ITEM NO. 15

STAFF REPORT

CITY OF OCEANSIDE

DATE: August 15, 2012

TO: Honorable Mayor and City Councilmembers

FROM: Water Utilities Department

SUBJECT: **RESOLUTION APPROVING THE REVISION OF SEWER DISCHARGE LIMITS (LOCAL LIMITS) FOR INDUSTRIAL USERS**

SYNOPSIS

Staff and the Utilities Commission recommend that the City Council adopt a resolution (Exhibit A) approving revisions to sewer discharge limits (local limits) for industrial users.

BACKGROUND

The federal pretreatment regulations in 40 CFR 403.5(c) require publicly owned treatment works (wastewater treatment plants), to develop and enforce local limits for discharge and to implement the general and specific prohibitions in 40 CFR 403.5(a) and (b). The pretreatment regulations also require publicly owned treatment works to continue to develop these local limits as necessary and effectively enforce such limits.

The National Pollutant Discharge Elimination System (NPDES) regulations in 40 CFR 122.44(j)(2)(ii) require publicly owned treatment works to provide a current Technically Based Local Limits Study in conjunction with permit reissuance. The City of Oceanside's current NPDES permit was reissued on August 20, 2010.

On November 19, 2009, the California Regional Water Quality Control Board in San Diego conducted an audit of the City's pretreatment program and indicated that the City's existing local limits were not technically based from the standpoint that there is no assurance that they are protective of the City's two publicly owned treatment works (La Salina and San Luis Rey Wastewater Treatment Plants).

In response, a request for proposal (RFP) was issued for the development of technically-based local limits on September 25, 2009. The RFP was provided to five consulting firms and three responded. On February 24, 2010, Council awarded the work to RvL Associates (RvL) of Costa Mesa at a cost of $55,400. The study was completed in February 2011 based on discharge data from 2010. In May 2012, staff requested that RvL update the study with more current data. RvL submitted a proposal (Exhibit C) to perform the update for an additional amount of $9,800.

ANALYSIS

The local limits study consisted of an evaluation of the treatment capacities and pollutant removal efficiencies of both the San Luis Rey and La Salina plants. The regulatory discharge limits for ocean discharge, recycled water and for biosolids were reviewed and laboratory data evaluated. Maximum allowable limits for each type of pollutant were then calculated. The study was submitted to the Regional Water Quality Control Board (RWQCB) and after evaluation of the study; the RWQCB proposes to approve the study after City Council approval.

The table below lists the current and proposed local limits for all pollutants:

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
Arsenic	As	mg/L	0.5	0.91	
Boron	B	mg/L	1.0	2.7	SLR[a] only
Cadmium	Cd	mg/L	0.11	0.15	
Chromium	Cr	mg/L	2.77	15	
Copper	Cu	mg/L	3.38	3.3	
Cyanide	CN	mg/L	1.2	3.9	
Grease and Oil		mg/L	100	Eliminate; covered by narrative limit in permit	
Lead	Pb	mg/L	0.69	0.94	
Mercury	Hg	mg/L	0.05	0.057	
Molybdenum	Mo	mg/L		0.56	New limit per EPA[b] guidelines
Nickel	Ni	mg/L	3.98	9.3	
Phenolic Compounds		mg/L	2.0		No data for local limit; eliminate as a local limit
Selenium	Se	mg/L		0.34	New limit per EPA guidelines
Silver	Ag	mg/L	0.43	3.4	
Sulfide	S^{2-}	mg/L	1.0	1.0	Retain existing local limit
Total Metals		mg/L	10.5		Eliminate; no need for (aggregate) POC[c] limit
Total Toxic Organics	TTO	mg/L	2.13		Eliminate; covered by narrative limit in permit
Zinc	Zn	mg/L	2.61	4.2	
BOD_5	BOD	ppd		Individual permits MAIL[d] of 6,806 ppd SLR and 3,852 for LS[e] ; maintain current limits for 2 IUs; issue permit for 1 new IU[f]	Monitor IUs; track total BOD versus MAIL; permit IUs above 200 ppd; eliminate limits for other IUs; pollution prevention report required for increase of 20% above current limit.

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
Ammonia	NH_3-N	ppd	Individual permits	MAIL of 1,980 ppd for SLR and 537 for LS; maintain current limit for 1 IU; eliminate limits for other IUs	Monitor IUs; track total NH_3-N versus MAIL and NPDES permit changes; permit IUs above 30 ppd (1); pollution prevention report required for increase of 20% above current limit
Total Dissolved Solids	TDS	ppd	None	MAIL for SLR-18,664 ppd	SLR only; monitor IUs; track total TDS versus MAIL; allow IUs to expand as needed up to the MAIL; pollution prevention report required for increase of 20% above current discharge

[a] SLR—San Luis Rey Treatment Plant

[b] EPA—Environmental Protection Agency

[c] POC—Pollutant of Concern

[d] MAIL = Maximum allowable industrial limit

[e] LS—La Salina Treatment Plant

[f] IU—Industrial User

The study also reviewed all of the industrial users' discharge data and determined that there are three constituents in their current discharge that can negatively impact the wastewater and recycled water systems. The constituents are ammonia, biochemical oxygen demand (BOD) and total dissolved solids (TDS). The City has four current industrial users (IUs) that discharge these constituents in sufficient volume and strength so as to have the potential to negatively impact the City's treatment systems. These IUs will be subject to the revised local limits for ammonia, BOD and TDS. The limits will be incorporated into those industries' wastewater discharge permits if applicable.

The current and proposed limits for each industrial user are listed the tables below:

AMMONIA

The only significant discharger of ammonia is Hydranautics. No changes were made to the current limit.

Industry	Pollutant	Unit	Average Discharge	Current Limit	Proposed Limit
Genentech	Ammonia	ppd	8	20	NA <30
Hydranautics	Ammonia	ppd	400	1450	1450
Sabra	Ammonia	ppd	1	None	NA <30
Sepro	Ammonia	ppd	3	None	NA <30

BOD

Proposed limits are 4 times the average discharge from Jan 2010 – Apr 2012

Industry	Pollutant	Unit	Average Discharge	Current Limit	Proposed Limit

Genentech	BOD	ppd	320	1300	1300
Hydranautics	BOD	ppd	420	2000	1700
Sabra	BOD	ppd	260	None	1100
Sepro	BOD	ppd	270	None	1100

TDS

Proposed limits are 2.1 times the average discharge from Jan 2010 – Apr 2012

Industry	Pollutant	Unit	Average Discharge	Current Limit	Proposed Limit
Genentech	TDS	ppd	4200	None	9000
Hydranautics	TDS	ppd	3500	None	7500
Sabra	TDS	ppd	450	None	1000
Sepro	TDS	ppd	70	None	NA <300

Significant Industrial Users may have Federal Standards that differ from the City's local limit. The most stringent will apply.

If the City Council adopts a resolution approving the revised local limits, the RWQCB will notify all interested parties and hold a 30-day public comment period on the revised local limits. The public comments will be addressed at a RWQCB public hearing. In addition to this process, City staff has met with each of the four industrial users to explain the local limits revisions and address any concerns.

The implementation of these limits will not require the addition of on-site treatment by industrial users, based upon measurements of their most recent pollutant loadings.

FISCAL IMPACT

In FY 11-12, RvL Associates updated the technically-based local limits in the amount of $9,800 for a total project cost of $65,200. There are no additional costs associated with the development of the local limits.

INSURANCE REQUIREMENTS

Does not apply.

COMMISSION OR COMMITTEE REPORT

The Utilities Commission approved staff's recommendation at its scheduled meeting on July 24, 2012.

CITY ATTORNEY'S ANALYSIS

The referenced documents have been reviewed by the City Attorney and approved as to form.

RECOMMENDATION

Staff and the Utilities Commission recommend that the City Council adopt a resolution approving revisions to sewer discharge limits (local limits) for industrial users.

PREPARED BY:

Cari Dale
Water Utilities Director

SUBMITTED BY:

Peter A. Weiss
City Manager

REVIEWED BY:

Michelle Skaggs-Lawrence, Deputy City Manager

Teri Ferro, Financial Services Director

Exhibit A: Resolution
Exhibit B: Technically Based Local Limits Study
Exhibit C: RvL Associates Scope of Work

RESOLUTION NO.

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF OCEANSIDE APPROVING REVISIONS TO THE SEWER DISCHARGE LIMITS (TECHNICALLY-BASED LOCAL LIMITS) FOR INDUSTRIAL USERS

WHEREAS, the City of Oceanside's current local limits for industrial users of the wastewater treatment system have not been revised since 1982;

WHEREAS, the City Council adopted Ordinance No. 11-OR0603-1 on August 17, 2011, which established new sewer discharge regulations;

WHEREAS, a technically-based local limits study was completed in February 2011 which established the revised local limits for industrial users; and

WHEREAS, pursuant to sewer discharge regulations, industrial users are charged for the treatment of excessive materials in accordance with the extra strength surcharges established by City Ordinance.

NOW, THEREFORE, the City Council of the City of Oceanside does resolve as follows:

SECTION 1. The following revised sewer discharge limits (technically-based local limits) for the City of Oceanside are hereby adopted and approved:

The table below lists the current and proposed local limits for all pollutants.

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
Arsenic	As	mg/L	0.5	0.91	
Boron	B	mg/L	1.0	2.7	SLR[a] only
Cadmium	Cd	mg/L	0.11	0.15	
Chromium	Cr	mg/L	2.77	15	
Copper	Cu	mg/L	3.38	3.3	
Cyanide	CN	mg/L	1.2	3.9	
Grease and Oil		mg/L	100	Eliminate; covered by narrative limit in permit	
Lead	Pb	mg/L	0.69	0.94	

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
Mercury	Hg	mg/L	0.05	0.057	
Molybdenum	Mo	mg/L		0.56	New limit per EPA [b] guidelines
Nickel	Ni	mg/L	3.98	9.3	
Phenolic Compounds		mg/L	2.0		No data for local limit; eliminate as a local limit
Selenium	Se	mg/L		0.34	New limit per EPA guidelines
Silver	Ag	mg/L	0.43	3.4	
Sulfide	S^{2-}	mg/L	1.0	1.0	Retain existing local limit
Total Metals		mg/L	10.5		Eliminate; no need for (aggregate) POC[c] limit
Total Toxic Organics	TTO	mg/L	2.13		Eliminate; covered by narrative limit in permit
Zinc	Zn	mg/L	2.61	4.2	
BOD_5	BOD	ppd		Individual permits MAIL[d] of 6,806 ppd SLR and 3,852 for LS[e] ; maintain current limits for 2 IUs; issue permit for 1 new IU[f]	Monitor IUs; track total BOD versus MAIL; permit IUs above 200 ppd; eliminate limits for other IUs; pollution prevention report required for increase of 20% above current limit.
Ammonia	NH_3-N	ppd	Individual permits	MAIL of 1,980 ppd for SLR and 537 for LS; maintain current limit for 1 IU; eliminate limits for other IUs	Monitor IUs; track total NH_3-N versus MAIL and NPDES permit changes; permit IUs above 30 ppd (1); pollution prevention report required for increase of 20% above current limit
Total Dissolved Solids	TDS	ppd	None	MAIL for SLR-18,664 ppd	SLR only; monitor IUs; track total TDS versus MAIL; allow IUs to expand as needed up to the MAIL; pollution prevention report required for increase of 20% above current discharge

[a] SLR—San Luis Rey Treatment Plant

[b] EPA—Environmental Protection Agency

[c] POC—Pollutant of Concern

[d] MAIL = Maximum allowable industrial limit

[e] LS—La Salina Treatment Plant

[f] IU—Industrial User

\\\

\\\

\\\

PASSED AND ADOPTED by the City Council of the City of Oceanside, California, this _____ day of _____________, 2012, by the following vote:

AYES:

NAYES:

ABSENT:

ABSTAIN:

____
Mayor of the City of Oceanside

ATTEST:

____
City Clerk

APPROVED AS TO FORM:

_______________________________, AST.
City Attorney

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF OCEANSIDE APPROVING REVISIONS TO THE SEWER DISCHARGE LIMITS (TECHNICALLY-BASED LOCAL LIMITS) FOR INDUSTRIAL USERS

Exhibit B

City of Oceanside

Final

Technically Based Local Limits Study

February 2011

Prepared for:

City of Oceanside

Water Utilities Department
300 North Coast Highway
Oceanside, CA 92054

Prepared by:

RvL Associates

Table of Contents

List of Tables

List of Figures

List of Appendices

EXECUTIVE SUMMARY

Technically based local limits are industrial users discharge limits designed to protect publically owned treatment works (POTW) and their workers from discharges that may pass through or interfere with treatment plant processes, cause the POTW effluent to not meet discharge limits, and/or hinder or prevent beneficial reuse of biosolids and beneficial reuse of the effluent. Local limits are based on site-specific data regarding the performance of the POTW and local collection system and consider the industrial user's (IU's) current discharge.

The City of Oceanside (Oceanside) last developed local limits for industrial users in 1982 and contracted RvL Associates (RvL) to develop technically based local limits using recent collection system, treatment plant, and industrial user samples. Oceanside has two wastewater treatment plants (San Luis Rey Water Reclamation Facility [SLR] and La Salina Wastewater Treatment Plant [LS]) that use preliminary, primary, and activated sludge secondary treatment for discharge of effluent to the ocean. Oceanside's Mission Basin Desalting Facility discharges brine from its reverse osmosis system to the ocean before the ocean discharge, compliance point in the Oceanside Ocean Outfall (OOO). Genentech, a pharmaceutical manufacturer, also discharges brine to the ocean discharge upstream of the compliance point. Eight months per year, SLR uses tertiary treatment to produce Title 22 recycled water for the City golf course and Lake Whalen.

RvL reviewed wastewater quality and flow data, discharge permit, and other data to determine potential pollutants of concern (POCs). With Oceanside, RvL developed a sampling plan to collect the additional information needed to develop the local limits. Oceanside collected and analyzed the samples, transmitting the results to RvL for review and analysis.

RvL analyzed the data and divided POCs into three groups, toxic pollutants (Group 1), conventional pollutants (Group 2), and mineral constituents (Group 3). OOO discharge performance goals based on the California Ocean Plan, land application of biosolids, regulations, and, for two constituents, State of California hazardous waste characteristic requirements are the basis for toxic POC. Plant design criteria typically limit conventional POC. However, the treatment plants are not designed for ammonia removal. Nonetheless, ammonia has a discharge limit, and because Oceanside demonstrated a correlation between OOO ammonia concentration and toxicity, we considered both criteria for local limits development. Mineral POC local limits only apply to the recycled water discharge from SLR.

RvL made calculations to provide the necessary information to develop allowable headworks loadings (AHL), maximum allowable headworks loadings (MAHL), and maximum allowable industrial loading (MAIL) for each wastewater treatment plant. We calculated a uniform concentration limit for Group 1 POC by dividing the MAIL for each plant by the industrial flow to the plant and recommended the lesser concentration as the local limit concentration limit. For all limits except chromium, this was the uniform concentration limit for SLR. Uniform concentration local limits are conservative limits and to prevent the potential for some IUs to exceed these stringent values, we used the EPA Guidance industrial contributory method calculations for arsenic and nickel, which are still protective of the plant.

For biochemical oxygen demand (BOD) and ammonia, RvL recommends that Oceanside establish a MAIL that is 90% of the calculated MAIL. The 10% is reserved for a potential new large IU wanting that allocation provided they have been diligent in implementing pollution prevention, source control, and/or pretreatment to control their discharge. We recommend that Oceanside permit and establish limits for IUs that discharge 200 pounds per day (ppd) BOD and/or 30 ppd of ammonia. There are two IUs that discharge 200 ppd BOD (Hydranautics and Mission Linen) and one IU (Hydranautics) discharges more than 30 ppd of ammonia. We recommend that the existing mass-based limits for these two IUs continue as they are, but eliminate BOD and ammonia mass limits on other IUs.

Mineral POCs limits only apply to recycled water; were limited to boron and total dissolved solids (TDS); and limited to IUs discharging to SLR. Oceanside plans to increase their production of recycled water in the future and wishes to maintain its high quality to attract new customers. OOO discharge limits are 0.5 mg/L B and 1,200 mg TDS as 12-month averages and 1,300 mg/L TDS as a daily maximum. In addition to meeting all discharge standards, Oceanside wants to maintain the TDS at their current levels of just over 1,000 mg/L. However, they recognize that to attract new IUs and sustain existing ones, they do not want to overburden IUs with restrictions. Therefore, we recommend an approach that provides an allowance for new IU with a large TDS discharge to locate in the SLR service area and provides for the expansion of existing industries in an environmentally responsible manner, meaning IUs can discharge more TDS, but they must investigate and implement technically feasible and economically viable reductions. We allocated the boron MAIL as a uniform concentration limit to those IUs discharging boron in concentrations above background levels from uncontrolled sources.

Similar to BOD and ammonia, we recommended that IUs discharging a minimum mass of TDS (300 ppd) be permitted and have discharge limits established. The report contains two major strategies to control TDS and four methods to allocate the TDS MAIL. We considered two alternatives that allow significant IU flexibility while protecting the recycled water quality and recommended that Oceanside permit the three major and two significant IUs discharge TDS and establish TDS mass limits for those five IUs. The recommended allocation method is to a use a “first come, first served with conditions” method. Oceanside would make 90% of the MAIL available to the five IUs, reserving 10% of the MAIL for a new major TDS discharger. The IU could increase their TDS mass discharge with the condition that if the TDS mass increase is 20% or more above their current levels, the IU needs to evaluate and, where appropriate, implement TDS control strategies. If the actual TDS load drops below 70% of the predicted or previous year’s actual load, Oceanside would reduce the permitted TDS load by 10%.

There are no data for grease and oil, phenolic compounds, sulfide, or TTO. A local limit for grease and oil is primarily to protect the collection system. There are no known studies to determine the mass of grease and oil that would cause interference and plugging of a sewer, and we only know of one conducted by a POTW that attempted to define the performance of standard grease traps and clarifiers. Some POTW differentiate petroleum and animal or plant-based grease and oil standards. The current local limit is on the lower end of other POTW local limits and half that of the typical performance of a standard grease trap. Depending on the past problems with administering and enforcement, Oceanside may wish to change their standard. At minimum, we recommend Oceanside specify the type of grease and oil they wish to regulate or eliminate it as a limit.

The OOO discharge limits include chlorinated and non-chlorinated phenolic compounds. The current local limit does not specify and therefore is for all phenolic compounds. There is no known source of industrial phenolic compounds, Oceanside is easily meeting the OOO discharge limit, and there are no reported plant problems with phenolic compounds. Therefore, we recommend that Oceanside eliminate this local limit.

Sulfide is another POC whose local limit is primarily to protect the collection system. A high sulfide discharge can cause POTW system corrosion, but so can a high BOD and sulfate discharge that must travel a long distance under anaerobic conditions. Other POTW sulfide local limits are typically 0.5 to 1.0 mg/L. There are no Oceanside data available for this POC and other than comparing the current limit with limits from other POTWs, we have no recommendation for this POC.

EPA categorical standards define TTO as the summation of specific toxic organic compounds detected above 10 µg/L. Many of the TTO compounds are also ones listed in the 2001 California Ocean Plan and have performance goals in the OOO discharge permit. Volatile TTO compounds evaporate during conveyance and in the treatment process. TTO are typically associated with categorical industries and Oceanside has narrative limits in their sewer use ordinance that can be used to control any gross discharge of TTO. We recommend that the TTO local limit be removed. Table 1 shows the current and proposed local limits for the POC studied.

Table 1. Oceanside Current and Proposed Local Limits

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
Arsenic	As	mg/L	0.5	0.91	
Boron	B	mg/L	1.0	2.7	SLR only
Cadmium	Cd	mg/L	0.11	0.15	
Chromium	Cr	mg/L	2.77	15	
Copper	Cu	mg/L	3.38	3.3	
Cyanide	CN	mg/L	1.2	3.9	
Grease and Oil		mg/L	100		Eliminate; covered by narrative limit in SUO
Lead	Pb	mg/L	0.69	0.94	
Mercury	Hg	mg/L	0.05	0.057	
Molybdenum	Mo	mg/L		0.56	New limit per EPA guidelines
Nickel	Ni	mg/L	3.98	9.3	
Phenolic Compounds		mg/L	2.0		No data for local limit; eliminate as a local limit
Selenium	Se	mg/L		0.34	New limit per EPA guidelines
Silver	Ag	mg/L	0.43	3.4	
Sulfide	S^{2-}	mg/L	1.0	1.0	Retain existing local limit
Total Metals		mg/L	10.5		Eliminate; no need for (aggregate) POC limit

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
Total Toxic Organics	TTO	mg/L	2.13		Eliminate; covered by narrative limit in SUO
Zinc	Zn	mg/L	2.61	4.2	
BOD_5	BOD	ppd	Individual permits	MAIL of 6,500 ppd; maintain current limits for 2 IUs	Monitor IUs; track total BOD versus MAIL; permit IUs above 200 ppd (2); eliminate limits for other IUs; require contingency plan for Hydranautics; pollution prevention report required for increase of 20% above current limit.
Ammonia	NH_3	ppd	Individual permits	MAIL of 1,200 ppd Maintain current limit for 1 IU; eliminate limits for other IUs	Monitor IUs; track total NH_3 versus MAIL and NPDES permit changes; permit IUs above 30 ppd (1); require contingency plan for Hydranautics; pollution prevention report required for increase of 20% above current limit
Total Dissolved Solids	TDS	ppd	None	MAIL for SLR-19,100 ppd	SLR only; monitor IUs; track total TDS versus MAIL; allow IUs to expand as needed up to the MAIL; pollution prevention report required for increase of 20% above current limit

Introduction

This report describes the service area, collection system, two treatment plants, and current IUs. It describes how many and where samples were taken as well as the associated flow and other information used in developing the local limits. The report then summarizes our data analyses and calculation of the AHL, MAHL, and MAIL. Finally, it describes the allocation of the MAIL and recommendations of local limits. Table 2 presents abbreviations used in the report.

Table 2. List of Abbreviations

Abbreviation	Description
Ag	silver
AHL	Allowable Headworks Loading(s)
AS	activated sludge
As	arsenic
Avg	Average
B	boron
BOD	biochemical oxygen demand
CBOD	carbonaceous BOD
Cd	cadmium
CFR	Code of Federal Regulations
Cl	chloride
CN	cyanide
Cr	chromium
Cu	copper
EPA	Environmental Protection Agency
Fe	iron
gpd	gallons per day
gpm	gallons per minute
Hg	mercury
IU	industrial user(s)
LS	La Salina Water Treatment Plant
MAHL	Maximum Allowable Headworks Loading(s)
MAIL	Maximum Allowable Industrial Loading(s)

Abbreviation	Description
MB-2	POTW Mass Balance
mg/kg	milligrams per kilogram
mg/L	milligrams per liter, or ppm in dilute concentrations
MGD	million gallons per day
MBDF	Mission Basin Desalting Facility
Mn	manganese
Mo	molybdenum
ND	non-detect(s)
NH_3	total ammonia
Ni	nickel
NPDES	National Pollutant Discharge Elimination System
Oceanside	City of Oceanside
OOO	Oceanside Ocean Outfall
Pb	lead
POC	Pollutant(s) of Concern
POTW	Publicly Owned Treatment Work(s)
RO	Reverse Osmosis
RvL	RvL Associates
RWQCB	Regional Water Quality Control Board
SLR	San Luis Rey Water Reclamation Facility
SMR	self-monitoring report
SUO	sewer use ordinance
SD	standard deviation
Se	selenium
TCLP	Toxicity Characteristics Leaching Procedure
TDS	total dissolved solids
TSS	total suspended solids
TTLC	Total Threshold Limit Concentration
TTO	Total Toxic Organics (as defined by CFR 433)

Abbreviation	Description
µg/L	microgram per liter
WDR	Waste Discharge Requirement(s)
Zn	zinc

SERVICE AREA AND TREATMENT SYSTEMS DESCRIPTION

Oceanside service area serves a population of approximately 191,000; covers approximately 42 square miles; and includes 450 miles of collection sewers, two treatment plants, and an ocean outfall. Figure 1 shows the Oceanside service area. The two treatment plants, La Salina Wastewater Treatment Plant (LS) and San Luis Rey Water Reclamation Facility (SLR) use preliminary, primary, and activated sludge secondary treatment processes. Primary and secondary biosolids are processed in an anaerobic digester, dewatered, and then land-applied by a third-party vendor.

The annual average and design flows for LS are 2.79 million gallons per day (MGD) and 3.0 MGD, respectively. Peak monthly design flow capacity is 5.5 MGD. Industrial users discharge an average of 0.082 MGD. Of the remaining, 89% is domestic and 11% is commercial flow as estimated by Oceanside using parcel count information. Figure 2 is a schematic of the LS treatment plant.

SLR has an annual average flow of 9.77 MGD and a design flow of 13.5 MGD. Peak monthly design flow is 15.4 MGD. Industrial users discharge an average of 0.668 MGD and of the remaining flow, 97% is domestic and 3% is commercial flow as estimated by Oceanside using parcel count information. SLR processes also include a primary effluent equalization tank and effluent holding ponds. During eight months of the year, SLR uses tertiary filtration to produce Title 22 recycled water. Oceanside uses recycled water to replenish Lake Whalen, a recreational lake, and to water one of two city golf courses. Figure 3 is a schematic of the SLR plant.

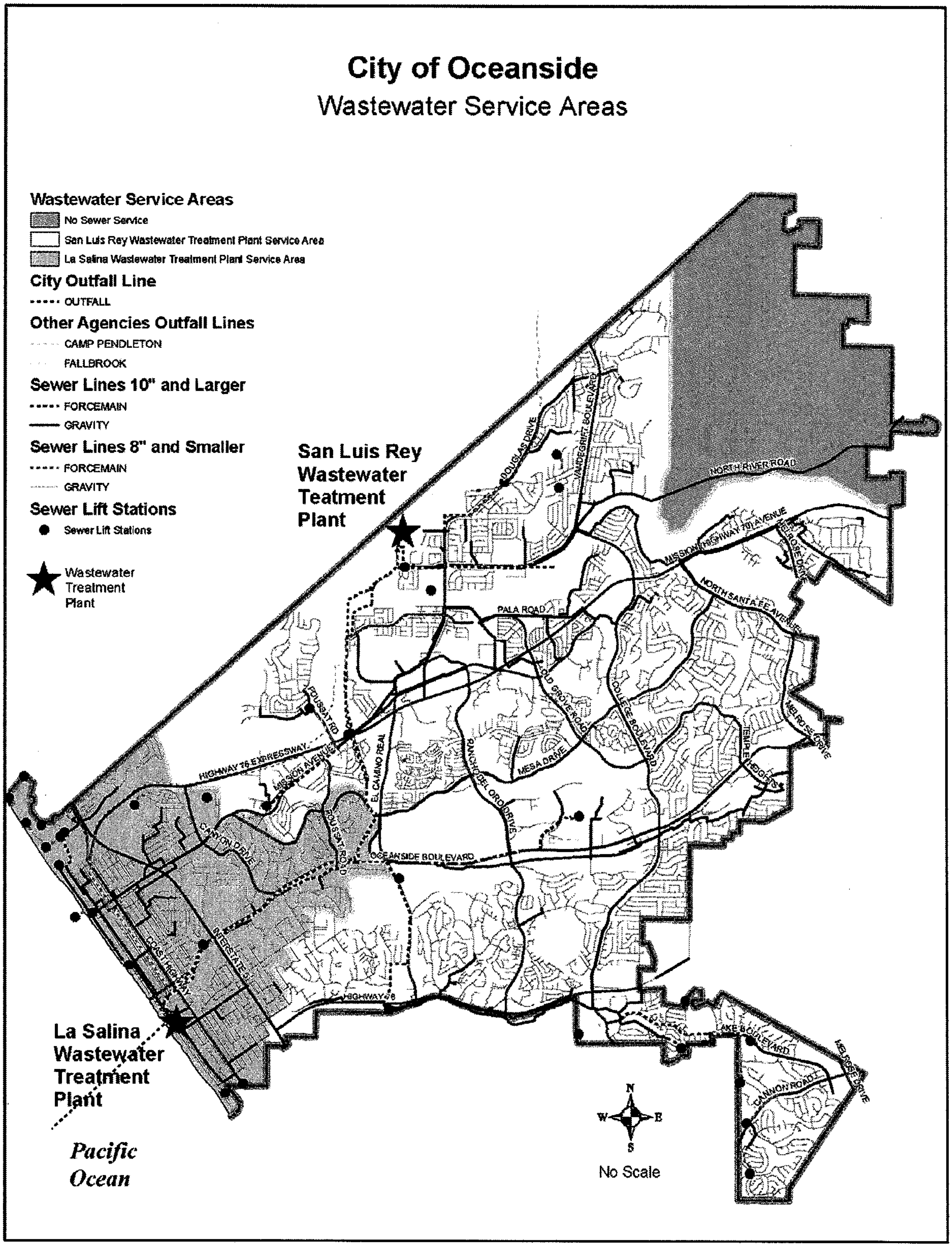


Figure 1. Oceanside Service Area

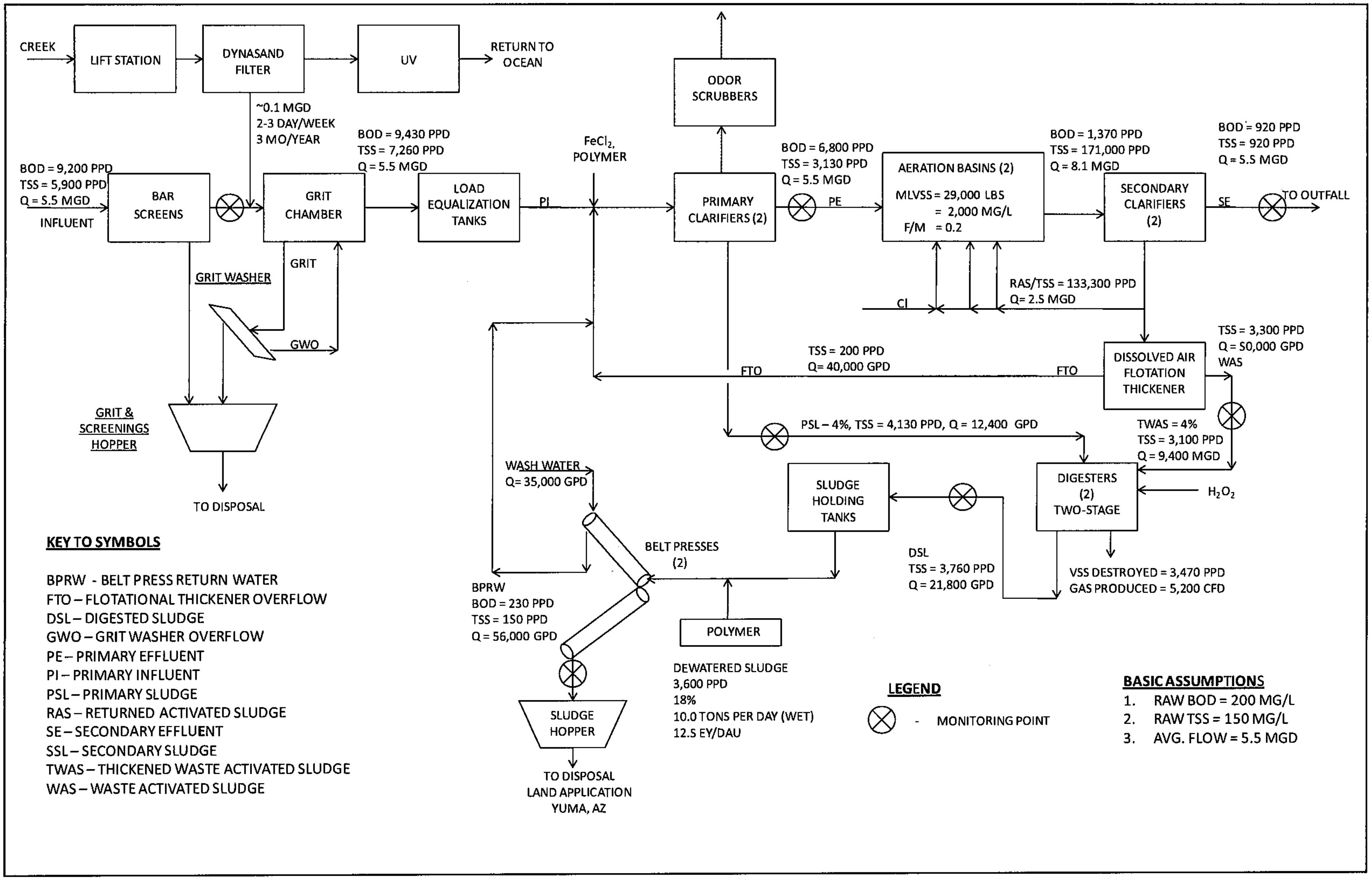


Figure 2. La Salina Wastewater Treatment Plant Schematic Process Flow Diagram

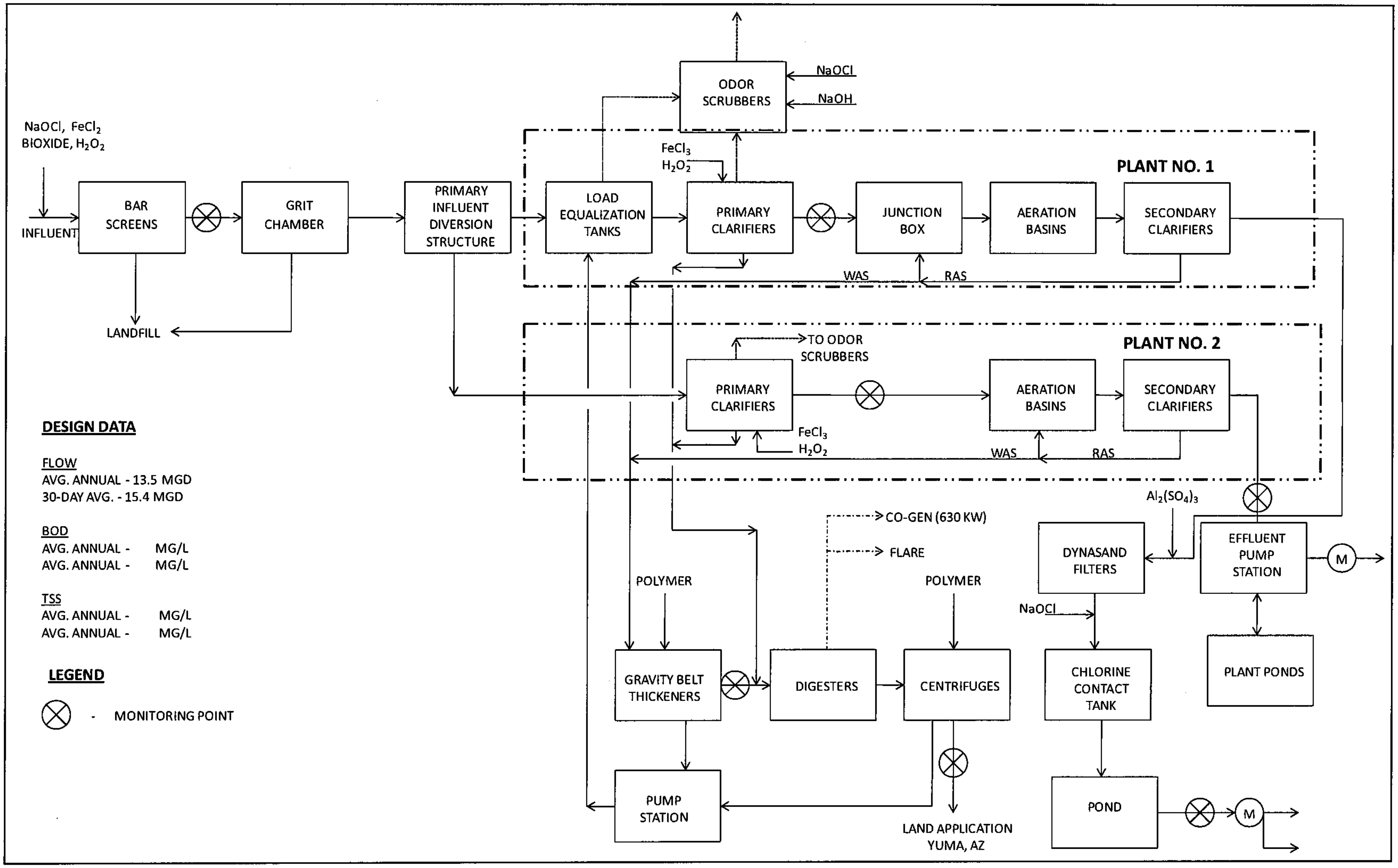


Figure 3. San Luis Rey Water Reclamation Facility Schematic Process Flow Diagram

MBDF produces up to 6.37 MGD of potable water from local groundwater. Treatment includes cartridge filtration, green sand filtration to remove iron and manganese, RO, and granular activated carbon. MBDF uses potable water to backwash the green sand filters and discharges the backwash water to SLR. Two RO trains discharge up to 2.0 MGD of brine to the OOO.

Both wastewater treatment plants discharge effluent to OOO, as does the brine discharge from MBDF and Genentech, a pharmaceutical manufacturer. MBDF does not have a separate discharge permit for the RO brine. Genentech has two facilities; only the larger facility discharges to the OOO under a separate permit, WDR R9-2008-0082 and NPDES No. CA109193. Genentech and MBDF also discharge process wastes to the SLR sewer. Figure 4 shows the schematic of the OOO system. It is important to note that Oceanside MBDF and Genentech discharges are "uncontrolled" sources to SLR and LS treatment plants.

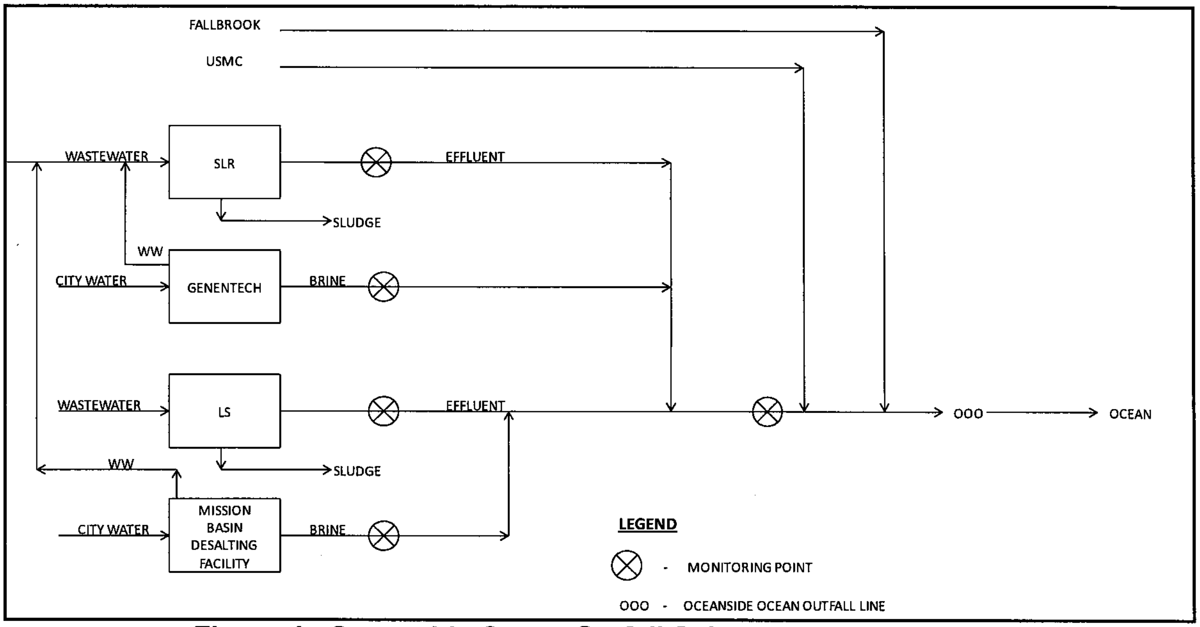


Figure 4. Oceanside Ocean Outfall Schematic Flow Diagram

SAMPLE COLLECTION AND ANALYSES

Oceanside collected some plant influent, effluent, and biosolids; IU's effluent; and Oceanside data prior to engaging RvL. We reviewed the data and determined that we needed additional data to understand the quantity and characteristics of the wastewater and water treatment plants for all of the POC identified. RvL prepared a sampling plan for Oceanside implementation that included domestic and commercial collection system sampling and additional sampling of plant influent, effluent, and biosolids. Tables 3, 4, and 5 summarize the type of data collected at the water and wastewater treatment plants and in the collection system (domestic, commercial, and IUs) and include:

- Sample location
- Sample type
- Number of samples analyzed by POC
- Percent of samples that were less than the detection limit
- Flow data
- Weight of wet biosolids leaving the plant
- Wet cake percent solids data

Oceanside also provided additional data regarding the quantity of chemicals added to the collection system and treatment processes in support of preparing a mass balance around the system.

Table 3. Oceanside Local Limit Sampling Information for LS, SLR, OOO, Domestic, and Commercial Sources

Location	Type[a]		Number of Samples Results by POC															Comments
		Ag	As	B	Cd	CN	Cr	Cu	Hg	Mo	Ni	Pb	Se	Zn	NH3	B	TDS	
LS Influent	Composite	7	7	NA	7	4	7	7	7	4	7	7	7	7	3	6	NA	Grab samples for CN
%-Non-Detect		100	86		100	75	29	0	72	25	0	72	100	0	0	0		
LS Effluent	Composite	7	7	NA	7	4	7	7	6	4	7	7	7	7	4	6	NA	Grab samples for CN
% Non-Detect		100	86		100	75	86	43	100	25	14	86	100	0	0	0		
LS Biosolids	Grab	4	13	NA	13	3	13	13	16	13	13	13	13	13	NA	NA	NA	Composite of Grab Samples
%-Non-Detect		25	77		8	0	0	0	0	8	0	0	38	0				
SLR Influent	Composite	4	4	6	4	4	4	4	4	4	4	4	4	4	8	6	10	Grab samples for CN
%-Non-Detect		50	100	0	75	75	0	0	75	0	0	50	75	0	0	0	0	
SLR Effluent	Composite	4	4	11	4	4	4	4	4	4	4	4	4	4	8	11	10	Grab samples for CN
%-Non-Detect		100	100	0	100	75	75	75	50	0	0	50	100	25	0	0	0	
SLR Biosolids	Grab	4	12	4	12	4	12	12	16	12	12	12	12	12	NA	4	NA	Composite of Grab Samples
%-Non-Detect		0	67	0	0	0	0	0	0	0	0	0	33	0		0		
SLR Recycled Water	Composite	2	3	18	3	NA	3	3	3	1	1	3	3	3	NA	18	25	
%-Non-Detect		100	100	0	67		67	67	100	0	0	67	100	0		17	0	
MBDF RO Brine	Composite	6	6	1	6	6	8	6	6	6	6	6	6	6	NA	1	NA	Grab samples for CN
%-Non-Detect		100	50	0	50	100	100	0	100	0	17	100	0	50		0		
Genentech	Composite	NA	2	NA	NA	NA	2	2	NA	NA	2	NA	NA	2	NA	NA	NA	
%-Non-Detect			100				100	50			100			100				
OOO	Composite	11	11	NA	11	10	11	11	12	6	11	11	11	11	3	10	NA	Grab samples for CN
%-Non-Detect		100	91		100	90	64	64	100	0	0	82	82	9	0	90		
Domestic	Composite	6	6	6	6	12	6	6	6	6	6	6	6	6	6	6	6	Grab samples for CN
%-Non-Detect		0	0	0	0	92	0	0	67	0	0	0	0	0	0	0	0	
Commercial	Composite	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	Grab samples for CN
%-Non-Detect		0	0	0	0	100	0	0	100	0	0	0	0	0	0	0	0	

NA-Not analyzed
[a] Composite samples are time-composite samples; biosolids are a collection of grab samples composited into a single sample for testing
[b] Highlighted areas are for POC with sufficient data to determine site-specific removal efficiencies

Table 4. Oceanside Local Limits Flow and Other Data Summary

Flow and Other Data	Data Type	No. of Data Points		Comments
		Time Period 1	Time Period 2	
LS Influent Flow	Daily Total	365		2009 Data
LS Effluent Flow	Daily Total	365		2009 Data
LS Biosolids Weight	Daily Total	139		2009 Data
LS Biosolids % Moisture	Daily Total	23		2009 Data
LS Domestic	Parcel No.			Estimated by Oceanside
LS Commercial	Parcel No.			Estimated by Oceanside
SLR Influent Flow	Daily Total	365		2009 Data
SLR Effluent Flow	Daily Total	365		2009 Data
SLR Biosolids Weight	Daily Total	274		2009 Data
SLR Biosolids % Moisture	Daily Total	194		2009 Data
SLR Recycled Water	Daily Total	1		Estimated by Oceanside
SLR Domestic	Parcel No.			Estimated by Oceanside
SLR Commercial	Parcel No.			Estimated by Oceanside
MBDF RO Brine	Daily Total	347	59	2009, Jan-Feb 2010 Data
Genentech	Daily Total	1	1	Jan-Jun & Jun-Dec SMR
OOO	Daily Total	366	365	2008, 2009 Data
Chemical Addition	Various	1		Daily, monthly, and annual data

Table 5. Oceanside Local Limits Industrial Sampling Information

			Number of Sample Results																															
		Flow	Ag		As		Cd		CN		Cr		Cu		Hg		Mo		Ni		Pb		Se		Zn		BOD		NH3		B		TDS	
Industrial User	Discharge To	Data Points	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND	#	% ND
Metro Roof Products	LS	17					1	0					1	100							1	100			1	0			18	6	14	7	18	0
Mission Linen Service	LS	18																											18	6	18	0	18	0
California Creative Foods	SLR	18																													10	0	18	0
Deutsch	SLR	18	30	67	4	50	29	31	28	21	28	7	30	0	2	50	2	0	30	0	30	13	4	0	30	13			18	0	32	0	18	0
Elite Metal Finishing	SLR	14	17	100	1	100	17	100	6	67	17	65	17	41			1	0	17	71	17	100	1	100	17	65			2	50	16	19	13	0
Genentech OCN	SLR	18							18	100																			19	53	18	0	18	0
Genentech OCP	SLR	18							1	100																			19	58	18	0	18	0
Hydranautics	SLR	56																											56	7	58	0	58	0
Indigo Labs	SLR	4			13	31	13	69			13	54	13	23	13	100			13	62	13	54			14	7			14	14	13	0	14	0
Nitto Dinko Technical	SLR	5																											5	80	1	0	5	0
Sepro Membranes	SLR	18																											18	0	17	0	18	0

POC

RvL used the *EPA Local Limits Guidance, July 2004* (EPA Guidance) as a reference throughout the study. EPA Guidance recommends 15 POC for consideration for any local limits study, Group 1 Toxic POC, and Group 2 Conventional POC. We also reviewed the regulatory limits applicable to the discharge requirements for the two wastewater treatment plants. An NPDES and a WDR permit regulate OOO; biosolids are land-applied and regulated by EPA biosolids regulations. Because EPA does not directly regulate sliver and chromium concentrations in biosolids, we applied state hazardous waste characterization limits for these two constituents. We used the 1993 SLR recycled water discharge limits to identify potential mineral POC, Group 3 Mineral POC. The following list is a compilation of the potential POC for LS and SLR:

Group 1—Toxic POC

- Arsenic[a]
- Cadmium[a]
- Chromium[a]
- Copper[a]
- Cyanide[a]
- Lead[a]
- Mercury[a]
- Molybdenum
- Nickel[a]
- Selenium
- Silver[a]
- Zinc[a]

Group 2—Conventional POC

- Biochemical oxygen demand[b]
- Total suspended solids
- Ammonia[b]

Group 3—Mineral POC

- Boron[a]
- Chloride
- Fluoride
- Iron
- Manganese
- Nitrate
- Sulfate
- Total dissolved solids

[a] POC with current Oceanside local limit in City Code
[b] Oceanside issued permits with mass-based limits for these POCs.

Oceanside also has existing local limits for grease and oil, phenolic compounds, sulfide, total metals (chromium, copper, nickel, and zinc), and total toxic organics (TTO). The OOO discharge permit also contains acute and chronic toxicity limits. Previous testing by Oceanside found that effluent ammonia concentration directly affects effluent toxicity. However, the RWQCB 2010 draft permit for OOO eliminated testing for the acute toxicity limit, and Oceanside is conducting new tests to relate ammonia to chronic toxicity.

Analysis of Group 1 POC Data

Only LS and SLR influent and effluent sample data for chromium, copper, molybdenum, nickel, and zinc had sufficient results greater than the minimum detection limit to provide reasonable quantity and quality of information to calculate specific plant removal rates. Data for other potential POC contained numerous results below detection limits, including some biosolids data below detection limits as shown in Table 3.

Percent removal efficiencies for conservative (metals) pollutants tend to increase as influent pollutant concentration increases from very low concentrations that are mostly soluble metals and pass through the treatment plant to higher concentrations that may be bio-absorbed and removed as solids or as particulate in the influent. At high concentrations, the metals become inhibitory to the biological processes. An analysis of EPA-collected data is able to show this trend.

EPA collected samples of plant influent, effluent, and percent removal for lead in 38 POTW (*Fate of Priority Pollutants in Publically Owned Treatment Works, Final Report*, EPA 440/1-82/303, September 1982). The treatment processes in all these POTW included conventional activated sludge process (ASP) (30 POTW), extended ASP (2 POTW), and trickling filter (6 POTW). Ten out of the 38 POTW provide tertiary treatment comprised of either filtration or polishing lagoon. Data showed a large range of percent removal among the POTW.

By example for lead, the average percent removal for the average influent metal concentration was calculated. Figure 5 shows average percent removal for a data range and best-fit curve for average removal data. As pollutant concentration continues to increase, percent removal efficiency increases and then tends to plateau as it approaches the plant's maximum percent removal efficiency. Low influent POC concentrations may show lower removal efficiency than the plant is capable of achieving. Understandably, with more discharges that are industrial and/or increasing POC concentration, plant removal efficiency will also increase; therefore, the impact on effluent POC concentration will be negligible.

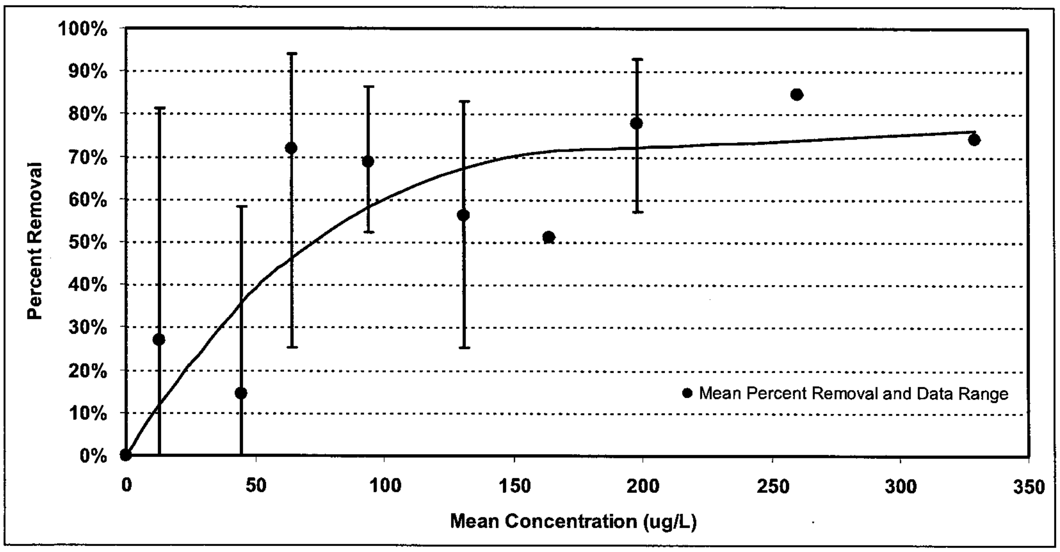


Figure 5. Percent Removal vs. Influent Lead Concentration (Data from 1982 EPA study)

Therefore, for Group 1 POC with insufficient data above MDL or results that are subject to question because they do not appear to be representative, we used a different method described later in the report to determine the percent removal for these POC. We retained these POCs for local limit development.

Analysis of Group 2 POC Data

LS and SLR treatment plants are designed to remove BOD and TSS and have treatment plant capacities for each POC. SLR aeration blower capacity limits BOD removal capacity whereas LS BOD capacity is currently based on the design capacity. LS and SLR plants are not designed to remove ammonia. However, Oceanside's operation of the activated sludge process incidentally removes ammonia. There are sufficient data to calculate an ammonia removal rate. The TSS MAHL could be calculated from plant design information. However, it is more practical and prudent to prevent slug loadings of TSS from plugging the sewer. We retained all three POC for local limit development. However, we developed numeric limits for BOD and ammonia and recommend narrative limits for TSS.

Analysis of Group 3 POC Data

As noted above, these eight POC only apply to SLR's Title 22 recycled water discharge. Oceanside analyzed domestic, commercial, SLR influent, and SLR effluent samples for these POC. Oceanside did not analyze biosolids for nitrate or total dissolved solids because there are no approved test methods for nitrate and TDS in biosolids. Oceanside has not collected and analyzed IU samples for iron, manganese, chloride, fluoride, nitrate, and sulfate, primarily because there is no suspected high use of those POC with the possible exception of chloride and/or sulfate at Genentech. The average recycled water concentration test results of these eight POC are 51% or less of the discharge limit except for B and TDS. Oceanside has no violations or concerns about meeting the discharge limits for the other six mineral POC. Therefore, we only developed local limits for B and TDS as Group 3 POC.

In summary, we developed numeric limits for 16 POC including all of the Group 1 POC, BOD and ammonia in Group 2, and B and TDS in Group 3. The other POC were not included for further development except TSS, where we recommend a narrative limit.

DATA ANALYSIS

We received and analyzed the following types of data and information:

- SLR and LS treatment plant influent, effluent and biosolids concentration data; SLR and LS influent and effluent flow data; and biosolids percent solids and weight of biosolids taken off-site data
- OOO effluent concentration and OOO flow data
- MBDF brine flow and chemical composition discharged to the OOO
- Genentech brine discharge flow and chemical composition discharged to the OOO
- IUs effluent concentration and flow data
- Potable water chemical analysis
- Domestic and commercial concentration data and estimated percentage of flow from each type of source for the SLR and LS treatment plant
- Quantity of chemicals added; addition locations; and chemical constituent analyses
- OOO permit discharge requirements and performance goals (concentration and mass of POC)
- Discharge specifications for Title 22 recycled water from SLR, EPA ceiling and monthly average concentration of POC for land application of biosolids

- Concentrations of POC in the biosolids, if exceeded, would be considered a California hazardous waste.

The following sections describe how we analyzed and used the data in developing technically based local limits.

Regulatory Information and Data

We reviewed the permit and regulatory information described above and applicable limits, performance goals, and maximum concentrations and assembled in a table. Table 6 shows the POC and limits for the various regulatory standards. The RWQCB based performance goal mass limits on the permitted OOO flow and 2001 California Ocean Plan concentrations. OOO permitted flow is 29.055 MGD compared to an average flow of about 13.1 MGD; we used a conservative approach and used performance goal concentrations and project future flow (which is as the limiting criteria.

OOO and Brine Discharger Data

We calculated the average, standard deviation, and percent variability (standard deviation divided by average, expressed as a percentage) of the OOO, MBDF, and Genentech brine discharges for POC concentrations and flow. The flow balance around OOO compared average OOO flow to the sum of the average SLR and LS effluent flow, brine flow from MBDF, and brine flow from Genentech. Results were within 1% of one another. We used the sum of the average flows in subsequent calculations. Appendix A shows the OOO flow balance in spreadsheet format.

SLR and LS Treatment Plant Data

POC percent removal is generally determined from treatment plant influent and effluent concentration and flow data. We calculated statistical parameters such as average, standard deviation, and percent variability to assess the quality of the data. We also determined by POC the number and percentage of data that were at or below the minimum detection limit (non-detects). Table 3 summarizes the percent non-detects for Groups 1and 3 POC and shows that only boron (B), chromium (Cr), copper (Cu), molybdenum (Mo), nickel (Ni), total dissolved solids (TDS), and zinc (Zn) have sufficient data to support calculation of a plant-specific percent removal. We analyzed biosolids concentration, percent solids, and weight data to develop the same statistical parameters.

We analyzed influent and effluent flow data and biosolids mass data. Using an assumed specific gravity for the biosolids, we attempted to make a flow balance across the plants. According to Oceanside, there is 90,000 gallons per day of potable water used at SLR for cooling water and scrubber water make-up. The measured influent flow was significantly lower than the calculated influent flow using effluent, biosolids, potable water, and chemical addition. We used the SLR and LS effluent meter data to calculate the influent flow because we believed the effluent flow meter was more accurate based on the following:

- Plant effluent is cleaner and less variable, therefore it is easier to meter.
- As described above, the OOO effluent flow meter agreed with the flow balance using SLR and LS effluent flow meter data.

We used effluent flow, biosolids mass, and chemical addition data to "back-calculate" SLR and LS plant influent flow. Appendix A provides summary tables for SLR and LS.

Table 6. SLR/LS Potential POCs

	1. Order No. R9-2005-0136 / NPDES NO. CA0107433							2. Order No. 93-07			3. California Ocean Plan 2001 Performance Goals (Assumed to be the discharge limit)		4. City of Oceanside Existing Local Limits	5. Adoption of Order No. R9-2008-0082; NPDES Permit No. Ca0109193; Waste Discharge Requirements for Genentech, Inc. Discharge to the Pacific Ocean Through the Oceanside Ocean Outfall		6. EPA: 40 CFR § 503.13		7. State Hazardous Waste Disposal (Title 22, Chapter 11, Article 3)	8. EPA 833-R-04-002B Local Limits Development Guidance Appendix D, Clean Water Act Priority Pollutants and The Federal Water Quality Criteria	9. EPA 833-R-04-002B Local Limits Development Guidance Appendix G, Literature Inhibition Values		
	SLR/LS/RO/Genentech Combined to OOO							SLR - Reclaimed Water					Article VI. Regulation of Discharge into City Sewer System						Saltwater	Reported range of Activated Sludge Inhibition Threshold Levels, mg/L	Reported Range of Anaerobic Digestion Inhibition Threshold Levels, mg/L	Reported Range of Nitrification Inhibition Threshold Levels, mg/L
	Based on Secondary Treatment		Based on California Ocean Plan 2001																			
POTENTIAL POC	Average Monthly (ppd)	Average Weekly (ppd)	Maximum Daily	Average Monthly	Average Weekly	Instantaneous Maximum	6 Month Median	12-Month Average mg/L	30-day Average mg/L	Daily Maximum mg/L	Max Daily, mg/L	Six Month Median, mg/L	mg/L	Average Monthly	Maximum Daily	Ceiling Concentration	Monthly Average Pollutant Concentration. (mg/kg dry weight)	TTLC (Wet-weight mg/Kg)	CCC (mg/L)			
[redacted]																						
Boron								0.5					1									
[redacted]																						
CBOD5	4,400	7,000							25	45												
Chloride								350		400												180
[redacted]																						
Fluoride								1														
Iron								0.3														
[redacted]																						
Manganese								0.15														
[redacted]																						

	1. Order No. R9-2005-0136 / NPDES NO. CA0107433							2. Order No. 93-07			3. California Ocean Plan 2001 Performance Goals (Assumed to be the discharge limit)		4. City of Oceanside Existing Local Limits	5. Adoption of Order No. R9-2008-0082; NPDES Permit No. Ca0109193; Waste Discharge Requirements for Genentech, Inc. Discharge to the Pacific Ocean Through the Oceanside Ocean Outfall		6. EPA: 40 CFR § 503.13		7. State Hazardous Waste Disposal (Title 22, Chapter 11, Article 3)	8. EPA 833-R-04-002B Local Limits Development Guidance Appendix D, Clean Water Act Priority Pollutants and The Federal Water Quality Criteria	9. EPA 833-R-04-002B Local Limits Development Guidance Appendix G, Literature Inhibition Values		
	SLR/LS/RO/Genentech Combined to OOO							SLR - Reclaimed Water					Article VI. Regulation of Discharge into City Sewer System						Saltwater	Reported range of Activated Sludge Inhibition Threshold Levels, mg/L	Reported Range of Anaerobic Digestion Inhibition Threshold Levels, mg/L	Reported Range of Nitrification Inhibition Threshold Levels, mg/L
	Based on Secondary Treatment		Based on California Ocean Plan 2001																			
POTENTIAL POC	Average Monthly (ppd)	Average Weekly (ppd)	Maximum Daily	Average Monthly	Average Weekly	Instantaneous Maximum	6 Month Median	12-Month Average mg/L	30-day Average mg/L	Daily Maximum mg/L	Max Daily, mg/L	Six Month Median, mg/L	mg/L	Average Monthly	Maximum Daily	Ceiling Concentration	Monthly Average Pollutant Concentration (mg/kg dry weight)	TTLC (Wet-weight mg/Kg)	CCC (mg/L)			
Nitrate (as NO3)									45	50												
pH	6-9								6-9					6-9								
[redacted]																						
Sulfate								350		400											500-1000	
Sulfide													1.00							25-30	50-100	
TDS								1,200		1,300												
[redacted]																						
Oil and Grease				4,400 ppd	7,000 ppd	75 mg/L							100	32 ppd								
Acute Toxicity			2.91 TUa																			
Chronic Toxicity			88 TUc																			
Phenolic Compounds			11.35 mg/L				2.688 mg/L						2									

[redacted]
Permit limit exists; not EPA recommended 15 POCs

Abbreviations:
TTLC- Total Threshold Limit Concentration
CCC- Criterion Continuous Concentration

Uncontrolled Sources

We calculated the average, standard deviation, and percent variability of domestic and commercial composite sample results and averaged the two domestic sample results. Oceanside determined the relative percentages of domestic and commercial flow to SLR and LS by comparing the number of domestic and commercial parcels within each service area. There were no hauled waste samples collected and for purposes of this study, we considered this source minor and part of the uncontrolled flows to the two treatment plant influents. We also consider the MBDF green sand filter backwash as an uncontrolled source to SLR. Appendix A presents the domestic and commercial data and statistical calculations.

MAHL AND MAIL CALCULATIONS

Appendix B presents the general formulas used in developing the MAHL and MAIL. We used the following general procedure to determine the MAHL and MAIL:

- Determine SLR and LS plant removal rates for each POC
- Determine the AHL for each POC and for each type of constraint
- Determine minimum AHL and select as the MAHL for each plant
- Select safety factors for each type of AHL limit
- Determine the MAIL

Determine SLR and LS Plant Removal Rates

Plant removal rate is the POC mass removed (mass in minus mass out) divided by the mass into the plant. Typically, mass is determined by multiplying flow and concentration data. The following paragraphs explain the calculations used to determine flow and concentrations and identify the formulas used to calculate removal rates, and in special cases, the formulas used when flow, concentration, and mass were used.

As noted above, we "back calculated" SLR and LS plant influent flow by assuming that it is equal to the sum of plant effluent, water in the biosolids hauled off site, water in chemical addition, and potable water used for pump seal and cooling water. For boron, chromium, copper, molybdenum, nickel, zinc, and TDS, we checked the mass balance across the plant (mass of the POC in should equal mass of the POC out). We did this by comparing plant influent mass to the sum of the plant effluent, biosolids, chemical addition, and potable water.

Our general approach is to compare the mass in to the mass out. EPA Guidance suggests that the collection system mass balance (sum of all sources) be 80% to 120% of the plant influent mass. EPA Guidance did not provide guidelines for the plant mass balance, but we assumed that it also should be within 20%. Mass balance differences for the 7 POC were within 12%. We next calculated removal efficiency using a modification of the EPA Guidance formula as shown in Appendix B. It is the mass of the POC in the influent less the mass of the POC out in effluent (and recycled water for SLR), all divided by the average of the Mass In and Total Mass Out. We used the average value because it is unknown which value is "more correct."

For all other Group 1 POC, we calculated the average removal efficiency from EPA Guidance data and removal efficiencies from local limits studies of other local southern California treatment plants of similar size and with similar processes to Oceanside. This included four plants within Eastern Municipal Water District, Encina Wastewater Authority plant in Carlsbad, and Meadowlark Water Reclamation Facility owned and operated by the Vallecitos Water District in San Marcos. Appendix A summarizes the removal efficiency calculations.

For BOD, RvL calculated AHL using Oceanside-provided information as described in the next section on AHL calculations. The only significant industrial ammonia load is from an IU discharging to the SLR treatment plant. Oceanside only collected SLR plant data. We assumed that LS removal efficiency was the same as SLR's because they have very similar treatment processes. The SLR mass balance for ammonia showed a less than 20% difference between the influent and effluent mass. Since there was no analysis of ammonia in the recycled water or biosolids, we considered the mass balance adequate and calculated the site-specific ammonia removal efficiency.

Boron and TDS limits removal efficiencies are only required for recycled water produced at the SLR plant. The mass balance for boron showed a less than 1% difference between mass in and mass out and TDS was less than 3%. We defined the mass in as influent mass going through tertiary treatment (using the recycled water effluent flow) plus the portion of the chemical addition going through tertiary (total mass of chemical addition multiplied by the proportion of flow into the tertiary treatment to the plant influent). Mass out was equal to the mass in the recycled water (flow multiplied by concentration). Appendix B shows the formula derivation.

Determine the AHL for Each POC

The AHL for each POC must be determined for each type of constraint. Constraints include effluent discharge, recycled water reuse, process inhibition, surface disposal of biosolids, and for certain constituents, hazardous waste. As shown in Figure 4, the OOO limits include contributions from SLR and LS treatment plants and brine discharges from MBDF and Genentech. For the purposes of this calculation, we assumed that the brine discharges are uncontrolled sources. RWQCB used the OOO permitted flow OOO and ocean plan limits to set Oceanside POC mass goals.

We used a conservative approach to calculate OOO discharge "limits" and AHL. Total OOO flow summed current and permitted flow from Genentech, projected flow from MBDF, and current flow plus growth from SLR and LS. We calculated the OOO limits using the short-term and long-term Ocean Plan concentration goals and the projected OOO flow and subtracted the POC mass contributed by Genentech and MBDF. SLR and LS mass limit allocations were flow proportional to their future flows. We used EPA Guidance formula to calculate Group 1 POC AHL for SLR and LS as shown in Appendix A.

Since there are no other (practical) limits for BOD, the "design basis" AHL is also the MAHL. At SLR, we calculated the MAHL using Oceanside-provided data that included the maximum blower capacity and the current mass of BOD and current airflow and assumed that the BOD MAIL was proportional to the maximum blower capacity. The current air demand includes the oxygen required for BOD removal and partial nitrification of the higher ammonia concentrations at SLR. By using this proportionality, we include the total likely demand of both BOD and ammonia; this is a conservative approach. At LS, we assumed the BOD MAHL was equivalent to the plant design basis.

There are two effluent AHL calculations for ammonia, one based on the Ocean Plan discharge limit and the second based on a correlation established by Oceanside laboratory data relating acute toxicity to ammonia concentration. Comparing the two concentrations, the toxicity limit is the most stringent using the current NPDES discharge permit. However, the 2010 RWQCB draft permit eliminated the acute toxicity limit from testing, but retained the chronic toxicity limit.

SLR receives a significant ammonia load from IUs, whereas IUs discharging to LS have a concentration comparable to domestic/commercial flow. We used the limit derived from the current permit acute toxicity limit to calculate the AHL. The ammonia concentration corresponding to the acute toxicity limit is 50% to 75% higher than LS effluent concentration. However, in calculating the AHL for SLR, we assumed there was no dilution of the SLR discharge to the OOO by the LS effluent. Appendix A shows the AHL ammonia calculations.

Recycled water AHL for boron and TDS use the 1993 permit recycled water discharge limits. There is a 12-month average limit for boron and TDS, and TDS has a daily maximum limit. We calculated the boron and TDS AHLs using the EPA Guidance formula for SLR and LS as shown in Appendix A.

We used EPA Guidance formula and biosolids surface disposal limits to calculate the AHL as shown in Appendix A. We considered EPA monthly limits for surface disposal for most Group 1 POC to be "long-term" limits and used ceiling concentrations to calculate the AHL for molybdenum because there is no monthly average concentration limit. The EPA limits are on a biosolids dry-weight basis.

EPA and State of California hazardous waste regulations potentially apply to the biosolids disposal. EPA TCLP limits are much higher than any concentration measured in the biosolids from SLR and LS and are much higher than the EPA regulations for surface disposal of biosolids. We did not perform any AHL calculations using these criteria. California hazardous waste regulations use TTLC tests to determine whether a substance is a hazardous waste; these tests are determined on a wet-waste basis. All TTLC concentration limits are equal to or greater than the EPA biosolids surface disposal monthly average concentrations. Standardizing the EPA and TTLC limits to a dry-weight basis, the TTLC limits are 4.3 times those of the EPA surface disposal limits. We did not calculate TTLC-based AHLs for those constituents that have surface disposal criteria. However, since there are no EPA surface disposal limits for silver and chromium, we used TTLC limits to calculate AHL for these two compounds.

Neither plant reported process inhibition problems due to industrial discharges. Therefore, we used EPA Guidance activated sludge and anaerobic digestion inhibition information to determine the AHL. We used EPA Guidance formulas to calculate process inhibition AHLs as shown in Appendix A.

Growth and Safety Factors

Oceanside has many factors that influence their growth including the influence of Marines and staff at Camp Pendleton, industrial growth from larger industries (Genentech, Hydranautics, and Deutsch), and tourist attractions of city beaches and entertainment. Camp Pendleton has its own water and wastewater treatment systems, but base personnel use community housing and commercial establishments when not on base. The war in Iraq and Afghanistan increased the number of personnel going through training, but reduced the number of personnel stationed at the base thus reducing the influence on local services. The economic slowdown also reduced growth in the need for services. However, while the large industries have reduced their growth rate, they are still expanding. From discussions with Oceanside staff and our understanding of the general growth pattern in southern California, we choose to use a 5% growth factor for domestic, commercial, and industrial flows. This is typical for southern California for the next five-year period.

The size and applicability of safety factors are influence by several factors:

- Quantity of data (e.g., fewer data points increase in safety factor)
- Quality of data (e.g., large variations in concentration and/or load would increase the safety factor)
- POTW and/or IU compliance history with the POC limit
- Potential for IU slug loadings
- Number and size of IU flow with respect to the total POTW flow

We used different safety factors for short-term and long-term wastewater or recycled water discharge limits as part of the AHL calculations. We considered daily effluent or recycled water discharge limits as short-term limits and monthly, 30-day, six-month, and 12–month average limits to be long-term limits. For nearly all cases, the long-term average limits are significantly lower than the daily maximum limits, typically 25% of the daily maximum amount. There were exceptions, a few mineral constituents of which only TDS is a designated POC.

For Group 1 POC, there are sufficient, but not an abundance of effluent data. In many cases, there are significant percentages of non-detect concentrations and high variability in the results. However, effluent concentrations are significantly smaller than the discharge goals, and the effluent has not exceeded the discharge goals. There are only a few small IUs with a potential to slug-load a Group 1 POC. We used long-term average limits to determine Group 1 POC AHLs and we used the recommended minimum safety factor of 10%.

Group 2 POC include BOD and ammonia. Currently and for the next five years, there is sufficient BOD capacity for the expected growth and there are no incidents of process upset or being near the effluent limit due to industrial discharges. The SLR primary effluent equalization basin for plant #1 significantly dampens any variation in influent load and IU slug loads. Hydranautics is the only significant IU discharging BOD and discharges to SLR. Because SLR equalizes primary effluent, we used the EPA Guidance recommended minimum safety factor of 10% for BOD.

As discussed above, the toxicity limit controls the MAHL for ammonia; this is a maximum daily limit. SLR and LS treatment plant design did not include ammonia removal. There is sufficient, but not an abundance of, effluent data and data correlating ammonia and acute toxicity. Hydranautics is the only significant IU that discharges ammonia. However, the 2010 draft NPDES permit relies on the chronic toxicity limit and Oceanside believes that the correlation between effluent ammonia concentration and chronic toxicity will yield a higher ammonia concentration limit than the current projected ammonia limit based on acute toxicity. We used the EPA Guidance recommended minimum safety factor of 10% for ammonia.

Group 3 POCs included boron and TDS. There was sufficient, but not an abundance of, effluent data. Boron only has a 12-month average limit. There is little removal of boron at SLR, effluent boron concentrations average 86% of the limit, and effluent variability is small. However, the maximum effluent boron concentration is 95% of the limit. There are two IUs discharging notable average concentrations of boron. In both cases, a single maximum value caused the variability to exceed 100%. These high values occurred in 2008, addressed by the IUs after counseling by Oceanside, and that high level discharges has not been observed since. As such, we used the EPA Guidance recommended minimum safety factor of 10% for boron.

TDS has a short-term and long-term average limit, and the short-term is only 8% less. Effluent TDS variability is 10%, but the maximum effluent TDS concentration equaled the daily maximum limit. There are three major and two other significant TDS dischargers to SLR. Since the daily maximum and 12-month average limits are nearly the same, we decided to calculate the MAIL using each limit and two different safety factors, 10% for the long-term average and 20% for the short-term average.

MAHL Determination

By definition, the MAHL is the smallest AHL. There were no MAHLs based on process inhibition or the TTLC criteria. AHL for biosolids concentrations dictated the MAHL for 9 of the 12 Group 1 POCs at both plants; the six-month mean Ocean Plan goals dictated the other three Group 1 POCs. The SLR blower capacity and the LS design capacity provided the MAHL for BOD. Using the relationship between acute toxicity and ammonia that Oceanside developed, the current toxicity limit determined the MAHL for ammonia at SLR and LS. The AHL using boron recycled water limits became the MAHL. We calculated both AHLs using recycled water limits for TDS and used them in determining the MAIL.

MAIL Determination

RvL derived the MAIL from the EPA Guidance formula that uses the MAHL, safety factor, uncontrolled sources, hauled wastes, and a growth factor (see above for an explanation of the MAHL, safety factor and growth factor. We considered hauled wastes as part of the uncontrolled sources). Appendix A shows the spreadsheet calculations and Appendix B provides the derivation of the formula used for the calculation. We evaluated two methods to determine the load from uncontrolled sources. Method 1 used domestic and commercial concentration and flow data described above to calculate the uncontrolled load to the treatment plants. Method 2 used influent load derived from plant influent flow and concentration data less average IU loading.

We compared the results of the two methods. In general, we selected the higher load to represent the uncontrolled source load. For SLR, Method 1 result was higher than Method 2 for NH_3, Cd, CN, Cu, Hg, and Zn. For LS, Method 2 result was higher than Method 1 for all parameters except NH_3, Cu, and Zn. Domestic sample results for BOD average over 400 mg/L and considered unrepresentative particularly when compared to SLR and LS influent concentrations of 263 and 189 mg/L, respectively. As a result, we used Method 2 load results as the BOD of uncontrolled sources.

All AHL except BOD at SLR use concentration limits. Therefore, we used future flow and load conditions in the EPA Guidance formula for calculating MAIL. Appendix B presents the derivation of the EPA Guidance formula for MAIL into the one we used. As noted above, we used two discharge AHLs with different safety factors to determine the AHL and after subtracting the uncontrolled sources, we calculated the two allowable industrial loading. We compared the two results to determine the MAIL.

MAIL Allocation and Local Limits

Group 1 POC

Current Oceanside local limits for toxic pollutants appear to be similar to or the same as EPA pretreatment standards for metal finishing. They are applicable to all IUs whether discharging to SLR or LS. They are maximum concentration limits or daily mass emission rates based on total industrial flow and the concentration limits.

For simplicity and continuity, RvL wanted to allocate the MAIL as a uniform concentration limit for all IUs in the system. We first calculated the uniform concentration limits for each plant using total IU flow. With the exception of chromium, uniform concentration limits using total IU flow for SLR always was less than limits calculated for LS. SLR calculated local limits for arsenic, copper, and nickel limits were less than the current local limits by 66%, 2.4%, and 56%, respectively. The LS calculated local limit for arsenic is also lower than the current limit and is 52% less. There are no As or Ni data for IU discharging to LS. The one sample taken and analyzed for Cu at one of two permitted IUs discharging to LS was a non-detect result.

The new Cu limit would not affect any currently discharging IUs. Indigo Labs is the only IU discharging As and Ni above background levels and Deutsch discharges Ni above background levels. Indigo Labs is a non-categorical discharger and Deutsch is a metal finisher, categorical discharger. Indigo Labs discharges to SLR an average of 55 gpd. The new As and Ni limits are less than the maximum concentrations discharged by Indigo Labs although all data shows compliance with current limits. Deutsch discharges an average of about 127,700 gpd. The new Ni limit is less than the maximum concentrations discharge by Deutsch although all data shows compliance with the current Ni limit.

Using the total industrial flow to determine a uniform concentration local limit is a conservative approach. Using the flow of only those industries discharging the POC above background levels to calculate the local limit is an accepted EPA allocation method (industrial contributory method) and results in a higher limit. An As local limit based on industrial contributory flow solely from Indigo Labs is not practical due to the extremely low flow of Indigo Labs. Therefore, we base the calculation on flows from Deutsch, Elite Plating, and Indigo (0.129 MGD) assuming that these IUs could discharge As or a reasonably sized semi-conductor industry may wish to locate in Oceanside. This resulted in a calculated local limit of 0.91 mg/L As versus the current limit of 0.5 mg/L.

Using the industrial contributory flow for Ni, we calculated a local limit of 9.44 mg/L nickel (versus the current limit of 3.98 mg/L). Since Deutsch is a categorical discharger and their limit is that of the metal finishing limits of 3.98 mg/L as a daily maximum limit, the calculated local limit would be applicable to Indigo Labs at this time.

Group 2 POC

Currently, Oceanside has a narrative limit for "oxygen-demanding" pollutants that prohibits discharges of a high concentration or load that would cause interference to the POTW processes. Oceanside prohibits slug loads and defines them as a 15-minute release of a pollutant that exceeds 5 times the average discharge concentration or load (if continuously discharged). The ordinance also allows Oceanside to develop limits on a specific POC or IU to prevent pass-through or interference and four IUs have mass-based BOD limits. We recommend that the MAIL allocation use a two-step process: identify and permit high BOD dischargers, and then allocate the MAIL to those IUs.

We recommend that Oceanside define a significant BOD discharger as an IU with an average of 200 pounds per day (ppd) or more of BOD. This represents approximately 3.5% of the BOD loading to the LS plant. EPA Guidance suggests that POTW define a significant industrial user as one that discharges 5% or more of the plant load. There are only two current IU dischargers discharging more than 200 ppd, Hydranautics' average and permitted BOD discharge represents 5% and 24% of the 8,229 ppd MAIL, respectively. Mission Linen's average BOD discharge represents 5% of the MAIL to LS; Mission Linen currently does not have a BOD permit limit. Allocation of the entire MAIL to the two IUs potentially would allow these two companies to have a large impact on the treatment plants.

Hydranautics' current average BOD discharge is only about 24% of their current permit limit. However, if their biological treatment plant failed, their BOD (soluble) load may increase 10 to 20 fold and severely strain SLR treatment capabilities. Mission Linen uses physical/chemical treatment to remove TSS and particulate BOD and discharges approximately 5% of the LS BOD average daily loading. We assume that the treatment process only removes a small portion of the soluble (colloidal) BOD. If the Mission Linen treatment process failed, there would only be a slight increase in BOD going to the LS secondary treatment system. LS primary clarifiers would remove Mission Linen's particulate BOD, but the increase in TSS and/or BOD to the primary clarifiers and anaerobic digesters is not significant enough to cause a pass-through or interference impact on a short-term basis.

We recommend that Oceanside do the following:

- Continue to require and also collect periodic samples of all permitted IU's effluent and analyze it for BOD as well as calculate the average BOD mass loading to the sewer
- Determine those IUs that become subject to BOD mass limits
- Remove BOD mass-loading limits for IUs not discharging more than 200 ppd;
- Allow Hydranautics and Mission Linen to maintain their current BOD permit limits;
- Require Hydranautics to develop and submit for review a contingency plan to maintain compliance with their limits should their biological treatment system fail;
- Require all significant BOD IU dischargers to notify Oceanside if they predict a 20% or more increase in their average effluent mass discharge of BOD to the sewer.
- Establish 90% of the MAIL as available to currently discharging major and significant IUs. Ten percent of the MAIL is reserved for new significant IU and is above the estimated IU growth.
- For any IUs increase above 20% of their current loading, IUs must submit a study signed by a California registered professional engineer. IUs to implement BOD reduction(s) if found to be technically feasible and economically viable. The study would include:
    - Flow and BOD mass balance identifying and characterizing BOD sources
    - Alternatives for source control, pollution prevention, and pretreatment of BOD sources and/or IU effluent
    - Cost analysis of viable alternatives
    - Evaluation of costs and other factors
    - Recommendations for implementation

Hydranautics is the only significant ammonia discharger. The average ammonia discharge is 37% of their permitted maximum ammonia mass loading, 1,450 ppd. Maximum loadings occurred when Hydranautics had some operational problems with their biological treatment system. The treatment system converts amines in their raw wastewater to ammonia. It is unknown whether a significant portion of the ammonia is nitrified, but there is no de-nitrification process in their treatment system.

Although SLR is not designed to remove ammonia, there is 17% removal through the secondary treatment process. Therefore, we assumed that SLR nitrifies a portion of the flow. Because ammonia nitrification on a mass basis takes 4.5 times more oxygen than oxidation of BOD, nitrification places an additional load on the blowers. As noted above, the draft NPDES permit has eliminated the acute toxicity limit and is relying on the chronic toxicity test. Oceanside believes the ammonia concentration associated with this limit is higher than the existing. Oceanside is generating more data regarding the relationship between toxicity and ammonia.

If the Hydranautics treatment system failed, Hydranautics would discharge amines, and we believe that the SLR secondary treatment would convert most or all of the amines to ammonia. This potentially causes two problems. First, there is additional oxygen demand at SLR for amine conversion to ammonia and potentially more oxygen required for nitrifying 17% of the additional ammonia. Second, the discharge of high ammonia concentrations would increase effluent toxicity, a daily maximum limit.

Given these conditions, we recommend that Oceanside use an approach for controlling ammonia similar to that recommended for BOD:

- Continue to require and also collect periodic samples of all permitted IU's effluent where ammonia is greater than 30 mg/L and analyze it for ammonia and calculate the average ammonia mass loading to the sewer
- Determine those IUs that become subject to ammonia mass limits.
- Remove ammonia mass-loading limits for IUs not discharging more than 30 ppd and only permit IUs with discharges exceeding 30 mg/L and more than 30 ppd of ammonia (approximately 5% of LS influent loading).
- Establish 90% of the MAIL as available to currently discharging major and significant IUs. Ten percent of the MAIL is reserved for new significant IUs and is above the estimated IU's growth.

We recommend that Oceanside maintain their existing ammonia mass discharge limit for Hydranautics until they collect and analyze additional information. As part of the contingency plan prepared by Hydranautics, we recommend that they also submit:

- Current and projected (five year) theoretical maximum and average amine mass loading to the biological treatment system
- Biological treatment system influent and effluent mass loading of ammonia, nitrate, and nitrite
- Measured oxygen uptake rate of the raw wastewater to the biological treatment system

Group 3 POC

Boron and TDS local limits only apply to IUs discharging to SLR. For boron, we recommend allocating the SLR AIL as a uniform concentration limit by dividing the MAIL by the IU's flow. Oceanside monitors IU's TDS discharges, potable water, and recycled water to ascertain the current levels and trends. SLR provides recycled water to water a city golf course and provides water for Whalen Lake. Oceanside plans to increase its recycled water capacity for additional uses and to lessen the reliance on potable water for non-critical uses. To keep recycled water an attractive alternative to potable water, Oceanside wants to maintain the TDS levels near the current levels of approximately 1,000 mg/L and well below the 1,300 mg/L daily maximum limits.

There are three major and two significant TDS dischargers above 300 ppd (approximately 2.5% of the MAIL). The three major TDS dischargers (Deutsch, Hydranautics, and Genentech OCN) have average discharge concentrations above the recycled water daily maximum limit and the two significant TDS dischargers (California Creative Foods and Genentech OCP) have maximum concentrations that exceed the recycled water daily maximum limit.

During the study, RvL contacted Hydranautics and Genentech's consultant to discuss planned and future TDS loads. Hydranautics planned to increase its membrane testing. Since this includes testing seawater/brine membranes, we would predict an increase in TDS load to the sewer from their facility. Genentech plans the introduction of a new product that will increase the TDS load to the sewer by 7,700 to 8,800 ppd or up to a 400% increase. According to Oceanside, Deutsch may move, modify, or reduce their plating operations, therefore potentially reducing their TDS load to the sewer.

TDS Control Strategies

There are two main strategies to maintaining high-quality recycled water quality: source control by restricting industrial, commercial, and domestic TDS discharges to the sewer and SLR post treatment using nanofiltration or reverse osmosis (RO) to remove TDS. There could also be a combination of both strategies and variations. Oceanside is also committed to maintaining their current businesses and working with them to explore alternatives that allow Oceanside to maintain their goals and local businesses to expand. The premise is that by establishing local limits, Oceanside sets public policy for the good of the community and that IUs can discharge to the sewer provided they stay in compliance with their permit.

There is a broad range of source control strategies including:

- No increases above current levels
- Allocate 90% of the MAIL (reserves 10% for a new significant source of TDS)
- Allocate 90% of the MAIL and allow IUs step increases of up to 20% per year of the IU's allocation to their maximum allocation.
- For any IU to increase above 20% of their current loading, IU must submit a study signed by a California registered professional engineer. IU to implement TDS reduction(s) if found to be technically feasible and economically viable. The study would include:
    - Flow and TDS mass balance identifying and characterizing TDS sources
    - Alternatives for source control, pollution prevention, and pretreatment of TDS sources and/or IU's effluent
    - Cost analysis of viable alternatives
    - Evaluation of costs and other factors
    - Recommendations for implementation

SLR currently produces up to 0.5 million gallons per day (MGD) of recycled water through the granular media filters. Average demand is about 0.36 MGD. While Oceanside plans to expand the recycled water system, there are no firm projects to do so at this time. To maintain the high-quality recycled water at 1,000 mg/L of TDS and allow IU's to expand and discharge more TDS, Oceanside could treat tertiary effluent to remove TDS. Under this scenario, the AHL for process inhibition would replace the AHL for the recycled water limit as a much higher MAIL.

Assuming that Oceanside would allow all IUs a 400% increase, the SLR tertiary effluent would contain approximately 1,250 mg/L. Only a portion of the flow must go through the RO system to produce recycled water with 1,000 mg/L. Using a dual-pass reverse osmosis unit of 75% efficiency, the RO system would only need to process 0.126 MGD (88 gpm) to produce 0.468 MGD of recycled water at 1,000 mg/L.

Order-of-magnitude cost opinion for a 100-gpm pre-filtration, pH adjustment, chemical addition, membrane cleaning, and RO system is $2M with annual operating costs of less than $100,000. Depreciation would double the annual costs, and the result is a cost is $0.014 to $0.055/pound of TDS discharged from the five IUs. For example, under this scenario Genentech would pay $40,000 to $160,000 per year for 8,000 ppd of TDS. The lower number is if all IUs discharge 400% more TDS and the higher number is if only Genentech expanded by 400%.

This scenario assumes that Oceanside would fund the installation and be liable for the expense even if IUs leave Oceanside potentially negating the use of the RO system. Since the RO system is solely for the convenience of the IUs, we believe that it is preferable to get the IUs to agree that this scenario is preferred over source control. The five significant IUs would pay a one-time assessment in proportion to their allocated or requested TDS discharge. IUs would then pay operating costs in proportion to their TDS discharge.

TDS Allocation:

If the IUs and Oceanside agree to use SLR post-treatment strategy, the TDS process inhibition will become the MAHL and the MAIL will significantly increase. There would be no immediate need to allocate the MAIL. Using SLR source control strategy (and similar to BOD and ammonia local limits), we believe that mass-based limits are appropriate for TDS. EPA Guidance suggests three allocation alternatives, and RvL added a fourth:

- Mass proportional—the allowable mass discharge for an IU equals the proportion of the IU's current loading to the total IU loading times the MAIL above background levels
- Case-by-case—limits based on the IUs current discharge, need for the continued allocation, ability to apply source control or pretreatment or other factors deemed appropriate. To avoid allocating more than the MAIL, Oceanside should develop a system to track the allocations. We believe that if Oceanside uses this method, they should request similar information from all significant IUs so that Oceanside uses best available information to allocate the MAIL or portion thereof.
- Pretreatment or Effluent Trading—in accordance with 40 CFR 403 and Oceanside's NPDES permit (see http://www.epa.gov/owow/watershed/trading/finalpolicy2003.html), Oceanside would allocate the MAIL (for example) based on their current discharge loading. IUs not needing their allocation could sell it to another IU. This would allow reductions created by one IU through source control, pollution prevention, and/or pretreatment for use by another IU. Oceanside would administer the program. This allows market forces to determine the economics of purchasing credits or adding equipment to meet discharge limits. An example of this type of trading is in the City of Modesto for molybdenum.
- First Come, First Served with Conditions—As described above, allow IUs to increase their mass loading to the sewer up to 20% above current levels. Any increase above this amount requires that the IU perform a study to determine whether source control, pollution prevention, and/or pretreatment are technically feasible and economically viable in reducing TDS and implement the recommendations if possible. If the average TDS load were less than 70% of the predicted load or the previous year's load, Oceanside would reduce the permitted TDS load by 10%.

The strategy and allocation finally chosen by Oceanside will depend on many factors including environmental, political, short-term and long-term compliance strategies, and economic factors to name a few. Two alternatives offer the most flexibility to Oceanside IUs while still producing a high-quality recycled water quality: SLR post treatment and First Come, First Served with Conditions. The former requires IUs' consensus and monetary resources and that Oceanside be willing to be responsible for design, construction, and operational, administering the SLR costs and IU fees, and the complication of operating additional equipment. The second alternative allows those rapidly expanding IUs to discharge TDS, but requires them to examine closely their own production and disposal processes for economical ways to be environmentally responsible and reduce their TDS discharge.

We recommend a similar approach to BOD and ammonia for developing TDS local limits:

- Continue monitoring all IUs for TDS concentrations and flow.
- Establish a threshold load (e.g. 300 ppd) to permit and limit IU TDS discharges.
- Establish 90% of the MAIL as available to currently discharging major and significant IUs. Ten percent of the MAIL is reserved for new significant IUs and is above the estimated IU's growth.
- Use the First Come, First Served with Conditions allocation method to allow industries to increase their TDS discharge to the sewer responsibly.

RECOMMENDATIONS

Local limits protect the POTW from pass-through and interference, discharge violations, and disallowance of beneficial reuse of the effluent and biosolids. Oceanside last adopted local limits in 1982. The service area, collection system, SLR and LS treatment plants, industrial users and discharge requirements have significantly changed since then. While the current local limits have protected the treatment plant, there was a need to update and develop technically based local limits. The recommended local limits for Group 1 POC (toxic constituents) and boron are all higher than the current local limits. Local limits that are higher than categorical limits only apply to non-categorical IUs and certain categorical IUs. For example, metal finishers do not have a discharge limit for arsenic, but would have to meet local limit for arsenic. However, it is unlikely that these categorical IUs will discharge arsenic above background levels. We do not expect any change in effluent or biosolids quality or the ability of Oceanside to meet their performance goals due to these changes.

Oceanside individually permitted IU's with significant discharges of Group 2 POC with mass-based limits. We recommend that Oceanside only allocate 90% of the MAIL for BOD and ammonia leaving 10% for a major new IU. We also recommend that Oceanside continue testing IUs for BOD and ammonia, define and permit IUs with significant BOD and ammonia discharges, retain current permit limits on those significant IUs, and that any significant discharger that increase their discharge by 20% of more notify Oceanside of their intent. Because Hydranautics is such a significant source of BOD and ammonia and that if their biological treatment system malfunctioned, Hydranautics discharge could affect SLR. We recommend that Hydranautics be required to prepare and submit a contingency plan for their biological treatment system.

RvL recommends that Oceanside begin regulating IUs with significant TDS discharges to protect the high quality of their recycled water. We presented two basic strategies and six alternatives for Oceanside's consideration. We recommend an approach similar to regulating BOD and ammonia, monitor IUs for

TDS and define and permit significant dischargers. Similarly, Oceanside should only allocate up to 90% of the MAIL to allow a significant discharger to enter Oceanside's system provided they also are using pollution prevention, source control and pretreatment to limit their discharge. The strategy would also allow significant dischargers to increase their TDS discharge, but only after conducting a study and implementing technically viable and economically feasible source control strategies. Table 7 presents the current and recommended local limits.

Table 7. Oceanside Current and Proposed Local Limits

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
Arsenic	As	mg/L	0.5	0.91	
Boron	B	mg/L	1.0	2.7	SLR only local limit
Cadmium	Cd	mg/L	0.11	0.15	
Chromium	Cr	mg/L	2.77	15	
Copper	Cu	mg/L	3.38	3.3	
Cyanide	CN	mg/L	1.2	3.9	
Grease and Oil		mg/L	100		Eliminate; covered by narrative limit in SUO
Lead	Pb	mg/L	0.69	0.94	
Mercury	Hg	mg/L	0.05	0.057	
Molybdenum	Mo	mg/L		0.56	New limit per EPA guidelines
Nickel	Ni	mg/L	3.98	9.3	
Phenolic Compounds		mg/L	2.0		No data for local limit; eliminate as a local limit
Selenium	Se	mg/L		0.34	New limit per EPA guidelines
Silver	Ag	mg/L	0.43	3.4	
Sulfide	S^{2-}	mg/L	1.0	1.0	Retain existing local limit
Total Metals		mg/L	10.5		Eliminate; no need for (aggregate) POC limit
Total Toxic Organics	TTO	mg/L	2.13		Eliminate; covered by narrative limit in SUO
Zinc	Zn	mg/L	2.61	4.2	

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
BOD_5	BOD	ppd	Individual permits	MAIL of 6,500 ppd; maintain current limits for 2 IUs	Monitor IUs; track total BOD versus MAIL; permit IUs above 200 ppd (2); eliminate limits for other IUs; require contingency plan for Hydranautics; pollution prevention report required for increase of 20% above current limit.
Ammonia	NH_3	ppd	Individual permits	MAIL of 1,200 ppd Maintain current limit for 1 IU; eliminate limits for other IUs	Monitor IUs; track total NH_3 versus MAIL and NPDES permit changes; permit IUs above 30 ppd (1); require contingency plan for Hydranautics; pollution prevention report required for increase of 20% above current limit
Total Dissolved Solids	TDS	ppd	None	MAIL for SLR-19,100 ppd	SLR only local limit; monitor IUs; track total TDS versus MAIL; allow IUs to expand as needed up to the MAIL; pollution prevention report required for increase of 20% above current limit

PUBLIC PARTICIPATION

EPA regulations consider development and implementation of local limits as a major change to the Oceanside Pretreatment Program and require public participation as part of the adoption process. Oceanside informed the permitted IUs about the local limits study during a Sewer Use Ordinance Workshop on October 1, 2009. They also made a formal solicitation to major dischargers regarding their 5-year projection of TDS loading to the sewer. During the course of the study, RvL also contacted Hydranautics and Genentech's consultant regarding specifics of their expansion plans.

After Oceanside reviews and receives the final local limits study from RvL, Oceanside plans to conduct a Local Limits Workshop to review the study results, recommendations, and implementation plan, and to solicit IUs' input. Oceanside will address IUs comments and submit to RWQCB for review and approval the final Local Limits Study and transmittal letter that specifies the local limits they plan to adopt. Following RWQCB approval, Oceanside staff will present the local limits to the Public Utilities Commission during a published and public meeting. Assuming no significant changes, Oceanside staff will then present it to the Oceanside City Council at a published and public meeting for discussion and adoption into the City Code.

Appendix A—Spreadsheet Calculations

- OOO Flow Balance
- SLR Mass Balance and POC Percent Removal
- LS Mass Balance and POC Percent Removal
- Loading from Uncontrolled Sources
- Removal Efficiency Calculations
- SLR and LS Calculated Allowable Loadings
- LS AHL, MAHL, and MAIL Calculations
- SLR AHL, MAHL, and MAIL Calculations
- Local Limits Calculations

City of Oceanside - Development of Technically Based Local Limits

Oceanside Outfall - Flow Balance

		SLR	LS	RO	Genen	Total	Oceanside outfall, 2009	Difference
Total		3,497	1,081	213			4,811	
Max		12.24	4.50	1.30	0.199		18.530	
Min		5.78	2.35	0.06	0.085		7.640	
Median		9.56	2.96	0.55	0.109		13.200	
Avg.		9.58	2.96	0.58	0.115	13.239	13.182	(0.057)
Std. Dev		0.93	0.18	0.34	0.027		1.158	
% Variability		10%	6%	59%	23%		9%	
Range average (Ave ± 2*SD)	+	11.44	3.32	1.27	0.168		15.498	
	-	7.72	2.60	-0.11	0.062		10.866	

San Luis Rey Water Reclamation Facility - Flow Balance

Assumption: Effluent flowmeter is more accurate than influent flowmeter.

INFLUENT	Influent	Potable Water	Reclaimed Water	Effluent	Boisolids (Based on Daily Average)			Total	
	MGD	MGD	MGD	MGD	MGD	lbs/day	%	MGD	
Average	9.01			9.58		72,988	23%		
Maximum	10.82			12.24		501,700	26%		
Minimum	7.35			5.78		47,340	18%		
Median	8.95			9.56		100,040	23%		
Standard Deviation	0.60			0.93		45,093	1%		
Percent Variability	7%			10%		46%	5%		
Range (Avg ± 2*SD)	10.22			11.44		187,415	26%		
	7.81			7.72		7,042	21%		
Adjustment Factor	1.2532								Difference
Plant Average	9.7670	0.0900	0.2400	9.5800	0.0570	72,988	23%	9.8570	0.0000
Dry Biosolids (lbs/day)					16,918.13				
Biosolids SG	**1.02**								

Industrial flow 0.693 MGD
Domestic and commerial flow 9.074 MGD

Domestic flow 97% of dom and com flow to SLR
Commercial flow 3% of dom and com flow to SLR

Las Salina Wastewater Treatment Facility - Flow Balance

Assumption: Effluent flowmeter is more accurate than influent flowmeter.

INFLUENT	Influent	Effluent	Boisolids (Based on Daily Average)			Total	
	MGD	MGD	MGD	lbs/day	%	MGD	
Average	2.96	2.77		19,351	19%		
Maximum	4.50	3.85		58,000	20%		
Minimum	2.35	1.76		42,800	18%		
Median	2.96	2.76		50,940	19%		
Standard Deviation	0.18	0.23		1,652	1%		
Percent Variability	6%	8%		9%	3%		
Range (Avg ± 2*SD)	3.32	3.24		22,656	20%		
	2.60	2.31		16,046	18%		
Adjustment Factor	-0.9585						Difference
Plant Average	2.7863	2.7743	0.0121	19,351	18.82%	2.7864	(0.0001)
Dry Biosolids (lb/day)					3,642.18		

Domestic flow 89% of dom and com flow to LaS
Commercial flow 11% of dom and com flow to LaS

Industrial flow 0.0815 MGD
Dom + Com flow 2.705 MGD

City of Oceanside - Development of Technically Based Local Limits San Luis Rey Water Reclamation Facility

Mass Balance Calculations from Sampling Results

Sampling Location		Flow (MGD)	NH4+	Ag mg/L	As mg/L	B mg/L	Cd mg/L	CN mg/L	Cr mg/L	Cu mg/L	Fe mg/L	Hg mg/L	Mn mg/L	Mo mg/L	Ni mg/L	Pb mg/L	Se mg/L	Zn mg/L	Cl- mg/L	F mg/L	NO3- mg/L	SO4 2- mg/L	TDS mg/L
INFLUENT																							
Average		9.01	40.94	0.0073	0.0070	0.4413	0.0015	0.0035	0.0158	0.0600	3.4853	0.0001	0.2527	0.0120	0.0215	0.0047	0.0093	0.1368	233.33	0.5133	0.3100	253.33	992
Maximum		10.82	45.00	0.0150	0.0070	0.6000	0.0020	0.0073	0.0210	0.0700	9.4000	0.0002	0.5000	0.0160	0.0490	0.0059	0.0100	0.1590	280.00	0.5400	0.4100	280.00	1,060
Minimum		7.35	36.40	0.0020	0.0070	0.3500	0.0009	0.0022	0.0050	0.0500	0.6410	0.0001	0.0980	0.0098	0.0081	0.0040	0.0080	0.1100	200.00	0.5000	0.2500	220.00	924
Median		8.95	42.00	0.0060	0.0070	0.4140	0.0015	0.0022	0.0185	0.0600	1.9500	0.0001	0.1600	0.0110	0.0145	0.0044	0.0095	0.1390	220.00	0.5000	0.2700	260.00	989
Standard Deviation		0.60	3.31	0.0055	-	0.0937	0.0006	0.0026	0.0075	0.0095	3.9914	0.0001	0.2164	0.0029	0.0187	0.0009	0.0010	0.0221	41.63	0.0231	0.0872	30.55	41
Percent Variability		7%	0.08	0.7586	-	0.2124	0.4119	0.7338	0.4790	0.1587	1.1452	0.4848	0.8566	0.2407	0.8676	0.1928	0.1035	0.1615	0.18	0.0450	0.2812	0.12	4%
Range (Avg ± 2*SD)	+	10.22	47.55	0.0183	0.0070	0.6288	0.0027	0.0086	0.0308	0.0790	11.4680	0.0003	0.6855	0.0177	0.0589	0.0064	0.0112	0.1809	316.60	0.5595	0.4844	314.43	1,074
	-	7.81	34.32	(0.0038)	0.0070	0.2539	0.0003	(0.0016)	0.0007	0.0410	(4.4975)	0.0000	(0.1802)	0.0062	(0.0158)	0.0029	0.0073	0.0926	150.07	0.4671	0.1356	192.23	909
Adjustment Factor		1.25							-		-			-	-								
Plant Average		9.77	40.94	0.0073	0.0070	0.4413	0.0015	0.0035	0.01575	0.06000	3.48525	0.0001	0.25267	0.01195	0.0215	0.0047	0.00925	0.13675	233.33	0.51333	0.31000	253.33	992
Total, lbs/day			3,335	0.5906	0.5702	35.95	0.1201	0.2831	1.28	4.89	283.90	0.0108	20.58	0.9734	1.7534	0.3788	0.7535	11.14	19,007	41.81	25.25	20,636	80,789
EFFLUENT																							
Average		9.58	34.80	0.0040	0.0070	0.4292	0.0015	0.0025	0.0030	0.0028	0.1700	0.0001	0.1670	0.0088	0.0091	0.0037	0.0090	0.0081	250.00	0.5067	26.67	260.00	989
Maximum		12.24	43.00	0.0060	0.0070	0.4710	0.0020	0.0032	0.0040	0.0030	0.1800	0.0001	0.2200	0.0150	0.0200	0.0040	0.0100	0.0092	270.00	0.5200	30.00	280.00	1,070
Minimum		5.78	25.30	0.0020	0.0070	0.3800	0.0009	0.0022	0.0020	0.0020	0.1500	0.0001	0.0910	0.0050	0.0040	0.0032	0.0080	0.0060	240.00	0.4900	23.00	250.00	925
Median		9.56	34.25	0.0040	0.0070	0.4240	0.0015	0.0022	0.0030	0.0030	0.1800	0.0001	0.1900	0.0076	0.0062	0.0037	0.0090	0.0085	240.00	0.5100	27.00	250.00	984
Standard Deviation		0.93	5.42	0.0023	-	0.0316	0.0006	0.0005	0.0012	0.0005	0.0173	0.0000	0.0675	0.0044	0.0074	0.0004	0.0012	0.0015	17.32	0.0153	3.51	17.32	47
Percent Variability		10%	0.16	0.5774	-	0.0737	0.4380	0.2041	0.3849	0.1818	0.1019	0.2857	0.4042	0.4961	0.8107	0.1130	0.1283	0.1819	0.07	0.0301	0.13	0.07	0
Range (Avg ± 2*SD)		11.44	45.65	0.0086	0.0070	0.4925	0.0027	0.0035	0.0053	0.0038	0.2046	0.0001	0.3020	0.0175	0.0239	0.0045	0.0113	0.0110	284.64	0.5372	33.69	294.64	1,083
		7.72	23.95	(0.0006)	0.0070	0.3659	0.0002	0.0015	0.0007	0.0018	0.1354	0.0000	0.0320	0.0001	(0.0057)	0.0028	0.0067	0.0051	215.36	0.4761	19.64	225.36	894
Adjustment Factor																							
Plant Average		9.580	34.80	0.0040	0.0070	0.4292	0.0015	0.0025	0.0030	0.0028	0.1700	0.0001	0.1670	0.0088	0.0091	0.0037	0.0090	0.0081	250.00	0.5067	26.67	260.00	988.50
Total, lbs/day			2,780	0.3196	0.5593	34.29	0.1159	0.1957	0.2397	0.2197	13.58	0.0070	13.34	0.7011	0.7271	0.2916	0.7191	0.6432	19,974	40.48	2,131	20,773	78,978
	LB/DAY			mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
BIOSOLIDS																							
Average	72,988	0.037015		4.25	3.98	35.00	3.93	17.50	79.25	309.67	48,667	0.85	607.50	17.00	51.33	9.58	7.65	671.00	933.33	16.33		3,633.33	988.50
Maximum	501,700	0		7.40	7.30	40.00	9.10	20.00	129.00	379.00	54,000	1.40	630.00	19.00	86.00	15.00	15.00	800.00	940.00	19.00		4,900.00	
Minimum	47,340	0		2.20	3.20	32.00	1.50	13.00	44.00	240.00	45,000	0.60	580.00	15.00	29.00	6.60	4.30	530.00	920.00	14.00		1,800.00	
Median	100,040	0		3.70	3.65	34.00	3.75	18.50	74.00	310.00	47,000	0.82	610.00	17.00	46.50	8.85	6.40	673.00	940.00	16.00		4,200.00	
Standard Deviation	45,093	0		2.22	1.07	3.83	2.18	3.32	29.98	39.46	4,726	0.21	20.62	1.21	21.23	2.49	3.80	78.08	11.55	2.52		1,625.83	47
Percent Variability	46%	0%		0.52	0.27	0.11	0.55	0.19	0.38	0.13	0	0.25	0.03	0.07	0.41	0.26	0.50	0.12	0.01	0.15		0.45	4.79%
Range (Avg ± 2*SD)	187,415	0		8.68	6.13	42.66	8.29	24.13	139.21	388.59	58,118	1.28	648.73	19.41	93.79	14.56	15.24	827.16	956.43	21.37		6,885.00	
	7,042	0		(0.18)	1.84	27.34	(0.43)	10.87	19.29	230.75	39,215	0.43	566.27	14.59	8.88	4.59	0.06	514.84	910.24	11.30		381.67	
Adjustment Factor																							
Plant Average	72,988	0.03702		4.25	3.98	35.00	3.93	17.50	79.25	309.67	48,667	0.85	607.50	17.00	51.33	9.58	7.65	671.00	933.33	16.33	-	3,633	988.50
Total, lbs/day				0.0719	0.0674	0.5921	0.0665	0.2961	1.34	5.24	823.35	0.0144	10.28	0.2876	0.8685	0.1620	0.1294	11.35	15.79	0.2763	-	61.47	54
Average sludge content	23.2%																						
Specific gravity of sludge	1.02																						
CHEMICAL ADDITION				lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Secondary Treatment									0.27		663.36								1,410.02				2,255.04
Tertiary Treatment																			39.15			0.76	73.11
Total, lbs/day				0	0	0	0	0	0.2719821	0	663.36	0	0	0	0	0	0	0	1,449.17	0	0	0.7598361	2,328.15

City of Oceanside - Development of Technically Based Local Limits San Luis Rey Water Reclamation Facility

Mass Balance Calculations from Sampling Results

Sampling Location	Flow (MGD)	NH4+	Ag	As	B	Cd	CN	Cr	Cu	Fe	Hg	Mn	Mo	Ni	Pb	Se	Zn	Cl-	F	NO3-	SO4 2-	TDS
RECLAIMED WATER		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Average			0.0040	0.0080	0.3587	0.0096		0.0027	0.0029	0.0613	0.0001	0.0615	0.0060	0.0040	0.0035	0.0093	0.0100	176.64	0.3783	0.01	141.46	1,033
Maximum			0.0060	0.0100	0.4700	0.0260		0.0040	0.0036	0.1070	0.0001	0.0970	0.0060	0.0040	0.0040	0.0100	0.0140	294.00	0.6430	0.01	262.00	1,300
Minimum			0.0020	0.0070	0.0100	0.0009		0.0020	0.0020	0.0060	0.0001	0.0020	0.0060	0.0040	0.0030	0.0080	0.0040	10.00	0.0090	0.01	10.00	815
Median			0.0040	0.0070	0.4225	0.0020		0.0020	0.0030	0.0765	0.0001	0.0720	0.0060	0.0040	0.0034	0.0100	0.0120	254.50	0.5000	0.01	198.00	1,020
Standard Deviation			0.0028	0.0017	0.1638	0.0142		0.0012	0.0008	0.0381	0.0000	0.0329			0.0005	0.0012	0.0053	129.58	0.2819	-	110.51	100
Percent Variability			71%	22%	46%	147%		43%	28%	62%	35%	54%			15%	12%	53%	73%	75%	0%	78%	10%
Range (Avg ± 2*SD)			0.0097	0.0115	0.6864	0.0380		0.0050	0.0045	0.1375	0.0001	0.1273			0.0045	0.0116	0.0206	435.80	0.9422	0.01	362.48	1,233
			(0.0017)	0.0045	0.0311	(0.0187)		0.0004	0.0013	(0.0150)	0.0000	(0.0043)			0.0025	0.0070	(0.0006)	(82.51)	(0.1855)	0.01	(79.55)	834
Adjustment Factor																						
Plant Average	0.240		0.0040	0.0080	0.3587	0.0096		0.0027	0.0029	0.0613	0.0001	0.0615	0.0060	0.0040	0.0035	0.0093	0.0100	176.64	0.3783	0.0100	141.46	1,033
Total			0.0080	0.0160	0.7180	0.0193	-	0.0053	0.0057	0.1226	0.0002	0.1230	0.0120	0.0080	0.0069	0.0187	0.0200	353.57	0.7573	0.0200	283.15	2,069
Mass Balance 2 (Influent + Chemical Addition = Effluent+ Biosolids)																						
Influent	9.77	3,335	0.5906	0.5702	35.95	0.1201	0.2831	1.28	4.89	283.90	0.0108	20.58	0.9734	1.7534	0.3788	0.7535	11.14	19,007	41.81	25.25	20,636	80,789
Chemical Addition	-	-	-	-	-	-	-	0.2720	-	663.36	-	-	-	-	-	-	-	1,449	-	-	0.7598	2,328
Mass Loading In, lb/day		3,335	0.5906	0.5702	35.95	0.1201	0.2831	1.55	4.89	947	0.0108	20.58	0.9734	1.7534	0.3788	0.7535	11.14	20,456	41.81	25.25	20,637	83,117
Effluent (Secondary)	9.58	2,780	0.3196	0.5593	34.29	0.1159	0.1957	0.2397	0.2197	13.5825	0.01	13.3428	0.7011	0.7271	0.2916	0.7191	0.6432	19,974	40.48	2,131	20,773	78,978
Reclaimed Water	0.2400	-	0.0080	0.0160	0.7180	0.0193	-	0.0053	0.0057	0.1226	0.0002	0.1230	0.0120	0.0080	0.0069	0.0187	0.0200	353.57	0.7573	0.0200	283.15	2,069
Biosolids	0.03702	-	0.0719	0.0674	0.5921	0.0665	0.2961	1.34	5.24	823.35	0.01	10.2778	0.2876	0.8685	0.1620	0.1294	11.35	15.79	0.2763	-	61.47	54.34
Mass Loading Out, lb/day		2,780	0.3995	0.6427	35.60	0.2017	0.4918	1.59	5.46	837.05	0.02	23.74	1.00	1.60	0.46	0.87	12.02	20,344	41.51	2,131	21,118	81,101
Loading in - Loading out, lb/day		554	0.1911	(0.0725)	0.35	(0.0815)	(0.2088)	(0.0309)	(0.5770)	110.2076	(0.0108)	(3.1622)	(0.0273)	0.1498	(0.0818)	(0.1137)	(0.8760)	112.14	0.2997	(2,105.36)	(481.37)	2,016
% difference		18.13%	38.60%	-11.95%	0.98%	-50.67%	-53.88%	-1.97%	-11.15%	12.35%	-67.02%	-14.27%	-2.77%	8.93%	-19.49%	-14.03%	-7.57%	0.55%	0.72%	-195.31%	-2.31%	2.46%
Plant removal efficiency through 2°		17%	46%	2%	5%	4%	31%	85%	96%	99%	35%	35%	28%	59%	23%	5%	94.23%	2%	3%	-8337%	-1%	5%

Tertiary Removal is equal to the tertiary system influent minus effluent divided by influent.
Influent concentration is secondary effluent. Influent flow must be greater than effluent as filter backwash is discharged to secondary clarifiers. POC are B, Cl, SO4, and TDS

Sampling Location	Flow (MGD)	NH4+	Ag	As	B	Cd	CN	Cr	Cu	Fe	Hg	Mn	Mo	Ni	Pb	Se	Zn	Cl-	F	NO3-	SO4 2-	TDS
Influent-lb/day	0.2616				0.9364					0.3709		0.3644						545	1.11	58	567	2,157
Chemical Addition-lb/day					-					-		-						39	-	-	1	73
Mass In, lbs/day					0.9364					0.3709		0.3644						585	1.11	58	568	2,230
Reclaimed Water	0.240				0.7180					0.1226		0.1230						354	0.76	0.02	283	2,069
Mass Out in RW, lbs/day					0.7180					0.1226		0.1230						354	0.76	0.02	283	2,069
Tertiary removal efficiency					23%					67%		66%						40%	31%	100%	50%	7.23%
Overall Removal Efficiency					25%					99.5%		78%						36%	32%	97%	49%	7.13%

City of Oceanside - Development of Technically Based Local Limits La Salina Wastewater Treatment Plant

Mass Balance Calculations from Sampling Results

Sampling Location		Flow (MGD)	Ag	As	B	Cd	CN	Cr	Cu	Fe	Hg	Mn	Mo	Ni	Pb	Se	Zn
			mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
INFLUENT																	
Average		2.96	0.0049	0.0074	0.4408	0.0017	0.0028	0.0057	0.0475		0.0001		0.0074	0.0082	0.0064	0.0086	0.1733
Maximum		4.50	0.0060	0.0100	0.5700	0.0020	0.0045	0.0099	0.1100		0.0002		0.0110	0.0160	0.0200	0.0100	0.4100
Minimum		2.35	0.0020	0.0070	0.3700	0.0009	0.0022	0.0020	0.0048		0.0001		0.0035	0.0035	0.0030	0.0080	0.0790
Median		2.96	0.0060	0.0070	0.4350	0.0020	0.0022	0.0048	0.0420		0.0001		0.0075	0.0066	0.0040	0.0080	0.1400
Standard Deviation		0.18	0.0020	0.0011	0.0723	0.0005	0.0012	0.0029	0.0320		0.0001		0.0037	0.0045	0.0061	0.0010	0.1091
Percent Variability		0.06	40%	15%	16%	32%	41%	50%	67%		47%		50%	55%	96%	11%	63%
Range (Avg ± 2*SD)		3.32	0.0088	0.0097	0.5854	0.0028	0.0051	0.0115	0.1116		0.0002		0.0147	0.0171	0.0187	0.0105	0.3915
		2.60	0.0010	0.0052	0.2963	0.0006	0.0005	(0.0000)	(0.0165)		0.0000		0.0000	(0.0008)	(0.0059)	0.0066	(0.0449)
Adjustment Factor		-0.9585	-					0.6000	0.5000		0.5000		-	0.6000	-		(0.2500)
Plant Average		2.7863	0.0049	0.0074	0.4408	0.0017	0.0028	0.0074	0.0636	-	0.0001	-	0.0074	0.0108	0.0064	0.0086	0.1460
Influent loading (lbs/day)			0.1129	0.1726	10.2439	0.0392	0.0645	0.1731	1.4769	-	0.0035	-	0.1714	0.2517	0.1487	0.1992	3.3930
EFFLUENT																	
Average		2.77	0.0049	0.0073	0.4202	0.0017	0.0026	0.0029	0.0031		0.0001		0.0070	0.0058	0.0041	0.0086	0.0171
Maximum		3.85	0.0060	0.0089	0.5100	0.0020	0.0039	0.0043	0.0048		0.0001		0.0090	0.0090	0.0074	0.0100	0.0260
Minimum		1.76	0.0020	0.0070	0.3500	0.0009	0.0022	0.0020	0.0020		0.0001		0.0050	0.0040	0.0030	0.0080	0.0070
Median		2.76	0.0060	0.0070	0.4250	0.0020	0.0022	0.0020	0.0030		0.0001		0.0070	0.0055	0.0040	0.0080	0.0190
Standard Deviation		0.23	0.0020	0.0007	0.0566	0.0005	0.0009	0.0011	0.0010		0.0000		0.0018	0.0017	0.0016	0.0010	0.0063
Percent Variability		0.08	40%	10%	13%	32%	32%	39%	32%		22%		26%	29%	38%	11%	37%
Range (Avg ± 2*SD)		3.24	0.0088	0.0087	0.5334	0.0028	0.0043	0.0052	0.0050		0.0001		0.0107	0.0093	0.0072	0.0105	0.0298
		2.31	0.0010	0.0058	0.3069	0.0006	0.0009	0.0006	0.0011		0.0001		0.0033	0.0024	0.0009	0.0066	0.0045
Adjustment Factor							-										-
Plant Average		2.77	0.0049	0.0073	0.4202	0.0017	0.0026	0.0029	0.0031	-	0.0001	-	0.0070	0.0058	0.0041	0.0086	0.0171
Effluent loading			0.1124	0.1682	9.7217	0.0390	0.0607	0.0671	0.0711	-	0.0021	-	0.1614	0.1352	0.0939	0.1983	0.3966
	%	LB/DAY	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
BIOSOLIDS																	
Average	18.82%	19,351	4.25	4.38		1.45	2.40	34.9	348		0.375		10.0	27.3	16.1	7.7	795
Maximum	20%	58,000	8.60	6.60		2.20	3.60	54.0	420		0.930		15.0	35.0	21.0	13.0	1,000
Minimum	18%	42,800	0.98	2.00		0.49	1.40	7.3	63		0.170		2.0	5.6	2.9	2.0	190
Median	19%	50,940	3.70	4.40		1.40	2.20	37.0	380		0.265		10.0	29.0	17.0	7.9	890
Standard Deviation	1%	1,652	3.61	0.98		0.46	1.11	11.9	91		0.269		3.0	7.3	4.4	3.2	272
Percent Variability	3%	9%	85%	22%		32%	46%	34%	26%		72%		30%	27%	27%	42%	34%
Range (Avg ± 2*SD)	20%	22,656	11.46	6.34		2.38	4.63	58.65	530		0.913		16.0	42.0	24.9	14.1	1,338
	18%	16,046	(2.97)	2.43		0.53	0.17	11.09	167		(0.163)		3.9	12.6	7.3	1.2	251
Adjustment Factor		0															0
Plant Average	18.82%	19,351	4.25	4.38	-	1.45	2.40	34.9	348	-	0.38	-	9.96	27.28	16.07	7.68	795
Total (lbs/day)			0.015461	0.01597	0	0.005292	0.008741	0.1270001	1.26860013	0	0.001366	0	0.0362817	0.0993475	0.058527	0.027989	2.894134139

City of Oceanside - Development of Technically Based Local Limits La Salina Wastewater Treatment Plant

Mass Balance Calculations from Sampling Results

Sampling Location	Flow (MGD)	Ag	As	B	Cd	CN	Cr	Cu	Fe	Hg	Mn	Mo	Ni	Pb	Se	Zn
		lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
CHEMICAL ADDITION																

Mass Balance 2 (Influent + Chemical Addition = Effluent+ Biosolids)

	Flow (MGD)	Ag	As	B	Cd	CN	Cr	Cu	Fe	Hg	Mn	Mo	Ni	Pb	Se	Zn
Influent	2.7863	0.1129	0.1726	10.2439	0.0392	0.0645	0.1731	1.4769	-	0.0035	-	0.1714	0.2517	0.1487	0.1992	3.3930
Chemical Addition	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mass Loading In	2.7863	0.1129	0.1726	10.2439	0.0392	0.0645	0.1731	1.4769	-	0.0035	-	0.1714	0.2517	0.1487	0.1992	3.3930
Effluent	2.7743	0.1124	0.1682	9.7217	0.0390	0.0607	0.0671	0.0711	-	0.0021	-	0.1614	0.1352	0.0939	0.1983	0.3966
Biosolids	0.0121	0.0155	0.0160	-	0.0053	0.0087	0.1270	1.2686	-	0.0014	-	0.0363	0.0993	0.0585	0.0280	2.8941
Mass Loading Out	2.7864	0.1278	0.1842	9.7217	0.0443	0.0695	0.1941	1.3397	-	0.0035	-	0.1977	0.2345	0.1524	0.2263	3.2908
Loading in - Loading out	(0.00)	(0.01)	(0.01)	0.52	(0.01)	(0.00)	(0.02)	0.14	-	(0.00)	-	(0.03)	0.02	(0.00)	(0.03)	0.10
% difference	0.00%	-12%	-6%	5%	-12%	-7%	-11%	10%	#DIV/0!	0%	#DIV/0!	-14%	7%	-2%	-13%	3%
Plant removal efficiency		0%	3%	5%	0%	6%	61%	95%	#DIV/0!	39%	#DIV/0!	6%	46%	37%	0%	88%

City of Oceanside - Development of Technically Based Local Limits

SLR Background Concentration and Domestic and Commercial Loading

Domestic flow 97% of dom and com flow to SLR
Commercial flow 3% of dom and com flow to SLR

Sampling Location	Flow (MGO)	NH4	Ag	As	B	Cd	CN	Cr	Cu	Fe	Hg	Mn	Mo	Ni	Pb	Se	Zn	Cl-	F	NO3-	SO4 2-	TDS	BOD
		mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Dom + Com flow	9.0739																						
Commercial L1 Avg Conc.		36.33	0.0003	0.0022	0.4067	0.0006	0.0022	0.0023	0.0367	0.7133	0.0001	0.0277	0.0057	0.0043	0.0019	0.0023	0.1633	130	0.5800	0.2633	217	790	253
Domestic S1 Avg Conc.		35.33	0.0003	0.0022	0.4567	0.0010	0.0022	0.0026	0.045	0.2267	0.0001	0.056	0.0063	0.0047	0.0017	0.0036	0.1533	200	0.4233	0.3300	240	917	237
S4 Avg Conc.		22.67	0.0007	0.0020	0.2167	0.0008	0.0027	0.0080	0.099	1.1667	0.0001	0.031	0.0071	0.0130	0.0030	0.0025	0.4333	140	0.4667	0.2500	227	930	567
Dom Avg Conc.		29.0000	0.0005	0.0021	0.3367	0.0009	[illegible]	0.0053	0.072	0.6967	[illegible]	0.043	0.0067	0.0089	0.0024	0.0031	0.2933	170	0.4450	0.2900	233	923	402
Dom + Com Avg Conc.		29.2200	0.0005	0.0021	0.3388	0.0009	0.0025	0.0052	0.071	0.6972	0.0001	0.043	0.0067	0.0087	0.0024	0.0030	0.29	168.30	0.4491	0.2892	233	919	397
Dom + Com Loading (from Sampling)	lb/day	2,211	0.036	0.16	25.64	0.067	0.185	0.392	5.34	52.76	0.008	3.23	0.506	0.661	0.178	0.230	21.9	12,774	33.98	21.89	17,620	69,572	30,060
Dom + Com Loading (used for MAIHL calculation)	lb/day	2,771	0.578	0.566	34.04	0.067	0.185	0.790	5.34	284	0.008	21	0.962	1.332	0.362	0.747	21.9	18,436	33.98	21.89	19,516	70,535	20,525
SLR Influent Concentration	mg/L	40.94	[illegible]	[illegible]	0.4413	[illegible]	[illegible]	0.0158	0.0600	3.485	[illegible]	0.2527	0.0120	0.0215	[illegible]	[illegible]	0.1345	233	0.5133	[illegible]	253	992	263
Influent - Controlled = Uncontrolled	lb/day	2,771	0.578	0.566	34.04	0.054	0.065	0.790	4.087	284	(0.153)	20.581	0.962	1.332	0.362	0.747	10.8	18,436			19,516	70,535	20,525

LS Background Concentration and Domestic and Commercial Loading

Assumption: LS dom and com POC average concentration is assumed to be same as SLR

Sampling Location	Flow (MGO)	NH4	Ag	As	B	Cd	CN	Cr	Cu	Fe	Hg	Mn	Mo	Ni	Pb	Se	Zn	Cl-	F	NO3-	SO4 2-	TDS	BOD
Dom + Com Flow	2.704761																						
Dom + Com Loading (from Sampling)	lb/day	672	0.010	0.048	7.768	0.019	0.055	0.111	1.530	15.76	0.002	0.935	0.149	0.189	0.052	0.067	6.294	3,736	10.373	6.476	5,222	20,497	8,693
Dom + Com Loading (used for MAIHL calculation)	lb/day	672	0.113	0.169	7.768	0.039	0.064	0.133	1.530	15.76	0.003	0.935	0.171	0.190	0.149	0.199	6.294	3,736	10.373	6.476	5,222	20,497	4,143
LS Influent Concentration	mg/L		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	0.048		[illegible]		[illegible]	0.008	[illegible]	[illegible]	0.173						188.5
Influent - Controlled = Uncontrolled	lb/day		0.113	0.169		0.039	0.064	0.133	1.105		0.003		0.171	0.190	0.149	0.199	4.027						4,143

Domestic flow 89% of dom and com flow to LS
Commercial flow 11% of dom and com flow to LS
Uncontrolled higher than Dom + Com except as noted
All or mostly ND data

City of Oceanside - Development of Technically Based Local Limits

Removal Efficiency

Pollutant		San Luis Rey Water Reclamation Facility		La Salina Water Treatment Facility	Assumed primary removal efficiency, based on similar treatment facilities	Average of Available Data from EPA, EMWD, EWA, and VVWD	EPA 40 POTW										Eastern Municipal Water District (Plant Removal Efficiency)				Encina Water District			
							Primary Treatment [a]	Through Activated Sludge Treatment [a]			Through Trickling Filter Treatment [a]			Through Tertiary Treatment [a]			Temecula Valley [b]	San Jacinto Valley [b]	Moreno Valley [b]	Perris Valley [b]	Encina Water Pollution Control Facility		Meadowlark Water Reclamation Facility	
		Secondary	Overall	Overall		Through Secondary	Median	Second Decile	Median	Eighth Decile	Second Decile	Median	Eighth Decile	Second Decile	Median	Eighth Decile					Primary Removal Efficiency	Plant Removal Efficiency	Secondary Treatment	Tertiary Treatment
Silver	Ag	81%		81%	56%	81%	20%	50%	75%	88%	38%	66%	86%	55%	62%	82%	93%	78%	62%	73%	56%	95%	91%	95%
Arsenic	As	42%		42%	18%	42%		31%	45%	53%							31%	52%	45%	47%	18%	38%	34%	44%
Cadmium	Cd	65%		65%	75%	65%	15%	33%	67%	91%	33%	68%	93%	50%	50%	73%	62%	82%	28%	60%	75%	81%	77%	88%
Cyanide	CN	69%		69%	45%	69%	27%	41%	69%	84%	33%	59%	79%	32%	66%	83%								
Chromium	Cr	85%		61%	69%	87%	27%	68%	82%	91%	34%	55%	71%	62%	72%	89%	90%	93%	82%	90%	69%	89%	79%	87%
Copper	Cu	96%		95%	63%	91%	22%	67%	86%	95%	32%	61%	89%	58%	85%	98%	95%	98%	94%	93%	63%	92%	81%	89%
Mercury	Hg	78%		78%	79%	78%	10%	50%	60%	79%	33%	50%	62%	43%	67%	75%	77%	84%	63%	81%	75%	95%	89%	95%
Molybdenum	Mo	28%		28%	13%	29%											32%	43%	24%	24%	18%	26%	28%	27%
Nickel	Ni	59%		46%	32%	48%	14%	25%	42%	62%	11%	29%	57%	17%	17%	57%	41%	66%	54%	46%	32%	44%	46%	49%
Lead	Pb	82%		82%	77%	82%	57%	39%	61%	76%	25%	55%	70%	9%	52%	77%	88%	92%	70%	88%	77%	93%	85%	91%
Selenium	Se	58%		58%	19%	58%		33%	50%	67%							50%	67%	57%	69%	49%	58%	51%	46%
Zinc	Zn	94%		88%	73%	80%	27%	64%	79%	88%	34%	67%	81%	50%	78%	88%	69%	95%	82%	66%	73%	87%	80%	85%
						Through 3*																		
Boron	B	5%	25%			3%											2%	2%	3%	6%				6%
Iron	Fe	99%	100%			94%											98%	98%	98%	94%				81%
Manganese	Mn	35%	78%			51%											53%	60%	59%	42%				39%
Chloride	Cl	2%	1%			1%											3%	14%	3%	12%				
Sulfate	SO_4	-1%	6%			6%											5%	2%	-1%	20%				
Ammonia	NH_4	17%				82%											99%	62%	69%	96%				
Total Dissolved Solids	TDS	5%	7.13%			13%											7%	17%	16%	20%			14%	7%

Note:

a. Median removal efficiency from a data base of removal efficiencies for 40 POTWs.

b. Primary removal efficiency was considered to be 65% of plant removal (8PJ)

Estimated to have sufficient data to calculate mass balance and % removal

Removal low (6% calculated) compared to other data; Influent variability is 50%, Effluent 26%; if Eff + B/5 = Inf ==> 18% removal. Mo controlled by biosolids quality. Use SLR value. Avg. of other data is 29%

Assume equal to 65% of Average of Available Data Through Secondary

City of Oceanside - Development of Technically Based Local Limits

RO Plant and Genen Tech POC Loading to Ocean Outfall (Based on Sampling Results)

	RO Plant [a]						Genen Tech [d]		
	Concentrate Flow [c]	Average Concentration		Loading			Flow	Average Concentration	Loading
		Concentrate A	Concentrate B	Concentrate A	Concentrate B	Total			
POC	MGD	mg/L	mg/L	lbs/day	lbs/day	lbs/day	MGD	mg/L	lbs/day
Ag	0.784	0.0001	0.0001	0.00	0.00	0.00	0.155		
As	0.784	0.0013	0.0014	0.00	0.00	0.01	0.155		
Cd	0.784	0.0001	0.0001	0.00	0.00	0.00	0.155		
CN	0.784	0.0022	0.0022	0.01	0.01	0.01	0.155		
Cr	0.784	0.0057	0.0057	0.02	0.02	0.04	0.155		
Cu	0.784	0.0056	0.0048	0.02	0.02	0.03	0.155	0.0014	0.00180978
Hg	0.784	0.0001	0.0001	0.00	0.00	0.00	0.155		
Mo	0.784	0.0490	0.0420	0.16	0.14	0.30	0.155		
Ni	0.784	0.0030	0.0034	0.01	0.01	0.02	0.155		
Pb	0.784	0.0002	0.0002	0.00	0.00	0.00	0.155		
Se	0.784	0.0143	0.0133	0.05	0.04	0.09	0.155		
Zn	0.784	0.0064	0.0057	0.02	0.02	0.04	0.155		
B	0.784	0.2920	0.2920	0.95	0.95	1.91	0.155		
Fe	0.784			-	-	-	0.155		
Mn	0.784	1.3725	1.3433	4.49	4.39	8.88	0.155		

a. RO plant currently produces 5.8 MGD. It has capacity of 7.8 MGD water production. Future concentrate flow to Ocean Outfall is predicted based on 7.8 MGD production
b. Average RO plant combined concentrate current flow
= 0.5832 MGD
c. Concentrate A flow : Concentrate B flow = 1:1
d. Genen Tech WDR permits to discharge upto 0.155 MGD

SLR and LS POC Loading to Ocean Outfall (Calculated)

	California Ocean Plan 2001 Performance Goals (Assumed to be the dischage limit)		Future Flows					Loading				Calculated Allowable Loading			
								Allowable POC loading to Ocean Outfall				SLR		LS	
	Max Daily	Six Month Median	RO Plant	Genen Tech	SLR Effluent	LS Effluent	Total	Max Daily	Six Month Median	RO Plant	Genen Tech	Based on Max Daily	Based on Six Month Median	Based on Max Daily	Based on Six Month Median
POC	mg/L	mg/L	MGD	MGD	MGD	MGD	MGD	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day	lbs/day
Ag	0.23	0.048	0.784	0.155	10.06	2.91301	13.911	26.68	5.57	0.0007	-	20.69	4.32	5.992	1.250
As	2.6	0.44	0.784	0.155	10.06	2.91301	13.911	301.65	51.05	0.0087	-	233.91	39.58	67.737	11.462
Cd	0.35	0.088	0.784	0.155	10.06	2.91301	13.911	40.61	10.21	0.0007	-	31.49	7.92	9.119	2.293
CN	0.35	0.088	0.784	0.155	10.06	2.91301	13.911	40.61	10.21	0.0144	-	31.48	7.91	9.116	2.289
Cr	0.7	0.18	0.784	0.155	10.06	2.91301	13.911	81.21	20.88	0.0371	-	62.95	16.17	18.229	4.681
Cu	0.88	0.09	0.784	0.155	10.06	2.91301	13.911	102.10	10.44	0.0340	0.0018	79.14	8.07	22.919	2.337
Hg	0.014	0.0035	0.784	0.155	10.06	2.91301	13.911	1.62	0.41	0.0007	-	1.26	0.31	0.365	0.091
Mo			0.784	0.155	10.06	2.91301	13.911	-	-	0.2976	-				
Ni	1.8	0.44	0.784	0.155	10.06	2.91301	13.911	208.84	51.05	0.0210	-	161.92	39.57	46.892	11.459
Pb	0.7	0.18	0.784	0.155	10.06	2.91301	13.911	81.21	20.88	0.0013	-	62.98	16.19	18.237	4.689
Se	5.3	1.3	0.784	0.155	10.06	2.91301	13.911	614.90	150.83	0.0905	-	476.75	116.89	138.063	33.849
Zn	6.3	1.1	0.784	0.155	10.06	2.91301	13.911	730.92	127.62	0.0396	-	566.76	98.93	164.128	28.650
B			0.784	0.155	10.06	2.91301	13.911	-	-	1.9098	-				
Fe			0.784	0.155	10.06	2.91301	13.911	-	-	-	-				
Mn			0.784	0.155	10.06	2.91301	13.911	-	-	8.8815	-				
NH_4	345	86.2	0.784	0.155	10.06	2.91301	13.911	40,000	10,000	-	-	31,018	7,754	8,982	2,246
NH_4	44		0.784	0.155	10.06	2.91301	13.911	5,105	-	-	-	3,959	-	1,146	

City of Oceanside - Development of Technically Based Local Limits

La Salina Wastewater Treatment Plant

AHL, MAHL and MAIL

QINF (MGD), Current	2.786	
Growth Factor (MGD), 5% of flow	0.139	
Q_{INF} (MGD), Future	2.926	
Safety Factor	10%	
Q_{EFF} (MGD), Future	2.913	
Sludge Flow (MGD), Future from/to Digester	0.013	0.060
Percent Solids from/to Digester	19%	4%
Specific Gravity of Sludge (kg/L)	1.020	
Dry sludge (lbs/day), Future	3,824	

POC	Plant Removal Efficiency: Primary	Plant Removal Efficiency: Secondary	1. Order No. R9-2005-0136 / NPDES NO. CA0107433 — SLR/LS/RO: Based on secondary treatment	1. Based on CA Ocean Plan 2001	2. California Ocean Plan 2001 Performance Goals (Assumed to be the dischage limit): Max Daily	2. Six Month Median	3. EPA: 40 CFR § 503.13: Ceiling Concentration	3. Monthly Average Pollutant Concentration.	4. State Hazardous Waste Disposal (Title 22, Chapter 11, Article 3)	5. EPA 833-R-04-002B Local Limits Development Guidance Appendix G, Literature Inhibition Values: Reported range of Activated Sludge Inhibition Threshold Levels, mg/L	5. Reported Range of Anaerobic Digestion Inhibition Threshold Levels, mg/L
					mg/L	mg/L	mg/kg dry	mg/kg dry	mg/kg wet	mg/L	mg/L
Ag	56%	81%	-	-	0.23	0.048			500		65
As	18%	42%	-	-	2.6	0.44		41		0.1	1.6
Cd	75%	65%	-	-	0.35	0.088		39		5.5	20
CN	45%	69%	-	-	0.35	0.088				2.55	52
Cr	69%	61%	-	-	0.7	0.18			2500	50.5	
Cu	63%	95%	-	-	0.88	0.09		1500		1	145
Hg	79%	78%	-	-	0.014	0.0035		17		0.55	
Mo	13%	28%	-	-			75	-			
Ni	32%	46%	-	-	1.8	0.44		420		1.75	100
Pb	77%	82%	-	-	0.7	0.18		300		1	340
Se	19%	58%	-	-	5.3	1.3		100			
Zn	73%	88%	-	-	6.3	1.1		2,800		2.65	400
NH_4	2.00%	17%	-	-						100	3,000

References other than EPA Guidance used for these POC. Higher inhibition concentrations, (e.g. Johnson, Carlan *A Survey of Municipal Thermophilic Anaerobic Sludge Digesters and Diagnostic Activity Assays, 2006* showed concentration as high as 250 mg/L as beneficial to methan production.)

AHL, lbs/day

POC	1. Order No. R9-2005- SLR/LS/RO: Based on secondary treatment	1. Based on CA Ocean Plan 2001	2. California Ocean Plan 2001 Performance Goals (Assumed to be the dischage limit): Max Daily	2. Six Month Median	3. EPA: 40 CFR § 503.13: Based on Ceiling Concentration	3. Based on Monthly Average Pollutant Concentration.	4. State Hazardous Waste Disposal (Title 22, Chapter 11, Article 3)	5. EPA 833-R-04-002B Local: Reported range of Activated Sludge Inhibition Threshold Levels, mg/L	5. Reported Range of Anaerobic Digestion Inhibition Threshold Levels, mg/L	MAHL -ppd	Basis of limitation	MAIL-ppd
Ag	-	-	31.51	6.57		-	12.55		39.97	6.57	#2-6 Mo. Med.	5.80
As	-	-	116.13	19.65		0.38	-	2.98	1.91	0.38	#3-Monthly	0.16
Cd	-	-	26.25	6.60		0.23	-	537	15.3	0.23	#3-Monthly	0.16
CN	-	-	29.40	7.39		-	-	113	37.5	7.39	#2-6 Mo. Med.	6.58
Cr	-	-	47.02	12.08		-	83	3,945	-	12.08	#2-6 Mo. Med.	10.73
Cu	-	-	476.31	48.56		6.03	-	65.9	75.9	6.03	#3-Monthly	3.81
Hg	-	-	1.68	0.42		0.08	-	62.5	-	0.0830	#3-Monthly	0.0717
Mo	-	-	-	-	1.03		-	-	-	1.03	#3-Ceiling	0.74
Ni	-	-	87.29	21.33		3.47	-	62.9	108	3.47	#3-Monthly	2.92
Pb	-	-	102.84	26.44		1.39	-	107	206	1.39	#3-Monthly	1.10
Se	-	-	326.34	80.01		0.66	-	-	-	0.66	#3-Monthly	0.39
Zn	-	-	1,404.00	245.08		12.13	-	239	226	12.13	#3-Monthly	4.30
BOD										9,174	Plant Capacity	3,900
NH_4			1,146							1,146	Toxicity Limit	326

MAHL

City of Oceanside - Development of Technically Based Local Limits

San Luis Rey Water Reclamation Facility

AHL, MAHL and MAIL

QINF (MGD), Current	9.767	
Growth Factor (MGD), 5% of flow	0.488	
Q_{INF} (MGD), Future	10.255	
Safety Factor for average/max	10%	20%
Q_{EFF} (MGD), Future	10.059	
Sludge Flow (MGD), Future from/to Digester	0.039	0.225
Percent Solids from/to Digester	23%	4%
Specific Gravity of Sludge (kg/L)	1.020	
Dry sludge (lbs/day), Future	17,764	

POC	Plant Removal Efficiency: Primary	Plant Removal Efficiency: Secondary	Plant Removal Efficiency: Tertiary	1. Order No. R9-2005-0136 / NPDES NO. CA0107433: SLR/LS/RO: Based on secondary treatment	1. Order No. R9-2005-0136 / NPDES NO. CA0107433: Based on CA Ocean Plan 2001	2. Order No. 93-07: SLR - Reclaimed Water: 12-month Average	3. California Ocean Plan 2001 Performance Goals (Assumed to be the discharge limit): Max Daily	3. California Ocean Plan 2001 Performance Goals (Assumed to be the discharge limit): Six Month Median	4. EPA: 40 CFR § 503.13: Ceiling Concentration	4. EPA: 40 CFR § 503.13: Monthly Average Pollutant Concentration.	5. State Hazardous Waste Disposal (Title 22, Chapter 11, Article 3)	6. EPA 833-R-04-002B Local Limits Development Guidance Appendix G, Literature Inhibition Values: Reported range of Activated Sludge Inhibition Threshold Levels, mg/L	6. EPA 833-R-04-002B Local Limits Development Guidance Appendix G, Literature Inhibition Values: Reported Range of Anaerobic Digestion Inhibition Threshold Levels, mg/L
						mg/L	mg/L	mg/L	mg/kg dry	mg/kg dry	mg/kg wet	mg/L	mg/L
Ag	56%	81%	0%	-	-		0.23	0.048			500		65
As	18%	41.67%	0%	-	-		2.6	0.44		41		0.1	1.6
Cd		65%	0%	-	-		0.35	0.088		39		5.5	20
CN		69.00%	0%	-	-		0.35	0.088				2.55	52
Cr	69%	85%	0%	-	-		0.7	0.18			2500	50.5	
Cu	63%	96%	0%	-	-		0.88	0.09		1500		1	145
Hg	79%	78%	0%	-	-		0.014	0.0035		17		0.55	
Mo	13%	28%	0%	-	-				75	-			
Ni	32%	59%	0%	-	-		1.8	0.44		420		1.75	100
Pb	77%	82%	0%	-	-		0.7	0.18		300		1	340
Se	19%	58%	0%	-	-		5.3	1.3		100			
Zn	73%	94%	0%	-	-		6.3	1.1		2,800		2.65	400
B			25%	-	-	0.50							
Fe			99.5%	-	-	0.30							
Mn			78%	-	-	0.15							
Cl			1%			350							
SO_4			6%			350							
TDS			7.13%			1,200							
TDS_{max}			7.13%			1,300							
BOD													
NH_4*		17%			52.8								

* Based on Oceanside developed relationship between ammonia and acute toxicity

POC	AHL, lbs/day — 1. Order No. R9-2005-: SLR/LS/RO: Based on secondary treatment	1. Order No. R9-2005-: Based on CA Ocean Plan 2001	2. Order No. 93-07: SLR - Reclaimed Water: Daily Maximum	2. Order No. 93-07: SLR - Reclaimed Water: 12-month Average	3. California Ocean Plan 2001 Performance Goals (Assumed to be the discharge limit): Max Daily	3. California Ocean Plan 2001 Performance Goals: Six Month Median	4. EPA: 40 CFR § 503.13: Ceiling Concentration	4. EPA: 40 CFR § 503.13: Monthly Average Pollutant Concentration.	5. State Hazardous Waste Disposal (Title 22, Chapter 11, Article 3)	6. EPA 833-R-04-002B Local: Reported range of Activated Sludge Inhibition Threshold	6. EPA 833-R-04-002B Local: Reported Range of Anaerobic Digestion Inhibition Threshold	MAHL	Basis of limitation	MAIHL
Ag	-	-			108.79	22.70		-	47.32		151	22.70	#3- 6-Mo Med.	19.82
As	-	-			401	67.85		1.75	-	10.45	7	1.75	#2-Monthly	0.98
Cd	-	-			90.65	22.79		1.06	-	470.41	58	1.06	#2-Monthly	0.88
CN	-	-			101.54	25.50		-	-		142	25.50	#3- 6-Mo Med.	22.75
Cr	-	-			408	104.87		-	226.51	13,830	-	104.87	#3- 6-Mo Med.	93.53
Cu	-	-			1,760	179		27.90	-	231	285	27.90	#2-Monthly	19.46
Hg	-	-			5.82	1.45		0.39	-	219.23	-	0.39	#2-Monthly	0.33
Mo	-	-			-	-	4.76		-	-	-	4.76	#2-Ceiling	3.28
Ni	-	-			390	95.42		12.75	-	220.44	321	12.75	#2-Monthly	10.05
Pb	-	-			355.13	91.31		6.48	-	374.01	776	6.48	#2-Monthly	5.45
Se	-	-			1,127	276.29		3.08	-	-	-	3.08	#2-Monthly	1.99
Zn	-	-			9,816	1,713		52.79	-	839	797	52.79	#2-Monthly	24.50
B	-	-		57.35	-	-				-	-	57.35	Reclaimed water	15.78
Fe	-	-		5,383	-	-				-	-	5,383	Reclaimed water	4,546
Mn	-	-		57.48	-	-				-	-	57.48	Reclaimed water	30.12
Cl				30,164								30,164	Reclaimed water	7,761
SO_4				31,977								31,977	Reclaimed water	8,232
TDS				110,520								110,520	Reclaimed water-12mo Avg	24,893
TDS			119,730									119,730	Reclaimed water-Daily Max	21,209
BOD												32,000	Blower Limitation	7,202
NH_4					4,748							4,748	Toxicity Standard	1,335

(shaded) MAHL

References other than EPA Guidance show much higher concentrations as not inhibitory (e.g. Konzell-Katsiri and Kartsonas,1986; Cu 40-250 mg/L, Ni 10-300 mg/L)

City of Oceanside - Development of Technically Based Local Limits

Local Limits Calculation

Industries	Flow MGD	Loadings									
		TDS-Current		BOD-Permitted		BOD-Current		NH3-Permitted		NH3-Current	
Industries discharging to San Luis Rey WRF		*ppd*	*% of Total*	*ppd*	*% of Total*	*ppd*	*% of Total*	*ppd*	*% of Total*	*ppd*	*% of Total*
Deutsch	0.1277	2,167	21%	150	4%	30	3%	100	6%	12	2%
Hydranautics, Inc	0.3386	5,343	52%	2,000	52%	477	52%	1,450	92%	543	96%
West Coast Plating	-										
SEPRO, Inc	0.0095	60	1%			107	12%			1	0.1%
Genentech, NICO/OCP	0.0487	324	3%	400	10%	89	10%	10	1%	6	1%
Genentech, NIMO/OCN	0.1152	2,018	20%	1,300	34%	49	5%	20	1%	1	0.18%
Elite Metal Finishing	0.0009	35	0.3%			0.08	0.01%			0.08	0.01%
Arctic Glacier Premium Ice	0.0250										
Nitto Denko Technical Corp.	0.0021	5	0.1%			2	0.3%			0.01	0.002%
California Creative Foods	0.0255	301	3%			170	18%			1	0.098%
Indigo Labs	0.0001	0.36	0.004%			0.13	0.01%			0.001	0.0001%
Oceanside Ale Works	-										
TOTAL	0.6931	10,254	100%	3,850	100%	925	100%	1,580	100%	563	100%
Industries discharging to La Salina WTP											
Mission Linen Service	0.0794					216	91%				
Metro Roof Products	0.0022					22	9%				
Breakwater Brewery Co	-										
TOTAL	0.0815					238	100%				

Local Limits Based on Uniform Distribution (Except as Noted)

POC	MAIL		Uniform Local Limits			IU Contributory Local Limits		Recommended Local Limit	Current Local Limit
	SLR	LS	SLR	LS	MIN	SLR	LS		
	lbs/day	*lbs/day*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
Ag	19.82	5.80	3.43	8.53	3.430			3.4	0.43
As	0.98	0.16	0.17	0.24	0.169	0.91		0.91	0.5
Cd	0.88	0.16	0.15	0.24	0.153			0.15	0.11
CN	22.75	6.58	3.94	9.68	3.935			3.9	1.2
Cr	93.53	10.73	16.18	15.78	15.778			15	2.77
Cu	19.46	3.81	3.37	5.61	3.366			3.3	3.38
Hg	0.33	0.07	0.06	0.11	0.057			0.057	0.05
Mo	3.28	0.74	0.57	1.09	0.567			0.56	
Ni	10.05	2.92	1.74	4.30	1.739	9.37		9.3	3.98
Pb	5.45	1.10	0.94	1.62	0.943			0.94	0.69
Se	1.99	0.39	0.34	0.57	0.344			0.34	
Zn	24.50	4.30	4.24	6.33	4.239			4.2	2.61
B	15.78		2.73		2.729			2.7	1.0

POC	Available MAIL[a]		Current IU		Available for IU Growth		Permitted	
	SLR	LS	SLR	LS	SLR	LS	SLR	LS
	lbs/day	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*
TDS	19,088	NA	10,254	NA	8,834	NA	-	-
BOD	6,482	3,900	925	238	5,557	3,662	3,850	-
NH_4	1,201	326	563	NT	638	-	1,580	-

NA-Not applicable

NT-Not tested

[a] If 90% of MAIL made available to existing IU

Appendix B—Formulas and Example Calculations

- General Formulas from EPA Guidance
- Removal Efficiency Formulas
- SLR and LS Effluent Limits from OOO Performance Goals
- MAIL Calculations Using Concentration-Based Discharge Limits
- B and TDS Tertiary Treatment Mass Balance and % Removal

RvL Associates
Industrial Water & Wastewater

Project: Oceanside TBLL Computed: RvL Date: 12/12/10
Subject: General Formulas for Local Limits Development Checked: ______ Date: ______

Job: ______ No.: 103-001

From EPA Local Limits Development Guidance 2004 and Other General Formulas

% Removal - See next Calculation Sheets

AHL Based on NPDES Performance Goals

Performance Goals based on 2001 CA. CCcom Plan

From EPA Guidance

$$AHL_{NPDES} = \frac{(8.34)(C_{NPDES})Q_{POTW}}{(1-R_{POTW})}$$

Where:

AHL_{NPDES} = AHL based on NPDES permit limit, ppd

C_{NPDES} = NPDES permit limit, mg/L

Q_{POTW} = POTW average flow rate, MGD

R_{POTW} = Plant Removal Efficiency from Headworks to effluent as a decimal

8.34 = Conversion factor

See AHL Calculation Sheets for determining AHL based on concentration limit vs. mass limit.

AHL: Based on Land Application and Surface Disposal of Biosolids for conservative POC

From EPA Guidance 2004

$$AHL_{SLDG} = \frac{(8.34)(C_{SLDG})(PS/100)(Q_{SLDG})\,G_{SLDG}}{R_{POTW}}$$

Where

AHL_{SLDG} = AHL based on sludge standard, lb/day or ppd

C_{SLDG} = Sludge standard, mg/kg dry wt.

PS = percent solids of sludge to disposal

Q_{SLDG} = Total sludge flow rate to disposal - MGD

R_{POTW} = Plant removal efficiency from headworks to plant effluent, as decimal.

G_{SLDG} = Specific gravity of sludge, Kg/L

8.34 = Conversion factor

AHL Based on State Hazardous Waste TTLC Test

$$AHL_{SLDG} = TTLC_{CONC} \times DS_{SLDG} \times \frac{1}{R_{POTW}} \times \frac{100}{PS} \times \frac{1}{10^6}$$

Where:

AHL_{SLDG} = AHL based on CA TTLC conc., mg/kg wet sludge

$TTLC_{conc}$ = TTLC Test standard for POC in wet sludge – mg/kg

DS_{SLDG} = Dry solids of sludge, ppd

R_{POTW} = Plant removal efficiency from headworks to plant effluent, as decimal

PS = percent solids of sludge for disposal

$\frac{1}{10^6}$ = Conversion factor

AHL Based on Secondary Treatment Inhibition ~~+ Tertiary Treatment Inhibition~~

$$AHL_{sec} = \frac{8.34\,(C_{INHIB2})(Q_{POTW})}{(1-R_{prim})}$$

~~From EPA Guidance~~
~~AHL_{tert} = 8.34 Cn~~
where

AHL_{sec} = AHL based on 2° treatment, ppd

C_{INHIB2} = Inhibition criterion for 2°, mg/L

Q_{POTW} = POTW average flow rate, MGD

R_{prim} = Removal efficiency from headworks to 2° effluent, as decimal

8.34 = Conversion factor

From EPA Guidance: AHL Based on Sludge Digestion Inhibition for Conservative Pollutants

$$AHL_{DGSTR} = \frac{8.34 (C_{DI})(Q_{DGSTR})}{R_{POTW}}$$

Where:

AHL_{DGSTR} = AHL based on sludge digestion inhibition, ppd

C_{DI} = Sludge digester inhibition criterion mg/L

Note: "... only metals in soluble, free form are toxic to the microorganisms." ~~Review~~ Inhibition of Anaerobic Digestion Process: A Review Ye Chen, Jay J. Cheng, Kurt Creamer Bioresource Technology 99 (2008) p4044-4064

Q_{DGSTR} = Sludge flow to digester, MGD

R_{POTW} = Plant removal efficiency from headworks to plant effluent, as decimal

8.34 = conversion factor

AHL Based on Plant Design Criteria Non-Conservative POC

~~AHL~~

$$AHL_{DC} = 8.34 (C_{DC})(Q_{DC})$$

where:

AHL_{DC} = AHL based on influent design criteria for plant, ppd

RvL Associates
Industrial Water & Wastewater

Project: Oceanside TBLL Computed: [illegible] Date: 12/12/10
Subject: General Formulas Checked: Date:
for Local Limits Development Page: 5 of 5
Job: No.:

C_{DC} = Design ~~criterion~~ basis criterion, mg/L

Q_{DC} = Plant design flow criterion, MGD

8.34 = Conversion factor

From EPA Guidance

MAHL = lowest AHL computed

RvL Associates
Industrial Water & Wastewater

Project: Oceanside TBLL Computed: ____ Date: ____
Subject: Removal Efficiency Calcs. Checked: ____ Date: ____

Job No: 103-001 Task No.: 4

SLR and LS Removal Efficiencies:

There was only sufficient non-detect data to determine removal efficiencies for B, Cr, Cu, Mo, Ni, Zn, and TDS (7 POCs). We determined removal efficiencies for other Group 1 POC using the average of plant removal efficiencies from EPA's Study (Fate of Priority Pollutants in Publically Owned Treatment Works, 1982) and other southern California wastewater treatment plants of similar size and treatment processes. Removal efficiencies for the 7 POCs used for following formula:

% Removal = (Mass in – Mass Out)/((Mass In + Mass Out)/2)

Where:

% Removal = Percent of the POC removed from the headworks to the effluent, biosolids,

Mass in = Average influent concentration * Average influent flow * 8.34

Mass Out = Mass out in the effluent + mass out in biosolids;

Mass in effluent = average effluent concentration * average daily flow * 8.34

Mass in biosolids = avearage daily mass of biosolids * concentration of POC (in mg/Kg)

(Mass In + Mass Out)/2 = "Average" Mass In since it is unknown which mass may be more accurate

We used average concentrations of influent and effluent rather than matched pairs. Matched pairs resulted in averages significantly different than the average of EPA and other SoCal plants and on some occasions, significantly negative (-156%) removal rates which are considered unrepresentative.

For Mo: LS removal was low (6% calculated) compared to other data; Influent variability is 50%, Effluent 26%. If removal efficiency calculated using biosolids mass data Eff + B/S = Inf ==> 18% removal.
Mo controlled by biosolids quality. Use SLR Mo removal efficiency value, 28%.
Average of EPA and data from similar SoCal treatment plants is 29%.

Problem Statement: Oceanside has NPDES performance goals on the OOO. However, Genentech and MBDF (Oceanside's water treatment plant) discharge to the OOO upstream of the compliance point. We assumed that the OOO limit was equal to the performance goal concentrations and 5-year project flow. Assuming that the Genentech and MBDF loadings are uncontrolled, we needed to develop a method and associated equations to calculate the SLR and LS "discharge limits" based on the OOO performance goals. Reference Spreadsheet: SLR and LS POC Loading to Ocean Outfall (Calculated)

Given:

Flow Balance:

$OOO = Q_G + Q_{MBDF} + Q_{SLR} + Q_{LS}$

Where:

OOO = Future flow to the ocean from OOO

Q_G = Future flow from Genentech

Q_{MBDF} = Future flow from MBDF

Q_{SLR} = Future flow from SLR

Q_{LS} = Future flow from LS

Future flows for Genentech and MBDF explained on Reference Spreadsheet. Future SLR and LS flow assumes 5% growth.

Mass Balance:

$OOOx = GTx + MBDFx + SLRx + LSx$ **[1]**

Where:

$OOOx = OOO * NPDES_{LC} * 8.34$

OOOx = loading to OOO of POC x, ppd

$NPDES_{LC}$ = OOO NPDES limiting concentration (performance goal), mg/L

8.34 = converstion factor

$GTx = Q_C * GT_C * 8.34$

GTx = loading from Genentech for POCx, ppd

GT_C = discharge concentration for POCx, mg/L

$MBDFx = Q_{MBDF} * MBDF_C * 8.34$

Similar to GTx; refer to above

RvL Associates
Industrial Water & Wastewater

Project: Oceanside TBLL Computed: Date:
Subject: Calculations of SLR and LS Effluent Limits from OOO Performance Goals Checked: Date:

Job No: 103-001 Task No.: 4

CONTINUED

Assume SLR and LS effluent mass limits are proportional to flow contributions to OOO.

SLRx = OOOxrmg * Q_{SLR}/OOO

LSx = OOOxrmg * Q_{LS}/OOO

OOOxrmng = OOOx - GTx - MBDFx

SLRx = (OOOx - GTx - MBDFx) * Q_{SLR}/OOO ←

LSx = (OOOx - GTx - MBDFx)* QLS/OOO ←

RvL Associates Industrial Water & Wastewater	Project: Oceanside TBLL	Computed: RWvL	Date: 12/12/10
	Subject: MAIL Calculations Using Concentration-Based Discharge Limits	Checked:	Date:
		Page: 1 of 2	
	Job No: 103-001		Task No.: 4

Problem Statement: NPDES permit uses concentration and mass based performance goals based on the California 2001 Ocean Plan. The mass limit is based on OOO capacity of nearly 30 MGD versus the 5-year projected flow of about 13 MGD. To be conservative, we used the concentration based performance goals and project flow as the mass limit for Group 1 POC. SLR recycled water WDR limits include a daily maximum limit for TDS and 12-month average concentration limits for B and TDS.

Convert EPA Guidance equation for MAIL for mass-based limits on present flow to mass-based limits for future flow.

Given: EPA Guidance Formula for MAIL

$$MAIL = MAHL\ (1\text{-}SF) - (L_{unc} + HW + GA)$$

Where:

MAIL = Maximum Allowable Industrial Loading to the headworks, ppd

MAHL = Maximum Allowable Headworks Loading, ppd

SF = Safety factor, as decimal

L_{unc} = Loadings from uncontrolled sources (domestic & commercial), ppd

HW = Hauled waste loading, ppd

GA = Growth Allowance for industrial growth, ppd

$_c$ = current $_f$ = future

Assumptions:

SF - defined as 10% for long term average limits (e.g. 12-month average); defined as 20% for short-term limits (e.g. daily maximum)

HW - part of the uncontrolled sources, 0 ppd

GA - 5% above current IU loading

$MAIL = MAHL\,(1\text{-}SF) - (L_{unc} + HW + GA)$ **[1]**

If AHL and MAHL are based on mass-based limits, the $MAHL_c = MAHL_f$. However, if the AHL and MAHL are based on concentration limits, the $MAHL_f$ will increase with flow to the treatment plant. For Oceanside, we assumed a 5% flow increase for domestic, commercial, other uncontrolled, and industrial sources

Formula used to calculate MAIL for concentration-based POC is as follows:

$MAIL_f = MAHL_f\,(1\text{-}SF) - GA_I - L_{UNCF}$ **[2]**

where: L_{UNCF} = Future loadings from uncontrolled sources.
GA_L = Loading from industrial growth

Equation 1 can be rewritten to be:

$MAIL = MAHL\,(1 - SF) - L_{UNC} - HW - GA$

Since HW = 0 and GA for future includes growth of domestic and commercial sources, 1 is now:

$MAIL_f = MAHL_f\,(1\text{-}SF) - L_{UNC} - GA_I - GA_{D/C}$ where: $GA_{D/C}$ is the growth allowance for domestic and commercial growth

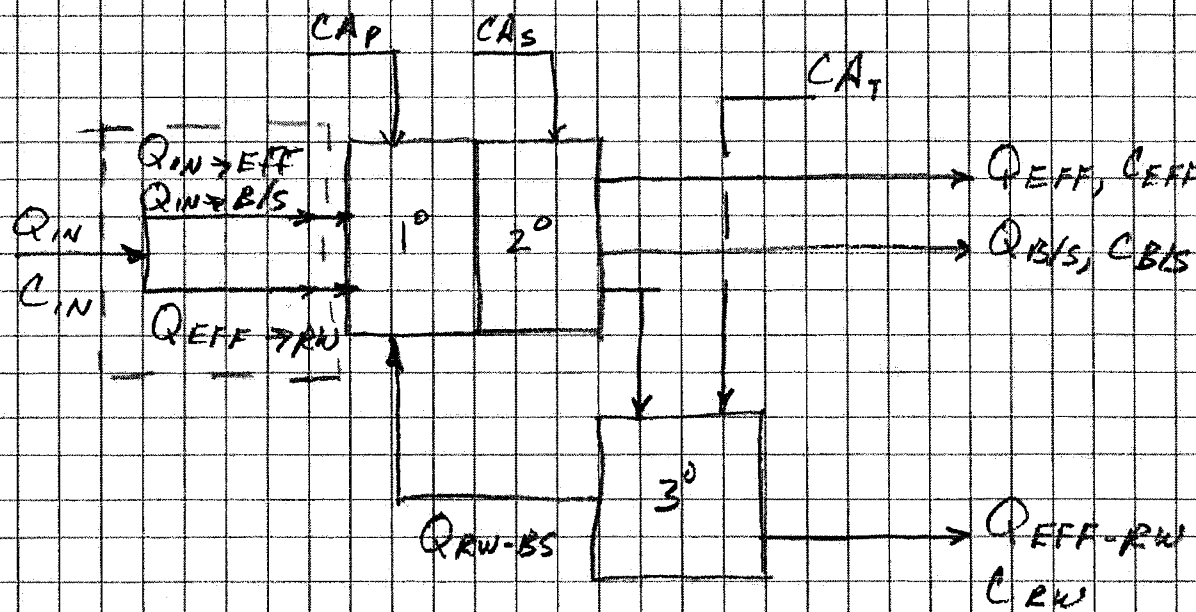
Since $(L_{unc} + GA_{D/C}) = L_{UNCF}$ (uncontrolled sources at future flow and current concentration) formula 1 can be rewritten as:

$MAIL_f = MAHL_f\,(1\text{-}SF) - L_{UNCF} - GA_I$ and equivalent to formula **[2]**

RvL Associates Industrial Water & Wastewater	Project: Oceanside TBLL	Computed: RVL	Date: 12/13/10
	Subject: SLR Tertiary Trmt	Checked:	Date:
	Mass Balance and Percent Removal		Page: 1 of
	Job No: 103-001		Task No.:

Problem statement: Develop formula for determining % Removal of B + TDS through Tertiary treatment at SLR

SLR Mass Balance Diagram



Where:

Q = Flow C = Concentration

IN = Influent to SLR IN → EFF = Influent to Effluent

IN → B/S = Influent to Biosolids

EFF → RW = Influent to Tertiary Treated (Recycled Water)

P - Primary S - Secondary T - Tertiary

1° - Primary 2° - Secondary 3° - Tertiary

CA - Chemical Addition

RvL Associates
Industrial Water & Wastewater

Project: Oceanside TBLL Computed: RWL Date: 12/13/10
Subject: SLR Tertiary Trmt Checked: ____ Date: ____
Mass Balance + Percent Removal Page: 2 of ___
Job: 103-001 No.: ____

Assumptions:

1. CA_P, CA_S + CA_T small flow, assume negligible but mass of POC must be accounted for.

Flow Balance

$$Q_{IN} = Q_{IN \to EFF} + Q_{IN \to B/S} + Q_{EFF \to RW}$$

Chemical Addition $CA = CA_P + CA_S + CA_T$

3° % Removal

$$\% \text{Removal} = \frac{(\text{Mass In } 3° - \text{Mass Out } 3°)}{\text{Mass In } 3°} \times 100$$

1

$$\text{Mass In } 3^\circ = \left(Q_{EFF \to RW} * C_{IN} * 8.34 + CA * \frac{Q_{EFF \to RW}}{Q_{IN}}\right)$$

$$\text{Mass Out } 3^\circ = \left(Q_{EFF \to RW} * C_{RW} * 8.34\right)$$

Substituting Into Equation [1]

$$\%\text{ Removal} = \left(\left(Q_{EFF \to RW} * C_{IN} * 8.34 + CA * \frac{Q_{EFF \to RW}}{Q_{IN}}\right) - \left(Q_{EFF \to RW} * C_{RW} * 8.34\right)\right) \Big/ \left(Q_{EFF \to RW} * C_{IN} * 8.34 + CA * \frac{Q_{EFF \to RW}}{Q_{IN}}\right)$$

July 9, 2012

Mr. Mark Hammond
Laboratory Manager
City of Oceanside
Water Utilities Division
3950 North River Road
Oceanside, CA 92058

Subject: Update to Technically Based Local Limits Study, February 2011

Dear Mr. Hammond:

As requested, we have updated Tables 1 and 7, both titled Oceanside Current and Proposed Local Limits of our Technically Based Local Limits Study, February 2011. Table 1 is presented in the Executive Summary, and Table 7, the same table, is presented in the Recommendations chapter. The updates reflect the inclusion of the Maximum Allowable Industrial Loadings (MAIL) for biochemical oxygen demand (BOD) and ammonia as nitrogen (NH3-N) for the La Salina Wastewater Treatment Plant (LS) and recommended limits for NH3-N and total dissolved solids (TDS) based on more current information. MAIL calculations for the other pollutants of concern (POC) were not included as the total industrial flow decreased and one of the larger IUs discharging metals significantly reduced operations. Both factors would have increased the allowable metals limits and, to be conservative, we do not recommend changing the limits of the other POCs as they are generally an increase above the existing limits and all IU can meet the limits published in the February 2011 report. The following paragraphs explain the changes to the table. The revised table showing the minor changes to Tables1 and Table 7 of the original report to reflect more and current discharge data is presented as Attachment A.

New Limits and Data

In April 2011, RvL prepared and transmitted a letter to the City of Oceanside (Oceanside) regarding the new NH3-N MAIL based on 53 mg/L, the 6-month median NH3-N concentration in the Oceanside discharge permit. This increased the MAIL by about 65% from the previous study. The recommendations for administering the NH3-N local limits remained the same. A copy of the letter is attached for reference as Attachment B.

Our original report issued in February 2011 used Oceanside-collected data from 2008 and 2009. Oceanside provided additional data from 2010 through the beginning of 2012 for 12 of the larger dischargers because there had been some significant changes to the operations of some industrial users and Oceanside wanted to determine whether these operational changes would impact our recommendations for local limits. Parameters included biochemical oxygen demand (BOD), NH3-N, TDS, and flow to the sewer.

The original report recommended that industrial users (IU) dischargers be identified and tracked if their discharge was equal to or greater than 200 ppd of BOD, 30 mg/L and 30 ppd of NH3-N, or 300 ppd of TDS. RvL analyzed the additional Oceanside data and calculated MAILs for SLR and LS for comparison to the original report values. Attachment C includes a summary of the statistical information about the data sets for each of the 12 IUs. Attachment C also includes a chart comparing the final report results to results using the additional data as it relates to TDS. Although the flow to SLR decreased by 25%, calculated additional TDS discharged due to industrial growth, MAIL based on the 12-month average and daily maximum, and available MAIL for IU growth are all 94% or greater than the amounts reported in the original report.

Conclusions and Recommendations

Some IU decreased and others increased their discharges of BOD, NH3-N, and TDS. However, results from analyzing the more current IU data find that the MAIL is similar to those found in the original report. The conclusions and recommendations of how to control these three POC are the same as in the original report.

Thank you for the opportunity to provide these additional services. Please contact me if you have any questions.

Very truly yours,

RvL ASSOCIATES, INC.

Richard W. von Langen, P.E.
President

ATTACHMENT A

Table 1. Oceanside Current and Proposed Local Limits

Pollutant	Chemical Symbol	Units	Current Limit	Proposed Limit	Comments
Arsenic	As	mg/L	0.5	0.91	
Boron	B	mg/L	1.0	2.7	SLR[a] only
Cadmium	Cd	mg/L	0.11	0.15	
Chromium	Cr	mg/L	2.77	15	
Copper	Cu	mg/L	3.38	3.3	
Cyanide	CN	mg/L	1.2	3.9	
Grease and Oil		mg/L	100	Eliminate; covered by narrative limit in SUO[b]	
Lead	Pb	mg/L	0.69	0.94	
Mercury	Hg	mg/L	0.05	0.057	
Molybdenum	Mo	mg/L		0.56	New limit per EPA[c] guidelines
Nickel	Ni	mg/L	3.98	9.3	
Phenolic Compounds		mg/L	2.0		No data for local limit; eliminate as a local limit
Selenium	Se	mg/L		0.34	New limit per EPA guidelines
Silver	Ag	mg/L	0.43	3.4	
Sulfide	S^{2-}	mg/L	1.0	1.0	Retain existing local limit
Total Metals		mg/L	10.5		Eliminate; no need for (aggregate) POC[d] limit
Total Toxic Organics	TTO	mg/L	2.13		Eliminate; covered by narrative limit in SUO
Zinc	Zn	mg/L	2.61	4.2	
BOD_5	BOD	ppd		Individual permits MAIL of 6,806 ppd SLR and 3,852 for LS[e] ; maintain current limits for 2 IUs; issue permit for 1 new IU[f]	Monitor IUs; track total BOD versus MAIL; permit IUs above 200 ppd; eliminate limits for other IUs; pollution prevention report required for increase of 20% above current limit.
Ammonia	NH_3-N	ppd	Individual permits	MAIL of 1,980 ppd for SLR and 537 for LS; maintain current limit for 1 IU; eliminate limits for other IUs	Monitor IUs; track total NH_3-N versus MAIL and NPDES permit changes; permit IUs above 30 ppd (1); pollution prevention report required for increase of 20% above current limit
Total Dissolved Solids	TDS	ppd	None	MAIL for SLR-18,664 ppd	SLR only; monitor IUs; track total TDS versus MAIL; allow IUs to expand as needed up to the MAIL; pollution prevention report required for increase of 20% above current discharge

[a] SLR—San Luis Rey Treatment Plant
[b] SUO—Sewer Use Ordinance
[c] EPA—Environmental Protection Agency
[d] POC—Pollutant of Concern
[e] LS—La Salina Treatment Plant
[f] IU—Industrial User

ATTACHMENT B

April 18, 2011

Mr. Peregrino Yosuico
Industrial Waste Inspector
3950 North River Road
Oceanside, CA 92058

Subject: Revision of Ammonia Technically Based Local Limits

Dear Mr. Yosuico:

The City of Oceanside (Oceanside) Oceanside Ocean Outfall (OOO) limit for ammonia based on the California Ocean Plan 2001 permit limits for ammonia are 210 mg/L ammonia as nitrogen for the daily maximum or 40,000 pounds per day (ppd) at the permitted flow of 22.9 million gallons per day. The 6-month median limit for ammonia is 53 mg/L or 10,000 ppd. In previous studies, Oceanside found that high ammonia concentrations caused the effluent to fail the acute toxicity test and from those studies, Oceanside predicted the maximum effluent concentration that could be discharged.

In the final "City of Oceanside Technically Based Local Limits" report, RvL Associates (RvL) calculated the allowable headworks loadings (AHLs) for the three limits and found that the acute toxicity limit determined the maximum allowable headworks loading (MAHL) for ammonia. Recently, Regional Water Quality Control Board, San Diego Region (RWQCB) informed Oceanside that the acute toxicity limit was being removed from the OOO permit. Oceanside conducted additional tests and found that effluent ammonia concentrations below 53 mg/L would not cause the effluent to fail the chronic effluent toxicity test. Therefore the 6-month median ammonia concentration limit of 53 mg/L became the basis for the MAHL.

Based on this new information, RvL calculated the ammonia local limits for Oceanside's San Luis Rey (SLR) and La Salina (LS) treatment plants and found that the MAIL was about 65% higher. The attached spreadsheet shows that the SLR MAIL is 1,988 and LS is 537 ppd assuming that 90% of the MAIL is made available to existing industrial users.

However, our recommendations for administering the ammonia local limits are the same:

- Continue to require and also collect periodic samples of all permitted IU's effluent where ammonia is greater than 30 mg/L, analyze it for ammonia, and calculate the average ammonia mass loading to the sewer.
- Determine those IUs that become subject to ammonia mass limits.

- Remove ammonia mass-loading limits for IUs not discharging more than 30 ppd and only permit IUs with discharges exceeding 30 mg/L and more than 30 ppd of ammonia (approximately 5% of LS influent loading).
- Establish 90% of the MAIL as available to currently discharging major and significant IUs. Ten percent of the MAIL is reserved for new significant IUs and is above the estimated IU's growth.

We recommend that Oceanside maintain their existing ammonia mass discharge limit for Hydranautics until they collect and analyze additional information. As part of the contingency plan prepared by Hydranautics, we recommend that they also submit:

- Current and projected (five year) theoretical maximum and average amine mass loading to the biological treatment system
- Biological treatment system influent and effluent mass loading of ammonia, nitrate, and nitrite
- Measured oxygen uptake rate of the raw wastewater to the biological treatment system

Thank you for the opportunity to provide these additional services. Please contact me if you have any questions.

Very truly yours,

Richard W. von Langen, P.E.
President

Attachment: Oceanside Local Limits Calculation Spreadsheet

cc: Mo Lahsaiezadeh, Oceanside
Mark Hammond, Oceanside
Carrie Dale, Oceanside

E:\Oceanside LL\Deliverables\Revised Ammonia Calcs\NH3 Rev. xmt.docx

City of Oceanside - Development of Technically Based Local Limits

Local Limits Calculation

Industries	Flow MGD	Loadings									
		TDS-Current		BOD-Permitted		BOD-Current		NH3-Permitted		NH3-Current	
Industries discharging to San Luis Rey WRF		*ppd*	*% of Total*	*ppd*	*% of Total*	*ppd*	*% of Total*	*ppd*	*% of Total*	*ppd*	*% of Total*
Deutsch	0.1277	2,167	21%	150	4%	30	3%	100	6%	12	2%
Hydranautics, Inc	0.3386	5,343	52%	2,000	52%	477	52%	1,450	92%	543	96%
West Coast Plating	-										
SEPRO, Inc	0.0095	60	1%			107	12%			1	0.1%
Genentech, NICO/OCP	0.0487	324	3%	400	10%	89	10%	10	1%	6	1%
Genentech, NIMO/OCN	0.1152	2,018	20%	1,300	34%	49	5%	20	1%	1	0.18%
Elite Metal Finishing	0.0009	35	0.3%			0.08	0.01%			0.08	0.01%
Arctic Glacier Premium Ice	0.0250										
Nitto Denko Technical Corp.	0.0021	5	0.1%			2	0.3%			0.01	0.002%
California Creative Foods	0.0255	301	3%			170	18%			1	0.098%
Indigo Labs	0.0001	0.36	0.004%			0.13	0.01%			0.001	0.0001%
Oceanside Ale Works	-										
TOTAL	0.6931	10,254	100%	3,850	100%	925	100%	1,580	100%	563	100%
Industries discharging to La Salina WTP											
Mission Linen Service	0.0794					216	91%				
Metro Roof Products	0.0022					22	9%				
Breakwater Brewery Co	-										
TOTAL	0.0815					238	100%				

Local Limits Based on Uniform Distribution (Except as Noted)

POC	MAIL		Uniform Local Limits			IU Contributory Local Limits		Recommended Local Limit	Current Local Limit
	SLR	LS	SLR	LS	MIN	SLR	LS		
	lbs/day	*lbs/day*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
Ag	19.82	5.80	3.43	8.53	3.430			3.4	0.43
As	0.98	0.16	0.17	0.24	0.169	0.91		0.91	0.5
Cd	0.88	0.16	0.15	0.24	0.153			0.15	0.11
CN	22.75	6.58	3.94	9.68	3.935			3.9	1.2
Cr	93.53	10.73	16.18	15.78	15.778			15	2.77
Cu	19.46	3.81	3.37	5.61	3.366			3.3	3.38
Hg	0.33	0.07	0.06	0.11	0.057			0.057	0.05
Mo	3.28	0.74	0.57	1.09	0.567			0.56	
Ni	10.05	2.92	1.74	4.30	1.739	9.37		9.3	3.98
Pb	5.45	1.10	0.94	1.62	0.943			0.94	0.69
Se	1.99	0.39	0.34	0.57	0.344			0.34	
Zn	24.50	4.30	4.24	6.33	4.239			4.2	2.61
B	15.78		2.73		2.729			2.7	1.0

POC	Available MAIL[a]		Current IU		Available for IU Growth		Permitted	
	SLR	LS	SLR	LS	SLR	LS	SLR	LS
	lbs/day	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*	*lbs/day*
TDS	19,088	NA	10,254	NA	8,834	NA	-	-
BOD	6,482	3,900	925	238	5,557	3,662	3,850	-
NH_4	1,988	537	563	NT	1,425	-	1,580	-

NA-Not applicable

NT-Not tested

[a] If 90% of MAIL made available to existing IU

ATTACHMENT C

CITY OF OCEANSIDE
UPDATED BOD, NH3-N, TDS, AND FLOW DATA STATISTICS
July 9, 2012

Company	Date Range Start	Stop	Average Mass of POC-ppd BOD	NH3-H	TDS	Avg GPD Flow	Comments
ARCTIC	4/14/2010	1/7/2012					Small with only max above ID level for TDS
Average			0.51	0.05	161	9,947	
Maximum			7.80	0.14	320	16,003	
Std Dev			1.59	0.04	77	3,530	
% Variance			312%	77%	48%	35%	
Avg + 2 Std Dev			3.69	0.12	316	17,008	
CCF	2/3/2010	9/16/2011					Above ID level for BOD and TDS; no 2012 data
Average			257	1	447	27,384	
Maximum			1050	1	1,363	37,400	
Std Dev			246	0	304	4,412	
% Variance			96%	31%	68%	16%	
Avg + 2 Std Dev			750	1	1,054	36,207	
DEUTSCH	3/31/2010	8/12/2011					Former TDS significant discharger; ~2% of former MAIL
Average			7	1	181	16,295	
Maximum			28	8	1211	99,484	
Std Dev			8	2	294	25,394	
% Variance			1	176%	162%	156%	
Avg + 2 Std Dev			9	5	184	16,298	
	11/30/2010	8/12/2011					Change in operations; now below ID level
Average			5.3	0.56	50	6,166	
Maximum			24.7	7.82	274	53,856	
Std Dev			6.4	1.82	69	12,995	
% Variance			121%	325%	137%	211%	
Avg + 2 Std Dev			18.1	4.19	187	32,156	
ELITE	5/20/2010	12/15/2011					Small and below ID level for TDS
Average			0	0	23	1,092	
Maximum			0	0	73	1,875	
Std Dev			0	0	21	377	
% Variance			0%	0%	93%	35%	
Avg + 2 Std Dev			0	0	65	1,846	
GENEN	4/20/2010	3/16/2012					
Average			318	8	4,136	117,879	Large; max is ~50% of former MAIL
Maximum			830	23	11,125	169,875	
Std Dev			264	8	2,266	25,094	
% Variance			83%	101%	55%	21%	
Avg + 2 Std Dev			847	23	8,669	168,068	
	5/3/2011	3/16/2012					Large; recent new product; max is ~50% of former MAIL; % variability 44%
Average			357	10	5,342	124,816	
Maximum			830	23	11,125	169,875	
Std Dev			329	9	2,327	22,605	
% Variance			92%	93%	44%	18%	
Avg + 2 Std Dev			1016	28	9,997	170,026	
GENEN_NIC	4/20/2010	4/8/2011					Small; maxium above ID level for TDS
Average			32	0.32	237	31,648	
Maximum			168	1.03	402	41,736	
Std Dev			47	0.22	80	7,023	
% Variance			146%	69%	34%	22%	
Avg + 2 Std Dev			126	0.76	397	45,694	

CITY OF OCEANSIDE
UPDATED BOD, NH3-N, TDS, AND FLOW DATA STATISTICS
July 9, 2012

Company	Date Range		Average Mass of POC-ppd			Avg GPD	Comments
	Start	Stop	BOD	NH3-H	TDS	Flow	
GILEAD	1/10/2012	3/2/2012					New discharger
Average			17	1	246	44,616	
Maximum			32	2	386	49,239	
Std Dev			17	0	102	3,683	
% Variance			100%	51%	41%	8%	
Avg + 2 Std Dev			50	2	449	51,983	
HYDRA	1/12/2010	12/9/2011					Large discharger of BOD, NH3-N, and TDS; maximum TDS is ~20% of former MAIL
Average			427	398	3,526	259,089	
Maximum			837	659	5,110	332,480	
Std Dev			216	127	793	39,067	
% Variance			50%	32%	22%	15%	
Avg + 2 Std Dev			859	652	5,111	337,223	
SEPRO	2/3/2010	3/2/2012					Small; above ID level for BOD, below for NH3-N and TDS; however use all data
Average			268	3	67	12,975	
Maximum			783	37	166	26,068	
Std Dev			291	9	40	4,951	
% Variance			108%	316%	59%	38%	
Avg + 2 Std Dev			850	20	147	22,877	
METRO	3/16/2010	11/18/2011					Small; below ID level for BOD, NH3-N, TDS
Average			14	2	29	1,895	
Maximum			41	4	66	3,142	
Std Dev			10	1	15	611	
% Variance			75%	62%	53%	32%	
Avg + 2 Std Dev			34	3	60	3,118	
MISSION	4/22/2010	12/9/2011					No 2012 data; below ID for BOD, NH3-N; discharges to LS, no TDS issue
Average			163	1	1,123.03	88,991	
Maximum			361	5	1,582.97	100,980	
Std Dev			80	2	266.22	8,720	
% Variance			49%	107%	24%	10%	
Avg + 2 Std Dev			324	4	1,655.46	106,430	
INDIGO	1/26/2010	5/18/2010					Small; below ID level
Average			0.60	0.00	0.83	63	
Maximum			1.94	0.00	1.97	100	
Std Dev			0.83	0.00	0.63	23	
% Variance			138%	98%	76%	36%	
Avg + 2 Std Dev			2.27	0.00	2.09	109	

Discharges to La Salina Wastewater Treatment Plant

CITY OF OCEANSIDE LOCAL LIMITS

COPARISON OF FINAL REPORT (2008-2009 DATA) VS. CURRENT CONDITIONS (2010-2012 DATA)

JULY 2012

SOURCE	IU FLOW--MGD[a]	IU TDS-PPD Addtl[b]	MAIL-PPD-SLR[c]		Available MAIL[d]	Current IU TDS[e]	Available for IU Growth[f]
	SLR	SLR	12 mo Avg	Daily Max	SLR-PPD	SLR-PPD	SLR-PPD
Final Report	0.693	513	24,893	21,209	19,088	10,254	8,834
Rvsd TDS	0.517	489	24,415	20,731	18,658	9,613	9,045
Rvsd/Final	75%	95%	98%	98%	98%	94%	102%

Comments

a IU flow to SLR decreased primarily due to the decrease in flow from Deutsch

b IU growth is based on 5% of the current industrial load

c 10% safety factor used to meet the 12-month average; 20% safety factor used to meet the daily maximum; final report and revised values nearly the same

d Available MAIL is 90% of the MAIL

e Current TDS is 95% of that in the original final report primarily due to the large increase from Genentech

f Overall the final report and current "conditions" are nearly the same; the MAIL available to allocate is also nearly the same

May 8, 2012

Mr. Mark Hammond
Laboratory Director
City of Oceanside, Water Utilities, Wastewater Division
3950 North River Road
Oceanside, CA 92058

Subject: Engineering Services Proposal—Local Limits Technical Support

Dear Mr. Hammond:

RvL Associates, Inc. (RvL) prepared the City of Oceanside's (Oceanside's) local limits report using the most current data (2009) available at that time. Internal questions related to the impact of the proposed total dissolved solids (TDS) discharge limits for industrial users delayed you in reviewing them with the permittees. You are concerned that because the industrial base has changed, the local limits may need to be recalculated.

RvL is pleased to present our proposal for engineering services to provide technical support regarding the Oceanside Local Limits. The services would be on an as-requested and hourly rate and expense basis of $150 and a not-to-exceed amount of $9,800. Tasks may include the following:

1. Meeting to discuss and plan an approach to quickly review and re-calculate the TDS local limits.
2. Perform the calculations and prepare a 2-page letter report summarizing the findings.
3. Assist in the presentation to industries by providing various approaches and developing responses to potential questions.
4. Assist in preparing for Regional Water Quality Control Board meeting related to approval of the Oceanside Local Limits.
5. Other tasks as requested

RvL can proceed within three business days of receiving your authorization to proceed. However, work may be slightly delayed between May 21 to 31, as I will be out of the area and have somewhat limited access to the internet. In general, Items 1 and 2 can be completed within 5 business days, and the remaining items completed within 2 business days with sufficient notice and compatible mutual schedules. To indicate your acceptance of our proposal and your authorization to proceed, please use the information in this letter as the scope of work and compensation to your Professional Services Agreement. Please contact me at (714) 488-1303 if you have any questions. Thank you for this opportunity to provide engineering services to the City of Oceanside. We look forward to working with you.

Respectfully yours,

RvL ASSOCIATES, INC.

Richard W. von Langen, P.E.
President