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$\pm$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$\pm$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 10th percentile (or Effects Range-Low) and 50th 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.