure III.E-6 Bacterial Densities at Shore Stations Before and After Outfall Extension

Note: Mean bacterial densities (mean±SE) for PLOO shore stations from 1991–2006. The pre-extension period is from January 1991 to November 1993 while post-extension is from November 1993 to December 2006. Sample size indicated as Pre/Post. (A) Mean densities by parameter. Total=total coliform (n = 1007/4768), Fecal=fecal coliform (n = 1007/4781), Entero=enterococcus (n = 1008/4780). (B) Mean fecal coliform densities by station (n = 212–556), Entero=enterococcus (n = 10,531/17,924).

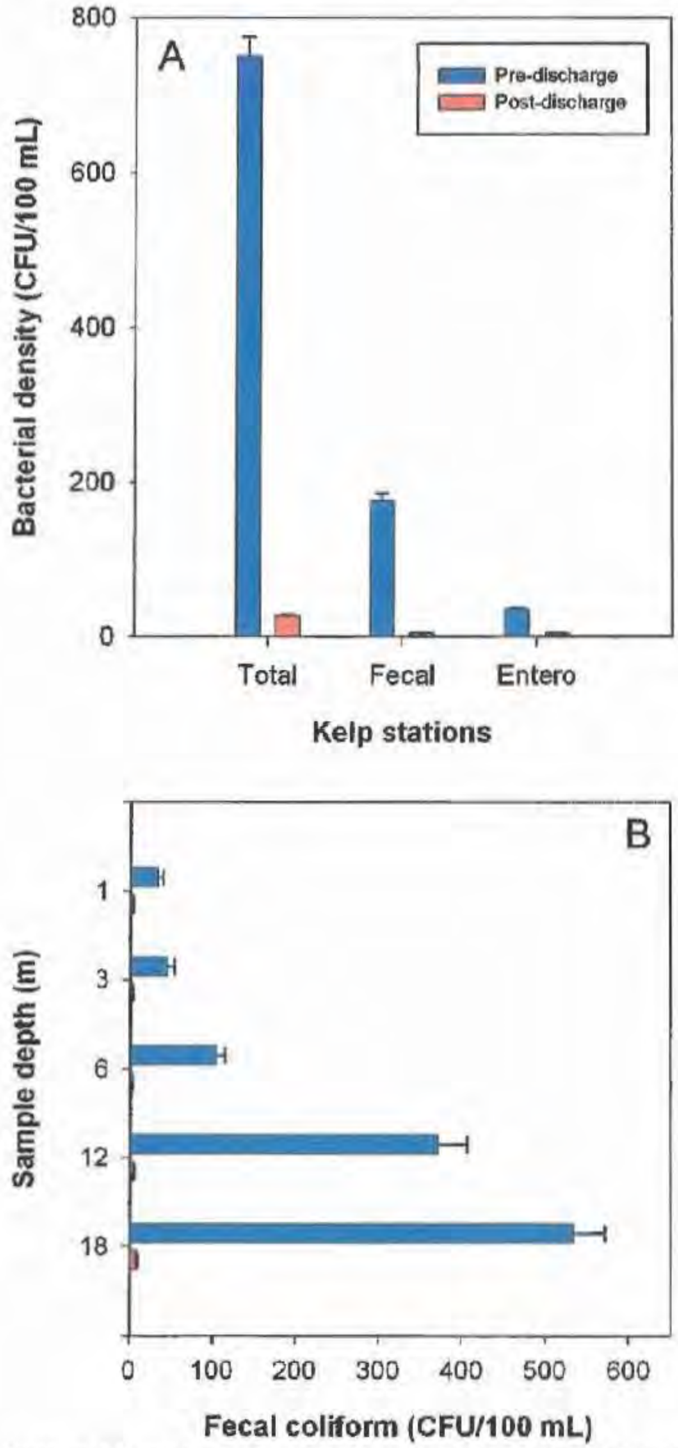


Figure III.E-7 Bacterial Densities at Kelp Bed Stations Before and After Outfall Extension

Note: PLOO kelp station mean bacterial densities (mean±SE) collected by (A) parameter and (B) depth from 1991–2006. The pre-discharge period is from January 1991 to November 1993 while post-discharge is from November 1993 to December 2006. Sample size indicated as Pre/Post. Total=total coliform (n = 10,550/17,883), Fecal = fecal coliform (n = 10,540/17,925).

Table III.E-12
Significance of Difference in Bacterial Densities After Outfall Extension

Location	Variable	t	Degrees of Freedom	Computed Probability
Shore	Total coliform	-2.243	1,319	0.025
	Fecal coliform	-3.967	1,294	< 0.001
	Enterococcus	-1.698	5,786	0.089
Kelp	Total coliform	-68.360	13,356	< 0.001
	Fecal coliform	-59.411	11,668	< 0.001
	Enterococcus	-55.091	12,281	< 0.001
Offshore	Total coliform	-28.937	6,375	< 0.001
	Fecal coliform	-27.340	6,131	< 0.001
	Enterococcus	-25.688	6,430	< 0.001

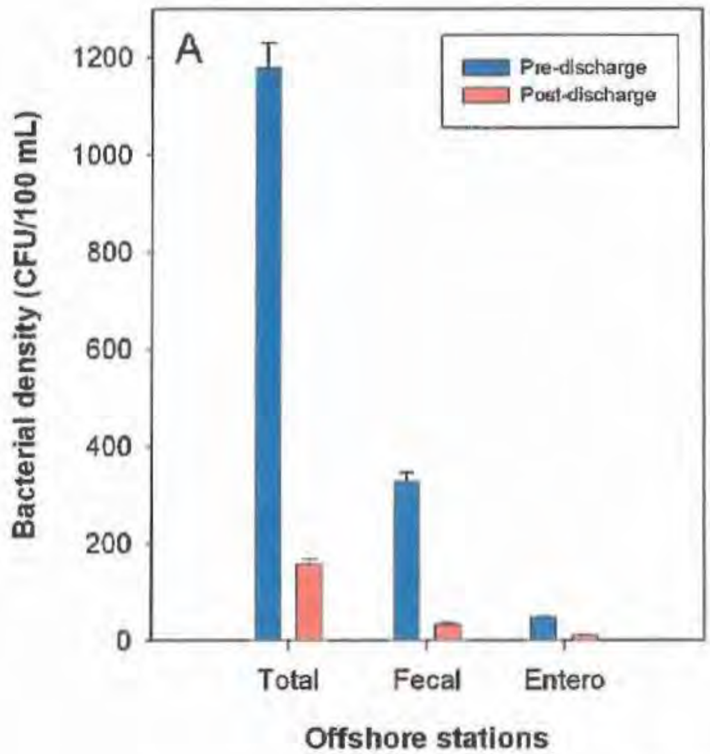
Note: Independent sample "t-test" results for pre-extension discharge versus post-extension discharge periods from PLOO shore, kelp, and monthly offshore stations. The pre-extension discharge period is from January 1991 to November 1993, while post-extension data used in this analysis is from November 1993 to December 2006 (Shore and Kelp) and November 1993 to July 2003 (Offshore). The t-test determines whether mean values from two groups of data are statistically different from each other.) The two data sets (pre-discharge and post-discharge) are log(x+1) transformed. The formula for the "t-test" between two data sets "x" and "y" is:

$$t = \frac{M_x - M_y}{\sqrt{\frac{Var_x}{n_x} + \frac{Var_y}{n_y}}}$$

Where : n_x is the number of samples, M_x is mean value, and var_x is the variance of data set "x", and n_y is the number of samples, M_y is mean value, and var_y is the variance of data set "y".

Mean densities of indicator bacteria at the offshore samples were also significantly lower and samples indicative of contaminated water have been restricted to deeper waters since discharge began through the extended outfall (Figure III.E-6 and Table III.E-9). For example, the highest fecal coliform densities occurred in samples taken from 24 to 43 m during the pre-discharge period, but occurred in samples from 80 m during the post-discharge period (see Figure III.E-8 on page III.E-28).

Similarly, fecal densities greater than 400 CFU/100 ml have not been found shallower than 12 m during the post-discharge period. Finally, total coliforms densities during the post-discharge period have fallen below 1000 CFU/100 ml at stations along the 60 m contour near the old outfall as well as those stations farther inshore, with densities >1000 CFU/100 ml limited to stations along the 80 m contour (Figure III.E-9 on page III.E-29). Overall these results suggest that the extension of the outfall pipe has suppressed the surfacing potential and significantly reduced the onshore movement of the PLOO wastefield.



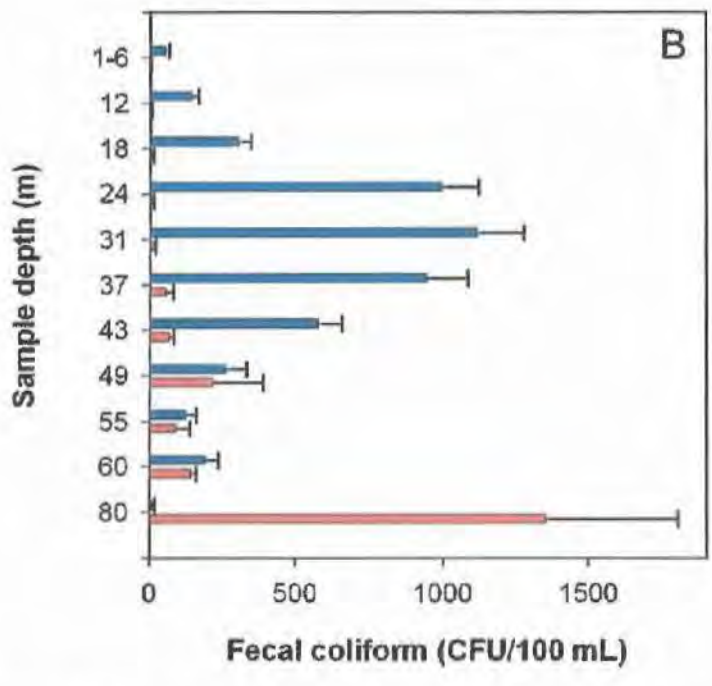


Figure III.E-8 Offshore Bacterial Densities Before and After Outfall Extension.

Note: PLOO monthly offshore station mean bacterial densities (mean±SE) collected by (A) parameter and (B) depth from 1991–2006. The pre-discharge period is from January 1991 to November 1993 while post-discharge is from November 1993 to July 2003. Sample size indicated as Pre/Post. Total=total coliform (n = 4,444/6,977), Fecal=fecal coliform (n = 4,477/6,980), Entero=enterococcus (n = 4,476/6,980).

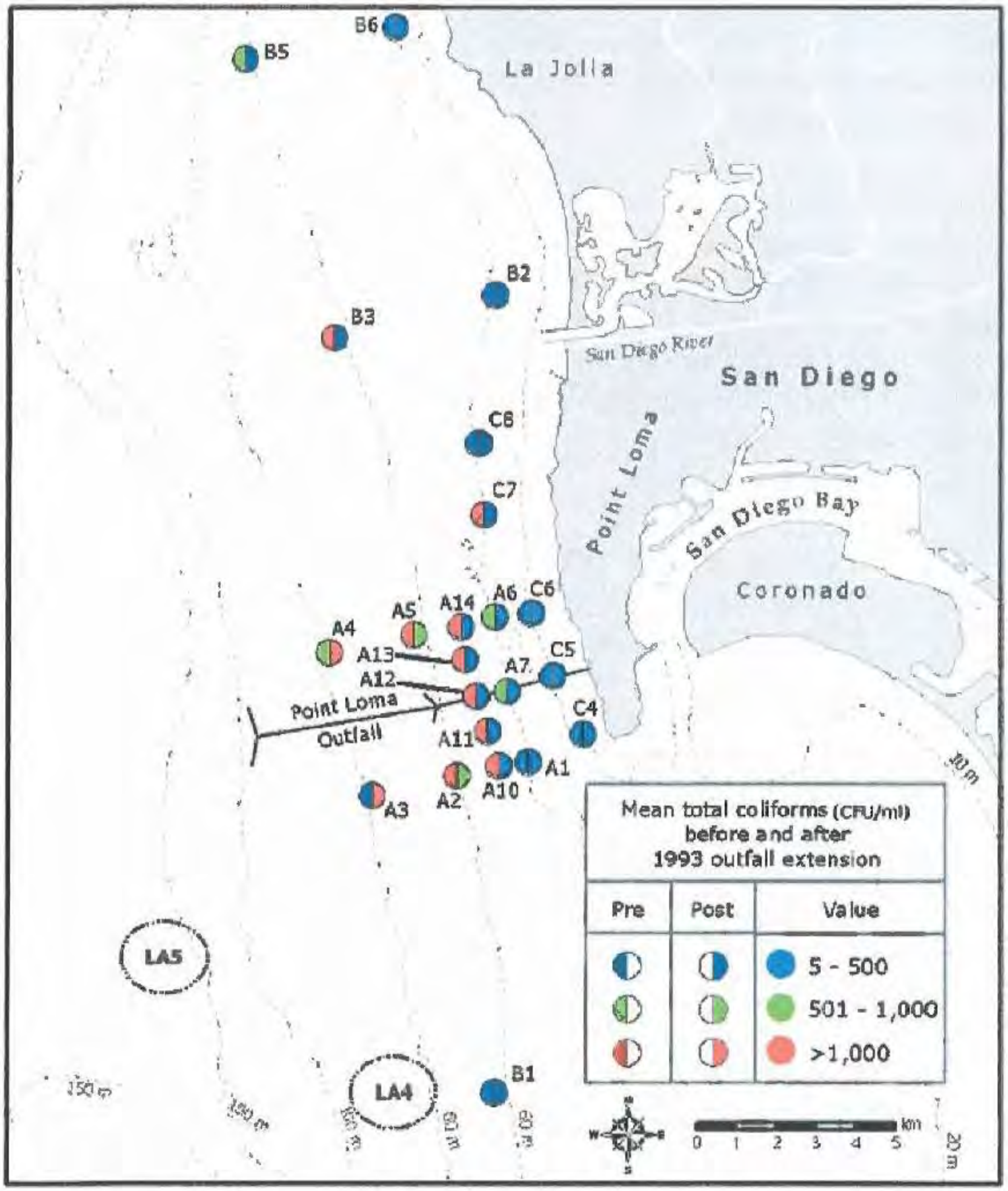


Figure III.E-9 Offshore Coliform Densities Before and After Outfall Extension.

Note: This figure compares pre- and post-discharge mean total coliform densities (CFU/100 ml) for PLOO water quality monitoring stations where monthly bacteriological samples were collected from 1991–2003.

No evidence exists that the PLOO wastewater plume reached the shoreline or recreational waters during 2006. Elevated bacterial densities along the shore were limited to Stations D8 and D11 where the source of contamination may have been heavy recreational use or decaying kelp and surfgrass wrack material. Despite a below-average amount of rainfall in 2006, most of these elevated bacterial densities occurred during the wettest months of February through May.

All of the kelp bed stations had low densities of all indicator bacteria. Furthermore, all seven kelp bed stations and all but one shore station were 100 percent compliant with the four Ocean Plan bacteriological standards. Shore Station D11, located near the mouth of the San Diego River, was 95 percent compliant with the 30-day total coliform standard and 100 percent compliant with the other three Ocean Plan standards. All of the exceedances at Station D11 occurred during March when rains were heaviest; however, an analysis of rainfall and shore station bacterial densities showed that there was no significant correlation between rain and fecal coliforms.

It is also unlikely that the PLOO wastewater ever reached surface waters in 2006. Bacteriological evidence of contaminated water at the offshore stations was predominantly limited to samples collected from depths of 60 m and deeper. The only shallow water sample indicative of contaminated water was taken from Station F01 (12 m depth) in April, and may have been due to sewage discharge from Naval Base San Diego into the San Diego Bay.

The discharge depth (approximately 98 m) may be the dominant factor that keeps the plume from reaching the surface. Wastewater is released into cold, dense seawater that does not appear to mix with the top 25 m of the water column. Physical parameters suggest that the water column was strongly stratified during the spring through fall months. However, the absence of evidence for bacteriological contamination in the surface waters in January, when the water column was well mixed, suggests that stratification may not be the only factor limiting the depth of the plume to 60 m and deeper.

The dominant direction of the PLOO waste field flow appeared to be northward in 2006. High bacterial densities were detected at the northern limits of the quarterly sampling grid during most quarters, and were detected at the southern limits only in April. There was also evidence that the plume moved inshore to the 60-m depth contour in April. It also appears that the plume may have dispersed farther offshore than most of the sampling stations in January, when contaminated water was only detected well north of the PLOO in the 60 m sample from Station F33. There did not appear to be one consistent pattern for the distribution of the wastefield.

Historical data demonstrate that since the extension of the PLOO, the wastefield does not reach the shoreline. Mean coliform densities at shore stations significantly decreased during the post-discharge period. Similarly, all kelp bed station indicator bacterial densities decreased significantly during the post-discharge period. The largest decreases were detected in the 12 and 18-m depth samples. There is no bacteriological evidence that the PLOO wastefield has reached the Point Loma kelp bed since the outfall extension went into operation. Similarly, all indicator bacterial densities from the monthly offshore stations significantly decreased during the post-discharge period. The highest mean fecal coliform densities shifted from 24-43 m depth samples during the pre-discharge period to 80 m samples during the post-discharge period. These results, combined with recent results from quarterly station samples, indicate that the wastewater plume is remaining below the thermocline and offshore of the Point Loma kelp bed.

Beach Water Quality. Heal the Bay is a non-profit environmental group that has prepared California beach water quality reports for 17 years (Heal the Bay, 2007a). The same beach water quality information is included in the annual report of the National Resources Defense Council – Testing the Waters covering U. S. vacation beaches (NRDC, 2007).

Heal the Bay's Beach Report Cards™ provide beachgoers with water quality information by grading monitoring locations from Humboldt County to San Diego County (Heal the Bay 2007a). The grades are based on dry weather water quality data provided by over 20 different entities throughout California. The Beach Report Cards are based on the routine monitoring of beaches conducted by local health agencies and dischargers. The better the grade a beach receives (A is best, F is worst), the lower the presumed risk of illness to ocean users.

In the most recent Heal the Bay's Beach Report Card, Heal the Bay's 2007 California Summer Beach Report Card (Heal the Bay, 2007b), water quality at beaches in San Diego County received nearly 100 percent A or B grades. Of the 93 locations monitored frequently enough to be included in the report, 92 sites (99 percent) received either an A or B grade. The drought played a major role in the excellent water quality as few storm drains and creeks discharged to beaches. The only location with data exceeding acceptable levels frequently enough to drop the grade to a D was at Pacific Beach Point.

In 2006, the City of San Diego completed a study to identify the source(s) of bacterial contamination in ocean waters at the Pacific Beach Point cove (City of San Diego and Weston Solutions, 2006). A total of 40 surveys (with sampling at 10 shoreline sites within the cove during each survey) were conducted between June 1, 2005 and March 31, 2006 to determine the spatial and temporal extent of bacterial densities in the waters of P.B. Point. In addition to analysis of ocean and storm drain water by traditional test methods, PCR (polymerase chain reaction) and ribotyping genetic methods were employed as DNA fingerprinting techniques to track the source (human, bird, etc.) of bacteria measured in water quality samples. The major findings of the study were:

- Poor water circulation and the accumulation of decaying kelp in the inside cove during summer months are important factors for the high bacterial densities in adjacent ocean waters. Dry weather runoff from one of three storm drains and bird fecal matter can act as bacterial "seed" in the piles of decaying kelp on the beach.
- The kelp on the beach acts as a reservoir for bacteria. Bacterial re-growth also occurs in the kelp, and brine flies can transfer bacteria from contaminated kelp to uncontaminated kelp.
- Fecal coliform and enterococci bacterial levels are highest along the shoreline of P.B. Point cove during spring tides in summer and early fall. (Spring tides occur during new and full moons.) Bacteria are pulled into ocean waters during spring high tides when waves wash over the kelp and ponded storm drain water.
- There were no enterococci or fecal coliform exceedances measured in offshore waters (approximately 100 to 200 yards from the beach) during any of the surveys.
- Results for PCR analysis of 182 samples (108 ocean water and 74 storm drain) indicated fecal bacteria from warm-blooded animals in 78 percent of the samples. However, only two samples (1 percent) from storm drains were positive for bacteria of human origin.
- Analysis by ribotyping for the three most frequently contaminated shoreline sites indicated 71 percent of the bacterial contamination comes from birds, 18% from dog, raccoon and rodents, 9 percent unknown, and 2 percent from human or sewage origin.
- Analysis by ribotyping for the most problematic storm drain in the cove indicated 48% of the bacterial contamination comes from birds, 43 percent from dog, raccoon and rodents, 4 percent unknown, and 5 percent from human or sewage origin.

Two sewage spills during the summer 2007 led to San Diego County beach closures (Heal the Bay, 2007b). The first was a 20-gallon spill from a line underneath Imperial Beach Pier. The beach at the pier was closed for two days in May. Also, the beach adjacent to Lawrence and Kellogg streets in San Diego Bay was closed Aug. 28-31 due to a 600-gallon sewage spill at the U.S. Navy Sub base. These beach closures were not related to the operation of the PLOO facility.

With the exception of short-term sewage spills and the chronic contamination emanating from the Tijuana River, elevated bacteriological levels at beaches in San Diego County (Mission Bay, San Diego Bay, and Pacific Beach Point) appear to come from non-sewage sources. Water quality standards to protect human health in recreational waters have traditionally been assessed by measuring the concentration of "indicator bacteria" to infer the presence of fecal matter and associated fecal pathogens. Fecal matter originates from the intestines of warm-blooded animals, and the presence of fecal bacteria in surface waters is used as an indicator of human pathogens that can cause illness in recreational water users (EPA, 2007a). Indicator bacteria may not cause illness themselves, but have been linked to the presence of harmful pathogens (EPA, 2007b). Indicator bacteria are used as a surrogate for human pathogens because they are easier and less costly to measure than the pathogens themselves.

Beaches in San Diego with "compromised" water quality are located downstream of watershed discharge points. Bacteria entering estuaries, bays, and the ocean originate from a wide variety of sources including natural sources such as feces from aquatic and terrestrial wildlife, and anthropogenic sources such as sewer line breaks, leaking septic systems, pets, trash, and homeless encampments. Once in the environment, bacteria also re-grow and multiply (City of San Diego and Weston Solutions, 2004; Martin and Gruber, 2005). As summarized above, the City of San Diego and Weston Solutions study of bacterial contamination at Pacific Beach Point (City of San Diego and Weston Solutions, 2006) found that the elevated bacteriological levels stemmed mainly from bacteria regrowth in the kelp wrackline on the beach, and from birds and flies, not from sewage sources.

During wet weather, wash-off of bacteria from land is the primary mechanism for transport of bacteria from land into the ocean. During dry conditions, streams in urban areas have a sustained flow even if no rainfall has occurred. These flows result from land use practices that generate urban runoff, which enters storm drains and creeks and carries bacteria into the receiving water.

The Regional Board in conjunction with other regulatory agencies and local research organizations investigated bacteriological water quality at "reference beaches" with upstream watershed consisting of at least 95 percent undeveloped lands. Because the reference beach drainage area consists almost entirely of undeveloped land, bacteria washed down to the beach come from natural, non-anthropogenic sources. Measurements during the 2004-2005 winter season showed that at four reference beaches (two in Los Angeles County, one in Orange County, and one in San Diego County) 27 percent of all samples collected within 24 hours of rainfall exceeded water quality standards for at least one indicator bacteria (i.e. a single sample bacteriological threshold was exceeded 27 percent of the time) (Schiff et al., 2005). Thus, lack of compliance with bacteriological standards at beaches downstream of watersheds is likely related to natural sources as well as anthropogenic ones.

The only shoreline sampling stations along Point Loma that have continuing episodes of non-compliance with water contact bacteriological standards (Stations D8-D11) are located over seven miles from the PLOO in the vicinity of the San Diego River (City of San Diego, 2005, 2006). Results of the long-term, comprehensive City of San Diego bacteriological monitoring program indicate that the PLOO wastewater plume rarely, if ever, contacts the shoreline. Indicator bacteria detected at Ocean Beach adjacent to the San Diego River are derived from natural and urban sources washed off the land and transported to the area by freshwater flows. Thus, any public health risk along the Ocean Beach shoreline would be associated with exposure to pathogens transported from land, not from the ocean discharge of wastewater over seven miles away.

A recent Draft Technical Report by the San Diego Regional Water Quality Control Board acknowledges significant areas of uncertainty regarding the actual health risk associated with water contact in areas that fail to comply with bacteriological standards as a result of runoff from land (p. 137-139, Regional Board, 1994):

> *The San Diego Water Board recognizes that there are potential problems associated with using bacteriological standards to indicate the presence of human pathogens in receiving waters free of sewage discharges. The indicator bacteria standards were developed, in part, based on epidemiological studies in waters with sewage inputs. The risk of contracting a water-borne illness from contact with urban runoff devoid of sewage, or human-source bacteria is not known. Some pathogens, such as giardia and cryptosporidium can be contracted from animal hosts. Likewise, domestic animals can pass on human pathogens through their feces. These and other uncertainties need to be addressed through special studies and, as a result, revisions to the Total Mass Daily Limits (TMDLs) established in this project may be appropriate.*

Indicator bacteria are used to measure the risk of swimmer illness because they have been shown to indicate the presence of human pathogens, such as viruses, when human bacteria sources are present. Bacterial indicators have been historically used because they are easier and less costly to measure than the pathogens themselves. In recent years, however, questions have been raised regarding the validity of using indicator bacteria to ascertain risk to swimmers in recreational waters, since they appear to be less correlated to viruses when sources are from urban runoff (Jiang et al., 2001). In fact, most epidemiology studies conducted to measure the risk of swimmer illness in the presence of indicator bacteria have taken place in receiving waters containing known sewage impacts.

To date, only two epidemiology studies have been conducted where the bacteria source was primarily urban runoff. The Santa Monica Bay epidemiology study (Haile et al, 1999) reported that there was a direct correlation between swimming related illnesses and densities of indicator bacteria. The sites included in this study were known to contain human sources of fecal contamination

Most recently, the Mission Bay epidemiological study (Colford et al., 2007) showed that there was no correlation between swimmer illness and concentrations of indicator bacteria. Unlike Santa Monica Bay, bacteria sources in Mission Bay were shown to be primarily of nonhuman origin (City of San Diego and Weston Solutions, 2004). The studies caution against extrapolating the results from the Mission Bay study to other locations, since there have been extensive cleanup activities on this waterbody and subsequently bacteria source analyses have shown that human fecal sources are only a minor contributor. The link between bacteria loads from urban runoff containing mostly nonhuman sources, and risk of illness needs to be better understood.

Recent studies have also shown that bacteria regrowth is a significant phenomenon (City of San Diego and Weston Solutions 2004, City of Laguna Niguel and Kennedy Jenks, 2003). Such regrowth can cause elevations in bacteria levels that do not correspond to an increase in human pathogens and risk of illness. For example, the Mission Bay Source Identification Study found that bacteria multiply in the wrack line on the beach (eel grass and other debris) during low tide, causing exceedances of the water quality objectives during high tide when the wrack is inundated.

This same phenomenon likely occurs inside storm drains, where tidal cycles and freshwater input can cause bacteria to multiply. In both these cases, an increase in bacteria densities does not necessarily correlate to an increase in the presence of human pathogens. The regrowth phenomenon is problematic since dischargers must expend significant resources to reduce the current bacteria loads to receiving waters to meet the required waste load reductions.

As information is gathered, initiating special studies to understand the uncertainties between bacteria levels and bacteria sources within contributing watersheds will be required. Such studies are being considered as part of integrated watershed planning work coordinated by principal stormwater copermittees within the San Diego Region.

Bacteriological Concentrations in Deeper Offshore Waters. Appendix C presents an evaluation of bacteriological concentrations within all State-regulated waters (waters at all depths within the three-nautical-mile limit). As part of this analysis, bacteriological concentrations at all offshore stations at or within the three-nautical-mile limit were compared with 2005 Ocean Plan recreational body-contact bacteriological standards. (The 2005 Ocean Plan recreational body-contact bacteriological standards are presented in Table III.E-4 on page III.E-8.)

Table III.E-13 summarizes compliance of these offshore stations during October 2003 through June 2007 with the Ocean Plan body-contact standards. As shown in the table, bacteriological concentrations complied with Ocean Plan total coliform single sample limits nearly 98 percent of the time at all water depths at offshore stations within the three-mile-limit. Approximately 95 percent compliance was achieved at all water depths at these offshore stations with 2005 Ocean Plan single-sample limits for fecal coliform and enterococcus. Exceedances that did occur during 2003-2007 were in offshore waters beyond the kelp bed at depths greater than 130 feet (40 meters), at depths (and distances offshore) beyond the range of typical recreational SCUBA divers.

Effects of Improved Discharge. As discussed above, the existing PLOO discharge does not adversely affect recreation. To provide added insurance against impacts to recreation, the City is implementing effluent disinfection at the Point Loma WTP. Proposed effluent disinfection operations (see Appendices A and D) would reduce Point Loma WTP effluent indicator organism concentrations by 2.1 logarithms (approximately 99 percent). As documented in Appendix D, with this 2.1 logarithm reduction the PLOO discharge would comply with recreational body-contact bacteriological standards at all water depths within all State-regulated waters.

Table III.E-13
Compliance of Offshore Stations with 2005 Ocean Plan Body-Contact Bacteriological Samples[1]

Standard	Number of Samples	Percent Compliance[1,2]
T. Coliform <10,000 CFU per 100 ml	1,470	97.9
Fecal Coliform < 400 CFU per 100ml	1,470	94.6
Enterococcus <104 CFU per 100ml	1,470	95.8
T. Coliform <1000 CFU per 100 ml when TC:FC ratio > 0.1	1,470	92.2

1 Compliance measurements for offshore areas out to three (3) nautical miles from shore and from the ocean surface to the bottom with that area. Data is from offshore water quality monitoring conducted offshore and beyond the kelp forest water contact area out to the three nautical mile location. Sampling period is from October 2003 through June 2007. Location of sample points is shown in Attachment C-3 to Appendix C. All data are included as Attachment C-4 to Appendix C.

2 Exceedances generally occurred at depths greater than 130 feet (40 meters) beyond the typical range of recreational SCUBA divers.

III.E.3. Are there any Federal, State, or local restrictions on recreational activities in the vicinity of the modified discharge(s)? If yes, describe the restrictions and provide citations to available references.

Appendix G documents recreational activities in the vicinity of the PLOO discharge. There are no federal, state, or local restrictions on recreational activities in the vicinity of Point Loma Ocean Outfall.

III.E.4. If recreational restrictions exist, would such restrictions be lifted or modified if you were discharging a secondary treatment effluent?

No such restrictions exist that are related to the PLOO discharge.

Section III.F

Large Applicant Questionnaire

III.F. *Establishment of a Monitoring Program* [40 CFR 125.63]:

III.F.1. Describe the biological, water quality, and effluent monitoring programs which you propose to meet the criteria of 40 CFR 125.63. Only those scientific investigations that are necessary to study the effects of the proposed discharge should be included in the scope of the 301(h) monitoring program [40 CFR 125.63(a)(1)(I)(B)].

SUMMARY: No changes in the existing monitoring program are proposed.

The existing PLOO monitoring program is set forth in Monitoring and Reporting Program No. R9-2002-0025 as amended by Addendum No. 1 dated June 11, 2003. This comprehensive monitoring program includes:

- influent and effluent monitoring,
- sediment chemistry monitoring,
- benthic monitoring,
- fish trawl and rig fish monitoring,
- bioaccumulation monitoring,
- sludge monitoring, and
- bacteriological water quality monitoring.

Influent/Effluent Monitoring. Appendix I (Volume V of this application) presents the monitoring program proposed as part of this modified NPDES application. As shown in Appendix I, the City proposes to maintain the existing core influent and effluent monitoring program established by Order No. R9-2002-0025 as amended by Addendum No.1.

Receiving Water Monitoring. As discussed in Appendix I, the City also proposes to maintain the receiving water monitoring program established in Order No. R9-2002-0025 as amended by Addendum No. 1.

Monitoring and Reporting Program No. R9-2002-0025 underwent significant modifications in June 2003 when the Regional Water Quality Control Board adopted Addendum No.1 to that program. At that time the program was modified to incorporate the recommendations of the Southern California Coastal Water Research Project's (SCCWRP) *Model Monitoring Program for Large Ocean Dischargers in Southern California*.

The PLOO monitoring program is now in full alignment with the provisions of the SCCWRP *Model Monitoring Program.* As a result, changes to this existing monitoring program are not proposed.

The City of San Diego is committed to maintaining a comprehensive monitoring and reporting program and will embrace any appropriate modifications that may be required in the future. The basis for the program involves three elements:

1) a core NPDES permit compliance monitoring program that includes influent and effluent water quality monitoring, and monitoring of receiving waters, receiving water sediments, fish, and benthic species,

2) participation in regional surveys that may involve many agencies and academic organizations and provides information about the general Southern California Bight as well as its bays and estuaries, and

3) special projects designed to address and answer specific questions about some aspect of the ocean environment.

Potential for Special Projects. The adaptive nature of the existing program allows for the inclusion of any special monitoring projects the City chooses to implement to assess treatability, receiving water quality, or other issues. No changes in the NPDES monitoring program are required to accommodate such special monitoring projects; such special projects can be initiated and completed within the scope of the existing program. Upon completion of a project, if it is found necessary to modify the core NPDES program to reflect the results of the project, such proposed changes can be presented to and discussed with regulators at that time.

The only special monitoring project currently being considered by the City relates to the study of disinfection effectiveness at the Point Loma WTP. As described in Appendices A and D, the City has installed prototype effluent disinfection facilities at the Point Loma WTP, and has requested Regional Board approval to initiate operation of the disinfection system under Order No. R9-2002-0025. Point Loma WTP effluent disinfection operations will be commenced upon receipt of Regional Board approval. The City may implement special monitoring studies in conjunction with the Point Loma WTP effluent disinfection program to assess the disinfection efficiency and cost-effectiveness of the prototype disinfection facilities and operations.

III.F.2 Describe the sampling techniques, schedules, and locations, analytical techniques, quality control and verification procedures to be used.

No changes in the sampling techniques, schedules, locations, analytical techniques, quality control, or verification procedures established in Order No. R9-2002-0025 as amended by Addendum No. 1, (NPDES CA0107409) are recommended at this time.

The City of San Diego maintains a rigorous quality control program for sample collection and laboratory analysis. A copy of the City's *Wastewater Chemistry Laboratory Quality Assurance Report* has been submitted to EPA and the Regional Board. A copy of the City's current *Quality Assurance Manual for the Ocean Monitoring Program* has also been submitted to EPA and the Regional Board.

The quality assurance reports document sampling methods, preservation techniques, analytical techniques, quality assurance/verification procedures, statistical techniques, and taxonomic procedures. To avoid duplication, these previously submitted documents are not reproduced herein, but are incorporated by reference as part of the City's 301(h) application.

III.F.3 Describe the personnel and financial resources available to implement the monitoring programs upon issuance of a modified permit and to carry it out for the life of the modified permit.

SUMMARY: The City has the available personnel, equipment, and financial resources to carry out the 301(h) monitoring program.

As noted in the response to Question III.F.1, the City proposes maintaining the comprehensive monitoring program established under the provisions of Monitoring and Reporting Program No. R9-2002-0025 (NPDES Permit No. CA0107409) as amended by Addendum No. 1.

This comprehensive monitoring program is administered by the City of San Diego's Environmental Monitoring and Technical Services Division. Including administrative support, the program is carried out by a staff of 93 with an annual budget of approximately $13.8 million. Table III.F-1 (page III.F-5) summarizes FY 2008 program staffing. Table III.F-2 (page III.F-6) summarizes the FY 2008 program budget.

The biology section includes a professional staff of 39, including marine biologists, microbiologists, toxicologists, laboratory technicians, data management specialists, and boat operators. As part of the ocean monitoring program, receiving water, sediment, benthic organisms, and fish are collected by two marine monitoring vessels, the *Monitor III* (42 foot-length) and the *Oceanus* (48 foot-length). The City also maintains extensive chemistry, marine, and microbiological laboratories, and a computer database.

Wastewater influent, effluent, residuals, fish tissue and sediment chemistry analyses are performed by the City of San Diego's Wastewater Chemistry Laboratory. The laboratory is staffed by approximately 49 chemists, laboratory technicians, and data base management personnel.

City laboratories have been certified by the State of California's Environmental Laboratory Accreditation Program (ELAP). All appropriate analyses are performed according to EPAP approved methods.

Southern California regional monitoring programs have been coordinated by the Southern California Coastal Water Research Project in conjunction with EPA and the various Regional Water Quality Control Boards. San Diego's laboratories have successfully participated in the regional program's method comparability studies when required.

Resumes of key City monitoring and laboratory personnel are presented in the City's *Wastewater Chemistry Laboratory Quality Assurance Report* and *Quality Assurance Manual for the Ocean Monitoring Program.* These reports are incorporated by reference as part of the City's 301(h) application.

Table III.F-1
Summary of FY 2008 Staffing
Environmental and Technical Services Technical Division
Wastewater Chemistry Laboratory and Ocean Monitoring Program

Group	Personnel	FY 2008 Staffing
Administration	Deputy Director	1
	Business Manager	1
	Analyst	1
	Other Support Staff	2
	Section Total	5
Ocean Monitoring Program	Program Supervisor (Sr. Marine Biologist)	1
	Sr. Biologist	1
	Marine Biologist III	4
	Biologist III	1
	Marine Biologist II	18
	Biologist II	6
	Lab Technician	4
	Assistant Lab Technician	1
	Sr. Boat Operator/Boat Operator	2
	Clerical Support	1
	Section Total	39
Wastewater Chemistry Laboratory	Senior Chemist	1
	Associate Chemist	6
	Assistant/Jr. Chemist	31
	Lab Technician	10
	Clerical Support	1
	Section Total	49
Program Totals		93

Table III.F-1
Summary of FY 2008 Budget
Environmental and Technical Services Technical Division
Wastewater Chemistry Laboratory and Ocean Monitoring Program

Category	FY2008 Budget
Personnel	$ 8,900,569
Non-Personnel	3,397,143
Capital Outlay	284,422
Contracts/Support of Research & Prof. Orgs.	1,215,119
TOTAL	$ 13,797,253

Section III.G

Large Applicant Questionnaire

III.G. *Effect of Discharge on Other Point and Nonpoint Sources* [40 CFR 125.63]:

III.G.1. Does (will) your modified discharge(s) cause additional treatment or control requirements for any other point or nonpoint pollution source(s)?

SUMMARY: No other regional ocean discharger will be affected by the PLOO discharge.

A number of other point and non-point dischargers exist within the San Diego County region. Near-shore discharges within the United States include storm drain discharges, discharges from natural watercourses, cooling water discharges from power plants, and aquarium or mammal confinement discharges. Nearshore discharges in Mexican federal waters include a surf zone wastewater discharge from the Tijuana municipal wastewater plant.

As documented in Appendix N, ocean currents off the San Diego coast are predominantly long-shore. Since the PLOO discharge is approximately 7.2 km (4.5 miles) offshore, the discharge has virtually no impact on shoreline water quality. Conversely, the nearshore discharges (including storm runoff and storm drains) tend to move upcoast and downcoast within nearshore waters, but have little impact on offshore water quality.

While offshore waters (including waters passing through the PLOO ZID) tend to remain offshore, sufficient distance exists between the PLOO and other regional outfall facilities to insure that the regional discharges do not impact each other.

Table III.G-1 (page III.G-2) presents a list of existing NPDES dischargers to offshore coastal waters of San Diego County. Table III.G-2 (page III.G-3) presents a description of outfall discharge facilities. As shown in Table III.G-2, the PLOO discharge is the only deep-water ocean discharge in the region. All other San Diego County outfall discharges are to depths of 36 m (110 feet) or less. The nearest discharge to PLOO is the South Bay Ocean Outfall; the South Bay outfall diffuser is located approximately 18 km (10 miles) southwest of the PLOO diffuser.

Three ocean outfall discharges of treated effluent occur in San Diego County north of the PLOO discharge. The three discharges account for approximately 4.2 m^3/sec (96 mgd) of undisinfected secondary and tertiary wastewater.

Table III.G-1
Regional Municipal Wastewater Discharger
Offshore Ocean Outfall Discharges

Facility	Contributing Agencies	Nature of Discharge	NPDES Permit	Permitted Flow[1]
Oceanside Ocean Outfall	City of Oceanside	Secondary and tertiary treated wastewater	Order No. R9-2005-0136 NPDES CA0107433	1.00 m^3/sec (22.9 mgd)
	Fallbrook Public Utility District	Tertiary treated wastewater	Order No. R9-2006-0002 NPDES CA0108031	0.12 m^3/sec (2.7 mgd)
	USMC Camp Pendleton	Secondary treated wastewater	Order No. R9-2003-0155 NPDES CA0109347	0.16 m^3/sec (3.6 mgd)
Encina Ocean Outfall	Encina Joint Powers Agencies	Secondary treated wastewater[3]	Order No. R9-2005-0219 NPDES CA0107395	1.90 m^3/sec (43.3 mgd)
San Elijo Ocean Outfall	City of Escondido	Secondary treated wastewater[3]	Order No. R9-2005-0101 NPDES CA0107981	0.79 m^3/sec (18.0 mgd)
	San Elijo Joint Powers Authority	Secondary treated wastewater[3]	Order No. R9-2005-0100 NPDES CA0107999	0.23 m^3/sec (5.25 mgd)
IBWC South Bay Ocean Outfall	International Boundary and Water Commission	Primary treated wastewater	Order No. 96-50 NPDES CA0108928	1.1 m^3/sec (25 mgd)
	City of San Diego	Secondary treated wastewater[3]	Order No. R9-2006-0067 NPDES CA0109045	0.66 m^3/sec (15 mgd)

1 Average daily flow limits imposed by NPDES permits. Actual discharges through the outfalls are typically less than the permitted flows.
2 NPDES permit application has been developed and submitted to the Regional Board. Regional Board development of tentative NPDES requirements is pending resolution of outstanding issues.
3 The discharge may occasionally contain excess tertiary treated flows or tertiary treated flows that do not meet Title 22 recycled water specifications.

Table III.G-2
Physical Characteristics of Regional Outfall Discharges

Outfall Facility	Distance from PLOO discharge	Outfall Discharge Depth	Discharge Distance Offshore	Estimated Initial Dilution[1]	Total Permitted Flow[2]
Oceanside Ocean Outfall	60 km north (37 miles)	30 meters (100 feet)	2,400 meters (8,000 feet)	80	1.28 m^3/sec (29.1 mgd)
Encina Ocean Outfall	50 km north (32 miles)	36 meters (120 feet)	2,700 meters (9,000 feet)	100	1.90 m^3/sec (43.3 mgd)
San Elijo Ocean Outfall	37 km north (23 miles)	30 meters (100 feet)	3,000 meters 10,000 feet	100	1.02 m^3/sec (23.25 mgd)
South Bay Ocean Outfall	20 km south (5 miles)	28 meters (93 feet)	8700 meters[4] (23,600 feet)	100[3]	1.1 m^3/sec (25 mgd)

1 Approximate initial dilution on which NPDES effluent limits are based.
2 Flow limits on USA outfall discharges are the flow limits established in NPDES permits issued by the Regional Board during 1999.
3 Actual dilution is projected to be significantly higher. Regional Board used 100 to 1 dilution in establishing requirements for IBWC discharge through SBOO.

III.G.2. Provide the determination required by 40 CFR 125.63(b) or, if the determination has not yet been received, a copy of a letter to the appropriate agency(s) requesting the required determination.

The City has submitted a letter to the California Regional Water Quality Control Board, San Diego Region, requesting the determination required by 40 CFR 125.63(b). A copy of the letter is presented in Appendix U (Volume VIII).

Section III.H

Large Applicant Questionnaire

III.H.1. a. Do you have any known or suspected industrial sources of toxic pollutants or pesticides?

As detailed in Appendices K and L (Volume VII), the City maintains an industrial source control program that:

- identifies industrial sources of toxic pollutants,
- establishes permits for industrial dischargers, and
- monitors and enforces pretreatment and source control discharge limits.

Appendix K presents a summary of the City's industrial waste pretreatment program. Appendix L presents the 2006 annual report for the City's pretreatment program. As documented in Appendices K and L, industries within the City's pretreatment program are classified into four groups based on the type of industry and characteristics of the wastestream:

Class 1: Industries subject to federal categorical pretreatment standards

Class 2: Industries which have potential toxic discharges at flows > 25 gpd, but do not require Best Available Technology (BAT) pretreatment

Class 3: Industries which have process discharges of > 2500 gpd that require control of conventional pollutants

Class 4: Dry industries, industries with sanitary discharges only, or non-CIUs with discharge flows below permit flow thresholds.

Permits are issued to Class 1, 2, and 3 industrial dischargers. Table III.H-1 (page III.H-2) summarizes the number of regulated industries and associated industrial flows.

As shown in Table the table, a total of 50 industries are subject to federal categorical pretreatment standards (Categorical Industrial Users, or CIUs). Total flows from CIUs average approximately 0.3 mgd (0.013 m^3/sec).

A total of 70 industries are regulated as Significant Industrial Users (SIUs), as defined under 40 CFR 403.3. Flows from non-categorical SIUs represent a significant majority of all Metro System industrial flows.

As documented in Appendices K and L, the number of CIUs and SIUs within the Metro System have significantly declined during the past 20 years.

Table III.H-1
Breakdown of Historic and Projected CIUs and SIUs

Parameter	Total	SIUs[1]	CIUs[2]
Number of Permitted Industrial Dischargers	1548	70	50
Industrial Flows (mgd)	6.7	6.5	0.3
Industrial Flows as a Percent of total Point Loma WTP Influent Flow[3]	3.9	3.8	0.18

1 SIUs are Significant Industrial Users, as defined in 40 CFR 403.3.
2 CIUs are Categorical Industrial Users subject to federal categorical pretreatment standards established in 40 CFR Sections 405 through 471.
3 Expressed as a percent of 2006 average annual Point Loma WTP flow of 170 mgd.

Table III.H-2 presents a breakdown by Standard Industrial Classification (SIC) of the Metro System industrial users. As shown in Table III.H-2, photofinishing laboratories and dry cleaners represent two-thirds of the permitted dischargers. The majority of the industrial flows are contributed by sanitary services, groundwater remediation discharges, and food preparation industries.

Table III.H-2
Current Breakdown of Industries and Flows by Standard Industrial Code (Aug 16, 2007)

SIC Code	Industry Type	No. of Industrial Dischargers		Industrial Discharge Flows (gpd)	
		Permit Issued[1]	No Permit[2]	Total	Average
0200	Livestock production and animal specialties	1	4	3,463	1,154
0700	Agricultural services	1	1	35	18
0740	Veterinary services	3	5	5,844	1,461
1500	Construction/trade contractors	2	19	2,273	325
2010	Meat products	0	5	1,215	1,215
2030	Canned and preserved fruits and vegetables	0	1		
2040	Grain mill products	0	2	785	785
2050	Bakery products	0	5	120	120
2070	Vegetables and animal oils	1	0	20,000	20,000
2080	Beverages (bottling companies, breweries)	3	3	123,255	20,543
2090	Misc. food product prep (fish,snacks,misc. can/pckgd)	1	16	103,321	17,220
2099	Food preparations, NEC	1	2	795,057	397,529
2300	Apparel and other products made from fibers	0	7	3,500	3,500
2400	Lumber and wood products except furniture	2	5	173	87
2500	Furniture and fixtures mfg	1	12	76	38
2600	Pulp, paper mills & paper, card- & food-board prods	1	1	72	36
2700	Printing, publishing & allied industries	11	26	3,083	257
2750	Commercial printing	28	35	1,343	90
2759	Silk screening	5	17	4,609	288
2790	Typesetting/platemaking for printing trade	0	1	6	6

Table III.H-2
Current Breakdown of Industries and Flows by Standard Industrial Code (Aug 16, 2007)

SIC Code	Industry Type	No. of Industrial Dischargers		Industrial Discharge Flows (gpd)	
		Permit Issued[1]	No Permit[2]	Total	Average
2810	Industrial inorganic chemicals	0	2	0	0
2820	Plastics, resins, synthetic rubber, manmade fibers	0	9	241	80
2830	Drugs, pharmaceutical, biological products	29	6	56,939	1,675
2840	Soaps detergents, cleaning preparation, cosmetics	2	4	322	64
2850	Paints, varnishes, enamels & allied products	1	4	149	75
2860	Industrial organic chemicals	0	2	0	0
2870	Agricultural chems: nitrogenous/phosphatic fertilizers	0	1	1,459	1,459
2879	Pest-, insect-, fung-, herbicides; soil conditioners	0	1		
2890	Misc chemical products	1	2	1,248	624
2900	Petroleum refining and related industries	0	2		
2950	Asphalt paving and roofing materials	0	3		
2990	Misc petroleum & coal products	1	0	72	72
2992	Lubricating oils and greases				
3000	Rubber products	1	9	121	61
3080	Plastics products	1	9	513	513
3081	Plastic film and sheet, unsupported	4	0	255,484	63,871
3100	Leather products mfg.	0	1		
3200	Stone, clay, glass, and concrete products	0	14	1,442	721
3300	Primary metal industries	0	1		
3340	Secondary refining and recovery,non-ferrous	0	1		
3350	Rolling, drawing, & extruding non-ferrous metals	2	1	1,038	346
3360	Non-ferrous foundries/casting	1	3	220	110
3390	Metal heat-treating, metal powders & paste	1	5	608	203
3400	Fabricated metal products, except machinery	8	44	11,658	530
3440	Fabricated structural metal products	1	5	600	300
3462	Iron and steel forgings	0	1		
3469	Metal stampings	0	1		
3471	Electroplating, plating, polishing, anodizing, coloring	6	4	2,385	341
3479	Coating, engraving, etching, galvanizing, enameling	8	12	6,062	551
3490	Misc fabricated metal products: valves, wire, foil	0	2	0	0
3500	Manufacture of machinery except electrical	1	4	100	50
3510	Manufacture of engines and turbines	3	0	11,407	3,802
3530	Construction, mining, & materials handling machines	0	1	150	150
3540	Metalworking machinery and equipment	0	3	3	3
3550	Spec mach: textile, woodwork, print/paper, food proc.	0	1		
3560	General ind. machines: pumps, fans, gears, furnaces	0	2		
3570	Manufacture of computers and office equipment	1	2	3,298	3,298
3580	Refrigeration and service industry machinery	0	1		
3590	Misc ind. and comm. machines: pumps, scales, etc.	0	3		
3559	Machine shops, jobbing and repair	7	49	1,459	52
3600	Electrical & electronic equipment	10	65	9,576	282
3601	Wave soldering	1	0	167	167
3630	Household appliances	0	1		
3640	Electric lighting and wiring equipment	0	2		
3650	Household audio and video equipment; audio record.	0	1		

Table III.H-2
Current Breakdown of Industries and Flows by Standard Industrial Code (Aug 16, 2007)

SIC Code	Industry Type	No. of Industrial Dischargers		Industrial Discharge Flows (gpd)	
		Permit Issued[1]	No Permit[2]	Total	Average
3660	Communications equipment: phone, radio, tv, alarms	0	3	6	3
3670	Manufacture of electronic components	9	18	61,559	4,397
3672	Printed circuit board manufacturing	1	0	75,489	75,489
3674	Semiconductor and related devices manufacturing	0	2	20	20
3690	Misc electrical machinery, equipment, and supplies	0	4		
3691	Storage batteries	0	1		
3710	Manufacture vehicles and vehicle equipment	1	6	103	52
3720	Manufacture aircraft and aircraft parts	5	5	54,997	9,166
3730	Ship and boat building and repairing	8	8	95,811	11,976
3760	Guided missiles, space vehicles & parts	2	1	1,504	501
3790	Misc transportation equipment	0	1	0	0
3820	Lab app & anal. optical, measure, control instruments	4	7	1,348	150
3840	Surgical, medical, and dental instruments & supplies	1	11	267	45
3850	Opthalmic goods, i.e. contacts, glasses, lenses	0	3	80	40
3860	Photographic equipment and supplies	1	0	120	120
3900	Miscellaneous manufacturing industries	1	19	844	121
3910	Jewelry, silverware, and plated wares	0	6		
3949	Sporting and athletic goods, not elsewhere classed	0	2	1,223	612
4000	Railroad transportation	1	4	15,152	5,051
4100	Local transportation; taxicabs, buses, rental cars	4	7	15,412	2,202
4200	Motor freight and warehousing	2	27	2,449	408
4220	Public storage	0	3		
4300	U.S. postal service	0	2	71	35
4400	Water transportation (includes marinas)	1	5	8,390	2,098
4500	Air transportation, airports, terminals, services	3	12	3,462	692
4800	Telephone, television, radio broadcasting	0	6	1,100	550
4900	Utilities	3	2	14,376	3,594
4910	Electric Services	3	3	69,665	13,933
4930	Combination electric and gas, with other services	3	2	2,187	437
4940	Water supply utilities	2	5	3,496	699
4950	Sanitary services	2	4	9,677,784	1,935,557
4953	Refuse systems: TSDF, landfill, incinerator, sludge	0	5	5,299	2,650
4959	Groundwater remediation/water disposal/und. tanks	28	2	2,393,729	82,524
5000	Wholesale trade - durable goods	2	36	287	96
5100	Wholesale trade - nondurable goods	4	17	9,926	1,103
5200	Retail trade - building materials & garden supplies	0	8	142	47
5300	Retail trade - general merchandise/dept. stores	3	5	3	1
5400	Retail trade - food stores	1	8	48	12
5410	Convenience grocery stores	0	2	122	122
5460	Retail bakeries	0	1		
5500	Auto, boat, motorcycle, recreational vehicle dealers	10	52	42,952	1,048
5540	Gasoline stations	3	24	57,216	3,814
5800	Eating and drinking places	0	5	7,770	3,885
5900	Miscellaneous retail stores and shops	4	29	1,024	146
6000	Finance, insurance and real estate	0	1		

Table III.H-2
Current Breakdown of Industries and Flows by Standard Industrial Code (Aug 16, 2007)

SIC Code	Industry Type	No. of Industrial Dischargers		Industrial Discharge Flows (gpd)	
		Permit Issued[1]	No Permit[2]	Total	Average
7000	Hotels, motels, trailer parks and other lodging	4	59	227,995	5,846
7212	Garment pressing, laundry/cleaning elsewhere	0	4	0	0
7213	Commercial laundries, linen supply	2	7	292,696	48,783
7215	Coin operated laundries	0	6	14,828	14,828
7216	Dry-cleaning plants, except rug cleaning	168	22	4,800	28
7217	Carpet and upholstery cleaning	0	8	1,487	372
7218	Industrial laundries	4	0	140,783	35,196
7220	Photographic studios (no photofinishing)	0	8	600	600
7334	Photocopying & blueprinting	1	10	25	13
7335	Commercial photography	0	5		
7336	Commercial art, graphics design	2	13	148	37
7340	Disinfecting, exterminating and cleaning services	0	8	592	197
7350	Equipment leasing, heavy	12	15	9,397	447
7384	Photofinishing laboratories	836	10	273	1
7389	Miscellaneous services/soft water services	3	32	65,064	5,422
7510	Car and truck rental agencies	2	21	18,419	1,674
7530	Gas stations, Auto repair shops, body shops	29	395	42,272	252
7539	Radiator repair shops	10	9	1,117	74
7540	Car washes	10	96	312,379	4,339
7549	Auto steam cleaning	7	5	11,516	1,152
7600	Misc. repair shops (welding, furniture refinish)	3	16	801	114
7620	Electrical repair shops	0	6	17	6
7690	Misc. Repair shops and related services, except TW	1	6	1,566	522
7699	Trucked waste, domestic and industrial	0	1	214,540	4,989
7800	Motion picture production and theatres	0	2	750	750
7900	Amusement and recreation services	1	14	3,628	454
8000	Health services	7	33	3	2
8050	Convalescent homes and other extended nursing	0	15	34,150	3,415
8060	Hospitals	19	3	122,002	7,177
8070	Medical and dental laboratories	11	30	2,007	201
8090	Clinics/outpatient care facilities	11	34	8,528	609
8100	Legal and social services and membership orgs	1	0		
8200	Educational services (school, colleges etc.)	14	20	177,645	9,350
8400	Museums, botanical, zoological gardens	1	0	967	967
8730	Research and development, testing labs	76	77	171,857	1,469
9100	Executive, legislative, general government offices	4	5	5,868	734
9200	Justice, public order, & safety (correctional facilities)	4	5	86,971	14,495
9700	National security/international affairs	10	5	177,312	16,119
9900	Nonclassifiable establishments	1	32	500	83

1 Includes Class 1, Class 2, Class 2F, Class 3, and Class 4D industrial discharge permits.

2 Includes Class 4, Class 4C, Class 4F, and Class 5 dischargers. (No permits are required for these discharge classes.)

III.H.1 b. If no, provide the certification required by 40 CFR 125.66(a)(2) for small dischargers, and required by 40 CFR 125.66(c)(2) for large dischargers.

The question is not applicable. Industrial sources of toxic pollutants exist within the Metro System service area, as documented within Appendices K and L of this 301(h) application.

III.H.1 c. Provide the results of wet and dry weather effluent analyses for toxic pollutants and pesticides as required by 40 CFR 125.66(a)(1).

The City of San Diego routinely analyzes the Point Loma WTP influent and effluent for toxic compounds. Effluent samples are collected and analyzed on a weekly basis for metals, cyanide, ammonia, chlorinated pesticides, phenolic compounds, and PCBs. Organophosphorus pesticides, dioxin, purgeable (volatile) compounds, acrolein and acrylonitrile, base/neutral compounds, and tri, di, and monobutyl tins are performed on a monthly basis.

The results of the 2006 Point Loma WTP effluent analyses were summarized in the response to Question II.A.4. Results of the Point Loma WTP influent analyses are summarized below for wet and dry weather conditions. Point Loma WTP influent and effluent data have previously been presented in monthly, quarterly, and annual reports submitted to the Regional Board and EPA. Through agreement with EPA, these data are not reproduced in their entirety herein, but the City is coordinating with EPA for the electronic transfer of the data. Data are also presented in the City's 2006 annual pretreatment report (Appendix L).

Table III.H-3 (page III.H-8) summarizes days of recorded rainfall at Point Loma during 2006. The 2006 precipitation was approximately two-thirds the long-term average precipitation at Point Loma.

Table III.H-4 (page III.H-9) compares concentrations of toxic inorganic constituents detected in the Point Loma WTP influent during wet-weather and dry-weather sample days during 2006. The statistics of the wet- and dry-weather sampling are skewed by an occasional abnormal influent value and the fact that significantly more dry-weather data are available than wet-weather data. No marked differences or trends, however, are evident in comparing the wet- and dry-weather Point Loma WTP influent concentrations.

Table III.H-3
Precipitation Days at Point Loma WTP During 2006

Month	Dates on which Precipitation was Recorded at the Point Loma WTP[1]	Total Monthly Precipitation	
		inches	cm
January	1, 2, 14, 15, 27	0.36	0.91
February	14, 17, 18, 19, 27, 28	1.01	2.57
March	3, 6, 7, 9, 10, 11, 12, 13, 15, 17, 18, 19, 21, 26, 27, 28, 29, 31	1.47	3.73
April	3, 4, 5, 6, 10, 14, 15, 16, 17, 22, 23, 26, 27	0.88	2.24
May	22, 27	0.77	1.96
June	6, 6, 26, 27	trace	Trace
July	16, 22, 23, 24, 26, 29, 30, 31	0.04	0.10
August	3, 30	0.01	0.03
September	None	NA	NA
October	13, 14, 15,	0.76	1.93
November	11, 12, 14, 26, 27, 28	0.15	0.38
December	9, 10, 16, 17, 22, 27	0.71	1.80
Annual Totals		6.16	15.65

1 From Point Loma WTP 2006 Annual Report

Table III.H-4
Summary of Toxic Inorganic Concentrations in Wet and Dry Conditions
Point Loma WTP Influent - Calendar Year 2006

Toxic Inorganic Constituent	Point Loma WTP Influent Concentration in $\mu g/\ell$							
	Dry Weather 2006 Samples				Wet Weather 2006 Samples			
	No. of Samples	Mean Value	Max. Value	Min. Value	No. of Samples	Mean Value	Max. Value	Min. Value
antimony	38	< 0.85	2.5	ND[2]	8	< 1.1	3.5	ND[2]
arsenic	38	1.0	1.7	0.61	8	1.2	1.9	0.76
barium	38	101	179	61	8	90	111	71
beryllium	38	< 0.03	0.12	ND[2]	8	< 0.07	0.45	ND[2]
cadmium	38	< 0.26	0.85	ND[2]	8	< 0.21	0.51	ND[2]
chromium	38	12	181	2.2	8	7.2	13	4.2
cobalt	38	< 1.1	2.3	ND[2]	8	0.94	1.5	0.35
copper	38	95	205	47	8	80	101	51
lead	38	< 3.7	12	ND[2]	8	4.5	11	2.7
lithium	38	38	44	27	8	36	42	27
mercury	38	< 0.20	1.1	ND[2]	8	< 0.16	0.36	ND[2]
molybdenum	38	11	54	5.9	8	8.6	11	6.1
nickel	38	14	28	8	8	12	19	8.0
selenium	38	1.6	2.5	1.2	8	1.5	1.7	1.2
silver	38	< 1.7	5.7	ND[2]	8	1.2	3.1	0.2
thallium	38	< 1.9	6.1	ND[2]	8	ND[2]	ND[2]	ND[2]
vanadium	38	5.1	17	0.8	8	4.3	7.7	2.3
zinc	38	170	371	82	8	138	182	93
cyanide	37	< 1.7	3.0	ND[2]	8	< 1.9	3.0	ND[2]

1 The listed wet weather analyses are for sampling days in which precipitation was recorded at Point Loma WTP, per Table III.H-3 on page III.H-7. Dry weather analyses are for sampling days in which no precipitation was recorded. Samples for metals and cyanide were collected weekly (on the average approximately once each eight days) during the year. For samples with non-detected concentrations, a concentration equal to one-half the Method Detection Limit was assigned for purposes of computing mean annual values. Raw data are from 2006 Point Loma WTP monthly monitoring reports.

2 ND indicates the constituent was not detected. Method Detection Limits (MDLs) achieved during 2006 for the Point Loma WTP influent analyses include: 1.0 μg/l for antimony, 0.04 μg/l for beryllium, 0.19 μg/l for cadmium, 0.16 μg/l for cobalt, 1.4 μg/l for lead, 0.09 μg/l for mercury, 0.16 μg/l for silver, 1.8 μg/l for thallium, and 2.0 μg/l for cyanide.

Table III.H-5 (page III.H-10) compares concentrations of toxic inorganic constituents detected in the Point Loma WTP effluent during wet- and dry-weather sample days during 2006. As with the Point Loma WTP influent, no significant differences or trends are evident in comparing the effluent wet- and dry-weather concentrations.

Table III.H-5
Summary of Toxic Inorganic Concentrations in Wet and Dry Conditions
Point Loma WTP Effluent - Calendar Year 2006

Toxic Inorganic Constituent	Point Loma WTP Effluent Concentration in μg/ℓ							
	Dry Weather 2006 Samples[1]				Wet Weather 2006 Samples[1]			
	No. of Samples	Mean Value	Max. Value	Min. Value	No. of Samples	Mean Value	Max. Value	Min. Value
antimony	38	< 0.73	2.80[3]	ND[2]	8	< 0.83	2.0	ND[2]
arsenic	38	< 0.52	0.77	ND[2]	8	0.65	0.88	0.57
barium	38	33	73	17	8	32	43	21
beryllium	38	< 0.02	0.05	ND[2]	8	< 0.02	0.05	ND[2]
cadmium	38	< 0.14	0.44	ND[2]	8	< 0.14	0.32	ND[2]
chromium	38	< 1.8	7.6	ND[2]	8	1.9	2.9	0.94
cobalt	38	< 0.8	2.4[3]	ND[2]	8	1.0	1.8	0.24
copper	38	20	42	7.7	8	24	39	17
lead	38	< 1.0	3.0	ND[2]	8	< 1.5	5.3	ND[2]
lithium	38	37	45[3]	30	8	37	42	31
mercury	38	< 0.05	0.09	ND[2]	8	< 0.06	0.14	ND[2]
molybdenum	38	13	164[3]	5.9	8	7.4	9.5	5.9
nickel	38	9.7	18	5.4	8	8.2	9.9	5.6
selenium	38	0.92	1.3	0.69	8	0.9	1.1	0.6
silver	38	< 0.17	0.91	ND[2]	8	< 0.22	0.90	ND[2]
thallium	38	< 1.0	2.3	ND[2]	8	ND	ND	ND[2]
vanadium	38	< 2.9	8.0	ND[2]	8	2.9	5.7	0.65
zinc	38	25	64	9	8	22	31	9.4
cyanide	37	< 1.6	3.0	ND[2]	8	< 1.6	2.0	ND[2]

1 The listed wet weather analyses are for sampling days in which precipitation was recorded at Point Loma WTP, per Table III.H-3 on page III.H-7. Dry weather analyses are for sampling days in which no precipitation was recorded. Samples for metals and cyanide were collected weekly (on the average approximately once each eight days) during the year. For samples with non-detected concentrations, a concentration equal to one-half the Method Detection Limit was assigned for purposes of computing mean annual values. Raw data are from 2006 Point Loma WTP monthly monitoring reports.

2 ND indicates the constituent was not detected. Method Detection Limits (MDLs) achieved during 2006 for the Point Loma WTP effluent analyses include: 1.0 μg/l for antimony, 0.4 μg/l for arsenic, 0.04 μg/l for beryllium, 0.19 μg/l for cadmium, 0.19 μg/l for chromium, 0.16 μg/l for cobalt, 1.4 μg/l for lead, 0.09 μg/l for mercury, 0.16 μg/l for silver, 1.8 μg/l for thallium, 0.48 μg/l for vanadium, and 2.0 μg/l for cyanide.

3 Maximum effluent concentration during 2006 was higher than the maximum influent concentration. While the Point Loma WTP influent and effluent samples are collected approximately simultaneously, the effluent can occasionally be higher than the influent due to time-variation in influent and effluent quality and the hydraulic travel time through the plant.

The response to Question II.A.4 summarizes toxic organic compounds detected in the Point Loma WTP effluent during 2006. Toxic organic compounds detected in the Point Loma WTP influent and effluent on a consistent or near-consistent basis during 2006 included:

- 1,4-dichlorobenzene,
- 2-butanone,
- acetone,
- BHC gamma (lindane),
- bis (2-ethylhexyl) phthalate,
- bromodichloromethane (dichlorobromomethane),
- chloroform (trichloromethane),
- dibromochloromethane (chlorodibromomethane),
- methyl tertiary butyl ether (MTBE),
- methylene chloride,
- phenol, and
- toluene

Toxic organic compounds detected in the Point Loma influent on an isolated basis during 2006 included:

- 1,3-dichlorobenzene (detected in 1 of 24 influent samples),
- 4-methyl, 2-pentanone (detected in 1 of 12 influent samples),
- ethylbenzene (detected in 1 of 12 influent samples),
- p,p'-DDE, also known as 4,4'-DDE (detected 2 of 46 influent samples),
- Tetrachloroethylene (detected in 2 of 12 influent samples), and
- xylene (detected in 1 of 12 influent samples)

In addition to being detected twice in the Point Loma WTP influent, tetrachloroethylene (tetrachloroethene) was also detected in 1 of 12 Point Loma WTP effluent samples. Further, the compound diethyl phthalate was detected in 2 of 12 Point Loma effluent samples during 2006, but was not detected in the Point Loma WTP influent.

Table III.H-6 (page III.H-12) summarizes wet- and dry-weather analyses for toxic compounds consistently detected in the Point Loma influent and effluent during 2006. Table III.H-7 (page III.H-13) summarizes wet- and dry-weather analyses for the Point Loma WTP effluent.

As shown in the tables, no significant differences appear to exist between the wet- and dry-weather analyses of Point Loma influent and effluent toxic organic constituents.

Table III.H-6
Summary of Toxic Organic Concentrations in Wet and Dry Conditions
Point Loma WTP Influent - Calendar Year 2006

Toxic Organic Constituent	Point Loma Influent Concentration (μg/ℓ)							
	Dry Weather 2006 Samples[1]				Wet Weather 2006 Samples[1]			
	No. of Samples	No. of Non-Detects[2]	Mean Value	Max. Value	No. of Samples	No. of Non-Detects[2]	Mean Value	Max. Value
1,4-dichlorobenzene	10	0	2.9	3.9	2	0	2.8	3.0
2-butanone	10	0	8.4	23.7	2	0	6.2	7.5
acetone	10	0	970	3240	2	0	1010	1110
BHC gamma (Lindane)	38	25	< 0.01	0.05	8	4	< 0.01	0.03
bis (2-ethylhexyl) phthalate	6	0	19	30	2	0	26	36
bromodichloromethane	10	7	< 0.9	2.7	2	1	< 0.8	1.1
chloroform	10	0	6.1	11	2	0	5.1	5.6
dibromochloromethane	10	7	< 0.8	2.2	2	2	ND[3]	ND[3]
MTBE	10	0	3.2	6.6	2	2	ND[3]	ND[3]
methylene chloride	10	2	< 1.7	2.7	2	0	2.3	2.3
phenol	38	0	19	41	8	0	19	27
toluene	10	5	< 3.9	30	2	2	ND[3]	ND[3]

1 The listed wet weather analyses are for sampling days in which precipitation was recorded at Point Loma WTP, per Table III.H-3 on page III.H-7. Dry weather analyses are for sampling days in which no precipitation was recorded. Samples for phenol and BHC gamma were collected weekly (on the average approximately once each eight days) during the year. All other toxic organic constituents were monitored on a monthly basis. For samples with non-detected concentrations, a concentration equal to one-half the Method Detection Limit (MDL) was assigned for purposes of computing mean annual values. Raw data are from 2006 Point Loma WTP monthly monitoring reports.

2 Number of 2006 samples in which the constituent was not detected. MDLs achieved during 2006 for the Point Loma WTP effluent analyses include: 0.01 μg/l for BHC gamma, 1.0 μg/l for bromodichloromethane, 1.0 μg/l for dibromochloromethane, 1.0 μg/l for MTBE (methyl tertiary butyl ether), 1.0 μg/l for methylene chloride, and 1.0 μg/l for tetrachloroethylene, and, 1.0 μg/l for toluene.

3 ND indicates the constituent was not detected at the MDL referenced in above footnote #2.

Table III.H-7
Summary of Toxic Organic Concentrations in Wet and Dry Conditions
Point Loma WTP Effluent - Calendar Year 2006

Toxic Organic Constituent	Point Loma Effluent Concentration (μg/ℓ)							
	Dry Weather 2006 Samples[1]				Wet Weather 2006 Samples[1]			
	No. of Samples	No. of Non-Detects[2]	Median Value	Max Value	No. of Samples	No. of Non-Detects[2]	Median Value	Max Value
1,4-dichlorobenzene	10	0	2.6	3.0	2	0	3.1	3.4
2-butanone	10	0	10	23	2	0	33	58[4]
acetone	10	0	1000	2780	2	0	1160	1400[4]
BHC gamma (Lindane)	38	34	< 0.01	0.02	8	7	< 0.01	0.01
bis (2-ethylhexyl) phthalate	6	5	< 7.7	15	2	2	ND[3]	ND[3]
bromodichloromethane	10	7	< 0.9	2.2	2	0	2.5	3.7
chloroform	10	0	6.0	9.4	2	0	8.4	11
dibromochloromethane	10	9	< 0.8	2.0	2	0	2.0	2.9
MTBE	10	0	2.7	4.6	2	0	1.4	1.4[4]
methylene chloride	10	2	< 2.2	3.5[4]	2	0	3.4	3.6[4]
phenol	38	0	14	26	8	0	13	19
toluene	10	2	< 1.5	3.0	2	0	1.6	1.6[4]

1 The listed wet weather analyses are for sampling days in which precipitation was recorded at Point Loma WTP, per Table III.H-3 on page III.H-7. Dry weather analyses are for sampling days in which no precipitation was recorded. Samples for phenol and BHC gamma were collected weekly (on the average approximately once each eight days) during the year. All other toxic organic constituents were monitored on a monthly basis. For samples with non-detected concentrations, a concentration equal to one-half the Method Detection Limit (MDL) was assigned for purposes of computing mean annual values. Raw data are from 2006 Point Loma WTP monthly monitoring reports.

2 Number of 2006 samples in which the constituent was not detected. MDLs achieved during 2006 for the Point Loma WTP effluent analyses include: 0.01 μg/l for BHC gamma, 1.0 μg/l for bis (2-ethylhexyl) phthalate, 1.0 μg/l for bromodichloromethane, 1.0 μg/l for dibromochloromethane, 1.0 μg/l for methylene chloride, and 1.0 μg/l for tetrachloroethylene, and, 1.0 μg/l for toluene.

3 ND indicates the constituent was not detected at the MDL referenced in above footnote #2.

4 Maximum effluent concentration during 2006 was higher than the maximum influent concentration. While the Point Loma WTP influent and effluent samples are collected approximately simultaneously, the effluent can occasionally be higher than the influent due to time-variation in influent and effluent quality and the hydraulic travel time through the plant.

III.H.1 d. Provide an analysis of known or suspected industrial sources of toxic pollutants and pesticides identified in (1)(c) above in accordance with 40 CFR 125.66(b).

As part of the City's Industrial Waste Source Control Program, industries that may potentially discharge toxic organic or inorganic constituents to the sewer system are surveyed, discharge permits are issues, and industrial discharges are monitored. The City also performs an annual system-wide non-industrial toxics survey program to further identify the sources of toxic constituents within the Metro System.

Appendix K presents a summary of the City's pretreatment program and identifies regulated dischargers. Effluent analyses for individual SIUs are also presented in Appendix K.

Attachment K3 to Appendix K presents the City's 2006 annual update of local limits. Appendix L presents the pretreatment program annual report for 2006.

The City's 2006 Annual Pretreatment Program Report (presented as Appendix L) summarizes industrial users and waste loads.

On the basis of pretreatment program surveys, permitting, inspections, and local limits updates, Table III.H-8 (page III.H-15) presents a general summary of identified or suspected sources for inorganic toxic constituents found in the Point Loma WTP effluent. Table III.H-9 (page III.H-16) presents a summary of identified or suspected sources for organic toxic constituents found in the Point Loma WTP effluent.

Table III.H-8
Summary of Sources of Point Loma WTP Pollutants of Concern

Constituent	Contribution by Categorical Industries?	Contribution by Non-categorical Industrial or Commercial Facilities?	Industrial or Nonindustrial Sources[1]
antimony	Yes	No[2]	No known significant industrial sources
arsenic	No	No[2]	Pest control poisons, no known significant industrial sources
barium	Yes	Yes	Radiography
beryllium	No	No[2]	No known significant industrial sources
cadmium	Yes	Yes	Metal plating, metalworking and metal alloys, electronics and batteries
chromium	Yes	Yes	Metal plating, shipbuilding, metalworking and metal alloys
cobalt	No	Yes	Aerospace metalworking; turbine/rotor manufacturing
copper	Yes	Yes	Metal plating, working, electronics, tool manufacturing, electroplating, semiconductor manufacturing, shipbuilding, metalworking, water pipe corrosion
lead	Yes	Yes	Metal plating; metalworking, paints, batteries
lithium	No	No[2]	No known significant industrial sources
mercury	No	Yes	Orthodontics, thermostats, thermometers
nickel	Yes	Yes	Metal plating, metalworking and metal alloys
molybdenum	Yes	Yes	Aerospace metalworking, turbine/rotor manufacturing, semiconductor manufacturing
selenium	No	Yes	Water supply
silver	No	Yes	Photo processing
thallium	No	Yes	Pest control poisons, photodetectors, nuclear imaging
vanadium	No	Yes	Aerospace manufacturing; rotor/turbine manufacturing
zinc	Yes	Yes	Metal working, electronics, tool manufacturing, electroplating, circuit printing, shipbuilding, metalworking, research institutions, water pipe corrosion
cyanide	Yes	Yes	Electroplating, electronics and semiconductor manufacturing, pharmaceuticals

1 From information presented in the City's 1996 Urban Area Pretreatment Program, local limits updates (see Attachment K2 to Appendix K), and Metro System industrial user monitoring (summarized in Appendices K and L).

2 No known significant industrial sources.

Table III.H-9
Summary of Sources of Point Loma WTP Pollutants of Concern

Constituent	Contribution by Categorical Industries?	Contribution by Non-categorical Industrial or Commercial Facilities?	Industrial or Nonindustrial Sources[1]
1,4-dichloromethane	No	Yes	Disinfectants, disinfecting deodorizers, mothballs, disinfecting cleansers
2-butanone	Yes	Yes	Solvent, electronics cleaners, constituent of paint, plastics & synthetics
acetone	Yes	Yes	Solvents, glues/adhesives, paints, photo processing
BHC gamma (Lindane)	No	No	Nonindustrial illicit discharges of pesticide wastes
Bis (2-ethylhexyl) phthalate	No	Yes	Plasticizer in PVC pipe, plastics, and styrofoam
bromodichloromethane	No	No	Organic synthesis, water and wastewater chlorination
Chloroform	Yes	Yes	Laboratory solvent, pharmaceuticals, cleaning agents, electronics degreasing
dibromochloromethane	No	No	Organic synthesis, water and wastewater chlorination
MTBE	No	Yes	Gasoline additive
methylene chloride	Yes	Yes	Paint strippers, metal degreasers, electronics cleaners, refrigerant, laboratory solvent
phenolic compounds	Yes	Yes	Constituent of medical and household disinfectants and pharmaceuticals, laboratory solvent, electronics cleaner, constituent of paints, inks, & photo supplies
toluene	Yes	Yes	Solvent-based paint and inks, laboratories, electronics cleaner, metal degreaser, paint stripper, photo supplies, antifreeze

1 From information presented in the City's 1996 Urban Area Pretreatment Program, local limits updates (see Attachment K2 to Appendix K), and Metro System industrial user monitoring (summarized in Appendices K and L).

III.H.2. Provide a schedule for development and implementation of a nonindustrial toxics control program to meet the requirements of 40 CFR 125.66(d)(3).

SUMMARY: The City of San Diego continues implementation and improvement of its nonindustrial program that has been in effect since 1982. The program features a wide range of components directed toward eliminating the discharges of toxic constituents to the sewer system from nonindustrial contaminant sources.

Since 1982, the City of San Diego has maintained a nonindustrial control program aimed at reducing the introduction of nonindustrial toxic pollutants into the sewer system. Key elements of this program include:

- a Household Hazardous Waste (HHW) Program,
- a public education program,
- development and implementation of Industrial User Discharge permits and/or Best Management Practice (BMP) Discharge Authorization requirements for select commercial sectors, and
- ongoing surveys to identify contaminant sources.

Detailed descriptions of the City's HHW Program, education program, permit program, BMPs, and surveys are presented in Appendices K and L.

HHW Program Goals and Objectives. The primary goal of the City's HHW Program is to improve the quality of life in the city of San Diego. The primary focus of the City's strategies is to reduce the amount of HHW generated and to encourage proper disposal of HHW, thereby eliminating illegal and dangerous disposal practices. Overall goals of the program include:

- Educate the residents of San Diego about HHWs. Provide information enabling residents to select and use products in ways that minimize the generation of HHWs. Provide information on appropriate methods of storage and disposal.
- Provide appropriate and convenient HHW collection and disposal opportunities for all City of San Diego residents.
- Encourage and facilitate the reuse and recycling of HHWs, when feasible.

Objectives of the HHW Program include:

- Continue an active public education program to create a high level of public awareness of the proper storage and disposal of HHW and to encourage source reduction measures (such as the use of alternative household products that are less hazardous and purchasing only the quantity needed).
- Continue outreach to schools with HHW Program educational materials that provide information about household hazardous materials, their hazards and opportunities for utilizing safer alternative materials.
- Broaden teacher participation in HHW Program through workshops, conferences and teacher training.
- Maintain HHW Program outreach at community activities with presentations, booths and information distribution sites.
- Maintain public-private partnerships to enhance community and education outreach and maximize impact of outreach dollars.
- Continue sponsorship of HHW collection services, and increase the number of participants using these services.
- Determine the optimum combination of permanent HHW facilities, and one-day HHW collection events to best serve the needs of City residents, and initiate projects to implement such a system.
- Maintain a permanent HHW collection facility adjacent to the entrance to the Miramar Landfill to create a convenient HHW drop-off alternative for residents.
- Continue cooperation with privately-operated used oil and vehicle battery collection facilities that provide drop-off services for residents disposing of these HHWs. Distribute lists of these sites to increase public awareness and use of these drop-off facilities.

Appendix K (Section K.4) presents a detailed description of the City of San Diego HHW Program. Member agencies conduct separate HHW Programs for their respective areas

Public Outreach Effort. The City's public education and outreach elements are important components of the City's non-industrial toxic pollutant reduction strategy. The response to Question III.H.3 summarizes the City's public education and outreach effort. Appendix K (Section K.4) presents a description of this program.

Pollution Reduction Strategies for Commercial Sources. The City's Industrial Wastewater Control Program (IWCP) continues to regulate discharges from laboratories, radiator shops, boatyards and shipyards, and engine repair/cleaning operations. The City has modified and expanded its sector specific Best Management Program (BMP) for the management of silver-rich waste solutions generated by x-ray and photo processors; the City also developed and implemented a BMP program for the management of perchloroethylene at dry cleaning establishments.

Contaminant Source Surveys. A final element of the City's source control program is the City's quarterly collection system monitoring program to:

(1) identify pollutants discharged into the collection system, and

(2) determine the sources of the pollutants.

The collected pollutant discharge information is used identify opportunities for pollutant reduction, and to develop effective pollutant reduction strategies. The most recent contaminant source survey is summarized in the response to Question III.H.5, and described in detail in Appendix K (Section K.2).

III.H.3. Describe the public education program you propose to minimize the entrance of nonindustrial toxic pollutants and pesticides into your treatment system. [40 CFR 125.66(d)(1)]

SUMMARY: The City of San Diego proposes to continue the comprehensive public education program that has been in effect since 1985.

Since 1985, the City of San Diego has conducted an ongoing public education program to minimize the entrance of Household Hazardous Wastes into the treatment system. The City has also conducted an independent, but complementary, public education and outreach program for used oil and oil filters (Used Oil Program).

The City of San Diego uses a variety of methods to inform the public and targeted commercial sectors regarding nonindustrial toxic control pollutant issues, including:

- operating public information hotline services,
- giving presentations in English, Spanish or Vietnamese to community, business or school groups,
- participating in booths at community fairs,
- developing and distributing flyers to private businesses and City facilities where the public had access (e.g., park and recreation centers, libraries, and permit centers),
- placing ads and announcements in local and ethnic newspapers, on radio, and on television regarding the availability of HHW collection services,
- distributing inserts in local newspapers and publications by targeting areas with upcoming HHW collection events, and
- incorporating information in other flyers (e.g., community cleanup event flyers).

Appendix K (Section K.4) presents the City's public education program. Other member agencies conduct separate public education programs. Attachment K2 to Appendix K presents fact sheets, handouts, flyers, and other information used in the City's ongoing public education program. The City proposes to continue the public education programs listed above to educate citizens on proper disposal practices for nonindustrial wastes.

III.H.4. Do you have an approved industrial pretreatment program (40 CFR 125.66(c)(1)?

a. If yes, provide the date of approval.

b. If no, and if required by 40 CFR Part 403 to have an industrial pretreatment program, provide a proposed schedule for development and implementation of your industrial pretreatment program to meet the requirements of 40 CFR Part 403.

Yes. The City of San Diego industrial waste control (pretreatment) program was approved by EPA on June 29, 1982. The letter of EPA approval is presented as Attachment K1 to Appendix K.

III.H.5. Urban area pretreatment requirement [40 CFR 125.65]

a. Provide data on all toxic pollutants introduced into the treatment works from industrial sources (categorical and noncategorical).

The City's Industrial Waste Source Control Program identifies and regulates categorical and noncategorical industries that may potentially discharge toxic organic or inorganic constituents to the sewer system.

Appendix K presents a summary of the City's pretreatment program and identifies regulated dischargers. Effluent analyses for individual SIUs are also presented in Appendix K. The City's 2006 Annual Pretreatment Program Report (presented as Appendix L) summarizes industrial users and waste loads.

Attachment K3 to Appendix K presents the City's 2006 annual update of local limits. As shown in Attachment K3 to Appendix K, three categories of "pollutants of concern" are identified in the 2006 update:

1. Heavy metals addressed by existing local limits for which significant industrial sources have been identified. Metals designated as pollutants of concern on the basis of these criteria include:
   - cadmium,
   - chromium,
   - copper,
   - lead,
   - nickel, and
   - zinc.
2. Toxic organics without individual limits that are regulated by federal total toxic organics (TTOs) limits and toxic organic management plans (TOMPs). Toxic compounds designated as pollutants of concern on the basis of these criteria include:
   - bis(2-ethylhexyl) phthalate,
   - 1,4-dichlorobenzene,
   - non-chlorinated phenols,
   - toluene, and
   - chloroform.
3. Other parameters considered as "special cases", which include cyanide, lindane (BHC gamma) and silver.

As part of the annual local limits update, water quality, sludge, inhibition criteria, and worker health and safety screening levels are assessed for the Point Loma WTP. Criteria used in the City's 2006 local limits update are presented in Attachment K3 to Appendix K. Additionally, Point Loma WTP influent and effluent concentrations are assessed to identify treatment removals, and the influent/effluent data are compared with applicable water quality, sludge, inhibition, and safety criteria. (See Table 3-2 of Attachment K3 to Appendix K) Collection system data and industrial user discharge data are also reviewed to identify pollutants discharged that were not identified by plant influent and effluent data.

Chemical inventory lists submitted with permit applications were also reviewed to identify toxic pollutants used or stored in reportable quantities; Attachment K3 to Appendix K presents pollutants identified through review of chemical lists, and notes whether the pollutant is discharged, whether an applicable pretreatment requirement exists and, if so, whether the industry is in compliance. Attachment K3 to Appendix K also presents data that show the industry-by-industry contribution of pollutants of concern, and the allocation of allowable headworks loads among the industrial sources.

b. Note whether applicable pretreatment requirements are in effect for each toxic pollutant. Are the industrial sources introducing such toxic pollutants in compliance with all of their pretreatment requirements? Are these pretreatment requirements being enforced? [40 CFR 125.65(b)(2)]

Applicable pretreatment requirements are in effect for each toxic pollutant. Attachment K3 to Appendix K presents the 2006 update of the City's local limits. Table III.H-10 (page III.H-25) summarizes the local limits update for inorganic pollutants of concern (metals and cyanide).

Appendix K presents a summary of the City's pretreatment program, while Appendix L presents a copy of the 2006 program annual report. As shown in the appendices, if applicable federal categorical pretreatment standards have been established, current pretreatment permits apply the federal standards to the discharger and require monitoring to determine compliance.

As established in the Program's approved Enforcement Response Plan (see Section K.4 of Appendix K), enforcement actions are taken for instances of noncompliance.

Table III.H-10
Summary of 2006 Update of Local Pretreatment Limits[1]
Metals and Cyanides

Pollutant	Controlling Criterial[2]		Existing Local Limit (mg/l)	Recommended Local Limit		Comments and Proposed Actions
	Source	Value (mg/ℓ)		Value (mg/l)	Type	
Arsenic	B	0.00355	2.0	No Limit	--	■ Heavy metal with no significant industrial sources
Cadmium	B	0.00533	1.0	1.0	HW	■ Heavy metal with significant industrial sources ■ Limit contributing CIUs to federal categorical limits ■ Require non-contributing SIUs to inform of changes ■ Monitor non-categorical SIU dischargers to verify contributions ■ Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications
Chromium	B	0.05409	5.0	5.0	HW	■ Heavy metal with significant industrial sources ■ Limit contributing CIUs to federal categorical limits ■ Require non-contributing SIUs to inform of changes ■ Monitor non-categorical SIU dischargers to verify contributions ■ Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications
Cyanide	B	0.00598	1.9	1.9	Interim	■ Keep existing limit as an interim limit, which protects NPDES permit limit ■ Perform an annual statistical evaluation and comparison of PLWTP data to continue to define effluent emission levels ■ If annual updates show increases from baseline established in 1994-1995, propose control actions. ■ Investigate mechanisms for gains, losses of cyanide in collection system and at WWTP
Lead	B	0.05409	5.0	5.0	HW	■ Heavy metal with significant industrial sources ■ Limit contributing CIUs to federal categorical limits ■ Require non-contributing SIUs to inform of change ■ Use CFL for contributing non-categorical SIUs ■ Monitor non-categorical SIU dischargers to verify contributions ■ Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications
Mercury	B	0.00072	NA	--	--	■ Heavy metal with no significant sources ■ Add BMPs for laboratories regarding mercury disposal

(Table III.H-11 is continued on the next page. See end of table on page III.H-26 for footnotes and abbreviations.)

Table III.H-10 (Continued)
Summary of 2006 Update of Local Pretreatment Limits[1]
Metals and Cyanides

Pollutant	Controlling Criterial[2]		Existing Local Limit (mg/l)	Recommended Local Limit		Comments and Proposed Actions
	Source	Value (mg/l)		Value (mg/l)	Type	
Nickel	B	0.04304	13	13	CFL	■ Heavy metal with significant industrial sources ■ Limit contributing CIUs to federal categorical limits ■ Require non-contributing SIUs to inform of change ■ Use CFL for contributing non-categorical SIUs ■ Monitor non-categorical SIU dischargers to verify contributions ■ Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications
Selenium	B	0.00168	--	--	--	■ Heavy metal with no significant industrial sources ■ In annual updates show increased from benchmark, investigate source and possible control actions
Silver	B	0.01067	BMP	BMP	--	■ Heavy metal with no significant industrial sources ■ Continue certification requirement for photoprocessors. Certification indicates that they have treated fixing solution or had it hauled to proper disposal site
Zinc	B	0.06971	24	24	CFL	■ Heavy metal with significant industrial sources ■ Limit contributing CIUs to federal categorical limits ■ Require non-contributing SIUs to inform of change ■ Use CFL for contributing non-categorical SIUs ■ Monitor non-categorical SIU dischargers to verify contributions ■ Screen new SIUs (Permit application and initial sampling) and existing SIUs with modifications

B = Benchmark concentration
N = NPDES effluent criteria
CIU = Categorical Industrial User
CFL = Contributory Flow Limits
SIU = Significant Industrial User
H&S = Health and Safety based on Fume Toxicity or Fire/Explosivity

1 Local limits update summary is presented in Attachment K3 to Appendix K.
2 Where implementation of the controlling criteria is recommended, it stands that all other criteria are protected. Thus, if the controlling criterion is the benchmark, the NPDES (N), sludge quality concerns, process inhibition limitations, and health- and worker-safety requirements are protected as well.

c. If applicable pretreatment requirements do not exist for each toxic pollutant in the POTW effluent introduced by industrial sources,

- **provide a description and schedule for your development and implementation of applicable pretreatment requirements [40 CFR 125.65(c)], or**
- **describe how you propose to demonstrate secondary equivalency for each of those toxic pollutants, including a schedule for compliance, by using a secondary treatment pilot plant. [40 CFR 125.65(d)]**

SUMMARY: The City of San Diego complies with applicable urban area pretreatment requirements, and has implemented pretreatment requirements for each toxic pollutant that may affect effluent quality, sludge quality, treatment effectiveness (inhibition or pass through), and health and safety.

The question is not applicable. The City of San Diego has complied with the urban area pretreatment requirements. As set forth in 40 CFR 125.65(c), the City has established pretreatment requirements, where appropriate, for each constituent introduced to the Metro System by an industry. The resultant local limits were approved by EPA as part of the Urban Area Pretreatment Program. As summarized in Appendices K and L, the local limits are annually reviewed and updated.

All industrial discharge permits include the approved local limits. In regulating industries, the City applies the lower of (1) the calculated local limit or (2) the California Title 22 hazardous waste regulatory threshold. For industries where a federal pretreatment standard has been established for a pollutant, the City applies the federal standard. Where a federal pretreatment standard does not exist, the City reviews industry sampling data to determine whether the industry discharges the pollutant at levels greater than POTW-specific background levels. Industries that discharge at greater than background levels are termed "contributors" of that pollutant, and the local limit is applied in the industry's permit. Industries determined to be non-contributors are not regulated for the pollutant in their permit.

Regardless of contributory status, the City monitors all SIUs for all pollutants for which a local limit has been developed. This monitoring then allows the City to re-evaluate the industry's contributory status at each annual inspection. If data reveals that an industry has become a "contributor" for a pollutant, the permit is modified to include local limits for that pollutant.

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