

2002 Annual Reports and Summary Point Loma Wastewater Treatment Plant & Point Loma Ocean Outfall



Monitoring and Reporting
Program No. R-2002-0025
NPDES No. CA 0107409





THE CITY OF SAN DIEGO

June 30, 2003

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

Dear Mr. Robertus:

Enclosed are the 2002 Annual Reports and Summary, Pt. Loma Wastewater Treatment Plant Ocean Outfall as specified in discharge permit Order NO. R-2002-0025, NPDES No. CA0107409 (Point Loma).

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

ACL/swm

cc: EPA Region 9
San Diego County Department of Environmental Health, Hazardous Materials Division
San Diego County Department of Environmental Health, Land Use Division
Distribution
File



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

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The City of San Diego Metropolitan Wastewater System Existing and Planned Facilities



I. Introduction

A. Explanatory Notes

The purpose of this document is to both meet the requirements of Monitoring and Reporting Program (MRP) No. R-2002-0025, NPDES Permit No. CA0107409, and to provide a reference source and resource tools for both regulatory agencies and City staff and their consultants. To this end the past years data is presented in tabular and graphical form. Monitoring results only reported annually are presented, as well as the special items and discussions itemized in Order No. R-2002-0025. To make this document more useful we have included information on the method, frequency and changes in analyses, longer term tables, operational data, background analyses and process control information. Wherever 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 6-year tables have been updated to include 1996 through 2001 data.

It should be noted 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. For example, the Diazinon value for PLE on March 10, 1998 (in the table below) is reported as <2.4 ug/L (see the below table); this indicates that one or more, of two or more, determinations was above the MDL, while the average was below the MDL. This value is still treated as a zero for averaging and other summary calculations. Note also, that sub-totals and totals consisting of multiple analytes (see below) are also reported as "<X", where the "X" value is the highest MDL for the particular group of analytes. This has the same significance as a "ND" or not detected.

		Organophosphorus Pesticides							
				PLE	PLE	PLE	PLR	PLR	PLR
		MDL	Units	10-MAR-1998	27-APR-1998	10-SEP-1998	10-MAR-1998	27-APR-1998	10-SEP-1998
				0311980006	0428980006	9809107494	0311980007	0428980007	9809107515
Demeton O	1.69 UG/L	ND	ND	ND	ND	ND	ND	ND	ND
Demeton S	1.82 UG/L	ND	ND	ND	ND	ND	ND	ND	ND
Diazinon	2.41 UG/L	<2.4	ND	ND	<2.4	ND	ND	ND	ND
Guthion	7.1 UG/L	ND	ND	ND	ND	ND	ND	ND	ND
Malathion	2.98 UG/L	ND	ND	ND	ND	ND	ND	ND	ND
Parathion	2.83 UG/L	ND	ND	ND	ND	ND	ND	ND	ND
Thiophosphorus Pesticides		<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1
Demeton -O, -S		<1.8	<0.2	<0.2	<1.8	<0.2	<0.2	<0.2	<0.2
Total Organophosphorus Pesticides		<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1	<7.1

A further limitation, that the user of this data should note, is that confidence in the results of an analysis is heavily dependent upon the concentration relative to the Method Detection Limit (MDL). For the most part 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 so that removals and other relationships are readily apparent. Please note that many of the graphs are on expanded scales, that is they normally 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.

B. Notes on Specific Analyses:

1. It should be noted that some of the reference methods are equivalent. The organic priority pollutant analyses listed in E.P.A.'s Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, SW-846 (ref. c) are equivalent to the methods E.P.A. prescribes for water in Methods for Chemical Analysis for Water and Wastes, (ref.a). Specifically wastewater methods 3510 and 8270 (ref.d) together are the same as the water method 625 (ref.a), and Method 8240 (ref. c) is equivalent to Method 624 (ref.a). Methods 3550 and 8270 together are equivalent to the E.P.A. Contract Laboratory Program's (ref. aa) method for ultrasonication and gas chromatograph-mass spectrographic analysis. The E.P.A.'s metals analyses for water (ref.a) generally just refers to the procedure in Standard Methods (ref. b, bb).

2. Particle Size determinations of marine sediments has been performed by using a Laser light-scattering analyzer since the beginning of 1993 for the fine fraction (<1,000 microns). The coarse fraction (particle sizes >1,000 microns) is determined using a 1,000 micron sieve and the coarse fraction (phi >0) is reported as a percent of total sample. The fine fraction data is reported as a percent distribution and is not normalized with the coarse fraction, since the coarse fraction is not specifically used for benthic correlation determinations and is reported for anecdotal use. The data can be normalized by the user of this data by treating the fine fraction phi distributions as the indicated percent of the remaining percentage of sample remaining after sieving. In other words the normalized value for >+1 f, assuming a reported value of 0.08% and >0 f reported as 64.20%, would be,

$$\frac{0.08\%}{100\%} * \frac{100\% - 64.20\%}{100\%} * 100\% = 0.03\% \text{ Normalized } \Phi > +1 \text{ distribution.}$$

Ocean data for chlorinated pesticides and PCB congeners contains data that is qualified with a prefixed **AE@** (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 indicate that one or more tests identified the compound but was below detection limits for quantitation. When reported as part of annual averages, the **AE@** qualifier may accompany average concentration values either below or above MDLs.

Analyte	MDL	Units	SD-14	SD-17	SD-18	SD-19	SD-20	SD-21	RF-1
			2001	2001	2001	2001	2001	2001	2001
			Avg	Avg	Avg	Avg	Avg	Avg	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

3. Arsenic and selenium:

June and July arsenic and selenium concentrations reported in the Monthly Monitoring Reports for June and July 2002 have been determined to be erroneous. The samples were re-run and the data in this report reflects the corrected values as explained below.

Due to instrument problems in our in-house laboratory, arsenic and selenium determinations were sent to an outside laboratory for analysis for the June and July 2002 samples. The results initially reported in Monthly Monitoring Reports for those months reflected the values received from the contract laboratory. The contract laboratory used ICP-MS (inductively-coupled plasma-mass spectrometry) instrumentation vs. our in-house labs' use of AA-hydride (atomic absorption spectrophotometry). The results from the contract laboratory for arsenic ran 200 -300 percent (or more) higher than historical norms. Selenium concentrations ran over 10 times as high as historical norms; both well outside of expected variation.¹ See Figure 1B.a.

Once a new AA was online, we re-ran arsenic and selenium on reserved sample aliquots. Those determinations were within historical norms and all other quality control measures nominal.

Figure 1B.a – Comparison of arsenic and selenium values, In-house laboratory to contract laboratory.

Sample Id	Sample Date	Sample Source	City Lab. Results Selenium			Truesdail Labs. Selenium			Percent difference (%)	City Lab. Results Arsenic			Truesdail Labs. Arsenic			Percent difference
			Value	Units	MDL	Value	Units	MDL		Value	Units	MDL	Value	Units	MDL	
P172172	1-Jun-02	PLE	1.12	UG/L	0.28					0.98	UG/L	0.18				
P173078	9-Jun-02	PLE		UG/L	0.28	20.7	UG/L	1		0.90	UG/L	0.18	4.47	UG/L	0.5	397%
P174041	17-Jun-02	PLE	0.83	UG/L	0.28	12	UG/L	1	1344%	2.74	UG/L	0.4	9.25	UG/L	0.5	238%
P175051	25-Jun-02	PLE	1.05	UG/L	0.28	13	UG/L	1	1138%	1.06	UG/L	0.4	3.02	UG/L	0.5	185%
		Average:	1.00			15.23			1241%	1.42			5.58			273%
P175848	3-Jul-02	PLE	1.27	UG/L	0.28	14.6	UG/L	1	1050%	1.89	UG/L	0.4	8.76	UG/L	0.5	363%
P177729	11-Jul-02	PLE	1.29	UG/L	0.28	13.9	UG/L	1	978%	2.34	UG/L	0.4	8.7	UG/L	0.5	272%
P179506	19-Jul-02	PLE	1.21	UG/L	0.28	14.8	UG/L	1	1123%	1.74	UG/L	0.4	5.08	UG/L	0.5	192%
P180949	27-Jul-02	PLE	1.25	UG/L	0.28	12.5	UG/L	1	900%	1.46	UG/L	0.4	5.38	UG/L	0.5	268%
			1.26			13.95			1013%	1.86			6.98			274%
P172175	1-Jun-02	PLR	1.73	UG/L	0.28					1.74	UG/L	0.18				
P173081	9-Jun-02	PLR	1.35	UG/L	0.28	14.9	UG/L	1	1004%	1.53	UG/L	0.4	5.52	UG/L	0.5	261%
P174044	17-Jun-02	PLR	1.28	UG/L	0.28	12.1	UG/L	1	845%	2.84	UG/L	0.4	8.93	UG/L	0.5	214%
P175054	25-Jun-02	PLR	1.37	UG/L	0.28	13.9	UG/L	1	915%	1.44	UG/L	0.4	4.37	UG/L	0.5	203%
			1.43			13.63			921%	1.89			6.27			226%
P175851	3-Jul-02	PLR	2.00	UG/L	0.28	12.6	UG/L	1	530%	2.31	UG/L	0.4	8.01	UG/L	0.5	247%
P177732	11-Jul-02	PLR	2.15	UG/L	0.28	6.33	UG/L	1	194%	2.96	UG/L	0.4	4.7	UG/L	0.5	59%
P179509	19-Jul-02	PLR	1.89	UG/L	0.28	14.9	UG/L	1	688%	2.65	UG/L	0.4	9.34	UG/L	0.5	252%
P180952	27-Jul-02	PLR	1.64	UG/L	0.28	11.2	UG/L	1	583%	1.83	UG/L	0.4	6.18	UG/L	0.5	238%
			1.92			11.26			499%	2.44			7.06			199%

The ability of the contract laboratory's ICP-MS method to accurately measure low level arsenic and selenium concentrations was tested by sending eight blind samples to the contract laboratory. The samples are aliquots of a sewage mix with various spike concentrations. Duplicate aliquots of the various concentrations were sent. Figure 1B.b. shows the composition of the eight samples and the ICP-MS results from the contract laboratory. The samples consisted of un-spiked and spiked sample aliquots in what is essentially a standard additions technique. The contract laboratory results showed that they could not reliably distinguish concentration levels at concentrations that should have been above their MDLs. See Figure 1B.b. Their results do not show statistically significant differences between concentration levels of the spiked samples. Nor does the precision data (see Figure 1B.c) show consistent reproducibility.

¹ 2002 arsenic and selenium concentrations averaged 1.25 ug/L and 1.17 respectively in Pt. Loma WWTP effluent, with standard deviations of 0.53 and 0.13 respectively.

Figure 1B.b – blind samples to contract laboratory.

Sample ID	Contract laboratory reported Arsenic Concentration (ug/L)	Arsenic Spike Concentration (ug/L)	Contract Laboratory reported Selenium Concentration (ug/L)	Selenium Spike Concentration (ug/L)
P190192	11.1 ug/L	No Spike	15.5 ug/L	No Spike
P190194	16.5 ug/L	1 ug/L	20.9 ug/L	1 ug/L
P190197	17.5 ug/L	2 ug/L	18.3 ug/L	2 ug/L
P190199	24.8 ug/L	4 ug/L	24.0 ug/L	4 ug/L
P190208	27.5 ug/L	No Spike	23.8 ug/L	No Spike
P190209	14.8 ug/L	1 ug/L	18.8 ug/L	1 ug/L
P190210	13.4 ug/L	2 ug/L	18.2 ug/L	2 ug/L
P190211	16.6 ug/L	4 ug/L	18.8 ug/L	4 ug/L

The arsenic and selenium concentration of the sewage mix was determined by the in-house laboratory using the new instrumentation. The arsenic concentration was 2.11 ug/L and the selenium concentration is 1.43 ug/L. The hydride method for in-house laboratory's new AA method accurately distinguishes the difference between wastewater samples and 2 ug/L spikes of wastewater samples.

Figure 1B.c. – Precision data.

Concentration:	Arsenic:	RPD:	Selenium:	RPD:
No Spike	19.3 ug/L	85%	19.7 ug/L	42%
1 ug/L	15.7 ug/L	11%	19.9 ug/L	11%
2 ug/L	15.5 ug/L	26%	18.3 ug/L	1%
4 ug/L	20.7 ug/L	40%	21.4 ug/L	24%

Arguably, by separating the arsenic/selenium from its matrix by generation of the hydride gas, the hydride generation method may remove potential interferences that the ICP-MS method cannot.

The results for June and July arsenic and selenium values reported previously in Monthly Monitoring Reports are not supportable values. All evidence points to inaccuracy in methodology at target concentrations by the contractor laboratory. We have discarded the June and July values and replaced them with the in-house re-analysis as tabulated in Figure 1B.a. in this report.

- C. Terms and Abbreviations used in this Report
 Along with standard abbreviations the following is a list of local/uncommon abbreviations and terms for the readers-reference.

PLANT TERMS

U.S.EPA	- United States Environmental Protection Agency.
NPDES	- National Pollutant Discharge Elimination System.
WWTP	- Wastewater Treatment Plant.
WRP	- Water Reclamation Plant.
PLWWTP	- Pt. Loma Wastewater Treatment Plant
PLR	- Point Loma Raw (influent to the plant).
PLE	- Point Loma Effluent (effluent from the plant).
N-1-P	- North Digester Number 1, Primary, Pt. Loma
N-2-P	- North Digester Number 2, Primary, Pt. Loma
C-1-P	- Central Digester Number 1, Primary, Pt. Loma
C-2-P	- Central Digester Number 2, Primary, Pt. Loma
S-1-P	- South Digester Number 1, Primary, Pt. Loma
S-2-P	- South Digester Number 2, Primary, Pt. Loma
Dig 7	- Digester Number 7, Primary, Pt. Loma
Dig 8	- Digester Number 8, Primary, Pt. Loma
DIG COMP	- Digested Sludge Composite; a composite of grabs taken from each of the in-service digesters.
RAW COMP	- A Composite of Raw Sludge taken over the preceding 24 hrs.
NCWRP	- North City Water Reclamation Plant
N01-PS_INF	- The plant primary Influent from Pump Station 64
N01-PEN	- The plant primary Influent from the Penasquitos pump station.
N30-DFE	- Disinfected Final Effluent
N34-REC WATER	- Reclaimed Water.
N10-PSP COMB	- raw sludge
N15-WAS LCP	- Waste Activated Sludge
MBC	- Metro Biosolids Center
MBCDEWCN	- Metro Biosolids Center Dewatering Centrifuges; typically the dewatered sludge from these.
MBC_COMBCN	- MBC Combined Centrate; the centrate from all the dewatering centrifuges. (The return stream from MBC to the sewer system.)
MBC_NC_DSL	- North City to Metropolitan Biosolids Center (MBC) Digested Sludge Line.
Dig 1	- MBC Digester number 1.
Dig 2	- MBC Digester number 2.
Dig 3	- MBC Digester number 3.

UNITS

mg/L	milligrams per liter
ug/L	micrograms per liter = 0.001 milligrams per liter
ng/L	nanograms per liter = 0.001 micrograms per liter
mg/Kg	milligrams per kilogram
ug/Kg	micrograms per kilogram
ng/Kg	nanograms per kilogram
pg/L	picograms per liter
pg/Kg	picograms per kilogram
pc/L or pCi/L	pico curies per liter (a measure of radioactivity)
TU	toxicity units
ntu	nephelometric turbidity units
°C	degrees Celsius = degrees centigrade
MGD	million gallons per day
umhos/cm.	micromhos per centimeter (conductivity)
uS	microsiemens = umhos (conductivity)
mils/100 mL	millions per 100 milliliters
nd	not detected
NA	not analyzed (when in a data column)
NR	not required
NS	not sampled

CHEMICAL TERMS & ABBREVIATIONS:

AA	Atomic Absorption Spectroscopy.
Ag	Silver
Al	Aluminum
As	Arsenic
B	Boron
Ba	Barium
Be	Beryllium
BOD	Biochemical Oxygen Demand
Br	Bromide
C	Carbon
Ca	Calcium
Cd	Cadmium
Cl	Chlorine
CN ⁻	Cyanide
Co	Cobalt
COD	Chemical Oxygen Demand
Cr	Chromium
Cr ⁶⁺	Hexavalent Chromium
Cu	Copper
D.O.	Dissolved Oxygen
DDD	Dichlorodiphenyldichloroethane (a.k.a. TDE-tetrachlorodiphenylethane)
DDE	Dichlorodiphenyldichloroethylene
DDT	Dichlorodiphenyltrichloroethane

F	Fluorine
Fe	Iron
FeCl ₃	Ferric Chloride
G&O	Grease and Oil
GC	Gas chromatography.
GC-ECD	Electron Capture Detector.
GC-FID	Flame Ionization Detector.
GC-FPD	Flame Photometric Detector.
GC-MS	Mass Spectroscopy.
H	Hydrogen
H ₂ S	Hydrogen Sulfide
Hg	Mercury
I	Iodine
IC	Ion Chromatography
ICP-AES	Inductively Coupled Plasma-Atomic Emission Spectroscopy
K	Potassium
Li	Lithium
MDL	Method Detection Limit
Mg	Magnesium
Mn	Manganese
Mo	Molybdenum
MSD	Mass Spectroscopy Detector
N	Nitrogen
Na	Sodium
NH ₃	Ammonia
NH ₃ -N	Ammonia Nitrogen
NH ₄ ⁺	Ammonium ion
Ni	Nickel
NO ₃ ⁻	Nitrate
O	Oxygen
PAD	Pulsed Amperometric Detector
Pb	Lead
PCB	Polychlorinated Biphenyls
PO ₄ ³⁻	Phosphate
S	Sulfur
Sb	Antimony
Se	Selenium
Sn	Tin
SO ₄ ²⁻	Sulfate
SS	Suspended Solids
TBT	Tributyl tin
TCH	Total Chlorinated Hydrocarbons (i.e. chlorinated pesticides & PCB's)
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
Tl	Thallium
TS	Total Solids
TVS	Total Volatile Solids
V	Vanadium
VSS	Volatile Suspended Solids
Zn	Zinc

D. Frequency of Analysis and Type of Sample - 2002

1. Definitions.

D = Daily	R = Required test	C = Composite-24 hour flow proportioned
W = Weekly	B = Background information	G = Grab samples
F = Fortnightly	RB = Test is performed more frequently than required	() = Number of compounds
M = Monthly		
Q = Quarterly		
S = Semi-annually		
A = Annually		

2. Schedule.

CONSTITUENT	PLR	PLE	C/G Comments
<u>Process Control</u>			
Biochemical Oxygen Demand -Total (5-day)	D R	D R	C
Biochemical Oxygen Demand -Soluble	D B	D B	C M-F
Chemical Oxygen Demand	W B	W B	C
Conductivity	W B	W B	C
Floating Particulates	D R	D R	C
Flow	D R	D R	Same meter used
Oil and Grease	D R	D R	G
pH	D R	D R	G
Settleable Solids	D R	D R	G
Temperature	D R	D R	G
Total Dissolved Solids	D R	D R	C
Total Solids	W B	W B	C
Total Suspended Solids	D R	D R	C
Total Volatile Solids	W B	W B	C
Turbidity	D R	D R	C
Volatile Suspended Solids	D R	D R	C
<u>Metals</u>			
As,Cd,Cr,Cu,Pb,Hg,Ni,Se,Ag,Zn	W R	W R	C
Sb, Be, Tl	W RB	W RB	C Required monthly, analyzed weekly
Fe	W B	W B	C
<u>Ions</u>			
Alkalinity	W B	W B	C
Ammonia-Nitrogen	W R	W R	C
Anions (F ⁻ ,Cl ⁻ ,Br ⁻ ,SO ₄ ²⁻ ,NO ₃ ⁻ ,PO ₄ ³⁻)	W B	W B	C
Cations (Ca ²⁺ , Mg ²⁺ , Li ⁺ ,Na ⁺ ,K ⁺)	W B	W B	C
Cyanide	W R	W R	C
Hardness (Total, Ca, Mg)	W B	W B	C By calculation

<u>CONSTITUENT</u>	<u>PLR</u>	<u>PLE</u>	<u>C/G</u>	<u>Comments</u>
<u>Organic Priority Pollutants</u>				
Acrolein and Acrylonitrile	M R	M R	C	Method 624.
Base/Neutral Compounds	M R	M R	C	
Benzidines	M R	M R	C	
Dioxin	M R	M R	C	Performed by a contract lab.
Pesticides, chlorinated	W R	W R	C	
Pesticides, organophosphorus	B	B	C	For background use only. Discontinued as a monthly analysis after Sept. 1997.
Phenols, non-chlorinated	W R	W R	C	*for background use only
Phenols, chlorinated	W R	W R	C	
Polychlorinated Biphenyls	W R	W R	C	
Purgeable (Volatile) Compounds	M R	M R	G	
Tri, Di, & monobutyl tins	M R	M R	C	
<u>Miscellaneous</u>				
Radiation	M R	M R	C	Performed by a contract lab.
Toxicity (Acute & Chronic)	M R	M B	C	Reported monthly in the <u>Toxicity Testing Report</u> by the Biology Section.

E. Methods of Analysis

WASTEWATER INFLUENT and EFFLUENT (General)

Analyte	Description	Instrumentation	Reference ¹
Alkalinity	Selected Endpoint Titration	Mettler DL-25 Titrator	(h) 2320 B
Ammonia Nitrogen	Distillation and Titration	Buchi Distillation Unit K-314	(h) 4500-NH3 B & E
Biochemical Oxygen Demand (BOD-5 Day)	Dissolved Oxygen Probe	YSI-5000 DO Meter YSI-59 DO Meter	(h) 5210 B
Biochemical Oxygen Demand (BOD-Soluble)	Dissolved Oxygen Probe	YSI-5000 DO Meter YSI-59 DO Meter	(h) 5210 B
Chemical Oxygen Demand (COD)	Closed Reflux / Colorimetric	Hach DR-2010 UV/Vis spectrophotometer	(h) 5220 D
Conductivity	Wheatstone Bridge	YSI-3200 Cond Meter & Accumet 150 Titration Controller (multi purpose meter)	(h) 2510 B
Cyanide	Acid Digest-Distil / Colorimetric	Hach DR-4000/Vis	(h) 4500-CN E
Floating Particulates	Flotation Funnel	Mettler A2-100 Balance	(h) 2530 B
Flow	Continuous Meter	Gould (pressure sensor), ADS (sonic sensor), or Venturi (velocity sensor)	
Hardness; Ca, Mg, Total	ICP-AES / Calculation	TJA Atomscan-25	(a) 200.7 (h) 2340 B
Kjeldahl Nitrogen (TKN)	Micro-Digestion / Titration	Hach DR-2000 UV/Vis	(h) 4500-NH3 B,C
Oil and Grease	Freon Extraction / Gravimetric	AND HM-120	(h) 5520 B
Organic Carbon (TOC)	Catalytic Oxidation / IR (Water Production Laboratory)	Shimadzu ASI-5000	(bb) 5310 B
pH	Hydrogen+Reference Electrode	Various models of pH meters.	(h) 4500-H+ B
Radiation (alpha & beta)	Gross proportional counter (Truesdail Labs Inc.)	Protean IPC-9025 (alpha) Tennelec LB-50100 (beta)	(h) 7110 B
Solids, Dissolved-Total	Gravimetric @ 180°C	Mettler AE-100 Balance & Mettler AG204	(h) 2540 C
Solids, Settleable	Volumetric	Imhoff Cone	(h) 2540 F
Solids, Suspended-Total	Gravimetric @ 103-105°C	Mettler AE-100 Balance	(h) 2540 D
Solids, Suspended-Volatile	Gravimetric @ 500°C	Mettler AE-100 Balance	(h) 2540 E
Solids, Total	Gravimetric @ 103-105°C	Mettler AE-100 Balance	(a) 160.3
Solids, Total-Volatile	Gravimetric @ 500°C	Mettler AE-100 Balance	(a) 160.4
Temperature	Direct Reading	Fisher Digital Thermometer	(h) 2550 B
Turbidity	Nephelometer Turbidimeter	Hach 2100-N Meter	(h) 2130 B

INFLUENT and EFFLUENT (Anions)

Analyte	Description	Instrumentation	Reference ¹
Bromide, Chloride, Fluoride, Nitrate, Phosphate, Sulfate	Ion Chromatography	Dionex DX-500	(a) 300.0

¹ Reference listing is found following this listing of analytical methods.

WASTEWATER INFLUENT and EFFLUENT (Metals)

Analyte	Description	Instrumentation	Reference ¹
Aluminum	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Antimony	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Arsenic	Hydride Generation / AA	TJA Solaar M6	(h) 3114 B
Barium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Beryllium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Boron	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Cadmium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Calcium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Chromium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Cobalt	Acid Digestion / ICP-AES	TJA Atomscan -25	(a) 200.7
Copper	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Iron	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Lead	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Lithium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Magnesium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Manganese	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Mercury	Cold Vapor Generation / AA	TJA Leeman PS 200II	(h) 3112 B
Molybdenum	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Nickel	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Potassium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Selenium	Hydride Generation / AA	TJA Solaar M6	(h) 3114 B
Silver	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Sodium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Thallium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Vanadium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7
Zinc	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.7

¹ Reference listing is found following this listing of analytical methods.

WASTEWATER INFLUENT and EFFLUENT (Organics)

Analyte	Description	Instrumentation	Reference ¹
Acrolein and Acrylonitrile	Purge & Trap, GC-MSD	Tekmar/Dohrman P2AS/3100C HP-5890GC / 5972MSD Capillary HP-624	(c) 8260 B
Base/Neutral Extractables	Basic / CH ₂ Cl ₂ continuous extraction, GC-MSD	HP-6890GC / 5973MSD HP-5890GC / 5972MSD Capillary HP-5ms	(a) 625 (aa)
Benzidines	HPLC- ED / UV/Vis Diode Array	Dionex DX-500 / PDA-40/ED-40 C-18 Luna 5um	(a) 605
Chlorinated Compounds	CH ₂ Cl ₂ extraction, GC-ECD	Varian 3600 GC-ECD Varian 3400 GC-ECD RTX-5/60m : RTX-1701/60m	(a) 608
Dioxin	Outside Contract (Pacific Analytical)	GC-MS	(a) 1613
Organophosphorus Pesticides	CH ₂ Cl ₂ extraction, hexane exchange, GC-PFPD	Varian 3800 GC-PFPD DB-1/30m DB-608/30m	(a) 622
Phenolic Compounds	Acidic / CH ₂ Cl ₂ continuous extraction, GC-MSD	HP-6890GC / 5973MSD HP-5890GC / 5972MSD Capillary HP-5ms	(a) 625 (aa)
Purgeables (VOCs)	Purge & Trap, GC-MSD	Tekmar/Dohrman P2AS/3100C HP-5890GC / 5972MSD Capillary HP-624	(a) 624 (aa)
Tri, Di, and Monobutyl Tin	CH ₂ Cl ₂ extraction, derivatization, hexane exchange, GC-FPD	Varian 3400 GC-FPD DB-1/30m / DB-608/30m	(z)

¹ Reference listing is found following this listing of analytical methods.

LIQUID SLUDGE: Raw, Digested, and Filtrate (General)

Analyte	Description	Instrumentation	Reference ¹
Alkalinity	Selected Endpoint Titration	Mettler DL-25 Titrator	(h) 2320 B
Cyanide	Acid Digest-Distil / Colorimetric	Hach DR/4000V	(h) 4500-CN E
pH	Hydrogen+Reference Electrode	Various models of pH meters.	(c) 9010 B
Radiation (alpha & beta)	Gross proportional counter (Truesdail Labs Inc.)	Protean IPC-9025 (alpha) Tennelec LB-50100 (beta)	(h) 7110 B
Sulfides	Acid Digest-Distil / Titration	Class A Manual Buret	(c) 9030 B
Sulfides, reactive	Distillation / Titration	Class A Manual Buret	7.3.4.2
Solids, Total	Gravimetric @ 103-105°C	Mettler PM 4600 Balance	(h) 2540 B
Solids, Total-Volatile	Gravimetric @ 500°C	Mettler PM 4600 Balance	(h) 2540 E

LIQUID SLUDGE: Raw, Digested, and Filtrate (Metals)

Analyte	Description	Instrumentation	Reference ¹
Aluminum	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Antimony	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Arsenic	Hydride Generation / AA	TJA Solaar M6	(c) 7062
Beryllium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Barium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Boron	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Cadmium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Chromium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Cobalt	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Copper	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Iron	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Lead	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Manganese	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Mercury	Cold Vapor Generation / AA	TJA Leeman PS 200II	(c) 7471 A
Molybdenum	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Nickel	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Selenium	Hydride Generation / AA	TJA Solaar M6	(c) 7742
Silver	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Thallium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Vanadium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Zinc	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B

¹ Reference listing is found following this listing of analytical methods.

LIQUID SLUDGE: Raw, Digested, and Decant (Organics)

Analyte	Description	Instrumentation	Reference ¹
Acrolein and Acrylonitrile	Purge & Trap, GC-MSD	Tekmar/Dohrman P2AS/3100C HP-5890GC / 5972MSD Capillary HP-624	(c) 8260 B (aa)
Base/Neutral Extractables	Basic / CH ₂ Cl ₂ continuous extraction, GC-MSD	HP-6890GC / 5973MSD HP-5890GC / 5972MSD Capillary HP-5MS	(a) 625 (aa)
Benzidines	HPLC-ED / UV/Vis Diode Array	Dionex DX-500 / PDA-40/ED-40 C-18 Luna 5um	(a) 605
Chlorinated Compounds	CH ₂ Cl ₂ extraction, GC-ECD	Varian 3400 GC-ECD RTX-5/60m : RTX-1701/60m	(c) 8081 A
PCBs	CH ₂ Cl ₂ extraction, GC-ECD	Varian 3400 GC-ECD RTX-5/60m : RTX-1701/60m	8082
Dioxin	Outside Contact (Pacific Analytical)	GC-MS	(a) 1613
Herbicides	HPLC-UV/Vis Diode Array	Dionex DX-500 / PDA-40 C-18 Hypersil 5um	(c) 8321 A
Organophosphorus Pesticides	CH ₂ Cl ₂ extraction, hexane exchange, GC-PFPD	Varian 3800 GC-PFPD DB-1/30m : DB-608/30m	(a) 622
Phenolic Compounds	Acidic / CH ₂ Cl ₂ continuous extraction, GC-MSD	HP-6890GC / 5973MSD HP-5890GC / 5972MSD Capillary HP-5MS	(a) 625 (aa)
Purgeables (VOCs)	Purge & Trap, GC-MSD	Tekmar/Dohrman P2AS/3100C HP-5890GC / 5972MSD Capillary HP-624	(c) 8260 B (aa)
Tri, Di, and Monobutyl Tin	CH ₂ Cl ₂ extraction, derivatization, hexane exchange, GC-FPD	Varian 3400 GC-FPD DB-1/30m : DB-608/30m	(z)

LIQUID SLUDGE: Raw, Digested, and Decant (Digester Gases)

Analyte	Description	Instrumentation	Reference ¹
Methane	Gas Chromatography	EG&G Chandler Eng. 100-AGC	(h) 2720 C
Carbon Dioxide	Gas Chromatography	EG&G Chandler Eng. 100-AGC	(h) 2720 C
Hydrogen Sulfide	Colorimetric	Draeger H2S 2/a	

¹ Reference listing is found following this listing of analytical methods.

DRIED SLUDGE: Metro Biosolids Center (General)

Analyte	Description	Instrumentation	Reference ¹
Cyanide	Acid Digest-Distillation Colorimetric	Hach DR/4000V UV/Vis	(c) 9010 A
Cyanide Reactive	Distillation / Colorimetric	Hach DR/4000V UV/Vis	7.3.3.2
pH	Hydrogen+Reference Electrode	Various models of pH meters.	(c) 9045 C
Radiation (alpha & beta)	Gross proportional counter (Truesdail Labs Inc.)	Protean IPC-9025 (alpha) Tennelec LB-50100 (beta)	(h) 7110 B
Sulfides	Acid Digest-Distil / Titration	Class A Manual Buret	(c) 9030 B
Sulfides, reactive	Distillation / Titration	Class A Manual Buret	7.3.4.2
Solids, Total	Gravimetric @ 103-105°C	Denver AA-250 Balance	(h) 2540 B
Solids, Total-Volatile	Gravimetric @ 500°C	Denver AA-250 Balance	(h) 2540 E

DRIED SLUDGE: Metro Biosolids Center (Metals)

Analyte	Description	Instrumentation	Reference ¹
Aluminum	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Antimony	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Arsenic	Hydride Generation / AA	TJA Solaar M6	(c) 7062
Barium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Beryllium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Boron	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Cadmium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Chromium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Cobalt	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Copper	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Iron	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Lead	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Manganese	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Mercury	Cold Vapor Generation / AA	TJA Leeman PS 200II	(c) 7471 A
Molybdenum	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Nickel	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Selenium	Hydride Generation / AA	TJA Solaar M6	(c) 7742
Silver	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Thallium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Vanadium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Zinc	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B

Waste Extraction Test (WET)	Extraction with Sodium Citrate ICP-AES	Burrel wrist action shaker	(r) Section 66261.100
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¹ Reference listing is found following this listing of analytical methods.

DRIED SLUDGE: Metro Biosolids Center (Organics)

Analyte	Description	Instrumentation	Reference ¹
Acrolein and Acrylonitrile	Purge & Trap, GC-MSD	Tekmar/Dohrman P2AS/3100C HP-5890GC / 5972MSD Capillary HP-624	(c) 8260 B (aa)
Base/Neutral Extractables	Basic / CH ₂ Cl ₂ sonication extraction, GC-MSD	HP-6890GC / 5973MSD HP-5890GC / 5972MSD Capillary HP-5MS	(c) 8270 C (c) 3550 A (aa)
Benzidines	Basic / CH ₂ Cl ₂ Sonication extraction	HP-6890GC / 5976MSD Capillary HP-5MS	(c) 8270C (c) 3550 A
Chlorinated Compounds	CH ₂ Cl ₂ extraction, GC-ECD	Varian 3400 GC-ECD RTX-5/60m : RTX-1701/60m	(c) 8081 A
PCBs	CH ₂ Cl ₂ extraction, GC-ECD	Varian 3400 GC-ECD RTX-5/60m : RTX-1701/60m	(c) 8082
Dioxin	Outside Contact (Pacific Analytical)	GC-MS	(a) 1613
Herbicides	HPLC-UV/Vis Diode Array	Dionex DX-500 / PDA-40 C-18 Hypersil 5um	(c) 8321/3545
Organophosphorus Pesticides	CH ₂ Cl ₂ extraction, hexane exchange, GC-PFPD	Varian 3800 GC-PFPD DB-1/30m DB-608/30m	(c) 8141 A
Phenolic Compounds	CH ₂ Cl ₂ / Acetone sonication extraction, GC-MSD	HP-6890GC / 5973MSD HP-5890GC / 5972MSD Capillary HP-5MS	(c) 8270 C (c) 3550 A (aa)
Purgeables (VOCs)	Purge & Trap, GC-MSD	Tekmar/Dohrman P2AS/3100C HP-5890GC / 5972MSD Capillary HP-624	(c) 8260 B
Tri, Di, and Monobutyl Tin	CH ₂ Cl ₂ extraction, derivatization, hexane exchange, GC-FPD	Varian 3400 GC-FPD DB-1/30m DB-608/30m	(z)

¹ Reference listing is found following this listing of analytical methods.

OCEAN SEDIMENT (General)

Analyte	Description	Instrumentation	Reference ¹
Biochemical Oxygen Demand (BOD-5 Day)	Dissolved Oxygen Probe	YSI-5000 DO Meter	(h) 5210 B
Particle Size	Coarse fraction by sieve; fine fraction by laser scatter	Horiba LA-900	(v) 3-380
Sulfides	Acid Digest-Distil / IC-PAD	Dionex IC-PAD(Ag)	(x)
Solids, Total	Gravimetric @ 103-105°C	AND HM-120	(h) 2540 B
Solids, Total-Volatile	Gravimetric @ 500°C	AND HM-120	(h) 2540 E
Total Organic Carbon (TOC) and Total Nitrogen (TN)	Combustion / GC-TCD	Carlo-Erba NC-2500 Porapak QS	(#)

OCEAN SEDIMENT (Metals)

Analyte	Description	Instrumentation	Reference ¹
Aluminum	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Antimony	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Arsenic	Hydride Generation / AA	TJA Solaar M6	(c) 7062
Beryllium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Cadmium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Chromium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Copper	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Iron	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Lead	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Manganese	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Mercury	Cold Vapor Generation / AA	TJA Leeman PS 200II	(c) 7471 A
Nickel	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Selenium	Hydride Generation / AA	TJA Solaar M6	(c) 7742
Silver	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Thallium	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Tin	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B
Zinc	Acid Digestion / ICP-AES	TJA Atomscan-25	(c) 6010 B

¹ Reference listing is found following this listing of analytical methods.

OCEAN SEDIMENT (Organics)

Analyte	Description	Instrumentation	Reference ¹
Base/Neutral Extractables	Basic / CH ₂ Cl ₂ / Acetone ASE GC-MSD	HP-6890GC / 5973MSD HP-5890GC / 5972MSD Capillary HP-5MS	(c) 8270 C (aa)
Chlorinated Compounds	CH ₂ Cl ₂ extraction, GC-ECD/MS/MS	Varian 3800 GC-ECD/MS/MS DBXLB/60m	(c) 8081 A
PCBs as Congeners	CH ₂ Cl ₂ extraction, GC-ECD/MS/MS	Varian 3600 GC-ECD/MS/MS DBXLB/60m	(c) 8082
Organophosphorus Pesticides	CH ₂ Cl ₂ extraction, hexane exchange, GC-PFPD	Varian 3600 GC-PFPD DB-5/30m DB-608/30m	(c) 8141 A
Tri, Di, and Monobutyl Tin	CH ₂ Cl ₂ extraction, derivatization, hexane exchange, GC-FPD	Varian 3400 GC-FPD DB-1/30m DB-608/30m	(z)

¹ Reference listing is found following this listing of analytical methods.

FISH TISSUE: Liver, Muscle, and Whole (General)

Analyte	Description	Instrumentation	Reference ¹
Solids, Total	Freeze Drying Gravimetric	Labconco Freezone 4.5 Mettler AG-104 Balance	(%)
Lipids	Hexane/Acetone Extraction Gravimetric	Dionex ASE-200 Mettler AG-104 Balance	(*)

FISH TISSUE: Liver, Muscle, and Whole (Metals)

Analyte	Description	Instrumentation	Reference ¹
Aluminum	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Antimony	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Arsenic	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Beryllium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Cadmium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Chromium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Copper	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Iron	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Lead	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Manganese	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Mercury	Cold Vapor Generation / AA	TJA SH-8000 AA	(a) 245.6
Nickel	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Selenium	Hydride Generation / AA	TJA Solaar M6	(c) 7742
Silver	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Thallium	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Tin	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7
Zinc	Acid Digestion / ICP-AES	TJA Atomscan-25	(a) 200.3 / 200.7

FISH TISSUE: Liver, Muscle, and Whole (Organics)

Analyte	Description	Instrumentation	Reference ¹
Base/Neutral Extractables	Basic / CH ₂ Cl ₂ ASE extraction, GC-MSD	Dionex ASE-200 HP-5890GC / 5971MSD Capillary DB-XLB/30m	(c) 3545 / 8270 C
Chlorinated Compounds	CH ₂ Cl ₂ extraction, GC-ECD/MS/MS	Varian 3800 GC Saturn 2000 MS-Ion Trap DB-XLB/60m	(c) 3545 / 8081 A
PCBs	CH ₂ Cl ₂ extraction, hexane exchange, GC-ECD/MS/MS	Varian 3800 GC Saturn 2000 MS-Ion Trap DB-XLB/60m	(c) 3545 / 8082

¹ Reference listing is found following this listing of analytical methods.

Method References: Methods of Analysis Used to Produce the Data Presented in this Report.

- a) Methods for Chemical Analysis of Water and Wastes, EPA, Environmental Monitoring and Support Laboratory, Cincinnati, Ohio, March 1979 (EPA-600/4-79-020), 1983 Revision, and March 1984 (EPA-600/4-84-017).
- aa) U.S. EPA Contract Laboratory Program, Statement of Work for Organic Analysis, Multi-Media, Multi-Concentration, 7/85 revision and 1/91 revision.
- b) Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WPCF, 16th Edition, 1985
- bb) Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WPCF, 17th Edition, 1989
- c) Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, U.S. EPA Office of Solid Waste and emergency Response, Washington, D.C. 20460, November 1986, SW-846, Third Edition.
- g) Laboratory Procedures for the Examination of Seawater and Shellfish, 5th Edition, 1984, American Public Health Association.
- h) Standard Methods for the Examination of Water and Wastewater, APHA, AWWA, WPCF, 18th Edition, 1992.
- j) Methods for Organic Analysis of Municipal and Industrial Wastewater, EPA-600/4-82-057, July 1982.
- o) Official Methods of Analysis, 15th Edition, Association of Official Analytical Chemists (AOAC), 1990.
- q) Federal Register, Vol. 56, No. 5, pp 636-643, January 8, 1991.
- r) Criteria for Identification of Hazardous and Extremely Hazardous Wastes, California Code of Regulations (CCR), Title 22.
- t) ADirect Current Plasma (DCP) Optical Emission Spectrometric Method for Trace Elemental Analysis of Water and Wastes, Method AES0029", 1986, revised 1991, Applied Research Laboratories (ARL) Inc., 24911 Avenue Standford, Valencia, CA 91355.
- u) Radiochemical Procedures Manual, EPA-520/5-84-006, August 1984 (EPA 1984a) Eastern Environmental Radiation Facility, Montgomery, AL 36109.
- v) Procedures for Handling and Chemical Analysis of Sediment and Water Samples, Russel H. Plumb, Jr., May 1981, EPA/Corp of Engineers Technical Committee on Criteria for Dredged and Fill Material, EPA Contract 4805572010.
- w) California Administrative Code, Title 22, Division 4, Chapter 30, Section 66700.
- x) DIONEX AU 107, R.D.Rocklin and E.L.Johnson, ANAL. CHEM., 1983, 55, 4

- y) Manual of Analytical Methods For the Analysis of Pesticides In Humans and Environmental Samples, EPA-600/8-80-038, June 1980.
- z) Adaptation of method by the Naval Ocean Systems Center, San Diego, Marine Environment Branch, San Diego, CA 92152-5000
- #) ATOC/TN in Marine Sediments...@ SCCWRP Annual Report, 1990-1991, and 1991-1992.
- %) AA Guide to Freeze Drying for the Laboratory...@ LABCONCO, 3-53-5/94-Rosse-5M-R3, 1994.
- *) ALipids Content in Fish Tissues via Accelerated Solvent Extraction...@WWChem, EMTS/MWWD, 1998

F. Laboratories Contributing Results used in this report.

1. Metropolitan Wastewater Chemistry Laboratory
(EPA Lab Code: CA00380,
ELAP Certificate: 1609)
5530 Kiowa Drive
La Mesa, CA 91942
(619)668-3205
All results except those listed below.
2. Point Loma Wastewater Chemistry Laboratory
(EPA Lab Code: CA01435,
ELAP Certificate: 2474)
1902 Gatchell Road
San Diego, CA 92106
(619)221-8765
Process control analyses and wet methods for the plant.
3. North City Wastewater Chemistry Laboratory
(EPA Lab Code: CA01436,
ELAP Certificate: 2477)
4949 Eastgate Mall
San Diego, CA 92121
(858)824-6009
Process control analyses and wet methods for the plant.
4. Metro Biosolids Center Chemistry Laboratory
(EPA Lab Code: CA01437,
ELAP Certificate: 2478)
5240 Convoy Street
San Diego, CA 92111
(858)614-5834
Process control analyses and wet methods for the plant.
5. South Bay Water Reclamation Plant
(EPA Lab Code: CA01460,
ELAP Certificate: 2539)
2411 Dairy Mart Road
San Diego, CA 92173
619.428.7349
Process control analyses and wet methods for the plant.
6. City of San Diego - Water Quality Laboratory
(EPA Lab Code: CA00080,
ELAP Certificate: 1058)
5530 Kiowa Drive
La Mesa, CA 91942
(619)668-3237
Total Organic Carbon in Wastewater
7. City of San Diego - Marine Microbiology and Vector Management (EPA LabCode: CA01393, ELAP
Certificate: 2185)
5530 Kiowa Drive
La Mesa, CA 91942
(619)668-3226
Microbiology
8. City of San Diego - Toxicity Bioassay Laboratory

(EPA Lab Code: CA01302,
ELAP Certificate: 1989)
4918 Harbor Drive, Suite 101
San Diego, CA 92106
(619) 758-2347

Bioassays

9. Pacific Analytical, Inc.
(EPA Lab Code: CA00052,
ELAP Certificate: 1466)
6349 Paseo Del Lago
Carlsbad, CA 92009
(760)438-3100

Dioxins/Furans

10. Truesdail Laboratories, Inc.
(EPA Lab Code: CA09469,
ELAP Certificate: 1237)
14201 Franklin Ave.
Tustin, CA 92780-7008
(714)730-6239

Gross Alpha/Beta Radioactivity and some mercury, arsenic and selenium values.

G. Discharge Limits

NPDES Permit No. CA0107409/RWQCB Order No. R-2002-0025

DISCHARGE SPECIFICATIONS from NPDES Permit No. CA0107409/RWQCB Order No. R-2002-0025 effective on September 13, 2002 with limits on pollutant discharges.

The discharge of waste through the Point Loma Ocean Outfall containing pollutants in excess of the following effluent limitations are prohibited:

NPDES Permit No. CA0107409/RWQCB Order No. R-2002-0025						
Constituent	Units	6-month Median	30-day Average	7-Day Average	Daily Maximum	Instantaneous Maximum
Biochemical Oxygen Demand BOD ₅ @ 20EC	mg/L	The "Mean Annual Percent Removal" limit for BOD is 58%. There is no mass emission limit.				
Total Suspended Solids ²	mg/L lb/day		75			
pH	pH units	Within the limits of 6.0 - 9.0 at all times.				
Grease & Oil	mg/L lb/day		25 34,000	40 68,000		75 130,000
Settleable Solids	mL/L		1.0	1.5		3.0
Turbidity	NTU		75	100		225
Acute Toxicity	TUa				6.5	
Arsenic	ug/L	1,000			5,900	16,000
Cadmium	ug/L	200			800	2,100
Chromium ³ (Hexavalent)	ug/L	400			2,000	4,100
Copper	ug/L	200			2,100	5,700
Lead	ug/L	400			2,000	4,100
Mercury	ug/L	8.1			33	80
Nickel	ug/L	1,000			4,100	10,000
Selenium	ug/L	3,100			12,000	30,800
Silver	ug/L	100			540	1,000
Zinc	ug/L	2,500			15,000	39,400
Cyanide	mg/L	0.2			0.8	2.1
Total Residual Chlorine(TRC)	mg/L	0.400			2.0	12
Ammonia (expressed as Nitrogen)	mg/L	123			492	1,230
Chronic Toxicity	TUc				205	
Phenolic Compounds (non- chlorinated)	ug/L	6,200			24,600	61,500
Chlorinated Phenolics	ug/L	200			800	2,100

² Total Suspended Solids (TSS)- The discharger shall achieve a mass emission of TSS of no greater than 13,995 mt/yr; this requirement shall be effective through December 31, 2005. Effective January 1, 2006, the discharger shall achieve a mass emission of TSS of no greater than 13,599 mt/yr. These mass emission requirements shall only apply to TSS discharged from POTWs which are owned and operated by the discharger, and the discharger's wastewater generated in the Metro System service area. These mass emission requirements do not apply to wastewater (and the resulting TSS) generated in Mexico as a result of upset or shutdown and treated at and discharged from the PLMWTP.

³ Hexavalent Chromium limit met as Total Chromium.

NPDES Permit No. CA0107409/RWQCB Order No. R-2002-0025

Constituent	Units	6-month Median	30-day Average	7-Day Average	Daily Maximum	Instantaneous Maximum
Endosulfan	ng/L	2,000			3,700	5,500
Endrin	ng/L	400			800	1,000
HCH (hexachlorocyclohexanes)	ng/L lb/day	800			2,000	2,500

Radioactivity - Not to exceed limits specified in Title 17, Division 1, Chapter 5, Subchapter 4, Group 3, Article 3, Section 30269 of the California Code of Regulations.

Note: mg/L= milligrams per liter
 ug/L = micrograms per liter
 ng/L = nanograms per liter
 lb/day= pounds per day
 NTU= Nephelometric turbidity units
 TUa = Acute toxicity units
 TUc = Chronic toxicity units

NPDES Permit No. CA0107409/RWQCB Order No. R-2002-0025

Constituent	Units	Monthly Average (30-Day)
LIMITATIONS FOR PROTECTION OF HUMAN HEALTH--NONCARCINOGENS		
Acrolein	ug/L	45,000
Antimony	ug/L	250,000
Bis(2-chloroethoxy) methane	ug/L	900
Bis(2-chloroisopropyl) ether	ug/L	250,000
Chlorobenzene	ug/L	120,000
Chromium (III) ⁴	ug/L	39,000,000
di-n-butyl phthalate	ug/L	720,000
dichlorobenzenes	ug/L	1,000,000
Diethyl phthalate	ug/L	6,800,000
Dimethyl phthalate	ug/L	170,000,000
4,6-dinitro-2-methylphenol	ug/L	45,000
2,4-dinitrophenol	ug/L	820
Ethylbenzene	ug/L	840,000
Fluoranthene	ug/L	3,100
Hexachlorocyclopentadiene	ug/L	12,000
Nitrobenzene	ug/L	1,000
Thallium	ug/L	400
Toluene	ug/L	17,000,000
Tributyltin	ug/L	0.29
1,1,1-trichloroethane	ug/L	110,000,000
LIMITATIONS FOR PROTECTION OF HUMAN HEALT—CARCINOGENS		
Acrylonitrile	ug/L	21
Aldrin	ng/L	4.5
Benzene	ug/L	1,200
Benzidine	ug/L	0.014
Beryllium	ug/L	6.8
Bis(2-chloroethyl)ether	ug/L	9.2
Bis(2-ethylhexyl)phthalate	ug/L	720

⁴ Chromium (III) limit is met by Total Chromium.

Constituent	Units	Monthly Average (30-Day)
Carbon Tetrachloride	ug/L	180
Chlordane	ng/L	4.7
Chloroform	ug/L	27,000
DDT	ng/L	35
1,1,2,2-tetrachloroethane	ug/L	470
1,1-dichloroethylene	ug/L	200
1,1,2-trichloroethane	ug/L	1,900
1,4-dichlorobenzene	ug/L	3,700
3,3-dichlorobenzidine	ug/L	1.7
1,2-dichloroethane	ug/L	5,700
Dichloromethane	ug/L	92,000
1,3-dichloropropene	ug/L	1,800
Dieldrin	ng/L	8.20
2,4-dinitrotoluene	ug/L	530
1,2-diphenylhydrazine	ug/L	33
Halomethanes	ug/L	27,000
Heptachlor	ng/L	10
Hexachlorobenzene	ug/L	0.043
Hexachlorobutadiene	ug/L	2,900
Hexachloroethane	ug/L	510
Isophorone	ug/L	150,000
N-nitrosodimethylamine	ug/L	1,500
N-nitrosodiphenylamine	ug/L	510
PAHs	ug/L	1.80
PCBs	ng/L	3.90
TCDD equivalents	pg/L	0.8
Tetrachloroethylene	ug/L	410
Toxaphene	ng/L	430
Trichloroethylene	ug/L	5,500
Vinyl Chloride	ug/L	7,400

H. Laboratory Accreditation Certificate

Our wastewater laboratory consists of a main laboratory with three satellite laboratories, one at each wastewater treatment plant; Point Loma Wastewater Treatment Plant, North City Water Reclamation Plant, and the Metro Biosolids Center. The main laboratory performs analyses for permit regulated parameters. The Point Loma, North City, and Metro Biosolids Center laboratories perform some of our permit regulated analyses, as well as process control analyses. All of our laboratories are California Environmental Laboratory Accreditation Program (ELAP) Certified Laboratories. A copy of all the Laboratory Certifications from the California Department of Health Services (DOHS), Environmental Laboratory Accreditation Program (ELAP) follows.

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY CERTIFICATION

is hereby granted to

CITY of SAN DIEGO
ENVIRONMENTAL MONITORING SERVICE
METROPOLITAN WASTEWATER CHEMISTRY LABORATORY
5530 KIOWA DRIVE
LA MESA, CALIFORNIA



to conduct analyses of environmental samples as specified in the
"List of Approved Fields of Testing and Analytes"
which accompanies this Certificate.

This Certificate is granted in accordance with provisions of Section 1010, et seq.
(New Section 100825) of the Health and Safety Code.

Certificate No.: **1609**

Expiration Date: **08/31/2003**

Issued on: **08/01/2001**

at Berkeley, California,
subject to forfeiture or revocation.

George C. Kulasingam, Ph.D.
Manager
Environmental Laboratory Accreditation Program

**CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing**

CITY of SAN DIEGO ENVIRONMENTAL MONITORING SERVICE
METROPOLITAN WASTEWATER CHEMISTRY LABORATORY
5530 KIOWA DRIVE
LA MESA, CA 91942

Lab Phone (619) 668-3212

Certificate No: 1609 Renew Date: 08/31/2003

Field of Testing: 09 - Physical Properties Testing of Hazardous Waste

09.02	02	Corrosivity - pH Determination	EPA 9045C
09.04A	01	Reactive Cyanide	Section 7.3 SW-846
09.04B	01	Reactive Sulfide	Section 7.3 SW-846

Field of Testing: 10 - Inorganic Chemistry and Toxic Chemical Elements of Hazardous Waste

10.01	04	Antimony	EPA 6010B
10.02	02	Arsenic	EPA 7061A
10.03	03	Barium	EPA 6010B
10.04	03	Beryllium	EPA 6010B
10.05	03	Cadmium	EPA 6010B
10.06	03	Chromium, Total	EPA 6010B
10.07	03	Cobalt	EPA 6010B
10.08	03	Copper	EPA 6010B
10.09	03	Lead	EPA 6010B
10.10	01	Mercury	EPA 7470A
10.10	02	Mercury	EPA 7471A
10.11	03	Molybdenum	EPA 6010B
10.12	03	Nickel	EPA 6010B
10.13	02	Selenium	EPA 7741A
10.14	03	Silver	EPA 6010B
10.15	03	Thallium	EPA 6010B
10.16	03	Vanadium	EPA 6010B
10.17	03	Zinc	EPA 6010B
10.19	03	Cyanide	EPA 9014
10.21	01	Sulfide	EPA 9034

Field of Testing: 11 - Extraction Tests of Hazardous Waste

11.01	01	Waste Extraction Test (WET)	CCR Chapter11, Article 5, Appendix II
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Field of Testing: 12 - Organic Chemistry of Hazardous Waste by GC/MS

12.03A	01	Extractable Organics	EPA 8270C
12.06A	01	Volatile Organic Compounds	EPA 8260B

Field of Testing: 13 - Organic Chemistry of Hazardous Waste (excluding GC/MS)

13.24C	01	PCBs	EPA 8082
13.25C	01	Organochlorine Pesticides	EPA 8081A

Field of Testing: 16 - Wastewater Inorganic Chemistry, Nutrients and Demand

16.02	01	Alkalinity	SM2320B
16.04	01	Biochemical Oxygen Demand	SM5210B
16.05	03	Boron	EPA 200.7
16.06	02	Bromide	EPA 300.0
16.07	04	Calcium	EPA 200.7
16.08	01	Carbonaceous BOD	SM5210B
16.09	06	Chemical Oxygen Demand	SM5220D
16.10	06	Chloride	EPA 300.0
16.12	02	Cyanide	SM4500-CN C,E

As of 03/07/2003, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

Page 1 of 2

CITY of SAN DIEGO ENVIRONMENTAL MONITORING SERVICE

Certificate No: 1609

Renew Date: 08/31/2003

16.14	07	Fluoride	EPA 300.0
16.15	05	Hardness - Total as CaCO3	EPA 200.7
16.17	04	Magnesium	EPA 200.7
16.18	08	Nitrate	EPA 300.0
16.22	01	Oxygen,dissolved	SM4500-O C
16.23	01	pH	SM4500-H+ B
16.25	06	Phosphate, Ortho	EPA 300.0
16.26	03	Phosphorus, Total	EPA 365.2
16.27	04	Potassium	EPA 200.7
16.28	02	Residue, Total	EPA 160.3
16.29	01	Residue, Filterable	SM2540C
16.30	01	Residue, Non-filterable	SM2540D
16.32	01	Residue, Volatile	EPA 160.4
16.34	04	Sodium	EPA 200.7
16.35	01	Conductivity	SM2510B
16.36	05	Sulfate	EPA 300.0
16.41	01	Turbidity	SM2130B

Field of Testing: 17 - Toxic Chemical Elements in Wastewater

17.01	05	Aluminum	EPA 200.7
17.02	05	Antimony	EPA 200.7
17.03	02	Arsenic	SM3114B 4,d
17.04	06	Barium	EPA 200.7
17.05	06	Beryllium	EPA 200.7
17.06	07	Cadmium	EPA 200.7
17.08	08	Chromium, Total	EPA 200.7
17.09	07	Cobalt	EPA 200.7
17.10	07	Copper	EPA 200.7
17.13	07	Iron	EPA 200.7
17.14	07	Lead	EPA 200.7
17.15	06	Manganese	EPA 200.7
17.16	01	Mercury	SM3112B
17.17	06	Molybdenum	EPA 200.7
17.18	07	Nickel	EPA 200.7
17.24	05	Selenium	SM3114B
17.25	07	Silver	EPA 200.7
17.27	05	Thallium	EPA 200.7
17.28	05	Tin	EPA 200.7
17.30	05	Vanadium	EPA 200.7
17.31	06	Zinc	EPA 200.7

Field of Testing: 18 - Organic Chemistry of Wastewater by GC/MS

18.01	01	All Volatile Organics	EPA 624
18.02	01	All Acid/base/neutral Compounds	EPA 625

Field of Testing: 19 - Organic Chemistry of Wastewater (excluding GC/MS)

19.05	01	Benzidine	EPA 605
19.08A	01	PCBs and Organochlorine Pesticides	EPA 608
19.08B	01	PCBs	EPA 608

As of 03/07/2003, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

Page 2 of 2

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY CERTIFICATION

is hereby granted to

PT. LOMA WASTEWATER CHEMISTRY LAB
CITY OF SAN DIEGO ENVIRONMENTAL MONITORING
1902 GATCHELL ROAD
SAN DIEGO, CALIFORNIA

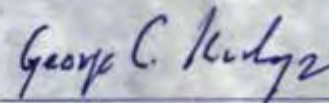
to conduct analyses of environmental samples as specified in the
"List of Approved Fields of Testing and Analytes"
which accompanies this Certificate.

This Certificate is granted in accordance with provisions of Section 1010, et seq.
(New Section 100825) of the Health and Safety Code.

Certificate No.: 2474

Expiration Date: 07/31/2003

Issued on: 07/03/2001
at Berkeley, California,
subject to forfeiture or revocation.



George C. Kulasingam, Ph.D.
Manager
Environmental Laboratory Accreditation Program

**CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
Accredited Fields of Testing**

PT. LOMA WASTEWATER CHEMISTRY LAB
CITY OF SAN DIEGO ENVIRONMENTAL MONITORING
1902 GATCHELL ROAD
SAN DIEGO, CA 92106

Lab Phone (619) 668-3205

Certificate No: 2474 Renew Date: 07/31/2003

Field of Testing: 16 - Wastewater Inorganic Chemistry, Nutrients and Demand			
16.02	01	Alkalinity	SM2320B
16.03	01	Ammonia	SM4500-NH3 B,C
16.04	00	Biochemical Oxygen Demand	
16.08	01	Carbonaceous BOD	SM5210B
16.09	01	Chemical Oxygen Demand	SM5220C
16.20	00	Oil and Grease	
16.22	00	Oxygen, dissolved	
16.23	00	pH	
16.28	00	Residue, Total	
16.29	01	Residue, Filterable	SM2540C
16.30	01	Residue, Non-filterable	SM2540D
16.31	00	Residue, Settleable	
16.32	00	Residue, Volatile	
16.35	00	Conductivity	
16.41	01	Turbidity	SM2130B

As of 08/20/2002, this list supersedes all previous lists for this certificate number.
Customers: Please verify the current accreditation standing with the State.

Page 1 of 1

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY CERTIFICATION

is hereby granted to

NORTH CITY WASTEWATER CHEMISTRY LAB
CITY OF SAN DIEGO ENVIRONMENTAL MONITORING

4949 EASTGATE MALL
SAN DIEGO, CALIFORNIA

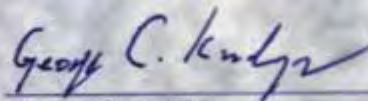
to conduct analyses of environmental samples as specified in the
"List of Approved Fields of Testing and Analytes"
which accompanies this Certificate.

This Certificate is granted in accordance with provisions of Section 1010, et seq.
(New Section 100825) of the Health and Safety Code.

Certificate No.: **2477**

Expiration Date: **07/31/2003**

Issued on: **07/25/2001**
at Berkeley, California,
subject to forfeiture or revocation.



George C. Kinsbergen, Ph.D.
Manager
Environmental Laboratory Accreditation Program

**CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
List of Approved Fields of Testing and Analytes**

NORTH CITY WASTEWATER CHEMISTRY LAB	Certificate No. 2477
CITY OF SAN DIEGO ENVIRONMENTAL MONITORING	
4949 EASTGATE MALL	PHONE No. (858) 824-6030
SAN DIEGO, CA	Expiration Date 07/31/2003
	COUNTY SAN DIEGO

16 Wastewater Inorganic Chemistry, Nutrients and Demand

- 16.02 Alkalinity
- 16.03 Ammonia
- 16.04 Biochemical Oxygen Demand
- 16.08 Carbonaceous Biological Oxygen Demand
- 16.09 Chemical Oxygen Demand
- 16.11 Chlorine Residual, total
- 16.16 Kjeldahl Nitrogen
- 16.22 Oxygen, Dissolved
- 16.23 pH
- 16.28 Residue, Total
- 16.29 Residue, Filterable (Total Dissolved Solids)
- 16.30 Residue, Nonfilterable (Total Suspended Solids)
- 16.31 Residue, Settleable (Settleable Solids)
- 16.32 Residue, Volatile
- 16.35 Specific Conductance
- 16.39 Surfactants (MBAS)
- 16.41 Turbidity

STATE OF CALIFORNIA
DEPARTMENT OF HEALTH SERVICES

ENVIRONMENTAL LABORATORY CERTIFICATION

Is hereby granted to

METRO BIOSOLIDS CENTER WASTEWATER CHEMISTRY
CITY OF SAN DIEGO - ENVIRONMENTAL MONITORING

5240 CONVOY STREET
SAN DIEGO, CALIFORNIA



to conduct analyses of environmental samples as specified in the
"List of Approved Fields of Testing and Analytes"
which accompanies this Certificate.

This Certificate is granted in accordance with provisions of Section 1010, et seq.
(New Section 100825) of the Health and Safety Code.

Certificate No.: 2478

Expiration Date: 07/31/2003

Issued on: 07/25/2001
at Berkeley, California,
subject to forfeiture or revocation.

George C. Kulasingam, Ph.D.
Manager
Environmental Laboratory Accreditation Program

CALIFORNIA DEPARTMENT OF HEALTH SERVICES
ENVIRONMENTAL LABORATORY ACCREDITATION PROGRAM
List of Approved Fields of Testing and Analytes

METRO BIOSOLIDS CENTER WASTEWATER CHEMISTRY LAB	Certificate No. 2478
CITY OF SAN DIEGO - ENVIRONMENTAL MONITORING	
5240 CONVOY STREET	PHONE No. (619) 614-5809
SAN DIEGO, CA	Expiration Date 07/31/2003
	COUNTY SAN DIEGO

16 Wastewater Inorganic Chemistry, Nutrients and Demand

16.02	Alkalinity
16.23	pH
16.28	Residue, Total
16.30	Residue, Nonfilterable (Total Suspended Solids)
16.32	Residue, Volatile

I. Staff Contributing to this Report

Initials	ID	First Name	Last Name	Signature
LA	LOA	Liliana	Arriaga	Liliana Arriaga
BOA	BOA	Ben	Andoh	Benjamin Andoh
CB	CLB	Carol	Backus	Carol Backus
TB	TSB	Tan	Bao	Tan Bao
VB	VFB	Virginia	Basilan	Virginia Basilan
EB	EMB	Eric	Becker	Eric Becker
EB	BTX	Enrique	Blanco	Enrique Blanco
BGB	N8B	Brent	Bowman	Brent Bowman
TB	TMB	Tom	Burger	Tom Burger
DC	DVC	Doug	Campbell	Doug Campbell
LC	UEC	Laura	Carr	Laura Carr
LC	G3C	Jose	Castro	Jose Castro
JCM	U8C	Jacqueline	Cazares-Medina	Jacqueline Cazares Medina
CC	I5C	CC	Chou	CC Chou
NC	NLC	Nancy	Coglan	Nancy Coglan
MC	M5C	Maricela	Coronel	Maricela Coronel
JCM	G8C	Jerry	Czajkowski	Jerry Czajkowski
KD	KOD	Ken	Dang	Ken Dang
HHD	HZD	Heather	Duckett	Heather Duckett
ACD	AD4	Angelica	Duran	Angelica Duran
SE	SZE	Steve	Evans	Steve Evans
JF	JRF	Jeff	Findley	Jeff Findley
KG	KG3	Kenneth	Genz	Kenneth Genz
TH	UFH	Tim	Huynh	Tim Huynh
JI	JZI	Judi	Ireton	Judi Ireton
RJ	RCJ	Ron	Jardine	Ron Jardine
LK	LNK	Lee	King	Lee M. King
WK	WXK	Walter	Konopka	Walter Konopka
EL	EVL	Estela	Lanez	Estela Lanez
NL	NDL	Ninette	Lilienthal	Ninette Lilienthal
RL	AUL	Ron	Lilienthal	Ron Lilienthal
AM	M5U	Armando	Martinez	Armando Martinez
FM	YBM	Fernando	Martinez	Fernando Martinez
SWM	BWM	Steve	Meyer	Steve Meyer
FM	I2M	Francisco	Meza	Francisco Meza
JM	G7M	Jeff	McAnally	Jeff McAnally
JN	IEN	Jesus	Nieto	Jesus Nieto
PO	A2O	A. Patricia	Ortega	A. Patricia Ortega
LP	LJP	Lorena	Pantoja	Lorena Pantoja
LP	LXP	Leonard	Przybylo	Leonard Przybylo
CAQ	CQ5	Corinna	Quinata	Corinna Quintana
JS	JVS	Jovanne	Sanchez	Jovanne Sanchez
RS	RDS	Robert	Sandoval	Robert Sandoval
DWS	DXS	David	Schlickman	David Schlickman
GS	GTS	Greg	Schimme	Greg Schimme
GR	HIR	Gloria	Siqueiros	Gloria Siqueiros
MS	D8U	Miles	Slattery	Miles Slattery
MRS	MWS	Michael	Stewart	Michael Stewart
SV	SCV	Sandra	Valenzuela	Sandra Valenzuela
GV	JRV	Gabriel	Velarde	Gabriel Velarde
JW	AIW	Julie	Webb	Julie Webb
CW	C2W	Crystal	Winkler	Crystal Winkler
KW	KLW	Kristof	Witczak	Kristof Witczak
MZ	MZ	Maria	Zapata	Maria Zapata

Figure 1. Chemistry Laboratory Organization Chart. (2002)

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Environmental Monitoring and Technical Services Division
Wastewater Chemistry Laboratory

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Asst. Deputy Director
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Walter F. Konopka, Jr

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<i>Assistant Chemists: 9.00</i> TAN BAO CC CHOU KEN DANG CRYSTAL WINKLER MARIA ZAPATA SANDRA VALENZUELA JAQUELINE CAZARES-MEDINA HEATHER DUCKETT MICHAEL STEWART	<i>Assistant Chemists: 4.00</i> LEE KING RONALD JARDINE TOM BURGER MILES SLATTERY	<i>Assistant Chemists: 5.00</i> BEN ANDOH JERRY CZAJKOWSKI JEFF FINDLEY JESUS NIETO LEONARD PRZYBYLO	<i>Assistant Chemists: 3.00</i> JULIE WEBB GREG SCHLIMME ENRIQUE BLANCO	<i>Assistant Chemists: 4.00</i> VIRGINIA BASILAN KRIS WITCZAK LAURA CARR LORENA PANTOJA	<i>Assistant Chemists: 6.00</i> FRANCISCO MEZA STEVE EVANS ESTELA LANEZ -SB FERNANDO MARTINEZ DOUG CAMPBELL
<i>Laboratory Technician: 1.00</i> ERIC BECKER	<i>Laboratory Technician: 1.00</i> ARMANDO MARTINEZ	<i>Laboratory Technician: 2.00</i> GABRIEL VELARDE GLORIA SIQUEIROS	<i>Laboratory Technician: 3.00</i> MARICELA CORONEL NINETTE LILIENTHAL ALMA PATRICIA ORTEGA	<i>Laboratory Technician: 2.00</i> ANGELICA DURAN KENNETH GENZ	<i>Laboratory Technician: 1.00</i> JOSE CASTRO -SB
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