Permit

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Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

memorandum

Reg. NPDES

TO: Steve Rae, ESH-18, MS K497
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DATE: September 24, 1996

reports

FROM: David Nochumson, ESH-18

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SYMBOL: ESH-18/WQ&H-96-0490

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SUBJECT: **NPDES REPORT FOR 1992-94**

I. Introduction

This report covers the period of 1992 through 1994 for the Laboratory's wastewater discharges permitted under the National Pollutant Discharge Elimination System (NPDES). NPDES was established under the Clean Water Act (33 U.S.C. 446 et seq). NPDES requires the permitting of point-source discharges to the nation's waters. The NPDES permits establish specific chemical, physical, and biological criteria that an effluent must meet before it is discharged. Although most of the Laboratory's effluent is discharged to normally dry arroyos, the Laboratory is required to meet effluent limitations under the NPDES permit program.

This report covers the Laboratory's NPDES permit number NM0028355, effluent discharges at Los Alamos. The permit includes discharge limitations (by concentration and/or discharge rate) and monitoring and reporting requirements. Revisions to this permit went into effect on August 1, 1994. Revisions to the permit included changes and additions to the discharge limitations and to the monitoring and reporting requirements.

This report is divided into sections according to discharge category. As shown in Table I-1, the Laboratory's outfalls are classified into nine discharge categories. Category 13S covers sanitary wasterwater effluents and the other eight cover industrial wastewater effluents. Eight sanitary wasterwater discharge categories, 01S, 02S, 03S, 04S, 05S, 07S, 09S and 10S, and one industrial discharge category, 07A, were eliminated and are not covered in this report.

Each section of the report provides the following information for each discharge category.

1. A table listing the outfalls, with some descriptive information concerning the outfall, the permit conditions and the measurement data (if there are more than two outfalls covered by the discharge category);

2. the discharge limitations by effluent characteristic;

3. exceedances of the discharge limitations, if any;

4. summary statistics by year for the period of 1992 through 1994 and by quarter for 1994; and

5. time series plots of the data by outfall (if there are one or two outfalls in the discharge category) or bar charts summarizing the data by discharge category (if there are greater than two outfalls in the discharge category);

Table I-1 shows that there were 135 outfalls in operation during the period of 1992 through 1994 and 20 outfalls were eliminated since 1992. Four discharge categories, 051, 128, 13S and 01A, have only one outfall; one discharge category, 02A, has two outfalls; and the remaining four discharge categories, 03A, 04A, 05A and 06A, had between 14 to 57 outfalls in operation.

Table I-2 shows the number of analyses by discharge category and effluent characteristic that were performed for the period of 1992 through 1994. A total of 6436 analyses were performed for 26 effluent characteristics. The discharge categories with the first, second and third highest number of analyses performed were 051, 02A and 128, respectively. The effluent characteristics with the first, second and third highest number of analyses performed were pH, total suspended solids and total copper, respectively.

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Table I-1
Discharge Category Summary

Discharge Category	Description of Discharge Category	Number of Outfalls in Operation During 1992-94	Number of Outfalls Eliminated Since 1992	Number of Outfalls Still in Operation
051	Industrial (radioactive liquid) waste treament plant discharge	1	0	1
128	Process wastewater from printed circuit board manufacturing using photo-etching techniques	1	0	1
13S	Treated sanitary sewage effluents	1	0	1
01A	Power plant discharge, including treated sanitary effluent used for cooling water and monitored prior to reuse under outfall 13S	1	0	1
02A	Neutralized demineralizer regeneration brine and boiler blowdown	2	0	2
03A	Cooling tower blowdown, evaporative coolers, chillers, condensers and air washer blowdown, including treated sanitary effluent used for cooling water and monitored prior to reuse under Outfall 13S	40	5	35
04A	Noncontact cooling water, non-destructive testing discharge and water production facilities	57	13	44
05A	High explosive waste discharges	18	1	17
06A	Photo waste discharges	14	1	13
	Totals	135	20	115

Table I-2
Number of Analyses by Effluent Characteristic and Discharge Category

Effluent Characteristic	51	128	13S	01A	02A	03A	04A	05A	06A	Totals
Ammonia	146	0	0	0	0	0	0	0	0	146
Biochemical Oxygen Demand (5 day)	0	0	15	0	0	0	0	0	0	15
Chemical Oxygen Demand	162	154	0	0	0	0	0	149	0	465
Fecal Coliform Bacteria (per 100 ml)	0	0	15	0	0	0	0	0	0	15
Free Available Chlorine	0	0	0	37	0	218	0	0	0	255
Nitrate-Nitrogen (as Nitrogen)	5	0	0	0	0	0	0	0	0	5
Oil and Grease	0	0	0	0	0	0	0	14	0	14
pH	163	155	24	38	237	218	182	149	159	1325
Radium-226 + Radium-228	4	0	0	0	0	0	0	0	0	4
Sulfite (as SO3)	0	0	0	0	153	0	0	0	0	153
Total Aresenic	0	0	0	0	0	46	0	0	0	46
Total Cadmium	164	0	0	0	0	0	0	0	0	164
Total Chromium	164	0	0	0	158	0	0	0	0	322
Total Copper	164	154	0	0	160	0	0	0	0	478
Total Cyanide	0	0	0	0	0	0	0	0	149	149
Total Iron	162	154	0	0	158	0	0	0	0	474
Total Lead	163	0	0	0	0	0	0	0	0	163
Total Mercury	163	0	0	0	0	0	0	0	0	163
Total Nickel	161	0	0	0	0	0	0	0	0	161
Total Nitrogen	5	0	0	0	0	0	0	0	0	5
Total Phosphorus	0	0	0	0	212	218	0	0	0	430
Total Residual Chlorine	0	0	0	0	0	0	27	0	0	27
Total Silver	0	154	0	0	0	0	0	0	159	313
Total Suspended Solids	163	154	16	38	236	220	0	150	0	977
Total Toxic Organics	4	0	0	0	0	0	0	0	0	4
Total Zinc	163	0	0	0	0	0	0	0	0	163
Totals	1956	925	70	113	1314	920	209	462	467	6436

II. Discharge Category 051

This discharge category covers discharges from outfall 051, the industrial (radioactive liquid) waste treatment plant. Discharge events average twice per week for approximately one half hour each during the time the plant is operating. Sources contributing pollutants to the plant include numerous metal shops, experimental laboratories, electroplating facilities, radioisotope research and development laboratories, chemical laboratories, and the chemical batch treatment plant.

Table II-1 lists the discharge limits for eleven water quality parameters, chemical oxygen demand, total suspended solids, total cadmium, total chromium, total copper, total iron, total lead, total mercury, total zinc, total toxic organics, and Radium-226 + Radium-228. Also, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units.

There are no discharge limits but there are reporting requirements for four additional water quality parameters, ammonia, total nickel, total nitrogen and nitrate-nitrite. On August 1, 1994, the permit conditions were changed and concentration discharge limits were added for nine water quality parameters, chemical oxygen demand, total cadmium, total chromium, total copper, total lead, total mercury, total zinc, total toxic organics, and Radium-226 + Radium-228. Also, on August 1, 1994, reporting requirements were added for three water quality parameters, total nickel, total nitrogen and nitrate-nitrite.

The current permit conditions also include discharge limits for fourteen additional water quality parameters. Seven of these parameters, total cadmium, total chromium, total copper, total lead, total mercury, total zinc, and Radium-226 + Radium-228, are also covered under the discharge limits for discharge category 051. For the other seven parameters, water samples are required to be collected and analyzed only once per year. The sampling and analyses for these other seven additional parameters were performed during calendar year 1995.

There were no exceedances of the discharge limits for discharge category 051 for the three year period of 1992 through 1994.

Table II-2 lists the summary statistics by year for the period of 1992 through 1994. Outfall 051 was sampled approximately weekly. Both the concentrations (mg/l) and discharge rates (lbs/day) tended to be highest during 1993. Based on the average statistics, both the concentrations

(mg/l) and discharge rates (lbs/day) tended to be lowest during 1992. But based on the maximum statistics, both the concentrations (mg/l) and discharge rates (lbs/day) tended to be lowest during 1994.

Table II-3 lists the summary statistics by quarter for 1994. Based on the average statistics, both the concentrations (mg/l) and discharge rates (lbs/day) tended to be highest during the first two quarters and lowest during the last two quarters of 1994. Based on the maximum statistics, the concentrations (mg/l) tended to be highest during the first two quarters and lowest during the last two quarters of 1994, but the discharge rates (lbs/day) tended to be highest only during the first quarter of 1994.

Table II-4 shows the total volume of effluent released each year for the period of 1992 through 1994. There was only a small change in total volume released between the three years.

Table II-5 lists the discharges in pounds per year of the metals for the period of 1992 through 1994. On a per weight basis, iron and copper were the metals with the two highest dicharges; and mercury and cadmium were the metals with the two lowest discharges. The discharges of metals tended to be highest during 1993 and lower during 1992 and 1994.

Table II-6 lists the discharges in curies of radionuclides for the period of 1992 through 1994. These radionuclides are not covered under LANL's NPDES permit but are monitored in order to meet requirements established by the US Department of Energy. On a total activity basis, tritium, Rubidium 83 and Strontium 85 were the radionuclides with the three highest total activity released; and Plutonium 238, Plutonium 239 and Uranium 234 were the radionuclides with the three lowest. The total activities released tended to be higher during 1993 and 1994 and lowest during 1992.

Time series plots of the data are shown in Figures II-1 through II-23.

Table II-1
Discharge Category 051
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Before and since 8-1-94	Ammonia (as nitrogen)	(1)	(1)	mg/l
	Chemical Oxygen Demand	94	156	lbs/day
	Total Suspended Solids	18.8	62.6	lbs/day
	Total Cadmium	0.06	0.30	lbs/day
	Total Chromium	0.19	0.38	lbs/day
	Total Copper	0.63	0.63	lbs/day
	Total Iron	1.0	2.0	lbs/day
	Total Lead	0.06	0.15	lbs/day
	Total Mercury	0.003	0.09	lbs/day
	Total Zinc	0.62	1.83	lbs/day
Since 8-1-94	Chemical Oxygen Demand	125	125	mg/l
	Total Cadmium	0.2	0.2	mg/l
	Total Chromium	5.1	5.1	mg/l
	Total Copper	1.6	1.6	mg/l
	Total Lead	0.4	0.4	mg/l
	Total Mercury	0.01	0.01	mg/l
	Total Nickel	(1)	(1)	mg/l
	Total Nitrogen	(1)	(1)	mg/l

(1) Report only.

Table II-1 (continued)
Discharge Category 051
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Since 8-1-94	Nitrate-Nitrite (as nitrogen)	(1)	(1)	mg/l
	Total Zinc	95.4	95.4	mg/l
	Total Toxic Organics	1.0	1.0	mg/l
	Radium-226 + Radium 228	30.0	30.0	pCi/l

(1) Report only.

Table II-2
Discharge Category 051
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Ammonia as Nitrogen (as Nitrogen)	mg/l	1992	54	0.97	4.5	9.08
		1993	54	2	6.5	49
		1994	38	0.6	5.8	11.8
Chemical Oxygen Demand	mg/l	1992	54	10	24.5	99
		1993	54	10	24.1	72
		1994	54	10	24.4	55
Total Suspended Solids	mg/l	1992	54	0	6.8	25
		1993	54	0	14.9	79
		1994	55	0	3.8	14
Total Cadmium	mg/l	1992	54	0.0001	0.00021	0.0021
		1993	54	0.0001	0.00020	0.001
		1994	56	0.0001	0.00068	0.005
Total Chromium	mg/l	1992	54	0.001	0.0082	0.094
		1993	54	0.0025	0.014	0.056
		1994	56	0.0004	0.0045	0.024

Table II-2 (continued)
Discharge Category 051
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Total Copper	mg/l	1992	54	0.036	0.089	0.481
		1993	54	0.045	0.11	0.303
		1994	56	0.03	0.11	0.23
Total Iron	mg/l	1992	54	0.02	0.21	1.3
		1993	54	0.02	0.34	2.7
		1994	54	0.022	0.14	0.52
Total Lead	mg/l	1992	54	0.002	0.0024	0.0052
		1993	54	0.002	0.0026	0.010
		1994	55	0.002	0.0046	0.02
Total Mercury	mg/l	1992	54	0.0001	0.00025	0.0015
		1993	54	0.0002	0.00032	0.0019
		1994	55	0.0001	0.00023	0.001
Total Nickel	mg/l	1992	54	0.015	0.033	0.16
		1993	54	0.015	0.060	0.49
		1994	53	0.015	0.056	0.15
Total Nitrogen	mg/l	1994	5	4.8	5.6	6.4
Nitrate-Nitrite (as Nitrogen)	mg/l	1994	5	20.5	45.5	89.7
Total Zinc	mg/l	1992	54	0.005	0.025	0.13
		1993	54	0.01	0.044	0.21
		1994	55	0.005	0.048	0.19
Total Toxic Organics	mg/l	1994	4	0	0.0035	0.014
Radium 226 and Radium 228	pCi/l	1994	4	0.37	3.2	10.4
pH	pH units	1992	54	6.06	6.6	7.08
		1993	54	6.03	6.5	7.5
		1994	55	6.14	6.5	7.4
Ammonia (as Nitrogen)	lbs/day	1992	54	0.25	0.93	2.3
		1993	54	0.36	1.4	17.4
		1994	38	0.11	1.1	2.1

Table II-2 (continued)
Discharge Category 051
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Chemical Oxygen Demand	lbs/day	1992	54	1.8	4.9	17.6
		1993	54	1.8	4.7	17.4
		1994	54	1.8	4.8	16.0
Total Suspended Solids	lbs/day	1992	54	0	1.5	7.8
		1993	54	0	3.0	21.0
		1994	55	0	0.74	2.8
Total Cadmium	lbs/day	1992	54	0.000018	0.000048	0.00075
		1993	54	0.000018	0.000039	0.00018
		1994	56	0.000018	0.00012	0.00089
Total Chromium	lbs/day	1992	54	0.00018	0.0020	0.033
		1993	54	0.00045	0.0027	0.011
		1994	56	0.00014	0.00083	0.0043
Total Copper	lbs/day	1992	54	0.0064	0.018	0.086
		1993	54	0.0080	0.022	0.064
		1994	56	0.0053	0.020	0.050
Total Iron	lbs/day	1992	54	0.0036	0.046	0.46
		1993	54	0.0036	0.067	0.48
		1994	54	0.0039	0.027	0.11
Total Lead	lbs/day	1992	54	0.00036	0.00050	0.0019
		1993	54	0.00036	0.00051	0.0018
		1994	55	0.00036	0.00088	0.0039
Total Mercury	lbs/day	1992	54	0.000018	0.000050	0.00027
		1993	54	0.000036	0.000063	0.00034
		1994	55	0.000018	0.000044	0.00018
Total Nickel	lbs/day	1992	54	0.0027	0.0067	0.028
		1993	54	0.0027	0.011	0.087
		1994	53	0.0027	0.011	0.053
Total Nitrogen	lbs/day	1994	5	0.85	1.0	1.1
Nitrate-Nitrite (as Nitrogen)	lbs/day	1994	5	3.6	8.1	16.0
Total Zinc	lbs/day	1992	54	0.0009	0.0052	0.027
		1993	54	0.0018	0.0085	0.038
		1994	55	0.0018	0.0092	0.061

Table II-2 (continued)
Discharge Category 051
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Total Toxic Organics	lbs/day	1994	4	0	0.00062	0.0025

Table II-3
Discharge Category 051
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Ammonia (as Nitrogen)	mg/l	1	16	0.6	4.7	7.2
		2	13	4.4	8.1	11.8
		3	6	3.5	4.8	6.2
		4	3	4	4.5	5.4
Chemical Oxygen Demand	mg/l	1	15	10	30	55
		2	13	10	25.8	44
		3	13	10	19.4	40
		4	13	11	21.5	38
Total Suspended Solids	mg/l	1	16	0	6	11
		2	13	0	4	12
		3	13	0	2.5	9
		4	13	0	2.3	14
Total Cadmium	mg/l	1	17	0.0001	0.00044	0.003
		2	13	0.0001	0.00045	0.0019
		3	13	0.0001	0.0012	0.005
		4	13	0.0002	0.00066	0.003
Total Chromium	mg/l	1	17	0.002	0.0052	0.024
		2	13	0.002	0.0046	0.014
		3	13	0.001	0.0042	0.02
		4	13	0.0004	0.0039	0.006
Total Copper	mg/l	1	17	0.036	0.079	0.14
		2	13	0.03	0.11	0.19
		3	13	0.084	0.13	0.23
		4	13	0.052	0.11	0.22

Table II-3 (continued)
Discharge Category 051
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Total Iron	mg/l	1	15	0.05	0.20	0.48
		2	13	0.03	0.16	0.52
		3	13	0.049	0.13	0.33
		4	13	0.022	0.058	0.12
Total Lead	mg/l	1	16	0.002	0.004	0.011
		2	13	0.002	0.0066	0.02
		3	13	0.002	0.0032	0.006
		4	13	0.002	0.0048	0.016
Total Mercury	mg/l	1	16	0.0002	0.00021	0.0003
		2	13	0.0001	0.00017	0.0003
		3	13	0.0001	0.00028	0.001
		4	13	0.0002	0.00028	0.0004
Total Nickel	mg/l	1	14	0.02	0.090	0.15
		2	13	0.029	0.056	0.077
		3	13	0.017	0.050	0.092
		4	13	0.015	0.023	0.04
Total Nitrogen	mg/l	3	2	20.5	55.1	89.7
		4	3	23	39.1	60.9
Nitrate-Nitrite (as Nitrogen)	mg/l	3	2	5.2	5.5	5.7
		4	3	4.8	5.7	6.4
Total Zinc	mg/l	1	16	0.02	0.045	0.17
		2	13	0.01	0.075	0.19
		3	13	0.014	0.041	0.08
		4	13	0.005	0.032	0.07
Total Toxic Organics	mg/l	3	2	0	0	0
		4	2	0	0.007	0.014
Radium 226 and Radium 228	pCi/l	3	2	0.37	0.59	0.8
		4	2	1.3	5.8	10.4
pH	pH units	1	16	6.4	6.6	7.1
		2	13	6.3	6.4	6.7
		3	13	6.1	6.4	7.4
		4	13	6.2	6.4	6.7

Table II-3 (continued)
Discharge Category 051
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Ammonia (as Nitrogen)	lbs/day	1	16	0.11	0.94	2.0
		2	13	0.78	1.4	2.1
		3	6	0.62	0.85	1.1
		4	3	0.71	0.80	0.96
Chemical Oxygen Demand	lbs/day	1	15	1.8	6.4	16.0
		2	13	1.8	4.6	7.8
		3	13	1.8	3.5	7.1
		4	13	2.0	4.4	13.5
Total Suspended Solids	lbs/day	1	16	0	1.2	2.8
		2	13	0	0.71	2.1
		3	13	0	0.45	1.6
		4	13	0	0.47	2.5
Total Cadmium	lbs/day	1	17	0.000018	0.000083	0.00053
		2	13	0.000018	0.000081	0.00034
		3	13	0.000018	0.00022	0.00089
		4	13	0.000036	0.00012	0.00053
Total Chromium	lbs/day	1	17	0.00036	0.00099	0.0043
		2	13	0.00036	0.00083	0.0025
		3	13	0.00018	0.00075	0.0036
		4	13	0.00014	0.00070	0.0011
Total Copper	lbs/day	1	17	0.0064	0.017	0.050
		2	13	0.0053	0.020	0.034
		3	13	0.015	0.023	0.041
		4	13	0.0093	0.021	0.046
Total Iron	lbs/day	1	15	0.0089	0.043	0.11
		2	13	0.0053	0.028	0.093
		3	13	0.0087	0.022	0.059
		4	13	0.0039	0.011	0.021
Total Lead	lbs/day	1	16	0.00036	0.00086	0.0039
		2	13	0.00036	0.0012	0.0036
		3	13	0.00036	0.00058	0.0011
		4	13	0.00036	0.00093	0.0028
Total Mercury	lbs/day	1	16	0.000036	0.000043	0.000071
		2	13	0.000018	0.000030	0.000053
		3	13	0.000018	0.000051	0.00018
		4	13	0.000036	0.000052	0.000071

Table II-3 (continued)
Discharge Category 051
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Total Nickel	lbs/day	1	14	0.0036	0.020	0.053
		2	13	0.0052	0.010	0.014
		3	13	0.0030	0.0090	0.016
		4	13	0.0027	0.0047	0.014
Total Nitrogen	lbs/day	3	2	3.6	9.8	16.0
		4	3	4.1	7.0	10.8
Nitrate-Nitrite (as Nitrogen)	lbs/day	3	2	0.93	1.0	1.0
		4	3	0.85	1.0	1.1
Total Zinc	lbs/day	1	16	0.0036	0.010	0.061
		2	13	0.0018	0.013	0.034
		3	13	0.0025	0.0072	0.014
		4	13	0.0018	0.0058	0.012
Total Toxic Organics	lbs/day	3	2	0	0	0
		4	2	0	0.0012	0.0025

Table II-4
Discharge Category 051
Volume of Liquid Effluent

Year	Volume (liters)
1992	1.99E+07
1993	2.17E+07
1994	2.08E+07

Table II-5
Discharge Category 051
Discharge of Metals

Metal	Year	Discharge (lbs)
Total Cadmium	1992	0.00906
	1993	0.00972
	1994	0.0310
Total Chromium	1992	0.359
	1993	0.648
	1994	0.208
Total Copper	1992	3.89
	1993	5.44
	1994	4.83
Total Iron	1992	9.24
	1993	16.4
	1994	6.38
Total Lead	1992	0.103
	1993	0.127
	1994	0.212
Total Mercury	1992	0.0108
	1993	0.0154
	1994	0.0107
Total Nickel	1992	1.46
	1993	2.88
	1994	2.55

Table II-6
Discharge Category 051
Discharge of Radionuclides

Radionuclide	Year	Discharge (Curies)
Americium 241	1992	0.000266
	1993	0.0112
	1994	0.00306
Cesium 137	1992	0.00050
	1993	0.00817
	1994	0.00851
Cobalt 57	1992	--
	1993	0.000351
	1994	--
Cobalt 58	1992	--
	1993	0.000682
	1994	--
Plutonium 238	1992	0.000324
	1993	0.000579
	1994	0.00281
Plutonium 239	1992	0.000389
	1993	0.000493
	1994	0.000446
Rubidium 83	1992	--
	1993	0.049
	1994	0.049
Rubidium 84	1992	--
	1993	0.00809
	1994	--

Table II-6 (continued)
Discharge Category 051
Discharge of Radionuclides

Radionuclide	Year	Discharge (Curies)
Selenium 75	1992	--
	1993	0.00383
	1994	0.0188
Sodium 22	1992	--
	1993	0.000784
	1994	--
Strontium 85	1992	0.0133
	1993	0.00158
	1994	0.0344
Strontium 89	1992	0.00251
	1993	0.00263
	1994	0.00196
Strontium 90	1992	0.000925
	1993	0.00343
	1994	0.000285
Tritium	1992	10.6
	1993	2.66
	1994	2.23
Uranium 234	1992	0.0000511
	1993	0.000106
	1994	0.000118
Uranium 235	1992	--
	1993	--
	1994	0.0000149
Yttrium 88	1992	--
	1993	0.000545
	1994	--

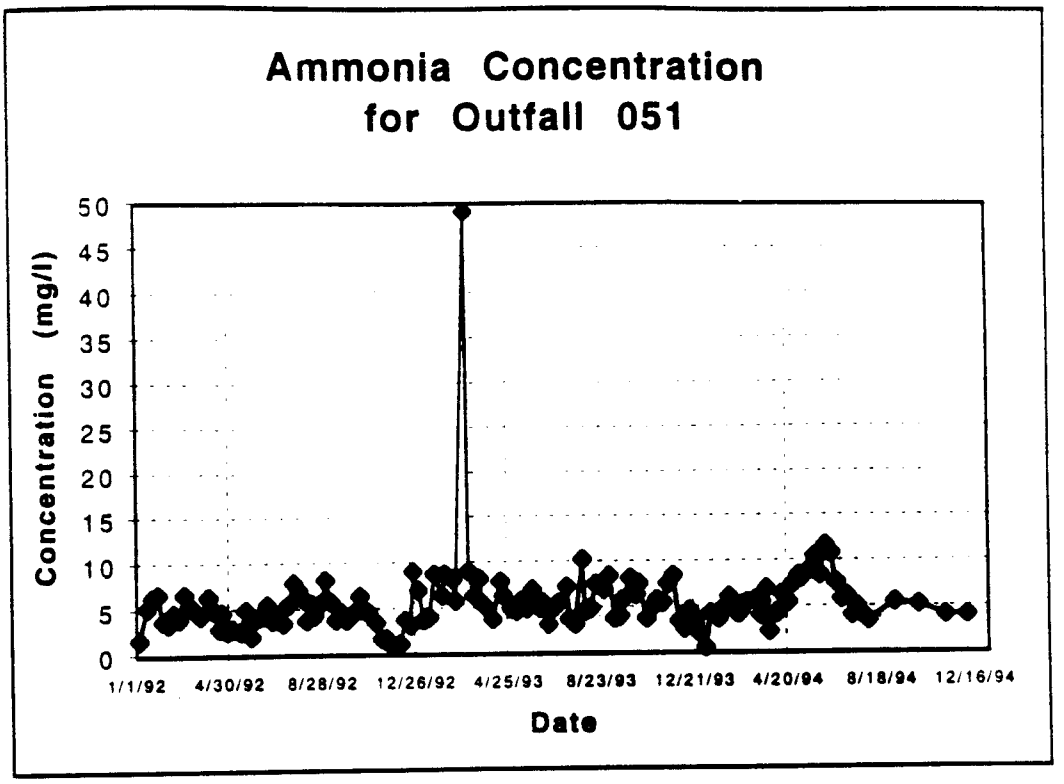
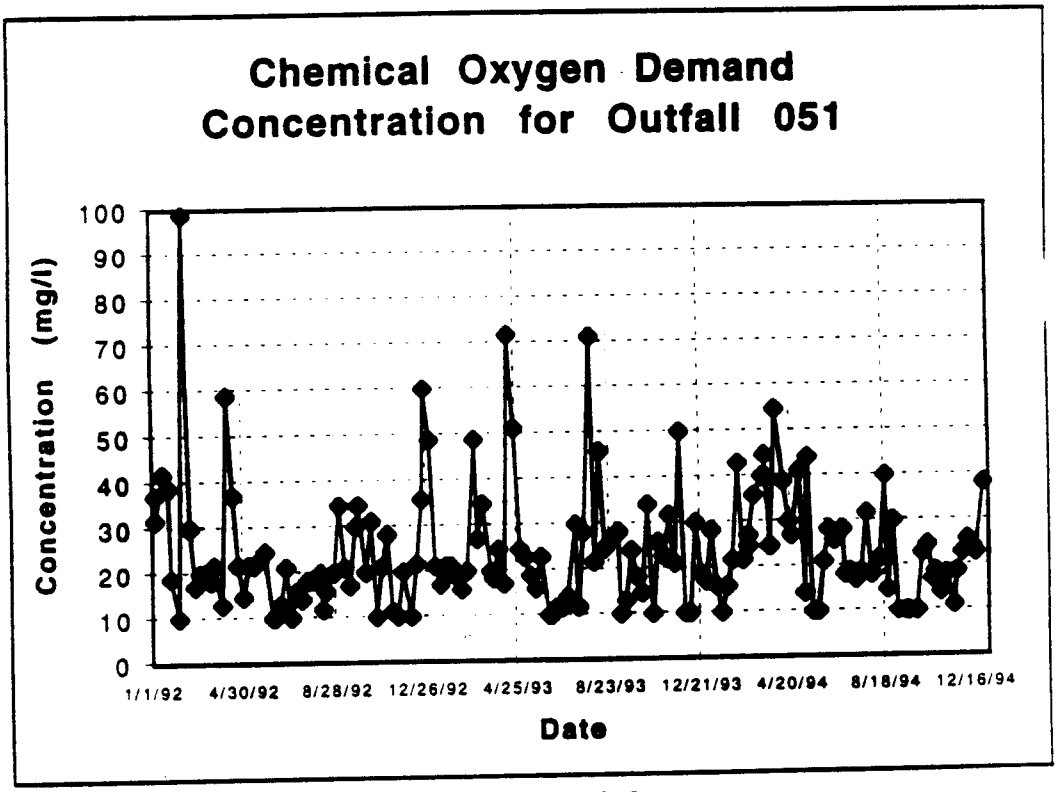


Figure II-1



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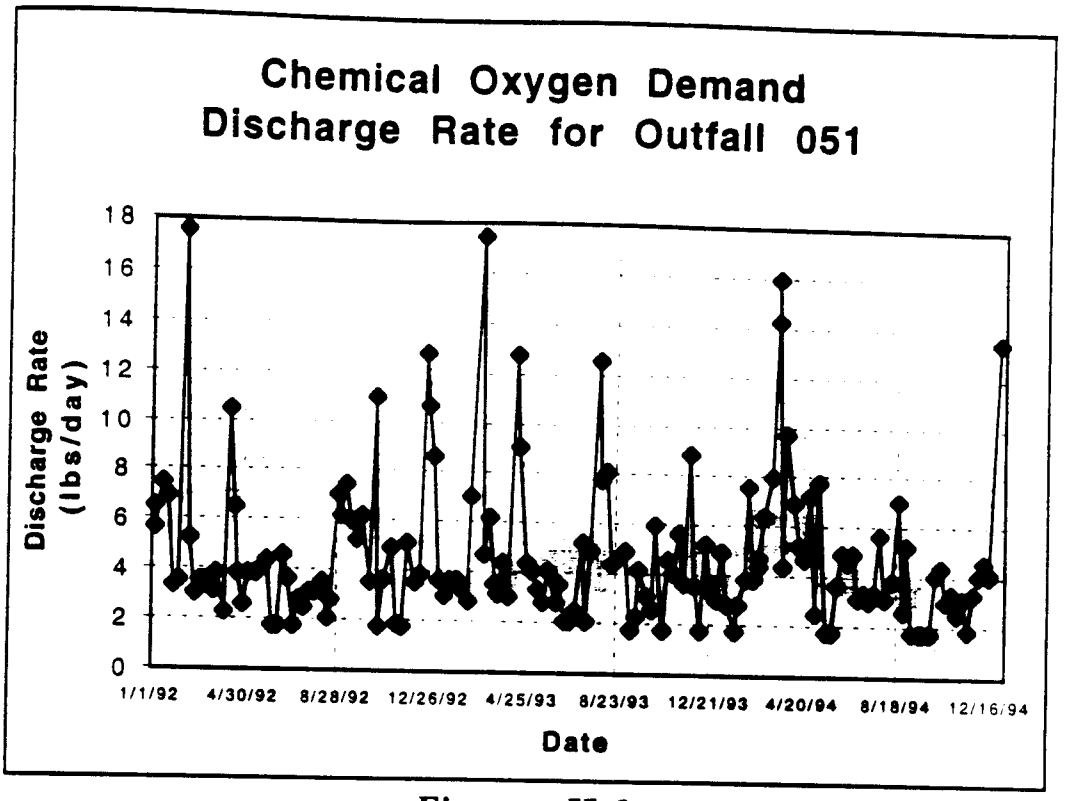

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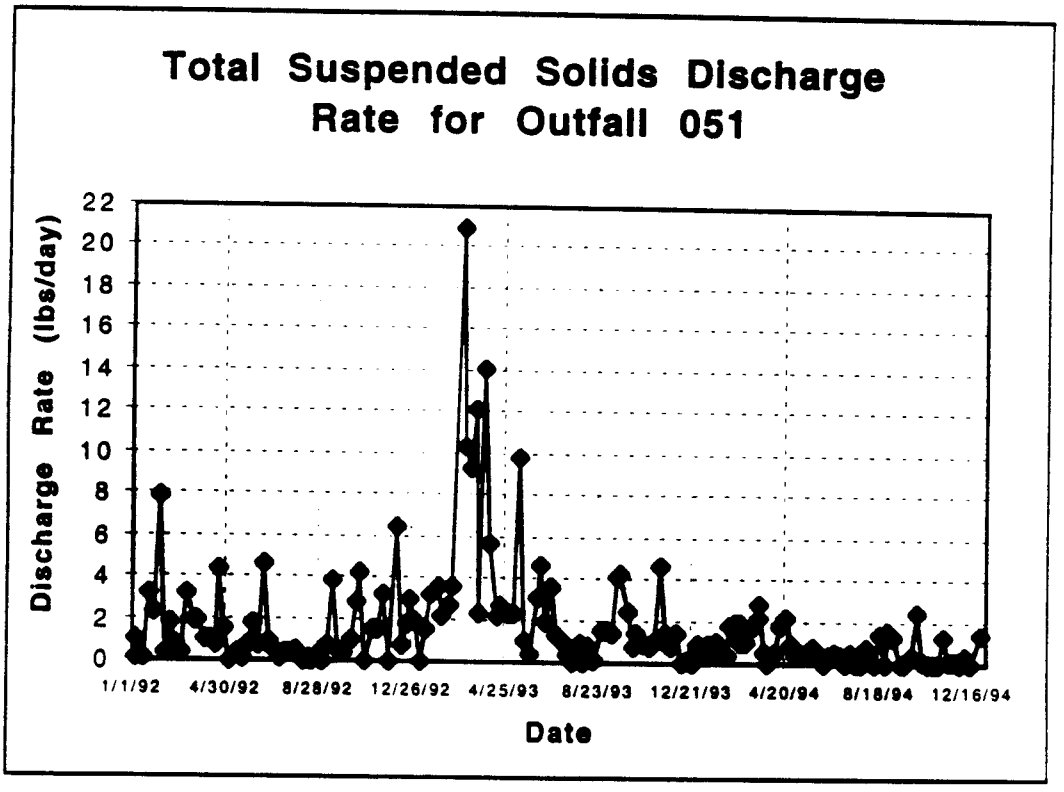

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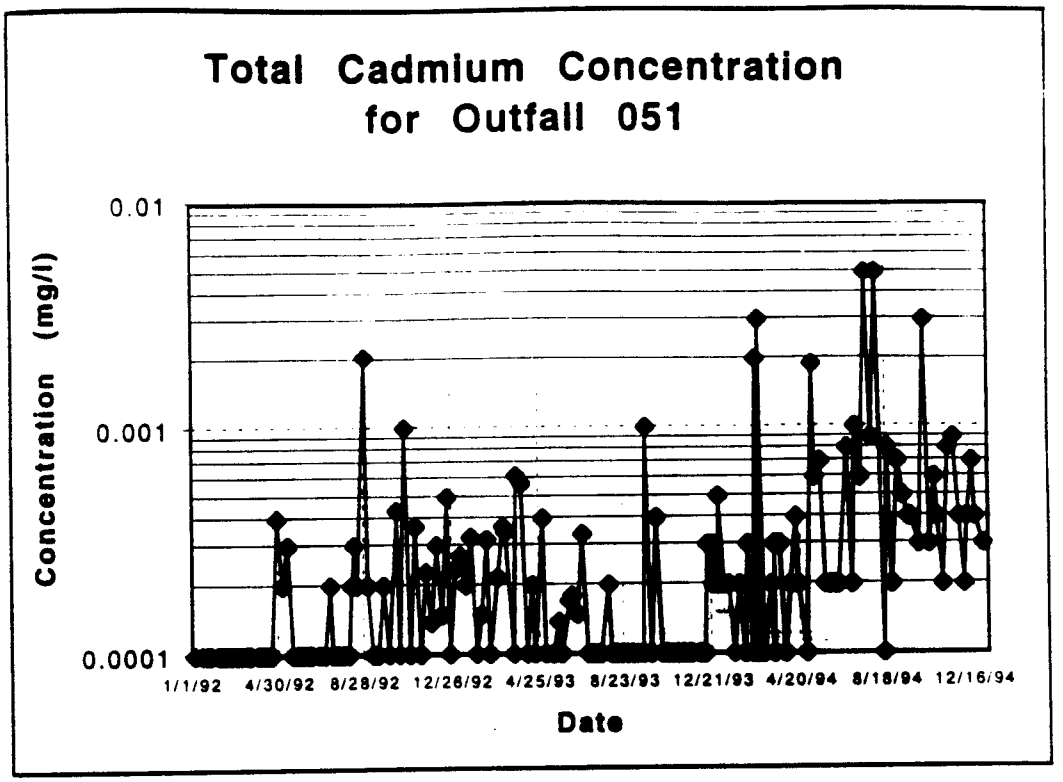

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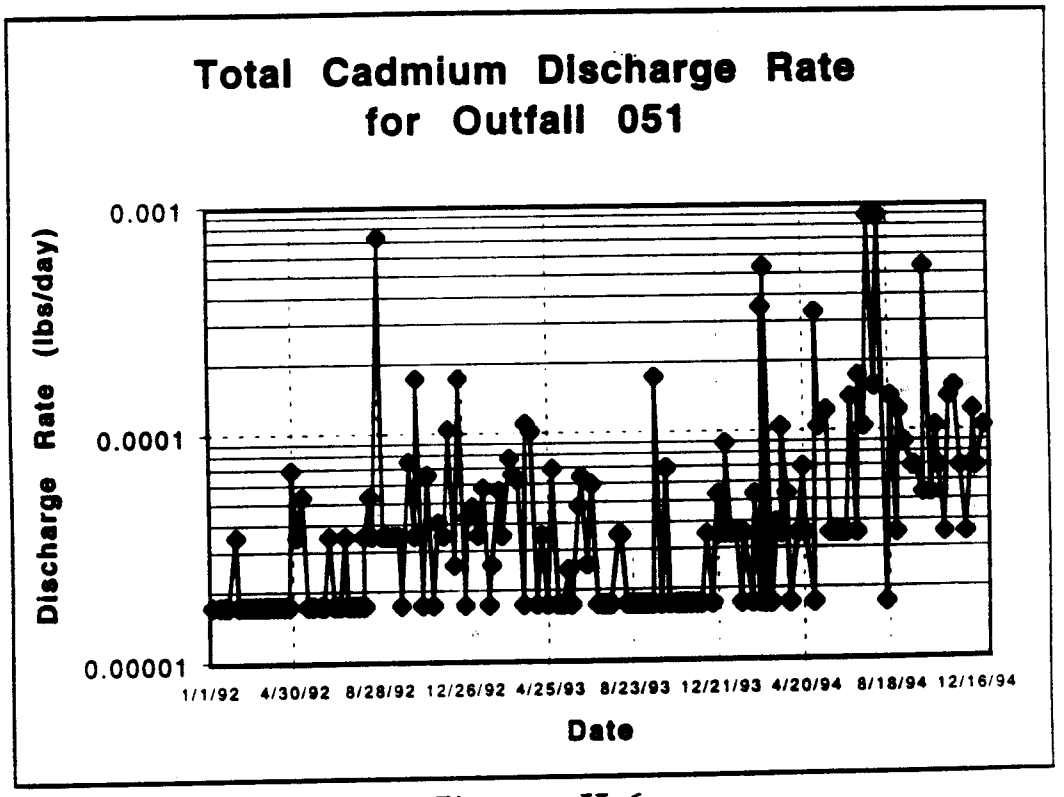

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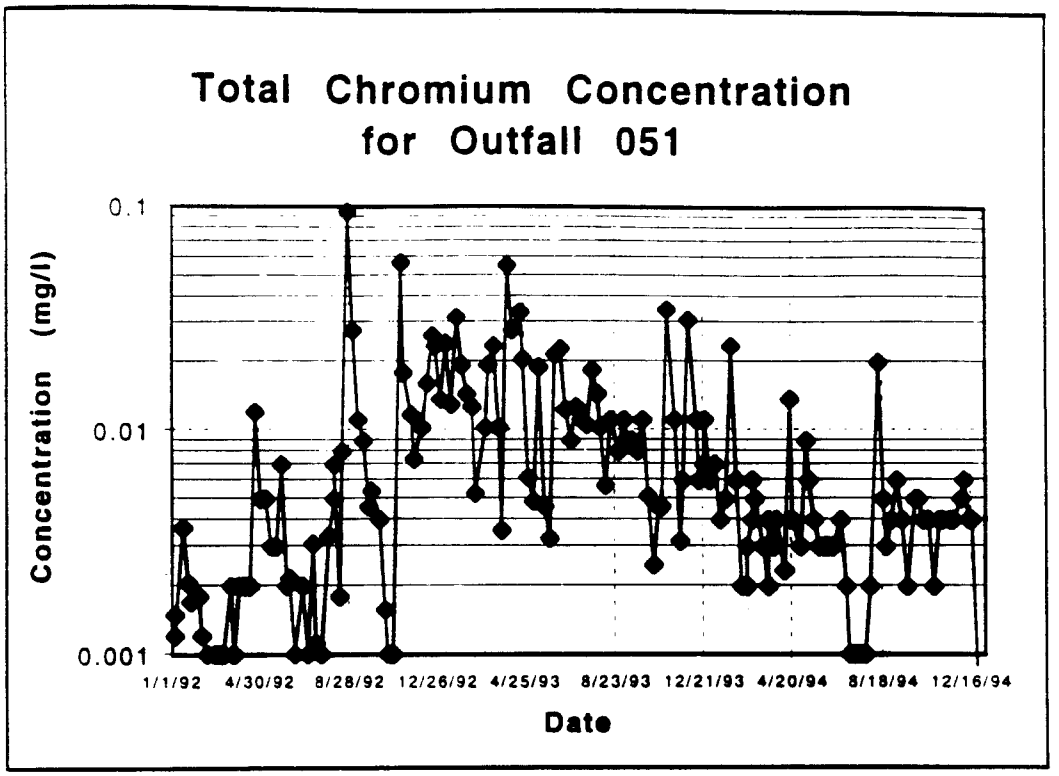

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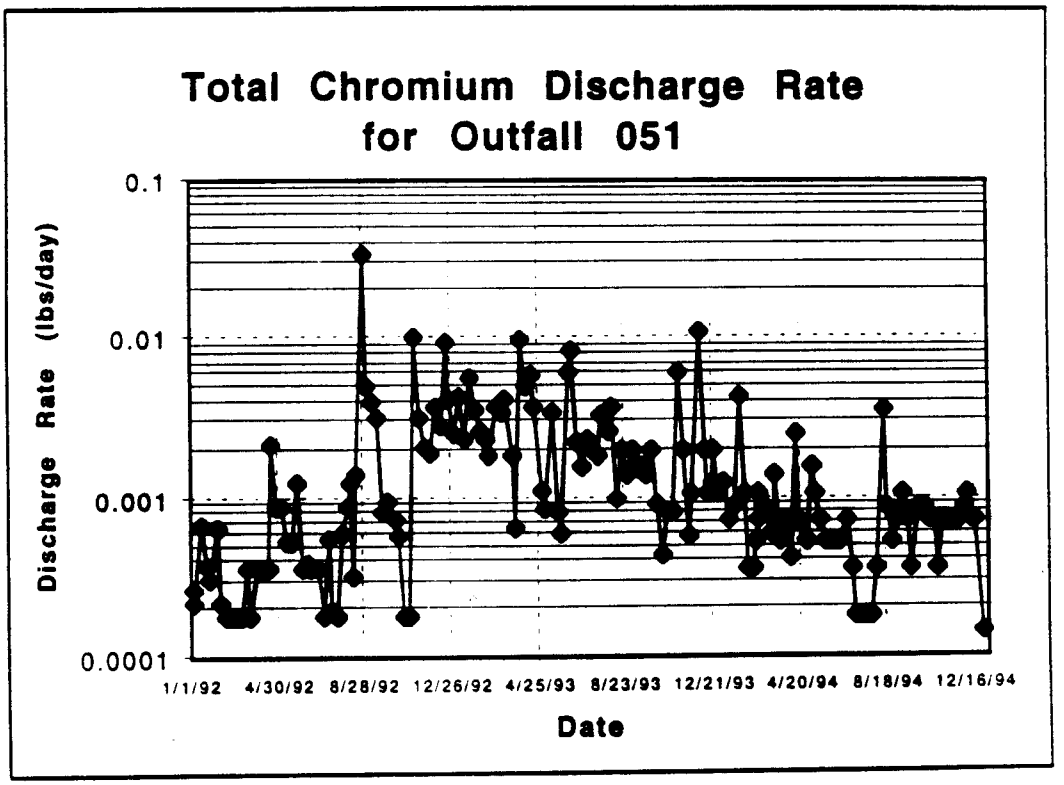

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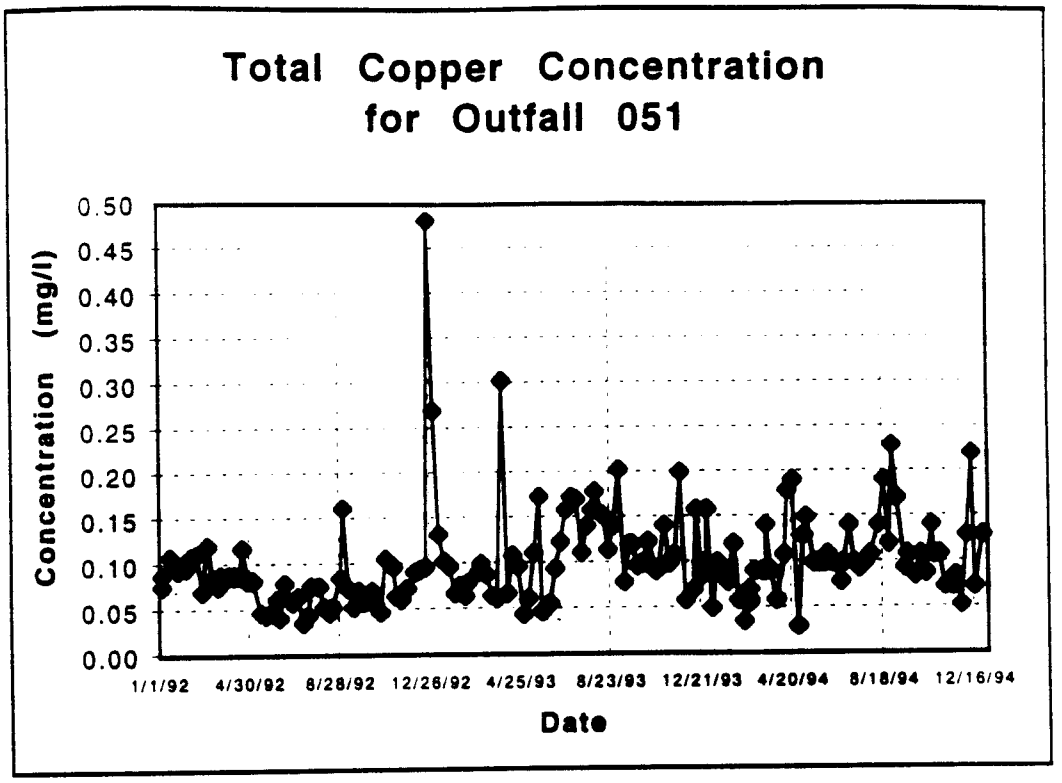

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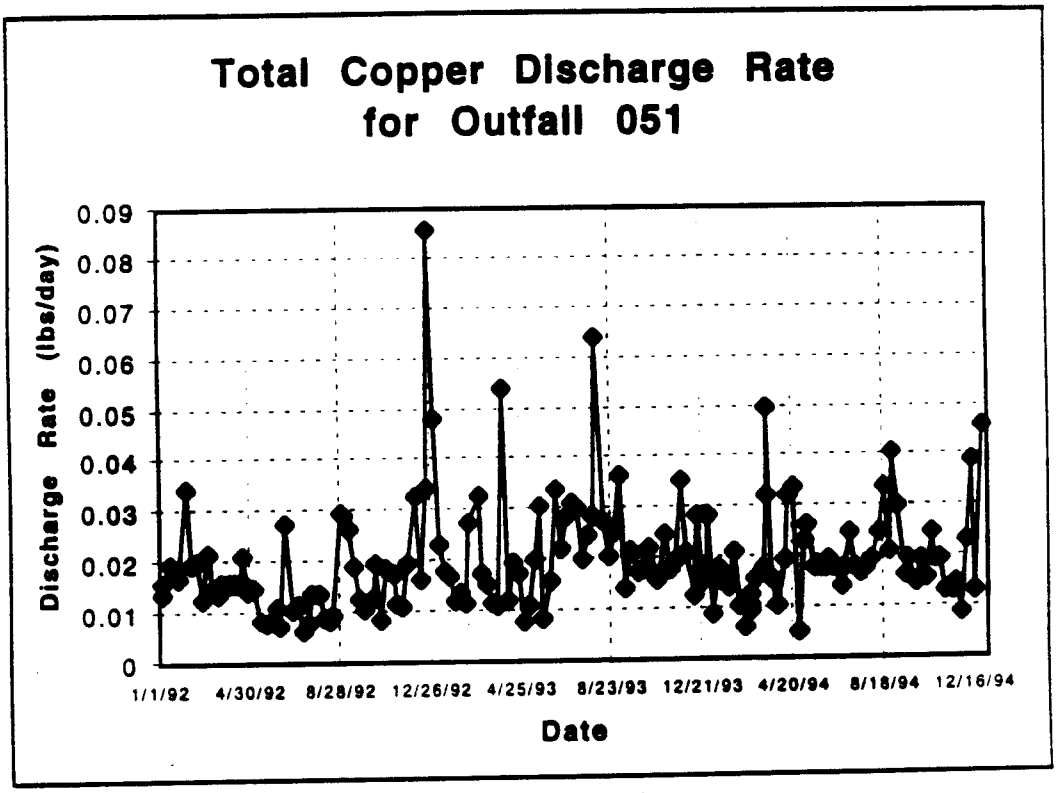

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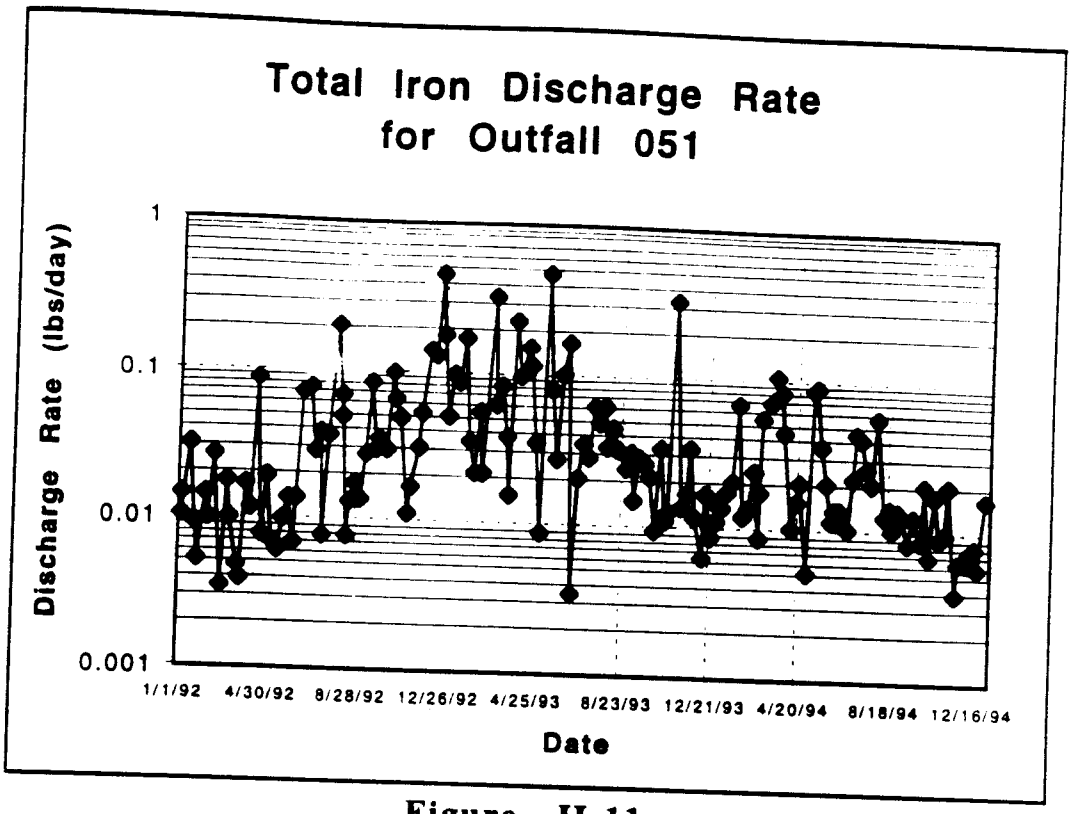

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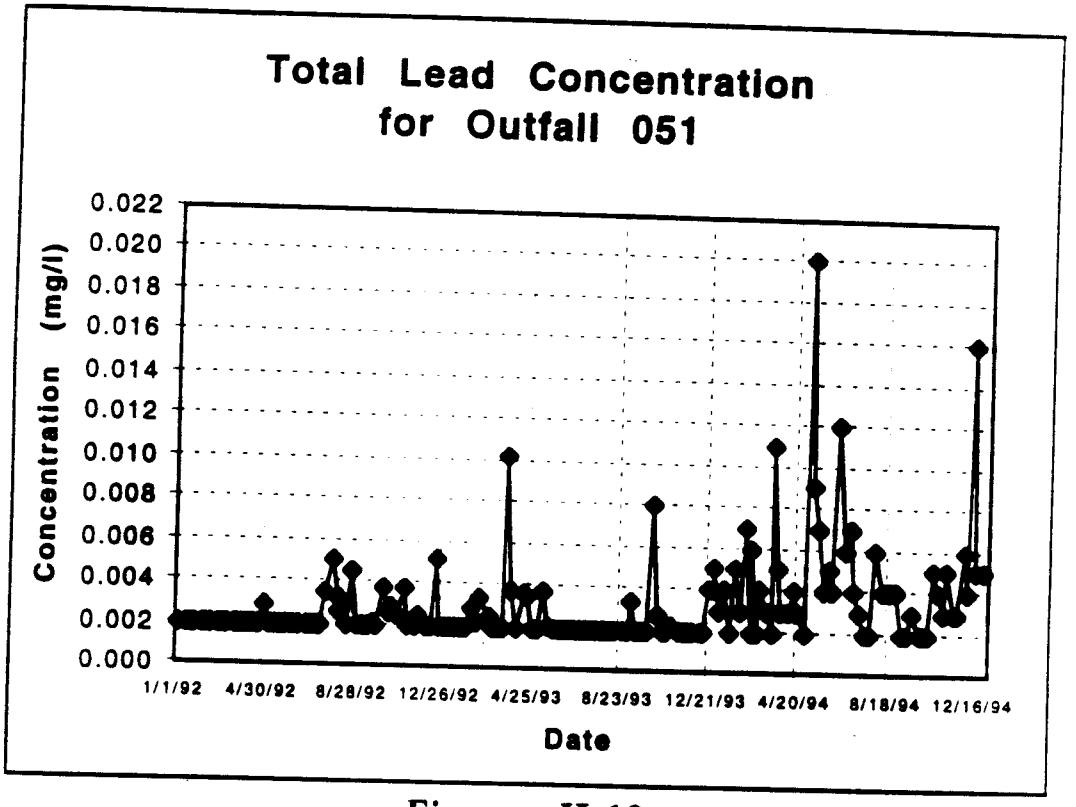
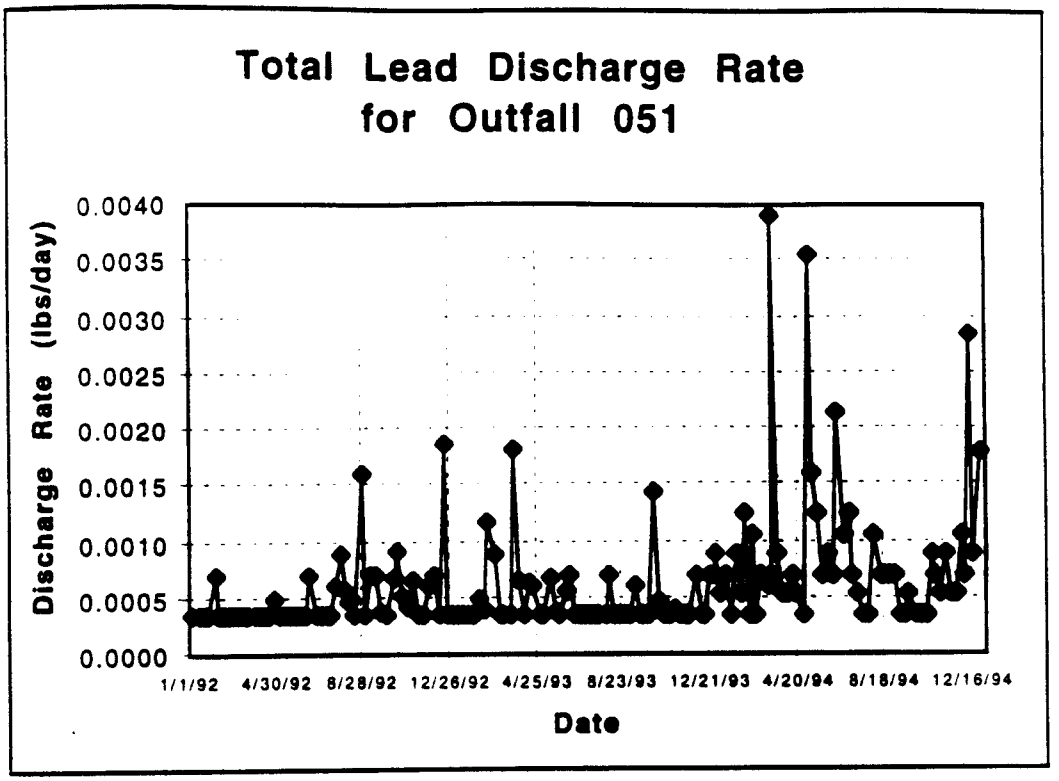


Figure II-12



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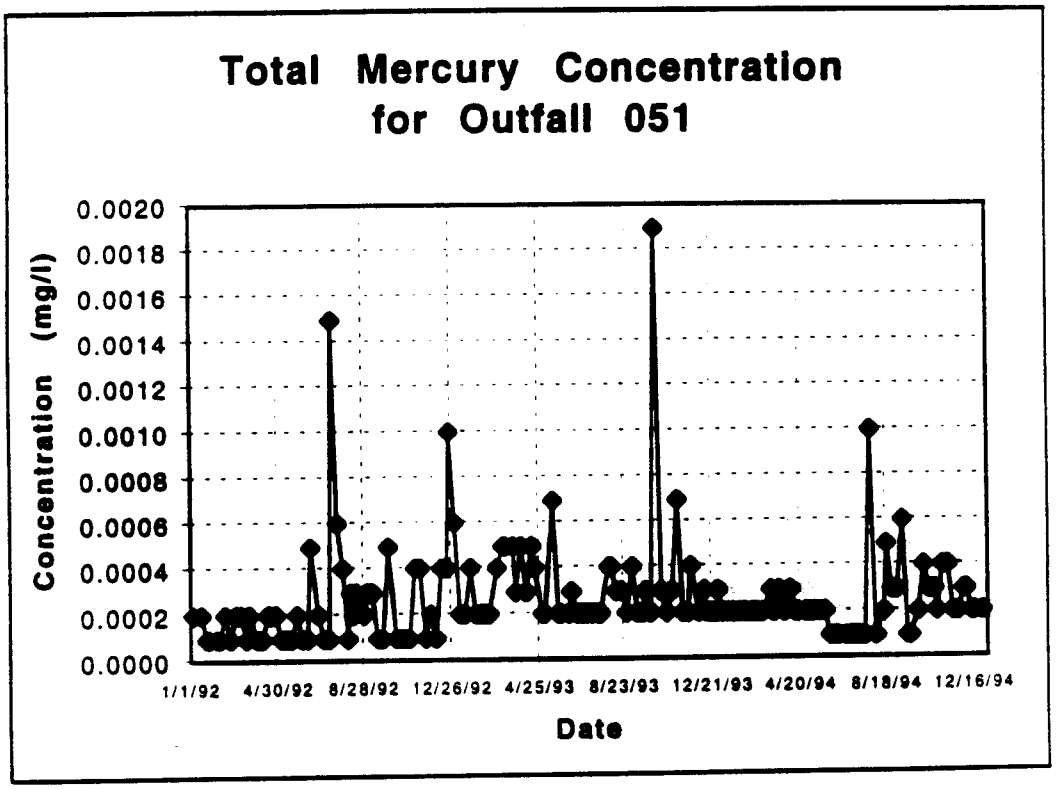

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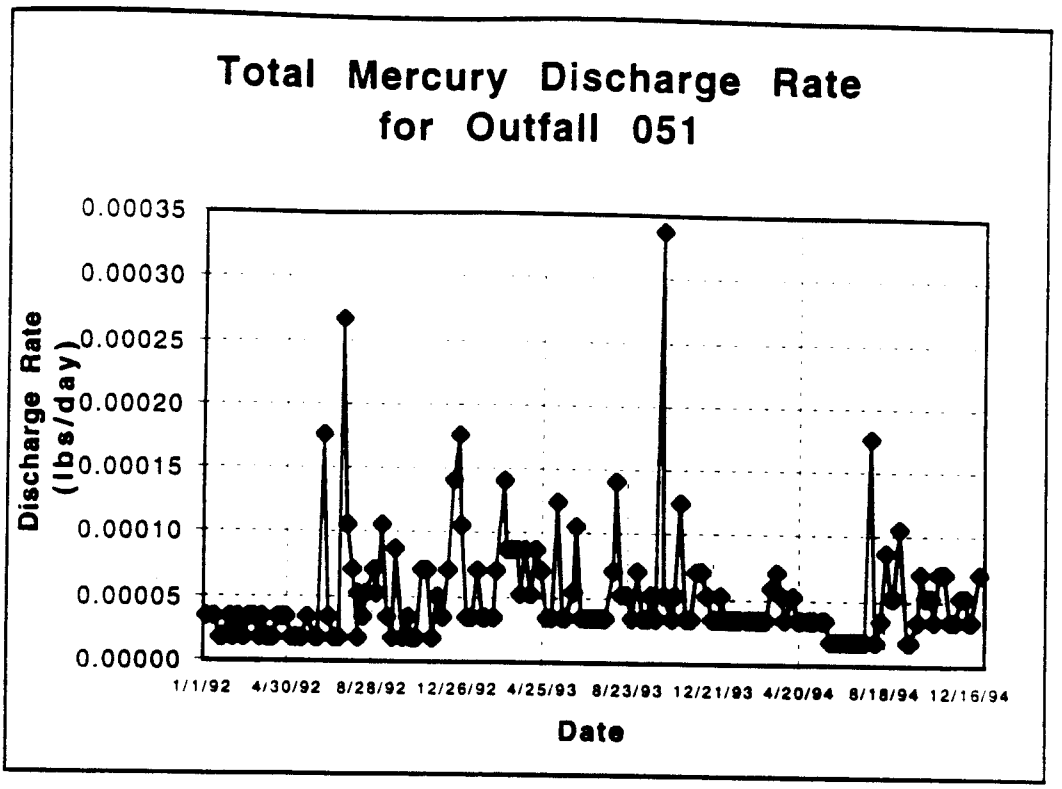

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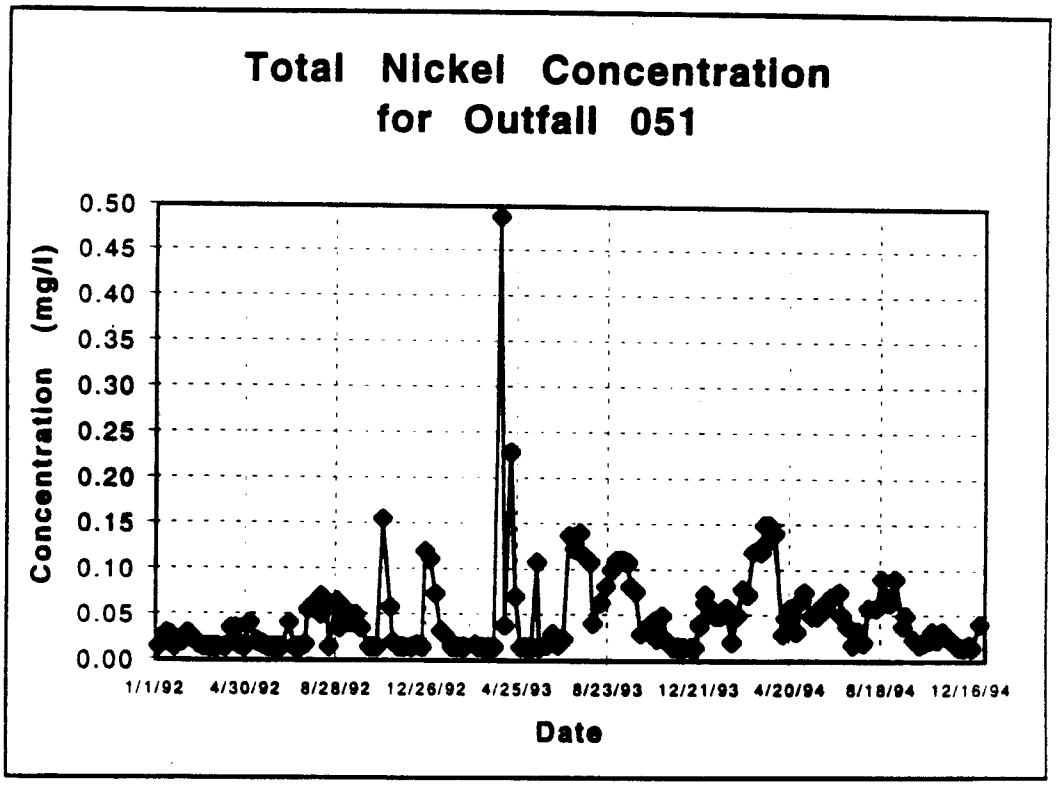

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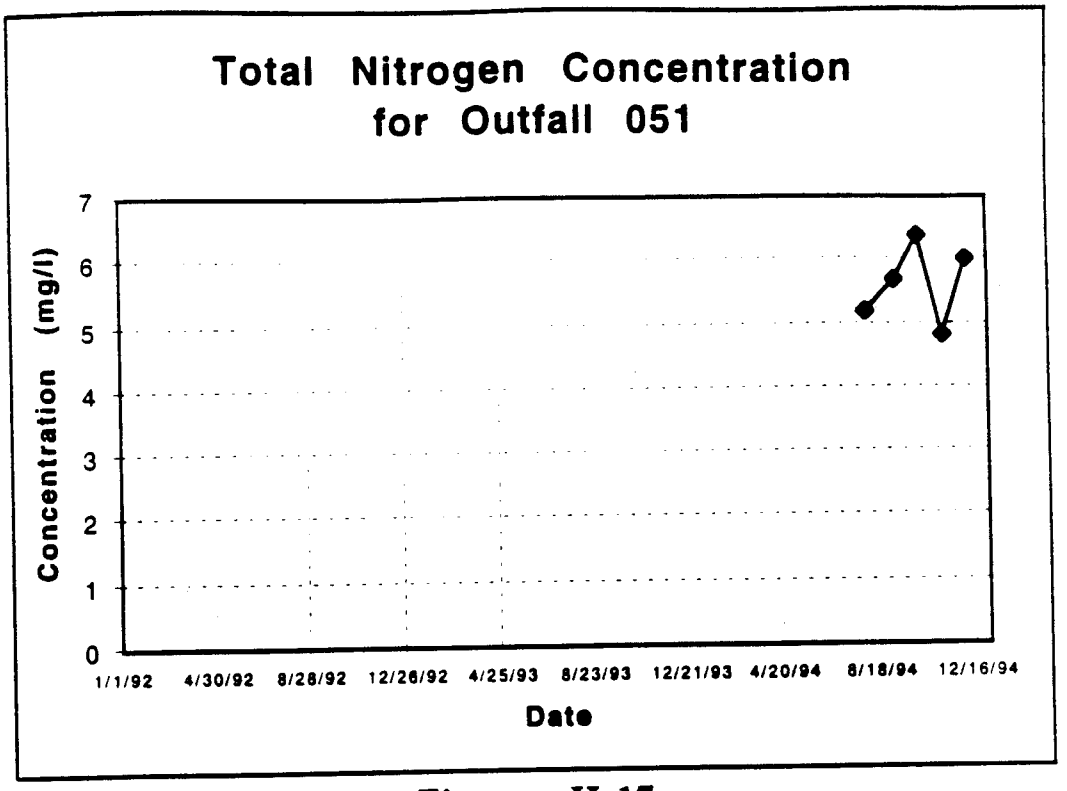

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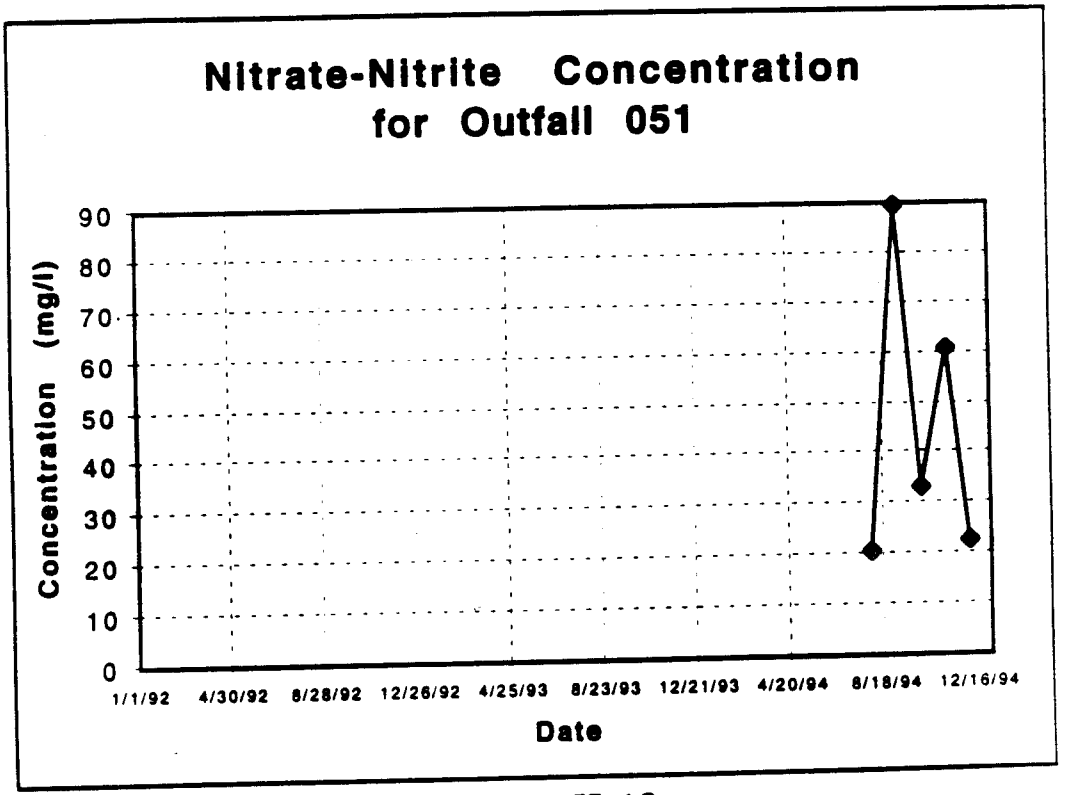
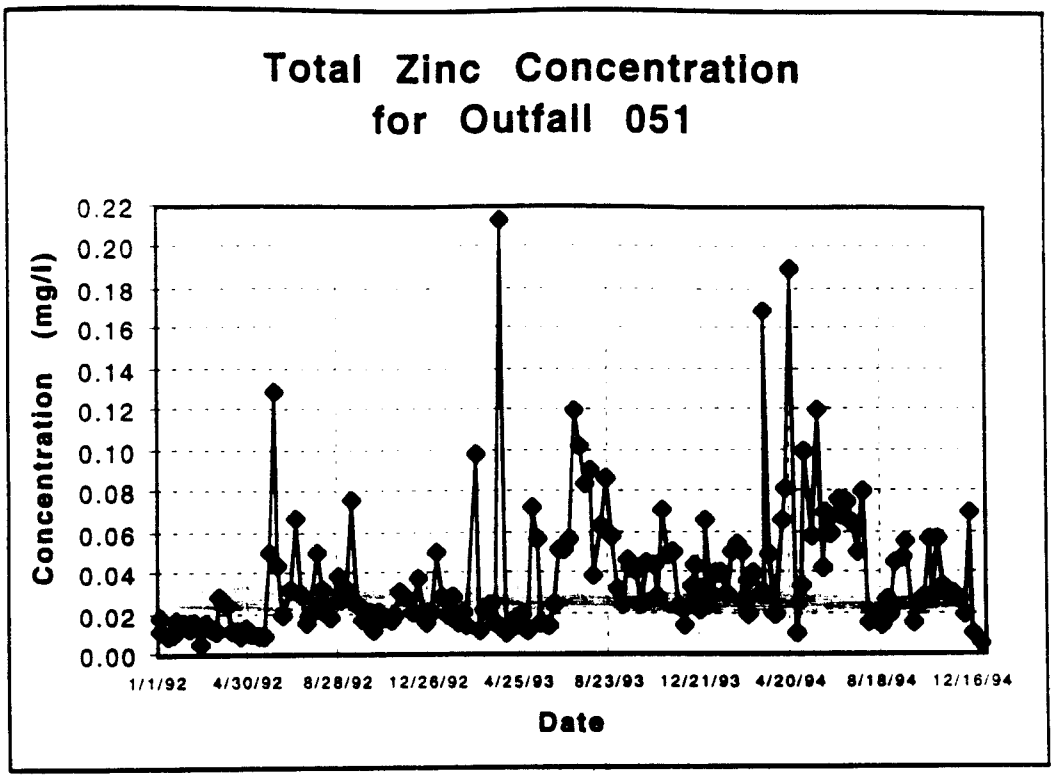


Figure II-18



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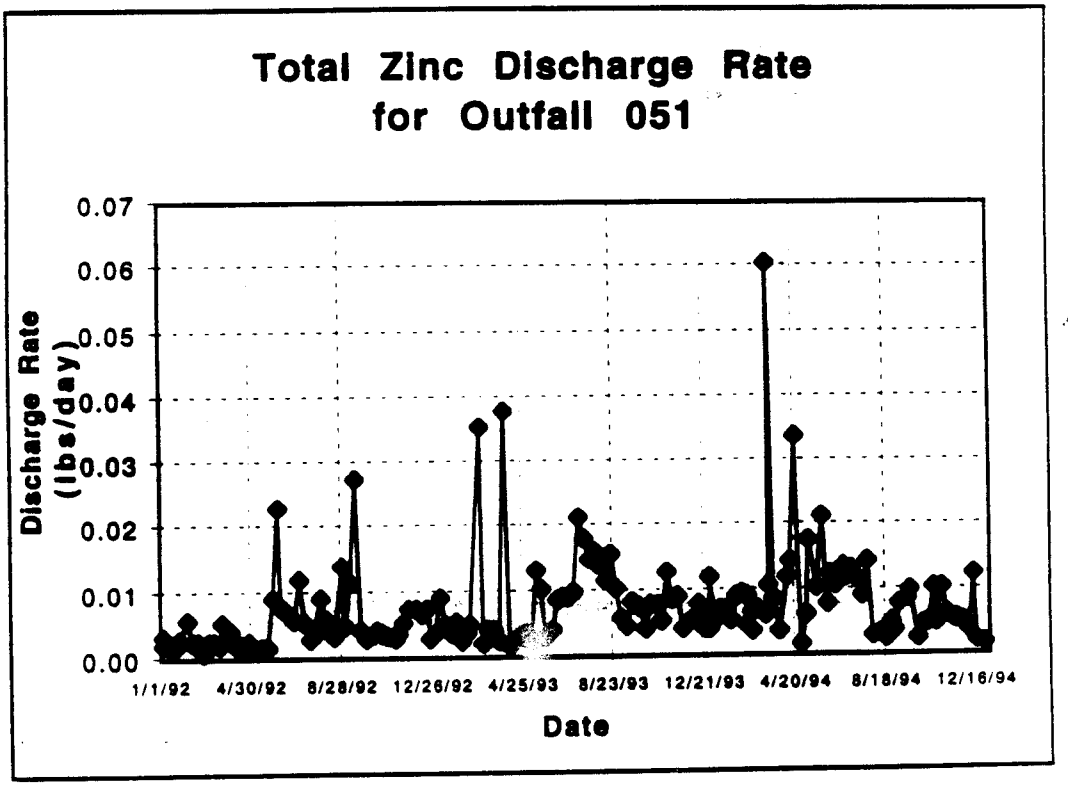


Figure II-20

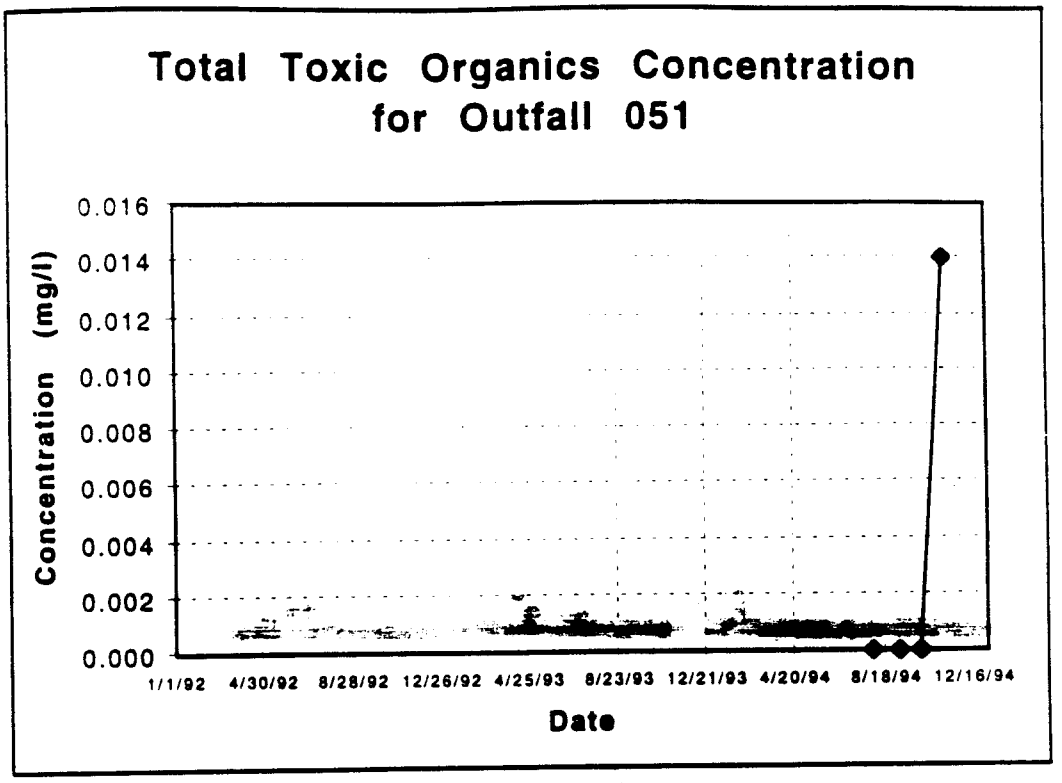


Figure II-21

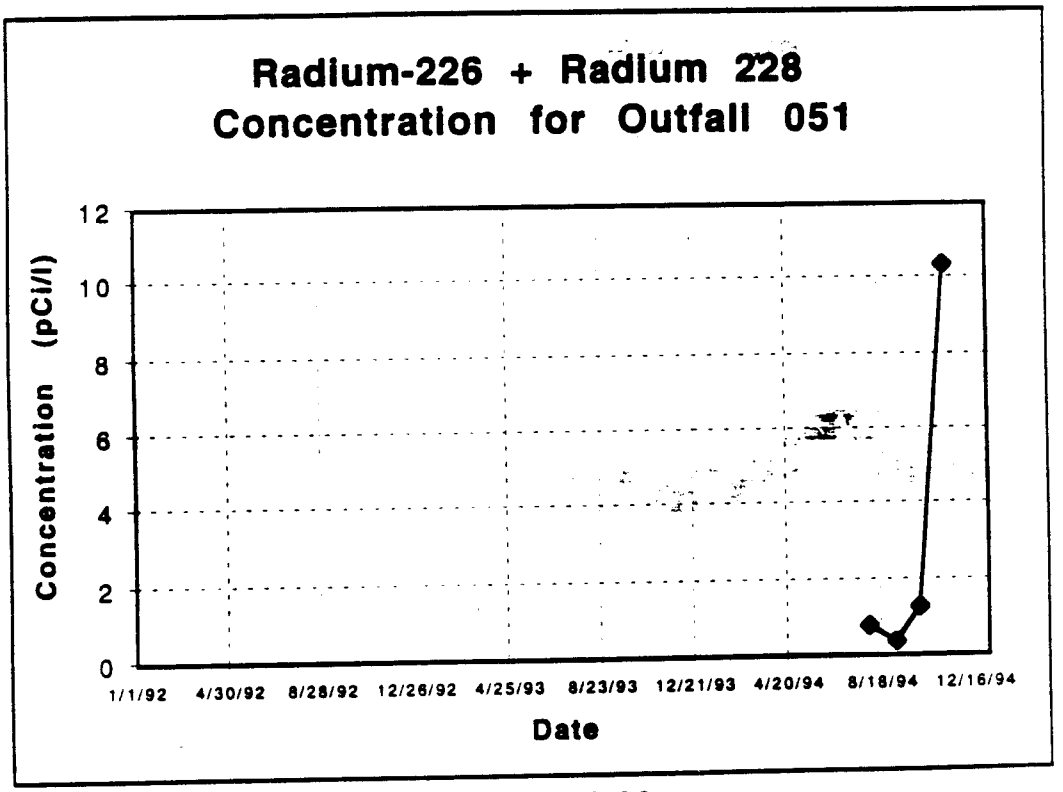


Figure II-22

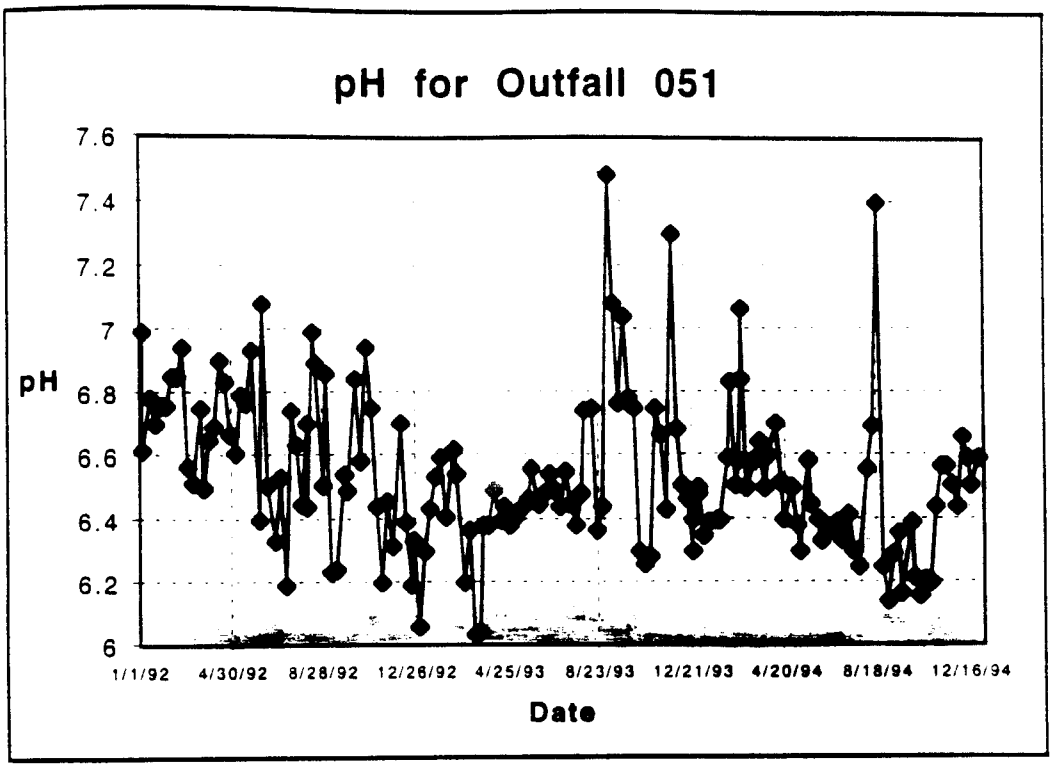

pH for Outfall 051
pH
7.6
7.4
7.2
7
6.8
6.6
6.4
6.2
6
1/1/92
4/30/92
8/28/92
12/26/92
4/25/93
8/23/93
12/21/93
4/20/94
8/18/94
12/16/94
Date

Figure II-23

III. Discharge Category 128

This discharge category covers discharges from outfall 128, process wastewater from printed circuit board manufacturing using photo-etching techniques. The circuit board manufacturing is done at TA-22-91. The process does not include any electroplating process. The facility takes the copper clad laminate and using photo-etching techniques produces the printed circuit boards.

Table III-1 lists the discharge limits for chemical oxygen demand, total suspended solids, total iron, total copper, and total silver. Also, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units. On August 1, 1984, the permit conditions were changed for all of the effluent characteristics, except for pH, total suspended solids and total iron. The limit for chemical oxygen demand was changed from a mass loading limit to a concentration limit. Concentration limits were added for total copper and total silver.

The current permit conditions, which went into effect on August 1, 1994, also include discharge limits for fourteen additional water quality parameters. The water samples are required to be analyzed for these fourteen parameters once per year. One of these parameters, total copper, is also covered under the discharge limits for discharge category 128. The sampling and analyses for the fourteen additional parameters were performed during calendar year 1995.

Table III-2 lists the exceedances of the discharge limits. There were two exceedances of the daily maximum limit for total iron. Both occurred in 1994. There was one exceedance of the daily average limit for total iron, which occurred in 1994. There was one exceedance of the daily maximum limit for total copper, which also occurred in 1994. There were three exceedances of the pH limit. One occurred in 1993 and two in 1994.

Table III-3 lists the summary statistics by year for the three year period of 1992 through 1994. Outfall 128 was sampled approximately weekly. Both the concentrations (mg/l) and discharge rates (lbs/day) tended to be lowest during 1992.

Table III-4 lists the summary statistics by quarter for 1994. Both the concentrations and discharge rates tended to be lowest during the fourth quarter. Also, the concentrations tended to higher during the third quarter and lower during the second quarter.

Time series plots of the data are shown in Figures III-1 through III-8.

Table III-1
Discharge Category 128
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Before 8-1-94	Chemical Oxygen Demand	1.9	3.8	lbs/day
	Total Copper	.05	.10	lbs/day
	Total Silver	(1)	(1)	mg/l
Before and since 8-1-94	Total Suspended Solids	1.25	2.5	lbs/day
	Total Iron	.05	.10	lbs/day
Since 8-1-94	Chemical Oxygen Demand	125	125	mg/l
8-1-94 to 9-30-94	Total Copper	(1)	(1)	lbs/day
		(1)	(1)	mg/l
	Total Silver	(1)	(1)	mg/l
Since 10-1-94	Total Copper	.05	.10	lb/sday
		1.0	1.0	mg/l
	Total Silver	.02	.02	mg/l

(1) Report only.

Table III-2
Discharge Category 128
Exceedances of Discharge Limits

Effluent Characteristic	Date	Limit	Value	Units
Total Iron	2-7-94	Daily Maximum	.14	lbs/day
	8-4-94	Daily Maximum	1.6	lbs/day
	8-94	Daily Average	.33	lbs/day
Total Copper	2-7-94	Daily Maximum	.12	lbs/day
pH	4-7-93	--	9.8	pH units
	8-24-94	--	9.2	pH units
	12-5-94	--	9.8	pH units

Table III-3
Outfall 128
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Chemical Oxygen Demand	lbs/day	1992	52	.02	.14	1.4
		1993	52	0	.22	2.2
		1994	50	.033	.22	.95
	mg/l	1992	52	10	10.3	17
		1993	52	0	12.2	123
		1994	50	10	11.6	45
Total Suspended Solids	lbs/day	1992	52	0	.010	.10
		1993	52	0	.035	.54
		1994	50	0	.0077	.11
	mg/l	1992	52	0	.83	7
		1993	52	0	1.67	14
		1994	50	0	.5	6
Total Iron	lbs/day	1992	52	.00018	.0030	.050
		1993	51	.000077	.0030	.030
		1994	51	.00036	.038	1.6
	mg/l	1992	52	.02	.19	1.1
		1993	51	.02	.16	1.2
		1994	51	.045	7.2	350
Total Copper	lbs/day	1992	52	.00002	.00027	.0043
		1993	51	.000033	.00042	.0046
		1994	51	.000043	.0034	.12
	mg/l	1992	52	.01	.017	.143
		1993	51	.01	.028	.31
		1994	51	.01	.27	6.1
Total Silver	lbs/day	1992	52	.000017	.00014	.0014
		1993	51	.000017	.00021	.0022
		1994	51	.000037	.00020	.00082
	mg/l	1992	52	.01	.010	.016
		1993	51	.01	.011	.036
		1994	51	.01	.012	.1
pH	pH units	1992	52	6.4	7.4	8.74
		1993	52	6.6	7.7	9.8
		1994	51	6.6	7.8	9.8

Table III-4
Outfall 128
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Chemical Oxygen Demand	lbs/day	1	12	.07	.18	.30
		2	14	.06	.42	.95
		3	12	.033	.15	.60
		4	12	.043	.11	.17
	mg/l	1	12	10	10.4	15
		2	14	10	11.6	20
		3	12	10	12.9	45
		4	12	10	11.3	17
Total Suspended Solids	lbs/day	1	12	0	.018	.11
		2	14	0	.005	.07
		3	12	0	.003	.027
		4	12	0	.0059	.063
	mg/l	1	12	0	1.1	6
		2	14	0	.21	3
		3	12	0	.25	2
		4	12	0	.5	5
Total Iron	lbs/day	1	12	.00071	.015	.14
		2	14	.00036	.0076	.026
		3	13	.00038	.13	1.6
		4	12	.00037	.002	.011
	mg/l	1	12	.05	.78	7.5
		2	14	.06	.20	.7
		3	13	.045	27.1	350
		4	12	.061	.19	.89
Total Copper	lbs/day	1	12	.00007	.0098	.12
		2	14	.000066	.0014	.0072
		3	13	.000084	.0026	.028
		4	12	.000043	.00021	.0013
	mg/l	1	12	.01	.52	6.1
		2	14	.01	.034	.18
		3	13	.01	.52	6.1
		4	12	.01	.019	.1

Table III-4 (continued)
Outfall 128
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Total Silver	lbs/day	1	12	.00012	.00017	.00022
		2	14	.00006	.00037	.00082
		3	13	.000037	.00015	.00047
		4	12	.000043	.000095	.00013
	mg/l	1	12	.01	.011	.02
		2	14	.01	.01	.01
		3	13	.01	.018	.1
		4	12	.01	.01	.01
pH	pH units	1	12	6.8	7.6	9
		2	14	7.3	7.8	8.8
		3	12	6.6	7.6	9.2
		4	13	7	8.0	9.8

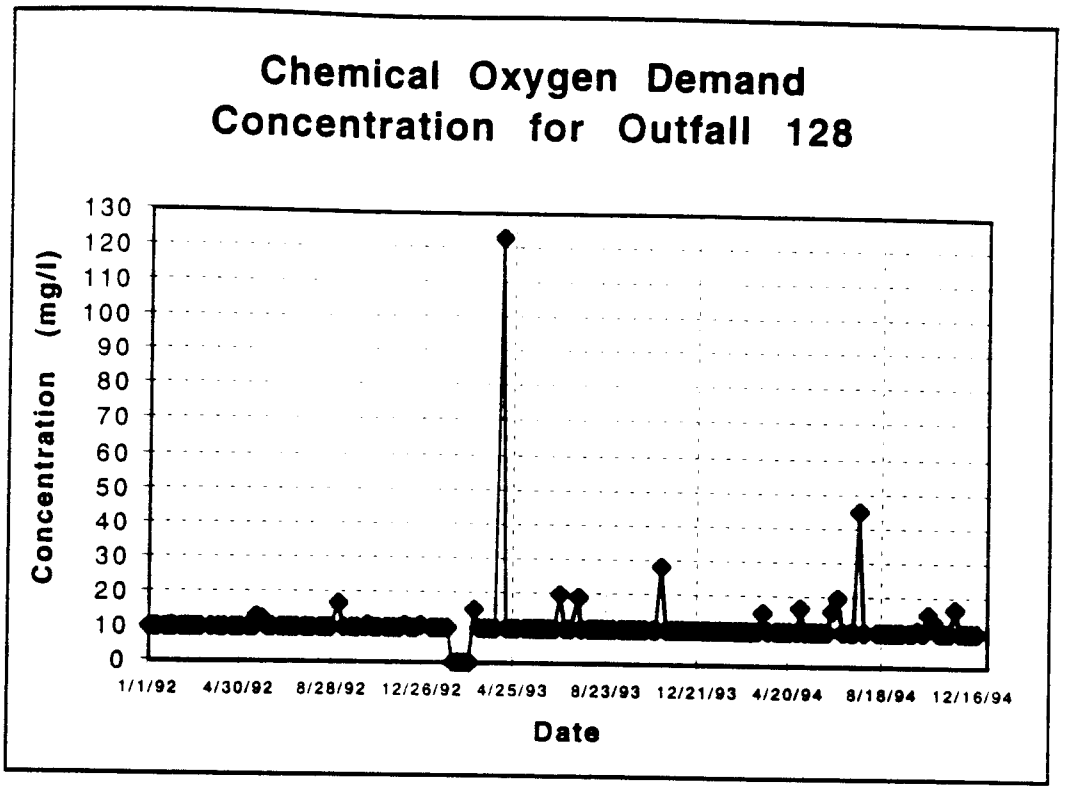
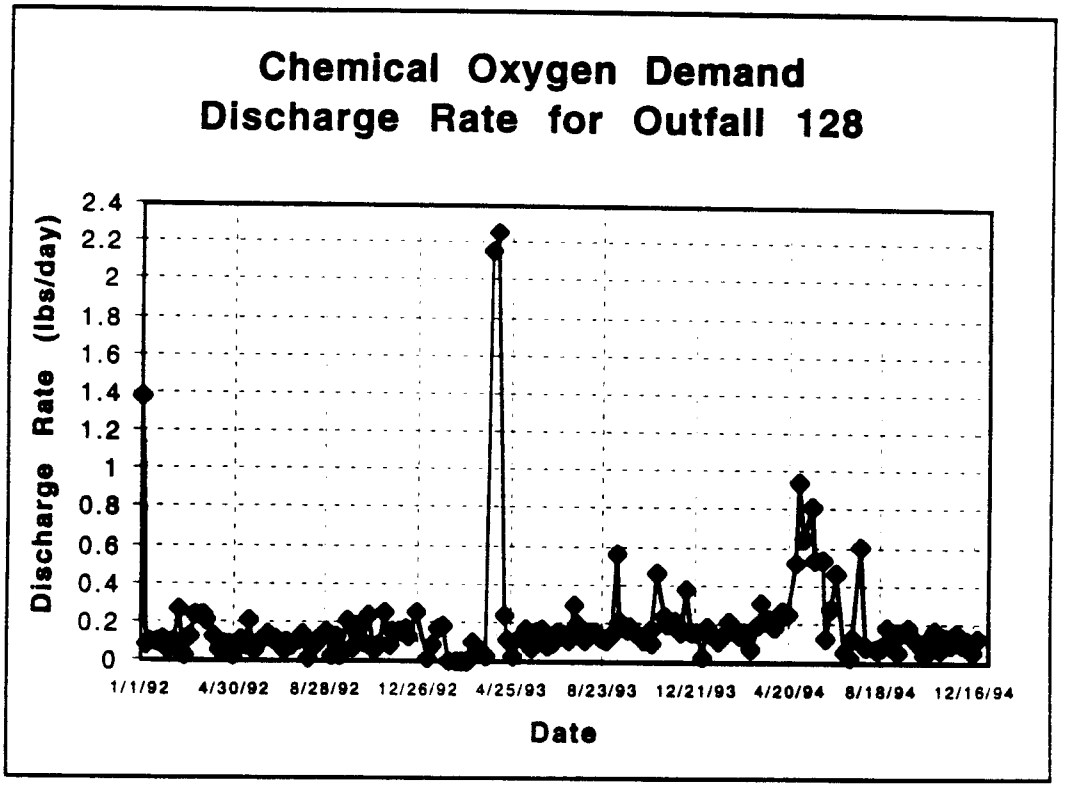


Figure III-1



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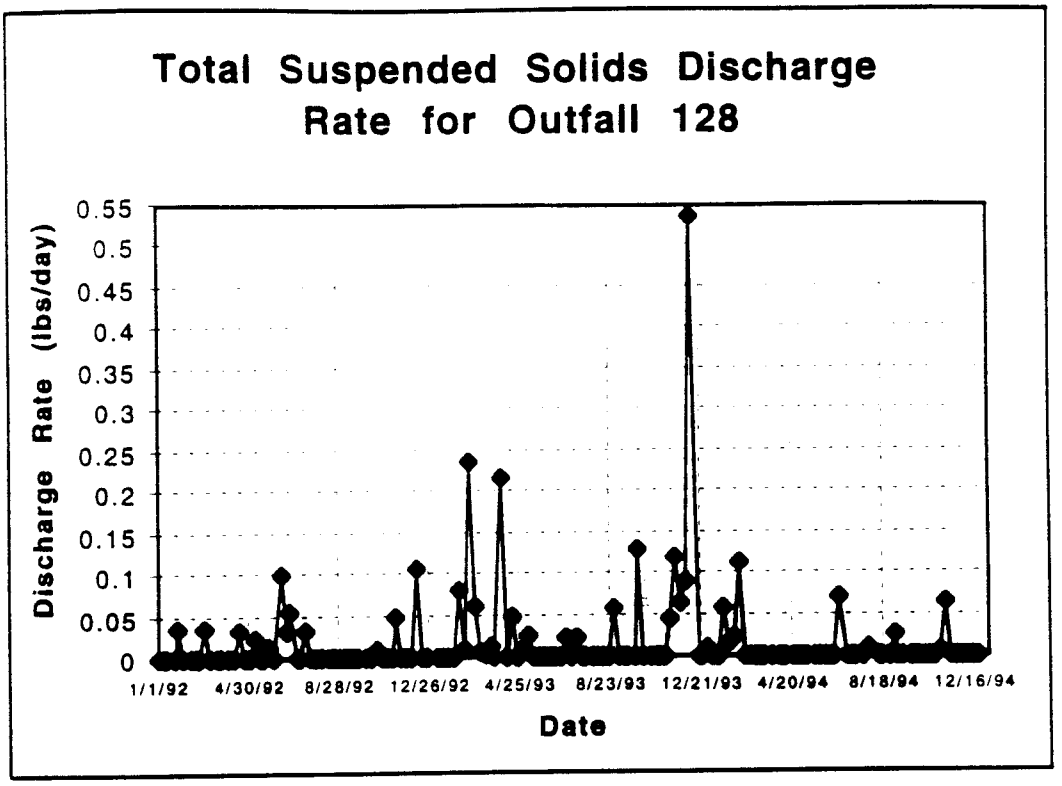

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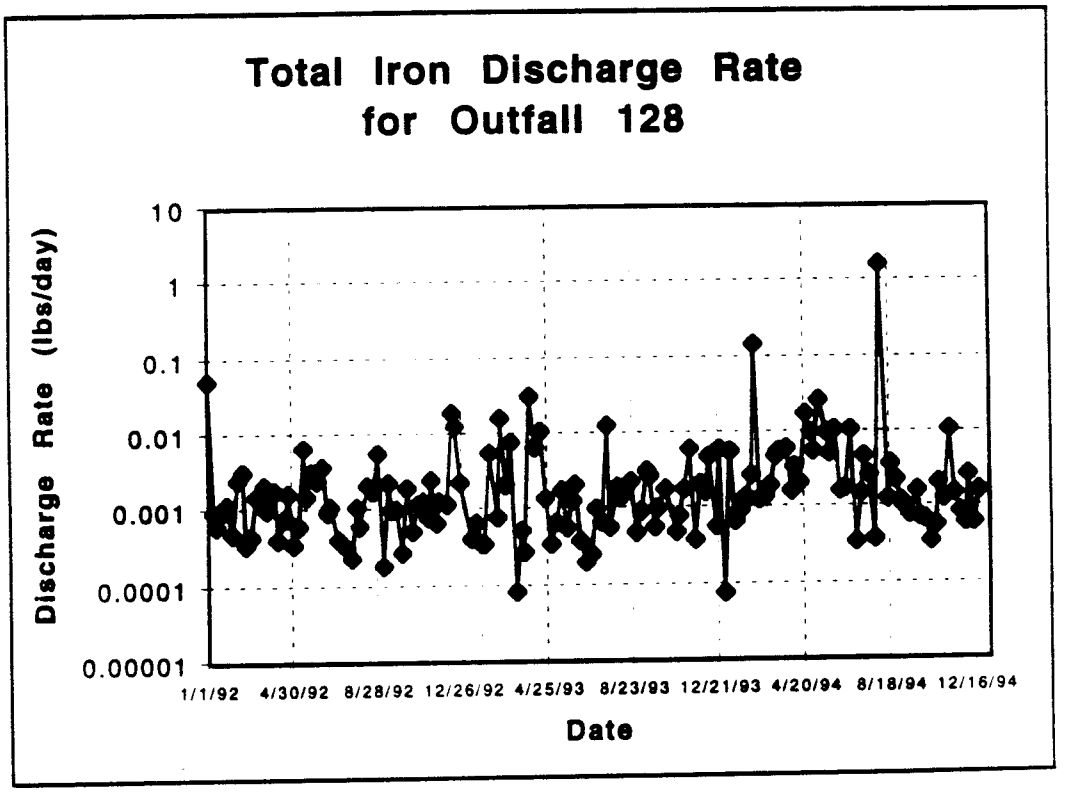

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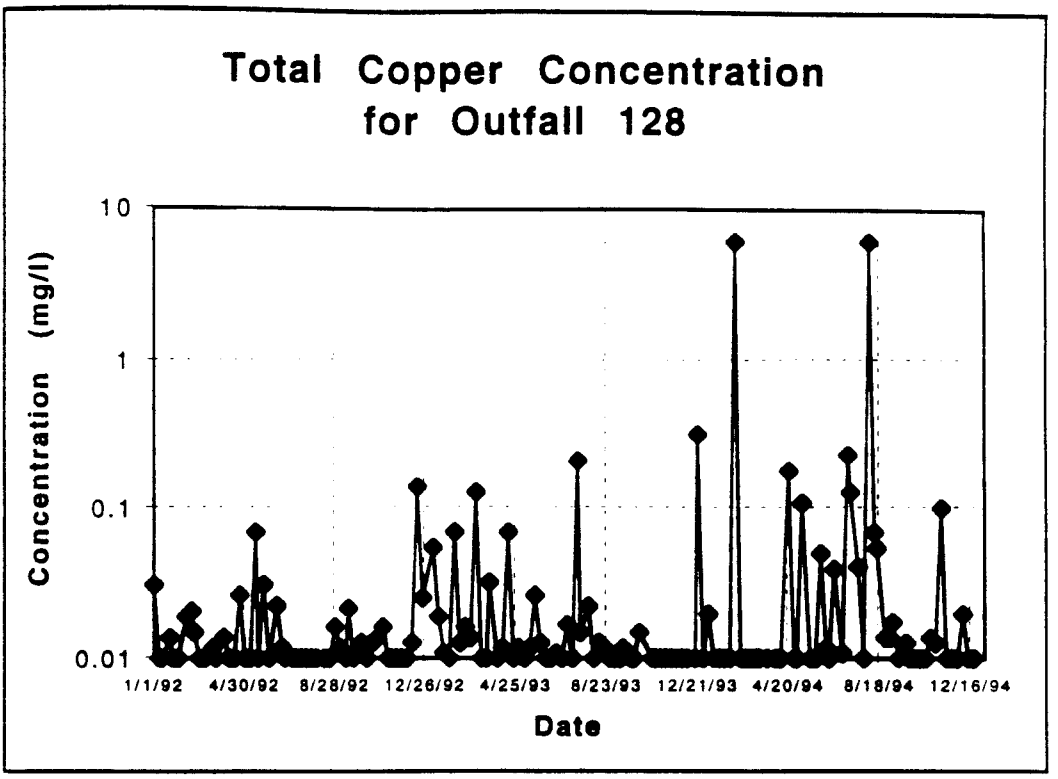


Figure III-5

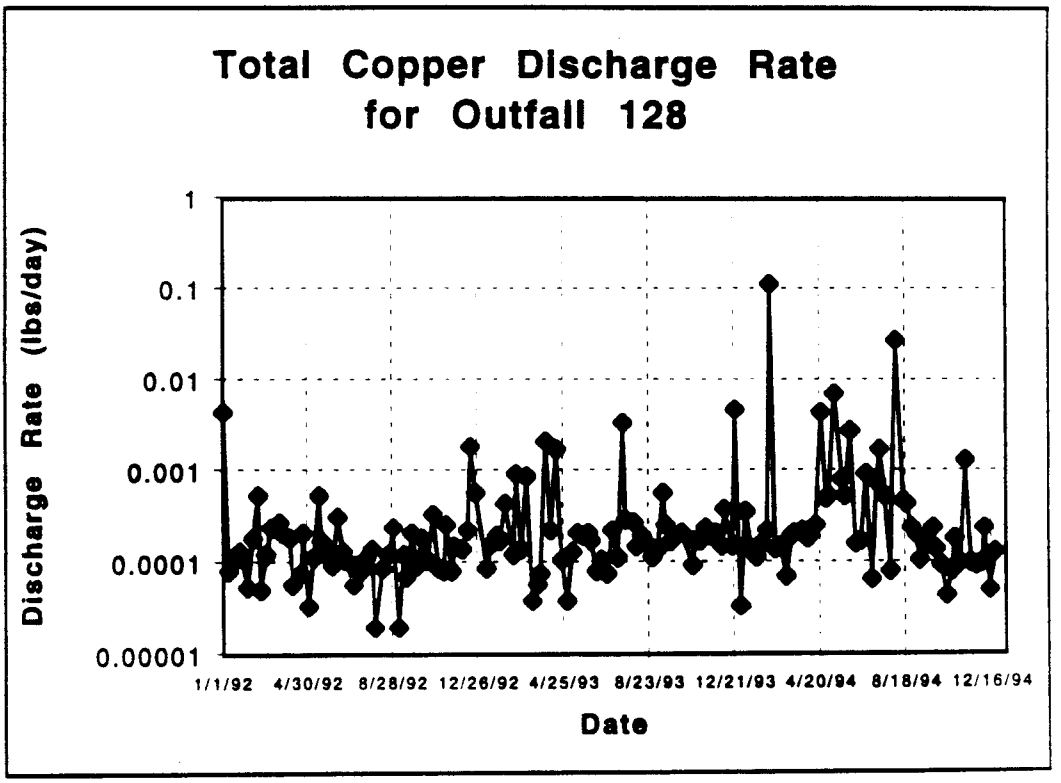
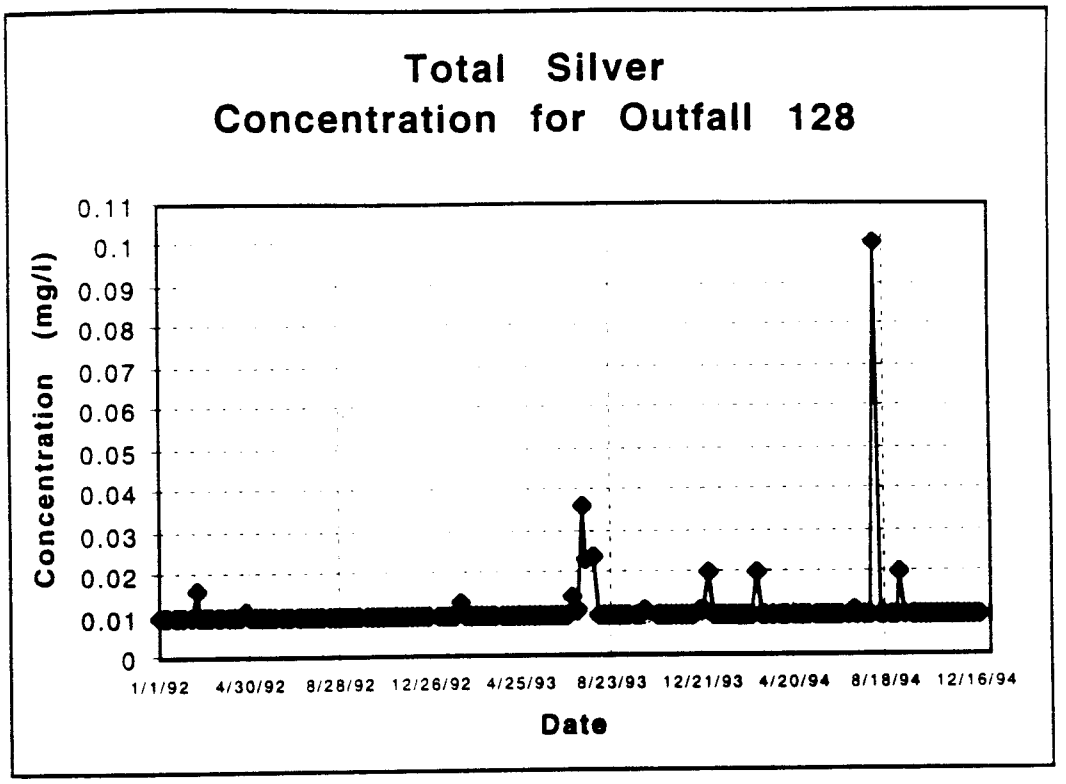


Figure III-6



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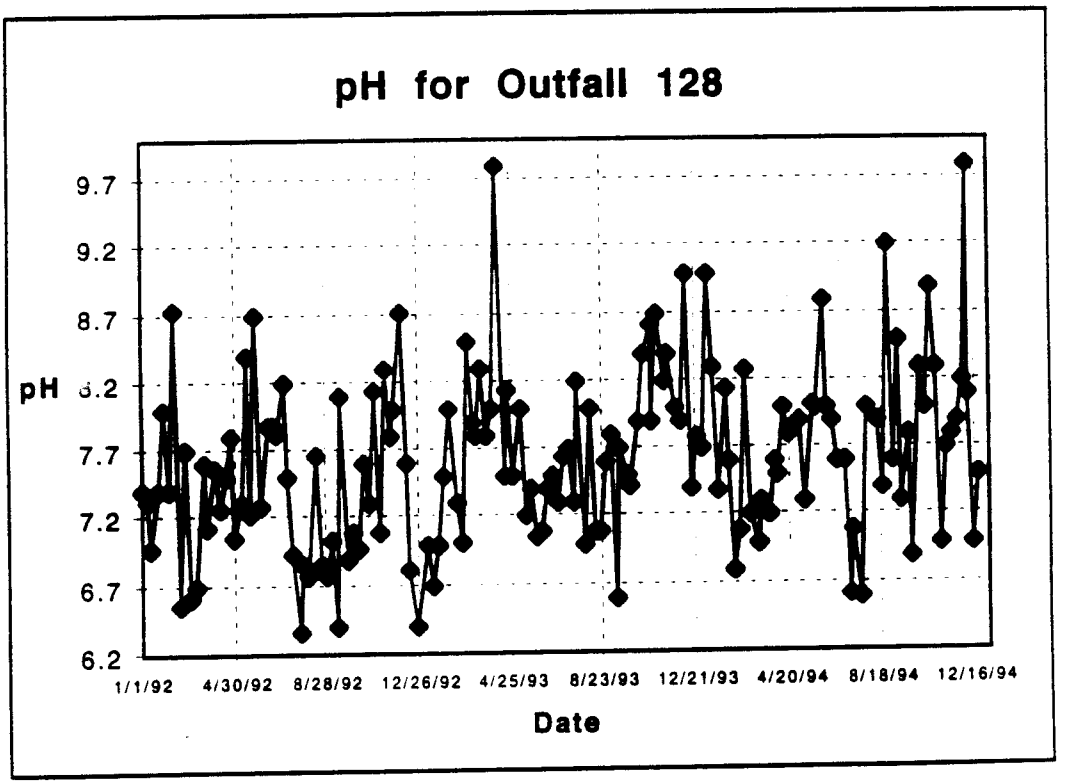


Figure III-8

IV. Discharge Category 13S

This discharge category covers discharges from outfall 13S, treated sanitary sewage effluents. This outfall receives sewage from the TA-46 Sanitary Wastewater System Consolidation (SWSC) plant. The SWSC treatment plant is located in Canada del Buey. It was designed to treat 600,000 gallons per day of sanitary wastewater using an activated sludge process. The SWSC plant treats sewage from all Laboratory Technical Areas except isolated sites which rely on holding tanks and septic systems. In all eight treatment plants and 33 septic systems were eliminated by the construction of the SWSC treatment plant. An extensive collection system consisting of eight new lift stations convey the sanitary wastewater to the plant.

Table IV-1 lists the discharge limits for biochemical oxygen demand (5-day), total suspended solids and fecal coliform bacteria. Also, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units. When the Laboratory's permit was issued on August 1, 1994, the permit conditions were established for this new discharge category.

The current permit conditions include discharge limits for fourteen additional water quality parameters. The water samples are required to be analyzed for these fourteen parameters once per year. The sampling and analyses for the fourteen additional parameters were performed during calendar year 1995.

There were no exceedances of the discharge limits during 1994.

Table IV-2 lists the summary statistics by quarter for 1994. Except for pH, samples were taken approximately once every two weeks during the last two quarters of calendar year 1994. For pH, samples were taken approximately weekly. Both the concentrations and discharge rates tended to be higher during the fourth quarter.

Time series plots of the data are shown in Figures IV-1 through IV-6.

Table IV-1
Discharge Category 13S
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Since 8-1-94	Biochemical Oxygen Demand (5-Day)	100	--	lbs/day
		30	45	mg/l
	Total Suspended Solids	100	--	lbs/day
		30	45	mg/l
	Fecal Coliform Bacteria	500 (1)	500	Number/100 ml

(1) Logarithmic mean.

Table IV-2
Outfall 13S
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Biochemical Oxygen Demand (5-Day)	lbs/day	3	6	2.4	4.6	6.7
		4	9	3.2	5.5	8.6
	mg/l	3	6	1.7	2.3	2.7
		4	9	1.6	2.3	2.9
Total Suspended Solids	lbs/day	3	7	0.23	4.0	5.8
		4	9	6.2	13.0	23.1
	mg/l	3	7	1.0	2.2	4.1
		4	9	2.1	5.6	8
Fecal Coliform Bacteria	per 100 ml	3	6	1	2.2	6
		4	9	1	3.4	10
pH	pH units	3	10	7.2	7.4	7.7
		4	14	7	7.3	7.7

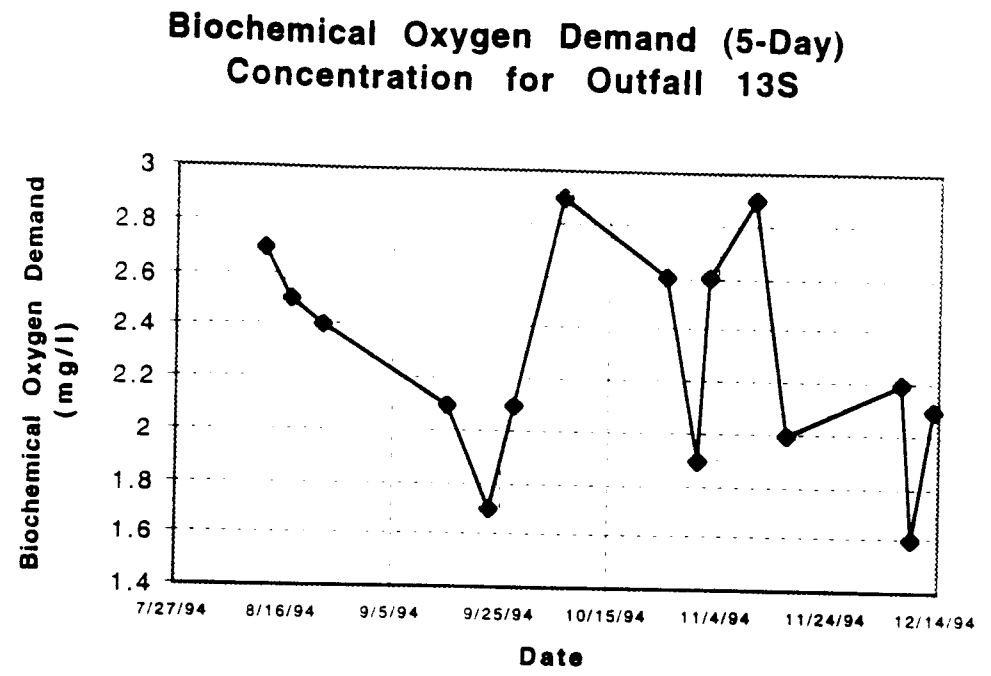


Figure IV-1

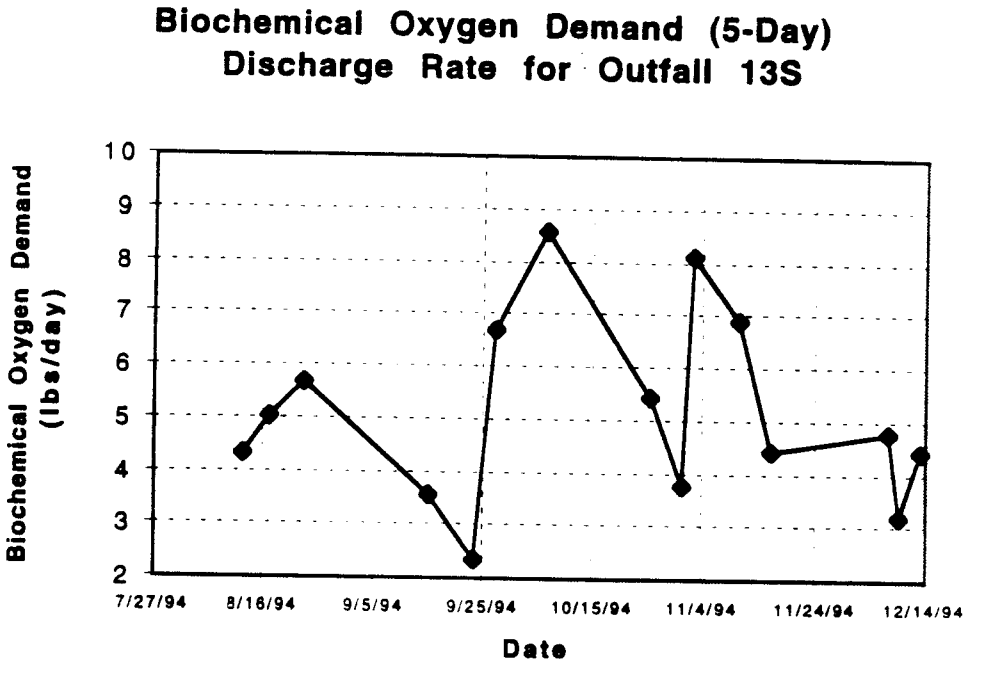


Figure IV-2

Total Suspended Solids Concentration for Outfall 13S

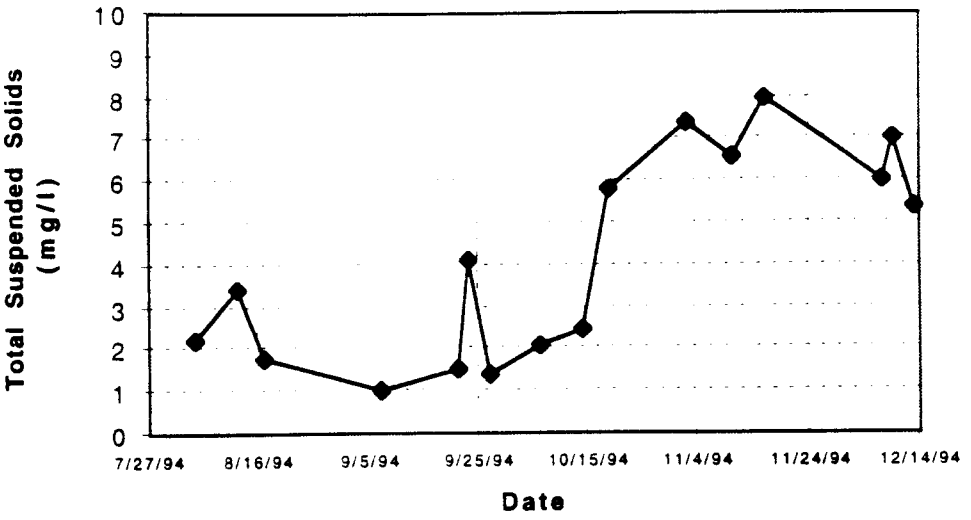


Figure IV-3

Total Suspended Solids Discharge Rate for Outfall 13S

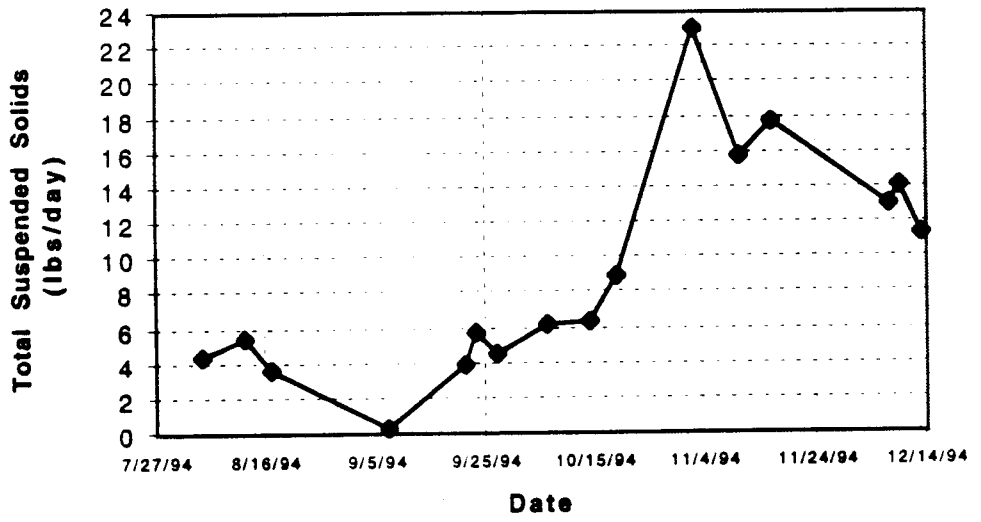


Figure IV-4

Fecal Coliform Bacteria Count for Outfall 13S

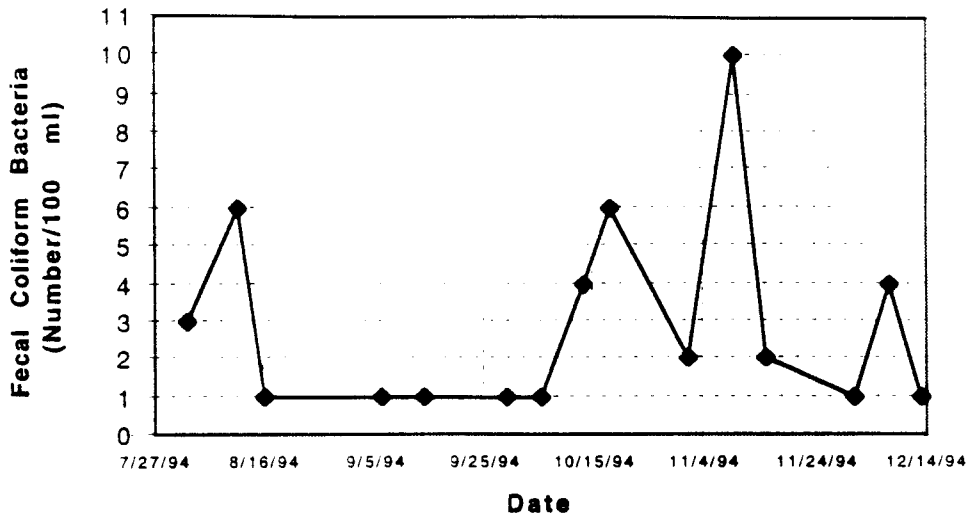


Figure IV-5

pH for Outfall 13S

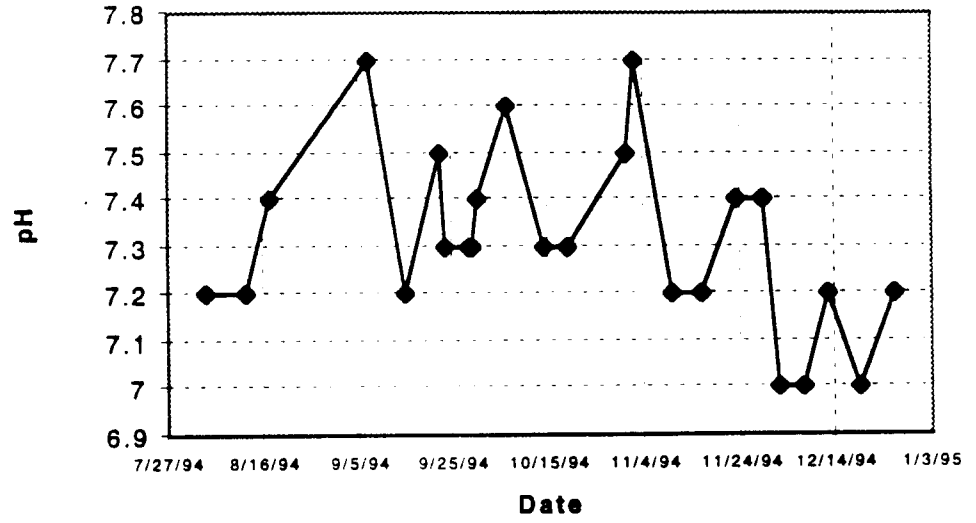


Figure IV-6

V. Discharge Category 1A

This discharge category covers discharges from outfall 001, power plant discharge, including sanitary effluent used for cooling water and monitored prior to reuse under outfall 13S. The TA-3 power plant is the only outfall included in this category. It consists of effluent from water treatment and steam generating systems. The following constituents are present in this outfall: demineralizer reagents, boiler blowdown, diatomaceous filter backwash, cooling tower blowdown and non-contact cooling water. The demineralizer reagents are used to purify the water to the steam generators. The boiler blowdown is employed to eliminate any breakthrough from the demineralizers. The diatomaceous filters treat raw water prior to demineralizer treatment. The blowdown is from the TA-3 power plant cooling towers. The cooling towers are used only when the facility generates electric power, which occurs infrequently. The non-contact cooling water comes from once through cooling of bearings.

Table V-1 lists the discharge limits for free available chlorine and total suspended solids. Also, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units. For this discharge category and these three effluent characteristics, the former and current permit conditions have the same discharge limits.

Over the three year period of 1992 through 1994, there were no exceedances of these discharge limits.

The current permit conditions, which went into effect on August 1, 1994, also include discharge limits for fourteen additional water quality parameters. The water samples are required to be analyzed for these fourteen parameters once per year. No data are available for these parameters. The sampling and analyses for these other seven additional parameters were performed during calendar year 1995.

Table V-2 lists the summary statistics by year for the three year period of 1992 through 1994. Outfall 1 was sampled monthly. According to the average statistics, there were no clear trends in the data. According to the maximum statistics, the discharge concentrations were highest in 1992 and tended to be lowest in 1994.

Table V-3 lists the summary statistics by quarter for 1994. There do not appear to be any quarterly trends in the data.

Time series plots of the data are shown in Figures V-1 through V-3.

Table V-1
Discharge Category 1A
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Since and Before 8-1-94	Free Available Chlorine	0.2	0.5	mg/l
	Total Suspended Solids	30	100	mg/l

Table V-2
Discharge Category 1A
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Free Available Chlorine	mg/l	1992	11	0.0	.016	.18
		1993	13	0.0	.013	.11
		1994	12	0.0	.004	.05
Total Suspended Solids	mg/l	1992	11	0.0	4.7	29
		1993	14	0.0	4.1	20
		1994	12	0.0	4.6	21
pH	pH units	1992	11	6.9	8.01	8.7
		1993	14	7.1	8.02	8.8
		1994	12	7.3	7.98	8.9

Table V-3
Discharge Category 1A
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Free Available Chlorine	mg/l	1	3	0.0	0.0	0.0
		2	3	0.0	.017	.05
		3	3	0.0	0.0	0.0
		4	3	0.0	0.0	0.0
Total Suspended Solids	mg/l	1	3	0.0	0.0	0
		2	3	2.0	8.7	21
		3	3	0.0	7.7	19
		4	3	0.0	2.0	3
pH	pH units	1	3	7.3	7.67	8.0
		2	3	7.8	7.87	7.9
		3	3	7.5	7.99	8.9
		4	3	8.0	8.36	8.6

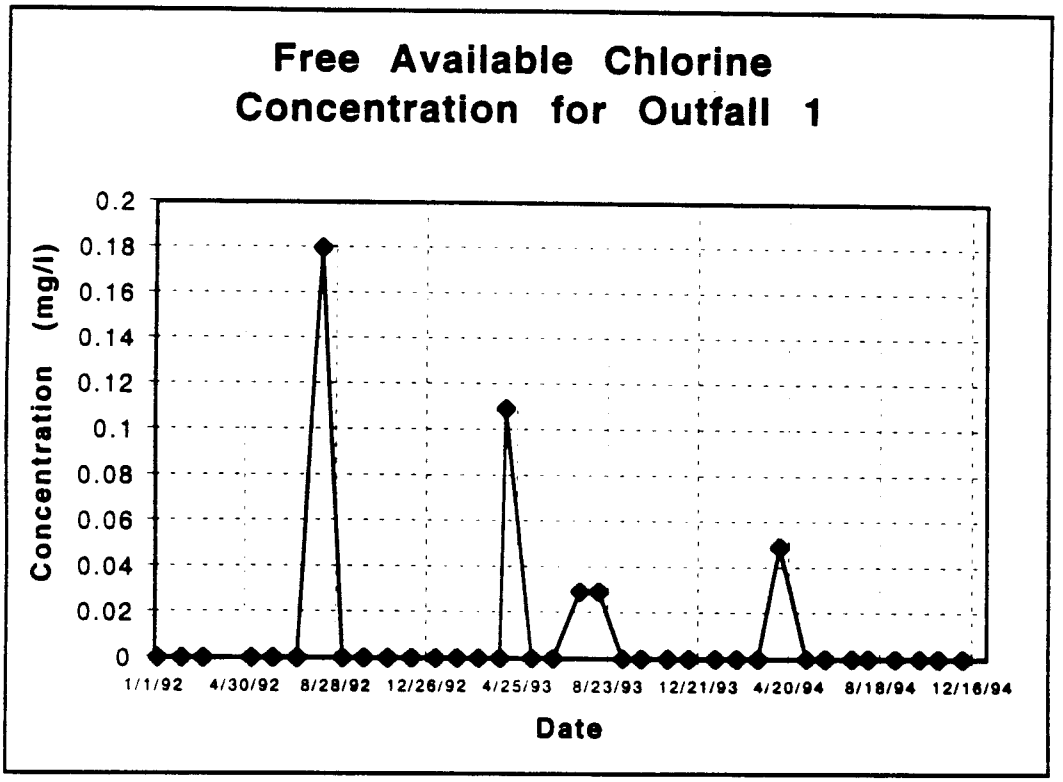


Figure V-1

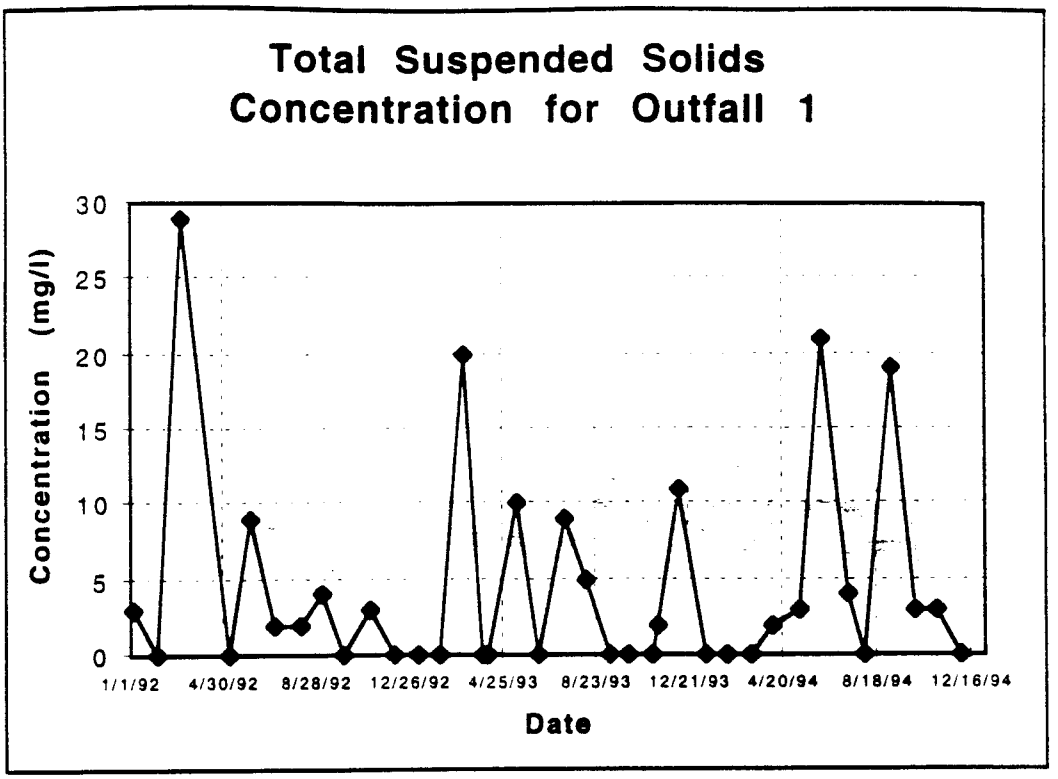


Figure V-2

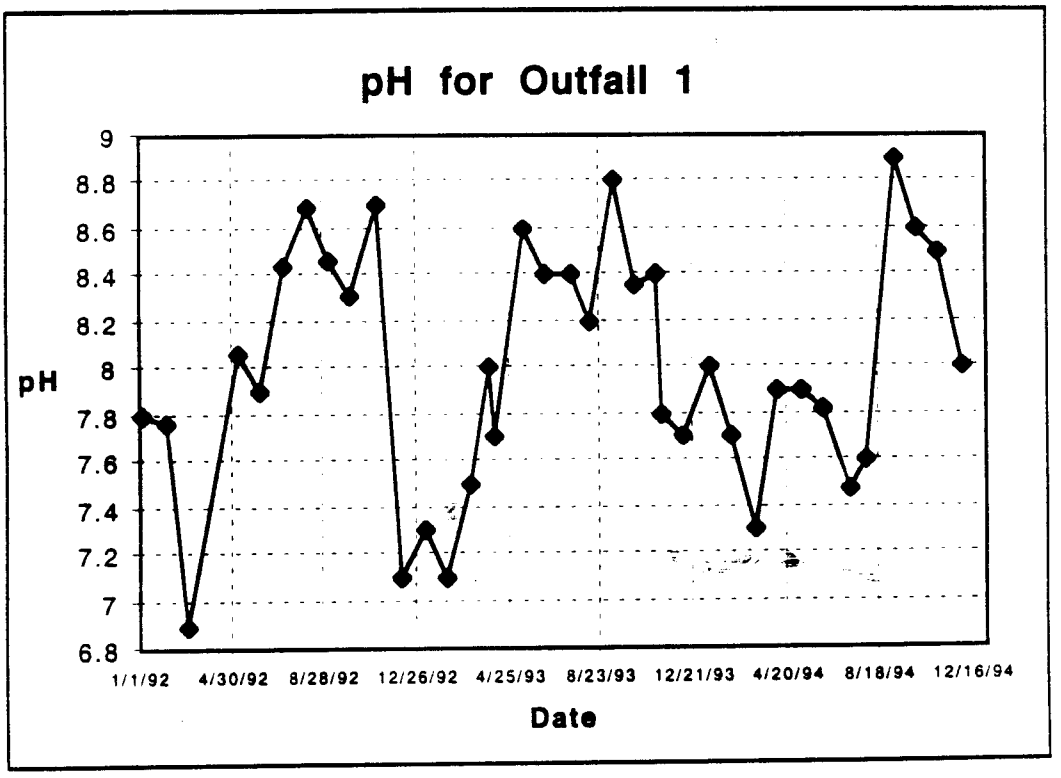


Figure V-3

VI. Discharge Category 2A

This discharge category covers discharges from outfalls 007 and 129, neutralized demineralizer regeneration brine and boiler blowdown. Outfall 007 is from the TA-16 steam plant and outfall 129 is from the TA-21 steam plant. The effluent consists of softener reagents and blowdown from both steam and mud drums of the steam boilers.

Table VI-1 lists the discharge limits for total suspended solids, total iron, total copper, total phosphorus, sulfite and total chromium. Also, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units. For this discharge category and for the preceeding effluent characteristics, except total chromium, the former and current permit conditions have the same discharge limits. The former permit conditions did not have a discharge limit for total chromium but only required its reporting.

The current permit conditions, which went into effect on August 1, 1994, also include discharge limits for fourteen additional water quality parameters. The water samples are required to be analyzed for t.. ,e fourteen parameters once per year. Two of these parameters, total copper and total chromium, are also covered under the discharge limits for discharge category 2A. The sampling and analyses for these other seven additional parameters were performed during calendar year 1995.

Table VI-2 lists the exceedances of the discharge limits. There were six exceedances of the daily maximum limit for total suspended solids for outfall 007. One occurred in 1992, five in 1993 and none in 1994. There were two exceedances of the daily maximum limit for total suspended solids for outfall 129. All occurred in 1992. There were seven exceedances of the daily average limit for total suspended solids. Three occurred in 1992, four in 1993 and none in 1994. There were three exceedances of the pH limit for outfall 007. One occurred in 1992, two in 1993 and none in 1994.

Table VI-3 lists the summary statistics by year for the three year period of 1992 through 1994. Outfall 7 was sampled from approximately weekly to once every two weeks. Outfall 129 was sampled about once every two weeks. For outfall 7, the discharge concentrations tended to be higher during 1993. For outfall 129, the discharge concentrations tended to be higher during 1992 and lower during 1994. Overall, there wasn't a strong difference between outfalls 7 and 129 with regard to their discharge concentrations.

Table VI-4 lists the summary statistics by quarter for 1994. For outfall 7, the discharge concentrations tended to be higher during the second quarter of the year and lower during the fourth quarter of the year. For outfall 129, the discharge concentrations tended to be higher during the first two quarters of the year and lower during the last two quarters of the year.

Time series plots of the data are shown in Figures VI-1 through VI-14.

Table VI-1
Discharge Category 2A
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Since and Before 8-1-94	Total Suspended Solids	30	100	mg/l
	Total Iron	10	40	mg/l
	Total Copper	1.0	1.0	mg/l
	Total Phosphorus	20	40	mg/l
	Sulfite	35	70	mg/l
	Total Chromium	1.0[1]	1.0[1]	mg/l

(1) The former permit conditions did not have a discharge limit for total chromium but only required its reporting.

Table VI-2
Discharge Category 2A
Exceedances of Discharge Limits

Outfall	Effluent Characteristic	Date	Limit	Value	Units
007	Total Suspended Solids	12-18-92	Daily Maximum	128	mg/l
		1-12-93	Daily Maximum	270	mg/l
		3-1-93	Daily Maximum	441	mg/l
		3-9-93	Daily Maximum	526	mg/l
		3-17-93	Daily Maximum	417	mg/l
		11-1-93	Daily Maximum	170	mg/l
	pH	2-3-92	--	9.3	pH units
		4-7-92	--	9.4	pH units
		1-12-93	--	9.2	pH units
129	Total Suspended Solids	9-18-92	Daily Maximum	155	mg/l
		10-9-92	Daily Maximum	135	mg/l
007& 129	Total Suspended	9-92	Daily Average	46.5	mg/l
		10-92	Daily Average	48.2	mg/l
		12-92	Daily Average	37.1	mg/l
		1-93	Daily Average	43.3	mg/l
		2-93	Daily Average	37.4	mg/l
		3-93	Daily Average	114	mg/l
		11-93	Daily Average	80.3	mg/l

Table VI-3
Discharge Category 2A
Summary Statistics by Year for 1994

Outfall	Effluent Characteristic	Units of Measurement	Year	No. of Samples	Minimum	Average	Maximum
7	Total Suspended Solids	mg/l	1992	48	0.0	17.6	128
			1993	74	0.0	36.3	526
			1994	38	0.0	2.7	17
	Total Iron	mg/l	1992	29	.52	1.5	3.4
			1993	26	.12	1.5	5.4
			1994	27	.075	.63	1.5
	Total Copper	mg/l	1992	29	.022	.097	.33
			1993	26	.01	.067	.34
			1994	29	.007	.032	.07
	Total Phosphorus	mg/l	1992	48	.52	3.8	9.4
			1993	50	1.27	8.8	21
			1994	38	.87	7.2	16.5
	Sulfite	mg/l	1992	28	.1	4.2	15
			1993	25	.5	4.6	12.2
			1994	23	.9	3.0	11.1
	Total Chromium	mg/l	1992	29	.007	.029	.08
			1993	26	.001	.022	.047
			1994	27	.002	.90	8
	pH	pH units	1992	51	6.7	7.50	9.4
			1993	72	6.5	7.40	9.2
			1994	38	6.8	7.36	8.3
129	Total Suspended Solids	mg/l	1992	27	0.0	17.7	155
			1993	28	0.0	17.9	170
			1994	21	0.0	4.5	33
	Total Iron	mg/l	1992	27	.125	1.7	9.7
			1993	28	.102	1.4	3.6
			1994	21	.13	.50	1.4
	Total Copper	mg/l	1992	27	.01	.15	.73
			1993	28	.016	.083	.22
			1994	21	.01	.036	.092
	Total Phosphorus	mg/l	1992	27	1.1	10.3	28.6
			1993	28	2.4	8.9	17
			1994	21	2.9	8.8	20

Table VI-3 (continued)
Discharge Category 2A
Summary Statistics by Year for 1994

Outfall	Effluent Characteristic	Units of Measurement	Year	No. of Samples	Minimum	Average	Maximum
129	Sulfite	mg/l	1992	26	.11	1.8	9.6
			1993	28	1	3.9	10.8
			1994	22	1.3	5.4	11.3
	Total Chromium	mg/l	1992	27	.001	.064	1.5
			1993	28	.0011	.0095	0307
			1994	21	.003	.0065	.012
	pH	pH units	1992	27	7.2	7.6	8.03
			1993	28	6.7	7.9	8.9
			1994	21	7.09	7.7	8.1

Table VI-4
Discharge Category 2A
Summary Statistics by Quarter for 1994

Outfall	Effluent Characteristic	Units of Measurement	Quarter	No. of Samples	Minimum	Average	Maximum
7	Total Suspended Solids	mg/l	1	16	0.0	2.2	10
			2	12	0.0	4.0	17
			3	7	0.0	2.3	4
			4	3	0.0	.67	2
	Total Iron	mg/l	1	10	.12	.80	1.26
			2	8	.075	.46	1.5
			3	6	.27	.67	1.5
			4	3	.15	.43	.72
	Total Copper	mg/l	1	12	.02	.042	.06
			2	8	.013	.029	.07
			3	6	.01	.022	.03
			4	3	.007	.022	.037
	Total Phosphorus	mg/l	1	16	3.9	6.4	8.2
			2	12	4.6	10.3	16.5
			3	7	.87	4.9	11
			4	3	3.8	4.4	5.21
	Sulfite	mg/l	1	8	.9	2.0	2.8
			2	7	1.3	4.0	9.9
			3	5	1.2	3.7	11.1
			4	3	1	2.5	3.3

Table VI-4 (continued)
Discharge Category 2A
Summary Statistics by Quarter for 1994

Outfall	Effluent Characteristic	Units of Measurement	Quarter	No. of Samples	Minimum	Average	Maximum
7	Total Chromium	mg/l	1	10	.008	2.4	8
			2	8	.003	.0096	.016
			3	6	.002	.005	.008
			4	3	.002	.0037	.007
	pH	pH units	1	16	6.9	7.5	7.98
			2	12	6.8	7.3	8.3
			3	7	6.9	7.2	8
			4	3	6.9	7.3	7.5
129	Total Suspended Solids	mg/l	1	6	0.0	11.0	33
			2	7	0.0	3.7	11
			3	5	0.0	0.2	1
			4	3	0.0	.33	1
	Total Iron		1	6	.27	.46	.64
			2	7	.16	.50	1.1
			3	5	.13	.22	.34
			4	3	.78	1.0	1.4
	Total Copper	mg/l	1	6	.01	.032	.065
			2	7	.014	.032	.082
			3	5	.017	.022	.029
			4	3	.056	.074	.092
	Total Phosphorus	mg/l	1	6	5.8	7.6	10.6
			2	7	4.6	9.6	20
			3	5	5.5	11.2	18.2
			4	3	2.9	5.3	6.9
	Sulfite	mg/l	1	6	3.7	7.6	11.3
			2	6	2.7	5.0	7.4
			3	6	2.5	4.2	7.2
			4	4	1.3	4.4	6.5
	Total Chromium	mg/l	1	6	.005	.0078	.009
			2	7	.004	.0073	.012
			3	5	.003	.0044	.005
			4	3	.005	.0057	.006
	pH	pH units	1	6	7.1	7.6	
			2	7	7.2	7.7	
			3	5	7.2	7.6	
			4	3	7.7	7.8	

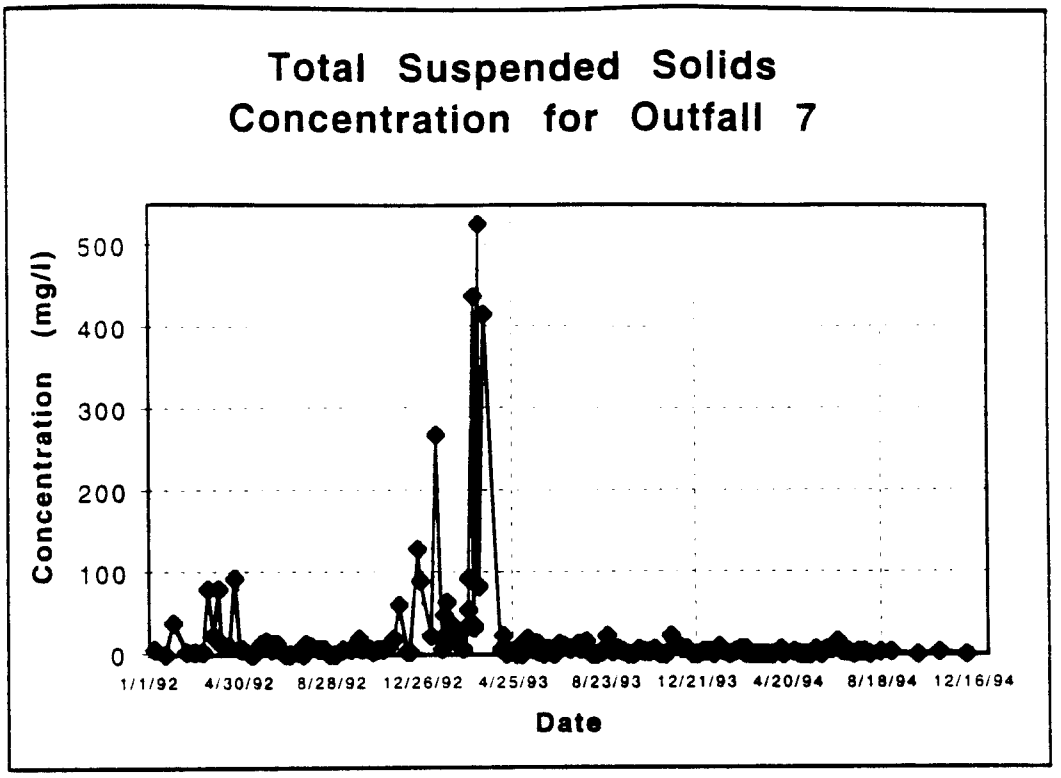


Figure VI-1

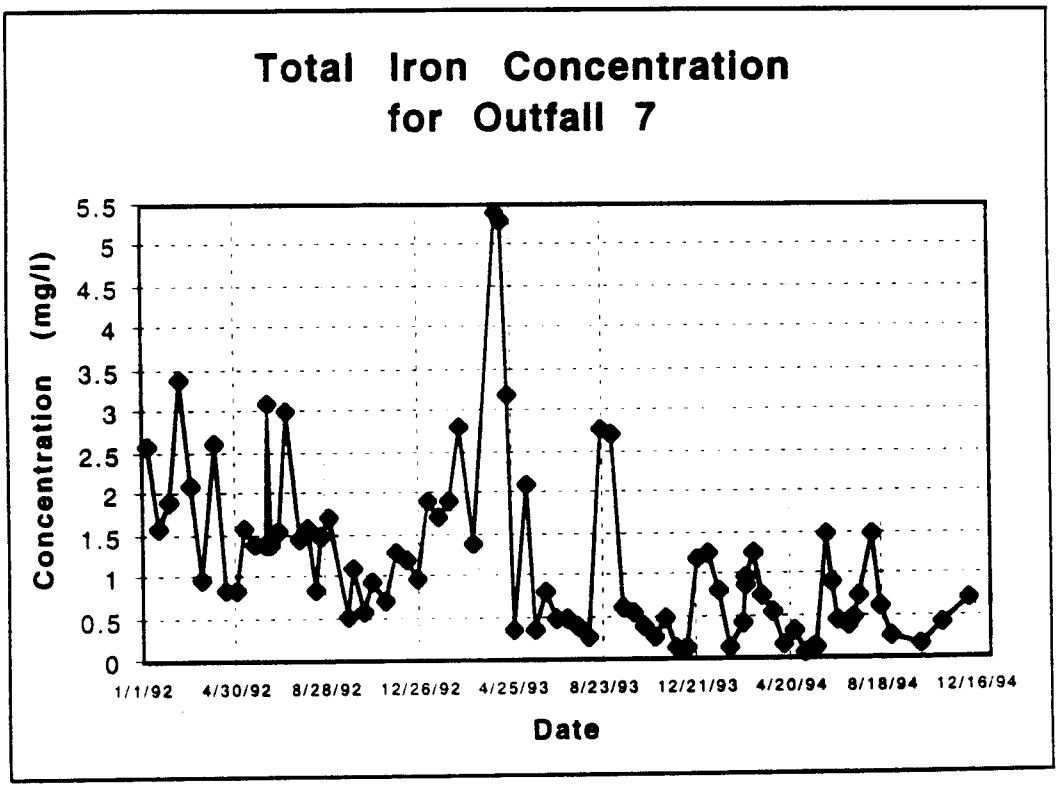


Figure VI-2

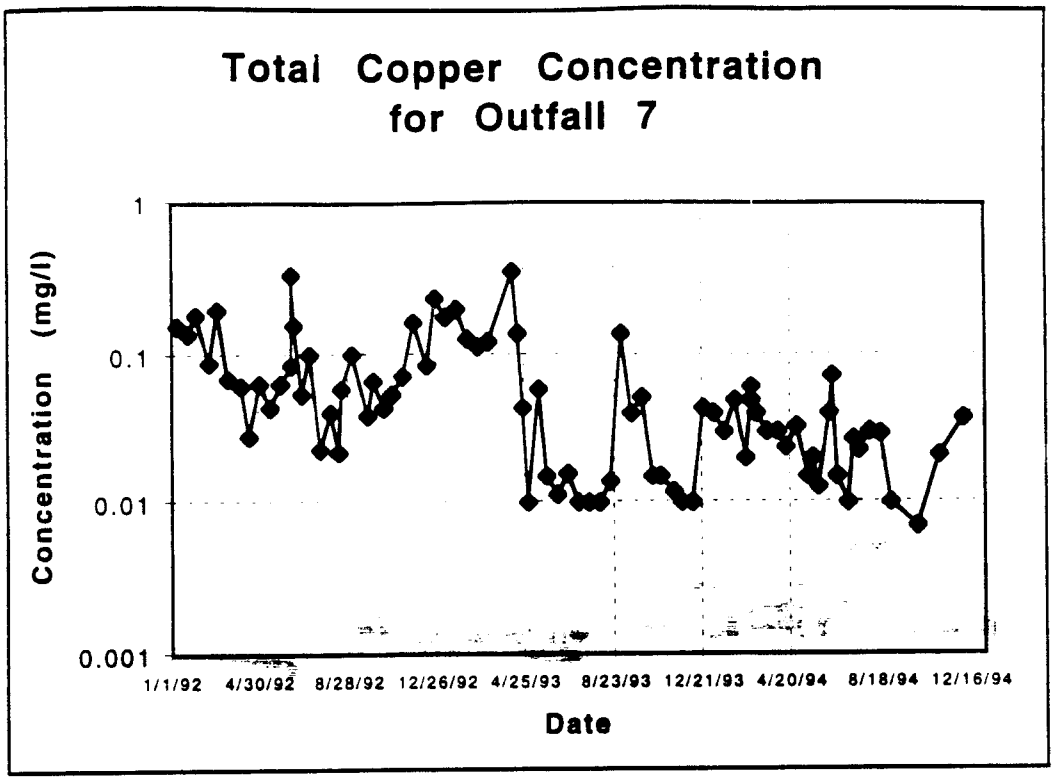


Figure VI-3

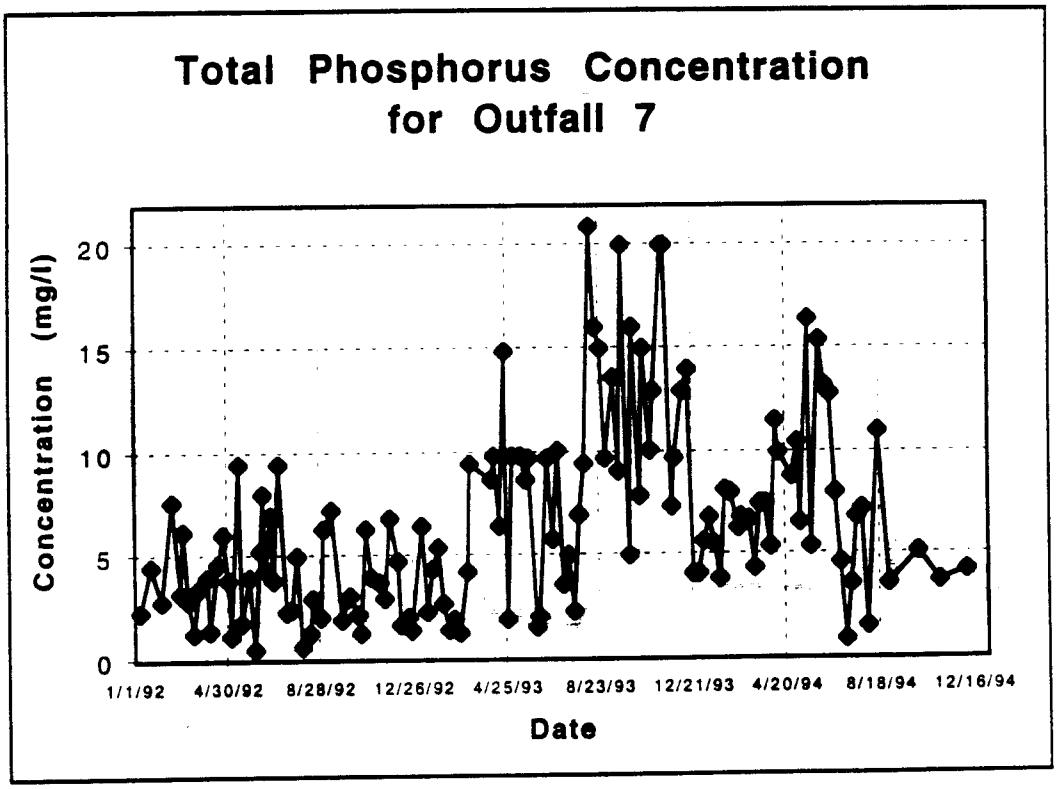


Figure VI-4

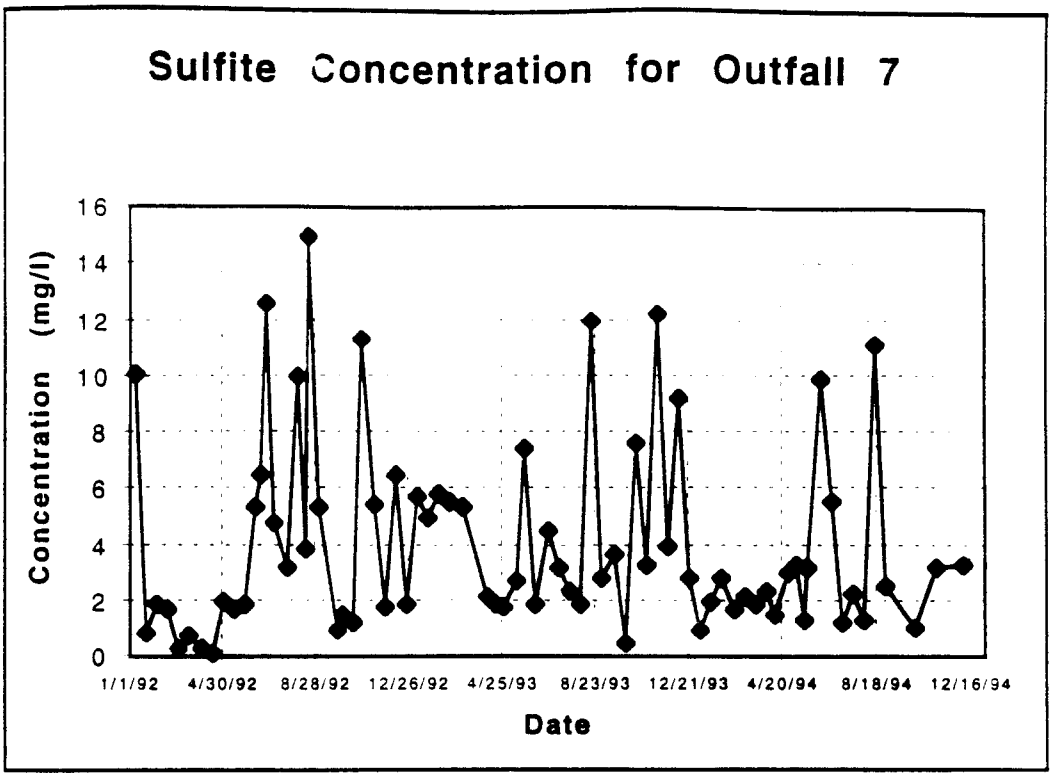


Figure VI-5

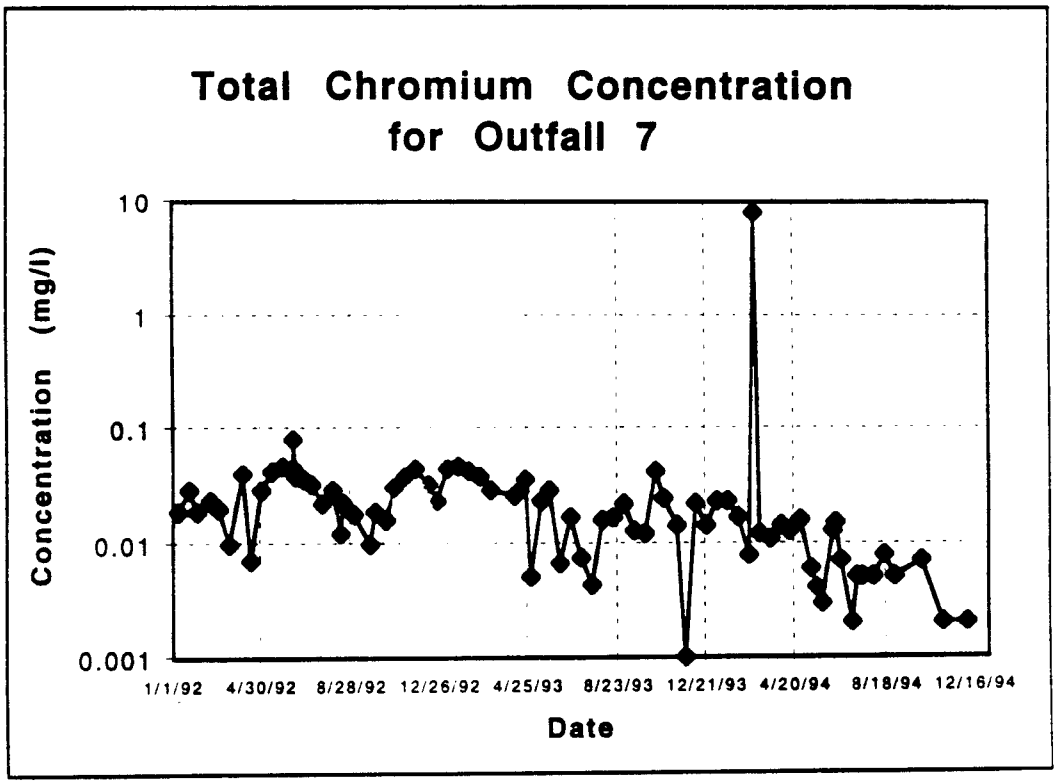
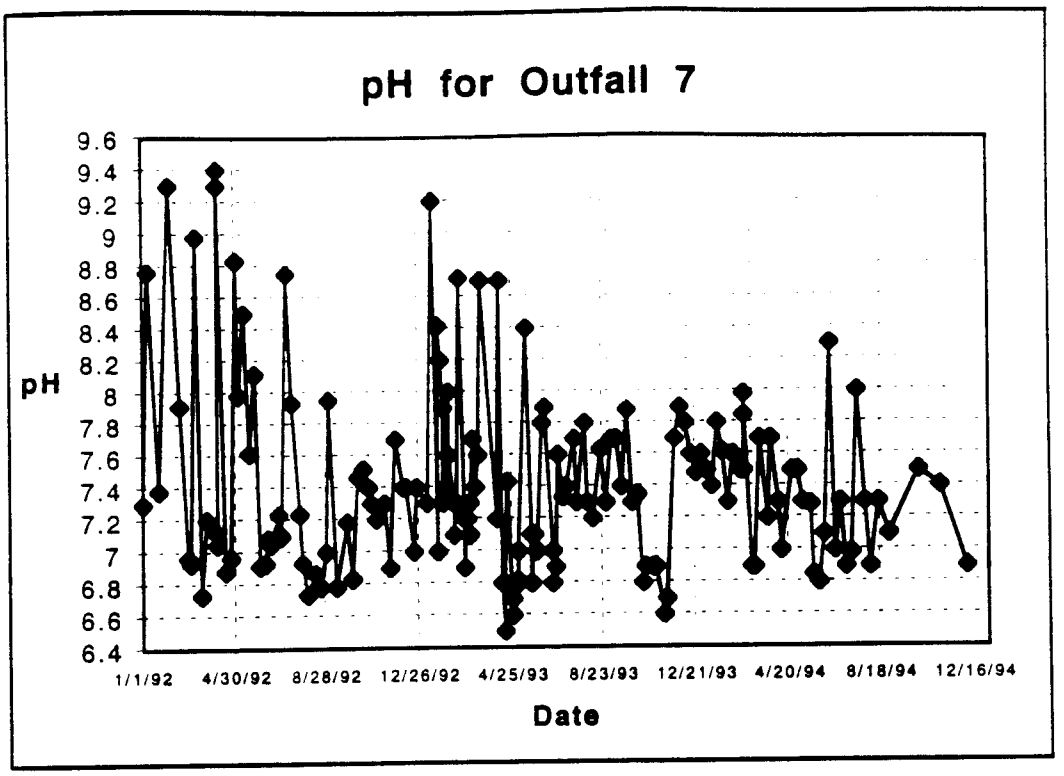


Figure VI-6



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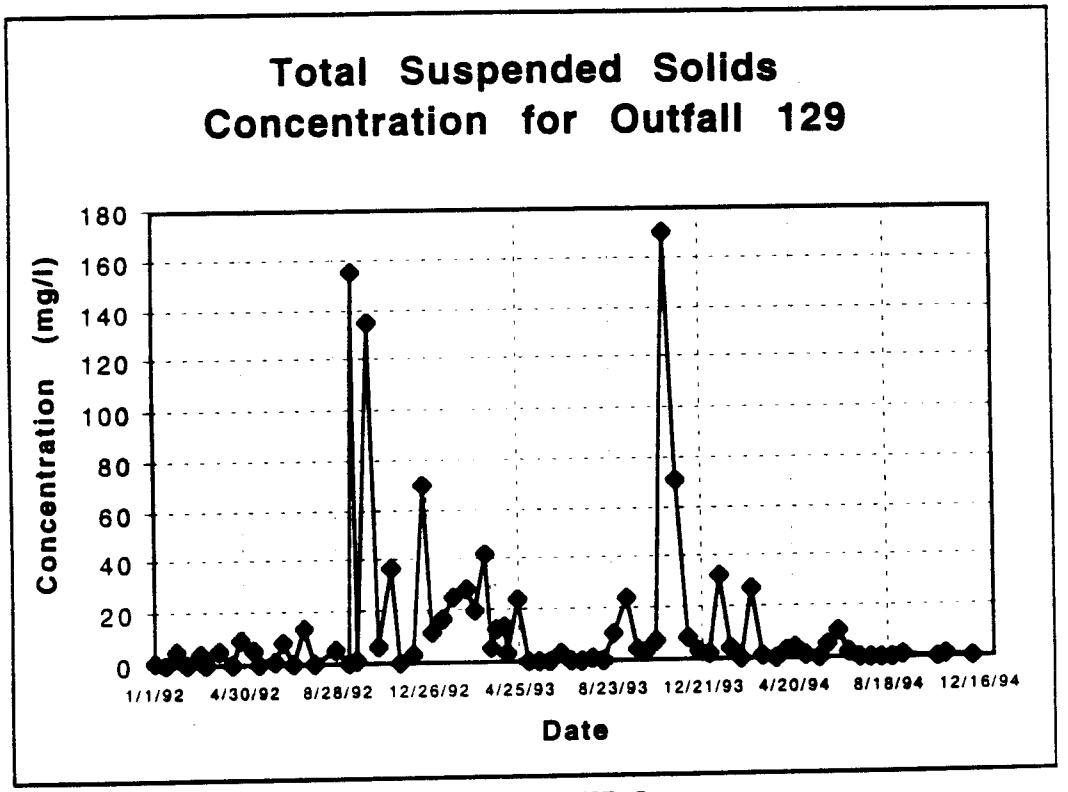

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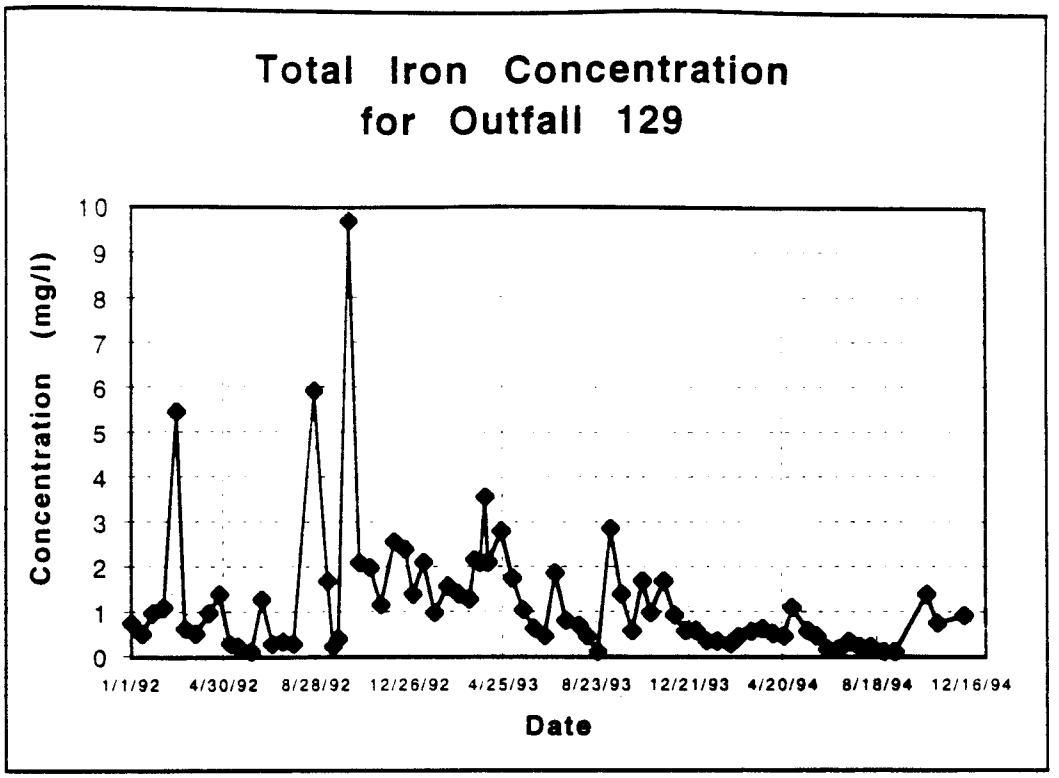

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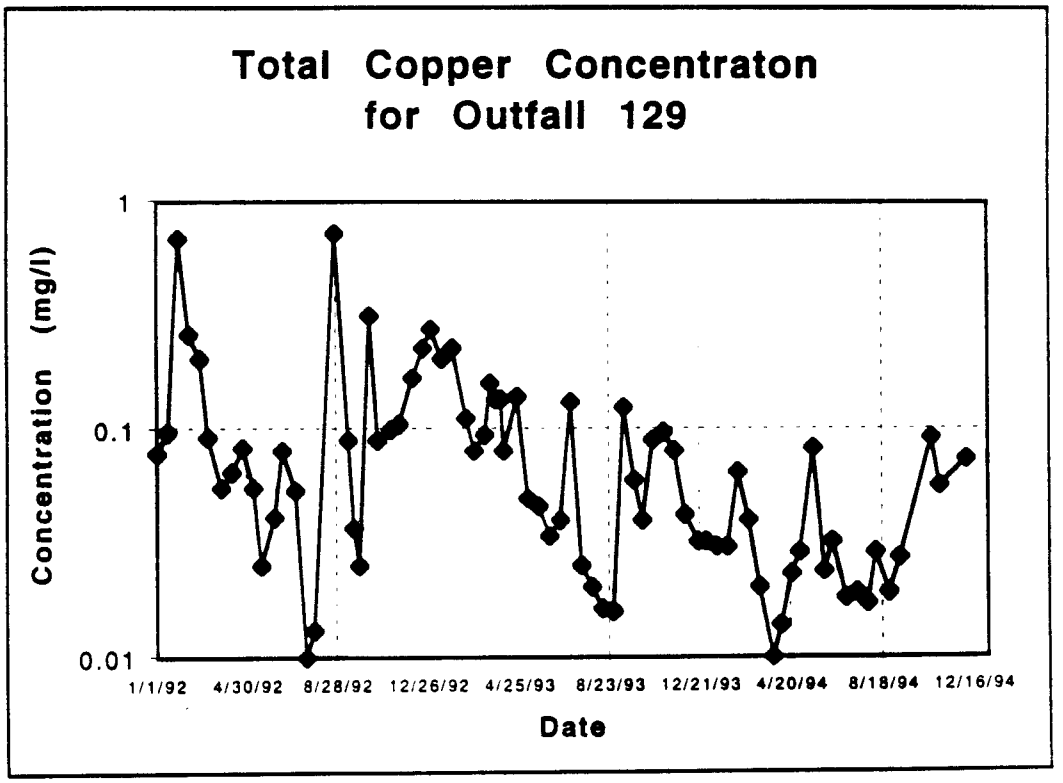

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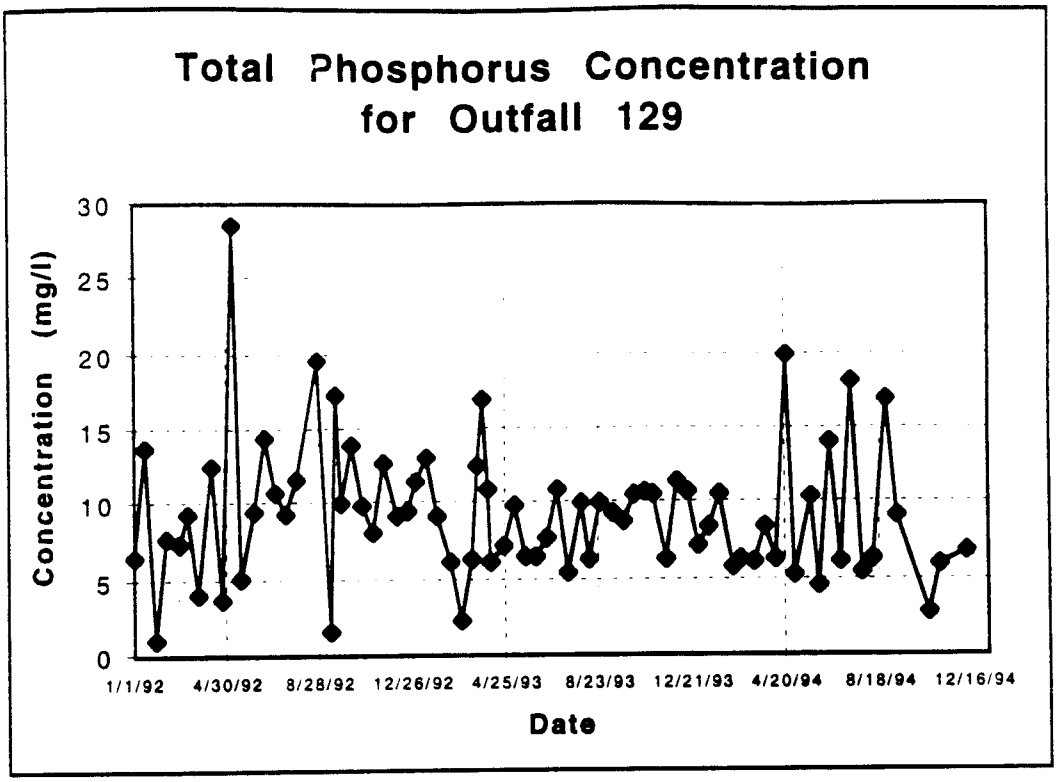

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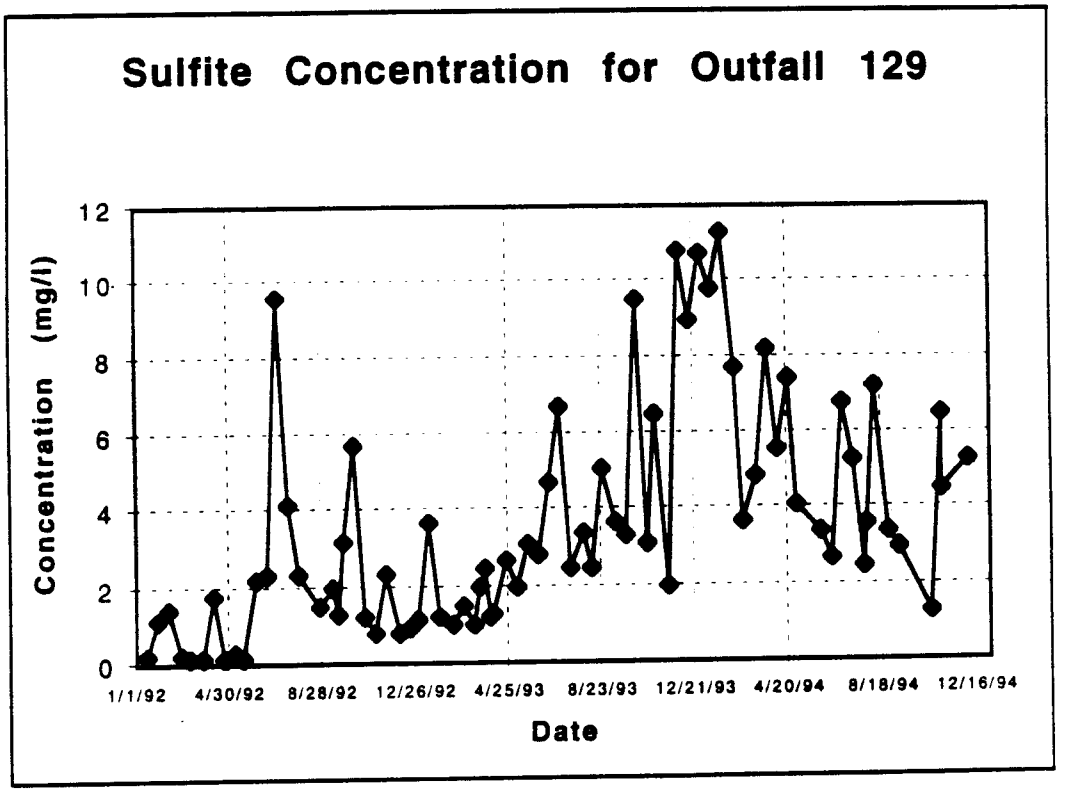


Figure VI-12

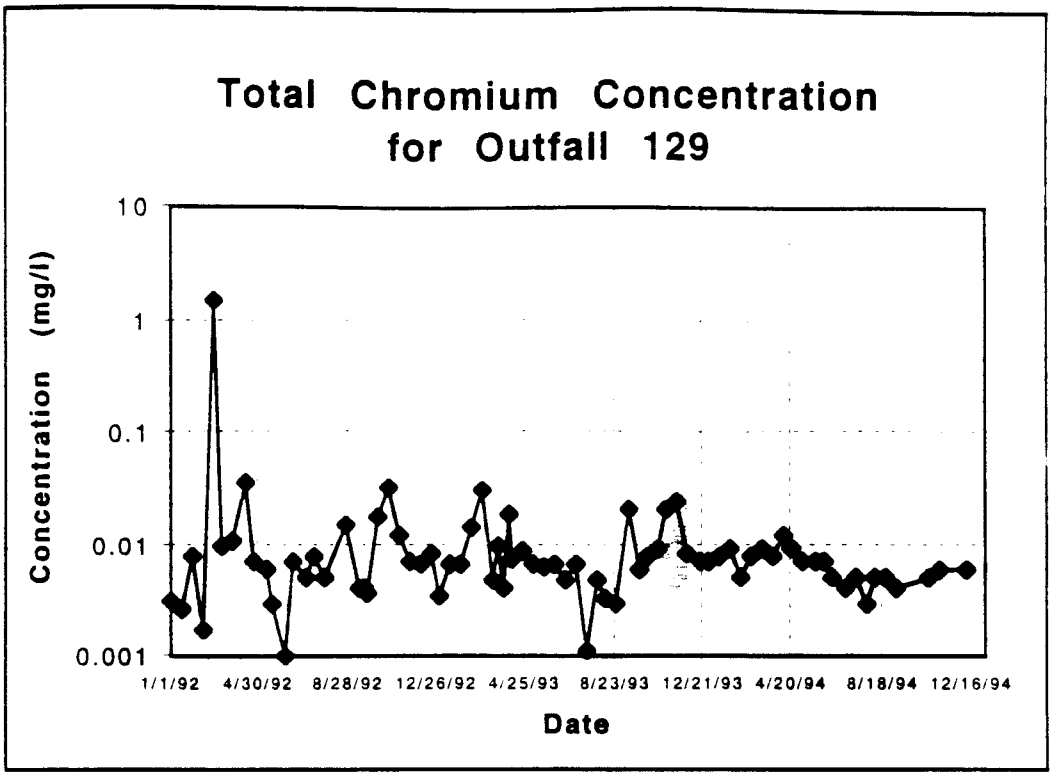


Figure VI-13

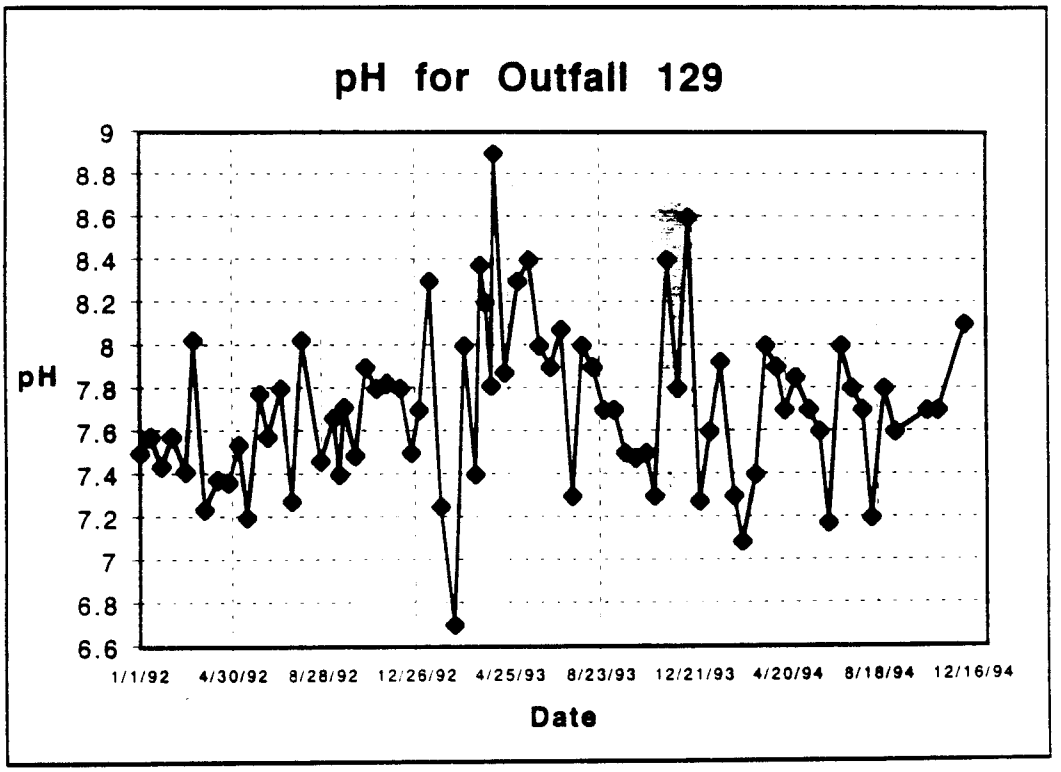


Figure VI-14

VII. Discharge Category 3A

Table VII-1 list the 40 outfalls covered under discharge category 3A, cooling tower blowdown, evaporative coolers, chillers, condensers and air washer blowdown including treated sanitary effluent used for cooling water and monitored prior to reuse under Outfall 13S. Discharges are often controlled by conductivity sensors in the cooling water. Treatment chemicals comprise the pollutant load of the discharge and consist of hypochlorites for biological control, bromine compounds for biological control, molybdates for corrosion control, phsophate sequesterants for scale control, and bisulfites for dechlorination. The treatment program changes as new chemicals are found which prove more effective in achieving the desired result and in conserving water.

Thirty-eight of the outfalls were covered under both the former and current permit conditons. An additional two outfalls were covered under the current permit conditions only. Five outfalls, 20, 23, 31, 114 and 184, have been eliminated and are no longer discharging. Thirty-five of the outfalls were sampled during 1992 through 1994 and and five were not sampled. Of the five outfalls that were not sampled, one, outfall 184, has been eliminated.

Table VII-2 lists the discharge limits for total suspended solids, free available chlorine, total phosphorus and and total arsenic. Also, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units. When the Laboratory's permit was issued on August 1, 1994, the discharge limit for total phosphorous was revised and one was added for total arsenic.

The current permit conditions include discharge limits for fourteen additional water quality parameters. The water samples are required to be analyzed for these fourteen parameters once per year. The sampling and analyses for the fourteen additional parameters were performed during calendar year 1995.

Table VII-3 lists the exceedances of the discharge limits. There were 21 exceedances of the daily maximum discharge limit and 18 of the daily average for the four effluent characteristics (excluding pH). For the daily maximum, 7 occurred during 1992, 8 during 1993 and 6 during 1994. For the daily average, 3 occurred during 1992, 6 during 1993 and 9 during 1994. There were 5 exceedances of the pH limits. One occurred during 1992 and 4 during 1994. Three of the four 1994 pH exceedances occurred for outfall 45.

There were 5 exceedances of the daily maximum discharge limit and 7 of the daily average for total suspended solids. For the daily maximum, 3 occurred during 1993 and 2 occurred during 1994. For the daily average, 3 occurred during 1993 and 4 occurred during 1994. There were 8 exceedances of the daily maximum discharge limit and 7 of the daily average for residual free chlorine. For the daily maximum, 3 occurred during 1992, 4 during 1993 and

1 during 1994. For the daily average, three occurred during 1993 and 4 occurred during 1994. There were 6 exceedances of the daily maximum discharge limit and 2 of the daily average for total phosphorus. For the daily maximum, 4 occurred during 1992, 1 during 1993 and 1 during 1994. For the daily average, both occurred during 1994. There were 2 exceedances of the daily maximum discharge limit and 2 f the daily average for total arsenic. Since this discharge limit went into effect in 1994, all of the exceedances occurred during 1994. All of the total arsenic exceedances occurred for outfall 28.

Table VII-4 lists the summary statistics by year for the three year period of 1992 through 1994. Figures VII-1 through VII-6 illustrate the same information through bar charts. Discharge category 3A was sampled between once and twice per week. Some outfalls were sampled more frequently [illegible] others. The total number of samples collected was highest during 1994 [illegible] lowest during 1992. There were no overall trends in the the discharge concentration data.

Table VII-5 lists the summary statistics by quarter for 1994. Figures VII-7 through VII-12 illustrate the same information through bar charts. Based on the the average statistic, the discharge concenrations tended to be highest during the second and third quarters and lowest during the first and fourth quarters. Based on the the maximum statistic, the maximum values tended to be higher during the second quarter and lower during the other three quarters. There was an increasing trend in the total number of samples collected during the year.

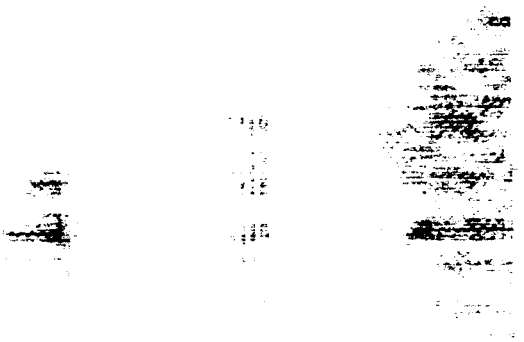


Table VII-1
Discharge Category 3A Outfalls

Outfall Number	Covered Under Former Permit Conditions	Covered Under Current Permit Conditions	Data Available for 1992-1994	Comments
9	Yes	Yes	Yes	
20	Yes	Yes	Yes	Eliminated; based on correspondence to EPA dated June 20, 1995.
21	Yes	Yes	Yes	
22	Yes	Yes	Yes	
23	Yes	Yes	Yes	Eliminated; based on correspondence to EPA dated June 20, 1995.
24	Yes	Yes	No	
25	Yes	Yes	Yes	
27	Yes	Yes	Yes	
28	Yes	Yes	Yes	
31	Yes	Yes	No	Eliminated; based on correspondence to EPA dated June 20, 1995.
32	Yes	Yes	Yes	
34	Yes	Yes	Yes	
35	Yes	Yes	Yes	
36	Yes	Yes	Yes	Only 4 analyses were performed.
37	Yes	Yes	Yes	
38	Yes	Yes	Yes	
40	Yes	Yes	Yes	
42	Yes	Yes	Yes	
43	Yes	Yes	Yes	
45	Yes	Yes	Yes	
47	Yes	Yes	Yes	
48	Yes	Yes	Yes	
49	Yes	Yes	Yes	
60	Yes	Yes	Yes	
98	Yes	Yes	Yes	
113	Yes	Yes	Yes	
114	Yes	Yes	Yes	Eliminated; based on correspondence to EPA dated June 20, 1995.
124	Yes	Yes	Yes	
125	Yes	Yes	No	
130	Yes	Yes	Yes	
136	Yes	Yes	Yes	
145	Yes	Yes	Yes	Only 4 analyses were performed.

Table VII-1 (Continued)
Discharge Category 3A Outfalls

Outfall Number	Covered Under Former Permit Conditions	Covered Under Current Permit Conditions	Data Available for 1992-1994	Comments
146	Yes	Yes	Yes	
148	Yes	Yes	Yes	
158	Yes	Yes	Yes	
160	Yes	Yes	Yes	
180	Yes	Yes	Yes	
181	Yes	Yes	Yes	
184	No	Yes	No	Eliminated; based on correspondence to EPA dated February 23, 1995.
185	No	Yes	No	

Table VII-2
Discharge Category 3A
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Before and Since 8-1-94	Total Suspended Solids	30	100	mg/l
	Free Available Chlorine	0.2	0.5	mg/l
Before 8-1-94	Total Phosphorus	5	5	mg/l
Since 8-1-94	Total Phosphorus	20	40	mg/l
	Total Arsenic	0.04	0.04	mg/l

Table VII-3
Discharge Category 3A
Exceedances of Discharge Limits

Effluent Characteristic	Outfall	Date	Limit	Value	Units
Total Suspended Solids	113	3-25-93	Daily Maximum	210	mg/l
	160	6-3-93	Daily Maximum	331	mg/l
	160	12-2-93	Daily Maximum	335	mg/l
	37	1-6-94	Daily Maximum	362	mg/l
	49	4-20-94	Daily Maximum	133,130	mg/l
Free Available Chlorine	130	4-23-92	Daily Maximum	15.4	mg/l
	9	10-2-92	Daily Maximum	0.61	mg/l
	45	12-23-92	Daily Maximum	0.56	mg/l
	34	6-17-93	Daily Maximum	0.52	mg/l
	45	6-30-93	Daily Maximum	0.53	mg/l
	22	10-19-93	Daily Maximum	0.55	mg/l
	180	12-9-93	Daily Maximum	0.63	mg/l
	47	11-9-94	Daily Maximum	0.6	mg/l
Total Phosphorus	45	8-12-92	Daily Maximum	5.79	mg/l
	47	8-19-92	Daily Maximum	6.35	mg/l
	49	9-1-92	Daily Maximum	5.83	mg/l
	148	11-19-92	Daily Maximum	7.68	mg/l
	23	4-29-93	Daily Maximum	6.26	mg/l
	49	4-20-94	Daily Maximum	40	mg/l

Table VII-3 (Continued)
Discharge Category 3A
Exceedances of Discharge Limits

Effluent Characteristic	Outfall	Date	Limit	Value	Units
Total Arsenic	28	8-12-94	Daily Maximum	0.284	mg/l
	28	12-15-94	Daily Maximum	0.068	mg/l
Total Suspended Solids	--	3-93	Daily Average	93	mg/l
	--	6-93	Daily Average	89	mg/l
	--	12-93	Daily Average	136	mg/l
	--	1-94	Daily Average	33	mg/l
	--	4-94	Daily Average	29,584	mg/l
	148	8-94	Daily Average	48	mg/l
	28	9-94	Daily Average	37	mg/l
Free Available Chlorine	--	4-92	Daily Average	0.42	mg/l
	--	10-92	Daily Average	0.34	mg/l
	--	12-92	Daily Average	0.27	mg/l
	--	6-93	Daily Average	0.22	mg/l
	--	10-93	Daily Average	0.49	mg/l
	--	12-93	Daily Average	0.25	mg/l
	47	11-94	Daily Average	0.58	mg/l
Total Phosphorus	--	4-94	Daily Average	9.0	mg/l
	27	8-94	Daily Average	27	mg/l

Table VII-3 (Continued)
Discharge Category 3A
Exceedances of Discharge Limits

Effluent Characteristic	Outfall	Date	Limit	Value	Units
Total Arsenic	28	11-94	Daily Average	0.284	mg/l
	28	12-94	Daily Average	0.068	mg/l
pH	98	9-15-92	--	2.8	pH units
	37	1-6-94	--	9.3	pH units
	45	10-18-94	--	9.3	pH units
	45	11-8-94	--	9.5	pH units
	45	11-15-94	--	9.1	pH units

Table VII-4
Outfall Category 3A
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Total Suspended Solids	mg/l	1992	64	0	3.5	38
		1993	71	0	18	335
		1994	85	0	1575	133130
Free Available Chlorine	mg/l	1992	63	0	0.31	15.4
		1993	72	0	0.043	0.63
		1994	83	0	0.019	0.6
Total Phosphorous	mg/l	1992	65	0	1.7	7.7
		1993	70	0.02	1.2	6.3
		1994	83	0.02	1.9	40
Total Arsenic	mg/l	1994	46	.002	.014	.284
pH	pH units	1992	64	2.8	7.8	9
		1993	69	6.5	7.9	8.9
		1994	85	6.1	8.1	9.5

Table VII-5
Outfall Category 3A
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Total Suspended Solids	mg/l	1	14	0	29	362
		2	19	0	7011	133130
		3	24	0	6.8	48
		4	28	0	2.5	16
Free Available Chlorine	mg/l	1	14	0	0.0043	0.06
		2	18	0	0.018	0.33
		3	25	0	0.024	0.31
		4	26	0	0.023	0.6
Total Phosphorous	mg/l	1	14	0.02	1.2	4.8
		2	19	0.04	2.7	40
		3	25	0.07	2.0	27
		4	25	0.02	1.4	15
Total Arsenic	mg/l	3	20	0.002	0.0062	0.019
		4	26	0.002	0.021	0.28
pH	pH units	1	14	7	8.1	9.3
		2	18	7.2	8.0	8.8
		3	24	6.1	8.1	9
		4	29	6.7	8.2	9.5

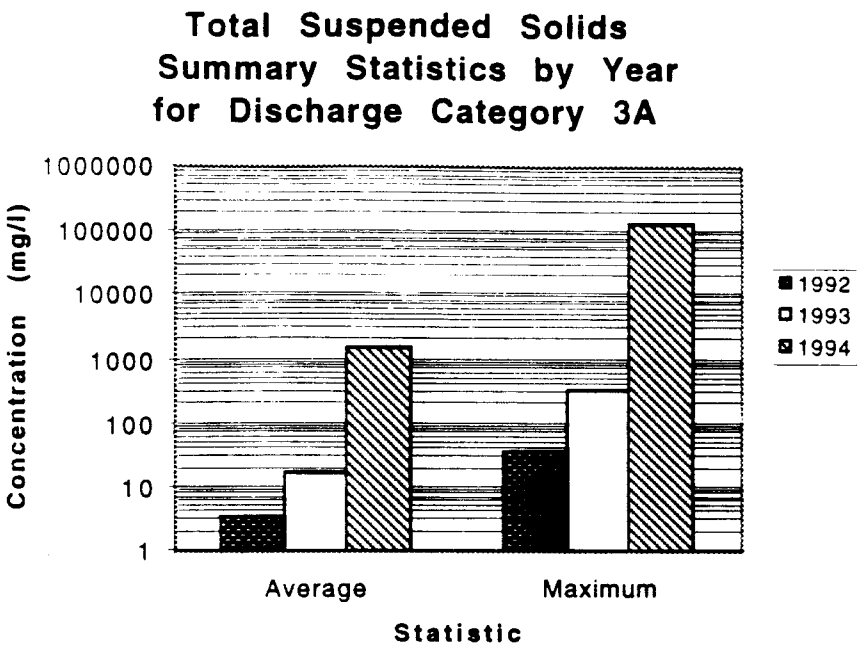


Figure VII-1

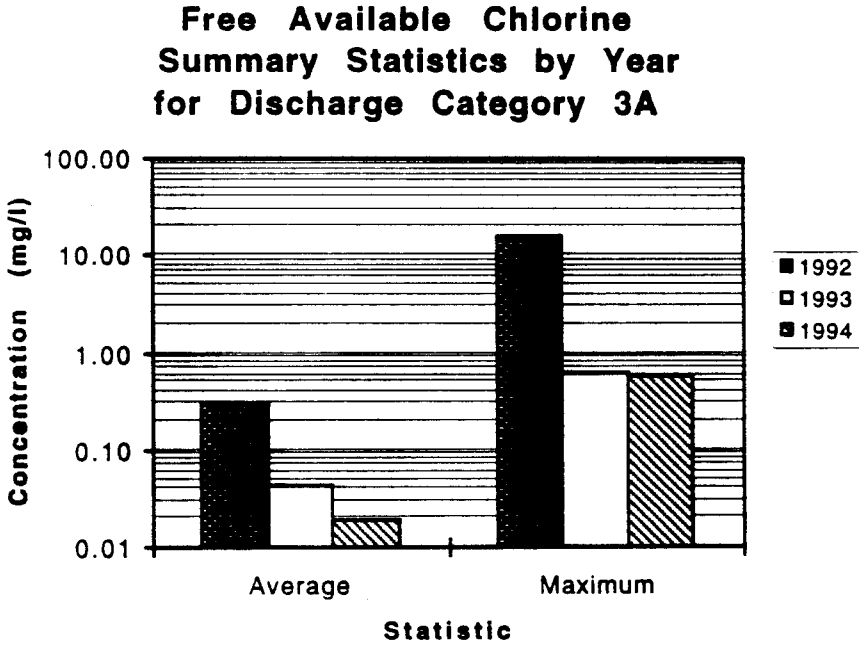


Figure VII-2

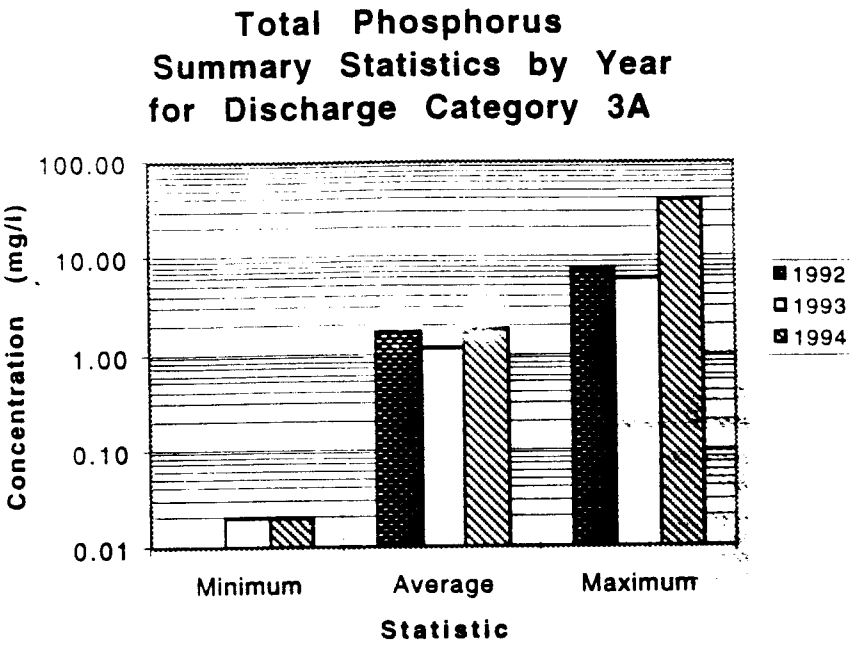


Figure VII-3

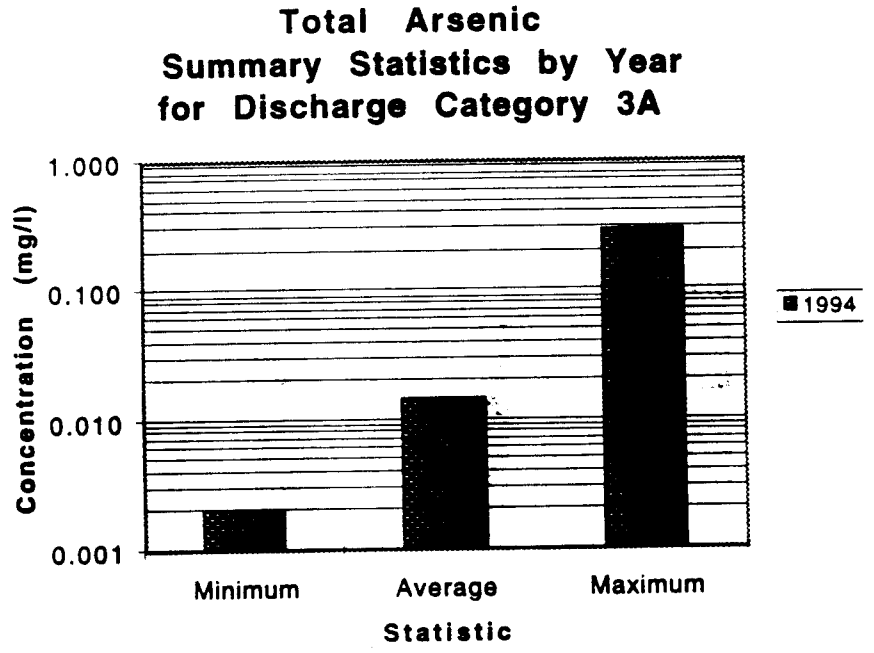


Figure VII-4

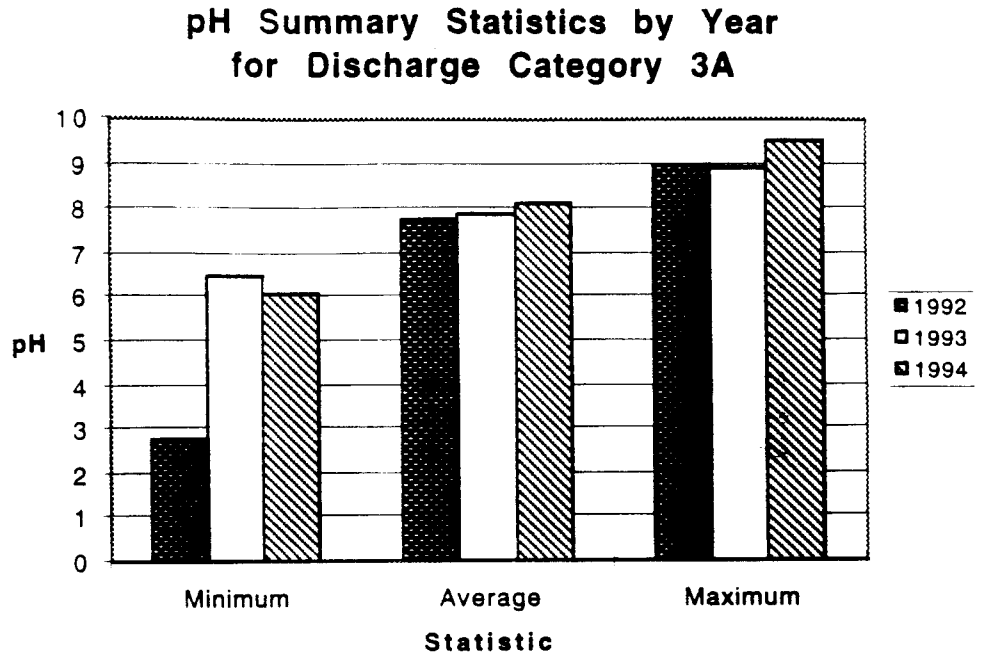


Figure VII-5

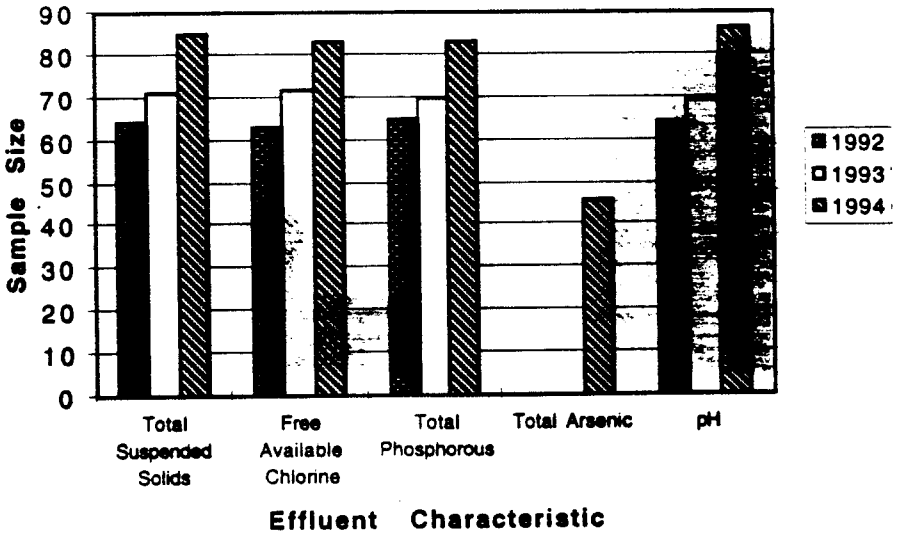


Figure VII-6

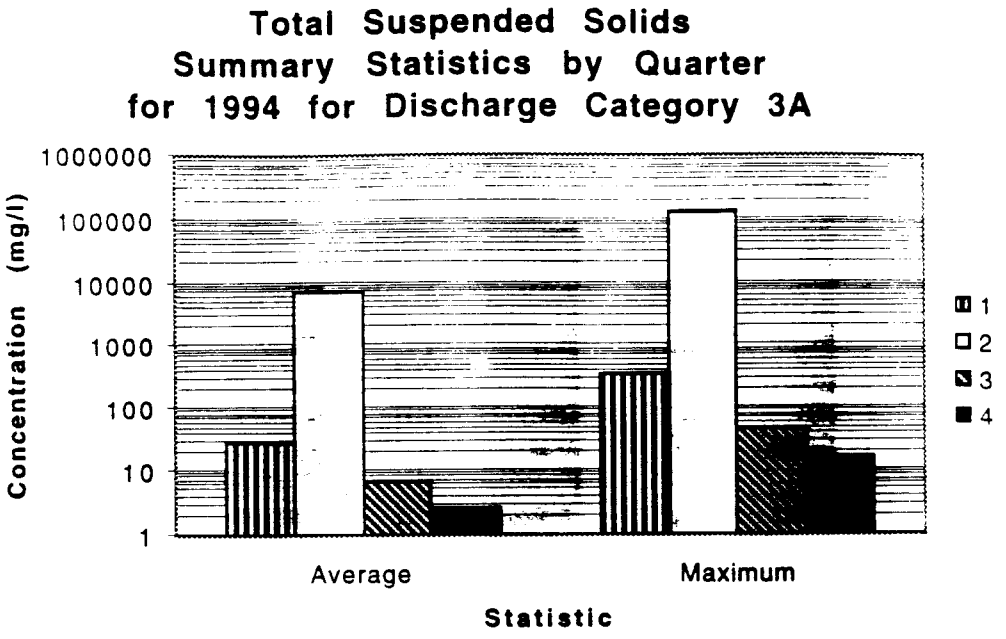


Figure VII-7

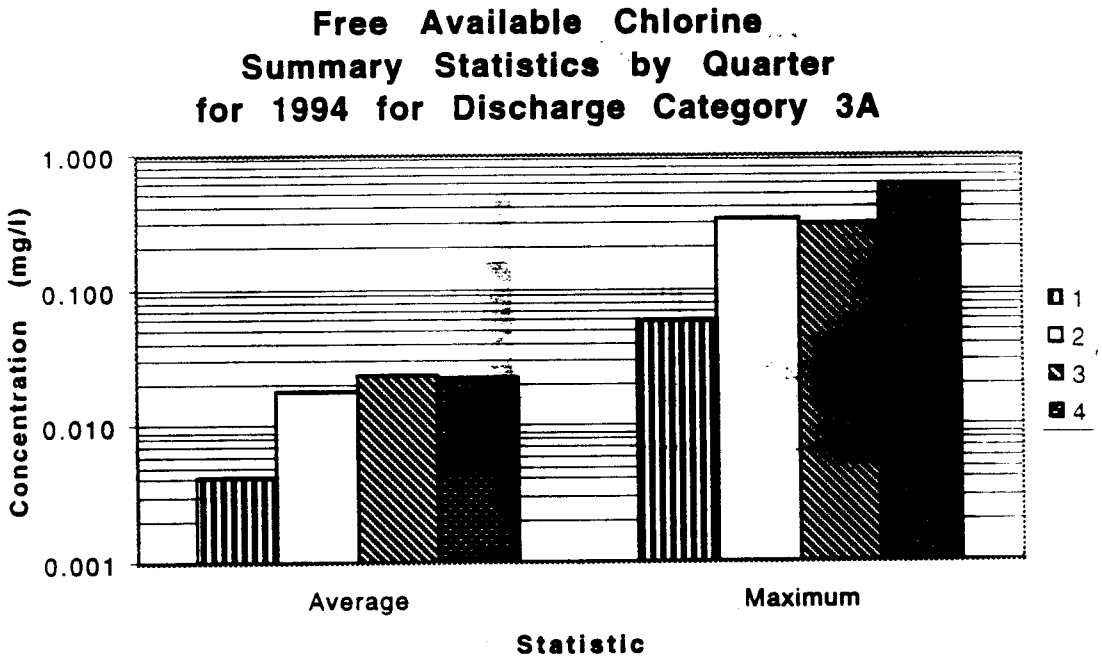


Figure VII-8

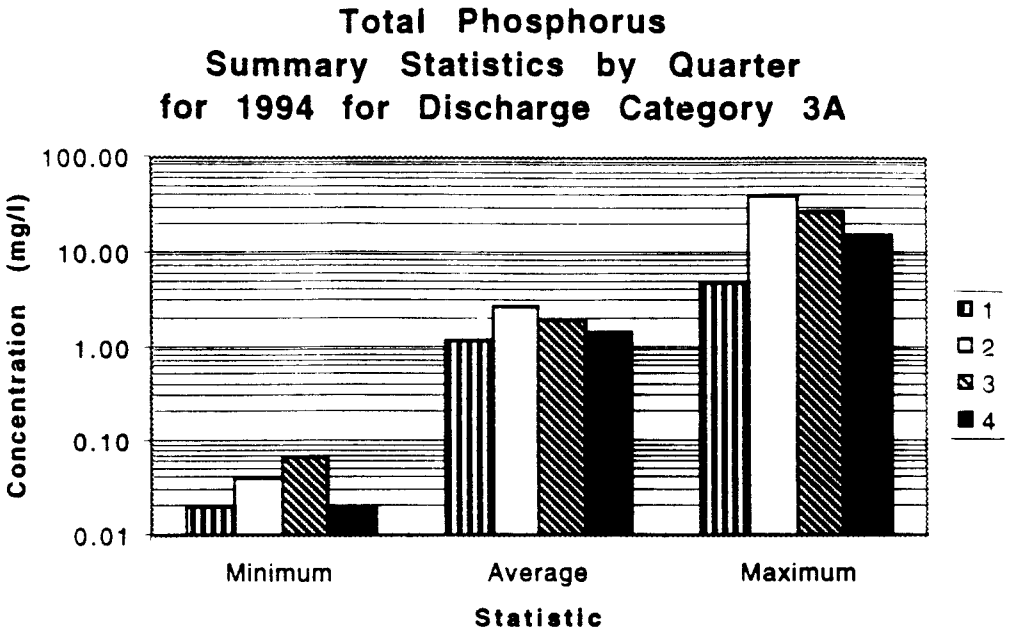


Figure VII-9

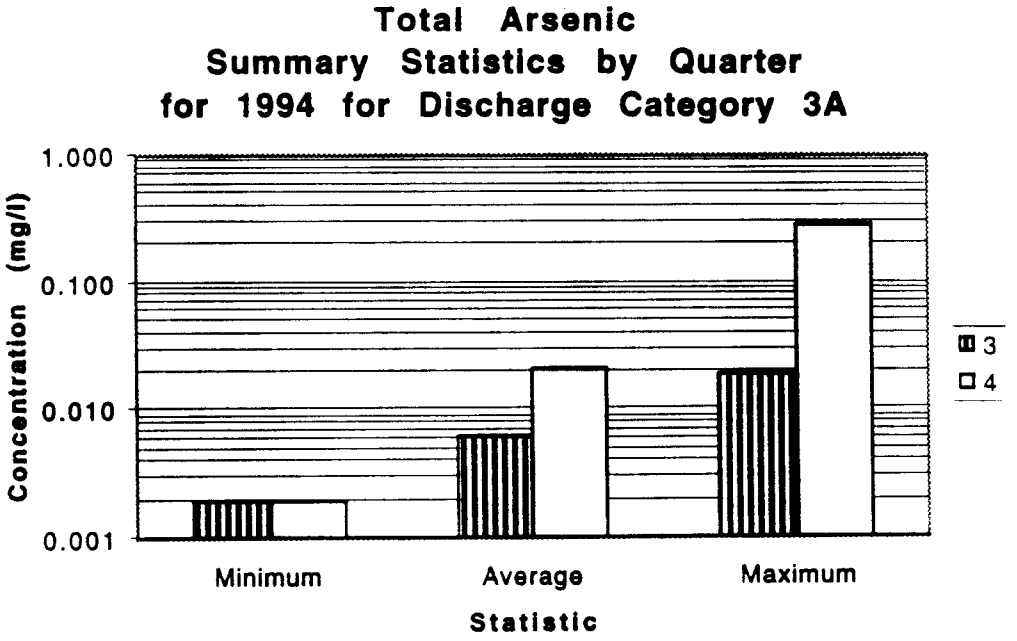


Figure VII-10

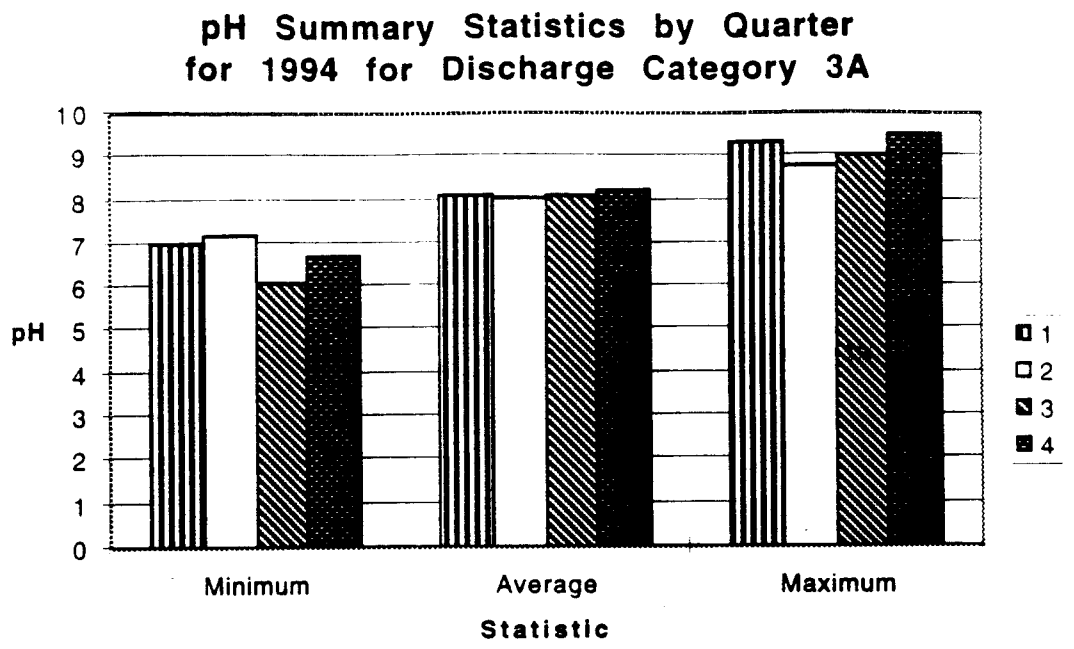


Figure VII-11

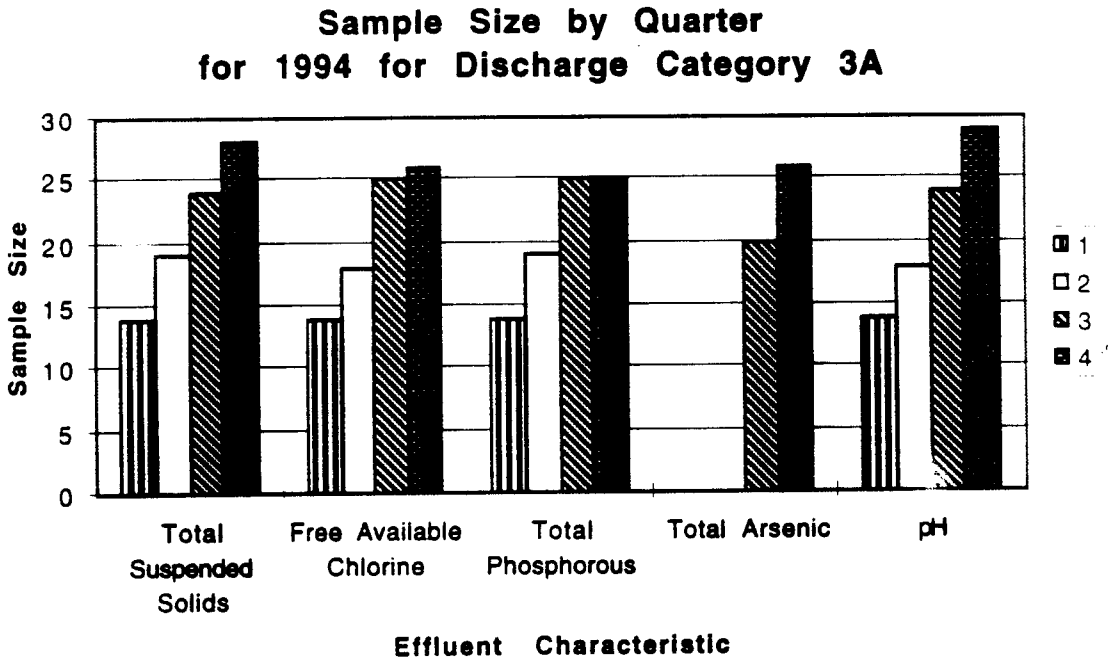


Figure VII-12

VIII. Discharge Category 4A

Table VIII-1 lists the 57 outfalls covered under discharge category 4A, noncontact cooling water, non-destructive testing discharge and water production facilities. Forty-four of the outfalls were covered under both the current permit conditions, which were issued on August 1, 1994, and the former permit conditions. Thirteen of the outfalls were covered under the former permit conditions only. Thirty-three of the outfalls were sampled during 1992 through 1994 and twenty-four were not sampled. Of the 33 outfalls sampled, 31 were covered under both the current and former permit conditions and 2 were covered only under the former permit conditions. Since 1992, thirteen outfalls, 14, 93, 117, 135, 140, 142, 147, 151, 167-170 and 178, have been eliminated.

Both the former and the current permit conditions require that the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units. When the Laboratory's permit was issued on August 1, 1994, the requirement for the sampling, analysis and reporting of total residual chlorine went into effect. A discharge limit was not set for total residual chlorine. Of the thirty-one outfalls, which were covered under both the current and former permit conditions and had analyses for pH, twenty-one also had analyses for total residual chlorine and ten did not.

The current permit conditions include discharge limits for fourteen additional water quality parameters. The water samples are required to be analyzed for these fourteen parameters once per year. The sampling and analyses for the fourteen additional parameters were performed during calendar year 1995.

Table VIII-2 lists the exceedances of the discharge limit for pH. There was one exceedance of the pH discharge limit. It occurred during 1993 for outfall 142.

Table VIII-3 lists the summary statistics by year for the three year period of 1992 through 1994. Figures VIII-1 through VIII-3 illustrate the same information through bar charts. Discharge category 4A was sampled approximately weekly. Some outfalls were sampled more frequently than others. There was no overall trend in the data.

Table VIII-4 lists the summary statistics by quarter for 1994. Figures VIII-4 through VIII-6 illustrate the same information through bar charts. There was no overall trend in the data.

Table VIII-1
Discharge Category 4A Outfalls

Outfall Number	Covered Under Former Permit Conditions	Covered Under Current Permit Conditions	Data Available for 1992-1994	Comments
13	Yes	Yes	Yes	Only 2 analyses were performed.
14	Yes	Yes	Yes	Eliminated; based on correspondence to the USEPA dated June 20, 1995.
16	Yes	Yes	Yes	
18	Yes	Yes	Yes	
40	Yes	No	No	
70	Yes	Yes	Yes	
83	Yes	Yes	Yes	No Total Residual Chlorine meaurements. Only 3 analyses were performed.
91	Yes	Yes	Yes	Only 4 analyses were performed.
92	Yes	Yes	Yes	
93	Yes	No	No	Eliminated; based on correspondence to the USEPA dated July 9, 1993.
94	Yes	Yes	Yes	
101	Yes	Yes	No	
102	Yes	No	No	
103	Yes	No	No	
109	Yes	No	Yes	No Total Residual Chlorine meaurements.
115	Yes	Yes	Yes	
117	Yes	Yes	No	Eliminated; based on correspondence to the USEPA dated June 20, 1995.
118	Yes	Yes	Yes	No Total Residual Chlorine meaurements.
126	Yes	Yes	Yes	
127	Yes	Yes	Yes	
131	Yes	Yes	No	
133	Yes	No	No	
135	Yes	Yes	No	Eliminated; based on correspondence to the USEPA dated February 23, 1995.
137	Yes	Yes	Yes	No Total Residual Chlorine meaurements. Only 2 analyses were performed.
139	Yes	Yes	No	

Table VIII-1 (continued)
Discharge Category 4A Outfalls

Outfall Number	Covered Under Former Permit Conditions	Covered Under Current Permit Conditions	Data Available for 1992-1994	Comments
140	Yes	Yes	Yes	Eliminated: based on correspondence to the USEPA dated February 23, 1995. No Total Residual Chlorine meaurements. Only 1 analysis was performed.
141	Yes	Yes	Yes	No Total Residual Chlorine meaurements.
142	Yes	Yes	Yes	Eliminated: based on correspondence to the USEPA dated June 20, 1995.
143	Yes	Yes	Yes	
147	Yes	Yes	Yes	Eliminated; based on correspondence to the USEPA dated June 20, 1995. No Total Residual Chlorine meaurements. Only 1 analysis was performed.
151	Yes	Yes	Yes	Eliminated; based on correspondence to the USEPA dated February 23, 1995. No Total Residual Chlorine meaurements. Only 3 analyses were performed.
152	Yes	Yes	Yes	
153	Yes	Yes	Yes	
155	Yes	Yes	No	
156	Yes	Yes	Yes	
157	Yes	Yes	Yes	
161	Yes	Yes	No	
163	Yes	Yes	Yes	
164	Yes	Yes	Yes	No Total Residual Chlorine meaurements. Only 1 analysis was performed.
165	Yes	Yes	Yes	
166	Yes	Yes	Yes	No Total Residual Chlorine meaurements. Only 1 analysis was performed.
167	Yes	No	No	Eliminated; based on correspondence to the USEPA dated August 2, 1993.

Table VIII-1 (continued)
Discharge Category 4A Outfalls

Outfall Number	Covered Under Former Permit Conditions	Covered Under Current Permit Conditions	Data Available for 1992-1994	Comments
168	Yes	No	Yes	Eliminated; based on correspondence to the USEPA dated August 2, 1993. No Total Residual Chlorine meaurements. Only 1 analysis was performed.
169	Yes	No	No	Eliminated; based on correspondence to the USEPA dated August 2, 1993.
170	Yes	No	No	Eliminated; based on correspondence to the USEPA dated August 2, 1993.
171	Yes	Yes	No	
172	Yes	Yes	No	
173	Yes	Yes	No	
174	Yes	Yes	No	
175	Yes	Yes	No	
176	Yes	Yes	Yes	No Total Residual Chlorine meaurements. Only 2 analyses were performed.
177	Yes	Yes	Yes	
178	Yes	No	No	Eliminated; based on correspondence to the USEPA dated August 2, 1993.
179	Yes	No	No	
182	Yes	Yes	Yes	
186	Yes	Yes	No	

Table VIII-2
Discharge Category 4A
Exceedances of Discharge Limits

Effluent Characteristic	Outfall	Date	Limit	Value	Units
pH	142	12-9-93	--	9.1	pH units

Table VIII-3
Discharge Category 4A
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Total Residual Chlorine	mg/l	1994	27	0	0.218	0.73
pH	pH units	1992	58	6.0	7.6	8.7
		1993	60	6.6	7.7	9.1
		1994	64	6.3	7.8	8.9

Table VIII-4
Discharge Category 4A
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Total Residual Chlorine	mg/l	3	6	0	0.367	0.68
		4	21	0	0.175	0.73
pH	pH units	1	14	7.4	8.0	8.7
		2	19	6.3	7.9	8.9
		3	10	7.6	7.9	8.7
		4	21	6.4	7.7	8.9

Total Residual Chlorine
Summary Statistics for 1994
for Discharge Category 4A

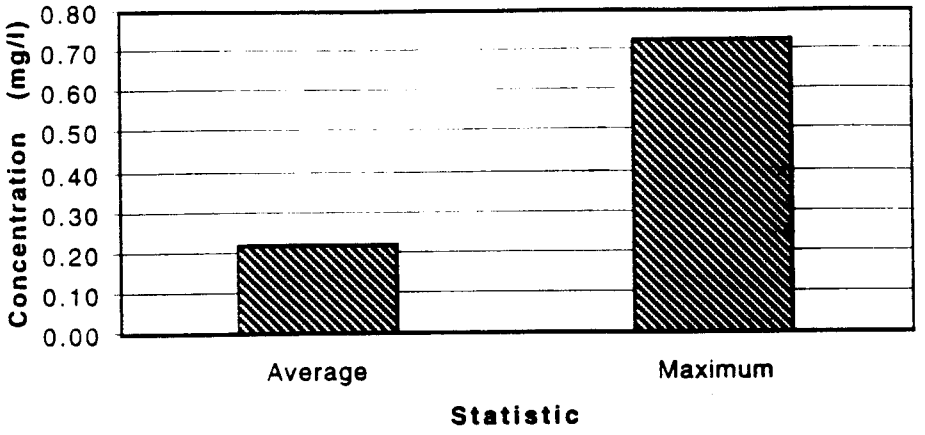


Figure VIII-1

pH Summary Statistics by Year
for Discharge Category 4A

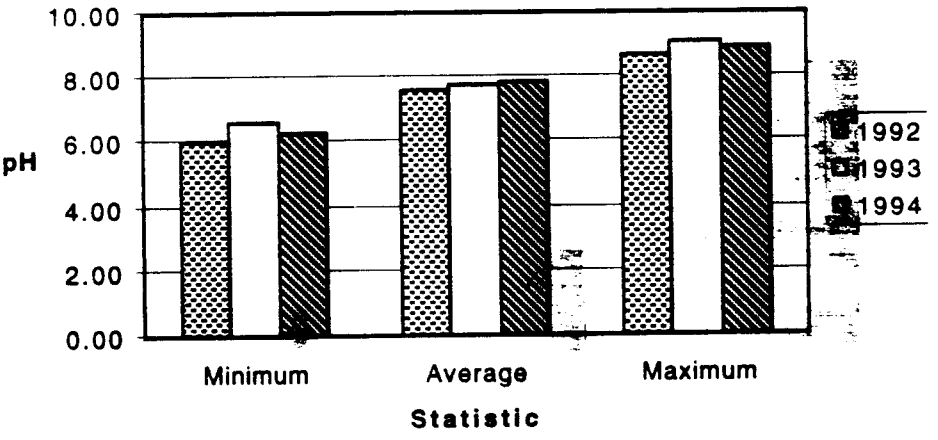


Figure VIII-2

Sample Size by Year for Discharge Category 4A

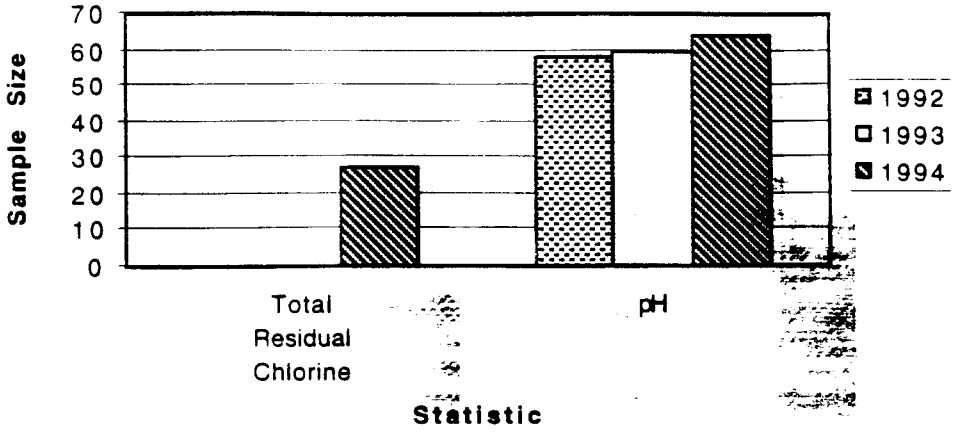


Figure VIII-3

Total Residual Chlorine Summary Statistics by Quarter for 1994 for Discharge Category 4A

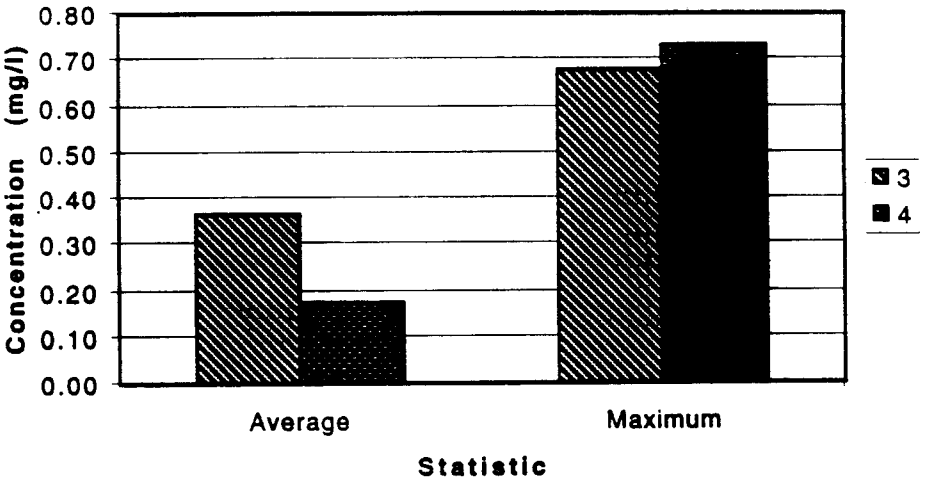


Figure VIII-4

pH Summary Statistics by Quarter for 1994 for Discharge Category 4A

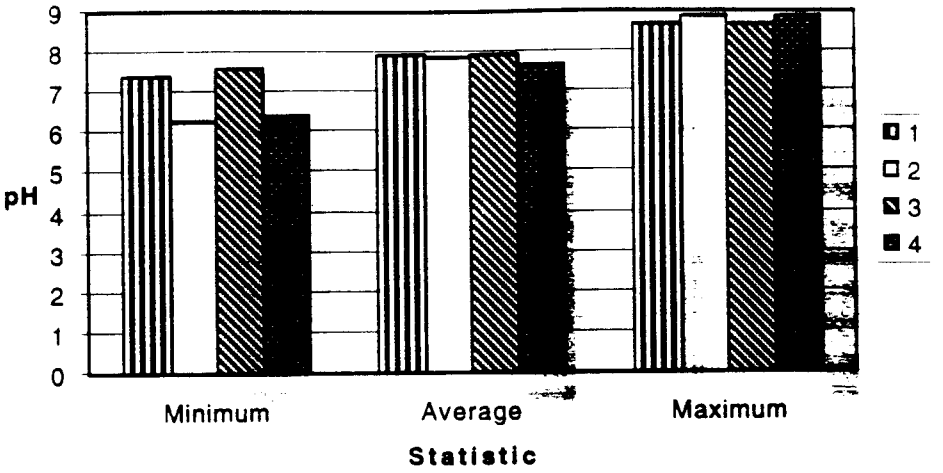


Figure VIII-5

Sample Size by Quarter for 1994 for Discharge Category 4A

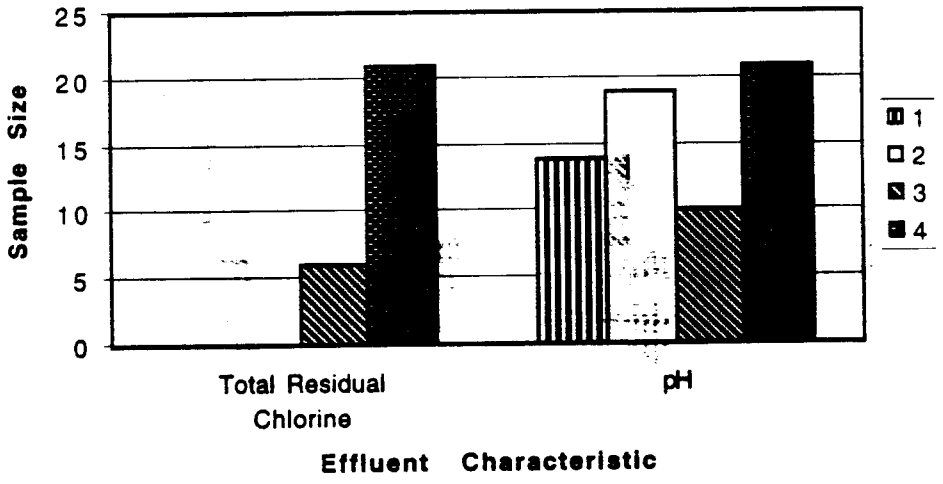


Figure VIII-6

IX. Discharge Category 5A

Table IX-1 list the 18 outfalls covered under discharge category 5A, high explosive waste discharges. Suspended high explosive components are removed in a settling tank prior to discharge. Besides some soluble high explosives, processing reagents may also be present in the effluent. Several operations contribute to wastewater discharges. These include high explosives synthesis (outfall 54), formulation (outfall 62), machining (outfall 56), pressing (outfall 71), component assembly (outfall 53), casting (outfall 58), sump cleaning (outfall 55), equipment wash down (outfall 63), general area washdown, and chemistry lab wastewater (outfalls 66 and 72).

Twelve of the outfalls were sampled during 1992 through 1994 and six were not sampled. Of the 12 outfalls sampled, four did not have analyses for oil and grease. Outfall 159 has been plugged and is no longer discharging. Except for outfalls 154 and 159, the outfalls were covered under both the current and former permit conditons. Outfalls 154 and 159 were covered only under the current permit conditions that went into effect on August 1, 1994.

Table IX-2 lists the discharge limits for chemical oxygen demand, total suspended solids and oil and grease. Also, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units. When the Laboratory's permit was issued on August 1, 1994, the discharge limits were changed for chemical oxygen demand and added for oil and grease.

The current permit conditions include discharge limits for fourteen additional water quality parameters. The water samples are required to be analyzed for these fourteen parameters once per year. The sampling and analyses for the fourteen additional parameters were performed during calendar year 1995.

Table IX-3 lists the exceedances of the discharge limits. There was one exceedance of the daily maximum and one exceedance of the daily average discharge limit for chemical oxygen demand. Both occurred during 1992 for outfall 55. There were two exceedances of the daily maximum and one exceedance of the daily average discharge limit for total suspended solids. They all occurred during 1994 for outfall 66. There were two exceedances of the daily maximum and two exceedances of the daily average discharge limit for oil and grease. They all occurred during 1994 for outfalls 53 and 56. There were two exceedances of the pH limit. They occurred during 1992 for outfall 55.

Table IX-4 lists the summary statistics by year for the three year period of 1992 through 1994. Figures IX-1 through IX-5 illustrate the same information through bar charts. Discharge category 5A was sampled approximately weekly.

Some outfalls were sampled more frequently than others. There were no overall trends in the data.

Table IX-5 lists the summary statistics by quarter for 1994. Figures IX-6 through IX-10 illustrate the same information through bar charts. There were no overall trends in the data.

Table IX-1
Discharge Category 5A Outfalls

Outfall Number	Covered Under Former Permit Conditions	Covered Under Current Permit Conditions	Data Available for 1992-1994	Comments
53	Yes	Yes	Yes	
54	Yes	Yes	Yes	
55	Yes	Yes	Yes	
56	Yes	Yes	Yes	
58	Yes	Yes	Yes	
61	Yes	Yes	Yes	No data for Oil and Grease.
62	Yes	Yes	No	
63	Yes	Yes	Yes	Only 3 pieces of data. No data for Oil and Grease.
66	Yes	Yes	Yes	
67	Yes	Yes	Yes	Only 6 pieces of data. No data for Oil and Grease.
68	Yes	Yes	Yes	
69	Yes	Yes	No	
71	Yes	Yes	Yes	
72	Yes	Yes	Yes	Only 6 pieces of data. No data for Oil and Grease.
96	Yes	Yes	No	
97	Yes	Yes	No	
154	No	Yes	No	This outfall was added according to correspondence dated 6-4-90.
159	No	Yes	No	This outfall was plugged according to a correspondence dated 2-23-95.

Table IX-2
Discharge Category 5A
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Before and Since 8-1-94	Total Suspended Solids	30	45	mg/l
Before 8-1-94	Chemical Oxygen Demand	150	250	mg/l
Since 8-1-94	Chemical Oxygen Demand	125	125	mg/l
	Oil and Grease	15	15	mg/l

Table IX-3
Discharge Category 5A
Exceedances of Discharge Limits

Effluent Characteristic	Outfall	Date	Limit	Value	Units
Chemical Oxygen Demand	55	9-16-92	Daily Maximum	1640	mg/l
Total Suspended Solids	66	6-7-94	Daily Maximum	80	mg/l
	66	9-7-94	Daily Maximum	92	mg/l
Oil and Grease	53	9-21-94	Daily Maximum	204.2	mg/l
	56	12-23-94	Daily Maximum	47	mg/l
Chemical Oxygen Demand	--	9-92	Daily Average	402	mg/l
Total Suspended Solids	66	9-94	Daily Average	92	mg/l
Oil and Grease	53	9-94	Daily Average	204.2	mg/l
	56	12-94	Daily Average	35.1	mg/l
pH	55	2-19-92	--	9.46	mg/l
	55	9-16-92	--	5.36	mg/l

Table IX-4
Outfall Category 5A
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Chemical Oxygen Demand	mg/l	1992	52	10	48.8	1640
		1993	54	0	13.6	58
		1994	43	10	17.1	73
Total Suspended Solids	mg/l	1992	52	0	2.5	30
		1993	54	0	3	45
		1994	44	0	6.2	92
Oil and Grease	mg/l	1994	14	0	21.2	204.2
pH	pH units	1992	52	5.4	7.3	9.46
		1993	54	6.3	7.3	9
		1994	43	6.4	7.4	8.9

Table IX-5
Outfall Category 5A
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Chemical Oxygen Demand	mg/l	1	14	10	12.6	28
		2	13	10	17.8	47
		3	11	10	19.3	73
		4	5	10	23.2	58
Total Suspended Solids	mg/l	1	14	0	1.2	5
		2	13	0	11.8	80
		3	11	0	8.8	92
		4	6	0	1	3
Oil and Grease	mg/l	3	7	0	33.3	204.2
		4	7	0	9.1	47
pH	pH units	1	14	6.9	7.5	8.2
		2	13	6.4	7.5	8.5
		3	11	6.4	7.4	8.9
		4	5	6.5	7.3	8.1

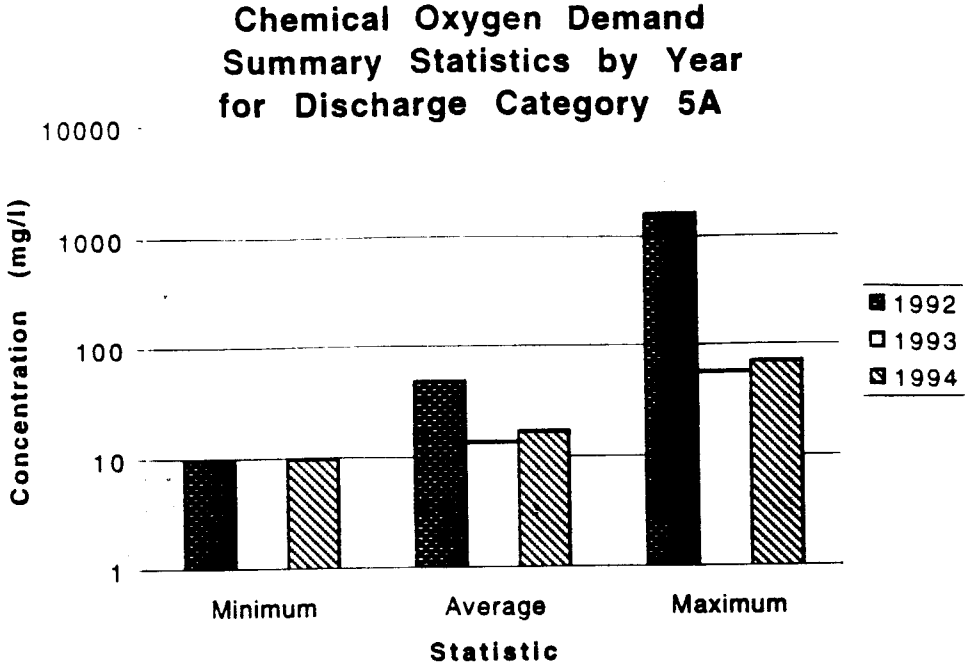


Figure IX-1

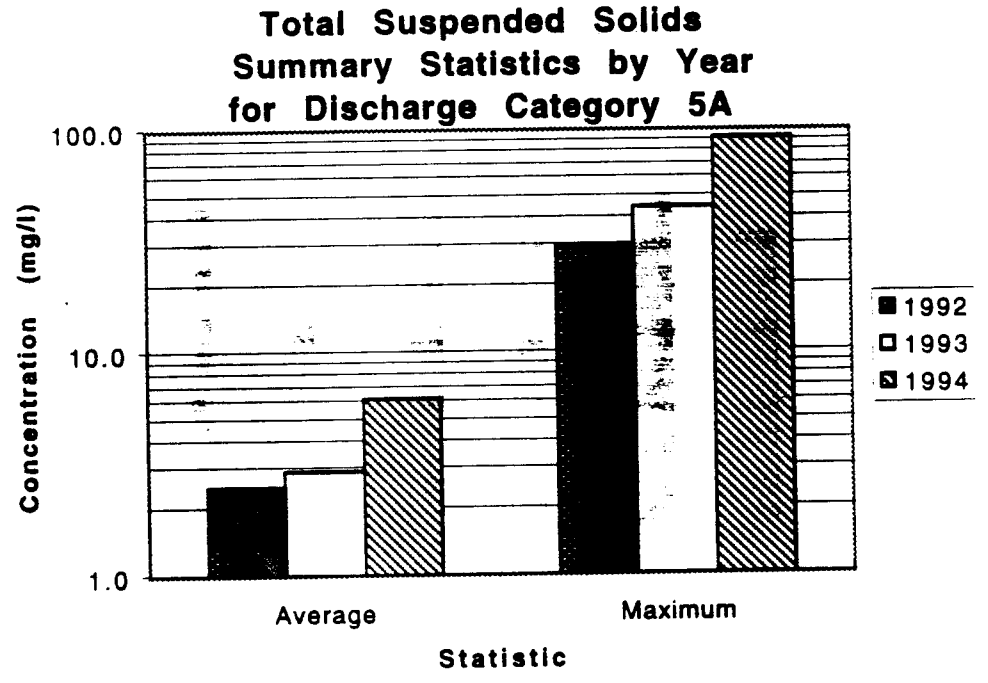
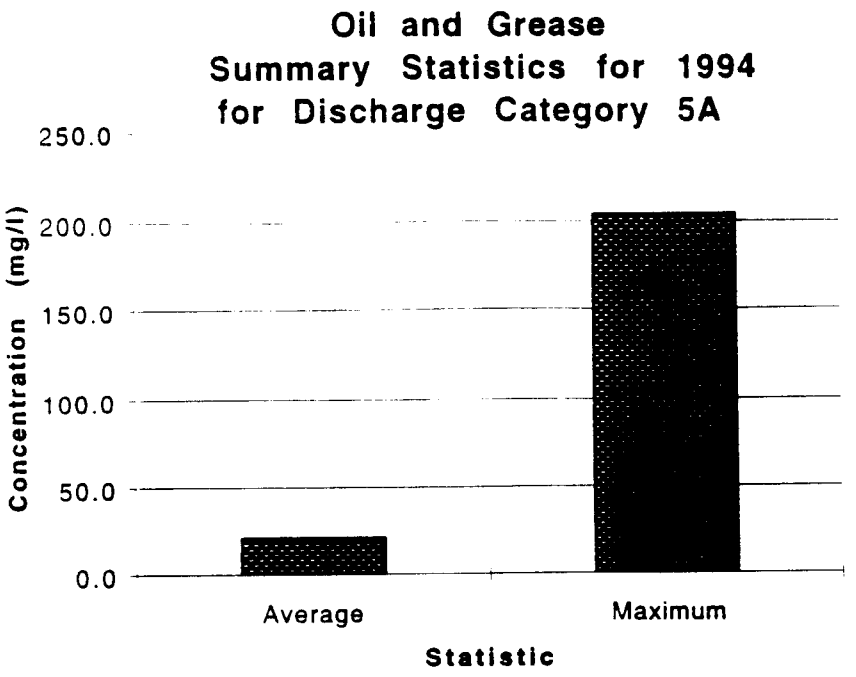


Figure IX-2



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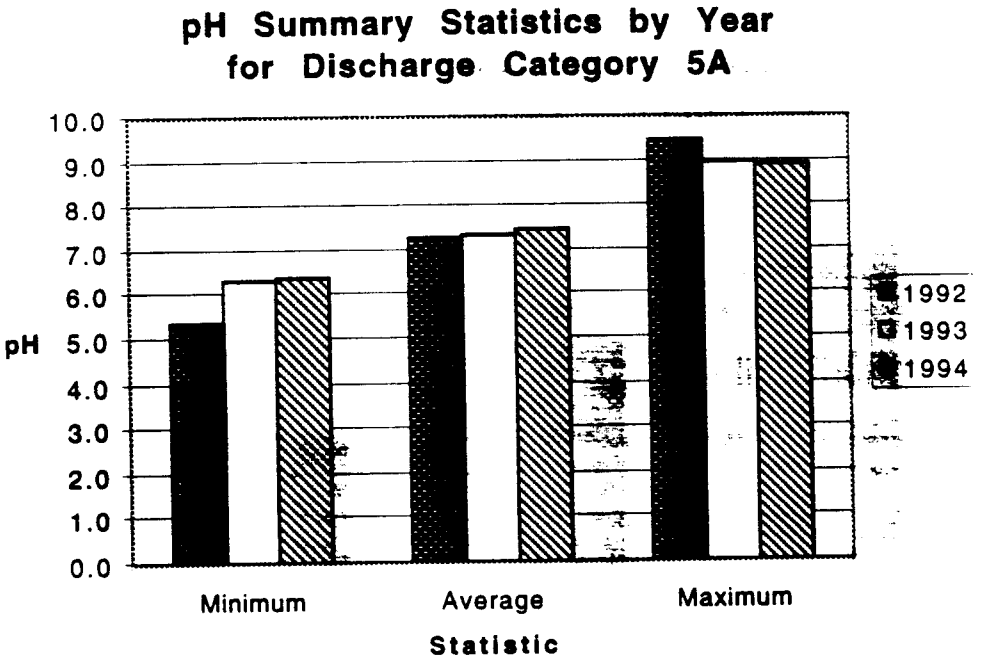


Figure IX-4

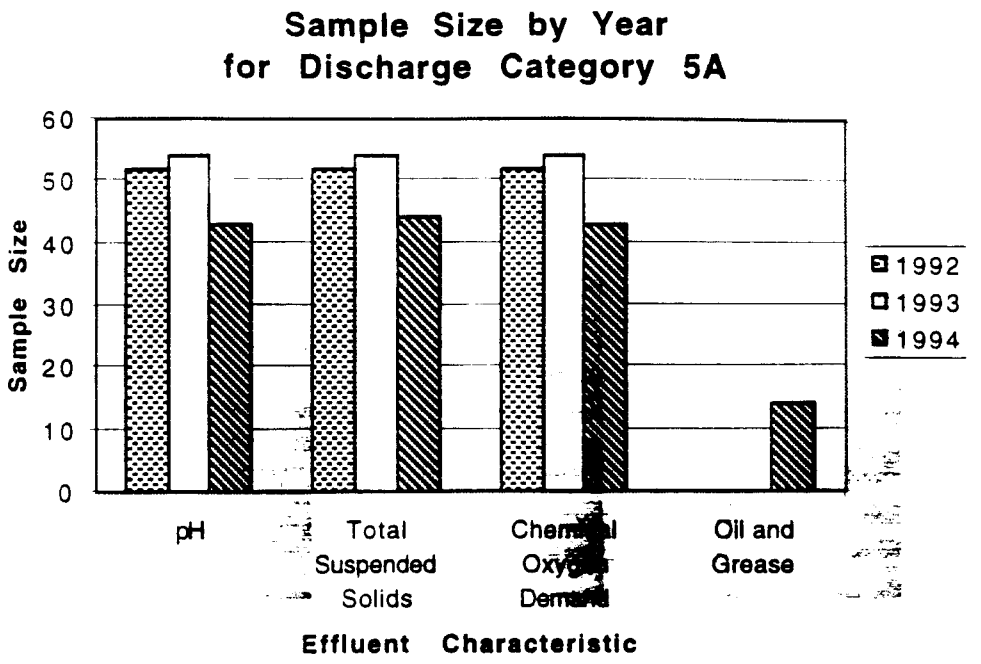


Figure IX-5

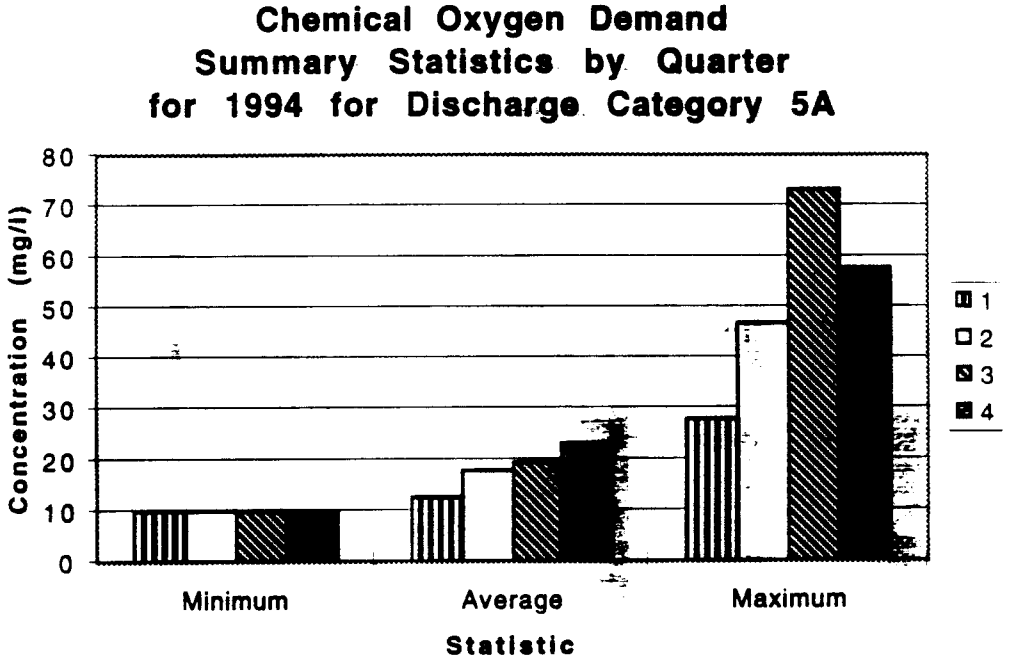


Figure IX-6

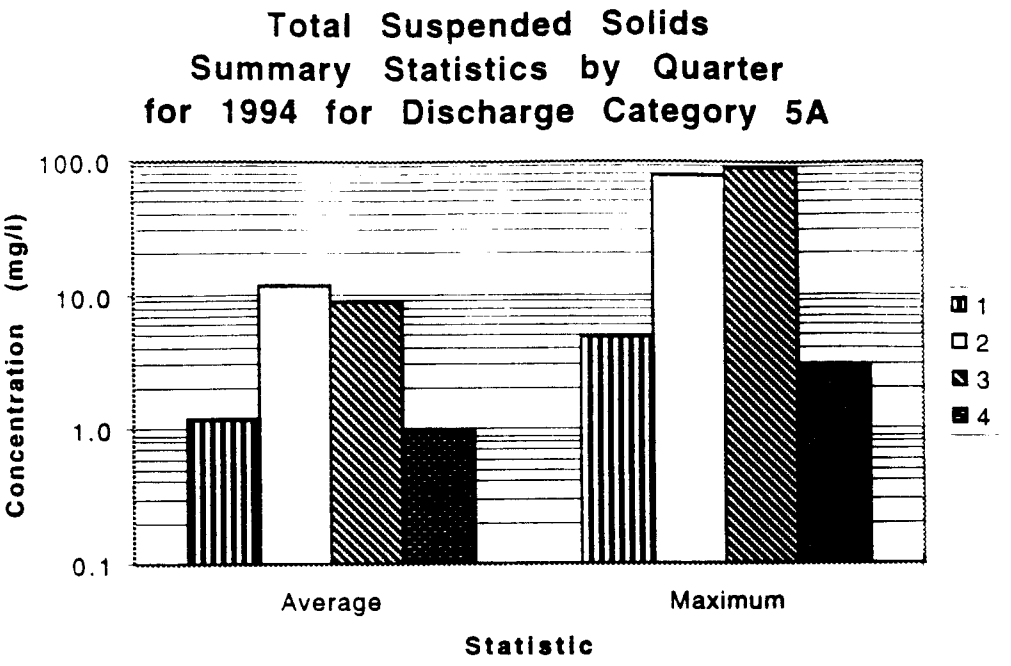


Figure IX-7

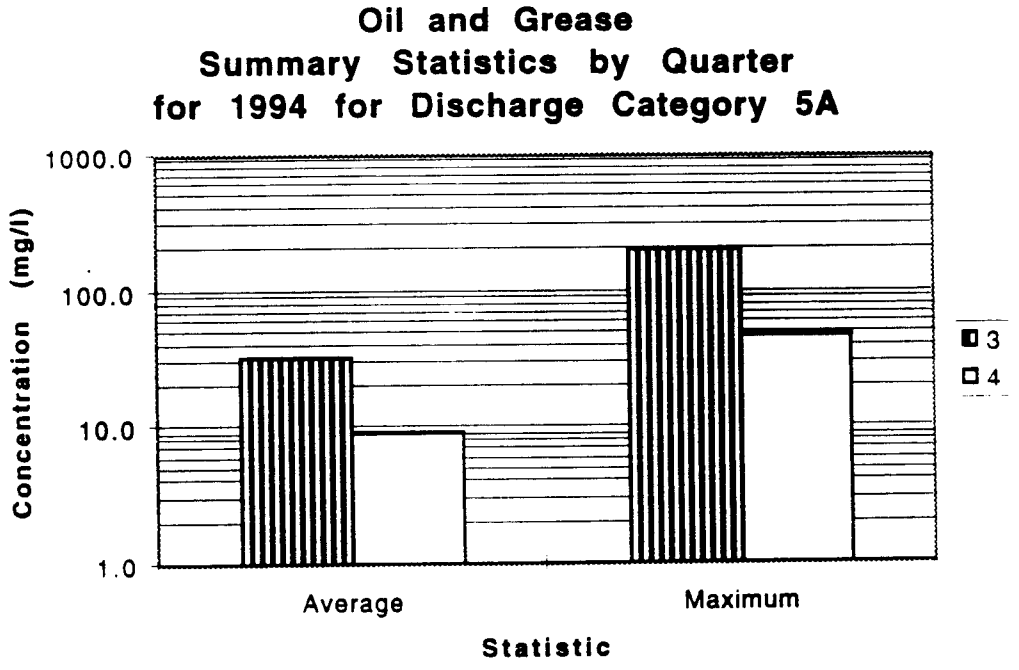


Figure IX-8

pH Summary Statistics by Quarter for 1994 for Discharge Category 5A

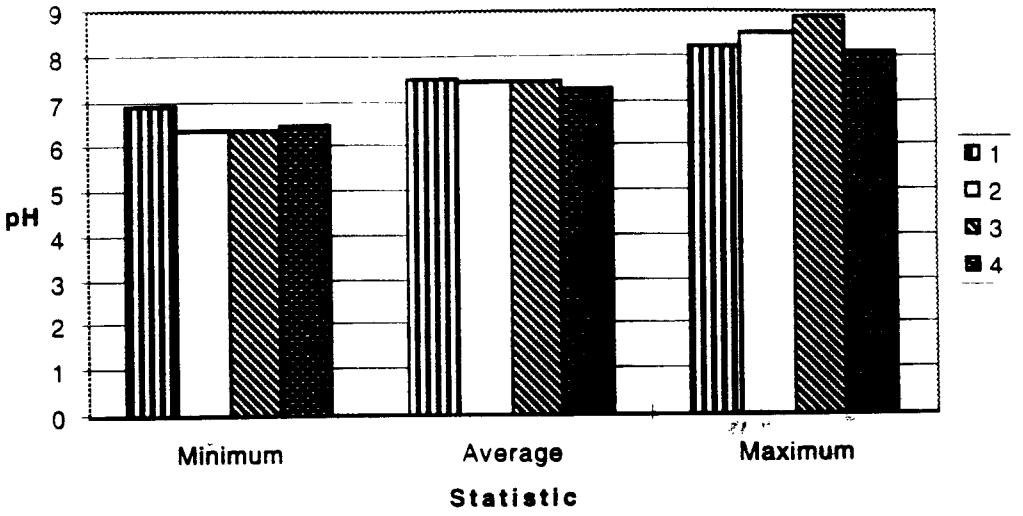


Figure IX-9

Sample Size by Quarter for 1994 for Discharge Category 5A

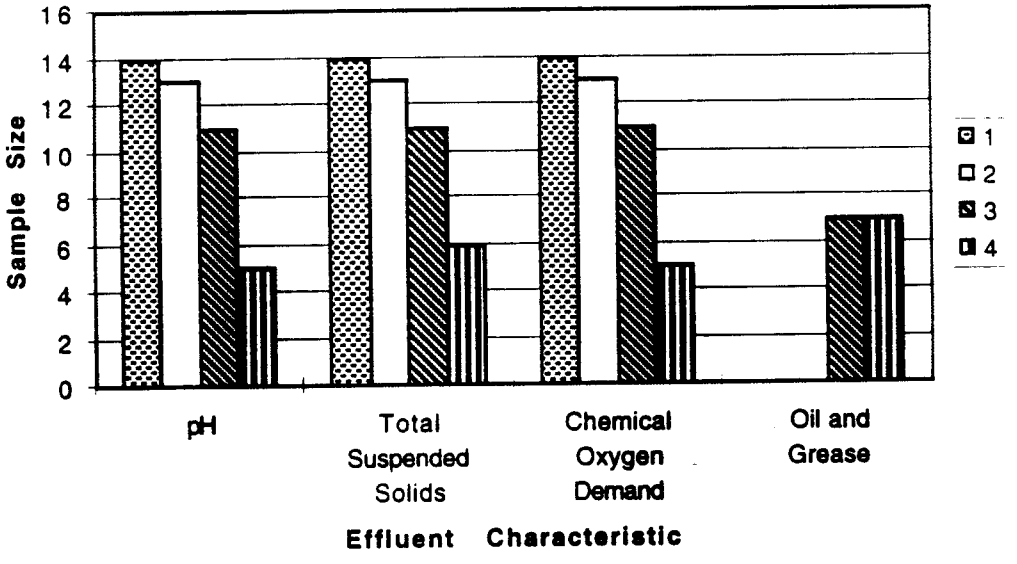


Figure IX-10

X. Discharge Category 6A

Table X-1 list the 14 outfalls covered under discharge category 6A, photo waste discharges. The following chemicals are used in photo processing: developers and stop baths consisting of hydroquinone, potassium hydroxide, acetic acid and sodium bromide; bleaches; fixer consisting of sodium thiosulfate and sodium sulfite; stabilizer consisting of formaldehyde; and the wash. Most of the photo processing equipment at the Laboratory operate according to the following steps: developing, stopping, fixing, stabilizing and washing. Spent photo chemicals from each step are containerized for disposal. Washing may be single or double stage. The wash goes to an outfall and contains "drag through" from the previous stage.

Twelve of the outfalls were sampled during 1992 through 1994 and two were not sampled. Of the 12 outfalls sampled, outfall 183 did not have any analyses for total cyanide. Outfall 183 has been eliminated and is no longer discharging. All the outfalls were covered under both the current and former permit conditons.

Table X-2 lists the discharge limits for total cyanide and total silver. Also, the pH shall not be less than 6.0 standard units nor greater than 9.0 standard units. When the Laboratory's permit was issued on August 1, 1994, the discharge limit for total cyanide was eliminated.

The current permit conditions include discharge limits for fourteen additional water quality parameters. The water samples are required to be analyzed for these fourteen parameters once per year. The sampling and analyses for the fourteen additional parameters were performed during calendar year 1995.

Table X-3 lists the exceedances of the discharge limits. There were four exceedances of the daily maximum discharge limit for total cyanide. Two occurred during 1992 for outfalls 123 and 132; one occurred during 1993 for outfall 74; and one occurred during 1994 for outfall 123.

Table X-4 lists the summary statistics by year for the three year period of 1992 through 1994. Figures X-1 through X-4 illustrate the same information through bar charts. Discharge category 6A was sampled approximately weekly. Some outfalls were sampled more frequently than others. The discharge concentrations tended to be lowest during 1993. The total number of samples collected was highest during 1993 and lowest during 1994.

Table X-5 lists the summary statistics by quarter for 1994. Figures X-5 through X-8 illustrate the same information through bar charts. There were no overall trends in the the discharge concentration data. There was a decreasing trend in the total number of samples collected during the year.

Table X-1
Discharge Category 6A Outfalls

Outfall Number	Covered Under Former Permit Conditions	Covered Under Current Permit Conditions	Data Available for 1992-1994	Comments
73	Yes	Yes	Yes	
74	Yes	Yes	Yes	
75	Yes	Yes	Yes	
78	Yes	Yes	Yes	
79	Yes	Yes	Yes	
80	Yes	Yes	Yes	
81	Yes	Yes	No	
82	Yes	Yes	No	
99	Yes	Yes	Yes	Only 3 analyses were performed.
100	Yes	Yes	Yes	
106	Yes	Yes	Yes	
123	Yes	Yes	Yes	
132	Yes	Yes	Yes	
183	Yes	Yes	Yes	"Eliminated; based on correspondence to EPA dated February 23, 1995. No Total Cyanide measurements. Only 2 analyses were performed."

Table X-2
Discharge Category 6A
Discharge Limitations

Permit Period	Effluent Characteristic	Daily Average	Daily Maximum	Units of Measurement
Before and Since 8-1-94	Total Silver	0.5	1.0	mg/l
Before 8-1-94	Total Cyanide	0.20	0.20	mg/l

Table X-3
Discharge Category 6A
Exceedances of Discharge Limits

Effluent Characteristic	Outfall	Date	Limit	Value	Units
Total Cyanide	123	3-20-92	Daily Maximum	0.49	mg/l
	132	12-21-92	Daily Maximum	0.46	mg/l
	74	10-6-93	Daily Maximum	0.35	mg/l
	123	3-15-94	Daily Maximum	0.37	mg/l

Table X-4
Outfall Category 6A
Summary Statistics by Year

Effluent Characteristic	Units of Measurement	Year	Number of Samples	Minimum	Average	Maximum
Total Cyanide	mg/l	1992	54	0	0.018	0.49
		1993	62	0	0.0082	0.35
		1994	33	0	0.013	0.37
Total Silver	mg/l	1992	54	0.01	0.051	0.293
		1993	58	0.01	0.027	0.263
		1994	47	0.01	0.056	0.28
pH	pH units	1992	54	6.33	7.4	8.5
		1993	58	6.8	7.6	8.6
		1994	47	6.3	7.5	8.6

Table X-5
Outfall Category 5A
Summary Statistics by Quarter for 1994

Effluent Characteristic	Units of Measurement	Quarter	Number of Samples	Minimum	Average	Maximum
Total Cyanide	mg/l	1	15	0	0.029	0.37
		2	14	0	0.0	0
		3	4	0	0.0	0
Total Silver	mg/l	1	15	0.01	0.039	0.2
		2	14	0.01	0.043	0.16
		3	11	0.01	0.10	0.28
		4	7	0.01	0.049	0.25
pH	pH units	1	15	6.7	7.7	8.6
		2	14	6.4	7.5	8.6
		3	11	6.3	7.4	8.6
		4	7	6.9	7.5	8

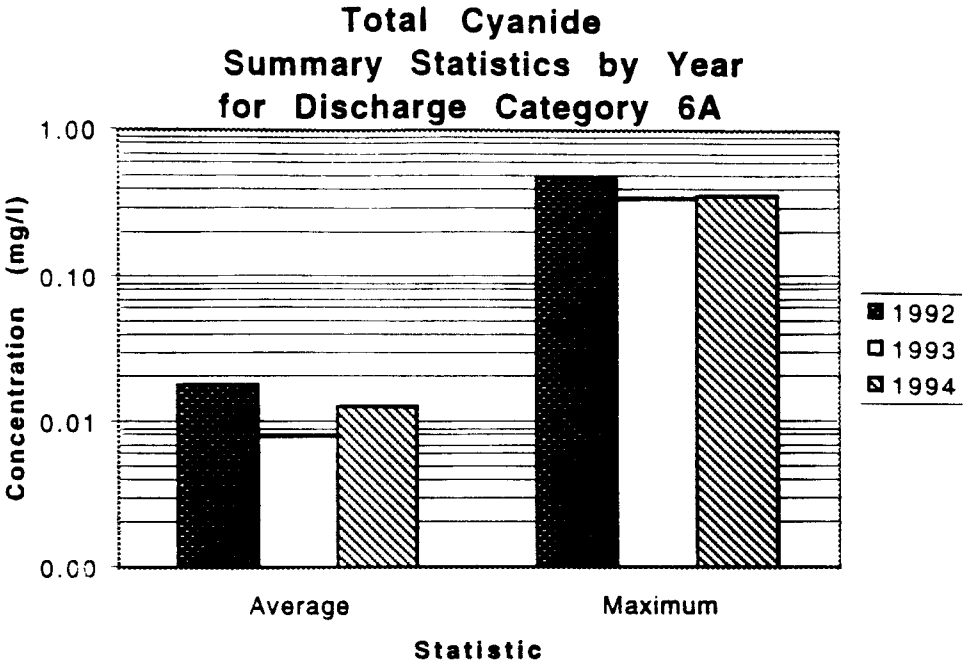
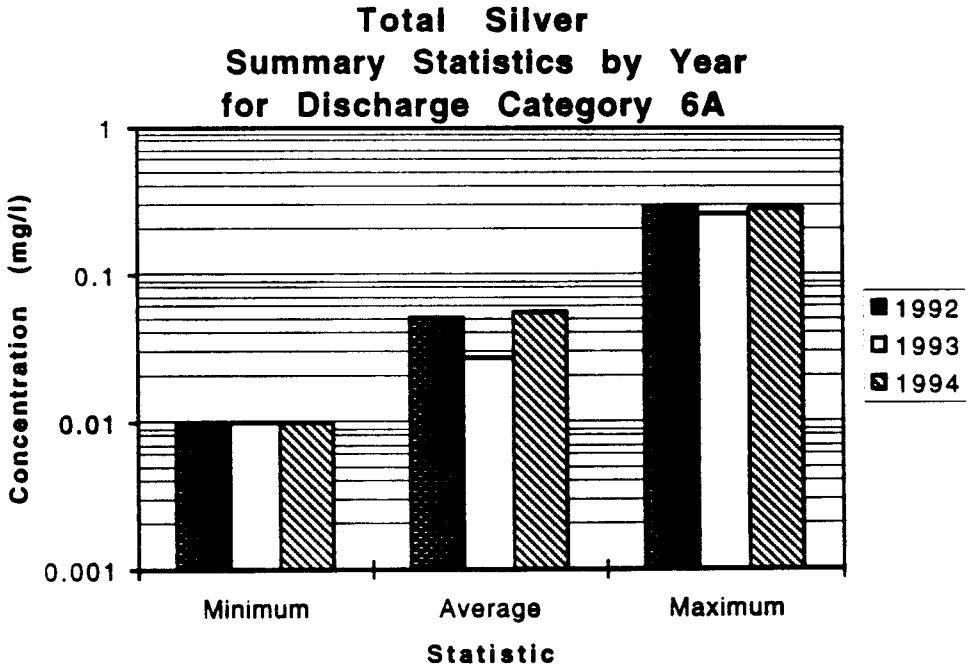


Figure X-1



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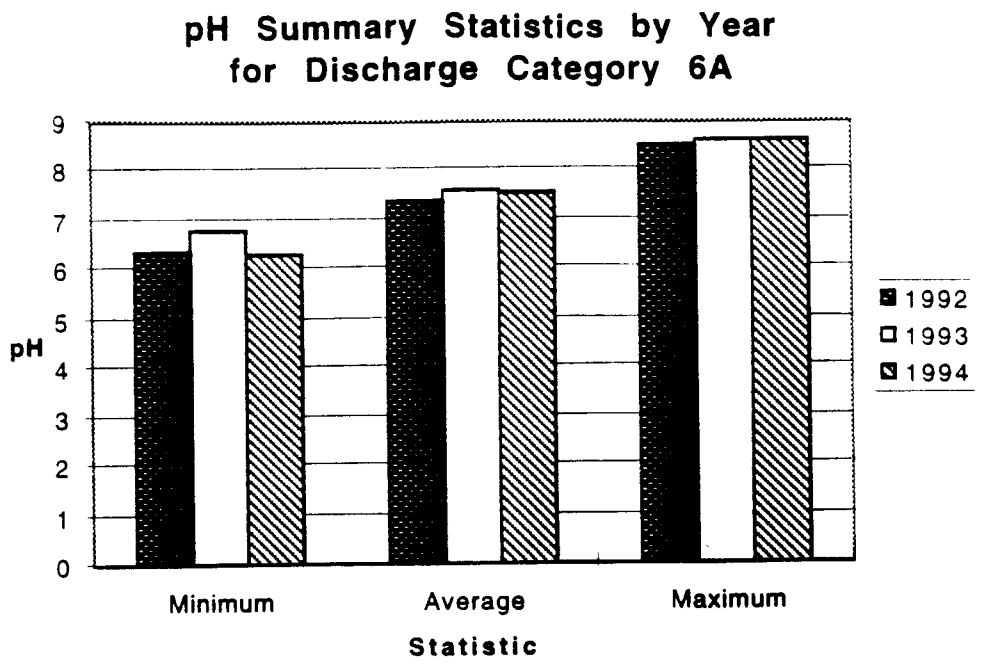

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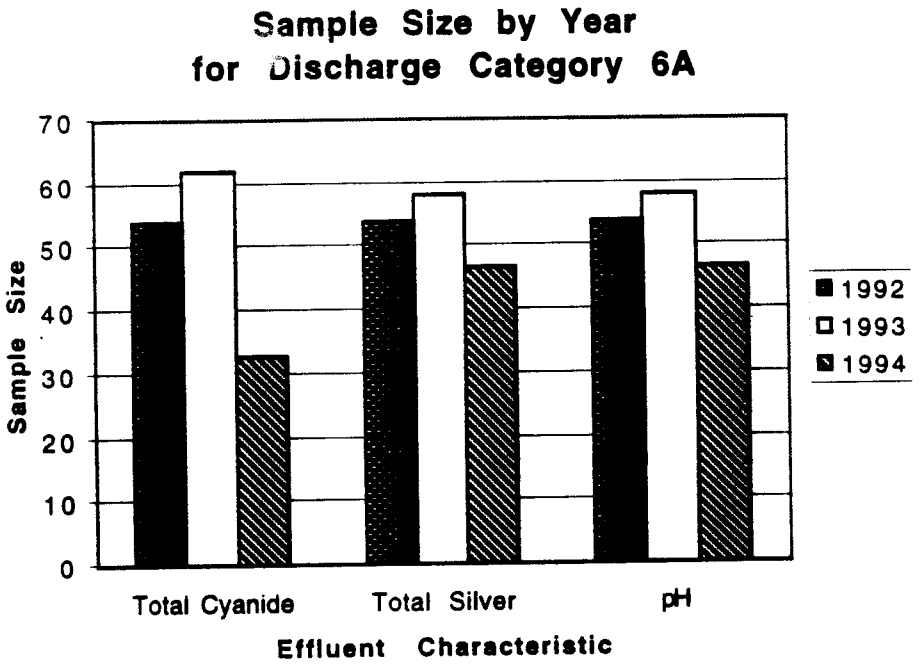

Figure X-4

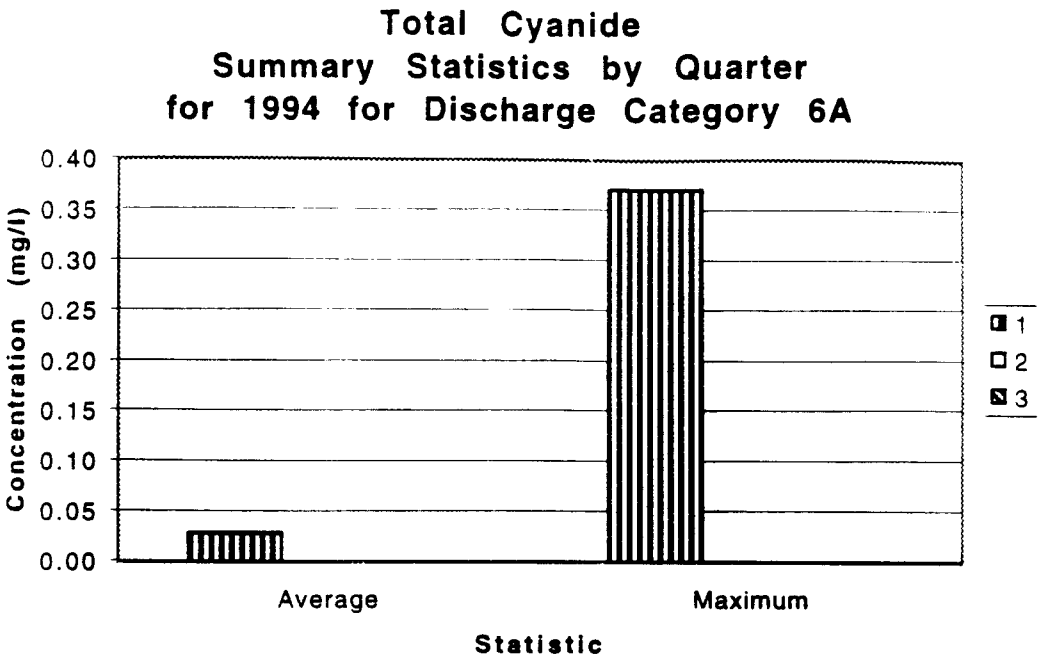

Figure X-5

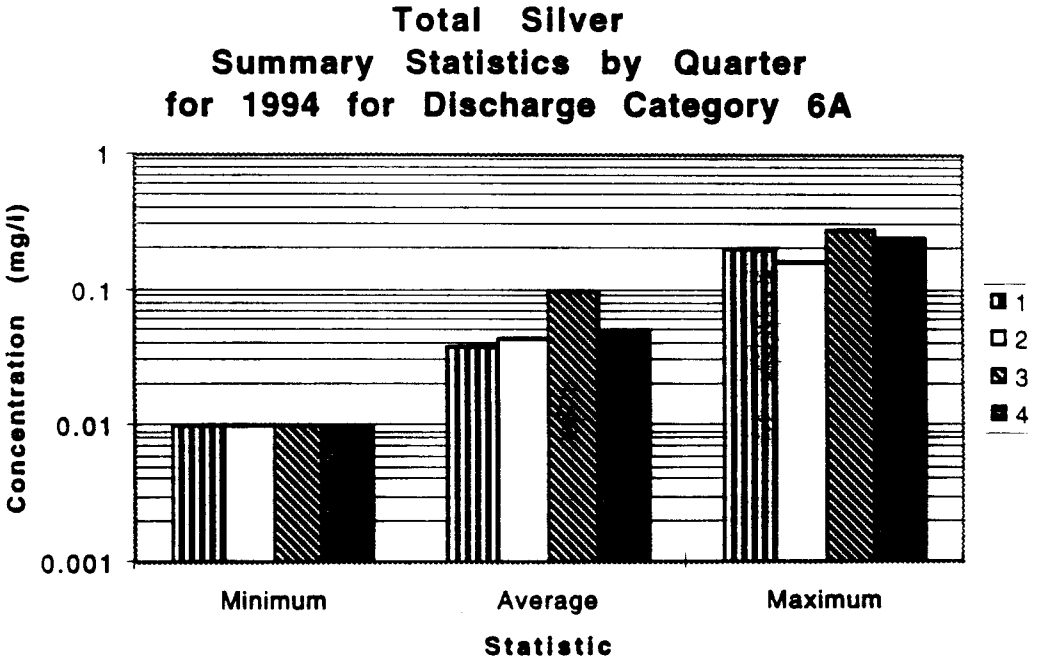

Figure X-6

pH Summary Statistics by Quarter for 1994 for Discharge Category 6A

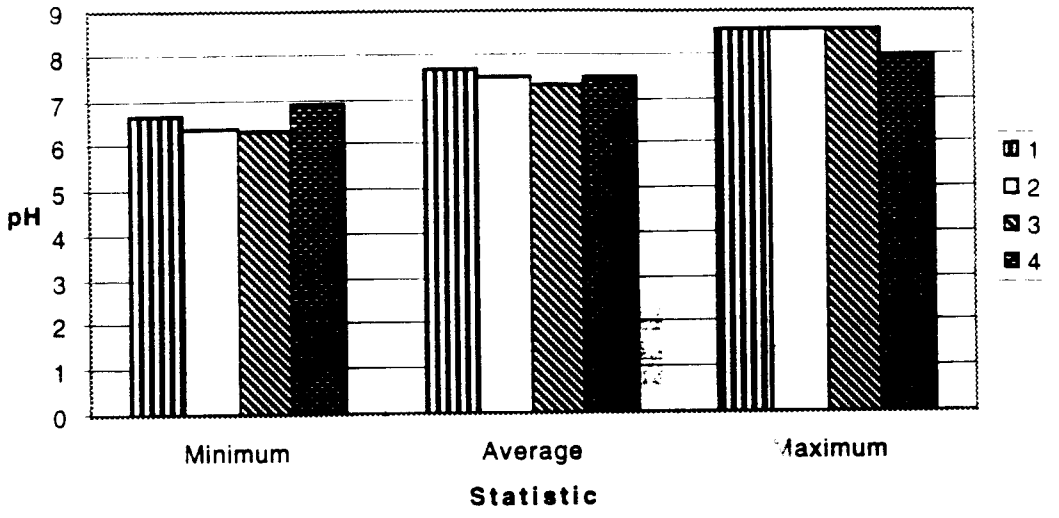

Figure X-7

Sample Size by Quarter for 1994 for Discharge Category 6A

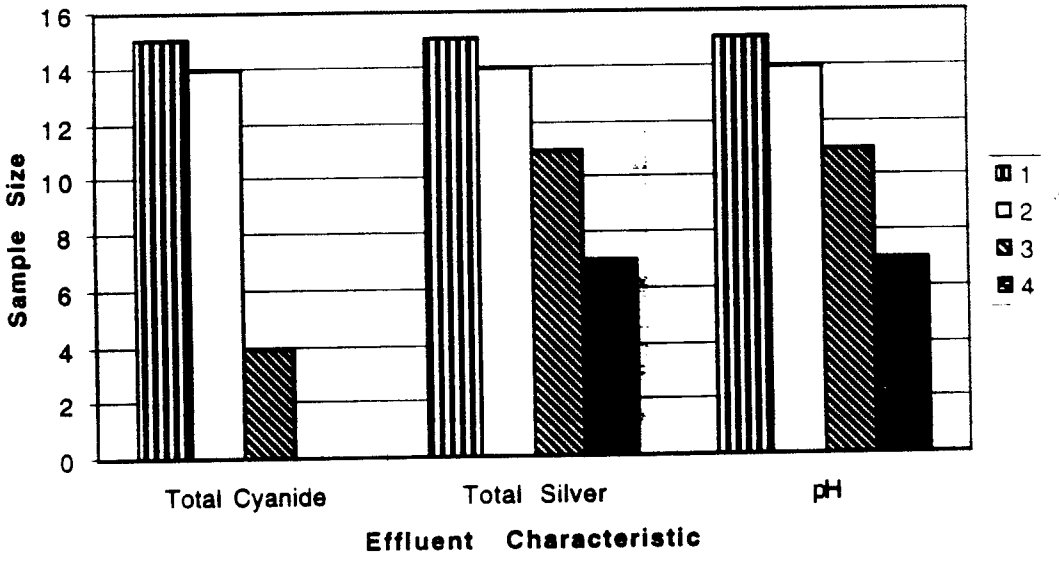

Figure X-8