

VIII. Discussion of Results.

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## A. Plant Facility Operation Report

### POINT LOMA 2006 ANNUAL FACILITY REPORT

Document prepared under the direction of Plant Superintendent K.C. Shankles.

The facility report addresses Process Control concerns and considerations and summarizes Plant Operations, & Engineering activities.

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#### **PROCESS CONTROL: FACTORS IMPACTING PLANT PERFORMANCE 2006**

The following information is being reported in an effort to identify some of the factors, operational and otherwise, that may have impacted plant performance during 2006. Much of the information contained herein is based on assumptions regarding plant performance for this period. The main point of this effort is to continue identifying possible factors influencing plant performance which in turn will help to more effectively operate this facility. The information is presented in chronological order when possible. Please note that the numerical values used here are largely based on analysis performed by Plant staff at the Process Laboratory and have not always been validated for official reporting purposes.

Areas that will be covered include: sludge blanket levels in the sedimentation basins and raw sludge pumping volumes, coagulation chemical application, and special projects.

#### **SLUDGE BLANKET LEVELS AND RAW SLUDGE PUMPING VOLUMES**

In most circumstances it is assumed that maintaining lower sludge blanket levels in sedimentation basins and increased raw sludge pumping will produce a plant effluent with a lower total suspended solids (TSS) concentration. Review of data, for daily average sludge blanket levels and daily average total raw sludge pumped, shows that the averages for the five years were too close to draw any conclusions about the validity of the above assumption.

The average effluent TSS concentration was calculated for 2002, 2003, 2004, 2005 and 2006. This average was then compared to the average sludge blanket level, for all basins in operation, and the average daily raw sludge pumping volume for this same period. The information below reflects the data gathered for this comparison.

Calendar Year	Effluent TSS Average Concentration	Average Daily Sludge Blanket Level	Average Daily Raw Sludge Volume
2002	43.5 mg/L	153.5 inches	1.14 MGD
2003	42.0 mg/L	158.0 inches	1.15 MGD
2004	42.6 mg/L	168.0 inches	1.09 MGD
2005	40.7 mg/L	159.0 inches	1.11 MGD
2006	34.9 mg/L	161.0 inches	0.99 MGD

## **COAGULATION CHEMICAL APPLICATION**

Data for ferric chloride and anionic polymer doses was reviewed to determine the impact that rates of product application have on plant performance. The average daily dose for each chemical was calculated for the same time period as above and compared to the TSS and BOD concentrations and removal rates.

Calendar Year	Ferric Chloride	Polymer	Average Effluent TSS Concentration	Average Effluent TSS Removal Rate	Average Effluent BOD Concentration	Average Effluent BOD Removal Rate
	Average Daily Dose					
2002	25.8 mg/L	0.15 mg/L	43.5 mg/L	84.9%	93.8 mg/L	64.7%
2003	29.9 mg/L	0.18 mg/L	42.0 mg/L	85.1%	105.0 mg/L	61.3%
2004	29.7 mg/L	0.17 mg/L	42.6 mg/L	85.2%	101.8 mg/L	60.2%
2005	26.5 mg/L	0.17 mg/L	40.7 mg/L	85.1%	104.5 mg/L	58.4%
2006	24.0 mg/L	0.14 mg/L	34.9 mg/L	87.7%	101.8 mg/L	62.3%

A reduction of TSS and BOD concentrations occurred in the effluent in 2006, when compared to the 2005 values. These lower values resulted in improved removal rates for the year.

## **SPECIAL PROJECTS**

In May of 2006 US Peroxide began a pilot study at the Point Loma Wastewater Treatment Plant. The following is an excerpt from the executive summary provided by US Peroxide:

“US Peroxide completed a 5 month full-scale demonstration of its proprietary Peroxide Regenerated Iron (PRI) technology program within the Point Loma wastewater treatment system inclusive of facilities PS1, PS2 and Point Loma WWTP. Specifically the demonstration evaluated the combination of Peroxide Regenerated Iron-Sulfide Control and Peroxide Regenerated Iron-Chemically Enhanced Primary Treatment (PRI-SC™/PRI-CEPT™) from early May through late September 2006. The prime objective of the demonstration was to evaluate the fundamental proof of concept and efficacy of the PRI technology to achieve a cost benefit in the form of net savings resulting from the reduction in the amount of ferric chloride (FeCl<sub>3</sub>) needed for meeting wastewater treatment permit requirements within the Point Loma system. The demonstration program was delivered by US peroxide under the direction of SDMWD on a full-service basis inclusive of all the necessary chemicals, equipment, labor and services to operate and maintain the program on safe, reliable and cost effective level. The application approach basically involved the addition of hydrogen peroxide at PS2 and Point Loma in place of ferric chloride.”

San Diego Metropolitan Wastewater Department is evaluating the results of the pilot study for possible implementation.

## **CONCLUSIONS**

Plant performance in the year of 2006 exceeded all NPDES Permit requirements. Ferric Chloride addition was applied to the sludge blending tank in March of 2006 when the Hydrogen Sulfide (H<sub>2</sub>S) concentrations in the digester gas started to elevate. In June of 2006 Ferrous Chloride replaced Ferric Chloride as the chemical utilized to aid in the control the H<sub>2</sub>S concentration in the Digester Gas.

## ENGINEERING REPORT 2006

The following projects were in construction at the Point Loma Wastewater facility during 2006:

### Grit Aeration System Project

This project will replace the existing leaking grit air piping and the existing grit air blowers. The new piping is 316 stainless steel and there are three new blowers. There is a new enclosure for the blowers. This project was awarded in September 2006 and should be complete by September 2007. The estimated cost for this work is \$1,257,000.

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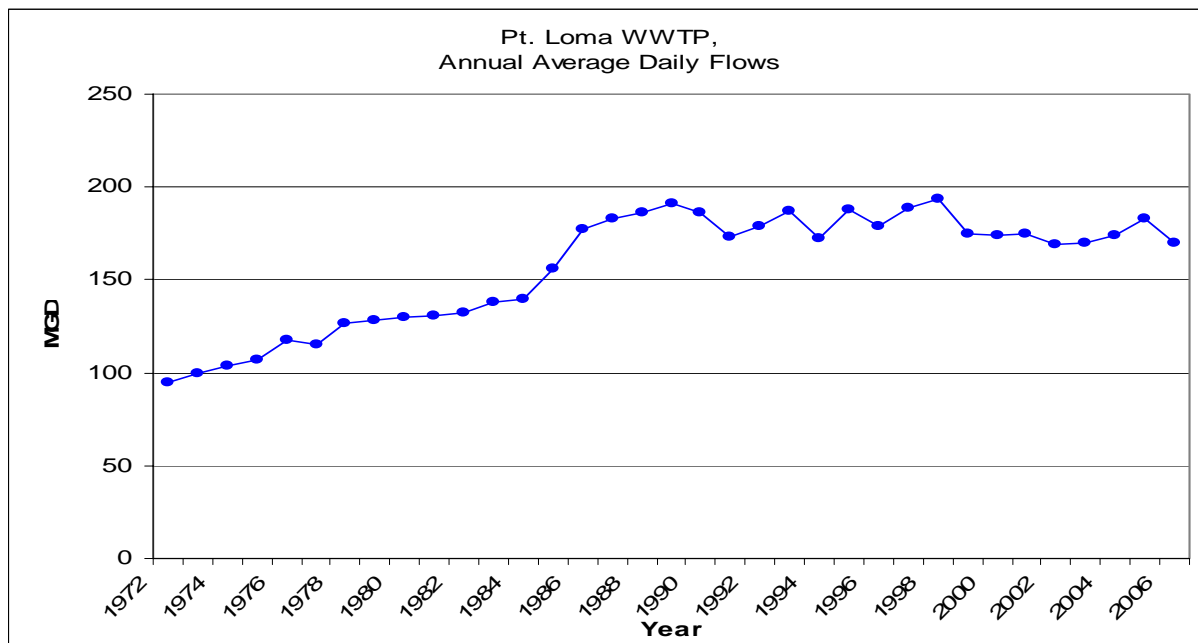
## B. Correlation of Results to Plant Conditions.

### Major changes

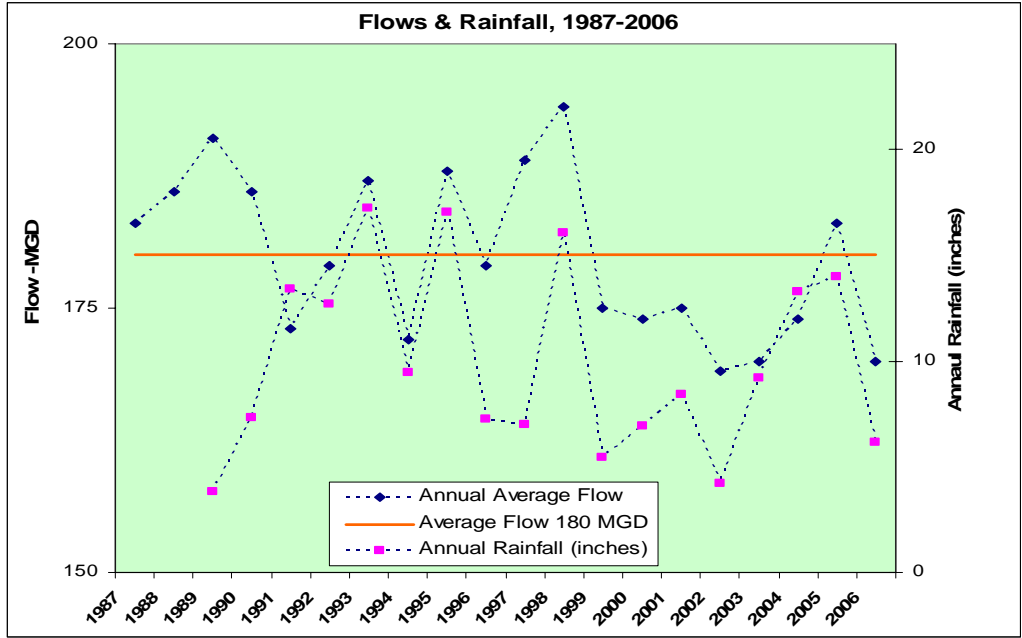
- a. Drought – rainfall =6.16 inches, well below average.
- b. Flows down – average daily flow to 170 vs 183 of previous year.
- c. TSS Removals up – 88% (87.7) vs 85% in the preceding 3-years.
- d. BOD Removals up – but slightly; to 62.3% from 58.4%.

### Flow

The 2006 daily average influent flow to the Point Loma WWTP was 170 MGD. This is down from 183 MGD in 2005.



The data shows a continued reduction in the flows vs. what would have been predicted from 1970's and 80's steady increases. It appears that the drought-induced reductions in flows from water conservation efforts, have become permanent. In the past 18-years, there is no discernable increase in flows on a sustained basis. In fact, since 1987 the regression line would show a slight decrease in flow rates. The significant correlation between rainfall and flow rates (below graph) seems to dominate the changes in flows from year-to-year.



In 2006 the amount of SBWRP effluent diverted to the South Bay outfall increased from 3.95 MGD to 4.95 MGD. Distribution of reclaimed water at the SBWRP began in July 2006 and averaged 0.21 MGD, yielding a total of about 5-MGD removed from the Metro flows to Pt. Loma. The amount of water reclaimed at the NCWRP was essentially the same at 3.7 MGD and other uses total about 4-MGD. The total rainfall in 2006 of 6.16 was significantly less than the total rainfall of 14.02 in 2005, continuing an overall long-term drought.

Historical perspective:

The table on this page shows past flows back to 1972. New Parshall flumes were installed and calibrated in 1985 and the bugs were worked out over the next year, this accounts for the major jump over the three year period from 1984 to 1986. From 1986 on multiple meters on the flumes have been calibrated yearly and fairly closely match Venturi meter data at Pump Station II (see tables in the Plant Operations section).

The historical picture of changes to the flow rates and the factors effecting those changes are discussed comprehensively in previous Annual Reports. Those factors include:

- Weather patterns, drought, and water conservation.
- The Tijuana Interceptor.
- Water Reclamation and Reuse by the North City Water Reclamation Plant, and later, by the South Bay Water Reclamation Plant.
- Population.

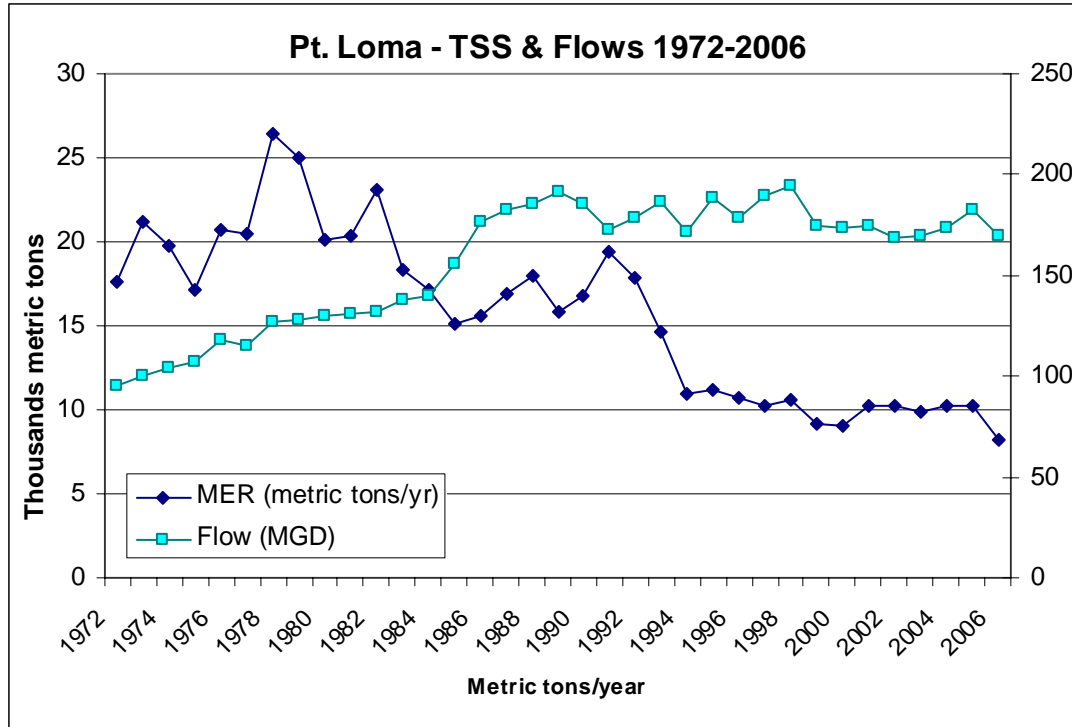
Historical Average Daily Flows

YEAR	FLOW (MGD)	YEAR	FLOW (MGD)
1972	95	1990	186
1973	100	1991	173
1974	104	1992	179
1975	107	1993	187
1976	118	1994	172
1977	115	1995	188
1978	127	1996	179
1979	128	1997	189
1980	130	1998	194
1981	131	1999	175
1982	132	2000	174
1983	138	2001	175
1984	140	2002	169
1985	156	2003	170
1986	177	2004	174
1987	183	2005	183
1988	186	2006	170
1989	191		

Weather and the various components of water conservation have appeared to emerged as more significant factors affecting flows, supplanting the historical role that population growth played.

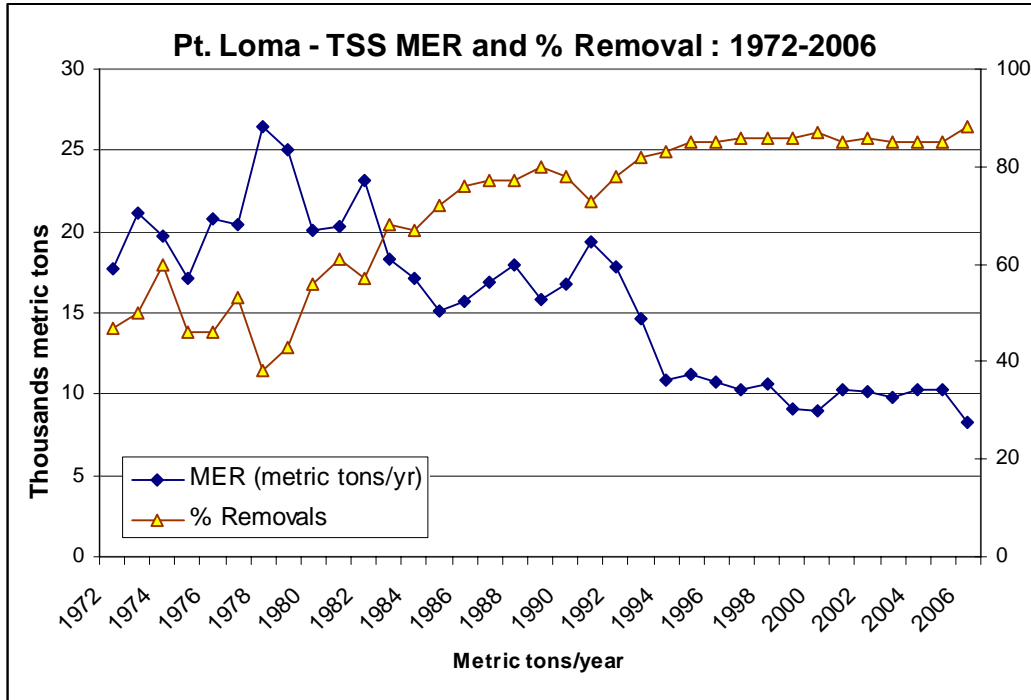
**Suspended Solids, Volatile Suspended Solids and Percent Suspended Solids Removal:**

Past data, as can be seen in the table on the page, has shown that influent concentrations tend to range from the mid-200's to around 300. The influent suspended solids averaged 287 mg/L this year. This combines with a similar decrease in average daily Flows this year resulting in a drop in mass emissions of solids.



Severe drought this year added to the additional reduction of total flows to Pt. Loma WWTP. Flows continue to follow the lowering trend described in past reports and include many of the same factors as described earlier.

The reduction in TSS mass emissions rate is more attributable to the increase removals obtained this year, 88% compared to last year's 85% removals, than to a reduction of flows alone. You can see that removal rates correlate very closely with Mass Emission Rate (MER), as expected. Effluent TSS concentration goes down from year-to-year, following the MER pattern.



The historical picture of changes in the annual TSS removals and MER and the factors effecting those changes are discussed comprehensively in previous Annual Reports. The factors include:

- Changes in base industries, e.g. Tuna canneries, etc.
- Weather and infiltration.
- Sludge handling including Fiesta Island and Metro Biosolids Center.
- Water reclamation plants.
- Population changes.
- Tijuana Interceptor.



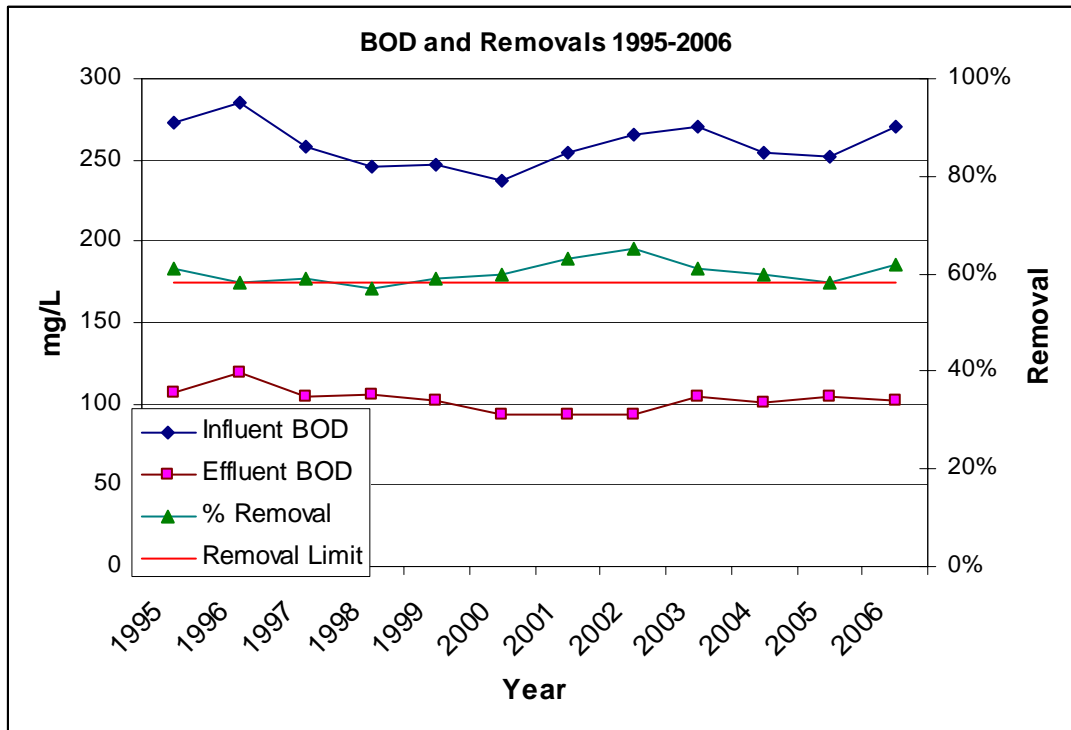
**SUSPENDED SOLIDS TRENDS**  
**AVERAGE DAILY SOLIDS**

Year	Flow, Annual Average Daily (mgd)	Rainfall, Annual Total (inches)	TSS INFLUENT (mg/L)	TSS EFFLUENT (mg/L)	TSS % Removal	TSS Mass Emission (lbs/day)	TSS Mass Emission (metric tons /year)
1972	95		257	135	47	106,600	17,661
1973	100		310	154	50	127,947	21,197
1974	104		346	138	60	119,143	19,739
1975	107		215	115	46	103,135	17,087
1976	118		238	127	46	125,281	20,756
1977	115		273	128	53	123,277	20,424
1978	127		245	151	38	159,428	26,413
1979	128		248	143	43	150,933	25,006
1980	130		255	113	56	121,088	20,061
1981	131		289	114	61	122,705	20,329
1982	132		296	126	57	139,563	23,122
1983	138		310	98	68	110,789	18,355
1984	140		272	90	67	103,175	17,093
1985	156		251	70	72	91,190	15,108
1986	177		261	64	76	94,476	15,652
1987	183		289	67	77	102,257	16,941
1988	186		303	70	77	108,587	17,990
1989	191	3.8	305	60	80	95,576	15,834
1990	186	7.29	307	65	78	101,301	16,783
1991	173	13.46	295	81	73	116,810	19,352
1992	179	12.71	317	72	78	107,903	17,877
1993	187	17.26	298	55	82	88,724	14,699
1994	172	9.43	276	46	83	65,777	10,898
1995	188	17.04	289	43	85	67,492	11,182
1996	179	7.27	295	43	85	64,541	10,693
1997	189	7	284	39	86	61,923	10,259
1998	194	16.05	278	39	86	64,171	10,631
1999	175	5.43	273	38	86	55,130	9,134
2000	174	6.9	278	37	87	54,413	9,015
2001	175	8.45	275	43	85	61,931	10,260
2002	169	4.23	287	44	86	61,493	10,188
2003	170	9.18	285	42	85	59,459	9,851
2004	174	13.29	291	43	85	62,028	10,276
2005	183	14.02	274	41	85	61,768	10,233
2006	170	6.16	287	35	88	49,581	8,214

(In the table there is more scatter in the data before 1980 because monthly averages were calculated using only the two suspended solids values done on "complete analysis" days, rather than averaging all of the daily test results).

### BOD – Biochemical Oxygen Demand

In 2006 the average influent concentration was back up a bit to 271-mg/L, while the effluent concentration dropped to 102-mg/L. This increase was well within past ranges. The removal rate was up to 65%, reversing last years' trend.



BOD Concentration mg/L

	Influent	Effluent	% Removal
1995 - Total	273	107	61%
Adjusted Total*	270	107	60%
Soluble	99	79	20%
1996 - Total	285	119	58%
Adjusted Total*	283	119	58%
Soluble	104	89	14%
1997 - Total	258	105	59%
Adjusted Total*	256	105	59%
Soluble	92	79	14%
1998 - Total	246	106	57%
Adjusted Total*	244	106	57%
Soluble	89	81	9%
1999- Total	247	102	59%
System-wide Total	251	102	59%
Soluble	96	79	18%
2000 - Total	237	94	60%
System-wide Total	248	94	62%
Soluble	84	69	18%
2001 - Total	254	94	63%
System-wide Total	270	94	65%
Soluble	84	58	31%
2002 - Total	266	94	65%
System-wide Total	287	94	67%
Soluble	86	59	31%
2003 - Total	271	105	61%
System-wide Total	292	105	64%
Soluble	86	70	19%
2004 - Total	255	101	60%
System-wide Total	273	101	63%
Soluble	80	70	12%
2005 - Total	252	105	58%
System-wide Total	269	105	61%
Soluble	88	75	15%
2006 - Total	271	102	62%
System-wide Total	295	102	65%
Soluble	87	73	16%

C. Discussion of Compliance Record

Compliance Issues by Month – 2006 - All limits met.

Month	Number of measures that exceeded Permit Limits.	Comments: (see monthly report for further details if desired.)
	NPDES Permit No. CA0107409 Order R9-2002-0025	
January	None	
February	None	
March	None	
April	None	
May	None	
June	None	
July	None	
August	None	
September	None	
October	None	
November	None	
December	None	
Annual Limits:	None	

Chemical and Physical Parameters

Suspended Solids and BOD.

All limits met.

Limit	Pt. Loma Performance 2006
BOD $\geq$ 58% removal <sup>A</sup>	65%
TSS $\geq$ 80% Removal <sup>A</sup>	88%
TSS $\leq$ 75-mg/L <sup>B</sup>	35-mg/L
TSS MER 13,995 metric tons/yr <sup>A</sup>	8,211 metric tons/yr

<sup>A</sup> based on annual average system-wide adjusted values.

<sup>B</sup> based on annual average.

Other chemical parameters and toxicity.

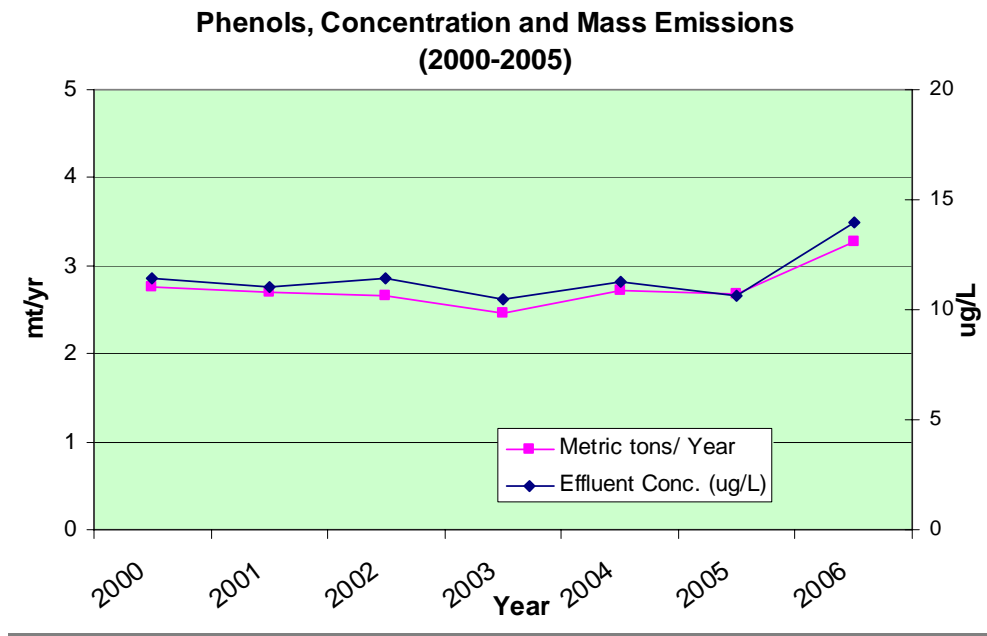
All limits met. Permit limits are detailed in Section 1 of this report and effluent data is presented in summary tables in section 2 of this report.

Benchmarks:

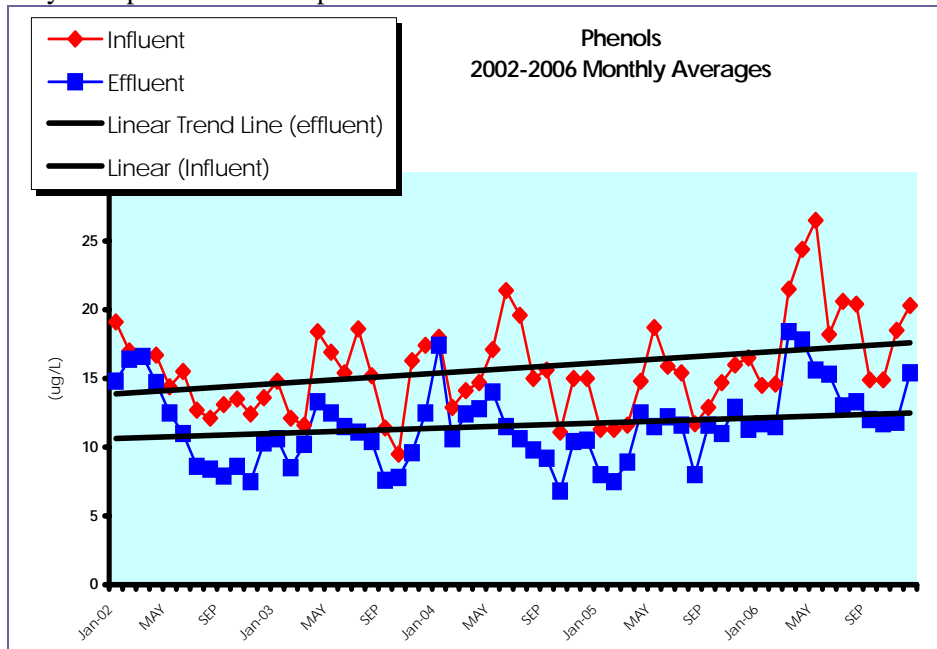
All mass emissions rate (MER) benchmarks were within permit guidelines except for non-chlorinated phenols.

Phenols, non-chlorinated

The mass emissions rate (MER) of 3.28 metric tons/year, for non-chlorinated phenols<sup>7</sup> was slightly higher than the bench mark of 2.57 metric tons/year and slightly higher than last year's 2.68-metric tons. This was based on an average concentration of 14-ug/L, which represents approximately 20-pounds per day.



The multi-year downward trend in phenol concentrations was reversed slightly this year and dominated by the up-tic in influent phenol concentrations.



7 All found was as phenol itself.

## **ISO 14001 Certification**

Since 2002, the entire Operations and Maintenance Division (including the Point Loma WWTP) and the Monitoring and Reporting Programs operated by the Environmental Monitoring and Technical Services Division has maintained certification and active programs in the International Standards Organization (ISO) 14001, Environmental Management Systems program.

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#### D. Report of Operator Certifications

The following list includes all Wastewater Treatment Plant Operators working for the Metropolitan Wastewater Department and their California State certification status as of **January 2007**.

##### Operator Certifications:

The following lists all Wastewater Treatment Plant Operators working for the Operating Units of the Metropolitan Wastewater Department and their California State certification status as of January 2007. Name, Certification Grade, Certification Number, and expiration date are shown for each operator. The listing is by facility and classification.

#### Point Loma Wastewater Treatment Plant

Name	Grade	Cert. No.	Expiration Date
<u>Point Loma Wastewater Treatment Plant Superintendent:</u>			
Shankles, K.C.	V	06975	06-30-2007
<u>Sr. Operations Supervisor:</u>			
Cooper, Kip	V	09401	12-31-2007
<u>Operation Supervisors:</u>			
Williams, Jeff	V	06452	06/30/2007
Creaghe, Joe	III	7280	06/30/2007
Evans, Gayle D.	III	9395	12/31/2007
Janowicz, Claude	III	5939	06/30/2008
Leibenguth, Robert	III	6777	12/31/2007
<u>Operators:</u>			
Gardiner, Teresa	III	10657	12/31/2007
Marlow, David	III	10216	06/30/2008
Nguyen, Thanh	III	6637	06/30/2007
Parry, Thomas	III	3805	06/30/2007
Smith, Dwight	III	9992	12/31/2007
Duhamel, Michael	II	9444	06/30/2008
Gross, Allen	II	9264	06/30/2007
Gutierrez, Marlene	II	9636	06/30/2007
Palestini, Anthony	II	8521	12/31/2007
Pizarro, Emiliano	II	9863	06/30/2008
Reynolds, Benjamin	II	6638	12/31/2007
Rogers, Larry	II	10121	12/31/2007
Saulog, Noel	II	10299	12/31/2008
Wade, Brian	II	9141	12/31/2008
Duresseau, Gabriel	OIT	OIT	06/30/2008
Jacques, Richie	OIT	OIT	06/30/2007
Salonga, Leonardo	OIT	OIT	12/31/2007
Williams Jr., Hayvert	OIT	OIT	12/31/2007
<u>Process Control:</u>			
Jewell, Dennis	V	04813	06-30-2008
Dornfield, Michael	II	07678	12-31-2008

## Report of Operator Certification

The following list includes all Wastewater Treatment Plant Operators working for the Metropolitan Wastewater Department at the Metro Bio-solids Center and their California State certification status **as of January 2007**. Name, Certification Grade, Certification Number, and expiration date are shown for each operator.

<b>Metro Bio-solids Center (MBC)</b>			
<u>Name</u>	<u>Grade</u>	<u>Cert. No.</u>	<u>Expiration Date</u>
<u>MBC Superintendent:</u>			
Jack Swerlein	V	5527	06-30-2008
Jesse Pagliaro	V	06454	06-30-2008
<u>Sr. Operations Supervisor:</u>			
Barry Ayers	V	09346	06-30-2008
Chuck Lockhart	V	04610	12-31-2008
<u>Operation Supervisors:</u>			
Claude Lovelace	III	3952	06-30-2007
David Huntamer	V	8686	12-31-2007
Ralph Dugdale	III	5936	06-30-2007
Warren Wazny	III	4583	06-30-2007
Shannon McKiernan	III	7465	12-31-2007
Javier Zavala	III	9635	06-30-2007
<u>Operators:</u>			
Randy Cook	II	6811	12-31-2007
Maria LeSire	II	5445	06-30-2007
Sal Lopez	II	8476	06-30-2007
Robert Roderick	III	6169	12-31-2007
George Wendorf	II	9774	12-31-2007
Dedric Evans	II	10196	06-30-2008
Barry Calton	II	10178	12-31-2007
Bill Shannon	II	10371	12-31-2007
Gary Hiatt	III	8350	06-30-2007
Chris Culver	II	4403	12-31-2007
Kylie Hatch	II	10878	06-30-2007
John Faxon	II	27877	12-31-2008



## E. Status of the Operations and Maintenance Manual

### Point Loma WWTP:

There is an approved O&M Manual for the PLWWTP. Plant staff continues to review and update the Manual and SOP's as necessary to keep current with changes in equipment, processes, and standards of practice. New procedures are included as needs are identified. For example, PLWWTP Staff, in conjunction with the Safety Staff, have developed and established a standard Lock-Out/Tag-Out Program to serve all MWWD Facilities.

Plant Personnel continue the ISO certification and operate the PLWTP facility under the guidelines of the Environmental Management System established under our ISO 14001 program. This program has helped to organize and consolidate facility Standard Operating Procedures (SOP), and has been effective in enhancing plant personnel's awareness of industrial and environmental issues as they relate to the work place.

## F. Annual Flow Calibration Report

The firm of MWH completed the annual Gould Flow Metering System Certification in March 2006.

A copy of their findings, without appendices, follows.