UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region IX
75 Hawthorne Street
San Francisco, CA 94105

City of San Diego's
E. W. Blom Point Loma Metropolitan
Wastewater Treatment Plant and Ocean Outfall
Application for a Modified NPDES Permit
Under Sections 301(h) and (j)(5) of the Clean Water Act

Tentative Decision of the
Regional Administrator
Pursuant to
40 CFR Part 125, Subpart G

I have reviewed the attached evaluation analyzing the merits of the application of the City of San Diego's request for the E.W. Blom Point Loma Metropolitan Wastewater Treatment Plant and Ocean Outfall variance from secondary treatment requirements of the Clean Water Act (the Act), pursuant to section 301(h). It is my tentative decision that the Point Loma Wastewater Treatment Plant and Ocean Outfall be granted a variance in accordance with the terms, conditions, and limitations of the attached evaluation, based on sections 301(h) and (j)(5) of the Act.

My decision is based on available information specific to this particular discharge. It is not intended to assess the need for secondary treatment in general, nor does it reflect on the necessity for secondary treatment by other publicly owned treatment works discharging to the marine environment. This decision and the National Pollutant Discharge Elimination System (NPDES) permit implementing this decision are subject to revision on the basis of subsequently acquired information relating to the impact of the less-than-secondary discharge on the marine environment.

Under the procedures of the Permit Regulations, 40 CFR Part 124, public notice and comment regarding this tentative decision and accompanying draft NPDES permit will be made available to interested persons. Following the public comment period on this tentative decision and draft permit, a final decision and permit will be issued under the procedures in 40 CFR Part 124.

This tentative decision is issued without prejudice to the rights of any party to address the legal issue of the applicability of 33 U.S.C. section 1311(j)(5) to the City's future NPDES permits.

Dated: December 2, 2008 //S//.

Wayne Nastri
Regional Administrator

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INTRODUCTION

The City of San Diego, California (the applicant or City) is requesting a renewal of its variance (sometimes informally called a “waiver” or “modification”) under section 301(h) of the Clean Water Act (the Act, CWA), 33 U.S.C. section 1311(h), and the Ocean Pollution Reduction Act of 1994, 33 U.S.C. section 1311(j)(5), from the secondary treatment requirements contained in section 301(b)(1)(B) of the Act, U.S.C. section 1311(b)(1)(B). The City submitted its renewal application to the U.S. Environmental Protection Agency, Southwest Region (the EPA Region 9 or EPA), on December 10, 2007.

The variance is being sought for the E.W. Blom Point Loma Metropolitan Wastewater Treatment Plant and Ocean Outfall, a publicly owned treatment works (POTW). The applicant is seeking a 301(h) variance to discharge wastewater receiving less-than-secondary treatment to the Pacific Ocean. Secondary treatment is defined in the regulations (40 CFR Part 133) in terms of effluent quality for total suspended solids (TSS), biochemical oxygen demand (BOD), and pH. The secondary treatment requirements for effluent TSS, BOD, and pH are listed below:

TSS: (1) The 30-day average shall not exceed 30 mg/l.
(2) The 7-day average shall not exceed 45 mg/l.
(3) The 30-day average percent removal shall not be less than 85 percent.

BOD: (1) The 30-day average shall not exceed 30 mg/l.
(2) The 7-day average shall not exceed 45 mg/l.
(3) The 30-day average percent removal shall not be less than 85 percent.

pH: At all times, shall be maintained within the limits of 6.0 to 9.0 units.

40 CFR 125.58(c) defines a large applicant as serving a population of 50,000 or more, or having a discharge flow of 5 million gallons per day (mgd) or more. The City meets the criteria for a large applicant. The City is requesting a modification for only TSS and BOD. (A modification for pH is not requested.) The applicant’s proposed alternative effluent limits for TSS and BOD are shown in Volume III, Tables II.A-2 and II.A.5, of the application and require:

TSS: (1) The monthly average system-wide percent removal shall not be less than 80% percent (computed in accordance with Addendum No. 1 to Order No. R9-2002-0025, NPDES No. CA0107409).
(2) The monthly average treatment plant effluent concentration shall not be more than 75 mg/l.
(3) The annual treatment plant loading to the ocean shall not be more than 15,000 metric tons per year during years one through four of the permit and not more than 13,598 metric tons per year during year five of the permit. Compliance calculations for these loadings are not to include contributions from: Tijuana,

Mexico, via the emergency connection; federal facilities in excess of solids contributions received in calendar year 1995; Metro System flows treated in the City of Escondido; South Bay Water Reclamation Plant flows discharged to the South Bay Ocean Outfall; and emergency use of the Metro System by participating agencies over their capacity allotments.

BOD: The annual average system-wide percent removal shall not be less than 58 percent (computed in accordance with Addendum No. 1 to Order No. R9-2002-0025, NPDES No. CA0107409).

A concentration effluent limit for BOD (in mg/l) has not been requested by the applicant or required in NPDES permits for the 4.5 mile Point Loma Ocean Outfall. The alternative effluent limits requested by the applicant satisfy sections 301(h) and (j)(5) of the Act. The application is based on an "improved" discharge, as defined at 40 CFR 125.58(i). Facilities improvements proposed by the applicant during the period of the renewed NPDES permit (2009-2014) are effluent disinfection and follow-up studies. Volume III, Large Applicant Questionnaire section II.A.1, of the application.

This document presents the findings, conclusions, and recommendations of EPA Region 9, as to whether the applicant's proposed discharge complies with the criteria set forth in sections 301(h) and (j)(5) of the Act, as implemented by regulations at 40 CFR 125, Subpart G.

DECISION CRITERIA

Under section 301(b)(1)(B) of the Act, U.S.C. section 1311(b)(1)(B), POTWs in existence on July 1, 1977, were required to meet effluent limits based on secondary treatment as defined by the Administrator of EPA (the Administrator). Secondary treatment is defined by the Administrator in terms of three parameters: TSS, BOD, and pH. Uniform national effluent limitations for these pollutants were promulgated and included in National Pollutant Discharge Elimination System (NPDES) permits for POTWs issued under section 402 of the Act. POTWs were required to comply with these limitations by July 1, 1977.

Congress subsequently amended the Act, adding section 301(h) which authorizes the Administrator, with State concurrence, to issue NPDES permits which modify the secondary treatment requirements of the Act with respect to certain discharges. P.L. 95-217, 91 Stat. 1566, as amended by P.L. 97-117, 95 Stat. 1623; and section 303 of the Water Quality Act of 1987. Section 301(h) provides that:

> The Administrator, with the concurrence of the State, may issue a permit under section 402 [of the Act] which modifies the requirements of subsection (b)(1)(B) of this section [the secondary treatment requirements] with respect to the discharge of any pollutant from a publicly owned treatment works into marine waters, if the applicant demonstrates to the satisfaction of the Administrator that:

(1) there is an applicable water quality standard specific to the pollutant for which the modification is requested, which has been identified under section 304(a)(6) of this Act;

(2) such modified requirements will not interfere, alone or in combination with pollutants from other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies and the protection and propagation of a balanced, indigenous population (BIP) of shellfish, fish and wildlife, and allows recreational activities, in and on the water;

(3) the applicant has established a system for monitoring the impact of such discharge on a representative sample of aquatic biota, to the extent practicable, and the scope of the monitoring is limited to include only those scientific investigations which are necessary to study the effects of the proposed discharge;

(4) such modified requirements will not result in any additional requirements on any other point or nonpoint source;

(5) all applicable pretreatment requirements for sources introducing waste into such treatment works will be enforced;

(6) in the case of any treatment works serving a population of 50,000 or more, with respect to any toxic pollutant introduced into such works by an industrial discharger for which pollutant there is no applicable pretreatment requirement in effect, sources introducing waste into such works are in compliance with all applicable pretreatment requirements, the applicant has in effect a pretreatment program which, in combination with the treatment of discharges from such works, removes the same amount of such pollutant as would be removed if such works were to apply secondary treatment to discharges and if such works had no pretreatment program with respect to such pollutant;

(7) to the extent practicable, the applicant has established a schedule of activities designed to eliminate the entrance of toxic pollutants from nonindustrial sources into such treatment works;

(8) there will be no new or substantially increased discharges from the point source of the pollutant into which the modification applies above that volume of discharge specified in the permit;

(9) the applicant at the time such modification becomes effective will be discharging effluent which has received at least primary or equivalent treatment and which meets the criteria established under section 304(a)(1)

> of the Clean Water Act after initial mixing in the waters surrounding or adjacent to the point at which such effluent is discharged.
>
> For the purposes of this subsection the phrase "the discharge of any pollutant into marine waters" refers to a discharge into deep waters of the territorial sea or the waters of the contiguous zone, or into saline estuarine waters where there is strong tidal movement and other hydrological and geological characteristics which the Administrator determines necessary to allow compliance with paragraph (2) of this subsection, and section 101(a)(2) of this Act. For the purposes of paragraph (9), "primary or equivalent treatment" means treatment by screening, sedimentation and skimming adequate to remove at least 30 percent of the biochemical oxygen demanding material and of the suspended solids in the treatment works influent, and disinfection, where appropriate. A municipality which applies secondary treatment shall be eligible to receive a permit pursuant to this subsection which modifies the requirements of subsection (b)(1)(B) of this section with respect to the discharge of any pollutant from any treatment works owned by such municipality into marine waters. No permit issued under this subsection shall authorize the discharge of sewage sludge into marine waters. In order for a permit to be issued under this subsection for the discharge of a pollutant into marine waters, such marine waters must exhibit characteristics assuring that water providing dilution does not contain significant amounts of previous discharged effluent from such treatment works. No permit issued under this subsection shall authorize the discharge of any pollutant into marine estuarine waters which at the time of application do not support a balanced, indigenous population of shellfish, fish and wildlife, or allow recreation in and on the waters or which exhibit ambient water quality below applicable water quality standards adopted for the protection of public water supplies, shellfish and wildlife, or recreational activities or such other standards necessary to assure support and protection of such uses. The prohibition contained in the preceding sentence shall apply without regard to the presence or absence of a causal relationship between such characteristics and the applicant's current or proposed discharge. Notwithstanding any of the other provisions of this subsection, no permit may be issued under this subsection for discharge of a pollutant into the New York Bight Apex consisting of the ocean waters of the Atlantic Ocean westward of 73 degrees 30 minutes west longitude and westward of 40 degrees 10 minutes north latitude.

EPA regulations implementing section 301(h) provide that a 301(h)-modified NPDES permit may not be issued in violation of 40 CFR 125.59(b) which requires, among other things, compliance with the provisions of the Coastal Zone Management Act (16 U.S.C. 1451 et seq.), the Endangered Species Act (16 U.S.C. 1531 et seq.), the Marine Protection Research and Sanctuaries Act (16 U.S.C. 1431 et seq.), and any other applicable provisions of State or federal law or Executive Order.

In addition, under the Ocean Pollution Reduction Act of 1994, 33 U.S.C. section 1311(j)(5)(B) and (C):

> An application under this paragraph shall include a commitment by the applicant to implement a waste water reclamation program that, at minimum, will –
>
> (i) achieve a system capacity of 45,000,000 gallons of reclaimed waste water per day by January 1, 2010; and
>
> (ii) result in a reduction in the quantity of suspended solids discharged by the applicant into the marine environment during the period of the modification.
>
> The Administrator may not grant a modification pursuant to an application submitted under this paragraph unless the Administrator determines that such modification will result in removal of not less than 58 percent of the biological oxygen demand (on an annual average) and not less than 80 percent of total suspended solids (on a monthly average) in the discharge to which the application applies.

In the following discussion, data submitted by the applicant are analyzed in the context of the statutory and regulatory criteria.

SUMMARY OF FINDINGS

Based upon review of the data, references, and empirical evidence furnished in the application and other relevant sources, EPA Region 9 makes the following findings with regard to the statutory and regulatory criteria:

1. The applicant's proposed discharge will comply with primary treatment requirements. [CWA section 301(h)(9); 40 CFR 125.60]

2. The applicant's proposed 301(h)-modified discharge will comply with the State of California's water quality standards for natural light and dissolved oxygen. (A modification for pH is not requested.) The applicant has sent a letter to the San Diego Regional Water Quality Control Board (Regional Water Board) requesting determination that the proposed discharge complies with applicable State law including water quality standards. In 1984, a Memorandum of Understanding was signed by EPA Region 9 and the State of California to jointly administer discharges that are granted modifications from secondary treatment standards. The joint issuance of a NPDES permit which incorporates both the federal 301(h) variance and State permit requirements will serve as the State's certification/concurrence that the modified discharge will comply with applicable State law and water quality standards. A draft 301(h)-modified permit has been

jointly developed by the Regional Water Board and EPA Region 9. [Section 301(h)(1); 40 CFR 125.61]

3. The applicant has demonstrated it can consistently achieve State water quality standards and federal 304(a)(1) water quality criteria beyond the zone of initial dilution. [CWA section 301(h)(9); 40 CFR 125.62(a)]

4. The applicant's proposed discharge, alone or in combination with pollutants from other sources, will not adversely impact public water supplies or interfere with the protection and propagation of a balanced, indigenous population (BIP) of fish, shellfish and wildlife, and will allow for recreational activities. [CWA section 301(h)(2); 40 CFR 125.62(b), (c), (d)]

5. The applicant has a well-established monitoring program and has demonstrated it has adequate resources to continue the program. The applicant has proposed no changes to its existing monitoring program. EPA Region 9 and the Regional Water Board will review the applicant's existing monitoring program and revise it, as appropriate. These revisions will be included in the 301(h)-modified permit, as conditions for monitoring the impact of the discharge. [CWA section 301(h)(3); 40 CFR 125.63]

6. The applicant has sent a letter to the Regional Water Board requesting determination that the proposed discharge will not result in any additional treatment requirements on any other point or nonpoint sources. The adoption by the Regional Water Board of a NPDES permit which incorporates both the federal 301(h) variance and State permit requirements will serve as the State's determination, pursuant to 40 CFR 125.59(f)(4), that the requirements under 40 CFR 125.64 are achieved. [CWA section 301(h)(4); 40 CFR 125.64]

7. The applicant's existing pretreatment program was approved by EPA Region 9 on June 29, 1982, and remains in effect. [CWA section 301(h)(5); 40 CFR 125.66 and 125.68]

8. The applicant has complied with urban area pretreatment requirements by demonstrating that it has an applicable pretreatment requirement in effect for each toxic pollutant introduced by an industrial discharger. The Urban Area Pretreatment Program was submitted to EPA Region 9 and the Regional Water Board in August 1996. This program was approved by the Regional Water Board on August 13, 1997 and EPA on December 1, 1998. [CWA section 301(h)(6); 40 CFR 125.65]

9. The applicant will continue to develop and implement both its existing nonindustrial source control program, in effect since 1985, and existing comprehensive public education program to minimize the amount of toxic pollutants that enter the treatment system from nonindustrial sources. [CWA section 301(h)(7); 40 CFR 125.66]

10. There will be no new or substantially increased discharges from the point source of the pollutants to which the 301(h) variance applies above those specified in the permit. [CWA section 301(h)(8); 40 CFR 125.67]

11. The applicant has sent letters to the U.S. Fish and Wildlife Service and NOAA National Marine Fisheries Service requesting determinations that the proposed discharge complies with applicable federal and State laws. The applicant has prepared a letter to the California Coastal Commission requesting a determination that the proposed discharge complies with applicable federal and State laws; this request will be transmitted to the California Coastal Commission after the 301(h) modified permit is adopted by the Regional Water Board. The issuance of a final 301(h)-modified permit is contingent upon receipt of determinations that the issuance of such permit does not conflict with applicable provisions of federal and State laws. [40 CFR 125.59]

12. In its operation of the Point Loma WTP, the applicant will continue to: achieve a monthly average system-wide percent removal for TSS of not less than 80 percent and an annual average system-wide percent removal for BOD of not less than 58 percent; and has implemented a water reclamation program that will result in a reduction in the quantity of suspended solids discharged into the marine environment during the period of the 301(h) modification. To ensure compliance with this requirement, EPA Region 9 is imposing permit conditions slightly different than those proposed by the applicant. In addition, the applicant has constructed a system capacity of 45 mgd of reclaimed water, thereby meeting this January 1, 2010 requirement. [CWA section 301(j)(5)]

CONCLUSION

EPA Region 9 concludes that the applicant’s proposed discharge will satisfy CWA sections 301(h) and (j)(5) and 40 CFR 125, Subpart G.

RECOMMENDATION

It is recommended that the applicant be granted a CWA section 301(h) variance in accordance with the above findings, contingent upon satisfaction of the following conditions:

1. The determination by the Regional Water Board that the proposed discharge will comply with applicable provisions of State law, including water quality standards, in accordance with 40 CFR 125.61(b)(2). The adoption by the Regional Water Board of a NPDES permit which incorporates both the federal 301(h) variance and State permit requirements will serve as the State’s certification/concurrence, pursuant to 40 CFR Parts 124.53 and 124.54, that the requirements under 40 CFR 125.61(b)(2) are achieved.

2. The determination by the Regional Water Board that the proposed discharge will not result in any additional treatment requirements on any other point or nonpoint sources, in accordance with 40 CFR 125.64. The adoption by the Regional Water Board of a NPDES permit which incorporates both the federal 301(h) variance and State permit requirements will serve as the State's determination, pursuant to 40 CFR 125.59(f)(4), that the requirements under 40 CFR 125.64 are achieved.

3. The draft permit contains the applicable terms and conditions required by 40 CFR 125.68, for establishment of a monitoring program.

4. The determination by the California Coastal Commission that issuance of a 301(h)-modified permit does not conflict with the Coastal Zone Management Act, as amended.

5. The determination by the U.S. Fish and Wildlife Service that issuance of a 301(h)-modified permit does not conflict with applicable provisions of the federal Endangered Species Act, as amended.

6. The determination by the NOAA National Marine Fisheries Service that issuance of a 301(h)-modified permit does not conflict with applicable provisions of the federal Endangered Species Act, as amended, and the Magnuson-Stevens Fishery Conservation and Management Act, as amended.

7. Issuance of the 301(h)-modified permit assures compliance with all applicable requirements of 40 CFR 122 and 40 CFR 125, Subpart G.

DESCRIPTION OF TREATMENT SYSTEM

Treatment System

The City's treatment system is described in Volume III, Large Applicant Questionnaire section II.A, and Volume IV, Appendix A, of the application. The San Diego Metropolitan Sewage System (Metro System) provides for the conveyance, treatment, reuse, and disposal of wastewater within a 450-square mile service area for the City of San Diego and regional participating agencies (Figure A-1). Metro System facilities include wastewater collection interceptors and pump stations, wastewater treatment and water recycling plants, sludge pipelines and solids handling facilities, and two land/ocean outfall systems. Metro System facilities are owned by the City of San Diego and are managed and operated by the City's Metropolitan Wastewater Department. The City administers and executes contracts with each participating agency, monitors flows to the Metro System, bills and collects payments from participating agencies, and disburses all monies spent in connection with the Metro System. Wastewater collection systems that discharge to the Metro System are owned and operated by respective participating agencies. Current wastewater flows from the City comprise approximately 70 percent of the total Metro System flows. Remaining Metro System wastewater flows are contributed by the 15 Metro System participating agencies. Participating agency input to Metro System planning and operation is provided through the San Diego Metropolitan Wastewater Commission.

The following five groups of facilities comprise the Metro System: wastewater conveyance facilities; the Point Loma Wastewater Treatment Plant and Ocean Outfall; the North City Water Reclamation Plant; the Metro Biosolids Center and sludge conveyance facilities; and the South Bay Water Reclamation Plant and Ocean Outfall.

There have been improvements to Metro System facilities since the existing federal NPDES permit became effective in 2003. These include bringing the South Bay Water Reclamation Plant and recycled water users online within the service area of the South Bay Water Reclamation Plant and Ocean Outfall, and adding recycled water users within the North City Water Reclamation Plant service area. Figure A-2 presents a schematic of existing Metro System treatment and solids handling facilities which include the: Point Loma Wastewater Treatment Plant and Ocean Outfall, North City Water Reclamation Plant, South Bay Water Reclamation Plant and Ocean Outfall, and the Metro Biosolids Center. Waste solids from the South Bay Water Reclamation Plant (WRP) are conveyed to Point Loma WTP for treatment. Waste solids from Point Loma WTP and North City WRP are conveyed to the Metro Biosolids Center for dewatering and disposal.

Pump Station No. 2 is the largest and most important pump station within the Metro System. It is a reinforced concrete structure equipped with eight dry pit pumping units. With one pump serving as a standby unit, the pumping capacity is approximately 432 million gallons per day (mgd). All influent wastewater delivered to the Point Loma WTP is pumped through Pump Station No. 2 which also provides preliminary treatment in the form of coarse screening (4 units) and chemical addition (ferric chloride). Ferric chloride is added for odor control and to assist in coagulation/sedimentation at Point Loma WTP.

Point Loma WTP operates as a chemically-assisted primary treatment plant and is the terminal treatment facility discharging to the Point Loma Ocean Outfall (PLOO) and Pacific Ocean. The plant has rated capacities (with one sedimentation tank out of service) of 240 mgd annual average daily flow and 432 mgd peak wet weather flow. Point Loma WTP receives a blend of excess recycled water (during irrigation season), secondary treated effluent (during non-irrigation season), and waste plant streams from the 30 mgd North City WRP, return solids from the 15 mgd South Bay WRP, and untreated sewage from all other parts of the Metro System. The applicant states that of the approximately 170 to 180 mgd of wastewater treated, the estimated contribution from industrial users of the Metro System is 2.5 percent (Volume VII, Appendix K, of the application). The applicant states that inflow and infiltration is approximately 4 to 5 percent of the total flow into the treatment works (Volume II, EPA Form 3510-2A, of the application).

Point Loma WTP unit process and design criteria and loadings are provided in Table A-2 of Volume IV, Appendix A, of the application. Unit processes at the Point Loma WTP include: preliminary treatment with 15-millimeter mesh mechanical self-cleaning climber screens (5 units) to remove rags, paper, and other floatable material; chemical addition (ferric chloride) to screened wastewater and influent flow measurement at the Parshall flumes; aerated grit removal (6 units) including grit tanks, separators and washers; chemical addition (anionic synthetic polymer and hydrogen peroxide) at sedimentation basin entrances to enhance settling of solids and assist in stabilization and odor control; sedimentation basins (12 units) where flocculated solids (sludge) settle to the bottom and sum floats to the surface; and sludge and scum removal facilities. From the sedimentation basins, treated wastewater enters the effluent channel.

The following outfall conveyance facilities allow the treated effluent to be discharge to the 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 the effluent to the outfall via a vortex structure. The 7,154-meter PLOO extends approximately 7.24 kilometers (4.5 miles or 3.9 nautical miles) offshore to the edge of the mainland shelf and discharges at a depth of approximately 95 meters (312 feet). The outfall terminates in a "Y"-shaped diffuser, the center of which is located at: north latitude 32 degrees, 39 minutes, 55 seconds, and longitude 117 degrees west, 19 minutes, 25 seconds. From the outfall terminus, each leg of the diffuser extends approximately 805 meters (0.5 miles). Effluent discharge commenced at this location in November 1993.

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. Digested solids are pumped to the Metro Biosolids Center for dewatering and disposal. Dewatered solids are beneficially used as an alternate daily cover at a landfill or as a soil amendment. Screenings, grit, and scum are trucked to a landfill for disposal.

The City's recycled water operations are regulated by water reclamation requirements established by the San Diego Regional Water 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. The South Bay WRP secondary effluent discharge to the South Bay Ocean Outfall (SBOO) is regulated by Regional Board Order No. R9-2006-0067, NPDES No. CA0109045. Waste solids from North City WRP are directed to the Metro Biosolids Center for digestion and dewatering. Waste solids from the South Bay WRP are discharged to the sewer system for transport to Point Loma WTP for treatment and removal.

Improved Discharge

The City's 2007 application is based on an "improved" discharge, as defined at 40 CFR 125.58(i). Increases in Metro System flow (hydraulic) and load (suspended solids and biochemical oxygen demand) projections for long term facilities planning are projected at approximately 0.9 percent per year over the next 20 years (starting with the year 2008 projection). Section A.4 of the application (Volume IV, Appendix A) provides an overview of the new facilities and existing facility improvements that will be needed to meet discharge permit conditions for the Point Loma WTP and improve hydraulic capacity within the Metro System. The two categories of facility improvements needed over the next 20 years are: (1) facilities to handle projected increased Metro System hydraulic and solids loadings which focus on South Bay facilities of the Metro System and (2) facilities at the Point Loma WTP to comply with revised California Ocean Plan (SWRCB, 2005) bacteriological water quality standards.

During the next 5-year permit cycle, the applicant has proposed the following improvements to the Metro System. Volume III, Large Applicant Questionnaire section II.A.2, of the application. These improvements are: (1) the ongoing program to bring additional recycled water users online to reduce dry-weather North City WRP flows discharged downstream to the Point Loma WTP and PLOO and South Bay WRP flows discharged to the SBOO; and (2) effluent disinfection provided by the installation and implementation (operation) of prototype effluent disinfection facilities at the Point Loma WTP. Prototype effluent 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). The City will perform and complete follow-up studies to assess the need for refinements or modifications to prototype disinfection facilities or operations. The City is proposing to implement effluent disinfection at the Point Loma WTP to achieve a 2.1 logarithm (approximately 99%) reduction in pathogen indicator organisms using a 7 mg/l dose rate of a 12 percent sodium hypochlorite solution in the effluent channel. (For reference, 1 milligram per liter is 1 part per million.) The application projects that the sodium hypochlorite solution will be entirely consumed by effluent chlorine demand during outfall transport, allowing the Point Loma discharge to maintain a zero chlorine residual as the effluent enters the outfall diffuser. The City may propose future modification of the prototype disinfection facilities or operations based on additional studies and following approval by the Regional Water Board and EPA.

As documented in Volume III, Large Applicant Questionnaire section II.A.3, of the application, the City has constructed 45 mgd of recycled water treatment capacity; during the period of the existing permit, the applicant has consistently achieved 80% removal of TSS and 58% removal of BOD; and reduced TSS mass emissions during the period of the 301(h) modification (in Tables II.A-3 and II.A-4 and Figure II.A-1, Volume III of the application). Except for a slight reduction in year five of the renewed permit, the City is not requesting any change in the mass emission rate effluent limits for TSS, the concentration effluent limit for TSS, or the percent removal effluent limits for TSS and BOD, from those in the existing permit (in Tables II.A-2 and II.A-5, Volume III of the application). “System-wide” percent removal is computed as specified in Addendum No. 1 to Order No. R9-2002-0025, NPDES No. CA0107409. Tables II.A-3 and II.A-4 include the contribution from South Bay WRP which is neither identified in amended Order No. R9-2002-0025, nor included in the computation of “system-wide” percent removal.

DESCRIPTION OF RECEIVING WATERS

Volume III, Large Applicant Questionnaire section II.B, of the application presents general information describing receiving waters for the Point Loma discharge. Volume VIII, Appendix N, of the application presents a detailed characterization of seasonal circulation patterns in the vicinity of the Point Loma discharge which was originally provided in the 1995 application. This characterization includes descriptions of regional and local bathymetry, regional currents, and currents and stratification in the Point Loma shelf area. (For reference, 1 meter is about 3.281 feet; 1 kilometer is 1,000 meters, or about 0.6214 statute miles or 0.5397 nautical miles; 1 statute mile is about 0.8684 nautical miles.)

Bathymetry

The waters of the Southern California Bight (SCB) overlie the continental borderland of southern California. The outer edge of the borderland lies about 250 to 300 kilometers offshore and is defined by a sharp change of slope at 1000 meters. The continental borderland consists of a number of offshore islands, submerged banks, submarine canyons, and deep basins. The result is an unusually narrow mainland shelf, which averages 3 kilometers in width (ranging from 1 to 20 kilometers) and ends in waters of 200 meters depth. The narrowness of the mainland shelf in the SCB makes it particularly susceptible to human activities. Shiff et al., 2000.

The mainland shelf off Point Loma is about 6.5 kilometers wide. Within this region, a narrow rocky shelf runs parallel to the coast and extends from the shoreline to water depths of about 17 to 20 meters. The outer edge of this rocky shelf is marked by the outer edge of kelp beds where the sea floor drops sharply by about 3 to 18 meters and terminates in a relatively smooth, gently sloping plain that extends seaward. This plain continues to gently slope seaward to water depths of about 90 to 95 meters, with only minor variations in direction and width for at least 15 kilometers north and south of the PLOO. The outer edge of the mainland shelf breaks at water depths of about 110 meters, as the bottom slopes sharply downward into the Loma Sea Valley. The PLOO discharges at the outer edge of this mainland shelf. The Loma Sea Valley axis lies about 15 kilometers offshore of Point Loma at a water depth of about 370 meters.

Currents

The local ocean current circulation in the vicinity of the PLOO occurs within the larger circulation of the California Current (the major southward-flowing surface current far offshore); the Southern California Counter Current (the inner northward-flowing leg of the counter-clockwise circulating gyre between the California Current and the coast); and the California Undercurrent (a northward flow beneath the Southern California Countercurrent at depths in excess of 100 meters).

Volume III and Volume VIII, Appendix N, of the application provide the following general characterization of the mainland shelf currents off the coast of Point Loma: the net subsurface flow (at a depth of 40 meters at the 60 meter contour) is upcoast at approximately 3 cm/sec; the net surface flow is downcoast at approximately 6 cm/sec; the net flow 1 to 2 meters above the ocean bottom has a strong offshore component that can exceed the longshore flow velocity; more than half the variations in 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 1 to 3 kilometers; waters along the nearshore shelf are dispersed with offshore waters on time scales of weeks; and long-term variability in currents can equal or exceed the seasonal variability. (For reference 1 cm/sec is about 0.6 m/min, or 1.1969 ft/min.)Table II.B-1 in Appendix III of the application summarizes 10th percentile, 50th percentile (median), and 90th percentile current speeds within the typical depth range of the PLOO wastefield (60 to 80 meters). Tenth percentile current speeds are typically 2 to 3 cm/sec and median current speeds are on the order of 7 to 10 cm/sec.

Stratification

The water column above the Point Loma outfall diffuser is density stratified by gradients in temperature and salinity. Salinity gradients are small for water temperatures above 11 to 12 degrees C, but they make an important contribution to the density gradients of lower temperature waters. The strongest density gradients exist during the summer in the upper portion of the water column due to the formation of a seasonal thermocline at depths that range from a few meters to tens of meters (typically around 5 to 20 meters). Surface water temperatures may reach 18 to 23 degrees C. Water temperatures are generally lowest in the late winter, when surface temperatures can fall to about 12 to 14 degrees C. During this time, the seasonal thermocline may disappear and the density gradients may be minimal. At water column depths in excess of about 45 meters, the strongest density gradients occur during the winter (typically in January). Although these density gradients are weak in comparison with the gradients existing in the upper portion of the water column during the summer, they are sufficient to trap the wastefield from the Point Loma discharge at depths of 30 meters, or more, below the surface. Modeling and receiving water monitoring data indicate that the wastefield is typically confined to the water depth interval between 55 and 87 meters (Volume III, Large Applicant Questionnaire section III.A.3, of the application).

PHYSICAL CHARACTERISTICS OF THE DISCHARGE

Outfall/Diffuser and Initial Dilution

40 CFR 125.62(a) requires that the proposed outfall and diffuser must be located and designed to provide adequate initial dilution, dispersion, and transport of wastewater to meet all applicable water quality standards and criteria at and beyond the boundary of the zone of initial dilution (ZID). This evaluation is based on conditions occurring during periods of maximum stratification and during other periods when discharge characteristics, water quality, biological seasons, or oceanographic conditions indicate

more critical situations may exist. The physical characteristics of the PLOO (including diffuser) are summarized in Volume III, Large Applicant Questionnaire section II.A.8, of the application.

In the 2007 application, the Metro System service area projected annual average flow for 2009 is 208 mgd and the peak flow is 463 mgd. The Metro System end-of-permit projected annual average flow for 2014 is 219 mgd and the peak flow is 486 mgd. This represents an average annual growth rate of 0.9 percent. For comparison, population within the Metro System service area increased at an annual growth rate of 1.07 percent from 1990 to 2000. By year 2025, the applicant projects the portion of Metro System flows directed to Point Loma WTP during inclement weather periods, when no recycled water use occurs, to approach 240 mgd.

The 1995 application for the Point Loma WTP was based on an end-of-permit projected flow of 205 mgd. The 2001 application was based on an end-of-permit projected flow of 195 mgd. For the 2007 application, the Point Loma WTP end-of-permit (2014) projected annual average flow is 202 mgd. Actual and projected effluent flow rates for the Point Loma WTP during the period of the existing and proposed permit are shown in Table 1.

Because the Point Loma WTP end-of-permit projected flow of 202 mgd is less than the end-of-permit projected flow of 205 mgd evaluated by EPA in the 1995 and 2001 applications, EPA believes that the projected flow of 205 mgd continues to be a reasonable estimate for evaluating initial dilutions in the 2007 application.

Chapter III of the California Ocean Plan requires that “Waste effluents shall be discharged in a manner which provides sufficient initial dilution to minimize the concentrations of substances not removed in the treatment.” This plan defines the “minimum initial dilution (Dm)” as the “… lowest average initial dilution within any single month of the year.” and specifies that “Dilution estimates shall be based on observed waste flow characteristics, observed receiving water density structure, and the assumption that no currents, of sufficient strength to influence the initial dilution process, flow across the discharge structure.”

The applicant has continued to provide two sets of initial dilution calculations employing flows of 205 mgd and 240 mgd. For the TDDs, EPA has only reviewed predictions based on an end-of-permit projected annual average flow of 205 mgd, because it is appropriate to the end of the five-year permit period.

Table 1. Actual and projected annual average and maximum daily/peak hour flows (mgd) for the Point Loma Ocean Outfall from 2001 through 2014.

Year	Observed Flows		Project Flows	
	Annual Average Flow[1]	Maximum Daily Flow	Projected Annual Average Flow[2]	Maximum Projected Peak Hour Flow[3]
2001	175	222	---	---
2002[4]	169	189	---	---
2003	170	223	---	---
2004	174	295	---	---
2005	183	325	---	---
2006	170	224	---	---
2007	161	206	---	---
2008	162[5]	233[5]	191	458[6]
2009	---	---	192	463[6]
2010	---	---	193	467[6]
2011	---	---	194	471[6]
2012	---	---	197	476[6]
2013	---	---	199	481[6]
2014	---	---	202	486[6]

[1] Data from monthly reports submitted to the Regional Water Board and EPA for 2001-2008. Maximum daily flow is the highest daily PLOO flow observed during the listed year.
[2] Average annual PLOO flow projections based on Metro System flow projections for long-term facilities planning. The flow projections for long-term facilities planning are conservative (overestimates that employ a factor of safety) to ensure that adequate future system capacity is maintained. Average annual PLOO flows will vary depending on hydrologic conditions, recycled water demands, and SBOO flows. These approximations are based on average annual recycled water use in the North City WRP service area of 7,210 AFY in 2008, 7,760 AFY by 2010, 8,260 AFY by 2012, linearly increasing beyond 2012 to 9,970 AFY (8.9 mgd) by 2027. Estimates are also based on combined South Bay WRP reuse and SBOO flows of 6,730 AFY in 2008, 6,930 AFY in 2010, 7,490 AFY in 2012, linearly increasing beyond 2012 to 8,850 AFY (7.9 mgd) by 2027. Estimates are also based on net annual Metro System flow reductions of 3.0 mgd from recycled water use from Padre Dam MWD, Santee WRP, and Otay Water District WRF.
[3] Maximum projected 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. Values assume that no recycled water use occurs during a wet weather event. Maximum projected peak-hour flows represent short-term peak flows for purposes of assessing the ability of Metro System collection facilities to handle short-term instantaneous peak flows. Actual maximum peak hour flows in any year are likely to be significantly less than this projected once-in-10-year event.
[4] South Bay WRP is brought online.
[5] Preliminary values for January 1 through September 30, 2008.
[6] The City is reassessing peak hour wet-weather flow projections. As part of this assessment, the City is evaluating the need to add equalization storage at Pump Station Nos. 1 and 2 (or implementing alternative peak-flow management options) to increase the ability of Metro System conveyance facilities to handle potential maximum instantaneous peak flows.

The 1995 application for the Point Loma WTP was based on an end-of-permit projected annual average flow of 205 mgd. For this flow rate, the 50^{th} percentile, flux-averaged initial dilution was predicted as 365:1 with currents and 300:1 without currents; the 5^{th} percentile, flux-averaged initial dilution was predicted as 215:1 with currents and 194:1 without currents (based on time series data). For the water quality objectives in Table B of the California Ocean Plan, the lowest 30-day average initial dilution was predicted as 204:1 without currents (based on hydrocast data). Volume VIII, Appendix O, of the application. As reported in the 1995 and 2002 TDDs, EPA verified the City's estimate of initial dilution for the California Ocean Plan (204:1) by obtaining the modified RSB model and raw data used by the applicant; EPA's result for the minimum monthly average initial dilution was 195:1, for zero currents. This same initial dilution (195:1) was obtained by EPA using a selected set of model runs and EPA's version of RSB. Using EPA's UMERGE model, EPA's result for the minimum monthly average initial dilution was 179:1, for zero currents. Taken together, these independent modeling efforts by the applicant and EPA produced estimates for minimum monthly average initial dilution of 204:1, 195:1, and 179:1. The 1995 TDD concluded these values were similar given the inherent uncertainties associated with modeling and that each would provide a conservative estimate of initial dilution for evaluating compliance with Table B water quality objectives. EPA continues to use 204:1 for evaluating compliance with Table B water quality objectives in the California Ocean Plan and EPA's 304(a)(1) toxics water quality criteria for aquatic life which lack Table B objectives.

The 1995 TDD also evaluated the critical initial dilution with the applicant's modified RSB model and the EPA's RSB and UMERGE models using: peak 2-3 hour effluent flows (generally estimated to be 4/3 the average monthly effluent flow), all density profiles in the given month, and zero currents. This evaluation of critical initial dilution differs from the evaluation of the lowest average initial dilution within any single month specified for Table B water quality objectives in the California Ocean Plan. The combination yielding the lowest initial dilution was used as EPA's estimate for worst-case initial dilution. The worst-case initial dilution estimate was: 143:1 for the applicant's modified RSB model, 134:1 for EPA's RSB model, and 99:1 for the UMERGE model. This TDD continues to use the initial dilution of 99:1 to assess worst-case conditions for TSS and BOD.

Finally, the 1995 TDD calculated a long-term average initial dilution of 328:1 for evaluating compliance with EPA's toxics water quality criteria for human health (organisms only); this TDD continues to use the initial dilution of 328:1 to evaluate compliance with EPA's toxics water quality criteria for human health which lack Table B objectives in the California Ocean Plan.

Application of Initial Dilution to Water Quality Standards and Criteria

Based on the information summarized in the previous section, EPA concludes that: (1) the outfall and diffuser system are well designed and achieve a high degree of dilution; (2) the minimum monthly average initial dilution value of 204:1 provides a conservative estimate of initial dilution for evaluating compliance with applicable State water quality standards in Table B of the California Ocean Plan and EPA toxics water quality criteria for aquatic life; and (3) the long-term effective dilution value of 328:1 provides an appropriate estimate for evaluating compliance with EPA toxics water quality criteria for human health (organisms only) based on long-term exposure. As in the 1995 and 2002 TDDs, this evaluation uses the initial dilution value of 99:1 to assess worst-case conditions for suspended solids and dissolved oxygen concentrations following initial dilution. The application of these initial dilution values is summarized in Table 2.

Table 2. Initial dilution values for evaluating compliance with applicable State water quality standards and EPA's 304(a)(1) water quality criteria.

Initial Dilution Type	Initial Dilution Value	Source	Applicable Water Quality Standard 40 CFR 125.62(a)
Minimum monthly average initial dilution (1995 and 2002)	204:1	California Ocean Plan	Table B objectives
Minimum monthly average initial dilution	204:1	Amended 301(h) Technical Support Document	304(a)(1) criteria for acute and chronic aquatic life with no Table B objectives
Long-term effective dilution	328:1	Amended 301(h) Technical Support Document	304(a)(1) criteria for human health (organisms only) with no Table B objectives
Worst-case (critical) initial dilution	99:1	Amended 301(h) Technical Support Document	Suspended solids and dissolved oxygen

Zone of Initial Dilution

No modifications to the PLOO have been implemented since its construction that would affect the dimensions of the zone of initial dilution. Consequently, the PLOO zone of initial dilution remains unchanged from the City's two prior applications. The zone of initial dilution extends 93.5 meters (307 feet) on either side of the PLOO diffuser legs. Volume VIII, Appendix O, of the application presents estimates of distances associated with completion of initial dilution at the PLOO's design average dry weather flow of 240 mgd; Table III.A-3 in Volume III of the application, presents a statistical breakdown of computed horizontal downstream distances from outfall ports to the completion of the initial dilution process.

As previously described, the outfall terminates in a "Y"-shaped diffuser, the center of which is located at: north latitude 32 degrees, 39 minutes, 55 seconds, and longitude 117 degrees west, 19 minutes, 25 seconds. For reference, near-ZID stations F30 (for water quality monitoring) and E14 (for sediment monitoring) are located on the 98 meter (320 foot) depth contour at: north latitude 32 degrees, 39 minutes, 94 seconds, and longitude 117 degrees west, 19 minutes, 49 seconds; or 300 meters (984 feet) west of the diffuser wye. See Figures A-3 and A-4 for maps of water quality stations and sediment monitoring stations, respectively.

Dilution Water Recirculation

The effect of re-entrainment of the wastefield is to reduce the volumetric initial dilutions for the discharged effluent within the zone of initial dilution. Under CWA section 301(h)(9), in order for a 301(h) permit to be issued for the discharge of a pollutant into marine waters, such marine waters must exhibit characteristics assuring that water providing dilution does not contain significant amounts of previously discharged effluent from the treatment works.

This requirement was addressed by the City in the 1995 application. To estimate the potential for re-entrainment effects on the 30-day average concentration, the applicant made the assumption that receiving waters around the outfall contain all the wastewater discharged during a 30-day period (205 mgd for a total volume of 1.3×10^8 cubic meters). This is a very conservative assumption, as physical oceanographic models indicate the residence time for wastewater within the 30 by 12 kilometer (19 by 7.5 miles) area around the outfall is about 4.5 days. For the effluent flow of 205 mgd, the largest reductions for computed volumetric initial dilutions were around 12 percent, occurring in July and September; the smallest reductions were around 4 percent, occurring in January and February.

Based on EPA's review of 2002 through 2006 effluent data for toxics concentrations to exceed California Ocean Plan Table B water quality objectives and EPA water quality criteria for aquatic life and human health, these predicted reductions for initial dilution due to re-entrainment are not expected to affect discharge compliance with applicable water quality objectives and criteria.

APPLICATION OF STATUTORY AND REGULATORY CRITERIA

A. Compliance with Federal Primary Treatment, California Ocean Plan Table A, and CWA section 301(j)(5) Requirements

Under CWA section 301(h)(9) and 40 CFR 125.60, the applicant's wastewater effluent must be receiving at least primary treatment at the time the 301(h) variance becomes effective. 40 CFR 125.58(r) specifies that primary treatment means treatment by screening, sedimentation, and skimming adequate to remove at least 30 percent of the biological oxygen demanding material and other suspended solids in the treatment works influent, and disinfection, where appropriate. In Table A of the California Ocean Plan, publicly owned treatment works must, as a 30-day average, remove 75 percent of suspended solids from their influent stream before discharging wastewaters to the ocean. Turbidity in the effluent must not exceed 75 NTU as a 30-day average, 100 NTU as a 7-

day average, and 225 NTU at any time. Settleable solids in the effluent must not exceed 1.0 Ml/l as a 30-day average, 1.5 Ml/l as a 7-day average, and 3.0 Ml/l at any time. There are no Table A effluent requirements for biochemical oxygen demand. Finally, CWA section 301(j)(5) specifies that the applicant must implement a wastewater reclamation program that will result in a reduction in the quantity of suspended solids discharged by the applicant into the marine environment during the period of the 301(h) modification. In addition, such modification must result in removal of not less than 80 percent of total suspended solids (on a monthly average) and not less than 58 percent of biochemical oxygen demand (on an annual average).

1. Total Suspended Solids

To comply with these requirements, the applicant has proposed the following effluent limits for total suspended solids:

TSS: (1) The monthly average system-wide percent removal shall not be less than 80% percent (computed in accordance with Addendum No. 1 to Order No. R9-2002-0025, NPDES No. CA0107409).
(2) The monthly average treatment plant effluent concentration shall not be more than 75 mg/l.
(3) The annual treatment plant loading to the ocean shall not be more than 15,000 metric tons per year during years one through four of the permit and not more than 13,598 metric tons per year during year five of the permit. Compliance calculations for these loadings are not to include contributions from: Tijuana, Mexico, via the emergency connection; federal facilities in excess of solids contributions received in calendar year 1995; Metro System flows treated in the City of Escondido; South Bay Water Reclamation Plant flows discharged to the South Bay Ocean Outfall; and emergency use of the Metro System by participating agencies over their capacity allotments.

(For reference, 1 metric ton is 1,000 kilograms which is approximately 2,205 pounds.)

EPA reviewed influent and effluent data for Point Loma WTP provided in Volume IV, Appendix A, of the application. The data for total suspended solids, turbidity, and settleable solids are summarized, as follows.

Table 3. Monthly average and annual average influent concentrations for total suspended solids (mg/l) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	281	296	311	245	283	271
February	260	289	294	251	294	283
March	270	282	290	239	275	298
April	283	290	289	268	273	319
May	290	293	285	269	282	323
June	301	290	303	287	274	340
July	318	292	300	280	282	368
August	293	288	297	294	278	377
September	290	276	295	296	299	338
October	287	267	293	281	309	320
November	291	268	262	290	303	313
December	283	287	274	292	288	280
Annual Average	287	285	291	274	287	319
Maximum Month	318	296	311	296	309	377
Minimum Month	260	267	262	239	273	271

Table 4. Monthly average and annual average effluent concentrations for total suspended solids (mg/l) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	40.5	41.0	46.4	38.0	35.7	36
February	46.6	42.2	43.7	39.0	36.8	34
March	40.9	39.9	43.6	35.6	36.8	33
April	41.7	41.1	43.5	38.2	37.9	29
May	42.5	45.8	42.0	40.2	35.1	26
June	46.5	43.7	44.0	45.1	33.6	25
July	51.9	44.1	43.7	46.9	37.2	31
August	46.0	41.4	43.1	41.0	37.1	34
September	39.0	39.9	44.8	41.9	30.6	41
October	39.4	41.3	37.5	43.0	31.7	43
November	42.4	40.5	37.9	39.2	33.9	35
December	44.5	43.3	41.9	38.5	32.5	41
Annual Average	43.5	42.0	42.7	40.6	34.9	34
Maximum Month	51.9	43.3	46.4	46.9	37.9	43
Minimum Month	39.0	39.9	37.5	35.6	30.6	25

Table 5. Monthly average and annual average percent removals for total suspended solids (%) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	85.6	86.1	85.1	84.5	87.4	86.7
February	82.1	85.4	85.1	84.5	87.5	87.9
March	84.9	85.9	85.0	85.1	86.6	88.9
April	85.2	85.8	84.9	85.7	86.1	90.9
May	85.3	84.4	85.3	85.1	87.6	91.6
June	84.6	84.9	85.5	84.3	87.7	92.6
July	83.7	84.9	85.4	83.3	86.8	91.4
August	84.3	85.6	85.5	86.1	86.7	90.8
September	86.5	85.5	84.8	85.8	89.8	87.7
October	86.3	84.5	87.2	84.7	89.7	86.5
November	85.4	84.9	85.5	86.5	88.8	88.7
December	84.3	84.9	84.7	86.8	88.7	85.4
Annual Average	84.9	85.2	85.3	85.2	87.8	89.1
Maximum Month	86.5	86.1	87.2	86.8	89.8	92.6
Minimum Month	82.1	84.4	84.7	83.3	86.1	85.4

Table 6. Monthly average and annual average effluent values for turbidity (NTU) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	42	40	50	51	43	44
February	48	38	45	47	44	44
March	45	39	47	42	42	47
April	43	44	49	47	45	41
May	43	47	53	51	45	41
June	45	49	50	52	40	40
July	48	49	50	53	42	42
August	46	48	54	49	38	42
September	44	47	53	47	38	46
October	46	47	44	47	40	48
November	44	46	49	45	45	46
December	43	47	53	46	46	47
Annual Average	45	45	50	48	42	44
Maximum Month	48	49	54	53	46	48
Minimum Month	42	38	44	42	38	40

Table 7. Monthly average and annual average effluent values for settleable solids (Ml/l) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	0.1	0.1	0.2	0.2	0.5	0.4
February	0.1	0.1	0.2	0.2	0.3	0.3
March	0.1	0.1	0.3	0.2	0.3	0.3
April	0.1	0.1	0.5	0.3	0.4	0.3
May	0.2	0.2	0.7	0.3	0.3	0.3
June	0.2	0.2	0.8	0.2	0.2	0.3
July	0.3	0.2	0.5	0.3	0.1	0.3
August	0.3	0.3	0.5	0.3	0.3	0.5
September	0.3	0.3	0.5	0.5	0.4	0.6
October	0.2	0.3	0.4	0.4	0.3	0.6
November	0.1	0.1	0.3	0.3	0.3	0.6
December	0.2	0.2	0.3	0.3	0.5	0.8
Annual Average	0.2	0.2	0.4	0.3	0.3	0.4
Maximum Month	0.3	0.3	0.8	0.5	0.5	0.8
Minimum Month	0.1	0.1	0.2	0.2	0.1	0.3

As shown in Table 5, the monthly average percent removals for total suspended solids meet both federal primary treatment requirements and California Ocean Plan Table A requirements for the Point Loma WTP. As shown in Table 4, the applicant’s proposed monthly average limit of 75 mg/l for the Point Loma WTP effluent will also be met, although lower concentrations for suspended solids in the effluent are achievable. As shown in Table 6 and based on EPA’s review of the effluent data, the turbidity limits for the Point Loma WTP effluent will be met. As shown in Table 7 and based on EPA’s review of the effluent data and the City’s response to permit violations which occurred in June and August 2004 (Table III.B-28 in Volume III of the application), the settleable solids limits for the Point Loma WTP effluent will be met.

In contrast to federal primary treatment and California Ocean Plan requirements, the percent removal requirement for total suspended solids specified under CWA section 301(j)(5) is applied on a “system-wide” basis and computed in accordance with the existing permit.

Table 8. Monthly average and annual average system-wide percent removals for total suspended solids (%).

Month	2002	2003	2004	2005	2006	2007
January	86	87	84	85	87	87
February	83	86	86	85	88	88
March	86	86	86	86	87	89
April	86	86	86	86	86	91
May	86	85	86	86	87	92
June	85	86	86	84	88	93
July	82	86	86	84	85	92
August	85	87	86	87	87	91
September	88	87	86	87	90	88
October	87	85	87	85	90	86
November	86	85	86	87	89	89
December	86	86	86	88	87	86
Annual Average	86	86	86	86	88	89
Maximum Month	88	87	87	88	90	93
Minimum Month	83	85	84	84	85	87

As shown in Table 8, the monthly average system-wide percent removals for total suspended solids meet the CWA section 301(j)(5) requirement of not less than 80 percent.

To comply with the CWA section 301(j)(5) requirement to implement a wastewater reclamation program that will result in a reduction in the quantity of suspended solids discharged by the applicant into the marine environment during the period of the 301(h) modification, the applicant has brought online the 30 mgd North City WRP and the 15 mgd South Bay WRP and, as part of its “improved” discharge, has committed to bring additional recycled water users online to reduce dry-weather flows to both the South Bay Ocean Outfall and Point Loma WTP and Ocean Outfall. Evidence for reductions in the quantity of suspended solids discharged by the applicant during the period of the 301(h) modification are provided in the application (Volume III, Figure II.A-1) which shows the actual reduction in Point Loma WTP effluent mass emissions for total suspended solids from 1995 through 2007. The application also provides projections for total suspended solids loadings from the Point Loma WTP during the period of the proposed 301(h) modification (Appendix III, Table II.A-21).

Table 9. Point Loma WTP actual and projected flows (mgd) and total suspended solids loadings (MT/year) during the terms of the existing and proposed permits.

Year	Actual Annual Average Discharge[1]	Actual TSS Mass Emissions[1,2]	Projected Annual Average Discharge	Projected TSS Mass Emissions
1995	188	11,060	---	---
1996	179	10,718	---	---
1997[3]	189	10,255	---	---
1998[4]	194	10,627	---	---
1999	175	9,130	---	---
2000[5]	174	9,036	---	---
2001	175	10,256	---	---
2002[6]	169	10,184	---	---
2003	170	9,862	---	---
2004	174	10,300	---	---
2005	183	10,229	---	---
2006	170	8,248	---	---
2007	161	7,588	---	---
2008	---	---	191	11,400
2009	---	---	193	11,500
2010	---	---	194	11,800
2011	---	---	195	11,700
2012	---	---	197	11,800
2013	---	---	199	11,900
2014	---	---	202	12,100

[1] Flow and mass emissions data from annual reports submitted to the Regional Water Board and EPA for 1995-2007.
[2] Annual mass emissions (converted to units of metric tons per year) are computed as the annual average of monthly mass emissions presented in annual reports submitted to the Regional Water Board and EPA for 1995-2007. The above-listed annual values (computed from monthly averages) may vary slightly from the annual values presented in the summary sheets within the annual reports, which are computed on the basis of average flow and effluent total suspended solids concentrations.
[3] North City WRP is brought online.
[4] Metro Biosolids Center is brought online.
[5] International Boundary and Water Commission International Wastewater Treatment Plant is brought online and Tijuana wastewater flows to Metro System are terminated.
[6] South Bay WRP is brought online.

The applicant's projections in Table 9 and proposed annual mass emissions limits for total suspended solids satisfy section 301(j)(5)(B)(ii) of the Act, except that footnotes 2 and 3 are retained from the existing permit:

> "[2] To be achieved on permit effective date through December 31, 2013. Applies only to TSS discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the Metro System service area; does not apply to wastewater (and the resulting TSS)

generated in Mexico which, as a result of upset or shutdown, is treated at and discharged from Point Loma WTP.

[3] To be achieved on January 1, 2014. Applies only to TSS discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the Metro System service area; does not apply to wastewater (and the resulting TSS) generated in Mexico which, as a result of upset or shutdown, is treated at and discharged from Point Loma WTP."

The applicant's proposed modifications to the requirements of footnotes 2 and 3 in the existing modified permit would allow significant new sources of total suspended solids to be included in the Point Loma discharge, but excluded from the determination of compliance with these mass emission limits. EPA cannot determine compliance with CWA section 301(j)(5)(B)(ii) if these provisions are changed to allow additional total suspended solids loadings to be excluded from the mass emission requirements for total suspended solids. Maintaining the existing requirements in footnotes 2 and 3 ensures that the mass emission loadings are measured on a comparable basis so that EPA can determine that the permit requires the necessary reduction in suspended solids loadings.

Based on Table 9, EPA believes that a total suspended solids mass emission rate of 12,100 metric tons per year would be achievable during all five years of the proposed 301(h) modification. During this period, EPA recognizes that reductions in mass emissions resulting from increased water reclamation are likely to be seasonal and anticipates the potential for corresponding higher mass emission rates during wet weather months. In the future, the City needs to pursue additional water reclamation and reuse projects, including those which demand a year-round supply of reclaimed water so as to maintain long-term compliance with the decision criteria.

2. Biochemical Oxygen Demand

To comply with federal primary treatment and CWA section 301(j)(5) requirements for biochemical oxygen demand, the applicant has proposed the following effluent limit:

BOD: The annual average system-wide percent removal shall not be less than 58 percent (computed in accordance with Addendum No. 1 to Order No. R9-2002-0025, NPDES No. CA0107409).

EPA reviewed influent and effluent data for Point Loma WTP provided in Volume IV, Appendix A, of the application. The data for biochemical oxygen demand are summarized, as follows.

Table 10. Monthly average and annual average influent concentrations for biochemical oxygen demand (mg/l) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	257	280	272	218	261	282
February	257	260	249	219	279	286
March	261	258	244	221	264	302
April	266	267	258	254	270	307
May	263	280	264	264	278	315
June	268	274	277	269	263	329
July	280	283	251	256	268	323
August	264	277	267	259	261	322
September	260	280	257	265	273	311
October	270	269	234	263	280	295
November	276	261	234	277	277	305
December	266	262	256	256	282	270
Annual Average	266	271	255	252	271	304
Maximum Month	280	283	277	277	282	329
Minimum Month	257	261	234	218	261	270

Table 11. Monthly average and annual average effluent concentrations for biochemical oxygen demand (mg/l) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	95.0	99.6	103.7	88.4	97.6	100
February	107.5	97.7	98.5	88.7	101.1	97
March	94.4	99.9	100.5	96.3	102.5	99
April	98.6	111.7	100.3	107.7	105.5	95
May	89.4	116.9	101.3	112.7	105.4	96
June	84.0	117.2	107.7	114.6	108.1	95
July	90.4	115.5	102.4	112.0	111.9	96
August	88.8	107.2	115.4	105.1	102.3	98
September	83.9	100.9	106.1	107.1	98.4	94
October	94.8	101.0	85.9	112.5	92.0	93
November	104.7	94.9	94.4	112.3	97.2	94
December	93.6	96.5	102.8	101.5	100.6	89
Annual Average	93.8	104.9	101.6	104.9	101.9	96
Maximum Month	107.7	117.2	115.4	114.6	111.9	100
Minimum Month	83.9	94.9	85.9	88.4	92.0	89

Table 12. Monthly average and annual average percent removals for biochemical oxygen demand (%) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	63.0	64.4	61.9	59.4	62.6	64.5
February	58.2	62.4	60.4	59.5	63.8	66.1
March	63.8	61.3	58.8	56.4	61.2	67.2
April	62.9	58.2	61.1	57.6	60.9	68.8
May	66.0	58.3	61.6	57.3	62.1	69.5
June	68.7	57.2	61.1	57.4	58.9	70.9
July	67.7	59.2	56.2	56.3	58.2	70.0
August	66.4	61.3	56.8	59.4	60.8	69.5
September	67.7	64.0	58.7	59.6	64.0	69.7
October	64.9	62.5	63.3	57.2	67.1	68.3
November	62.1	63.6	59.7	59.5	64.9	69.2
December	64.8	63.2	59.8	60.4	64.3	66.9
Annual Average	64.7	61.3	60.0	58.3	62.4	68.4
Maximum Month	68.7	64.4	63.3	60.4	67.1	70.9
Minimum Month	58.2	57.2	56.2	56.3	58.2	64.5

As shown in Table 12, the monthly average percent removals for biochemical oxygen demand meet the federal primary treatment requirement.

In contrast to the federal primary treatment requirement, the percent removal requirement for biochemical oxygen demand specified under CWA section 301(j)(5) is applied on a "system-wide" basis and computed in accordance with the existing permit.

Table 13. Monthly average and annual average system-wide percent removals for biochemical oxygen demand (%).

Month	2002	2003	2004	2005	2006	2007
January	65	67	62	62	65	67
February	61	65	64	62	66	68
March	67	63	62	60	63	69
April	66	61	64	61	63	71
May	69	61	65	60	64	71
June	70	61	64	59	62	73
July	68	62	63	60	60	72
August	69	64	60	62	64	72
September	71	66	61	63	67	72
October	68	65	66	60	69	70
November	65	67	63	63	67	71
December	68	66	62	63	66	69
Annual Average	67	64	63	61	65	70
Maximum Month	71	67	66	63	69	73
Minimum Month	61	61	60	59	60	67

As shown in Table 13, the annual average system-wide percent removals for biochemical oxygen demand meet the CWA section 301(j)(5) requirement of not less than 58 percent.

3. 301(h)-modified Permit Effluent Limits for TSS and BOD

Based on EPA's review of the 301(h) and (j)(5) decision criteria, the effluent limits in Table 14 will be incorporated into the 301(h)-modified permit:

Table 14. Effluent limits based on CWA sections 301(h) and (j)(5).

Effluent Constituent	Units	Annual Average	Monthly Average
TSS	% removal[1]	---	≥80
	mg/l	---	75[4]
	metric tons/year	15,000[2]	---
		13,598[3]	---
BOD5	% removal[1]	≥58	---

[1] To be calculated on a system-wide basis, as provided in Addendum No. 1 to Order No. R9-2002-0025.
[2] To be achieved on permit effective date through December 31, 2013. Applies only to TSS discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the Metro System service area; does not apply to wastewater (and the resulting TSS) generated in Mexico which, as a result of upset or shutdown, is treated at and discharged from Point Loma WTP.
[3] To be achieved on January 1, 2014. Applies only to TSS discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the Metro System service area; does not apply to wastewater (and the resulting TSS) generated in Mexico which, as a result of upset or shutdown, is treated at and discharged from Point Loma WTP.
[4] Based on average monthly performance data (1990 through 1994) for the Point Loma WTP provided by the Discharger for the 1995 301(h) application.

B. Attainment of Water Quality Standards for TSS and BOD

Under 40 CFR 125.61(a) which implements CWA section 301(h)(1), there must be a water quality standard applicable to the pollutants for which the modification is requested; under 125.61(b)(1), the applicant must demonstrate that the proposed modified discharge will comply with these standards. The applicant has requested modified requirements for total suspended solids, which can affect natural light (light transmissivity) and biochemical oxygen demand which can affect dissolved oxygen concentration.

1. Natural Light

In relation to the effects of total suspended solids, the California Ocean Plan specifies that: "Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste." Regional Water Boards may determine reduction of natural light by measurement of light transmissivity or total irradiance, or both. Compliance with this water quality objective is determined from samples collected at stations representative of the area within the wastefield where initial dilution is completed. The typical depth range of the PLOO wastefield is 60 to 80 meters below the surface which is well below the euphotic zone.

In the 1995 TDD, EPA predicted a maximum increase in total suspended solids of 0.5 mg/l, in the immediate area of the Point Loma discharge, based on an effluent concentration of 53 mg/l and the worst-case initial dilution of 99:1. Applying this initial dilution value to the total suspended solids effluent values in Table 4 and the applicant's estimate for ambient total suspended solids (depth-averaged over a complete tidal cycle) of 7 mg/l, the maximum increase in total suspended solids at the boundary of the zone of initial dilution should be on the order of 0.45 to 0.24 mg/l, or about 6 to 3 percent. While these estimates are larger than the applicant's estimates, the increases predicted by the mass balance model are not considered substantial given the range of natural variability in total suspended solids (2.2 to 11.2 mg/l) historically observed in the area of the discharge.

EPA also reviewed available receiving water data to assess whether or not natural light is significantly reduced by the drifting wastefield.

Under its existing NPDES permit, the City conducts the required quarterly monitoring for bacteria indicators (enterococcus, fecal coliforms, and total coliforms), at depths of 1, 25, 60, 80 and 98 meters below the surface, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours (Figure A-3). This data is used by the applicant and EPA to help identify the location of the drifting wastefield. EPA evaluated the applicant's monitoring results from October 2003 through July 2007. Bacteria indicator data indicative of the PLOO wastefield are variably found along the 98, 80, and 60 meter contours, generally at depths from 60 to 98 meters.

Under its existing NPDES permit, the City conducts the required quarterly monitoring for light transmittance, throughout the water column, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours. EPA evaluated the applicant's monitoring results from October 2003 through October 2007. As shown in Table B-1 and Figure A-5, long-term averages and standard deviations for percent transmissivity at different water depths at the near-ZID boundary and nearfield stations (F30, F29, F31) are similar to those observed for the same water depth, at farfield stations located on the 98 meter contour. Long-term averages for percent transmissivity are lower and more variable at water depths closer to the surface and at the bottom, in comparison to water depths below the euphotic zone which are frequented by the drifting wastefield. Generally, percent transmissivity is lower at stations closer to the coast, due to shoreline influences and sediment resuspension at the bottom. Based on this evaluation, EPA concludes that the Point Loma discharge does not result in a significant reduction in natural light in areas within the wastefield where initial dilution is completed.

2. Dissolved Oxygen

In relation to the effects of biochemical oxygen demand, the California Ocean Plan specifies that: "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." Compliance with this water quality objective is determined from samples collected at stations representative of the area within the wastefield where initial dilution is completed. The typical depth range of the PLOO wastefield is 60 to 80 meters below the surface which is well below the euphotic zone.

The 1995 application used a modeling approach to predict the effect of the Point Loma WTP discharge on ambient dissolved oxygen concentrations. In the 1995 TDD, EPA evaluated these efforts and conducted similar modeling, using a worst-case (critical) initial dilution of 99:1, to verify the City's predictions. EPA's modeling results were slightly higher, but comparable to the applicant's results. The results of these modeling efforts are still valid for this review, as the assumptions for discharge flow (240 mgd), total suspended solids (48 mg/l), and biochemical oxygen demand (121 mg/l) remain conservative model inputs, with respect to the 2007 application. A summary of the applicant's analyses are found in Volume III, Large Applicant Questionnaire section III.B, of the application. The results of the applicant's and EPA's modeling efforts are summarized, below. EPA's analyses are found in the administrative record for the 1995 TDD.

Both the applicant and EPA use modeling efforts to evaluate the potential for: (1) dissolved oxygen depression following initial dilution during the period of maximum stratification (or other critical period); (2) farfield dissolved oxygen depression associated with biochemical oxygen demand exertion in the wastefield; (3) dissolved oxygen depression associated with steady-state sediment oxygen demand; and (4) dissolved oxygen depression associated with the resuspension of sediments (Table 15). For these calculations, the applicant uses an initial dilution of 202:1 while EPA uses the worst-case initial dilution of 99:1.

Table 15. Predicted worst-case dissolved oxygen (DO) depressions (mg/l) and percent reductions (%) performed by San Diego (1995) and EPA (1995).

Sources of Potential Oxygen Demand	San Diego	EPA
DO depression upon initial dilution (and % reduction)	0.05 (<1%)	0.08 (1.7%)
DO depression due to BOD exertion in the farfield (and % reduction)	0.14 (2.4%)	0.23 (5.9%)
DO depression due to steady-state sediment oxygen demand (and % reduction)	0.045 (1.7%)	0.16 (4.7%)
DO depression due to abrupt sediment resuspension (and % reduction)	0.077 (2.4%)	0.12 (3.5%)

EPA has compared these model predictions to the most recent water quality data to assess the potential for the discharge to result in dissolved oxygen depressions more than 10 percent from that which occurs naturally. Under its existing NPDES permit, the City conducts the required quarterly monitoring for dissolved oxygen, throughout the water column, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours. EPA evaluated the applicant's monitoring results from October 2003 through October 2007. At water depths frequented by the drifting wastefield, the long-term average concentrations for dissolved oxygen are around 4 to 5 mg/l. As shown in Table B-2 and Figure A-6, the long-term average concentration for dissolved oxygen at the near-ZID boundary station (F30) is similar to long-term average concentrations measured at nearfield and farfield stations. Dissolved oxygen depression associated with sediment demand should be compared to bottom waters at the outfall depth which, on average, show dissolved oxygen concentrations around 3 mg/l. This evaluation supports the conclusion that the Point Loma discharge does not result in more than a 10 percent reduction in dissolved oxygen concentrations, in areas within the wastefield where initial dilution is completed, from that which occurs naturally.

Based on the model predictions and receiving water monitoring results, EPA concludes it is unlikely that the dissolved oxygen concentration will be depressed more than 10 percent from that which occurs naturally outside the initial dilution zone, as a result of the wastewater discharge.

C. Attainment of Other Water Quality Standards and Impact of the Discharge on Shellfish, Fish and Wildlife; Public Water Supplies; and Recreation

CWA section 301(h)(2), implemented under 40 CFR 125.62, requires the modified discharge to not interfere, either alone or in combination with other sources, with the attainment or maintenance of that water quality which assures protection of public water supplies; protection and propagation of a balanced indigenous population (BIP) of shellfish, fish, and wildlife; and allows recreational activities in and on the water. In addition, CWA section 301(h)(9), implemented under 40 CFR 125.62(a), requires that the modified discharge meet all applicable EPA-approved State water quality standards and, where no such standards exist, EPA's 304(a)(1) aquatic life criteria for acute and chronic toxicity and human health criteria for carcinogens and noncarcinogens, after initial mixing in the waters surrounding or adjacent to the outfall.

1. Attainment of Other Water Quality Standards and Criteria

40 CFR 125.62(a) requires that the applicant's outfall and diffuser be located and designed to provide adequate initial dilution, dispersion, and transport of wastewater such that the discharge does not exceed, at and beyond the zone of initial dilution, all applicable State water quality standards. Where there are no such standards, individual 304(a)(1) aquatic life criteria and human health criteria must not be exceeded by the discharge. For this review, the applicable water quality standards and criteria are analyzed in four categories: pH, toxics, whole effluent toxicity, and sediment quality.

a. pH

The applicant is not requesting a 301(h) modification for pH, but the modified discharge must still meet the water quality standard for pH. The California Ocean Plan specifies that in ocean water: “The pH shall not be changed at any time more than 0.2 units from that which occurs naturally.” Compliance with this water quality objective is determined from samples collected at stations representative of the area within the wastefield where initial dilution is completed. The typical depth range of the PLOO wastefield is 60 to 80 meters below the surface. Also, Table A in the California Ocean Plan has the effluent limit for pH: “Within the limit of 6.0 to 9.0 at all times.” This requirement for pH is the same as that found in the secondary treatment regulation (40 CFR Part 133).

The City’s 1995 application computed projected effects for a 240 mgd discharge on receiving water pH and a maximum change of 0.02 pH units was estimated.

Under its existing NPDES permit, the City conducts the required quarterly monitoring for pH, throughout the water column, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours. EPA evaluated the applicant’s monitoring results from October 2003 through October 2007. At water depths frequented by the drifting wastefield, the long-term average for pH ranges from 7.9 to 7.8 units. As shown in Table B-3 and Figure A-7, the long-term average for pH measured at the near-ZID boundary station (F30) is similar to long-term averages measured at nearfield and farfield stations.

Under its existing NPDES permit, the City conducts the required continuous monitoring for pH in the Point Loma WTP effluent. Table III.B-13 in Volume III of the application summarizes daily pH data for the effluent during 2002 through 2006. During this period, the maximum daily value for pH was 7.87 units and the minimum daily value was 6.65 units. These levels achieve the technology based effluent limits required in both Table A of the California Ocean Plan and federal secondary treatment standards.

Based on the model predictions and receiving water monitoring results, it is unlikely that pH will be depressed more than 0.2 units from that which occurs naturally outside the initial dilution zone, as a result of the wastewater discharge. Also, EPA expects that technology based effluent limits for pH will be met by the applicant.

b. Toxics and Whole Effluent Toxicity

Under its existing NPDES permit, the City conducts the required effluent monitoring for the priority toxic and non-conventional pollutants listed in Table B of the California Ocean Plan and “remaining priority pollutants”. Table B parameters for the protection of marine aquatic life are monitored weekly, except for chronic toxicity which is monitored monthly and acute toxicity which is monitored semi-annually. Table B parameters for the protection of human heath (noncarcinogens) are monitored monthly. Table B parameters for the protection of human health (carcinogens) are monitored monthly, except for aldrin and dieldrin, chlordane, DDT, PCBs, and toxaphene which are monitored weekly. “Remaining priority pollutants” are monitored monthly.

Toxics

The City submitted Point Loma WTP effluent data for metals, ammonia, and toxic organic chemicals from 2002 through 2006 in electronic format, as part of the application. Table B-4 provides a summary list of the monitored chemical parameters in this submission.

EPA screened this data using both the maximum method detection limit (MDL) and maximum effluent value reported by the applicant. Parameters never detected in the effluent were set aside. The remaining parameters were screened to determine which exceeded an applicable California Ocean Plan Table B water quality objective, or if no such objective exists, any applicable EPA 304(a)(1) water quality criterion. For Table B objectives, this screening was conducted using the 1995 and 2002 minimum monthly average initial dilution value of 204:1.

Table B-5 provides a summary list of parameters detected at least once in the effluent from 2002 through 2006. Only chlordane and heptachlor exceeded applicable State water quality standards, or EPA’s 304(a)(1) water quality criteria; both the applicant (Table III.B-28 in Volume III of the application) and EPA have identified that these two parameters exceeded Table B objectives only once, on July 24, 2004. Chlordane is a pesticide that was used on crops like corn and citrus, on home lawns and gardens, and to control termites. EPA banned all uses of chlordane in 1988. Heptachlor was extensively used in the past for killing insects in homes, buildings, and on food crops. These uses stopped in 1988. Currently, heptachlor can only be used for fire ant control in underground power transformers. The applicant monitors effluent levels of chlordane on a weekly basis and heptachlor on a monthly basis and attributes the exceedance results to an illicit discharge to the sewer system. All other monitoring results for chlordane and heptachlor were reported as not detected in the effluent.

EPA reviewed the sensitivity of analytical methods used by the applicant to evaluate effluent compliance with California Ocean Plan Table B water quality objectives after initial dilution. To do this, EPA reviewed the maximum method detection limits (MDLs) and maximum effluent concentrations for all Table B parameters monitored during 2002 through 2006. For Table B parameters which are always reported as “not detected”, EPA calculated estimated effluent wasteload allocations by multiplying Table B objectives by the respective initial dilution value. These estimated wasteload allocations are then compared to the applicant’s maximum MDLs during 2002 through 2006. Based on these comparisons, EPA has determined that the MDLs for aldrin, benzidine, chlordane, DDT, 3,3-dichlorobenzidine, dieldrin, heptachlor, heptachlor epoxide, PAHs, PCBs, TCDD equivalents, and toxaphene are generally not low enough to evaluate effluent quality in relation to the applicable water quality objective after initial dilution (i.e., the MDL is greater than the estimated effluent wasteload allocation). EPA determined that the applicant is using MDLs as sensitive as those prescribed under 40 CFR 136, except for aldrin, PCBs, and TCDD equivalents, where the applicant's MDLs need to be lowered in order to achieve 40 CFR 136 levels.

Whole Effluent Toxicity

The City provided Point Loma WTP effluent data for chronic toxicity and acute toxicity from 2002 through 2007 in electronic format, at EPA's request.

EPA reviewed these chronic toxicity data, along with the summary results for chronic toxicity provided in Volume III, Large Applicant Questionnaire section III.B.7, of the application to determine if any test results exceeded the Table B chronic toxicity objective of 1.0 TUc (= 100/NOEC). In accordance with the existing permit, the applicant conducted sensitivity screening using *Atherinops affinis* (topsmelt), *Haliotis rufescens* (red abalone), and *Macrocystis pyrifera* (giant kelp) and concluded that the red abalone and giant kelp were the most sensitive organisms for chronic toxicity testing. EPA's review of the 52 red abalone larval development test results from June 2003 through 2007 shows no exceedance of the chronic toxicity objective using the minimum monthly initial dilution value of 204:1. EPA's review of the 60 giant kelp germ tube length test results from June 2003 through 2007 shows one exceedance (December 19, 2005) of the chronic toxicity objective which is a very low failure rate. In response to the exceedance, the City conducted accelerated toxicity testing as required by the existing permit; these follow-up toxicity tests demonstrated compliance with the objective. The applicant reports that concentrations of toxic inorganic and organic constituents in the Point Loma WTP effluent at the time of the noncompliant toxicity test were at normal values and the cause of the toxicity is unknown. The existing permit limit is 205 TUc and the critical effluent concentration is 0.49 percent effluent.

EPA reviewed these acute toxicity data, along with the summary results for acute toxicity provided in Volume III, Large Applicant Questionnaire section III.B.7, of the application to determine if any test results exceeded the Table B acute toxicity objective of 0.3 TUa (= 100/LC50). In accordance with the existing permit, the applicant conducted sensitivity screening both using *Atherinops affinis* (topsmelt) and *Mysidopsis bahia* (shrimp) and concluded that the shrimp was the more sensitive organism for acute toxicity testing. EPA's review of the 11 test results from June 2003 through September 2007 shows no exceedance of the acute toxicity objective, using the minimum monthly initial dilution value of 20.4:1 for acute toxicity. The existing permit limit is 6.5 TUa and the critical effluent concentration is 15.5 percent effluent.

Toxics Mass Emission Benchmarks and Antidegradation

In the 1995 and 2003 permits, EPA and the Regional Water Board established annual mass based performance goals for California Ocean Plan Table B parameters based on Point Loma WTP effluent data from 1990 through April 1995. For most Table B parameters, the numerical benchmarks are set below the levels prescribed for water quality based effluent limits. The benchmarks are designed to provide an early measure of changes in effluent quality which may substantially increase the mass of toxic pollutants discharged to the marine environment. Consistent with State and federal antidegradation policies, these benchmarks are intended to serve as triggers for antidegradation analyses during renewal of the permit.

Under 40 CFR 131.12, State antidegradation polices and implementation practices must ensure that: (1) existing uses and the level of water quality necessary to protect such uses are maintained and protected (Tier I requirement); and (2) where water quality is better than necessary to support the propagation of fish, shellfish, and wildlife and recreation in and on the water, the level of water quality shall be maintained and protected unless the permitting authority finds that allowing lower water quality is necessary to accommodate important economic or social development in the area in which the waters are located; existing uses are fully protected; and the highest statutory and regulatory requirements are achieved for all new and existing point sources and all cost-effective and reasonable best management practices for nonpoint source control (Tier II requirement).

An analysis of compliance with the mass emission benchmarks in the existing permit is presented in Volume II, Part 3, of the application. During 2002 through 2006, the City achieved compliance with all benchmarks except for phenol (2.57 MT/yr) which was exceeded by about eight percent. Phenol is regularly detected in the Point Loma WTP effluent. According to the applicant, phenol is a common chemical used in industrial and nonindustrial applications as solvents, disinfectants and cleaning compounds; it is also a constituent in paints, inks, and photographic chemicals. Phenol has a variety of household uses including medical and household disinfectants, pharmaceuticals, solvents and cleaners, paints, inks, and photo supplies. It is identified by the applicant as a pollutant of concern, but does not have an existing local pretreatment limit. Industrial discharges of phenols to the sewer system are regulated by the City. Federal categorical industrial dischargers, hospitals, and laboratories are regulated by the applicant's "toxic organic management plans". Electroplating and metal finishing industries are regulated by federal total toxic organics limits. The applicant states that these existing practices are effective in limiting industrial discharges of phenol from electroplating and metal finishing industries, hospitals, laboratories, and other significant industrial users.

Point Loma WTP influent and effluent data presented in Table 2-5 of Volume II, Part 3, of the application demonstrate that the upward trend in phenol mass emissions is consistent and not an artifact of a few high concentrations in a limited number of samples. Historical annual average mass emissions for phenol are: 2.2 MT/yr (1990-1995), 3.3 MT/yr (1996-2001), and 2.7 MT/yr (2002-2006). During these periods, the average percent removal for phenol has improved: 17 percent (1990-1995), 20 percent (1996-2001), and 27 percent (2002-2006). During these periods, the average concentrations for phenol in the effluent are: 8.2 ug/l (1990-1995), 13.4 ug/l (1996-2001), and 11.5 ug/l (2002-2006). The applicant has not requested changes to the mass emission benchmark or the water quality based effluent limits for phenolic compounds in the existing permit.

Based on this information, EPA concludes that a full antidegradation analysis justifying that the continued increase in effluent loading of phenolic compounds (non-chlorinated) to a Tier II waterbody may be necessary. Because the effluent load for phenolic compounds appears likely to continue to increase during the permit term, the draft permit proposes that the applicant conduct a thorough analysis of the projected effluent load above the mass emission benchmark level, the resulting impact to receiving water quality of the total effluent load, and opportunities for effluent load reduction through additional treatment or controls, including local limits, and pollution prevention. If this analysis shows that the total effluent load for phenolic compounds produces either (1) a receiving water concentration at the boundary of the zone of initial dilution that is less than ten percent above the ambient (farfield) concentration, or (2) the receiving water concentration at the boundary of the zone of initial dilution is less than 50 percent of the California Ocean Plan water quality objectives for phenolic compounds (non-chlorinated), then the resulting impact to water quality is not considered “significant” and further analysis is not required at this time. However, if the change in receiving water quality is found to be “significant”, then the applicant must conduct a socioeconomic analysis considering the full benefits and costs of the increased effluent loading of phenolic compounds, including environmental impacts. Specifically, this analysis must assess whether allowing these increased loadings is necessary to accommodate important social and economic development in the San Diego service area.

The existing annual mass emission benchmarks will be incorporated into the reissued permit as a basis for evaluating future changes in effluent quality and mass loading.

EPA concludes that the modified discharge will attain applicable water quality standards and criteria for toxics and whole effluent toxicity, based on the very low rates of effluent excursions above water quality objectives for toxics and chronic toxicity. Consistent with State policy, appropriate requirements for toxics and whole effluent toxicity will be included in the permit. Water quality based effluent limits will be established for all California Ocean Plan Table B parameters where effluent data show the reasonable potential to exceed water quality objectives for toxics and whole effluent toxicity. The effluent will be monitored for all Table B parameters and other priority pollutants following the regular schedule set in the existing permit. The results of the effluent monitoring program will be evaluated against the annual mass emission benchmarks to protect the Point Loma WTP headworks and achieve permit compliance with water quality standards.

In accordance with 40 CFR 125.62, EPA concludes that the modified discharge will allow for the attainment or maintenance of water quality which assures protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife.

c. Sediment Quality

Accumulation of solids in and beyond the vicinity of the discharge can have adverse effects on water usage and biological communities. 40 CFR 125.62(a) requires that following initial dilution, the diluted wastewater and particles must be dispersed and transported such that water use areas and areas of biological sensitivity are not adversely affected.

In relation to solids, Chapter II of the California Ocean Plan contains the following water quality objective for physical characteristics of marine sediments: "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." In addition, Chapter II of the California Ocean Plan contains the following water quality objectives for chemical characteristics of marine sediments: "The concentration of organic materials in marine sediments shall not be increased to levels that would degrade marine life."; "Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota."; and "The dissolved sulfide concentration of waters in and near sediments shall not be significantly increased above that present under natural conditions."

Figure A-8 summarizes percent total solids in sediment at each 98 meter station, during July, from 1991 through 2006.

Applicants must predict seabed accumulation due to the discharge of suspended solids into the receiving water. The approach for large dischargers needs to consider the process of sediment deposition, decay of organic materials, and resuspension and anticipated mass emissions for the permit term.

In 1995, the applicant used a sediment deposition model (SEDPXY) to predict the rates of suspended solids and organic matter deposition and accumulation around the outfall. The model was run under two scenarios, assuming effluent flow rates of 205 (end-of-permit for 1995 application) and 240 mgd (design capacity) and solids mass emission rates of 14,073 and 16,476 MT/yr, respectively. In the 1995 TDD, EPA estimated sediment deposition using a modified version of the *Amended Section 301(h) Technical Support Document* (EPA 842-B-94-007, September 1994; ATSD) sediment deposition model which was run assuming an effluent flow rate of 205 mgd and a solids mass emission rate of 13,600 MT/yr. In the 2002 TDD, EPA adjusted its modeling for the solids mass emission rate of 15,000 MT/yr.

The predictions generated using the ATSD model are likely to be different from the applicant's SEDPXY model due to differences in the use of current meter data, bathymetry, trapping depth distributions, the size and resolution of the modeling grid, and the use of different assumptions regarding the rate which effluent particles settle (e.g., the settling velocities used by EPA were about two times higher than those used by the applicant). As a result of these differences, the ATSD model predicts a greater number of particles settling over a smaller area and is the more conservative result. These data are summarized in Table 16.

Table 16. Results of sediment deposition modeling performed by San Diego (1995) and EPA (1995 and 2002).

Parameter	San Diego	EPA
Effluent flow rate (mgd)	205 – 240	205 – 240
Mass of particles (MT/yr)	14,073 – 16,476	13,600 – 15,000
Mass of particles (lbs/day)	85,000 – 99,512	n/a
Area modeled (km^2)	360	200
Percent of particles settling in area modeled (%)	8.3 – 8.1	12
Area modeled around the diffuser (km^2)	0.01	0.25
Annual solids deposition rate ($g/m^2/yr$)	152 – 174	254 – 280
Critical 90-day solids deposition rate (g/m^2/90-day)	45 – 51	72 – 79
Annual organic deposition rate ($g/m^2/yr$)	122 – 139	203 – 224
Critical 90-day organic deposition rate (g/m^2/90-day)	37 – 57	58 – 64
Steady-state organic accumulation (g/m^2)	33 – 38	56 – 62

Modeled estimates for annual solids deposition rate ranged from 152 to 280 $g/m^2/yr$ and the critical 90-day solids deposition rate ranged from 45 to 79 $g/m^2/yr$.

Although a portion of the settled solids is inert, the organic fraction of the settled solids is a primary concern around outfalls. Assuming that effluent solids are 80% organic matter (USEPA, 1994), modeled estimates for annual organic deposition rate ranged from 122 to 224 $g/m^2/yr$ and the critical 90-day solids deposition rate ranged from 37 to 64 $g/m^2/yr$. Although not strictly comparable, a reasonable estimate of organic carbon flux from the water column associated with primary and secondary production in Southern California is 26 to 62 g $C/m^2/yr$ (Nelson et al., 1987).

Estimates of steady-state organic accumulation ranged from 33 to 62 g/m^2, over the area modeled. The steady-state accumulation of organic matter in sediments is a function of the rate that organic matter is deposited and the rate at which it decays. Both the applicant and EPA used the conservative assumption that there is no resuspension or transport of solids to outside the area modeled and the typical default decay rate of 0.01/day. This tends to overestimate the actual accumulation of outfall deposits in sediments. For instance, Hendricks and Eganhouse (1992) estimated a background accumulation rate for solids of 103 $g/m^2/yr$, about one-sixth of their estimate for solids deposition. Applying this ratio to the model results in Table 16 for annual organic deposition rate ($g/m^2/yr$), yields estimates for organic accumulation rate ranging from 20 to 37 $g/m^2/yr$ and steady-state organic accumulation rate ranging from 5 to 10 g/m^2. Empirical evidence suggests that steady-state organic accumulations less than 50 g/m^2 have minimal effects on benthic communities (USEPA, 1982).

To both evaluate whether significant accumulation is actually occurring in the area of the outfall and identify trends, EPA examined sediment monitoring data for pre-discharge (1991-1993) and discharge monitoring surveys (1994-2006) conducted during July, at the depth of the outfall along the 98 meter contour (Figure A-4). (Under its existing NPDES permit, the City conducts the required semi-annual monitoring, during January and July, at 12 primary stations located along the 98 meter contour and a total of 10 secondary stations located along the 88 and 116 meter contours.) For perspective, values from the 98 meter stations are compared with San Diego's regional surveys (Volume IV, Appendix E, of the application) and the Southern California Bight regional survey conducted in 2003 (Schiff et al., 2006).

Sediment Grain Size Characteristics

Information about sediment grain size characteristics (e.g., particle size, percent fines) and the dispersion of sediment particles at a survey sight is indicative of hydrodynamic regimes and allows for better interpretation of chemical and biological data collected at the sight. Measured mean particle size and percent fines and trends around the Point Loma outfall are summarized in Figures E-2 and E-4 of Volume IV, Appendix E, of the application. The mean particle size for all 98 meter stations during the pre-discharge and discharge periods is 0.061 millimeters (mm) and 0.069 mm, respectively. During these two periods, the mean particle size at near-ZID station E14 is 0.062 mm and 0.102 mm, respectively. The percentage of fine sediments (silt and clay) for all 98 meter stations during the pre-discharge and discharge periods has a mean of about 40 percent and 37 percent, respectively. During these two periods, percent fines at near-ZID station E14 is about 40 percent and 30 percent, respectively.

The applicant reports that the slight increase in mean particle size observed at near-ZID station E14 is likely related to the movement of ballast material supporting the outfall pipe and the presence of patchy sediments in the area. The applicant also notes that sediments at northern reference station B12 are frequently characterized by the presence of very course material (shell hash and gravel) which distinguishes this station from other 98 meter stations. Consequently, this review uses northern reference station B9 as the primary reference station for making comparisons.

The mean particle size at station B9 during the pre-discharge and discharge periods is 0.054 mm and 0.060 mm, respectively. During these two periods, percent fines at station B9 is about 42 percent and 40 percent, respectively. For mid-shelf sediments (30-120 meters) summarized for the Southern California Bight regional survey in 2003, the area-weighted mean and 95% confidence interval for fine sediments is 45 ± 8.4 percent. Figure E.5-1 in Volume IV, Attachment E.5, of the application summarizes percent fines in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Overall, there appears to be little change over time in sediment grain size characteristics relative to the outfall. The year-to-year variation in sediment grain size characteristics observed at station E14 are likely due to the movement of outfall ballast material.

Organic Indicators

Concentrations of total organic carbon, total volatile solids, total nitrogen, biochemical oxygen demand, and sulfides are measured as indicators of organic enrichment in sediments. Total organic carbon and total volatile solids represent more direct measurements of carbon imported as fine particulate matter.

Total Organic Carbon. Total organic carbon is a direct measure of the amount of organic carbon in sediments. Figure A-9 summarizes percent total organic carbon in sediment at each 98 meter station, during July, from 1993 through 2006. There does not appear to be a spatial trend in percent total organic carbon at these stations; however, during 2005 and 2006, there is a slight increase in percent total organic carbon at all 98 meter stations which does not appear to be related to the outfall. For January and July surveys, the mean percent total organic carbon for all 98 meter stations during the pre-discharge (1993) and most recent discharge period (2001-2006) is about 0.5 percent and 0.6 percent, respectively. During these two periods, the mean percent total organic carbon at near-ZID station E14 is about 0.5 percent and 0.5 percent, respectively, while levels at northern reference station B9 are about 0.6 percent and 0.6 percent, respectively. For mid-shelf sediments summarized for the 2003 Southern California Bight regional survey, the area-weighted mean and 95% confidence interval for total organic carbon is 0.75 ± 0.19 percent. These data do not suggest an outfall related effect. Figure E.5-2 in Volume IV, Attachment E.5, of the application summarizes percent total organic carbon in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Total Volatile Solids. Total volatile solids is a measure of organic carbon and nitrogenous matter in sediments. Figure A-10 summarizes percent total volatile solids in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are slightly higher than pre-discharge levels and there appears to be a weak spatial trend where levels slightly increase with distance from the outfall. For January and July surveys, the mean percent total volatile solids for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) is about 2.2 percent and 2.4 percent, respectively. During these two periods, the mean percent total volatile solids at near-ZID station E14 is about 2.1 percent and 2.0 percent, respectively, while levels at northern reference station B9 are about 2.4 percent and 3.2 percent, respectively. These data do not suggest an outfall-related effect. Figure E.5-3 in Volume IV, Attachment E.5, of the application summarizes percent total volatile solids in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Total Nitrogen. Figure A-11 summarizes percent total nitrogen in sediment at each 98 meter station, during July, from 1993 through 2006. At these stations, discharge period levels are slightly higher than pre-discharge levels and there appears to be a weak spatial trend where levels slightly increase with distance from the outfall. For January and July surveys, the mean percent total nitrogen for all 98 meter stations during the pre-discharge (1993) and most recent discharge period (2001-2006) is about 0.04 percent and 0.05 percent, respectively. During these two periods, the mean percent total nitrogen at near-ZID station E14 is about 0.03 percent and 0.5 percent, respectively, while during these two periods, levels at northern reference station B9 are about 0.05 percent and 0.06 percent, respectively. For mid-shelf sediments summarized for the 2003 Southern California Bight regional survey, the area-weighted mean and 95% confidence interval for total nitrogen is 0.05±0.01 percent. These data do not suggest an outfall-related effect. Figure E.5-4 in Volume IV, Attachment E.5, of the application summarizes percent total nitrogen in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Biochemical Oxygen Demand. Biochemical oxygen demand is an indirect measure of organic enrichment in sediments. Figure A-12 summarizes biochemical oxygen demand concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are slightly higher than pre-discharge levels and year-to-year concentrations measured at each station are quite variable. For January and July surveys, the mean biochemical oxygen demand concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 270 parts per million (ppm) and about 320 ppm, respectively. During these two periods, the mean biochemical oxygen demand concentrations at near-ZID station E14 are about 250 ppm and 470 ppm, respectively, while concentrations at northern reference station B9 are about 300 ppm and 310 ppm, respectively. These data suggest that a small amount of organic enrichment is occurring close to the outfall diffuser.

Sulfides. Sulfides are a byproduct of anaerobic digestion of organic material by sulfur bacteria. Figure A-13 summarizes sulfide concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are generally higher than pre-discharge levels and year-to-year concentrations measured at stations close to the outfall (E17, E14, E11) are distinctly higher and quite variable. (Station E14 is located about 120 meters from the center of the diffuser legs and stations E17 and E11 are located about 250 to 300 meters from the ends of the diffuser legs.) For January and July surveys, the mean sulfide concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 1.2 ppm and 3.9 ppm, respectively. During these two periods, the mean sulfide concentrations at near-ZID station E14 are 1.7 ppm and 16.2 ppm, respectively, while concentrations at northern reference station B9 are 0.5 ppm and 1.2 ppm, respectively. These data suggest that a small amount of organic enrichment is occurring close to the outfall diffuser. Figure E.5-5 in Volume IV, Attachment E.5, of the application summarizes sulfide concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Modeling predictions indicate that deposition and accumulation rates associated with the Point Loma Ocean Outfall are not likely to have negative effects on benthic communities beyond the zone of initial dilution. Monitoring results for sediment parameters associated with organic enrichment suggest a mixed picture relative to the potential for biological effects close to the outfall diffuser. Only biochemical oxygen demand and sulfides are elevated at near-ZID station E14; sulfides are variably elevated at nearfield stations E17 and E11. However, as described below, monitoring results for biological indicators of organic enrichment lead EPA to conclude that significant effects on the benthic macrofauna community are not occurring in areas beyond the zone of initial dilution. EPA also concludes that the modified discharge complies with applicable California Ocean Plan water quality objectives for chemical characteristics of marine sediments.

Trace Metals and Toxic Organics

Chapter II of the California Ocean Plan contains the following water quality objective for chemical characteristics in marine sediments: "The concentration of substances set forth in Chapter II, Table B, in marine sediments shall not be increased to levels which would degrade indigenous biota."

To both evaluate whether trace metals and toxic organic compounds are found at elevated concentrations in the area of the outfall and identify trends, EPA examined sediment monitoring data for pre-discharge (1991-1993) and discharge monitoring surveys (1994-2006) conducted during July, at the depth of the outfall along the 98 meter contour (Figure A-4). Ten metals, total DDTs, total PCBs, and total PAHs are reviewed. For perspective, parameter concentrations from the 98 meter stations are compared with non-regulatory NOAA sediment quality guidelines developed for the National Status and Trends Program (NOAA, 1999) and area-weighted means and 95% confidence intervals for mid-shelf (30-120 meters) sediments summarized for the Southern California Bight regional survey in 2003 (Table 17). The sediment quality guideline concentrations provided by NOAA represent the 10^{th} percentile (or Effects Range-Low) and 50^{th} percentile (or Effects Range-Median) of a toxicological effects database that has been compiled by NOAA for each parameter. The ERL is indicative of the concentrations below which adverse effects rarely occur and the ERM is representative of the concentrations above which effects frequently occur. The method detection limits (MDLs) for parameters monitored in sediments at the 98 meter stations are presented in the City's annual receiving water monitoring reports for the Point Loma Ocean Outfall.

Table II.A-11 in Volume III of the application includes summary data for trace metals monitored in the Point Loma WTP effluent during 2002 through 2006. Known or suspected industrial and nonindustrial sources for pollutants of concern found in the Point Loma WTP effluent are summarized in Table III.H-8, Volume III of the application. Table 2-1 in Volume II of the application estimates 2002 through 2006 mean annual mass emissions (in metric tons per year) for California Ocean Plan Table B parameters discharged from the Point Loma Ocean Outfall; for this calculation, the applicant multiplies the annual average effluent concentration by the annual average discharge flow; effluent results of "not detected" are assumed by the applicant to have a concentration equal to or less than one-half the method detection limit. Table K.5-2 in Volume VIII of the application summarizes Point Loma WTP effluent mass emissions for cadmium, chromium, copper, lead, nickel, silver, and zinc, beginning in 1979 through 2006. (For reference, 1 metric ton is 1,000 kilograms which is approximately 2,205 pounds.)

Table 17. NOAA sediment quality guidelines, area-weighted means and 95% confidence intervals for mid-shelf (30-120 meters) sediments summarized for the Southern California Bight regional survey in 2003, and the applicant's method detection limits during 2006.

Parameter	NOAA ERL	NOAA ERM	Bight '03	MDL in 2006
Arsenic (ppm)	8.2	70	4.1±1.1	0.33
Cadmium (ppm)	1.2	9.6	0.36±0.11	0.01
Chromium (ppm)	81	370	36±8.0	0.016
Copper (ppm)	34	270	12±2.1	0.028
Lead (ppm)	46.7	218	7.4±1.5	0.142
Mercury (ppm)	0.15	0.71	0.10±0.03	0.003
Nickel (ppm)	20.9	51.6	14±3.7	0.036
Selenium (ppm)	---	---	1.2±0.43	0.24
Silver (ppm)	1.0	3.7	0.11±0.06	0.013
Zinc (ppm)	150	410	47+8.4	0.052
Total DDTs (ppt)	1,580	46,100	36,000±6,300	See annual report.
Total PCBs (ppt)	22,700	180,000	2,400±130	
Total PAHs (ppb)	4,022	44,792	60.3±43.3	

Arsenic. The applicant reports that arsenic is detected in 221 of 228 effluent samples during 2002 through 2006. Identified sources are pest control poisons. The 2002-2006 mean annual mass emission rate for the Point Loma WTP discharge is <0.26 metric tons per year.

Figure A-14 summarizes arsenic concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are slightly higher than pre-discharge levels; these increases are most pronounced at near-ZID station E14 and northern reference station B12. For January and July surveys, the mean arsenic concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 2.4 ppm and 3.2 ppm, respectively. During these two periods, the mean arsenic concentrations at near-ZID station E14 are 2.2 ppm and 3.4 ppm, respectively, while concentrations at northern reference station B9 are 2.1 ppm and 3.5 ppm, respectively. These concentrations are below the ERL threshold and similar to the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Figure E.5-7 in Volume IV, Attachment E.5, of the application summarizes arsenic concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Cadmium. The applicant reports that cadmium is detected in 65 of 228 effluent samples during 2002 through 2006. Identified sources are metal plating, metalworking and metal alloys, electronics, and batteries. The 2002-2006 mean annual mass emission rate for the Point Loma WTP discharge is <0.12 metric tons per year; during this period, annual mass emissions for cadmium have decreased.

Figure A-15 summarizes cadmium concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are much lower than pre-discharge levels; the elevated and variable levels recorded during the pre-discharge period are no longer observed and the applicant explains that the frequent detections which begin during the most recent discharge period are due to an improved method detection limit. For January and July surveys, the mean cadmium concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 1.3 ppm and 0.1 ppm, respectively. During these two periods, the mean cadmium concentrations at near-ZID station E14 are 1.1 ppm and 0.1 ppm, respectively, while concentrations at northern reference station B9 are 1.3 ppm and 0.1 ppm, respectively. Concentrations for the most recent discharge period are below the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Figure E.5-9 in Volume IV, Attachment E.5, of the application summarizes cadmium concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Chromium. The applicant reports that chromium is detected in 115 of 228 effluent samples during 2002 through 2006. Identified sources are metal plating, shipbuilding, and metalworking and metal alloys. The 2002-2006 mean annual mass emission rate for chromium (III) in the Point Loma WPT discharge is <0.66 metric tons per year; during this period, annual mass emissions for chromium have increased.

Figure A-16 summarizes chromium concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are similar to pre-discharge levels. For January and July surveys, the mean chromium concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 17.3 ppm and 17.6 ppm, respectively. During these two periods, the mean chromium concentrations at near-ZID station E14 are 15.8 ppm and 14.6 ppm, respectively, while concentrations at northern reference station B9 are 21.8 ppm and 22.8 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Figure E.5-10 in Volume IV, Attachment E.5, of the application summarizes chromium concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Copper. The applicant reports that copper is detected in 228 of 228 effluent samples during 2002 through 2006. Identified sources are metal plating, electronics, tool manufacturing, electroplating, semiconductor manufacturing, shipbuilding, metalworking, and water pipe corrosion. The 2002-2006 mean annual mass emission rate for copper in the Point Loma WPT discharge is 12 metric tons per year; during this period, annual mass emissions for copper have decreased.

Figure A-17 summarizes copper concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are slightly higher than pre-discharge levels; levels at southern reference station E2 (near the LA-5 dredge materials disposal site) are generally elevated when compared to other 98 meter stations. For January and July surveys, the mean copper concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 7.4 ppm and 8.6 ppm, respectively. During these two periods, the mean copper concentrations at near-ZID station E14 are 6.7 ppm and 8.3 ppm, respectively; while concentrations at northern reference station B9 are 6.8 ppm and 8.7 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Concentrations at southern farfield station E2 are below the ERL threshold, but slightly higher than the average background level for the Southern California Bight survey. Figure E.5-11 in Volume IV, Attachment E.5, of the application summarizes copper concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Lead. The applicant reports that lead is detected in 21 of 228 effluent samples during 2002 through 2006. Identified sources are metal plating, metalworking, paints, and batteries. The 2002-2006 mean annual mass emission rate for lead in the Point Loma WPT discharge is <1.3 metric tons per year; during this period, annual mass emissions for lead have increased.

Figure A-18 summarizes lead concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, the discharge period levels appear higher than pre-discharge levels; however, this may be due, in part, to improved method detection limit beginning in 2003. For January and July surveys, the mean lead concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 1.8 ppm and 3.9 ppm, respectively. During these two periods, the mean lead concentrations at near-ZID station E14 are 1.0 ppm and 2.8 ppm, respectively, while concentrations at northern reference station B9 are 1.2 ppm and 4.2 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Figure E.5-13 in Volume IV, Attachment E.5, of the application summarizes lead concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Mercury. The applicant reports that mercury is detected in 7 of 228 effluent samples during 2002 through 2006. Identified sources are orthodontics, thermostats, and thermometers. The 2002-2006 mean annual mass emission rate for mercury in the Point Loma WPT discharge is <0.02 metric tons per year; during this period, annual mass emissions for mercury have decreased.

Figure A-19 summarizes mercury concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are higher than pre-discharge levels and quite variable from year-to-year; levels at southern reference station E2 (near the LA-5 dredge materials disposal site) are generally elevated when compared to other 98 meter stations. For January and July surveys, the mean mercury concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 0.011 ppm and 0.024 ppm, respectively. During these two periods, the mean mercury concentrations at near-ZID station E14 are 0.006 ppm and 0.017 ppm, respectively, while concentrations at northern reference station B9 are 0.002 ppm and 0.023 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Concentrations at southern farfield station E2 are below both the ERL threshold and the average background level for the Southern California Bight survey. Figure E.5-15 in Volume IV, Attachment E.5, of the application summarizes mercury concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Nickel. The applicant reports that nickel is detected in 121 of 228 effluent samples during 2002 through 2006. Identified sources are metal plating, metalworking, and metal alloys. The 2002-2006 mean annual mass emission rate for nickel in the Point Loma WPT discharge is <2.0 metric tons per year; during this period, annual mass emissions for nickel have increased.

Figure A-20 summarizes nickel concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are similar to pre-discharge levels. For January and July surveys, the mean nickel concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 6.6 ppm and 6.3 ppm, respectively. During these two periods, the mean nickel concentrations at near-ZID station E14 are 5.7 ppm and 6.5 ppm, respectively, while concentrations at northern reference station B9 are 7.3 ppm and 7.2 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Figure E.5-16 in Volume IV, Attachment E.5, of the application summarizes nickel concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Selenium. The applicant reports that selenium is detected in 228 of 228 effluent samples during 2002 through 2006. Identified sources are water supply. The 2002-2006 mean annual mass emission rate for selenium in the Point Loma WPT discharge is <0.26 metric tons per year; during this period, annual mass emissions for selenium have remained relatively constant.

Figure A-21 summarizes selenium concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are much lower than pre-discharge levels. The elevated and variable levels recorded during the pre-discharge period are no longer observed; however, the infrequent detections and resulting lower average concentrations for the most recent discharge period are likely due, in part, to use of a less sensitive method detection limit which began in 2003. For January and July surveys, the mean selenium concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 0.2 ppm and 0.1 ppm, respectively. During these two periods, the mean selenium concentrations at near-ZID station E14 are 0.2 ppm and 0.1 ppm, respectively, while concentrations at northern reference station B9 are 0.3 ppm and 0.1 ppm, respectively. These concentrations are well below the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. There is no ERL threshold for selenium. Figure E.5-17 in Volume IV, Attachment E.5, of the application summarizes selenium concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Silver. The applicant reports that silver is detected in 35 of 228 effluent samples during 2002 through 2006. Identified sources are photo processing. The 2002-2006 mean annual mass emission rate for silver in the Point Loma WPT discharge is <0.4 metric tons per year; during this period, annual mass emissions for silver have decreased and then remained relatively constant.

Figure A-22 summarizes silver concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, silver is rarely detected, but EPA notes that the detections which begin during the most recent discharge period (2001-2006) are likely due to an improved method detection limit beginning in 2003. For January and July surveys, the mean silver concentration for all 98 meter stations during the most recent discharge period (2001-2006) is 0.054 ppm. During this period, the mean silver concentration at near-ZID station E14 is 0.045 ppm, while the concentration at northern reference station B9 is 0.057 ppm. During the most recent discharge period, all silver concentrations are below the ERL threshold. During the most recent discharge period, except in 2006, all silver concentrations are generally below the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Figure E.5-18 in Volume IV, Attachment E.5, of the application summarizes silver concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Zinc. The applicant reports that zinc is detected in 225 of 228 effluent samples during 2002 through 2006. Identified sources are metalworking, electronics, tool manufacturing, electroplating, circuit printing, shipbuilding, metalworking, research institutions, and water pipe corrosion. The 2002-2006 mean annual mass emission rate for zinc in the Point Loma WPT discharge is 5.9 metric tons per year; during this period, annual mass emissions for zinc have remained relatively constant.

Figure A-23 summarizes zinc concentrations in sediment at each 98 meter station, during July, from 1991 through 2006. At these stations, discharge period levels are similar to pre-discharge levels. For January and July surveys, the mean zinc concentrations for all 98 meter stations during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) are 28.0 ppm and 27.8 ppm, respectively. During these two periods, the mean zinc concentrations at near-ZID station E14 are 25.2 ppm and 23.7 ppm, while concentrations at northern reference station B9 are 31.6 ppm and 33.9 ppm, respectively. These concentrations are below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey. Figure E.5-19 in Volume IV, Attachment E.5, of the application summarizes zinc concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Total DDTs. DDT and its derivatives are pesticides that were banned for use in the U.S. in 1972, but are still used in some countries. The applicant reports that DDT and its derivatives are generally not detected in effluent samples. (In 2006, the method detection limits for DDT and its derivatives in effluent ranged from 10 to 60 ng/l.) The 2002-2006 mean annual mass emission rate for the Point Loma WTP discharge is “not detected”.

Figure A-24 summarizes concentrations in sediment for total DDTs at each 98 meter station, during July, from 1991 through 2006; since 1997, concentrations are detected less frequently. For January and July surveys, the mean concentration for total DDTs at all 98 meter stations during the most recent discharge period (2001-2006) is 137 parts per trillion (ppt). (In 2007, the method detection limits for DDT and its derivatives in sediment ranged from 400 to 700 ppt.) During this period, the mean concentration is 42 ppt at near-ZID station E14 and 412 ppt at northern reference station B9. During the most recent discharge period, individual station concentrations are well below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey, except at nominal northern reference station B9 and southern farfield station E2, where concentrations higher than the ERL threshold are reported in 2001. Figure E.5-20 in Volume IV, Attachment E.5, of the application summarizes total DDT concentrations in sediments for the San Diego Coastal region during the period of the discharge (1994-2000 and 2001-2006).

Total PCBs. PCBs are synthetic organic chemicals used as coolants and lubricants in transformers and capacitors; they were banned from industrial use in the U.S. in 1977. The applicant reports that PCBs are generally not detected in effluent samples. (In 2006, the method detection limit for PCBs in effluent was 4,000 ng/l). The 2002-2006 mean annual mass emission rate for the Point Loma WTP discharge is “not detected”.

EPA reviewed summary concentrations in sediment for total PCBs at each 98 meter station, during July, from 2001 through 2006; concentrations are only rarely detected at these stations. For January and July surveys, the mean concentration for total PCBs at all 98 meter stations during the most recent discharge period (2001-2006) is 62 ppt. (In 2007, the method detection limit for all but three of the 41 monitored PCB congeners is 700 ppt.) During this period, the mean concentration is “not detected” at both near-ZID station E14 and northern reference station B9. During the most recent discharge period, all individual station concentrations are well below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey, including southern farfield station E5 (in 2001) and southern farfield station E2 (in 2002, 2004 and 2006) where PCBs detections are reported.

Total PAHs. PAHs are a group of 100 different chemicals formed during the incomplete burning of coal, oil and gas, garbage, or other organic substance. They are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides. The applicant reports that PAHs are generally not detected in effluent samples. (In 2006, the method detection limit for PAHs in effluent was 6.61 ug/l). The 2002-2006 mean annual mass emission rate for the Point Loma WTP discharge is “not detected”.

EPA reviewed summary concentrations in sediment for total PAHs at each 98 meter station, during July, from 2001 through 2006. At these stations, pre-discharge and discharge period levels are almost always “not detected”, until 2003 when method detection limits are improved; subsequently, PAHs are usually detected at each station (Figure A-25). For January and July surveys, the mean concentration for total PAHs at all 98 meter stations during the most recent discharge period (2001-2006) is 110 parts per billion (ppb). During this period, the mean concentration is 78 ppb at near-ZID station E14 and 110 ppb at northern reference station B9. During the most recent discharge period, all individual station concentrations are well below both the ERL threshold and the average background level for mid-depth sediments summarized for the 2003 Southern California Bight survey.

Based on this review, EPA concludes that the chemical characteristics in sediments beyond the zone of initial dilution are not changed by the modified discharge such that toxic substances in Table B of the California Ocean Plan are increased to levels which would degrade indigenous biota.

2. Impact of the Discharge on Public Water Supplies

Implementing CWA section 301(h)(2), 40 CFR 125.62(b) specifies that the discharge must allow for the attainment and maintenance of water quality that assures protection of public water supplies. Appendix III, Large Applicant Questionnaire section III.C, of the application describes a planned seawater desalination facility in San Diego County that is located about 30 miles north of the PLOO discharge (Regional Water Board Order No. R9-2006-0065, NPDES No. CA0109233). Based on the expected ability of the Point Loma WTP discharge to meet water quality standards and the distance to the nearest desalination facility, EPA concludes that the applicant’s proposed modified discharge will have no effect on the protection of public water supplies and will not interfere with the use of planned or existing public water supplies.

3. Impact of the Discharge on Shellfish, Fish, and Wildlife

Implementing CWA section 301(h)(2), 40 CFR 125.62(c)(1) through (3) specify that the modified discharge must allow for the attainment or maintenance of water quality which assures protection and propagation of a balanced indigenous population of shellfish, fish, and wildlife. A balanced indigenous population must exist immediately beyond the zone of initial dilution of the applicant's modified discharge; and in all other areas beyond the zone of initial dilution where marine life is actually or potentially affected by the discharge. Conditions within the zone of initial dilution must not contribute to extreme adverse biological impacts, including, but not limited to, the destruction of distinctive habitats of limited distribution, the presence of disease epicenters, or the stimulation of phytoplankton blooms which have adverse effects beyond the zone of initial dilution. The term "balanced indigenous population" is defined at 40 CFR 125.58 and means an ecological community which exhibits characteristics similar to those of nearby, healthy communities existing under comparable but unpolluted environmental conditions; or may reasonably be expected to become re-established in the polluted water body segment from adjacent waters if sources of pollution were removed. Also, Chapter II of the California Ocean Plan contains the following water quality objective for biological characteristics of ocean waters: "Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded." For this review, biological data collected by the applicant are analyzed in three categories: phytoplankton, benthic infauna, and fish and epibenthic invertebrates.

a. Phytoplankton

Wastewater discharges from ocean outfalls may influence the abundance and distribution of plankton in two important ways. Effluent particulates may rise into the euphotic zone (generally less than 20 meter water depths) and inhibit light penetration, thereby reducing phytoplankton primary productivity. Also, nutrient loading can cause an increase in the abundance of undesirable species. The California Ocean Plan specifies that in ocean water: "Natural light shall not be significantly reduced at any point outside the initial dilution zone as the result of the discharge of waste." and "Nutrient materials shall not cause objectionable aquatic growths or degrade indigenous biota." There are no numerical water quality objectives for nutrients in the California Ocean Plan. Compliance with these water quality objectives are determined from samples collected at stations representative of the area within the wastefield where initial dilution is completed. The typical depth range of the PLOO wastefield is 60 to 80 meters below the surface which is well below the euphotic zone. Under its existing NPDES permit, the City is not required to monitor plankton or ammonia. Therefore, EPA has reviewed parameters monitored by the applicant that relate to phytoplankton productivity and standing stock, such as effluent total suspended solids, light transmittance, effluent ammonia, and chlorophyll a. Attachment T1 in Volume XIII, Appendix T, of the 1995 application describes the plankton communities found in waters off San Diego County and summarizes studies on phytoplankton conducted on a regional scale in the Southern California Bight.

Based on the water quality modeling result for total suspended solids concentrations at the completion of initial dilution under worst case conditions and monitoring data for light transmittance throughout the water column, EPA concludes that the Point Loma discharge does not result in a significant reduction in natural light in areas within the wastefield where initial dilution is completed. This indicates that the discharge of total suspended solids should not result in a significant change in the productivity or standing stock of phytoplankton.

Total ammonia-nitrogen (NH_4^+-N and NH_3-N) in an effluent discharge may affect phytoplankton productivity and standing stock because nitrogen is a limiting nutrient in coastal waters of the Southern California Bight. Under its existing NPDES permit, the City conducts the required weekly effluent monitoring for ammonia (expressed as nitrogen). Effluent data for ammonia-nitrogen are summarized, as follows.

Table 18. Monthly average and annual average effluent concentrations for total ammonia-nitrogen (mg/l) at Point Loma WTP.

Month	2002	2003	2004	2005	2006	2007
January	29.4	26.0	28.6	24.2	29.5	31.2
February	27.1	25.4	25.7	26.0	32.3	31.0
March	29.0	24.4	27.5	23.8	31.1	31.0
April	29.1	28.9	26.8	27.7	30.4	32.7
May	30.0	29.5	29.0	27.9	30.7	31.7
June	26.4	30.2	28.6	29.3	29.3	32.5
July	26.8	29.6	27.8	28.4	30.1	32.2
August	28.4	27.9	28.8	28.1	30.5	30.5
September	26.9	28.7	27.3	28.6	30.4	31.4
October	27.3	27.9	25.2	28.6	30.6	31.7
November	27.8	26.6	26.4	28.7	30.9	30.6
December	26.3	27.7	26.7	28.9	32.6	28.5
Annual Average	27.9	27.7	27.4	27.5	30.7	31.3
Maximum Month	30.0	30.2	29.0	29.3	32.6	32.7
Minimum Month	26.3	24.4	25.2	23.8	29.3	28.5

Based on the effluent concentrations in Table 18 and the minimum monthly average initial dilution of 204:1 estimates for ammonia at the completion of initial dilution range from 0.1 to 0.2 mg/l. Such concentrations in the euphotic zone have the potential to stimulate phytoplankton productivity around an outfall, as natural background concentrations for ammonia within the euphotic zone of the Southern California Bight are typically an order of magnitude lower (Eppley et al., 1979). Based on the applicant's dilution modeling using time series data, the height-of-rise to the average level of minimum dilution varies from about 20 to 31 meters above the bottom, corresponding to water depths of 62 to 74 meters. The height-of-rise to the average top of the wastefield varies from about 30 to 40 meters above the bottom, corresponding to water depths of about 54 to 64 meters. The maximum height-of-rise to the top of the wastefield during a month varies from about 50 to 64 meters above the bottom, corresponding to water depths of about 30 to 44 meters. Figure O-16 in Volume VIII, Appendix O, of the application. Both dilution modeling and bacteria monitoring data at offshore stations support the conclusion that the wastewater plume is trapped below the euphotic zone most of the time. Consequently, the influence of wastefield ammonia concentrations on phytoplankton should be minimal.

Under its existing NPDES permit, the City conducts the required quarterly monitoring for chlorophyll a, throughout the water column, at a grid of 33 offshore stations located along the 98, 80 and 60 meter contours. EPA evaluated the applicant’s monitoring results from October 2003 through October 2007. At water depths frequented by the drifting wastefield, the long-term average for chlorophyll a ranges from 0.8 to 1.4 ug/l. As shown in Table B-6 and Figure A-26, the long-term average for chlorophyll a measured at the near-ZID boundary station (F30) is similar to long-term averages measured at nearfield and farfield stations.

Based on the water quality modeling results for total suspended solids and ammonia concentrations at the completion of initial dilution and monitoring data for light transmittance and chlorophyll a throughout the water column evaluated in this review, EPA concludes that total suspended solids and nutrient materials in the Point Loma discharge will not result in a significant change in the productivity or standing stock of phytoplankton, will not cause natural light to be significantly reduced beyond the initial dilution zone, and will not cause objectionable aquatic growths or degrade indigenous biota.

b. Benthic Macrofauna

Organisms with limited mobility that live in bottom sediments are used as indicators of the condition of marine environments because they respond to many different types of environmental stress and their responses integrate environmental conditions over time. Under its existing NPDES permit, the City conducts the required semi-annual monitoring, during January and July, at 12 primary stations located at the depth of the outfall along the 98 meter contour and a total of 10 secondary stations located along the 88 and 116 meter contours.

To evaluate the condition of the benthic macrofauna community in the area of the outfall and identify trends, EPA examined benthic macrofauna monitoring data for pre-discharge (1991-1993) and discharge monitoring surveys (1994-2006) conducted during July, at the depth of the outfall along the 98 meter contour (Figure A-4). A subset of these stations (E17, E14, and E11) spans the outfall diffuser. Near-ZID station E14 is closest to the diffuser, approximately 111 meters north and 256 meters west of the center of the diffuser wye. It is the most likely site to be impacted by the wastewater discharge. Nearfield stations E17 and E11 are located approximately 204 meters north and south, respectively, of the ends of the diffuser legs. The remaining “E” stations are considered farfield sites. The two “B” stations, located more than 11 kilometers north of the outfall, were originally selected to represent reference or control sites. However, benthic macrofauna communities differed between the “B” and “E” stations prior to operation of the outfall (Volume IV, Appendix E, of the application). Therefore, northern farfield station E26 is used as an additional (nominal) reference or control site. This station, located about 8 kilometers north of the outfall, is considered the least likely “E” station to be impacted by the discharge.

Summary statistics and trends for species richness, total abundance of all taxa, total abundance of several indicator taxa, and a Southern California Bight benthic index are reviewed by EPA. Both the applicant and EPA use two statistical approaches to evaluate observed changes in various benthic macrofauna community parameters near the outfall diffuser relative to control sites and reference conditions.

BACIP Approach

The applicant has used a BACIP (Before-After-Control-Impact-Paired) t-test to test the null hypothesis that there are no changes in various benthic macrofauna community parameters due to operation of the outfall. The BACIP model tests differences between control and impact sites at times before and after an impact event, in this case, the onset of wastewater discharge at the present location. Data are limited to three pre-discharge (1991-1993) and 13 discharge (1994-2006) surveys during July, at EPA’s request. Near-ZID station E14 and nearfield stations E17 or E11 are used as separate “impact” sites for the analysis because they are close to the boundary of the zone of initial dilution and more susceptible to impact. To the north, stations B9 and E26 are used as separate control sites for the analysis. Seven dependent variables are analyzed: species richness, total abundance of all benthic macrofauna taxa, Benthic Response Index, and abundance of the pollution sensitive indicator taxon, *Amphiodia* spp., and three pollution tolerant indicator taxa, *Euphilomedes* spp., *Parvilucina tenuisculpta*, and *Capitella* “*capitata*” (a species complex).

The applicant notes that the spatial and temporal variation inherent to many biological communities may lead to an increased chance of Type II error (falsely concluding that no impact has occurred). One solution is to increase the probability of Type I error (falsely concluding that an impact has occurred) by changing alpha, thereby increasing the power of the test and making the detection of “impact” less conservative. Consequently, all BACIP analyses are interpreted using both the conventional Type I error rate of alpha = 0.05 and the higher Type I error rate of alpha = 0.10. Results of the applicant’s BACIP analyses are summarized in Table 19.

Table 19. BACIP t-test results for six dependent variables around the Point Loma Ocean Outfall. Pre-discharge n=3 and discharge n=13. "*" means significant at alpha = 0.05; "**" means significant at alpha = 0.1; and "ns" means not significant.

Indicator	Comparison (Control v. Impact)	t-value	p-value	Significance (July only)
Species Richness	E26 v. E17	2.513	0.012	*
	E26 v. E14	-2.120	0.026	*
	E26 v. E11	1.637	0.062	**
	B9 v. E17	-2.606	0.010	*
	B9 v. E14	-3.010	0.005	*
	B9 v. E11	-1.358	0.098	**
Total Abundance	E26 v. E17	-0.434	0.335	ns
	E26 v. E14	-0.464	0.325	ns
	E26 v. E11	0.082	0.468	ns
	B9 v. E17	-0.567	0.290	ns
	B9 v. E14	-2.569	0.011	*
	B9 v. E11	-1.319	0.104	ns
Amphiodia spp. Abundance	E26 v. E17	-2.531	0.012	*
	E26 v. E14	-3.482	0.002	*
	E26 v. E11	-2.363	0.017	*
	B9 v. E17	-1.255	0.115	ns
	B9 v. E14	-5.645	<0.001	*
	B9 v. E11	-1.391	0.093	**
Euphilomedes spp. Abundance	E26 v. E17	0.111	0.457	ns
	E26 v. E14	-1.965	0.035	*
	E26 v. E11	-1.476	0.081	**
	B9 v. E17	-2.550	0.012	*
	B9 v. E14	-4.304	<0.001	*
	B9 v. E11	-2.701	0.012	*
Parvilucina tenuisculpta Abundance	E26 v. E17	0.626	0.271	ns
	E26 v. E14	-0.109	0.457	ns
	E26 v. E11	1.373	0.096	**
	B9 v. E17	-0.884	0.196	ns
	B9 v. E14	-1.877	0.041	*
	B9 v. E11	0.483	0.318	ns

These results are discussed, below.

Tolerance Interval Approach

An understanding of reference condition is important when evaluating environmental monitoring results. When appropriate data from regional reference locations are available, tolerance interval bounds can be computed to provide criteria or limits distinguishing reference from nonreference conditions. A tolerance interval is a statistical interval within which a specified proportion of the population falls, with some confidence. For example, it can describe—with a desired degree of statistical certainty—the lower 10^{th} and upper 90^{th} percentile of "average species richness" found among the San Diego regional monitoring stations for a particular benthic assemblage.

Based on a statistical analysis of sampling data from 1994 through 2003, the applicant determined the subset of San Diego regional survey stations which best represents a suitable reference assemblage for comparisons with "E" and "B" stations at the depth of the outfall. This subset of regional stations is generally confined between the 60 and 120 meter depth contours and ranges from near Solana Beach in the north, to the Tijuana River region in the south. Summary statistics and tolerance interval bounds defining reference conditions for benthic macrofauna community parameters within the region of the PLOO are presented in Table 20. If an impact site value is near or within the tolerance interval bounds for reference conditions, then impact can be deemed minimal or nonexistent. The further an impact site value deviates from a reference condition bound, the more serious the impact should be judged.

Table 20. Tolerance intervals and summary data for various benthic indicators at randomly selected San Diego regional stations from 1994 through 2003, based on cluster group F (Attachment E.1 in Volume IV, Appendix E, of the application).

Indicator by Year											Tolerance Interval	
	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	Lower	Upper
Species Richness												
Mean	73.9	119.9	116.4	82.9	78.4	112.4	109.7	121.2	112.6	67.4		
Min	33	48	33	30	26	38	56	52	37	21	72	175
Max	137	206	266	165	179	242	203	226	244	119		
Total Abundance												
Mean	325.2	321.0	328.3	351.7	362.5	353.2	310.5	319.9	278.4	222.2		
Min	91	56	45	79	39	87	73	65	67	56	230	671
Max	1031	880	1219	1467	756	1166	585	1082	890	567		
Amphiodia spp. Abundance												
Mean	39.7	45.1	52.6	45.0	58.2	41.4	53.5	32.0	32.9	19.8		
Min	0	0	0	0	0	0	0	0	0	0	1	216
Max	191	178	216	209	220	203	194	185	150	81		
Euphilomedes spp. Abundance												
Mean	3.7	4.0	3.6	9.6	2.3	1.2	1.0	1.4	1.8	3.9		
Min	0	0	0	0	0	0	0	0	0	0	0	34
Max	28	25	17	93	15	9	9	12	14	34		
Parvilucina tenuisculpta Abundance												
Mean	2.4	1.9	1.5	1.6	2.1	1.9	2.4	2.9	1.6	2.2		
Min	0	0	0	0	0	0	0	0	0	0	0	12
Max	17	14	10	12	12	12	12	12	12	21		
Capitella “*capitata*” Abundance												
Mean	2.1	0.1	0.2	0.0	0.1	0.1	0.1	0.0	0.0	0.0		
Min	0	0	0	0	0	0	0	0	0	0	0	2
Max	69	2	3	0	2	1	1	0	0	1		
Benthic Response Index												
Mean	6.9	10.3	12.4	10.6	10.7	8.0	7.2	10.6	9.9	9.8		
Max	-14.2	-11.8	-4.7	-2.4	1.2	-5.2	-3.3	-4.2	-0.8	-4.6	-0.65	15
Min	32.0	30.6	26.4	28.5	20.2	24.1	24.8	22.3	24.6	20.3		

These results are discussed, below.

Species richness. A potential indicator of environmental degradation is a reduction in the number of benthic macrofauna taxa (diversity) present near an outfall. Figure A-27 summarizes the average species richness per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2006. At these stations, the discharge period mean is higher than the pre-discharge mean; these increases are more pronounced at near-ZID station E14 and northern reference station B12. Mean species richness for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) is 70.7 and 97.0, respectively. During these two periods, mean species richness at near-ZID station E14 is 67.7 and 109.7, respectively, while mean species richness at northern reference station B9 is 64.2 and 91.5, respectively. BACIP analyses in Table 19 indicate that species richness at near-ZID station E14 and nearfield stations E17 or E11 are statistically significantly different when compared to either northern reference station B9 or nominal northern reference station E26. This suggests that organic enrichment may be enhancing the diversity of taxa near the outfall. During the most recent discharge period, average species richness ranged from 105.0 to 119.5 at station E14, 81.0 to 110.0 at station E17, and 80.0 to 117.5 at station E11. These impact site values are within the species richness tolerance interval (72-175) calculated for reference conditions identified in the San Diego regional surveys (Table 20). Thus, although changes in species richness at the outfall are statistically significant, they are not likely to be environmentally significant in comparison to Southern California Bight reference conditions.

Total abundance. Changes in the total abundance of benthic macrofauna taxa are used to demonstrate an outfall effect. These changes can vary depending on the level of organic enrichment in the area of an outfall. For example, total abundance is predicted to increase in response to low or moderate levels of organic enrichment. Generally, such increases are not considered adverse unless they are accompanied by a reduction in species richness, or material alterations in the abundances of pollution sensitive and pollution tolerant taxa. As organic enrichment increases, extremely high abundances associated with a further reduction in species richness is indicative of an adverse outfall effect. Abundances are expected to decline when organic enrichment causes anoxic conditions in sediments and indicates a degraded condition due to the outfall. Also see Appendix C in the ATSD (USEPA, 1994).

Figure A-28 summarizes the average total abundance of benthic macrofauna taxa per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2006. At these stations, the discharge period mean is higher than the pre-discharge mean. Mean total abundance for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) is 308.0 and 377.8, respectively. During these two periods, mean total abundance at near-ZID station E14 is 293.7 and 523.1, respectively, while mean total abundance at northern reference station B9 is 255.8 and 352.8, respectively. BACIP analyses in Table 19 indicate that mean total abundance at near-ZID station E14 and nearfield stations E17 or E11 are not statistically significantly different when compared to nominal northern reference station E26; only station E14 is statistically significantly different when compared to northern reference station B9. This suggests that while organic enrichment is occurring near the outfall, the effect on total abundance is relatively minor. During the most recent discharge period, average total abundance ranged from 446.5 to 590.5 at station E14, 240.5 to 475 at station E17, and 282.5 to 463 at station E11. These impact site values are within the total abundance tolerance interval (230-671) calculated for reference conditions identified in the San Diego regional surveys (Table 20). Although a statistically significant change in total abundance at the near-ZID boundary station E14 has occurred in relation to one control site, a similar change has not occurred in relation to nominal reference station E26 (also a control site). Moreover, in relation to the tolerance interval, this change is not likely to be environmentally significant in comparison to Southern California Bight reference conditions.

Pollution Sensitive Indicator Taxon

Amphiodia spp. For this review, EPA examined one pollution sensitive indicator taxon used to evaluate organic enrichment around outfalls. *Amphiodia urtica*, an ophiuroid echinoderm, is used as a key indicator species because it is one of the most abundant species found in mainland shelf sediments in the Southern California Bight and its populations decline near sewage outfalls. Both the applicant and EPA evaluated *Amphiodia* spp. (comprised of *A. urtica*, *A. digitata*, *A. psara*, and *A.* sp.). According to the applicant, *A. urtica* is most common at depths of about 60 meters and begins to naturally decrease at depths of about 100 meters. *A. digitata* is found in deeper waters and coarser sediments. The applicant grouped juveniles and damaged specimens as *A.* sp.

Figure A-29 summarizes the average abundance of *Amphiodia* spp. per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2006. At these stations, the discharge period mean is slightly higher than the pre-discharge mean and year-to-year averages at near-ZID station E14 are distinctly lower and variable. Mean abundance for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) is 41.7 and 37.0, respectively. During these two periods, mean abundance at near-ZID station E14 is 38.3 and 8.8, respectively, while mean abundance at northern reference station B9 is 35.7 and 48.0, respectively. BACIP analyses in Table 19 indicate that abundance at near-ZID station E14 and nearfield station E11 are statistically significantly different when compared to either northern reference station B9 or nominal northern reference station E26. BACIP analyses also indicate that abundance at near-ZID station E17 is statistically significantly different only when compared to nominal northern reference station E26. This reduction in abundance is likely due in large part to organic enrichment around the outfall, although the applicant has also hypothesized increased fish predation at the impact site or region-wide influences unrelated to the outfall. Figure A-29 suggests that the reduction in average abundance does not extend into the nearfield. During the most recent discharge period (2001-2006), average abundance ranged from 5.0 to 20.5 at station E14, 14 to 41.5 at station E17, and 20 to 64.5 at station E11. These impact site values are within the abundance tolerance interval (1-216) calculated for reference conditions identified in the San Diego regional surveys (Table 20). Although changes in the abundance of *Amphiodia* spp. at the outfall are statistically significant, they are not accompanied by a decrease in species richness or a detrimental increase in total abundance of benthic macrofauna taxa. Moreover, in relation to the tolerance interval, this change is not likely to be environmentally significant in comparison to Southern California Bight reference conditions.

Pollution Tolerant Indicator Taxa

For this review, EPA examined three pollution tolerant indicator taxa used to evaluate organic enrichment around outfalls.

Euphilomedes spp. Crustaceans known to be tolerant of organic enrichment are ostracods in the genus, *Euphilomedes*. Both the applicant and EPA evaluated *Euphilomedes* spp. (comprised of *E. carcharodonta*, *E. producta*, *E. longiseta*, and *E.* sp.). According to the applicant, the ratio of *E. carcharodonta* and E. producta are about 50:50 at depths of about 100 meters.

Figure A-30 summarizes the average abundance of *Euphilomedes* spp. per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2006. At these stations, the discharge period mean is similar to the pre-discharge mean and year-to-year averages generally trend lower with distance from the outfall. Mean abundance for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) is 19.4 and 23.3, respectively. During these two periods, mean abundance at near-ZID station E14 is 18.3 and 41.3, respectively, while mean abundance at northern reference station B9 is 22.3 and 11.9, respectively. BACIP analyses in Table 19 indicate that abundance at near-ZID station E14 and nearfield station E11 are statistically significantly different when compared to either northern reference station B9 or nominal northern reference station E26. BACIP analyses also indicate that abundance at near-ZID station E17 is statistically significantly different only when compared to nominal northern reference station B9. This increase in abundance is likely due in large part to organic enrichment at the outfall. During the most recent discharge period (2001-2006), average abundance ranged from 25.5 to 62.5 at station E14, 22 to 45.5 at station E17, and 18.5 to 42.5 at station E11. These impact site values are above the upper bound of the abundance tolerance interval (0-34) calculated for reference conditions identified in the San Diego regional surveys (Table 20), but in the range of average abundance observed during this period at northern reference station B12 (17.5-60) and during the regional surveys (0-93).

The applicant notes that *Euphilomedes* spp. abundances above the upper tolerance bound are frequently observed at other 98 meter stations and suggests this may be due to region-wide influences unrelated to the outfall (Figure E.1-4 in Attachment E.1 of Volume IV, Appendix E, of the application). EPA agrees that while an outfall related pattern appears to occur at near-ZID station E14, cyclical patterns in abundance suggest other factors may be influencing *Euphilomedes* spp. at 98 meter stations beyond the zone of initial dilution.

Parvilucina tenuisculpta. A mollusc known to be tolerant of organic enrichment is the bivalve, *Parvilucina tenuisculpta*. It is found in high abundances in areas of moderate organic enrichment.

Figure A-31 summarizes the average abundance of *Parvilucina tenuisculpta* per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2006. At these stations, the discharge period mean is similar to the pre-discharge mean and year-to-year averages at near-ZID station E14 are generally elevated when compared to other 98 meter stations. Mean abundance for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) is 3.0 and 3.3, respectively. During these two periods, mean abundance at near-ZID station E14 is 1.0 and 9.8, respectively, while mean abundance at northern reference station B9 is 3.5 and 4.3, respectively. BACIP analyses in Table 19 indicate that abundance at near-ZID station E14 and nearfield station E11 are statistically significantly different when compared to either northern reference station B9 or nominal northern reference station E26. BACIP analyses also indicate that abundance at near-ZID station E17 is statistically significantly different only when compared to northern reference station B9. This increase in abundance is likely due to organic enrichment around the outfall. During the most recent discharge period (2001-2006), average abundance ranged from 0 to 32 at station E14, 0 to 8.5 at station E17, and 0.5 to 4.5 at station E11. These impact site values are above the upper bound of the abundance tolerance interval (0-12) calculated for reference conditions identified in the San Diego regional surveys (Table 20), indicating that moderate levels of organic enrichment are indeed occurring at near-ZID station E14.

Capitella "*capitata*" Species Complex. A polychaete known to be tolerant of organic enrichment and other disturbances is *Capitella* "*capitata*". According to the applicant, background abundances are generally near zero, in the Southern California Bight, but may reach densities of 100 per 0.1 m^2 in areas of excessive organic deposits. Volume IV, Appendix E, of the application.

Figure A-32 summarizes the average abundance of *Capitella* "*capitata*" per 0.1 m^2 at each 98 meter station, during July, from 1991 through 2006. At these stations, the discharge period mean is higher than the pre-discharge mean and year-to-year averages at near-ZID station E14 are generally much higher when compared to other 98 meter stations. Mean abundance for all 98 meter stations in July during the pre-discharge (1991-1993) and most recent discharge period (2001-2006) is 0.0 and 0.8, respectively. During these two periods, mean abundance at near-ZID station E14 is 0.0 and 7.2, respectively, while mean abundance at northern reference station B9 is 0.0 and 0.1, respectively. This increase in abundance is likely due to organic enrichment around the outfall. BACIP analyses were not conducted because abundances at control sites are generally zero. During the most recent discharge period (2001-2006), average abundance ranged from 0.0 to 17.5 at station E14, 0.0 to 0.5 at station E17, and 0.0 to 4.0 at station E11. The impact site values at station E14 and E11 are well above the upper bound of the abundance tolerance interval (0-2) calculated for reference conditions identified in the San Diego regional surveys (Table 20). This indicates that variable levels of low to moderate organic enrichment are indeed occurring at these two stations. Other indicators of benthic macrofauna community condition do not show a decrease in species richness or a detrimental increase in total abundance of benthic macrofauna taxa dominated by pollution tolerant species.

Benthic Response Index. The Benthic Response Index (BRI) is an index developed by the Southern California Coastal Water Research Project as part of the Southern California Bight Pilot Project (Smith et al., 2001). Index values below 25 suggest "reference condition" and those in the range of 25 to 33 represent a "minor deviation from reference condition". A "loss in biodiversity" is set at an index value of 34. Index values greater than 44 indicate a "loss in community function". "Defaunation" is set at an index value of 72. Validation has shown that the BRI is most accurate from water depths of 31 to 200 meters which includes the middle and outer continental shelf (Ranasinghe, 2007) and the water depth of the Point Loma outfall.

Figures E-27 and E-28 in Volume IV, Appendix E, of the application summarize BRI per 0.1 m^2 at the 98 meter stations, from 1991 through 2006. Index values show a distinct outfall-related pattern during the discharge period (1994-2006). During the most recent discharge period (2001-2006), the mean BRI values at near-ZID station E14 are approaching 25, above which a loss in biodiversity is indicated. The mean BRI for all 98 meter stations, in January and July, during the pre-discharge (1991-1993) and most recent discharge period, is 4.2 and 6.2, respectively. During these two periods, the mean BRI at near-ZID station E14 is 4.9 and 13.9, respectively, while the mean BRI at northern reference station B9 is 6.1 and 2.3, respectively. BACIP analyses indicate that the BRI at near-ZID station E14 is statistically significantly different when compared to either northern reference station B9 or nominal northern reference station E26 (Table E-6 in Volume IV, Appendix E, of the application). The impact site mean for the most recent discharge period (13.9) is below the upper bound of the BRI tolerance interval (-0.65-15) calculated for reference conditions identified in the San Diego regional surveys (Table 20) and below the threshold level which indicates minor deviations from reference conditions. Annual BRI values approaching 25 are of concern to EPA because alteration from reference condition, although minor, is predicted at sites above this threshold. Changes in the BRI at station E14, in combination with other benthic macrofauna indicators of community condition, forecast that while anticipated TSS mass emissions over the proposed permit term will comply with CWA section 301(h) and (j)(5) requirements, the applicant needs to develop and implement an integrated long term plan which will reduce the organic loading that has been projected for the PLOO through 2027 (Table II.A-21 in Volume III of the application), so as to maintain long-term compliance with this decision criterion.

In conclusion, there are often statistically significant changes at near-ZID station E14 and sometimes at nearfield stations E17 and E11 in benthic macrofauna indicator parameters evaluated for this review. However, EPA observes that conditions at and beyond the near-ZID station are generally similar to reference conditions identified in the San Diego regional surveys. EPA notes that low numbers of pollution sensitive and pollution tolerant taxa are variably present at the near-ZID station and indicate a moderate level of organic enrichment in this area. Slight reductions in the abundance of *Amphiodia* spp., a pollution sensitive taxon, at nearfield stations indicate that a low level of organic enrichment extends beyond the zone of initial dilution into the nearfield. There appear to be no impacts to benthic macrofauna associated with the accumulation of toxic substances discharged from the outfall. Based on the evidence described in this section, EPA concludes that conditions beyond the zone of initial dilution are not degraded in compliance with the California Ocean Plan and support an ecological community which exhibits characteristics similar to those of nearby, healthy communities existing under comparable but unpolluted environmental conditions.

c. *Demersal Fish*

Chapter II of the California Ocean Plan contains the following water quality objective for biological characteristics of ocean waters: "Marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded." Demersal (bottom dwelling) fish communities are inherently variable due to their mobility and the influences of natural and anthropogenic factors. Under its existing NPDES permit, the City conducts the required semi-annual monitoring, during January and July, at six stations in trawl zones located at the depth of the outfall along the 98 meter contour. Nearfield stations SD12 and SD10 are within 1.2 kilometers of the outfall. Northern farfield stations SD14 and SD13 are located approximately 8 kilometers north of the outfall and southern farfield stations SD8 and SD7 are located approximately 9 kilometers south of the outfall. Station SD8 is located within a couple of kilometers of EPA-designated dredge materials disposal site LA-5 while station SD7 is located within one kilometer of non-active dredge materials disposal site LA-4.

EPA did not reanalyze the raw data for demersal fish submitted with the application. Rather, to evaluate the condition of demersal fish in the area of the outfall and identify trends, EPA reviewed the applicant's analyses of monitoring data for pre-discharge (1991-1993) and discharge monitoring surveys (1994-2006), conducted during January and July, along the 98 meter contour (Figure A-33).

Table 21 summarizes two indicator parameters of fish community structure calculated by the applicant. The average number of fish species (species richness) collected per trawl over the 16 year monitoring period ranges from 7 to 26. Over the pre-discharge and discharge periods, the average number of species has increased from 13 to 15 in the nearfield and 14 to 15 in the farfield. Year-to-year fish abundances (total catch) are quite variable and have increased in both the nearfield and farfield, since discharge began. The applicant reports that much of this variability is due to fluctuations in the populations of dominant species (e.g., Pacific sanddab) and sporadically common species (e.g., halfbanded rockfish). Figures E-36 through E-38 in Volume IV, Appendix E, of the application. Values for species richness and total abundance are within the range of natural variability observed for the Southern California Bight regional surveys and suggest no outfall-related trends. Table E-9 in Volume VI, Appendix E, of the application.

Table 21. Applicant's summary for total number of species and total abundance of demersal fishes at trawl zone stations during the pre-discharge (1991-1993) and discharge (1994-2006) periods. Data are expressed as means with ranges in parentheses.

Indicator Parameter	Pre-discharge Period		Discharge Period	
	Nearfield	Farfield	Nearfield	Farfield
Species Richness	13 (8-19)	14 (9-22)	15 (7-20)	15 (9-26)
Total Abundance	208 (63-399)	214 (51-453)	440 (44-2,322)	310 (50-695)

As shown in Table 22, the applicant reports that, generally, the same fish species are present and abundant during the pre-discharge and discharge periods. These species represent 95% of the total abundance of fishes caught from 1991 through 2006. Overall, the demersal fish assemblage in the area of the outfall is dominated by Pacific sanddab which is common in soft-bottom habitats of the Southern California Bight mainland shelf.

Table 22. Applicant's summary for percent abundance of demersal fish species at all trawl zone stations during pre-discharge (1991-1993) and discharge (1994-2006) periods. Data are expressed as the percent of total abundance per trawl.

Common Name	Pre-discharge Period Percent Abundance	Discharge Period Percent Abundance
Pacific sanddab	55	49
Plainfin midshipman	10	3
Yellowchin sculpin	6	13
Stripetail rockfish	4	3
Dover sole	4	6
Longspine combfish	4	5
Longfin sanddab	3	3
Pink seaperch	3	1
Halfbanded rockfish	2	9
Shortspine combfish	2	1
California tonguefish	1	1

The City's analysis in the application shows that Pacific sanddab comprise a smaller proportion of the nearfield fish assemblage during the discharge period, than prior to the discharge, while the proportion of Pacific sanddab remains similar over time in the farfield. In contrast, yellowchin sculpin comprise a larger proportion of both the nearfield and farfield fish assemblages during the discharge period, than prior to the discharge. Table E-8 and Figure E-38 in Volume IV, Appendix E, of the application. The applicant suggests that these changes may be due, in part, to cyclic population fluctuations and region-wide increases in water temperature observed during El Nino years. Ordination and classification analysis of fish abundance data from 1991 through 2007 seem to confirm that the differences in local fish assemblages over time appear in large part related to region-wide changes in water temperature, even though some cluster groups are in proximity to the two dredge materials disposal sites (Figure 6.4 in City of San Diego, 2008).

The applicant reports that evidence of parasitism or physical abnormalities (fin rot, discoloration, skin lesions, tumors) in fish populations off Point Loma has remained low, since monitoring began in 1991. The copepod eye parasite occurs in Pacific sanddab at a low percentage. An ecoparasitic cymothioid isopod is observed loose in some trawls and is known to be especially common on sanddab in southern California waters.

EPA concludes there are no apparent spatial or temporal trends in the total number of fish species or abundances of fishes that suggest an outfall-related impact.

4. Impact of the Discharge on Recreational Activities

This section describes the impact of the modified discharge on recreational activities. Under 40 CFR 125.62(d), the applicant's modified discharge must allow for the attainment or maintenance of water quality which allows for recreational activities beyond the zone of initial dilution, including, without limitation, swimming, diving, boating, fishing, and picnicking, and sports activities along shorelines and beaches. The requirement to protect recreational activities applies beyond the zone of initial dilution, in both federal and State waters. Both the bioaccumulation of toxic pollutants in fish tissues (liver or muscle) and water contact recreational activities and compliance with bacteriological water quality standards and criteria are discussed. The applicant's monitoring data are reviewed to assess whether the discharge will protect recreational activities.

a. Bioaccumulation and Fish Consumption

Chapter II of the California Ocean Plan contains the following water quality objectives for the biological characteristics of ocean waters: "The natural taste, odor, and color of fish, shellfish, or other marine resources used for human consumption shall not be altered." and "The concentrations of organic materials in fish, shellfish, or other marine resources used for human consumption shall not bioaccumulate to levels that are harmful to human health."

Bioaccumulation is a process by which chemical contaminants undergo uptake and retention in organisms via various pathways of exposure. For example, fishes can accumulate contaminants through adsorption and absorption of dissolved chemicals in the water or through ingestion or assimilation of contaminants in food. Once a contaminant is incorporated into the tissues of an organism, it may resist metabolic excretion and accumulate. Higher trophic level organisms may then feed on contaminated prey and further concentrate the contaminant in their tissues. This process can lead to concentrations of contaminants in fish tissue that are of ecological and human health concern.

Under its existing NPDES permit, the City conducts the required semi-annual monitoring at six stations in four trawl zones during January and July and the required annual monitoring at two rig (hook and line) fishing stations during October. The stations are located at the depth of the outfall along the 98 meter contour. The bioaccumulation monitoring program has two components: (1) liver tissue is analyzed for trawl-caught fish and (2) muscle tissue is analyzed for hook and line-caught fish.

Fish collected in trawls are representative of the general demersal fish community and certain species are targeted for analysis based on their prevalence in the community.

Chemical analysis of liver tissue in these fishes indicates which contaminants may be bioaccumulating through this community. For bioaccumulation analyses, the six trawl fishing stations are grouped into four trawl zones. Trawl zone 1 (TZ1) represents the nearfield and is defined as the area within a 1 kilometer radius of stations SD12 and SD10; both stations are within 1.2 kilometers of the outfall. Trawl zone 2 (TZ2) represents the northern farfield and is defined as the area within a 1 kilometer radius of stations SD14 and SD13; both stations are approximately 8 kilometers north of the outfall. Trawl zone 3 (TZ3) represents the southern farfield and is defined as the area centered within a 1 kilometer radius of station SD8. Station SD8 is located within a couple of kilometers of EPA-designated dredge materials disposal site LA-5. Trawl zone 4 (TZ4) represents the southernmost farfield and is defined as the area centered within a 1 kilometer radius of station SD7. Station SD7 is located within one kilometer of non-active dredge materials disposal site LA-4. Both stations SD8 and SD7 are within approximately 9 kilometers of the outfall.

Fish species collected by rig fishing represent a typical sport fisher's catch and are considered of recreational and commercial importance. Fish muscle tissue is analyzed because it is the tissue most often consumed by humans and may have public health implications. There are two rig fishing locations. Station RF1 is located in the nearfield close to the northern end of the diffuser leg while station RF2 is located in the northern farfield.

The applicant reports all tissue sample values in terms of milligrams per kilogram wet weight (mg/kg ww), or microgram per kilogram wet weight (ug/kg ww).

Fish Liver

To evaluate bioaccumulation in the area of the outfall and identify trends, EPA examined toxics concentrations in the liver tissue of trawl-caught fish species that were sampled in October during the discharge period (1995-2006) (Figure A-33). Table B-7 shows the five flatfish species (bigmouth sole, Dover sole, English sole, hornyhead turbot, longfin sanddab, and Pacific sanddab) examined over this period by EPA. During this period, 18 single parameters were detected in at least 10 percent of the averaged replicate composite samples: aluminum (70 percent), antimony (10 percent), arsenic (82 percent), barium (100 percent), beryllium (15 percent), cadmium (86 percent), chromium (63 percent), copper (100 percent), hexachlorobenzene (55 percent), iron (100 percent), lead (17 percent), manganese (96 percent), mercury (88 percent), nickel (23 percent), selenium (100 percent), silver (36 percent), tin (37 percent), and zinc (100 percent). Total chlordane, total DDT, and total PCBs are also reviewed.

Arsenic. Figure A-34 summarizes the average concentration of arsenic in flatfish livers, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in arsenic concentrations in liver that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the mean concentration of arsenic is 3.39 mg/kg ww at nearfield station TZ1, 6.18 mg/kg ww at northern farfield station TZ2, and 4.03 mg/kg ww and 3.85 mg/kg ww at southern farfield stations TZ3 and TZ4, respectively.

Mercury. Figure A-35 summarizes the average concentration of mercury in flatfish livers, during October, from 1995 through 2006. The applicant began using a slightly less sensitive method detection limit (0.012 ug/l changed to 0.03 ug/l) in 2003. There is no spatial or temporal pattern in mercury concentrations in liver that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the mean concentration of mercury is 0.083 mg/kg ww at nearfield station TZ1, 0.047 mg/kg ww at northern farfield station TZ2, and 0.068 mg/kg ww and 0.058 mg/kg ww at southern farfield stations TZ3 and TZ4, respectively.

Selenium. Figure A-36 summarizes the average concentration of selenium in flatfish liver, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in selenium concentrations in liver that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the mean concentration of selenium is 1.36 mg/kg ww at nearfield station TZ1, 1.47 mg/kg ww at northern farfield station TZ2, and 1.09 mg/kg ww and 1.25 mg/kg ww at southern farfield stations TZ3 and TZ4, respectively.

Hexachlorobenzene. Figure A-37 summarizes the average concentration of hexachlorobenzene in flatfish livers, during October, from 1995 through 2006. There is no spatial or temporal pattern in hexachlorobenzene concentrations in liver that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the mean concentration of hexachlorobenzene is 3.25 ug/kg ww at nearfield station TZ1, 4.19 ug/kg ww at northern farfield station TZ2, and 5.09 ug/kg ww and 3.83 ug/kg ww at southern farfield stations TZ3 and TZ4, respectively.

Total Chlordane. Figure A-38 summarizes the average concentration of total chlordane in flatfish livers, during October, from 1995 through 2006. There is no spatial or temporal pattern in total chlordane concentrations in liver that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the mean concentration of total chlordane is 14.10 ug/kg ww at nearfield station TZ1, 15.42 ug/kg ww at northern farfield station TZ2, and 18.27 ug/kg ww and 13.29 ug/kg ww at southern farfield stations TZ3 and TZ4, respectively.

Total DDT. Figure A-39 summarizes the average concentration of total DDT in flatfish livers, during October, from 1995 through 2006. There is no spatial or temporal pattern in total DDT concentrations in liver that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the mean concentration of total DDT is 424 ug/kg ww at nearfield station TZ1, 516 ug/kg ww at northern farfield station TZ2, and 611 ug/kg ww and 558 ug/kg ww at southern farfield stations TZ3 and TZ4, respectively. During the period 1995 through 2006, total TTD concentrations in flatfish livers at all trawl zone stations appear to be decreasing over time.

Total PCBs. Figure A-40 summarizes the average concentration of total PCBs in flatfish livers, during October, from 1995 through 2006. There is no spatial or temporal pattern in total PCB concentrations in liver that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the mean concentration of total PCBs is 263.9 ug/kg ww at nearfield station TZ1, 340.0 ug/kg ww at northern farfield station TZ2, and 742.2 ug/kg ww and 335.2 ug/kg ww at southern farfield stations TZ3 and TZ4, respectively.

EPA notes that on average, total PCB concentrations in sanddab livers are an order of magnitude higher than in other flatfish species analyzed by the applicant (Table F-26 in Volume IV, Appendix E, of the application). During the period 1995 through 2006, total PCB concentrations in flatfish livers at southern farfield station TZ3 (near the active dredge materials disposal site, LA-5) are noticeably higher than at other trawl zone stations during most years, but appear to be decreasing over time.

Because there are no noticeable effects of the outfall for these chemicals, the contributions of the discharge are minimal.

Fish Muscle

To evaluate bioaccumulation in the area of the outfall and identify trends, EPA examined toxics concentrations in the muscle tissue of rig-caught fish species that were sampled in October during the discharge period (1995-2006) (Figure A-33). Table B-8 shows the twelve fish species (rockfish and scorpionfish) examined over this period by EPA. During this period, 18 single parameters were detected in at least one percent of the averaged replicate composite samples: aluminum (46 percent), antimony (86 percent), arsenic (70 percent), barium (92 percent), cadmium (9 percent), chromium (41 percent), copper (61 percent), hexachlorobenzene (47 percent), iron (87 percent), lead (4 percent), manganese (39 percent), mercury (94 percent), nickel (9 percent), selenium (99 percent), silver (1 percent), thallium (9 percent), tin (21 percent), and zinc (100 percent). Total chlordane, total DDT, and total PCBs are also reviewed. To address public health concerns, pollutant concentrations for these detections were compared to available U.S. EPA recommended screening values for recreational fishers and California Office of Health Hazard Assessment fish contaminant goals for sport fish.

U.S. EPA has developed recommended target analyte screening values for recreational fishers (USEPA, 2000). These screening values are defined as concentrations of analytes in fish or shellfish tissue that are of potential public health concern and are used as threshold values against which levels of contamination in similar tissues collected from the ambient environment can be compared (Table 23). Exceedance of these screening values should be taken as an indication that more intensive site-specific monitoring and/or evaluation of human health risk should be conducted.

Table 23. Selected U.S. EPA recommended target analyte screening values for recreational fishers. Based on fish consumption rate of 17.5 grams per day, 70 kilograms body weight (all adults), and, for carcinogens, 10^{-5} risk level, and 70-year lifetime.

Target Analyte	Screening Values (mg/kg)	
	Noncarcinogens	Carcinogens (RL=10^{-5})
Arsenic (inorganic)	1.2	0.026
Cadmium	4.0	---
Mercury (methylmercury)	0.3[1]	---
Selenium	20	---
Tributlytin	1.2	---
Total chlordane (sum of cis- and trans-chlordane, cis- and trans-nonachlor; and oxychlordane)	2.0	0.114
Total DDT (sum of 4,4'- and 2,4'- isomers of DDT, DDE, and DDD)	2.0	0.117
Hexachlorobenzene	3.2	0.0250
Total PCBs (sum of congeners or Aroclors)	0.08	0.02

[1] Based on EPA's tissue-based 304(a)(1) water quality criterion for human health (USEPA, 2001).

The California Office of Environmental Health Hazard Assessment (OEHHA) is the agency solely responsible for evaluating the potential public health risks of chemical contaminants in sport fish and issuing State advisories, when appropriate. EPA is unaware of any sport fish advisories in the area off Point Loma issued by OEHAA. OEHAA has developed both advisory tissue levels and fish contaminant goals for seven common contaminants in California sport fish (Klasing and Brodberg, 2008). Fish contaminant goals are estimates of contaminant levels in fish that pose no significant health risk to individuals consuming sport fish as a standard consumption rate of eight ounces per week (32 grams per day), prior to cooking, over a lifetime (Table 24). Unlike advisory tissue levels, these goals are based solely on public health considerations relating to exposure to each individual contaminant, without regard to economic considerations, technical feasibility, or the counterbalancing effects of fish consumption.

Table 24. Selected Fish Contaminant Goals for selected fish contaminants based on cancer and non-cancer risk using an 8 ounce per week (prior to cooking) consumption rate (32 grams per day).

Contaminant	Fish Contaminant Goal (ug/kg, wet weight)
Chlordane [$(mg/kg/day)^{-1}$]	5.6
DDTs [$(mg/kg/day)^{-1}$]	21
Methylmercury (mg/kg-day)	220
PCBs [$(mg/kg/day)^{-1}$]	3.6
Selenium (mg/kg-day)	7,400

Arsenic. Figure A-41 summarizes the average concentration of arsenic in rockfish and scorpionfish muscle, during October, from 1995 through 2006. There is no spatial or temporal pattern in arsenic concentrations in muscle that suggests an outfall-related effect. The applicant began using a more sensitive method detection limit in 2003. During the most recent discharge period (2001-2006), the annual average concentration of arsenic ranged from 0.55 to 2.65 mg/kg ww at nearfield station RF1 (total n=18) and 0.59 to 4.13 mg/kg ww at farfield station RF2 (total n=16). These concentrations are above the EPA screening values of 1.2 and 0.026 mg/kg. There is no OEHHA fish contaminant goal for arsenic.

Mearns et al. (1991) reported that in the Southern California Bight, arsenic occurs in the edible tissues of fish, squid, lobster, and crab and the liver of some fish in concentrations ranging from about 0.1 to over 50 mg/kg ww and tissue concentrations were the same or higher in remote areas compared to urban areas. The authors concluded that the source of arsenic to these organisms is probably “natural”, due to hydrothermal springs, and further research was necessary to assess heath risks to humans that consume seafood at such levels.

From 2002 through 2006, arsenic concentrations in the Point Loma WTP effluent generally range between 0.4 and 2.7 ug/l; these concentrations will meet EPA’s 304(a)(1) water quality criterion for human health, 0.14 ug/l, at the boundary of the zone of initial dilution.

Because there is no noticeable effect of the outfall, the contribution of the discharge is minimal.

Cadmium. Figure A-42 summarizes the average concentration of cadmium in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003; however, cadmium was not detected in fish muscle until 2006. During the most recent discharge period (2001-2006), the annual average concentration of cadmium ranged from 0.00 to 0.16 mg/kg ww at nearfield station RF1 (total n=18) and 0.00 to 0.15 mg/kg ww at farfield station RF2 (total n=16). These concentrations are below the EPA screening value of 4.0 mg/kg. There is no OEHHA fish contaminant goal for cadmium.

Chromium. Figure A-43 summarizes the average concentration of chromium in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in chromium concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of chromium ranged from 0.00 to 0.44 mg/kg ww at nearfield station RF1 (total n=18) and 0.00 to 0.39 mg/kg ww at farfield station RF2 (total n=16). There is no EPA screening value or OEHHA fish contaminant goal for chromium.

Copper. Figure A-44 summarizes the average concentration of copper in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in copper concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of copper ranged from 0.15 to 3.58 mg/kg ww at nearfield station RF1 (total n=18) and 0.19 to 2.94 mg/kg ww at farfield station RF2 (total n=16). There is no EPA screening value or OEHHA fish contaminant goal for copper.

Lead. Figure A-45 summarizes the average concentration of lead in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003; however, lead was only detected in fish muscle in 2005. During the most recent discharge period (2001-2006), the annual average concentration of lead ranged from 0.00 to 0.00 mg/kg ww at nearfield station RF1 (total n=18) and 0.00 to 0.36 mg/kg ww at farfield station RF2 (total n=16). There is no EPA screening value or OEHHA fish contaminant goal for lead.

Mercury. Because analysis of total mercury is less expensive than that for methylmercury, total mercury is analyzed and assumed to be 100 percent methylmercury for the purpose of risk assessment. Figure A-46 summarizes the average concentration of mercury in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a slightly less sensitive method detection limit (0.012 ug/l changed to 0.03 ug/l) in 2003.There is no spatial or temporal pattern in mercury concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of mercury ranged from 0.09 to 0.59 mg/kg ww at nearfield station RF1 (total n=18) and 0.09 to 0.37 mg/kg ww at farfield station RF2 (total n=16). In some years, average concentrations are above the EPA screening value of 0.3 mg/kg and the OEHHA fish contaminant goal of 0.220 mg/kg ww for methylmercury. Average concentrations are sometimes above OEHHA advisory tissue levels based on non-cancer risk using an 8 ounce serving size (prior to cooking) once or more per week (Klasing and Brodberg, 2008).

Mearns et al. (1991) has identified mercury as a contaminant of concern in the Southern California Bight, but concludes that since the highest levels of mercury are seen in fish from areas located far from known sources, it does not appear that mercury from coastal waste discharges is responsible for the concentrations observed in fish.

Because there is no noticeable effect of the outfall, the contribution of the discharge is minimal.

From 2002 through 2006, mercury concentrations in the Point Loma WTP effluent generally are reported as “not detected” (217 of 228 samples) where the method detection limit ranges from 0.27 ug/l in 2002, to 0.09 ug/l in 2006. These method detection limits are low enough to evaluate the applicant’s ability to achieve compliance, following initial dilution, with California Ocean Plan Table B water quality objectives for mercury. However, EPA concludes that these method detection limits are not as sensitive as required by 40 CFR 136 or as needed to further quantify actual mass emissions of mercury from the PLOO to the region. Consequently, the draft permit proposes that the applicant monitor the effluent using EPA method 1631 which has a required minimum quantitation level of 0.0005 ug/l.

Nickel. Figure A-47 summarizes the average concentration of nickel in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003; however, nickel was not detected in fish muscle until 2006. During the most recent discharge period (2001-2006), the annual average concentration of nickel ranged from 0.00 to 0.23 mg/kg ww at nearfield station RF1 (total n=18) and 0.00 to 0.15 mg/kg ww at farfield station RF2 (total n=16). There is no EPA screening value or OEHHA fish contaminant goal for nickel.

Selenium. Figure A-48 summarizes the average concentration of selenium in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in selenium concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of selenium ranged from 0.37 to 0.48 mg/kg ww at nearfield station RF1 (total n=18) and 0.30 to 0.44 mg/kg ww at farfield station RF2 (total n=16). Annual average concentrations are below the EPA screening value of 20 mg/kg and the OEHHA fish contaminant goal of 7.4 mg/kg ww.

Silver. Figure A-49 summarizes the average concentration of silver in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003; however, silver was only detected in fish muscle in 2005. There is no spatial or temporal pattern in silver concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of silver ranged from 0.00 to 0.00 mg/kg ww at nearfield station RF1 (total n=18) and 0.00 to 0.17 mg/kg ww at farfield station RF2 (total n=16). There is no EPA screening value or OEHHA fish contaminant goal for silver.

Tin. Figure A-50 summarizes the average concentration of total tin in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in tin concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of tin ranged from 0.00 to 1.71 mg/kg ww at nearfield station RF1 (total n=18) and 0.00 to 1.65 mg/kg ww at farfield station RF2 (total n=16). Mearns et al (1991) reports that from 3 to 52 percent of the total tin in fish is in the form of organic tin. Based on this ratio, it is likely that the annual average concentrations are below the EPA screening value of 1.2 mg/kg for the organic tin, tributlytin.

From 2002 through 2006, tributlytin concentrations in the Point Loma WTP effluent are reported as “not detected” (60 of 60 samples) where the method detection limit ranges from 0.005 ug/l in 2002, to 2 ug/l in 2006.

Zinc. Figure A-51 summarizes the average concentration of zinc in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in zinc concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of zinc ranged from 3.04 to 5.24 mg/kg ww at nearfield station RF1 (total n=18) and 1.96 to 4.22 mg/kg ww at farfield station RF2 (total n=16). There is no EPA screening value or OEHHA fish contaminant goal for zinc.

Hexachlorobenzene. Figure A-52 summarizes the average concentration of hexachlorobenzene in rockfish and scorpionfish muscle, during October, from 1995 through 2006. The applicant began using a more sensitive method detection limit in 2003. There is no spatial or temporal pattern in hexachlorobenzene concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of hexachlorobenzene ranged from 0.10 to 0.58 ug/kg ww at nearfield station RF1 (total n=18) and 0.10 to 0.35 ug/kg ww at farfield station RF2 (total n=16). These concentrations are below the EPA screening values of 3,200 and 25.0 ug/kg. There is no OEHHA fish contaminant goal for hexachlorobenzene.

Total Chlordane. Figure A-53 summarizes the average concentration of total chlordane in rockfish and scorpionfish muscle, during October, from 1995 through 2006. There is no spatial or temporal pattern in total chlordane concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of total chlordane ranged from 0.00 to 1.13 ug/kg ww at nearfield station RF1 (total n=18) and 0.00 to 2.40 ug/kg ww at farfield station RF2 (total n=16). These concentrations are below the EPA screening values of 2,000 and 114 ug/kg ww and the OEHHA fish contaminant goal of 5.6 ug/kg ww.

Total DDT. Figure A-54 summarizes the average concentration of total DDT in rockfish and scorpionfish muscle, during October, from 1995 through 2006. There is no spatial or temporal pattern in total DDT concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of total DDT ranged from 5.00 to 78.8 ug/kg ww at nearfield station RF1 (total n=18) and 9.73 to 77.70 ug/kg ww at farfield station RF2 (total n=16). These concentrations are below the EPA screening values of 2,000 and 117 ug/kg ww, but often above the OEHHA fish contaminant goal of 21 ug/kg ww. These values are below all OEHHA advisory tissue levels based on non-cancer risk using an 8 ounce serving size (prior to cooking) once or more per week (Klasing and Brodberg, 2008).

From 2002 through 2006, total DDT concentrations in the Point Loma WTP effluent generally are reported as “not detected” (228 of 228 samples), although the metabolite homologue, p,p’-DDD, was reported as 0.020 ug/l in one sample. The method detection limits for the homologues of DDT and its metabolites range from 0.020 to 0.1 ug/l. EPA’s recommended minimum quantitation levels for the homologues of DDT and its metabolites are 0.1 ug/l using EPA method 608; Appendix II of the California Ocean Plan requires dischargers to achieve more stringent minimum levels.

Because there is no noticeable effect of the outfall, the contribution of the discharge is minimal.

Total PCBs. Figure A-55 summarizes the average concentration of total PCBs in rockfish and scorpionfish muscle, during October, from 1995 through 2006. There is no spatial or temporal pattern in total PCB concentrations in muscle that suggests an outfall-related effect. During the most recent discharge period (2001-2006), the annual average concentration of total PCBs ranged from 1.50 to 31.67 ug/kg ww at nearfield station RF1 (total n=18) and 3.00 to 37.25 ug/kg ww at farfield station RF2 (total n=16). These concentrations are generally below the EPA screening values of 80. and 20. ug/kg ww, but often above the OEHHA fish contaminant goal of 3.6 ug/kg ww. These values are usually below OEHHA advisory tissue levels based on non-cancer risk using an 8 ounce serving size (prior to cooking) once or more per week (Klasing and Brodberg, 2008).

From 2002 through 2006, total PCB concentrations in the Point Loma WTP effluent are reported as “not detected” (228 of 228 samples) where the method detection limit ranges from 2 to 4 ug/l, based on the measured Arochlor. EPA concludes that these method detection limits need to be lowered in order to achieve 40 CFR 136 levels and to further quantify actual mass emissions of PCBs from the PLOO to the region. However, neither the applicant’s nor EPA’s method detection limits are low enough to evaluate the applicant’s ability to achieve compliance, following initial dilution, with California Ocean Plan Table B water quality objectives for total PCBs.

Because there is no noticeable effect of the outfall, the contribution of the discharge is minimal.

Based on this review of fish liver and muscle tissues, EPA finds that the improved modified discharge will comply with California Ocean Plan water quality objectives for biological characteristics of ocean waters. EPA concludes that the improved modified discharge will allow for the attainment or maintenance of water quality which allows for recreational activities (fishing) beyond the zone of initial dilution.

b. Water Contact Recreation

Under 40 CFR 125.62(d), the applicant’s modified discharge must allow for the attainment or maintenance of water quality which allows for recreational activities beyond the zone of initial dilution. The requirement to protect recreational activities applies beyond the zone of initial dilution, in both federal and State waters. This section of the TDD discusses the EPA-approved water quality standards that apply in State waters and the recreational activities and 304(a)(1) water quality criteria that apply in federal waters beyond the zone of initial dilution. The applicant’s monitoring and laboratory data are reviewed to assess whether the improved modified discharge will protect recreational activities.

State Waters

Within State waters off Point Loma, most water contact recreational activities are centered around the Point Loma kelp beds and in nearshore waters. The shoreline along the southern portion of Point Loma is predominantly on a military reservation (Fort Rosecrans) and the extreme southern portion of the peninsula is within the Cabrillo National Monument. Shoreline access in these areas is limited to designated tidepool areas within the boundaries of the national monument.

The State Water Resources Control Board (State Water Board) has established bacteriological standards in ocean waters of the State used for water contact recreation. Ocean waters are the territorial marine waters of the State as defined by California law. The outer limit of territorial seas generally extends offshore to 3 nautical miles. “Water Contact Recreation” or “REC-1” is a beneficial use of the State and is defined to include uses of water for recreational activities involving body contact with water where ingestion of water is reasonably possible; these uses include, but are not limited to, swimming, wading, water-skiing, skin and SCUBA diving, surfing, white water activities, fishing, and use of natural hot springs. “REC-1” is designated as an existing beneficial use of coastal waters named the Pacific Ocean, in the California Ocean Plan and Regional Water Quality Control Plan for the San Diego Region (San Diego RWQCB, 1994).

CWA sections 303(i) and 502(21), together require the adoption of water quality criteria for all coastal waters designated by States for use for swimming, bathing, surfing, or similar water contact activities, even if, as a factual matter, the waters designated for swimming are not frequently or typically used for swimming (69 Fed. Reg. 67219-20, 67222, November 16, 2004). Consistent with this requirement, on November 16, 2004, EPA promulgated recreational water quality criteria for coastal waters in cases where States had failed to do so; these criteria apply where States have designated coastal waters for water contact recreation, but do not have in place EPA-approved bacteria criteria that are as protective as EPA’s 1986 recommended 304(a)(1) criteria for bacteria (69 Fed. Reg. 67218, November 16, 2004). This promulgation applies the criteria at 40 CFR 131.41(c)(2) to waters designated marine coastal recreational waters in California, excluding the Los Angeles Regional Water Quality Control Board (69 Fed. Reg. 67243, November 16, 2004). In 2005, the State Water Board adopted revised bacteria criteria for ocean waters of the State. Effective February 14, 2006, the revised California Ocean Plan specifies that within the zone bounded by the shoreline and 1,000 feet from the shoreline or the 30-foot depth contour (whichever is further) and in areas outside this zone used for water contact sports as determined by the Regional Water Board (i.e., waters designated as REC-1), including kelp beds, the bacterial objectives in Table 25 shall be maintained throughout the water column. The State has excluded the initial dilution zone for wastewater outfalls.

Table 25. Bacterial water quality objectives in the California Ocean Plan for State waters designated REC-1.

Indicator	30-day Geometric Mean (per 100 ml)	Single Sample Maximum (per 100 ml)
Total coliform	1,000	10,000
Fecal coliform	200	400
Total coliform when fecal coliform:total coliform ratio > 0.1		1,000
Enterococcus	35	104

Federal Waters

EPA has developed 304(a)(1) ambient water quality criteria for bacteria which are recommended to protect people from gastrointestinal illness for primary contact recreation, or similar full body contact activities, in marine recreational waters (*Ambient Water Quality Criteria for Bacteria—1986*, EPA 440/5-84-002, 1986), but EPA has not directly promulgated water quality standards for marine recreational activities in federal waters located offshore beyond 3 nautical miles. For these waters, the water use is defined by the CWA section 101(a)(2) interim goal to provide water quality for recreation in and on the water, wherever attainable. EPA describes the "primary contact recreation" use as protective when the potential for ingestion of, or immersion in, water is likely. Activities usually include swimming, water-skiing, skin-diving, surfing, and other activities likely to result in immersion (*Water Quality Standards Handbook*, EPA-823-B-94-005a, 1994). Therefore, EPA has reviewed the actual uses of federal waters surrounding the Point Loma Ocean Outfall to determine where such activities occur. Where such uses occur, they are protected by EPA's water quality criteria for bacteria in Table 26.

Table 26. 304(a)(1) ambient water quality criteria for bacteria in federal waters where primary contact recreation occurs.

Indicator	30-day Geometric Mean (per 100 ml)	Single Sample Maximum (per 100 ml)
Enterococci	35	104 for designated bathing beach
		158 for moderate use
		276 for light use
		501 for infrequent use

Volume V, Appendix G, of the application describes water contact recreational activities occurring in ocean waters off Point Loma and at shoreline, kelp bed, and offshore water quality monitoring stations. In Appendix G, Table 19 shows where water contact recreation takes place off Point Loma, based on the City's recreational use assessment and record of visual observations during monitoring events. In the vicinity of the Point Loma discharge, the applicant has documented no federally-defined primary contact recreational activities occurring in waters beyond 3 nautical miles; therefore, EPA has determined that federal waters beyond the zone of initial dilution are not currently required to achieve the 304(a)(1) water quality criteria for bacteria. However, within 3 nautical miles of the shoreline, the applicant's improved modified discharge must achieve California Ocean Plan bacteriological standards for water contact recreation throughout the water column.

Data Assessment

Under its existing NPDES permit, the City conducts the required monitoring for bacteria indicators (enterococcus, fecal coliforms, and total coliforms) at 52 stations shown in Figure A-3. Quarterly monitoring is conducted at a grid of 33 offshore stations located along the 98, 80, and 60 meter contours (at depths of 1, 25, 60, 80 and 98 meters below the surface); and at 3 offshore stations located along the 18 meter contour (at depths of 1, 12 and 18 meters). Five times per month, monitoring is conducted at 5 kelp bed stations located along the 18 meter contour (at depths of 1, 12 and 18 meters) and at 3 kelp bed stations located along the 9 meter (30 foot) contour (at depths of 1, 3 and 9 meters). Weekly monitoring is conducted at 8 shoreline stations. EPA evaluated the applicant's monitoring results from June 2003 through July 2007 for shoreline and kelp bed stations, and from October 2003 through July 2007 for offshore stations.

The water depth at the outer edge of the kelp bed lying inshore from the Point Loma outfall is about 16 to 17 meters and the water depth at the outer edge of the San Diego bight (along an extension of the Point Loma coastline) is about 40 to 45 meters. Based on dilution modeling for the wastewater plume using time series data, the height-of-rise to the average level of minimum dilution varies from about 20 to 31 meters above the bottom, corresponding to water depths of 62 to 74 meters. The height-of-rise to the average top of the wastefield varies from about 30 to 40 meters above the bottom, corresponding to water depths of about 54 to 64 meters. The maximum height-of-rise to the top of the wastefield during a month varies from about 50 to 64 meters above the bottom, corresponding to depths of about 30 to 44 meters. Figure O-16 in Volume VIII, Appendix O, of the application.

As shown in Table B-9, single sample maximum bacterial objectives at shoreline stations exhibit low exceedance rates (less than 4 percent). As shown in Tables B-10, geometric mean bacterial objectives at shoreline stations exhibit low exceedance rates (less than 2 percent). The applicant attributes these exceedances to surface runoff rather than the outfall plume. EPA agrees with this conclusion because of the lack of elevated concentrations at stations in the kelp bed and because modeling and monitoring results indicate that the outfall plume remains submerged in the offshore zone.

As shown in Tables B-11 through B-14, single sample maximum bacterial objectives at kelp bed stations exhibit very low exceedance rates at all depths (less than 1 percent). As shown in Tables B-15 through B-17, geometric mean bacterial objectives at kelp bed stations exhibit low exceedance rates at all depths (less than 1 percent). Exceedances are more likely observed at or within 3 meters of the surface rather than at the bottom, or at outer kelp bed station mid-depths. The applicant attributes most of these exceedances to storm events, rather than the outfall plume. EPA agrees with this conclusion because modeling and monitoring results indicate that the outfall plume remains submerged in the offshore zone, generally at water depths greater than 20 meters.

The 4.5 mile long PLOO discharges beyond the 3 nautical mile outer limit of the territorial seas. In Volume IV, Appendix C, of the application, Table C-5 summarizes bacteriological data from offshore stations within State waters that are not located in the Point Loma kelp bed. As summarized by the applicant, these offshore stations (at all water depths) achieved compliance with recreational water contact standards from 92 to 98 percent of the time, with exceedances typically limited to samples collected from water depths below 40 meters.

EPA also evaluated the raw data for bacteria indicators submitted with the application. As shown in Tables B-18 through B-21, single sample maximum bacterial objectives at offshore stations within State waters exhibit a low summary exceedance rate (less than 6 percent). At the subset of offshore stations in State waters located along the 80 and 60 meter contours, exceedances are limited to water depths below 25 meters, except at stations F18 and F09 where exceedance rates from the surface to water depths of 25 meters are less than 7 percent. As shown in Tables B-22 through B-24, geometric mean bacterial objectives at offshore stations within State waters exhibit a summary exceedance rate of less than 10 percent. At the subset of offshore stations in State waters located along the 80 and 60 meter contours, exceedances are limited to water depths below 25 meters, except at stations F18, F12, F10, F09, and F06 where exceedance rates from the surface to water depths of 25 meters are generally less than 8 percent.

Both the applicant and EPA compared maximum receiving water bacteriological concentrations from these offshore stations (at depth) with California Ocean Plan water quality objectives to determine the degree of reduction in indicator organisms discharged through the PLOO that is needed to achieve 100 percent compliance with California Ocean Plan water contact standards at all offshore station locations and depths within 3 nautical miles (Tables B-25 through B-27). Based on an evaluation of this data (Table C-6 in Volume IV, Appendix C, of the application), the City concluded that a 2.1-logarithm (approximately 99 percent) reduction of total coliform indicator organisms would ensure that the Point Loma discharge complies with bacteriological water quality standards at all locations and depths within State waters. Based on review and analysis of all offshore station data provided by the applicant, EPA believes the applicant’s conclusion is conservative and, therefore provides reasonable assurance of compliance with these standards.

Initial bench-scale laboratory tests, conducted by the applicant, show that a 2.1-log reduction of indicator organisms in the Point Loma effluent can be achieved by a sodium hypochlorite dose rate of 7 mg/1. Other studies show that this dose rate will be consumed in the PLOO and will not lead to non-compliance with Table B water quality objectives in the California Ocean Plan (e.g., total chlorine residual, chloroform, chloromethane, dichloromethane, chlorodibromomethane, dichlorobromomethane, chlorinated phenolic compounds, toxicity, etc.). Facilities currently exist at the Point Loma WTP site for storing and handling sodium hypochlorite. Volume IV, Appendix D, of the application.

The 2007 application is based on an improved discharge, as defined at 40 CFR 125.58(i), and incorporates effluent disinfection to achieve these California Ocean Plan standards in State waters prior to permit reissuance. On November 13, 2007, the City submitted a request to the Regional Water Board to initiate operation of prototype effluent disinfection facilities to achieve compliance with bacteriological water quality standards in State waters. On August 13, 2008, the Regional Water Board approved modifications associated with operation of the City's proposed prototype effluent disinfection facilities at Point Loma WTP. The City began adding sodium hypochlorite to the effluent discharge on September 3, 2008.

Based on this review, EPA finds that the improved modified discharge will meet bacterial water quality standards in State waters. EPA also finds that federal waters are not required to achieve the 304(a)(1) water quality criteria for bacteria because federally-defined primary contact recreational activities are not occurring in waters beyond 3 nautical miles. The reissued permit will require the City to record and report any primary contact recreational activities observed in federal waters, during offshore water quality monitoring surveys. The Regional Water Board and EPA conduct routine reviews of the City's discharge monitoring reports to assess compliance with the existing permit and water quality standards. EPA concludes that the improved modified discharge will allow for the attainment or maintenance of water quality which allows for recreational activities beyond the zone of initial dilution, including, without limitation, swimming, diving, picnicking, and sports activities along shorelines and beaches.

5. Additional Requirements for Improved Discharge

Under 40 CFR 125.62(e), an application for a 301(h)-modified permit on the basis of an improved discharge must include a demonstration that such improvements have been thoroughly planned and studied and can be completed or implemented expeditiously; detailed analyses projecting changes in average flow rates and composition of the discharge which are expected to result from proposed improvements; an assessment of the current discharge required by 40 CFR 125.62(a) through (d); and a detailed analysis of how the planned improvements will comply with 40 CFR 125.62(a) through (d).

Under Part A.11 of EPA Form 3510-A2, Description of Treatment, the applicant states that effluent disinfection is being implemented and will be operational prior to renewal of the NPDES permit. The applicant also states that dechlorination is not necessary, as chlorine residual is consumed during outfall transport. Under Part B.5 of EPA Form 3510-A2, the applicant explains that chlorination is being implemented to ensure compliance with California Ocean Plan recreational body-contact standards throughout the water column in State-regulated waters.

Volume IV (Appendices A, C, and D) and Volume VIII (Appendix U) of the application describe the City's proposal for an improved discharge. The City is proposing to implement effluent disinfection at the Point Loma WTP to achieve a 2.1 log reduction of indicator organisms in the effluent and has developed a prototype disinfection plan, as documented in Appendix D. A 7 mg/l dose rate of 12 percent sodium hypochlorite solution will be applied in the effluent channel and the outfall transport time will provide the contact time needed to achieve a 2.1 log reduction and zero chlorine residual as the effluent enters the outfall diffuser. There is a travel time of about five minutes between the feed point and the effluent sample point, to evaluate effluent compliance with NPDES permit requirements. Initial studies conducted by the applicant show that levels of chlorination byproducts and whole effluent toxicity will meet California Ocean Plan requirements. Figure A-14 in Volume IV, Appendix A, of the application presents the layout of the prototype effluent disinfection facility which has already been designed and installed. On August 13, 2008, the City received Regional Water Board approval to initiate operation of the prototype facility. The applicant states that during operation of the prototype facility, dosage rates will be confirmed and special effluent and ocean samples will be analyzed to demonstrate compliance. The results of full scale testing of the prototype facility will be used by the applicant to implement more permanent facilities. If prototype testing is adequate, the applicant states that an operational system (although not perhaps the permanent design) will be in place to provide continuous effluent disinfection during the term of the renewed permit. The City may propose to the Regional Water Board and EPA modification of the prototype facility or operations in accordance with the results of future studies.

Based on preliminary information provided in the updated application, EPA concludes that the applicable requirements under 40 CFR 125.62(e) have been met.

D. Establishment of a Monitoring Program

Under 40 CFR 125.63 which implements CWA section 301(h)(3), the applicant must have a monitoring program that is designed to provide data to evaluate the impact of the modified discharge on the marine biota; demonstrate compliance with applicable water quality standards or criteria, as applicable; measure toxic substances in the discharge; and have the capability to implement these programs upon issuance of the 301(h)-modified permit. The frequency and extent of the monitoring program are to be determined by taking into consideration the applicant’s rate of discharge, quantities of toxic pollutants discharged, and potentially significant impacts on receiving water, marine biota, and designated water uses.

The applicant has a well-established monitoring program. The existing monitoring program was developed jointly by the Regional Water Board, EPA, and the applicant. The program is described in Volume V, Appendix I, of the application. The City has consistently implemented the agreed upon program.

The applicant has proposed no changes to its existing monitoring program. EPA and the Regional Water Board will review the applicant’s existing monitoring program and revise it, as appropriate. These revisions will be included in the 301(h)-modified permit, as conditions for monitoring the impact of the discharge. EPA finds that the applicant has proposed a monitoring program which meets CWA section 301(h) requirements and has the resources to implement the program.

E. Impact of Modified Discharge on Other Point and Non-Point Sources

Under 40 CFR 125.64 which implements CWA section 301(h)(4), the applicant's proposed modified discharge must not result in the imposition of additional treatment requirements on any other point or non-point sources. For previous applications, the Regional Water Board has determined that the Point Loma discharge will not have an effect on any other point or non-point source discharges. There are a number of point and non-point source discharges within the San Diego Region; however, the PLOO is the only deep water discharge in the San Diego Region. All other San Diego Region discharges are to depths of 36 meters or less. The nearest discharge to the PLOO is the South Bay Ocean Outfall located approximately 18 kilometers southwest of the PLOO at a depth of 28 meters. For the 2007 application, the City has submitted a letter to Regional Water Board requesting the required determination. The granting of the 301(h) variance by EPA's Regional Administrator is contingent upon a determination by the Regional Water Board that the proposed discharge will not result in any additional treatment requirements on any other point or nonpoint sources.

F. Toxics Control Program

In accordance with 40 CFR 125.66, the applicant must design a toxics control program to identify and ensure control of toxic pollutants and pesticides discharged in the effluent. The applicant's Industrial Wastewater Control Program (for industrial toxics control) and the Household Hazardous Waste Program (for nonindustrial toxics control) are described, below.

1. Chemical Analysis

Under 40 CFR 125.66(a)(1), the applicant is required to submit chemical analyses of its current discharge for all toxic pollutants and pesticides defined in 40 CFR 125.58(aa) and (p). The analyses must be performed on two 24-hour composite samples (one dry weather and one wet weather). The City conducts influent and effluent monitoring following sampling schedules specified in the existing permit. Effluent samples are collected and analyzed on a weekly basis for metals, cyanide, ammonia, chlorinated pesticides, phenolic compounds, and PCBs. Analyses for organophosphate pesticides, dioxin, purgeable (volatile) compounds, acrolein and acrylonitrile, base/neutral compounds, and butyl tins are performed on a monthly basis. Influent and effluent monitoring data have been previously reported in monthly, quarterly, and annual reports to the Regional Water Board and EPA. The City submitted Point Loma WTP effluent data from 2002 through 2006 in electronic format, as part of the application. Based on influent and effluent data from 2006, the applicant indicates that there are no significant differences or evident trends in effluent quality between wet weather and dry weather conditions. These data are summarized by the City in Volume III, Large Applicant Questionnaire section III.H.1, of the application. Table 27 lists the commonly detected toxic inorganic and organic constituents in the Point Loma WTP effluent during 2006.

Table 27. Commonly detected toxic inorganic and organic constituents in the Point Loma WTP effluent during 2006.

Inorganic Toxic Constituent	Organic Toxic Constituent
Antimony	1,4-dichlorobenzene
Arsenic	2-butanone
Barium	Acetone
Beryllium	BHC gamma (lindane)
Cadmium	Bis (2-ethylhexyl) phthalate
Chromium	Bromodichloromethane (Dichlorobromomethane)
Cobalt	Chloroform (trichloromethane)
Copper	Dibromochloromethane (chlorodibromomethane)
Lead	Diethyl phthalate
Lithium	Methyl tertiary butyl ether (MTBE)
Mercury	Methylene chloride
Molybdenum	Phenol
Nickel	Tetrachloroethylene (tetrachloroethene)
Selenium	Toluene
Silver	
Thallium	
Vanadium	
Zinc	
Cyanide	

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.66(a)(2).

2. Toxic Pollutant Source Identification

Under 40 CFR 125.66(b), the applicant must submit an analysis of the known or suspected sources of toxic pollutants and pesticides identified in 40 CFR 125.66(a) and, to the extent practicable, categorize the sources according to industrial and nonindustrial types. As part of the City's industrial source control program, industries that may potentially discharge toxic organic or inorganic constituents into the Metro System are surveyed, discharge permits are issued, and industrial discharges are monitored. The applicant also performs an annual system-wide nonindustrial toxics survey program to further identify sources of toxic constituents within the Metro System. A summary of identified or suspected sources, sorted by categorical industries or noncategorical industrial/commercial facilities, for effluent pollutants of concern are listed in Tables III.H-8 (inorganic toxics) and III.H-9 (organic toxics), Volume III of the application.

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.66(b).

3. Industrial Pretreatment Requirements

Under 40 CFR 125.66(c), an applicant that has known or suspected industrial sources of toxic pollutants must have an approved pretreatment program, in accordance with 40 CFR 403. EPA approved the City's industrial pretreatment program, called the Industrial Wastewater Control Program, on June 29, 1982. The City's pretreatment program is summarized in Volume VII, Appendix K, of the application. Of the approximately 170 to 180 mgd of wastewater treated, the estimated contribution from Metro System industrial users is 2.5 percent. The program's active permit inventory includes: 50 categorical industrial users subject to federal categorical pretreatment standards and 20 additional significant industrial users subject to federal reporting requirements and local limits (i.e., 70 significant industrial users); 37 facilities with federally regulated processes where zero discharge is confirmed annually; and 1,550 non-categorical industrial users subject to applicable best management practices. The effectiveness of the Industrial Wastewater Control Program in reducing influent pollutant loadings is summarized in Appendix K. Local limits are reviewed annually and Attachment K3 contains the applicant's 2006 local limits update for Point Loma WTP. This review notes that the City's current local limits methodology facilitates a proactive planning approach to controlling pollutants which may become a problem in the future for the Point Loma WTP headworks and permit.

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.66(c).

4. Nonindustrial Source Control Program

Under 40 CFR 125.66(d), implementing CWA section 301(h)(7), the applicant must submit a proposed public education program and implementation schedule designed to minimize the entrance of nonindustrial toxic pollutants and pesticides into its POTW; and develop and implement additional nonindustrial source control programs, at the earliest possible schedule. These programs and schedules are subject to revision by the Regional Administrator during permit review and reissuance and throughout the term of the permit.

The applicant proposes to continue implementing and improving its nonindustrial source control program that has been in effect since 1982. The aim of this program is to reduce the introduction of nonindustrial toxic pollutants into the sewer system. Key elements of this program include: a Household Hazardous Waste Program; a public education program; development and implementation of Discharger permits and/or Best Management Practice Discharge Authorization requirements for select commercial sectors; and ongoing surveys to identify contaminant sources. Detailed descriptions of these program elements are presented in Volume VII, Appendices K and L, of the application.

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.66(d).

G. Urban Area Pretreatment Program

Under 40 CFR 125.65, implementing CWA section 301(h)(6), applicants serving a population of 50,000 or more and having one or more toxic pollutants introduced into the POTW by one or more industrial dischargers must comply with urban area pretreatment program requirements. A POTW subject to these requirements must demonstrate it either has in effect a program that achieves secondary equivalency, as described at 40 CFR 125.65(d), or that industrial sources introducing waste into the treatment works are in compliance with all applicable pretreatment requirements, including numerical standards set by local limits, and that it will enforce these requirements. The applicant is subject to this regulation.

In the 1995 application, the City indicated it would comply with urban area pretreatment program requirements by demonstrating that it has applicable pretreatment requirements in effect. The City submitted its Urban Area Pretreatment Program to EPA in 1996; the program was approved by the Regional Water Board on August 13, 1997 and by EPA on December 1, 1998.

As explained the preamble to the revised CWA section 301(h) regulations (59 Fed. Reg. 40642, August 9, 1994):

> "EPA intends to determine a POTW's continuing eligibility for a 301(h) waiver under section 301(h)(6) by measuring industrial user compliance and POTW enforcement activities against existing criteria in the Agency's National Pretreatment Program. … In 1989, EPA established criteria for determining POTW compliance with pretreatment implementation obligations. One element of these criteria is the level of significant noncompliance of the POTW's industrial users. The General Pretreatment Regulations (part 403) identify the circumstances when industrial user noncompliance is significant. The industrial user significant noncompliance (SNC) criteria are set out in 40 CFR 403.8(f)(2)(vii) and address both effluent and reporting violations. …
>
> For pretreatment purposes, a POTW's enforcement program is considered adequate if no more than 15 percent of its industrial users meet the SNC criteria in a single year. … In addition, a POTW is also considered in SNC if it fails to take formal appropriate and timely enforcement action against any industrial user, the wastewater from which passes through the POTW or interferes with the POTW operations.
>
> In enforcing the pretreatment programs, POTWs are expected to respond to respond to industrial user noncompliance using local enforcement

> authorities in accordance with an approved enforcement response plan (ERP) which is required of all approved pretreatment programs (see 40 CFR 403.5). POTWs including 301(h) POTWs, with greater than 15 percent of their users in SNC, or which fail to enforce appropriately against any single industrial user causing pass through or interference, are deemed to be failing to enforce their pretreatment program. …
>
> … EPA believes that the combination of industrial user compliance and POTW enforcement provides an appropriate measure of the POTW's eligibility for the 301(h) waiver under section 301(h)(6)."

The "1989 criteria" discussed in the preamble are found in a September 27, 1989 memorandum, from James R. Elder to EPA Regional Water Division Directors, entitled "FY 1990 Guidance for Reporting and Evaluating POTW Noncompliance with Pretreatment Implementation Requirements" (Elder, 27 September 1989 memorandum).

Although the 1994 preamble for the urban area pretreatment program refers to "industrial users" when discussing the 15 percent noncompliance criteria, the "1989 criteria" only apply to "significant industrial users". This term is defined at 40 CFR 403.3(t) and includes all industrial users subject to categorical standards and other industrial users designated by the POTW. Also, the Agency has issued clarifying guidance explaining that the significant noncompliance criteria at 40 CFR 403(f)(2)(vii) apply to only significant industrial users, rather than all industrial users. Consequently, in the context of the urban area pretreatment program, EPA views the 15 percent noncompliance criteria to include only significant industrial users in significant noncompliance which have not received at least one formal enforcement action from the POTW. EPA believes that the combination of industrial user compliance and POTW enforcement provides an appropriate measure of a POTW's eligibility for a variance under CWA section 301(h)(6).

The City's Enforcement Response Plan is described in Volume VII, Appendix K, of the application. The second level of formal enforcement is an Administrative Notice and Order which may be issued when an industrial user: fails to take any significant action to establish compliance within 30 days of receiving a Notice of Violation; fails to establish full compliance, beginning on the 91st day after receiving a Notice of Violation; is in significant noncompliance status; or violates a Compliance Findings of Violation and Order.

EPA recognizes that a specific enforcement response to a violation must be decided on a case-by-case basis; however, for most cases, EPA believes that an administrative notice and order, as described in the City's Enforcement Response Plan, are appropriate when significant industrial users are in significant noncompliance.

The local limits approved by EPA as part of the City's urban area pretreatment program were included in all industrial discharge permits by December 1997. As a consequence of any new local limits, some significant industrial users may need time to come into compliance. In such cases, EPA expects the City to issue a Compliance Findings of Violation and Order which is the first level of formal enforcement in the City's Enforcement Response Plan. The order shall contain a schedule for achieving compliance with the new local limits. Significant industrial users receiving such orders will not be included in the 15 percent noncompliance criteria.

On April 29 through May 1, 2008, a team comprised of personnel from the Regional Water Board, EPA, and PG Environmental, LLC performed a detailed review of the applicant's compliance rates with respect to significant industrial users and how the applicant had applied the definition of significant noncompliance to significant industrial users failing to achieve compliance with all applicable regulations. The summary statistics in Table 28 indicate the applicant is meeting the 15 percent noncompliance criteria.

Table 28. Summary of significant industrial users (SIUs) in significant noncompliance (SNC) percentage status.

Parameter	2003	2004	2005	2006	2007
Number of SUIs	90	84	81	79	92
Number of Permitted Outfalls	117	115	110	113	122
Number of Outfalls in Consistent Compliance	75	74	76	79	92
Number of Outfalls in Inconsistent Compliance	30	30	26	27	16
Number of Outfalls in SNC	12	11	8	7	14
Percentage (%) of Total Number of SIUs in SNC	10.3% (12/117)	9.6% (11/115)	7.3% (8/110)	6.2% (7/113)	11.5% (14/122)
Adjusted Percentage (%) of Number of SIUs in SNC (based on Administrative Actions taken by City)	9.4% (11/117)	8.7% (10/115)	7.3% (8/110)	4.4% (5/113)	10.7% (13/122)

Federal pretreatment regulations at 40 CFR 403.8(f)(5) require the City to develop and implement an enforcement response plan. This plan must contain procedures indicating how the City will investigate and respond to instances of industrial user noncompliance. The City has an enforcement response plan and is applying that plan as required by federal regulations. The results of EPA's pretreatment inspection indicate that the City is taking enforcement actions as necessary and the rate of significant noncompliance among significant industrial users is less than the 15 percent criterion.

EPA finds that the applicant's urban area pretreatment program is acceptable, in the context of applicable 301(h) requirements. The 301(h)-modified permit will require an annual rate of significant noncompliance for significant industrial users that is no more than 15 percent of the total number of the applicant's significant industrial users. In addition, the applicant reported no instances of interference or pass-through. Consequently, enforcement against industrial users regarding those problems was not necessary.

Based on this information, EPA concludes that the applicant has met the requirement at 40 CFR 125.65.

H. Increase in Effluent Volume or Amount of Pollutants Discharged

Under 40 CFR 125.67, which implements CWA section 301(h)(8), no modified discharge may result in any new or substantially increased discharges of the pollutant to which the modification applies above the discharge specified in the 301(h)-modified permit. In addition, the applicant must provide projections of effluent volume and mass loadings for any pollutants to which the modification applies, in five year increments, for the design life of the facility.
CWA section 301(j)(5) requires the City to remove not less than 58 percent of the biochemical oxygen demand (on an annual average) and not less than 80 percent of total suspended solids (on a monthly average). The City must also implement a wastewater reclamation program that, at minimum, will result in a reduction in the quantity of suspended solids discharged into the marine environment during the period of the modification. The projected end-of-permit (2014) annual average effluent flow is 202 mgd. The draft NPDES permit proposes the following effluent limits for total suspended solids and biochemical oxygen demand (Table 29).

Table 29. Effluent limits based on CWA sections 301(h) and (j)(5).

Effluent Constituent	Units	Annual Average	Monthly Average
TSS	% removal[1]	---	≥80
	mg/l	---	75[4]
	Metric tons/year	15,000[2]	---
		13,598[3]	---
BOD5	% removal[1]	≥58	---

[1] To be calculated on a system-wide basis, as provided in Addendum No. 1 to Order No. R9-2002-0025.
[2] To be achieved on permit effective date through December 31, 2013. Applies only to TSS discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the Metro System service area; does not apply to wastewater (and the resulting TSS) generated in Mexico which, as a result of upset or shutdown, is treated at and discharged from Point Loma WTP. [Approximates the average dry-weather flowrate capacity of the ocean outfall of 219 mgd and the Regional Water Board's TSS effluent limit for POTWs, based on BPJ, of 50 mg/l (as daily and instantaneous maximum), in 1990.]
[3] To be achieved on January 1, 2014. Applies only to TSS discharges from POTWs owned and operated by the Discharger and the Discharger's wastewater generated in the Metro System service area; does not apply to wastewater (and the resulting TSS) generated in Mexico which, as a result of upset or shutdown, is treated at and discharged from Point Loma WTP. [Approximates the projected effluent flowrate for 1997 of 185 mgd and the TSS effluent concentration of 53 mg/l.]
[4] Based on average monthly performance data (1990 through 1994) for the Point Loma WTP provided by the Discharger for the 1995 301(h) application.

According to the applicant, the design life of Metro System treatment facilities varies among the treatment components. Onsite mechanical equipment may have a design life of 20 years, while concrete structures may last for 50 years or more. In responding to 40 CFR 125.67, the applicant uses a design life of 20 years to project flow and mass loads. Table II.A-21 in Volume III of the application provides projections for Metro System flow and mass loads for total suspended solids and biochemical oxygen demand, in one year increments, through 2027. This table also provides flow and total suspended solids load projections for the PLOO discharge. Table 30 summarizes these projections for the term of the proposed permit (2009/10 through 2013/14).

Table 30. Point Loma Ocean Outfall flows (mgd) and total suspended solids loadings (MT/yr) projections for long-term facilities planning during the term of the proposed permit and proposed total suspended solids mass emission effluent limits.

Year	Projected Annual Average Discharge	Projected TSS Mass Emissions	Proposed TSS Mass Emission Effluent Limits
2009	193	11,500	15,000
2010	194	11,800	15,000
2011	195	11,700	15,000
2012	197	11,800	15,000
2013	199	11,900	15,000
2014	202	12,100	13,598

The applicant's projections in Table 30 and proposed effluent limits in Table 29 satisfy the applicable requirements. Based on Table 30, EPA believes that a total suspended solids mass emission rate of 12,100 metric tons per year would be achievable during all five years of the proposed 301(h) modification. During this period, EPA recognizes that reductions in mass emissions resulting from increased water reclamation are likely to be seasonal and anticipates the potential for corresponding higher mass emission rates during wet weather months. In the future, the City needs to pursue additional water reclamation and reuse projects, including those which demand a year-round supply of reclaimed water so as to maintain long-term compliance with this decision criterion.

I. Compliance with Other Applicable Laws

Under 40 CFR 125.59(b)(3), a 301(h)-modified permit shall not be issued where such issuance would conflict with applicable provisions of State, local, or other federal laws or Executive Orders.

1. Coastal Zone Management

A 301(h)-modified permit shall not be issued where such issuance would conflict with the federal Coastal Zone Management Act, as amended. In accordance with this law, an applicant must receive State certification that the modified discharge complies with applicable portions of the approved State coastal zone management program, or the State waives such certification.

Upon adoption of the 301(h)-modified NPDES permit by the Regional Water Board, the applicant will transmit correspondence requesting a determination from the California Coastal Commission, San Diego Coast Region, that the existing and proposed Point Loma WTP discharge are consistent with applicable coastal zone management requirements. Volume VIII, Appendix U, of the application. The issuance of a 301(h)-modified permit for the Point Loma WTP discharge is contingent upon the California Coastal Commission certification.

2. Marine Sanctuaries

A 301(h)-modified permit shall not be issued where such issuance would conflict with the federal Marine Protection, Research and Sanctuaries Act, as amended. In accordance with this law, a 301(h)-modified permit may not be issued for a discharge located in a marine sanctuary designated pursuant to Title III, if the regulations applicable to the sanctuary prohibit issuance of such a permit.

The PLOO is not located in a marine sanctuary, although more than a dozen protected marine areas exist within San Diego County. Two of these areas (San Diego-La Jolla Ecological Reserve and San Diego Marine Life Refuge), located approximately 21 to 22 kilometers north of the discharge point, have been designated by the State Water Board as “Areas of Special Biological Significance”. The discharge of wastewater to these zones is prohibited by the California Ocean Plan. A detailed description of protected areas in the vicinity of the PLOO is found in Volume V, Appendix G, of the application. EPA believes that given the distance to protected areas, pollutants discharged from the

PLOO will be diluted to background levels by the time the wastefield approaches any of these protected areas.

3. Endangered or Threatened Species

A 301(h)-modified permit shall not be issued where such issuance would conflict with the federal Endangered Species Act, as amended. This law is administered by the U.S. Fish and Wildlife Service and the NOAA National Marine Fisheries Service (collectively, the Services).

According to the applicant, 24 listed and candidate species may occur in the vicinity of Point Loma. Operation of the PLOO could affect these species by altering physical, chemical, or biological conditions, including: habitat suitability, water quality, biological integrity, food web dynamics, or the health of organisms. However, long-term monitoring conducted by the City shows no evidence of significant effects from operation of the PLOO on environmental conditions or biological communities. The applicant has reported to the Services that maintaining the existing discharge through the PLOO should not have an adverse impact on listed species or threaten their critical habitat.

By letters dated October 29, 2007, the applicant has requested determinations by the Services that the modified discharge is consistent with the federal Endangered Species Act. The issuance of a 301(h)-modified permit for the Point Loma WTP discharge is contingent upon determinations by the Services.

4. Fishery Conservation and Management

A 301(h)-modified permit shall not be issued where such issuance would conflict with the federal Magnuson-Stevens Fishery Conservation and Management Act, as amended (the MSA).

According to the applicant, the marine environment in the vicinity of Point Loma supports a wide variety of commercial fisheries that are protected and managed through the "Essential Fish Habitat" provisions of the MSA. The fisheries management plans (FMPs) for species that could occur in the Point Loma area are the Pacific Groundfish FMP (83 species), the Coastal Pelagic Species FMP (6 species), and the U.S. West Coast Fisheries for Highly Migratory Species (13 species). According to the applicant, the PLOO could have two types of effects on fisheries: physical impacts associated with the presence of the pipeline and diffusers on the ocean bottom, and biological impacts associated with the discharge of treated wastewater. Based on long-term monitoring results, the applicant has reported to the National Marine Fisheries Service that maintaining the existing discharge through the PLOO should not have an adverse effect on Essential Fish Habitat or Managed Species.

By letter dated October 29, 2007, the applicant has requested a determination by the National Marine Fisheries Service that the modified discharge is consistent with the

Magnuson-Stevens Fishery Conservation and Management Act. The issuance of a 301(h)-modified permit for the Point Loma WTP discharge is contingent upon the NMFS' determination.

J. State Determination and Concurrence

In accordance with 40 CFR 125.59(i)(2), no 301(h)-modified permit shall be issued until the appropriate State certification/concurrence is granted or waived, or if the State denies certification/concurrence, pursuant to 40 CFR 124.54.

The PLOO discharges beyond the 3 nautical mile State waters limit, into federal waters. Therefore, EPA has primary regulatory responsibility for the discharge. However, in May 1984, a Memorandum of Understanding was signed between EPA and the State of California to jointly administer discharges that are granted 301(h) modifications from federal secondary treatment standards. Under California's Porter-Cologne Water Quality Control Act, the Regional Water Boards issue waste discharge requirements which serve as NPDES permits. The joint issuance of a 301(h)-modified NPDES permit for the Point Loma WTP discharge which incorporates both the federal 301(h) variance and State waste discharge requirements will serve as the State's concurrence, pursuant to 40 CFR 124.54.

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APPENDIX A – FIGURES

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APPENDIX B – TABLES

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APPENDIX C – LIST OF TABLES AND FIGURES