2008 Annual Reports and Summary for the South Bay Wastewater Reclamation Plant & Ocean Outfall

NPDES No. CA 0109045
Order No. 2006-067
&
Order No. 2000-203

ISO 14001

THE CITY OF SAN DIEGO

June 30, 2009

Mr. John Robertus, Executive Officer
California Regional Water Quality Control Board
9174 Sky Park Court, Suite 100
San Diego, CA 92123

Attn: POTW Compliance Unit

Dear Mr. Robertus:

Enclosed are the 2008, Annual Reports and Summary, South Bay Water Reclamation Plant and Ocean Outfall as specified in discharge Order No. 2006-067, NPDES Permit No. CA0109045.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, I certify that the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

ALAN C. LANGWORTHY
Deputy Director
Environmental Monitoring & Technical Services Division

SWM

cc: EPA Region 9
San Diego County Department of Environmental Health
Distribution
File

Environmental Monitoring and Technical Services Division • Metropolitan Wastewater
2392 Kincaid Road • San Diego, CA 92101-0811
Tel (619) 758-2300 Fax (619) 758-2309

City of San Diego
Metropolitan Wastewater Department
Environmental Monitoring & Technical Services Division

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South Bay Wastewater Reclamation Plant and Ocean Outfall Annual Monitoring Report 2008

City of San Diego
Metropolitan Wastewater Department

Environmental Monitoring & Technical Services Division
Wastewater Chemistry Laboratory
5530 Kiowa Drive
La Mesa, CA 91942
Phone: (619) 668-3215 FAX: (619) 668-3284

Supervising Editors & Science Staff:
Steve Meyer
Brent Bowman

Editorial Production & Support
Corinna Quinata

Data Management, Report Generation, Data Tables & Graphics
Armando Martinez

Operations & Maintenance Division
2411 Dairy Mart Road
San Diego, CA
Phone: (619) 428-7306 FAX: (619) 428-6915

South Bay Wastewater Reclamation Plant Superintendent
Michael Roe

Senior WW Operations Supervisor
Ernesto Molas

Senior Plant Technician Supervisor
Bill Graham

WW Operations Supervisor- Process Control
Linda Ruiz Lopez

Senior Civil Engineer
Mike Faramarzi

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I. Introduction

A. Executive Summary:

Purpose:

This report meets the annual reporting requirements of Monitoring and Reporting Program (MRP) Order No. R-2006-067 (NPDES Permit No. CA0109045), as well as the requirements of Order No. 2000-203 relating to the production and purveyance of recycled water at the South Bay Water Reclamation Plant (SBWRP). It also serves as a historical record and reference of operational and compliance metrics of value to the public, policy makers, and technical users.

Background:

The South Bay Water Reclamation Plant (SBWRP) is located at the intersection of Dairy Mart and Monument Roads in the Tijuana River Valley. The plant relieves the South Metro Sewer Interceptor System and provides local wastewater treatment services and reclaimed water to the South Bay. The plant opened in May 2002 and has a wastewater treatment capacity of 15 million gallons a day. The plant shares the South Bay Ocean Outfall (SBOO) with the International Wastewater Treatment Plant operated by the U.S. Section of the International Boundary and Water Commission (IBWC). While the plant has been operating since May 2002, distribution of reclaimed water started 4-years later in July 2006. The volume reclaimed and distributed varies depending on demand for recycled water.

During 2008, the plant received and treated 3.173 billion gallons of wastewater, reclaiming 75% or 2.378 billion gallons. Sixty nine percent of the reclaimed water was beneficially reused by the Otay Water District, the International Treatment Plant, or used for in-plant processes. During the warmer periods, virtually 100% of the reclaimed water was reused.

Key metrics for 2008	**Daily Average Flow (mgd)**	**Total Annual Flow** (million gallons)
Influent to plant (Raw Wastewater Treated)	8.67	3,173
Effluent to Ocean Outfall	3.20	1,167
Reclaimed Water Produced	6.49	2,378
Beneficial Reuse (recycled water distributed)	4.46	1,638
Sludge and returns to South Metro Interceptor (SMI)	1.64	601
Plant Use of Reclaimed Water	0.68	250

For a detailed discussion of the plant and treatment process see sections I. F., Plant Facility Operation Report, and Chapter III. Plant Operations Summary.

Compliance:

Effluent to Ocean Outfall (NPDES) Discharge:

We believe that the discharge to the ocean from SBWRP was within discharge limits. However, as a consequence of maximizing the production and distribution of Reclaimed Water, the discharge to the SB outfall decreased considerably. At many times essentially no flow was discharged to the outfall. Between April and August 2008, the samples taken for monitoring were frequently impacted by the extremely low flow/no flow conditions. We believe that the configuration of the shared outfall structure allows International Wastewater Treatment Plant (IWTP) primary effluent to backup into the intake for our SBWRP effluent sampler. This was confirmed by engineering evaluation of the hydraulic profile of the SB outfall line and the diversion box where the SB outfall and IWTP effluent flows mix. The higher values of the monitored constituents (e.g. BOD, TSS, TDS, etc.) are more characteristic of the primary effluent and the data makes it appear to be exceedances of the discharge limits. See section E. Discussion of Compliance Record, for details.

Recycled Water:

There was one exceedance of limits in 2008 for recycled water, for exceeding the limit on total coliforms. The problem in reducing total coliforms was traced to algae growth on the walls of the UV disinfection cells which reduced the effectiveness of disinfection. A number of solutions were considered and dosing of chlorine at low dose (>0.5 mg/l) was introduce in April 2007 to inhibit the growth of algae in the channel and on the UV lamps. The consistency of the disinfection process was improved and bacteriological exceedances have not reoccurred.

B. Explanatory Notes:

The past year's data is presented in tabular and graphical form. Presented in this report are annual monitoring results, as well as special items and discussions itemized in the permits. This document is comprehensive, including supporting information on analytical methods, frequency and changes in analyses, long term tables of selected analytes, operational data, background analyses and treatment plant process control. Where the permit sets limits or requests the analysis of various groups of compounds (such as chlorinated and non-chlorinated phenols, PCBs, hexachlorocyclohexanes, etc.) we have provided summaries and averages of these groups and also of the individual compounds.

The Recycled Water Users Summary Report as described in Permit No. 2000-203 is submitted separately from this report. However, we do include summary information and an evaluation of the Water Reclamation and beneficial reuse integral to the operations of the plant. Section 7 contains a thorough presentation and evaluation of the Reclaimed Water process information and monitoring data.

Note that, for averaging purposes, "less than" and "not detected" (nd) values were treated as zeros. In many parts of the report zero values are found. Our computer system reads "less than" values as zero for summaries, as well as in computing averages. In those areas where zeros are found the reader can find appropriate method detection limits (MDL) in the table of data. Because "less than" values are averaged as zero a number of the summary table values are lower than the detection limits. The data tables may also contain values expressed as a <X (less than) with some number X.

A further limitation is that statistical confidence in the results of an analysis is heavily dependent upon the concentration relative to the Method Detection Limit (MDL). Essentially all of our detection limits have been established using the procedure in 40 CFR, part 136. This statistical basis for the MDL results in a defined statistical confidence (at the 99% Confidence Interval) of essentially ±100% of the result at or near the MDL. Only at concentrations approximately 5 times the MDL is the confidence interval at ±20% relative. While the precision of our methods generally ranges from 2-3 significant figures, the above limitations of confidence should always be considered.

Where possible, the influent and effluent values of a given parameter have been included on the same graph to make the removals and other relationships readily apparent. Please note that many of the graphs are on expanded scales that don't go to zero concentrations but show, in magnified scale, that range of concentrations where variation takes place. This makes differences and some trends obvious that might normally not be noticed however, it also provides the temptation to interpret minor changes or trends as being of more significance than they are. Frequent reference to the scales and the actual differences in concentrations is therefore necessary.

"E" Qualifier, estimated concentrations:

Ocean data for several of the trace organics (e.g. chlorinated pesticides and PCB congeners, etc.) contains data that is qualified with a prefixed "**E**" (see example below). This indicates Estimated concentrations. Analytical technique is sufficiently specific and sensitive enough (GC-MS-MS) so that qualitative identification has high confidence while the quantitative data is below 40CFR136 confidence intervals for MDL concentrations. The concentrations reported with this qualifier indicate that one or more tests identified the compound but it was below detection limits for quantitation. When reported as part of annual averages, an "E" qualifier may accompany average concentration values either below or above MDLs.

Analyte	MDL	Units	SD-14 2001 Avg	SD-17 2001 Avg	SD-18 2001 Avg	SD-19 2001 Avg	SD-20 2001 Avg	SD-21 2001 Avg	RF-1 2001 Avg
Hexachlorobenzene	13.3	UG/KG	<13.3	<13.3	<13.3	<13.3	E3.7	<13.3	**E2.8**
BHC, Gamma isomer	100	UG/KG	ND	ND	ND	ND	ND	ND	ND
Heptachlor	20	UG/KG	ND	ND	ND	ND	ND	ND	ND
Aldrin	133	UG/KG	ND	ND	ND	ND	ND	ND	ND
Heptachlor epoxide	20	UG/KG	ND	ND	ND	ND	ND	ND	ND
o,p-DDE	13.3	UG/KG	<13.3	E43.5	<13.3	E107.0	<13.3	<13.3	**E22.0**
Alpha Endosulfan	133	UG/KG	ND	ND	ND	ND	ND	ND	ND
Alpha (cis) Chlordane	13.3	UG/KG	<13.3	<13.3	ND	<13.3	<13.3	ND	<13.3
Trans Nonachlor	20	UG/KG	E11.3	<20.0	<20.0	<20.0	<20.0	<20.0	<20.0
p,p-DDE	13.3	UG/KG	713.0	1460.0	459.0	2030.0	618.0	693.0	712.0
Dieldrin	20	UG/KG	ND	ND	ND	ND	ND	ND	ND
o,p-DDD	13.3	UG/KG	ND	ND	ND	<13.3	<13.3	<13.3	<13.3
Endrin	20	UG/KG	ND	ND	ND	ND	ND	ND	ND
o,p-DDT	13.3	UG/KG	<13.3	ND	ND	<13.3	<13.3	ND	<13.3
p,p-DDD	13.3	UG/KG	E7.5	E5.5	<13.3	<13.3	E7.8	<13.3	E18.2
p,p-DDT	13.3	UG/KG	E5.9	<13.3	<13.3	<13.3	E5.4	<13.3	<13.3
Mirex	13.3	UG/KG	<13.3	ND	ND	ND	ND	ND	ND

nd= not detected
NA= not analyzed
NS= not sampled
E=estimated value, value is less than the Method Detection Limit but confirmed by GC/MS-MS

C. Overview of the Metropolitan Wastewater (Metro) System

The City operates wastewater facilities to transport, treat, reclaim, reuse, and discharge wastewater and its by-products collected from the Metropolitan Wastewater System (the System). The System serves a population of approximately 2.2 million people providing for conveyance, treatment, reuse, and disposal of wastewater within a 450 square mile service area. The Metro System currently consists of several service areas including the City of San Diego (serviced by the Municipal Sub-System) and the 15-regional Participating Agencies. Wastewater treatment for the System is provided at the North City Water Reclamation Plant (NCWRP), the South Bay Water Reclamation Plant (SBWRP), and the Pt. Loma Wastewater Treatment Plant (PLWTP). Solids treatment and handling provided at the PLWTP and the Metro Biosolids Center (MBC). The City of San Diego contributes approximately 65% of the flow in the Metro System with the remainder coming from the Participating Agencies.

Each Participating Agency is responsible for the wastewater collection system within its boundaries to the point of discharge to the System. Wastewater flows from the Municipal Sub-System comprise approximately 65% of the Metro Sub-System flows. All System facilities are owned by the City of San Diego and are managed by MWWD.

A map detailing major facilities in the System and the participating agencies is included.

The System is a complex system of pipelines and pump stations that collect wastewater and convey it for treatment and disposal or reuse. The PLWTP serves as the terminus for the System and is capable of treating all flows generated within the System. Within the System are two water reclamation plants, the NCWRP and the SBWRP, that pull flow from the sewers for treatment and reuse. The System also includes the Metro Biosolids Center (MBC) which treats and disposes of all treatment process solids material removed by the treatment plants.

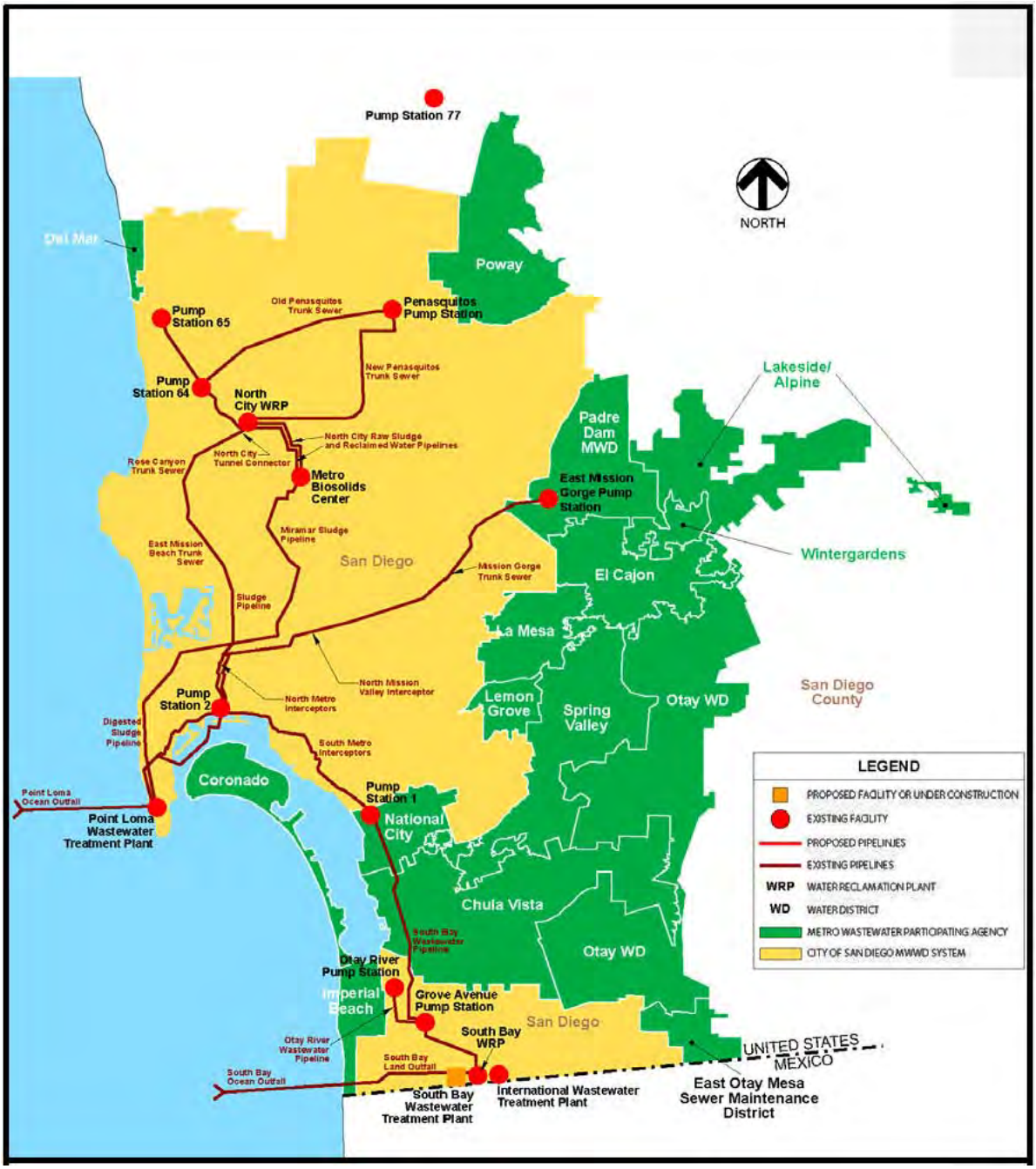
The PLWTP is the largest of the wastewater treatment plants in the System. The PLWTP is an advanced primary treatment WWTP that uses chemical addition to increase performance of the primary clarifiers and is the terminus for the System. The PLWTP discharges effluent through the Pt. Loma Ocean Outfall (PLOO). As an advanced primary treatment WWTP, performance is not measured entirely by effluent quality, but also against the California Ocean Plan and the Basin Plan which address the water quality and beneficial uses of the Pacific Ocean.

The plant has a rated capacity of 240 million gallons per day (mgd) average daily dry weather flow, 432 mgd peak wet weather flow, and currently operates at 168 mgd. The NCWRP has a rated capacity of 30 mgd and currently operates at a nominal flow-rate of 22.5 mgd. The SBWRP has a rated capacity of 15 mgd and is currently treating a nominal 9.5 mgd. The PLWTP is a modern primary treatment facility and the NCWRP and SBWRP are both modern tertiary treatment facilities.

The other two facilities, the NCWRP and the SBWRP are scalping plants that divert water from the System and treat it for reclamation purposes. Both plants currently operate as secondary treatment plants and reclaim water to tertiary standards to meet demand. Demand will fluctuate depending on the time of year and the type and number of customers. The NCWRP returns all secondary effluent that is not reclaimed back to the System for treatment at the PLWTP. However, the solids that are removed, either by sedimentation or biological oxidation, are pumped to the MBC for further treatment. The SBWRP discharges excess secondary effluent to the SBOO and returns all solids removed from the sewage to the System for transport to the PLWTP. Performance of both water reclamation plants is measured by each facility's ability to

treat reclaimed water to the required standards when discharging to the reclaimed system. Performance of the SBWRP is also measured via secondary treatment standards, as defined in the facility's NPDES permit, when discharging to the South Bay Ocean Outfall (SBOO).

The MBC processes primary and secondary solids from the NCWRP through anaerobic digestion and dewatering, and processed the digested biosolids from the PLWTP through dewatering. The dewatered biosolids are beneficially used as cover at a local landfill or used as a soil amendment for agricultural purposes. The centrate from the centrifuges is returned to the sewer and treated at the PLWTP. Performance of this facility is measured by the quality of the solids product generated for use or disposal.



ISO 14001 Certification

Wastewater Treatment and Disposal Division (formerly called Operations and Maintenance Division) and the Monitoring and Reporting Programs operated by the Environmental Monitoring and Technical Services Division has been certified in ISO[1] 14001, Environmental Management Systems.

[1] International Standards Organization

D. Overview of SBWRP

The **South Bay Water Reclamation Plant (SBWRP)** relieves the South Metro Sewer Interceptor System and provides local wastewater treatment services and reclaimed or recycled water to the South Bay. The plant opened in May 2002 and has a wastewater treatment capacity of 15 million gallons a day. The plant design incorporates the newest technologies and provides advanced treatment for up to 15 million gallons of wastewater per day.

The advanced treatment meets tertiary or reclaimed water standards including disinfection. The SBWRP treatment process is a state-of-the-art implementation of traditional secondary treatment using activated-sludge. Much of the secondary effluent is reclaimed and beneficially reused after tertiary filtration through anthracite coal beds and disinfection with high-intensity ultraviolet (UV) light. The plant shares the South Bay Ocean Outfall (SBOO) with the International Wastewater Treatment Plant (IWTP) operated by the U.S. Section of the International Boundary and Water Commission (IBWC).

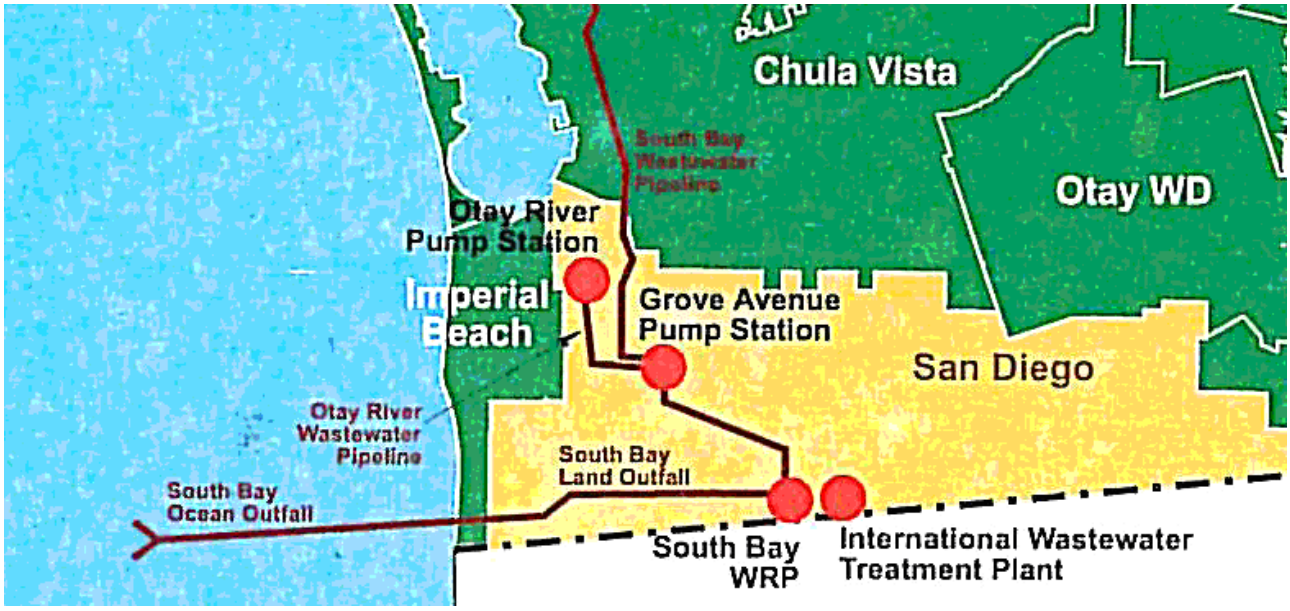
Treatment processes consist of mechanical bulky debris and grit removal at the headworks using standard traveling bar screens and aerated grit chambers. The removed debris is then dewatered and taken to landfills. Suspended solids of wastewater are removed by primary sedimentation. Scum removal is concurrent with primary sedimentation. Primary effluent is followed by industry standard aerated activated sludge secondary treatment. Secondary clarifiers allow settling and removal of the remainder of the solids (also called sludge) which is returned to the Metro System via the South Metro Interceptor and is pumped to the Pt. Loma WWTP. The resultant secondary effluent is either discharged to the South Bay Ocean Outfall or directed to tertiary treatment in the plant.

In 2008, approximately three quarters of the influent treated was directed to tertiary treatment. Tertiary treatment consists of running the secondary effluent through anthracite coal beds where it is filtered of remaining solids as it passes through the layered medium. The filtered water then passes through chambers where it is disinfected through exposure to high-energy ultraviolet light (UV). At this stage the "reclaimed" water meets State Title 22 full body contact requirements. Recycled or reclaimed water is beneficially reused for in-plant processes at SBWRP, at the nearby International Wastewater Treatment Plant and an increasing percentage of the recycled water is distributed to the Otay Water District for non-potable beneficial reuse off-setting demands for traditional potable water sources.

South Bay Ocean Outfall (SBOO)

The South Bay Water Reclamation Plant (SBWRP) is located at 2411 Dairy Mart Road, San Diego, CA 92154. It sits at the intersection of Dairy Mart and Monument Roads in the Tijuana River Valley just meters north of the U.S.-Mexico International border. The plant provides additional treatment capacity and reclaimed water for the southern service area of the Metro System (South Metro Sewer Interceptor System).

The South Bay Ocean Outfall extends approximately 3.5 miles offshore and discharges effluent in approximately 100 feet of water. The outfall tunnel has an 11 foot diameter and is 19,000 feet long.



E. Discussion of Compliance Record

The South Bay Water Reclamation Plant operates with two separate permits. NPDES Permit No.CA0109045/ Order No. 2006-067(with addenda) provides for the treatment and disposition of wastewater via the shared South Bay Ocean Outfall and Reclaimed Water Permit No. 2000-203 (with addenda) provides for water reclamation.

Recycled (Reclaimed) Water:

This is the third year of operating where reclaimed water was produced and distributed. There was one exceedance of recycled water limits in 2008; for exceeding the limits on total coliforms. The problem in reducing total coliforms was traced to algae growth on the walls of the UV disinfection cells which reduced the effectiveness of disinfection. A number of solutions were considered and dosing of chlorine at low dose (>0.5 mg/l) was introduce in April 2007 to inhibit the growth of algae in the channel and on the UV lamps. The consistency of the disinfection process was improved and bacteriological exceedances have not reoccurred.

Reclaimed Water Permit No. 2000-203		
Month	Number of measures exceeding Limits.	**Comments:** (see monthly report for further details.)
January 2008	none	On December 13, 18, 19, 25, 26, 27 samples were time paced vice flow-proportioned composites.
February 2008	none	
March 2008	none	
April 2008	none	
May 2008	none	
June 2008	none	
July 2008	none	
August 2008	none	
September 2008	none	
October 2008	none	
November 2008	1	More than one sample exceeded MPN of 23. On November 20&25 MPN was 33 and 34 respectively.[2]
December 2008	none	
Total:	1	

[2] Order 2000-203 is not specific about compliance determination. There may be some ambiguity in whether the exceedance of reclaimed water limits in this case constitute more than a single exceedance.

Ranges of Constituents in Reclaimed Water, 2008.

Waste Discharge and Water Recycling Requirements for the South Bay Water Reclamation Plant (Order No. 2000-203)				
Parameter	**Permit Limits**		**Measured Values CY 2008**	**Notes**
BOD_5	Monthly Average	30 mg/L	ND – 3.0	
	Daily Maximum	45 mg/L	ND – 13.5	
Total Dissolved Solids (TDS)	Monthly Average	1,200 mg/L	863 – 969	
	Daily Maximum	1,300 mg/L	685 – 1180	
Sulfate	Monthly Average	250 mg/L	183 – 211	
	Daily Maximum	300 mg/L	"	
MBAS	Monthly Average	0.5 mg/L	0.13 – 0.46	
	Daily Maximum	0.7 mg/L	"	
Iron	Monthly Average	0.3 mg/L	ND – 0.125	
	Daily Maximum	0.4 mg/L	"	
Fluoride	Monthly Average	1.0 mg/L	0.375 – 0.608	
	Daily Maximum	1.2 mg/L	"	
Coliform	7-Day Median	2.2/100-mLs	<1.8 – 2	
Turbidity	24-hour Average	2 NTU		
	5 % of time in a 24-hour period	5 NTU		
	Instantaneous Max	10 NTU		
pH	Range	6.0 – 9.0 pH	7.10 – 7.89	

Ocean Discharge:

We believe that the discharge to the ocean from SBWRP was within discharge limits. As summarized on the tables on the following pages, there were a number of measured or calculated values (e.g. Average Monthly Concentrations, etc.) that exceeded effluent limitations but those were based on samples adversely impacted by the backflow of primary effluent from the International Wastewater Treatment Plant (IWTP) into the 72-inch effluent line to the Effluent Distribution Structure (EDS), see Figure I.E.1. We have reported both sets of data, the comprehensive data that includes the adverse impacts and, in separate tables/graphs, the data where we could clearly identify that metrics indicated that material un-representative of the effluent from SBWRP dominated the sample. The re-evaluation and reporting of effluent quality data here included only TSS, VSS, BOD, TDS, Turbidity, and the TSS & BOD Removals.

As a consequence of maximizing the production and distribution of reclaimed water, the volume discharged to the South Bay Ocean Outfall (SBOO) decreased considerably and, at times, the effluent flow was essentially zero. The greatest impacts were between April and August 2008, when reclaimed water demand peaks. Monitoring samples were frequently impacted by the extremely low flow/no flow conditions and were unrepresentative of the actual effluent quality during these periods. Evaluating the monitoring data after excluding the days with obvious backflow impacts, shows all constituents met Effluent Limitations of the permit.

The criteria for evaluating and excluding adversely impacted data was a conservative one based on flows and other empirical information. A complete description of the criteria and evaluation process is included as a subsection, Assessment of Adverse Effects on the SBWRP Effluent Samples. The tables on the following pages, and in Section II. Influent and Effluent Data Summary, show both the original data and the data with the adverse impacts excluded.

Compliance Issues by Month – 2008 – **Adverse Impacts Excluded**

NPDES Permit No.CA0109045/ Order No. 2006-067		
Month	Number of measures exceeding Discharge Limits.	**Comments:** (see monthly report for further details.)
January	None	
February	None	
March	None	
April	None	
May	None	
June	None	
July	None	
August	None	
September	None	
October	None	
November	None	
December	None	
Total:	None	

NPDES Permit No.CA0109045/ Order No. 2006-067		
Month	Number of measures >Limits- including unrepresentative data.	**Comments:** (see monthly report for further details.)
January	None	
February	None	
March	None	
April	None	
May	6	Average Monthly BOD concentration (58.9-mg/L) and %Removal (81%) exceeded Limits of 30-mg/L and not less than 85%, respectively. Weekly Average BOD concentrations exceeded the 50-mg/L limit.
June	5	Average Monthly BOD concentration (70.5-mg/L) and %Removal (79.2%) exceeded Limits of 30-mg/L and not less than 85%, respectively. Weekly Average BOD concentrations exceeded the 50-mg/L limit on 3 occasions.
July	5	Average Monthly BOD concentration (50.5-mg/L) and %Removal (84.5%) exceeded Limits of 30-mg/L and not less than 85%, respectively. Weekly Average BOD concentrations exceeded the 50-mg/L limit on 3 occasions.
August	4	The Monthly Average BOD concentration was 33.7-mg/L, exceeding the limit of 30-mg/L. Two Average Weekly concentration limits were exceeded. The Average Weekly Turbidity for the week ending August 16th was 113.6 above the permit specified limit of 100.
September	None	
October	None	
November	None	
December	None	
Total:	20 qualified	

Assessment of Adverse Effects on the SBWRP Effluent Samples

The SBWRP first came online in 2002 and operated as an advanced treatment plant until 2006. All treated wastewater was discharged to the ocean and the removed solids returned to the Metro System and ultimately to the Pt. Loma Wastewater Treatment Plant. All NPDES limits on effluent constituents were fully met from 2002 through 2006.

Full production and distribution of reclaimed water began on July 6, 2006 with distribution of reclaimed water for beneficial reuse. Plant processes and protocols were established to meet the demand for reclaimed water by reuse customers. These were essentially automated. Beginning in 2007, the high demand and reuse of reclaimed water lead to the diversion of extremely high percentages of the treated wastewater stream to beneficial reuse, minimizing discharge to the Pacific Ocean. During high demand periods, particularly hot/dry weather, there were extended and episodic periods when the effluent to ocean from SBWRP was essentially zero or nearly so. Since beginning full-scale water reclamation, we have identified inconsistencies in monitoring data and in the levels of constituents in the samples taken from the effluent to ocean (SB_OUTFALL_00) sample point. We noted higher than expected values for TSS, BOD, and other constituents, sometimes to a level exceeding effluent permit limits. An examination of the entire treatment and sampling process was conducted to identify and solve the problem. With the benefit of a retrospective evaluation of the entire operating profile, discharge structures, and sampling system design, we now have a clear idea of the nature of the problem and have applied a technical correction treatment to the monitoring data to provide an accurate representation of effluent quality and plant performance in 2008. We have also installed a completely redesigned sampling system for effluent monitoring as of June 2009.

The Problem:

The sampling point (SB_OUTFALL_00) for effluent to ocean outfall monitoring was not able to provide unambiguously representative samples under certain conditions. When the plant is reclaiming and distributing a significant portion of the plant flow, the effluent sample point is impacted by backflow from the International Wastewater Treatment Plant (IWTP) due to the design of the Effluent Distribution Structure (EDS) and the sampling point (intake port) for effluent monitoring. The EDS is a largely subterranean vault where both effluents from the IWTP and SBWRP combine prior to discharge to the Outfall pipe. The configuration permits IWTP effluent to backflow into the SBWRP 72-inch effluent pipe leading into the EDS when SBWRP effluent flows are very low or zero. The sample intake port for the original effluent (SB_OUTFALL_00) sampling point are within the backflow impacted levels, the sample does not appropriately represent the discharge by SBWRP. In fact, during periods of high demand for reclaimed water, the discharge may be effectively zero. Sample is still taken since the pipe has "flow", albeit from IWTP backflow. If there was not a high demand for reclaimed water, and at least a fair portion (≥2-MGD) of the SBWRP treated wastewater is continuously discharged, then the pipe to the Effluent Distribution Structure (EDS) would remain filled with SBWRP effluent and prevent IWTP effluent from impinging on the sample intake port in the 72-inch line. IWTP flows are virtually continuous and significantly higher

than the flows from SBWRP, while SBWRP will vary considerably, virtually guaranteeing such a situation.

In retrospect, the constituents in the affected samples have shown inconsistencies during those same periods. These inconsistencies include, for example:

- Significant deviations from norms,
- Significantly greater concentrations of constituent in effluent than in influent,
- Constituent levels inconsistent with the level of treatment and plant performance at SBWRP (but more consistent with the effluent from IWTP)

The results of monitoring have been reported uncensored in each Monthly Monitoring Report during 2008. While that data is also summarized in this report, we have updated the summary data to exclude those days when adverse impact from the backflow is compelling.

The entire impact hinged on the amount of flow discharged through the SBWRP effluent 72-inch pipe. While it is clear that a sufficient volume of effluent is necessary to prevent backflow, exactly what volume permits backflow is not absolutely known and we have made a reasonable approximation. A conservative and relatively simple criteria was empirically derived using the flow data for the Reclaimed Water Distributed to beneficial reuse (not discharged) and the Effluent to EDS flows and the correlation to other constituent concentrations, particularly TDS (Total Dissolved Solids). In order to have a representative picture of plant performance and effluent quality, we developed formulistic criteria for evaluating the effluent data by excluding those days where the backflow clearly adversely impacted the monitoring data. Summary data identified as Adverse Impacts Excluded is data that results when the exclusion criteria were applied.

Exclusion criteria: Dates where:

1. Reclaimed Water (distributed) Flow is $\geq$ 2-MGD, and
2. Effluent to EDS Flow is $\leq$ 2-MGD.

This criteria was applied only to selected constituents, primarily those having frequent monitoring and an abundance of data:

- TSS (Total Suspended Solids) and VSS (Volatile Suspended Solids),
- BOD (Biochemical Oxygen Demand),
- Turbidity,
- TDS (Total Dissolved Solids),
- Removal rates for TSS and BOD.

While other constituents were obviously impacted, no other monitoring data was adjusted using the above criteria. Since other data may be very limited (e.g. monthly only) the application of the criteria could result in no data for extended periods, it was left as is for this report.

Adverse impacts likely occurred during any portion of a given operating day (midnight-to-midnight). Reclaimed distribution and discharge to the EDS is not constant and any

portion of a day may be affected at some or several times during the day. Part of the reason for the more conservation 2-MGD flow threshold for the exclusion criteria, is that it is not possible to discriminate to a finer detail level than a whole day. Particularly since the monitoring samples were generally 24-hour composites.

The following describes in further detail some of the factors and issues identified in trouble-shooting the problem. Data inconsistencies and correlations that lead to the development of our conclusions and exclusion criteria are further detailed as well.

Hydraulic profile

SBWRP effluent flow consists of secondary effluent and unused tertiary effluent that would otherwise meet demand for recycled water. The SBWRP process has protocols (largely automated) to set treatment priorities that are dependent on customer demand for reclaimed (recycled) water. Demand determines the amount of secondary effluent sent to tertiary filters and disinfection to produce reclaimed water for distribution to customers for reuse. Both tertiary and secondary flows can be diverted to the EDS for discharge through the SBOO should demand be less than the total plant output. In all cases, the SBWRP effluent consists of excess tertiary and secondary effluents in varying proportions, no other flows are discharged.

Effluent from the SBWRP, discharged to the SBOO, flows through individual connections to the 72-inch pipe that leads to the Effluent Distribution Structure (EDS) as shown in Figure I.E.1. Primary effluent from the IWTP also enters the EDS on the same side. The combined effluent must overflow the weir to be discharged to the outfall pipe. Since the weir in the EDS is at a higher elevation than the 72-inch effluent line to the EDS from SBWRP, any levels in the EDS will backflow into the effluent line in the absence of outgoing flows to counter it. Since the 72-inch pipe remains charged at all times, samples taken from the original sample intake port at the down-stream end of the 72-inch pipe will be of the dominate material at the time, including a high percentage of the ITWP primary effluent, given the low-flow states during peak reclamation discussed.

We have developed and installed (in 2009) an entirely new sampling process that isolates and captures the effluent streams before they enter the 72-inch outfall pipe to the combine Effluent Distribution Structure (EDS), eliminating the possibility of backflow contaminated samples.

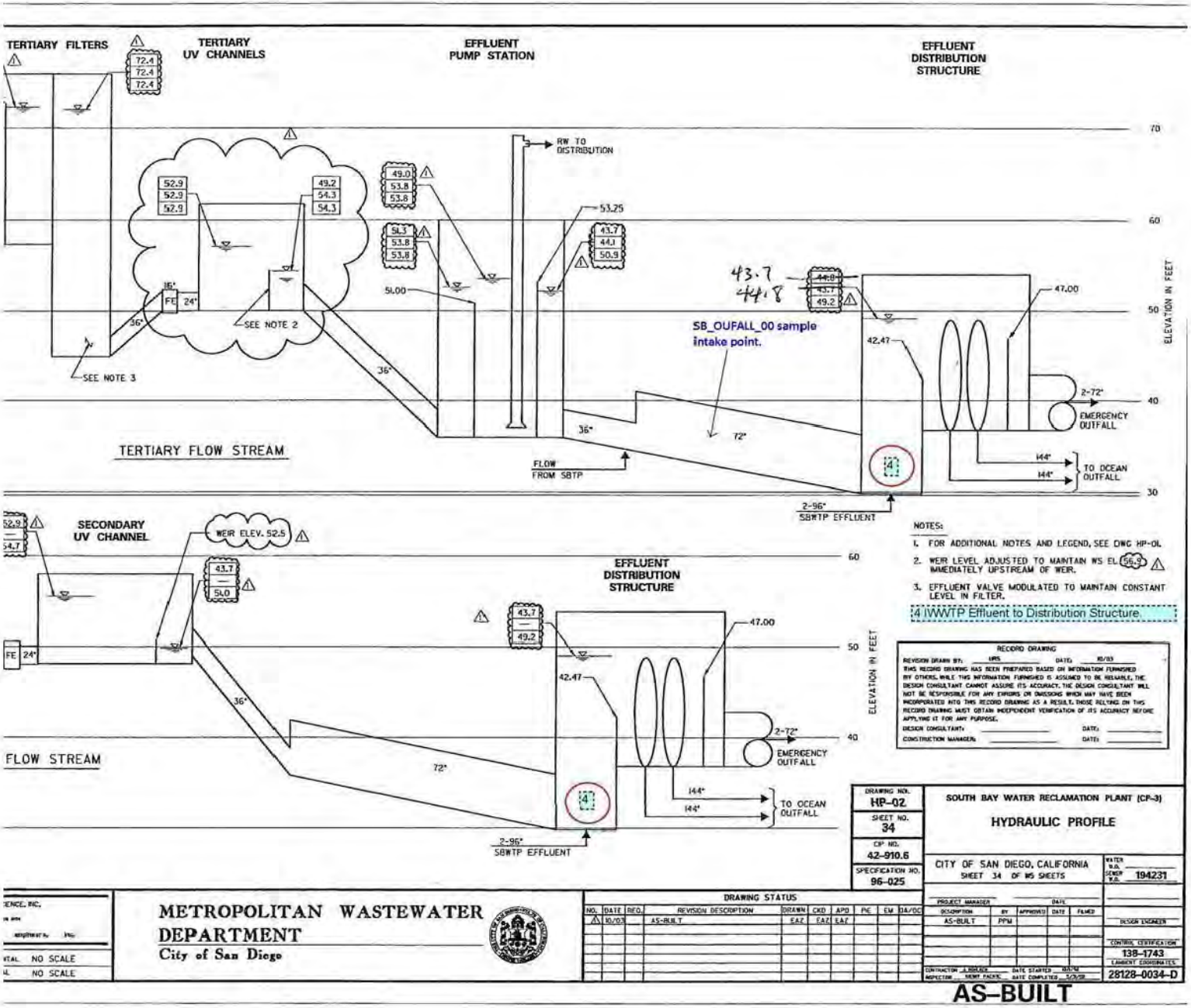


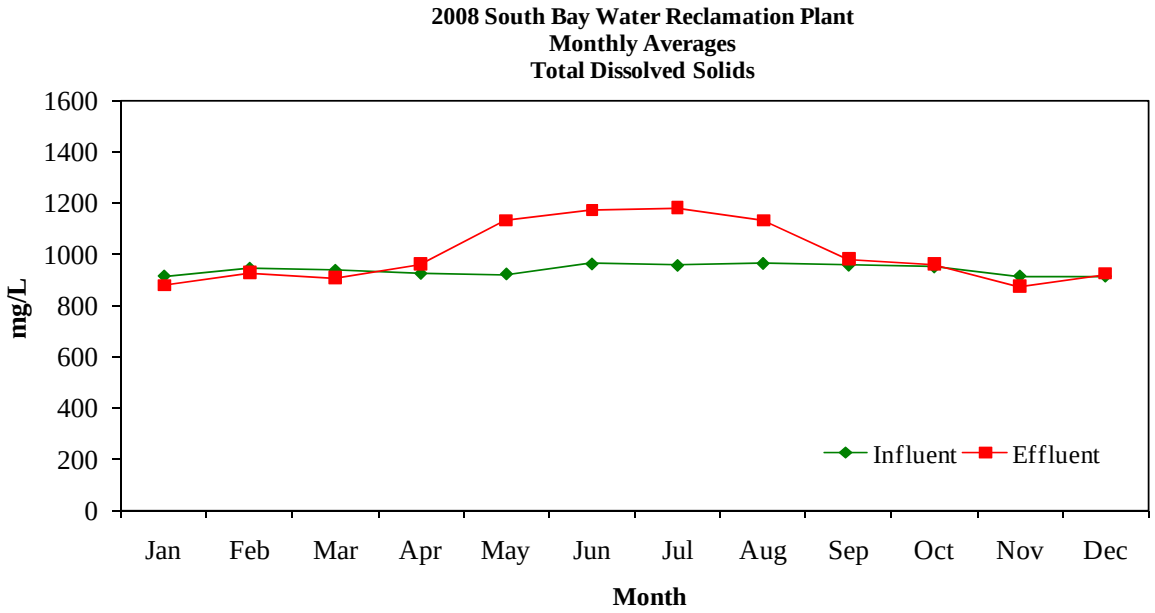
Figure I.E.1- SBWRP Effluent to Distribution Structure

Data Inconsistencies

TDS:

A number of constituents also provided a retrospective view of the uncharacteristic data. Chief among these is TDS which consists of dissolved minerals, and other soluble solids common in wastewater. Since TDS is neither removed or added in the treatment processes at SBWRP, TDS concentrations should be the same in influent and effluent. Since the IWTP and SBWRP Influent[3] TDS values are consistently different[4], when effluent TDS significantly diverges from the influent concentration, there must be a contribution from a higher TDS stream.

The impact of a different stream on the effluent sample is clear in the charts on the following page (Figure I.E.2a and .2b) showing the influent, reclaimed, and effluent (unadjusted) TDS for SBWRP. The effluent levels, shown in red, should actually follow the profile of influent and reclaimed water, but for the adverse impacts of the IWTP high TDS effluent. The higher impacts clearly show in the divergences in May through August 2008, correlating well with the flow criteria used to discriminate impacted data. While it does provide clear evidence of the impacts, TDS, by itself, was not an entirely satisfactory discriminator. The TDS data set did not include daily values, and was frequently limited to 4 or 5 data points per month.



3 Using only clearly unimpacted TDS values.
4 IWTP average TDS (2006 Annual Report) is 1,575-mg/L vs SBWRP TDS of 1,060-mg/L (2008).

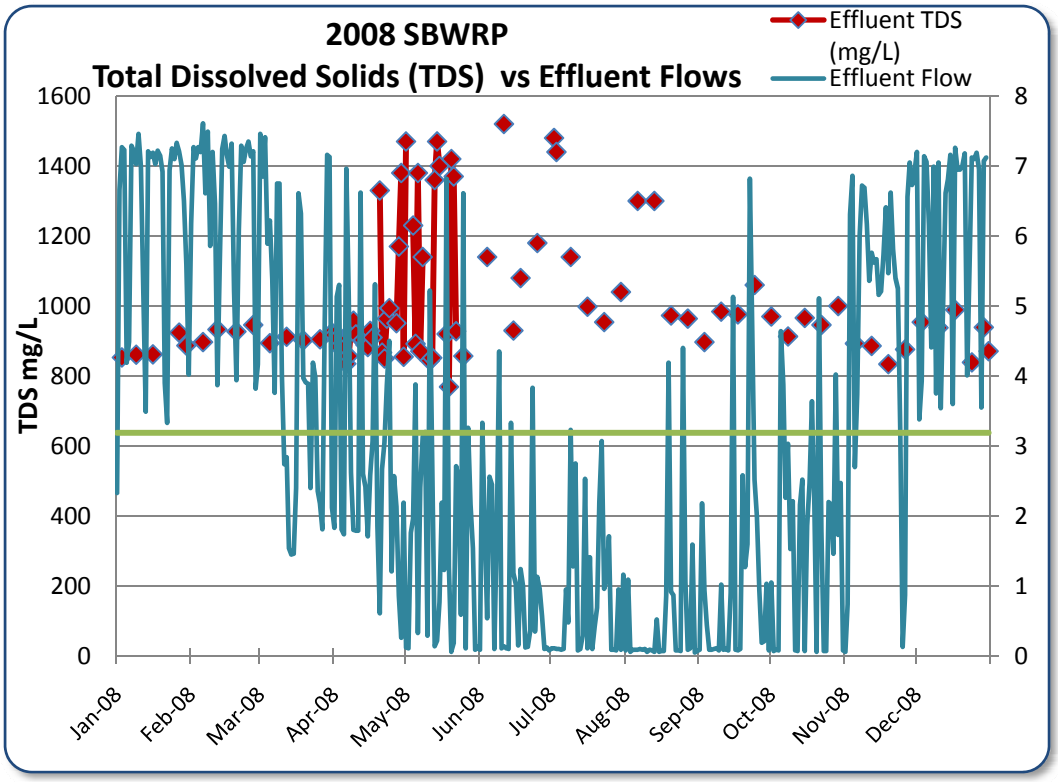


Figure I.E.2a SBWRP TDS vs. Effluent Flows – Strong Correlation between high TDS and flows.

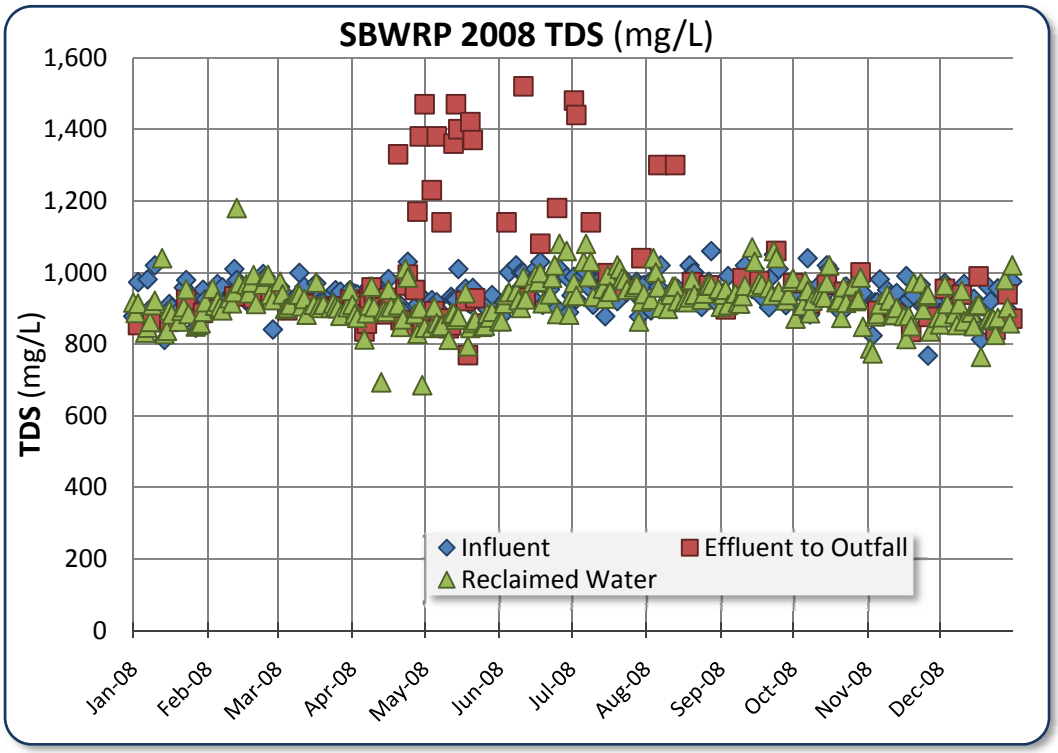


Figure I.E.2b SBWRP TDS 2008 – Clear departures from influent levels and norms.

Other constituents:
Several other constituents showed similar patterns as TDS, for example: minerals, BOD, ammonia-N, Turbidity, and some of the heavy metals showed the same patterns of inconsistency. However, these were also limited to a confirmatory role. Interestingly, iron and metals associated with ferric used in primary treatment, were higher in effluent samples during the same periods, correlating well with the flow criteria used to discriminate impacted data. If anything, metals should be lower in treated effluent than in influent, as illustrated by the following 2 charts of iron and manganese.

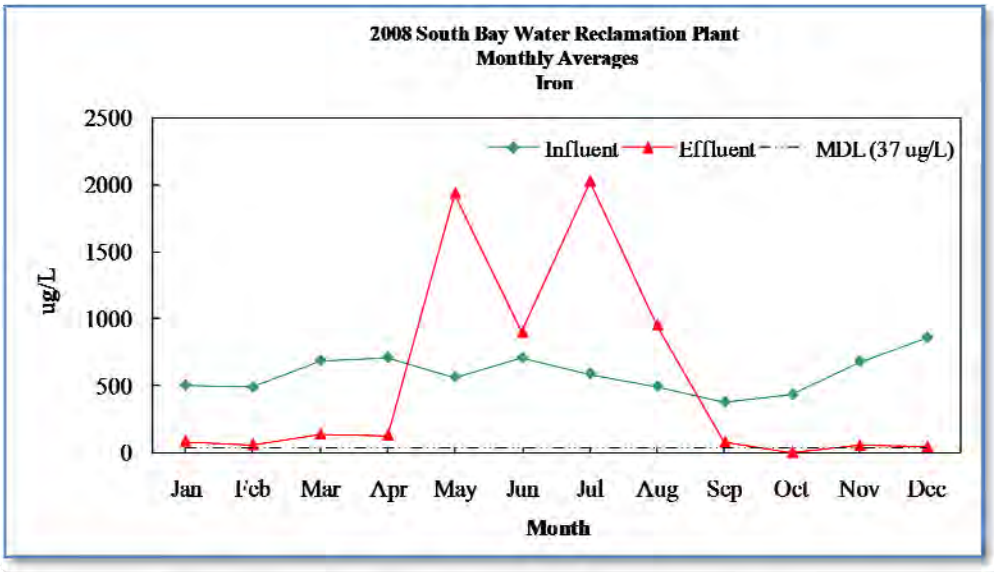


Figure I.E.3 SBWRP Iron 2008

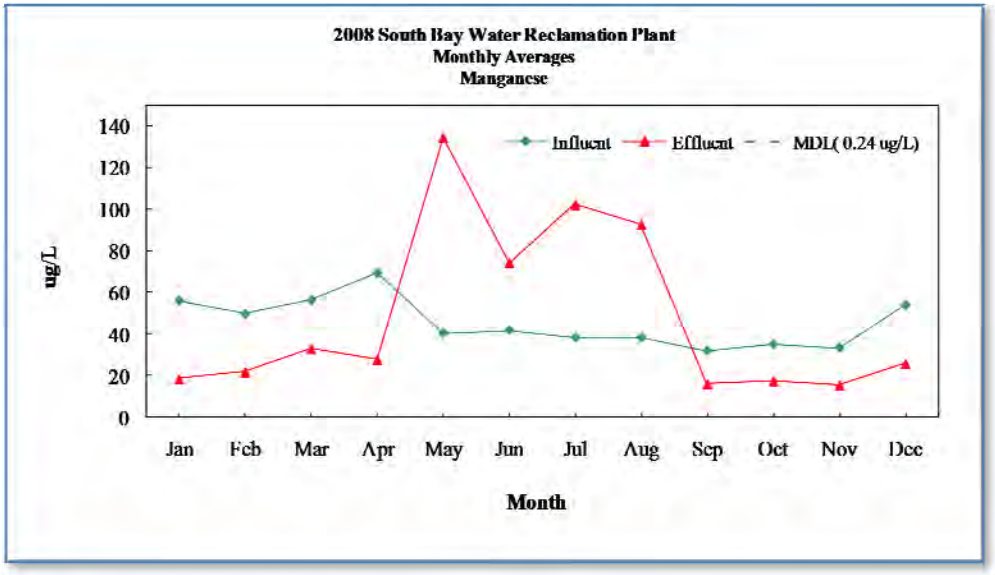


Figure I.E.4 SBWRP Manganese 2008

Effluent to Outfall Flows 2008
Days meeting exclusion criteria highlighted

Day		Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2.33	6.18	7.46		0.12	0.09	0.11	0.08	0.09	1.05	0.06	7.20
2	6.66	7.27	6.85	5.13	0.11	3.33	0.11	1.09	2.18	0.07	0.74	3.38
3	7.27	7.11	7.41	5.30	1.76	1.80	0.10	0.06	0.94	0.09	6.31	3.93
4	7.23	7.27	5.89	1.81	1.96	0.54	0.10	0.09	0.44	0.08	6.86	7.14
5	4.19	7.20	6.22	1.74	3.88	2.56	0.09	0.09	0.09	4.64	2.70	7.06
6	4.49	7.61	5.38	6.96	0.33	2.45	0.10	0.09	0.09	3.88	3.74	6.16
7	7.29	6.61	3.76	5.13	2.41	0.10	0.95	0.10	0.10	2.26	6.00	4.41
8	7.22	7.49	6.75	2.62	3.13	1.75	0.48	0.09	0.11	3.03	6.72	6.99
9	7.03	5.86	6.75	1.80	3.20	4.35	3.23	0.10	0.08	1.53	6.69	3.75
10	7.46	7.20	4.02	1.79	0.29	0.11	1.28	0.06	1.02	2.21	6.17	7.05
11	6.99	6.46	2.74	1.79	5.22	0.14	2.75	0.09	0.09	0.08	5.36	3.54
12	5.20	3.87	2.84	6.62	2.72	0.11	0.08	0.08	0.10	0.07	5.76	5.05
13	3.49	5.62	1.54	2.60	0.14	0.10	0.10	0.06	0.08	2.16	5.62	6.61
14	7.21	7.24	1.45	2.42	0.22	3.33	0.29	0.52	0.90	2.52	5.67	6.81
15	7.13	7.43	1.46	1.71	0.77	1.18	2.53	0.06	5.13	0.07	5.16	7.16
16	7.19	7.16	2.40	2.58	2.19	1.03	0.11	0.07	0.09	1.86	5.21	3.60
17	7.29	5.79	6.61	3.07	1.23	0.15	1.41	0.07	0.08	2.47	5.73	7.26
18	7.22	7.32	6.32	5.31	6.82	1.24	0.10	0.86	0.10	3.64	6.41	6.95
19	7.15	5.23	3.97	1.86	1.27	1.00	0.42	4.19	2.58	2.16	5.47	6.95
20	6.92	3.94	3.91	0.61	0.06	0.12	0.69	0.92	1.27	0.06	6.62	7.00
21	3.90	6.08	3.89	2.67	0.18	0.13	2.20	0.87	1.60	5.11	5.81	7.18
22	3.33	7.29	2.40	3.05	2.71	0.36	3.07	0.08	6.82	1.79	5.40	4.01
23	6.94	7.06	4.19	3.87	2.55	3.83	0.96	0.08	4.64	0.07	5.25	5.57
24	7.25	7.25	3.98	4.50	0.59	0.35	1.12	0.07	2.52	0.07	3.20	7.12
25	7.10	7.35	2.36	1.21	6.61	1.13	1.71	4.40	1.99	2.20	0.13	7.10
26	7.33	7.14	2.18	2.57	0.11	0.96	0.09	1.06	0.94	2.17	0.87	7.19
27	7.21	7.21	1.81	2.13	3.26	0.57	0.09	0.09	0.19	1.46	6.56	6.96
28	7.01	3.82	4.81	0.86	2.17	0.10	0.08	0.11	0.21	4.02	7.05	3.55
29	6.50	4.17	7.16	0.26	1.54	0.12	0.95	1.59	1.03	1.73	6.73	7.07
30	5.59		7.13	2.19	0.09	0.08	0.09	0.05	0.08	2.47	6.92	7.12
31	4.02		2.12		0.13		1.16	0.07		0.08		7.17

The highlighted days are that where data was excluded in the indicated tables and charts in Section II.

F. Plant Facility Operation Report

SOUTH BAY WATER RECLAMATION PLANT 2008 ANNUAL FACILITY REPORT
Prepared under the direction of Plant Superintendent Ernesto Molas

This facility report summarizes some of the key operational considerations involved in the facility operation of the South Bay Water Reclamation Plant (SBWRP) during calendar year 2008. Numerical data and analysis presented in this section are based on plant staff work. Refer to the laboratory data in this document for validated results for official reporting purposes.

Influent Flows:
The design capacity of the plant is 15 million gallons per day (MGD), with a peak capacity of 18 MGD. The average daily influent flows treated during 2008 were approximately 8.66 with 2.81 mgd discharged to ocean outfall and with 3.78 mgd reclaimed water (RW) distributed.

Influent Sampling:
Plant staff continues to implement a preventive maintenance program of switching and cleaning of the sample delivery pumps on a regular basis to ensure consistency in samples.

Basin Utilization:
The number of basins online for each unit processes meets the plant's overflow rates and detention time design criteria ranges which are as follows:
3 Primary Tanks on line with 2 offline as backups
5 Aeration Basin on line with 3 offline as backups
5 Secondary Basin on line with 4 as offline as backups

Solids Handling:
The influent screening and washer/compaction units operated well, with adequate on-site hopper capacity. Approximately 21.06 tons of screenings were disposed of through the end of December 2008. Grit storage capacity was also adequate with 8.38 tons of grit hauled off site. All primary scum was returned to the MWWD collection system (for treatment at the Pt. Loma WWTP facility) by routing the scum collection discharge to the blended sludge pump wet well. Primary and secondary sludge is also routed to the collection system via the blended sludge pumps. The activated sludge process was maintained through the use of high capacity wasting directly from the aeration basins to the blended sludge pumps during the full period of 2008 operation. Average daily totals for blended sludge volumes returned to the Pt. Loma facility via the South Metro Interceptor were 1.64 MGD.

Secondary Performance:
Secondary treatment performance for TSS and BOD has been an average TSS of 8.30 mg/L and BOD of 19.93 mg/L for 2008. Average secondary effluent turbidity was 7.16 NTU. MCRT has typically been maintained between 5 to 7 days.

Tertiary Processes:

The anthracite media for the tertiary filters did not experience any losses for 2008. Six out of seven filters were available for operation. And 4 to 5 filters were on line to meet the RW demand.

Chlorine is added at the UV influent to control algae growth. The total chlorine residual is maintain at equal or below 0.5 mg/l. The frequency of chlorine addition is 12 hrs/day.

Water Reclamation & Distribution:

RW water was delivered to IBWC ((International Boundary Water Commission) at a average daily rate of 0.57 MGD throughout the year. And the average delivery rate to Otay Storage tank during summer months was 5 to 6 mgd and only less than 1 mgd during the winter months.

Discussion of compliance record:

Ocean Discharge:

Similar to 2007 report**,** the SB outfall flow decreased considerably when the demand for RW increased. This is due to the diversion of all secondary effluent flow for tertiary treatment in order to meet the RW demand by Otay Water District. The decreased in the SB outfall flow (less than 0.5 mgd) has caused effluent flow from the International Boundary Water Commission (IBWC) plant to infiltrate the SB outfall line. This was confirmed by SB Engineering based on the hydraulic profile of the SB outfall line and the diversion box where the SB outfall flow and IBWC effluent flow mixes. Consequently, the SB outfall sampler will collect samples from this infiltrated flow yielding elevated BOD results.

The sampling point was moved upstream to about 100 ft. away from the original sampling location in an attempt to capture uncontaminated sample. Unfortunately, lab results from the samples taken from the new location still indicated contamination.

The only way to resolve the issue is to find a different sampling location or scheme not involving the SB outfall. An alternate sampling project has been planned and projected for completion on May 2009.

Recycled Water:

On 11/20 and 11/25 the bacti values were 33 MPN and 34 MPN respectively. These values exceeded the permit limit of only one value above 23 MPN allowed within a 30 day period. The violation was reported to RWQCB. As explained to the board, the 11/20 sample was not representative. The UV system was to be taken offline that day for maintenance and a sample was to be taken prior to shutdown. Unfortunately, the sample was taken after the UV has be offline for 10 minutes. As for the 11/25 sample, no explanation was given except that the sample might have been contaminated since the duplicate sample value was <1.8 MPN.

Vector Control:

Since early in the plant start-up, the presence of midge flies has been an on-going issue with the potential to adversely affect effluent quality, primarily at the secondary clarifiers and tertiary filters. Plant staff continues to utilize the services of a City entomologist who has been working with a number of products designed to disrupt the life-cycle of the insects. Additional, plant staff continues to rotate secondary clarifiers to disrupt midge flies larvae production. Control measures also include lowering the water level of a secondary clarifier to expose the larvae adhering to the side walls so they can be hosed down and removed. The efforts to gain full control over this problem continue.

Engineering Projects:

During 2008, many of the projects were handled via GRC and some were referred back to the Engineering Projects Management (EPM) to be worked under the Capital Improvement Projects (CIP) program. Numbers of deficiencies in the plant were addressed; a number of control system problems were resolved; and number of problems related to the production, sampling, and delivery of RW was resolved.

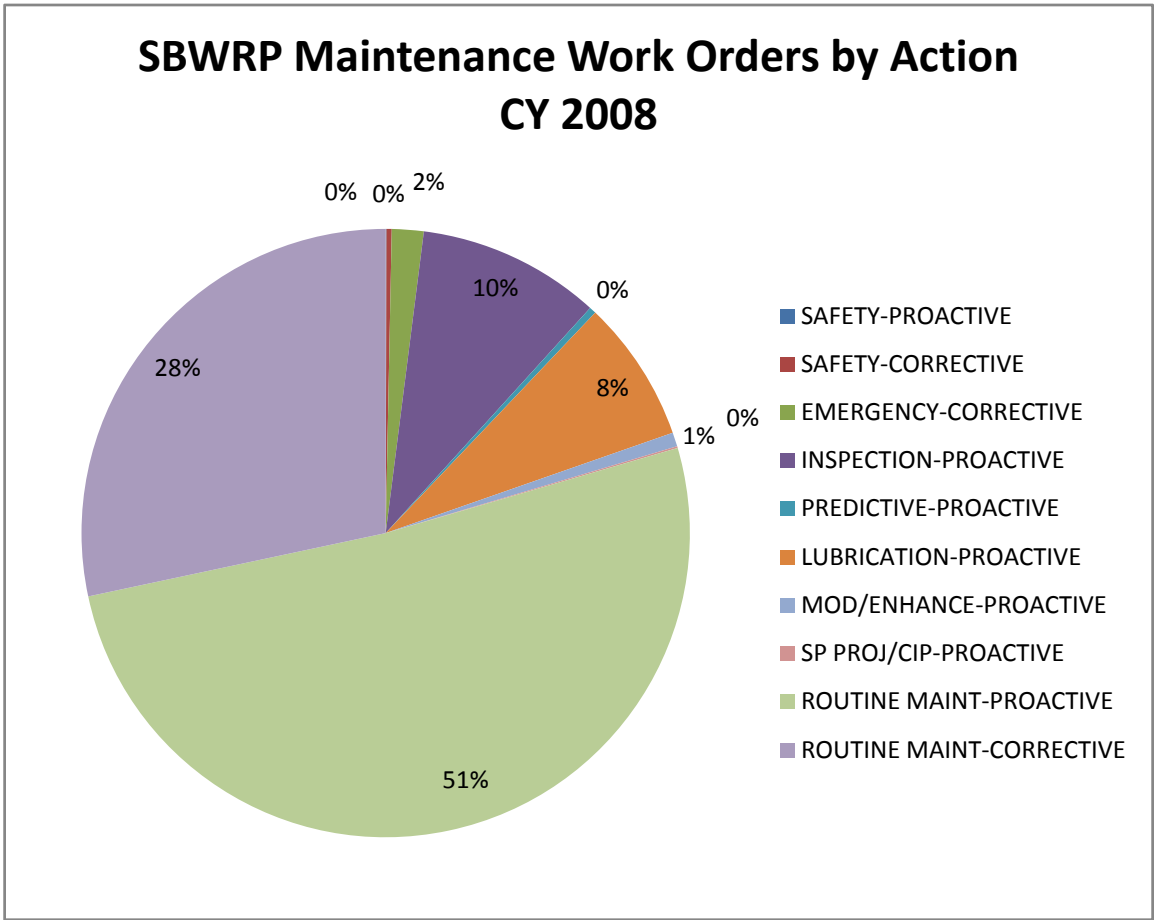
The Treatment Plant Engineer, working with plant staff and EPM division, completed a number of projects including:

1. Finishing rehabilitation of the remaining manholes issue from Latent Defect negotiations.
2. Completed installation, field and functional testing of Reclaimed Water Pump No. 3, motor, VFD and its as-built plans
3. Completed the Cathodic protection work with Kiewit as a latent defect work which has been hanging over us for 5-years.
4. Completed negotiation of the drainage plan for the slope south of operation building with Kiewit and it is now currently completed.
5. Investigated, filmed, and determined the piping material for the plant drainage piping to decide on the Cathodic Protection aspect of it.
6. Relocated and installed a new sampling line for the regulatory sampling purposes.
7. Revised and installed the top cover of the primary basins by Halsten Corp. to have access to the scum troughs.
8. Reviewed the Salt Creek Trunk Sewer plans.
9. Initiated multiple new GRC contract which are all underway and some are already completed.
10. Handled daily issue and problems brought up by plant staff.

Maintenance Report:

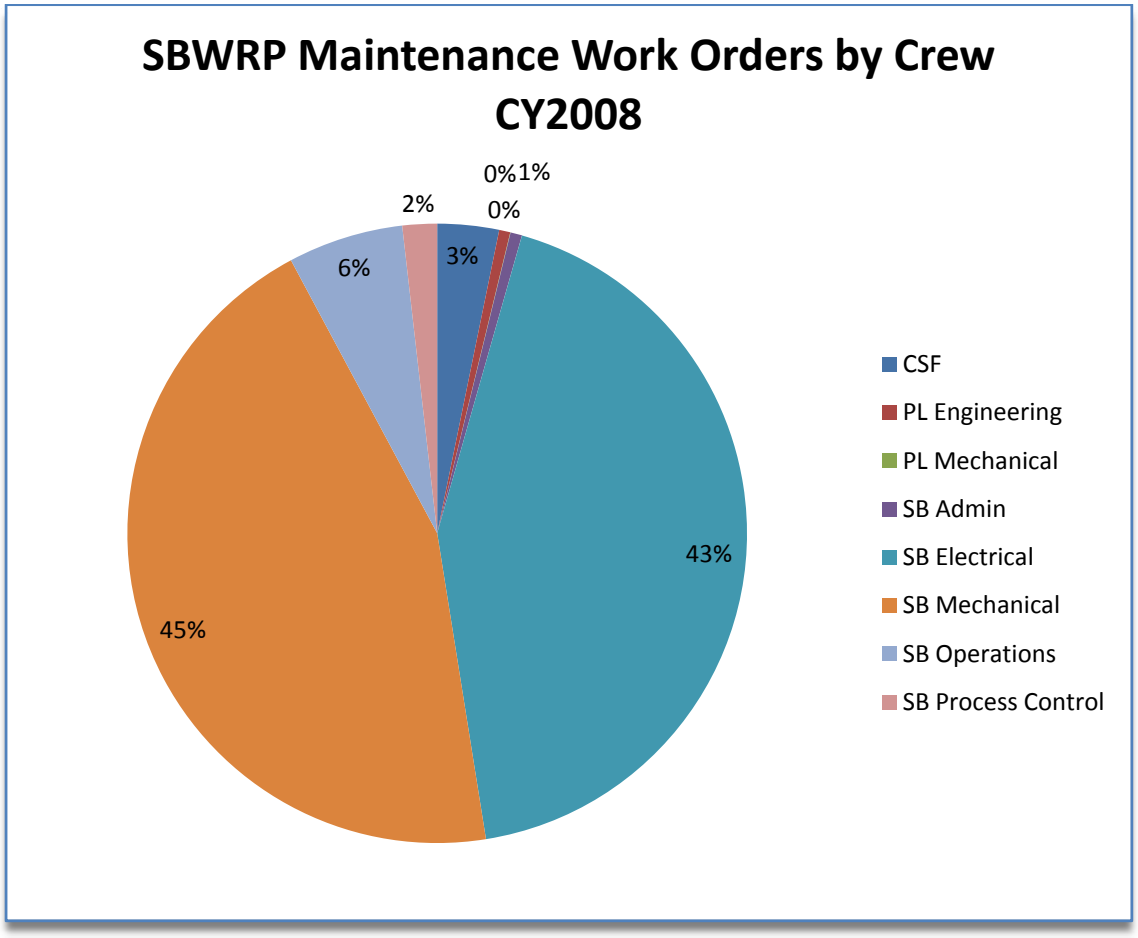
South Bay Maintenance Work Orders by Action

SAFETY-PROACTIVE - 2
SAFETY-CORRECTIVE - 14
EMERGENCY-CORRECTIVE - 84
INSPECTION-PROACTIVE - 485
PREDICTIVE-PROACTIVE - 18
LUBRICATION-PROACTIVE - 376
MOD/ENHANCE-PROACTIVE - 37
SP PROJ/CIP-PROACTIVE - 5
ROUTINE MAINT-PROACTIVE - 2550
ROUTINE MAINT-CORRECTIVE - 1412



South Bay Maintenance Work Orders by Crew

CSF - 160
PL Engineering - 29
PL Mechanical - 1
SB Admin - 30
SB Electrical - 2146
SB Mechanical - 2227
SB Operations - 300
SB Process Control - 90



G. Correlation of Results to Plant Conditions

In 2008 the amount of system flows treated at the SBWRP averaged over 8 million gallons per day

Annual Totals

Year	SBWRP Influent (million gals)	SBWRP Discharge to South Bay Outfall (million gals)	SBWRP Distributed Recycled Water (million gals)	System Return Stream (million gals)	Net removed from Metro (million gals)
2008	3,173	1,167	1,388	601	2,555
2007	3,158	1,467	1,101	527	2,568
2006	2,216	1,807	73.7	341	1,881

Comparative flow data:

	2006		2007		2008	
Flow stream	Daily Average	Annual Total	Daily Average	Annual Total	Daily Average	Annual Total
Influent	6.06	2216	8.66	3153	8.67	3173
RW (Reclaimed Water) Produced	5.96	1097	6.53	2389	6.49	2378
RW Distributed	0.40	73.7	3.00	1101	3.78	1388
RW In-plant use	0.46	163.0	0.72	261	0.68	250
Total reuse	0.86	236.7	3.72	1361	4.46	1638
Effluent to SBOO	4.94	1807	4.03	1467	3.20	1167
Return to SMI	0.93	341	1.45	527	1.64	601

The annual volume discharges to the ocean decreased nearly 20%, from 1,467 in 2007 to 1,167 million gallons in 2008. The production of reclaimed water maintained levels set in 2007, reclaimed water distributed increased by 287 million gallons in 2008 reflecting increased demand for recycled water for beneficial reuse.